

How...

ASRS Employees Deliver Service With PRIDE!

PROFESSIONALISM

We promote, strive for and expect individuals, teams, and divisions to possess professional qualities and skills to lead the organization.

- Displays a friendly, respectful and courteous demeanor even when confronted by adversity
- Has proactive and responsive approach to internal and external customer needs
- Possesses good communication and active listening skills
- Is a trusted contributor (manager, leader, SME, analyst, teammate)
- Takes personal accountability • Has subject matter expertise
- Has critical thinking skills • Has an honest, fair, non-judgmental mind-set
- Is adaptable to beneficial change • Adheres to the ASRS Code of Conduct

RESULTS

We treasure the achievements of individuals, teams, divisions and the agency that energize the organization.

- Meets goals and objectives
- Completes projects
- Produces quality work products
- Satisfies customers
- Attains individual accomplishments
- Manages risks successfully

IMPROVEMENT

We appreciate individuals, teams or divisions who drive the agency forward with new, innovative ideas and solutions.

- Promotes new ideas
- Enhances outcomes and performance
- Solves problems
- Enhances morale
- Improves relationships
- Increases efficiency, effectiveness or reduces costs

DIVERSITY

We recognize that utilizing different talents, strengths and points of view, strengthens the agency and helps propel outcomes greater than the sum of individual contributors.

- Encourages an attitude of openness and a free flow of ideas and opinions
- Treats others with dignity and respect
- Works effectively to accomplish goals with teams comprised of dissimilar individuals
- Recognizes and promotes skills in others attained on and off the job

EXCELLENCE

We celebrate individuals, teams and divisions who exceed expectations and deliver service with a PRIDE that permeates the organization.

- Surpasses member, stakeholder and associate expectations
- Demonstrates a willingness to go the extra mile to engender a positive public image
- Embraces change in a manner that inspires others
- Accepts responsibility and challenges with enthusiasm
- Takes a personal interest in promoting teamwork through effective use of communication (verbal, non-verbal, written and technological techniques)
- Creates a motivated, healthy and productive work environment that celebrates and rewards the accomplishments of others



**ARIZONA STATE
RETIREMENT SYSTEM**



ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

AGENDA

NOTICE OF COMBINED PUBLIC MEETING AND POSSIBLE EXECUTIVE SESSION OF THE ARIZONA STATE RETIREMENT SYSTEM BOARD

3300 North Central Avenue, 10th Floor Board Room
Phoenix, AZ 85012

June 24, 2016
8:30 a.m.

Pursuant to A.R.S. § 38-431.02 (F), notice is hereby given to the Trustees of the Arizona State Retirement System (ASRS) Board and to the general public that the ASRS Board will hold a meeting open to the public on Friday, June 24, 2016, beginning at 8:30 a.m., in the 10th Floor Board Room of the ASRS offices at 3300 N. Central Avenue, Phoenix, Arizona 85012. Trustees of the Board may attend either in person or by telephone conference call.

The Chair may take public comment during any agenda item. If any member of the public wishes to speak to a particular agenda item, they should complete a "Request To Speak" form indicating the item and provide it to the Board Administrator.

Pursuant to A.R.S. § 38-431.03(A)(3), the ASRS Board of Trustees may vote to go into executive session, which will not be open to the public, for the purpose of obtaining legal advice on any item on the Agenda.

This meeting will be teleconferenced to the ASRS Tucson office at 4400 East Broadway Boulevard, Suite 200, Tucson, Arizona 85711.

The Agenda for the meeting is as follows:

1. Call to Order; Roll Call; Opening Remarks.....Mr. Kevin McCarthy
Board Chair

2. Approval of the Minutes of the May 27, 2016 Public Meeting and Executive Session of the ASRS Board (*estimated time 1 minute*)Mr. Kevin McCarthy

3. Presentation Regarding PRIDE Award for Results (*estimated time 5 minutes*)
.....Mr. Paul Matson
Director
.....Mr. Anthony Guarino
Deputy Director and Chief Operations Officer

4. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates (*estimated time 20 minutes*) Mr. Paul Matson
..... Mr. Karl Polen
Chief Investment Officer
 - a. ASRS Fund Positioning
 - b. IMD Investment House Views
 - c. IMD Organization, Projects, and Asset Class Committee (ACC) Activities
 - d. State Street Risk Report

5. Presentation, Discussion and Appropriate Action Regarding Independent Reporting, Monitoring, and Oversight of the ASRS Investment Program – Includes Total Fund Q1-16 (*estimated time 20 minutes*)..... Mr. Allan Martin
Partner, NEPC

6. Presentation, Discussion, and Appropriate Actions Regarding the ASRS Retiree Health Insurance Contract Renewal (*estimated time 15 minutes*) Mr. Anthony Guarino
..... Mr. Dave King
Assistant Director, Member Services Division
..... Ms. Julie Lockwood
Program Manager
..... Mr. Frank Perri
Benefits Program Administrator

7. Presentation, Discussion, and Appropriate Action Regarding the Analysis of ASRS Benefit Estimates Compared to Actual Annuities (*estimated time 10 minutes*).. Mr. Anthony Guarino
..... Mr. Dave King
..... Mr. Brian Crockett
Sr. Strategic Planning Analyst

8. Presentation, Discussion, and Appropriate Action Regarding Strategic Topics to be Discussed by the Board During Fiscal Year 2017 (*estimated time 20 minutes*).....
..... Mr. Paul Matson
..... Mr. Anthony Guarino

9. Presentation, Discussion, and Appropriate Action Regarding Board Elections (*estimated time 5 minutes*) Mr. Kevin McCarthy

10. Presentation, Discussion, and Appropriate Action Regarding the Director's Report as well as Current Events (*estimated time 5 minutes*) Mr. Paul Matson
..... Mr. Anthony Guarino
 - a. 2016 Investments Report
 - b. 2016 Operations Report
 - c. 2016 Budget and Staffing Reports
 - d. 2016 Cash Flow Statement
 - e. 2016 Appeals Report
 - f. 2016 Employers Reporting

11. Presentation and Discussion Regarding Informational Updates from Prior and Upcoming Committee Meetings (*estimated time 15 minutes*)
 - a. Operations and Audit Committee (OAC) Mr. Jeff Tyne, Chair
..... Mr. Anthony Guarino
The next OAC Meeting will be held on August 9, 2016.
 - b. External Affairs Committee (EAC) Dr. Richard Jacob, Chair
..... Mr. Patrick Klein
The next EAC Meeting will be held on September 9, 2016.
 - c. Investment Committee (IC) Mr. Tom Connelly, Chair
..... Mr. Karl Polen
The next IC Meeting will be held on August 22, 2016.

12. Board Requests for Agenda Items (*estimated time 1 minute*) Mr. Kevin McCarthy

13. Call to the Public Mr. Kevin McCarthy

Those wishing to address the ASRS Board are required to complete a Request to Speak form before the meeting indicating their desire to speak. Request to Speak forms are available at the sign-in desk and should be given to the Board Administrator. Trustees of the Board are prohibited by A.R.S. § 38-431.01(H) from discussing or taking legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. As a result of public comment, the Board may direct staff to study and/or reschedule the matter for discussion and decision at a later date.

14. The next regular public ASRS Board meeting is scheduled for Friday, August 26, 2016, at 8:30 a.m., at 3300 N. Central Avenue, in the 10th Floor Board room, Phoenix, Arizona.

The Board will take a 10 minute recess while the meeting moves to the 14th floor conference room, where the balance of the meeting and possible executive sessions will take place.

Due to logistics, this portion of the meeting will NOT be teleconferenced to the ASRS Tucson office at 4400 East Broadway Boulevard, Suite 200, Tucson, Arizona 85711.

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(2), notice is hereby given to Trustees of the ASRS Board and the general public that the ASRS Board may vote to go into executive session, which will not be open to the public, for the purpose of discussion or consideration of records exempt by law from public inspection.

- 15. Presentation and Discussion Regarding Trustee Private Markets Investing Education (estimated time 60 minutes)..... Mr. Paul Matson
..... Mr. Karl Polen

- 16. Adjournment of the ASRS Board.

A copy of the agenda background material provided to Board Trustees (with the exception of material relating to possible executive sessions) is available for public inspection at the ASRS offices located at 3300 North Central Avenue, 14th Floor, Phoenix, Arizona and 4400 East Broadway Boulevard, Suite 200, Tucson, Arizona. The agenda is subject to revision up to 24 hours prior to meeting. These materials are also available on the ASRS website (<https://www.azasrs.gov/web/BoardCommittees.do>) approximately 48 hours prior to the meeting.

Persons(s) with disabilities may request a reasonable accommodation such as a sign language interpreter or alternate formats of this document by contacting Tracy Darmer, ADA Coordinator at (602) 240-5378 in Phoenix, at (520) 239-3100, ext. 5378 in Tucson, or 1-800-621-3778, ext. 5378 outside metro Phoenix or Tucson. Requests should be made as early as possible to allow time to arrange the accommodations.

