



# TRS Board of Trustees Meeting

March 27 – 28, 2014

**TEACHER RETIREMENT SYSTEM OF TEXAS MEETING  
BOARD OF TRUSTEES**

**AGENDA**

**March 27, 2014 – 11:15 a.m.**

**March 28, 2014 – 8:00 a.m.**

**TRS East Building, 5<sup>th</sup> Floor, Boardroom**

*NOTE: The Board may take up any item posted on the agenda during its meeting on Thursday, March 27, or the following day beginning at the time and place specified on this agenda.*

*The open portions of the March 27-28, 2014, Board meetings are being broadcast over the Internet. Access to the Internet broadcast of the Board meeting is provided on TRS' website at [www.trs.state.tx.us](http://www.trs.state.tx.us).*

1. Call roll of Board members. *[Estimated time 11:15 - 11:30]*
2. Consider administrative matters, including the following – David Kelly: *[Estimated time 11:15 - 11:30]*
  - A. Consider the approval of the February 12-14, 2014 Board meeting minutes.
  - B. Consider excusing Board member absence from the February 12-14, 2014 Board meeting.
3. Provide opportunity for public comments – David Kelly. *[Estimated time 11:15 - 11:30]*
4. Review and discuss the Executive Director's report on the following matters – Brian Guthrie: *[Estimated time 11:30 - 12:15]*
  - A. Administrative operational matters, including financial, audit, legal, staff services, board administration activities, special projects, long-term space planning, and strategic planning.
  - B. Board operational matters, including a review of draft agendas for upcoming meetings.
5. Discuss and consider investment matters, including the following items:
  - A. Performance Review: Fourth Quarter 2013 – Steve Voss and Brady O'Connell, Hewitt EnnisKnupp. *[Estimated time 12:15 – 1:00]*
  - B. Quarterly Strategic Partner Update – David Veal. *[Estimated time 1:00 – 1:15]*

- C. Discuss and consider the engagement of Tudor Pickering Holt & Co. as investment advisors to the Board – Vaughn Brock. *[Estimated time 1:15 - 1:30]*
  - D. 2014 Strategic Asset Allocation Study Update
    - i. Overview of fiduciary duty – Steve Huff, Reinhart Boerner Van Deuren s.c. *[Estimated time 1:30 - 2:00]*
    - ii. Review two leading Strategic Asset Allocation methodologies:
      - a. J.P. Morgan Long-Term Capital Market Return Assumptions Review – Tony Werley and Michael Hood, J.P. Morgan. *[Estimated time 2:00 - 2:30]*
      - b. Risk Parity Overview – Dr. Keith Brown. *[Estimated time 2:30 - 3:00]*
    - iii. Hewitt EnnisKnupp Strategic Asset Allocation Process Update – Steve Voss and Brady O’Connell, Hewitt EnnisKnupp. *[Estimated time 3:00 - 3:30]*
    - iv. Third Phase Review of the 2014 Asset Allocation Study – Mohan Balachandran and Ashley Baum. *[Estimated time 3:30 - 4:30]*
  - E. Review the report of the Investment Management Committee on its March 27, 2014 meeting – Todd Barth. *[Estimated time 4:30 - 4:45]*
  - F. Review the report of the Risk Management Committee on its March 27, 2014 meeting – Karen Charleston. *[Estimated time 4:30 - 4:45]*
  - 6. Review the report of the Policy Committee on its March 27, 2014 meeting and consider related matters, including amendments to the Trustee External Communications Policy – Joe Colonna. *[Estimated time 4:30 - 4:45]*
  - 7. Review the report of the Audit Committee on its March 27, 2014 meeting – Christopher Moss. *[Estimated time 4:30 – 4:45]*
  - 8. Discuss possible co-investment opportunities involving a foreign pension fund, including potential investments in private investment funds or the purchase, holding, or disposal of restricted securities or a private investment fund’s investment in restricted securities – David Kelly. *[Estimated time 4:45 – recess]*
- NOTE:** *The Board meeting likely will recess after the last item above and resume Friday morning to take up items listed below.*
- 9. Provide an opportunity for public comment – David Kelly. *[Estimated time 8:00 – 8:15]*

10. Discuss matters involving plan design of the active employees' health benefit program, TRS-ActiveCare and the retirees' health benefit program, TRS-Care – Betsey Jones; William Hickman, Gabriel, Roeder, Smith & Company; and Kevin DeStefino, RPh, Towers Watson. [*Estimated time 8:15 – 8:45*]
11. Receive a presentation from the TEAM Program Independent Program Assessment (IPA) Vendor – Michael Johnson, Bridgepoint Consulting. [*Estimated time 8:45 – 9:30*]
12. Receive a quarterly review of the TEAM Program – Amy Morgan; David Cook; and Jay Masci, Provaliant. [*Estimated time 9:30 -10:00*]
13. Receive the report of the Chief Financial Officer, including – Don Green: [*Estimated time 10:00 - 10:30*]
  - A. Mid-year financial review.
  - B. Review the report under § 825.314(b), Government Code, of expenditures that exceed the amount of operating expenses appropriated from the general revenue fund and are required to perform the fiduciary duties of the Board.
14. Review the report of the Chief Benefit Officer, and consider related matters – Marianne Woods Wiley: [*Estimated time 10:30 – 10:45*]
  - A. Approve members qualified for retirement.
  - B. Approve minutes of Medical Board meetings.
15. Receive the report and update of the General Counsel on pending or contemplated litigation, including updates on litigation involving benefit-program contributions, retirement benefits, health-benefit programs, securities, and open records – Carolina de Onís. [*Estimated time 11:00 - 11:15*]
16. Consider personnel matters, including the appointment, employment, evaluation, compensation, performance, duties, discipline, or dismissal of the Executive Director, Chief Investment Officer, or Chief Audit Executive – David Kelly.
17. Consult with the Board's attorney(s) in Executive Session on any item listed above on this meeting agenda as authorized by Section 551.071 of the Texas Open Meetings Act (Chapter 551 of the Texas Government Code) – David Kelly.

Tab 2 A

Minutes of the Board of Trustees  
February 12-14, 2014

The Board of Trustees of the Teacher Retirement System of Texas met on February 12, 2014, in the Room 3-23, Region 2 Educational Service Center at 209 North Water Street, Corpus Christi, Texas. The following board members were present:

David Kelly, Chair  
Todd Barth  
Karen Charleston  
David Corpus  
Chris Moss  
Anita Palmer  
Dolores Ramirez  
Nanette Sissney

Others present:

Brian Guthrie, TRS	Abel Herrero, State Representative for District 34
Ken Welch, TRS	Beverly Moore, Representative Lozano's Office
Amy Barrett, TRS	Ronnie Jung
Janet Bray, TRS	Steve Huff, Reinhart Boerner Van Deuren
Carolina de Onís, TRS	Steve Voss, Hewitt EnnisKnupp
Howard Goldman, TRS	Brady O'Connell, Hewitt EnnisKnupp
Don Green, TRS	Jody Wright, Legislative Budget Board
Betsey Jones, TRS	Tim Lee, Texas Retired Teachers Association
Ray Spivey, TRS	Ann Fickel, Texas Classroom Teachers Association
Ronnie Bounds, TRS	Ted Melina-Raab, Texas American Federation of Teachers
Edward Esquivel, TRS	Beaman Floyd, Texas Association of School Personnel Administrators
Dan Herron, TRS	Josh Sanderson, Association of Texas Professional Educators
Clarke Howard, TRS	Noel Candelaria, Texas State Teachers Association
Bob Jordan, TRS	John Grey, Texas State Teachers Association
Dan Junell, TRS	Linda DeHaven, Texas Retired Teachers Association
Rebecca Merrill, TRS	Leroy DeHaven, Texas Retired Teachers Association
Rhonda Price, TRS	Lanette Fox, Texas Retired Teachers Association
Yimei Zhao, TRS	Stacy Stoll, Texas State Teachers Association
Ignacio Salinas, Jr., Retirees Advisory Committee	Susan Seaton, Texas State Teachers Association
Bill Barnes, Retirees Advisory Committee	Katie Plemmons, Texas State Teachers Association
Bill Hickman, Gabriel, Roeder, Smith & Company	Michelle Cardenas, Texas State Teachers Association
Amy Cohen, Gabriel, Roeder, Smith & Company	Sandra Chesnutt, Texas Retired Teachers Association
Joe Newton, Gabriel, Roeder, Smith & Company	David Palacios, West Oso ISD
Eric St. Pierre, Aetna	Olga Mendes, West Oso ISD
Jeff Bernhard, Aetna	Nancy Byler, Texas Retired Teachers Association
Sally Imig, Aetna	Barbara Meador, Texas Retired Teachers Association
Ethan Baumfeld, Blue Cross and Blue Shield of Texas	Bob Meador, Texas Retired Teachers Association
Dr. Dan McCoy, Blue Cross and Blue Shield of Texas	Fran Plemmons, Texas Retired Teachers Association
Steve Kunz, CVS Caremark	Cora Elliot, Texas Retired Teachers Association
Kevin DeStefino, Towers Watson	Mary Jane Hamilton, Texas Retired Teachers Association
Dr. Steve Miller, Express Scripts	Jean Bounds, Texas Retired Teachers Association
David Runyan, Express Scripts	Dennis Harrod, Texas Retired Teachers Association
Craig Kessler, Express Scripts	Ann Caffey, Texas Retired Teachers Association
Brenda Dominguez, Del Valle ISD	Mack Caffey, Texas Retired Teachers Association
Art Granada, GG Inc.	

Norinne Holman, Rockport Retired Teachers Association  
David Holman, Rockport Retired Teachers Association  
Margaret DeVelli, Texas Retired Teachers Association  
Paula Stone, San Patricio County Retired Teachers Association  
Marian Salge, Corpus Christi Area Retired Teachers Association  
Zula Langley, Corpus Christi Area Retired Teachers Association  
Dino Castello, Kingsville Tri-City Retired Teachers Association  
Dorthie Hicks, Corpus Christi Area Retired Teachers Association  
Ryan Johnston, ESC-2  
Esther Reab, Corpus Christi Area Retired Teachers Association  
Ray Loiselle  
Gracie Yribe-Cano, Tri-County Retired Teachers Association  
Clark Adkin, Corpus Christi Area Retired Teachers Association  
Sayelynn Nesloney, ACISD  
Liz Flinn, ACISD  
Anson Nash, Corpus Christi Area Retired Teachers Association  
Tim Mulinix, Corpus Christi Area Retired Teachers Association  
Julie Kluge, Corpus Christi Area Retired Teachers Association  
Paula Dear, Corpus Christi Area Retired Teachers Association  
Harriet Lellman, Corpus Christi Area Retired Teachers Association  
Beverly Peters, Corpus Christi Area Retired Teachers Association  
Michael Briones, Corpus Christi Area Retired Teachers Association  
Marianne Robert  
Robin Moore, Skidmore-Tynan ISD  
Charles Schooley  
Linda O'Connell, Beeville ISD  
Janette Rode  
Diana Dopp  
Susan Zeller  
Carol Sue Hipp, Port Aransas ISD  
Sherry Henderson, Port Aransas ISD  
Roberta Davis  
Jodi Schroedter, Orange Grove ISD  
Sherry Schooley  
Karen Gillen  
Gerry Stuhrenberg  
Jan Trujillo, Corpus Christi Area Retired Teachers Association  
Nancy Ware, Corpus Christi Area Retired Teachers Association

Toni P. Garcia, Texas Retired Teachers Association  
Herb Norris, Texas Retired Teachers Association  
Kathleen A. Haynes, Texas Retired Teachers Association  
Joyce Cessae, Texas Retired Teachers Association  
Diane Brady, San Patricio County Retired Teachers Association  
Elizabeth Mokry, San Patricio County Retired Teachers Association  
Stanley Cole  
Sylvia M. Flores  
Anparo Quintanillo, Kingsville Tri-City Retired Teachers Association  
Dottie Pettman, Corpus Christi Area Retired Teachers Association  
Gaye White  
Beverly Jackett, Corpus Christi Area Retired Teachers Association  
Yvonne Landin  
Barbara Agan, Corpus Christi Retired Teachers Association  
Kathy Werner, Corpus Christi Retired Teachers Association  
Cheryl Stephens, GPISD  
Misty Kuyatt, GPISD  
Lamar E. Childress, Corpus Christi Area Retired Teachers Association  
Cathy Redinger, Corpus Christi Area Retired Teachers Association  
Janet Lumley, Corpus Christi Area Retired Teachers Association  
Maria Meurer, Corpus Christi Area Retired Teachers Association  
Olivia Barrera, Corpus Christi Area Retired Teachers Association  
Ella C. Qualls, Corpus Christi Area Retired Teachers Association  
Drusilla Knight Villarreal, Corpus Christi Area Retired Teachers Association  
Debra Robinson  
Michael Broines, Corpus Christi Area Retired Teachers Association  
Michael Burns, South Dallas County RSP  
Dianne Burns, South Dallas County RSP  
Lela Hayek, Calallen ISD  
Ken Cherniss  
Sandy Cherniss  
Phyllis McBride  
Don McBride  
Norma Hinojosa, Corpus Christi Area Retired Teachers Association  
Maria D. Díaz, Corpus Christi Area Retired Teachers Association  
Tony Díaz, Corpus Christi Area Retired Teachers Association  
Jann Dueitt, Corpus Christi Area Retired Teachers Association

Cynthia Weber  
Jim O. Littlefield  
Kathryn Littlefield  
Homero Villarreal  
Janet Hester  
Al Pulchen  
Jeanette Allbright  
H. J. Tijerina  
George Wilkinson  
Thelma Morehead  
Sonia Heil, Corpus Christi Area Retired  
Teachers Association  
Deborah Barrera, Corpus Christi Area Retired  
Teachers Association  
Benito Barrera  
Delia Gonzalez  
Guillermo Gonzalez  
Patricia Hopkins

Linda Guerrero  
Fran Pinckles, Corpus Christi Area Retired  
Teachers Association  
Ron McMury, Corpus Christi Area Retired  
Teachers Association  
Doyal Marek  
Deborah Ravenburg  
Elida Benavides  
Linda Strand, Corpus Christi Area Retired  
Teachers Association  
Laura W. Jones, Corpus Christi Area Retired  
Teachers Association  
Esther Figeren  
Sharon Erskine  
John D. Gaskins  
Anne Veech  
Eloisa Garaia  
Hal Roberts

Mr. Kelly called the meeting to order at 9:05 a.m.

**1. Call roll of Board members.**

Mr. Junell called the roll. A quorum was present. Mr. Colonna was absent.

**2. Consider the approval of the December 12-13, 2013 Board meeting minutes – David Kelly.**

On a motion by Mr. Moss, seconded by Mr. Corpus, the board unanimously approved the minutes of the December 12-13, 2013 board meeting.

**3. Provide opportunity for public comment – David Kelly.**

Mr. Guthrie introduced State Representative for District 34, The Honorable Abel Herrero. Representative Herrero gave some brief remarks.

Mr. Leroy DeHaven of Texas Retired Teachers Association (TRTA) introduced retirees from the Texas Retired Teachers Association Aransas County, Corpus Christi, Falfurrias-Premont, Kingsville County, San Patricio County, and Tri-County Local Units.

Ms. Stacy Stoll from Killeen Independent School District stated that her district opted out of TRS-ActiveCare, and she hoped that TRS would ally with district employees to find more affordable health benefits, which would help retain teachers in the classroom.

Ms. Susan Seaton from San Marcos commented on the impact of high health care costs on public education employees. She said she hope that TRS would ally with employees to find a more affordable health care plan. She noted that the state's contribution had remained at \$75 since 2002.

Ms. Katie Plemmons from Del Valle High School commented on the negative impact of high health care costs on teacher retention. She expressed her hope that TRS would ally with teachers to find more affordable health care options.

Ms. Michelle Cardenas of Del Valle Education Association commented on the deprived living conditions in the Del Valle area and how public education employees struggled with high health care costs. She expressed her hope that TRS would partner with the public education organizations to improve the situation.

Mr. David Palacios of West Oso Independent School District expressed his concerns about the high health care costs being unaffordable to school employees, which had caused school districts difficulties in retaining teachers.

**4. Overview of the February 12-14, 2014 TRS Board meeting, including an introduction of issues and instructions for participating in the afternoon TRS health care town hall discussion – Brian Guthrie.**

Mr. Guthrie provided an overview of the February 12-14, 2014 board meeting agenda.

**5. Receive presentation on and discuss national and state health care history and trends and the TRS health benefits plans – Betsey Jones; William Hickman and Amy Cohen, Gabriel, Roeder, Smith & Company.**

Mr. Hickman, Ms. Cohen, and Ms. Jones provided an overview of the U.S. health care history, health care trends in Texas, and the plans administered by TRS-Care and TRS-ActiveCare. Ms. Jones noted that in addition to premium increases, health care benefits also had been significantly reduced, which further increased participants' out-of-pocket costs. Mr. Hickman stated that the high premiums for TRS-ActiveCare 2 and 3 were needed in order to not have to raise the premiums for TRS-ActiveCare 1-HD even more. Mr. Barth asked staff to compile the data on the average out-of-pocket cost members had paid by year. He also asked that the data be compared with other employer-provided health coverage. Ms. Charleston also suggested comparing the health care costs with members' disposable income. Ms. Jones stated that staff could survey the districts and gather those data.

After a brief recess at 11:09 a.m., the board reconvened at 11:30 a.m.

Before the board took up agenda item 6, Mr. Kelly announced that the board would take up agenda item 3 to let another member of the public provide the board comments.

**3. Provide opportunity for public comment – David Kelly.**

Ms. Brenda Dominguez commented on the financial challenges high health care expenses created for public school employees. She urged the board to consider the public comments presented at this meeting and to find a solution that would help retain teachers.

- 6. Panel Discussion on health care matters and the federal Patient Protection and Affordable Care Act (PPACA) – Betsey Jones (Moderator); Jeff Bernhard and Sally Imig, Aetna; Dr. Dan McCoy and Ethan Baumfeld, Blue Cross and Blue Shield of Texas; Kevin DeStefino, RPh, Towers Watson; and Dr. Steve Miller, Express Scripts.**

The panelists introduced themselves and discussed the Affordable Care Act, future health care trends, cost drivers, and strategies to control health care costs.

After a recess at 12:55 p.m., the board reconvened at 1:24 p.m.

- 7. Meet with representative(s) from the Retirees Advisory Committee (RAC) and discuss the role of the RAC and issues regarding TRS-Care – Ignacio Salinas, Jr. Ph.D., Chair and Bill Barnes, Member**

Mr. Guthrie introduced Dr. Ignacio Salinas, Retirees Advisory Committee (RAC) Chair, and Mr. Bill Barnes, RAC member.

Dr. Salinas and Mr. Barnes expressed their appreciation for the opportunity to serve the retired community and to the TRS staff for arranging the opportunity to speak to the board. Dr. Salinas discussed long-term issues involving TRS-Care. He acknowledged the value of staff's assistance in helping retirees make health care decisions. Mr. Barnes urged that TRS keep retirees informed, seek their opinions and input, listen to their concerns, and involve the RAC in the process.

Ms. Jones recapped that, at the February 3, 2014 RAC meeting, the committee discussed the TRS-Care sustainability study, which staff would discuss again with the RAC and receive the committee's input before presenting the finalized study at the RAC's June 2014 meeting.

- 8. Conduct the TRS health care town hall meeting –Brian Guthrie (Moderator); Betsey Jones and William Hickman, Gabriel, Roeder, Smith & Company:**
  - A. Receive an introduction on the health care town hall meeting, including instructions for participation.**

Mr. Guthrie provided instructions to the audience, including online viewers, for participating in the health care town hall meeting. He invited to the table the representatives of the following associations: Noel Candelaria of the Texas State Teachers Association; Ann Fickel of the Texas Classroom Teachers Association; Tim Lee of the Texas Retired Teachers Association; Ted Melina Raab of the Texas American Federation of Teachers; Beaman Floyd of the Texas Association of School Personnel Administrators; and Josh Sanderson of the Association of Texas Professional Educators. The representatives provided remarks and suggestions to the board concerning health care issues. They noted the negative impact of high health care costs on education and emphasized the need to involve active members and retirees in the decision-making process.

**B. Discuss the TRS health benefits studies.**

Ms. Jones recapped the options in the TRS-Care study presented to the Legislature in 2013. She laid out the potential areas of consideration to be included in the next health benefits study, which will also include TRS-ActiveCare. She provided a comparison of TRS-Care benefits with those provided by the Employees Retirement System (ERS) health benefits program for retired state employees.

**C. Respond to in-person and web-cast audience questions on health care matters.**

Mr. Guthrie presented each of the following questions from the audience regarding TRS-ActiveCare:

- Responding to a question concerning local health-care providers not participating in TRS-ActiveCare, Ms. Jones stated that it was the nature of the business and an ongoing issue that required negotiation between the providers and the vendors who administer health benefits under the program.
- Responding to questions concerning the timing of setting premiums and enrollment periods, Ms. Jones stated that enrollment was moved to summer when additional experience data would be available for setting more accurate premium rates.
- Responding to a question regarding the impact of health care costs on teacher retention, Mr. Guthrie stated that the public comments given at this meeting indicated that the cost of health care was a significant driver in teacher retention. He agreed that high health care costs were a fundamental concern for most of the active members.
- Responding to a suggestion to establish a committee of benefit administrators from around the state who could gather members' feedback on TRS-ActiveCare issues, Mr. Guthrie and Ms. Jones both agreed that it was a good idea.
- Responding to a question concerning whether districts could opt out of TRS-ActiveCare after they had opted in, Mr. Guthrie stated that TRS-ActiveCare was established to provide health insurance to district employees and to let the participating districts share health care costs. Allowing districts to opt out of the program would undermine its purpose and further increase premium costs for those staying in the plan. Ms. Jones stated that having a mandatory pool would help stabilize the experience across the broad spectrum and sustain the plan for members. Ms. de Onís confirmed for Mr. Kelly that a TRS health care rule prohibited participating districts from opting out of TRS-ActiveCare.
- Responding to a suggestion that one program be established requiring all districts to participate, Mr. Hickman stated that the current pool of participating districts was large enough to give the program an advantage because of size in negotiating with providers. Setting up a program mandating all districts to participate would require the law to be

restructured. He noted that claims in large districts could have a significant impact on the experience of the entire membership.

- Regarding whether claims experience data were available to districts, Ms. Jones stated that such information was not readily available, but it could be compiled in some form if needed. She cautioned that experience data for any particular period could fluctuate and may not accurately reflect future claims.

Mr. Guthrie confirmed that materials relating to the history of health-care benefits presented at this meeting were available upon request and on TRS' website.

- Responding to a suggestion to create an individual program for each district, Mr. Jordan stated that administering different programs for 1128 employers would be a challenge.
- Responding to a suggestion for TRS to join educators across the state in making affordable health care available to all public education employees, Mr. Guthrie stated that TRS was not allowed to lobby but could provide the Legislature requested information for policymakers to use in deciding health benefit issues affecting TRS participants.

Mr. Guthrie presented the following questions from the audience regarding TRS-Care:

- Responding to a question concerning the cost of the TRS-Care shortfall faced in the upcoming legislative session, Mr. Guthrie stated that it would be about \$1 billion for the next biennium, which covers fiscal years 2016 and 2017.
- Concerning questions relating to the impact of the Affordable Care Act (ACA) on TRS retirees, Ms. Jones stated that non-Medicare retirees could decline TRS-Care coverage and shop for a plan in the market and be eligible for the ACA subsidy. She noted that Medicare retirees would not be eligible to participate in the market exchange. Mr. Guthrie stated that staff would try to include applicable information about the ACA in the upcoming health studies.
- Responding to a question about the allocation of active members' payments to TRS-Care, Mr. Guthrie confirmed that those payments were fully allocated to the retirees' health benefits fund.
- Responding to a question about keeping TRS-ActiveCare and TRS-Care on a par with ERS health coverage, Ms. Jones stated that to achieve that would take legislative action and additional state funding, neither of which were within TRS' control to accomplish.
- Responding to a question regarding selecting new vendors for the TRS-Care program, Mr. Guthrie stated that the board would discuss the selection of TRS-ActiveCare vendors at this meeting and would continue to go out for bids regularly in the future for both TRS-Care and TRS-ActiveCare. Mr. Jordan stated that the third-party health plan administrators did not set the premium rates or benefits. Rather, he said, the administrators operated with the premiums and benefits adopted by the TRS board. Mr. Kelly noted that the board set the rates and

benefits based on claims experience to ensure adequate funding for the programs during the contract term. Per Mr. Kelly's request, Ms. Jones and Mr. Jordan described recent actions TRS had taken to contain costs.

- Responding to a question regarding Scott & White's being the only provider for HMO coverage in central Texas, Mr. Guthrie stated that Scott & White was the only HMO that offered to provide services through TRS-ActiveCare in the central Texas area.
- Responding to a question regarding whether an indemnity policy was available for TRS-Care and TRS-ActiveCare, Mr. Hickman confirmed that the programs had no indemnity policy. He explained that premium rates were set based on the underwriter's best estimate of claims and expenses.
- Responding to a question about cost efficiencies in administering both TRS-Care and TRS-ActiveCare, Ms. Jones stated that one of the initiatives was to use paperless documentation.
- Responding to a question concerning the impact of the "baby boomers" on TRS-Care and Medicare in the next five years, Mr. Hickman confirmed that having more retirees and fewer active members was a phenomenon that TRS-Care must face. Mr. Guthrie noted that retirees not eligible for Medicare were a large cost driver because Medicare helped TRS-Care reduce costs by providing supplemental coverage to those who had reached age 65. He stated that the influx of "baby boomers" into TRS-Care was a nationwide issue, to which TRS paid close attention.
- Responding to a question as to whether TRS-Care would continue to be available to retirees at age 65 or older, Ms. Jones stated that it would continue to be provided unless the market changed or another viable option was available to those participants.
- Responding to a question regarding the status of the Medicare Advantage program after its first year of experience, Ms. Jones stated that 68 percent of eligible retirees participated in Medicare Advantage.
- Responding to a question regarding the experience and challenge faced by other organizations of the same size as TRS, Mr. Bernhard stated that, based on his experience in working with other statewide pension plans, all were facing the same challenges and exercising the same due diligence as TRS did. Dr. McCoy stated that TRS faced great challenges because its health benefit programs were among the largest in the nation, with a diverse membership spread all over the state. He commented that TRS had remarkably cut health benefit costs for members and retirees. Mr. Guthrie noted that TRS was one of the few public retirement systems that administered both pension and health care benefits.
- Responding to a question about the negative impact of vendor consolidation on the cost to administer health benefits, Dr. McCoy stated that a wide and diverse marketplace had given entities like TRS a competitive advantage in cost and quality. Having fewer competing vendors in the marketplace, he said, could significantly increase benefit administration costs in the future. He described some actions that had been taken to mitigate the situation.

Mr. Bernhard suggested that people contact the Social Security Administration to explore avenues that they could use to receive health care benefits from that source.

- Responding to a suggestion about reviewing the costs and benefits of other states' plans, Ms. Jones said that staff would look into that.

**9. Discuss and consider selecting a TRS-ActiveCare Health Plan Administrator (HPA) and Pharmacy Benefit Manager (PBM), including considering a finding that deliberating or conferring on the selection of the HPA and PBM in open meeting would have a detrimental effect on the position of the retirement system in negotiations with a third person – Betsey Jones.**

Mr. Kelly announced that the board would discuss and consider selecting a Health Plan Administrator (HPA) and Pharmacy Benefit Manager (PBM) for TRS-ActiveCare. He said the board would also consider making a finding that deliberating and conferring on the selection of the HPA and PBM in open meetings would have a detrimental effect on the position of the retirement system in negotiations with a third party. He noted that the board would go into executive session and reconvene in open session to make a decision by resolution.

On a motion by Ms. Sissney, seconded by Mr. Moss, the board unanimously agreed that deliberating or conferring in an open meeting about the current TRS-ActiveCare procurement would have a detrimental effect on TRS' position in negotiations with a third person.

Mr. Kelly announced that the board would go into executive session on agenda item 9 under section 825.115(e) of the Government Code. He asked all members of the public and staff not needed for the executive session to leave the meeting room and take their belongings with them.

Whereupon, the board went into executive session at 3:50 p.m.

The meeting was reconvened in open session at 6:23 p.m.

Mr. Kelly read the following proposed resolution pertaining to the selection of the TRS-Active Care Health Plan Administrator:

**Whereas**, Chapter 1579, Texas Insurance Code, governs the Texas School Employees Uniform Group Health Coverage Program (the "TRS-ActiveCare program") and authorizes the Teacher Retirement System of Texas ("TRS"), as trustee, to implement the group coverage program described in the statute;

**Whereas**, TRS issued a Request for Proposals ("RFP") to interested entities for health plan administrative, network, and network management services for the TRS-ActiveCare program;

**Whereas**, TRS received and evaluated responsive proposals to provide health plan administrative, network, and network management services for the TRS-ActiveCare program;

**Whereas**, TRS staff and the TRS healthcare consultant, Gabriel, Roeder, Smith & Company ("GRS"), have provided relevant information to the TRS Board of Trustees (the "Board"),

discussed the proposals with the Board, and presented an evaluation to the Board concerning the selection of a health plan administrator;

**Whereas,** The Board has considered the evaluation made by TRS staff and GRS; now, therefore, be it

**Resolved,** That the Board hereby selects Aetna Life Insurance Company to be the health plan administrator for the TRS-ActiveCare program, subject to successful negotiation and execution of a final agreement for the implementation and provision of health plan administrative, network, and network management services to the TRS-ActiveCare program, for a two-year term to commence on September 1, 2014, with four optional one-year renewals;

**Resolved,** That the Board authorizes the Executive Director to expend funds deemed by him to be necessary or advisable to implement the Board's selection of Aetna Life Insurance Company and further to execute all documents and take all actions deemed by the Executive Director to be necessary or advisable to implement this resolution, as well as all actions deemed by him to be necessary to negotiate a contract with Aetna Life Insurance Company on the same or better financial terms presented to the Board and on such other terms and conditions deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, and from time to time amend, modify, or extend the contract as deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, it being understood that the Board's selection of Aetna Life Insurance Company pursuant to this resolution shall not be construed as a binding agreement or obligation to contract, and there shall be no binding agreement among the parties until a full and final written contract is successfully negotiated and executed by both parties.

**Resolved,** That if for any reason, the Executive Director concludes in his sole judgment that TRS is not reasonably successful in negotiation or reasonably likely to reach a binding agreement with Aetna Life Insurance Company, then the Board hereby selects the other finalist to be the health plan administrator for the TRS-ActiveCare program, subject to successful negotiation and execution of a final agreement for the implementation and provision of health plan administrative, network, and network management services to the TRS-ActiveCare program, for a two-year term to commence on September 1, 2014, with four optional one-year renewals;

**Resolved,** That once the Executive Director concludes in his sole judgment that TRS is not reasonably successful in negotiation or reasonably likely to reach a binding agreement with Aetna Life Insurance Company, the Board authorizes the Executive Director to expend funds deemed by him to be necessary or advisable to implement the Board's selection of the other finalist and further to execute all documents and take all actions deemed by the Executive Director to be necessary or advisable to implement this resolution, as well as all actions deemed by him to be necessary to negotiate a contract with the other finalist on the same or better financial terms presented to the Board and on such other terms and conditions deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, and from time to time amend, modify, or extend the contract as deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, it being understood that the Board's selection of the other finalist pursuant to this resolution shall not be construed as a binding agreement or obligation to contract, and there shall be no binding agreement among the parties until a full and final written contract is negotiated and executed by both parties.

Mr. Barth made a motion to adopt the resolution; Mr. Corpus seconded the motion. Mr. Kelly asked each trustee to vote separately by voice. The board adopted the motion with Mr. Barth, Ms. Charleston, Mr. Corpus, Mr. Moss, Ms. Palmer, Ms. Ramirez and Ms. Sissney voting in favor of it and Mr. Kelly voting against it.

Next Mr. Kelly read the following proposed resolution pertaining to the selection of Pharmacy Benefit Manager:

**Whereas**, Chapter 1579, Texas Insurance Code, governs the Texas School Employees Uniform Group Health Coverage Program (the "TRS-ActiveCare program") and authorizes the Teacher Retirement System of Texas ("TRS"), as trustee, to implement the group coverage program described in the statute;

**Whereas**, TRS issued a Request for Proposals ("RFP") to interested entities for pharmacy benefit management services for the TRS-ActiveCare program;

**Whereas**, TRS received and evaluated responsive proposals to provide pharmacy benefit management services for the TRS-ActiveCare program;

**Whereas**, TRS staff and the TRS healthcare consultant, Gabriel, Roeder, Smith & Company ("GRS"), have provided relevant information to the TRS Board of Trustees (the "Board"), discussed the proposals with the Board, and presented an evaluation to the Board concerning the selection of a pharmacy benefit manager;

**Whereas**, The Board has considered the evaluation made by TRS staff and GRS; now, therefore, be it

**Resolved**, That the Board hereby selects CaremarkPCS Health, L.L.C. to be the pharmacy benefit manager for the TRS-ActiveCare program, subject to successful negotiation and execution of a final agreement for the implementation and provision of pharmacy benefit services to the TRS-ActiveCare program, for a two-year term to commence on September 1, 2014, with four optional one-year renewals;

**Resolved**, That the Board authorizes the Executive Director to expend funds deemed by him to be necessary or advisable to implement the Board's selection of CaremarkPCS Health, L.L.C. and further to execute all documents and take all actions deemed by the Executive Director to be necessary or advisable to implement this resolution, as well as all actions deemed by him to be necessary to negotiate a contract with CaremarkPCS Health, L.L.C. on the same or better financial terms presented to the Board and on such other terms and conditions deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, and from time to time amend, modify, or extend the contract as deemed by the Executive Director to be in the best interest of the TRS-ActiveCare program, it being understood that the Board's selection of CaremarkPCS Health, L.L.C. pursuant to this resolution shall not be construed as a binding agreement or obligation to contract, and there shall be no binding agreement among the parties until a full and final written contract is successfully negotiated and executed by both parties.

Mr. Moss made a motion to adopt the resolution; Ms. Charleston seconded the motion. Mr. Kelly asked for a voice vote from each trustee. The board adopted the motion with Mr. Barth, Ms. Charleston, Mr. Corpus, Mr. Moss, Ms. Palmer, Ms. Ramirez, Ms. Sissney and Mr. Kelly voting in favor of it.

Whereupon, the meeting was recessed at 6:30 p.m.

The Board of Trustees of the Teacher Retirement System of Texas reconvened on February 13, 2014, in the Room 3-23, Region 2 Educational Service Center at 209 North Water Street, Corpus Christi, Texas. The following board members were present:

David Kelly, Chair  
Todd Barth  
Karen Charleston  
David Corpus  
Chris Moss  
Anita Palmer  
Dolores Ramirez  
Nanette Sissney

Others present:

Brian Guthrie, TRS	Rhonda Price, TRS
Ken Welch, TRS	Noel Sherman, TRS
Amy Barrett, TRS	Merita Zoga, TRS
Janet Bray, TRS	Steve Huff, Reinhart Boerner Van Deuren
Carolina de Onís, TRS	Keith Johnson, Reinhart Boerner Van Deuren
Britt Harris, TRS	Dr. Keith Brown, Investment Advisor
Jerry Albright, TRS	Steve Voss, Hewitt EnnisKnupp
Howard Goldman, TRS	Brady O'Connell, Hewitt EnnisKnupp
Don Green, TRS	Tim Lee, Texas Retired Teachers Association
Betsey Jones, TRS	Rick Young, State Street
Amy Morgan, TRS	Brenda Dulger-Sherkin, State Street
Jase Auby, TRS	Art Granado, GG
Sylvia Bell, TRS	Tim Lee, Texas Retired Teachers Association
Ashley Baum, TRS	Bill Barnes, Texas Retired Teachers Association
Mohan Balachandran, TRS	Ann Fickel, Texas Classroom Teachers Association
Ronnie Bounds, TRS	Josh Sanderson, Association of Texas Professional Educators
Jan Engler, TRS	Ted Melina Raab, Texas American Federation of Teachers
Jay Leblanc, TRS	Beaman Floyd, Texas Association of School Administrators
Rich Hall, TRS	Jody Wright, Legislative Budget Board
Dan Herron, TRS	Leroy DeHaven, Texas Retired Teachers Association
Dan Junell, TRS	Fran Plemmons, Texas Retired Teachers Association
Rebecca Merrill, TRS	Philip Mullins, Texas State Employees Union
Melinda Nink, TRS	Keith Robinson, Focus Consulting Group
James Nield, TRS	John Grey, Texas State Teachers Association
Mike Pia, TRS	Michael Johnson, Bridgepoint Consulting
Jamie Pierce, TRS	Ryan Johnston

Mr. Kelly called the meeting to order at 8:00 a.m.

**1. Call roll of Board members.**

Mr. Junell called the roll. A quorum was present. Mr. Colonna was absent.

Mr. Kelly announced that the board would take up agenda item 10.

**10. Provide opportunity for public comment – David Kelly.**

Mr. Ryan Johnston stated that providing school districts access to the health care usage data would help manage expensive claims and contain health care costs over time. He also suggested proactively approaching those districts with high claim costs to help them minimize their cost increases in the long run.

**11. Review and discuss the Executive Director's report on the following matters – Brian Guthrie:**

**A. Overview of the agenda for February 13, 2014.**

Mr. Guthrie provided an overview of the February 13, 2014 board meeting agenda.

**B. Review TRS functions and organizational structure, including a workforce overview and a discussion of agency accomplishments and goals.**

Mr. Guthrie provided an overview of the significant events relating to the operation of TRS' programs since its inception. He reviewed TRS' responsibilities in administering the pension fund, health benefit programs, and 403(b) program. He also provided an update on the following: the current status of the TRS pension trust fund; the impact of 2013 legislation on pension benefit rules; pension fund operations; annual impact of pension benefit payments on Texas business; annuity distribution; TRS-Care and TRS-ActiveCare funding and operations; and the 403(b) program.

Mr. Guthrie provided an update on TRS' organizational structure and workforce. Mr. Guthrie confirmed for Mr. Kelly that succession planning was in place to address the number key staff expected to retire over time. Ms. Bray and Mr. Green gave examples of executive development and other enhanced educational opportunities made available to staff to prepare new leaders.

Mr. Guthrie provided an overview of the challenges and accomplishments in 2012 and 2013 and the challenges and goals for 2014.

**C. Preview draft agendas for upcoming Board meetings.**

Mr. Guthrie provided an overview of the 2014 board meeting agendas.

**D. Receive the Board training calendar.**

Mr. Guthrie presented the board training opportunities in 2014.

**12. Discuss strategic planning – Brian Guthrie; Rebecca Merrill; and Keith Robinson, Focus Consulting Group.**

Ms. Merrill provided the background and progress of the strategic planning. She stated that the final plan would be due in June. Mr. Robinson laid out the process of strategic development.

**13. Discuss preparation for the upcoming 2015 Texas legislative session – Ken Welch and Don Green.**

Mr. Welch provided the timeline for the upcoming legislative session and an overview of the turnover of state leadership after the general election, changes that would affect the 2015 session of the Legislature. Mr. Green reviewed the timeline for the approval, submission, and consideration of TRS' Legislative Appropriations Request. He explained the annual settle-up process with the Comptroller's office related to TRS' appropriations, which is an estimate based on certain assumptions adopted by the Legislature before actual figures are known. He also discussed state revenue sources, TRS' appropriations for the FY 2014-2015 biennium, and the FY 2014 operating budget adopted by the board.

After a recess at 10:50 a.m., the meeting reconvened at 11:00 a.m.

**14. Receive an update and discuss TRS long-term space planning issues – Don Green and Jerry Albright**

Mr. Green provided a historical overview of TRS' space development. Mr. Albright presented the findings of the space assessment completed by the Texas Facilities Commission in July 2011 and the options for long-term space planning. Presenting the timeline for planning and implementation, Mr. Albright stated that staff would provide the board with a final recommendation at the July 2014 meeting. Mr. Guthrie noted that the space planning would consider members' accessibility to TRS' offices. Per Ms. Palmer's request, staff would provide the board the floor plans of the 1000 Red River and 816 Congress offices.

**15. Review the report under § 825.314(b), Government Code, of expenditures that exceed the amount of operating expenses appropriated from the general revenue fund and are required to perform the fiduciary duties of the Board – Don Green.**

Pursuant to section 825.314(b) of the Government Code, Mr. Green presented a complete financial report for the first quarter ending November 30, 2013.

**16. Receive a presentation by Focus Consulting Group (FCG) on the process for executive personnel evaluations – Keith Robinson, Focus Consulting Group.**

Mr. Robinson provided a presentation of the executive personnel evaluation process.

After a recess at 11:55 a.m., the board reconvened at 12:20 p.m.

**17. Receive presentations on the TRS investment management and functions, including the following matters:**

- A. Panel discussion on asset allocation – Dr. Keith Brown, (Moderator); Steve Voss and Brady O’Connell, Hewitt EnnisKnupp; Joseph Newton, Gabriel, Roeder, Smith & Company; Britt Harris; Mohan Balachandran; and Ashley Baum.**

Dr. Brown led a panel discussion on the process of asset allocation development with Mr. Voss, Mr. O’Connell, Mr. Newton, Mr. Harris, Mr. Balachandran and Ms. Baum. The panel discussed the following: benchmarks; the asset class universe; factors affecting asset allocation decisions; best practices in reviewing asset allocation; the timeline for deciding the asset allocation; long-term goals and obligations of the plan; the impact of market environment, liability, and actuarial assumptions on investment return assumptions; and results of a survey on capital markets expectations.

After a recess at 3:50 p.m., the meeting reconvened at 4:05 p.m.

- B. Receive an update on the Emerging Manager Program – Stuart Bernstein.**

Mr. Bernstein provided an update on the Emerging Manager Program.

- C. Discuss the 2014 priorities for the Investment Management Division – Britt Harris.**

Mr. Harris discussed the 2014 priorities for the IMD.

- D. Receive market update and discuss results of the Investment Management Division’s Best Ideas Survey – Britt Harris and James Nield.**

Mr. Harris stated that the market update would be deferred until the March board meeting.

Mr. Nield provided the results of the IMD’s Best Ideas Survey.

Ms. Sissney, presiding chair, announced without objection that the board would not take up agenda item 17. F.

- F. Discuss possible co-investment opportunities involving a foreign pension fund, including potential investments in private investment funds or the purchase, holding, or disposal of restricted securities or a private investment fund’s investment in restricted securities – David Kelly.**

Ms. Sissney announced that the board would go into executive session on agenda items 17. E. and 17. G. under the following statutes: section 825.3011 of the Government Code to confer about confidential investment matters, and section 551.071 of the Government Code to seek advice from legal counsel. She asked that all members of the public and staff not needed for the executive session to leave the meeting room and take their belongings with them.

- E. Receive a report on the investments in private investment fund CVC European Equity Partners IV L.P. and a direct investment in restricted securities – Rich Hall and Carolina de Onís.**
- G. Receive legal advice on certain securities related to the legacy fixed income portfolio – Carolina de Onís.**

Whereupon, the board went into executive session at 4:28 p.m.

The meeting was reconvened in open session at 7:13 p.m. and recessed at 7:15 p.m.

The Board of Trustees of the Teacher Retirement System of Texas reconvened on February 14, 2014, in the Room 3-23, Region 2 Educational Service Center at 209 North Water Street, Corpus Christi, Texas. The following board members were present:

David Kelly, Chair  
 Todd Barth  
 Karen Charleston  
 David Corpus  
 Chris Moss  
 Anita Palmer  
 Dolores Ramirez  
 Nanette Sissney

Others present:

Brian Guthrie, TRS  
 Ken Welch, TRS  
 Amy Barrett, TRS  
 Janet Bray, TRS  
 Carolina de Onís, TRS  
 Jerry Albright, TRS  
 Janet Bray, TRS  
 Howard Goldman, TRS  
 Don Green, TRS  
 Amy Morgan, TRS  
 Ronnie Bounds, TRS  
 Dan Junell, TRS  
 Rebecca Merrill, TRS  
 Rhonda Price, TRS  
 T. A. Miller, TRS  
 David Cook, TRS  
 Barbie Pearson, TRS  
 Noel Sherman, TRS  
 Adam Fambrough, TRS

Garry Sitz, TRS  
 Amanda Gentry, TRS  
 Cindy Yarbrough, TRS  
 Steve Huff, Reinhart Boerner Van Deuren  
 Keith Johnson, Reinhart Boerner Van Deuren  
 Jay Masci, Provaliant  
 Tim Lee, Texas Retired Teachers Association  
 Esther Reud, Corpus Christi Area Retired Teachers Association  
 Leroy DeHaven, Corpus Christi Area Retired Teachers Association  
 Art Granado, GG  
 Bill Barnes, Texas Retired Teachers Association  
 Ann Fickel, Texas Classroom Teachers Association  
 Ted Melina Raab, Texas American Federation of Teachers  
 Maria A. Diaz  
 Tony C. Diaz  
 Jody Wright, Legislative Budget Board  
 Fran Plemmons, Texas Retired Teachers Association  
 Paula Stone, San Patricio Retired Teachers Association

Mr. Kelly called the meeting to order at 8:00 a.m.

**1. Call roll of Board members.**

Mr. Junell called the roll. A quorum was present. Mr. Colonna was absent.

**18. Provide opportunity for public comment – David Kelly.**

Mr. Kelly called for public comments. No comments were received.

**19. Review the agenda items to be taken up on February 14, 2014 – Brian Guthrie.**

Mr. Guthrie provided an overview of the February 14, 2014 board meeting agenda.

**20. Receive an overview of the TEAM Program, including the program's goals, history, and budget – TRS TEAM Program Core Management Team (CMT); David Cook, and Jay Masci, Provaliant.**

Mr. Masci, Mr. Miller, Ms. Pearson, Ms. Gentry and Mr. Fambrough presented the following topics: the development of the TEAM program from 2009 to 2014; updates on each TEAM project; the TEAM organizational structure; milestones and accomplishments; and upcoming goals for 2014. Mr. Sitz discussed the architecture and vision of TEAM. Mr. Cook reviewed the budget for the TEAM program. Mr. Masci presented the following: a list of TEAM acronyms and their definitions; the progress of the program; the interdependencies of TEAM projects; lessons learned; and typical risks involved in replacing a pension administration system.

After a recess at 10:25 a.m., the meeting was reconvened at 10:35 a.m.

**21. Receive an update on open government matters and review trustee roles, responsibilities, and fiduciary duties; qualifications for office and governance – Dan Junell, Ronnie Bounds, Carolina de Onís; and Steve Huff, Reinhart Boerner Van Deuren, s.c.**

Mr. Junell and Mr. Bounds provided an update on TRS' open government functions and 2013 accomplishments for Legal Services' open government team.

Ms. de Onís discussed a survey completed by Funston Advisors on best practices in fund governance and the role and responsibilities of the board.

Ms. de Onís, Mr. Huff and Mr. Johnson discussed co-fiduciary and liability issues from open government, fiduciary, and ethics perspectives. They presented different hypothetical scenarios and the proper actions for a trustee to take in each circumstance. Mr. Kelly requested that next year's fiduciary training include an explanation of the distinctions between the responsibilities of the general counsel and fiduciary counsel.

The board took up agenda item 18 again to hear a public comment.

**18. Provide opportunity for public comment – David Kelly.**

Mr. Leroy DeHaven expressed his appreciation to the board for holding the meeting in Corpus Christi and for the educational experience it provided TRS members and retirees.

The board took up no further business under agenda items 22 and 23.

- 22. Consider personnel matters, including the appointment, employment, evaluation, compensation, performance, duties, discipline, or dismissal of the Executive Director, Chief Investment Officer, or Chief Audit Executive – David Kelly.**
- 23. Consult with the Board's attorney(s) in Executive Session on any item listed above on this meeting agenda as authorized by § 551.071 of the Texas Open Meetings Act (Chapter 551 of the Texas Government Code) – David Kelly.**

The meeting was adjourned at 11:45 a.m.

Tab 4

# Teacher Retirement System of Texas



## *Executive Director's Report*

Brian Guthrie  
March 27, 2014





# Presentation Overview

- Notable Events.
- Strategic Planning.
- Long-term Space Planning.
- Major Agenda Items for June and July Meetings.



# Notable Events

- Asset Allocation Symposium, TRS – February 27.
- Public Market SPN Summit, TRS – February 28.
- NASRA Mid-Winter Meeting, Washington D.C. – March 1 to 3.
- Private Market SPN Summit, TRS – April 2.
- Enterprise Risk Management Peer Group Meeting, TRS (Co-hosted with CALPERS) – April 14 to 16.
- TRTA Conference in Dallas on April 15.
- NCTR Deputy/Administrative/Communications Workshop, TRS – April 28 to May 1.
- NCTR Directors Meeting, TRS – June 1 to 3.



# Strategic Planning: Goals

- Sustain a financially sound pension trust fund.
- Build and maintain strong, customer-focused relationships.
- Facilitate access to competitive, reliable health care benefits for our members.
- Attract, retain, and develop a highly competent staff.



