



TRS RISK MANAGEMENT COMMITTEE



APRIL 2012

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

(Mr. McDonald, Committee Chair; Ms. Charleston; Mr. Colonetta; Mr. Kelly; & Mr. Moss, Committee Members)

AGENDA

April 19, 2012

TRS East Building – Room E 345

1. Consider the approval of the proposed minutes of the September 15, 2011 committee meeting – Eric McDonald.
2. Review the annual report on the Securities Lending Program – Nicholas Bonn, Joyce P. Dardonis and John K. Powell, State Street, and Mohan Balachandran.
3. Review the Investment Risk Report – Jase Auby.
4. Review trust derivatives usage – 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 a quorum of the Board may attend the Committee meeting, the meeting of the Committee is also being posted as a meeting of the Board out of an abundance of caution.

Tab 1

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Minutes of the Risk Management Committee

September 15, 2011

The Risk Management Committee of the Board of Trustees of the Teacher Retirement System of Texas met at 2:53 p.m. on September 15, 2011 in Room 345E of the TRS offices. The following committee members were present:

Eric McDonald, Chair
Karen Charleston
Joe Colonna
David Kelly
Chris Moss

A quorum of the committee was present. Others present:

Todd Barth, TRS Trustee	Terry Harris, TRS
Charlotte Clifton, TRS Trustee	Eric Lang, TRS
Anita Palmer, TRS Trustee	Jay LeBlanc, TRS
Nanette Sissney, TRS Trustee	Niger Lewis, TRS
Ken Welch, TRS	Craig McCullough, TRS
Amy Barrett, TRS	James Nield, TRS
Dr. Keith Brown, Investment Advisor	Curt Rogers, TRS
Steve Huff, Reinhart Boerner Van Deuren	Ashley Strange, TRS
Steve Voss, Hewitt Ennis Knupp	Hugh Ohn, TRS
Brady O'Connell, Hewitt Ennis Knupp	Susan Wade, TRS
Jerry Albright, TRS	Dale West, TRS
Dinah Arce, TRS	Angela Vogeli, TRS
Jase Auby, TRS	Tathata Lohachitkul, Albourne America
Patricia Cantú, TRS	

Mr. McDonald called the meeting to order at 2:53 p.m.

1. Consider the approval of the proposed minutes of the April 7, 2011 committee meeting

On a motion by Mr. Moss, seconded by Mr. Kelly, the committee approved the minutes of the April 7, 2011 meeting as presented.

2. Review the Investment Risk Report

Mr. Auby reported that for the reporting period the portfolio had been in compliance with the TRS Investment Policy Statement (IPS). He described the portfolio's asset allocation measurements. He stated that for the reporting period the portfolio was overweighted by 1% in global equity; underweighted by 1.9% in stable value; and overweighted by 0.9% in real return. Mr. Auby noted that the largest overweighting was in emerging markets, by 3.5%, which was offset mainly by a 2.3% underweight in non-US developed. He stated that the underweighting to long U.S. Treasuries had been reduced from 4.1% as of June 30, 2011 to 2.5%. Responding to a question from Mr. Colonna, Mr. Auby stated that the credit portfolio was currently overweighted because of the dislocated credit strategy, which is part of the Absolute Return

Portfolio.

Mr. Auby next discussed the portfolio's Value-at-Risk (VaR) relative to the benchmark indices. He explained VaR concepts for the new trustees. He stated that at the close of the 2nd quarter of 2011, the portfolio's VaR was 7.8%. He noted two significant jumps in VaR in the past three years. He stated that the Absolute Return Portfolio currently represents 2.9% of the portfolio's assets and contributes 1.3% of the risk in the portfolio. He stated that 76.5% of the portfolio risk as measured by VaR was from the investment in global equities, but only 61% of the portfolio is invested in this asset class. Mr. Auby stated that both long Treasuries and Treasury Inflation Protected Securities (TIPS) serve as risk diversifiers to reduce the total VaR. He noted that TIPS represents 7.8% of the portfolio and contributes only 0.1% of the risk in the portfolio. Mr. Auby also noted that hedge fund investments represent 3.9% of the portfolio's assets but contributes 1.3% of the risk in the portfolio. He noted that the new asset allocation implemented three years ago had significantly increased the dollar amount invested in the Real Assets Portfolio. He responded to Mr. Colonna that the long-term allocation target is to increase the allocation to the Real Assets Portfolio from 8% to 15%. Responding to a question from Mr. Kelly about measuring the risk embedded in illiquid assets, Mr. Auby stated that TRS uses the REITs index, which is the industry standard. He noted that the REITs index tends to overstate the risk of REITs, which is relatively more leveraged than the real assets that the fund invests in. He stated that staff uses the Russell 3000 index for private equity, which is also relatively riskier than TRS' actual investments. He stated that staff was focusing on finding an alternative index better than the industry standard. Responding to a question from Mr. McDonald regarding using statistical measures to measure risks, Mr. Auby commented that statistical measures are helpful in looking at relative risks but risk measurement cannot rely on statistical measures alone. Mr. Auby presented the relative VaR for global equity, stable value, and real return. He reported that the VaR for the total fund is 0.1%, which is mainly because of the overweighting in the global equity – the riskiest asset.

Mr. Auby compared the actual tracking error level of each asset class to the relevant policy requirement. He stated that the current forecast of the portfolio's tracking error is 150 basis points, and that the three-year realized tracking error of the portfolio had been 183 basis points. He stated that most of the tracking errors were aligned with the policy neutrals. He noted that the three-year realized tracking error for hedge funds was 693 basis points, higher than the 400 basis points forecast, which reflected the global markets crisis in 2008. He stated that the realized tracking error would have been 333 basis points if the market crisis were removed from the calculation. Responding to a question from Dr. Brown what the tracking error would have been if the HFRI conservative index had been used as the benchmark, Mr. Auby said that it would have been lower than the error calculated using LIBOR plus 200 basis points, which the portfolio currently uses. Mr. Auby also explained for the new trustees the concepts of tracking error and information ratio. Based on an audit recommendation, Mr. Auby said that a one-page tracking error report had been included in the risk report to present a holistic view of the overall fund's tracking error. He noted that the report does not include private assets due to the lack of transparency of their benchmarks. He also noted that the high tracking error (744 bps) in commodities was caused by the gold fund, which is measured relative to the GSCI, the general commodities index.

Mr. Auby discussed the portfolio's leverage. He noted that the stated total trust leverage excludes securities lending, which is presented separately to avoid losing the detail of the total trust leverage because the securities lending leverage has a much higher number. He stated that the hedge fund and real estate portfolios' leverage were currently within their normal range and that the strategic partners leverage was at 166%, which has been quite stable through time.

Mr. Auby next described the counterparty exposure of the portfolio. He stated that the portfolio's current counterparty exposure was \$63 million. He noted that staff plans to propose inclusion of the four types of currency risk under the counterparty exposure section in its future reports. He reported that the total portfolio's swap exposure was 6.6%, futures exposure was 8.1%, and currency forward swaps exposure was 4.9%. He confirmed for Mr. Kelly that all exposures are in notional amounts. Mr. Auby recapped that the investment exposures were in compliance with the Investment Policy Statement and the trust's overall VaR remained stable by comparison to the first quarter of 2011.

3. Review the TRS Bubble Monitoring System

Mr. Nield presented the new bubble monitoring system that is used to identify investment bubbles. He stated that the objective is to systematically monitor asset classes to identify abnormal price behavior and report that finding. He cited historical bubbles to describe the three phases of a bubble: birth, sustenance, and bursting.

Mr. Nield provided an overview of the system. He stated that the system was developed based on internal research and input from TRS' external partners. He explained that the system reviews 100 different assets across six different asset classes and uses a systematic process across all assets. He explained three factors that are used to screen for potential bubbles: rolling 7 year Z score of prices, which analyzes price differences over the past seven years; changes in correlation to a benchmark; and absolute change from lowest price. Responding to a question from Mr. Kelly, Mr. Nield stated that the benchmark consists of different asset classes, which is intended to track the investable universe against everything else. He noted that it is difficult to systematically take advantage of bubbles. He presented a sample report of the most recent bubble monitor from August 2011, which depicts a silver bubble and a gold bubble signal. He explained that silver currently has the highest 7 years Z score (3.2) and is also one of the top absolute changes from lowest price. He stated that German equities top the list of correction changes. He confirmed for Mr. McDonald that a signal will be generated if only one of the three factors is triggered.

Mr. Nield presented historical bubble signals indicated by market trends. He highlighted the clusters of bubbles reflected in 2000 and 2005 through 2008 and noted that bubble signals can persist for a long time, although the duration is hard to predict. Mr. Nield responded to Mr. Moss that the monitor generates a list of 100 different assets that it tracks and ranks them according to their bubble score. He presented the actual bubbles observed over time. He clarified for Dr. Brown that the actual bubble is measured by a decline of 50% or more within a three-year period but he confirmed that the three-stemmed deviation event on a seven-year average was one of the key criteria to reflect an actual bubble. Responding to a question from Dr. Brown regarding how the monitor distinguishes a paradigm shift from an abnormal occurrence, Mr. Nield stated that the monitor does not distinguish between the two but only looks at the price change; and whether it is a paradigm shift or a bubble, it will generate the same signal. To distinguish the two, he said, will require human intervention. Concerning the accuracy of the monitoring system, Mr. Nield stated that roughly 30% of the signals generated were associated with an actual bubble. He noted that signals that prove not to be associated with an actual bubble still provide valuable information because those signals tend to outperform; and once that signal ends, they tend to underperform over the next one- to three-year time frame. He stated that external research also indicates that assets that generate a bubble signal experience increased volatility, which also assists staff in making investment decisions.

Mr. Nield discussed the actions taken based on the signals generated by the monitor. He stated that staff communicates any signals throughout the investment division so that the appropriate portfolio managers can incorporate the signals into their decision process. He stated that staff tries to minimize the negative impact of any potential bubbles and take action to preserve the capital of the TRS fund, whenever appropriate. For example, he said, in the case of gold, there is a trailing stop loss on that position at this time based on the signal that is being generated. Responding to a question from Mr. Kelly regarding the gain generated in the position to support a trailing stop loss on the gold's position, Mr. Nield responded that it was about 30% year-to-date. There was a further discussion relating to the Gold Portfolio and its current status. Mr. Auby stated that staff is actively monitoring and preserving the gain.

There being no other matters to discuss, Mr. McDonald adjourned the meeting at 3:42 p.m.

APPROVED BY THE **RISK MANAGEMENT COMMITTEE**
OF THE BOARD OF TRUSTEES OF THE TEACHER RETIREMENT SYSTEM OF TEXAS
ON THE ___ DAY OF _____, 20__.

ATTESTED BY:

Dan Junell
Secretary to the TRS Board of Trustees

Date

Tab 2

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Teacher Retirement System of Texas

State Street Securities Finance Program Review

April 19, 2012

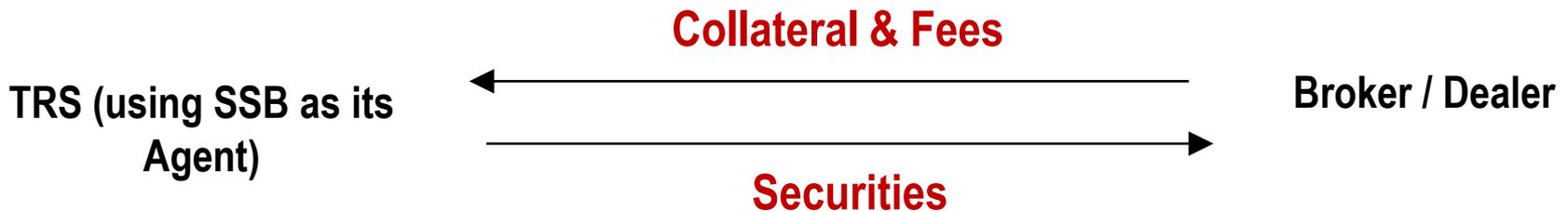
Relationship Highlights

- **Lending with State Street since September 2002**
- **Since inception TRS' earnings \$833mm (to December 31, 2011)**
- **Acceptable Forms of Collateral**
 - Cash:
 - U.S. dollars only
 - Invested in a separately managed cash collateral reinvestment pool
 - Investment guidelines reviewed annually
 - Non-Cash: U.S. Treasuries and Agencies only
- **Custom list of approved borrowers and credit limits**
- **State Street provides indemnification of borrower default**
- **State Street provides indemnification against principal loss on all repo transactions**

What is Securities Lending?

Securities Lending is where a client (TRS) generates revenue by having an agent (SSB) temporarily transfer their securities held in custody to a borrower (Broker/Dealer or Bank).

- I. The transaction, in the form of a loan, is typically collateralized with cash (102% for US securities and 105% for Non US Equity securities)
- II. Cash Collateral received from the Borrower is then invested in short-term, high quality money market like instruments by SSB
- III. At the end of the loan, the securities are then returned to SSB versus the cash collateral
- IV. The Borrower also typically receives a portion of the interest earned off the cash investment, with the remaining interest being split between TRS and SSB as the revenue earned from the loan
- V. If Non-cash Collateral was used against the loan, then a straight fee is collected from the Borrower by SSB. TRS and SSB then split the amount collected.



Securities Lending Overview

Broker / Dealer		SSB as Agent for TRS
Identifies Demand for Security In Market	»	Monitors Demand for Securities in Market
Contacts Lending Agent and Negotiates Loan fee	»	Loans Security to Broker/Dealer after Negotiating Loan fee
Provides either Cash Collateral or Non-Cash Collateral (102% vs US securities, 105% vs Non US Equity securities)	»	Invests Cash Collateral (to generate a spread) or accepts Non-Cash Collateral
Performs Daily Mark to Market to Maintain Collateral Levels	»	Performs Daily Mark to Market to Maintain Collateral Levels
At close of loan; Receives either a portion of the interest earned by the Agent from its cash collateral (a rebate) or pays a fee if it used non-cash collateral	»	At close of loan; TRS & SSB Receives difference between invested collateral interest and interest paid back to the Broker/Dealer or receives a fee if non-cash collateral was used TRS and SSB split the proceeds 74/26

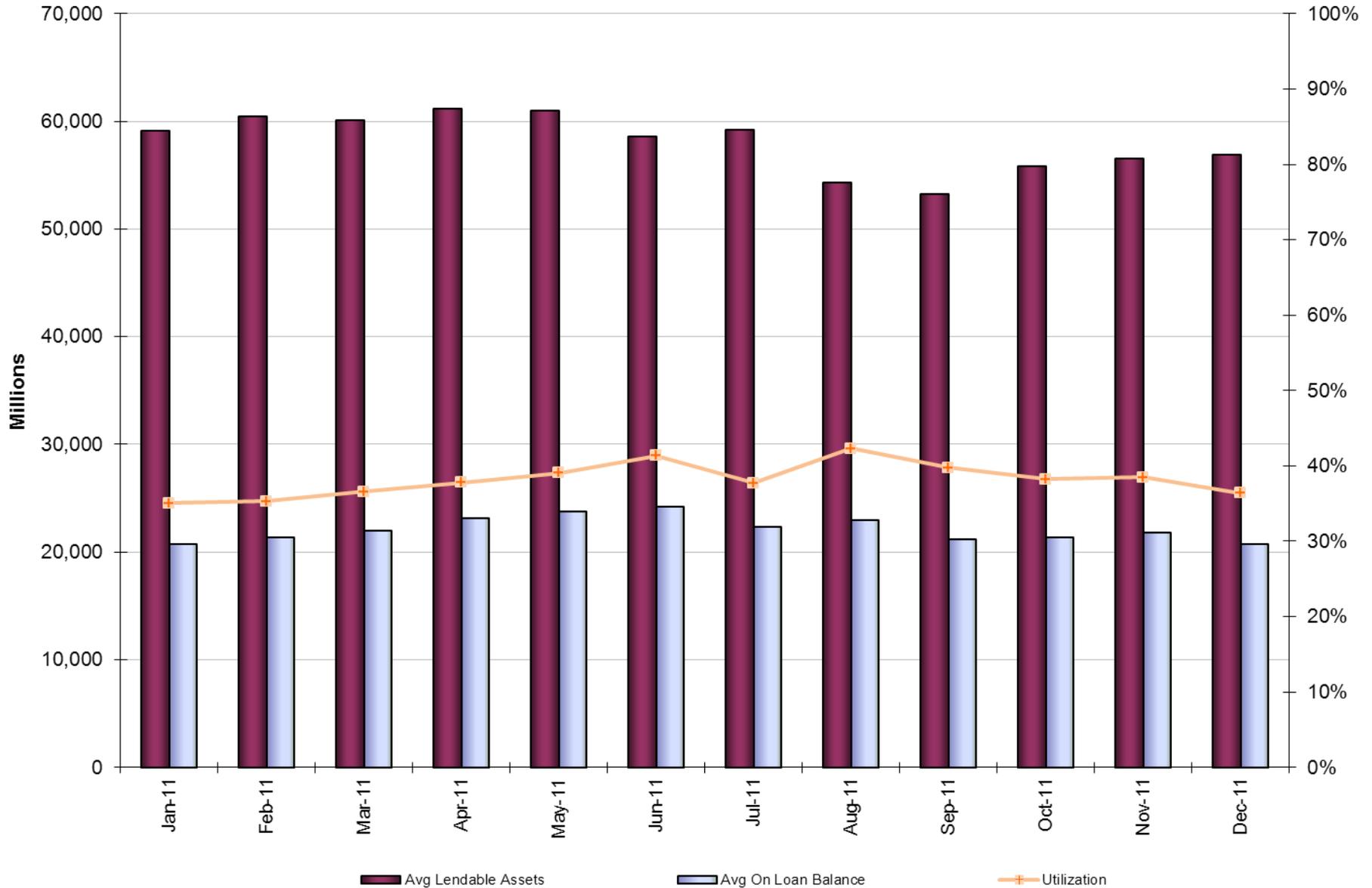
TRS Securities Lending Fiscal Performance Review

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012**
Average Lendable Assets (\$) (mm)	79,842,380,042	88,014,620,090	73,735,235,035	54,721,547,700	61,146,301,046	60,161,750,082	57,021,252,021
Average On-Loan Balance (\$) (mm)	11,606,875,557	15,987,725,000	22,711,620,992	20,816,320,870	26,481,220,409	22,800,322,555	21,415,200,425
Average Utilization	14.5%	18.2%	30.8%	38.0%	43.3%	37.8%	37.0%
Earnings by Program (mm)							
US Equity (\$)	10,389,044	17,004,380	87,126,911	87,700,217	33,734,369	18,842,788	10,575,266
US Corporate Fixed (\$)	460,292	563,532	3,549,185	1,557,706	263,023	166,792	37,685
US Treasury Debt (\$)	8,917,199	9,974,250	80,019,810	113,350,180	56,720,500	43,635,066	21,750,295
US Agency Debt (\$)	162,062	843,520	5,048,970	8,674	=	0	149
Non-US Equity (\$)	13,523,155	15,912,510	37,334,378	37,408,190	15,435,352	15,517,385	6,705,483
Non-US Fixed Income (\$)	=	39,120	228,950	482,085	=	=	=
Total (\$) (mm)	\$ 33,451,335	\$ 44,337,488	\$ 213,302,734	\$ 240,512,498	\$ 106,154,050	\$ 78,162,012	\$ 39,068,324
Components of Spread *							
Demand Spread (bps)	3130	2628	3538	1510	8.8	7.8	8.8
Reinvestment Spread (bps)	0.6	4.4	7070	13038	3830	3488	4846
Net Spread (bps)	3132	3036	10508	14548	4740	4244	5699
Return vs. Lendable Assets (bps)	4.2	5.0	2820	4440	1717	1310	1616

*Risk-free rate is Fed Funds Open. All spreads are annualized.