Dated June 17, 2016

ARIZONA STATE RETIREMENT SYSTEM

Signed Copy on File
Melanie A. Alexander
Board Administrator

Signed Copy on File
Paul Matson
Director

Agenda Item #2



ARIZONA STATE RETIREMENT SYSTEM

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*Paul Matson
Director*

MINUTES PUBLIC MEETING ARIZONA STATE RETIREMENT SYSTEM BOARD

Friday, May 27, 2016
8:30 a.m., MST

The Arizona State Retirement System (ASRS) Board met in the 10th Floor Board Room, 3300 N. Central Avenue, Phoenix, Arizona. Mr. Jeff Tyne, Vice-Chair of the ASRS Board, called the meeting to order at 8:30 a.m., Arizona Time.

The meeting was teleconferenced to the ASRS office at 4400 E. Broadway, Tucson, Arizona 85711.

1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Jeff Tyne, Vice Chair
Mr. Clark Partridge
Professor Dennis Hoffman
Mr. Lorenzo Romero
Dr. Richard Jacob
Mr. Robert Wadsworth
Mr. Tom Connelly

Absent: Mr. Kevin McCarthy, Chair
Mr. Tom Manos

A quorum was present for the purpose of conducting business.

2. Approval of the Minutes of the April 29, 2016 Public Meeting and Executive Sessions of the ASRS Board

Motion: Prof. Dennis Hoffman moved to approve the Minutes of the April 29, 2016 Public Meeting and Executive Sessions of the ASRS Board. Mr. Tom Connelly seconded the motion.

By a vote of 7 in favor, 0 opposed, 0 abstentions, and 2 excused, the motion was approved.

3. Presentation, Discussion, and Appropriate Action Regarding the 2016 ASRS Legislative Initiatives and Legislative Update

Mr. Patrick Klein, Assistant Director, External Affairs Division, and Mr. Nick Ponder, Government Relations Officer, provided a brief wrap-up to the Board regarding the 2016 Legislative session. Mr. Ponder advised the Board he was unable to have the Annual Legislative Handbook

completed because some of the bills haven't been chaptered yet. Therefore, he prepared a one sheet summary for review.

Mr. Ponder reviewed the status of the following ASRS bills:

- **HB2104: ASRS; Retention of Service Credit** – Passed and signed. Effective Date: May 18, 2016.
- **HB2159: ASRS; Rulemaking Exemption** – Passed and signed. Effective Date: August 6, 2016, but retroactive to January 1, 1987.
- **HB2160: ASRS; Eligible Rollovers** – Passed and signed. Effective Date: August 6, 2016.
- **HB2243: ASRS; LTD Program; Liability** – Failed to pass.
- **SB1037: ASRS; Board Delegation; Benefit Determinations** – Passed and signed. Effective Date: August 6, 2016.
- **SB1038: ASRS; Reinstatement; Contribution Amount** – Failed to pass.
- **SB1144: ASRS; Contributions; Adjustments** – Failed to pass.
Note: The failure to pass SB1038 and 1144 will not affect the ASRS operation and can be submitted through a subsequent legislative session if the Board is so inclined. These two bills were to clarify language that is currently in statute.

Mr. Ponder reviewed the status of the following bills impacting the ASRS:

- **HB2157: ASRS; Political Subdivision Entities** – Failed to pass.
- **HB2237: Retirement; Return to Work; Restrictions** – Failed to pass.
- **HB2583: Open Meetings; Audiovisual Recordings** – Failed to pass.
- **HB2617: Israel; Boycotts; contracts; Investments** – Passed and signed. Effective Date: August 6, 2016.
- **HB2703: Budget, BRB; Government; FY2016-17** - Passed and signed. Effective Date: August 6, 2016.
- **HCR2040: State Monies; Prohibited Investments; Terrorism** – Failed to pass.
- **SB1151: ASRS; Continuation** – Passed and signed. Effective Date: August 6, 2016, but retroactive to January 1, 2016.
- **SB1257: Misconduct Involving Weapons; Public Places** – Failed to pass.

Mr. Ponder concluded with a summary of Proposition 124, which included SB1428, SB1429 and SCR1019 regarding PSPRS modifications. This bill passed and was signed with an effective date of August 6, 2016; however, the changes in membership tiers will not begin until July 1, 2017. The Board asked if there was any impact to the ASRS with the passing of this bill and Mr. Ponder stated he did not believe there would be. Ms. Jothi Beljan, Assistant Attorney General, assured the Board that the amendment effective May 17, 2016, to the Arizona Constitution, Article XXIX, does not affect the ASRS in any way.

4. Presentation, Discussion, and Appropriate Action Regarding Strategic Topics to be Discussed by the Board During Fiscal Year 2017

Mr. Paul Matson, Director, opened the discussion by indicating he did not expect the Board to make a motion on the list of strategic topics today. Mr. Matson's expectation was for the Board

to review the list and provide input, which would then be added to the list of current topics and brought back to the Board at the June 24, 2016; meeting at which time the Board would make a motion to approve the list of strategic topics.

Mr. Matson provided a summary of each topic and responded to questions from the Board. Mr. Matson also indicated he would like to add a topic regarding the Director's perspective on ASRS programs, plans and the retirement landscape. Mr. Clark Partridge asked that the topic of ASRS succession planning also be added to the list.

5. Notification of Upcoming Board Elections to Occur at the June 24, 2016 Board Meeting

Mr. Jeff Tyne announced the upcoming Board elections to occur at the June 24, 2016, Board Meeting.

6. Presentation, Discussion, and Appropriate Action Regarding the Director's Report as well as Current Events

Mr. Paul Matson made the following announcements:

- The ASRS is currently undergoing its LTD vendor transition which is going smoothly. Aside from the lower cost, it appears there will be some good initiatives coming out of this change.
- There is currently a statewide RFP for the Deferred Compensation Plan (457 Plan) in progress. The current contract expires this summer. The ASRS is in the process of working with the State to ensure the two programs the ASRS offers as a separate entity, the SSDP and SRSP, are bundled with the State's Deferred Compensation Plan. It will be easier to understand which contract they are talking about, will possibly have better pricing and less confusion. The ASRS is working with the vendor on an extension of the current contract until the negotiations can be completed in the integration of the plans.
- The Arizona Department of Administration (ADOA) recently conducted a staff engagement survey for each agency.
- The ASRS is in the process of conducting its own survey of staff regarding leadership and communication which is conducted every two years.
- An update on the fiscal year-to-date investment returns was provided.

7. Presentation and Discussion with Respect to Informational Updates from Prior and Upcoming Committee Meetings

a. Operations and Audit Committee (OAC)

Mr. Jeff Tyne announced the next OAC meeting will be held today, immediately following the Board meeting in the 14th floor conference room to discuss internal/external audits, the retiree medical and dental insurance renewals, analysis of benefit estimates versus actual retirement annuities and the recent retiree survey results.

b. External Affairs Committee (EAC)

Dr. Richard Jacob announced the next EAC meeting will be held on September 9, 2016 at 10:30 a.m. in the 14th floor conference room and will focus on the upcoming legislative and rule making agendas.

c. Investment Committee (IC)

Mr. Tom Connelly announced the next IC meeting will be held on June 20, 2016 at 2:30 p.m. in the 14th floor conference room to discuss portfolio positioning, the second quarter performance, risk monitoring, fixed income asset class presentation, and recommendations from the compliance working group, the multi-asset class working group, and the performance measurement working group.

8. Board Requests for Agenda Items

No requests were made.

9. Call to the Public

A member of the public, Mr. Brent Fine, requested to address the Board on behalf of himself and the Arizona State Employee and Retirees Association. Mr. Fine shared his concerns regarding the future of the ASRS in light of the passing of Proposition 124 and the current State hiring freezes. Mr. Fine stated that he was concerned with the notations in the Director's Report regarding staffing and the vacancies in IT security which he believes is caused by the statewide hiring freeze.

Mr. Tyne thanked Mr. Fine for his comments and invited him to review past minutes of the Operations and Audit Committee meetings which cover many of the topics Mr. Fine shared his concerns about today. Mr. Matson also commented that IT security positions are extremely difficult to fill and the vacancies are not caused by the statewide hiring freeze. In conclusion, Mr. Clark Partridge pointed out that the staffing report Mr. Fine was referencing indicates that there are recruitment efforts currently underway for the vacant IT security positions.

10. The next regular ASRS Board meeting is scheduled for Friday, June 24, 2016, at 8:30 a.m., at 3300 N. Central Avenue, 10th Floor Board Room, Phoenix, Arizona.

11. Presentation, Discussion, and Appropriate Action Regarding *Mary Wade and Marla Paddock v. Arizona State Retirement System* Arizona Court of Appeals Opinion

Motion: Mr. Tom Connelly moved to approve the ASRS filing of a Petition for Review in this case. Dr. Richard Jacob seconded the motion.

By a vote of 7 in favor, 0 opposed, 0 abstentions, and 2 excused, the motion was approved.

Mr. Jeff Tyne announced there would be a 10 minute recess while the meeting moved to the 14th floor conference room for the final agenda topic. Prior to moving the meeting to the 14th floor conference room, the following motion was made to move the final agenda item to executive session.

12. Presentation and Discussion Regarding Trustee Fiduciary Education

Motion: Dr. Richard Jacob moved to go into executive session for the purpose of discussion and consultation for legal advice with the attorney of the public law. Prof. Dennis Hoffman seconded the motion.

By a vote of 7 in favor, 0 opposed, 0 abstentions, and 2 excused, the motion was approved.