# Strategic Planning: Goals

- TEAM is addressed under the goal “Build and maintain strong, customer-focused relationships.”
- Long-term space planning is a stand-alone goal in the Strategic Plan that is being addressed by the Division of Strategic Initiatives with the Space Planning Advisory Team.



# Strategic Planning: Planning Team

## Benefits Team

Team Lead – Edward Esquivel, Health Care  
Kathy Mynar, Pension  
Al Huebel, Pension

## Support Team

Chet Henry, IT  
Will Burgess, IT  
Beckie Smith, Legal  
Shunne Powell, HR  
Christine Bailey, HR  
Dan Herron, Comm  
Merita Zoga, GR  
Janie Duarte, Finance  
Scot Leith, Finance

## IMD Team

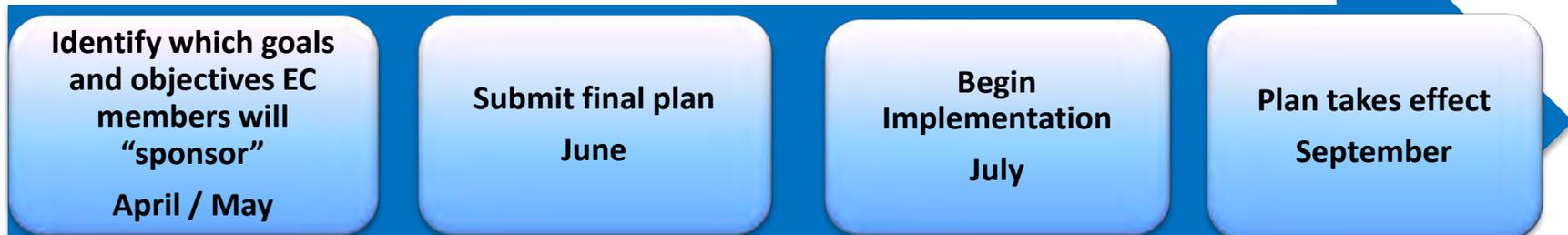
Team Lead – Mike Pia  
Tommy Albright  
Patrick Cosgrove  
Lulu Llano  
Mark Telschow

# Strategic Planning: Steps

## Steps Underway or Completed



## Next Steps





# Long-Term Space Planning: Basics

- TRS Space Planning Advisory Team
  - Don Green & Jerry Albright, Co-Chairs
  - Don Ballard, Legal
  - Chris Cutler, IT
  - Tom Guerin, Benefits
  - Eric Lang, IMD
  - Rebecca Merrill, Strategic Initiatives
  - Jim Smith, Staff Services
  - Grant Walker, IMD
  - Marianne Woods Wiley, Benefits
  
- The team has been meeting for several months. Key achievements:
  - Contracted with CBRE to conduct thorough analysis;
  - Defined vision and success; and
  - Defined the scope of work.



# Long-Term Space Planning: The Vision

## EFFICIENT

- More than improving space efficiency.
- Cost savings.
- Make it easier to connect with employees.
- Enhanced technology.

## EXCELLENT

- Promote professionalism.
- High-performance culture.

## COMFORTABLE & RESPECTFUL

- Easy and confidential member experience.
- Be a clean, safe, healthy facility.

## CONNECTED

- Leverage IT platform improvements.
- Improve strategic adjacencies.

## MOBILE

- Paperless, technologically enabled workforce.





# Long-Term Space Planning: Defining Success

Success is achieving our workplace objectives for the member experience, staff needs, and operational performance.

Success is also getting input or buy-in from stakeholders, including the board, the legislature, employees, and members.

Example Workplace Objectives Regarding the Member Experience:

- Make it easy and provide the right space for interactions with members.
- Convey the right image. Balance utility and appearance.

Example Workplace Objectives Regarding Staff Needs:

- Promote collaboration while supporting individual work.
- Address how space is allocated to individuals.

Example Workplace Objectives Regarding Operational Performance:

- Reflect our position as a top performing pension fund in the workplace.
- Integrate technology into the future office.



# Long-Term Space Planning: The Process

- Weekly calls between CBRE and the Space Planning Advisory Team, plus other parties as necessary.
- Input from Stakeholders:
  - Leadership interviews to define organizational objectives;
  - Focus groups to engage employees;
  - Employee survey to identify “how” people work; and
  - Meet with association representatives and RAC to get member perspective.
- Space utilization Review to measure occupancy and work activity at each workstation, office, and conference room.
- Bring final recommendations to the July 11 Board meeting.



# June 5-6, 2014 Board Agenda

## **Major items include** (2 Day Quarterly Meeting):

- Report on Q1 Earnings.
- Strategic Asset Allocation.
- Legislative Appropriations Request Update.
- TRS-Care and TRS-ActiveCare Rates and Plan Design Adoption.
- Health Benefits Study Update.
- Actuarial Audit Procurement.
- Quarterly SPN Update.

## **Committees**

- **Budget Committee Meeting**
  - FY 2015 Operating Budget (Discuss only – adopt in July).
- **Investment Management Committee Meeting**
  - Private Equity Review.
  - Real Assets Review.
  - Energy and Natural Resources Review.
  - Private SPN Review.
- **Risk Management Committee Meeting**
  - Enterprise Risk Management Update.
- **Policy Committee Meeting**
  - Begin review of Authority to Approve Benefit and Refund Payments Policy.
- **Benefits Committee Meeting**
  - Recommend adoption of TRS-Care and TRS-ActiveCare Rates and Plan Design.
- **Audit Committee Meeting**
  - TRS-ActiveCare Audit from Sagebrush.
  - Quarterly Investments Testing (External Public Markets and Hedge Funds).



# July 11, 2014 Board Agenda

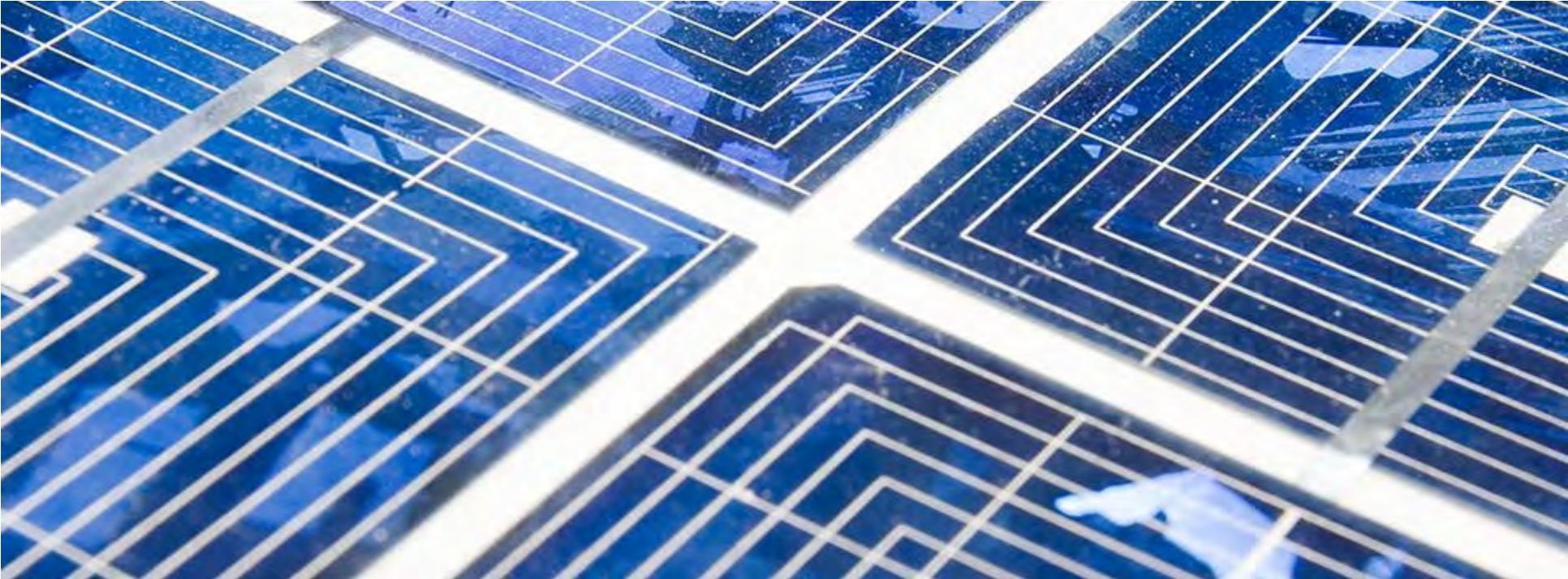
## **July 11, 2014 Major items include** (1 Day Off-Quarter Meeting):

- Space Planning Options Presentation.
- Legislative Appropriations Request.
- Adopt TRS FY 2015 Operating Budget.
- TEAM.
- Executive Evaluations.

## **Committees**

- **Budget Committee Meeting**
  - Recommend adoption of FY 2015 Operating Budget.
- **Audit Committee Meeting**
  - Evaluate the Chief Audit Executive.

Tab 5 A



# Teacher Retirement System of Texas

Performance Review: Fourth Quarter 2013  
March 2014

# Summary

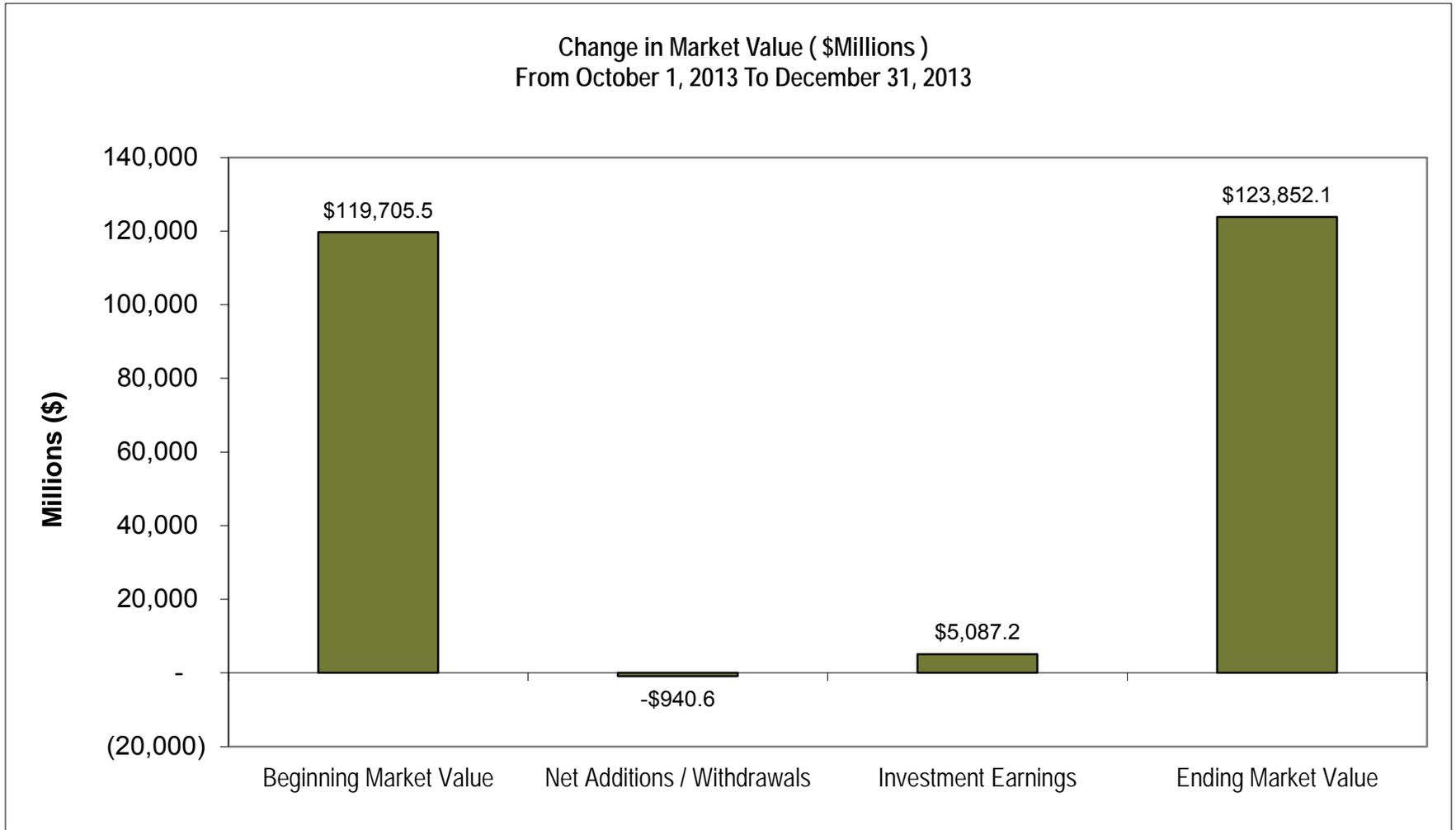
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- The fourth quarter began against a difficult backdrop given the U.S. government shutdown coming into effect and lasting until mid-October. With the resolution of the government shutdown, developed equity markets rallied toward the end of the year.
- In December, the FOMC announced that it would begin to “taper” the monthly rate of Treasury and MBS purchases by \$10 billion and that it intended to do so throughout 2014. Given that such a move had been anticipated, markets did not react negatively.
- TRS gained 4.2% during the fourth quarter and outperformed its benchmark by 42 basis points
  - Over the trailing 12 month period TRS performance remains strong on an absolute and relative basis
  - TRS also exceeded its performance benchmark during the trailing 3, 5, and 10 year periods
- Major sources of outperformance during the fourth quarter included:
  - Global Equity
    - Above benchmark performance from Non-U.S. Developed Equities
    - An overweight Domestic Equities, which had a great quarter and year
- Investments that detracted from relative results included:
  - Underperformance within U.S. Large Cap
  - Underperformance within Real Assets
  - An allocation to Commodities, which struggled during the fourth quarter

# 1. Market Summary – Fourth Quarter 2013

	Fourth Quarter	One Year	Three Years	Five Years	Ten Years
<b>Global Equity:</b>					
MSCI USA Standard	10.3%	32.6%	16.2%	18.2%	7.6%
MSCI USA Small Cap	8.9	38.3	16.6	23.2	9.8
MSCI EAFE + Canada Index	5.6	21.0	7.3	12.5	7.1
MSCI Emerging Markets Index	1.8	-2.6	-2.1	14.8	11.2
HFRI Fund of Funds Composite Index	3.5	8.8	2.4	4.8	3.4
State Street Private Equity Index (qtr lagged)	5.3	15.6	12.8	7.8	12.6
Global Equity Policy Benchmark	6.2	18.6	9.0	15.1	
<b>Stable Value:</b>					
Barclays Capital Long Treasury Index	-3.1%	-12.7%	5.5%	2.3%	5.9%
HFRI Fund of Funds Conservative Index	2.7	7.7	2.7	4.5	2.7
3 Month LIBOR + 2%	0.6	2.3	2.4	2.4	4.1
90 Day US Treasury Bill	0.0	0.1	0.1	0.1	1.7
Stable Value Policy Benchmark	-1.6	-7.7	5.4	3.1	
<b>Real Return:</b>					
Barclays Capital US Treasury TIPS Index	-2.0%	-8.6%	3.5%	5.6%	4.8%
NCREIF ODCE (qtr lagged)	3.3	12.0	13.2	-0.2	
Cambridge Nat. Resources (75) / CPI (qtr lagged) (25)	1.5				
Goldman Sachs Commodities Index	-0.3	-1.2	-0.8	3.9	0.7
Real Return Policy Benchmark	1.8	6.3	9.8	7.8	
TRS Policy Benchmark	3.8	11.0	9.0	11.7	6.7

## 2. Market Value Change



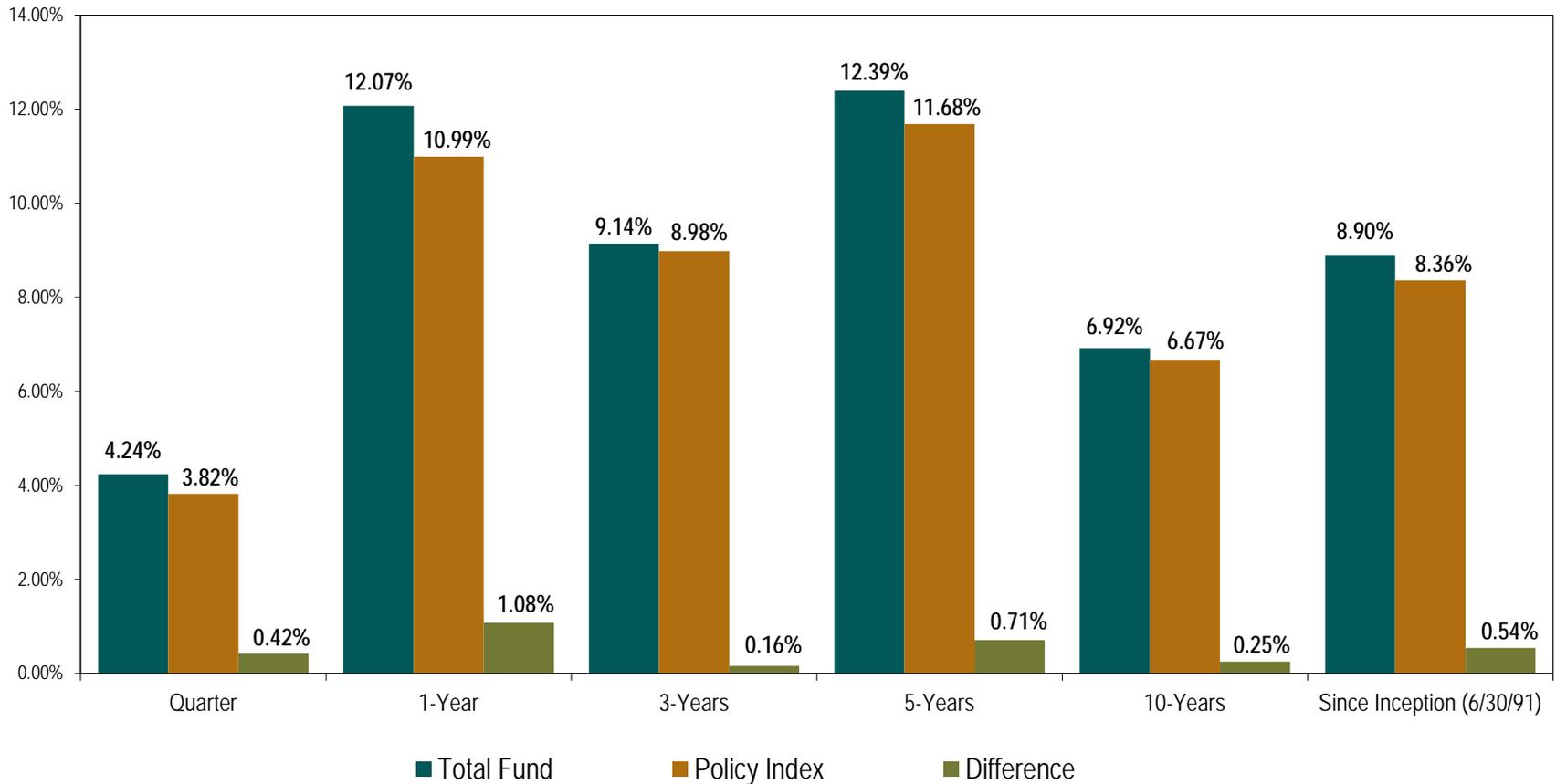
### 3. Asset Allocation Detail

	Market Value (\$ in millions) as of 12/31/2013		Policy Target	Relative Allocation to Policy Target	Ranges
	(\$)	(%)			
<b>Total Fund</b>	<b>\$123,852</b>	<b>100%</b>	<b>100%</b>	<b>---</b>	<b>--</b>
U.S. Large	\$25,868	20.9%	18%	+2.9%	13-23%
U.S. Small	\$3,118	2.5%	2%	+0.5%	0-7%
Non-U.S. Developed	\$17,849	14.4%	15%	-0.6%	10-20%
Emerging Markets	\$12,207	9.9%	10%	-0.1%	5-15%
Directional Hedge Funds	\$6,484	5.2%	5%	+0.2%	0-10%
Private Equity	\$13,919	11.2%	11%	+0.2%	6-16%
<b>Global Equity</b>	<b>\$79,444</b>	<b>64.1%</b>	<b>61%</b>	<b>+3.1%</b>	<b>54-68%</b>
Long Treasuries	\$14,707	11.9%	13%	-1.1%	0-20%
Stable Value Hedge Funds	\$4,978	4.0%	4%	+0.0%	0-10%
Absolute Return (including OAR)	\$689	0.6%	0%	+0.6%	0-20%
Cash	\$1,286	1.0%	1%	+0.0%	0-5%
<b>Stable Value</b>	<b>\$21,660</b>	<b>17.5%</b>	<b>18%</b>	<b>-0.5%</b>	<b>13-23%</b>
TIPS	\$5,670	4.6%	5%	-0.4%	0-10%
Real Assets	\$14,680	11.9%	13%	-1.1%	8-18%
Energy and Natural Resources	\$2,150	1.7%	3%	-1.3%	0-8%
Commodities	\$248	0.2%	0%	+0.2%	0-5%
<b>Real Return</b>	<b>\$22,747</b>	<b>18.4%</b>	<b>21%</b>	<b>-2.6%</b>	<b>16-26%</b>

Note: Actual allocations above are based upon Account Level information

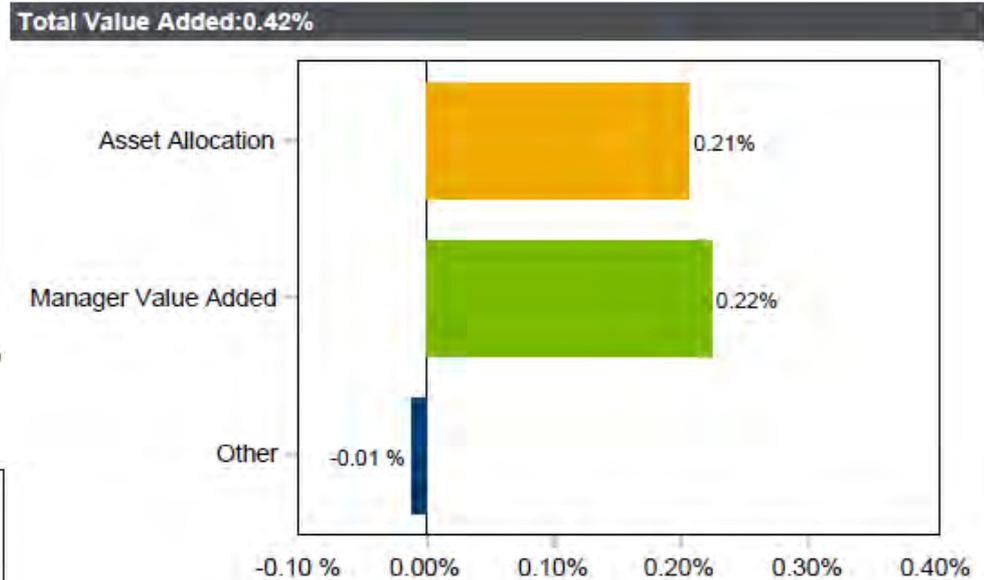
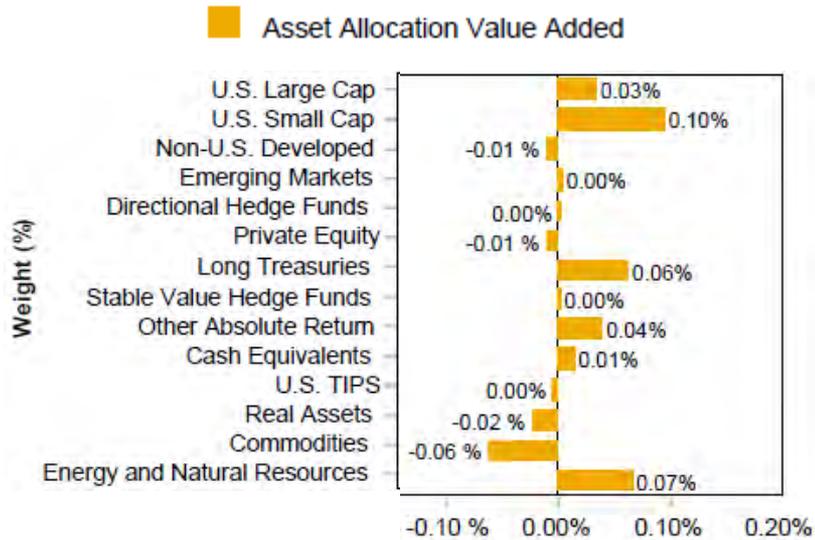
## 4. Total TRS Performance Ending 12/31/2013

### Investment Results As of 12/31/2013

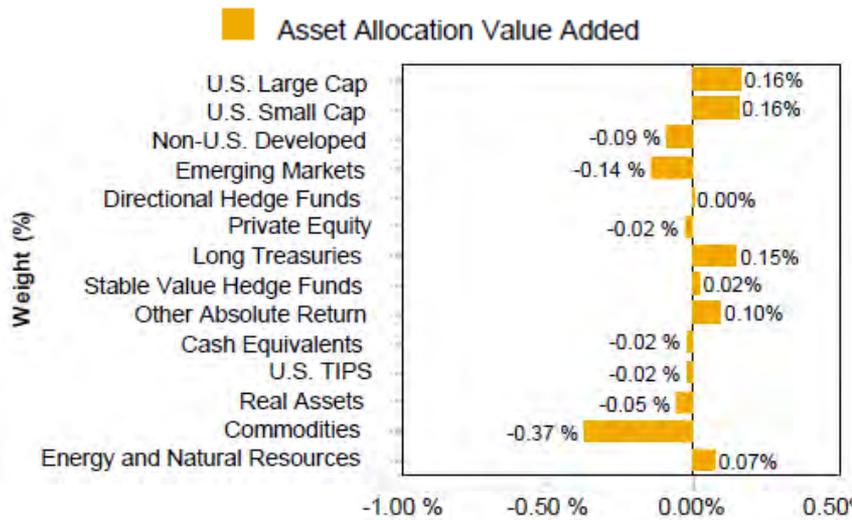


Note: The excess returns shown above may not be a perfect difference between the actual and benchmark returns due entirely to rounding.

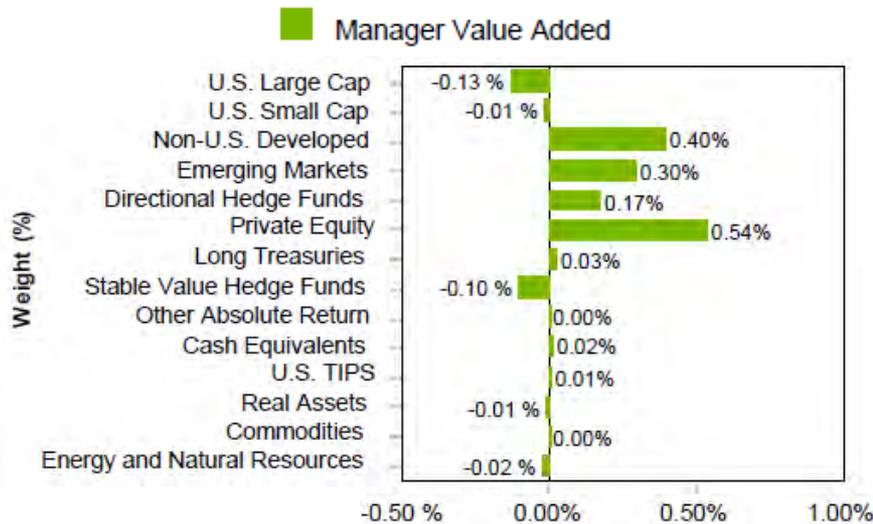
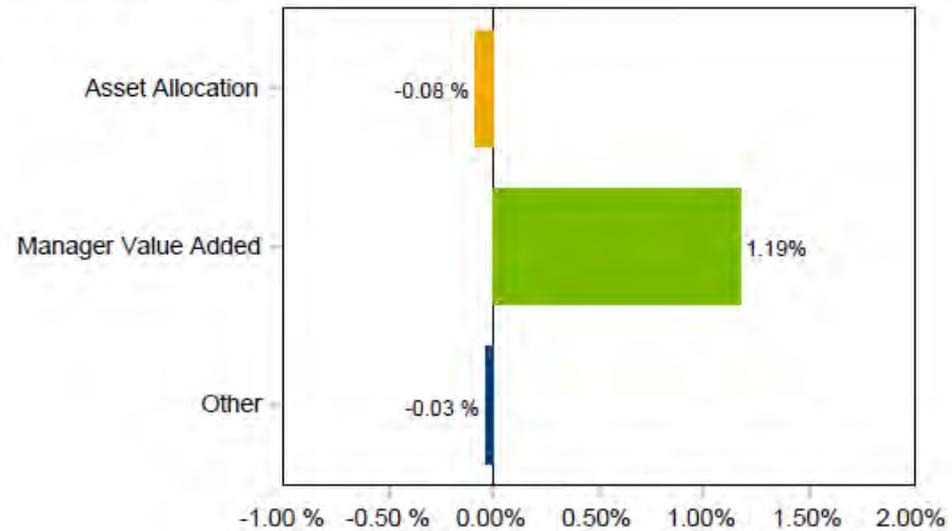
# 5. Total Fund Attribution - Quarter Ending 12/31/2013



# 5. Total Fund Attribution – Trailing One Year Ending 12/31/2013

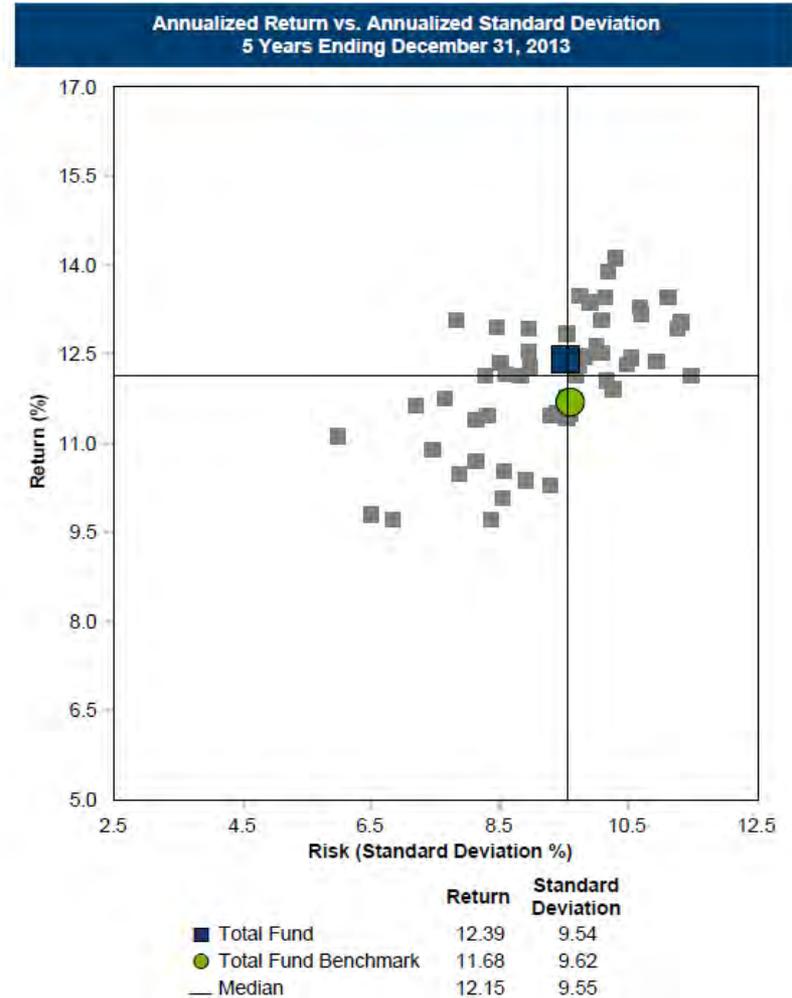
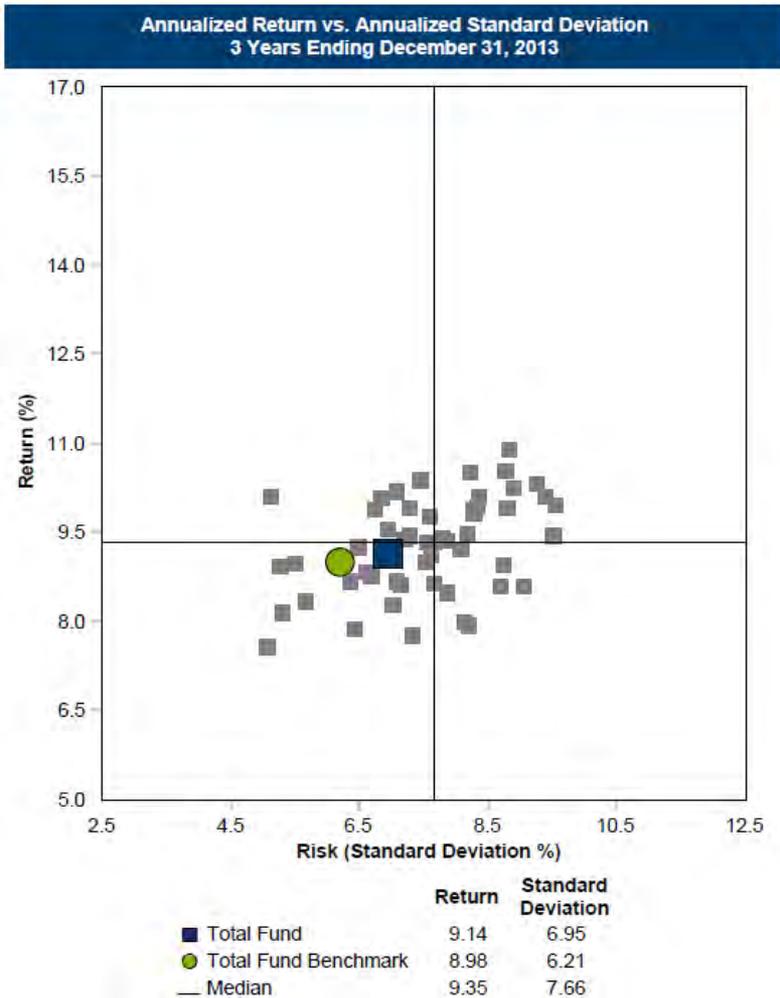


**Total Value Added: 1.08%**



## 6. Risk Profile: Total Fund Risk-Return vs. Peers

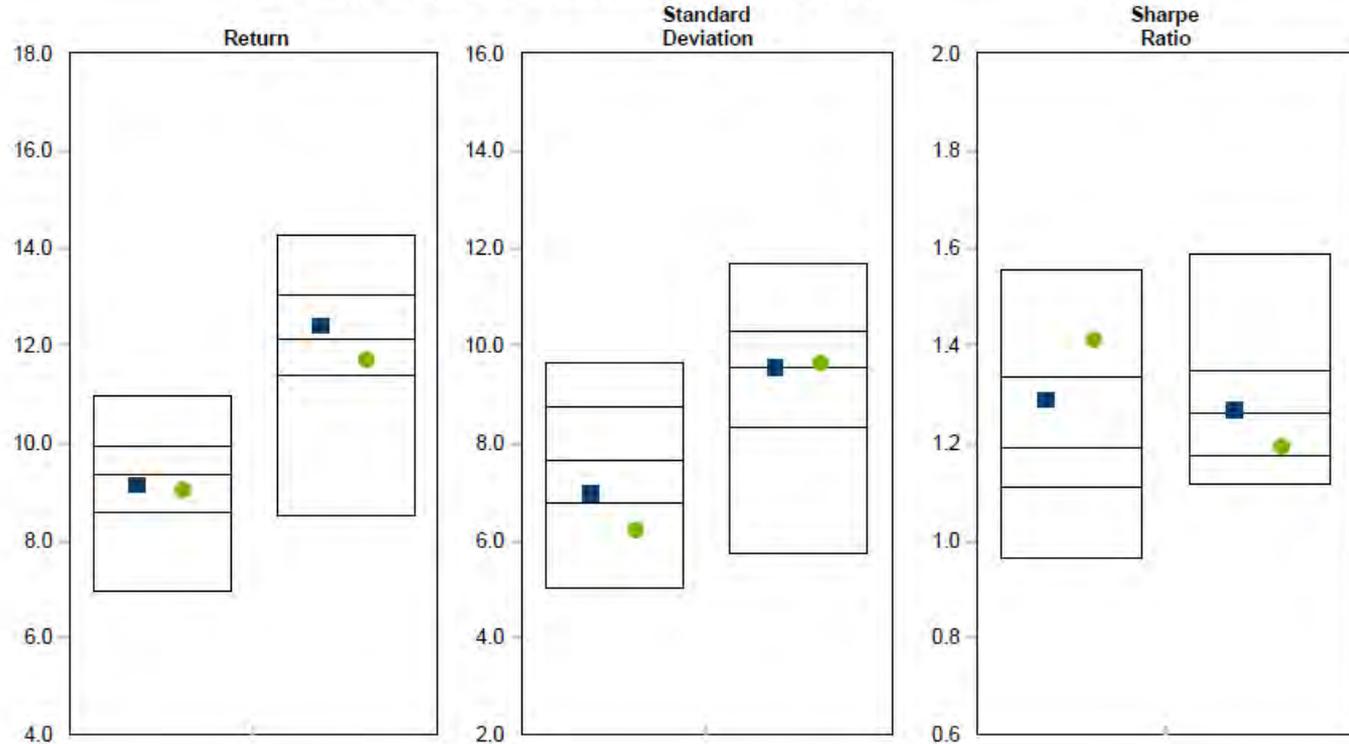
All Public Plans > \$1B-Total Fund vs. 90 Day U.S. Treasury Bill



Plan Sponsor Peer Group composed of 74 public funds with total assets in excess of \$1B as of 12/31/13.

# 6. Risk Profile: Trailing 3-Year and 5-Year Risk Metrics Peer Comparison

All Public Plans > \$1B-Total Fund vs. 90 Day U.S. Treasury Bill



	3 Years	5 Years	3 Years	5 Years	3 Years	5 Years
■ Total Fund	9.14 (59)	12.39 (42)	6.95 (73)	9.54 (51)	1.29 (32)	1.27 (48)
● Total Fund Benchmark	9.01 (60)	11.69 (65)	6.21 (84)	9.64 (45)	1.41 (16)	1.19 (70)
5th Percentile	10.97	14.29	9.69	11.68	1.56	1.59
1st Quartile	9.96	13.05	8.75	10.29	1.34	1.35
Median	9.35	12.15	7.66	9.55	1.19	1.26
3rd Quartile	8.59	11.39	6.79	8.31	1.11	1.17
95th Percentile	6.95	8.52	5.03	5.76	0.96	1.12

Plan Sponsor Peer Group composed of 74 public funds with total assets in excess of \$1B.

## 7. Global Equity: Performance Summary Ending 12/31/2013

	Fourth Quarter	One Year	Three Years	Five Years
<b>Total Global Equity</b>	<b>6.7%</b>	<b>20.6%</b>	<b>9.6%</b>	<b>14.6%</b>
Global Equity Benchmark	6.2	18.6	9.0	15.1
<i>Difference</i>	+0.5	+2.0	+0.6	-0.5
<b>Total U.S.</b>	<b>9.3</b>	<b>32.3</b>	<b>15.5</b>	<b>18.3</b>
U.S. Benchmark	10.2	33.2	16.0	18.5
<i>Difference</i>	-0.9	-0.9	-0.5	-0.2
<u>U.S. Large Cap</u>	<b>9.7</b>	<b>32.0</b>	<b>15.7</b>	<b>18.2</b>
Large Cap Benchmark	10.3	32.6	16.2	18.1
<i>Difference</i>	-0.6	-0.6	-0.5	+0.1
<u>U.S. Small Cap</u>	<b>8.4</b>	<b>38.3</b>	<b>18.1</b>	<b>21.7</b>
Small Cap Benchmark	8.9	38.3	16.6	21.1
<i>Difference</i>	-0.5	+0.0	+1.5	+0.6
<b>Non-U.S. Equity</b>	<b>5.0</b>	<b>13.1</b>	<b>4.0</b>	<b>13.7</b>
Non-U.S. Benchmark	4.1	11.1	3.6	13.5
<i>Difference</i>	+0.9	+2.0	+0.4	+0.2
<u>Non-U.S. Developed</u>	<b>7.3</b>	<b>24.0</b>	<b>8.5</b>	<b>13.0</b>
MSCI EAFE + Canada	5.6	21.0	7.3	12.5
<i>Difference</i>	+1.7	+3.0	+1.2	+0.5
<u>Emerging Markets</u>	<b>2.0</b>	<b>-0.2</b>	<b>-1.4</b>	<b>15.2</b>
MSCI Emerging Markets	1.8	-2.6	-2.1	14.8
<i>Difference</i>	+0.2	+2.4	+0.7	+0.4

Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.

## 7. Global Equity: Performance Summary Ending 12/31/2013 (cont'd)

	Fourth Quarter	One Year	Three Years	Five Years
<b>Directional Hedge Funds</b>	<b>4.9%</b>	<b>12.2%</b>	--	--
HFRI Fund of Funds Composite Index	3.5	8.8	--	--
<i>Difference</i>	+1.4	+3.4	--	--
<b>Total Public Equity</b>	<b>7.0</b>	<b>20.7</b>	<b>8.4</b>	<b>14.8</b>
Public Equity Benchmark	6.4	19.3	8.2	14.6
<i>Difference</i>	+0.6	+1.4	+0.2	+0.2
<b>Total Private Equity</b>	<b>5.7</b>	<b>20.1</b>	<b>15.8</b>	<b>10.9</b>
Private Equity Benchmark	4.8	15.1	12.6	17.2
<i>Difference</i>	+0.9	+5.0	+3.2	-6.3

*Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.*

## 8. Stable Value: Performance Summary Ending 12/31/2013

	Fourth Quarter	One Year	Three Years	Five Years
<b>Total Stable Value</b>	<b>-1.1%</b>	<b>-7.1%</b>	<b>5.0%</b>	<b>7.2%</b>
Total Stable Value Benchmark	-1.6	-7.7	5.4	3.1
<i>Difference</i>	+0.5	+0.6	-0.4	+4.1
<b>Long Treasuries</b>	<b>-3.0</b>	<b>-12.4</b>	<b>6.0</b>	<b>3.3</b>
Treasury Benchmark	-3.1	-12.7	5.5	2.3
<i>Difference</i>	+0.1	+0.3	+0.5	+1.0
<b>Stable Value Hedge Funds</b>	<b>2.8</b>	<b>5.1</b>	<b>1.9</b>	<b>5.3</b>
Hedge Funds Benchmark	2.7	7.7	4.5	3.7
<i>Difference</i>	+0.1	-2.6	-2.6	+1.6
<b>Other Absolute Return</b>	<b>13.7</b>	<b>6.7</b>	<b>12.6</b>	<b>17.8</b>
Other Absolute Return Benchmark	0.6	2.3	2.4	2.4
<i>Difference</i>	+13.1	+4.4	+10.2	+15.4
<b>Cash Equivalents</b>	<b>0.4</b>	<b>1.4</b>	<b>0.9</b>	<b>0.1</b>
Cash Benchmark	0.0	0.1	0.1	0.1
<i>Difference</i>	+0.4	+1.3	+0.8	+0.0

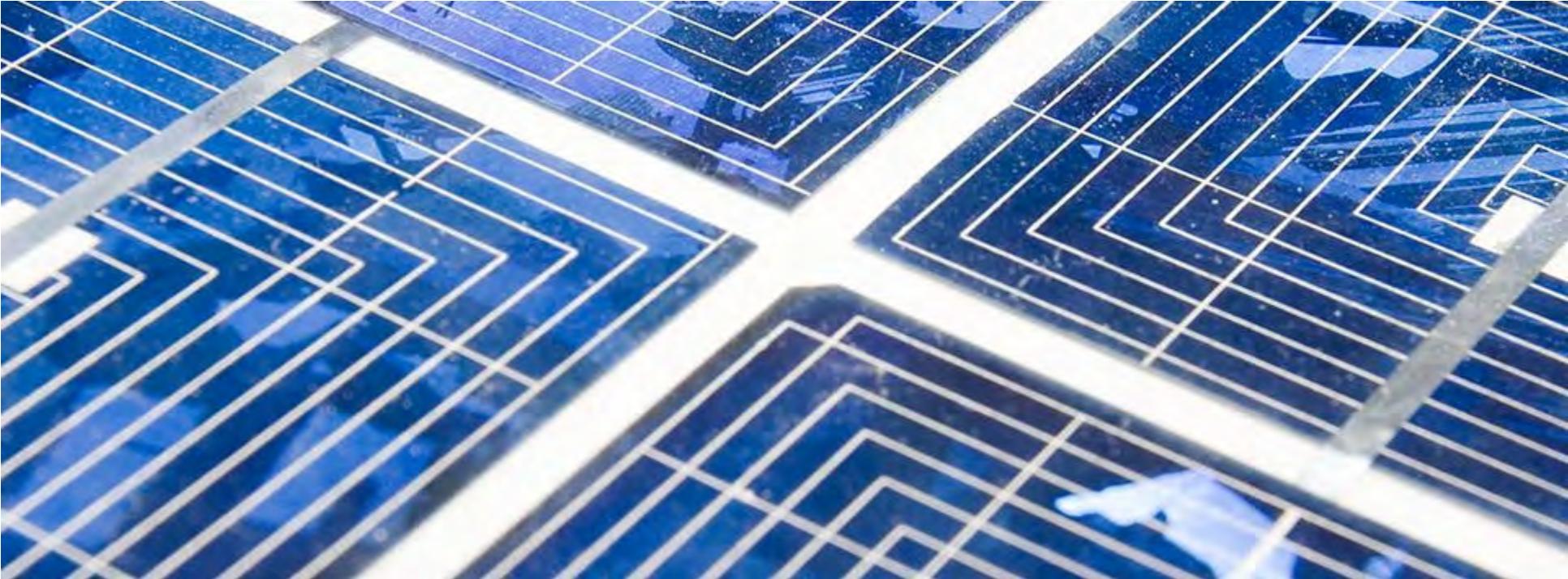
*Note: Performance of Cash Equivalents is shown net of fees paid to TRS Strategic Partners*

*Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.*

## 9. Real Return: Performance Summary Ending 12/31/2013

	Fourth Quarter	One Year	Three Years	Five Years
<b>Total Real Return</b>	<b>1.1%</b>	<b>3.9%</b>	<b>8.6%</b>	<b>7.7%</b>
Real Return Benchmark	1.8	6.3	9.8	7.8
<i>Difference</i>	-0.7	-2.4	-1.2	-0.1
<b>TIPS</b>	<b>-2.0</b>	<b>-8.5</b>	<b>3.7</b>	<b>6.1</b>
U.S. TIPS Benchmark	-2.0	-8.6	3.5	5.9
<i>Difference</i>	+0.0	+0.1	+0.2	+0.2
<b>Real Assets</b>	<b>2.8</b>	<b>12.0</b>	<b>12.7</b>	<b>6.2</b>
Real Asset Benchmark	3.3	12.0	13.2	2.0
<i>Difference</i>	-0.5	+0.0	-0.5	+4.2
<b>Energy and Natural Resources</b>	<b>0.8</b>	--	--	--
Energy and Natural Resources Benchmark	1.5	--	--	--
<i>Difference</i>	-0.7	--	--	--
<b>Commodities</b>	<b>-13.7</b>	<b>-40.9</b>	<b>-17.8</b>	<b>-5.8</b>
Commodities Benchmark	-0.3	-1.2	-0.8	3.9
<i>Difference</i>	-13.4	-39.7	-17.0	-9.7

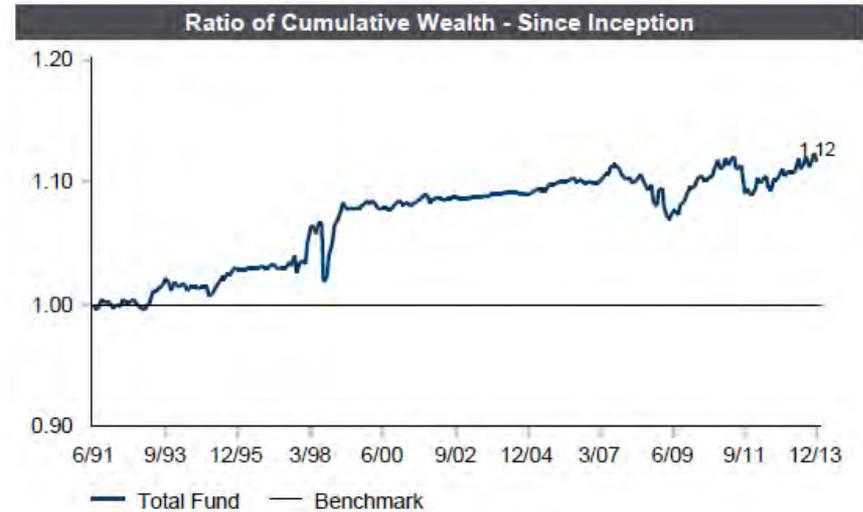
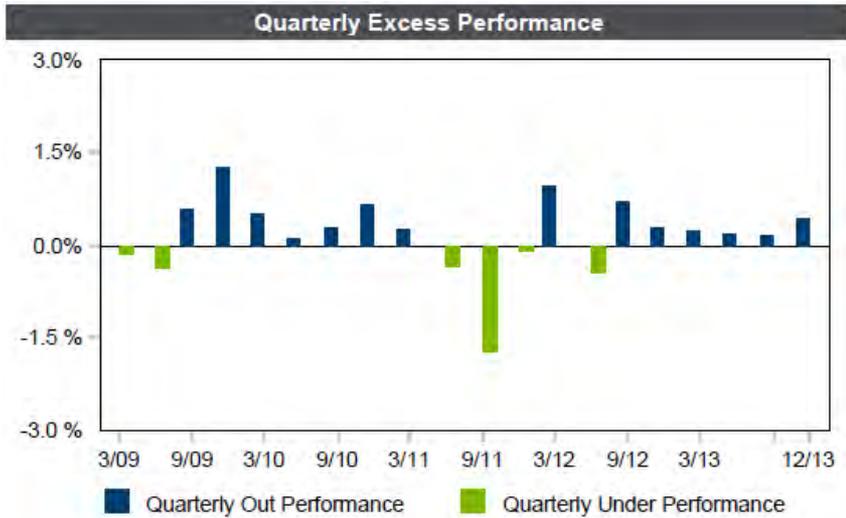
Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.