**FY 2012 - Sep 2010 though Jan 2011

Lendable Asset & Utilization Trends



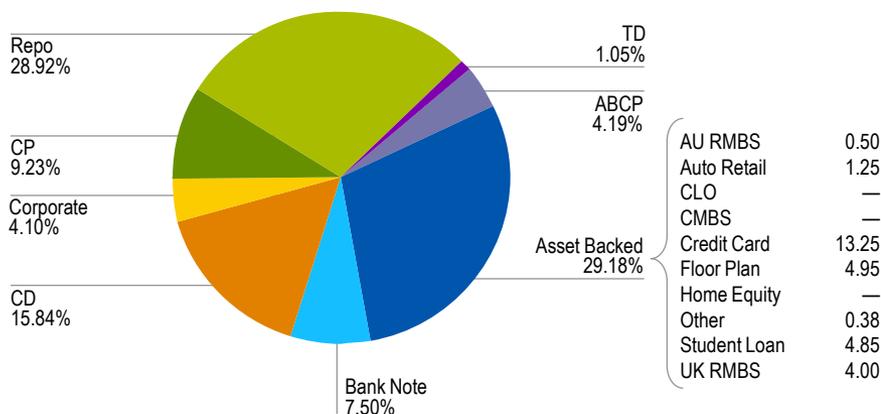
Teacher Retirement System of Texas

FC48 — Teacher Retirement System of Texas Summary Characteristics

As of December 31, 2011	
1-Day Yield (360 Basis)	0.61%
Shares Outstanding	21,721,610,662.63
Floating Rate %	74.21
% Foreign Issuers	27.43
WAM	23.88
WAM to Call	23.88
Call v. Mat Spread	—
% Callables	0.00%
Avg Life -Expected Maturity	177.41
Fund Price as of 12/31/11	100.0082
Number of Holdings	128

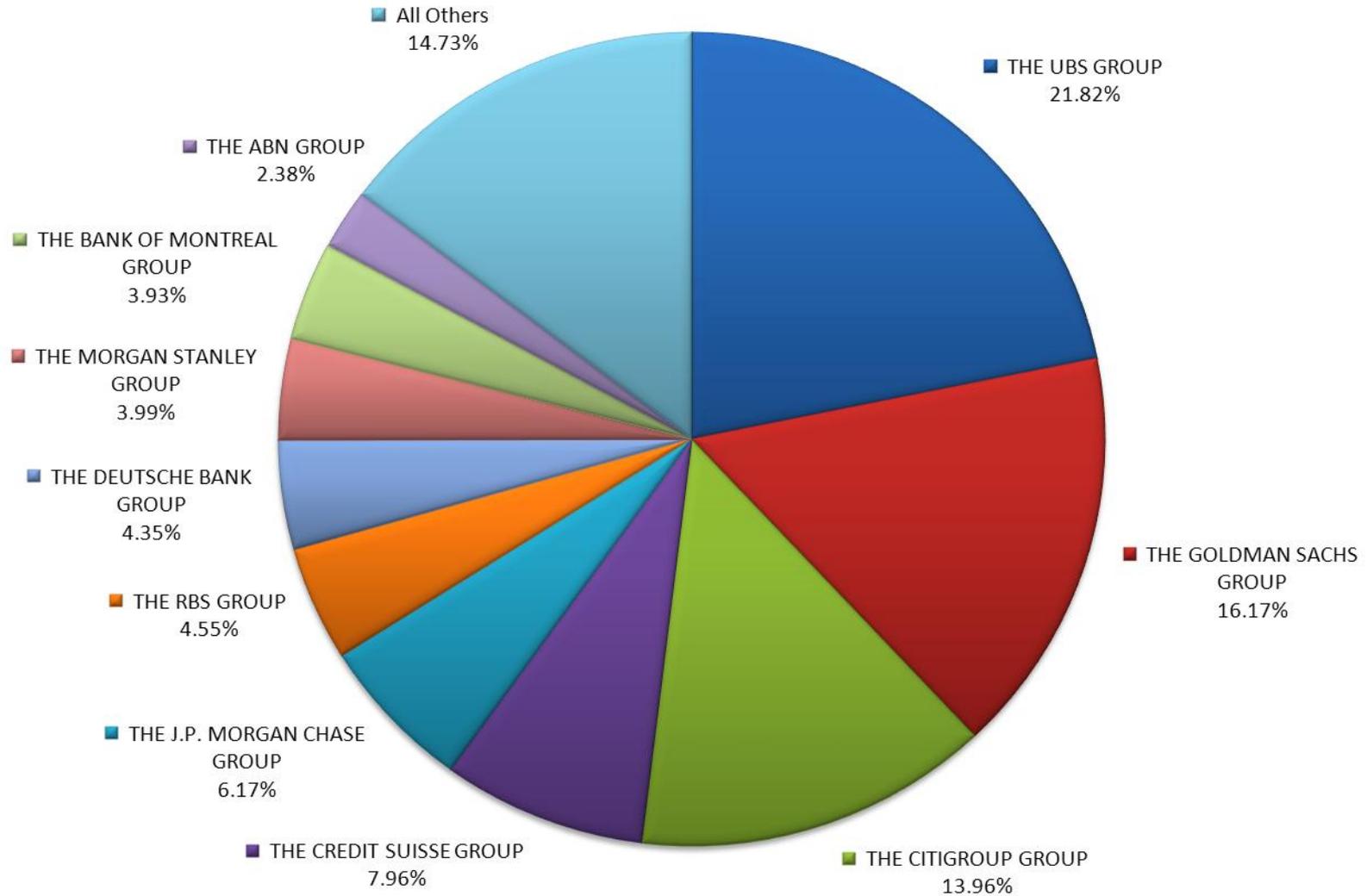
Credit Quality Breakdown	
LONG-TERM RATINGS	% OF FUND
AAA	24.43
AA	21.92
A	2.43
BBB+	—
BBB	—
BBB-	—
BB+	—
BB	—
BB-	—
SHORT-TERM RATINGS	% OF FUND
A-1+/P-1	10.88
A-1/P-1	39.21
SPLIT	—
OTHER	1.11

Floating Index Breakdown	
	% of Fund
FED FUNDS	17.06
1MO LIBOR	31.61
3 MOS LIBOR	25.54
PRIME	—
Reset Buckets	% of Fund
Next Business Day	19.56
2-7 Days	5.94
8-31 Days	32.06
1-2 Months	11.31
2-3 Months	5.33
Maturity Buckets	% of Fund
Next Business Day	4.16
1 WEEK LIQUIDITY	9.68
2-30 Days Liquidity	25.45
31-60 Days Liquidity	15.80
61-90 Days Liquidity	4.19
90 DAY LIQUIDITY	49.60
91-120 Days Liquidity	11.97
121-150 Days Liquidity	3.45
151-180 Days Liquidity	0.74
181-270 Days Liquidity	8.97
271-360 Days Liquidity	7.03
12-15 Month Liquidity	2.32
15-18 Month Liquidity	7.22
18-21 Month Liquidity	2.10
21-24 Month Liquidity	2.56
Greater than 2 Year Liquidity	4.04
Repo Collateral	% of Fund
Treasuries	—
Agencies	—
Agency MBS	—
Money Markets	—
Corporates	14.39
Asset-Backed	0.92
Equities	13.61



The fund does not hold any SIV's, CDO's, or Extendible Liquidity Note securities. Ratings are Standard and Poor's. The designation "Other" under Credit Quality Breakdown refers to Long Term Ratings below BB— and Short Term Ratings below A-1/P-1. Characteristics are as of the date indicated, are subject to change, and should not be relied upon as current thereafter. **This material is for SSgA Client use only.** All data sourced by SSgA unless stated otherwise. Past performance is not a guarantee of future results. This material is for your private information. The views expressed are the views of State Street Global Advisors only through the period noted herein and are subject to change based on market and other conditions. Sector information/security type is an internal characterization created and applied by SSgA analysts for internal surveillance based on market convention and security characteristics. Sector information/security type designations may vary according to analyst or security characteristics, and they should not be construed as formal statements or interpretations of asset classes or sectors. All views may be impacted by the present market environment and risks including downgrades, extension risk, volatility, deviations from expected performance or other risks. This information is based on our internal research and third party sources. We make no representations or assurances that the information is complete or accurate, or that the underlying securities will perform as originally anticipated. The information we provide does not constitute investment advice and it should not be relied on as such. It should not be considered a solicitation to buy or an offer to sell a security. It does not take into account any investor's particular investment objectives, strategies, tax status or investment horizon. We encourage you to consult your tax or financial advisor. All material has been obtained from sources believed to be reliable, but its accuracy is not guaranteed. There is no representation or warranty as to the current accuracy of, nor liability for, decisions based on such information. This document contains certain statements that may be deemed forward-looking statements. These statements are based on certain assumptions and analyses made by SSgA in light of its experience and perception of historical trends, current conditions, expected future developments and other factors it believes appropriate in the circumstances. All information is subject to change without notice.

Borrowers as of December 31, 2011



All Borrowers as of December 31, 2011

Borrower Org Legal Name	Dly Mkt Value on Loan	% of Total	Credit Limit	% of Credit Utilized
THE UBS GROUP	4,452,390,058	21.82%	5,500,000,000	81%
THE GOLDMAN SACHS GROUP	3,298,950,871	16.17%	6,000,000,000	55%
THE CITIGROUP GROUP	2,847,943,636	13.96%	5,500,000,000	52%
THE CREDIT SUISSE GROUP	1,624,894,823	7.96%	5,000,000,000	32%
THE J.P. MORGAN CHASE GROUP	1,258,578,438	6.17%	5,000,000,000	25%
THE RBS GROUP	928,029,644	4.55%	5,000,000,000	19%
THE DEUTSCHE BANK GROUP	888,114,115	4.35%	5,000,000,000	18%
THE MORGAN STANLEY GROUP	813,815,691	3.99%	6,000,000,000	14%
THE BANK OF MONTREAL GROUP	802,357,048	3.93%	1,500,000,000	53%
THE ABN GROUP	485,304,104	2.38%	1,000,000,000	49%
THE BNP PARIBAS GROUP	480,772,107	2.36%	5,500,000,000	9%
THE HSBC GROUP	455,297,616	2.23%	1,000,000,000	46%
THE BANK OF AMERICA GROUP	442,719,055	2.17%	5,000,000,000	9%
THE BARCLAYS GROUP	377,584,033	1.85%	5,500,000,000	7%
THE SOCIETE GENERALE GROUP	371,271,996	1.82%	3,500,000,000	11%
THE MIZUHO GROUP	176,292,649	0.86%	500,000,000	35%
THE SEB GROUP	121,433,829	0.60%	1,000,000,000	12%
THE NOMURA GROUP	120,011,558	0.59%	1,000,000,000	12%
THE CITADEL GROUP	84,040,777	0.41%	500,000,000	17%
THE JEFFRIES GROUP	82,199,667	0.40%	1,000,000,000	8%
THE BLEICHROEDER GROUP	58,296,461	0.29%	250,000,000	23%
THE FIDELITY GROUP	44,355,903	0.22%	1,000,000,000	4%
KNIGHT EXECUTION & CLEARING SERVICES, LLC	29,266,515	0.14%	500,000,000	6%
THE MACQUARIE GROUP	28,496,317	0.14%	500,000,000	6%
THE TD GROUP	27,217,996	0.13%	1,000,000,000	3%
THE RBC GROUP	23,970,083	0.12%	1,000,000,000	2%
THE ING GROUP	19,249,767	0.09%	3,500,000,000	1%
THE COMMERZBANK A G GROUP	14,218,921	0.07%	500,000,000	3%
THE DAIWA GROUP	13,400,062	0.07%	1,000,000,000	1%
THE NEWEDGE GROUP	9,744,098	0.05%	500,000,000	2%
THE WELLS FARGO GROUP	7,966,209	0.04%	500,000,000	2%
THE MAPLE GROUP	7,783,888	0.04%	250,000,000	3%
THE HBK GROUP	4,118,150	0.02%	500,000,000	1%
THE RAYMOND JAMES GROUP	3,350,801	0.02%	250,000,000	1%
THE CREDIT AGRICOLE GROUP	2,380,816	0.01%	250,000,000	1%
THE AXA GROUP	384,032	0.00%	250,000,000	0%
THE CIBC GROUP	-	0.00%	1,000,000,000	0%
THE BANCA IMI GROUP	-	0.00%	500,000,000	0%
Mitsubishi UFJ Financial Group Inc	-	0.00%	500,000,000	0%
THE SCOTIA GROUP	-	0.00%	500,000,000	0%
CANTOR FITZGERALD L.P	-	0.00%	250,000,000	0%
Summary	20,406,201,736	100%	84,500,000,000	24%

Securities Finance

Biographies

Joyce P. Dardonis
Managing Director
US Account Management - Securities Finance

Joyce P. Dardonis is a managing director in State Street's Securities Finance division and has various senior level responsibilities pertaining to our U.S. Accounts. She works with current securities lending clients to determine their unique needs and coordinates with representatives in other areas of State Street to provide their clients with opportunities and alternatives that may help them enhance their risk-adjusted returns. Ms. Dardonis has over 20 years of experience in the institutional trust, custody and securities lending business.

Prior to re-joining State Street in August 2007, Ms. Dardonis was senior vice president, head of securities lending sales for the Americas for Brown Brothers Harriman. Prior to State Street, Ms. Dardonis held various positions at Boston Safe Deposit and Trust/Mellon Trust including heading up Client Service for their not for profit client base. Ms. Dardonis received a Bachelor of Arts degree in business management/finance from Simmons College.

John K. Powell
Vice President
Relationship Manager Securities Finance

John Powell is a vice president and relationship manager within State Street's Securities Finance division. He is responsible for ensuring overall service delivery and satisfaction for U.S. lending customers and acts as the point of contact and advocate for Securities Finance-related matters. Mr. Powell has 20 years of experience in securities finance, asset-liability and investment management with roles in client service, compliance, trading, cash reinvestment and product development. Prior to joining State Street, he worked at UBS Investment Bank as the executive director and co-founder of the third-party Global Portfolio Lending Business. He was also previously employed by Paine Webber and The Boston Company.

Mr. Powell earned a Bachelor of Arts degree in political science with a corresponding minor in history from Colgate University. He holds the General Securities Representative (series 7), the State Uniform Securities Agent (series 63) and the General Securities Principal (series 24) licenses. He also successfully completed the former Boston Company's Executive Management Training Program.