The executive session moved to the 14th floor conference room.

The Board convened to Executive Session at 9:34 a.m.

13. Adjournment of the ASRS Board

Mr. Tyne adjourned the public meeting and executive session at 11:11 a.m.

ARIZONA STATE RETIREMENT SYSTEM

Melanie A. Alexander
Board Administrator

Paul Matson
Director

**Confidential Materials
were provided to the
Board and not
included in this book.**

Agenda Item #3



ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board
FROM: Mr. Paul Matson, Director
DATE: June 15, 2016
RE: **Agenda Item #3:** Presentation Regarding the PRIDE Results Award

The ASRS employee recognition program recognizes employees who exemplify various PRIDE characteristics (Professionalism, Results, Improvement, Diversity, Excellence) throughout the year. The second award for 2016 is the PRIDE Results award.

The nominees were nominated by their peers because they exemplify the following PRIDE qualities of results:

We treasure the achievements of individuals, teams, divisions and the agency that energize the organization:

- | | |
|--|--|
| <input type="checkbox"/> Meet goals and objectives | <input type="checkbox"/> Attain individual accomplishments |
| <input type="checkbox"/> Satisfy customers | <input type="checkbox"/> Produce quality work products |
| <input type="checkbox"/> Complete projects | <input type="checkbox"/> Successfully manage risks |

The nominees for the PRIDE Results Award are:

- Cincy Gould
- Procurement Team – *Russ Levine, Maurah Harrison, Renee Neier*
- Brandi Clemans
- Ben Robinson
- Employer Secured Messaging Project and Transition Team – *Kristi Zeller, Mark Muraoka, Kaleem Mohammed Abdul, Sayema Khatoon, David Bigelow, Bhargavi Ravinuthala, Brandon Heathcotte, Donna McNally, Harold Greene, Jean Langston, Wendy Tobin, Michael McCarthy, Michele Briggs, Genevieve McBride, Sravan Kumar, Randi Gray, William Roberts*
- Unusual Suspects Scrum Team - *Trent Kendall, Srinivasa Attaluri, Divyal Kuchal, Param Vonteddu, Tom Williamson and Sunitha Surendra*
- Nathaniel (Nate) Brengle

Chosen as winners of the 2016 ASRS PRIDE Results award is the **Procurement Team**. We invite the Board to join the ASRS staff in recognizing the following members of the team: Russ Levine, Maurah Harrison and Renee Neier.

Nominees for the 2016 PRIDE Results Award

The Results Award is the second of our 2016 bimonthly awards. The following employees were nominated by staff who feel they exemplify the results qualities listed below:

RESULTS

We treasure the achievements of individuals, teams, divisions and the agency that energize the organization:

- | | |
|--|--|
| <input type="checkbox"/> Meet goals and objectives | <input type="checkbox"/> Attain individual accomplishments |
| <input type="checkbox"/> Satisfy customers | <input type="checkbox"/> Produce quality work products |
| <input type="checkbox"/> Complete projects | <input type="checkbox"/> Successfully manage risks |

CINCY GOULD

Cincy is an outstanding employee. I work with her every day in the mail room and the short time I have been here, I can honestly say she goes above and beyond when it comes to her work duties. She is always on time or most times even early to work, she makes sure all tasks are completed by or before deadlines, she manages time efficiently and in the most productive way to benefit our department. As a co-worker, I can see that Cincy provides quality work as well, and makes sure everything is done with quality. These are just a few out of the many reasons I can list as to of why I believe Cincy deserves this award.

PROCUREMENT TEAM – *RUSS LEVINE, MAURAH HARRISON AND RENEE NEIER*

First Nomination

This team exceeded goals and objectives with the completion of the recent LTD RFP. Through their earlier efforts with a Request for Information (RFI), the ASRS received proposals from three vendors; this is more interest for these services in more than ten years.

The customers in this case is the business who manages the program for our members. The customers expressed their satisfaction with the process and the outcomes. It was a first time for many of the business users, and the team took all participants – both those who comprised the evaluation team and those who were advisors - through the entire process, in a step-by-step approach.

The team established a schedule by which the Request for Proposal (RFP) process would be completed and a contract awarded. While some of the dates “moved,” this was due to additional information/presentations/due diligence the evaluation team requested after the initial schedule and RFP was set. The project was completed in a timely fashion.

Because of the extraordinary efforts of the procurement team, at the conclusion of negotiations, savings will be realized as a result of the award of contract for these services. The team produced and provided thorough notes that reflected the results of references, due diligence and negotiations. The Procurement Team ensured the evaluation team was informed and educated on all aspects of the procurement.

Through the due diligence efforts of the procurement team, offerors provided demonstrations of their products for the business, extensive interviews with the offerors’ proposed teams were conducted, their model for customer service was investigated, and reference checks with current clients were completed. The efforts by the team during the RFI process allowed the Arizona State Retirement System to experience competition for this RFP that had not been experienced in quite some years. As a result of the competitive process, the LTD Contract Award will result in annual savings to the program.

Second Nomination

For their work and effort as the Procurement Officers supporting the Long Term Disability Administration RFP recently completed by the agency. Beginning last year, the procurement group completed extensive

market research to identify industry leading providers as well as to educate providers about the ASRS LTD program. This effort led to unprecedented competition during the RFP process. Maurah and Renee ensured the RFP evaluation committee received timely, professional and thorough materials for their review and consideration. Their commitment to quality and attention to the detail led to a meaningful group experience. Additionally, they were able to effectively negotiate with the responding vendors resulting in an annual projected savings to the ASRS Trust of \$320,000.

BRANDI CLEMANS

Brandi Clemans is an outstanding leader. She guides and directs her team with poise and confidence. Her calm, quiet leadership, and strength are qualities that allow her to meet the needs of her team, complete projects, and produce a qualified and effective Meetings Team. Brandi sets her team up for success and celebrates the accomplishments of others without expecting any praise in return. She is always available, approachable, and willing to help her team, ASRS members, and other ASRS employees outside her team. Brandi is results driven on every level while seeking to find the best way to deliver information in order to make the understanding of the retirement process smooth and comprehensive, all the while maintaining a great work ethic and pleasant attitude!

BEN ROBINSON

Ben consistently produces videos for the agency that are high-quality, educational, and engaging. He manages timelines and agency resources (such as office areas that can be used to shoot a video, people who provide input as subject matter experts, equipment, and people he directs on-camera) in efficient and responsible ways. Videos and projects that Ben works on are always completed timely and to the satisfaction of all involved. Ben puts his skills to work producing results that energize the organization – he inspires others to look at what the agency does in new and creative ways. Ben’s “results” mean our members and employers have valuable, educational resources at their fingertips (or mouse click).

EMPLOYER SECURED MESSAGING PROJECT AND TRANSITION TEAM – KRISTI ZELLER, MARK MURAOKA, KALEEM MOHAMMED ABDUL, SAYEMA KHATOON, DAVID BIGELOW, BHARGAVI RAVINUTHALA, BRANDON HEATHCOTTE, DONNA MCNALLY, HAROLD GREENE, JEAN LANGSTON, WENDY TOBIN, MICHAEL MCCARTHY, MICHELE BRIGGS, GENEVIEVE MCBRIDE, SRAVAN KUMAR, RANDI GRAY, WILLIAM ROBERTS

Under the direction of Product Owners Kristi Zeller and Mark Muraoka, the A Team worked tirelessly developing and implementing a vision for a new tool which enables employers to communicate in a more secure fashion with the ASRS. In addition, transparency and customer service has been enhanced because employer communications are now visible to the pertinent ASRS business users and everyone knows what has already been communicated to employers. Part of the transition included working out the roles that MSD and FSD staff would take on when communicating with employers and each other. Kristi coordinated transition meetings for the “before” and “after” production release roles. Donna McNally, Harold Greene and Jean Langston worked with Mark Muraoka, Wendy Tobin, Michael McCarthy and Michele Briggs to train MAC staff in the management of employer messages. Genevieve McBride played a strong role in representing the MAC point of view.

UNUSUAL SUSPECTS SCRUM TEAM - TRENT KENDALL, SRINIVASA ATTALURI, DIVYAL KUCHAL, PARAM VONTEDDU, TOM WILLIAMSON AND SUNITHA SURENDRA

The ‘Unusual Suspects Scrum Team’ consistently meet goals and objectives, satisfy customers, complete projects on time and on budget, attain business benefits, meet success criteria, produce quality work products and effectively manage risks.

The ‘Unusual Suspects Scrum Team’ has been particularly productive in Fiscal Year 2016. They have implemented the following projects:

- a. PWEB Responsive Design (August 2015)
- b. PWEB Employer Administrative Enhancements (September 2015)

- c. Transfers Out (January 2016)
- d. PWEB Health Insurance Online Enrollments (May 2016)

The 'Unusual Suspects Scrum Team' meet every project challenge positively and effectively: For PWEB Responsive Design, the team needed to learn a new technology; for PWEB Employer Administrative Enhancements, they needed to improve the PWEB Employer website so that it was user friendly for employers and also more secure; for Transfers Out, the team developed a salary calculation module that was also utilized by the Oracle Modernization Service Purchase Project; for PWEB Health Insurance Online Enrollments, the team worked with an outside health insurance vendor and complied with numerous health insurance regulatory requirements.

