



INVESTMENT MANAGEMENT COMMITTEE



September 2013

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

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

AGENDA

**September 12, 2013 – 8:30 a.m.
TRS East Building, 5th Floor, Boardroom**

*The September 12-13, 2013 meetings of the TRS Board of Trustees and Investment Management Committee will be held by telephone conference call as authorized under Texas Government Code Section 551.130. The Board and Investment Management Committee intend to have quorums physically present at **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 13, 2013 committee meeting – Committee Chair.
2. Review of the External Public Markets Portfolio – Dale West.
3. Receive a presentation on the five year anniversary of the Public Markets Strategic Partnership Network (SPN) – David Veal.
4. Discuss the process for developing new internal portfolios – Mohan Balachandran.
5. Discuss risk parity – James Nield.

NOTE: The Board of Trustees (Board) of the Teacher Retirement System of Texas will not consider or act upon any item before the Investment Management Committee (Committee) at this meeting of the Committee. This meeting is not a regular meeting of the Board. However, because the full Investment 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.

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Tab 1

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Minutes of the Investment Management Committee

June 13, 2013

The Investment Management Committee of the Board of Trustees of the Teacher Retirement System of Texas met on June 13, 2013 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:

Todd Barth, Chair
David Kelly
Eric McDonald
Nanette Sissney

A quorum of the committee was present. Others present:

Karen Charleston, TRS Trustee	Hugh Ohn, TRS
Charlotte Clifton, TRS Trustee	John Ritter, TRS
Chris Moss, TRS Trustee	Molly Rose, TRS
Anita Palmer, TRS Trustee	Noel Sherman, TRS
Brian Guthrie, TRS	Sharon Toalson, TRS
Britt Harris, TRS	David Veal, TRS
Ken Welch, TRS	Angela Vogeli, TRS
Mark Albert, TRS	Susan Wade, TRS
Jerry Albright, TRS	Dr. Keith Brown, Investment Advisor
Thomas Albright, TRS	Steven Huff, Fiduciary Counsel
Jase Auby, TRS	Steve Voss, Hewitt EnnisKnupp
Mohan Balachandran, TRS	Brady O'Connell, Hewitt EnnisKnupp
Amy Barrett, TRS	Ronnie Jung, Texas Retired Teachers Association
Sylvia Bell, TRS	Tim Lee, Texas Retired Teachers Association
Vaughn Brock, TRS	Ann Fickel, Texas Classroom Teachers Association
Chi Chai, TRS	Meredyth Fouler, Office of Speaker Straus
David DeStefano, TRS	Juan V. Garcia, Office of the Governor
Dennis Gold, TRS	Dan Pickering, Tudor, Pickering, Holt & Co.
Brian Gomolski, TRS	Sam Oh, Apollo
Rich Hall, TRS	Josh Harris, Apollo
Caroline Hansard, TRS	Jeremy Bergman, Apollo
Malorie Harding, TRS	Nick Ballard, Pension Review Board
Dan Herron, TRS	Alan Bunsen, Bridgewater
Dan Junell, TRS	Jim Bauer, UniteHere
Eric Lang, TRS	Mark Schafer, State Street
Lynn Lau, TRS	Jeff Lambert, State Street
Scot Leith, TRS	Craig teDuits, State Street
Jaime Llano, TRS	Paul Yett, Hamilton Lane
Denise Lopez, TRS	Bryan Ryland, Hamilton Lane
Shayne McGuire TRS	

Mr. Barth called the meeting to order at 8:45 a.m.

1. Consider the approval of the proposed minutes of the April 18, 2013 committee meeting – Todd Barth.

On a motion by Mr. McDonald, seconded by Mr. Kelly, the committee approved the minutes of the April 18, 2013 meeting as presented.

2. Receive an update and review of Private Equity – Rich Hall.

Mr. Hall provided an update on the Private Equity Portfolio. As of December 31, 2012, he said, the portfolio outperformed the State Street Private Equity Index over the one-year, three-year, and 10-year periods, and ranked number one in the peer group over the 10-year period. He stated that private equities diversified the trust and generated stronger-than-expected returns with lower-than-expected risk. Based on the study completed by Hamilton Lane, he stated, the portfolio had generated \$3.9 billion more than if the fund were invested in the public markets of the MSCI All Country World Index. Mr. Hall described the private equity team structure and introduced the team members. He also explained the investment process and long-term funding plan of the portfolio. Per Mr. Barth's request, he explained the process of incorporating the strategic partnership network into the long-term capital plan and funding model of the portfolio.

Mr. Hall presented information for the five-year period ending December 31, 2012 about the asset growth, allocation and returns of the Private Equity Portfolio. Responding to a question from Mr. McDonald, he stated that private equity exposure could be reduced, if needed, by selling in a secondary market. Per Mr. Barth's request, Mr. Hall explained the private equity benchmark, the State Street Private Equity Index. He noted that the drawback of the benchmark as a performance measurement tool was that the portfolio was not as mature as the index, which caused a mismatch between the portfolio and the benchmark. Dr. Brown, Mr. Hall, Mr. Harris and Mr. Kelly discussed the potential for a liquidity premium to be paid in connection with TRS' private equity investments.

Mr. Hall concluded his presentation with an overview of the accomplishments and priorities of the Private Equity Portfolio and the market conditions affecting it.

3. Receive an update and review of Real Assets – Eric Lang.

Mr. Lang provided an update on the Real Assets Portfolio. As of December 31, 2012, he said, the portfolio outperformed the benchmark over the one-year and three-year periods and ranked in the top quartile for the one-year period and second quartile for the three-year period. He noted that the portfolio had grown from \$2 billion to \$14 billion in five years. He stated that real assets provided a partial hedge during reflationary times and typically would not perform well during disinflationary periods. Mr. Lang described the team structure and introduced the team members. He also explained in detail the portfolio structure and investment process. He elaborated on the growth of the portfolio and charted historical returns since the inception of the portfolio in 2006. He summarized the accomplishments of the portfolio in 2012 and its priorities for 2013. He reviewed market conditions, general partner activity, and collaboration with the strategic partnership network. He also discussed principal and other investments in energy and natural resources.

4. Introduction of Energy and Natural Resources Investment Initiative, including the following:

A. Discussion of opportunities and risks associated with investing in energy and natural resources – Sam Oh, Apollo Investment Corporation and Dan Pickering, Tudor, Pickering, Holt & Co.

Mr. Harris reviewed the pros and cons of investing in energy and natural resources (ENR). Mr. Pickering and Mr. Oh detailed their projections on the future of ENR investments. Mr. Pickering and Mr. Oh discussed the prospects of ENR investments with trustees and answered their questions.

After a brief recess at 11:14 a.m., the committee reconvened at 11:27 a.m.

B. Risk review of proposed Energy and Natural Resources strategy – Jase Auby.

Mr. Auby described the proposed ENR strategy and asset allocation. He explained that the proposed new 3% policy allocation to ENR could be made by transferring 1% from the current allocation to private equity and 2% from real assets. He stated that the proposed ENR allocation was intended to improve the trust performance in an inflationary environment. He said that the proposal anticipated increasing the policy allocation to ENR to 5% over time, possibly in 2014. He described a proposed new benchmark for the ENR portfolio. Dr. Brown, Mr. Auby, Mr. Barth, and Mr. Kelly discussed the nature of and rationale for the proposed separate allocation and benchmark for ENR. Mr. Auby stated that the proposed policy changes concerning ENR would be considered by the board in October.

Mr. Barth asked Dr. Brown and Mr. Voss and Mr. O'Connell of Hewitt EnnisKnupp to consider alternatives for implementing an ENR strategy and to report to the board.

C. Energy and Natural Resources Strategic Plan – Vaughn Brock.

Mr. Brock reviewed the ENR strategic plan. He stated that the purpose of establishing the ENR Portfolio was to consolidate investments devoted to energy and natural resources and to assign a team to manage them. He defined energy and natural resources and laid out the timeline of implementation. Presenting current ENR investments across the trust, he stated that TRS had invested about \$9.8 billion in public equity, \$1.7 billion in private equity, \$2.1 in real assets, and \$700 million in gold and precious metals, which totaled about \$14.2 billion or 12% of the trust. He presented the historical growths and current allocation in different types of ENR investments as of March 31, 2013. He introduced the ENR team members and described the ENR portfolio's external relationships. He also presented the investment plan, outlook and opportunities for energy markets. Describing the optimal capital structure, he noted that the advantages of having overriding royalty interests. He stated that the ENR asset allocation was based on inflation sensitivity and projected returns. He noted that the target return would increase to about 16% from the current 14.2% after a reallocation from the gold fund to the higher return zones.

In conclusion, Mr. Brock described the investment plan and updated the committee on its implementation.

The meeting adjourned at 12:50 p.m.

Tab 2

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External Public Markets

Dale West
Managing Director
September 2013

Agenda

1. Performance and Investment Summary
2. Update on 2012 Priorities
3. External Public Markets Team and Processes
4. Long-Oriented Global Equity Update and Manager Case Study
5. Hedge Fund Update
6. 2013 Priorities

1. Executive Summary

As of June 30, 2013

EXTERNAL PUBLIC MARKETS					
Total Assets (\$ millions)	Percent of Trust	1-Year Return	3-Year Return	1-Year Alpha	3-Year Alpha
\$36,006	31.1% ¹	15.6%	10.0%	2.7%	1.0%

PERFORMANCE						
Program	1-Year Return	3-Year Return	1-Year Alpha	3-Year Alpha	1-Year TUCS Peer Quartile	3-Year TUCS Peer Quartile
US Large Cap	21.1%	18.0%	0.4%	-0.5%	2 nd	2 nd
US Small Cap	24.0%	18.4%	-1.9%	-1.5%	3 rd	2 nd
Non-US Developed	19.5%	8.8%	2.5%	-0.6%	2 nd	3 rd
Emerging Markets	5.8%	4.1%	2.9%	0.7%	2 nd	3 rd
World Equity	20.8%	13.4%	4.2%	1.0%	2 nd	2 nd
Total Hedge Funds	8.9%	4.5%	1.8%	1.0%		
Stable Value Hedge Funds	5.5%	n/a	-1.4%	n/a		
Directional Hedge Funds	12.1%	n/a	4.9%	n/a		
Other Absolute Return	78.6%	27.1%	76.3%	24.7%		

ASSETS (\$ MILLIONS)					
Program	June 2012 Assets	Net Cash Flows	June 2013 Assets	June 2013 % of Trust	Long-Term Target % of Trust
External Managers	\$22,585	-\$58	\$26,443	22.8%	22.5%
US Large Cap (10 managers)	7,135	-591	7,965	6.9%	6.2%
US Small Cap (7 managers)	1,675	42	2,127	1.8%	1.6%
Non-US Developed (7 managers)	4,063	773	5,761	5.0%	4.6%
Emerging Markets (7 managers)	6,139	-307	6,250	5.4%	6.1%
World Equity (4 managers)	3,573	24	4,340	3.7%	4.0%
Hedge Funds	\$7,165	\$1,563	\$9,434	8.1%	9.0%
Stable Value (15 funds)	3,862	220	4,293	3.7%	4.0%
Directional (23 funds)	3,303	1,343	5,141	4.4%	5.0%
Other Absolute Return (1)	\$1,270	-\$1,387	\$129	0.1%	0.0%

¹31.1% includes fund-based investments, including hedge funds. Agency agreements remain below 30% legislative mandate.

Source: State Street Bank

Note: Performance is annualized and net of fees



1. Investment Highlights

- Alpha goals achieved on a 1- and 3-year basis
 - Six of eight portfolios generated positive 1-year alpha
 - More than \$750 million in added value over 12 months
- Strong hedge fund performance since October 2011 split
 - Strong absolute and relative performance of Directional Hedge Funds
 - Stable Value Hedge Funds portfolio fulfilling its diversification role
- Portfolio build-out substantially completed
 - Long-oriented global equity and hedge fund portfolios are now in place

2. Update on 2012 Top Priorities

2012 Goals	Actual	Explanation		
Generating alpha across all portfolios	<ul style="list-style-type: none"> 1-year and 3-year alpha generated by Total External Public Markets program 1-year alpha achieved in 6 of 8 portfolios 3-year alpha achieved in Emerging Markets, World Equity, Hedge Funds and Dislocated Credit 3-year alpha not achieved in US Large Cap, US Small Cap and Non-US Developed 	<u>As of June 30, 2013</u> US Large Cap US Small Cap Non-US Developed Emerging Markets World Equity Total Hedge Funds Directional Hedge Funds Stable Value Hedge Funds Other Absolute Return Total External Public Markets	<u>1-Year Alpha</u> 0.4% -1.9% 2.5% 2.9% 4.2% 1.8% 4.9% -1.4% 76.3%	<u>3-Year Alpha</u> -0.5% -1.5% -0.6% 0.7% 1.0% 1.0% n/a n/a 24.7% 1.0%
Providing diversification for the Trust with our Hedge Fund investments	<ul style="list-style-type: none"> Directional and Stable Value hedge fund portfolios are providing diversifying return streams to the Trust 	<u>October 2011 - June 2013</u> Directional HF Portfolio MSCI AC World Index Stable Value HF Portfolio Long-term US Treasuries	<u>Return</u> 8.6% 17.2% 2.9% -1.6%	<u>Volatility</u> 4.5% 13.7% 2.6% 11.6%
Continuing the integration and cooperation with other IMD teams	<ul style="list-style-type: none"> Joint effort with Risk team on Risk Parity and Reinsurance strategies Two-way information sharing with IPM on managers in the Global Equity Portfolio 	<ul style="list-style-type: none"> \$514 million invested in external Risk Parity Strategies IIC approval of Reinsurance manager Cooperating with Stable Value Team on emerging market bond trade 		
Completing public markets Emerging Manager program	<ul style="list-style-type: none"> Completed programs for long-oriented and hedge fund emerging managers Transferred to dedicated unit 	Public Markets Emerging Managers Long-Oriented Equity Hedge Funds	<u>Firms</u> 7 9	<u>Invested (\$ millions)</u> \$138 \$99
Developing ability and structures to act opportunistically	<ul style="list-style-type: none"> Several innovative structures with existing managers to optimize value-added to TRS 	<ul style="list-style-type: none"> Examples: <ul style="list-style-type: none"> Opportunistic pre-commitment with fee discount Conversion from main fund to customized account 		