Tab 3

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Investment Risk Report

Jase Auby
Chief Risk Officer
April 2012

Contents



Summary	Summary
Asset Allocation	Asset Allocation
Value at Risk	Value at Risk (VaR)
Tracking Error	Tracking Error
Leverage	Leverage
Counterparty Risks	Counterparty Risks
Derivatives	Derivatives
Conclusions	Conclusions
Appendix	Appendix

Summary



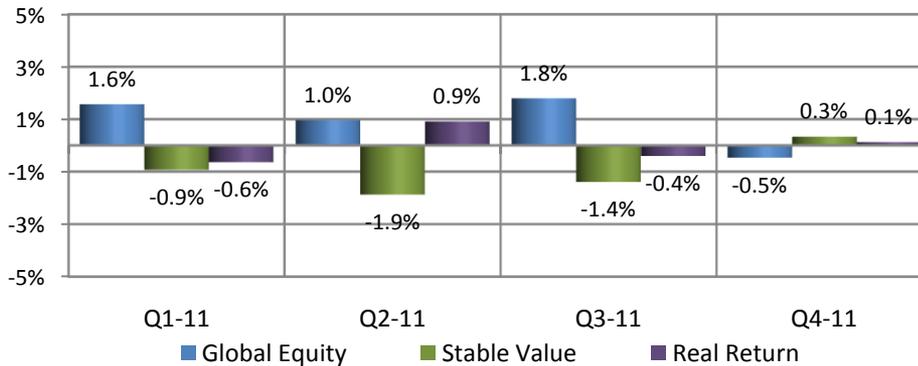
Policy Requirements	Description	In Compliance?
1. Asset Allocation	In compliance with policy	✓
2. Value at Risk (VaR)	8.2% (68% of the VaR limit range)	✓
3. Tracking Error	In compliance with policy	✓
Total Public Fund	Tracking Error 142	As % of Max 47%
		✓
4. Leverages		
Total Trust		
Net Leverage	97.7% (Within historical norm)	✓
Gross Leverage	112.4% (Increased due to change to TAA)	✓
Real Assets		
Loan to Value	49.0% (Within historical norm)	✓
Security Lending		
Net Leverage	100.4% (Within historical norm)	✓
Gross Leverage	120.1% (Within historical norm)	✓
Hedge Fund		
Net Leverage	49.6% (Within historical norm)	✓
Gross Leverage	297.0% (Within historical norm)	✓
Strategic Partner		
Net Leverage	108.7% (Within historical norm)	✓
Gross Leverage	159.9% (Within historical norm)	✓
5. Counterparty		
Exposure	In compliance with policy	✓
Rating	In compliance with policy	✓
6. Derivative Exposures	In compliance with policy	✓

Asset Allocation

Market Value % as of December 31, 2011



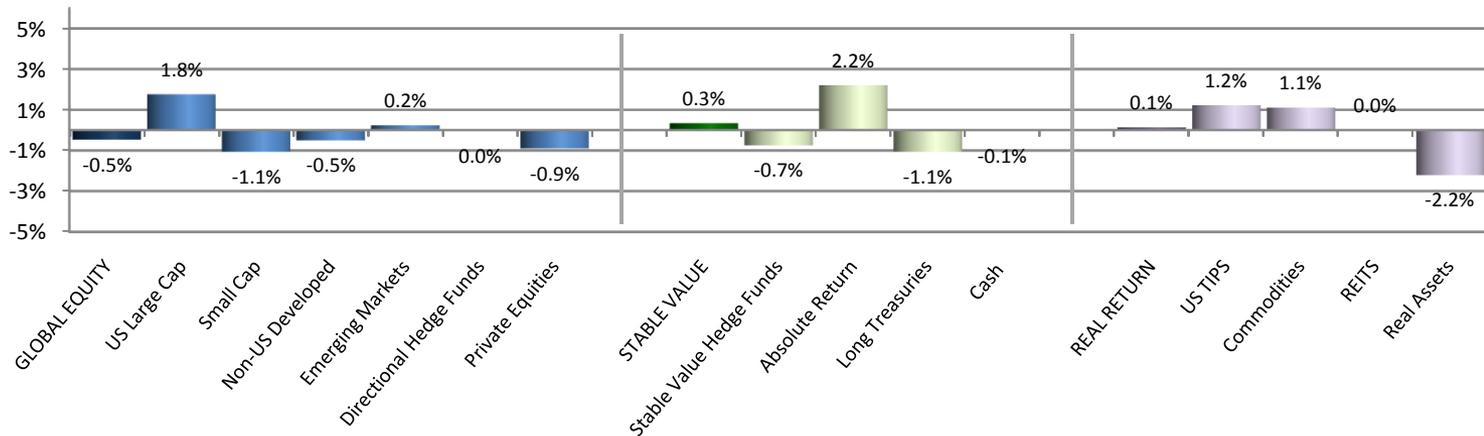
Group Active Allocation



Top Three Overweights	
Absolute Return	2.2%
US Large Cap	1.8%
US TIPS	1.2%

Top Three Underweights	
Real Assets	-2.2%
Small Cap	-1.1%
Long Treasuries	-1.1%

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



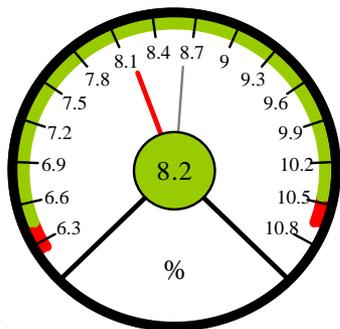
Value at Risk Analysis (VaR)

As of December 31, 2011



VaR as a Percent of Market Value

(One Month, 95% Confidence)



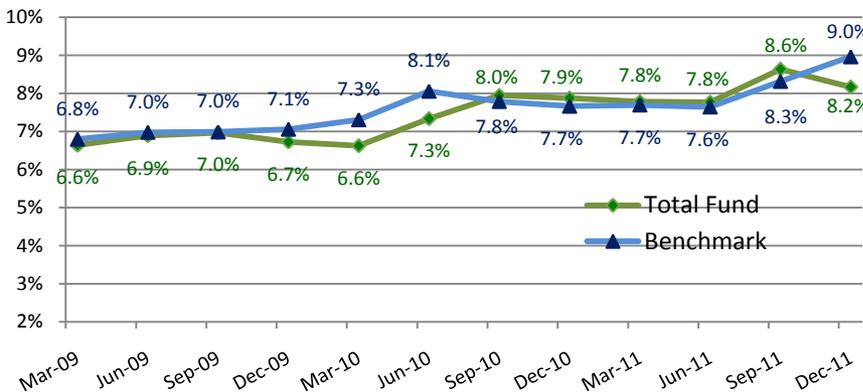
Min = 6.5%

Max = 10.4%

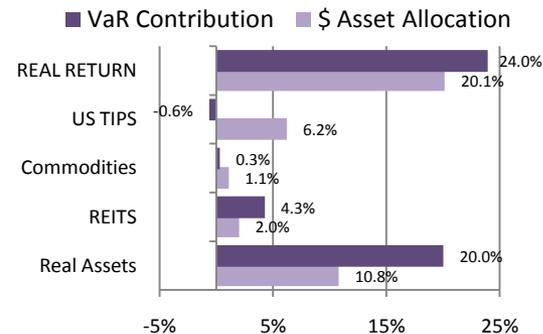
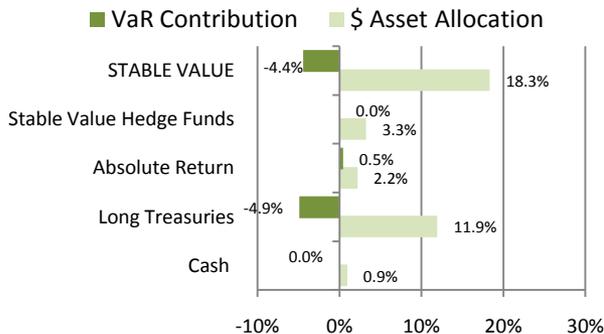
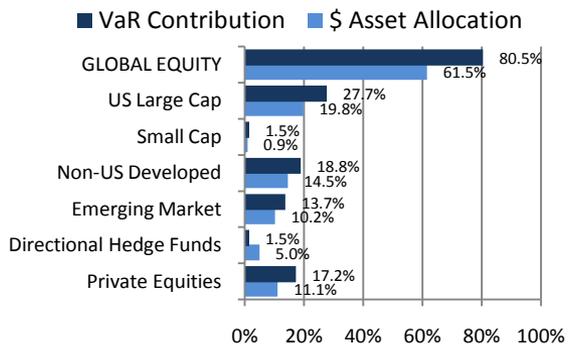
VAR is expressed as a percentage of the Fund's Market Value. Maximum and Minimum VAR values are determined by changing asset allocation of the Benchmark within the maximum and minimum ranges as outlined by the Investment Policy. The grey line represents VAR as of the prior quarter.

3 Year VaR History

(as Percent of Market Value)



VaR vs. \$ Allocation - Detail

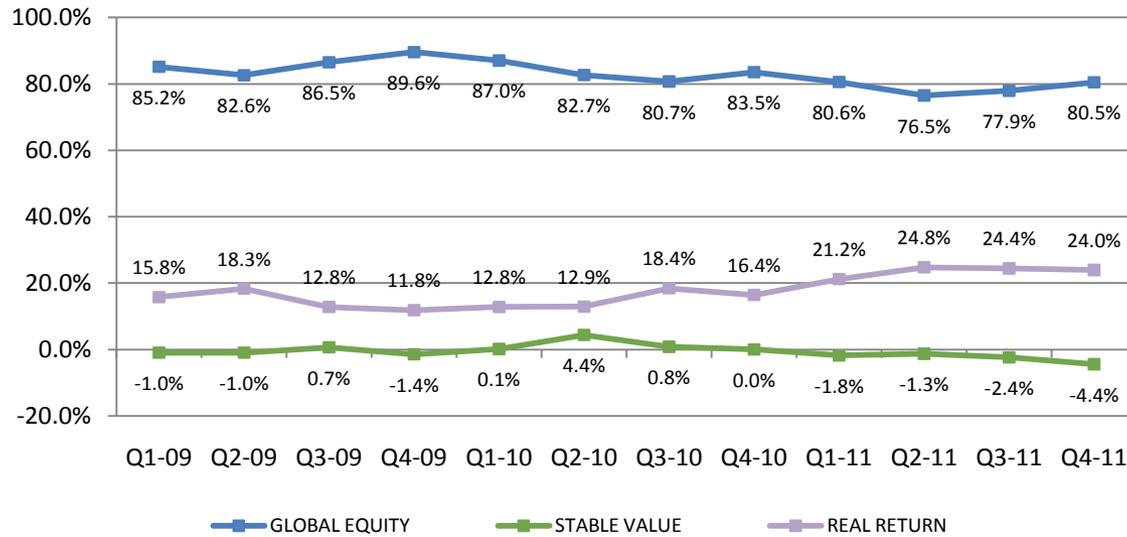


Source: State Street Bank

VaR Contribution by Asset Groups



History of VaR Contribution



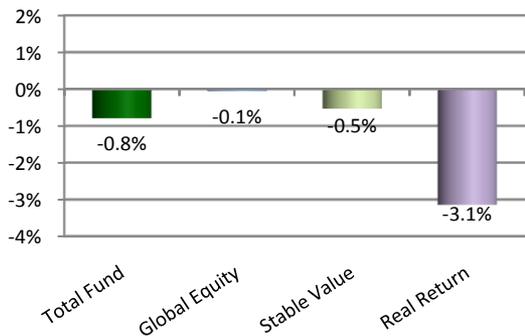
Source: State Street Bank

Relative VaR

One month, 95% Confidence

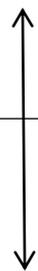


Fund & Group Level

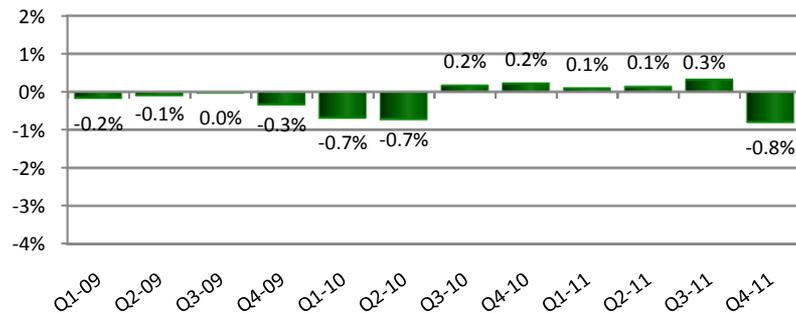


Fund More Risky than the Benchmark

Fund Less Risky than the Benchmark

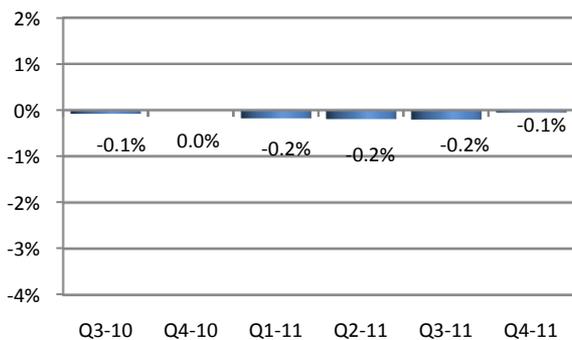


Fund Relative VaR History

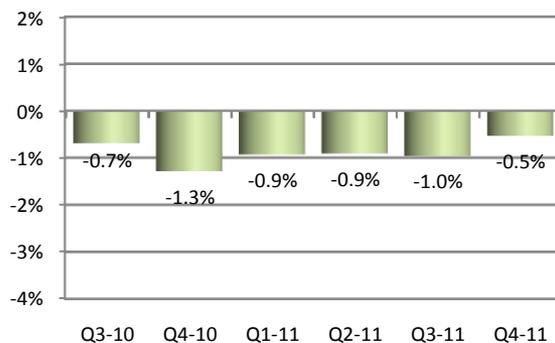


Relative risk measures the difference between the Fund's and the Benchmark's VaR. For example, the Stable Value was 0.5% less risky than the benchmark.

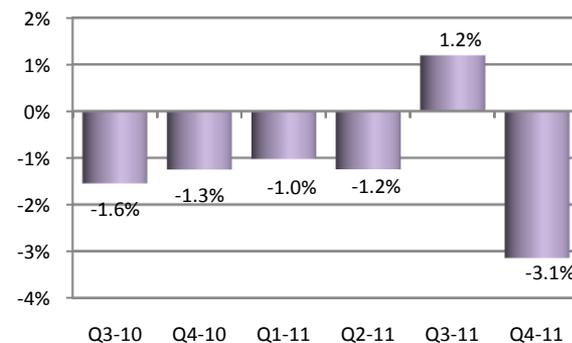
Global Equity



Stable Value



Real Return



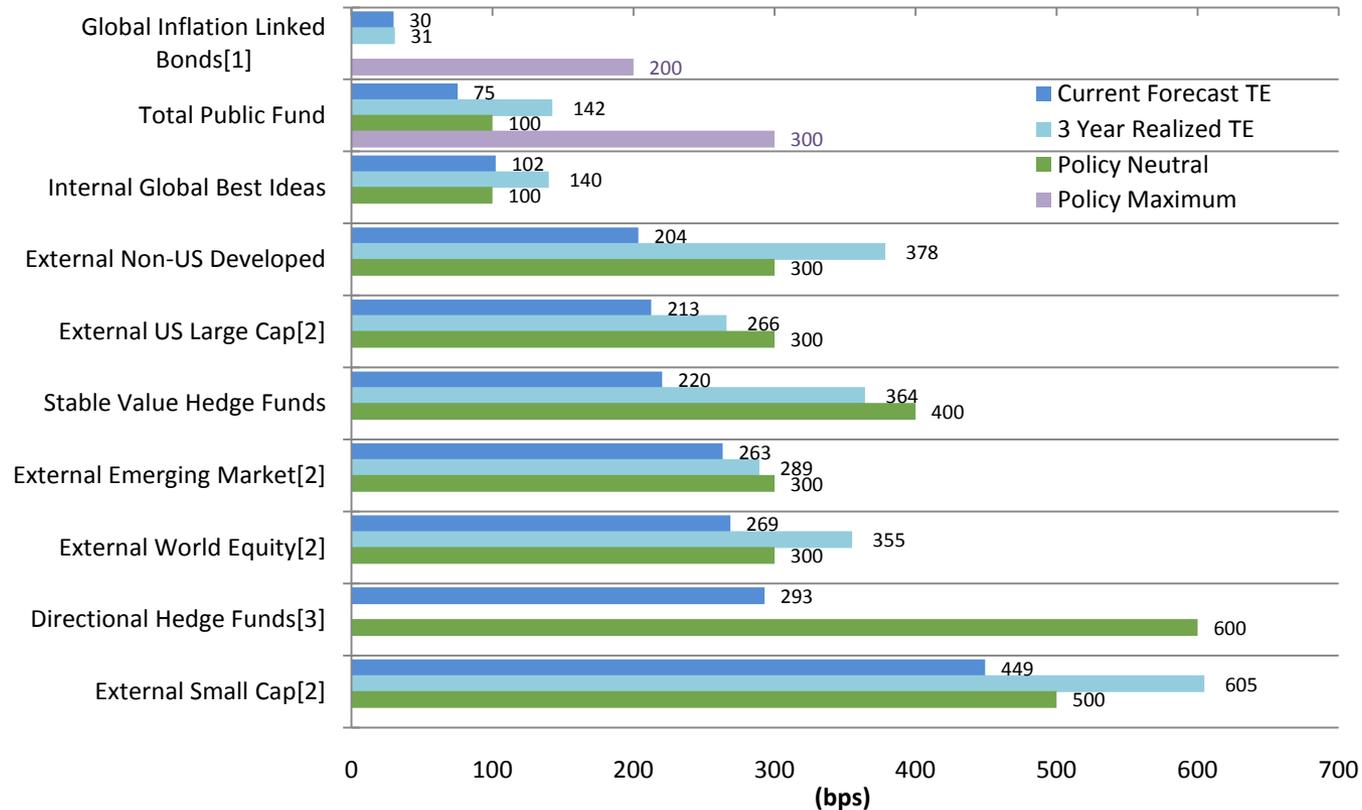
Source: State Street Bank

Policy Tracking Error

Annualized as of December 31, 2011



Actual Tracking Error Level vs. Policy Requirement



[1]: No policy neutral tracking error set for Global Inflation Linked.
 [2]: Realized tracking error was calculated with data of less than 3 years.
 [3]: Realized tracking error cannot be calculated because the short history of this portfolio.