The 'Unusual Suspects Scrum Team' is the epitome of 'results.'

NATHANIEL (NATE) BRENGLE

Although Nate has only been here a short time, since his very first week he has been designing beautiful flyers, brochures, publications and digital graphics for our website and has given our visual brand a fresh new interpretation. Nate takes the initiative to familiarize himself with each project and to determine the objectives of each internal customer who might be seeking assistance with a communication project. He takes the initiative to reach out to stakeholders, to communicate updates, anticipate problems that may arise and seeks to mitigate them. In project meetings, Nate asks thoughtful questions and offers solutions, usually volunteering to tackle it himself. Nate is a team player who is attentive to details and endeavors to ensure projects are delivered on-time and exceed expectations. Nate continues to take on additional responsibilities, such as project managing publications like "Your Retirement" or helping to develop a communications strategy to encourage members to enroll for online myASRS access – all while continuing to do exceptional work in his primary role as the agency's graphic designer.

Joining a small team that was in the process of reorganizing within the agency could have been intimidating, but Nate's easy-going personality fit right in with our various project teams and his determination to quickly learn about our agency made him a productive and reliable team member in short order! Nate's creativity, insight, experience and skillset has absolutely been an asset to the ASRS and that is why I am nominating him for the RESULTS Award.

Agenda Item #4

4a. ASRS Fund Positioning

Pension (Plan, System, HBS Assets)

ASRS Market Value Report

Wednesday, June 08, 2016

Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked	Multi-Asset	Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive				
State Street B&T: Boston	Tactical Cash (non-assetized)							0	0.00%
	Operating Cash (non-assetized)		4,667,000					4,667,000	0.01%
	Cash Total							\$4,785,974	0.01%
Blackrock: San Francisco	Treasuries (Long Duration)		391,856,660					391,856,660	1.14%
	Treasuries (Long Duration) Total							\$391,856,660	1.14%
	Treasuries (Long Duration) Policy Range: 0% - 10%								0.00%
Operating Cash (assetized) ASRS: Phoenix Blackrock: San Francisco	US Treasuries		54,603,900					54,603,900	0.16%
	Enhanced Passive F2		1,892,047,824					1,892,047,824	5.52%
	Passive (US Debt Index)		1,609,717,910					1,609,717,910	4.69%
Core Fixed Income Total							\$3,556,369,635	10.37%	
Interest Rate Sensitive							\$3,946,226,295	11.51%	
Interest Rate Sensitive: 11%								11.00%	
Columbia: Minneapolis JP Morgan: Indianapolis	Active	714,311,876						714,311,876	2.08%
	Active	365,863,900						365,863,900	1.07%
	High Yield Fixed Income Total							\$1,080,189,544	3.15%
High Yield Fixed Income Policy								4.00%	
Opportunistic Debt		1,151,649,725						\$1,151,649,725	3.36%
Opportunistic Debt Policy:								0.00%	
Private Debt Total		2,675,310,917						\$2,675,310,917	7.80%
Private Debt Policy Range: 8% - 12%									10.00%
Fixed Income Total								\$8,855,376,482	25.82%
Total Fixed Income Policy Range: 18% - 35%									25.00%
LSV: Chicago ASRS: Phoenix ASRS: Phoenix	Active (Value)			571,428,898				571,428,898	1.67%
	Passive E2				4,530,741,001			4,530,741,001	13.21%
	Enhanced Passive E7				576,382,748			576,382,748	1.68%
Operating Cash (assetized)	S&P 500				94,646,760			94,646,760	0.28%
ASRS: Phoenix	Enhanced Passive E8				550,863,499			550,863,499	1.61%
Large Cap Equity Total								\$6,324,063,339	18.44%
Large Cap Policy									20.00%
Wellington: Boston ASRS: Phoenix Operating Cash (assetized)	Active (Core)			288,745,198				288,745,198	0.84%
	Passive E3 (Growth)				402,432,565			402,432,565	1.17%
	Russell 2000				16,381,170			16,381,170	0.05%
ASRS: Phoenix	Passive E4 (Value)				383,919,770			383,919,770	1.12%
Mid Cap Equity Total								\$1,091,478,702	3.18%
Mid Cap Policy									3.00%
TimesSquare: New York Operating Cash (assetized) DFA: Santa Monica ASRS: Phoenix	Active (Growth)			371,316,986				371,316,986	1.08%
	Russell 2000				16,381,170			16,381,170	0.05%
	Active (Value)			284,572,819				284,572,819	0.83%
ASRS: Phoenix	Passive E6				334,708,004			334,708,004	0.98%
Small Cap Equity Total								\$1,006,978,980	2.94%
Small Cap Policy									3.00%
U.S. Equity Total								\$8,422,521,021	24.56%
US Equity Policy Range: 16% - 30%									23.00%
Brandes: San Diego American Century Trinity Street	Active (Value)			568,452,644				568,452,644	1.68%
	Active (EAFE)			558,310,814				558,310,814	1.63%
	Active (EAFE)			328,875,715				328,875,715	0.96%
Thompson Siegel Walmstey	Active (EAFE)			300,270,947				300,270,947	0.88%
Int'l Transition					2,937,896			2,937,896	0.01%
Blackrock: San Francisco	Passive (EAFE Tilt)				750,128,572			750,128,572	2.19%
Blackrock: San Francisco	Passive (EAFE)				4,054,581,611			4,054,581,611	11.82%
Large Cap Developed Non-US Equity Total								\$6,564,075,333	19.14%
Large Cap Developed Policy									17.00%
AQR: Greenwich DFA: Santa Monica Franklin Templeton: San Mateo Blackrock: San Francisco	Active (EAFE SC)			101,728,596				101,728,596	0.30%
	Active (EAFE SC)			107,067,098				107,067,098	0.31%
	Active (EAFE SC)			223,218,548				223,218,548	0.65%
Blackrock: San Francisco	Passive (EAFE SC)				265,063,320			265,063,320	0.77%
Small Cap Developed Non-US Equity Total								\$697,080,076	2.03%
Small Cap Developed Policy									2.00%
William Blair: Chicago Easton Vance: Boston LSV: Chicago Blackrock: San Francisco	Active (EM)			362,829,468				362,829,468	1.06%
	Active (EM)			277,984,584				277,984,584	0.81%
	Active (EM)			114,482,239				114,482,239	0.33%
Blackrock: San Francisco	Passive (EM)				316,972,805			316,972,805	0.92%
Emerging Markets Equity Total								\$1,072,269,096	3.13%
Emerging Markets Policy									5.00%
Non-US Equity Total								\$8,333,424,505	24.30%
Non-US Equity Policy Range: 14% - 34%									24.00%
ASRS: Phoenix	Risk Factor Portfolio							585,439,120	1.71%
	Public Equity Total							\$17,341,384,645	50.57%
	Private Equity Total			2,741,676,373				\$2,741,676,373	8.00%
Private Equity Policy Range: 6% - 10%								8.00%	
Opportunistic Equity			317,666,307					\$317,666,307	0.93%
Opportunistic Equity Policy:								0.00%	
Equity Total								\$20,400,727,325	59.49%
Total Equity Policy Range: 48% - 65%									55.00%
Gresham: New York	Commodities Total					234,502,853		234,502,853	0.68%
	Real Estate Total							\$234,502,853	0.68%
	Commodities Policy Range: 0% - 4%								2.00%
Real Estate Policy Range: 8% - 12%								9.52%	
Infrastructure Total					3,263,749,163			\$3,263,749,163	10.00%
Infrastructure Policy Range: 0% - 3%									0.95%
Farmland & Timber Total					325,444,191			\$325,444,191	0.95%
Farmland & Timber Policy Range: 0% - 3%									0.00%
Inflation Linked Total						188,017,561		\$188,017,561	0.55%
Farmland & Timber Policy Range: 0% - 3%									0.00%
Inflation Linked Policy Range: 10% - 16%									11.70%
Bridgewater	Multi-Asset Class Strategies						1,019,621,670	1,019,621,670	2.97%
	Multi-Asset Class Policy Range: 0% - 12%								2.97%
	Multi-Asset Class Policy Range: 0% - 12%								5.00%
TOTAL Amounts		\$4,907,150,186	\$3,953,012,269	\$7,519,146,881	\$12,881,580,443	\$4,011,713,769	\$1,019,621,670	\$34,292,225,220	Total Fund
TOTAL Percent		14.31%	11.53%	21.93%	37.56%	11.70%	2.97%		