3. External Public Markets Team



Dale West, CFA
Managing Director
MBA, Stanford

INVESTMENTS TEAM



Susanne Gealy, CAIA
Director, Global Equity
MBA, University of Chicago



Brad Gilbert, CFA, CAIA
Director, Hedge Funds
BBA, UT Austin



Katy Hoffman
Director
MBA, Vanderbilt



Joel Hinkhouse, CFA
Sr. Investment Manager
MBA, University of Chicago



Lulu Llano, CFA
Sr. Associate
BBA, UT Austin



Steven Wilson
Associate
MBA, Rice



Rachel Clark
Sr. Analyst
BA, UT Austin



Mikhael Rawls
Sr. Analyst
AB, Harvard



Scott Gonsoulin
Sr. Analyst
MS, Texas A&M



Nick Croix
Contract Analyst
MS, UT Austin

ANALYTICS TEAM



Joe Tannehill, CFA
Sr. Investment Manager
MBA, UNC Chapel Hill



Kyle Schmidt
Associate
MBA, SMU



Patty Steinwedell
Analyst
BA, North Carolina State



Courtney Dunn
Analyst
BBA, UT San Antonio

CONSULTANTS AND ADVISORS

Albourne, Hewitt EnnisKnupp, Investcorp, Rock Creek Group

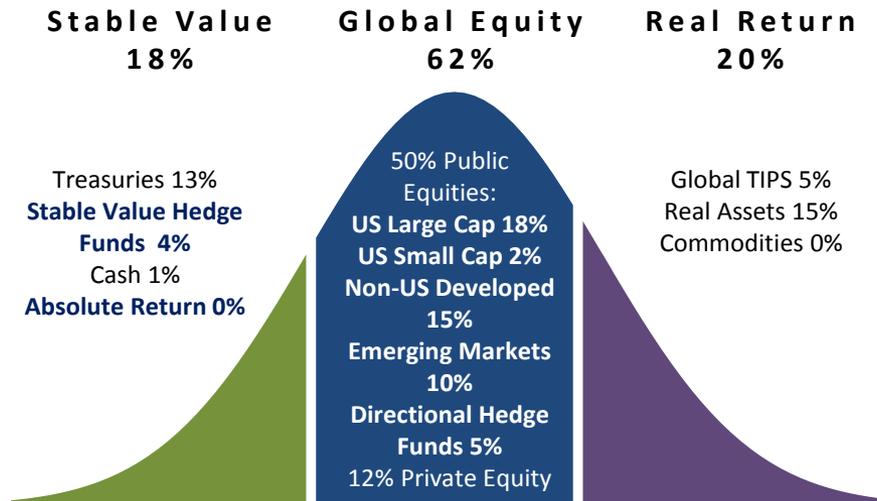
RELATIONSHIP MANAGEMENT



Jon Klekman
Analyst
BA, SUNY Binghamton

3. External Public Markets Portfolio Role

- Legislative cap for Agency Agreements: 30%
 - Does not include fund-based investments such as hedge funds
- Legislative cap for Hedge Funds: 10%
- Target tracking error for external Global Equity portfolios: 3-5%
 - Internal Global Best Ideas (GBI): 0-2%



Source: State Street Bank

Program	Long-Term Target	Percent of Trust 6/30/2013	Percent of Trust 6/30/2012
External Managers	22.5%	22.8%	20.7%
US Large Cap	6.2%	6.9%	6.6%
US Small Cap	1.6%	1.8%	1.5%
Non-US Developed	4.6%	5.0%	3.7%
Emerging Markets	6.1%	5.4%	5.6%
World Equity	4.0%	3.7%	3.3%
Hedge Funds	9.0%	8.1%	6.6%
Stable Value	4.0%	3.7%	3.5%
Directional	5.0%	4.4%	3.0%
Other Absolute Return	0.0%	0.1%	1.2%
Total	31.5%	31.1%	28.5%

3. Delegation Authority Detail

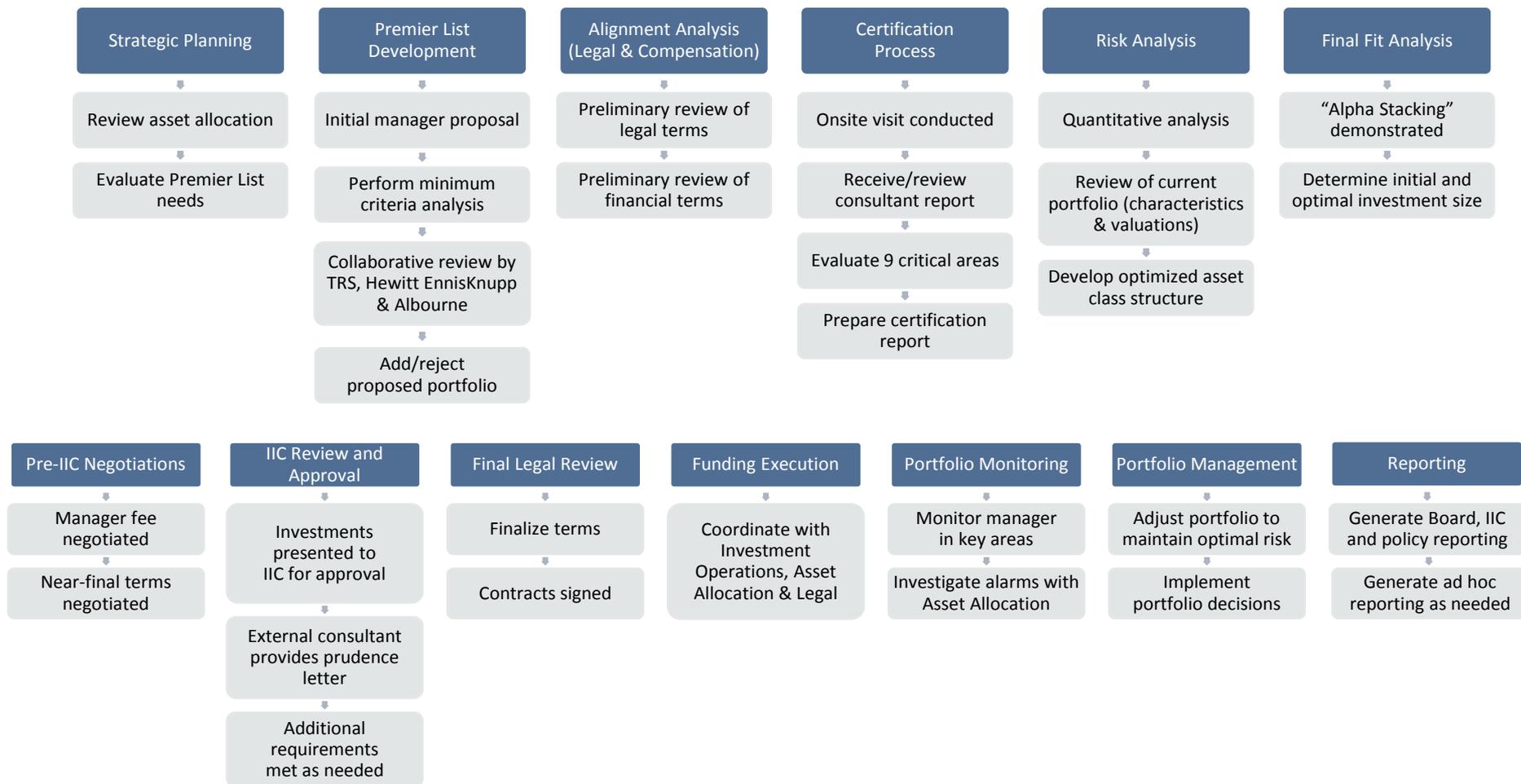
As of June 30, 2013

External Managers	# of Portfolios			Assets (\$ billion)			Percentage of Trust		
	Agency	LP	Total	Agency	LP	Total	Agency	LP	Total
US Large Cap	8	2	10	\$6.7	\$1.2	\$7.9	5.8%	1.0%	6.8%
US Small Cap	4	3	7	\$1.2	\$0.9	\$2.1	1.0%	0.8%	1.8%
Non-US Developed	4	3	7	\$3.3	\$2.2	\$5.5	2.8%	1.9%	4.7%
Emerging Markets	6	1	7	\$5.3	\$0.9	\$6.2	4.6%	0.8%	5.4%
World Equity	4	0	4	\$4.3	\$0.0	\$4.3	3.7%	0.0%	3.7%
Total Equity	26	9	35	\$20.9	\$5.2	\$26.1	18.0%	4.5%	22.5%
Other Absolute Return	0	1	1	\$0.0	\$0.1	\$0.1	0.0%	0.1%	0.1%
Public Market SPN	5		5	\$6.0		\$6.0	5.2%		5.2%
Other	2		2	\$0.4		\$0.4	0.4%		0.4%
Totals	33	10	43	\$27.3	\$5.3	\$32.7	23.6%	4.6%	28.2%

- 23.6% of the 30% Agency Agreement authority is currently utilized

3. External Public Critical Process

Texas Way



3. Investment Process

Texas Way

Organization	Investment Process	Performance	Portfolio Exposure
History	Benchmark	Beta	Country
Investment Philosophy	Objective	Correlation	Market Capitalization
Culture	Style	CUSUM	Policy Violations
Competitive Advantage	Region	Environmental Analysis	Fund Positions
Key Personnel	Instruments	Fund Track Record	
Professional Team	Idea Generation	Hit Ratio	
Ownership	Portfolio Construction	Information Ratio	
Compensation Philosophy	Strategy Implementation and Research	Maximum Drawdown	
Conflicts of Interest	Portfolio Concentration	Performance	
Employee Turnover	Portfolio Monitoring	Portfolio Volatility	
Succession Plan	Hedging	Up/Down Capture	
Firm Infrastructure		Sharpe Ratio	
Long-term Solvency			
Firm Assets			
Target Assets			
Subscription Capacity			
Client Base			
Placement Agent			

Risk Management	Diversification Impact	Fund Terms	Operation Check	Transparency
Market Risk Factors	Versus Peers	Fees	Pricing	Transparency Level
Leverage	Versus Asset Class	Hurdle Rate	Settlement Process	Transparency Frequency
Drawdown History	Versus Internal	Lock Up Period	Back Office	
Liquidity	Versus Fund	Early Redemption Penalty	Prime Brokers	
Risk Management Systems		High Water Mark	Administrator	
Audit History		Redemption Gate	Counterparty Exposure	
		Redemption Notice	Legal Resources	
		Redemption Period	Consultant Report	
		Subscription Period	Reference Check	
		Hedge Fund Test	Background Check	

4. Update on Long-Oriented Global Equity Portfolio

Long-Oriented Global Equity Portfolios

As of 6/30/2013

	Assets (\$ millions)	Return (1 yr)	Alpha (1 yr)
US Large Cap	\$7,965	21.1%	0.4%
<i>MSCI USA</i>		<i>20.7%</i>	
US Small Cap	\$2,127	24.0%	-1.9%
<i>MSCI USA Small Cap</i>		<i>25.9%</i>	
Non-US Developed	\$5,761	19.5%	2.5%
<i>MSCI EAFE + Canada</i>		<i>17.1%</i>	
Emerging Markets	\$6,250	5.8%	2.9%
<i>MSCI Emerging Markets</i>		<i>2.9%</i>	
World Equity	\$4,340	20.8%	4.2%
<i>MSCI AC World</i>		<i>16.6%</i>	

- Active management generated strong results in the year ending June 30, 2013
 - \$451 million in value added over passive alternatives
- Three new manager relationships
 - Includes a China specialist manager in the Emerging Markets portfolio
- Two terminations

4. Case Study: Sourcing a Value Manager

- World Equity Portfolio Fit
- Sourcing
- Wellington Capital Management
- Implementation

4. Case Study: World Equity Portfolio Fit

- The External Public Markets World Equity portfolio has a 3-year annualized alpha of 104 bps. However, it has underperformed its benchmark by 37 bps per month in strong environments for Value
- The World Equity portfolio is underexposed to Value as a factor when measured by our risk systems
 - Value has historically produced positive payoffs over the long term
 - This presents a sourcing opportunity

Performance in Value Environments	
EPU World Equity Portfolio	
	<u>Current EPU World Equity Portfolio</u>
Value Environments - Hit Rate	20.0%
Value Environments - Average Excess Return	-37 bps
Value Factor Exposure (Barra)	-0.19

4. Case Study: Sourcing

- We sourced value manager ideas from the Premier List
- We considered several managers, including strategies from existing invested relationships
- We brought two strategies to the Internal Investment Committee for investment approval:
 - Wellington Capital Management
 - D.E. Shaw Investment Management

Performance in Value Environments		
EPU World Equity Portfolio		
	<u>Current EPU World Equity Portfolio</u>	<u>Pro Forma with Recommended Changes</u>
Value Environments - Hit Rate	20.0%	70.0%
Value Environments - Average Excess Return	-37 bps	14 bps
Value Factor Exposure (Barra)	-0.19	-0.06

4. Case Study: Wellington Capital Management

- TRS has been invested in Wellington’s Global Select Capital Appreciation (“GSCA”) strategy since December 2009
 - The GSCA strategy uses a multi-manager approach allocating equally to three Wellington portfolio managers and is largely tilted to growth environments

Net Performance Through June 30, 2013*			
Wellington Global Select Capital Appreciation			
	<u>Portfolio</u>	<u>Benchmark</u>	<u>Difference</u>
			<u>vs. Benchmark</u>
1-Year	25.3%	16.6%	8.7%
2-Year	7.7%	4.4%	3.3%
3-Year	14.4%	12.4%	2.0%
Since Investment	9.4%	7.9%	1.5%