Source: State Street Bank, TRS calculation

Tracking Error

Annualized, as of December 31, 2011



Policy Asset Class Tracking Error

Policy Assets	Market Value (Billions)	Current Forecast (bp)	3 Year Realized (bp)
US Large Cap	\$ 20.6	162	208
US Small Cap	1.0	511	235
Non-US Developed	15.1	121	177
Emerging Market	10.7	209	252
Directional Hedge Funds	5.2	293	^[1]
US Treasuries	12.4	9	114
Absolute Return	2.3	696	826
Stable Value Hedge Funds	3.4	220	364
Cash	1.0	9	211
Global Inflation Linked Bonds	6.5	30	31
Commodities	1.2	2,031	788
REITS	2.1	163	266
Total Public Assets	81.3	75	142
Private Equity	11.5	^[2]	388 ^[3]
Real Assets	11.2	^[2]	444 ^[3]
Total Private Assets	22.8	^[2]	371 ^[3]
Total TRS Policy Assets	\$ 104.0	^[2]	213

Policy target is 100 bp and policy maximum is 300 bp

^[1] Realized tracking error cannot be calculated due to the short history of this portfolio.

^[2] Not modeled due to lack of transparency for the benchmarks.

^[3] Tracking error assuming current benchmark for entire period.

Source: State Street Bank

Summary

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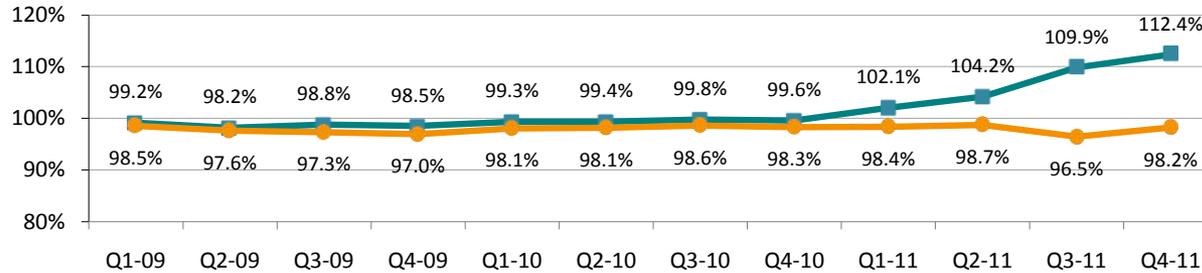
Appendix

Leverage

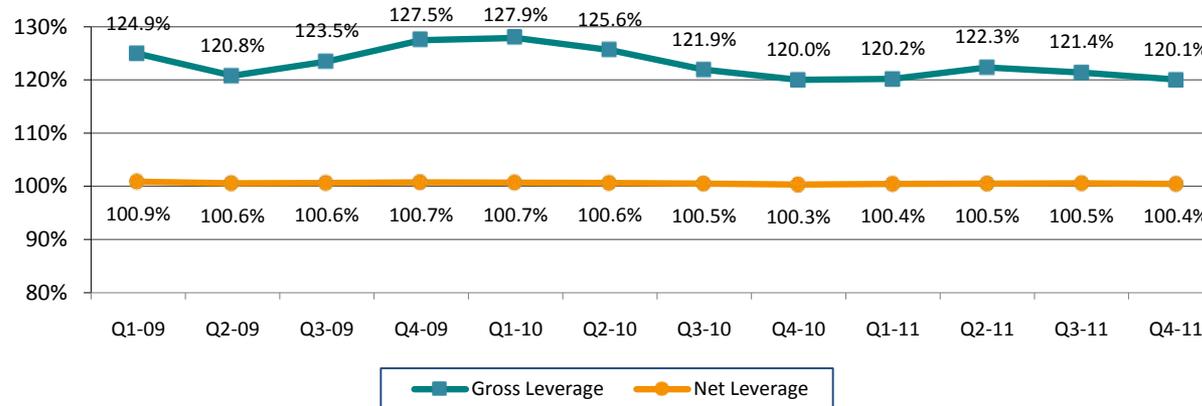
As of December 31, 2011



Trust Level Leverage (Excludes Security Lending)



Securities Lending Leverage



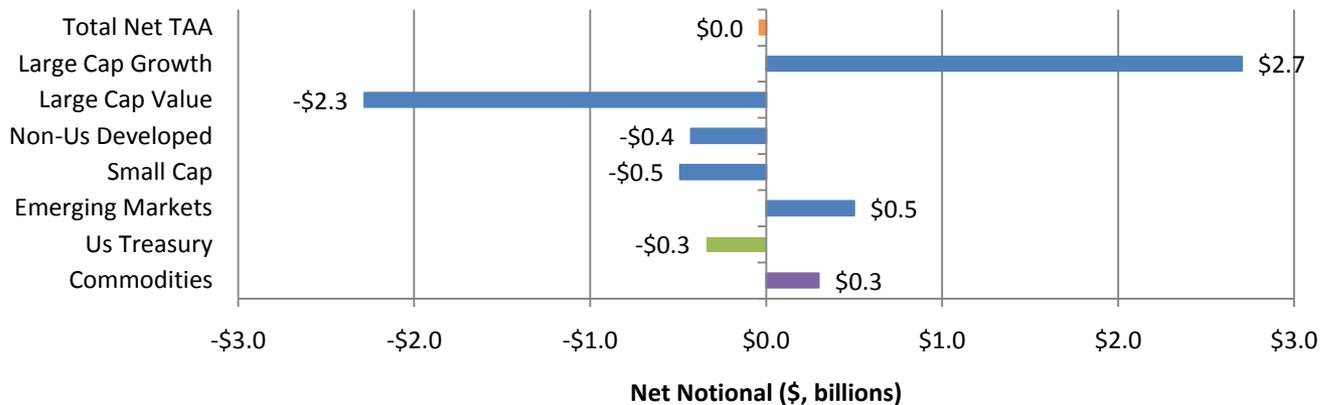
Source: State Street Bank, as of December 31, 2011

Trust Level Leverage

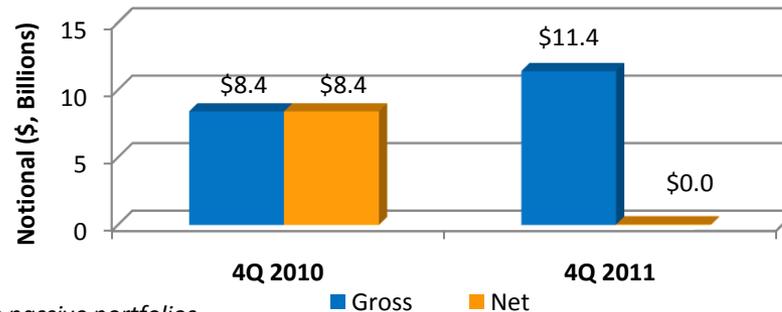
As of December 31, 2011



- ❑ Trust level gross leverage increased from 99.6% in 4Q 2010 to 112.4% in 4Q 2011
- ❑ This is primarily due to the transition of TAA to a 100% derivatives overlay implementation with overweights and underweights both implemented using derivatives
 - As of 4Q 2011, TAA net notional derivative usage was \$0.0 billion across seven asset classes:



- TAA net notional derivatives usage¹ fell from \$8.4 billion to \$0.0 billion from 2010 to 2011:



¹Excludes currency forwards and include passive portfolios

Trust Level Leverage

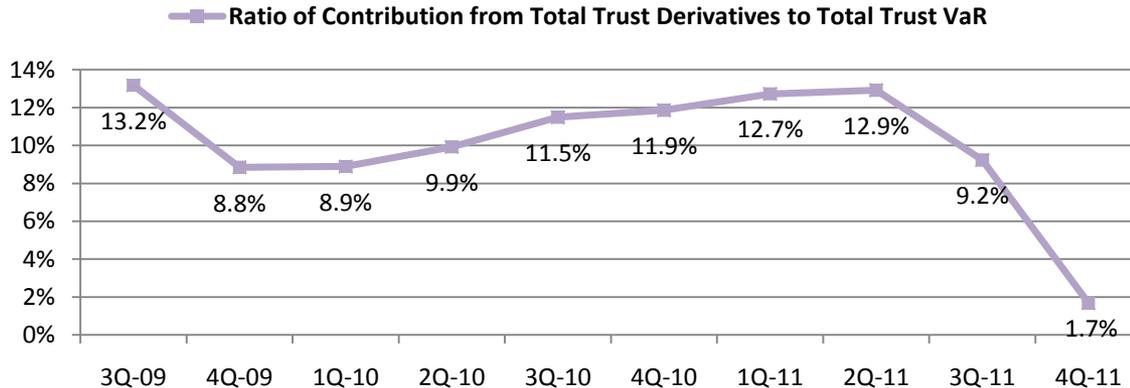
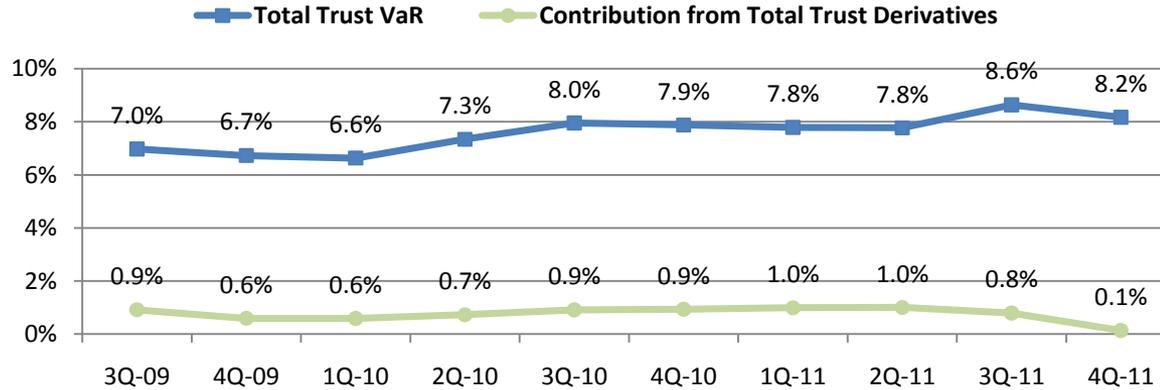
As of December 31, 2011



- ❑ Previously, TAA was implemented with a mixture of fully funded assets and derivatives
 - In 4Q 2010, derivatives were used for implementing overweight positions (gross equals net) while
 - In 4Q 2011, both overweight and underweight positions were implemented with derivatives (net equals zero)
- ❑ The benefits of this implementation change are:
 - **More efficient and liquid implementation of TAA allocation shifts** – this is important because of the large size of the TAA program and its monthly shifts
 - **Preserves core asset allocation** – TAA’s implementation has no effect on the allocations to the rest of the Trust.
 - For example, if TAA implements an underweight to Non-US Developed the PSE Group does not need to ask External Public to reduce its allocation to Non-US Developed external managers
 - **Trust use of derivatives is closer to neutral market risk** – the risk from overweights tends to offset the risk from underweights for a more risk neutral use of derivatives
- ❑ While liquidity for the TAA portfolio improves, there is potential for liquidity of the Trust as a whole to be impacted
 - Portfolio Strategy and Execution monitors daily the Trust’s potential liquidity requirements from TAA and other portfolios versus available liquidity sources such as cash and US Treasuries

Trust Level Leverage

Historical Value at Risk Contribution from Trust Derivatives



As TAA has moved to a nearly net zero funded position, the contribution to Total Trust VaR from Total Trust Derivatives has decreased to 1.7%

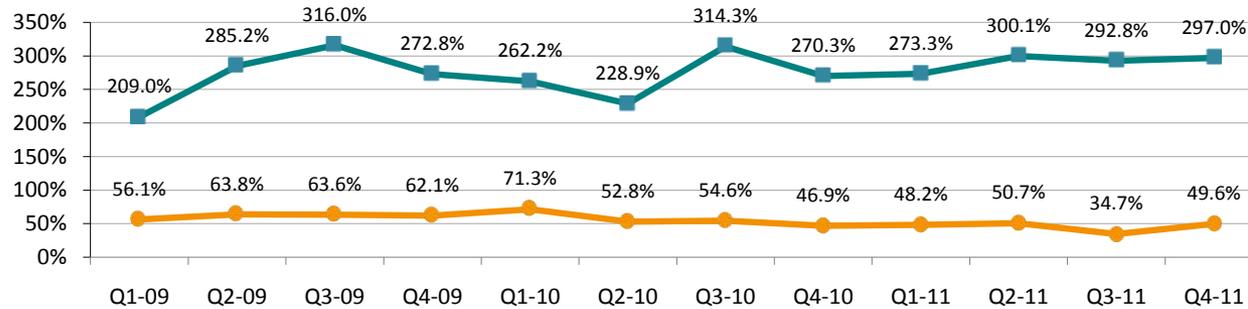
Source: State Street Bank

Leverage

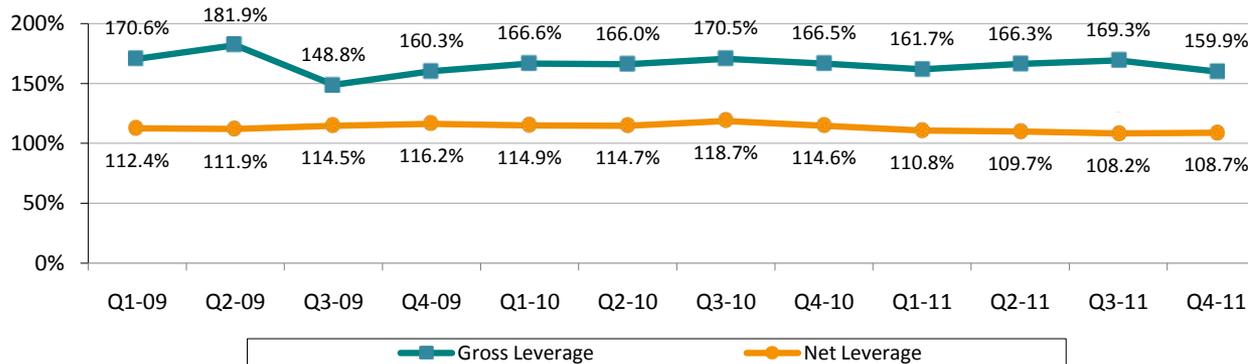
As of December 31, 2011



Hedge Fund Leverage



Strategic Partners Leverage



Note: Gross Leverage is defined as the sum of long exposure and short exposure and Net Leverage is defined as the difference between long exposure and short exposure.

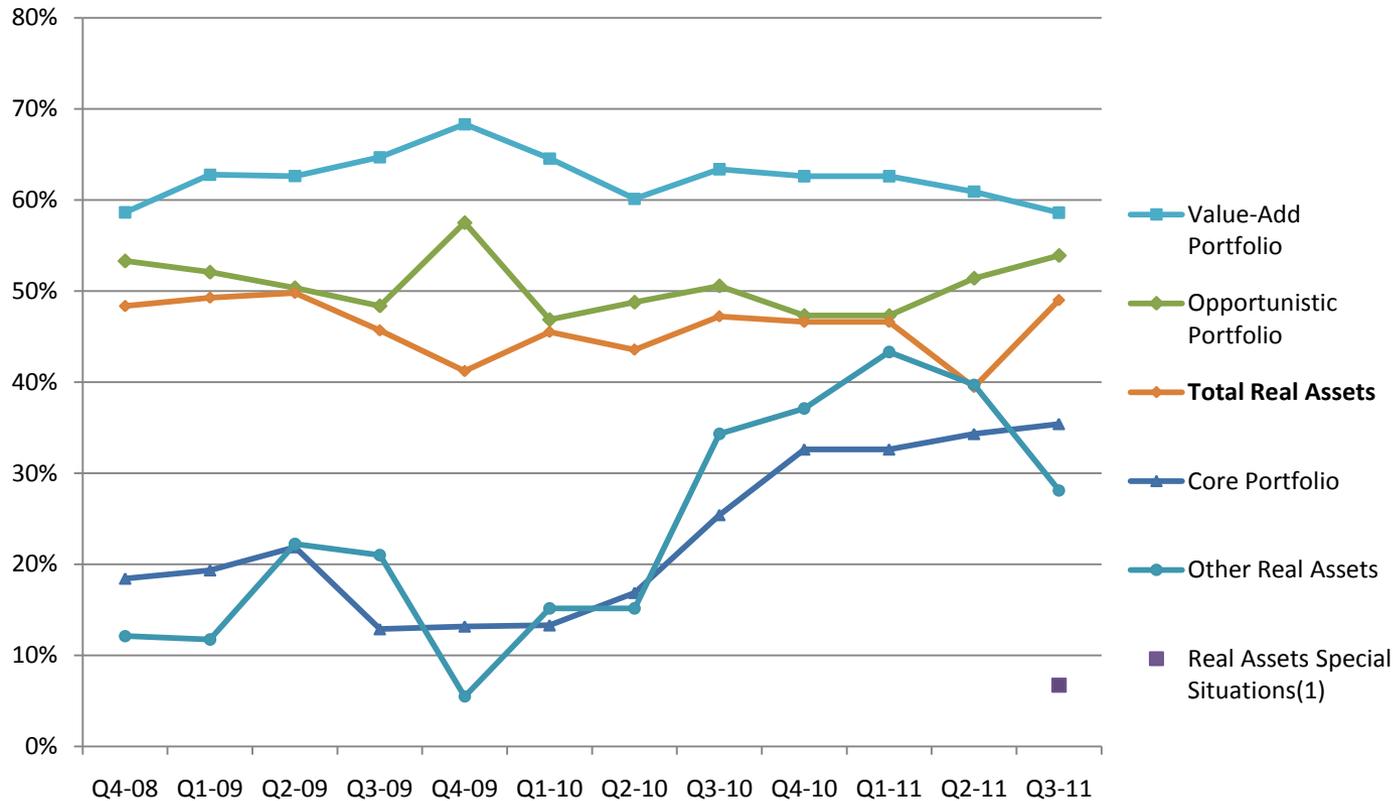
Source: State Street Bank as of December 31, 2011

Leverage

As of September 30, 2011



Real Assets Leverage



(1). Real Assets Special Situation is a new category started in 3Q, 2011.