Asset Class	Actual Portfolio	SAAP Target (Range)	Interim SAA* Adj Policy	Actual - Interim SAA** % diff	Actual - Interim SAA** \$ diff	Policy Band check Actual - Adj Policy
Tactical Cash	0.00%	0% (0-3%)	0.00%	0.00%		
Cash	0.01%	0.00%	0.00%	0.01%	4,785,974	
Interest Rate Sensitive	11.51%	11%	12.76%	-1.24%	-426,428,997	
High Yield	3.15%	4%	4.59%	-1.44%		
Opportunistic Debt	3.36%	0%	0.00%	3.36%	\$1,151,649,725	
Private Debt	7.80%	10% (8-12%)	7.8% (6-10%)	0.00%		
Total Fixed Income	25.82%	25% (18-35%)	25.14% (18-35%)	0.68%	\$232,678,169	OK
Large Cap	18.44%	20%	18.71%	-0.27%	-\$91,540,464	
Mid Cap	3.18%	3%	2.78%	0.41%	\$139,073,570	
Small Cap	2.94%	3%	3.00%	-0.06%	-\$21,787,777	
US Equity	24.56%	26% (16-36%)	24.49% (14-34%)	0.08%	\$25,745,329	OK
Developed Large Cap	19.14%	17%	17.14%	2.00%	\$686,409,771	
Developed Small Cap	2.03%	2%	2.00%	0.03%	\$11,235,571	
Emerging Markets	3.13%	5%	5.00%	-1.87%	-\$642,342,165	
Non-US Equity	24.30%	24% (14-34%)	24.14% (14-34%)	0.16%	\$55,303,178	OK
Risk Factors	1.71%	0%	1.71%	0.00%		
Private Equity	8.00%	8% (6-10%)	8.00%	0.00%	\$0	OK
Opportunistic Equity	0.93%	0%	0.00%	0.93%	\$317,666,307	
Total Equity	59.49%	58% (48-65%)	58.33% (48-65%)	1.16%	\$398,714,813	OK
Commodities	0.68%	2% (0-4%)	2.01%	-1.33%	-\$454,651,118	OK
Real Estate	9.52%	10% (8-12%)	9.52%	0.00%	\$0	OK
Infrastructure	0.95%	0% (0-3%)	0.00%	0.95%	\$325,444,191	OK
Farmland & Timber	0.55%	0% (0-3%)	0.00%	0.55%	\$188,017,561	OK
Opportunistic I/L	0.00%	0%	0.00%	0.00%	\$0	
Total Inflation Linked	11.70%	12% (10-16%)	11.53% (10-14%)	0.17%	\$58,810,635	OK
Multi-Asset Strategies**	2.97%	5% (0-12%)	5% (0-12%)	-2.03%	-\$694,989,591	OK
Total	100.00%	100%	100.00%	0.00%	\$0	

*Interim SAA includes a proration of unfunded Private Equity, Private Debt, and Real Estate
**Private Equity is prorated to domestic equity; Real Estate is prorated to equity, commodities, and fixed income; Private Debt is prorated to Interest Rate Sensitive and High Yield

Internally Managed Portfolios:	\$8,671,095,411	25%
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Opportunistic definitions:
An investment in a category that is not included in the ASRS Asset Allocation policy and represents an investment opportunity that is tactical in nature.
Opportunistic investments have a 0% target (0%-10% range), regardless of asset class.

Total Opportunistic		
Opportunistic Debt	\$1,151,649,725	3.4%
Opportunistic Equity	\$317,666,307	0.9%
Opportunistic IL	\$0	0.0%
Total	\$1,469,316,032	4.3%

4b. IMD Investment House Views

ARIZONA STATE RETIREMENT SYSTEM INVESTMENT MANAGEMENT HOUSE VIEWS

(Notable changes from the previous month are highlighted in **RED**)

JUNE 2016

U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEUTRAL**

- Economic data still shows moderate growth in 2016.
- Households wage growth continues to strengthen although the recent employment picture has deteriorated, the housing market has momentum, and credit creation has picked up. The recent rebound in energy prices is a dampener, particularly for lower income households.
- Corporations have exhibited waning credit demand, production growth has slowed, and the dollar has strengthened over the last month. Looking forward, the peak drag on capital spending from energy companies has passed while foreign growth has upside potential.
- Inflation remains generally subdued and below the Fed's target. The market is discounting a continuation of low inflation levels while pressures to the upside exist at the margin.
- While a 25bps rate hike is priced in by the Fed, the recent jobs report will likely delay the timing. The negative December market reaction exemplifies the short-term sensitivity to be aware of.

2. Valuations: **NEUTRAL**

- The large cap P/E ratio of 19 is at the top of its 5 and 10 year ranges. The mid cap P/E ratio of 21 is marginally above the average of its 5 and 10 year ranges. The small cap P/E ratio of 24 is at the average of its 5 and 10 year ranges.
- On a relative value basis, the S&P PE ratio is on the low end compared to the EAFE PE ratio versus history. On a relative value basis, the S&P PE ratio is at the midpoint compared to the Emerging Markets PE ratio versus history.

3. Sentiment: **NEUTRAL**

- With the exception of dips in Q3 2015 and Q1 2016, the market has been flat since the beginning of 2015; reflecting mixed macro data globally, downward revisions to corporate growth estimates, apprehension over the timing of a rate hike, and volatile foreign exchange markets.
- Fund flows reflect a modest appetite for U.S. equities on an absolute basis, but have been outpaced by demand for U.S. fixed income products.

- After a very strong run since the middle of 2014, the U.S. dollar fell from the beginning of the year through April. After rebounding during May, the dollar again showed weakness at the start of June which has given some lift to equities.

Commentary:

We remain cautious about U.S. equities and remain close to the benchmark weight. Domestically, we are slightly overweight to mid and small caps reflecting the relative richness of large caps. The U.S. equity bull market has enjoyed a long run and flattening of both profit margin expansion and revenue growth reflect being in the late stage of the business cycle. An accommodative Fed has been sensitive to this and compared to the rest of the world, the U.S. has exhibited stability if not momentum for its economic prospects. Prospectively, we expect to see mixed results in the stimulative efforts globally but should the picture change, we will adapt accordingly.

CURRENT PORTFOLIO POSTURE: EQUAL WEIGHT vs. SAA target

NON – U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEUTRAL (Developed), NEGATIVE (Emerging)**

- Central bank policies have been accommodative in Eurozone and Japan, albeit with mixed results as Europe has shown signs of life at the margin while Japan's experiment with negative interest rates has failed to create traction.
 - ◇ The ECB appears to be in wait and see mode as it assesses the effects of its latest policy measures. The recent GDP forecast was revised up, but still remains below 1.7%, and inflation remains at 0%. Further policy action is likely if there isn't a pick-up in either.
 - ◇ Japan postponed the VAT increase for the second time but the Yen continues to strengthen and appears increasingly in need of coordinated fiscal stimulus.
 - ◇ The UK's growth remains strong relative to the Eurozone but with the headwinds of a strong currency, Brexit uncertainty overhang, and exporters losing share.
- China continues to be a source of uncertainty as it attempts to maintain its 6.5% target growth rate. Incremental efforts to stimulate the economy have been less effective than in the past and reverted to construction related efforts which have stoked bad debt fears.

2. Valuations: **POSITIVE (Developed), POSITIVE (Emerging)**

- In looking at an equal-weighted mix of PE, P/book, dividend yield, P/sales, and EV/EBITDA, EAFE and Emerging Markets are both attractively valued relative to the S&P 500.
 - ◇ Within EAFE, Japan is trading cheaper than the UK and the Eurozone.
- On a relative value basis, the Emerging Markets PE ratio is on the low end compared to the EAFE PE ratio versus history.

3. Sentiment: **NEUTRAL (Developed), NEGATIVE (Emerging)**
- The prospect of Brexit has added a political element to markets.
 - Flows have tended away from Japan, Europe and China year-to-date reflecting relative uncertainty compared to the U.S.
 - China continues to be polarizing as it struggles to navigate toward the One Belt One Road plan. Several other emerging market economies hinge upon China, while India continues to attract positive attention while it has been embroiled in controversy.

Commentary:

We reallocated \$750M to EAFE in April with a tilt toward Europe and away from Japan reflecting our position that Europe will continue to be more effective in turning its economy around. In aggregate, we are in line with the Non-US equity benchmark weight. Draghi stepped up the pace of its bond buying program and continues to implement negative rates while exhibiting patience to see results. Japan's inability to drive growth from coordinated fiscal and monetary policy portends a bigger need for action with fewer options over time.

We remain underweight emerging markets on the premise that while they may be attractive from a valuation standpoint, China's ability to manufacture growth has been waning and creates uncertainty about their ability to manage its glidepath towards reasonable debt levels.

We are closely watching the momentum of Europe's growth and the quality of growth in emerging markets.

CURRENT PORTFOLIO POSTURE: OVER WEIGHT (Developed) and UNDERWEIGHT (Emerging) vs. SAA target

FIXED INCOME

Primary Markets Metrics & Indicators:

1. Fundamentals: **NEUTRAL**
- Global fundamentals are mixed. While the economy in the U.S. is generally improving, many international economies that influence U.S. fixed income markets are struggling to grow (Japan, Europe), facing a slowdown (China), or experiencing recessionary conditions (some emerging market countries). Following a selloff in risky assets earlier this year as well as in 2015, a number of factors have led to a rally in the past **few months** in equities, high yield bonds, investment-grade bonds and other areas of the credit markets. These factors include moderating expectations for interest rate increases by the Fed; more expansionary monetary policy in Europe and Japan; a rally in oil prices; and moderating fears of major currency devaluation in China. However, we are concerned that the recent rally in risk assets may reverse as the year progresses. Global growth may sputter and China risk issues may resurface.

- We believe that long-term U.S. interest rates may remain relatively low by historical standards for a number of reasons. These include slowing growth and disinflationary (or deflationary) pressures in many regions of the world including Europe and China, accommodative monetary policies in other countries and very low **or negative** competing long-term interest rates in other developed markets.