* Returns for periods greater than one year are annualized

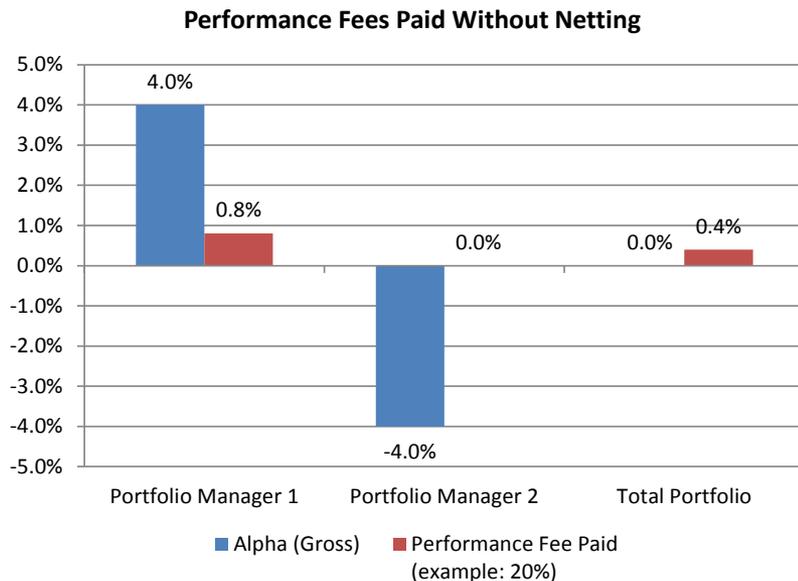
- Wellington employs 547 investment professionals and offers 148 equity strategies, 61 of which were in the top quartile of their respective peer groups
- We are adding two value portfolio managers to our multi-manager investment with Wellington
 - As part of this change, Wellington’s allocation will increase to approximately \$1.6 billion, well within the external manager limit of 3% of trust assets

4. Case Study: Implementation

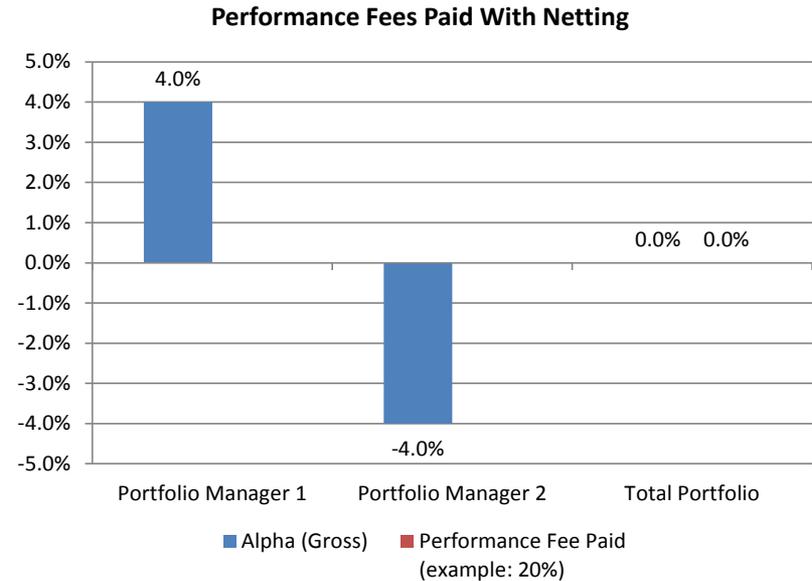
- In addition to adding the two value portfolio managers, TRS will work directly with Wellington in the future to add or remove portfolio managers within the mandate
 - In this adjusted framework, TRS will have access to Wellington's full array of institutional quality portfolio managers
- With the additional capital, TRS has negotiated a fee discount
- Additionally, in this multi-manager framework, performance fees are paid on an aggregated net basis rather than on the performance of each individual manager

4. Case Study: Fee Netting - Example

- The charts below detail how fee netting could benefit TRS, using fictional returns for two equally sized managers:



Performance Fees Paid Without Netting		
	<u>Alpha (Gross)</u>	<u>Performance Fees Paid</u>
Portfolio Manager 1	4.0%	0.8%
Portfolio Manager 2	-4.0%	0.0%
Total Portfolio Without Netting	0.0%	0.4%



Performance Fees Paid With Netting		
	<u>Alpha (Gross)</u>	<u>Performance Fees Paid</u>
Portfolio Manager 1	4.0%	N/A
Portfolio Manager 2	-4.0%	N/A
Total Portfolio With Netting	0.0%	0.0%

5. Hedge Fund Update

Hedge Fund Portfolios

As of 6/30/2013

	<u>Assets</u> (\$ millions)	<u>Return</u> (1 yr)	<u>Alpha</u> (1 yr)
Directional Hedge Funds	\$5,141	12.1%	4.9%
<i>HFRI Fund of Funds Composite</i>		7.2%	
Stable Value Hedge Funds	\$4,293	5.5%	-1.4%
<i>HFRI Fund of Funds Conservative</i>		6.9%	

- In 2011, the Texas Legislature approved an increase in the limit to hedge funds from 5% to 10% of Trust assets
 - As of June 30, 2013, TRS has 8.1% invested in external hedge funds
- The Board approved an increased target allocation from 4% to 9% in September 2011
- The Directional Hedge Fund portfolio was launched in October 2011

5. Directional Hedge Fund Portfolio

Directional Hedge Fund Objectives	Status	Details
Focus on equity and market sensitive hedge funds		<ul style="list-style-type: none"> Correlation to MSCI AC World: 0.8
Core strategies have moderate market sensitivity, lower volatility than equities		<ul style="list-style-type: none"> Beta to MSCI AC World: 0.3 Directional HF Volatility: 4.5% MSCI AC World Volatility: 13.7%
Expected to outperform equities when markets are down, but will underperform strong markets		<ul style="list-style-type: none"> 88% hit rate vs. equity in equity down months Average monthly excess return over equities in down months: 1.7% Inception to date return of 8.6% versus MSCI AC World 17.2%
Expected to outperform US Treasuries over the long term		<ul style="list-style-type: none"> 8.6% vs. Treasuries -1.6%
HFRI Fund of Funds Composite benchmark with target tracking error of 6%		<ul style="list-style-type: none"> 4.2% ahead of HFRI benchmark since inception Tracking Error: 1.6%

Dates: October 2011 to June 2013

Source: State Street Bank

Note: Performance is annualized except where noted and is net of fees

5. Stable Value Hedge Fund Portfolio

Stable Value Hedge Fund Objectives	Status	Details
Focus on absolute return hedge funds		<ul style="list-style-type: none"> Return: 2.9% Average Sharpe Ratio: 1.1
Core strategies have low to negative market sensitivity		<ul style="list-style-type: none"> Beta to MSCI AC World: 0
Expected to have positive returns when markets are down		<ul style="list-style-type: none"> Positive returns in 63% of down equity months since the split (5 of 8 months)
Expected to outperform US Treasuries over the long term		<ul style="list-style-type: none"> 2.9% vs. Treasuries -1.6%
HFRI Fund of Funds Conservative benchmark with target tracking error of 4%		<ul style="list-style-type: none"> Return of 2.9% vs. the HFRI benchmark of 4.3% Tracking Error: 2.6%

Dates: October 2011 to June 2013



Source: State Street Bank

Note: Performance is annualized except where noted and is net of fees

5. TRS Hedge Fund Portfolios: Alpha and Beta

- Analysis to separate the equity market (beta) return and alpha returns of the hedge fund portfolios reveals that both portfolios have produced a positive alpha return
- As expected, the Directional portfolio has a positive beta return while the Stable Value portfolio has a negligible beta return

October 2011 - June 2013	Beta to MSCI AC World	Beta Return	Alpha Return	Total Return
Stable Value HF Portfolio	0.00	0.0%	5.2%	5.2%
HFRI FoF: Conservative Index	0.13	4.2%	3.5%	7.7%
MSCI AC World Index				32.0%

October 2011 - June 2013	Beta to MSCI AC World	Beta Return	Alpha Return	Total Return
Directional HF Portfolio	0.27	8.7%	6.7%	15.4%
HFRI Fund of Funds Composite Index	0.20	6.4%	1.3%	7.7%
MSCI AC World Index				32.0%

Source: State Street Bank, TRS calculations

Note: Performance is cumulative since October 2011 split. Performance is net of fees.

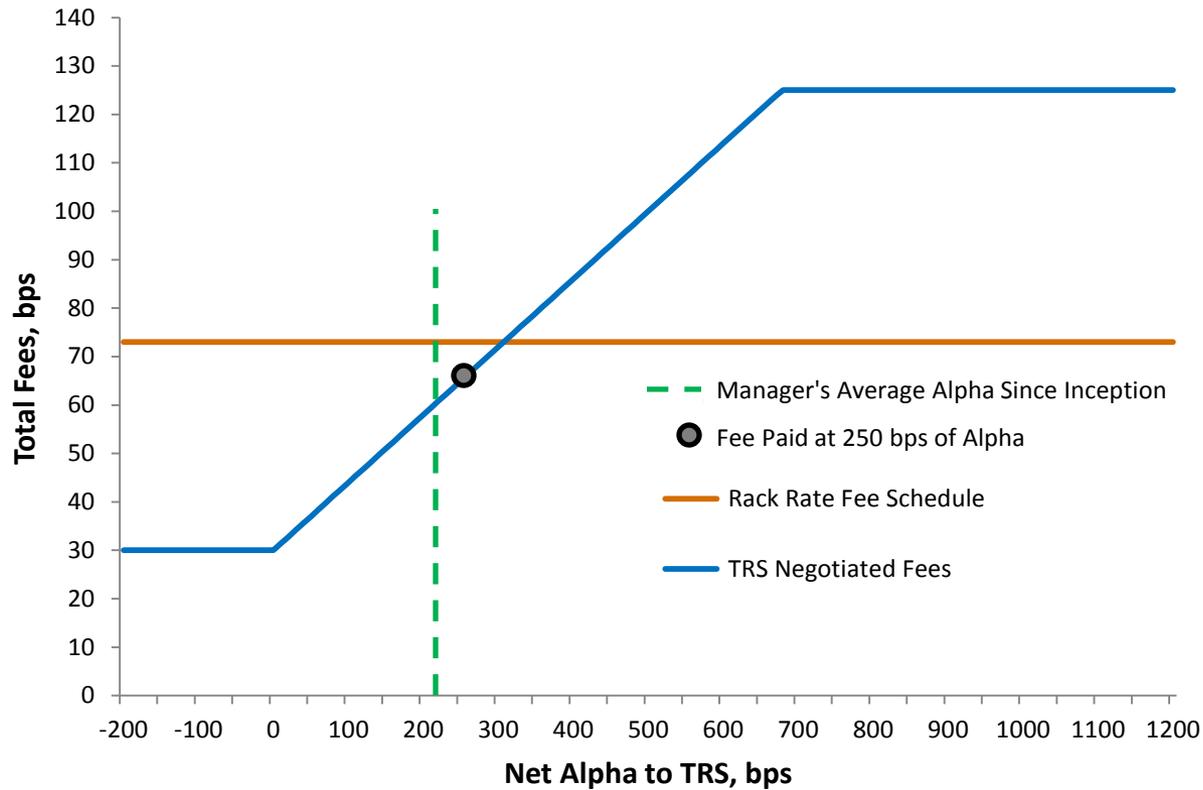
6. 2013 Priorities

- Generating alpha across all portfolios
- Continuing to develop the External Public team
 - Cross-training within investment team
 - EPU Wiki
- Moving from manager selection to strategic collaboration
- Continuing integration and cooperation with other IMD teams

APPENDIX

Preferred Fee Arrangement Example

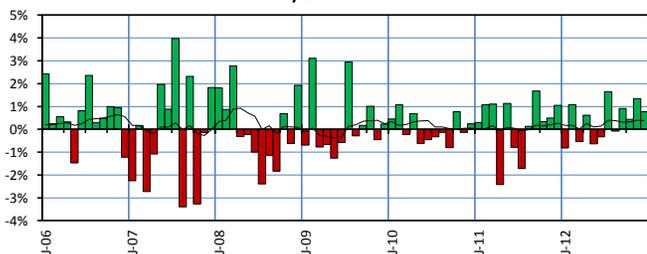
US Small Cap Manager



Statistical Tracking And Reporting (STAR) System
 External Public Emerging Markets Manager vs. >STAR EM 00 - MSCI EM Net (NDUEEGF)
 Monthly Data from 7/06 to 6/13

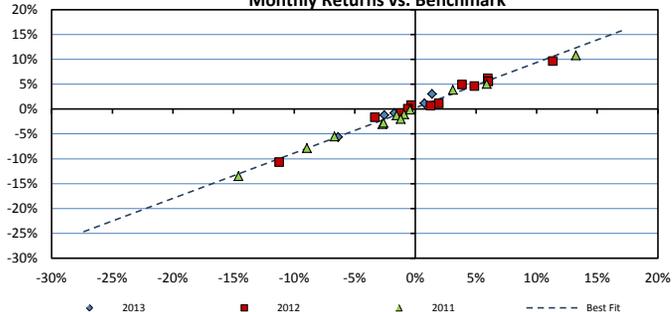


Monthly Excess Returns



Avg. Monthly Excess Returns: 0.19%

Monthly Returns vs. Benchmark



Trend Deviation: No Active Signal

Cumulative Performance:

Portfolio	79.29%	Periods	84
Benchmark	48.49%	R-Squared	96.88%
Excess Return	30.80%	Tracking Error	4.84%

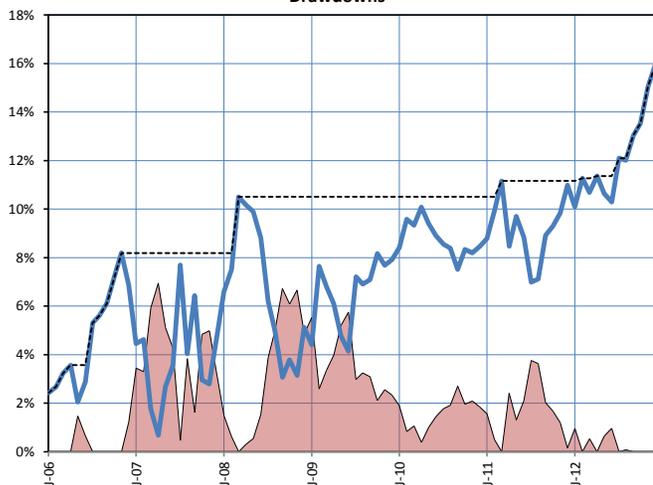
Annualized Performance:

	Portfolio	B'mark	Diff	Ex. Ret.	Risk Free
Return	8.70%	5.81%	2.89%	2.13%	1.35%
St. Dev.	24.06%	26.00%	(1.94%)	4.84%	0.55%
Best Month	17.33%	17.09%	3.98%	3.98%	0.43%
Worst Month	(27.68%)	(27.37%)	(3.39%)	(3.39%)	0.00%
Best 12 Mths	96.40%	91.63%	9.42%	5.07%	
Worst 12 Mths	(55.32%)	(56.56%)	(4.99%)	0.04%	
Up Capture	90.62%	98.38%			
Down Capture	(43.15%)	(48.77%)			