Source: The Townsend Group, as of September 30, 2011

Counterparty Exposure

As of December 31, 2011



Counterparty Exposure^{1,2}

Counterparty	Swaps Number of Contracts	FX Forwards Number of Contracts	Forwards Number of Contracts	OTC Options Number of Contracts	Total Counterparty Exposure less Collateral Held (millions)	In Compliance with Policy
Barclays Bank	4	28			\$ 0.3	Yes
Citibank	2	26			12.5	Yes
Deutsche Bank	10	66		2	5.5	Yes
Goldman Sachs	24	55	3		-	Yes
JPMorgan Chase Bank	18	47	1		-	Yes
Morgan Stanley	7	38		1	2.6	Yes
Societe Generale	0	0			-	Yes
UBS	11	91			0.9	Yes
Others ⁽³⁾		2			-	Yes
Grand Total	76	353	4	3	\$ 21.8	

Source: State Street Bank

Counterparty Ratings⁴ and Capital Assessment

Counterparty	S&P Rating	Moody's Rating	Fitch Rating	Tier 1 Capital	Common Capital
Barclays Bank	A	A1	A	12.9%	12.2%
Citibank	A	A1	A	13.6%	13.3%
Deutsche Bank	A+	Aa3	A+	12.9%	9.6%
GoldmanSachs	A-	A1	A	16.0%	14.6%
JP Morgan	A	Aa3	AA-	12.3%	10.2%
Morgan Stanley	A-	A2	A	16.1%	11.0%
Societe Generale	A	A1	A+	10.6%	9.2%
UBS	A	Aa3	A	19.7%	22.1%

Source: Rating Agencies and Bloomberg

¹ Counterparty exposures include TRS internally managed portfolios and externally managed separate accounts.

² 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.

³ Credit Suisse (1) and State Street (1)

⁴ Rating of credit support provider. Policy requirement is A- or A3 by at least one of Fitch, Moody's or S&P.

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Derivative Exposure

As of December 31, 2011



Swap Exposure¹

Swaps by Asset Class	Number of Contracts	Gross Exposure (millions)	Gross Exposure as % of Asset Class	Gross Exposure as % of Total Trust
Small Cap	2	\$ 713	73.8%	0.7%
Commodities	8	414	35.9%	0.4%
Directional Hedge Funds	4	362	7.0%	0.3%
US Long Treasuries	10	308	2.5%	0.3%
Non-US Developed	8	291	1.9%	0.3%
Emerging Market	2	211	2.0%	0.2%
Other	42	363	0.9%	0.3%
Grand Total	76	\$ 2,661	4.0%	2.6%

Future Exposure¹

Futures by Asset Class	Number of Contracts	Gross Exposure (millions)	Gross Exposure as % of Asset Class	Gross Exposure as % of Total Trust
Large Cap Value	11	\$ 3,499	35.7%	3.4%
Large Cap Growth	15	3,223	30.0%	3.1%
Directional Hedge Funds	10	2,206	42.4%	2.1%
US Long Treasuries	22	2,202	17.7%	2.1%
Small Cap	7	1,345	139.3%	1.3%
Non-US Developed	55	737	4.9%	0.7%
Emerging Market	7	485	4.6%	0.5%
Global Developed Debt	8	230	223.0%	0.2%
Other	58	221	0.5%	0.2%
Grand Total	193	\$ 14,149	19.8%	13.5%

¹ Exposures include TRS internally managed portfolios and externally managed separate accounts.

Source: Investment Operations Center

Derivative Exposure

As of December 31, 2011



Forwards and Options Exposure¹

Non-Currency Forwards by Asset Class	Number of Contracts	Gross Exposure (millions)	Gross Exposure as % of Total Trust
Emerging Markets	2	\$ 55.83	0.05%
Non-US Developed	1	34.64	0.03%
OAR Non Credit	1	0.88	0.00%
Grand Total	4	\$ 91.36	0.09%

Options By Assets	Number of Contracts	Gross Exposure ² (millions)	Gross Exposure as % of Total Trust
Real Assets	3	32.08	0.03%
Grand Total	3	32.08	0.03%

Currency Forwards by Asset Class	Number of Contracts	Gross Exposure (millions)	Gross Exposure as % of Total Trust
EURO Dollar	61	\$ 895	0.9%
British Pound	36	881	0.8%
Japanese Yen	37	718	0.7%
Hong Kong Dollar	13	575	0.6%
Canadian Dollar	33	459	0.4%
South African Rand	8	301	0.3%
Swiss Franc	41	272	0.3%
Australian Dollar	27	227	0.2%
Chinese Renminbi	12	190	0.2%
Swedish Krona	20	98	0.1%
Norwegian Krone	18	87	0.1%
South Korean Won	7	63	0.1%
Other	40	158	0.2%
Grand Total	353	\$ 4,923	4.7%

¹Exposures include TRS internally managed portfolios and externally managed separate accounts

²Delta notional plus mark to market value

Source: Investment Operations Center

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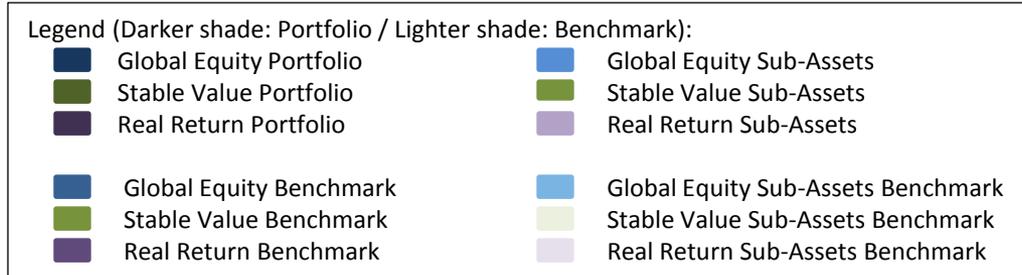
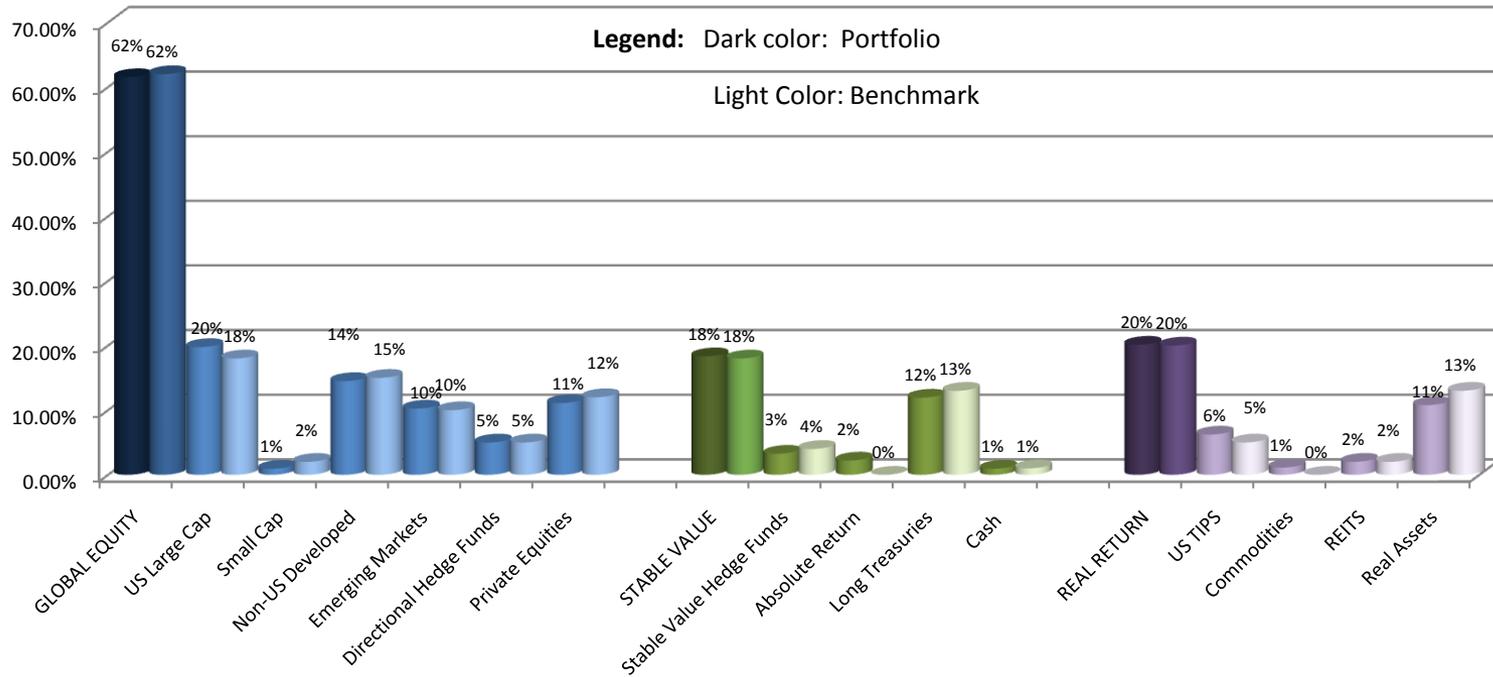
Conclusions

- ❑ TRS investment exposures are in compliance with the Investment Policy Statement
 - At the end of the fourth quarter, TRS was slightly underweight Global Equity while slightly overweight Stable Value and Real Return
 - At the asset class level, TRS was overweight US Large Cap, Absolute Return, US TIPS and Commodities while underweight Small Cap, Private Equity, US Treasuries and Real Assets
- ❑ From Q3-11 to Q4-11 the Trust's overall Value at Risk (VaR) decreased by 0.4% due to a shift from +1.8% overweight Global Equity to -0.5% underweight
- ❑ The Trust level VaR in Q4-11 is lower than the Trust benchmark (8.2% vs. 9.0%) due to the 10/1/2011 benchmark increase of 5% Real Assets and resulting actual Real Asset portfolio underweight
- ❑ TAA's transition to a net zero notional implementation has raised the normal gross leverage level of the Trust (112.4%) while leaving the normal net leverage level substantially unchanged (98.2%)

APPENDIX

Portfolio Weights vs. Long Term Policy Weights

As of December 31, 2011

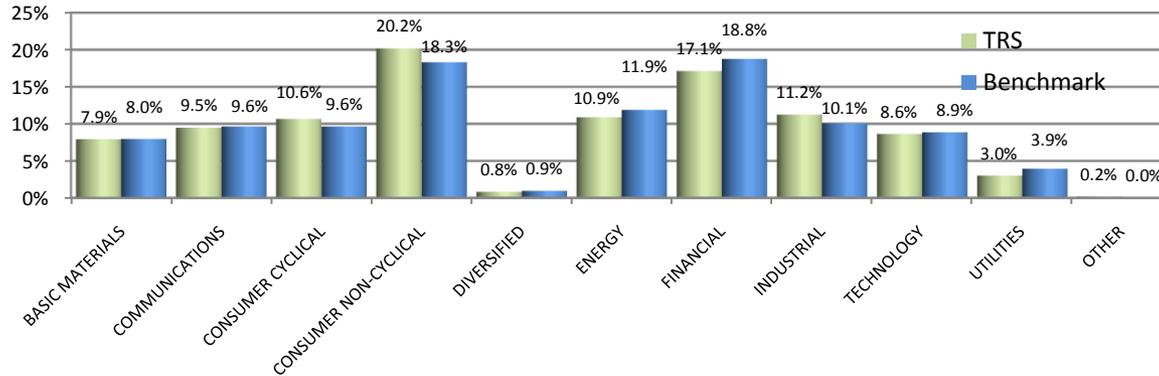


Source: Investment Operations Center



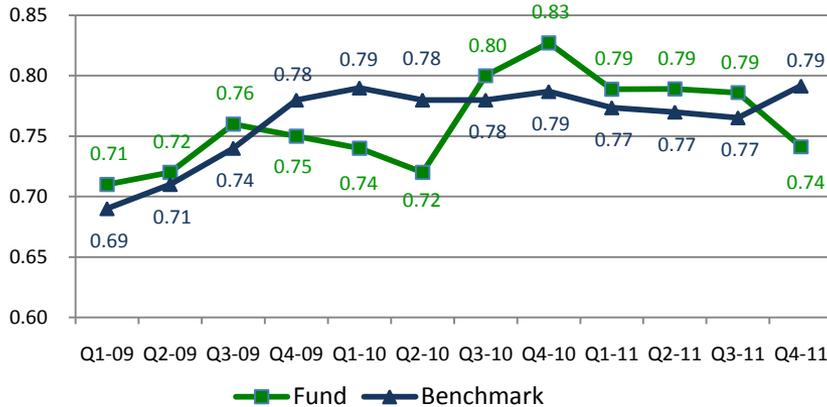
Sector Allocation: Beta & Scenario Analysis

Equity Sector Allocation



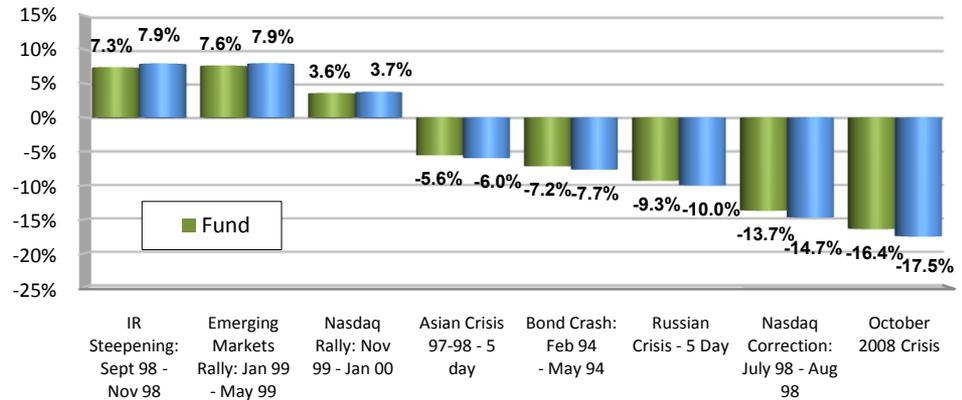
Source: State Street Bank

Beta Analysis MSCI World Index



For every 1% the MSCI World Index rises, the Fund may rise by 0.8%.
Source: State Street Bank

Scenario Analysis (% Gain/Loss in Market Value)



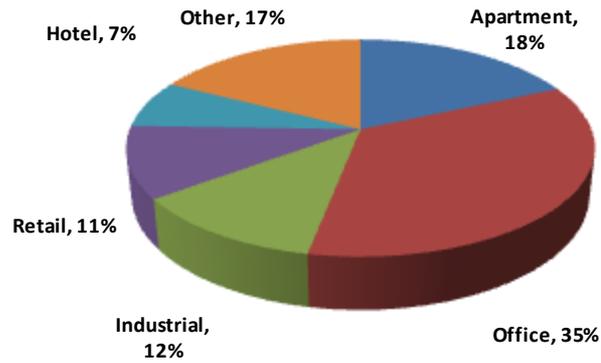
If the markets experienced another Nasdaq 25% correction identical to the one in July 1998, the Fund may lose 13.7% of its market value. The effects on the Fund and Benchmark are quantified for each scenario indicated.
Source: State Street Bank

Real Estate Diversification

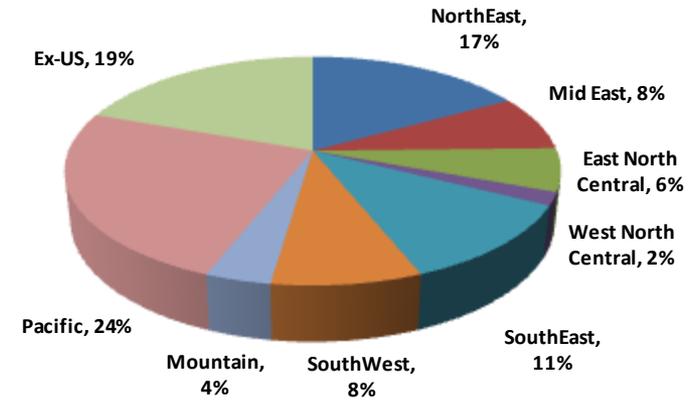
As of September 30, 2011



Property Type Diversification



Geographic Diversification



Source: Townsend Group

Glossary & Notes



Glossary

Beta is a measure of an asset's volatility in relation to a specific market or risk factor. Beta is the measure of an asset's risk in relation to the market (for example, the S&P500) or to an alternative benchmark or factors. Roughly speaking, a security with a beta of 1.5 will move, on average, 1.5 times the market return.