## Appendix – Supplemental Reporting

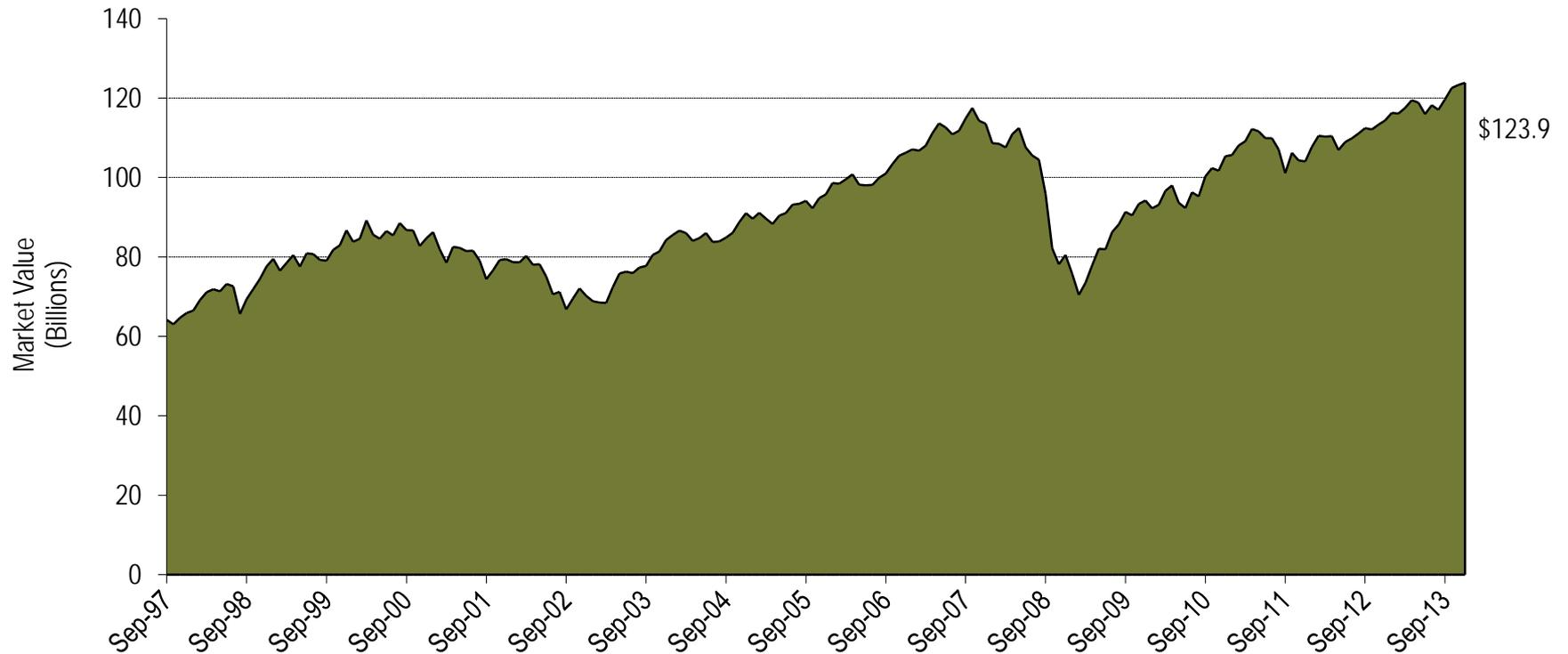
# Historical Excess Performance

Quarterly and Cumulative Excess Performance  
Total Fund vs. Total Fund Benchmark



# TRS Asset Growth

Total Fund Historical Growth (September 1997 - December 2013)



# External Manager Program: Public Equity Performance as of 12/31/2013

	Allocation (\$ in billions)	Fourth Quarter	One Year	Three Years
<b>EP Total Global Equity</b>	<b>\$34.8</b>	<b>6.6%</b>	<b>20.0%</b>	<b>8.2%</b>
EP Global Equity Benchmark	--	6.0	17.5	7.4
<i>Difference</i>	--	+0.6	+2.5	+0.8
<b>EP U.S. Large Cap</b>	<b>\$8.2</b>	<b>9.3</b>	<b>30.9</b>	<b>16.1</b>
EP Large Cap Benchmark	--	10.3	32.6	16.2
<i>Difference</i>	--	-1.0	-1.7	-0.1
<b>EP U.S. Small Cap</b>	<b>\$2.1</b>	<b>8.8</b>	<b>38.3</b>	<b>16.7</b>
EP Small Cap Benchmark	--	8.9	38.3	16.6
<i>Difference</i>	--	-0.1	+0.0	+0.1
<b>EP Non-U.S. Developed</b>	<b>\$6.1</b>	<b>7.6</b>	<b>25.7</b>	<b>8.3</b>
MSCI EAFE + Canada Index	--	5.6	21.0	7.3
<i>Difference</i>	--	+2.0	+4.7	+1.0
<b>EP Emerging Markets</b>	<b>\$7.2</b>	<b>1.9</b>	<b>-0.3</b>	<b>-1.6</b>
MSCI Emerging Markets Index	--	1.8	-2.6	-2.1
<i>Difference</i>	--	+0.1	+2.3	+0.5
<b>EP World Equity</b>	<b>\$5.3</b>	<b>8.3</b>	<b>27.8</b>	<b>11.9</b>
EP World Equity Benchmark	--	7.3	22.8	9.7
<i>Difference</i>	--	+1.0	+5.0	+2.2
<b>EP Directional Hedge Funds</b>	<b>\$5.8</b>	<b>5.4</b>	<b>13.9</b>	--
HFRI Fund of Funds Composite Index	--	3.5	8.8	--
<i>Difference</i>	--	+1.9	+5.1	--

Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.

# External Manager Program: Stable Value/Total Program Performance as of 12/31/2013

	Allocation (\$ in billions)	Fourth Quarter	One Year	Three Years
<b><u>EP Total Stable Value</u></b>	<b>\$5.2</b>	<b>3.1%</b>	<b>6.3%</b>	<b>4.4%</b>
EP Stable Value Benchmark	--	0.0	0.1	0.8
<i>Difference</i>	--	+3.1	+6.2	+3.6
<b><u>EP Stable Value Hedge Funds</u></b>	<b>\$5.0</b>	<b>2.8</b>	<b>5.1</b>	<b>1.9</b>
EP Stable Value Hedge Funds Benchmark	--	2.7	7.7	4.5
<i>Difference</i>	--	+0.1	-2.6	-2.6
<b><u>EP OAR</u></b>	<b>\$0.2</b>	<b>11.5</b>	<b>56.2</b>	<b>30.3</b>
EP OAR Benchmark	--	0.6	2.3	2.4
<i>Difference</i>	--	+10.9	+53.9	+27.9
<b><u>Total External Public Program</u></b>	<b>\$40.0</b>	<b>6.1</b>	<b>18.2</b>	<b>8.3</b>
EP External Public Benchmark	--	5.6	16.3	7.6
<i>Difference</i>	--	+0.5	+1.9	+0.7

Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.

## Public Strategic Partnership Program (SPN): Performance Summary as of 12/31/2013

	Allocation (\$ in billions)	Fourth Quarter	One Year	Three Years
<b>Public Strategic Partnership</b>	<b>\$6.0</b>	<b>5.3%</b>	<b>14.1%</b>	<b>9.7%</b>
Public SPN Benchmark	--	4.1	10.7	8.8
<i>Difference</i>	--	+1.2	+3.4	+0.9
<b>Blackrock</b>	<b>\$1.5</b>	<b>5.6%</b>	<b>12.9%</b>	<b>8.8%</b>
<b>J.P. Morgan</b>	<b>\$1.6</b>	<b>5.3%</b>	<b>15.2%</b>	<b>10.0%</b>
<b>Neuberger Berman</b>	<b>\$1.5</b>	<b>4.4%</b>	<b>11.8%</b>	<b>8.5%</b>
<b>Morgan Stanley</b>	<b>\$1.5</b>	<b>5.4%</b>	<b>16.5%</b>	<b>11.3%</b>

- The Public SPNs in aggregate outperformed the benchmark during all time periods shown above
  - Neuberger Berman was the only SPN with a 3-year return below benchmark
  - Barclays Capital SPN was liquidated during the 4<sup>th</sup> quarter

*Note: The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.*

# Benchmarks

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- **Total Fund Performance Benchmark** – 18% MSCI US Standard, 2% MSCI US Small Cap, 10% MSCI Emerging Markets, 15% MSCI EAFE plus Canada, 5% HFRI FoF Composite Index, 11% State Street Private Equity (1 qtr lagged), 13% BC Long Term Treasury, 4% HFRI FoF Conservative Index, 1% Citigroup 3 Mo T-Bill, 5% BC US TIPS, 13% NCREIF ODCE (1 qtr lagged), and 3% Energy and Natural Resources Benchmark.
- **Global Equity Benchmark**– 24% MSCI EAFE plus Canada, 29% MSCI US Standard, 3% MSCI US Small Cap, 16% MSCI Emerging markets index, 8% HFRI FoF Composite Index, and 19% State Street Private Equity (1 qtr lagged)
  - US Large Cap Benchmark - MSCI US Standard Index
  - US Small Cap Benchmark - MSCI US Small Cap Index
  - Emerging Markets Benchmark – MSCI Emerging Markets
  - Non-US Developed Benchmark– MSCI EAFE plus Canada
  - Directional Hedge Funds – HFRI Fund of Funds (FoF) Composite Index
  - Private Equity Benchmark - State Street Private Equity (1 qtr lagged)

*Note: Returns and market values (based on account level) reported are provided by State Street. Net additions/withdrawals are reported on a gross (adjusted for expenses) total fund level as provided by State Street. All rates of return for time periods greater than one year are annualized. The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.*

## Benchmarks (cont'd)

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- **Stable Value Benchmark** – 22% HFRI FoF Conservative Index, 72% BC Long Term Treasury, and 6% Citigroup 3 mo T-Bill.
  - US Treasuries Benchmark – Barclays Capital (BC) Long Term Treasury
  - Stable Value Hedge Funds – HFRI Fund of Funds (FoF) Conservative Index
  - Other Absolute Return Benchmark - 3 Mo LIBOR + 2%
  - Cash Benchmark - Citigroup 3 Mo T-Bill
- **Real Return Benchmark** – 25% BC US TIPS and 75% NCREIF ODCE
  - US TIPS Benchmark – BC US TIPS Index
  - Real Assets Benchmark – NCREIF ODCE (1qtr lagged)
  - Energy and Natural Resources – 75% Cambridge Associates Natural Resources (reweighted) / 25% quarterly Consumer Price Index (1qtr lagged)
  - Commodities Benchmark – Goldman Sachs Commodity Index

*Note: Returns and market values (based on account level) reported are provided by State Street. Net additions/withdrawals are reported on a gross (adjusted for expenses) total fund level as provided by State Street. All rates of return for time periods greater than one year are annualized. The excess returns shown in this presentation may differ from State Street statements due entirely to rounding. These differences are generally within a few basis points and are not material.*

## Description of Performance Attribution

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- A measure of the source of the deviation of a fund's performance from that of its policy benchmark. Each bar on the attribution graph represents the contribution made by the asset class to the total difference in performance. A positive value for a component indicates a positive contribution to the aggregate relative performance. A negative value indicates a detrimental impact. The magnitude of each component's contribution is a function of (1) the performance of the component relative to its benchmark, and (2) the weight (*beginning of period*) of the component in the aggregate.
- The individual Asset Class effect, also called Selection Effect, is calculated as  
$$\text{Actual Weight of Asset Class} \times (\text{Actual Asset Class Return} - \text{Asset Class Benchmark Return})$$
- The bar labeled Allocation Effect illustrates the effect that a Total Fund's asset allocation has on its relative performance. Allocation Effect calculation =  $(\text{Asset Class Benchmark Return} - \text{Total Benchmark Return}) \times (\text{Actual Weight of Asset Class} - \text{Target Policy Weight of Asset Class})$ .
- The bar labeled Other is a combination of Cash Flow Effect and Benchmark Effect:
  - Cash Flow Effect describes the impact of asset movements on the Total Fund results. Cash Flow Effect calculation =  $(\text{Total Fund Actual Return} - \text{Total Fund Policy Return}) - \text{Current Selection Effect} - \text{Current Allocation Effect}$
  - Benchmark Effect results from the weighted average return of the asset classes' benchmarks being different from the Total Funds' policy benchmark return. Benchmark Effect calculation =  $\text{Total Fund Policy Return} - (\text{Asset Class Benchmark Return} \times \text{Target Policy Weight of Asset Class})$
- Cumulative Effect  
$$\text{Cumulative Effect calculation} = \text{Current Effect } t \times (1 + \text{Cumulative Total Fund Actual Return } t-1) + \text{Cumulative Effect } t-1 \times (1 + \text{Total Fund Benchmark Return } t)$$

Tab 5 B



# Strategic Partnerships & Research (SPR) Update

David T. Veal  
Director  
March 2014

# Public Markets SPN

Performance and Positioning as of December 31, 2013

Program	Assets		Annualized Return %			Annualized Alpha %			Tracking Error			Information Ratio		
	NAV (\$m)	% of Trust	Since 1 Year	Since 3 Year	Since Incept.	Since 1 Year	Since 3 Year	Since Incept.	Since 1 Year	Since 3 Year	Since Incept.	Since 1 Year	Since 3 Year	Since Incept.
BlackRock	1,454.9	1.2%	12.9	8.8	6.7	2.2	0.0	0.9	2.3	1.8	2.1	0.9	0.0	0.4
JP Morgan	1,562.6	1.3%	15.2	10.0	7.9	4.4	1.2	2.1	1.4	2.5	2.4	3.1	0.5	0.9
Morgan Stanley	1,498.0	1.2%	16.5	11.3	7.3	5.8	2.5	1.5	1.9	1.8	1.6	3.0	1.4	0.9
Neuberger Berman	1,496.5	1.2%	11.8	8.5	7.1	1.1	-0.2	1.3	1.2	1.9	2.2	0.8	-0.1	0.6
<b>Total Public SPN</b>	<b>6,011.9</b>	<b>4.9%</b>	<b>14.1</b>	<b>9.7</b>	<b>7.3</b>	<b>3.4</b>	<b>0.9</b>	<b>1.5</b>	<b>1.2</b>	<b>1.4</b>	<b>1.4</b>	<b>2.8</b>	<b>0.6</b>	<b>1.0</b>

## Asset Allocation as of 12/31/13

Benchmark	Global Equity					Stable Value				Real Return				
	Total	US		Non-US		Total	US Long		Non \$		Total	Inflation-		
		LC	SC	EAFE	EM		Treasury	Sov Debt	Credit	Linked		Commodities	REITs	
Neutral	68%	28%	6%	20%	14%	20%	20%	0%	0%	12%	7%	3%	2%	
Minimum	53%	8%	-4%	10%	4%	-10%	-5%	-5%	-5%	-5%	-3%	-2%	-3%	
Maximum	83%	48%	16%	30%	24%	40%	30%	10%	10%	25%	17%	8%	7%	
BlackRock	15.4%	8.3%	-2.5%	10.0%	-0.4%	8.3%	2.4%	0.0%	5.9%	-4.4%	-1.5%	-0.9%	-2.0%	
JP Morgan	11.9%	4.6%	4.6%	3.1%	-0.5%	1.5%	-7.8%	0.0%	9.4%	-4.8%	-3.1%	-0.7%	-1.0%	
Morgan Stanley	1.3%	1.8%	0.1%	3.6%	-4.2%	-1.5%	2.6%	-4.1%	0.0%	-4.3%	-2.7%	-1.5%	-0.1%	
Neuberger Berman	5.9%	2.5%	0.1%	1.2%	2.1%	1.3%	-8.0%	3.6%	5.7%	-0.8%	0.1%	-0.7%	-0.2%	
Average	8.6%	4.3%	0.6%	4.5%	-0.7%	2.4%	-2.7%	-0.1%	5.3%	-3.6%	-1.8%	-1.0%	-0.8%	

## Change in Allocation since 09/30/13

BlackRock	11.5%	6.3%	-3.3%	6.2%	2.3%	10.6%	10.7%	0.0%	-0.1%	-0.5%	-0.4%	0.0%	0.0%
JP Morgan	0.0%	1.6%	1.4%	-2.2%	-0.8%	-3.0%	-6.7%	3.9%	-0.2%	-0.9%	-0.3%	-0.1%	-0.5%
Morgan Stanley	0.3%	7.4%	0.1%	-2.6%	-4.7%	-8.2%	-7.2%	-1.0%	0.0%	-0.4%	-0.3%	-0.1%	0.0%
Neuberger Berman	1.8%	1.4%	0.2%	0.4%	-0.1%	0.3%	-1.3%	1.7%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%
Average	3.4%	4.2%	-0.4%	0.5%	-0.8%	-0.1%	-1.1%	1.1%	-0.1%	-0.5%	-0.3%	-0.1%	-0.2%

Tab 5 C



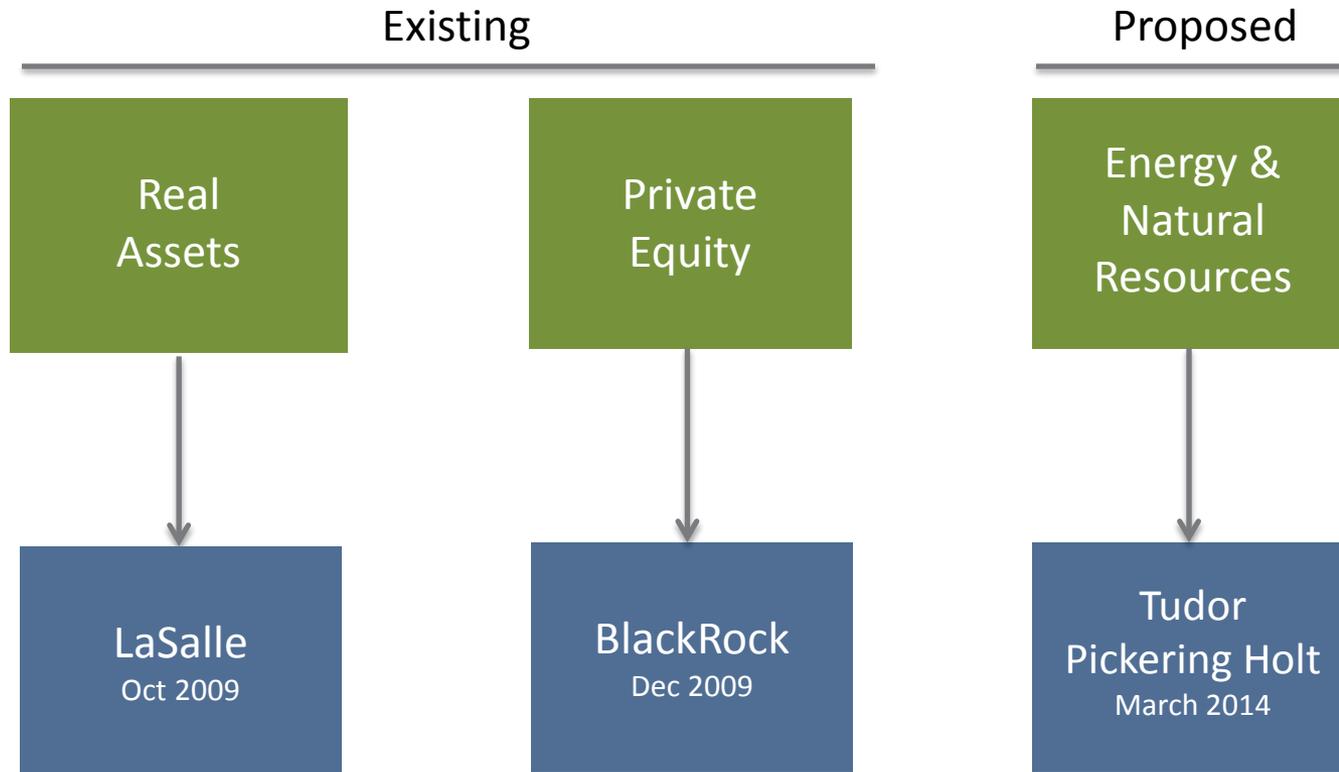
# Energy & Natural Resources Advisor Selection

Vaughn Brock

Director

March 2014

# TRS Principal Investment Program



- The Energy and Natural Resources (ENR) Team is recommending Tudor, Pickering, Holt & Co., LLC be approved as the Advisor for the ENR Principal Investments program
- This program and the Advisor arrangement will be similar to those established for Real Assets and Private Equity

# Tudor, Pickering, Holt & Co., LLC

## *Capabilities and Credentials*

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- **Energy Investment Capabilities:** Tudor, Pickering, Holt & Co., LLC (TPH) is one of the largest and most established full-service financial services firms solely dedicated to the energy industry. The 150 professionals at the firm provide a wide array of talent that is fully complimentary to sourcing and assessing investments throughout the energy value chain
- **Research and Analytics Resources:** TPH has a research team and proprietary valuation models that are widely used throughout the industry, including by TRS and many of the ENR manager relationships
- **Positive Reputation with TRS Managers:** As an energy dedicated firm, TPH has established good relationships with the managers who may present principal investment opportunities. In a detailed survey of the ENR premier relationships, TPH was the only firm unanimously recommended to manage the ENR Principal Investment program
- **Technical Expertise:** Evaluating the economic viability of energy investment opportunities requires a technical understanding of the opportunity to adequately assess the inherent risks. The investment team at TPH includes 20 engineers, 3 geologists, and an additional 15 investment professionals with significant industry experience
- **Rigorous Process:** All investments recommended by TPH for the TRS Principal Investment Program must be unanimously approved by Bobby Tudor (TPH CEO), Dan Pickering (Co-President, Head of TPH Asset Management), and a dedicated TPH Managing Director

**TEACHER RETIREMENT SYSTEM OF TEXAS  
BOARD RESOLUTION**

**Engagement of Tudor Pickering Holt & Co. as Investment Advisors to the  
Board of Trustees**

March 27-28, 2014

**Whereas**, The Investment Management Division of the Teacher Retirement System of Texas (TRS) desires to engage the services of Tudor Pickering Holt & Co. to assist and advise the Energy and Natural Resources staff and the Chief Investment Officer has recommended that the TRS Board of Trustees authorize such engagement; and

**Whereas**, Tudor Pickering Holt & Co. has demonstrated the requisite qualifications and experience to act as a portfolio consultant to the TRS, assist the Investment Management Division with due diligence, and to deliver prudence letters for prospective investment transactions as required by the board's Investment Policy Statement; now, therefore, be it

**Resolved**, That the TRS Board of Trustees hereby authorizes the engagement of Tudor Pickering Holt & Co. as a consultant to assist and advise the Investment Management Division with respect to the Energy and Natural Resources Portfolio; and

**Resolved**, That the Board authorizes the Executive Director or his designee to implement the Board's authorization to engage Tudor Pickering Holt & Co. and further to execute all documents and take all actions deemed by the Executive Director or his designee to be necessary or advisable to implement this resolution, as well as all actions deemed by him to be necessary to negotiate an agreement on substantially the same terms presented to the Board and on such other terms and conditions deemed by the Executive Director in his discretion to be in the best interest of the retirement system, and from time to time to amend, modify, or extend the contract as deemed by the Executive Director, in his discretion, to be in the best interest of the retirement system, it being stipulated that the Board's authorizations pursuant to this resolution shall not be construed as a binding agreement or obligation to contract, and there shall be no binding agreement among the parties until a definitive written agreement is successfully negotiated and executed by both parties.

Tab 5 D i

# **Fiduciary Duties in the Strategic Asset Allocation Process**

Teacher Retirement System  
of Texas

Board of Trustees Meeting

March 27, 2014

Reinhart Boerner Van Deuren s.c.

# Strategic Asset Allocation

- One of the most important decisions the Board makes
  - Board may delegate, but is ultimately responsible
- Two views – starting from a clean slate or modifying the existing SAA
- Time spent on review should align with importance of review
  - The Trustees are reviewing the SAA over the course of 5 meetings: December 2013; February, March, June and September 2014

# Fiduciary Duties in Procedural Reviews

- Important fiduciary obligations throughout process
- Trustees must act with the care, skill, prudence, and diligence under the circumstances that a prudent person acting in a like capacity would use
  - The focus is often on the procedural process at the time of the activity
- Board must monitor the effectiveness of procedures and delegations

# Fiduciary Duties in Procedural Reviews

- Trustees have a duty to follow
  - Plan documents, statutes and legal requirements
    - e.g., Government Code § 825.301(a) referencing Texas Trust Code standard included in Property Code § 117.004(b)
  - Policies
  - Established procedures
- Investment Policy Statement §1.6: *asset-liability study at least once every 5 years*
  - Previous study completed in 2009

# Strategic Asset Allocation Review

- HEK's steps for best practices in reviewing an asset allocation:
  1. Update/Review Long-Term Objectives
  2. Develop Forward Looking Capital Market Assumptions
  3. Evaluate Alternative Portfolios/Model Results
  4. Consider Other Issues
  5. Adopt a New Target Asset Allocation
  6. Implementation and Monitoring
- SAA Process structured to meet these best practices

# Strategic Asset Allocation Review

- Fiduciary obligations within each of these steps
- Overarching themes in all steps:
  - Review of delegations
  - Use of experts
  - Trustee involvement

# Step 1: Update/Review

- Duty of care requires reasonable effort and diligence in decision-making
- Important considerations:
  - Long-term goals and objectives
  - Long-term horizon
  - 5-year asset-liability study period
- Duty of loyalty and impartiality to all members when considering competing interests

# Step 1: Update/Review

## Examples from SAA Process

- Review:
  - change in circumstances since last review and on the horizon,
  - risk tolerance,
  - liability stream,
  - current actuarial assumptions,
  - long term goals and objectives of plan
- Timing: December 2013 and February 2014

# Steps 2-4: Develop/Evaluate/Consider

- Trustees have:
  - A duty and right to participate in deliberations of the Board
  - An obligation to act with competence
  - A duty to obtain education as needed
- Trustees should seek education, consult with experts on any aspect of the SAA process

# Steps 2-4: Develop/Evaluate/Consider

- Important Considerations:
  - Duty of prudence dictates that the Trustees review SAA to ensure allocation:
    - is consistent with current thinking and ideas
    - is in line with Fund objectives, mission and legal framework
  - Actuarial assumed rate of return
    - Design should anticipate achieving 8% assumed rate of return
  - Consider many alternatives
    - Diversify investments
    - Strategic partners conference – minimums, maximums and outliers
  - Determine whether any legislative or document changes are needed to implement

# Steps 2-4: Develop/Evaluate/Consider

## Examples from SAA Process

- Develop:
  - Develop/determine set of expected returns, risk and correlations for various asset classes
  - Test reasonableness of assumptions, explore alternatives
- Evaluate:
  - Model impact of various economic scenarios
  - Consider alternative portfolio construction approaches
  - Compare sample portfolio to current portfolio
- Consider:
  - Acceptable risk targets
  - Ability to access each asset class
- Timing: February –September 2014

# Step 5: Adopt

- Trustees responsible for independent review
  - Question staff, experts, fellow Board members
  - Ensure the decision of the Board is a composite of all the Trustees' judgment

# Step 5: Adopt

## Examples from SAA Process

- Adopt new target allocation
- Review implementation of any changes
- Update Investment Policy Statement to reflect necessary changes
- Timing: September 2014

# Step 6: Implement & Monitor

- Procedural process will be accomplished
  - Considered available options
  - Demonstrate by documentation
- Duty of prudence includes an ongoing duty to monitor
  - Continue to monitor the effectiveness of the SAA in the future

# Step 6: Implement & Monitor

## Examples from SAA Process

- Execute on plan
- Monitor actual portfolio to ensure compliance
- Thorough documentation: TRS Project Plan, SAA Study Memos, Project Archive and Board Materials
- Timing: September 2014 and ongoing

Tab 5 D ii a



## Teacher Retirement System of Texas Board Meeting

J.P. Morgan Long-Term Capital  
Market Return Assumptions

March 27, 2014

**Tony Werley**, Chief Investment Officer, Endowments & Foundations Group  
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**Michael Hood**, Global Markets Strategist  
212-648-1564, [michael.j.hood@jpmorgan.com](mailto:michael.j.hood@jpmorgan.com)

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**J.P.Morgan**  
Asset Management

# Agenda

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## J.P. Morgan Long-Term Capital Market Return Assumptions

- Long-term capital market return assumptions (LTCMRA) intention and methodology
  - Developed each year by our Capital Market Assumption Committee, a multi asset class team of senior investors from across the firm
    - the assumptions process has been undertaken every year since 1996, and was expanded in 2004
    - the content is central to assisting our clients in making sound asset allocation and policy decisions
  - Widely used by institutional investors to ensure that investment policies and decisions are based upon real-world, consistent views and can be tested under a variety of market scenarios
    - used to understand the absolute asset returns, relative return across asset opportunities and portfolio level potential returns for policy decision making
- Understanding the environment behind the assumptions
- Expectations versus historical “norm”
- Projected risk premia versus historical “norm”
- 2014 asset class expectations
- How accurate our projections have been over time



## LTCMRA intention and methodology

# LTCMRA intention and methodology

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- Benefit from a blend of qualitative and quantitative analysis, but rely ultimately on judgment
- Our “bottom-up” approach seeks to understand the building blocks of asset class returns:
  - equity return = real earnings growth + inflation + dividend growth + changes in valuation
  - long duration fixed income = cash return + inflation expectations + term premium + investor behavior
  - hedge funds = equity risk + fixed income risk + some skill
- Our “top-down” approach seeks to ask the less obvious, longer term questions that affect returns
  - demographics, country and corporate governance, geo-politics, resource availability, etc.
- We seek a measure of consistency across all capital markets assumptions as asset class specialists cannot seek to impose a “champion” asset class divorced from the reality of the marketplace
  - asset class relationships and Sharpe ratios are tested for reasonableness
- Volatility is primarily derived from trailing 10 year history where that history is indicative of future levels of volatility
  - are the economic and financial market assumptions synchronous with the volatility assumptions?
  - for alternative asset classes where composite and/or stale data obscures true risk we apply an “unsmoothing” methodology

## Understanding the environment behind the assumptions

# The big question marks

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- What is going on with emerging markets?
  - the world is less friendly to emerging economies than in the mid-2000s
  - performance of EM public markets has disappointed significantly in recent years
  - should we continue to assume that EM does well over the long run?
  
- Is inflation dead?
  - our projections assume that inflation drifts higher from today's very low levels but does not repeat the 1960s takeoff
  - central banks have fought hard to reduce inflation, and expectations are now well-anchored
  - will governments be tempted to fuel inflation as a way of easing debt burdens?
  
- Are today's heavy government debt loads sustainable?
  - public debt has risen sharply in most developed economies since the recession
  - demand for safe assets has also trended higher
  - will any major economies require debt restructuring or can they sustain current levels of debt?

Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

## Expectations versus historical “norm”

## Returns versus history: Less exciting performance in prospect

### 10-year compound annual return (%)

<u>Asset class</u>	<u>2014 LTCMRA projection</u>	<u>Historical norm (1979-2013)</u>
U.S. Large Cap Equity	7.50	12.00
U.S. Small Cap Equity	7.50	12.10
EAFE Equity	7.50	9.50
EM Equity	9.00	11.50 <sup>1</sup>
U.S. Cash	2.00	5.50
U.S. Intermediate Treasury	4.25	7.50
U.S. Long Treasury	3.25	9.00
U.S. Investment Grade Corporate	5.00	8.50
U.S. High Yield	6.00	9.50 <sup>1</sup>
U.S. Aggregate	4.25	8.00
U.S. Inflation	2.25	3.60

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<sup>1</sup> "Historical norm" for EM equity is 2000-2013 and for U.S. high yield is 1984-2013.

## Projected risk premia versus historical “norm”

## Expected risk premia versus history: Generally similar

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### Risk premia versus history (compound annual return difference, %)

	<u>2014 LTCMRA projection</u>	<u>Historical norm (1979-2013)</u>
Duration premium (U.S. intermediate Treasury versus U.S. cash)	2.25	2.00
Equity risk premium (U.S. large cap equity versus U.S. intermediate Treasury)	3.25	4.50
Small cap premium (U.S. small cap equity versus U.S. large cap equity)	0.00	0.10
Private equity premium (U.S. private equity versus U.S. large cap equity)	0.50	2.50
Investment grade premium (U.S. investment grade corporate versus U.S. intermediate Treasury)	0.75	1.00
High yield premium (U.S. high yield versus U.S. investment grade corporate)	1.00	1.00

Note: "Historical norm" is 1979-2013 except for U.S. high yield (1984-2013).

Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

## 2014 asset class expectations

# Fixed income: A journey back to normal

## Compound internal rate of return (IRR) 10–15 year returns

### Equilibrium fixed income assumptions (USD)

	Yields/ Spread	Returns (%)
U.S. cash	2.75%	2.00
U.S. 10-year Treasury	4.75%	4.50
U.S. TIPS (real yield)	1.50%	4.75
U.S. municipal	3.25%	3.75
U.S. corporate bonds	125 bps	5.00
U.S. high yield bonds	475 bps	6.00
Emerging market debt	250 bps	6.75
Local sovereign emerging market debt	7.50%	7.00
Corporate emerging market debt	325 bps	6.25

### ■ U.S. fixed income

- cash rate to remain low, both absolute and relative, due to economic slack, low inflation and liquidity preference
- real cash and long Treasury returns to be negative
- Treasury yields to rise from historical lows as central bank exits zero rate policy not until the end of 2015
- yield curve to flatten, especially in the ultra long end

### ■ Corporate credit

- more interest rate sensitivity, but lower credit risk premia as search for yield continues

### ■ Emerging market debt

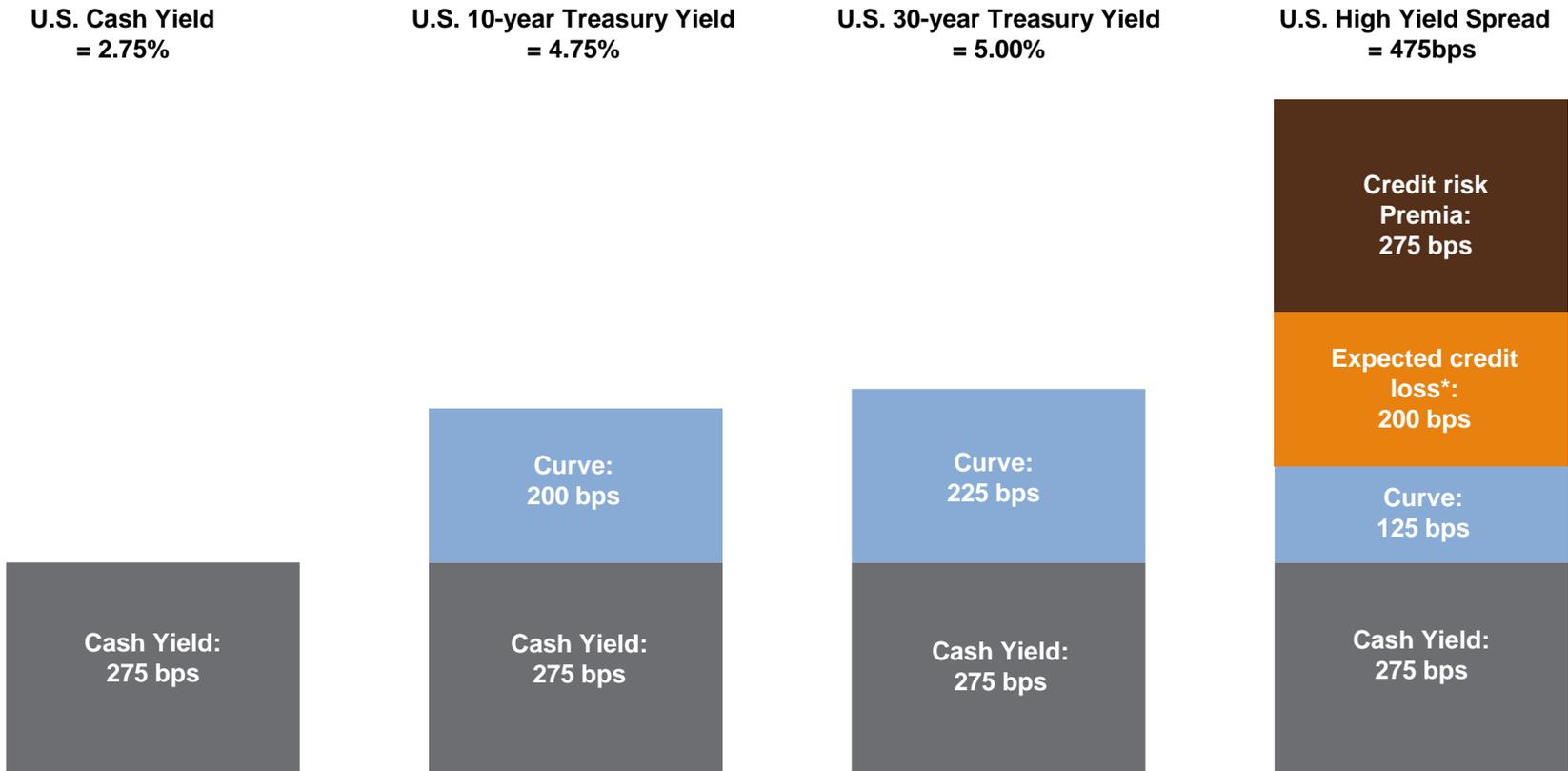
- external debt credit quality has peaked
- local currency yields to remain elevated due to sticky inflation and higher real yield requirements

Source: J.P. Morgan as of 30 September 2013. Equilibrium fixed income yields and spreads have been rounded to the nearest 25 bps.

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# Fixed income: A journey back to normal

## Fixed income equilibrium yield building block



Source: JPMAM; forecasts as of September 2013.

\* Expected credit loss = expected default rate times expected loss rate. Assuming the historical average recovery rate of 40%, the expected default rate would be 3.33%.

# Equities: The valuation outlook reflects normal economic conditions

## Compound (IRR) 10–15 year returns

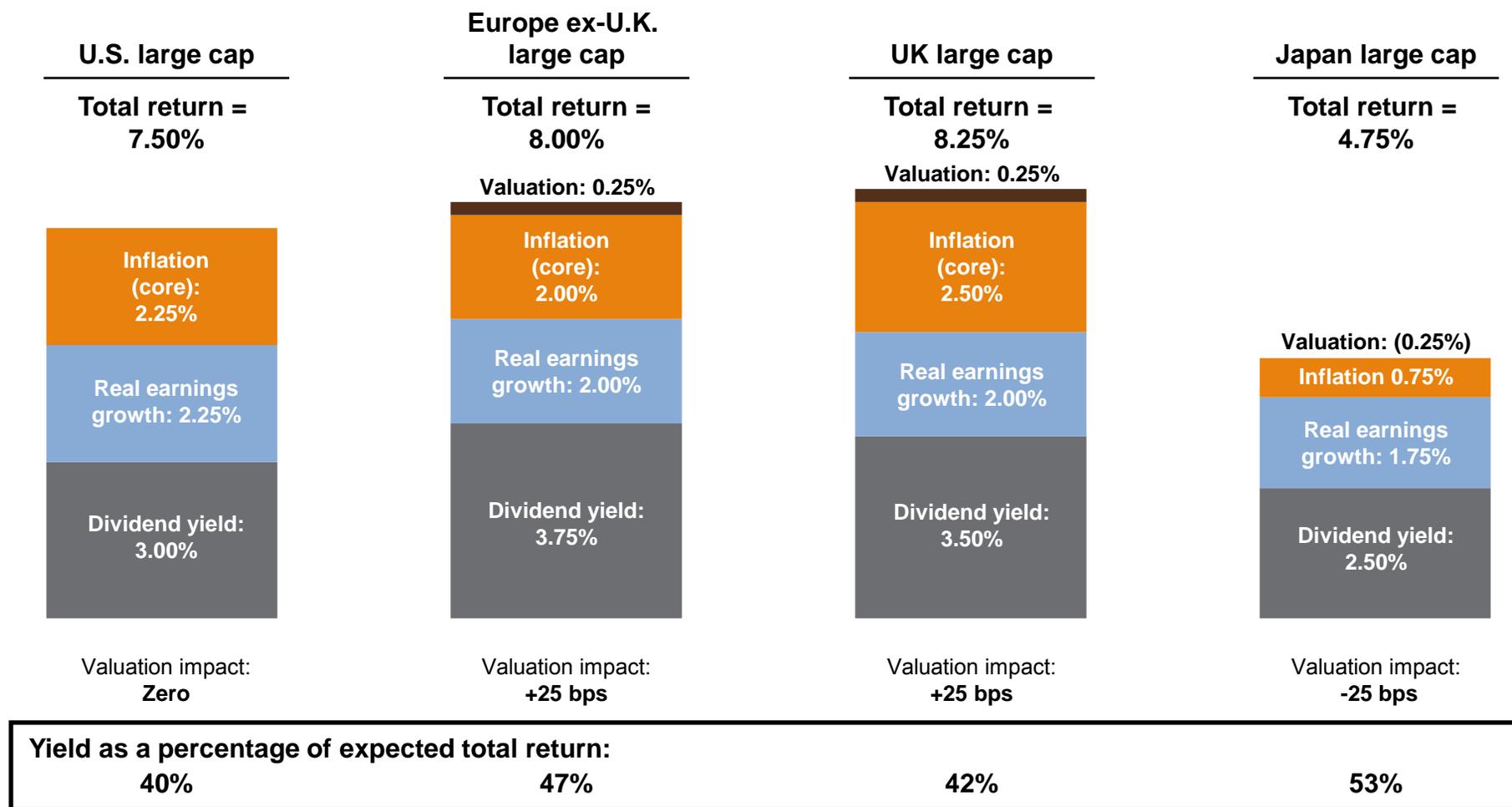
Equity returns	(%)
U.S. core inflation	2.25
U.S. real GDP	2.50
U.S. large cap	7.50
U.S. small cap	7.50
EAFE (USD)	7.75
Europe ex UK (local)	8.00
Japan (local)	4.75
UK (local)	8.25
Emerging markets (USD)	9.00

- U.S. equity
  - significantly higher starting levels
  - EPS (earnings per share) growth to lag nominal GDP slightly
  - dividend yields maintained given investor pressure for higher payouts
  - zero valuation contribution given higher future inflation and extent of market rise since March 2009
- Non-U.S. equity
  - Europe ex UK, Japan EPS growth above nominal GDP
  - Europe ex UK and the UK to benefit from valuation and large foreign-sourced revenues
  - Japanese local returns limited by low nominal economic growth, but USD returns boosted by expected currency appreciation
  - a significant proportion of total returns expected from dividend yield
  - emerging markets to outperform on stronger fundamentals, though total return estimates have been reduced—both in absolute terms and vs. rest of the world

Source: J.P. Morgan as of 30 September 2013.

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# Equities: The valuation outlook reflects normal economic conditions



Source: JPMAM; forecasts as of September 2013.

Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

# Alternative strategy classes: Composite assumptions understate top manager returns

U.S. dollar-based assumptions; compound (IRR) 10–15 year returns

Median Manager expectation

## Alternative assets (%)

<b>Private equity*</b>	8.00
------------------------	------

## Hedge funds

Event driven	6.00
--------------	------

Long bias	6.25
-----------	------

Relative value	4.75
----------------	------

Macro	5.25
-------	------

Diversified	5.25
-------------	------

## ■ Private equity returns

- assumed to return similar to mid cap equities
- expect wide differentials between managers

## ■ Hedge fund returns

- hedge fund returns generated using representative betas and forward looking beta assumptions
- **Data:** historical monthly returns of hedge fund managers from Bloomberg grouped into HF (hedge fund) strategies as defined by HFRI (hedge fund research inc) definitions
- **Stale Pricing:** unsmoothing of returns time-series applied at index level using Fisher-Geltner-Webb's methodology\* to address positive serial correlation of HF returns

Source: J.P. Morgan as of 30 September 2013.

\*Private Equity: PE are unlike other asset classes shown above, in that there is no underlying investible index. The return estimates shown above are equal to our estimates of mid cap equity returns.

Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

## Alternative strategy classes: Real assets

U.S. dollar-based assumptions; compound (IRR) 10–15 year returns

<b>Real assets</b>	<b>(%)</b>
REITs	6.75
U.S. direct real estate (unlevered)	6.00
U.S. value added real estate	7.75
European direct real estate (unlevered)	5.75
Global infrastructure (levered)	7.25
Commodities	3.75

### ■ Real assets

- weak REITs performance and slight NAV discount to direct unlevered real estate translates into REITs return premium to real assets
- meaningful year-over-year appreciation of real estate assets, lower initial property yields reduce return core return expectation by 0.5% from last year
- weaker nominal GDP expectations offset by weaker rebound from crises pricing as riskier real estate assets are priced inexpensively relative to core assets
- European property values have historically exhibited less volatility; surprising firmness in European economy has raised expectations somewhat for future cash flow growth
- growing global interest in perceived safety of cash flows and benefit of leverage from low “bondable” assets

### ■ Commodities

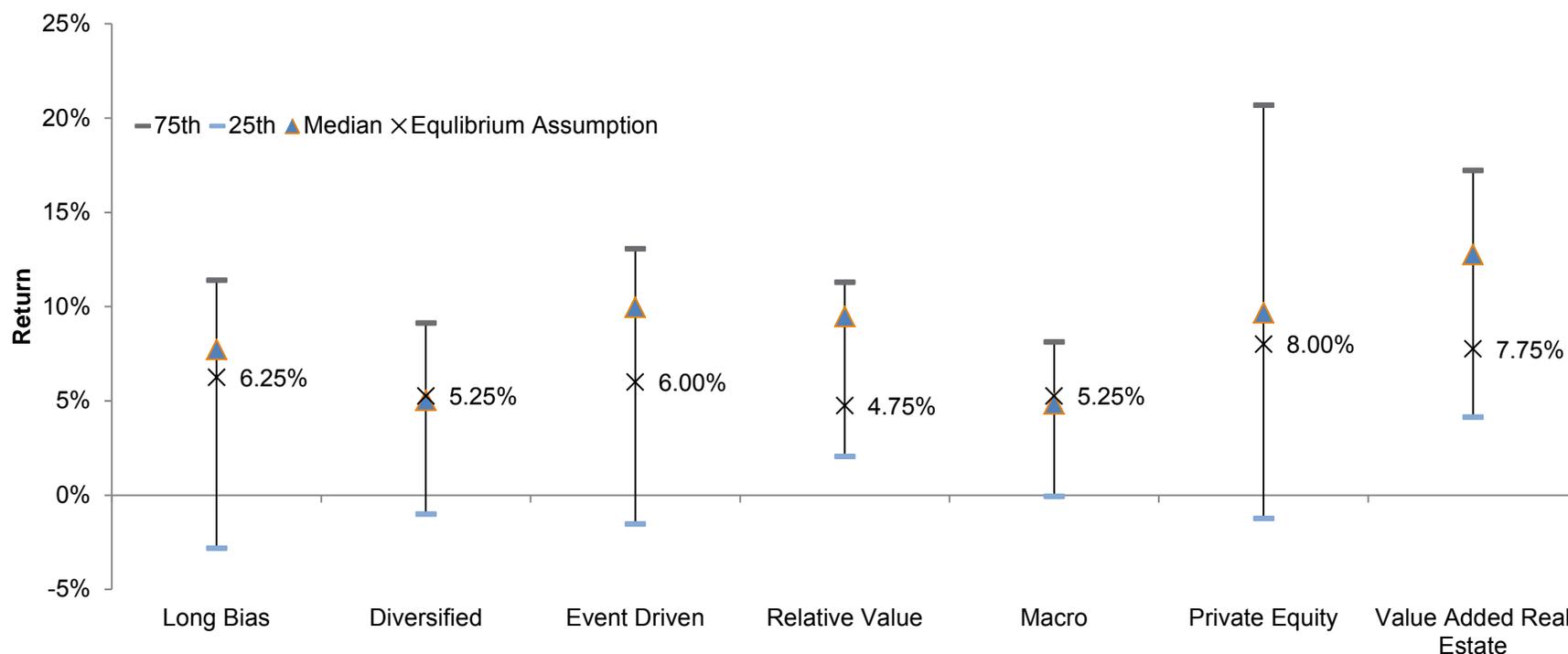
- returns take a major step function lower on reduced global demand while supply has risen over past 10 years; assumption for greater efficiency of asset use as emerging market commodity consumers move up the efficiency curve

Source: J.P. Morgan as of September 30, 2013.

Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

## Alternative strategy classes: Manager alpha and dispersion

- Existence of manager alpha results in historical dispersion in managers that are not captured by beta-driven forward looking factor approach
- Actual strategy performance is likely to deviate from long-term equilibrium assumptions given disparities in manager skill levels

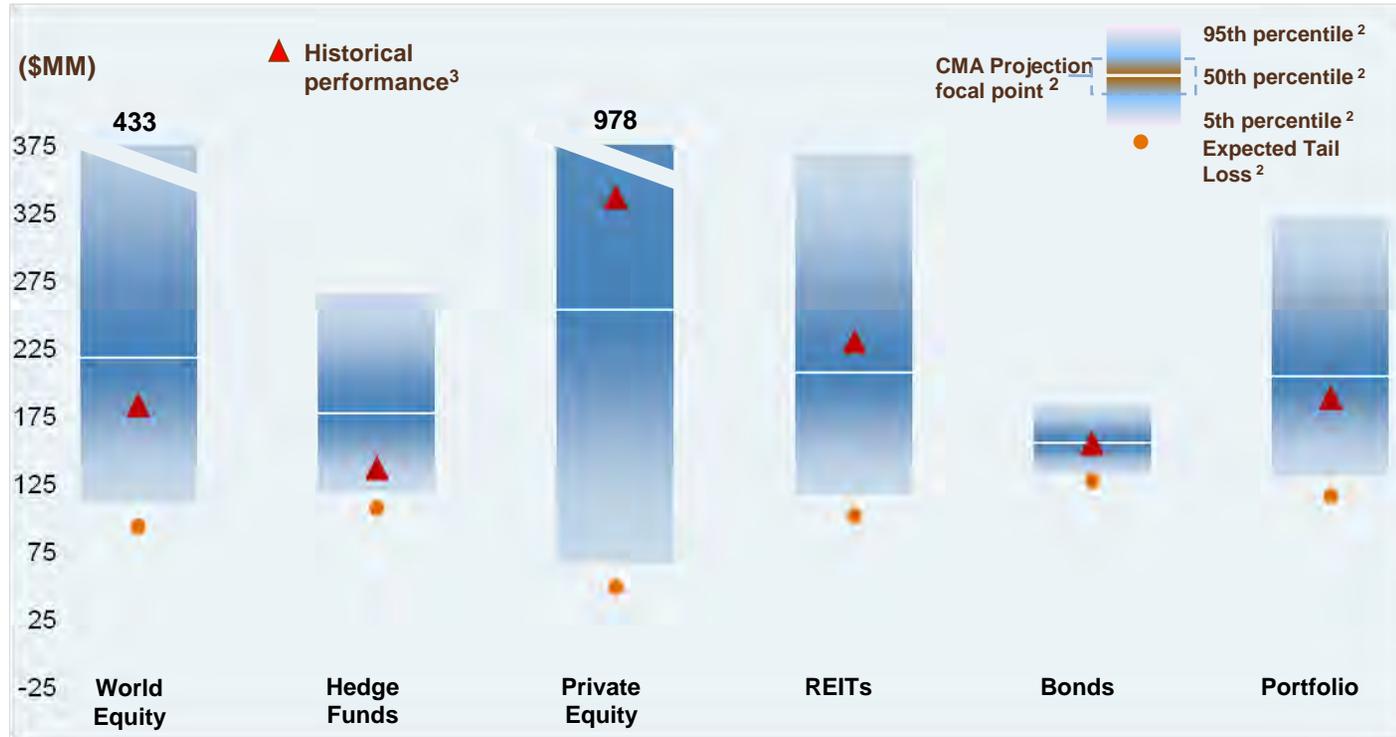


Source: J.P. Morgan as of June 30, 2013. HF manager returns are taken from PerTrac and internal J.P. Morgan databases. Historical range is given at 25th, 50th and 75th percentiles using annualized return from July 2005 to Jun 2013, with the exception of PE data. PE historical manager returns are taken from Venture Economics data; for detailed methodology please see Appendix. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met. Past performance is not indicative of comparable future returns.

## How accurate our projections have been over time

# CMA Asset Class and Portfolio Projections vs. Historical Performance

Projected asset values based on 2004 CMA projections and 10 yr historical performance<sup>1</sup>



- The greater the volatility of the asset class the greater the possibility and degree of missing the mark versus the ultimate market performance.
- The Portfolio consists of an asset mix with: 45% equity, 10% hedge funds, 10% Private Equity, 5% REIT's and 30% Bonds.

- The projected Portfolio value after 10 years based on the 2004 CMA projections differed only by approximately 7% from the actual realized value based on historical benchmark performance data.
- The projected Portfolio results never fell out of a 90% confidence interval even during the multiple market and strategy declines of 2008.

Source: J.P. Morgan., monthly returns data from Jan 2004-Sept 2013.

<sup>1</sup> This is a projection used for illustrative purposes only and does not represent investment in any particular vehicle. References to future asset values are not promises or even estimates of actual returns you may experience. Past performance is no guarantee of future results. It is not possible to invest directly in an index.

<sup>2</sup> "Most probable asset values," denoted by the darkly shaded area, indicates the range in and around the 50th percentile. The "50th percentile" indicates the middle wealth value of the entire range of probable asset values. The "95th percentile" wealth value indicates that 95% of the probable asset values will be equal to or below that number; the "5th percentile" wealth value indicates that 5% of the probable asset values will be equal to or below that number. Another way of looking at it is 90% of the probable asset values will be between those two figures. ETL is an assessment of the average loss as a result of a tail event (tail = worst 5% of outcomes).

<sup>3</sup> Historical allocation of 45% world equity, 10% hedge funds, 10% private equity, 5% REITS, 30% global aggregate bonds. Asset allocation assumes annual rebalancing, no taxes, and no cash flows. All returns are based on index data and include no manager alpha. Indices used: Barclays Capital Global Aggregate Bond Index, MSCI Developed World Index, HFRI Fund of Funds Diversified Index, Venture Economics US Buyouts Index (proxied with S&P 500 from April – Sept

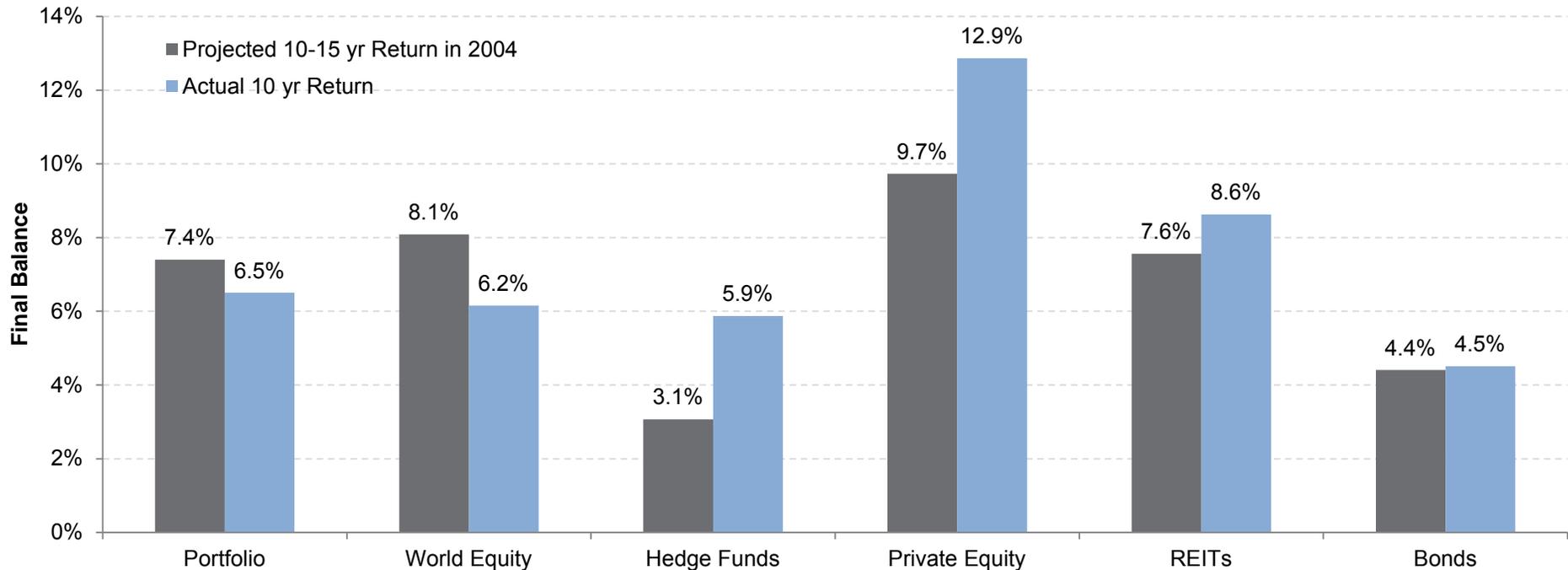
2013, NAREIT Equity REITs Index. The 2013 historical return is proxied with the return from Jan-Sept 2013.

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# LTCMRAs: Projected vs. Actual Growth Rates

- Projected and actual growth rates remained close even including multiple market declines in 2008-2009
- Median manager projections

## Projected vs. Actual Returns



Source: J.P. Morgan., monthly returns data from Jan 2004-Sept 2013. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

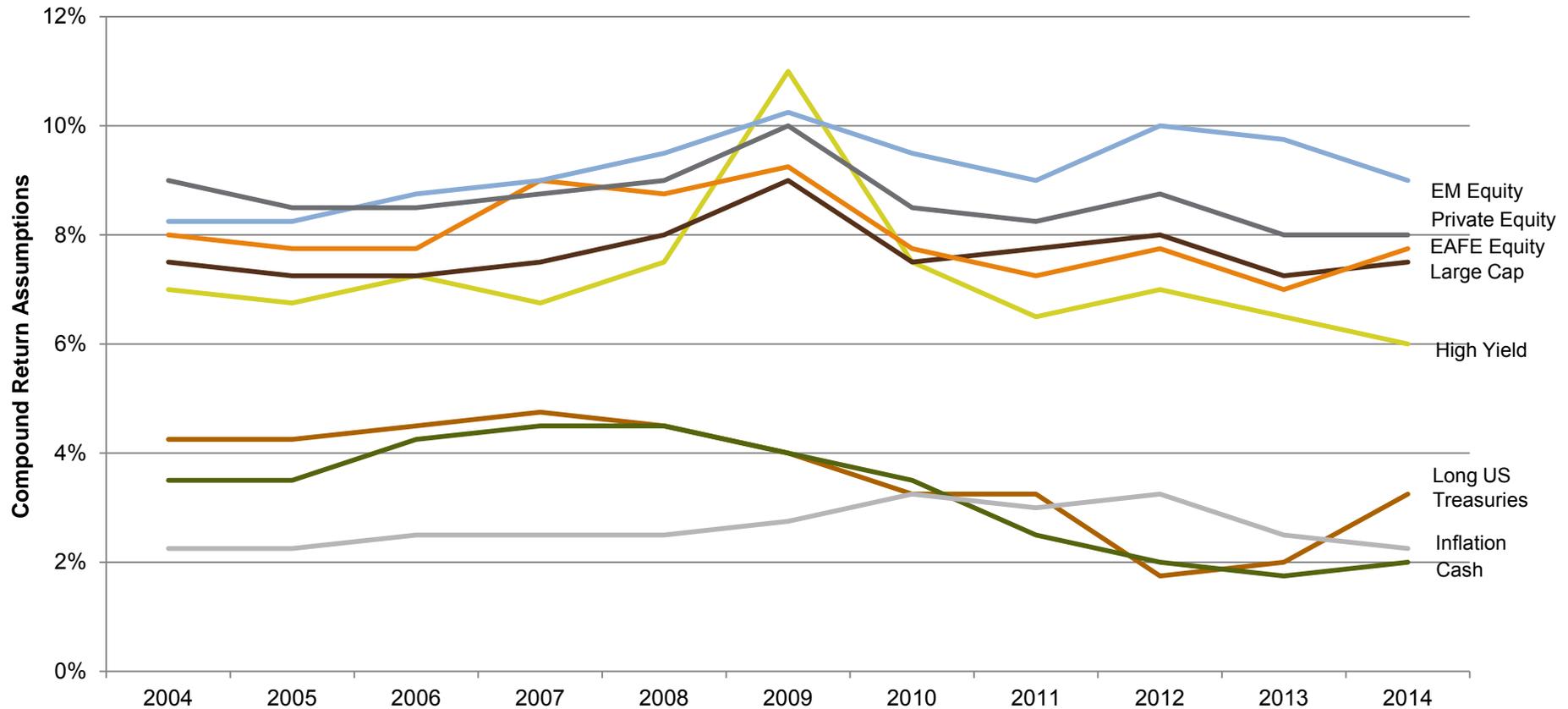
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# LTCMRAs: Revisions over time

The Long-Term Capital Market Return Assumptions are revised at the end of each calendar year

## Long-Term Capital Market Return Assumptions



Source: J.P. Morgan., monthly returns data from Jan 2004-Sept 2013. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met.

Long Term Capital Market Return Assumptions (2004-2013) are generated by J.P. Morgan Asset Management

The recession of 2008 and 2009 are identified by periods in which global GDP growth was less than 3% per year. Global GDP growth is sourced from the International Monetary Fund, World Economic Outlook Database, October 2013

# Appendix

## Biographies

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**Anthony D. Werley** is the Chief Investment Officer for the J.P. Morgan Endowments & Foundations Group (EFG). In this role he established overall investment policy and is responsible on an on-going basis for strategic and tactical allocation, manager and vehicle selection, risk management and performance across discretionary assets within EFG. Mr. Werley also advises and conducts portfolio analysis on behalf of non-discretionary client relationships. He has authored several white papers on topics germane to endowment and foundation investment management. In addition to this EFG role, Mr. Werley is a member of the J.P. Morgan Asset Management Capital Markets Assumptions Committee since 2003, and serves on the Investment Review, Performance Governance, Alternative Investments Review, Private Bank Global Investment and Fiduciary Governance committees. Mr. Werley joined J.P. Morgan in 2003 as a Managing Director within the Private Bank where he held leadership roles including Global Head of Portfolio Construction. He has served in management, investment and sales capacities for institutional and private clients for over 30 years. Prior to joining J.P. Morgan, Mr. Werley was with Graystone Consulting, advising on asset allocation and serving as Head of Transaction Advisory. Earlier in his career, he was President and co-founder of Asian research and private equity boutique Clarion Capital, and was the Global Head of Private Client Services for CS First Boston. Mr. Werley is quoted regularly in investment journals and the financial press and is a frequent speaker at leading industry conferences. Mr. Werley holds a B.A. from Georgetown University and an M.B.A. from New York University.



**Michael J. Hood** is the Global Markets Strategist within the institutional business at J.P. Morgan Asset Management. In this capacity, he provides analysis of and commentary on the economy and asset allocation to institutional investors of all types. He writes frequent “Global View” commentaries as well as stand-alone publications on economic and market topics. He also maintains forecasts for global growth, inflation, and policy interest rates, and contributes to the firm’s long-term capital markets assumptions process. He came to JPMAM in October 2011 from Traxis Partners, a USD1bn+ macro hedge fund based in New York. There, he served as chief economist from 2007 to 2011, maintaining detailed forecasts for global variables. He produced a monthly global outlook publication and frequent stand-alone pieces on a range of developed and emerging-market economic issues. Previously, he worked as an economist and market strategist at Barclays Capital (within the emerging markets research department) and the JPMorgan investment bank (within the economic research department). At JPMorgan, he began, in 1994, as an economist for several Latin American countries. Later, he oversaw JPMorgan’s Latin American economic research effort and helped coordinate the department’s global views. He contributed to and helped edit many JPMorgan publications, including the weekly “Global Data Watch” and quarterly “World Financial Markets.” He also created and edited the quarterly “Latin American Economic Outlook” publication. At Barclays Capital, where he worked from 2004 to 2007, he worked on a combination of economic and market-strategy topics within emerging markets, again writing for and helping edit a variety of publications. While at JPMorgan and Barclays Capital, he frequently traveled to Latin America and spoke to a wide range of clients, including institutional investors, corporations, and private equity sponsors. He began his career in the research department at the Federal Reserve Bank of New York, where he worked from 1992 to 1994 on a variety of international-finance and developing-country topics. In this capacity, he wrote many country-risk studies used by federal bank regulators.

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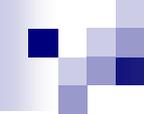
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Tab 5 D ii b



# Risk Parity and Asset Allocation

*Prepared for:*

Board of Trustees  
Teacher Retirement System of Texas

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March 27, 2014

# I. Risk Parity and Asset Allocation: Overview

- A common approach to allocating financial capital across a universe of asset classes is to think **directly** about how to **deploy the available investment dollars** in an “optimal” manner
  - An example of this is the celebrated **mean-variance optimization** approach of Markowitz, whereby the optimal asset class allocations are derived by minimizing portfolio risk subject to a specific return goal
- This “**efficient portfolio**” approach to strategic asset allocation has been extremely useful in practice—albeit to varying degrees—over the past 60 years. However, it does have **myriad shortcomings**:
  - The process **requires estimates** of several asset class investment characteristics: expected returns, standard deviations, correlations
  - It is prone to producing “**corner solutions**” (i.e., extreme over- or under-allocations) when using historical data over abnormal past periods
  - Some of the input variables (e.g., asset class correlations) are known to be quite **unstable over time**, which can lead to fragile solutions

## Risk Parity and Asset Allocation: Overview (cont.)

- In some ways, a **more important criticism** of mean-variance optimization is that, by focusing of the allocation of capital rather than the way in which risk is allocated, the approach can lead to **inefficient concentrations of assets** for most return goals
  - For instance, an investor with a higher return goal will need to put more capital into higher risk assets that promise higher payoffs which leads to fund solutions that, while falling on the Efficient Frontier, may be dominated by other potential portfolios
  - A consequence of this approach is that higher volatility assets tend to have a **disproportionate impact on the risk** of the total portfolio that may be out of sync with how the dollars are allocated in the fund
- The basic idea of a ***risk parity approach to asset allocation*** is for the investor to commit capital in the portfolio so as to ***equalize the risk contribution*** of each asset class
  - Stated more plainly: **Risk Parity = Equal Risk Contribution to the Total Portfolio** by each asset class in the investable universe
  - Notice that risk parity begins with the idea that it is the **risk allocation that matters**, not the dollar allocation (which then implies the level of portfolio risk)

## Risk Parity and Asset Allocation: Overview (cont.)

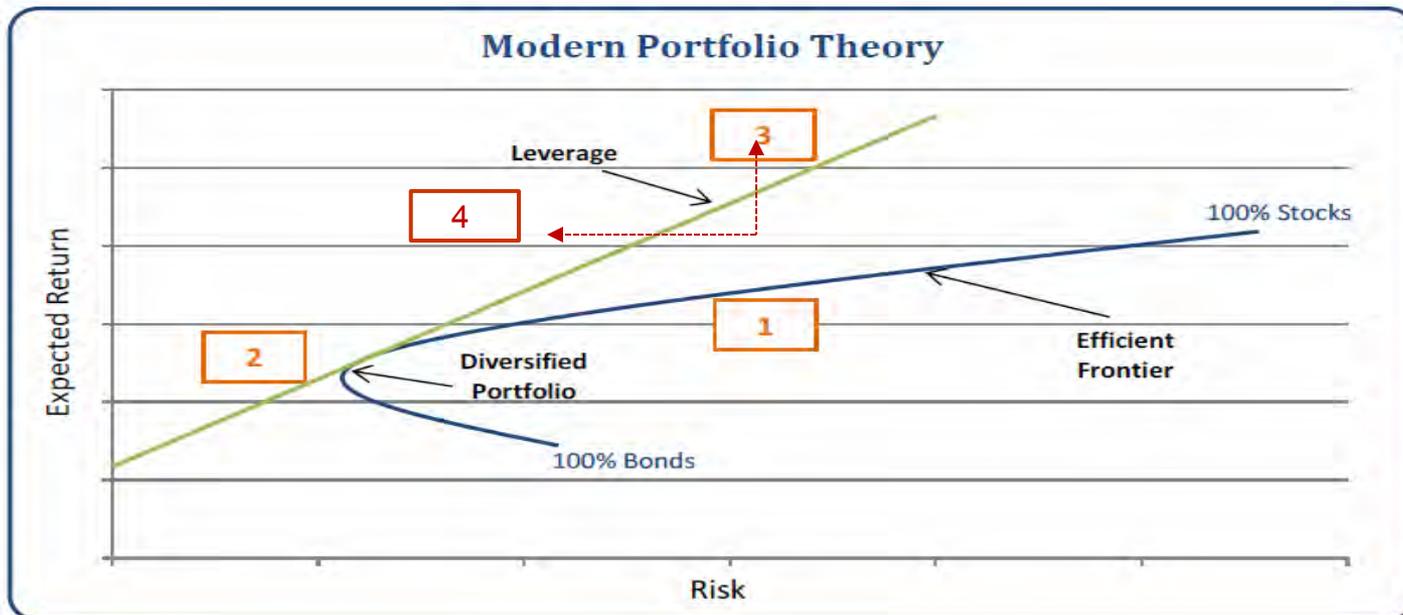
- Ultimately, the value of the risk parity approach to asset allocation rests on two arguments:
  - It presents the investor with a **more balanced** (i.e., diversified) **combination of risks** in the portfolio and it is thus a better way for the investor to spend his or her “risk budget” in anticipation of an uncertain economic future
  - The risk parity portfolio allocation is a **good proxy** for the so-called **tangency portfolio** in the mean-variance Efficient Frontier framework (i.e., the allocation scheme that maximizes the ex ante Sharpe Ratio, or the expected excess return divided by the portfolio’s risk)
- Both of these arguments have some **intuitive appeal**:
  - By concentrating directly on how risk is bundled in the portfolio, the risk parity approach to investing can be seen to provide the investor with **better protection in diverse economic circumstances** (e.g., high vs. low inflation, strong vs. weak GDP growth); it has also been called the “**All Weather**” asset allocation strategy.
  - There is **no guarantee** that an equal risk contribution allocation will be the **tangency portfolio**—the *most* efficient of the set of mean-variance efficient portfolios—but it has often generated a superior risk-return combination than portfolios designed to seek much higher expected return goals

## Risk Parity and Asset Allocation: Overview (cont.)

- The Risk Parity approach to asset allocation has an **investment implication** that is important to understand:
  - The Risk Parity portfolio (i.e., the tangency portfolio proxy) will typically have an expected return that is less than the investor's goal
  - This means that a 100% allocation to the Risk Parity portfolio is not appropriate for an investor with a higher expected return hurdle
- There are two ways that an investor desiring a higher expected return goal than that offered by the Risk Parity portfolio can react:
  - The **Mean-Variance Efficient** (i.e., Markowitz) solution would be to adjust the contents of the Risk Parity portfolio to **increase the allocation to higher risk assets**
  - The **Risk Parity** solution would be to **use leverage** to **buy more of the same Risk Parity portfolio** which maximizes the expected "reward-to-risk" ratio. The amount of leverage involved can be substantial and can involve significant additional trading and borrowing costs

## Risk Parity and Asset Allocation: Overview (cont.)

- So, the ultimate distinction between the two investment approaches is how the investor increases the risk necessary to generate the higher expected return goal
  - *Mean-Variance*: Alter the holdings of the Risk Parity portfolio to **increase the allocation to riskier assets** (and decrease the allocation to less-risky assets), using the same level of investment capital (i.e., no borrowing): #2 to #1
  - *Risk Parity*: Borrow money to **buy more** of the original Risk Parity portfolio. Thus, the relative composition of the portfolio does not change and the additional risk comes from **using financial leverage**: #2 to #3 (or #4)



## II. Calculating Risk Parity Allocation Weights

- There are **several approaches** to calculating the asset allocation percentages implied by a risk parity strategy depending on how the underlying problem is defined and the assumptions that one makes
  - One advantage that all risk parity-based asset allocation schemes have is that they **do not require** the estimation of asset class expected returns
- We will look at two different investment weight calculation schemes:
  - A **simple volatility-weighted** (i.e., “1 / Vol”) approach in which assets are included in the portfolio in inverse proportion to their inherent risk levels
  - A more involved approach that **equalizes the [% Total Contribution to Portfolio Risk]** of each asset class in the context of minimizing overall portfolio risk

## Calculating Risk Parity Allocation Weights (cont.)

- *Method #1*: In the **volatility-weighted risk parity** method, portfolio weights are computed for each Asset Class  $i$  by the reciprocal of its standard deviation, or:

$$W_i = \frac{\left(\frac{1}{\sigma_i}\right)}{\sum_{j=1}^N \left(\frac{1}{\sigma_j}\right)}$$

Where  $N$  is the number of investable asset classes

- The advantage of this approach is that it **does not require** the estimation of the set of asset class **correlations**
  - It generates the more involved risk parity solution for the two-asset portfolio
  - It also generated the more involved risk parity solution for the multi-asset class portfolio if all asset class correlations are the same

## Calculating Risk Parity Allocation Weights (cont.)

- *Method #2*: A more complicated approach would be to calculate the set of investment weights that lead to each asset class making the **same percentage contribution to the total risk of the portfolio** (i.e., [%TCR]). This is often done in the context of pursuing another goal, such as minimizing the volatility of the overall portfolio (i.e.,  $\sigma_p$ )
- The general format for this calculation is:

Select  $\{W_i\}$  so as to Minimize  $\sigma_p$

subject to:

- (i)  $\sum W_i = 1$
- (ii)  $[\%TCR]_1 = [\%TCR]_2 = \dots = [\%TCR]_N$
- (iii) All  $W_i \geq 0$  (Note: Short sale limits can be excluded)

- Notice once again that, unlike the traditional mean-variance optimization specification, solving for the risk parity weights in this context **does not require** any information about asset class **expected returns**
  - However, this is a complex non-linear minimization problem that requires an optimization program

### III. Asset Allocation with Risk Parity: An Example

- From an earlier example on Marginal Risk calculations, we had the following information about the **volatilities** (i.e., standard deviations) and **correlation coefficients** for a four-asset class portfolio:

$\sigma_1 =$	<b>16.7%</b>	$\rho_{12} =$	<b>0.71</b>	$\rho_{23} =$	<b>0.58</b>
$\sigma_2 =$	<b>12.8</b>	$\rho_{13} =$	<b>0.42</b>	$\rho_{24} =$	<b>0.30</b>
$\sigma_3 =$	<b>6.9</b>	$\rho_{14} =$	<b>0.22</b>	$\rho_{34} =$	<b>0.10</b>
$\sigma_4 =$	<b>7.0</b>				

- Also, although not necessary for the Risk Parity allocation computations, let us also consider the **expected returns** for these four asset classes as well as the **risk-free rate**:

$$E(R)_1 = 9.1\%, \quad E(R)_2 = 8.0\%, \quad E(R)_3 = 5.1\%, \quad E(R)_4 = 5.4\%, \quad RF = 2.7\%$$

### III-A. Risk Parity Example: Volatility-Weighted Approach

- The reciprocals of the standard deviations for each asset class are (using volatilities expressed in decimal form):

$1 / \sigma_1 =$	$1 / 0.167 =$	<b>5.99</b>
$1 / \sigma_2 =$	$1 / 0.128 =$	<b>7.81</b>
$1 / \sigma_3 =$	$1 / 0.069 =$	<b>14.49</b>
$1 / \sigma_4 =$	$1 / 0.070 =$	<b><u>14.29</u></b>
<b>Sum =</b>		<b>42.58</b>

- So, the Risk Parity **asset allocation percentages** are:

<b>W1 =</b>	$5.99 / 42.58 =$	<b>14.06%</b>
<b>W2 =</b>	$7.81 / 42.58 =$	<b>18.35</b>
<b>W3 =</b>	$14.49 / 42.58 =$	<b>34.04</b>
<b>W4 =</b>	$14.29 / 42.58 =$	<b><u>33.55</u></b>
		<b>100.00%</b>

## Risk Parity Example: Volatility-Weighted Approach (cont.)

- The **expected return** and **volatility level** for this Risk Parity Portfolio are:

$$E(R)_p = (.1406)(.091) + (.1835)(.080) + (.3404)(.051) + (.3355)(.054) = \mathbf{6.30\%}$$

and:

$$\begin{aligned} \sigma_p &= \{[(.1406)^2(.167)^2 + (.1835)^2(.128)^2 + (.3404)^2(.069)^2 + (.3355)^2(.070)^2] \\ &+ [2(.1406)(.1835)(.167)(.128)(0.71) + 2(.1406)(.3404)(.167)(.069)(0.42) \\ &+ 2(.1406)(.3355)(.167)(.070)(0.22) + 2(.1835)(.3404)(.128)(.069)(0.58) \\ &+ 2(.1835)(.3355)(.128)(.070)(0.30) + 2(.3404)(.3355)(.069)(.070)(0.10)]\}^{1/2} \\ &= \mathbf{6.91\%} \end{aligned}$$

- The ex ante **Sharpe Ratio** for this Risk Parity Portfolio is:

$$S_p = \frac{(6.30 - 2.70)}{6.91} = \mathbf{0.520}$$

# Risk Parity Example: Volatility-Weighted Approach (cont.)

## \*\*\*Input: Capital Market Variables\*\*\*

R1 =	9.10%	$\sigma_1$ =	16.70%	$\rho_{12}$ =	0.71	$\rho_{24}$ =	0.30	$1/\sigma_1$ =	5.99
R2 =	8.00%	$\sigma_2$ =	12.80%	$\rho_{13}$ =	0.42	$\rho_{25}$ =		$1/\sigma_2$ =	7.81
R3 =	5.10%	$\sigma_3$ =	6.90%	$\rho_{14}$ =	0.22	$\rho_{34}$ =	0.10	$1/\sigma_3$ =	14.49
R4 =	5.40%	$\sigma_4$ =	7.00%	$\rho_{15}$ =		$\rho_{35}$ =		$1/\sigma_4$ =	14.29
R5 =	0.00%	$\sigma_5$ =		$\rho_{23}$ =	0.58	$\rho_{45}$ =		$1/\sigma_5$ =	
								<b>Sum=</b>	<b>42.58</b>

## \*\*\* Input: Portfolio Weights\*\*\*

w1 =	14.06%
w2 =	18.35%
w3 =	34.04%
w4 =	33.55%
w5 =	0.00%
<hr/>	
Sum =	100%

## Portfolio Std. Deviation:

$\sigma_p$  = 6.91%

## Portfolio Return:

RF = 2.70%

$R_p$  = 6.30%      Sharpe = 0.520

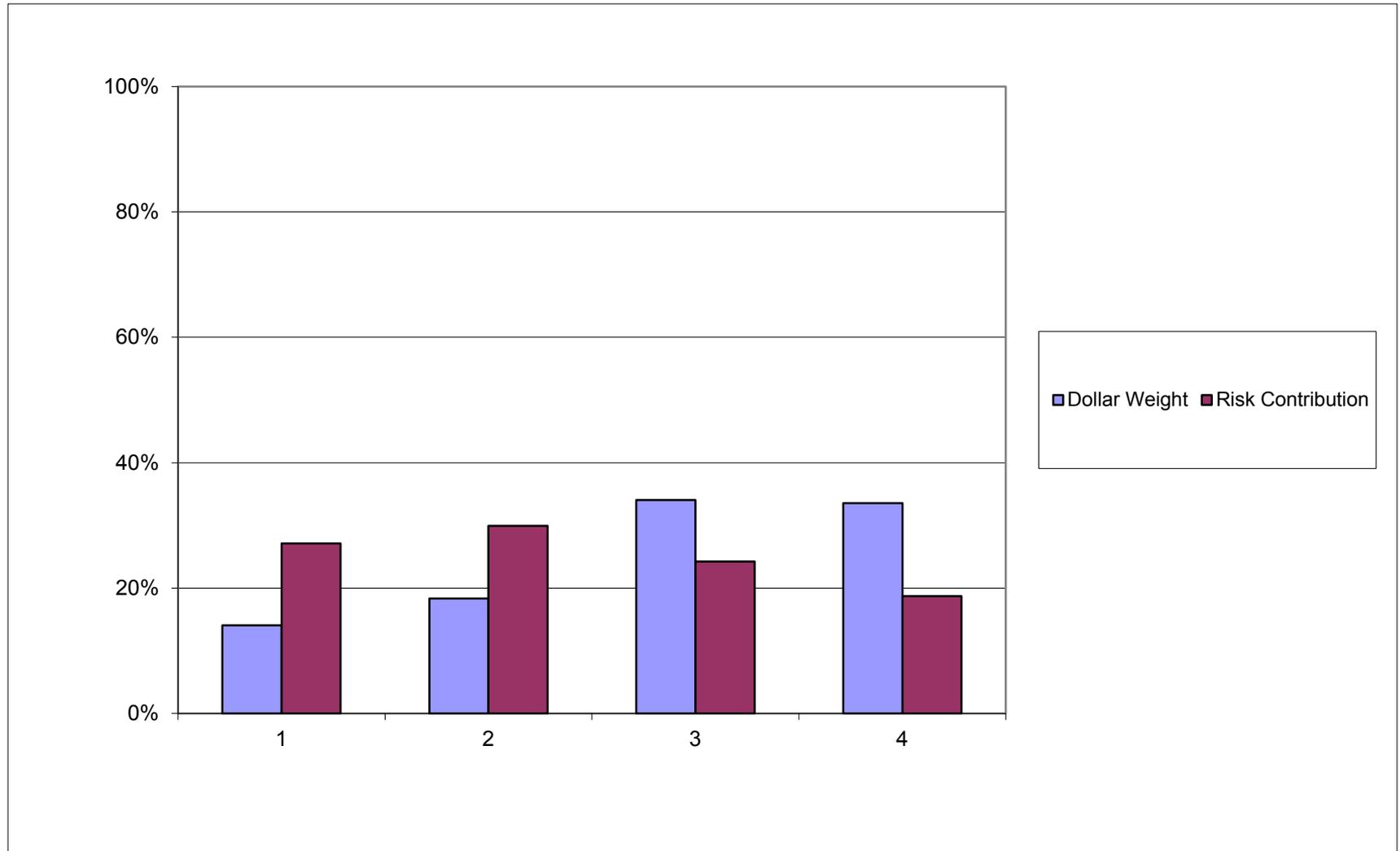
## 1. Total Portfolio Risk Decomposition:

<u>Asset Class</u>	<u>Marginal Risk</u>	<u>Total Contribution to Portfolio Risk</u>	<u>% Ttl Contribution to Portfolio Risk</u>
1	13.34%	1.88%	27.14%
2	11.27%	2.07%	29.91%
3	4.92%	1.68%	24.25%
4	3.85%	1.29%	18.71%
5	0.00%	0.00%	0.00%
<b>Weighted Average:</b>		<b>6.91%</b>	<b>100.00%</b>

## Risk Parity Example: Volatility-Weighted Approach (cont.)

- There are several things to notice about the volatility-weighted (i.e., simple) Risk Parity portfolio:
  - The calculation of the set of asset allocation weights (i.e.,  $\{W\}$ ) did not require any information other than the volatilities of the asset classes. In particular, these computations **did not require** that the investor estimate the **expected returns** or **correlations** for the asset classes
  - The **asset allocation weights** are **inversely proportional** to the **risk level** of the asset classes. So, the single riskiest investment (i.e., Asset Class #1 with  $\sigma_1 = 16.7\%$ ) receives the smallest allocation weight ( $W_1 = 14.06\%$ ) in the Risk Parity portfolio
  - The expected return for this portfolio (i.e., 6.25%) is likely to be less than that required by many investors with a long-term focus (e.g., 7.5 or 8.0%). Thus, implementing an investment strategy using this asset allocation would require the **use of leverage**
  - This procedure **does not insure** that each asset class contributes an **equal amount of risk** to the overall portfolio because the interaction (i.e., diversification potential) between the asset classes is ignored for simplicity of computations

## Risk Parity Example: Volatility-Weighted Approach (cont.)



## III-B. Risk Parity Example: Total Risk Contribution Approach

- The simple volatility-weighted approach to Risk Parity asset allocation just considered is computationally efficient to implement but it will seldom result in an allocation scheme in which the asset classes actually contribute equally to the risk of the overall portfolio
- A second approach to constructing a Risk Parity portfolio can insure that each asset class actually contributes equally to portfolio risk, but it comes at the expense of considerably more computational complexity
  - Specifically, the Equal Total Contribution to Risk approach requires the investor to specify asset class correlations and to solve the following non-linear optimization problem:

Select  $\{W_i\}$  so as to Minimize  $\sigma_p$

subject to:

- (i)  $\sum W_i = 1$
- (ii)  $[\%TCR]_1 = [\%TCR]_2 = \dots = [\%TCR]_N$
- (iii) All  $W_i \geq 0$

## Risk Parity Example: Total Risk Contribution Approach (cont.)

- Since there are four asset classes in this example, the relevant constraint in the problem to be solved is:

$$[\%TCR]_1 = [\%TCR]_2 = [\%TCR]_3 = [\%TCR]_4 = 0.25$$

- Solving the optimization problem in this example generates the following Risk Parity asset allocation percentages:

$$W_1 = 12.70\%$$

$$W_2 = 15.00\%$$

$$W_3 = 33.76\%$$

$$W_4 = 38.55\%$$

## Risk Parity Example: Total Risk Contribution Approach (cont.)

- The **expected return** and **volatility level** for this second approach to a Risk Parity Portfolio are:

$$E(R)_p = (.1270)(.091)+(.1500)(.080)+(.3376)(.051)+(.3855)(.054) = \mathbf{6.16\%}$$

and:

$$\begin{aligned} \sigma_p &= \{[(.1270)^2(.167)^2+(.1500)^2(.128)^2+(.3376)^2(.069)^2+(.3855)^2(.070)^2] \\ &+ [2(.1270)(.1500)(.167)(.128)(0.71)+2(.1270)(.3376)(.167)(.069)(0.42) \\ &+ 2(.1270)(.3855)(.167)(.070)(0.22) + 2(.1500)(.3376)(.128)(.069)(0.58) \\ &+ 2(.1500)(.3855)(.128)(.070)(0.30)+2(.3376)(.3855)(.069)(.070)(0.10)]\}^{1/2} \\ &= \mathbf{6.55\%} \end{aligned}$$

- The ex ante **Sharpe Ratio** for this Risk Parity Portfolio is:

$$S_p = \frac{(6.16 - 2.70)}{6.55} = \mathbf{0.528}$$

# Risk Parity Example: Total Risk Contribution Approach (cont.)

## \*\*\*Input: Capital Market Variables\*\*\*

R1 =	9.10%	$\sigma_1$ =	16.70%	$\rho_{12}$ =	0.71	$\rho_{24}$ =	0.30
R2 =	8.00%	$\sigma_2$ =	12.80%	$\rho_{13}$ =	0.42	$\rho_{25}$ =	
R3 =	5.10%	$\sigma_3$ =	6.90%	$\rho_{14}$ =	0.22	$\rho_{34}$ =	0.10
R4 =	5.40%	$\sigma_4$ =	7.00%	$\rho_{15}$ =		$\rho_{35}$ =	
R5 =	0.00%	$\sigma_5$ =		$\rho_{23}$ =	0.58	$\rho_{45}$ =	

## \*\*\* Input: Portfolio Weights\*\*\*

w1 =	12.70%
w2 =	15.00%
w3 =	33.76%
w4 =	38.55%
w5 =	0.00%
<hr/>	
Sum =	100%

## Portfolio Std. Deviation:

$\sigma_p$  = 6.55%

## Portfolio Return:

$R_p$  = 6.16%

## % Ttl Contribution Equal Risk Weight:

$W_{equal}$  = 25.00%

$R_F$  = 2.70%

Sharpe = 0.528

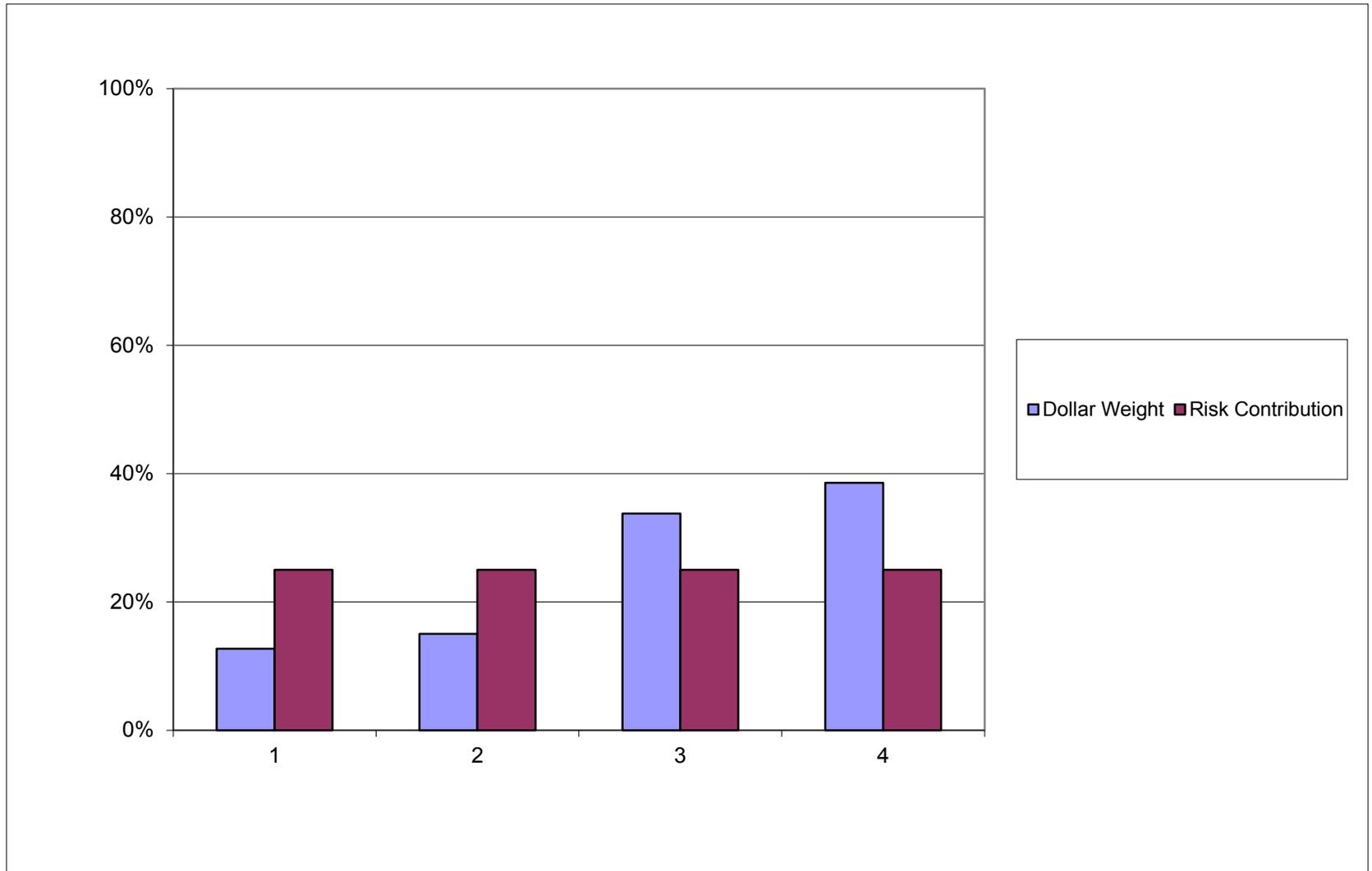
## 1. Total Portfolio Risk Decomposition:

<u>Asset Class</u>	<u>Marginal Risk</u>	<u>Total Contribution to Portfolio Risk</u>	<u>% Ttl Contribution to Portfolio Risk</u>
1	12.89%	1.64%	25.00%
2	10.92%	1.64%	25.00%
3	4.85%	1.64%	25.00%
4	4.25%	1.64%	25.00%
5	0.00%	0.00%	0.00%
	<b>Weighted Average:</b>	6.55%	100.00%

## Risk Parity Example: Total Risk Contribution Approach (cont.)

- There are several things to notice about the Equal Total Risk Contribution (i.e., more complex) Risk Parity portfolio:
  - This Risk Parity Portfolio represents the **lowest-risk combination** of these four asset classes that is possible, subject to the restriction that each asset class has to **contribute the same amount of risk** to the overall portfolio
  - As in the simpler volatility-weighted approach, the **asset allocation weights** are still **inversely proportional** to the **risk level** of the asset classes. So, as before, the single riskiest investment (i.e., Asset Class #1 with  $\sigma_1 = 16.7\%$ ) receives the smallest allocation weight ( $W_1 = 12.70\%$ ) in the Risk Parity portfolio
  - The expected return for this portfolio (i.e., 6.16%) is even lower than before and so it is still likely to be less than that required by many investors. Thus, once again, implementing an investment strategy using this asset allocation would require the **use of leverage**
  - This procedure **does insure** that each asset class contributes an **equal amount of risk** to the overall portfolio because the interaction (i.e., diversification potential) between the asset classes is **not ignored**; indeed, that is the whole point of the calculation

## Risk Parity Example: Total Risk Contribution Approach (cont.)



## Risk Parity Example: Comparing Approaches

- This chart summarizes the relevant characteristics of the asset allocation schemes produced by the two Risk Parity approaches in this example:

	<u>Volatility-Weighted</u>	<u>Equal Total Risk Contribution</u>
Portfolio Weight:		
$W_1$	14.06%	12.70%
$W_2$	18.35	15.00
$W_3$	34.04	33.76
$W_4$	33.55	38.55
Expected Return:	6.30%	6.16%
Volatility:	6.91%	6.55%
Sharpe Ratio:	0.520	0.528

## IV. Implementing a Risk Parity Asset Allocation Scheme

- As noted earlier, the Risk Parity approach to determining a strategic asset allocation is based on the **underlying assumption** that a portfolio in which all assets are combined so as to equalize their contributions to the overall level of risk will be the one that comes closest to **maximizing** the ex ante **Sharpe Ratio**
  - This is just another way of saying that the Risk Parity allocation is assumed to be a **good proxy for the tangency portfolio** on the Markowitz mean-variance Efficient Frontier
- With this assumption, implementing a strategic asset allocation scheme consistent with an investor's return goal is reasonably straightforward:
  - **Step 1: Identify the investment weights** of the Risk Parity portfolio for a given set of potential asset classes
  - **Step 2: Borrow** (lend) funds to buy more (less) of the Risk Parity portfolio to **adjust** either the **expected return** or risk level of the overall position to the desired level.