Risk-Adjusted Performance Summary:

Info. Ratio	0.60	Sharpe	0.31	Hit Rt Up	42.2%
M2 Premium	9.29%	Treynor	0.08	Hit Rt Dn	71.8%
Beta	0.91	Sortino	0.47	Hit Rt Tot	56.0%
Jensen's alpha	3.29%				

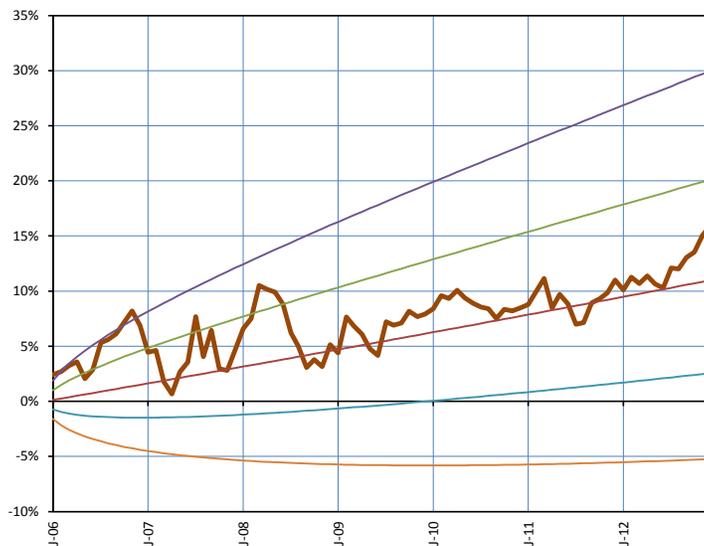
Drawdowns



Largest Drawdown: 6.95%, Peak to Trough

Cumulative Excess Returns vs Expectations

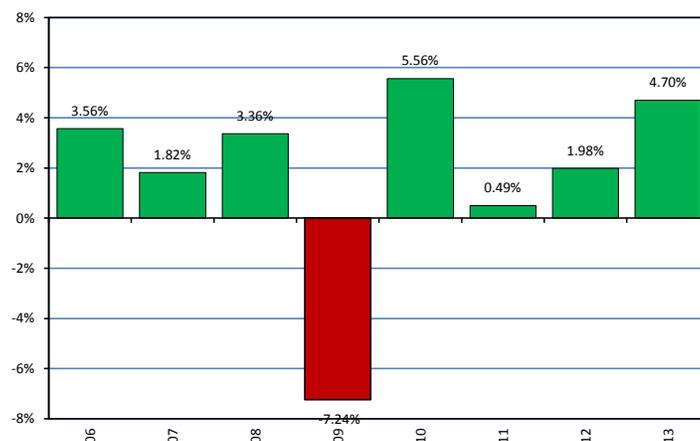
Ann. Expected Ex. Ret: 1.5%, Ann. Expected T.E.: 3.0%



Performance by Period (Inception: 7/31/98)

Period	Portfolio	B'mark	VFB	T.E.	I.R.
3-month	(5.65%)	(8.08%)	2.43%		
YTD	(4.87%)	(9.57%)	4.70%	2.14%	4.49
1-Year	7.60%	2.87%	4.74%	2.86%	1.66
2-Year	(3.36%)	(7.02%)	3.66%	3.58%	1.02
3-Year	6.26%	3.38%	2.87%	3.15%	0.91
5-Year	2.05%	(0.43%)	2.47%	4.03%	0.61
10-Year	17.03%	13.66%	3.37%	4.65%	0.72
Inception	13.97%	9.77%	4.20%	5.57%	0.75

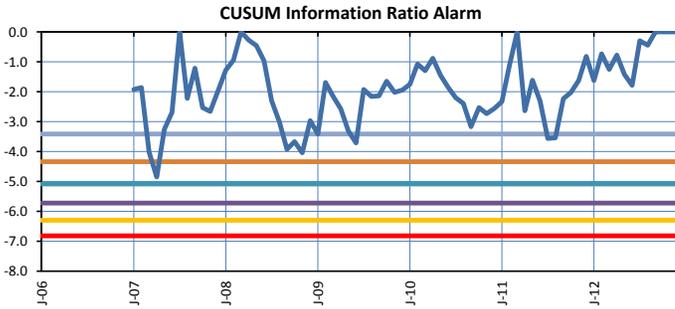
Annual Excess Returns



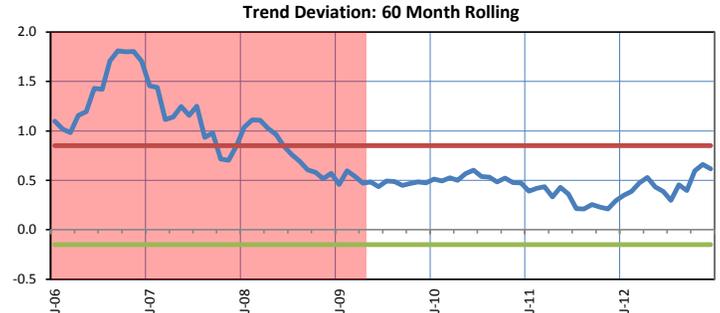
Performance by Year:

	Year	Portfolio	B'mark	Excess	
Start Date:	2006	26.88%	23.32%	3.56%	
	7/31/06	2007	41.23%	39.42%	1.82%
	2008	(49.97%)	(53.33%)	3.36%	
End Date:	2009	71.27%	78.51%	(7.24%)	
	6/30/13	2010	24.43%	18.88%	5.56%
	2011	(17.93%)	(18.42%)	0.49%	
	2012	20.20%	18.22%	1.98%	
	2013	(4.87%)	(9.57%)	4.70%	

Statistical Tracking And Reporting (STAR) System
 External Public Emerging Markets Manager vs. >STAR EM 00 - MSCI EM Net (NDUEEGF)
 Monthly Data from 7/06 to 6/13



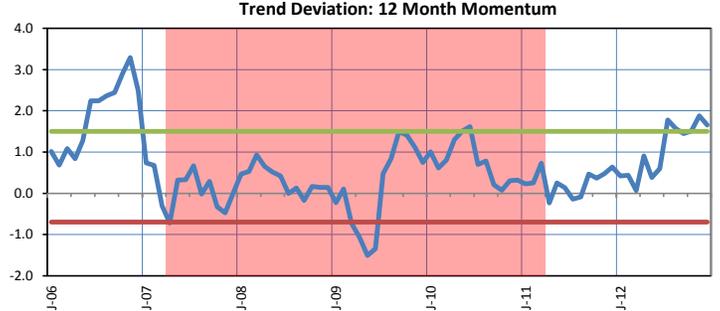
Current CUSUM Value: 0.00



No Active Signal



Avg. Tracking Error: 4.55%



No Active Signal



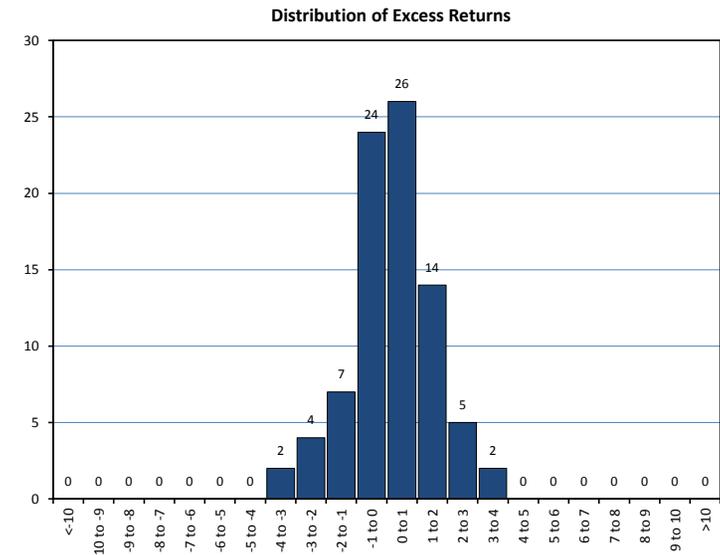
Avg. Excess Volatility: -1.99%

Hit Rate Analysis:

	Periods	Hit Rate	Avg. Ex. Ret.
Benchmark Up	45	42.2%	(36.7)
Benchmark Down	39	71.8%	82.3
All Periods	84	56.0%	18.6

Hit Rate During Various Environments: STAR EM Environment

Value/Growth	Value Outperf.	Neutral	Growth Outperf.
Periods	15	54	15
Hit Rate	46.7%	61.1%	46.7%
Avg Ex Ret (bp)	24.2	29.7	(27.2)
Small Value/Small Growth	Small Value Outperf.	Neutral	Small Growth Outperf.
Periods	17	57	10
Hit Rate	58.8%	54.4%	60.0%
Avg Ex Ret (bp)	79.4	2.4	7.1
Large/Small	Large Outperf.	Neutral	Small Outperf.
Periods	24	24	36
Hit Rate	50.0%	37.5%	72.2%
Avg Ex Ret (bp)	21.7	(36.3)	53.1
Core/High Yield	Core Outperf.	Neutral	High Yield Outperf.
Periods	18	32	34
Hit Rate	61.1%	68.8%	41.2%
Avg Ex Ret (bp)	50.2	43.4	(21.6)



US Bond/Intl Bond	US Bond Outperf.	Neutral	Intl Bond Outperf.
Periods	22	40	22
Hit Rate	59.1%	67.5%	31.8%
Avg Ex Ret (bp)	34.2	43.7	(42.6)
Stocks/Bonds	Stocks Outperf.	Neutral	Bonds Outperf.
Periods	36	17	31
Hit Rate	47.2%	52.9%	67.7%
Avg Ex Ret (bp)	(11.5)	8.7	59.0
US Stocks/Intl Stocks	US Stocks Outperf.	Neutral	Intl Stocks Outperf.
Periods	29	26	29
Hit Rate	69.0%	57.7%	41.4%
Avg Ex Ret (bp)	91.6	16.9	(53.0)

Tab 3

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Five Year Anniversary of the Public Markets Strategic Partnership Network (SPN)

David T. Veal
Director, Strategic Partnerships & Research
September 2013

Agenda

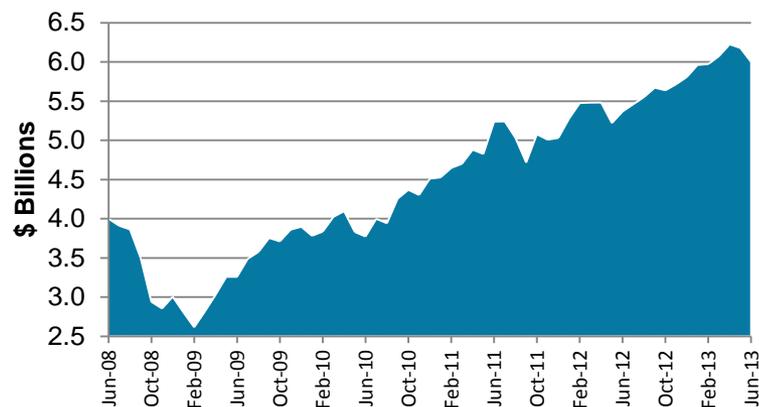
1. Overview
2. History
3. Performance
4. Positions
5. Research
6. Priorities

Public Markets SPN Performance

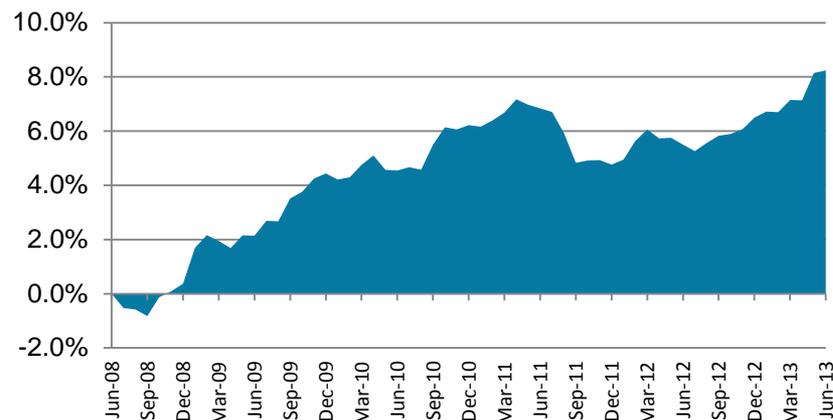
As of June 30, 2013

Program	Assets		Net Annualized Return %			Net Annualized Alpha %			Tracking Error			Information Ratio		
	NAV (\$m)	% of Trust	Since			Since			Since			Since		
			1 Year	3 Year	Incept.	1 Year	3 Year	Incept.	1 Year	3 Year	Incept.	1 Year	3 Year	Incept.
Barclays*	565.7	0.5%	10.2	n/a	6.2	1.5	n/a	-0.1	1.6	n/a	1.5	1.0	n/a	0.0
BlackRock	1,314.6	1.1%	9.7	11.8	5.3	1.0	0.3	0.7	1.7	1.8	2.0	0.6	0.2	0.4
JP Morgan	1,406.5	1.2%	13.8	12.9	6.5	5.1	1.3	2.0	1.6	2.8	2.5	3.2	0.5	0.8
Morgan Stanley	1,348.8	1.2%	12.9	13.5	5.9	4.3	2.0	1.3	2.1	1.7	1.6	2.1	1.2	0.8
Neuberger Berman	1,362.3	1.2%	10.0	11.4	5.8	1.3	-0.2	1.2	1.3	2.0	2.3	1.0	-0.1	0.6
Total Public SPN	5,998.0	5.2%	11.5	12.4	5.9	2.8	0.8	1.3	1.0	1.4	1.4	2.8	0.6	0.9

Public Markets SPN Assets Under Management



Cumulative Alpha of Public SPN



*Barclays inception date is July 1, 2011; all others were July 1, 2008
Source: State Street Bank



Mandates

Public Investments

- Manage, oversee and monitor five **unique long-term investment relationships** in the public markets around the world

Private Investments

- Work closely with two industry-leading private markets specialist partners to **identify and allocate capital to attractive private opportunities**