Collateral is assets pledged to secure payment of a party's obligation under a transaction. Collateral is a risk reduction tool which mitigates risk by reducing credit exposure.

Counterparty is the offsetting party in an exchange agreement.

Forward Contract is a non-standardized contract for the physical or electronic (bookkeeping entry) delivery of a commodity or financial instrument at a specified price at some point in the future.

Futures Contract is a standardized contract for either the physical delivery of an instrument at a specified price at some point in the future, or a financial settlement derived from the change in market price of the commodity or financial instrument during the term of the contract.

Leverage is a condition where the net potential monetary exposure of an obligation exceeds the value of the underlying assets which support the obligation.

Gross Leverage: Additional investment assets owned by the trust which are directly funded by liabilities (short sales). For securities lending this would be the value for the collateral taken in against loans.

Net Leverage: Additional investment assets net of the liabilities. For securities lending this would be the excess collateral (the 102% or 105% collateralization) net of the short positions. Generally, leverage allows greater potential return to the investor than otherwise would have been available. The potential for loss is also greater because if the investment becomes worthless, not only is that money lost, but the loan still needs to be repaid.

Notional Value is the value of a derivative's underlying assets at the spot price. In the case of a swap, this is the agreed principal amount on which the swap is based, but which neither party is obligated to pay to the other.

Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, models, people, and systems, or from external events. Overdrafts accounts for losses from failed transaction processing or process management.

Settlement risk is the risk that a counterparty fails to perform, causing a trade failure. Generally, this happens because one party defaults on its clearing obligations to one or more counterparties. As such, settlement risk comprises both credit and liquidity risks. The former arises when a counterparty cannot meet an obligation for full value on due date and thereafter because it is insolvent. Liquidity risk refers to the risk that a counterparty will not settle for full value at the due date but could do so at some unspecified time thereafter, causing the party which did not receive its expected payment to finance the shortfall on short notice.

Total Return Swap is a bilateral financial contract in which one counterparty pays out the total return of the index, including its dividends and capital appreciation or depreciation, and in return, receives a regular fixed or floating cash flow.

Tracking Error predicts the difference in returns between the managed portfolio and an equal investment in the market. Tracking error includes the effect of residual risk (risk not attributable to market influences) and market or systematic risk (beta is a measure of market risk).

Value at Risk ("VAR") is an established method of measuring economic exposure of risk. The measure conveys the maximum potential loss (in dollars or percent of total assets) for a particular investment position, for a particular period of time, for a particular level of confidence. VAR is based on historical market trends, correlations and volatilities. Confidence level is expressed as a percentage and seeks to indicate the percent likelihood that any result (loss) will not exceed the VAR.

Notes

State Street IFS produces their risk measures using historical simulations. They have found historic simulation is the most direct technique for computing VAR and is widely favored because it provides universal coverage of all instruments and all types of market risk -- a major strength. Statistically, in historic simulation, VAR is derived from the distribution of portfolio values over a given time horizon, given a series of historical market data prices. The distribution of portfolio values is calculated by revaluing the portfolio many times using a time series of market prices. The portfolio total return is measured as the change in market value between one date and the next, as determined by the length of the time horizon. TRS uses a 5 year lookback, monthly horizon with weekly sampling. No decay factor is applied, thus all periods are equally weighted. The Hedge Fund, Real Estate, Real Assets, and Private Equity portfolios are proxied in the State Street IFS risk model. Prior to October 2007, Bear Measurisk was our risk provider.

Liquidity Analysis: For the equity portfolio, our holdings were analyzed relative to the average of the last 20 day trading volumes. We assumed liquidation would be 12% per day. For the Hedge Fund portfolio, we analyzed contractual terms such as lock-up, period, redemption notification requirements, and the presence of "gate" contractual term for our calculation. For the Fixed Income instruments, we assumed static liquidation assumptions per asset class and market value (i.e. \$X Billion of TSY could be liquidated in 1 day). We assumed the Real Estate and Private Equity could be liquidated no sooner than seven years. The size of the OTC market was taken into account for each Total Return Swap. Liquidation was assumed to happen over several days.

Beginning on 3/31/08, the modeling of the emerging market ETF was updated to better capture the true economic risks of the portfolio. Beginning 6/30/08, tracking error methodology was changed to measure the standard deviation of the difference in the benchmark and the portfolio's returns. Prior to 6/30/08, only the downside volatility was reported.

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Tab 4

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Trust Derivatives Usage

Jase Auby

Chief Risk Officer

April 2012

Agenda



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Introduction

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Industry Use of Derivatives

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Why Use Derivatives?

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Future Use of
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Anticipated 2012 Future Use of Derivatives

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Appendix



Introduction

- ❑ In 2007, Texas statute and TRS investment policy were changed to allow the Trust to use over-the-counter derivatives
 - Prior to that time, the Trust's only derivatives usage was exchange-traded options and currency forwards

- ❑ The Investment Management Division executes four Instrument Types as a part of five derivatives uses:

(date of first TRS use in parentheses)

Instrument Types

Forwards (1993)

Options (2001)

Swaps (2007)

Futures (2008)

Uses

Currency Risk and Exchange (1993)

Covered Calls (2001)

TAA and Asset Replication (2007)

Risk Management (2007)

SPNs and External Managers (2008)

Industry Use of Derivatives

Hewitt EnnisKnupp Investment Policy Review of US Public Pensions



- Derivatives are widely used among large US public pensions

	Authority to Use Derivatives	Internal Mgmt	External Mgmt	Use of Futures	Use of Options	Use of Swaps
California Public Employees Retirement System	Yes	Yes	Yes	Yes	Yes	Yes
California Teachers Retirement Board	Yes	Yes	Yes	Yes	Yes	Yes
NY State Common Retirement Fund	No	No	No	No	No	No
Florida Retirement System	Yes	Yes	Yes	Yes	Yes	Yes
Teacher Retirement System of Texas	Yes	Yes	Yes	Yes	Yes	Yes
New York State Teachers Retirement System	Yes	Yes	No	Yes	Yes	No
State of Wisconsin	Yes	Yes	Yes	Yes	Yes	Yes
North Carolina	Yes	No	Yes			
Ohio Public Employees Retirement System	Yes	Yes	Yes	Yes	Yes	Yes
Ohio State Teachers	Yes	Yes	Yes	Yes	Yes	Yes
Washington State	Yes	Yes	Yes	Yes	No	No

Source: 2010 review of investment policy statements by Hewitt EnnisKnupp

Industry Use of Derivatives

BNY Mellon Survey



- Use of derivatives is very common among corporate pensions, public pensions, endowments/ foundations, and Taft/Hartley plans

Use of Derivatives by Purpose

Plan Type	Total Funds	Risk Reducing by Diversif.	Hedging Asset Class Exposures	Meet Fund Allocation Goals	Seeking Liquidity Beyond Cash	Hedge Currencies Exposures	Portable Alpha
Corporate Pensions	24	46%	58%	71%	42%	4%	13%
Public Pension	11	82%	64%	73%	64%	9%	9%
Endowment / Foundation	6	33%	33%	83%	50%	0%	17%
Other - Taft/Hartley	4	50%	100%	25%	25%	0%	0%
Total	45	53%	60%	69%	47%	4%	11%

Use of Derivatives by Instrument Type

Plan Type	Exchange Traded			Over-the-Counter	
	Options	Futures	Forwards	Options/ Swaptions	Swaps
Corporate Pensions	75%	88%	75%	67%	83%
Public Pension	55%	82%	73%	55%	73%
Endowment / Foundation	67%	100%	50%	17%	67%
Other - Taft/Hartley	100%	100%	100%	25%	75%
Total	71%	89%	73%	53%	78%

Source: BNY Mellon Asset Servicing, "Derivative and Risk Management Practices Utilized by Institutional Investors," Figures 2 and 3. December 2010.



Why Use Derivatives?

- Cash Market Alternative (“Asset Replication”).** The **Trust’s primary use of derivatives** is as a substitute for traditional fully funded investments when derivatives offer lower trading costs and superior liquidity
 - Example: The Tactical Asset Allocation (TAA) portfolio which overlays offsetting long and short derivative positions to tactically adjust the Trust’s asset allocation
 - Example: Hedge Fund replication to bridge the transition period for the investment of the new 5% Directional Hedge Fund allocation
- Non-Intrusive Method to Adjust Asset Allocation.** Derivatives allow asset allocation to be managed without requiring a disruption of long-term allocations to external managers, private investments and others
 - Example: TAA overlays the Trust’s long-term allocation to adjust allocation tactically on a shorter horizon
- Risk Management.** Derivatives can be used to manage the Trust’s exposure to market, macro and other risks
 - Example: Purchasing options on rising interest rates to hedge inflation
 - Example: Reducing risk in an elevated systemic risk environment



Why Use Derivatives? (cont'd)

4. **When Derivatives Are the Only Alternative.** Derivatives can be used to create portfolios with risk and return characteristics that could not be efficiently created with cash market securities
 - Example: Covered call writing
 - Example: Commodity (GSCI) investments using futures and swaps

5. **SPNs and Long-Oriented External Managers.** Use derivatives for similar strategies as the TRS internal portfolios and **operate under the same controls.**
 - Example: SPNs using derivatives in a similar manner as our TAA portfolio to tactically manage asset exposures
 - Example: External managers using currency forwards to manage the currency risk of their portfolio versus its benchmark

Trust Derivatives Management

Derivatives Personnel



PORTFOLIO STRATEGY AND EXECUTION Asset Allocation

Mohan Balachandran, Ph.D., Director
previous employer: NISA Investment Advisors, 15 yrs derivatives experience (15 yrs total). PhD (Brown)

Curt Rogers, CFA, CAIA, FRM, Director
previous employer: RAND, 5 yrs derivatives experience (14 yrs total). MS (MIT)

Tim Jones, Ph.D., Senior Investment Manager
previous employer: JP Morgan, 5 yrs derivatives experience (12 yrs total). Ph.D. (UT-Austin)

PORTFOLIO STRATEGY AND EXECUTION Risk

Jase Auby, CFA, Chief Risk Officer
previous employer: Lehman Brothers, 13 yrs derivatives experience (16 yrs total). BS (Harvard)

James Nield, CFA, Senior Investment Manager
previous employer: Ford, 6 yrs derivatives experience (6 yrs total). MBA (NYU)

PORTFOLIO STRATEGY AND EXECUTION Trading

Bernie Bozzelli, CFA, Senior Director
previous employer: TRS Internal Audit, 10 yrs derivatives experience (17 yrs total). MPA (UT-Austin)

Jaime Llano, Senior Investment Manager
previous employer: Cargill. 9 yrs derivatives experience (12 yrs total). MBA (St Edwards)

Komson Silapachai, Senior Analyst
*4 yrs derivatives experience (4 yrs total)
BBA (Texas A&M)*

INVESTMENT OPERATIONS

Sylvia Bell, Director
previous employer: JP Morgan, 20 yrs derivatives experience (20 yrs total). MPA Florida

Kelly Newhall, Manager
previous employer: Invesco Aim, 5 yrs derivatives experience (12 yrs total). BBA (UT-Austin)

EXTERNAL PUBLIC MARKETS

Dale West, CFA, Managing Director
previous employer: T. Rowe Price, 4 yrs derivatives experience (11 yrs total). MBA (Stanford)

Katy Hoffman, Director
previous employer: JP Morgan, 10 yrs derivatives experience (10 yrs total). MBA (Vanderbilt)

LEGAL SERVICES

Dennis Gold, Assistant General Counsel
previous employer: Graves, Dougherty, Hearon & Moody., 11 yrs derivatives experience (21 yrs total). J.D. (UT-Austin)

Angela Vogeli, Assistant General Counsel
previous employer: Citigroup, 7 yrs derivatives experience (12 yrs total). J.D. (American University)

STATE STREET RISK SERVICES

(On-Site) **Stephen Kim, Asst. Vice President**
previous employer: YellowJacket Energy, 5 yrs derivatives experience (5 yrs total). MBA (UT-Austin)

Off-Site Teams: Risk (3 personnel), Compliance (3), Performance (8) and Derivatives (3)

INVESTMENT COMPLIANCE

Hugh Ohn, Director of Investment Audit and Compliance
previous employer: State Auditor's Office, 3 yrs derivatives experience (20 yrs total). MBA (UT-San Antonio)

Terry Harris, CPA, CAIA, FRM, Investment Compliance Specialist
previous employer: Texas Department of Housing, 4 yrs derivatives experience (14 yrs total). BBA (Texas State)

Trust Derivatives Management

Monitoring and Managing Risk



Monitoring

- ❑ **General Trust Reports--** All Trust portfolio management, compliance, performance and other reporting incorporates derivatives
 - Compliance thresholds monitored daily and exposures managed as needed
- ❑ **Daily Derivatives Report--** Details instrument types, notional amounts, mark-to-market, counterparty risk and other information
- ❑ **Daily Report--** Reports the Trust's asset allocation and includes derivatives effects
- ❑ **Weekly Counterparty Risk Report--** Monitors credit ratings, financial health, exposure and credit default swap levels
 - Thresholds established for exposure size and credit ratings
 - Financial health actively monitored and exposures managed as needed
- ❑ **Monthly Derivatives Report to Executive Management--** Summarizes the information in the Daily Derivatives Report for the Executive Director, Internal Audit and others

Trust Derivatives Management (cont'd)

Monitoring and Managing Risk



Counterparty Exposure^{1,2}

Counterparty	Swaps Number of Contracts	FX Forwards Number of Contracts	Forwards Number of Contracts	OTC Options Number of Contracts	Total Counterparty Exposure less Collateral Held (millions)	In Compliance with Policy
Barclays Bank	4	28			\$ 0.3	Yes
Citibank	2	26			12.5	Yes
Deutsche Bank	10	66		2	5.5	Yes
Goldman Sachs	24	55	3		-	Yes
JPMorgan Chase Bank	18	47	1		-	Yes
Morgan Stanley	7	38		1	2.6	Yes
Societe Generale	0	0			-	Yes
UBS	11	91			0.9	Yes
Others ⁽³⁾		2			-	Yes
Grand Total	76	353	4	3	\$ 21.8	

Source: State Street Bank

Counterparty Ratings⁴ and Capital Assessment

Counterparty	S&P Rating	Moody's Rating	Fitch Rating	Tier 1 Capital	Common Capital
Barclays Bank	A	A1	A	12.9%	12.2%
Citibank	A	A1	A	13.6%	13.3%
Deutsche Bank	A+	Aa3	A+	12.9%	9.6%
GoldmanSachs	A-	A1	A	16.0%	14.6%
JP Morgan	A	Aa3	AA-	12.3%	10.2%
Morgan Stanley	A-	A2	A	16.1%	11.0%
Societe Generale	A	A1	A+	10.6%	9.2%
UBS	A	Aa3	A	19.7%	22.1%

Source: Rating Agencies and Bloomberg

¹ Counterparty exposures include TRS internally managed portfolios and externally managed separate accounts.

² 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.

³ Credit Suisse (1) and State Street (1)

⁴ Rating of credit support provider. Policy requirement is A- or A3 by at least one of Fitch, Moody's or S&P.