2. Valuations: **NEUTRAL**

- Valuations as measured by credit spreads in both the investment-grade and high yield bond markets may seem attractive relative to the tighter levels experienced in recent years; however, the wider spreads may primarily reflect deteriorating credit quality. Over the coming years, we expect both a rise in corporate defaults and an increase in the number of bond issuers that are likely to lose their investment-grade ratings. Initially, this deterioration in credit quality will be led by sectors that have been adversely affected by the severe decline in global commodity prices including energy, energy services, metals and mining. However, as we **are likely** in the later stages of credit cycle (that began with an upturn in 2009), credit ratings **will likely** decline and defaults **will likely** increase in other sectors as well. We believe this may lead **to a spike in defaults (probably in 2017) and further spread widening before the market bottoms. This should create attractive opportunities for our distressed debt managers in the Opportunistic Debt asset class.** With this view, we are underweight High Yield vs. the SAA target.
- Private debt offers the most attractive opportunity in the fixed income markets with double-digit yields readily available for investors willing to accept illiquidity. We believe the market opportunity has recently improved due to a number of factors including the piecemeal sale of GE Capital, a leading provider of capital to the middle market; a reduced capacity to lend by business development companies; the enforcement of leveraged lending guidelines by banking regulators which further restricts the ability of banks to provide leveraged loans and underwrite high yield bonds; and a materially less receptive new issuance market for high yield bonds and tradable leveraged loans. In 2015 **and 2016**, we expanded our commitments to take advantage of the attractive opportunities in the private debt asset class.
- The Interest Rate Sensitive fixed income markets are likely to generate low returns due to low overall yields as Treasury rates remain at low levels. That being said, Interest Rate Sensitive fixed income remains a safe haven in times of market turbulence and tends to perform well when risky assets such as equities sell-off. While we are slightly underweight Interest Rate Sensitive fixed income vs. the interim SAA target, we have more interest rate duration in our portfolio than the benchmark due to an allocation made in August 2015 to the Treasuries (Long Duration) asset class. This allocation has performed well when risky assets have sold off.

3. Sentiment: **NEUTRAL**

- Sentiment has declined in the credit markets due to a combination of weakening fundamentals and diminished trading liquidity **but remains favorable for U.S. Treasuries.** U.S. Treasuries continue to be an attractive safe haven for investors looking to reduce risk

particularly as interest rates in other safe haven countries such as Germany and Japan are extremely low or even negative depending on the maturity.

Commentary:

IMD views of the fixed income markets are bifurcated: we are positive on the return opportunities in the private markets (i.e. Private Debt) and less sanguine on the public markets (i.e. Interest Rate Sensitive fixed income and High Yield bonds).

CURRENT PORTFOLIO POSTURE: OVER WEIGHT vs. SAA target

REAL ESTATE

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**

- Property markets are generally moving out of a recovery phase to a mature phase. Excess inventory from the last cycle is largely absorbed and greater discipline in new supply delivery places property markets generally in reasonable supply/demand balance. The only property types that we consider to still be in a recovery phase are for-sale residential, suburban office and certain niche industrial property types.
- Local conditions vary greatly with tight supply and rapidly accelerating rents in certain markets and a more normal recovery in other markets.
- Our review of property market fundamentals leads us to emphasize apartments, industrial properties, medical office buildings, senior housing, self-storage, and student housing in our current investing efforts for demographic and macro policy reasons. We have entered in to separate account partnerships to pursue these opportunities.
- The resolution of pre-global financial crisis CMBS structures continues to work its way through the system presenting opportunities in mezzanine and senior equity. We have retained managers well-positioned to pursue such opportunities.

2. Valuations: **NEUTRAL**

- Values have recovered from the global financial crisis with stable properties in coastal markets priced at record values.
- YTD in 2016 there has been a contraction in the pace of CMBS lending and an increase in the pricing of the underlying loans.
- Recent increases in treasury rates do not appear to have affected commercial real estate valuations. Many observers believe that ~100bps of rate increase was already discounted into cap rates.
- At the end of **April**, REITs were trading at an average dividend yield of **3.9%** (**211bp** above 10y treasury) and a **1% discount** to NAV. The dividend yield spread is above the historical average of 127 while the historical difference to NAV is a 3% premium.

3. Sentiment: **NEUTRAL**

- About 80% of real estate executives believe we will see a recessionary cycle in property sometime in the next several years.
- Nevertheless, fund raising has been robust. The pace of U.S. focused real estate fund raising is around \$100 billion per year with dry powder of around \$200 billion. Additionally, there is evidence of high interest in U.S. property from foreign investors.
- Consequently, there remains strong demand for good quality property and we have yet to see any softness in pricing as a result of recessionary or other concerns.

Commentary:

ASRS has become more cautious in property underwriting and requires its managers to consider a moderate recession in the next few years in property level underwriting. We continue to focus on niche property types and markets which receive less institutional focus. In new transactions, we will generally avoid construction risk except in the strongest locations with supply constraints and robust tenant demand. The 2016 implementation plan calls for about \$300 million in new commitments to complete the separate account and net zero new investments in commingled product.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target (in program funding/build-out phase)

PRIVATE EQUITY

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**

- The U.S. economy has moderated and inflation remains muted but the unemployment rate continues to fall.
 - ◇ Oil prices have settled in the \$40 price range which has resulted in rig lay downs and reduced service costs, which has tempered production growth in the medium term. Debt markets have locked up and equity transactions will take time to sort out. We expect industry consolidation at the margin favoring low cost producers with less leverage and more hedged production.
 - ◇ Healthcare is being reshaped to implement the requirements of “Obamacare.”
 - ◇ The U.S. continues to be a global leader in technology innovation.
- Europe continues to struggle in recovering from the financial crisis with the ECB maintaining its stimulus efforts by buying €80B per month. Its problems are exacerbated by a unified currency without unified fiscal policy and it is expected to experience a very slow recovery.
- Emerging markets have slowed while the largest emerging markets are transitioning to focus on domestic consumption.

2. Valuations: **NEUTRAL**

- Current U.S. median purchase price multiples are 8.5x, down from 8.9x a year ago.
- The leveraged loan and high yield debt markets tightened up in 2015. Single B high yield spreads have widened to ~800bps.
- The U.S. median Debt/EBITDA ratio of 6.2x is up a bit from 5.8x in 2014.

3. Sentiment: **NEUTRAL**

- Globally, \$551B (1,062 funds) closed in 2015 compared to \$589B (1,394 funds) in 2014.
- Dry powder of nearly \$1.3T globally has ticked up from \$1.2T for 2014.
- The global number of buyout deals was 3,556 in 2015 compared to 3,796 for all of 2014. The aggregate value of deals was \$411B in 2015 compared to \$348B for all of 2014.
- There were 1,620 exits representing \$405B in 2015. There were 1,734 exits representing \$460B in 2014.
- The IPO market in 2015 has softened to a level of \$30B in 2015 versus \$67B in 2014.

Commentary:

Areas of emphasis are U.S. middle market buyout with focus on managers with strong operational capability. Vertical strategies in healthcare and technology are under consideration. IMD will reduce emphasis on large buyout strategies though larger managers with specialized deal flow remain of interest and continue to monitor Europe for a favorable reentry point and look for opportunities to capitalize upon distress.

ASRS 2016 private equity pacing plan calls for \$700 million in new commitments to achieve the 8% strategic allocation target.

CURRENT PORTFOLIO POSTURE: EQUAL WEIGHT vs. SAA target

COMMODITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEUTRAL**

- The U.S. dollar has weakened year-to-date but remains strong on a relative basis. Questions remain about China's economy while Europe continues to struggle.
- Most commodity sectors appear well supplied, particularly for the current global growth environment.
- Corn and wheat stockpiles have recently hit multi-year highs while world food prices continue to slide. The decision by Saudi Arabia to freeze its production level has given the market optimism and **points the arrow toward coming into balance**. Metals are mixed as precious metals have strengthened while industrial metals still exhibit weak demand.

2. Valuations: **NEGATIVE**

- The Bloomberg Commodities Index is up 12% year-to-date as the dollar has weakened which is unlikely to persist over a longer time period given the impetus for global central banks to ease.
- Our bottoms-up model forecasts a small decline of ~2% while our top down model predicts a 1% increase over the next quarter.

3. Sentiment: **NEUTRAL**

- Moderate growth, weak inflation, and a strong supply environment kept investor enthusiasm for commodities muted until recently as energy and precious metals have rallied.
- While China reverted to stimulating its economy via construction activity, the sustainability is not likely to persist.
- Saudi Arabia has agreed to freeze output at current levels although an OPEC consensus is elusive. Domestically the rig layoffs have curtailed production. Nearing the \$50 range the shale plays may begin to bring production back online.

Commentary:

We remain underweight commodities based on the fundamental basis that global growth remains modest and inflation is muted. At the commodity specific level, energy markets have run up in anticipation of the market balancing although levels are approaching a point where shale plays may reactivate and Iran is ramping its production. Ags have benefitted from poor weather in South America and a warm start to the growing season in the U.S. Precious metals have rallied on dollar weakness while base metals still have a weak picture. Should growth and inflation exhibit more traction we will revisit our position.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

OPPORTUNISTIC INVESTMENTS

IMD continues to monitor and assess co-investment flow from real estate, private equity and debt managers for select opportunistic investments with favorable capital market dynamics. Opportunistic investments are tactical in nature AND are outside ASRS SAAP benchmarks or absolute return oriented.