Headlight System

- Use and disseminate views and positioning data from partners to **provide insight and support to other groups** in the IMD and to the Trust overall

Research Center

- Work with heavily resourced partners to provide **customized, timely investment research and training** that meets the needs of the IMD

Center of Excellence

- Leverage the TRS investment network to **develop product and process expertise** to help ensure that the IMD is world class in every respect

Strategic Partnerships & Research Group



David T. Veal, CAIA, CFA, FRM
Director, Strategic Partnerships & Research
BS, Industrial Engineering, Auburn University
MBA, Finance & Accounting, University of Michigan

Background:

- *Portfolio Manager, ERS of Texas*
- *Research Analyst, Morgan Stanley*
- *Supply Officer, US Navy*



Courtney Villalta
Senior Investment Manager
BS, Finance, St. Edwards
Private Equity and Real Assets

Background:

- *TRS External Private Markets*
- *Private Equity*
- *Investment Banking, Tejas Securities Co.*



Grant Birdwell
Investment Manager
BS, Finance, Texas A&M
Public Markets

Background:

- *TRS Tactical Asset Allocation*
- *Fixed Income Trading, Morgan Stanley*
- *Institutional Advisory, Morgan Stanley*



Matt Wey
Analyst
BBA, Accounting, Texas A&M
MS, Finance & Mathematics, Texas A&M

Background:

- *Associate, Berkeley Research Group*



Roxy Becker
Team Support - Contractor
BA, Communications, Austin College

Background:

- *Executive Assistant, Goldman Sachs*



History of the Public Markets SPN

- First major initiative using external managers in public markets
- Firms manage customized and risk-controlled global mandates
- Benchmark weights and tactical ranges based on TRS public markets asset allocation policy
- Four selected (BlackRock, JP Morgan, Morgan Stanley, Neuberger Berman) after a thorough review of multiple candidates
- Funded at \$1 billion each in July 2008
- Barclays added in July 2011 at half weight (\$500 million)

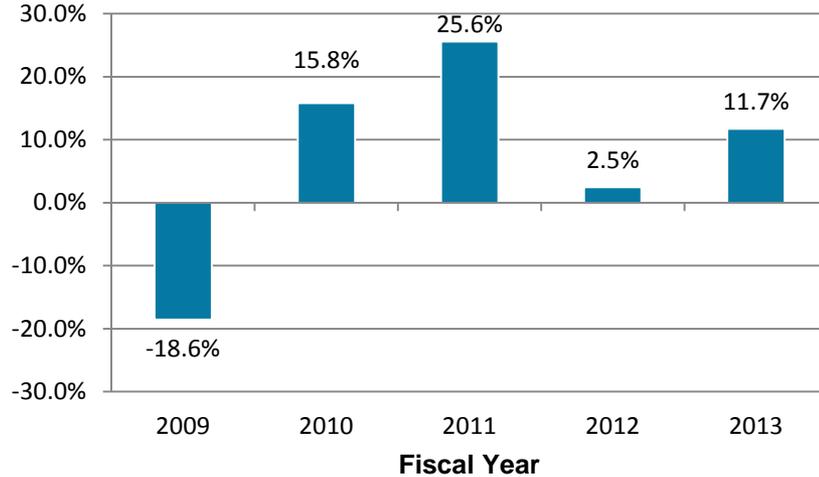
Seven Requirements for Public Markets Strategic Partners

1. Delivers full range of valuable investment products and services
2. Customizes products and services to specific TRS requirements
3. Operates globally with a sustainable business model
4. Produces proprietary, value-added investment research
5. Shares significant resources when appropriate
6. Shares long-term compensation philosophy compatible with TRS
7. Fully committed team, beginning with senior management

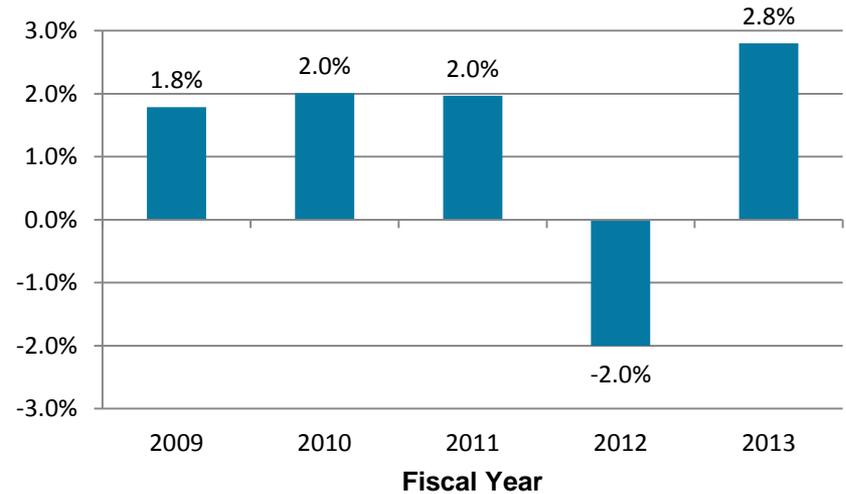
Public Markets SPN Performance

Periods Ending June 30

Net Return By Public Markets SPN



Net Alpha By Public Markets SPN



*Barclays inception date is July 1, 2011; all others were July 1, 2008
Source: State Street Bank

Public Markets SPN Positioning

"Headlight System" Example

As of 06/30/2013

Benchmark	Global Equity					Stable Value				Real Return			
	Total	US		Non-US		Total	US Long	Non \$	Credit	Total	Inflation		
		LC	SC	EAFE	EM		Treasury	Sov Debt			Linked	Com	REITs
Neutral	68%	28%	6%	20%	14%	20%	20%	0%	0%	12%	7%	3%	2%
Barclays	6.0%	6.2%	0.0%	-4.5%	4.2%	13.6%	-0.6%	14.2%	0.0%	-3.1%	-2.2%	-0.9%	0.0%
BlackRock	6.8%	9.6%	0.4%	-0.6%	-2.6%	2.6%	-6.5%	0.0%	9.1%	-5.2%	-0.8%	-2.3%	-2.0%
JP Morgan	8.2%	1.4%	2.0%	4.5%	0.2%	3.9%	-7.4%	1.2%	10.2%	-3.3%	-2.7%	-0.6%	-0.1%
Morgan Stanley	2.2%	5.5%	-0.2%	-1.5%	-1.7%	-2.3%	-2.0%	-0.3%	0.0%	-6.8%	-2.2%	-4.5%	-0.1%
Neuberger Berman	0.4%	0.9%	1.0%	-1.0%	-0.5%	8.3%	4.2%	-0.9%	5.0%	-0.6%	-0.1%	-0.5%	0.0%
Total (Average)	4.7%	4.7%	0.6%	-0.6%	-0.1%	5.2%	-2.5%	2.8%	4.9%	-3.8%	-1.6%	-1.8%	-0.4%

As of 12/28/2012

Benchmark	Global Equity					Stable Value				Real Return			
	Total	US		Non-US		Total	US Long	Non \$	Credit	Total	Inflation		
		LC	SC	EAFE	EM		Treasury	Sov Debt			Linked	Com	REITs
Barclays	4.1%	1.9%	0.0%	0.4%	1.8%	13.3%	-0.5%	11.3%	2.5%	-0.3%	-0.2%	-0.1%	0.0%
BlackRock	3.2%	3.2%	-0.4%	-3.9%	4.3%	0.5%	-2.1%	0.0%	2.6%	-3.6%	-0.2%	-1.4%	-2.0%
JP Morgan	8.8%	2.5%	-1.5%	7.5%	0.3%	-1.1%	-11.5%	0.3%	10.1%	-2.5%	-2.1%	-0.3%	-0.1%
Morgan Stanley	1.3%	-8.9%	-0.7%	8.1%	2.8%	7.7%	-0.8%	8.5%	0.0%	-2.0%	-1.5%	-0.4%	-0.1%
Neuberger Berman	2.8%	1.4%	0.1%	0.1%	1.2%	11.6%	2.9%	2.4%	6.3%	-0.2%	0.0%	-0.2%	0.0%
Total (Average)	4.0%	0.0%	-0.5%	2.4%	2.1%	6.4%	-2.4%	4.5%	4.3%	-1.7%	-0.8%	-0.5%	-0.4%

Joint Public/Private SPN Summit

Center of Excellence

- Held on July 24, 2013 in New York City
- First such event of its kind
- Brought together 54 senior investors representing 7 firms
- ~1000 years of collective leadership & investment experience

KEY TOPICS OF DISCUSSION	
SPN positioning & performance	Geopolitical outlook
Fed tapering and leadership	Portfolio trends
Global monetary policy	Academic review on private equity
US political landscape	Leadership in uncertain times

Joint Public/Private SPN Summit Key Findings

Center of Excellence

- Fed's unemployment target looks achievable within the next 24 months, such that tapering should begin in 2013
- Inflation not a near-term concern for the next 12 months, though its eventual return may be marked by wage pressures which could be problematic for margins
- US is well-positioned relative to the rest of the world, and absent an external shock the current expansion is likely to last another 2-3 years.
- Mexico stands to be a key beneficiary of US growth and is showing early signs of getting its security situation under control
- China is the biggest wild card in the global economy and could swing the entire equation.
- Strong disagreement among partners on the path of global monetary policy, with some seeing tightening on EM inflation and others seeing loosening on slowing growth
- Biggest geopolitical risks are an Asian maritime crisis and an Israel/Iran conflict

Public Strategic Partnership

Research Center

PUBLIC STRATEGIC PARTNERSHIP RESEARCH PROJECTS										
Program	2008	2009 1H	2009 2H	2010 1H	2010 2H	2011 1H	2011 2H	2012 1H	2012 2H	2013 1H
Barclays				Risk Budgeting		Alternative Risk Premia	Risk-Based Asset Allocation	Hedge Fund Alpha Persistence	Hedge Fund Risk Premia	Risk Premia Implementation
BlackRock	Currency Hedging	Inflation and Deflation	Portfolio Risk Analysis	NCREIF Modeling	NOI/Private Equity Model	Optimal Property Sector	Real Estate as Inflation Hedge	Thematic Trading	Forecasting Volatility	Opportunistic Global Screens
JP Morgan	Currency Hedging	Downside Risk	Inflation and GDP Regimes	Regimes and Asset Classes		Regime Change	Tail Risk	Factor Rotation	Europe Country Switching	Switching Between Risk Parity and Mean Variance
Morgan Stanley	Currency Hedging	Inflation Regimes	Liquidity	Sentiment	Volatility Reduction	Earnings Forecasting		Gold vs. Cash Switching	Europe Country Switching	Tactical FX Overlay
Neuberger Berman	Currency Hedging	Regime Analysis	Tactical Credit Allocation	Risk-Based Asset Allocation		Risk Parity		Spanning Tree Analysis	Implications of Low Rates	Structured Alpha Part I

INVESTMENT MODELS

- NCREIF Modeling
- NOI/Private Equity
- Optimal Property Sector
- Factor Rotation
- European Country Switching
- Tactical FX Overlay
- Tactical Credit Allocation

VALUATION FRAMEWORKS

- Inflation/Deflation Regimes
- Regimes and Asset Classes
- Regime Change
- Sentiment
- Earnings Forecasts
- Implications of Low Rates
- Opportunistic Global Screens
- Persistence of Hedge Fund Alpha

RISK MANAGEMENT

- Risk Budgeting
- FX Hedging
- Portfolio Risk Analysis
- RE as an Inflation Hedge
- Forecasting Volatility
- Tail Risk
- Liquidity Risk
- Volatility Reduction
- Spanning Tree Analysis

INVESTMENT STRATEGIES

- Alternative Risk Premia
- Risk-Based Asset Allocation
- Hedge Fund Risk Premia
- Risk Premia Implementation
- Thematic Investing
- Switching Between Risk Parity and Mean Variance
- Structured Alpha

2013 Priorities

- Enhancement of Trust “headlight system” using portfolio signals
- Develop common language to enable greater information exchange
- Greater IMD access to Strategic Partner resources and research
- Develop academic research partnership with State Street Associates

SPN Summits remaining during 2013

- Public Markets SPN Summit – Wednesday, September 18 in Austin
- Private Markets SPN Summit – Wednesday, November 13 in Austin

APPENDIX

STAR Report for Total Public Markets SPN

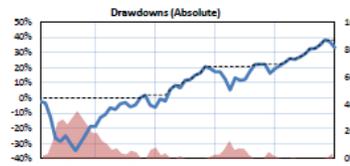
Public SPN vs. Custom SPN Benchmark

Statistical Tracking And Reporting (STAR) Report

Monthly Data from 7/08 to 6/13



Avg. Monthly Excess Return: 0.11%



Largest Drawdown: 34.66%, Peak to Trough

Performance by Period (Inception: 7/31/08)

Period	Portfolio	B.mark	VFB	T.E.	I.R.
3-month	(1.34%)	(2.36%)	1.01%		
YTD	3.14%	1.49%	1.65%		
1-year	11.47%	8.67%	2.80%	1.00%	2.80
2-year	6.57%	6.25%	0.32%	1.54%	0.21
3-year	12.38%	11.56%	0.82%	1.40%	0.58
5-year	5.89%	4.59%	1.30%	1.43%	0.91
10-year	N/A	N/A	N/A	N/A	N/A
Inception	5.89%	4.59%	1.30%	1.43%	0.91

Performance by Year:

Year	Portfolio	B.mark	Excess	
Start Date:	2008	(24.88%)	(25.23%)	0.35%
7/31/08	2009	29.23%	24.56%	4.67%
	2010	15.05%	13.96%	1.09%
End Date:	2011	0.46%	2.40%	(1.94%)
6/30/13	2012	15.04%	13.47%	1.58%
	2013	3.14%	1.49%	1.65%

Valuation Model: Overvalued Half-Signal since: 06/30/2013
Overall Performance (Since Inception 7/31/08)

Cumulative Performance:

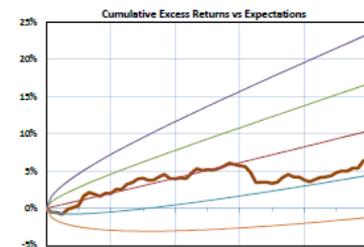
Portfolio	33.1%	Periods	60
Benchmark	25.2%	R-Squared	99.2%
Excess Return	8.0%	Tracking Error	1.4%