Trust Derivatives Management (cont'd)

Monitoring and Managing Risk



Operational Risk and Control Procedures

- ❑ Exchange traded derivatives and forwards are entered, executed and approved through the Bloomberg Order Management System platform
 - The Bloomberg system has embedded controls which segregate trade ticket and execution functions and mitigate data entry and other possible errors
 - Delivered electronically to the custodian, counterparty (if forwards) and the Futures Commission Merchant (“FCM”)
- ❑ Over the counter derivatives (except forwards) are executed and approved using trade confirmations which Investment Operations compares to term sheets for accuracy
 - Documents are sent to the custodian and counterparty
- ❑ The custodian reconciles all trades with the counterparty or FCM on a daily, monthly or as-traded basis
- ❑ TRS monitors notional value and mark-to-market on a daily basis
- ❑ TRS ensures that daily collateral and margin transactions are posted timely and accurately
- ❑ Derivatives in External Manager portfolios have an additional monthly reconciliation between the Custodian and each External Manager

Trust Derivatives Management

2010 Derivatives Audits



- ❑ The Trust's use of derivatives was the subject of two audits in 2010:
 - Internal Audit
 - Independent Fiduciary Services for the State Auditors Office

- ❑ Both audits resulted in no significant findings

Trust Derivatives Management

Regulatory Trends



- ❑ The Dodd-Frank Wall Street Reform and Consumer Protection Act was passed in 2010 and will have implications for the derivatives markets and TRS
- ❑ Final regulations from the CFTC and the SEC regarding Dodd-Frank are still in progress but will likely:
 - Encourage movement of over-the-counter-products to centralized clearing and regulated exchanges
 - This is a positive development as it increases market transparency and reduces counterparty risk
 - Increase collateral requirements
 - This is a neutral to positive development. While it will require additional posting of collateral by TRS, it will also require additional posting of collateral by TRS counterparties and thereby reduce counterparty risk.
 - Increase compliance and suitability requirements of TRS and TRS counterparties
 - This is a positive development as meeting these requirements is unlikely to burden TRS and will enhance best practices within the industry
- ❑ The Investment Management Division is actively monitoring the evolution of implementation timelines and processes and will be well-prepared to implement all required changes



Instrument Types

- The Investment Management Division uses four derivative instrument types:

Type and TRS First Use Date	Description	Example
Forwards 1993	Contract agreeing to purchase a security or a currency on a specified date at a specified price	Contract to purchase the British Pound on June 15, 2012 at a price of 1.6 US Dollars per British Pound
Options 2001	Contract where one party agrees to buy (or sell) an asset at a specified price at the option of another party	Contract to sell the S&P 500 on June 15, 2012 at a price of 1415 in exchange for an upfront amount of 2.6%
Swaps 2007	Contract where one party pays a return and receives a different return in exchange	Contract to pay the Total Return on the S&P 500 index and receive a Floating Rate (ie, LIBOR)
Futures 2008	Same as forwards except futures are exchange-traded whereas forwards are over-the-counter	Contract to purchase the S&P 500 on June 15, 2012 at a price of 1415

Instrument Types (cont'd)

Swap Instrument Type



- Within the Swaps Instrument Type, there are four basic forms:

Form	TRS First Use	Receive Example	Pay Example
Total Return Swaps	2007	Total Return on the S&P 500 Index	LIBOR Floating Rate
Interest Rate Swaps	2008	6% Fixed Rate	LIBOR Floating Rate
Enhanced Swaps	2008	Systematic trading strategy (e.g., a commodities futures strategy)	LIBOR Floating Rate
Credit Default Swaps	2010	3% Fixed Rate	<ul style="list-style-type: none">• If asset does not default, 0%• If asset defaults, the resulting loss on the asset

Instrument Types (cont'd)

How Traded



- ❑ There are two major ways to execute derivatives:

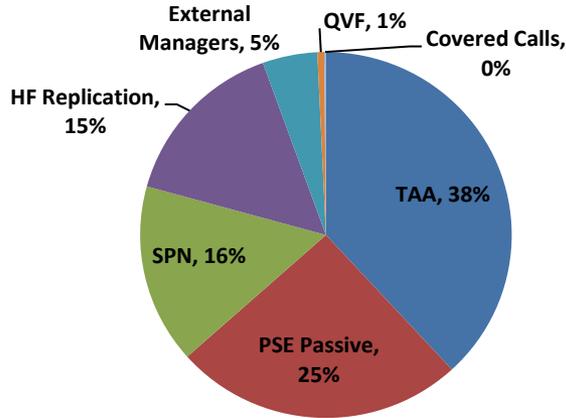
	Exchange-Traded	Over-the-Counter (OTC)
Trading Method	Traded on an exchange	Executed using a standardized contract between two parties (typically, the Trust and a bank)
TRS Counterparty Type	Executed by brokers on the exchange for TRS and cleared by a Futures Commission Merchant (FCM)	Executed under International Swaps and Derivatives Association (ISDA) Master Agreements and Credit Support Annexes between the Trust and an ISDA counterparty
Number of Counterparties	TRS currently has one FCM and six executing Brokers	TRS currently has eight ISDA counterparties
Counterparty Risk	Counterparty risk is subject to CFTC or SEC regulation	Counterparty risk is governed by a bilateral ISDA contract

Trust Derivatives Usage

Gross Notional

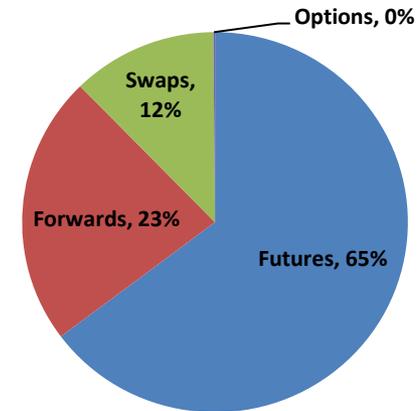


TRS Gross Notional by Portfolio



The bulk of derivatives usage is TAA (tactically adjusting the Trust's asset allocation) Passive and Hedge Fund benchmark replication (efficiently replicating Trust benchmarks) and the SPNs (which also implement TAA and benchmark replication)

TRS Gross Notional by Instrument Type



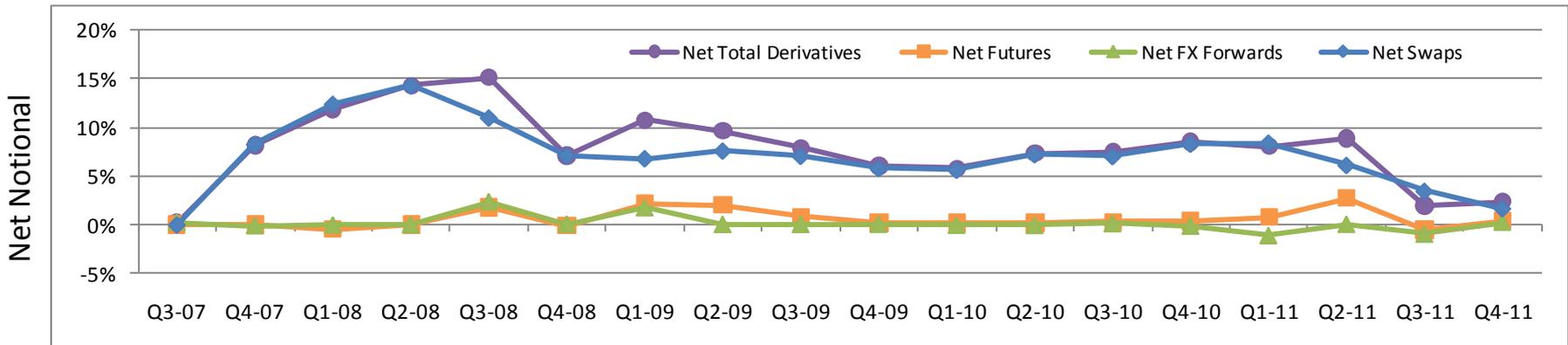
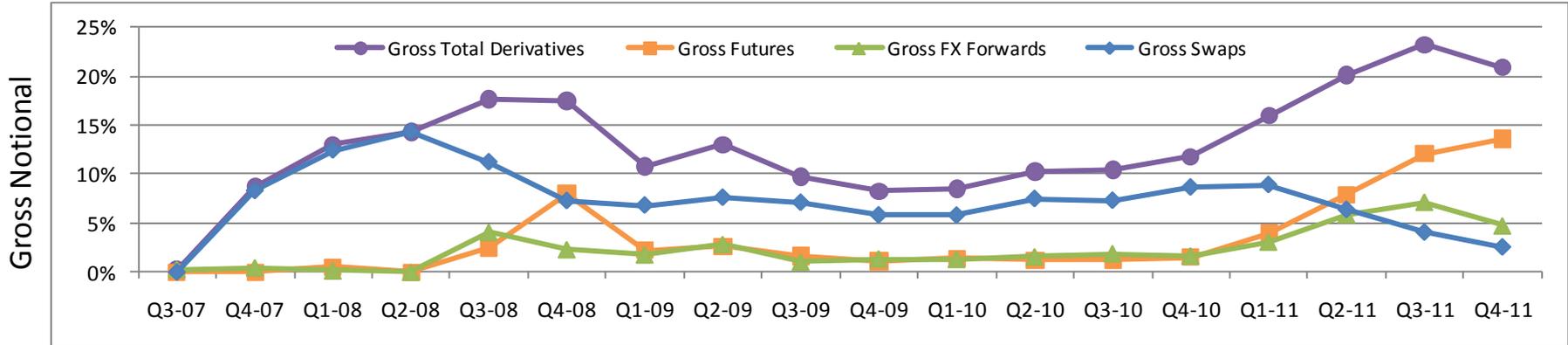
Futures and forwards, which are among the most liquid forms of derivatives, constitute the bulk of the Trust's derivatives portfolio

	Gross Notional (mm)
TAA	8,335.9
PSE Passive	5,524.9
SPN	3,465.3
HF Replication	3,323.4
External Managers	1,043.3
QVF	131.4
Covered Calls	30.5
Total	21,854.8

\$, millions	Gross Notional (mm)
Futures	14,148.7
Forwards	5,014.4
Swaps	2,661.1
Options	30.5
Total	21,854.8

Trust Derivatives Usage (cont'd)

Gross Notional and Net Notional (as a % of Total Trust)

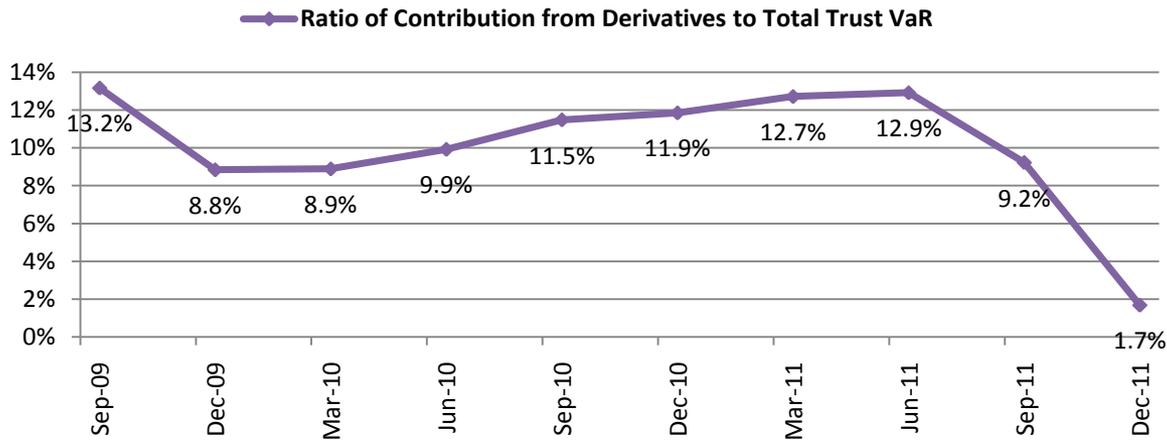
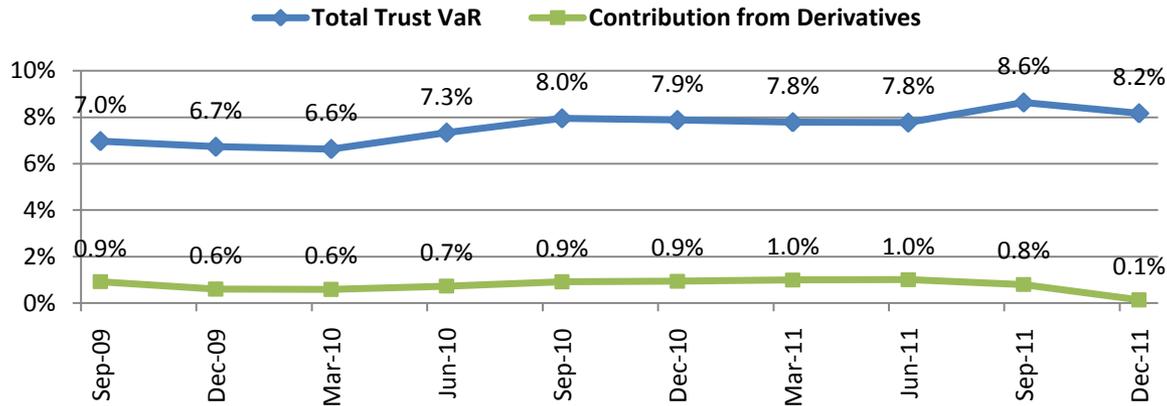


Net notional has decreased and Gross notional has increased recently for two reasons:

- (1) "Double counting" of TAA exposure where Total Return Swaps have been replaced with Futures and Currency Forwards, e.g., \$100 notional of non-US Total Return Swaps is equivalent to \$100 notional of Futures plus \$100 notional of Currency Forwards
- (2) The new Hedge Fund replication portfolio and other Passive investments resulting from the new benchmark transition started on 10/1/2011

Trust Derivatives Usage (cont'd)

Historical Value at Risk



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

Trust Derivatives Usage (cont'd)

Gross Notional and Net Notional



Current Gross Notional

\$, millions	PSE				SPN	External Managers	Other	Total
	TAA	Passive	HF Replic	QVF				
Forwards	2,298	242	756	1	864	853	-	5,014
Options	-	-	-	-	-	-	31	31
Swaps	249	763	362	7	1,136	144	-	2,661
Futures	5,789	4,519	2,206	123	1,465	46	-	14,149
Total	8,336	5,525	3,323	131	3,465	1,043	31	21,855

The bulk of derivatives usage is TAA (tactically adjusting the Trust's asset allocation), Passive and Hedge Fund benchmark replication (efficiently replicating Trust benchmarks) and the SPNs (which also implement TAA and benchmark replication)

Current Net Notional

\$, millions	PSE				SPN	External Managers	Other	Total
	TAA	Passive	HF Replic	QVF				
Forwards	191	0	406	(1)	(74)	(228)	-	295
Options	-	-	-	-	-	-	(31)	(31)
Swaps	249	763	362	5	497	(135)	-	1,742
Futures	(497)	(574)	952	(4)	574	(1)	-	450
Total	(56)	190	1,720	(0)	997	(364)	(31)	2,456

TAA's \$8.3 billion gross notional nets to a much lower (-\$56 million) net position

The Trust's \$21.8 billion gross notional nets to a much lower \$2.5 billion net position

Trust Derivatives Usage (cont'd)

Mark to Market and Tenor



Mark to Market

\$, millions	PSE				SPN	External Managers	Other	Total
	TAA	Passive	HF Replic	QVF				
Forwards	8	(0)	3	(0)	2	5	-	17
Options	-	-	-	-	-	-	0	0
Swaps	(3)	(4)	(1)	(1)	6	(2)	-	(4)
Futures	(22)	(22)	(3)	(0)	10	(0)	-	(37)
Total	(18)	(26)	(1)	(1)	18	4	0	(24)

The Trust's notional amount reduces to a -\$24 million mark-to-market position

Average Tenor in Months

	PSE				SPN	External Managers	Other	Total
	TAA	Passive	HF Replic	QVF				
Forwards	2.4	2.4	2.4	2.5	0.6	2.1	-	2.0
Options	-	-	-	-	-	-	2.4	2.4
Swaps	0.1	1.3	1.2	0.1	29.0	8.6	-	13.4
Futures	2.2	2.5	2.9	2.6	2.5	2.3	-	2.2
Total	2.2	2.3	2.6	2.5	10.7	3.0	2.4	3.5

SPN average tenor is longer than average because they utilize interest rate swaps of 5-10 years in maturity

The low mark-to-market is mainly due to the short term maturity of the derivatives positions – on average 3.5 months



Anticipated 2012 Future Use of Derivatives

- ❑ Asset Replication Additions to Internal Portfolios
 - Credit Default Swaps
 - Interest Rate Swaps
 - Index Options
- ❑ External Public Markets use of overlay to manage factor risk exposures and excess cash balances within external manager portfolios
- ❑ Risk Strategies – seeks to optimize the risk profile of the Trust in three ways, some of which use derivatives:

TRS Advantage	<ul style="list-style-type: none">• Objective: Identify trades that are unique to TRS, create additional returns and/or provide unusual risk, return and cost trade-offs• Examples: GGP covered call writing, replicating benchmarks with options
Tactical Hedging	<ul style="list-style-type: none">• Objective: Reduce or cap unacceptable risks• Examples: Bubble monitoring, currency risk, inflation risk
Insurance Hedging	<ul style="list-style-type: none">• Objective: Reduce significant but unlikely risk events• Examples: Sovereign credit risk, equity market shocks



Conclusion

- ❑ Derivatives are in wide use by US Public pensions
 - TRS' use of derivatives is similar to the use by other funds
- ❑ The Trust's derivatives are primarily used by TAA or other Asset Replication activities
- ❑ The Investment Management Division has a robust, experienced infrastructure for portfolio management, risk management, operations management and legal risk management of derivatives



Appendix

Permitted Derivative Use

- Each of the Investment Management Division's Uses of derivatives are authorized under one or more of the Investment Policy Statement Permitted Derivatives Applications:

Section 8.5 Permitted Derivatives Applications

“(a) Implement investment strategies in a lower cost and efficient manner; [Asset Replication]

(b) Efficiently manage the Total Fund portfolio by altering the portfolio's market (systematic) exposure in lieu of trading the underlying cash market securities through purchases or short sales, or both, of appropriate derivatives; [Asset Replication]

(c) Construct portfolios with risk and return characteristics that could not be efficiently created with cash market securities consistently with the objectives in this Policy and in compliance with applicable law; [Covered Calls]

(d) Hedge and control risks so that the Total Fund's risk-return profile is more closely aligned with the Total Fund's targeted risk-return profile through purchases or short sales, or both, of appropriate derivatives; and [Risk Management]

(e) Facilitate transition trading when holdings must be rebalanced or reallocated among permissible investments as a result of changes to applicable benchmark indexes or policy changes.”