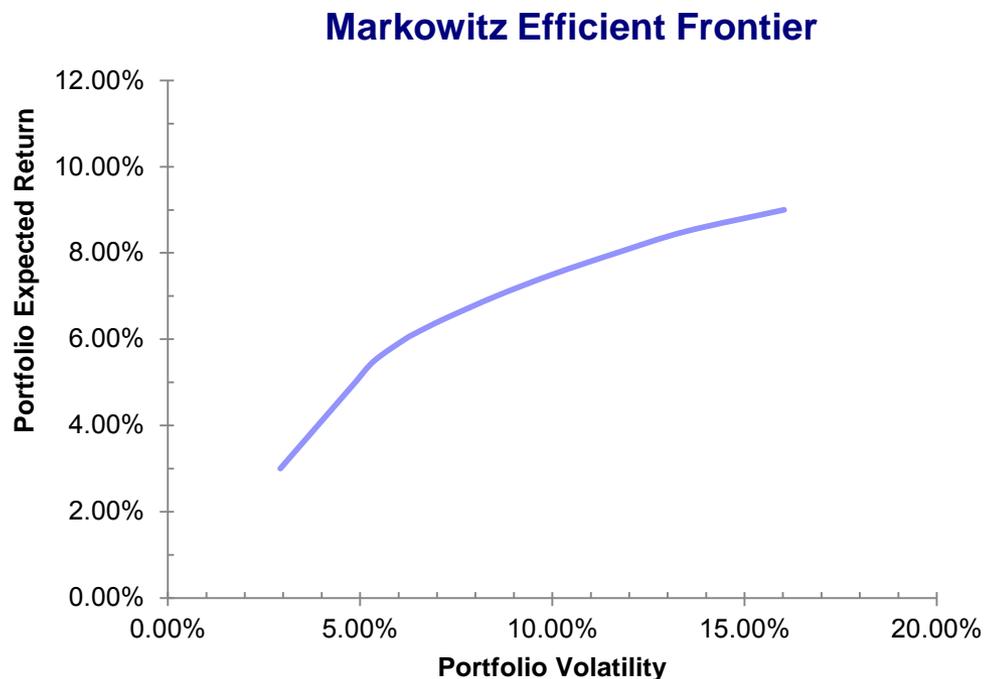
## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- To see how this might work in the context of the preceding example, we must first use the asset class data for expected returns, volatilities, and correlations to **construct the Markowitz Efficient Frontier** of portfolio solutions
  - Recall that each point on the mean-variance Efficient Frontier represents the **optimal** (i.e., lowest-risk) **combination of assets** that is capable of delivering a given expected return
- The following chart and graph summarize the set of **mean-variance efficient portfolio outcomes** using these four asset classes for a range of expected return goals:
  - The Efficient Frontier in this example has been constructed under the restrictions that the investor **cannot borrow** any additional funds and that **no short sales** are possible for any asset class
  - The two **highlighted entries** represent the mean-variance efficient portfolios with the **same expected returns** as the two different Risk Parity portfolios calculated earlier

## Implementing a Risk Parity Asset Allocation Scheme (cont.)

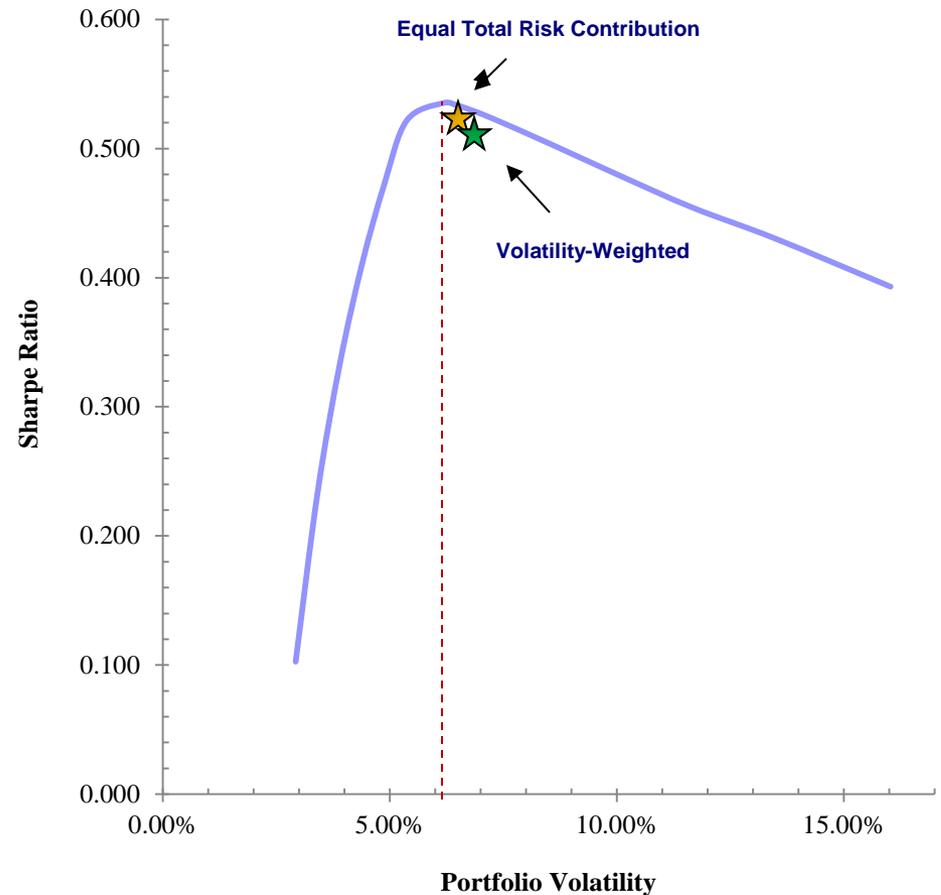
### Mean-Variance Efficient Portfolios

<u>E(R<sub>p</sub>)</u>	<u>σ<sub>p</sub></u>	<u>Sharpe Ratio</u>
3.00%	2.92%	0.103
3.50%	3.41%	0.235
4.00%	3.90%	0.333
4.50%	4.39%	0.410
5.00%	4.87%	0.472
5.50%	5.37%	0.522
6.00%	6.17%	0.535
<b>6.16%</b>	<b>6.49%</b>	<b>0.533</b>
<b>6.30%</b>	<b>6.79%</b>	<b>0.530</b>
6.50%	7.26%	0.523
7.00%	8.54%	0.503
7.50%	10.00%	0.480
8.00%	11.67%	0.454
8.50%	13.47%	0.431
9.00%	16.03%	0.393



## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- It is interesting to notice in these data that the ex ante **Sharpe Ratio is maximized** at relatively low expected return goal (i.e., around 6.00% in this example) and with a commensurately low level of overall portfolio risk
  - This is the so-called **tangency portfolio** that the Risk Parity scheme attempts to mimic
- This can be shown **graphically**, with the positions of the two Risk Parity allocation schemes included in the display



## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- In this example, both of the Risk Parity approaches produce asset allocations that are **very close** to the theoretical tangency portfolio on the mean-variance Efficient Frontier
  - The Equal Total Contribution to Risk approach is **slightly closer** to the maximum Sharpe Ratio portfolio than the Volatility-Weighted approach
- Now suppose an investor has a **required expected return of 7.50%**. The **mean-variance efficient strategic asset allocation** would have the following properties:

Allocation:		E(R) =	7.50%
$W_1$	31.08%		
$W_2$	36.54	$\sigma =$	10.00%
$W_3$	0.00		
$W_4$	32.38	<b>Sharpe =</b>	<b>0.480</b>

## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- Notice two things about this mean-variance optimal allocation associated with the 7.50% return goal:
  - It makes **no allocation** at all one of the four asset classes (i.e., Asset Class 3)
  - It produces an inferior ex ante **Sharpe Ratio** to that of the best available Risk Parity portfolio (i.e., 0.480 vs. 0.528)
- Comparing the allocation schemes for the 7.5% mean-variance portfolio and the best Risk Parity portfolio:

Allocation:	Mean-Variance:	Risk Parity:
$W_1$	31.08%	12.70%
$W_2$	36.54	15.00
$W_3$	0.00	33.76
$W_4$	32.38	38.55
<b>Sharpe Ratio:</b>	<b>0.480</b>	<b>0.528</b>

## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- The **Risk Parity portfolio** has a very different asset allocation than the Mean-Variance efficient portfolio associated with the return goal and has a **better reward-to-risk ratio**
  - However, the Risk Parity allocation only generates an expected return of 6.16%, which **falls short** of the investor's 7.50% required return
  - So, the investor will have to **borrow additional funds** to buy more of the Risk Parity portfolio to achieve the higher return goal
- Assuming for simplicity that the investor can either borrow or lend money at the risk-free rate (RF = 2.70% in this example), the **amount of gross leverage** required—call it  $W^*$ —can be calculated by solving the following equation, which is based on the notion that the expected return from combining two investment portfolios is just a weighted average of the separate expected returns:

$$7.50\% = W^* \cdot (6.16\%) + (1 - W^*) \cdot (2.70\%)$$

## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- Solving for  $W^*$  in this case leaves:

$$W^* = \frac{(7.50 - 2.70)}{(6.16 - 2.70)} = 1.3873$$

so that  $(1 - W^*) = -0.3873$  (i.e., a short position in RF)

- This means that the investor will have to borrow 38.73 cents per every dollar of their initial capital in order to buy enough of the risk parity portfolio to generate the 7.50% required return

- Intuitively, the return the investor expects to receive comes from the **net amount of two activities**:

- Investing 1.3873 at 6.16%:  $1.3873 \times 6.16\% = 8.546\%$
- Borrow 0.3873 at 2.70%:  $-0.3873 \times 2.70\% = \underline{-1.046\%}$

Net Expected Return: 7.500%

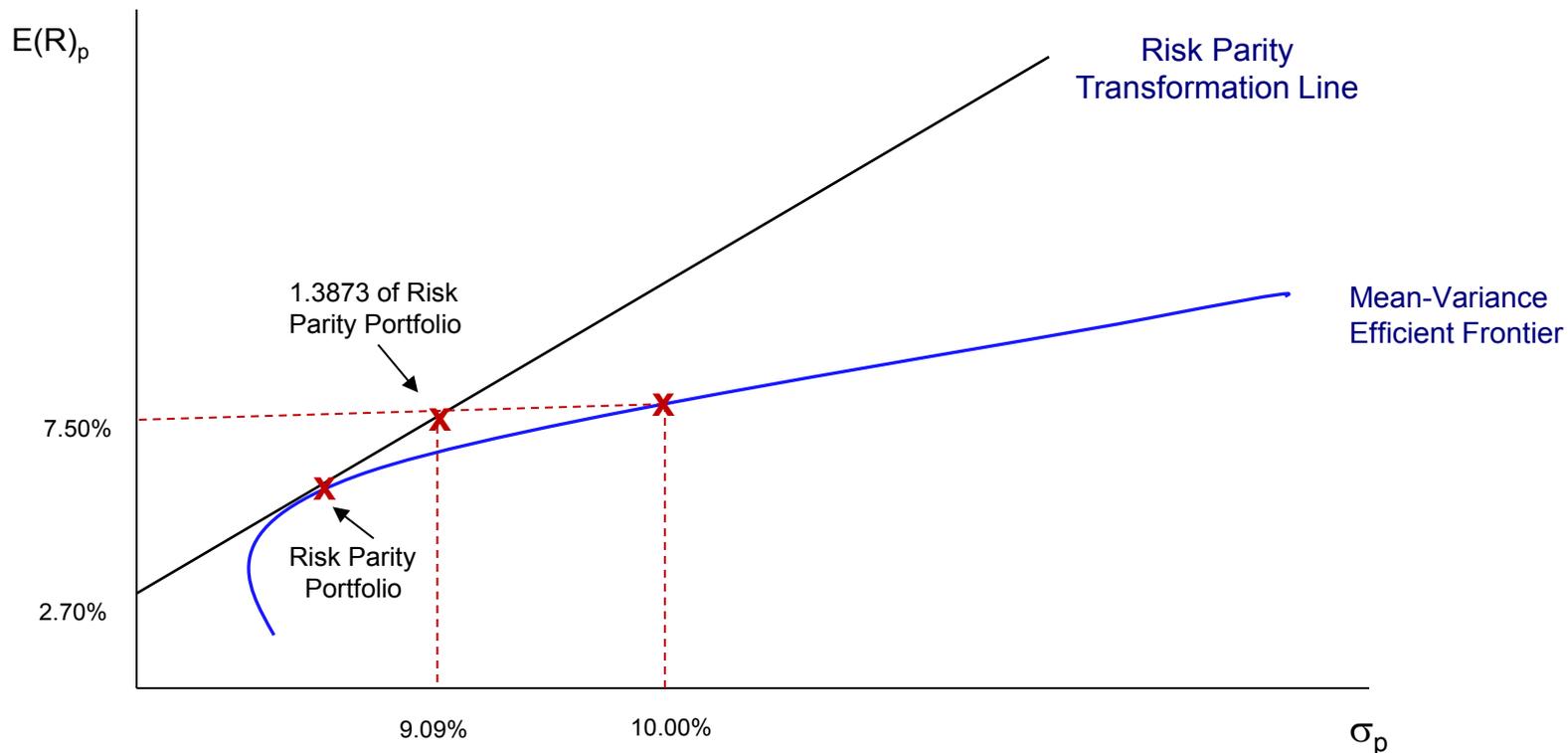
## Implementing a Risk Parity Asset Allocation Scheme (cont.)

- Additionally, assuming that the risk-free asset has no volatility or correlation with the Risk Parity portfolio—which is reasonable for the investor who is borrowing at this rate—the volatility of this position is:

$$\sigma^* = (\text{Gross Leverage}) \times (\sigma_{\text{risk parity}}) = (1.3873) \times (6.55\%) = 9.09\%$$

which is **substantially less** than the  $\sigma = 10.00\%$  for the mean-variance efficient portfolio for this expected return goal

- Graphically, these concepts can be illustrated as follows:



## V. Risk Parity and Asset Allocation: Summary

- The **theoretical justification** for the Risk Parity approach to asset allocation has been around for more than 50 years, dating to the **pioneering work** of Nobel laureate **James Tobin**
  - The **main idea** is that investors should only hold the **single collection of risky assets** that maximizes the ex ante Sharpe Ratio (i.e., the tangency portfolio) and then **adjust this position** to their desired risk exposure through the use of **leverage**
- The **critical assumption** underlying the Risk Parity allocation scheme is that the Risk Parity portfolio is a **good proxy** for the **tangency portfolio** on the mean-variance Efficient Frontier
  - This is a reasonable assumption in a wide variety of situations—including the example developed here—but need not be true in all cases

## Risk Parity and Asset Allocation: Summary (cont.)

- There are some other **important caveats** to consider when implementing a Risk Parity program:
  - The **use of leverage** in the Risk Parity scheme can be **considerable** and **tends to increase** with the distance between the investor's return goal and the expected return of Equal Total Risk Contribution portfolio. Recent research (Anderson, Bianchi, Goldberg) has shown that the amount of leverage needed to convert an unlevered risk parity position to the volatility level of a traditional "60-40" position is about 350% over time
  - The substantial use of leverage also increases the **transaction costs** and **borrowing costs** involved in managing a Risk Parity position. These additional costs can substantially erode performance in different market environments
  - When large levels of leverage are required, it may be **difficult** (perhaps impossible) **to scale** up investments in certain illiquid asset classes in order to achieve the desired volatility level for the overall portfolio
  - **Inferring future performance** of a Risk Parity position from past results can be **difficult** and tend to be extremely dependent on the time horizon used in the empirical analysis

## Risk Parity and Asset Allocation: Summary (cont.)

- Two other points associated with the Risk Parity approach to forming a strategic asset allocation are worth noting here:
  - Although the preceding analysis was based on volatility (i.e., standard deviation) as a risk measure, the Risk Parity concepts can be **applied with downside risk measures** (e.g., Value at Risk, or VaR) as well
  - Because of Risk Parity portfolios and mean-variance efficient portfolios for higher return goals tend to have very different asset allocation schemes, they also tend to produce returns that are **not perfectly correlated**. This means that a Risk Parity portfolio can also be viewed as a way to **further diversify** an existing allocation (i.e., Risk Parity can be used as a **partial solution**, not a replacement)

Tab 5 D iii



# Teacher Retirement System of Texas

SAA Strategy Discussion

March 2014

**Hewitt** ennisknupp

*An Aon Company*

# Asset Allocation Method Alternatives

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## Peer-Sensitive

- Asset allocation decision is heavily informed by peer practices

## Highly Tactical

- De-emphasize policy portfolio in favor of dynamic asset allocation, expressing medium-term views on asset classes

## Mean-Variance Optimization

- Develop optimal asset allocation based on expected return, risk (as measured by volatility) and correlations between asset classes

## Risk-Based

- Base allocations on exposure to risk factors (equity, credit, interest rates, currency, liquidity, etc.) rather than asset classes, using a total fund risk model

## Asset Allocation Method Alternatives (cont'd.)

Method	Pros	Cons
Peer-Sensitive	<ul style="list-style-type: none"> <li>Minimizes peer group risk</li> <li>Benefits from collective insight of peers</li> </ul>	<ul style="list-style-type: none"> <li>Not focused on client-specific factors</li> </ul>
Highly Tactical	<ul style="list-style-type: none"> <li>Highly flexible in implementation</li> <li>By definition, not tied to a policy portfolio</li> </ul>	<ul style="list-style-type: none"> <li>De-emphasizes risk-controlling aspect of long-term policy portfolio</li> <li>Requires skill...for success</li> </ul>
Mean-Variance Optimization	<ul style="list-style-type: none"> <li>Traditional</li> <li>Easily tractable</li> <li>Produces “best” result given assumptions and risk definition</li> </ul>	<ul style="list-style-type: none"> <li>Highly sensitive to assumptions</li> <li>Is variance <i>the</i> correct measure of risk?</li> </ul>
Risk-Based	<ul style="list-style-type: none"> <li>Linked to risk factors that drive fund returns</li> <li>Examines common risks and returns across asset classes</li> </ul>	<ul style="list-style-type: none"> <li>Most useful as a lens through which to look at asset allocation rather than a replacement for existing methods</li> </ul>

# Institutional Investor Portfolios

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- Regardless of the method used to arrive at an allocation, most institutional investor portfolios can be grouped into some broad categories:
  - 100% Fixed Income/Cash – for institutions with short time horizons or specific cash flow needs.
  - 100% Long Duration Credit – used by corporate plans
  - Norway Model
  - 60/40
  - Canadian Model
  - Endowment Model
  - Risk-based / Risk Parity

# Is There One Right Approach?

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- NO! (but some are better than others)
- Regardless of methods and models used we find the following important:
  1. Clearly articulated investment thesis that fits goals / objectives of the investment program
  2. Stress Testing Alternatives
    - ♦ Using historical data
    - ♦ Using forward-looking assumptions (Monte Carlo Simulations)
  3. Graphic display of outcomes – pictures say 1,000 words
  4. Maintain clear focus on competitive advantages and constraints / restrictions
  5. Don't slice the baloney too thin

Tab 5 D iv



# Strategic Asset Allocation Study Update

Mohan Balachandran, Senior Managing Director

Ashley Baum, Investment Manager

March 2014

# Agenda

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1. 2014 SAA Study Objectives and Current Progress
2. Current SAA Policy Framework and Portfolio Analysis
3. Main Challenge for a Long-Term Investor
4. Illustrations of Various Ways to Meet the Challenge
5. Potential SAA Portfolios in Focus
6. Key Takeaways and Next Steps
7. Appendix
  - A – Current SAA Overview
  - B – Role of Treasuries
  - C – Liquidity Considerations
  - D – Additional Portfolio Considerations

# 2014 SAA Study: Objectives, Participants, Issues

## Objective of the SAA Study

- Maximize the probability of achieving 8% returns over twenty years, without an unacceptable risk of intermediate-term downside volatility
- Continue to meet the Long-Term Goals and Obligations of the Plan as set forth in Section 1.4 of the Investment Policy Statement
  - a. *Control risk through proper diversification of asset classes and by establishing long-term risk and return expectations; and*
  - b. *...[A]chieve a long-term rate of return that:*
    - i. *Exceeds the assumed actuarial rate of return...*
    - ii. *Exceeds the long-term rate of inflation by an annualized 5%...*
    - iii. *Exceeds the return of a composite benchmark of the...long-term normal asset mix weighting of the major asset classes.*

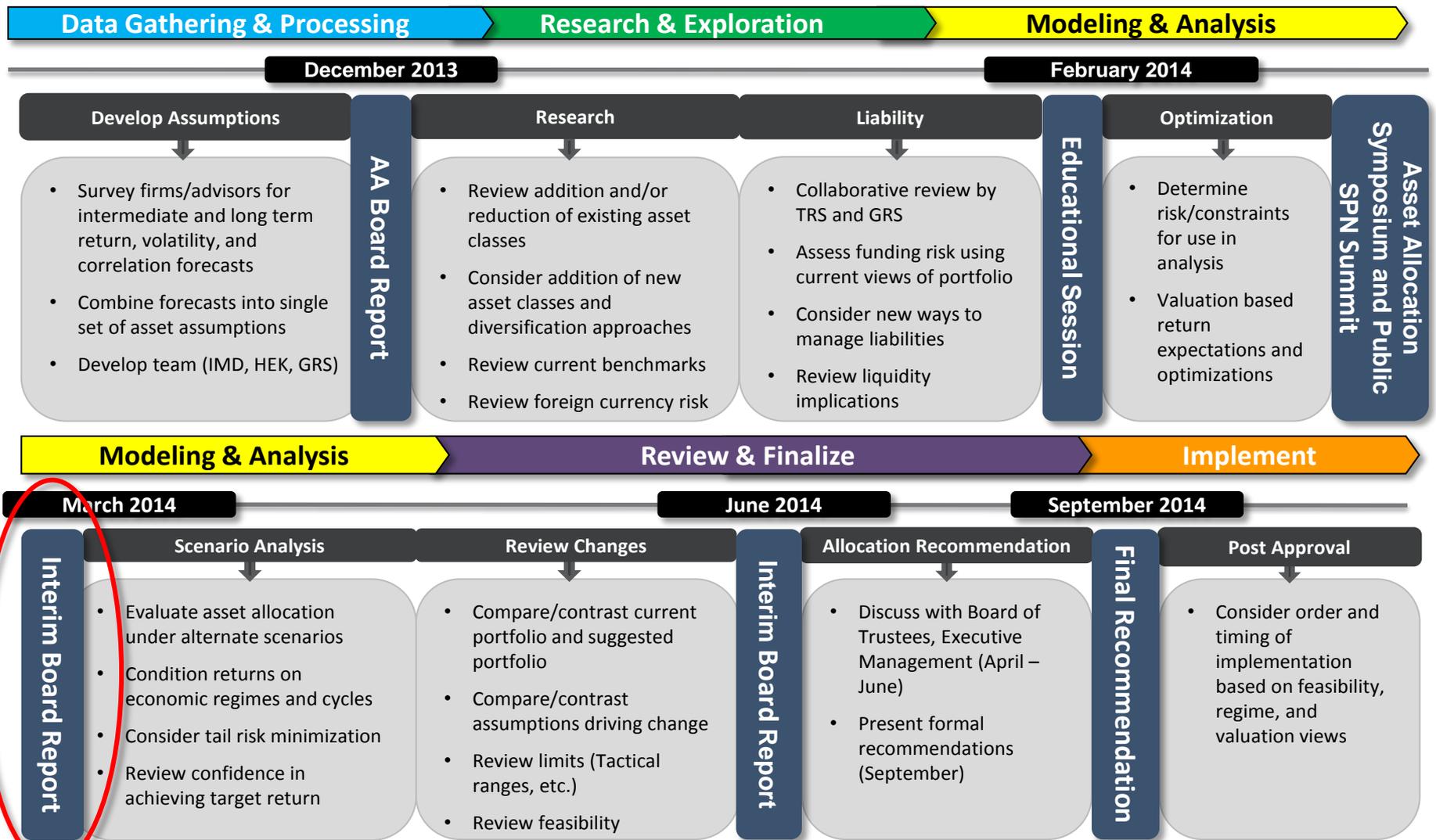
## Key Participants

- TRS Board of Trustees
- IMD Investment Professionals
- HEK
- Dr. Keith Brown
- GRS
- Strategic Partners
- Select External Managers

## Environmental Issues

- Low inflation and low interest rates
- Secular deleveraging
- High intermediate-term valuations could result in low intermediate-term returns
- Potential for inflation in the future
- Increased government share of GDP relative to the private sector
- Global geopolitical issues

# 2014 SAA Study: Where Are We?



# Capital Market Expectations – Key Assets

	Long-Term Expected Returns (10+ Years)		
	Median	Max	Min
<b>US Large Cap</b>	6.7%	7.5%	2.7%
US Midcap	7.2%	9.4%	5.0%
<b>US Smallcap</b>	7.5%	10.7%	3.2%
<b>MSCI EAFE &amp; Canada</b>	7.3%	11.0%	3.1%
<b>Emerging Markets</b>	8.1%	12.0%	3.1%
<b>Directional Hedge Funds</b>	5.4%	7.8%	3.5%
<b>Private Equity</b>	9.2%	12.1%	3.1%
<b>Cash</b>	2.0%	3.8%	1.3%
US Aggregate	3.0%	4.6%	0.1%
US Treasurys -- Intermediate	3.6%	4.6%	2.0%
<b>US Treasurys -- Long</b>	2.9%	5.1%	1.0%
US Investment Grade Credit	3.3%	5.0%	2.1%
US High Yield	4.6%	6.0%	2.1%
Emerging Market Debt	5.0%	6.7%	2.7%
<b>Stable Value Hedge Funds</b>	5.2%	6.1%	3.0%
Infrastructure	7.5%	9.7%	4.9%
<b>Real Assets</b>	7.3%	12.7%	3.9%
<b>US TIPS</b>	2.8%	4.8%	1.0%
<b>Commodities</b>	3.0%	7.2%	1.0%
<b>ENR<sup>1</sup></b>	8.2%	12.4%	3.5%

Expected returns compiled from the median response to the TRS 2014 Capital Market Expectations Survey

- 17 final survey participants including JP Morgan, Morgan Stanley, Bridgewater and AQR
- Surveyed expected returns and risk across two time horizons: Long-Term and Intermediate-Term
- SAA focuses on Long-Term expectations; Intermediate-Term in Appendix

Source: TRS 2014 Capital Market Expectations Survey. Current Policy Asset Classes noted in bold font.

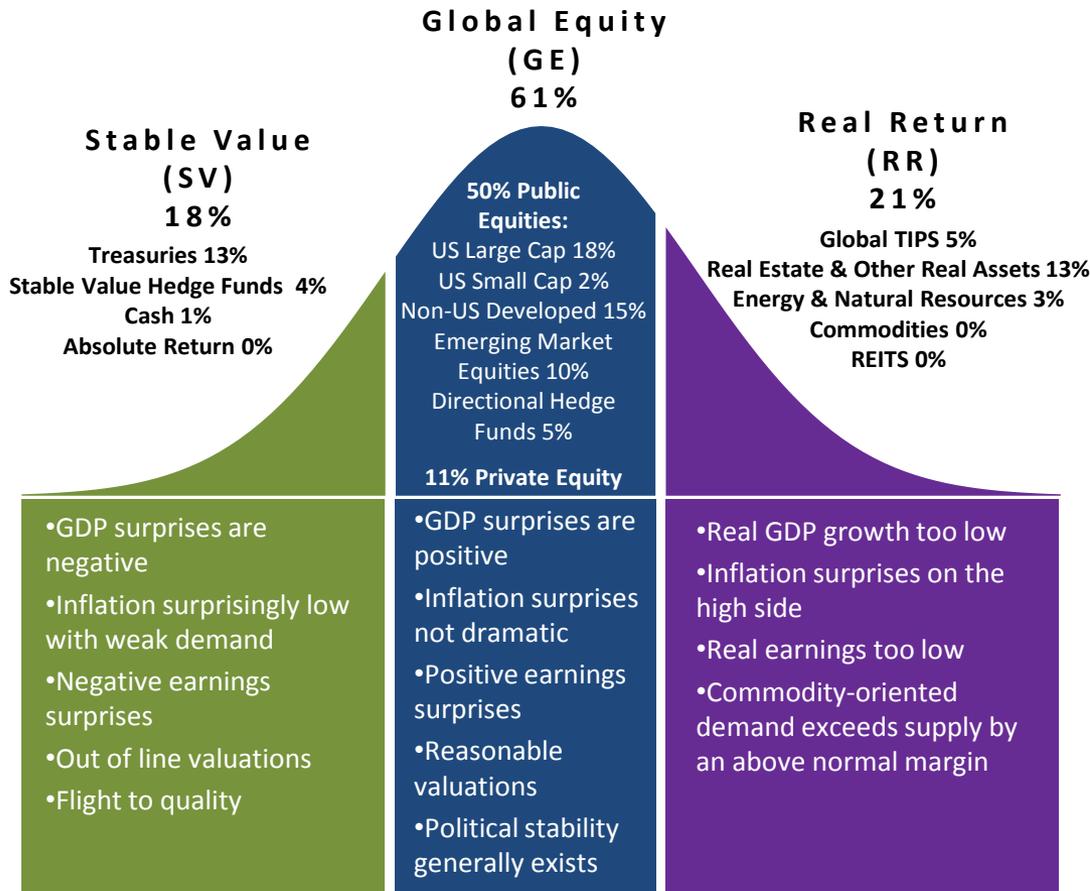
<sup>1</sup> ENR Expected Returns calculated as 50% Private Equity and 50% Real Assets

# Portfolio Metrics

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1. Expected Passive Return
2. Expected Return with 100 bps Alpha
3. Expected Passive Volatility
4. Expected Sharpe Ratio
  - Measure of risk-adjusted return
  - Higher is better
  - 0.30 is considered good; anything over 0.60 should be examined with skepticism
5. Liquidity Score
  - Qualitative Assessment to compare the liquidity across various portfolios in the SAA process
  - Methodology uses Antti Ilmanen's methodology and assigns a score to each asset type based on the ease and cost of trading
  - The scoring ranges from 1 to 6, from 1=most liquid to 6=most illiquid
    - The median score for the asset classes reviewed in the SAA is 2.9
    - The liquidity of the Current TRS Trust Allocation Policy is 2.8
    - Detailed asset level scores listed in Appendix

# Current SAA Policy Framework



## Comparative Portfolios

	Expected Return	+100 bps Alpha	Expected Volatility	Expected Passive Sharpe Ratio	Liquidity Score
Current TRS Policy	7.4%	8.4%	11.4%	0.50	2.82
CEM Peer Survey	7.0%	8.0%	12.3%	0.43	2.43
Pre-2007 TRS Policy	6.2%	7.2%	11.1%	0.40	1.97
60/30/10 (Stocks/Bonds/Alt <sup>1</sup> )	6.2%	7.2%	11.0%	0.40	1.85
60/40 (Stocks/Bonds)	5.6%	6.6%	9.9%	0.39	1.55

## The TRS Competitive Advantages

1. Large size
2. Unlevered portfolio
3. Long-term capital
4. Liquid assets

**Conclusion: This process is expected to refine the SAA, but not produce significant changes**

<sup>1</sup>Stock/Bond/Alt classification includes 10% allocated to Alternatives within the following categories: 5% Real Assets, 5% Private Equity

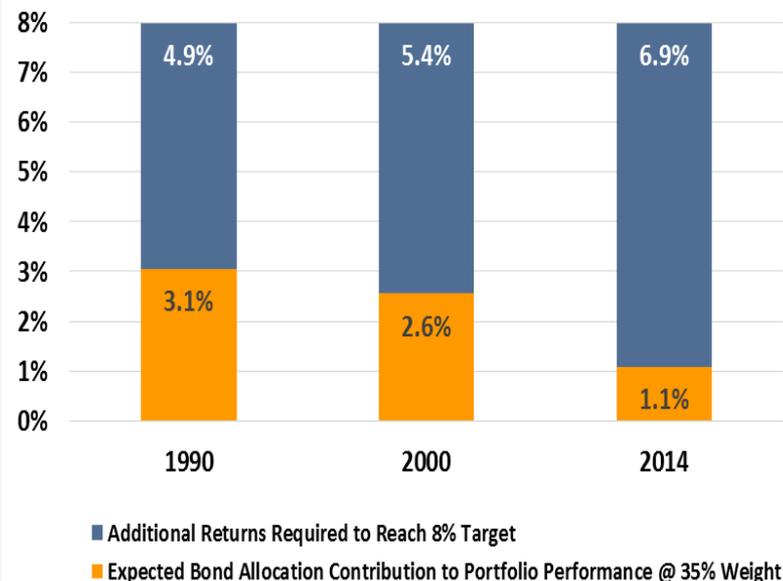
# What is the Main Challenge for a Long-Term Investor Today?

Financial markets face the headwinds of a low interest rate environment, driving down expected returns across asset classes

## Yield on 10-Year Treasury Bond and Investment Grade Corporate Bonds



## Contribution to 8% Target Return by a 35% Bond Allocation<sup>1</sup>



<sup>1</sup>Bond Allocation represented by 50% US Treasuries / 50% Moody's Aa Corporate Bond.

# How Could the SAA Meet this Challenge?

- Strategies to meet the challenge:
  1. Leverage the bond portfolio with Risk Parity
  2. Find strategies with similar risk that offer higher returns
  3. Increase allocation to the highest expected return strategies at the cost of a less liquid portfolio
  4. Find new strategies with high Sharpe Ratios and low correlation
  5. Choose to ride it out
- A combination of the above can raise the return but will have potentially problematic impacts on:
  1. Symmetrical regime diversification
  2. Liquidity
  3. Counterparty and model risk
- Alpha will be required, regardless of what we are likely to do with the SAA
- All the above considerations will require an organizational structure that matches the sophistication of the strategy being employed and an Agency structure that supports it

# Illustrations of Various Ways to Meet the Challenge

# Move Toward Risk Parity

	Current Policy	Blend 75% Trust/ Blend 95% Trust/			
		Liquid Asset Risk	25% Liquid Risk	5% Liquid Risk	Total Trust Risk
		Parity	Parity	Parity	Parity
		1	2	3	4
US Large Cap	18.0%	16.1%	17.9%	18.0%	10.0%
US Smallcap	2.0%	13.4%	1.2%	1.8%	7.9%
MSCI EAFE & Canada	15.0%	13.8%	14.3%	14.9%	8.8%
Emerging Markets	10.0%	10.7%	8.5%	9.7%	6.9%
Directional Hedge Funds	5.0%		5.0%	5.0%	6.4%
Private Equity	11.0%		11.0%	11.0%	9.5%
Cash	1.0%	-53.4%	-12.4%	-1.7%	-58.8%
US Treasurys -- Long	13.0%	51.8%	21.8%	14.8%	47.0%
Stable Value Hedge Funds	4.0%		4.0%	4.0%	3.2%
Real Assets	13.0%		13.0%	13.0%	12.9%
US TIPS	5.0%	47.7%	12.8%	6.6%	35.2%
ENR	3.0%		3.0%	3.0%	10.9%
<b>Total Global Equity</b>	<b>61.0%</b>	<b>54.0%</b>	<b>57.8%</b>	<b>60.4%</b>	<b>49.5%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>-1.6%</b>	<b>13.4%</b>	<b>17.1%</b>	<b>-8.6%</b>
<b>Total Real Return</b>	<b>21.0%</b>	<b>47.7%</b>	<b>28.8%</b>	<b>22.6%</b>	<b>59.0%</b>
<b>Total Public</b>	73.0%	100.0%	73.0%	73.0%	66.6%
<b>Total Private</b>	27.0%	0.0%	27.0%	27.0%	33.3%

	Policy	Liquid Asset Risk Parity	Blend 75% Trust/ 25%	Blend 95% Trust/ 5%	Total Trust Risk Parity
			Liquid Risk Parity	Liquid Risk Parity	
			1	2	
Long Term Passive Return	7.4%	6.4%	7.3%	7.4%	7.8%
+100 bps Alpha	8.4%	7.4%	8.3%	8.4%	8.8%
Long Term Volatility	11.4%	11.4%	10.8%	11.3%	11.4%
Long Term Passive Sharpe Ratio	0.50	0.41	0.52	0.50	0.53
Liquidity Score	2.82	2.17	2.78	2.82	3.02

- Blending Risk Parity into the current allocation framework decreases the risk of the portfolio while maintaining returns close to Current Policy
- Improving risk characteristics will enable the portfolio to take additional, compensated risk in other areas
- There are various approaches to Risk Parity. Additional SAA research is required to evaluate this approach

# Increase Long-Term Returns by 50 bps near Current Risk Levels

	Current Policy	Buy Private Assets/ Sell Trust	Buy Private Assets/ Sell UST & TIPS	Buy Public Equity/ Sell UST & TIPS
		5	6	7
US Large Cap	18.0%	14.3%	18.0%	21.3%
US Smallcap	2.0%		2.0%	5.3%
MSCI EAFE & Canada	15.0%	11.3%	15.0%	18.3%
Emerging Markets	10.0%	6.3%	10.0%	13.3%
Directional Hedge Funds	5.0%	5.0%	5.0%	5.0%
Private Equity	11.0%	17.6%	14.3%	11.0%
Cash	1.0%	1.0%	1.0%	1.0%
US Treasuries -- Long	13.0%	9.7%	7.0%	5.0%
Stable Value Hedge Funds	4.0%	4.0%	4.0%	4.0%
Real Assets	13.0%	19.6%	16.3%	13.0%
US TIPS	5.0%	1.7%	1.2%	
ENR	3.0%	9.6%	6.3%	3.0%
<b>Total Global Equity</b>	<b>61.0%</b>	<b>54.4%</b>	<b>64.3%</b>	<b>74.0%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>14.7%</b>	<b>12.0%</b>	<b>10.0%</b>
<b>Total Real Return</b>	<b>21.0%</b>	<b>30.8%</b>	<b>23.8%</b>	<b>16.0%</b>
<b>Total Public</b>	73.0%	53.3%	63.2%	73.0%
<b>Total Private</b>	27.0%	46.7%	36.8%	27.0%

	Policy	Buy Private Assets/ Sell Trust	Buy Private Assets/ Sell UST & TIPS	Buy Public Equity/ Sell UST & TIPS
		5	6	7
Long Term Passive Return	7.4%	7.9%	7.9%	7.9%
+100 bps Alpha	8.4%	8.9%	8.9%	8.9%
Long Term Volatility	11.4%	11.7%	12.7%	13.9%
Long Term Passive Sharpe Ratio	0.50	0.53	0.49	0.44
Liquidity Score	2.82	3.40	3.14	2.87

- The current TRS Policy portfolio is close to the Efficient Frontier, making it difficult to increase returns without adding to volatility
- To improve returns without utilizing leverage, the portfolio must take on additional market risk or additional illiquidity risk
- All approaches change the current economic regime diversification

# More Competitive Structure: Canadian Model

	Current Policy	CPP	OMERS	Ontario Teachers
		8	9	10
US Large Cap	18.0%	10.3%	7.9%	14.7%
US Smallcap	2.0%		1.0%	1.9%
MSCI EAFE & Canada	15.0%	16.2%	14.8%	14.5%
Emerging Markets	10.0%	5.7%	2.0%	3.8%
Directional Hedge Funds	5.0%			
Private Equity	11.0%	17.8%	14.1%	13.5%
Cash	1.0%			-23.0%
US Aggregate		32.9%	20.2%	23.0%
US Treasuries -- Long	13.0%			
Stable Value Hedge Funds	4.0%			
Real Assets	13.0%	16.9%	32.9%	27.0%
US TIPS	5.0%	0.2%	7.1%	24.4%
ENR	3.0%			
<b>Total Global Equity</b>	<b>61.0%</b>	<b>50.0%</b>	<b>39.8%</b>	<b>48.6%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>32.9%</b>	<b>20.2%</b>	
<b>Total Real Return</b>	<b>21.0%</b>	<b>17.1%</b>	<b>40.0%</b>	<b>51.4%</b>
<b>Total Public</b>	<b>73.0%</b>	<b>65.3%</b>	<b>53.0%</b>	<b>59.5%</b>
<b>Total Private</b>	<b>27.0%</b>	<b>34.7%</b>	<b>47.0%</b>	<b>40.5%</b>

	Policy	CPP	OMERS	Ontario Teachers
		8	9	10
<b>Passive Long Term Return</b>	<b>7.4%</b>	<b>7.0%</b>	<b>7.3%</b>	<b>7.4%</b>
<b>Expected Fee Savings</b>	<b>-</b>	<b>0.5%</b>	<b>0.7%</b>	<b>0.6%</b>
<b>Total Expected Return</b>	<b>7.4%</b>	<b>7.5%</b>	<b>8.0%</b>	<b>8.0%</b>
<b>+100 bps Alpha</b>	<b>8.4%</b>	<b>8.5%</b>	<b>9.0%</b>	<b>9.0%</b>
<b>Long Term Volatility</b>	11.4%	10.3%	10.5%	11.5%
<b>Long Term Passive Sharpe Ratio</b>	0.50	0.57	0.60	0.55
<b>Liquidity Score</b>	<b>2.82</b>	<b>2.97</b>	<b>3.37</b>	<b>3.18</b>

- The “Canadian Model” emphasizes Alternatives and Illiquids
- It tilts toward internal management and direct leverage, especially in PE, RE and Infrastructure
- Requires significant staffing
- In addition to portfolio sales, liquidity is managed via:
  - Issuance of commercial paper
  - Security repurchase agreements
  - Drawing on unsecured credit facilities

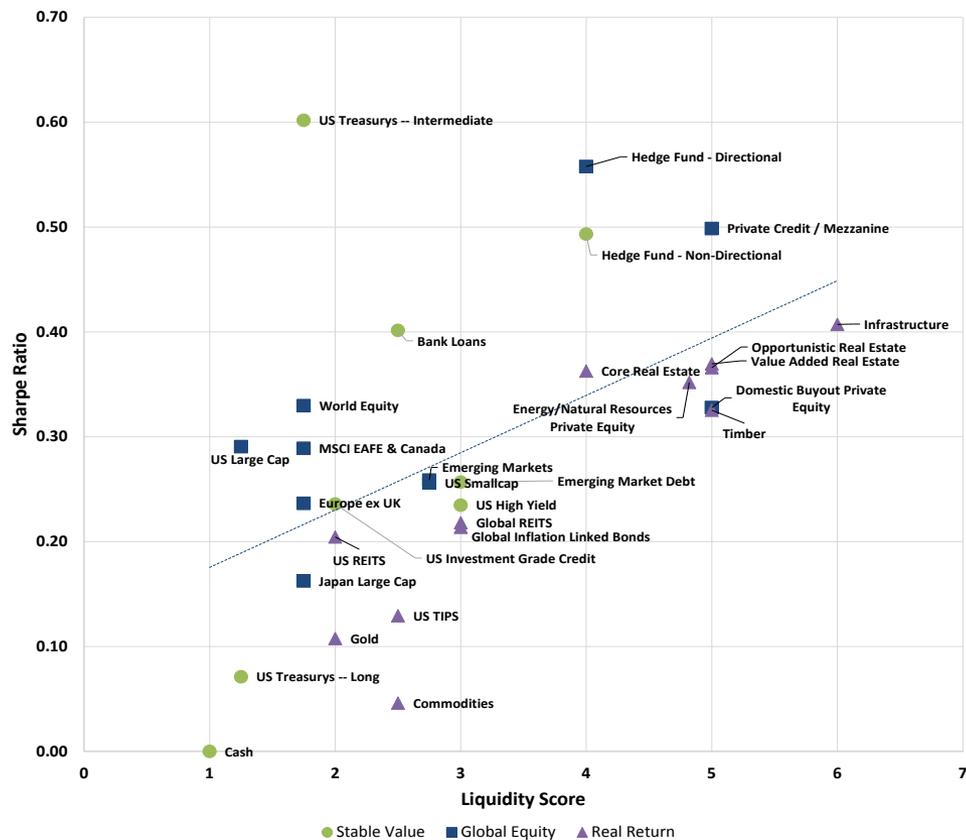
Source: Fee benefit calculated by TRS. Assumes a 50/50 allocation to Fund Investments and 50% to Direct Investments reported in its 2013 Annual Report by CPP, the Canadian Pension Plan. Fund investments modeled using 1.5% Management Fee, 8% Preferred Return, 50% catchup and 80/20 profit split on a 20% gross return. Direct Investments modeled assuming no fee or profit split on the same return. Actual calculation assumes a fee benefit on the portfolio of 260 bps however to be conservative, both accounting for increased internal salary and management cost and the possibility of lower returns going forward, 150 bps is selected as the fee benefit over a traditional 100% Fund investor.

# Capturing Additional Illiquidity Premium

TRS has a low annual cash need and a liability duration of 24 years enabling it to capture the illiquidity premium to generate higher returns

- TRS has consistently maintained well over the Risk Group Illiquidity Stress Levels
  - Dec 2013: Sources exceed uses of liquidity by 10.8x
  - Stress Threshold Level is 3x
- Required payouts are manageable
  - Benefit payments expected to remain in \$4-6 billion (3-4% of the Trust) over the next 10 years
  - Capital calls expected to be in the +/- \$1-2 billion range the next 10 years
- TRS has an allocation of 27% to private investments (PE, RA and ENR) while Median Peers have an allocation of up to 38%

**Illiquid assets generally offer higher forward looking risk-adjusted returns than their public market counterparts**



# Capturing Additional Illiquidity Premium

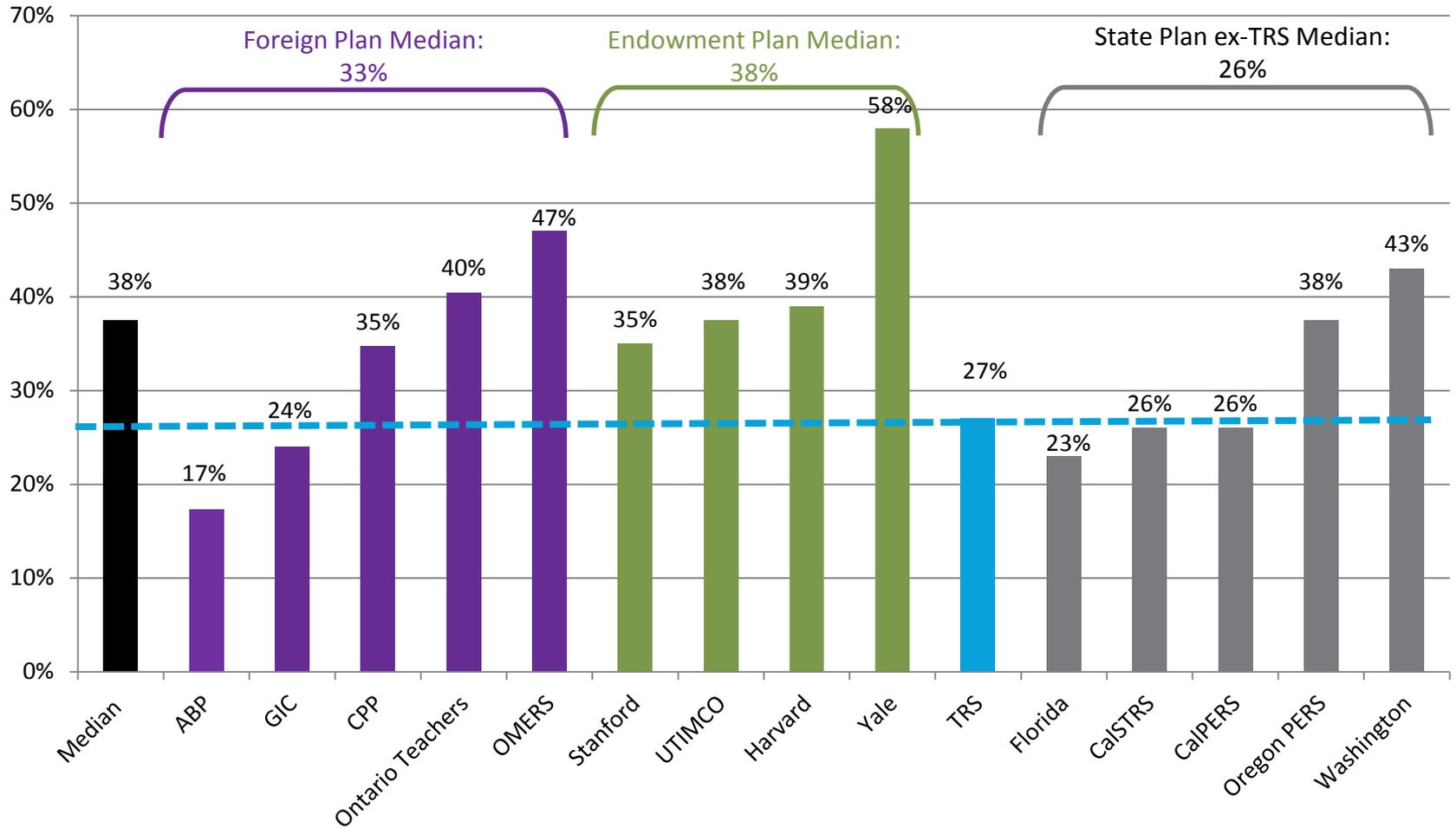
	Current Policy	Buy Liquids/	Private at 50%	Private at 32%	Private at 37%
		Private at 0%	/ Sell Liquids	/ Sell Liquids	/ Sell Liquids
		11	12	13	14
US Large Cap	18.0%	25.0%	12.3%	17.2%	16.3%
US Smallcap	2.0%	3.1%	1.4%	1.2%	0.3%
MSCI EAFE & Canada	15.0%	20.9%	10.3%	14.2%	13.3%
Emerging Markets	10.0%	14.1%	6.8%	9.2%	8.3%
Directional Hedge Funds	5.0%	6.3%	3.4%	5.0%	5.0%
Private Equity	11.0%		20.4%	12.7%	14.3%
Cash	1.0%	1.0%	0.7%	1.0%	1.0%
US Treasuries -- Long	13.0%	18.1%	8.9%	12.2%	11.3%
Stable Value Hedge Funds	4.0%	4.3%	2.7%	4.0%	4.0%
Real Assets	13.0%		24.1%	14.7%	16.3%
US TIPS	5.0%	7.1%	3.4%	4.2%	3.3%
ENR	3.0%		5.6%	4.7%	6.3%
<b>Total Global Equity</b>	<b>61.0%</b>	<b>69.5%</b>	<b>54.6%</b>	<b>59.3%</b>	<b>57.7%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>23.4%</b>	<b>12.3%</b>	<b>17.2%</b>	<b>16.3%</b>
<b>Total Real Return</b>	<b>21.0%</b>	<b>7.1%</b>	<b>33.1%</b>	<b>23.5%</b>	<b>26.0%</b>
<b>Total Public</b>	<b>73.0%</b>	<b>100.0%</b>	<b>50.0%</b>	<b>68.0%</b>	<b>63.0%</b>
<b>Total Private</b>	<b>27.0%</b>	<b>0.0%</b>	<b>50.0%</b>	<b>32.0%</b>	<b>37.0%</b>

	Policy	Buy Liquids /	Private at 50%	Private at 32%	Private at 37%
		Private at 0%	/ Sell Liquids	/ Sell Liquids	/ Sell Liquids
		11	12	13	14
Long Term Passive Return	7.4%	6.6%	8.0%	7.5%	7.6%
+100 bps Alpha	8.4%	7.6%	9.0%	8.5%	8.6%
Long Term Volatility	11.4%	11.5%	11.9%	11.4%	11.5%
Long Term Passive Sharpe Ratio	0.50	0.42	0.53	0.51	0.52
Liquidity Score	2.82	1.99	3.50	2.96	3.11

- Private market asset classes – Private Equity, Real Assets, Energy and Natural Resources – offer higher risk-adjusted returns than public market assets
- Increasing allocation to private markets increases the portfolio Sharpe Ratio at the cost of assuming additional illiquidity in the portfolio
- Key Question: What proportion of private market assets can TRS afford to have in the portfolio?