Annualized Performance:

Portfolio	B.mark	Diff	Ex. Ret.	Risk Free	
Return	5.89%	4.59%	1.30%	1.26%	0.23%
St. Dev.	15.58%	15.39%	0.19%	1.43%	0.13%
Best Month	7.77%	7.90%	(0.14%)	1.29%	0.19%
Worst Month	(15.97%)	(16.67%)	0.70%	(1.29%)	(0.01%)
Skew	(0.91)	(1.05)		-0.24	
Kurtosis	2.11	2.83		2.01	
Best 12 Mths	46.05%	43.82%			
Worst 12 Mths	(18.68%)	(20.46%)			
Up Capture	47.36%	44.39%			
Down Capture	(35.50%)	(35.52%)			

Risk Summary:

Info Ratio	0.91	Sharpe	0.36	Hi: R: Up	69%
M2 Premium	5.82%	Treynor	0.06	Hi: R: Dn	46%
Beta	1.01	Sortino	0.33	Hi: R: Tot	60%
Jensen's alpha	1.26%	5% h/Var	(0.53%)		



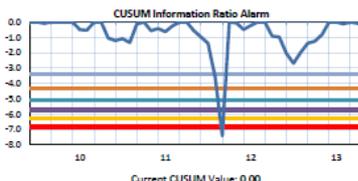
Ann. Expected Ex. Ret: 2.0%, Ann. Expected T.E.: 2.5%



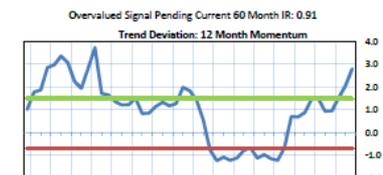
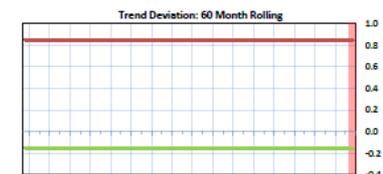
Public SPN vs. Custom SPN Benchmark

Statistical Tracking And Reporting (STAR) Report

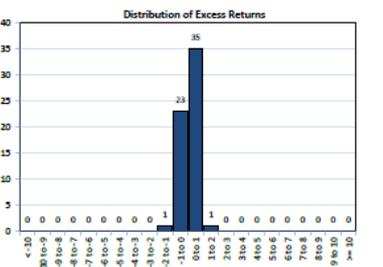
Monthly Data from 7/08 to 6/13



Current CUSUM Value: 0.00



No Active Signal



Hit Rate Analysis:

	Periods	Hit Rate	Avg Ex Ret
Benchmark Up	36	69.4%	0.18%
Benchmark Down	24	45.8%	(0.00%)
All Periods	60	60.0%	0.11%

Hit Rate During Various Environments:

Value/ Growth	Value	Neutral	Growth
Outperf.	18	28	14
Hit Rate	38.9%	71.4%	64.3%
Avg Ex Ret	(0.09%)	0.19%	0.18%
EMV/ US Stocks	EM	Neutral	US
Outperf.	22	25	Outperf.
Hit Rate	54.5%	60.0%	69.2%
Avg Ex Ret	(0.02%)	0.11%	0.32%
Equity Size	Large	Neutral	Small
Outperf.	23	11	26
Hit Rate	78.3%	54.5%	46.2%
Avg Ex Ret	0.27%	0.02%	(0.01%)
Treasuries/ High Yield	Treas.	Neutral	High Yield
Outperf.	21	14	25
Hit Rate	28.6%	64.3%	84.0%
Avg Ex Ret	(0.16%)	0.10%	0.33%

Treasuries/ GSCI	Treas.	Neutral	GSCI
Outperf.	25	9	26
Hit Rate	32.0%	77.8%	80.8%
Avg Ex Ret	(0.09%)	0.35%	0.21%
Stocks/ Bonds	Stocks	Neutral	Bonds
Outperf.	31	8	21
Hit Rate	77.4%	37.5%	42.9%
Avg Ex Ret	0.24%	0.02%	(0.06%)
US/ Intl Stocks	US	Neutral	Intl
Outperf.	24	17	19
Hit Rate	45.8%	64.7%	73.7%
Avg Ex Ret	(0.03%)	0.21%	0.19%

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Process for Developing New Internal Strategies

Mohan Balachandran
Managing Director
September 2013

Agenda

1. Introduction
2. Guidelines for new internal portfolios
3. Current portfolios
4. Performance
5. Appendix

Introduction

- The IMD's current new internal portfolio development effort began in 2009 with the addition of GBI Quant to the GBI portfolio
- As the Trust's strategic asset allocation transition has neared completion, the IMD's ability to identify new internal portfolio strategies has increased
 - Currently, there are ten new internal portfolios in various stages of research
- Accordingly, the IIC has developed a formal four step process for new internal portfolios:
 1. **Strategy Development.** Develop the strategy, obtain a Management Committee sponsor and present to the Management Committee.
 2. **Paper Portfolio.** Launch a fully documented and independently reported Paper Portfolio.
 3. **Research Portfolio.** Obtain IIC approval for a small allocation following normal Board notification procedures used for external managers (transparency report).
 4. **Full Allocation.** Obtain IIC approval for a permanent allocation or terminate the portfolio.
- There are two exceptions to these guidelines: portfolios that are minor extensions of current Trust portfolios and strategies taking advantage of time-sensitive market dislocations

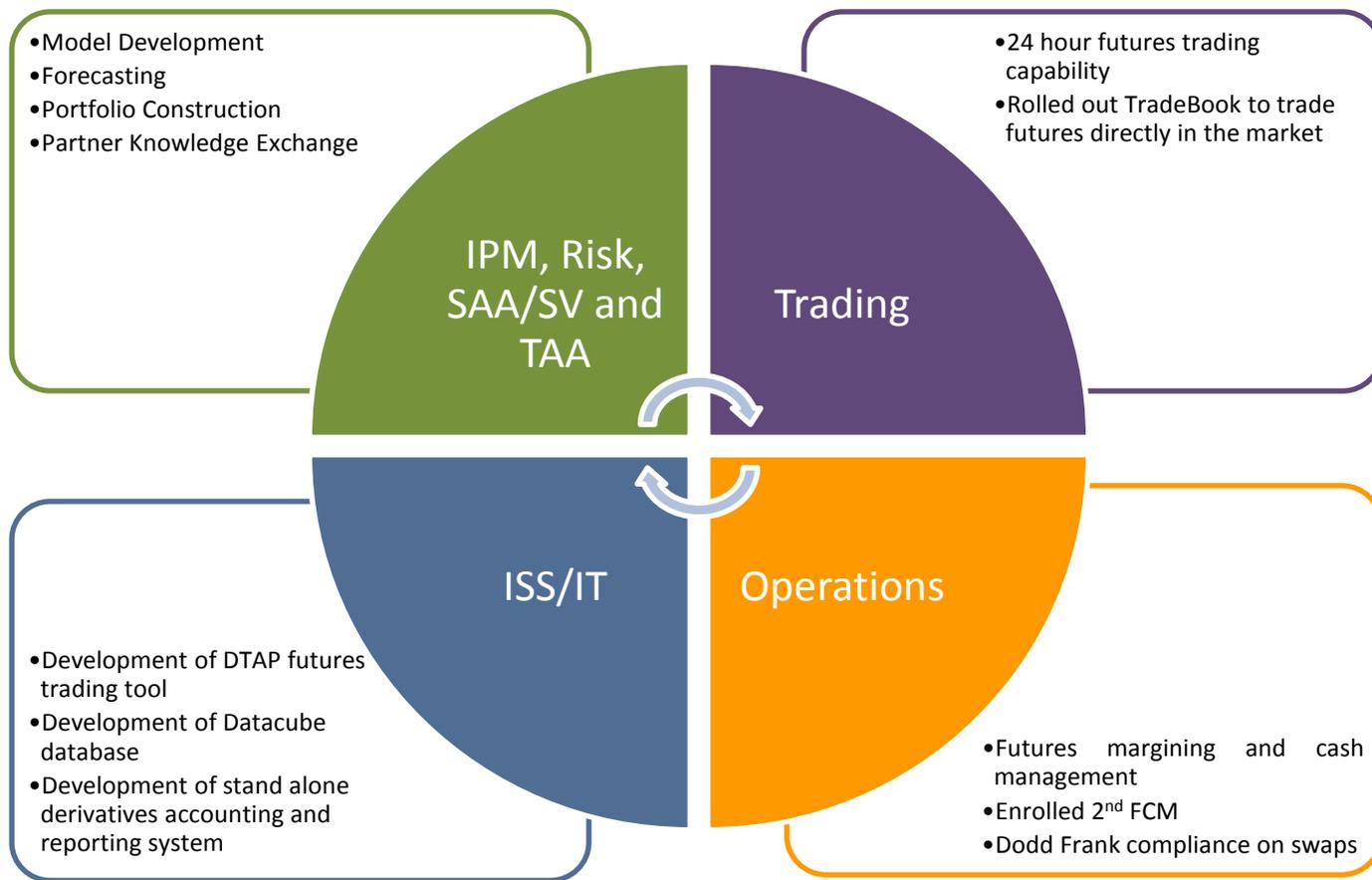
IMD Evaluation Process

Research and Development of New Investment Concepts and Strategies

Investment Concept	Research and Development		Long-Term Allocation
	"Paper" Portfolio	"Research" Portfolio	
<ul style="list-style-type: none"> • Role in Trust • Type of Strategy • Investment Process • Policy Compliance • Sponsor from Management Committee • Success Metrics 	<ul style="list-style-type: none"> • Six Months • Operations oversight No assets Trade entry Position reporting • Performance reporting through State Street Systems • Monthly Report to Management Committee • Transparency Report 	<ul style="list-style-type: none"> • Six Months • Operations oversight Assets <= \$100 m Trade entry Position reporting • Performance reporting through State Street Systems • Monthly Report to Management Committee • Transparency Report 	<ul style="list-style-type: none"> • Beyond one year • Metrics satisfied • Role in Trust established • Direct assignments made • All previous oversight and reporting continued
<p>Management Committee Approval/Disapproval</p>	<p>IIC Approval/Disapproval</p>	<p>IIC Approval/Disapproval</p>	<p>Established Internal Strategy</p>

IMD Implementation Platform

- New internal portfolios use the IMD's full management, trading, operations and IT platform



Strategy Types

- New Strategies fall into one of three categories:

Type	Alternative Beta	Valuation/Dislocation	Alpha
Source of Return	Risk premium	Reversion to mean – move back to long term intrinsic value	All other sources. Typically differentiated information or outlook
Concentration	Well-diversified	Typically high	Varies
Implementation	Systematic	Security or asset class selection with margin of safety	Systematic or selection
Time Horizon	Long term	Until dislocation mean reverts to mean	Typically short to intermediate term
Duration	Perpetual	Finite	Continuous
Examples	Small cap, momentum, low volatility, value, quality, risk parity	Dislocated credit, residential housing post 2008 crisis	QVF, Enhanced Commodities, Currency overlay

Summary of IMD Research and Development Plan

- IMD has developed an ability to
 - Identify potentially effective strategies
 - Rigorously assess these strategies
 - Incrementally discontinue or fund strategies based on metrics and independent reporting
- Evaluation Process
 - Exceeds one year
 - Evaluation and funding requires Management Committee review and IIC approval
- Reporting is systematic and transparent
 - Monthly reports to the Management Committee
 - Monthly disclosure in the Transparency Report
- Searches for New Strategies in three areas
 - Alternative Beta: Five strategies under review and development
 - Valuation/Dislocation: One strategy under development
 - Alpha: Four strategies under review

APPENDIX



**TRS Investment Management Division
Internal Investment Committee
Recommended Guidelines for Developing New Internal Portfolios**

Portfolio Strategies

Type	Alternative Beta	Valuation	Alpha
Source of Return	Risk premium	Reversion to mean – move back to long term intrinsic value	All other sources. Typically differentiated information or outlook.
Concentration	Well diversified	Typically high	Varies
Implementation	Systematic	Security or asset class selection with margin of safety	Systematic or selection
Time Horizon	Long term	Until dislocation mean reverts	Typically short term to intermediate term
Duration	Perpetual	Finite	Continuous
Examples	Small cap, momentum, low volatility, value, quality, risk parity	Dislocated credit, residential housing post GFC	QVF, enhanced commodities

Four Steps to IIC Approval of a New Internal Portfolio or Strategy

1. Develop Strategy (prior to paper portfolio launch)

- a. Create a strategy document, which addresses the following:
 - i. Strategy description (objective, type, source of return, concentration, implementation, time horizon, duration, instruments used, etc.)
 - ii. Role in Trust and potential impact (size considerations, source of funds, impact on risk and return, impact on leverage and liquidity, etc.)
 - iii. Investment process
 - iv. Policy benchmark and risk controls
 - v. STAR Reports
 - vi. Future success metrics (absolute return, alpha, return/risk ratios, liquidity, environmental expectations, peer group of external portfolios, portfolio characteristics, etc.)
 - vii. Required resources (people, databases, external resources, operations resources, trading, etc.)
 - viii. Compliance with the Investment Policy Statement
- b. Obtain support of the relevant profit center (management team and full group) and demonstrate alignment with the annual priorities of the profit center.
- c. Present strategy document to a Management Committee sponsor and obtain that member’s sponsorship.
- d. Present strategy document to the Management Committee.

2. Launch Paper Portfolio (month 0 to month ~4)

- a. Send notification to the Management Committee of paper portfolio launch with one page executive summary and list of initial portfolio holdings.
- b. Engage Investment Operations to oversee portfolio trading and performance measurement.
- c. Engage State Street to report performance through PureView.
- a. Develop a useful and concise monthly reporting package for distribution to the Management Committee, the relevant profit center and others who may be interested.
 - i. Performance
 - ii. Risk metrics
 - iii. Sources of beta and alpha (absolute and versus expectations)
 - iv. Current portfolio
 - v. Portfolio commentary
- d. The typical duration of a paper portfolio is four months.

3. Launch Research and Development Portfolio (month ~5 to month 12+)

- b. Present strategy document to the IIC for formal vote to fund research and development allocation.
- c. Confirm compliance treatment with State Street.
- d. Confirm portfolio fit with the Risk Group.