CURRENT PORTFOLIO POSTURE: Approx. 4.8% of ASRS TOTAL MARKET VALUE

GLOSSARY

Commentary: Provides verbiage on 1) the current asset class market environment and possible changes to this environment and 2) ASRS asset class portfolio positioning relative to ASRS SAA policy, its rationale for positioning and anticipated changes which may occur in such positioning.

Current Portfolio Posture: Indicates ASRS asset class position relative to its asset allocation policy weight. “Overweight” indicates an asset class weight is greater than its policy target, “Neutral” indicates an equal weight and “Underweight” indicates a lesser weight than its policy target.

Investment House Views: Synthesizes IMD’s current and forward-looking investment perspectives and tactical positioning in asset classes and investment strategies in which the ASRS invests.

Primary Market Metrics and Indicators: Broadly-defined metrics (Fundamentals, Valuations, and Sentiments) applied universally to ASRS asset classes and used collectively to evaluate existing market conditions. Indicators (“Positive,” “Neutral” and “Negative”) reflect IMD’s existing views of these metrics and, in addition to other factors, generally determine the basis for the existing (and possible future changes) to ASRS aggregate portfolio position relative to or within ASRS SAA policy targets.

4c. IMD Organization, Projects, & Asset Class Committee Activities

IMD Activities

Arizona State Retirement System

June 24, 2016

Outline

- Organization

- 2 Asset Class Committees

- 3 Working Groups

Outline

1 Organization

2 Asset Class Committees

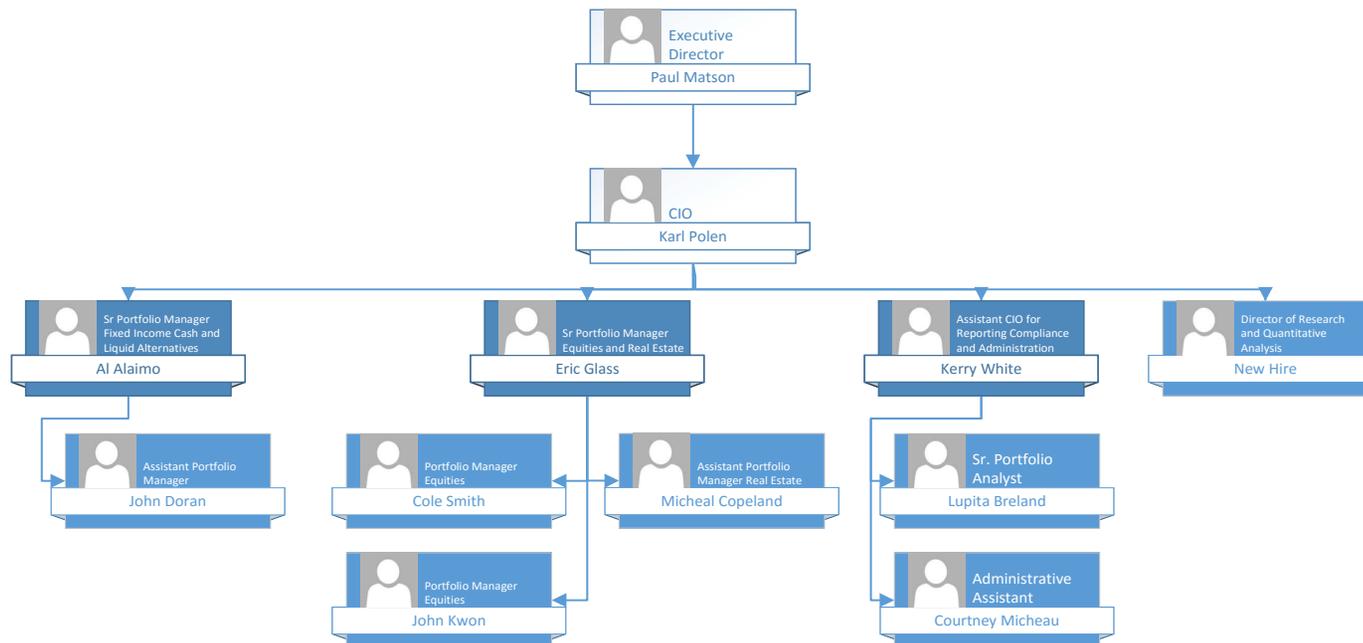
3 Working Groups

New Organization Chart

- The ASRS has adopted a new organization chart (found on the following page)
We have retained functional organization around asset classes with Sr. Portfolio Managers responsible for equities, fixed income (including cash and liquid alternatives) and private markets
We have refocused the Assistant CIO role to manage reporting, legal and compliance matters

Organization Chart

Investment Management Organization



Notes:

1. The Investment Strategy Committee is a committee of the whole co-chaired by the Exec. Director and CIO. It decides policy matters and refers investments for decision to asset class committees for review pursuant to SIP006.
2. The Tactical Positioning Committee makes tactical and rebalance decisions. Its members are the Exec. Director, CIO, Asst. CIO and each of the Sr. Portfolio Managers.
3. Asset Class Committees include the Exec. Director, CIO, Asst. CIO and relevant portfolio managers. They are established pursuant to SIP006 and make investment decisions in accordance with the requirements of SIP006.
4. Various working groups are established for projects and continuing processes. Working groups report to the Investment Strategy Committee. The Exec. Director and CIO are active participants on various working groups.

Committees

- Investment Strategy
 - Committee includes all members of IMD
 - Meets weekly
 - Co-Chaired by CIO and Executive Director
 - Considers all investment and policy matters
 - Refers investments to Asset Class committees when required under SIP006

Tactical Positioning

Members include the Executive Director, CIO, Assistant CIO and the Sr. Portfolio Managers
Reviews portfolio positioning and makes rebalance and tactical repositioning decisions

Asset Class Committees

Established pursuant to and operate as required under SIP006
Members include the Executive Director, CIO, Assistant CIO and applicable portfolio managers
Meet as needed, generally monthly

Working Groups

- Working groups are established to deal with various investment, policy and administrative matters

Working groups can be standing or temporary

They tend to be interdisciplinary for coordination and cross-training opportunities

A list of working groups and their membership is on the following page

Working Groups

	Active Management	ASRS Market Value Report	Bridgewater	Cash Mgmt/Assetization	Compliance	Data Services and Subscriptions	Enterprise Risk Managemetn	Facilities and Technology	Factors and Smart Beta	FX for Tactical Positioning	IMD Master Calendar	IMD Web Pages and IQ	Internal Portfolio Review	Legal Process	LTD	Performance Measurement	Reporting Content	Risk Management	Securities Litigation	Tactical Positionins
Al Alaimo	X									X				X						X
Cole Smith			X			X				X						X				
Courtney Micheau							X				X	X		X			X			
Eric Glass	X		X			X			X	X		X								X
John Doran		X	X	X		X				X		X	X		X	X				
John Kwon	X			X					X									X	X	
Karl Polen	X	X						X	X				X			X	X			
Kerry White					X		X	X			X	X		X			X			X
Lupita Breland				X	X		X						X		X		X		X	
Micheal Copeland		X			X	X		X								X			X	
Paul Matson									X				X							

Culture

- Emphasis on cross-disciplinary approach – No Silos
Evidence based with commitment honest, respectful communication
Soft boundaries on job descriptions – emphasize cross-disciplinary collaboration and cross-training opportunities

Outline

1 Organization

2 Asset Class Committees

3 Working Groups

Private Markets Committee Schedule

- The private markets committee met on the following days during 2016:
 - January 19
 - February 25
 - March 22
 - April 26
 - May 26

The private markets committee is scheduled to meet:

June 24

July 20

Additional meetings anticipated monthly for the balance of the year

Private Markets Committee – April 22, 2016

- Approved a \$40 million renewal investment in a U.S. based lower middle market private equity sponsor
- Approved a \$3 million allocation increase to a shopping center investment

Private Markets Committee – May 26, 2016

- Approved a \$30 million investment in a co-invest vehicle to invest along side an existing partnership investing in health care related businesses

Public Markets Committee Meeting Schedule

- Starting with the June 24 meeting, the public markets committee will meet monthly in a joint session with the private markets committee
The public markets agenda will include, at a minimum, a review of monthly reports and other administrative and investment items that arise from time to time

Public Markets Committee – May 2, 2016

- Approved a separate account of up to \$300 million to invest in business development companies (“BDCs”)

Although listed public equities, BDCs invest in corporate loans and, as such, it was decided to place this investment in the opportunistic debt portfolio

Outline

1 Organization

2 Asset Class Committees

3 Working Groups

Recent Accomplishments - Master Cash Optimization

- Several steps taken to minimize cash

Have reduced master cash and established goal to run master cash at <1% of total fund

Commenced program to routinely sweep cash from portfolios when that is preferable to reinvestment

- Eliminates round trip transaction costs for sale of investments to meet predictable cash needs

Optimized assetization

Eliminated more expensive foreign futures contracts from protocol
Changed procedure to assetize combined cash balances in two different “master cash” accounts to achieve 100% assetization at 2PM every day

Switched to “STIF” from “GSTIF” for cash investment increasing yield by approximately 20bp