# Peer Liquidity

## Illiquid Investment Allocation



Source: February Board Presentation, Fund Policy Statements



# Qualitative Score Detail

Asset Liquidity Score in Economic Regime by Descending Liquidity			
Asset Class	Median Long Term Volatility	Median Long Term Returns	Liquidity Score
Cash	0.60%	2.00%	1.00
US Treasurys -- Long	10.80%	2.90%	1.25
US Treasurys -- Intermediate	3.05%	3.62%	1.75
US Aggregate	4.22%	2.97%	2.00
Municipal Bonds	4.40%	3.27%	2.00
US Investment Grade Credit	5.55%	3.32%	2.00
WGBI hedged	2.95%	2.65%	2.00
WGBI ex US hedged	3.25%	3.07%	2.00
WGBI unhedged	6.40%	2.54%	2.00
WGBI ex US unhedged	8.25%	2.75%	2.00
Bank Loans	7.50%	4.92%	2.50
US High Yield	11.10%	4.62%	3.00
Emerging Market Debt	11.70%	5.34%	3.00
Hedge Fund - Non-Directional	6.78%	5.20%	4.00
US Large Cap Value	15.50%	7.37%	1.25
US Large Cap Growth	16.11%	7.15%	1.25
US Large Cap	16.18%	6.68%	1.25
World Equity	16.83%	7.50%	1.75
UK	17.50%	6.92%	1.75
MSCI EAFE & Canada	18.25%	7.25%	1.75
Europe ex UK	19.65%	7.19%	1.75
Japan Large Cap	20.41%	5.37%	1.75
US Midcap	17.75%	7.16%	2.00
Asia ex Japan	21.77%	7.66%	2.25
US Smallcap	21.30%	7.45%	2.75
Emerging Markets	23.60%	8.10%	2.75
Hedge Fund - Directional	6.45%	5.41%	4.00
Private Equity	18.28%	9.20%	5.00
Gold	18.80%	4.11%	2.00
US REITS	20.30%	6.43%	2.00
US TIPS	5.95%	3.07%	2.50
Commodities	19.55%	3.36%	2.50
Core Real Estate	11.84%	6.23%	4.00
ENR <sup>1</sup>	14.46%	8.23%	4.82
Value Added Real Estate	17.05%	7.25%	5.00
Infrastructure	13.80%	7.53%	6.00

Source: TRS 2014 Capital Market Expectations Survey.

<sup>1</sup>ENR Expected Returns calculated as 50% Private Equity and 50% Real Assets



# Potential SAA Portfolios

## Key Sample Portfolios

	Current Policy	Private at 32% / Sell Liquids	Private at 37% / Sell Liquids	Blend 95% Trust / 5% Liquid Risk Parity	Blend 75% Trust / 25% Liquid Risk Parity	Reduce Treasuries by 5% - Fund Rest of Trust	Ontario Teachers
		15	16	17	18	19	20
US Large Cap	18.0%	17.2%	16.3%	18.0%	17.9%	18.5%	14.7%
US Smallcap	2.0%	1.2%	0.3%	1.8%	1.2%	2.5%	1.9%
MSCI EAFE & Canada	15.0%	14.2%	13.3%	14.9%	14.3%	15.5%	14.5%
Emerging Markets	10.0%	9.2%	8.3%	9.7%	8.5%	10.5%	3.8%
Directional Hedge Fund	5.0%	5.0%	5.0%	5.0%	5.0%	5.5%	
Private Equity	11.0%	12.7%	14.3%	11.0%	11.0%	11.5%	13.5%
Cash	1.0%	1.0%	1.0%	-1.7%	-12.4%	1.5%	-23.0%
US Aggregate							23.0%
US Treasurys -- Long	13.0%	12.2%	11.3%	14.8%	21.8%	8.0%	
Stable Value Hedge Fund	4.0%	4.0%	4.0%	4.0%	4.0%	4.5%	
Real Assets	13.0%	14.7%	16.3%	13.0%	13.0%	13.5%	27.0%
US TIPS	5.0%	4.2%	3.3%	6.6%	12.8%	5.5%	24.4%
ENR	3.0%	4.7%	6.3%	3.0%	3.0%	3.5%	
<b>Total Global Equity</b>	<b>61.0%</b>	<b>59.3%</b>	<b>57.7%</b>	<b>60.4%</b>	<b>57.8%</b>	<b>63.7%</b>	<b>48.6%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>17.2%</b>	<b>16.3%</b>	<b>17.1%</b>	<b>13.4%</b>	<b>13.9%</b>	
<b>Total Real Return</b>	<b>21.0%</b>	<b>23.5%</b>	<b>26.0%</b>	<b>22.6%</b>	<b>28.8%</b>	<b>22.4%</b>	<b>51.4%</b>
<b>Total Public</b>	73.0%	68.0%	63.0%	73.0%	73.0%	71.6%	59.5%
<b>Total Private</b>	27.0%	32.0%	37.0%	27.0%	27.0%	28.4%	40.5%

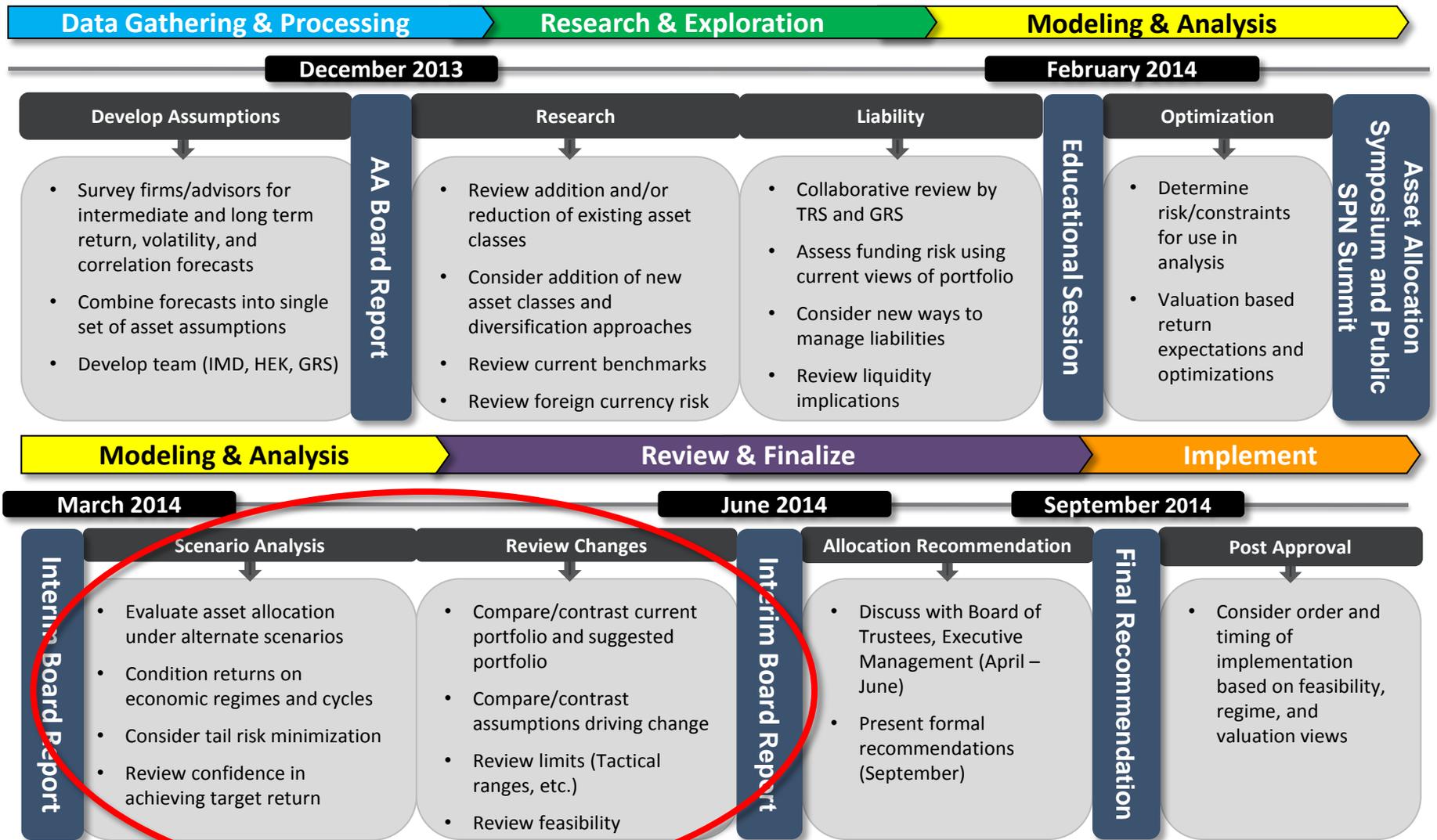
	Current Policy	Private at 32% / Sell Liquids	Private at 37% / Sell Liquids	Blend 95% Trust / 5% Liquid Risk Parity	Blend 75% Trust / 25% Liquid Risk Parity	Reduce Treasuries by 5% - Fund Rest of Trust	Ontario Teachers
		15	16	17	18	19	20
Long Term Return	7.4%	7.5%	7.6%	7.4%	7.3%	7.5%	8.0%
+100 bps Alpha	8.4%	8.5%	8.6%	8.4%	8.3%	8.5%	9.0%
Long Term Volatility	11.4%	11.4%	11.5%	11.3%	10.8%	12.0%	11.5%
Long Term Passive Sharpe Ratio	0.50	0.51	0.52	0.50	0.52	0.48	0.55
Liquidity Score	2.82	2.96	3.11	2.82	2.78	2.92	3.18

## Sample Portfolios Relative to Current Policy

	Current Policy	Private at 32% / Sell Liquids	Private at 37% / Sell Liquids	Blend 95% Trust / 5% Liquid Risk Parity	Blend 75% Trust / 25% Liquid Risk Parity	Reduce Treasuries by 5% - Fund Rest of Trust	Ontario Teachers
		15	16	17	18	19	20
US Large Cap	18.0%	(-0.8%)	(-1.7%)	(-0.0%)	(-0.1%)	+0.5%	(-3.3%)
US Smallcap	2.0%	(-0.8%)	(-1.7%)	(-0.2%)	(-0.8%)	+0.5%	(-0.1%)
MSCI EAFE & Canada	15.0%	(-0.8%)	(-1.7%)	(-0.1%)	(-0.7%)	+0.5%	(-0.5%)
Emerging Markets	10.0%	(-0.8%)	(-1.7%)	(-0.3%)	(-1.5%)	+0.5%	(-6.2%)
Directional Hedge Fund	5.0%					+0.5%	
Private Equity	11.0%	+1.7%	+3.3%			+0.5%	+2.5%
Cash	1.0%			(-2.7%)	(-13.4%)	+0.5%	(-24.0%)
US Aggregate							+23.0%
US Treasurys -- Long	13.0%	(-0.8%)	(-1.7%)	+1.8%	+8.8%	(-5.0%)	
Stable Value Hedge Fund	4.0%					+0.5%	
Real Assets	13.0%	+1.7%	+3.3%			+0.5%	+14.0%
US TIPS	5.0%	(-0.8%)	(-1.7%)	+1.6%	+7.8%	+0.5%	+19.4%
ENR	3.0%	+1.7%	+3.3%			+0.5%	
<b>Total Global Equity</b>	<b>61.0%</b>	<b>(-1.7%)</b>	<b>(-3.3%)</b>	<b>(-0.6%)</b>	<b>(-3.2%)</b>	<b>+2.7%</b>	<b>(-12.4%)</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>(-0.8%)</b>	<b>(-1.7%)</b>	<b>(-0.9%)</b>	<b>(-4.6%)</b>	<b>(-4.1%)</b>	<b>(-18.0%)</b>
<b>Total Real Return</b>	<b>21.0%</b>	<b>+2.5%</b>	<b>+5.0%</b>	<b>+1.6%</b>	<b>+7.8%</b>	<b>+1.4%</b>	<b>+30.4%</b>
<b>Total Public</b>	73.0%	(-5.0%)	(-10.0%)	+0.0%	+0.0%	(-1.4%)	(-13.5%)
<b>Total Private</b>	27.0%	+5.0%	+10.0%	0.0%	0.0%	+1.4%	+13.5%

	Current Policy	Private at 32% / Sell Liquids	Private at 37% / Sell Liquids	Blend 95% Trust / 5% Liquid Risk Parity	Blend 75% Trust / 25% Liquid Risk Parity	Reduce Treasuries by 5% - Fund Rest of Trust	Ontario Teachers
		15	16	17	18	19	20
Long Term Return	7.4%	+0.1%	+0.3%	0.0%	0.0%	+0.1%	+0.7%
+100 bps Alpha	8.4%						
Long Term Volatility	11.4%	+0.0%	+0.1%	-0.1%	-0.6%	+0.7%	+0.1%
Long Term Passive Sharpe Ratio	0.50	+0.01	+0.02	+0.01	+0.02	-0.02	+0.06
Liquidity Score	2.82	0.14	0.29	0.00	-0.04	0.10	0.36

# 2014 SAA Study: Where Are We Going?



# Key Takeaways and Next Steps

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- Current Trust Policy is well-balanced and expected to return close to 8% for the next twenty years
  - Given interest rate normalization and asset valuations, the next five years are likely to be challenging
  - Tactical capabilities are critical to achieving Trust objectives, especially in the near-term
- The Policy improvements that could be prudently made include:
  - Increasing the illiquidity premium captured by the Trust
  - Considering some use of leverage/Risk Parity approaches
  - Increasing allocations to asset classes that have higher alpha potential
  - Changing the neutral size of TRS environmental portfolios
  - Modifying the Policy tactical bands to take advantage of shifting opportunities
- The SAA Team will continue to explore these options, stress-test various scenarios, and will bring an initial recommendation to the Board at the June meeting

# Appendix A – Current SAA Overview

# Capital Market Expectations Overview

	Long-Term Expected Returns (10+ Years)			Long-Term Expected Volatility (10+ Years)				Intermediate-Term Expected Returns (3-5 Years)			Intermediate-Term Expected Volatility (3-5 Years)		
	Median	Max	Min	Median	Max	Min		Median	Max	Min	Median	Max	Min
<b>US Large Cap</b>	6.7%	7.5%	2.7%	16.2%	19.5%	14.3%	<b>US Large Cap</b>	5.6%	7.4%	0.5%	15.6%	19.0%	14.3%
US Midcap	7.2%	9.4%	5.0%	17.8%	20.7%	16.4%	US Midcap	7.1%	7.6%	5.3%	16.7%	16.8%	16.4%
<b>US Smallcap</b>	7.5%	10.7%	3.2%	21.3%	25.5%	18.8%	<b>US Smallcap</b>	5.7%	8.9%	-2.7%	20.0%	25.0%	18.8%
<b>MSCI EAFE &amp; Canada</b>	7.3%	11.0%	3.1%	18.3%	21.0%	16.1%	<b>MSCI EAFE &amp; Canada</b>	6.7%	9.5%	3.2%	17.8%	20.5%	16.7%
<b>Emerging Markets</b>	8.1%	12.0%	3.1%	23.6%	29.0%	11.3%	<b>Emerging Markets</b>	7.0%	12.7%	4.0%	22.6%	28.5%	11.3%
<b>Directional Hedge Funds</b>	5.4%	7.8%	3.5%	6.5%	9.1%	5.3%	<b>Directional Hedge Funds</b>	3.1%	6.8%	3.0%	5.9%	8.0%	4.6%
<b>Private Equity</b>	9.2%	12.1%	3.1%	22.1%	30.0%	11.1%	<b>Private Equity</b>	8.9%	9.9%	1.3%	21.9%	34.0%	11.1%
<b>Cash</b>	2.0%	3.8%	1.3%	0.6%	2.3%	0.2%	<b>Cash</b>	1.8%	2.5%	1.5%	0.6%	1.5%	0.3%
US Aggregate	3.0%	4.6%	0.1%	4.2%	5.5%	3.3%	US Aggregate	2.4%	3.3%	1.5%	3.6%	4.5%	3.3%
US Treasurys -- Intermediate	3.6%	4.6%	2.0%	3.1%	6.5%	2.8%	US Treasurys -- Intermediate	2.8%	4.6%	1.9%	2.9%	3.0%	2.5%
<b>US Treasurys -- Long</b>	2.9%	5.1%	1.0%	10.8%	13.6%	6.5%	<b>US Treasurys -- Long</b>	3.0%	4.4%	1.6%	10.1%	11.0%	9.0%
US Investment Grade Credit	3.3%	5.0%	2.1%	5.6%	7.0%	4.7%	US Investment Grade Credit	2.8%	3.5%	2.7%	4.7%	5.3%	4.7%
US High Yield	4.6%	6.0%	2.1%	11.1%	14.5%	7.1%	US High Yield	3.6%	5.4%	2.6%	8.9%	14.0%	5.5%
Emerging Market Debt	5.0%	6.7%	2.7%	11.7%	16.3%	9.5%	Emerging Market Debt	5.1%	5.5%	4.5%	11.2%	13.3%	10.0%
<b>Stable Value Hedge Funds</b>	5.2%	6.1%	3.0%	6.8%	8.5%	3.8%	<b>Stable Value Hedge Funds</b>	3.0%	5.2%	2.7%	4.0%	8.0%	3.7%
Infrastructure	7.5%	9.7%	4.9%	13.8%	17.0%	7.2%	Infrastructure	7.9%	8.0%	7.8%	15.8%	16.5%	15.1%
<b>Real Assets</b>	7.3%	12.7%	3.9%	14.4%	21.7%	6.5%	<b>Real Assets</b>	10.5%	12.1%	3.2%	16.3%	21.0%	13.6%
<b>US TIPS</b>	2.8%	4.8%	1.0%	6.0%	7.2%	4.5%	<b>US TIPS</b>	2.5%	3.3%	1.1%	5.6%	6.0%	4.5%
<b>Commodities</b>	3.0%	7.2%	1.0%	19.6%	32.4%	15.7%	<b>Commodities</b>	2.8%	7.1%	-1.0%	19.4%	24.0%	14.3%
<b>ENR<sup>1</sup></b>	8.2%	12.4%	3.5%	15.1%	21.3%	7.3%	<b>ENR<sup>1</sup></b>	9.7%	11.0%	2.2%	15.7%	22.8%	10.1%

Source: TRS 2014 Capital Market Expectations Survey; Current Policy Asset Classes noted in bold font.

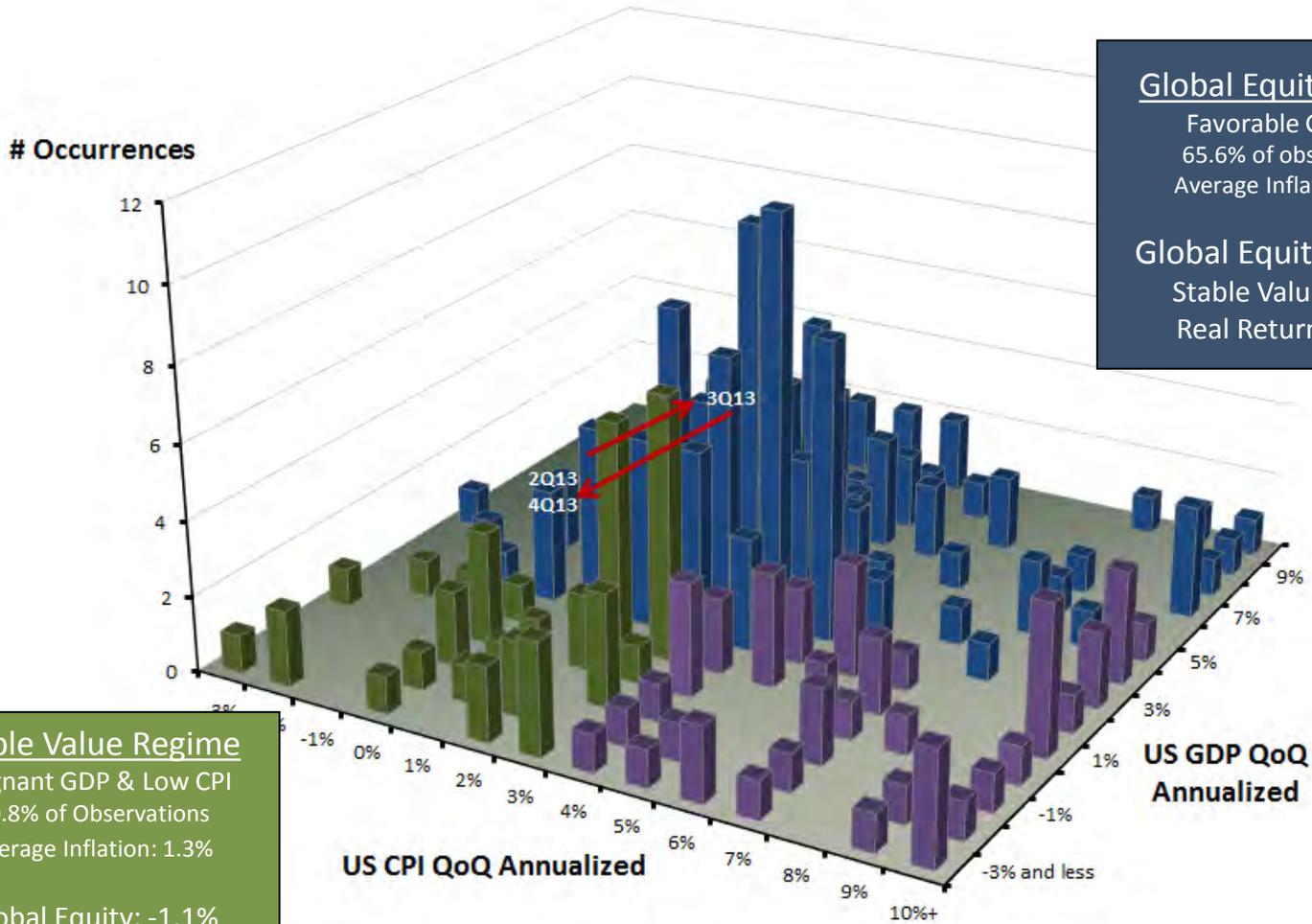
<sup>1</sup>ENR Expected Returns calculated as 50% Private Equity and 50% Real Assets

Correlations used to construct the covariance matrix are from JPM Long Term Capital Market Expectations



# Rationale Behind Existing SAA

*Importance of diversification in different environmental regimes and periods of stress*



**Global Equity Regime**  
 Favorable GDP/CPI  
 65.6% of observations  
 Average Inflation: 3.0%

Global Equity: +15.4%  
 Stable Value: +5.3%  
 Real Return: +8.2%

**Real Return Regime**  
 High CPI, Low GDP  
 13.5% of observations  
 Average Inflation: 7.3%

Global Equity: +8.1%  
 Stable Value: +5.9%  
 Real Return: +8.1%

**Stable Value Regime**  
 Stagnant GDP & Low CPI  
 20.8% of Observations  
 Average Inflation: 1.3%

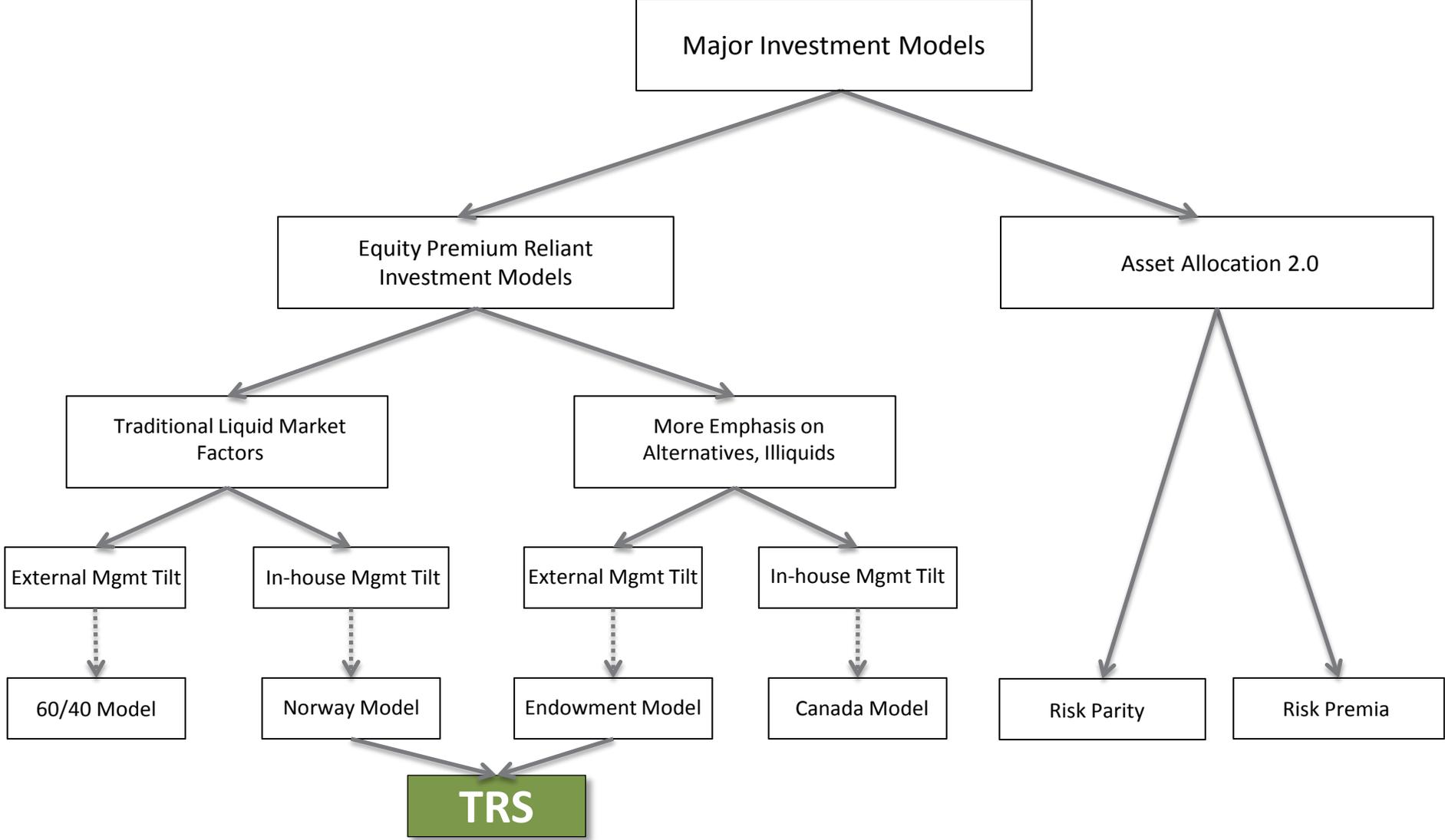
Global Equity: -1.1%  
 Stable Value: +16.0%  
 Real Return: +4.6%

Source: Data from Bureau of Labor Statistics (CPI) and Bureau of Economic Analysis (GDP). Graph depicts year-over-year quarterly observations from 1947 to date. Market returns based on 2013 TRS policy, dependent on QOQ inflation and GDP prevailing since 1990. All data 1990 through December 2013.



# SAA Investment Options

TRS investment model is reliant on equity premium and straddles the Norway and Endowment Models

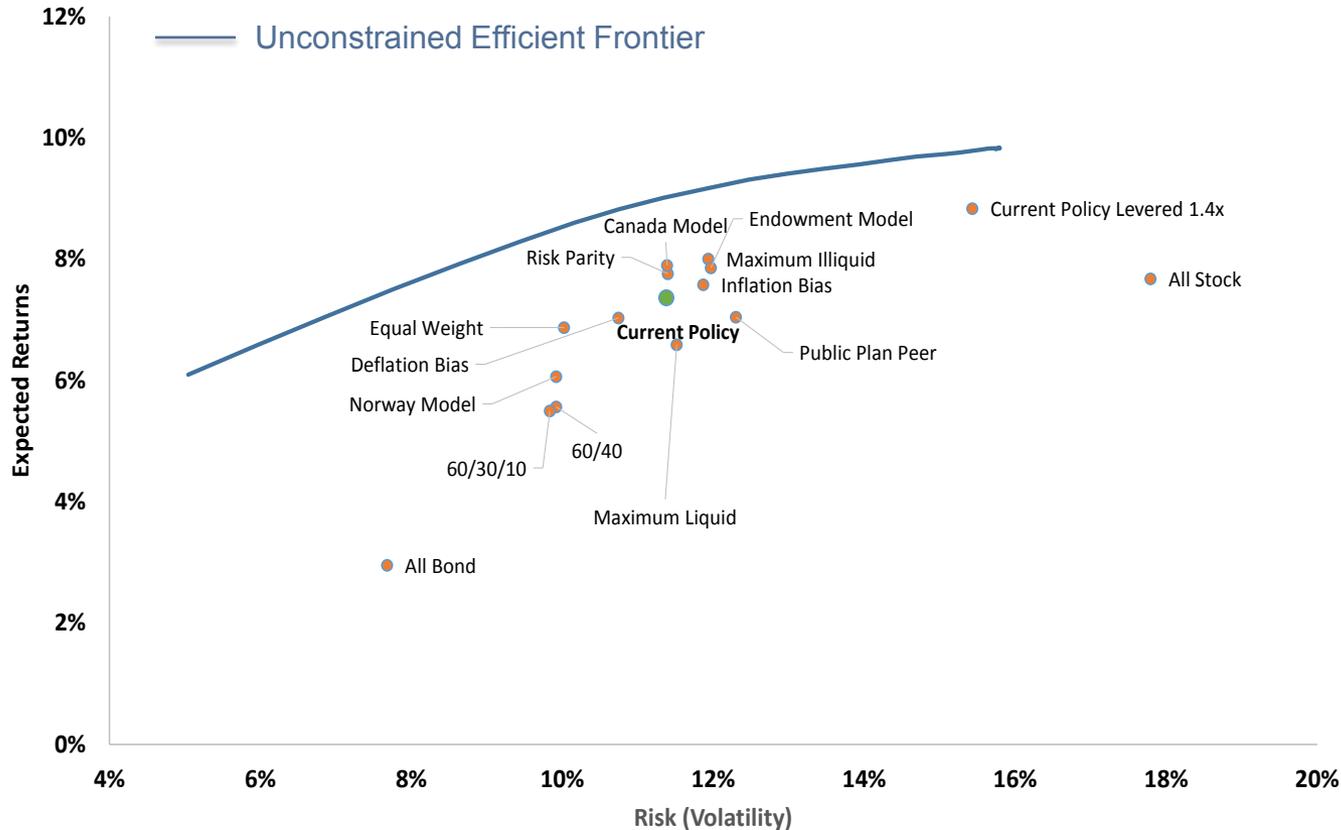


Source: AQR



# SAA Investment Options

## Major Allocation Models and the Efficient Frontier



- Current Policy portfolio shows good risk-return tradeoffs versus other models
- Typical approaches to increase return will focus on four levers:
  1. Liquidity
  2. Leverage
  3. Cost
  4. Asset Selection

Results of the 2014 Capital Market Survey are used above to construct an unconstrained “Efficient Frontier” representing the maximum potential returns for a given level of risk

Source: TRS Capital Market Expectations Survey 2014

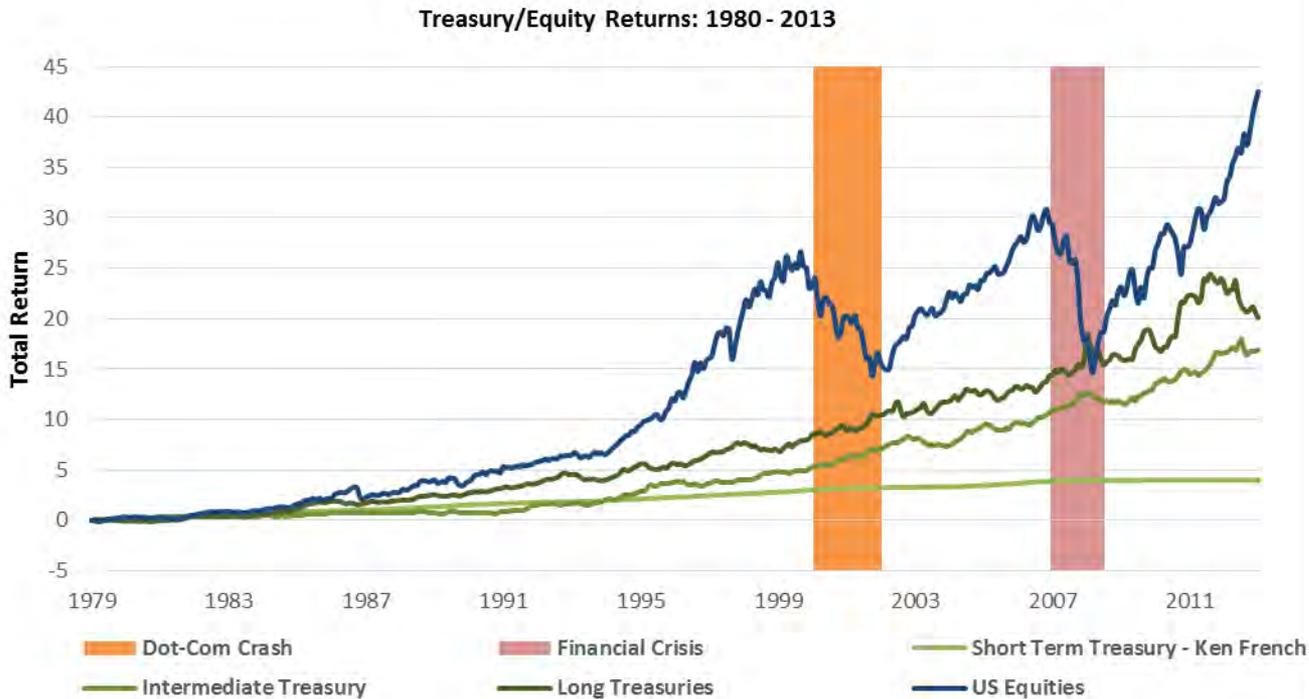
60/40 and 60/30/10 portfolio performance is reflected net of 50 bp management fee

Norway Model = 60/40 gross of 50 bp management fee, Canada model also gross of 50 bps management fee

Other representative portfolios detailed in the Appendix

## Appendix B – Role of Treasuries

# Role of Treasuries



## Asset Characteristics

	Annualized Returns	Annualized Volatility	Sharpe Ratio	Correlation to US Equities
US Equities	11.8%	15.3%	0.8	1.00
Short Term	4.9%	1.0%	4.8	0.01
Intermediate Term	8.7%	7.3%	1.2	-0.03
Long Term	9.4%	10.0%	0.9	0.07

## Stress Period Drawdowns

Portfolio	Dot-Com Crash	2008 Financial Crisis
TRS Policy Portfolio	-9.0%	-19.9%
TRS Policy ex-Treasuries	-12.2%	-24.1%

Sources: Ken French, Neuberger Berman, Bloomberg, St. Louis Fed

US Equities represented by Total Returns on the SP500 Index

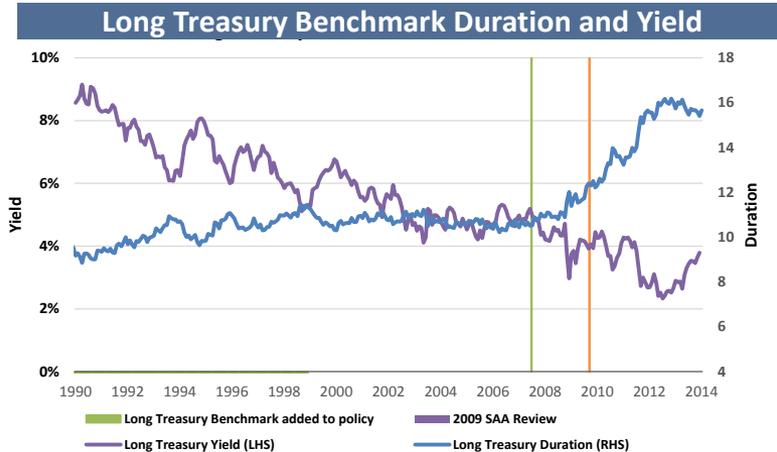
Short Term Treasury Returns uses Ibbotson 1 month Treasuries as accessed via Ken French's dataset

Intermediate Term Treasury modeled as returns on a constant maturity 5-year Treasury Bill

Long Treasuries provided by Neuberger Berman and use a 20 Year Constant Maturity Treasury Bond for all periods except for 1987-1993 where they proxy the 20 year Bond with 90% of the move in the 30-Year Constant Maturity Treasury

# Two Key Challenges to Treasuries Going Forward

## 1) Rising rates = lower returns relative to history

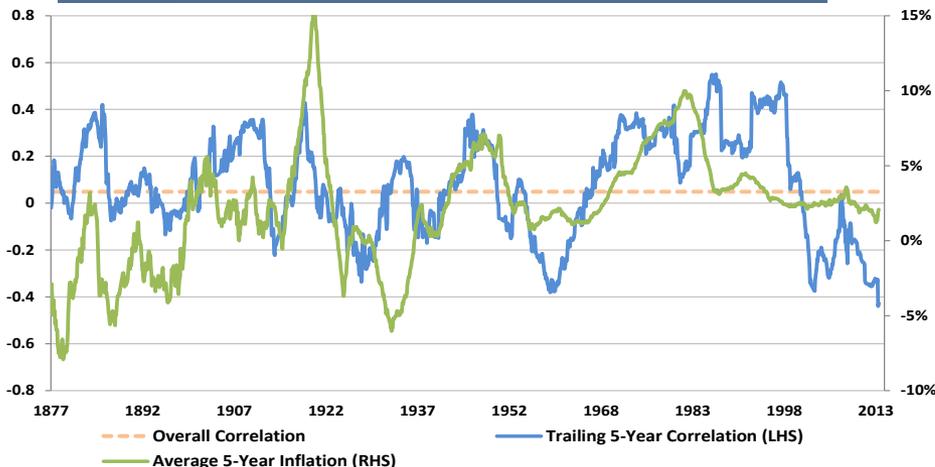


### Historical Performance vs Expected Returns

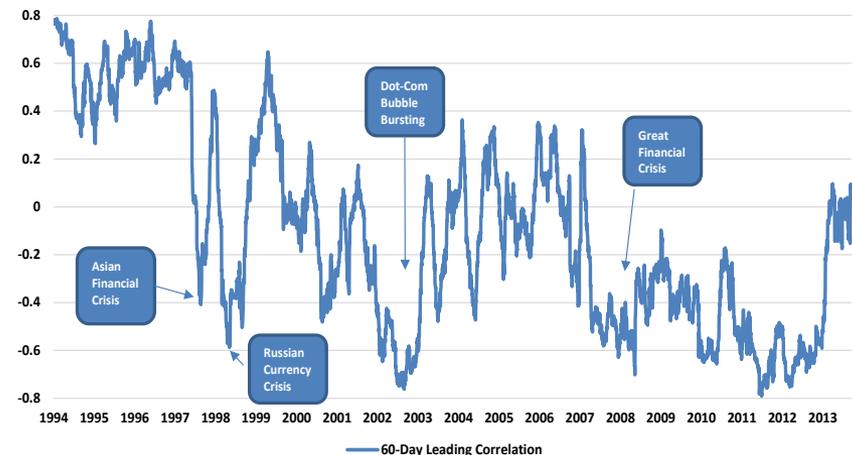
		Cash	Intermediate Treasury	Long Treasury
Historical <sup>1</sup>	Returns	4.9%	6.2%	7.0%
	Volatility	0.9%	6.2%	8.7%
	Sharpe	<b>5.7</b>	<b>1.0</b>	<b>0.8</b>
Expected <sup>2</sup>	Returns	2.1%	4.1%	2.9%
	Volatility	1.1%	3.5%	10.8%
	Sharpe	<b>1.9</b>	<b>1.2</b>	<b>0.3</b>

## 2) Correlation conundrum: will bonds continue to diversify equity risk?

### Long-Term Stock/Bond Correlations and Inflation



### Stock/Bond Correlation in Stress Periods



Sources: Bloomberg, Barclays, Neuberger Berman, St. Louis Fed

<sup>1</sup>Historical Returns from 1960-2013

<sup>2</sup>Expected Returns reflect Median Response to the 2014 Capital Market Expectations Survey

# Alternatives to Long Treasuries

Portfolio	Expected Return	Expected Risk	Sharpe Ratio	Liquidity Score
Current Policy	7.4%	11.4%	0.50	2.82
Change Benchmark to Intermediate Treasuries	7.4%	11.6%	0.49	2.88
Adopt Blended Long/Short Treasuries Benchmark	7.3%	11.5%	0.49	2.81
Reduce Treasuries by 5% / Fund Current Policy	7.5%	12.0%	0.48	2.90
Reduce Treasuries by 5% / Fund Private Markets	7.6%	12.1%	0.49	3.00
Reduce Treasuries by 5% / Fund Total Trust Risk Parity	7.6%	11.9%	0.49	2.87
Reduce Treasuries by 5% / Fund Infrastructure	7.6%	11.7%	0.50	3.06

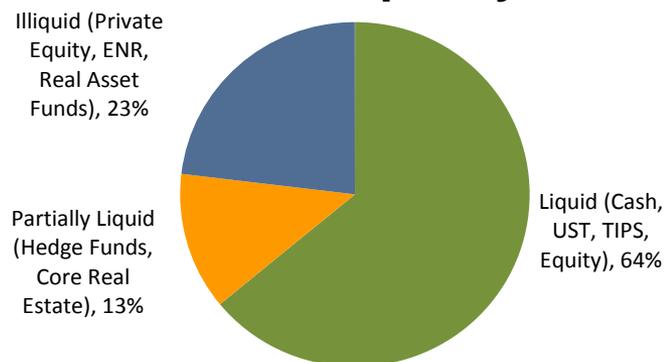
Source: TRS 2014 Capital Market Expectations Survey

## Appendix C – Liquidity Considerations

# Trust Liquidity

- Maintaining adequate liquidity is essential to ensure TRS can meet benefit payments and capital calls
- TRS has a liability duration of 24 years enabling it to capture an illiquidity premium to generate higher returns
- TRS has assets that are liquid, partially liquid (under 1 year) and illiquid (over 3 years)
- The SAA Study will review four metrics of illiquidity:
  1. Drivers of Trust Liquidity Needs
  2. Risk Group Framework
  3. Peer Comparison
  4. Qualitative Scoring Methodology to Evaluate Portfolio Liquidity

## Trust Liquidity



### Liquidity Assumptions

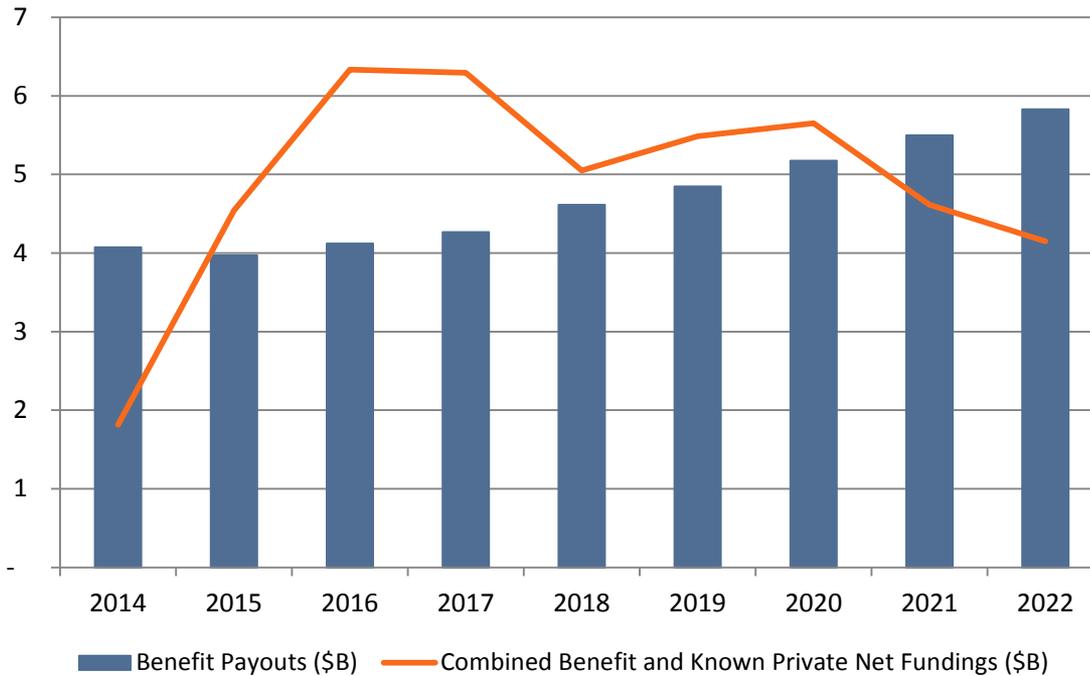
	Weighted Average Redemption (Yrs)
<b>Partially Liquid Investments</b>	
<b>Hedge Funds</b>	<b>0.8</b>
<b>Illiquid Investments</b>	
<b>Real Assets</b>	
Core and Separate Accounts	0.8
Value Add and Opportunistic Funds	
Expected Life: New Fund Investments	10.0
New Principal Investments	4.0
Infrastructure Funds	15.0
<b>Real Assets Portfolio</b>	<b>7.1</b>
<b>Private Equity &amp; ENR</b>	
Expected Life: New Fund Investments	10.0
Expected Life: New Principal Investments	4.0
<b>Private Equity &amp; ENR Portfolio</b>	<b>8.8</b>

Source: TRS Liquidity Report, December 31, 2013.

# Drivers of Trust Liquidity Needs

## Benefit Payments and Net Capital Calls

### Trust Liability



- Benefit payments increase over time
  - Expected to remain in the 3-4% range over the next 30 years assuming the Trust grows at its actuarial rate
  - The payout ratio will vary based on actual Trust growth
- Capital calls depend on the net amount of contributions and distributions
  - Expected to be in the +/- \$1-2 billion range the next 10 years assuming GPs are consistent with the modeled assumptions

TRS Private Investments					
<i>\$ billions as of December 31, 2013</i>					
	Private Equity	Real Assets	ENR	Emerging Managers	Total
Market Value	13.8	14.6	2.1	1.1	<b>31.5</b>
Unfunded Commitments	9.1	6.3	1.8	0.9	<b>18.0</b>
Total Exposure	22.8	20.8	3.9	2.0	<b>49.5</b>

GRS Estimates as of August 31, 2013. Tactical Plans consolidated across Trust as of December 31, 2013.