4. Launch Full Allocation (month 12+)

- a. Deliver final presentation to the relevant profit center and IIC sponsor for approval.
- b. Present to IIC with recommendation to increase funding to full long-term target over a specified time horizon or terminate portfolio.
- c. Formal IIC vote required.
- d. Fund follow-on.

Shorter Timeline

These four steps suggest a general timeline for launching a new portfolio or strategy. At the discretion of the IIC, the process and timeline may be shortened, for instance in the following circumstances:

- The portfolio represents only a minor extension of currently implemented portfolios, presents few novel operational challenges and will not significantly affect risk parameters at the Trust level.
- The investment opportunity is timely, and a long-term rollout would risk missing the opportunity. This might be the case in a Valuation Strategy where a market dislocation or anomaly is not expected to last for an extended period.

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Risk Parity

James Nield
Senior Investment Manager
September 2013

Agenda

1. Executive Summary
2. Portfolio Construction
3. Benefits and Considerations
4. State of the Market

Executive Summary

Risk Parity and TRS

1. Invested \$500 million in Risk Parity strategies on February 1, 2012

- Allocated to two external managers
- 10% allocation within Directional Hedge Fund Portfolio

2. Developed an internal Risk Parity strategy

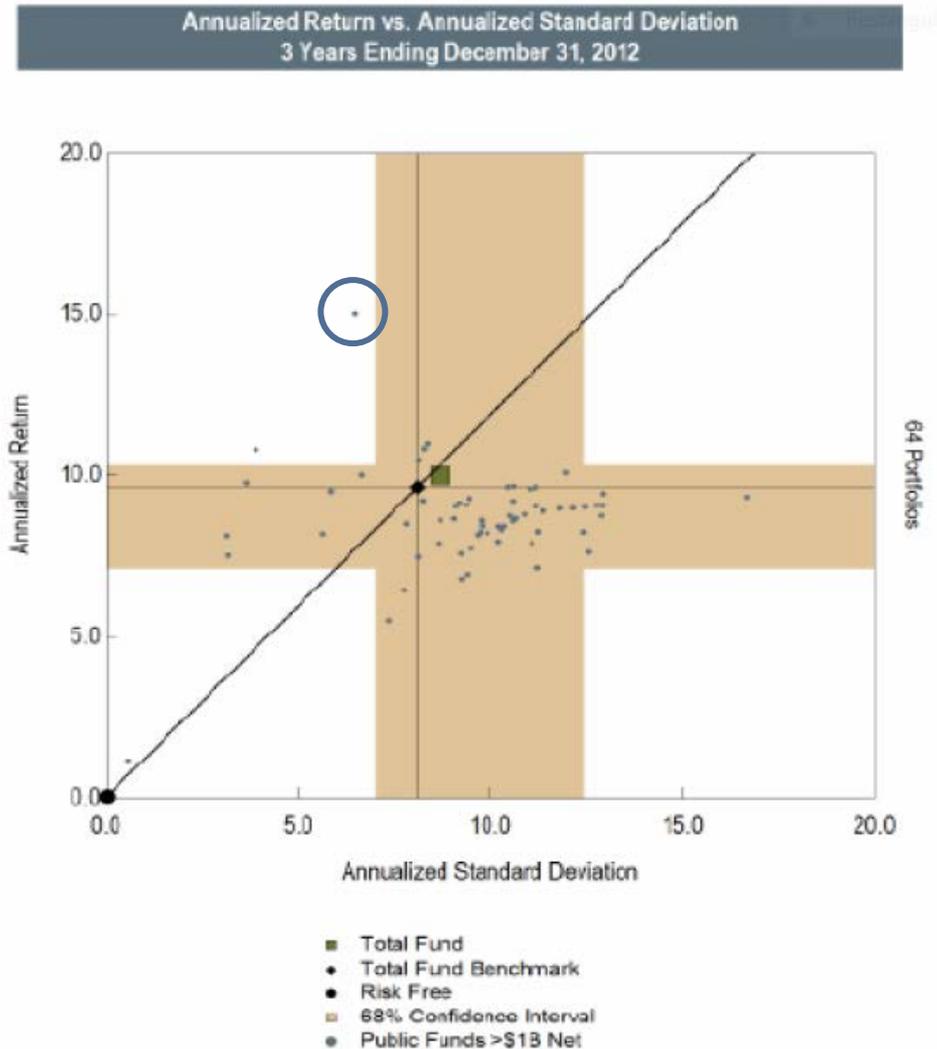
- Began research portfolio in September 2012
- Performance in line with peers
- Funded research and development portfolio on July 1, 2013 (\$100 million)

3. Strategic Asset Allocation (SAA)

- Provide opportunity to enhance existing portfolio construction process
- Next SAA study in 2014

Executive Summary

Peer Comparison

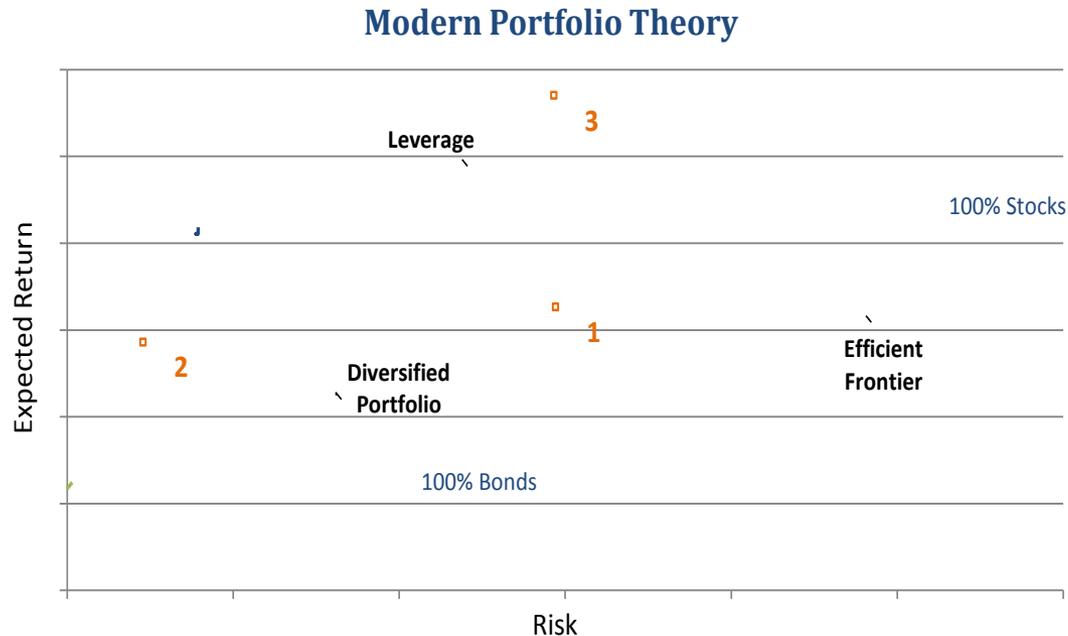


- Top performing fund in TUCS universe over the past three years is the Fairfax County (VA) Employees' Retirement System
- Fairfax County incorporates a risk parity like framework at the Trust level
- Target market exposure was 153% of assets (as of June 2012)
- Asset mix includes a large allocation to core Fixed Income

Source: Hewitt EnnisKnupp, Wilshire TUCS

Portfolio Construction

Modern Portfolio Theory



Risk Parity seeks to capitalize on Modern Portfolio Theory

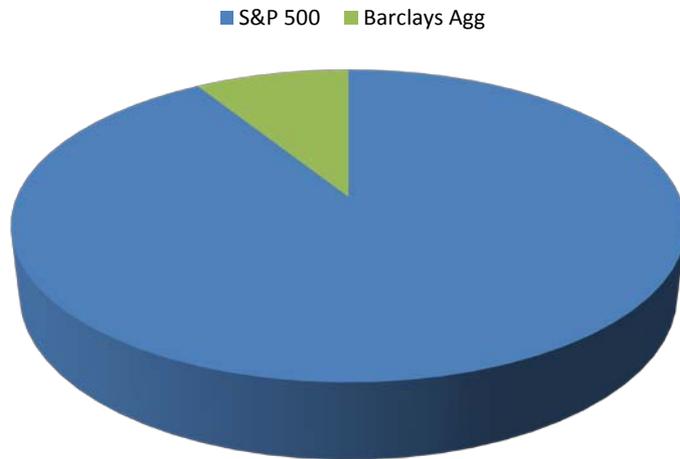
1. Most investors create a portfolio with their desired risk and return characteristics along the efficient frontier. For example, a 60/40¹ portfolio might be a portfolio selected by an investor
2. Alternatively, Risk Parity seeks to build a well-diversified portfolio that has the highest probability of outperforming cash
3. However, the Risk Parity portfolio has a low expected return and risk profile. An investor can then apply leverage to the Risk Parity portfolio to target the desired risk profile

Portfolio Construction

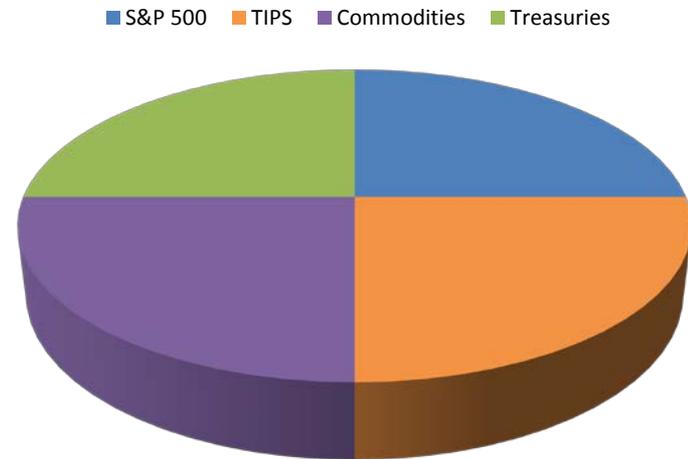
Balance Risk Exposures

- Risk Parity seeks to build a well-diversified portfolio balancing risk exposures
- Sample risk contributions:

60% stocks/40% bonds



Risk Parity



- The balance in a Risk Parity portfolio leads to a more equal contribution of risk relative to a 60/40 portfolio
 - Since stocks are more volatile they dominate the risk profile of a 60/40 portfolio
- No one asset or factor exposure should dominate returns in a Risk Parity portfolio

Portfolio Construction

Return Forecasts

- Risk Parity **does not** use return forecasts to construct a portfolio

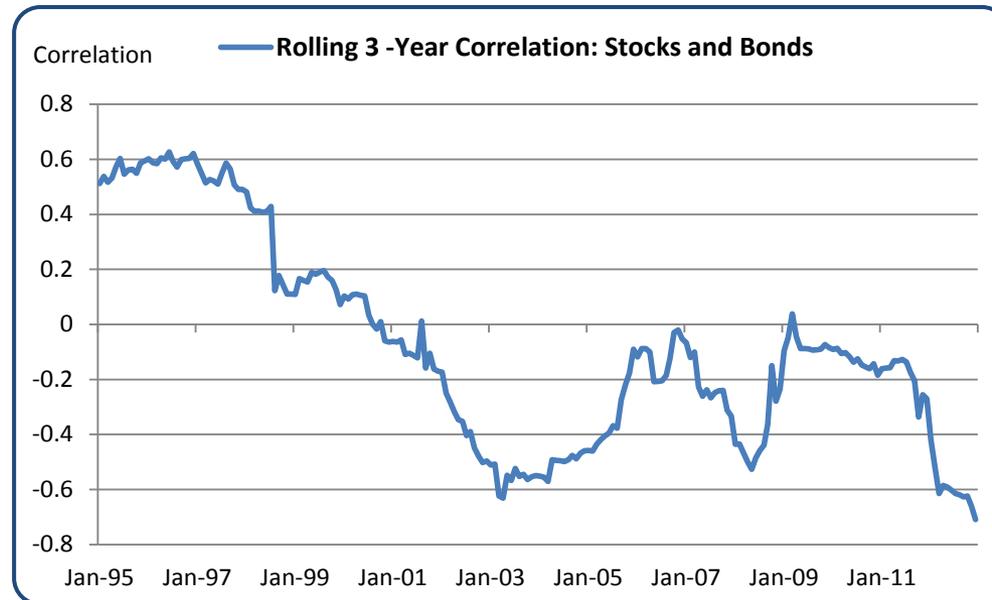


- Building a balanced portfolio, rather than relying on return forecasts, is beneficial as asset class returns can vary greatly from expectations

Portfolio Construction

Asset Class Correlations

- Risk Parity **does not** typically rely on past correlations to construct a balanced portfolio

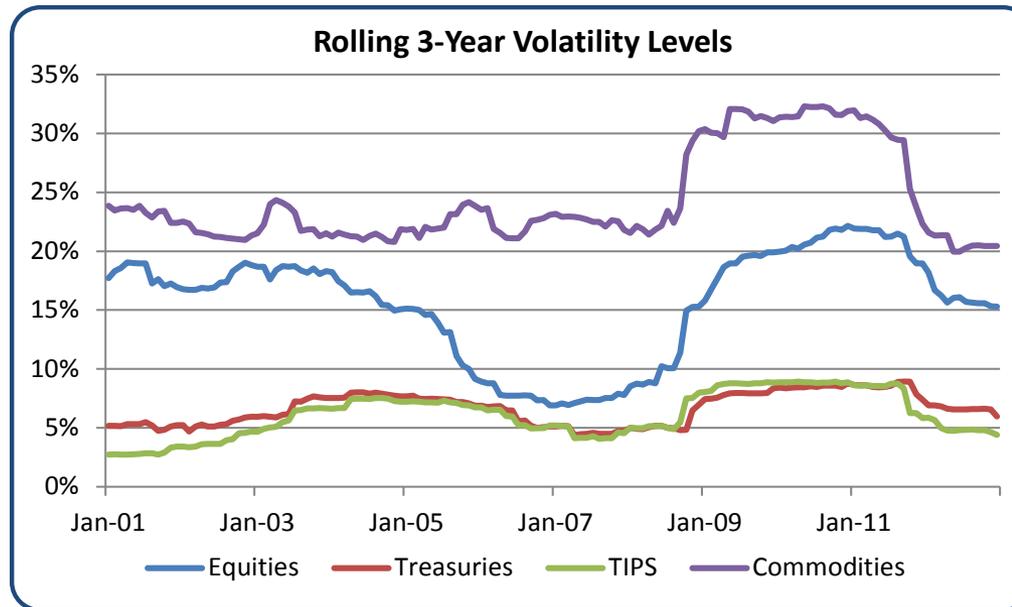


- Correlations between assets are not stable
 - Stocks and bonds are often thought to be negatively correlated but they can also be positively correlated as was the case in the late 1990's
- A portfolio that relies on past correlations to build a diversified portfolio may become more concentrated in the future