- [Label in Green] denotes Uses



Permitted Instrument Types

- ❑ Each of the Investment Management Division's Instrument Types are authorized by the Investment Policy Statement:

Section 2.2 Authorized Investments

“(e) Exchange-traded futures contracts, options contracts, and options on futures contracts in order to efficiently manage or reduce the risk of the overall investment portfolio, or both, in accordance with this Policy and applicable law. [Futures, Options]

(f) Over-the-counter swap and option agreements, including but not limited to total return swaps, interest rate swaps, credit default swaps, and currency swaps, to efficiently manage or reduce the risk of the overall investment portfolio, or both. The Fund may also use forward agreements and any other instrument commonly used by institutional investors to manage institutional investment portfolios, in accordance with this Policy and applicable law.” [Swaps, Forwards, Other]

- ❑ [Label in Green] denotes Instrument Types

Trust Derivatives Management (cont'd)

Monitoring and Managing Risk



Pricing Risk

- ❑ Daily pricing
- ❑ Assessed by how easily the Trust can obtain independent pricing
- ❑ The Trust's concentrations to Level I, Level II and Level III assets are monitored by the Valuation Committee
 - As of December 31, 2011, 100% of Trust derivatives pricing is Level I or Level II
 - Level I – can obtain a price quote through an active market (generally, exchange traded derivatives)
 - Level II – observable market data is sufficiently applicable to allow a fair value to be estimated (generally, over the counter derivatives)
 - Level III – the inputs for determining the fair value of the assets are unobservable (no derivatives)



Pricing Risk (cont'd)

- ❑ Exchange Traded Derivatives Pricing Process
 - Custodian bank obtains security pricing from TRS approved vendor on a daily basis
 - Custodian reconciles pricing per vendor to pricing per futures commission merchant on a daily basis
 - Custodian performs missing price and stale price checks on a daily basis
 - TRS reconciles market value with custodian and futures commission merchant on a daily basis
 - Price discrepancies are escalated between custodian and TRS on a daily basis
 - Performance return and derivatives exposure reports are prepared and reviewed on a daily basis
- ❑ Over The Counter Derivatives Pricing Process
 - Custodian bank obtains security pricing from TRS approved vendor on a daily basis
 - Custodian performs price tolerance, missing and stale pricing checks on a daily basis
 - Custodian reconciles current market value to counterparty on a monthly or as-traded basis
 - TRS reconciles market value with custodian on a daily basis
 - Price discrepancies are escalated between custodian and TRS on a daily basis
 - At each reset, TRS reconciles all security economic details with counterparty and custodian
 - Performance return and derivative exposure are prepared and reviewed on a daily basis

Trust Derivatives Management (cont'd)

Monitoring and Managing Risk



Market Risk

- ❑ Managed by monitoring derivatives directly
 - Notional and Mark-To-Market Exposure
 - Value at Risk
- ❑ Also managed by monitoring derivatives indirectly as a part of standard portfolio management processes:
 - Tracking Error – External Managers, SPNs, Hedge Fund Replication
 - Trust Asset Allocation Limits – TAA
 - Volatility – QVF
 - Value at Risk – Total Trust

Modeling Risk

- ❑ All derivatives (except options) are explicitly linked one-for-one with underlying instruments
 - For example, a Total Return Swap or a Future on the S&P 500 has substantially the same return as owning the 500 individual equity securities
- ❑ The exception is Options which are modeled using industry standard pricing models (Black-Scholes)



Liquidity Risk

- ❑ Need for collateral posting for mark-to-market exposures, while reducing counterparty risk, adds liquidity risk to the Trust
 - Collateral is posted in the form of cash and US Treasuries
 - This risk is managed by comparing the amount of drawdown risk (Value at Risk) within the derivatives portfolio with sources of available liquidity on a daily and monthly time horizon
- ❑ A primary motivation for most of the Trust's derivatives usage is because of the superior liquidity of the derivative versus the underlying instrument
 - Futures, Forwards – generally more liquid than the underlying instrument
 - Swaps – generally more liquid than the underlying instrument with the exception of Enhanced Swaps which are less liquid than the futures or other markets they reference
 - Options – less liquid than the underlying instrument

Trust Derivatives Management (cont'd)

Monitoring and Managing Risk



Legal Risk

- Two in-house attorneys (plus, an additional attorney will be cross-trained in derivatives)
- Outside counsel (Fulbright & Jaworski)
- Various Investment Management Division staff with derivatives documentation experience

Leverage

- Leverage is monitored and managed explicitly by monitoring the gross and net exposure levels
- Leverage can result in an increase to market risk and liquidity risk and so is monitored using VaR, other market risk measures and monitoring of existing Trust liquidity

Counterparty Risk

- All derivatives must be either exchange traded or traded using ISDA documentation
- All ISDA counterparties must be rated at A- or A3 (as applicable) by Fitch, Moody's or S&P
 - Additional credit enhancement is provided by collateral posting requirements under ISDA Credit Support Annexes
- Credit ratings, credit default swap levels, financial risk measures and exposures are monitored in the "Counterparty Risk Report"
 - Exposure by counterparty is actively monitored and counterparty usage is adjusted as counterparty credit or market conditions warrant

Derivatives Usage by Portfolio

Gross Notional and Net Notional



\$, millions	Gross Notional								Net Notional							
	PSE				External				PSE				External			
	TAA	Passive	HF Replic	QVF	SPN	Managers	Other	Total	TAA	Passive	HF Replic	QVF	SPN	Managers	Other	Total
Commodities	249.4	50.2	-	-	114.6	-	-	414.3	249.4	50.2	-	-	114.6	-	-	414.3
Emerging Markets	-	-	-	-	211.3	-	-	211.3	-	-	-	-	211.3	-	-	211.3
Non-Us Developed	-	-	-	-	290.6	-	-	290.6	-	-	-	-	198.8	-	-	198.8
Qar Non Credit	-	-	-	7.3	-	7.0	-	14.3	-	-	-	4.6	-	(1.0)	-	3.6
Small Cap	-	712.9	-	-	-	-	-	712.9	-	712.9	-	-	-	-	-	712.9
Us Treasury	-	-	-	-	307.7	-	-	307.7	-	-	-	-	(4.2)	-	-	(4.2)
World Equity	-	-	-	-	-	136.8	-	136.8	-	-	-	-	-	(133.7)	-	(133.7)
Directional Hedge Funds	-	-	361.7	-	-	-	-	361.7	-	-	361.7	-	-	-	-	361.7
Large Cap Growth	-	-	-	-	140.0	-	-	140.0	-	-	-	-	-	-	-	-
Credit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Large Cap Value</u>	-	-	-	-	71.5	-	-	71.5	-	-	-	-	(23.0)	-	-	(23.0)
Total Swaps	249.4	763.2	361.7	7.3	1,135.8	143.7	-	2,661.1	249.4	763.2	361.7	4.6	497.5	(134.7)	-	1,741.7
Emerging Markets	443.9	-	-	-	41.4	-	-	485.3	443.9	-	-	-	9.8	-	-	453.7
Global Developed Debt	-	-	-	-	229.9	-	-	229.9	-	-	-	-	100.2	-	-	100.2
Global Tips	-	-	-	-	46.6	-	-	46.6	-	-	-	-	(18.2)	-	-	(18.2)
Large Cap Growth	2,255.2	856.7	-	-	111.5	-	-	3,223.4	1,969.2	733.6	-	-	13.7	-	-	2,716.6
Large Cap Value	421.0	2,970.4	-	-	107.6	-	-	3,499.0	(283.3)	(1,999.4)	-	-	54.4	-	-	(2,228.4)
Non-Us Developed	393.1	-	-	-	344.0	-	-	737.1	(393.1)	-	-	-	120.6	-	-	(272.4)
Qar Non Credit	-	-	-	123.2	-	13.2	-	136.4	-	-	-	(3.8)	-	(1.6)	-	(5.4)
Small Cap	1,245.0	-	-	-	100.0	-	-	1,345.1	(1,203.2)	-	-	-	47.6	-	-	(1,155.6)
Us Treasury	1,030.5	692.2	-	-	479.1	-	-	2,201.9	(1,030.5)	692.2	-	-	251.0	-	-	(87.3)
World Equity	-	-	-	-	-	33.1	-	33.1	-	-	-	-	-	0.4	-	0.4
Investment Grade Credit	-	-	-	-	5.3	-	-	5.3	-	-	-	-	(5.3)	-	-	(5.3)
<u>Directional Hedge Funds</u>	-	-	2,205.7	-	-	-	-	2,205.7	-	-	951.9	-	-	-	-	951.9
Total Futures	5,788.7	4,519.3	2,205.7	123.2	1,465.4	46.2	-	14,148.7	(497.0)	(573.6)	951.9	(3.8)	573.8	(1.2)	-	450.1
<u>Real Assets</u>	-	-	-	-	-	-	30.5	30.5	-	-	-	-	-	-	(30.5)	(30.5)
Total Options	-	-	-	-	-	-	30.5	30.5	-	-	-	-	-	-	(30.5)	(30.5)
Emerging Markets	55.8	-	-	-	-	-	-	55.8	55.8	-	-	-	-	-	-	55.8
Non-US Developed	34.6	-	-	-	-	-	-	34.6	(34.6)	-	-	-	-	-	-	(34.6)
<u>Qar Non Credit</u>	-	-	-	0.9	-	-	-	0.9	-	-	-	(0.9)	-	-	-	(0.9)
Non-Currency Forwards/Other	90.5	-	-	0.9	-	-	-	91.4	21.2	-	-	(0.9)	-	-	-	20.3
Euro	383.2	-	127.5	-	197.9	186.0	-	894.7	(106.4)	-	(103.1)	-	(82.7)	(166.5)	-	(458.7)
Japanese Yen	327.3	-	139.3	-	37.6	213.8	-	718.0	(90.2)	-	117.0	-	3.3	(127.9)	-	(97.9)
UK Pound	345.2	-	321.6	-	110.7	103.3	-	880.7	(94.9)	-	252.0	-	(15.0)	(59.8)	-	82.3
Canadian Dollar	181.8	-	167.5	-	68.8	41.3	-	459.4	(51.0)	-	140.5	-	23.0	26.1	-	138.6
Other Non-US Developed	759.3	158.8	-	-	307.2	177.7	-	1,403.0	308.7	0.2	-	-	22.5	53.0	-	384.4
<u>Emerging Markets</u>	<u>210.5</u>	<u>83.7</u>	<u>-</u>	<u>-</u>	<u>141.9</u>	<u>131.2</u>	<u>-</u>	<u>567.3</u>	<u>203.7</u>	<u>(0.1)</u>	<u>-</u>	<u>-</u>	<u>(25.1)</u>	<u>47.3</u>	<u>-</u>	<u>225.8</u>
Total Currency Forwards	2,207.2	242.4	756.0	-	864.1	853.3	-	4,923.1	169.9	0.1	406.4	-	(74.1)	(227.7)	-	274.5
TOTAL	8,335.9	5,524.9	3,323.4	131.4	3,465.3	1,043.3	30.5	21,854.8	(56.5)	189.7	1,720.0	(0.1)	997.1	(363.7)	(30.5)	2,456.0

Derivatives Usage by Portfolio (cont'd)

Mark to Market and Tenor (Months)



\$, millions	Mark to Market								Expiration Date (Months)							
	PSE				External				PSE				External			
	TAA	Passive	HF Replic	QVF	SPN	Managers	Other	Total	TAA	Passive	HF Replic	QVF	SPN	Managers	Other	Total
Commodities	(3.5)	0.0	-	-	1.6	-	-	(1.9)	0.1	1.8	-	-	5.9	-	-	1.9
Emerging Markets	-	-	-	-	(0.6)	-	-	(0.6)	-	-	-	-	9.9	-	-	9.9
Non-US Developed	-	-	-	-	6.8	-	-	6.8	-	-	-	-	7.4	-	-	7.4
Oar Non Credit	-	-	-	(0.6)	-	0.1	-	(0.5)	-	-	-	0.1	-	25.3	-	12.4
Small Cap	-	(4.2)	-	-	-	-	-	(4.2)	-	1.2	-	-	-	-	-	1.2
US Treasury	-	-	-	-	0.1	-	-	0.1	-	-	-	-	85.6	-	-	85.6
World Equity	-	-	-	-	-	(1.6)	-	(1.6)	-	-	-	-	-	7.8	-	7.8
Directional Hedge Funds	-	-	(0.6)	-	-	-	-	(0.6)	-	-	1.2	-	-	-	-	1.2
Large Cap Growth	-	-	-	-	(1.7)	-	-	(1.7)	-	-	-	-	6.1	-	-	6.1
Credit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Large Cap Value</u>	-	-	-	-	(0.2)	-	-	(0.2)	-	-	-	-	11.5	-	-	11.5
Total Swaps	(3.5)	(4.2)	(0.6)	(0.6)	5.9	(1.5)	-	(4.5)	0.1	1.3	1.2	0.1	29.0	8.6	-	13.4
Emerging Markets	0.9	-	-	-	0.6	-	-	1.5	1.6	-	-	-	1.9	-	-	1.6
Global Developed Debt	-	-	-	-	1.4	-	-	1.4	-	-	-	-	2.4	-	-	2.4
Global Tips	-	-	-	-	0.3	-	-	0.3	-	-	-	-	2.7	-	-	2.7
Large Cap Growth	6.9	4.8	-	-	(0.1)	-	-	11.7	2.5	2.5	-	-	2.5	-	-	2.5
Large Cap Value	(5.3)	(37.6)	-	-	0.7	-	-	(42.3)	2.5	2.5	-	-	2.5	-	-	2.5
Non-US Developed	1.2	-	-	-	1.6	-	-	2.8	1.6	-	-	-	2.3	-	-	1.3
Oar Non Credit	-	-	-	(0.1)	-	(0.0)	-	(0.2)	-	-	2.6	-	2.0	-	-	2.6
Small Cap	(7.2)	-	-	-	1.1	-	-	(6.1)	2.5	-	-	-	2.5	-	-	2.5
US Treasury	(18.4)	11.2	-	-	4.6	-	-	(2.7)	2.7	2.7	-	-	2.7	-	-	2.7
World Equity	-	-	-	-	-	(0.0)	-	(0.0)	-	-	-	-	-	2.4	-	2.4
Investment Grade Credit	-	-	-	-	(0.0)	-	-	(0.0)	-	-	-	-	2.7	-	-	2.7
<u>Directional Hedge Funds</u>	-	-	(3.4)	-	-	-	-	(3.4)	-	-	2.9	-	-	-	-	2.9
Total Futures	(22.0)	(21.6)	(3.4)	(0.1)	10.1	(0.0)	-	(37.0)	2.2	2.5	2.9	2.6	2.5	2.3	-	2.2
<u>Real Assets</u>	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	2.4	2.4
Total Options	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	2.4	2.4
Emerging Markets	(1.2)	-	-	-	-	-	-	(1.2)	1.7	-	-	-	-	-	-	1.7
Non-US Developed	(1.3)	-	-	-	-	-	-	(1.3)	2.5	-	-	-	-	-	-	2.5
Oar Non Credit	-	-	-	(0.0)	-	-	-	(0.0)	-	-	-	2.5	-	-	-	2.5
Non-Currency Forwards/Other	(2.5)	-	-	(0.0)	-	-	-	(2.5)	2.0	-	-	2.5	-	-	-	2.0
Euro	6.0	-	4.0	-	1.0	5.6	-	16.7	2.4	-	2.4	-	0.9	2.1	-	2.0
Japanese Yen	(0.6)	-	1.1	-	(0.0)	(2.2)	-	(1.7)	2.4	-	2.4	-	0.5	1.6	-	2.0
UK Pound	1.3	-	(2.6)	-	(0.0)	1.0	-	(0.3)	2.4	-	2.4	-	0.5	1.9	-	2.1
Canadian Dollar	0.7	-	0.2	-	0.4	0.2	-	1.5	2.4	-	2.4	-	0.8	1.5	-	2.1
Other Non-US Developed	1.9	(0.2)	-	-	(0.2)	(0.6)	-	0.8	2.4	2.4	-	-	0.5	1.5	-	0.5
<u>Emerging Markets</u>	<u>0.9</u>	<u>0.1</u>	<u>-</u>	<u>-</u>	<u>0.4</u>	<u>1.0</u>	<u>-</u>	<u>2.5</u>	<u>2.4</u>	<u>2.4</u>	<u>-</u>	<u>-</u>	<u>0.6</u>	<u>3.9</u>	<u>-</u>	<u>0.6</u>
Total Currency Forwards	10.1	(0.1)	2.8	-	1.6	5.1	-	19.5	2.4	2.4	2.4	-	0.6	2.1	-	2.0
TOTAL	(17.8)	(25.9)	(1.2)	(0.8)	17.6	3.5	0.1	(24.5)	2.2	2.3	2.6	2.5	10.7	3.0	2.4	3.5

Hedge Fund Use of Derivatives

- ❑ The Trust invests in Hedge Funds through limited partnerships with derivatives usage and management that is independent from the Trust and is separately monitored
- ❑ Hedge funds commonly use derivatives as a form of risk management as well as instruments for expressing trade ideas in a cost effective way. The primary types of derivatives used by hedge funds include options, futures, forwards and swaps
 1. **Portfolio level hedging.** Reducing market exposures and mitigating tail risk.
 - Examples: Out of the money puts on market indices to hedge long biased equity exposure, interest rate swaps to hedge interest rate risk
 2. **Position level hedging.** Mitigating risks associated with individual securities.
 - Examples: CDS on individual credits to hedge counterparty risk, selling commodity futures to hedge long equity position with exposure to specific commodity
 3. **Expression of directional or relative value trade ideas.** Cost effective way of expressing tactical views. Mispricings among derivatives present alpha opportunities
 - Examples: long/short index futures, long short dated Treasury futures versus short long dated Treasury futures, long/short commodity future with a certain maturity versus another maturity
 4. **Form of Leverage.** As an alternative to cash instruments, exposures are based on notional amounts, reducing the amount of equity required for a trade