# TRS Risk Group Liquidity Framework

*TRS has consistently maintained well over the stress case thresholds for liquidity*

- In place since March 2012
- Designed to test the ability of the Trust to meet its obligations, even under stressed conditions
  - Includes securities lending
- Sources of liquidity must exceed uses of liquidity by a factor of 3x under the stress scenario
- The stress case approximates 1.5x the worst historical monthly performance of these assets in the past 10 years plus an additional liquidity stress of:
  - No private capital distributions
  - Capital calls at 6x TRS' historic experience
- Under normal market conditions, the total sources of liquidity greatly exceed the total uses of liquidity
- TRS has consistently maintained well over the stress case of liquidity

## December 31, 2013 TRS Liquidity Report:

Sources of Liquidity (\$, billions)	Market Value	Stressed Value
Liquid Assets Not on Loan (Cash, UST, TIPS, Equity, Commodities)	61.2	34.6
Securities Lending Collateral (Cash, Fixed Income)	23.2	18.2
<b>Total Sources of Liquidity</b>	<b>84.4</b>	<b>52.7</b>
<i>Note: Excluded Illiquid Assets (Private Equity, Real Assets, Hedge Funds, Other)</i>	43.3	NA
<i>Note: Excluded Liquid Assets remaining on loan</i>	19.1	NA

Uses of Liquidity (\$, billions)	Market Value	Stressed Value
Normal Uses of Liquidity	0.1	0.1
Stressed Securities Lending		-2.4
Stressed Derivatives		-0.6
Stressed Private Markets		-2.0
<b>Total Uses of Liquidity</b>	<b>0.1</b>	<b>-4.9</b>

Liquidity Ratio	
Sources of Liquidity	52.7
Uses of Liquidity	-4.9
<b>Ratio (Sources/Uses)</b>	<b>10.8</b>
Alert Threshold	4.0
Fail Threshold	3.0
<b>Test Result</b>	<b>Pass</b>
<i>Note: Net Liquidity (Sources less Uses)</i>	47.9
<i>Note: 12 Months Benefit Payments (at 4% Annual)</i>	4.9

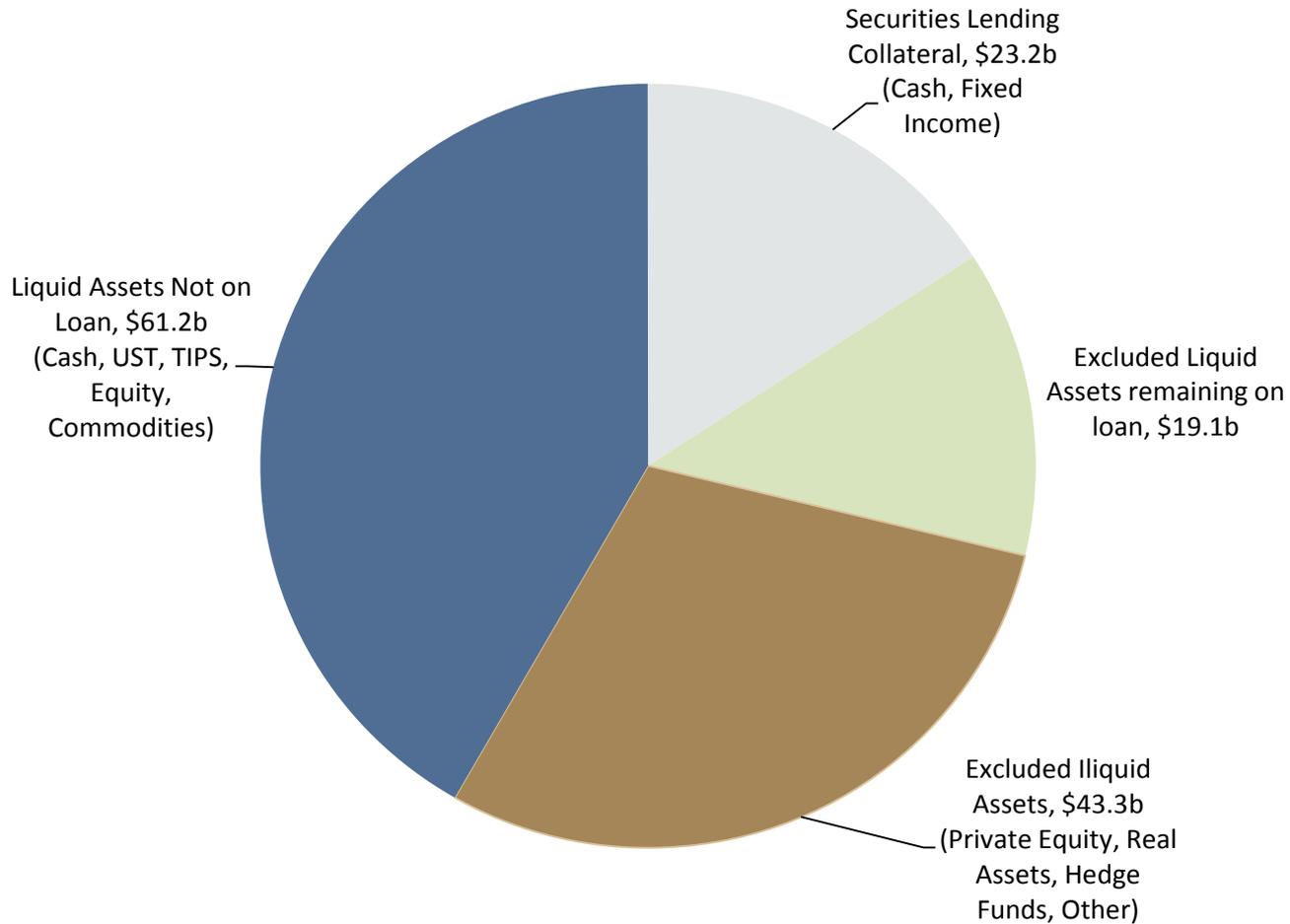
Assumptions: In the stress case, Liquid Assets are valued at 56% and Securities Lending collateral is valued at 78% which is meant to approximate 1.5x the worst monthly performance of these assets in the past ten years plus an additional liquidity stress. Within Securities Lending, 50% of equity on loan and 0% of US Treasuries on loan are assumed to be returned to TRS. Derivatives are assumed to experience the same market stress applied to the Liquid Assets. Private Market investment are assumed to not return any capital and experience capital calls at 6x the normal amount expected for a month.

Source: TRS Liquidity Report, December 31, 2013.



# Trust Liquidity Including Securities Lending

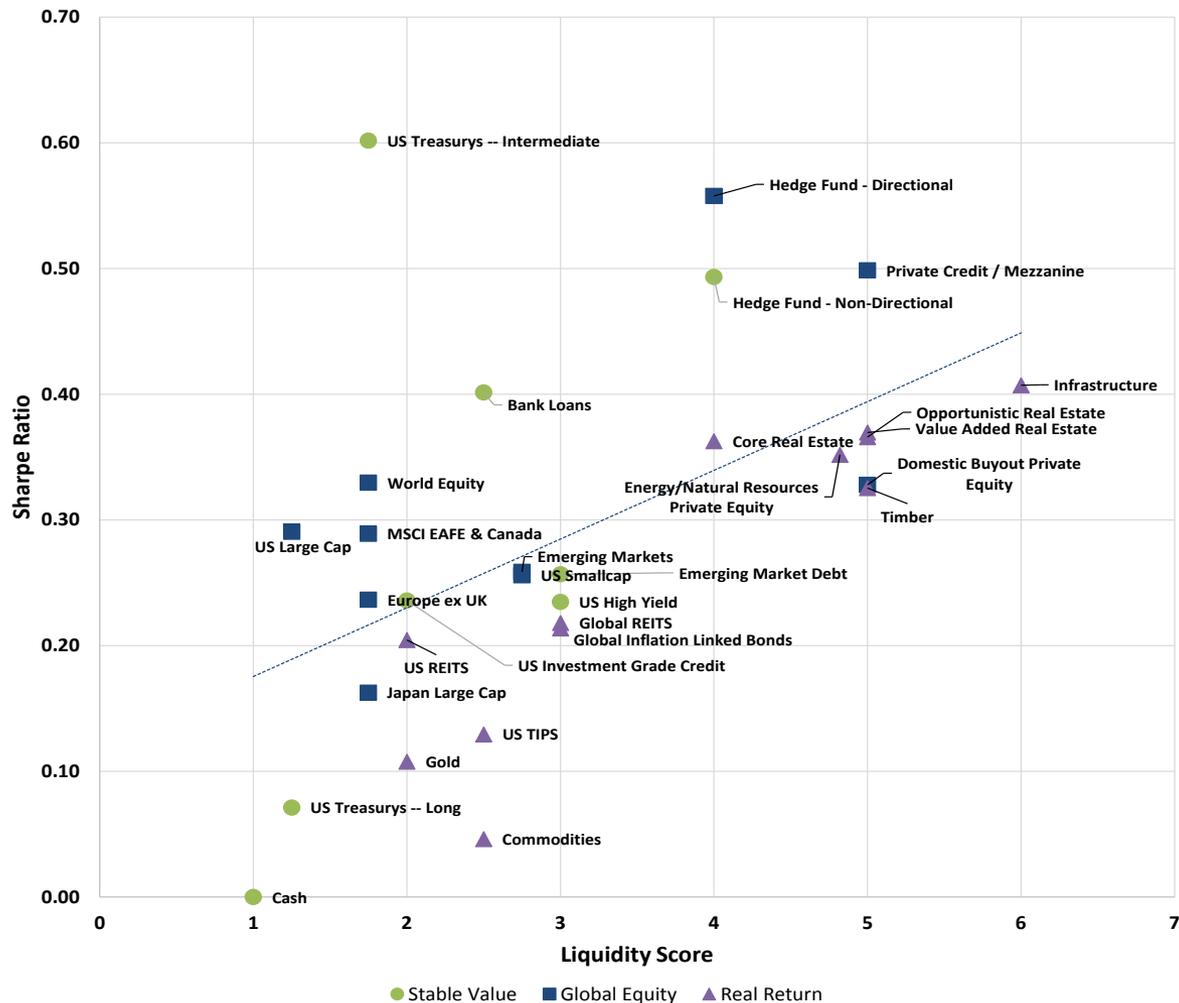
- Risk Group Sources of Current Trust Liquidity/ Illiquidity



Source: TRS Liquidity Report, December 31, 2013.

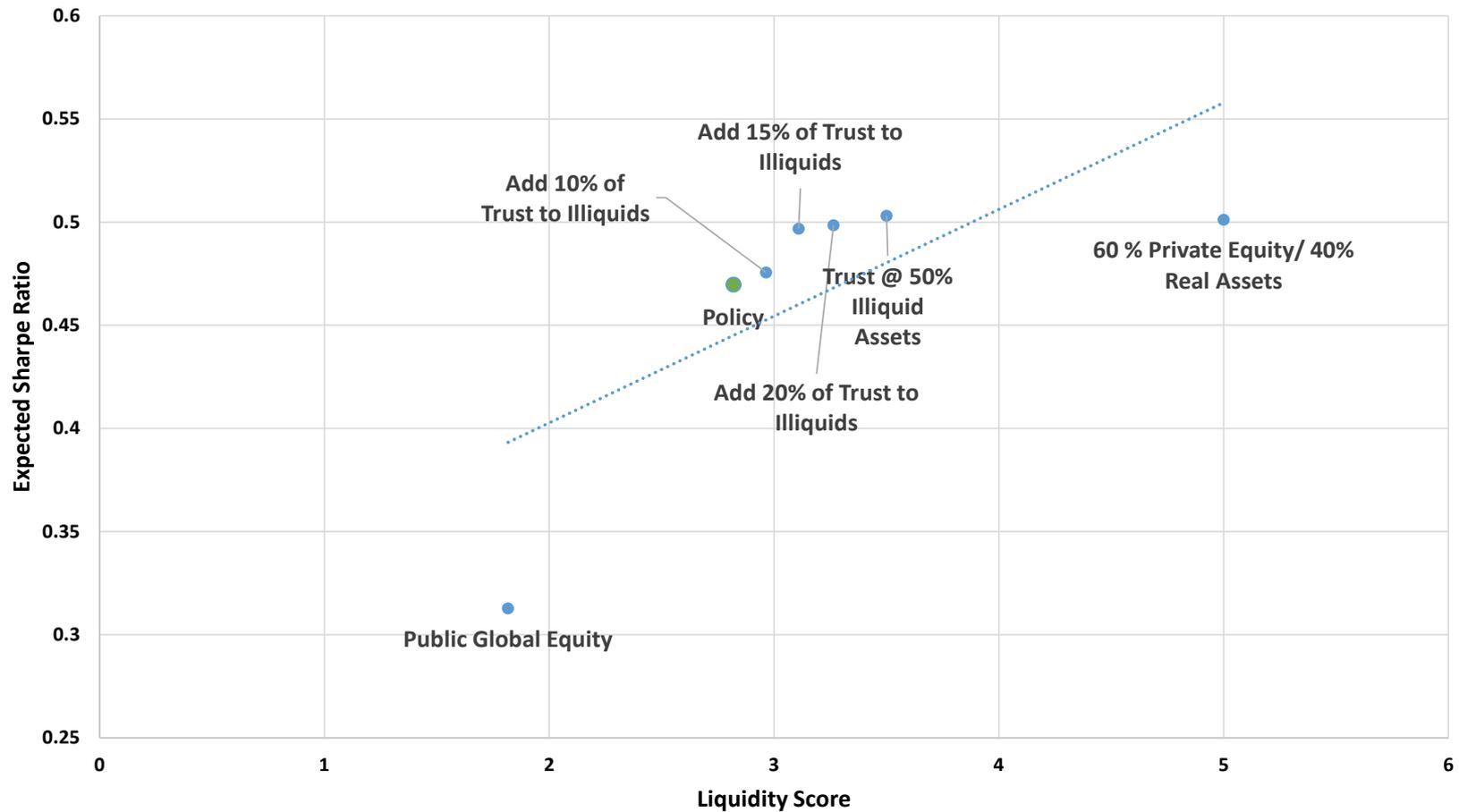
# Asset Class Liquidity Trade-off

*Higher Expected Sharpe Ratio assets generally have higher levels of illiquidity*



- Sharpe Ratios calculated using 2014 Survey Median Expected Forward Returns and Volatilities
- Public asset classes such as US Treasuries and Equity have high liquidity indicated by scores ranging from 1-2
- Hedge Funds and Core Real Estate are semi-liquid indicated by a score ranging from 4-5
- Private asset classes such as Private Equity and Infrastructure have high illiquidity indicated by scores ranging from 5-6

# Asset Composites Liquidity Trade-off



Source: TRS, 2014 Capital Market Expectations Survey

# Qualitative Scoring Methodology to Evaluate Portfolio Liquidity

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- TRS has developed an approach to compare the liquidity across various portfolios in the SAA process
- Methodology uses Ilmanen's metrics and assigns a score to each asset type based on the ease and cost of trading
  - Antti Ilmanen, *Expected Returns (2011)*
- Scores were modified to account for additional asset classes as well as consultations with internal and external trading professionals
- The scoring ranges from 1 to 6, from 1=most liquid to 6=most illiquid
  - The median score for the asset classes reviewed in the SAA is 2.9
  - The liquidity of the Current TRS Trust Allocation Policy is 2.8
  - Detailed scores listed in Appendix

# Trust Liquidity: Research Reviewed

Source	Approach
Andrew Ang <i>Illiquid Asset Investing</i> (Working Paper)	Compensation for infrequent trading opportunities
Kinlaw, Kritzman, and Turkington <i>Liquidity and Portfolio Choice: A Unified Approach</i>	Treat liquidity as shadow allocation in portfolio optimization
J.P. Morgan <i>2014 Long-term Capital Return Assumptions</i>	The difference of capital markets assumptions and expected return based on equal risk adjusted return for all asset classes
BlackRock <i>Investing in Alternatives: Incorporating the Impact of Liquidity (Working Draft)</i>	Stochastic modeling approach to incorporate selling illiquids at a haircut if needed to raise liquidity
UTIMCO	Premium for Locking up Capital + Compensation for risk in holding period + Opportunity cost of the uncalled capital
Richard Lindsey, Janus Capital <i>Fire Sales and the True Cost of Illiquid Investments</i> (presentation)	Illiquidity priced as a barrier option

## Appendix D – Additional Portfolio Considerations

# Alternative Risk Premia

**Alternative Risk Premia combined with the risk parity approach offers the potential of both return enhancement and diversification relative to a traditional investment approach**

## Key Characteristics:

- Widely researched and empirically proven in academic literature
- Dynamic, rules-based strategies that take both long and short positions
- Uncorrelated to traditional asset-classes

## Types of Alternative Risk Premia

**Value**

The tendency for relatively cheap assets to outperform relatively expensive ones

**Momentum**

The tendency for an asset's recent relative performance to continue in the near future

**Carry**

The tendency for higher-yielding assets to provide higher returns than lower yielding assets

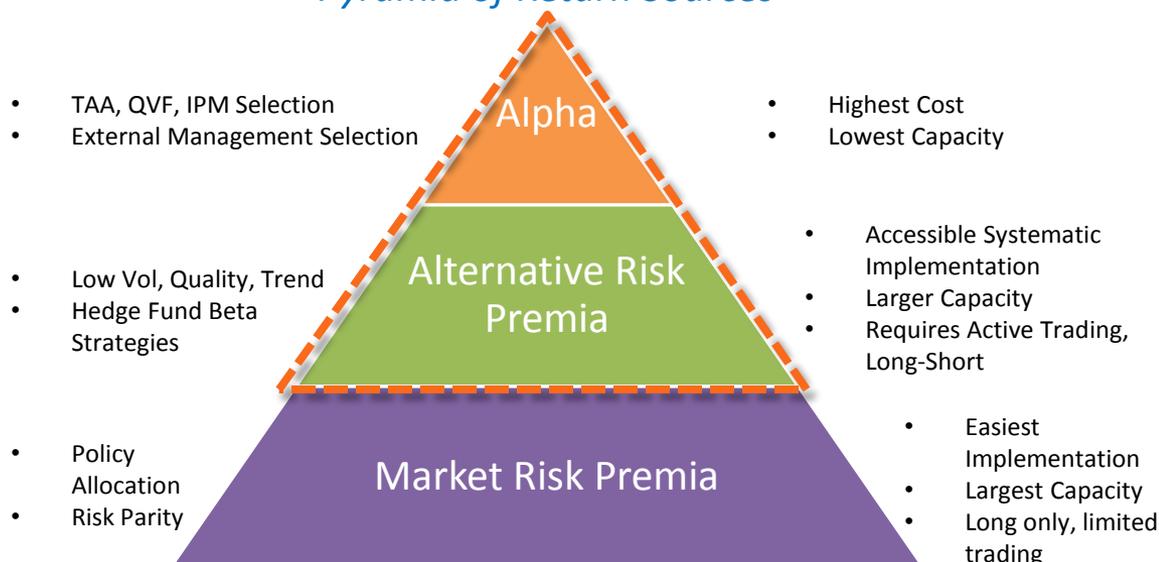
**Defensive**

The tendency for lower risk and higher-quality assets to generate higher risk-adjusted returns

**Liquidity Provision**

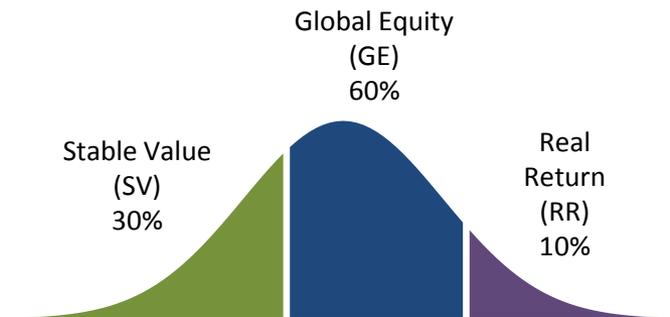
Generates returns by providing liquidity to benchmarked investors

## Pyramid of Return Sources

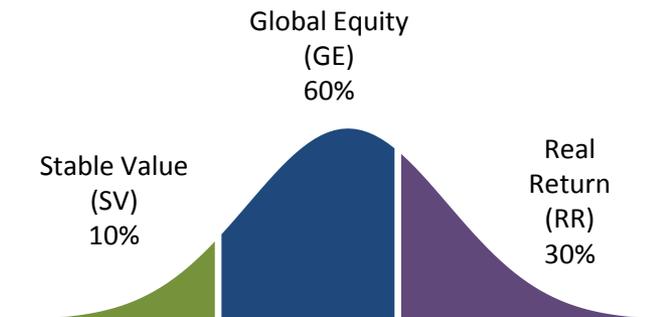


# Sample Portfolios: Tilt Environmental Bias

Deflation biased portfolio: 30/60/10 in SV/GE/RR



Inflation biased portfolio: 10/60/30 in SV/GE/RR



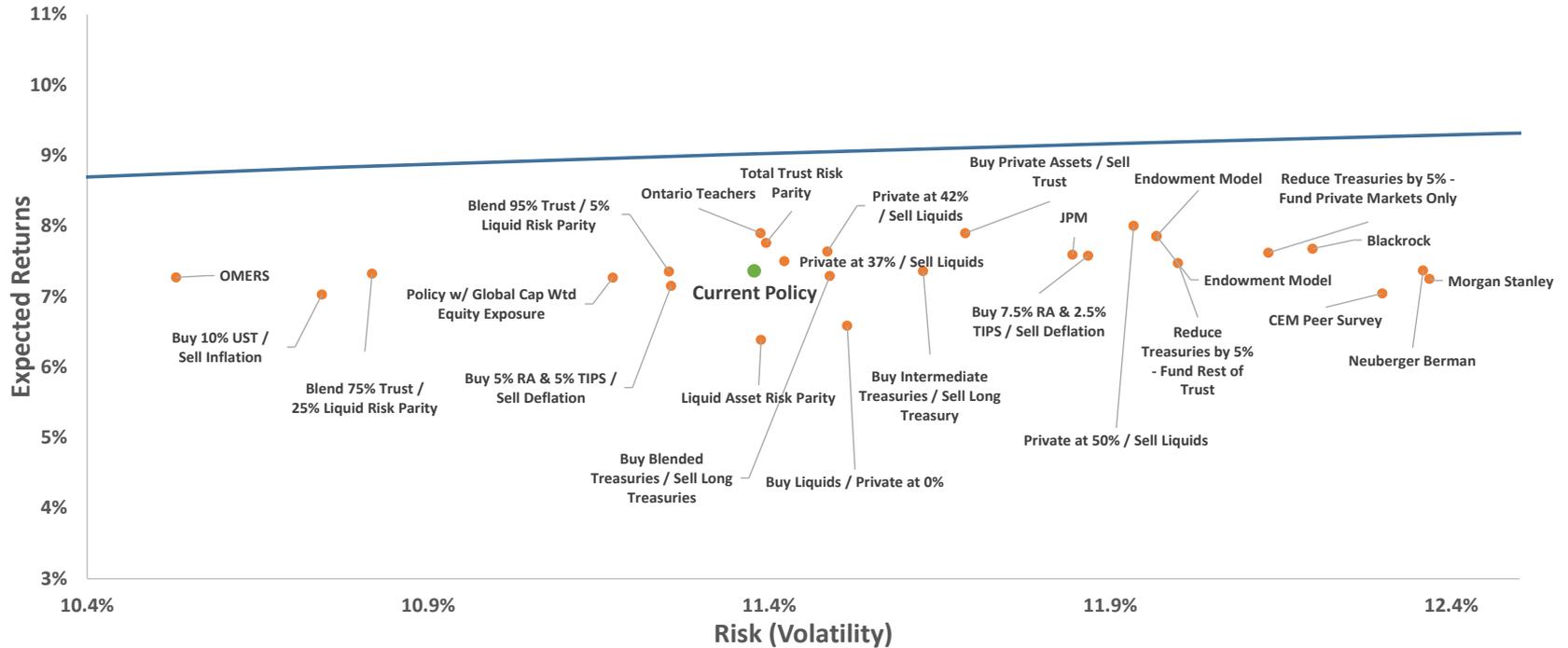
	Current Policy	Buy 7.5% UST & Buy 7.5% RA & Buy 5% RA & Buy 10% UST / Sell 2.5% SV HF / Sell 2.5% TIPS / Sell 5% TIPS / Sell			
		Inflation	Inflation	Deflation	Deflation
		11	12	13	14
US Large Cap	18.0%	18.2%	17.7%	17.7%	17.7%
US Smallcap	2.0%	2.4%	2.0%	2.0%	2.0%
MSCI EAFE & Canada	15.0%	15.2%	14.8%	14.8%	14.8%
Emerging Markets	10.0%	10.3%	9.8%	9.8%	9.8%
Directional Hedge Funds	5.0%	2.5%	4.9%	4.9%	4.9%
Private Equity	11.0%	11.3%	10.8%	10.8%	10.8%
Cash	1.0%	1.0%	1.0%	1.0%	1.0%
US Treasurys -- Long	13.0%	21.5%	29.0%	6.8%	6.8%
Stable Value Hedge Funds	4.0%	7.5%		2.2%	2.2%
Real Assets	13.0%	6.2%	6.2%	22.5%	15.0%
US TIPS	5.0%	2.4%	2.4%	7.5%	15.0%
ENR	3.0%	1.4%	1.4%		
<b>Total Global Equity</b>	<b>61.0%</b>	<b>60.0%</b>	<b>60.0%</b>	<b>60.0%</b>	<b>60.0%</b>
<b>Total Stable Value</b>	<b>18.0%</b>	<b>30.0%</b>	<b>30.0%</b>	<b>10.0%</b>	<b>10.0%</b>
<b>Total Real Return</b>	<b>21.0%</b>	<b>10.0%</b>	<b>10.0%</b>	<b>30.0%</b>	<b>30.0%</b>
<b>Total Public</b>	73.0%	81.1%	81.6%	66.7%	74.2%
<b>Total Private</b>	27.0%	18.9%	18.4%	33.3%	25.8%

	Policy	Buy 7.5% UST & Buy 7.5% RA & Buy 5% RA & Buy 10% UST / Sell 2.5% SV HF / Sell 2.5% TIPS / Sell 5% TIPS / Sell			
		11	12	13	14
Long Term Passive Return	7.4%	7.0%	6.9%	7.6%	7.2%
+100 bps Alpha	8.4%	8.0%	7.9%	8.6%	8.2%
Long Term Volatility	11.4%	10.7%	10.0%	11.9%	11.3%
Long Term Passive Sharpe Ratio	0.50	0.50	0.52	0.50	0.48
Liquidity Score	2.82	2.53	2.35	3.04	2.85

- As expected, US Treasury diversification results in risk reduction in the deflation-biased portfolios while the inflation-biased portfolios show similar risk return characteristics to the current portfolio
- The inflation-biased portfolio is expected to outperform in periods where inflation surprises to the upside due to increased allocation to US TIPS

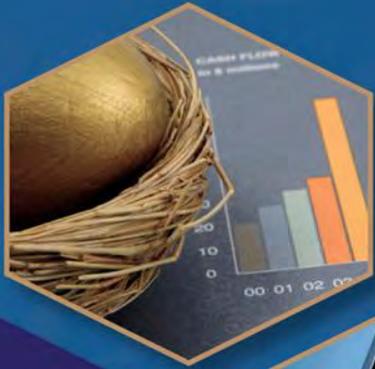
# Target Portfolios In Focus For Ongoing Research

Returns are generally in the 7-8% range while risk levels will be within a 1% band around current levels



Ongoing research will focus on increased use of illiquidity to improve returns and Risk Parity approach to reduce overall portfolio risk

Tab 10



# Compound Drug Briefing

Teacher Retirement System of Texas

March 28, 2014

**GRS**

**Gabriel Roeder Smith & Company**  
Consultants & Actuaries  
[www.gabrielroeder.com](http://www.gabrielroeder.com)



# Topics

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- ◆ What is a Compound Prescription?
- ◆ History of Compounding Law
- ◆ Dramatically Rising Costs
- ◆ Illustration of a Compound



# What is a Compound Prescription?

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- ◆ Compounding is the process by which a licensed pharmacist “combines, mixes, or alters ingredients of a drug [or multiple drugs] to create a medication tailored to the needs of the individual patient.”<sup>1</sup>
- ◆ Compound drugs are not approved by the FDA



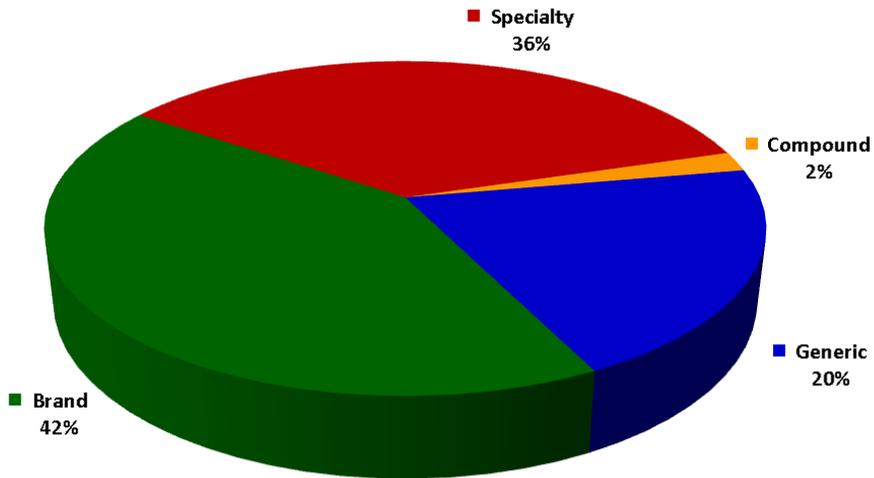
# History of Compounding

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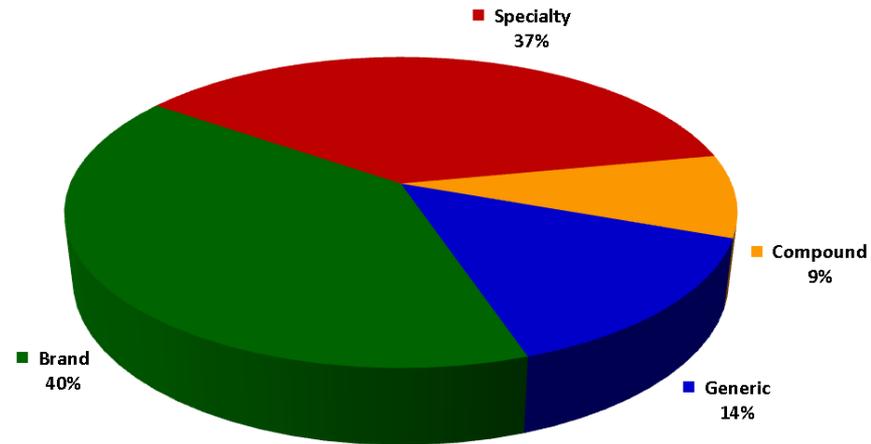
- ◆ In the beginning...all drugs were compounded by an apothecary
- ◆ July 2008 – US Court of Appeals – 5<sup>th</sup> District Ruling
  - ▶ Prohibited advertising and promotion of compounds
  - ▶ Allowed FDA to conduct limited inspections of pharmacy records concerning compounds
- ◆ February 2011 – US Court of Appeals – 5<sup>th</sup> District Ruling
  - ▶ Prohibited FDA from conducting limited inspections of pharmacy records concerning compounds
- ◆ November 2013 – Drug Quality and Security Act
  - ▶ Removed certain restrictions against the advertising and promotion of compounds

# Recent Experience

1st Fiscal Quarter of FY2013



1st Fiscal Quarter of FY2014

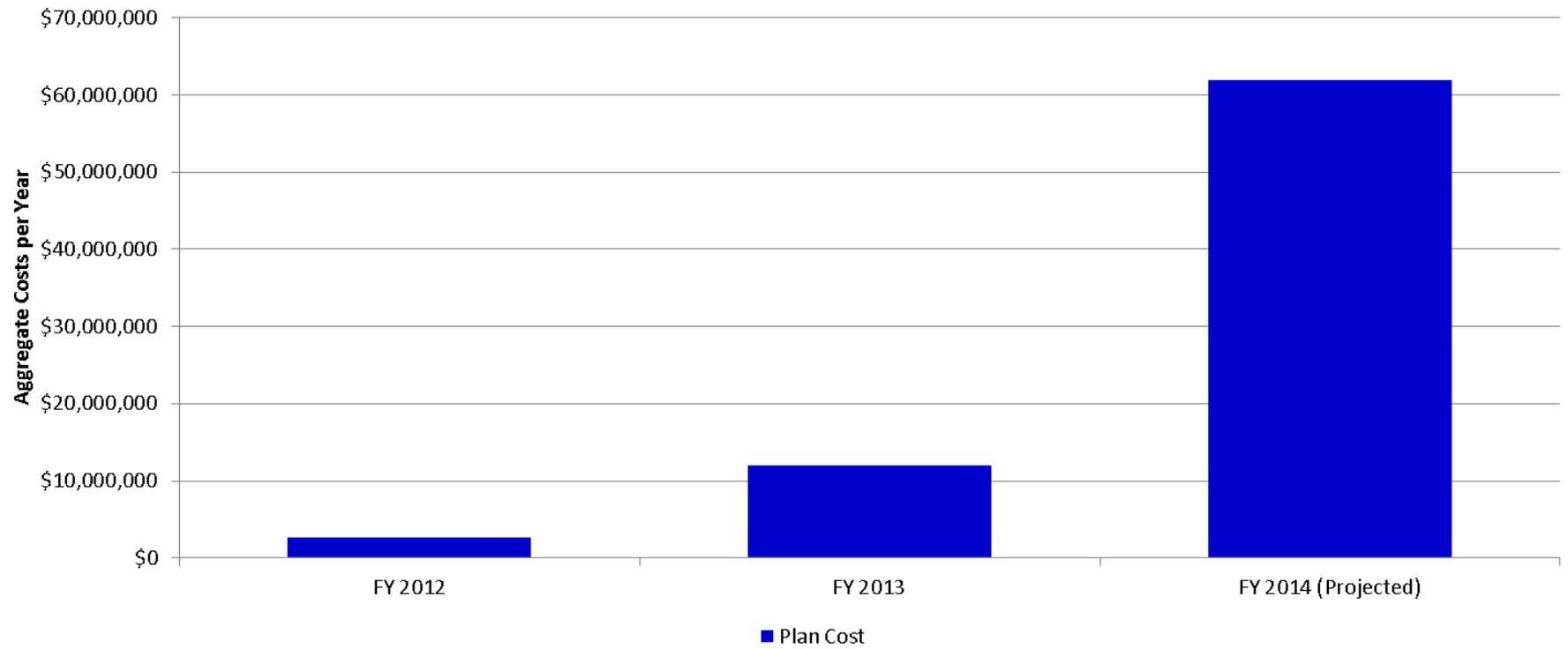


- At current growth rate, compounds are expected to make up at least 15% of TRS-ActiveCare plan costs within the next year.



# TRS-ActiveCare Experience

## Cost of Compound Drugs by Fiscal Year



Aggregate plan cost is increasing at an annual rate of over 500%.



# CY2013 Experience

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Pharmacy Location	Plan Cost	Script Count	Plan Cost per Script
Houston, TX	\$12,223,507	7,405	\$1,650.71
Dallas/Fort Worth, TX	\$5,641,535	8,670	\$650.70
Brownsville/McAllen, TX	\$2,419,419	1,329	\$1,820.48
Wichita Falls, TX	\$642,362	970	\$662.23

- ◆ These areas represent 60% of compound plan costs and 49% of compound script counts within the TRS-ActiveCare, TRS-Care, and Medicare Part D experience for Calendar Year 2013.
- ◆ Other geographic areas are also experiencing higher plan costs due to compounds.



# Sample Claim

Drug Name	Drug Type	COST		<i>ESTIMATED COST</i>
		Compound	Notes	If Not Compound
Fluticasone	Bulk powder	\$15,751.34	Topical cream available	\$389.95
Gabapentin	Bulk powder	\$3762.32	Tablet available	\$44.17
Prilocaine	Bulk powder	\$243.02	Topical cream available	\$21.00
Diphenhydramine	Bulk powder	\$22.50	OTC capsules	Not covered
Pracacil TM-Plus	Proprietary base	\$5,400.46	Inert cream	n/a
Pentoxifylline	Bulk powder	\$18.90	Tablet available	\$37.00
<b>Total Approved Drug Cost</b>		<b>\$25,198.54</b>		<b>\$492.12</b>

Tab 11

# **Teacher Retirement System of Texas**

**TEAM Program:**

**Independent Program Assessment**

**Board Presentation  
March 28, 2014**



- Independent Program Assessment (IPA):
  - Provide independent reporting and oversight to the TRS Board and Executive Director or designee regarding critical risks related to the TRS Enterprise Application Modernization (TEAM) Program to enable informed decision-making.
  - Critical Risks Focus:
    - Failure to meet TEAM objectives
    - Lack of user acceptance
    - Program substantially delayed
    - Program substantially over budget

# Execution Risks – Overview

- Bridgepoint Consulting reviewed and evaluated the new detailed Hewlett-Packard (HP) Line Of Business (LOB) project schedule, TEAM Resource Plan, Staffing Guide, Resource Report and updated LOB, Financial System Replacement (FSR) and Data Management (DM) project schedules to determine:
  - Milestone dates, tasks and deliverables
  - Resource allocations and resource contention
  - Project interdependencies identified
  - Organizational Change Management (OCM) tasks integrated within each plan or included in OCM plan
  - Updated cost estimates

# Observations – Strengths

1. Advanced OCM and TEAM Program Communications:
  - *TEAM Program Website “TEAM Connect” - includes a wealth of information on each project; visually pleasing; easy to read and highly entertaining*
  - *Vendors Meet and Greet event – was a well organized and informative introduction to TEAM Program Vendors*
  - *TEAM Advisory Groups and Team Huddles – highly successful information sharing and allows employees to offer suggestions regarding OCM*
  
2. Improved TEAM Program Budget to Actual Reporting :
  - *Total life to date budget with expense categories established*
  - *Actual to budget variance by year and by project breakdown*

# IPA Current Scorecard

<b>TEAM Program Governance</b>	<b>Prior Score</b>	<b>Current Score</b>	<b>Observations</b>
1. Program/Project Management	2	2	4,5
2. Risk Management	1	1	
3. Issues Management and Tracking	1	1	
4. Program Communication	1	1	
5. Change Management/ Quality Control	1	1	
6. Staffing and Organization	2	3	4, 13 - 15
7. Budget Tracking	2	1	
<b>TEAM Projects</b>			
1. LOB Implementation	1	2	13 15
2. FSR Implementation	2	2	9
3. Data Management	2	1	
4. Reporting Entity Outreach	1	1	
5. Organizational Change Management	1	1	
6. Business Rules Development	1	1	
7. Business Procedures and Training	NA	NA	
8. Legacy System Decommissioning	NA	NA	
9. External Website Enhancement	NA	NA	
10. Legacy System Decommissioning	N/A	N/A	

**Legend**

- 1 = LOW
- 2 = GUARDED
- 3 = CAUTION
- 4 = ELEVATED
- 5 = SEVERE

N/A= Project not started, rating is not applicable at this time



# List of Prior Observations – *Open Planning Risks*

ID #	Date	Observation	Status
4	Feb '13	Team and project staffing plan is not detailed enough	In Progress
5	Feb '13	Project interdependencies have not been documented	In Progress
9	Apr '13	Line of Business (LOB) and Financial System Replacement (FSR) system implementation projects are executed concurrently, increasing demand on TRS staff	In Progress

**Legend – Risk Score**

- 1 = LOW
- 2= GUARDED
- 3= CAUTION
- 4= ELEVATED
- 5= SEVERE



\*Closed *Observations/Recommendations* are not included.

13. Detailed LOB project schedule lacks TRS resource allocations, thus potentially causing conflicts and inaccuracies within the TEAM resource plan

- The HP LOB Microsoft (MS) Project Plan is not resource loaded; detailed TRS tasks are assigned to roles rather than individual/specific TRS resources.
- The TEAM Resource Plan as of 2/19/14 indicates a large number of over allocated resources.

**Risks:**

- *The lack of fully resource loaded project schedule increases the risk of inadequate TRS resource levels that could potentially result in project delays and increased cost.*
- *Conflicting priorities for key project staff may not be detected and resolved on time.*

**Recommendations:**

- *Identify LOB Core Project Team members and document their specific area of project roles and responsibilities (Project Charter)*
- *Update project schedule or TEAM – Resource Plan to include resource allocations and resolve over allocations (level resources)*
- *Consider adding a TEAM Project Controller position to provide additional project management support to Project Management Office (PMO) Director (maintenance and consolidation of all Project schedules and resource plans)*

## **Mitigation/ CMT Responses #13**

- TRS agrees that the over-allocation of resources on the TEAM Program is a risk. Management is taking steps to reduce the likelihood and impact of this risk. Management believes that these mitigations, described in detail below, can reduce the risk to an acceptable level.
- Management has developed a TEAM Resource Plan which contains resource estimates by role and month for the TEAM projects. The TEAM Resource plan is reviewed monthly and apparent allocations are reviewed with the project managers and resource managers to verify and reconcile possible over allocations. There will always be a variation in the allocations because of the timing of the quarterly “supply” review by the TRS managers and the monthly “demand” review of the individual project assignments by the project managers.
- Relating to the loading of resources in the HP Project Schedule, it includes HP resources and a partial list of named TRS resources. HP will not always know which specific TRS resources will be working on tasks. The TEAM Resource Plan mentioned above lists the TRS resources by role that will be required by each project. When we get better insight into who, specifically, will be filling a certain role, we can include that information in the applicable project schedules or in the overall TEAM - Resource Plan.
- At this time, management feels like it can implement these steps without the addition of an additional Project Controller position. Management will reassess this on a quarterly basis.

## 14. Key functional leads or Subject Matter Experts (SME) are only partially allocated to the LOB project

- There are approximately 40 key functional areas within LOB and none of the business SMEs identified are fully(100%) dedicated to the project. Business Process Managers (BPM) and Business Process Analysts (BPA) are serving as key functional leads to all LOB functional areas as well as to several other TEAM projects.

### **Risks:**

- *Key functional decisions may not always be made timely causing potential schedule delays and increased cost without adequate allocation of TRS business resources.*
- *Conflicting priorities for key project staff may result is TEAM having lower priority than necessary to successfully execute the program.*

### **Recommendations:**

- *Assign designated business leads from significant functional areas to work on the project closer to 100% of their time as possible.*

# New IPA Observations – February ‘14



## **Mitigation/ CMT Responses #14**

- The observation as stated is correct (key SMEs are only partially allocated to the LOB project). However, we believe that the combination of the full-time Business Process Managers and Business Process Analysts (as described below) in conjunction with key SMEs that are engaged when required effectively mitigates any risk. TRS does plan to supplement this structure with an additional full-time Business Process Analyst.
- TRS has broken the LOB project into 3 high level functional areas based on recommendations from Provaliant and by HP: Active Membership, Benefits, and Fiscal. Each of these high level functional areas has a dedicated Business Process Manager, functional subject matter experts and Core Management Team representation. It is the role of the Business Process Managers and the Core Management Team to understand the full processes that make up the 3 high level functional areas. The 40 key functional areas within the LOB, listed in the observation, are part of Provaliant's methodology to define the commitment gathering process for the Request for Offer (RFO). These key functional areas represent specific functional expertise that is common among public pension organizations and they map into one of the 3 high level functional areas. HP has reviewed the resource commitment specified by TRS by high level functional areas and have said that it is sufficient for the project. In addition HP has built their schedule around the roles and percentage of the roles time allocated to the LOB project, as was specified in the RFO.

## 15. IT staff may not be sufficiently allocated to the LOB project or aligned with specific technologies

- IT staff identified as partially allocated to work on LOB (27 IT staff at 30%)
- Instead of identifying dedicated members of the LOB Project team, roster only includes % allocation

### **Risks:**

- *Partially dedicated IT staff may not be able to develop the appropriate technology skills to provide sufficient technical support to the LOB project.*
- *Conflicting priorities with other projects requiring IT staff at the same time.*
- *Insufficient allocation of technical staff may delay project schedule and increase cost.*

### **Recommendations:**

- *Assign designated technical IT staff to work on the project as close to 100% of their time as possible.*
- *Develop an individual training plan for each IT staff member according to technology specific training guidance provided by HP.*

## **Mitigation/ CMT Responses #15**

- TRS previously identified the lack of qualified staff and competing priorities as risks and offers the following mitigations and responses.

### Recommendation 1:

1. Developing RACI (Responsible, Accountable, Consulted, Informed) chart at the individual level
2. Identified a core team of Java developers for embedding with HP
3. Developed set of questions for HP about how to achieve the embedding as early as possible
4. Brought contractors on board for backfill
5. Can hire additional personnel

### Recommendation 2:

6. Developing training plan at the individual level
7. Identified an internal trainer and training outline for Java
8. Conducted technical training for reporting services and new technologies
9. Conducting research into new technologies and ‘hands-on’ learning opportunities

### Recommendation 1 & 2:

10. Discussed embedding experiences with OPERS, who implemented Clarety and embedded their team with HP

# Activities Completed – Current Period

1. Attended weekly Core Management Team (CMT) status meetings, Executive Briefing or Executive Steering Committee (ESC), Organizational Change Management and PMO Team Meetings.
2. Continued with a detailed project management documentation review, including: overall TEAM Program Management status report, individual project schedules and status reports, project Action and Decision Logs and other program/project related reports.
3. Completed the review of Data Management vendor invoice payments and deliverable acceptance approvals; provided feedback to DM Project Manager and PMO Program Director.
4. Completed the review of all Phase 0 HP LOB deliverables and artifact acceptance documentation such as –LOB Project Charter, LOB Project Schedule (MS Project Plan), Change Management Plan, Risks Management Plan, Quality Management Plans and Data Conversion Plan. Discussed minor follow up questions with PMO Program Manager.
5. Analyzed TEAM Project staffing, reviewed various staffing related documentation such as the “TEAM Resource Plan”, “TEAM IT Resource Report” “TEAM Enterprise Resource Planning (ERP) Resource Projection”, along with the HP LOB resource allocation projection within the LOB Detailed Project Plan. Developed preliminary staffing related observations. Reviewed observation details and related risks with PMO Program manager.

# Activities for Next Period

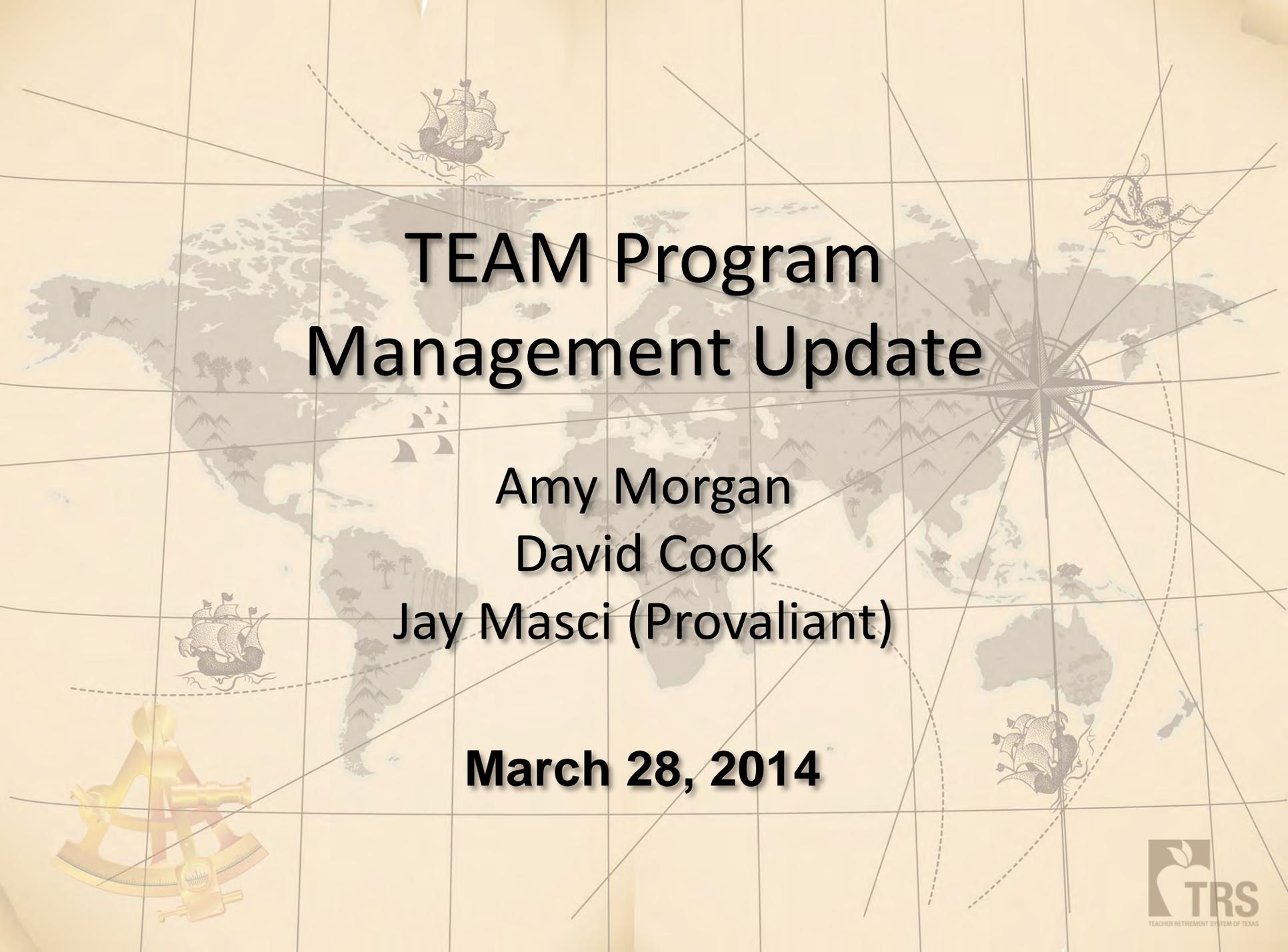
1. Continue to attend and observe weekly Executive Steering Committee (ESC) and Core Management Team (CMT) meetings.
2. Assess FSR, LOB and Data Management Project Team meetings, observe interaction between vendors and TRS teams, current project issues and risks identified during team meetings.
3. When updated, review and evaluate consolidated TEAM Program level resource allocation plans; verify that resource requirements are aligned with schedule within each project plan and resource contentions across projects are clearly identified.
4. When completed, review and evaluate updated and consolidated TEAM Interdependency schedule, including updated LOB, FSR and Data Management project schedules and related interdependencies.
5. When completed, review and evaluate FSR GO/No-Go Criteria documentation and CGI deliverables from Phase 1 – the “Implementation Analysis Documentation”.
6. Review and evaluate updated TEAM Program financial reporting including actual to budget variances and alignment with Program timeline.
7. Continue to monitor TRS risk mitigation activities related to execution risks.