Portfolio Construction

Risk Estimates

- Risk Parity **does** use risk estimates to size positions within the portfolio



- Risk relationships are more stable than asset returns or correlations
 - Absolute volatility levels can vary but the relative ranking of asset class volatilities stays fairly consistent
- Higher volatility assets are given a smaller relative weight in the portfolio

Portfolio Construction

Balanced Portfolio

- An alternative to using correlations to build a diversified portfolio is to use asset environmental sensitivities (rising and falling growth and inflation) which are more stable

	Rising Growth	Falling Growth	Rising Inflation	Falling Inflation
Equities				
Treasuries				
TIPS				
Commodities				

- The objective in this scenario is to target an equal risk allocation to each macroeconomic environment

Rising Growth 25%	Rising Inflation 25%
Falling Growth 25%	Falling Inflation 25%

Portfolio Construction

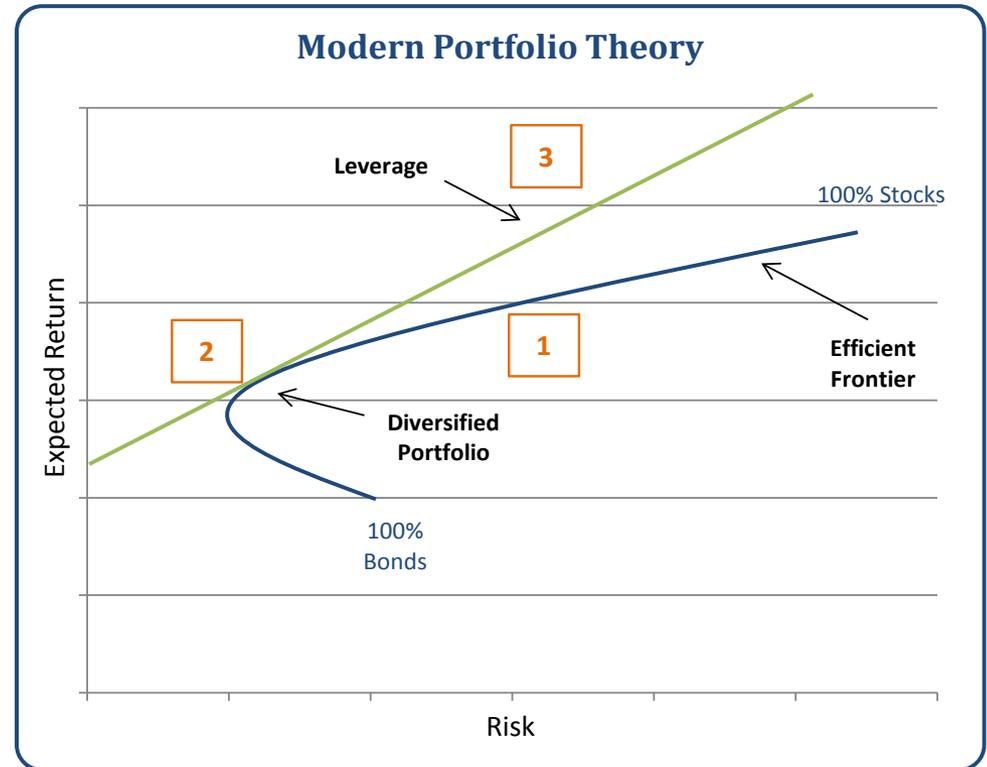
Summary

Portfolio Construction Process

1. Most investors create a portfolio with their desired risk and return characteristics along the efficient frontier
2. Risk Parity seeks to build a well-diversified portfolio that has the highest probability of outperforming cash

Internal Process

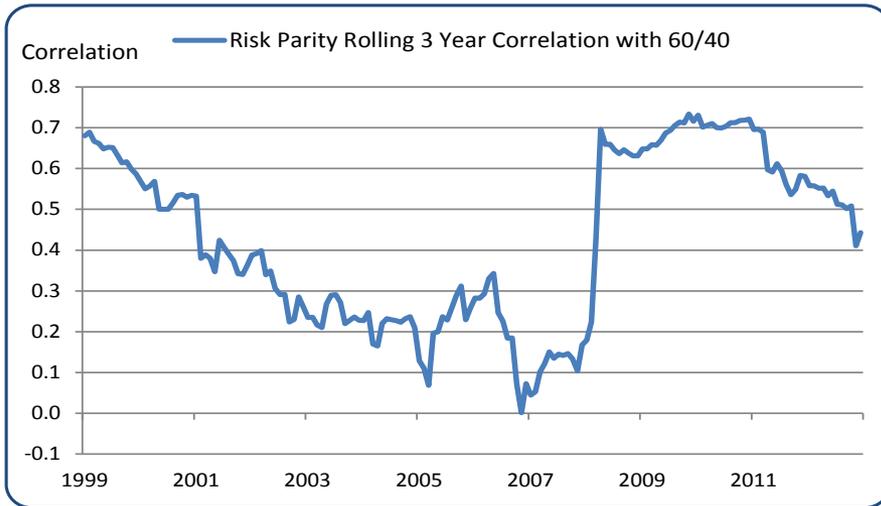
- a. Determine asset sensitivities to macroeconomic regimes
 - b. Develop a risk estimate for each asset
 - c. Combine asset sensitivities and risk estimates to build a balanced portfolio to rising and falling growth and inflation
3. Apply leverage to the Risk Parity portfolio to target the desired risk profile



Result: A balanced portfolio that collects a diverse set of risk premiums with a high probability of outperforming cash

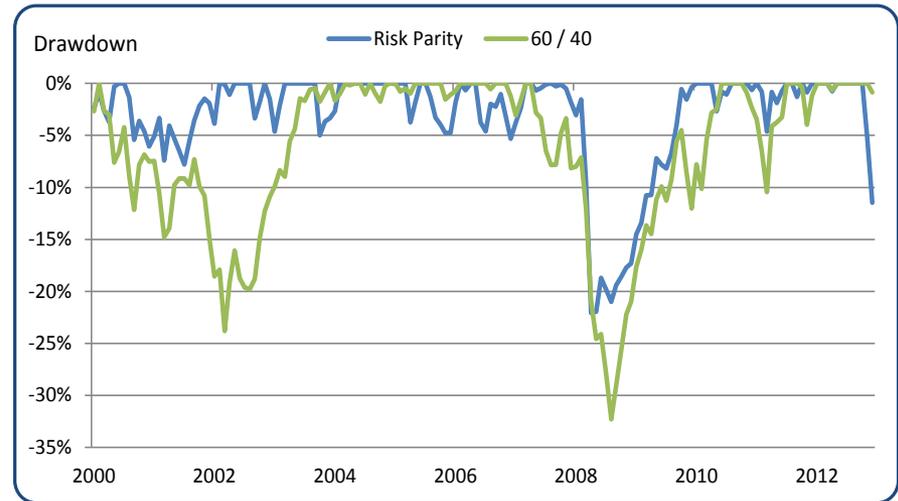
Benefits

Diversification



- A Risk Parity portfolio provides a diversified return stream relative to a 60/40 portfolio
- Risk Parity has also been able to outperform a 60/40 portfolio with lower volatility providing additional diversification benefits

Risk Profile



- The balanced exposure in Risk Parity portfolios results in a drawdown profile that is generally improved relative to a 60/40 despite the use of leverage
- In 2008, Risk Parity had a drawdown of 22%, whereas a 60/40 portfolio had a drawdown of 33%
- Risk Parity will underperform a 60/40 portfolio when equities do well as was the case recently

Considerations

Rising Rates

- Risk Parity has a large capital allocation to nominal bonds which will be negatively impacted if rates rise faster than expected
- *Mitigating factors include:*
 - The balance in the portfolio should help mitigate losses from bonds
 - Risk Parity has exposure to global rates, not just U.S. rates
 - Example: Sample Risk Parity portfolio returned 15% from October 1998 - January 2000 when rates rose 260 basis points

Asset	Weight	Return
Treasuries	75%	-7%
TIPS	70%	2%
S&P 500	35%	39%
Commodities	20%	24%
Total	200%	15%

Short Cash Position

- Risk Parity portfolios are short cash leading to negative performance when cash is a preferred asset
- Cash is typically a preferred asset in two scenarios:
 - Flight to quality (2008 financial crisis)
 - A reduction in liquidity (unexpected central bank tightening 1994; 2013)
- *Mitigating factors include:*
 - Portfolio leverage will be reduced when assets move together helping to preserve capital
 - Investments are liquid so positions can be adjusted daily as needed

State of the Market

- Risk Parity is a widely invested strategy
 - More than \$100 billion invested in top five managers
 - Risk Parity is considered to be one of the fastest growing strategies
- Risk Parity is now offered in mutual fund form
 - AQR (AQRIX); First Quadrant (MMAFX); Invesco (ABRZX); Salient (SRPFX)
- Some investors make Risk Parity a line item in their asset allocation
 - One Texas Fund has a 7% allocation target to Risk Parity
- Some plans have adopted risk parity principles at an enterprise level
 - ATP (Danish pension fund)
 - Fairfax County (VA) Employees' Retirement System
 - Ontario Teachers Pension Plan
 - San Diego County Employees Retirement Association
 - State of Wisconsin Investment Board (SWIB)

APPENDIX

Investment Process

TRS Internal Strategy

- Internal Portfolio Investment Checklist

- Create Strategy Document



- Identify IIC Sponsor



- Present strategy to Management Committee



- Review process with operations



- Launch paper portfolio



- Provide monthly performance report



- Formal IIC funding request



- Fund research and development portfolio



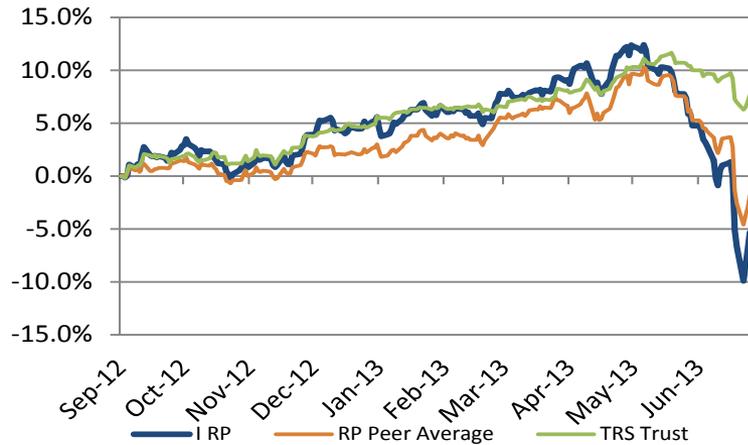
- Fund full allocation portfolio



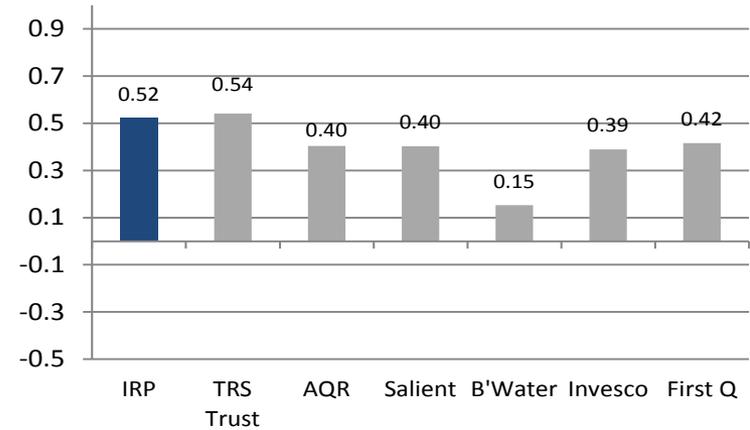
Paper Portfolio Performance

TRS Internal Strategy

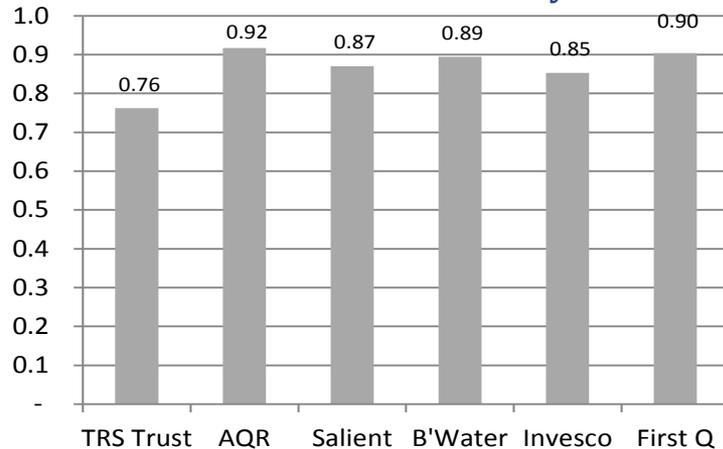
Inception-to-Date Performance



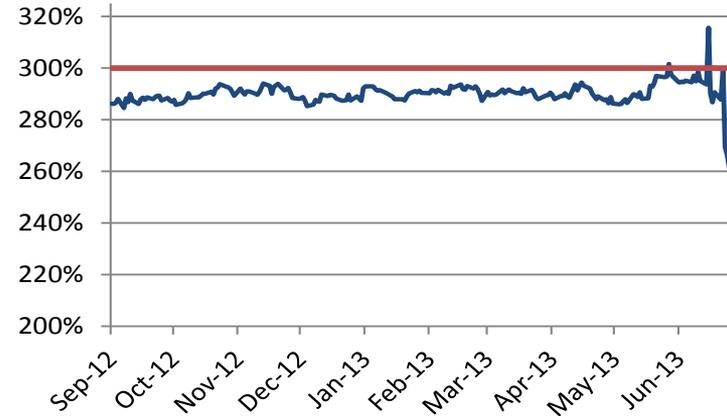
Equity Beta Since Inception



Correlation to TRS Parity



Actual Leverage vs Leverage Cap



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