# IPA Budget Status

## IPA Financial summary status through February 15, 2014

➤ Total hours incurred	1,507
➤ Total calculated cost incurred	\$268,720
➤ Total billings for deliverables	\$270,000
➤ Variance	(\$1,280 )

Tab 12

The background features a stylized world map with a grid of latitude and longitude lines. Several navigation-related icons are scattered across the map: a sailing ship in the upper left, an octopus in the upper right, a compass rose on the right side, another sailing ship in the lower left, and a sextant in the bottom left corner. Dashed lines represent various travel routes across the globe.

# TEAM Program Management Update

Amy Morgan  
David Cook  
Jay Masci (Provaliant)

**March 28, 2014**

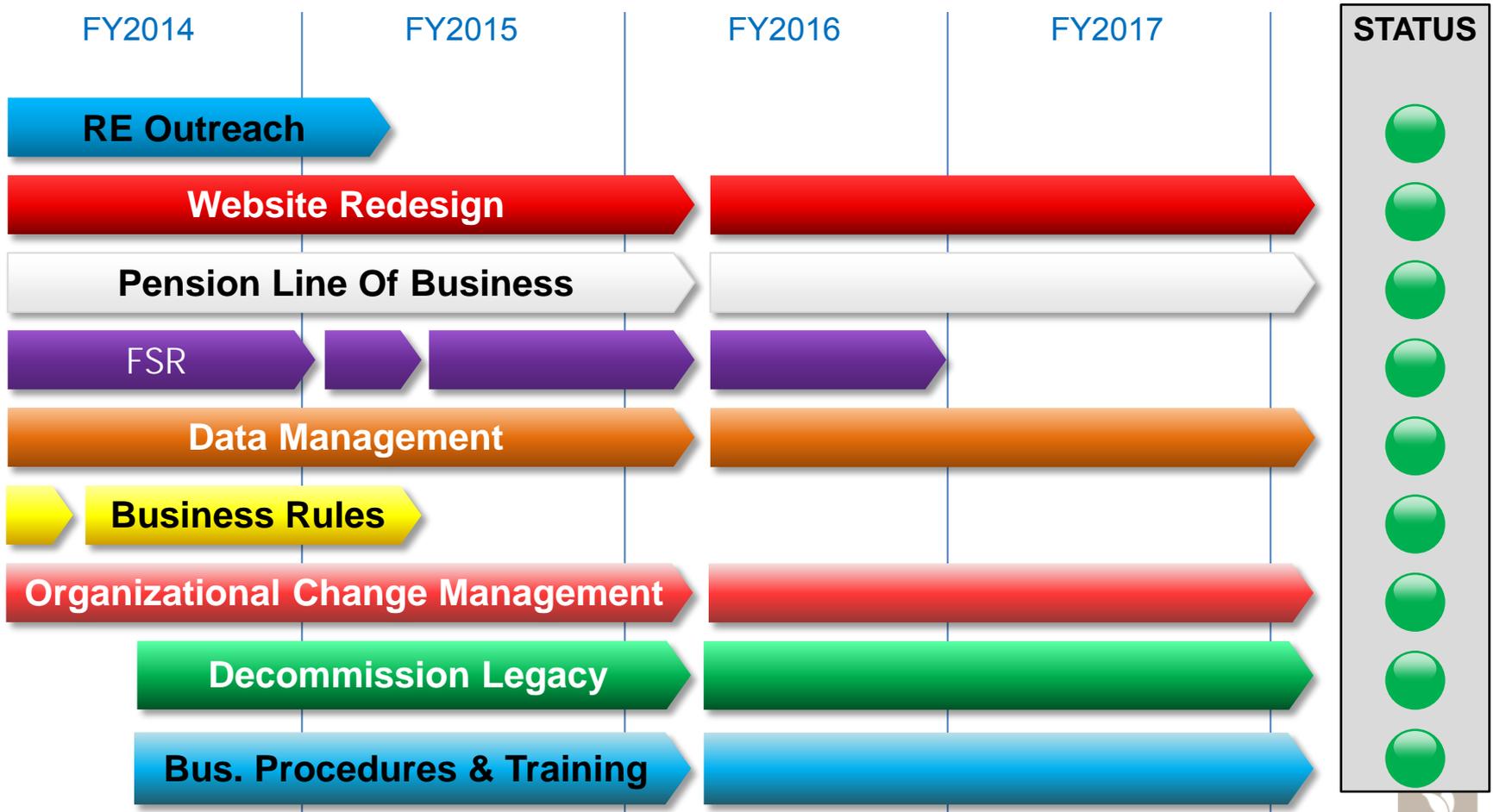
# TEAM PROGRAM

## Update Items

- TEAM Program Progress
- TEAM Program Budget Summary
- TEAM Program Project Interdependencies
- TEAM Project Milestones
- TEAM Project Accomplishments

# TEAM PROGRAM

## TEAM Progress as of January 20, 2014



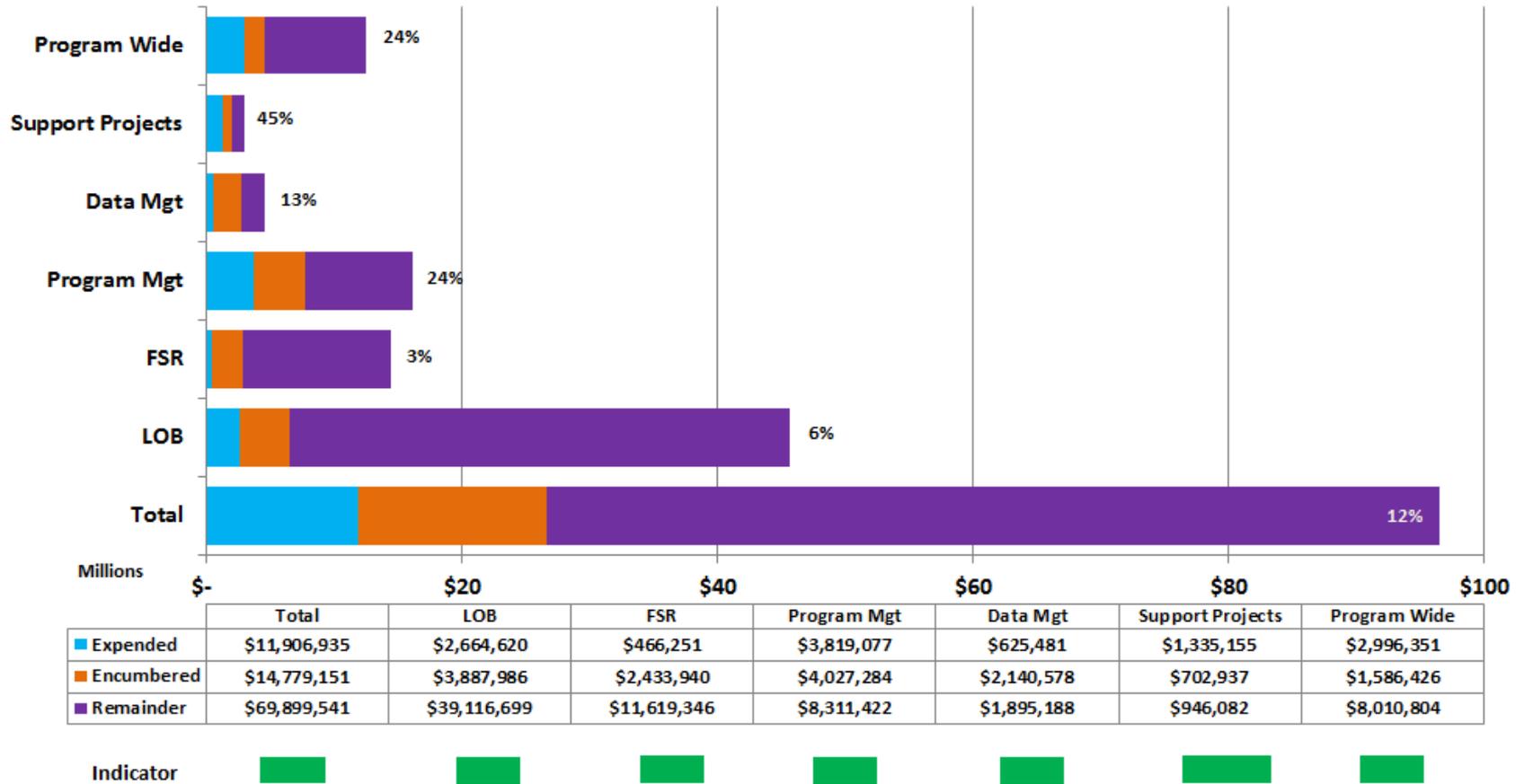
# TEAM PROGRAM

## TEAM Progress as of March 6, 2014



# TEAM PROGRAM

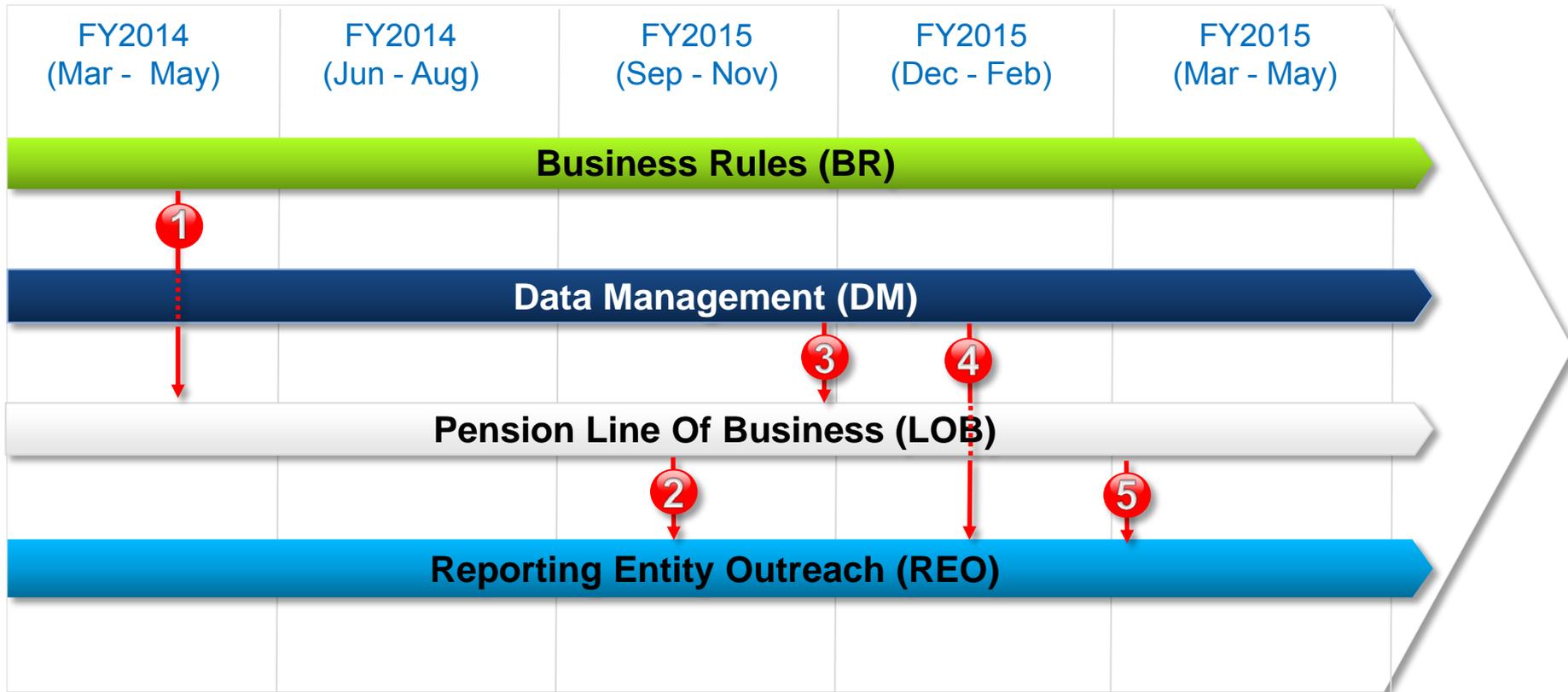
## Program Budget by Project (% spent indicated)



Notes: Total Project cost is \$96.6 million. Does not include services or maintenance beyond 2017. FSR figure is estimate only.

# TEAM PROGRAM

## TEAM Project Interdependencies



# TEAM PROGRAM

## TEAM Project Interdependencies

- ① 04/21/14 – The LOB project needs the business rules for detailed requirements
- ② 10/10/14 – The REO project needs the employer reporting file layout
- ③ 11/24/14 – The LOB project needs assessed and migrated data for testing
- ④ 01/12/15 – The REO project needs assessed and migrated data for user acceptance testing
- ⑤ 03/02/15 – The REO project needs the certification environment available to begin Reporting Entity certification

# TEAM PROGRAM

## Milestones

Planned Milestones (from February Board Meeting)	Previous Planned Date	Current Planned Date	Status
N/A			

Upcoming Milestones (next fiscal quarter: March – May)	Previous Planned Date	Current Planned Date	Status
Website LOB Sequencing Decision Made		3/19/2014	On Schedule
LOB Phase 1 - High Level Requirements Definition Complete		4/22/2014	On Schedule
FSR Consolidated Envision Phase Completed		5/31/2014	On Schedule

# TEAM PROGRAM

## Accomplishments

1. Started the Decommissioning Legacy System project
2. Started the Business Procedures & Training project
3. Rolled out the TEAM Connect SharePoint site

# TEAM PROGRAM

## Accomplishments



# TEAM PROGRAM

## Accomplishments



**TEAM Connect** | [Pass It On](#) | [Projects in Focus](#) | [TEAM Strides](#) | [Survival Kit](#) | [Repository](#) | [Contacts](#) | [TRS Intranet](#)

This site brought to you by the TEAM Advisory Groups.



Hi!  
I'm Leaper,  
your TEAM  
Connect  
guide.

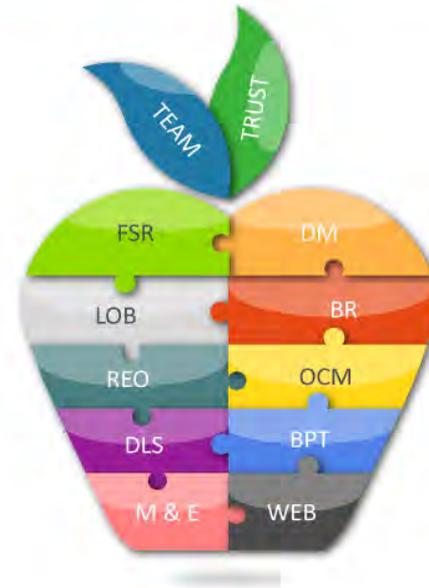
### This just in...

**TIP** Hover over a Leaper Link below to see a description.

Kudos to the **Disbursements Team**; to **BICS, AGs, and volunteers**; to **James Tullos**; and to the **Retirement Mail Team**...[read more](#)



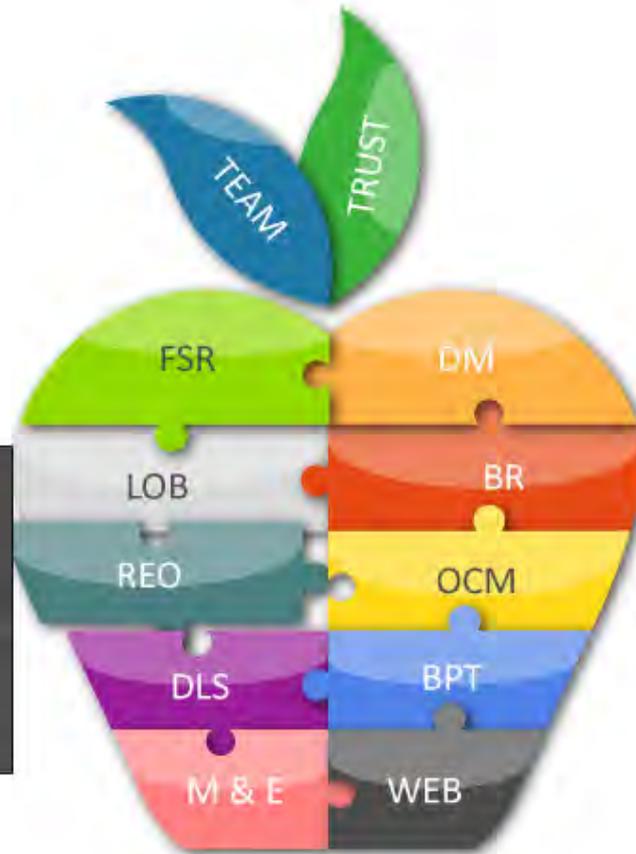
Check out photos and handouts from [Connect the Dots](#), the 2014 Vendor Meet and Greet.



# TEAM PROGRAM

## Accomplishments

The **Reporting Entity Outreach** project will prepare Reporting Entities, Education Service Centers and Software Providers (collectively referred to as "REs") to use the new pension administration line of business (LOB) system.



# TEAM PROGRAM

## Accomplishments

The image shows a screenshot of the TEAM Connect website. At the top left is the TEAM Connect logo, which features a stylized green and blue apple icon. Below the logo is a dark blue navigation bar with several menu items: 'TEAM Connect' (highlighted in green), 'Pass It On' (with a dropdown arrow), 'Projects in Focus' (with a dropdown arrow), 'TEAM Strides', 'Survival Kit', and 'Repository'. Below the navigation bar, five blue arrows point downwards to five cartoon frog characters. The first frog is holding a large yellow megaphone. A dark grey callout box is positioned over the first frog, containing the text: 'Pass It On' in orange, followed by 'Check out the latest TEAM spotlight, Kudos, Q and A, Videos, and more.' in white. The background of the website is light blue with a faint world map and a compass rose.

# TEAM PROGRAM

## Accomplishments

TEAM Strides

Survival Kit

Repository

### Survival Kit

Tips to help guide and empower you as you embrace change.



# TEAM PROGRAM

## Accomplishments



### Survival Kit

Resiliency  
Stress Management  
Peer Likes



TRS Wellness Committee



### Resiliency

We all go through difficult times that test our resiliency. Resiliency (or resilience) is your ability to bounce back when things don't go as planned...[read more](#)

Take the [Resiliency Quiz](#) to see how resilient you are.



### Stress Management

Check out these [stress tests and quizzes](#) from StressStop.com, "the leader in stress management training."

Tab 13 A

# Teacher Retirement System of Texas



## FY2014 Mid-Year Analysis

**Don Green, Chief Financial Officer**

Board of Trustees Meeting

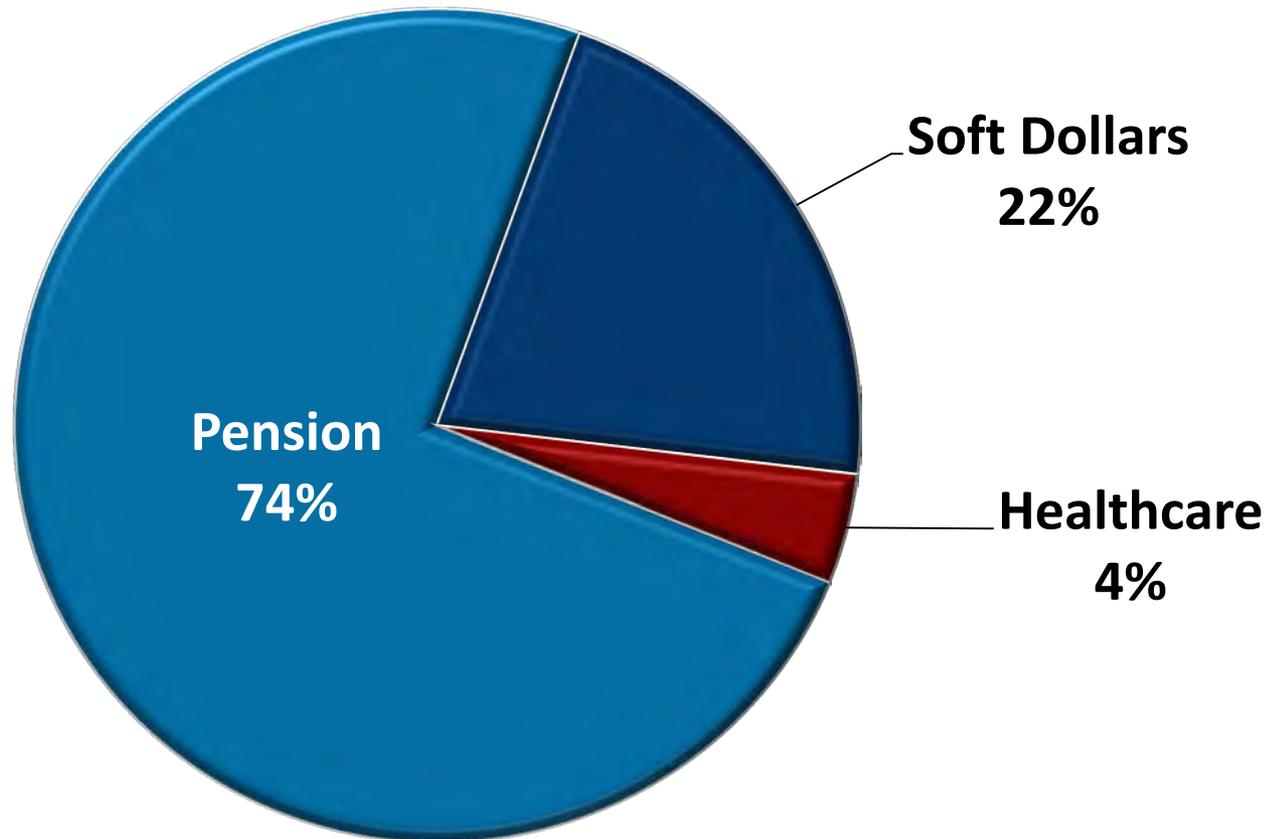
March 28, 2014





# Recap of FY2014 Budget by Fund

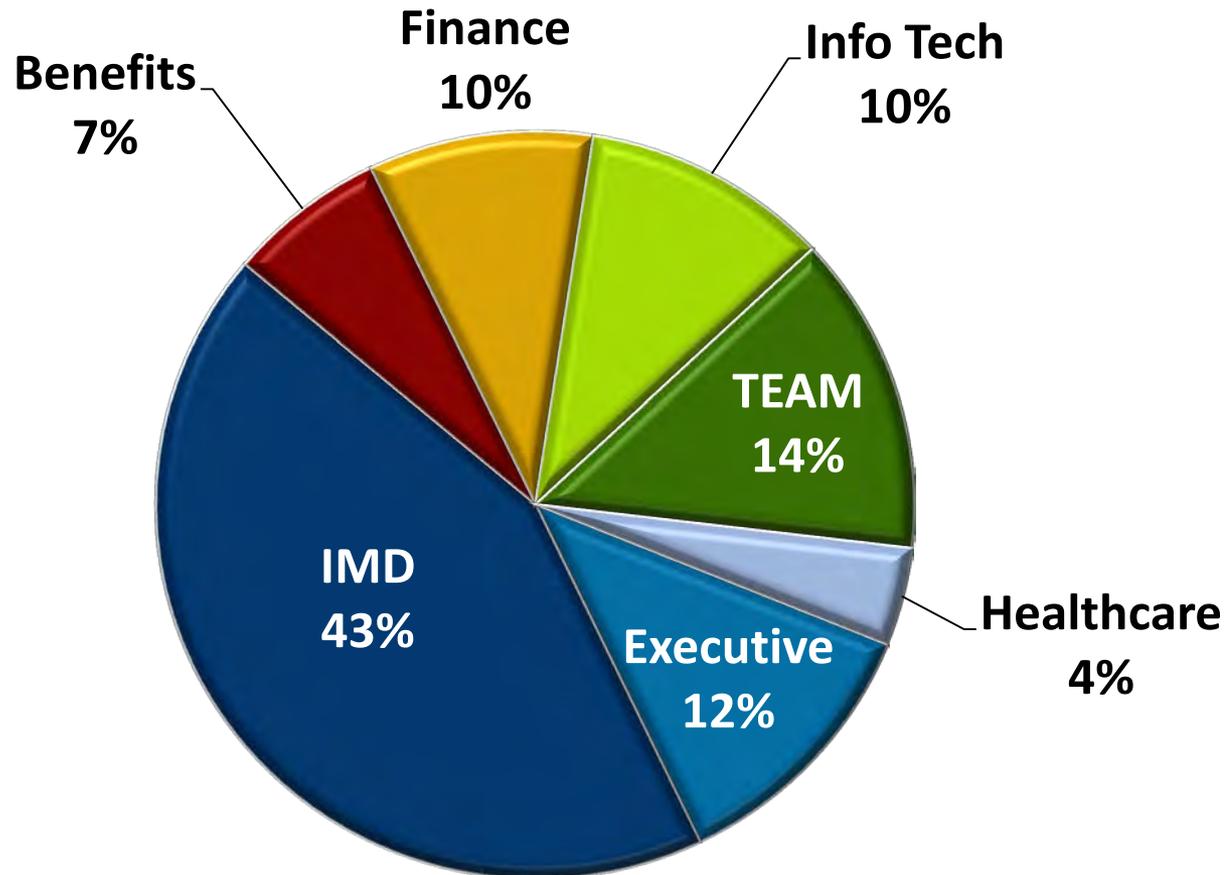
The total operating budget is \$154,685,234 across all funds.





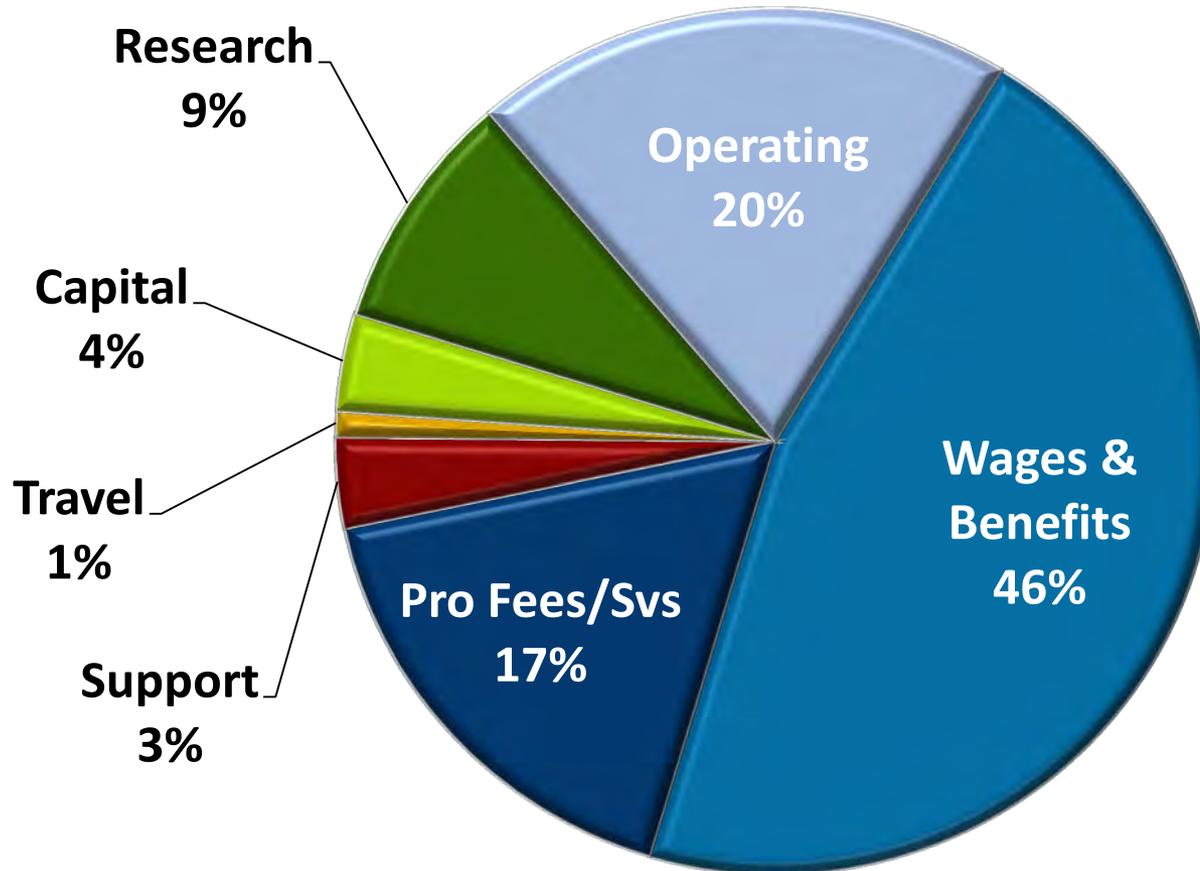
# Recap of FY2014 Budget by Division

The Executive Division includes executive, human resources, communications, internal audit, strategic initiatives, risk management and legal.





# Recap of FY2014 Budget by Expense



## Operating costs:

- Software
- Hardware
- Postage
- Printing
- Equipment
- Reference materials

## Professional fees and services:

- Contractors
- Consultants
- Contractual services

## Support:

- Rent
- Utilities
- Supplies



# Summary By Fund

Fund	Budget	Exp/Enc	% Spent	Projected
Pension	93,622,916	45,968,347	49.0%	83,950,593
TEAM	21,413,786	9,969,262	46.5%	16,664,937
Soft Dollars	33,085,494	14,136,232	42.7%	32,208,417
Care	4,042,982	2,046,262	50.6%	3,735,608
ActiveCare	2,453,308	1,082,835	44.1%	2,414,546
403(b)	66,748	26,503	39.7%	51,035
<b>Totals</b>	<b>154,685,234</b>	<b>73,229,441</b>	<b>47.3%</b>	<b>139,025,136</b>



# Summary By Division

Division	Budget	Exp/Enc	% Spent	Projected
Executive	18,189,337	8,043,036	44.2%	18,523,176
IMD	66,899,775	32,664,526	48.8%	62,233,708
Benefits	10,429,626	4,791,817	45.9%	9,788,111
Finance	14,830,852	6,075,851	41.0%	10,339,368
Info Tech	16,358,820	8,529,348	52.1%	15,274,647
TEAM	21,413,786	9,969,262	46.6%	16,664,937
Healthcare	6,563,038	3,155,601	48.1%	6,201,189
<b>Totals</b>	<b>154,685,234</b>	<b>73,229,441</b>	<b>47.3%</b>	<b>139,025,136</b>

# Summary By Category

Category	Budget	Exp/Enc	% Spent	Projected
Wages/Benefits	71,172,666	35,363,651	49.7%	66,350,416
Pro Fees and Services	26,539,827	12,872,627	48.5%	24,426,204
Support Costs	5,224,785	3,325,518	63.6%	4,947,981
Travel	1,475,333	687,267	46.6%	1,298,536
Capital Projects	5,652,990	877,060	15.5%	1,597,046
Research	13,815,000	5,688,190	41.1%	13,677,503
Operating Costs	30,804,633	14,415,128	46.8%	26,727,450
<b>Totals</b>	<b>154,685,234</b>	<b>73,229,441</b>	<b>47.3%</b>	<b>139,025,136</b>

# Wages and Benefits Only

Division	Budget	Exp/Enc	% Spent	Projected
Executive	10,483,723	4,528,342	43.2%	10,097,901
IMD	20,144,567	9,437,421	46.8%	19,201,880
Incentive Comp	9,350,000	6,719,172	71.9%	6,719,172
Benefits	10,156,811	4,658,592	45.9%	9,560,787
Finance	5,734,359	2,670,354	46.6%	5,417,465
Info Tech	8,074,138	3,995,278	49.5%	8,066,713
TEAM	2,888,286	1,319,301	45.7%	3,104,227
Healthcare	4,340,782	2,035,191	46.9%	4,182,271
<b>Totals</b>	<b>71,172,666</b>	<b>35,363,651</b>	<b>49.7%</b>	<b>66,350,416</b>



# Capital Budget (non TEAM)

Project	Budget	Exp/Enc	% Spent	Projected
Investment Systems	370,000	16,506	4.5%	166,506
PC Upgrades	350,000	338,222	96.6%	350,000
Telecom Upgrades	380,000	146,791	38.6%	380,000
Mainframe Upgrades	420,000	261,193	62.2%	311,193
Bldg Renovations	175,000	0	0%	175,000
Air Handlers	3,597,990	114,348	3.2%	214,347
Stairwells	360,000	0	0%	0
<b>Totals</b>	<b>5,652,990</b>	<b>877,060</b>	<b>15.5%</b>	<b>1,597,046</b>



# Conclusions

- During FY13, we left 14% (or \$17 million) of the budget unspent. Two thirds of which was for TEAM and soft dollars.
- The remaining third was wages/benefits and operational costs.
- This year, based on current projections, we are on track to leave around 10% of the budget unspent.
- The majority of it relates to TEAM and capital projects that will be executed next year.

Tab 13 B



# Financial Statements

## January & February 2014 Cash Disbursements Pension Trust Fund

**To:** TRS Board of Trustees  
Brian Guthrie, Executive Director  
Ken Welch, Deputy Director

**From:** Don Green, Chief Financial Officer

**Date:** March 27, 2014

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Section 825.314(b) of the Texas Government Code requires the staff of the retirement system to report to the board at each board meeting the amounts and uses since the preceding board meeting of any money expended by the system from the Pension Trust Fund along with an explanation of why the amounts were needed to perform the fiduciary duties of the board. The 83<sup>rd</sup> Texas State Legislature adopted provisions allowing operating expenses of the system to be paid out of the Pension Trust Fund. On June 14, 2013, the board approved the Administrative Operations budget for fiscal year 2014.

*Total Administrative Expenses (excluding TEAM Program)* of \$12.9 million were disbursed in January, 2014. *Salaries and Other Personnel Costs* were \$11.2 million, *Professional Fees* were \$775 thousand, and *Other Operating Expenses* were \$908 thousand. Items of interest include \$139 thousand for rent/lease/parking, \$608 thousand for outside legal counsel, and \$246 thousand in postage.

*Total Administrative Expenses (excluding TEAM Program)* of \$6.2 million were disbursed in February, 2014. *Salaries and Other Personnel Costs* were \$4.2 million, *Professional Fees* were \$831 thousand, and *Other Operating Expenses* were \$966 thousand. Items of interest include \$663 thousand for outside legal counsel, \$107 thousand for newsletter printing, and \$431 thousand in newsletter postage.

*TEAM Program Expenses* of \$2.5 million were disbursed in January, 2014. *Salaries and Other Personnel Costs* were \$233 thousand and *Professional Fees* were \$2.3 million.

*TEAM Program Expenses* of \$584 thousand were disbursed in February, 2014. *Salaries and Other Personnel Costs* were \$231 thousand, *Professional Fees* were \$344 thousand, \$ 9 thousand in other operating expenses.

# Financial Statements

## Pension Trust Fund Cash Disbursements - FY 2014 YTD for the Month Ended February 28

	<u>2013</u>	(a)	<u>2014</u>
September	\$ 6,956,188		\$ 6,970,179
October	7,527,488		6,917,337
November	7,342,717		6,708,686
December	5,384,514		6,566,553
January	13,588,764		15,411,211
February	5,410,553		6,792,019
Totals	<u>\$ 46,210,224</u>		<u>\$ 49,365,985</u> (b)

(a) Cash disbursements totaled \$82,959,217 at August 31, 2013

(b) Includes reimbursements of \$2,192.45

Tab 14 A

AC4016  
03/03/2014  
18:50:02

TEACHER RETIREMENT SYSTEM OF TEXAS  
BOARD REPORT  
SUMMARY OF DISBURSEMENTS

PAGE 1

	December 1, 2013 through February 28, 2014		
	NUMBER OF	GROSS	AVERAGE
	PAYMENTS	PAYMENT TOTAL	PAYMENT
Service Retirees	3,841	7,599,405.29	1,978.49
Disability Retirees	193	212,713.20	1,102.14
Survivor Benefits	276	69,050.00	250.18
Survivor Benefit Lump Sum Payment	2,405	14,519,767.76	6,037.32
Life Annuity as Death Settlement	48	72,192.12	1,504.00
60 Monthly Payments as Death Settlement	58	79,741.59	1,374.85
Refund of Deposit as Death Settlement	121	2,272,916.32	18,784.43
Twice Annual Salary as Death Settlement	264	9,931,515.91	37,619.37
Lump Sum DROP Member Payment	1	105,568.49	105,568.49
5 Annual DROP Member Payments			
10 Annual DROP Member Payments			
60 Monthly DROP Member Payments			
120 Monthly DROP Member Payments	1	2,812.11	2,812.11
DROP Payments to Beneficiary of Active Member			
12 Month Partial Lump Sum Option Payment	318	8,399,864.16	26,414.66
24 Month Partial Lump Sum Option Payment	202	11,789,337.96	58,363.05
36 Month Partial Lump Sum Option Payment	449	35,835,991.20	79,812.89
Totals:	8,177	90,890,876.11	11,115.43

SUMMARY OF DISBURSEMENTS  
Glossary

The Summary of Disbursements on the preceding page provides data related to annuitants added to the payroll during the quarter. Specifically, for each category listed, the data includes: (1) the number of new payment inceptions, (2) the gross total of all new payments, and (3) the average of all payments. The categories are defined as follows:

**Service Retirees:** Members who have met the eligibility requirements and applied for a monthly service retirement annuity.

**Disability Retirees:** Members who have met the eligibility requirements, applied and been approved for a monthly disability retirement annuity.

**Survivor Benefits:** Monthly survivor benefits paid to eligible beneficiaries of deceased active members and retirees.

**Survivor Benefit Lump Sum Payment:** Single lump-sum survivor benefit, or reduced lump-sum in conjunction with monthly survivor benefit, paid to eligible beneficiaries of deceased active members and retirees.

**Life Annuity as Death Settlement:** Actuarially reduced monthly life annuity payment to eligible beneficiary of deceased active member. (One of several options which may be payable upon the death of an active member.)

**60 Monthly Payments as Death Settlement:** Monthly standard annuity payment, for a period of 60 months, to eligible beneficiary of deceased active member.

**Refund of Deposit as Death Settlement:** Payment of accumulated contributions and interest to beneficiary of deceased active member.

**Twice Annual Salary as Death Settlement:** Lump-sum payment equal to twice the member's annual salary rate, not to exceed \$80,000, paid to beneficiary of deceased active member.

**Lump Sum DROP Member Payment:** One-time, lump-sum distribution, at retirement, of member's DROP account balance. (One of several DROP distribution options that may be elected by a retiree.)

**5 Annual DROP Member Payments:** Initial or subsequent annual DROP payment under this DROP distribution election.

**10 Annual DROP Member Payments:** Initial or subsequent annual DROP payment under this DROP distribution election.

**60 Monthly DROP Member Payments:** Initial or subsequent monthly DROP payment under this DROP distribution election.

**120 Monthly DROP Member Payments:** Initial or subsequent monthly DROP payment under this DROP distribution election.

**DROP Payments to Beneficiary of Active Member:** Lump-sum distribution of DROP account balance to beneficiary of deceased active member who participated in DROP prior to death.

**12 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 12 months of standard annuity.

**24 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 24 months of standard annuity.

**36 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 36 months of standard annuity.

AC4016  
01/02/2014  
11:01:25

TEACHER RETIREMENT SYSTEM OF TEXAS  
BOARD REPORT  
SUMMARY OF DISBURSEMENTS

PAGE 1

	September 1, 2013 through November 30, 2013		
	NUMBER OF PAYMENTS	GROSS PAYMENT TOTAL	AVERAGE PAYMENT
	-----	-----	-----
Service Retirees	6,341	13,840,230.17	2,182.65
Disability Retirees	237	303,555.89	1,280.82
Survivor Benefits	247	62,150.00	251.61
Survivor Benefit Lump Sum Payment	2,471	14,918,737.15	6,037.53
Life Annuity as Death Settlement	35	56,292.29	1,608.35
60 Monthly Payments as Death Settlement	45	50,432.46	1,120.72
Refund of Deposit as Death Settlement	128	2,268,668.53	17,723.97
Twice Annual Salary as Death Settlement	273	10,397,753.18	38,087.00
Lump Sum DROP Member Payment	17	2,831,504.52	166,559.08
5 Annual DROP Member Payments	2	82,295.22	41,147.61
10 Annual DROP Member Payments	1	12,947.05	12,947.05
60 Monthly DROP Member Payments			
120 Monthly DROP Member Payments	2	6,160.82	3,080.41
DROP Payments to Beneficiary of Active Member			
12 Month Partial Lump Sum Option Payment	552	16,954,613.28	30,714.87
24 Month Partial Lump Sum Option Payment	293	18,478,870.20	63,067.81
36 Month Partial Lump Sum Option Payment	696	58,343,273.04	83,826.54
Totals:	11,340	138,607,483.80	12,222.88

SUMMARY OF DISBURSEMENTS  
Glossary

The Summary of Disbursements on the preceding page provides data related to annuitants added to the payroll during the quarter. Specifically, for each category listed, the data includes: (1) the number of new payment inceptions, (2) the gross total of all new payments, and (3) the average of all payments. The categories are defined as follows:

**Service Retirees:** Members who have met the eligibility requirements and applied for a monthly service retirement annuity.

**Disability Retirees:** Members who have met the eligibility requirements, applied and been approved for a monthly disability retirement annuity.

**Survivor Benefits:** Monthly survivor benefits paid to eligible beneficiaries of deceased active members and retirees.

**Survivor Benefit Lump Sum Payment:** Single lump-sum survivor benefit, or reduced lump-sum in conjunction with monthly survivor benefit, paid to eligible beneficiaries of deceased active members and retirees.

**Life Annuity as Death Settlement:** Actuarially reduced monthly life annuity payment to eligible beneficiary of deceased active member. (One of several options which may be payable upon the death of an active member.)

**60 Monthly Payments as Death Settlement:** Monthly standard annuity payment, for a period of 60 months, to eligible beneficiary of deceased active member.

**Refund of Deposit as Death Settlement:** Payment of accumulated contributions and interest to beneficiary of deceased active member.

**Twice Annual Salary as Death Settlement:** Lump-sum payment equal to twice the member's annual salary rate, not to exceed \$80,000, paid to beneficiary of deceased active member.

**Lump Sum DROP Member Payment:** One-time, lump-sum distribution, at retirement, of member's DROP account balance. (One of several DROP distribution options that may be elected by a retiree.)

**5 Annual DROP Member Payments:** Initial or subsequent annual DROP payment under this DROP distribution election.

**10 Annual DROP Member Payments:** Initial or subsequent annual DROP payment under this DROP distribution election.

**60 Monthly DROP Member Payments:** Initial or subsequent monthly DROP payment under this DROP distribution election.

**120 Monthly DROP Member Payments:** Initial or subsequent monthly DROP payment under this DROP distribution election.

**DROP Payments to Beneficiary of Active Member:** Lump-sum distribution of DROP account balance to beneficiary of deceased active member who participated in DROP prior to death.

**12 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 12 months of standard annuity.

**24 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 24 months of standard annuity.

**36 Month Partial Lump Sum Option Payment:** Lump-sum payment to retiree who elected a partial lump-sum option (PLSO) distribution equal to 36 months of standard annuity.

Tab 14 B

**TEACHER RETIREMENT SYSTEM OF TEXAS  
MEDICAL BOARD MEETING  
OPEN SESSION AGENDA  
January 14, 2014**

The Medical Board of the Teacher Retirement System of Texas met at 12:00 p.m. Tuesday, January 14, 2014 in the TRS offices.

**The following members were present:**

Dr. Alice Cox, Fredericksburg  
Dr. James Allen Reinartz, Austin  
Dr. Larry Wilson, Austin

**Others present:**

Ms. Beckie Smith, Legal Services, TRS  
Ms. Kirsten Morgan, Legal Services, TRS  
Mr. Mike Rehling, Manager, Benefit Processing, TRS  
Mr. Adam Fambrough, Assistant Manager, Benefit Processing, TRS  
Ms. Andrea Torrez, Benefit Consultant, Benefit Processing, TRS  
Ms. Denise Hope, Benefit Consultant, Benefit Processing, TRS

**Dr. Wilson called the meeting to order at 12:12 p.m.**

**1. REVIEW OF MINUTES FROM THE NOVEMBER 12, 2013 MEETING.**

The minutes of the November 12, 2013 meeting were reviewed and approved.

**2. CONSIDERATION OF FILES OF TRS MEMBERS WHO ARE CURRENTLY APPLYING FOR DISABILITY RETIREMENT AND THE FILES OF DISABILITY RETIREES WHO ARE DUE A RE-EXAMINATION REPORT.**

Dr. Wilson announced that the Medical Board would enter into Executive Session, as provided by section 551.078 of the Texas Government Code, to deliberate medical information of individual members and retirees.

The Board entered into closed session at 12:19 p.m.  
The meeting was re-opened at 12:40 p.m.

**3. REVIEW OF DISABILITY STATISTICS.**

**PG. 2 TRS Medical Board Minutes**  
**January 14, 2014**

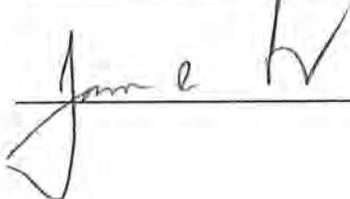
**4. DISCUSSION OF ITEMS TO BE PLACED ON FUTURE AGENDAS.**

Dr. Wilson spoke about the new regulations beginning May 2014 from the Federal Motor Carrier Safety Administration (FMCSA). Certification will be required every two years for bus drivers under the new FMCSA regulations.

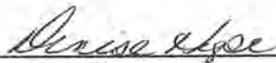
**5. DISCUSSION OF THE DATE OF NEXT BOARD MEETING.**

The next Medical Board meeting was scheduled for March 11, 2014. The meeting was adjourned at 1:07 p.m.

**Dr. Larry Wilson, Chairman**  
**TRS Medical Board**

  
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**Attest:**

  
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**Denise Hope**

**TEACHER RETIREMENT SYSTEM OF TEXAS  
MEDICAL BOARD MEETING  
OPEN SESSION AGENDA  
November 12, 2013**

The Medical Board of the Teacher Retirement System of Texas met at 12:00 p.m. Tuesday, November 12, 2013 in the TRS offices.

**The following members were present:**

Dr. Alice Cox, Fredericksburg  
Dr. James Allen Reinartz, Austin  
Dr. Larry Wilson, Austin

**Others present:**

Ms. Marianne Woods Wiley, Chief Benefit Officer, TRS  
Ms. Mary Chang, Legal Services, TRS  
Ms. Kirsten Morgan, Legal Services, TRS  
Mr. Mike Rehling, Manager, Benefit Processing, TRS  
Ms. Andrea Torrez, Benefit Consultant, Benefit Processing, TRS  
Ms. Denise Hope, Benefit Consultant, Benefit Processing, TRS

**Dr. Wilson called the meeting to order at 12:07 p.m.**

**1. REVIEW OF MINUTES FROM THE September 17, 2013 MEETING.**

The minutes of the September 17, 2013 meeting were reviewed and approved.

**2. CONSIDERATION OF FILES OF TRS MEMBERS WHO ARE CURRENTLY APPLYING FOR DISABILITY RETIREMENT AND THE FILES OF DISABILITY RETIREES WHO ARE DUE A RE-EXAMINATION REPORT.**

Dr. Wilson announced that the Medical Board would enter into Executive Session, as provided by section 551.078 of the Texas Government Code, to deliberate medical information of individual members and retirees.

The Board entered into closed session at 12:17 p.m.  
The meeting was re-opened at 12:35 p.m.

**3. REVIEW OF DISABILITY STATISTICS.**

**PG. 2 TRS Medical Board Minutes  
November 12, 2013**

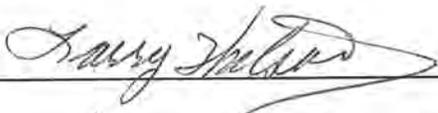
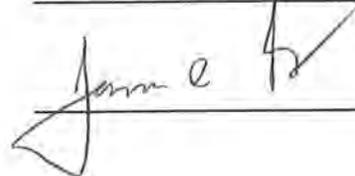
**4. DISCUSSION OF ITEMS TO BE PLACED ON FUTURE AGENDAS.**

Dr. Wilson has asked to speak about the new regulations for 2014 from the Federal Motor Carrier Safety Administration (FMCSA).

**5. DISCUSSION OF THE DATE OF NEXT BOARD MEETING.**

The next Medical Board meeting was scheduled for January 14, 2014. The meeting was adjourned at 12:54 p.m.

**Dr. Larry Wilson, Chairman  
TRS Medical Board**

  
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Larry D. Cole, M.D.  
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**Attest:**

  
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**Denise Hope**