Combined effect of these changes is \$3 to \$5 million per year improvement in performance

Portfolio Cash Optimization and Other Investment Accomplishments

- Internal equity portfolios have optimized cash
 - Internal equity portfolios have reduced cash to 10-20 bp, compared to previous 80b
 - reduces drag from futures equitization
 - reduces tracking error from imperfection of futures equitization for portfolios where there is not a well matched futures contract for the portfolio
 - Investment performance improvement is 2bp to 5bp on a \$6.7 billion portfolio, the equivalent of \$1 million to \$3 million per year

Established weekly portfolio positioning meetings to review portfolio position and implement changes

Rebalanced portfolio from overweight U.S./underweight international to neutral

Reformatted structure of passive EAFE holdings to EAFE fund from country funds

Established smaller, separate country fund account for tactical flexibility in weightings

Results in 3bp annual savings on \$3 bn+ portfolio (about \$1 million per year savings)

Process and Administrative Accomplishments

- Reformatted daily portfolio position report to accurately reflect exposures from cash assetization and the equity factor portfolio
 - Identified anomalies in performance reporting from various vendors and implemented changes to increase accuracy, minimize differences and establish consistency in performance reporting
 - Established weekly “all hands” meetings and combined calendars for manager meetings and team coverage
 - Established corporate subscriptions and kindle accounts for shared reading resources
 - Completed formalization of compliance for public and private portfolios (presenting to IC today)
 - Completed performance analysis of multi asset category (presenting to IC today)

Work in Process - Portfolio Management

- Continued implementation of internal equity portfolio improvements
 - Optimization of trades around name changes including development of a model for the market microstructure of index changes
 - Factor based filters for trade timing
 - Optimization of equitization include “rich/cheap” analysis and consideration of alternate instruments or markets for equitization
 - Minimization of cash

Further optimization of cash under consideration

Equitization of frictional cash in external manager portfolios
Integration of internal equity portfolio cash with master cash consolidating all assetization efforts in a single account and allowing the internal equity portfolios to operate effectively at zero cash

Work in Process - Investment Process

- A monthly reporting system for public market assets
 - Combines returns based and holdings based analysis for performance assessment
 - Goal is to identify and diagnose performance anomalies with an effort to separate skill from cyclical and equity factor effects allowing for
 - rebalance to cyclically undervalued strategies or factors
 - rebalance away from cyclically overvalued strategies or factors
 - increase or reduce funding to managers with positive or negative skill assessments

Develop an integrated strategy paper for equities investing considering passive, factor driven and active strategies and their applicability to equity sub asset classes

Work in Process - Administrative Matters

- Real estate consulting RFP (presenting to IC today)
- Private equity consulting RFP
- Legal and tax SOPs
- Optimization of reporting systems
 - elimination of unused/less valuable reports
 - automation of reports retained to enhance quality control and minimize portfolio team time spent preparing reports
- Implementation of technology improvements and remodeled work spaces to encourage and enhance collaboration

Planned and Potential Future Projects

- Dynamic modeling for liquidity and risk management
Enhanced processes and analytical methods for 2017 strategic asset allocation update
Customized personnel systems for IMD to enhance careers, cross training, development and succession planning

4d. State Street Risk Report

Executive Presentation

To: Arizona State Retirement System

truView Risk Report April 30, 2016

Produced by State Street Global Exchange, Risk Services

Monthly Reallocation Summary*

Month Ending March 31, 2016

Portfolio Reductions

- TOTAL EQUITY
 - \$12.4M – E2 (Large Cap)
 - \$1.8M – E7 (Large Cap)
 - \$1.3M – E8 (Large Cap)
 - \$0.5M – INTECH (Large Cap)
 - \$4M – E3 (Mid Cap)
 - \$0.8M – E6 (Small Cap)
- TOTAL CASH
 - \$80M – CASH–ASSETIZED
- **TOTAL REDUCTIONS****
 - **\$100.8M**

Portfolio Additions

- TOTAL CASH
 - \$100.8M – CASH–UNASSETIZED
- **TOTAL ADDITIONS****
 - **\$100.8M**

*Based on State Street accounting records for public markets and therefore exclude private market drawdowns.

**Reductions and additions do not include plan distributions.

Monthly Reallocation Summary*

Month Ending April 30, 2016

Portfolio Reductions

- TOTAL EQUITY
 - \$9.4M – E2 (Large Cap)
 - \$2.4M – E7 (Large Cap)
 - \$1.7M – E8 (Large Cap)
 - \$3.2M – E3 (Mid Cap)
 - \$4.7M – E4 (Mid Cap)
 - \$1.9M – E6 (Small Cap)
- TOTAL FIXED INCOME
 - \$24.9M – BLACKROCK INT GOVT/CREDIT (Core)
 - \$35M – F2 (Core)
- TOTAL OPPORTUNISTIC EQUITY
 - \$97.3M – OPPORTUNISTIC EQUITY
- TOTAL CASH
 - \$95M – CASH-ASSETIZED
- **TOTAL REDUCTIONS****
 - **\$275.5M**

Portfolio Additions

- TOTAL CASH
 - \$275.5M – CASH-UNASSETIZED
- **TOTAL ADDITIONS****
 - **\$275.5M**

*Based on State Street accounting records for public markets and therefore exclude private market drawdowns.

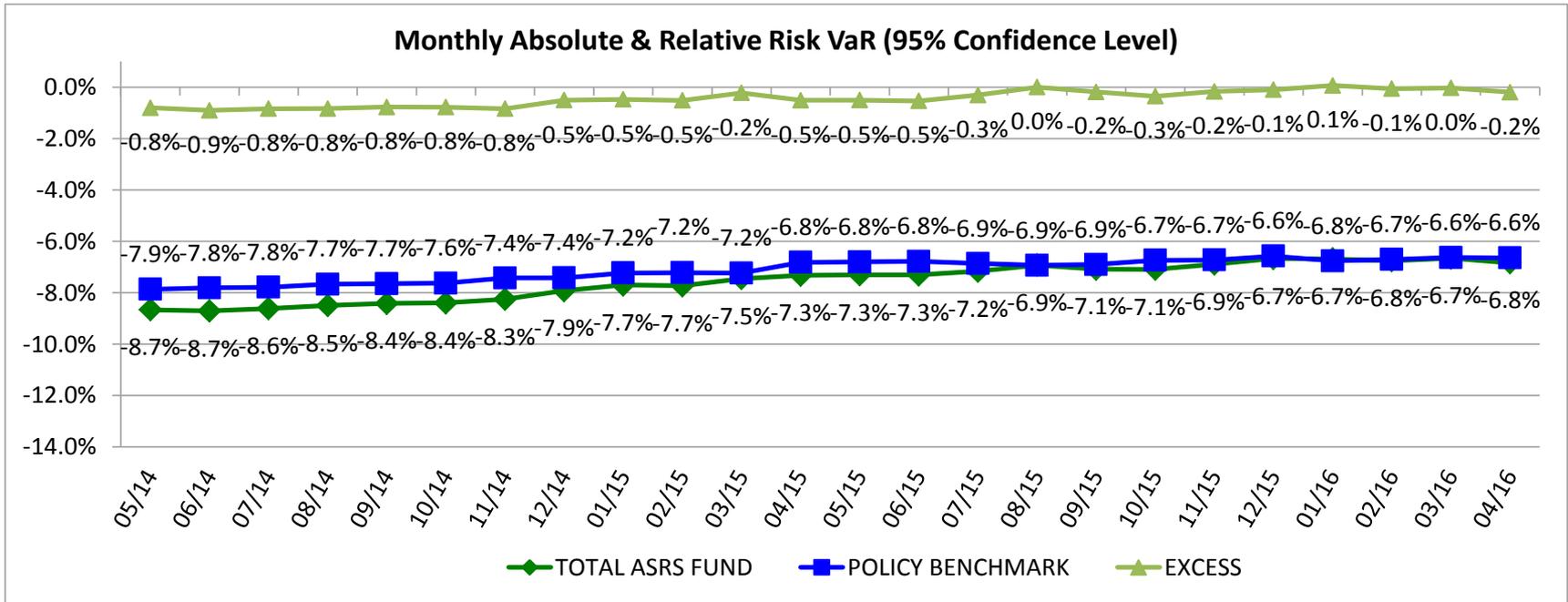
**Reductions and additions do not include plan distributions.

Monthly Risk Summary

Month Ending April 30, 2016

Month-end Risk Profile

- Historical Risk (95% VaR) for most asset classes reported another slight up-tick in risk from prior months. This incremental rise in risk is reflective of the increasingly volatile market. In aggregate, Total Plan risk increased 19bps which was primarily driven by the allocation shift of \$740m from US Equity to International Equity. The Policy Benchmark risk increased 1bps.
- Excess risk over the Policy Benchmark increased to settle at 19bps.



ARIZONA STATE RETIREMENT SYSTEM

TOTAL PLAN EXPOSURE OVERVIEW

As of April 30, 2016

Sector (Public US Equity Only)	\$ Value	% Value	**Blended US BM	Difference
CONSUMER NON-CYCLICAL	\$ 1,952,098,488	22.5%	24.3%	(1.8%)
FINANCIAL	\$ 1,443,631,403	16.7%	17.2%	(0.6%)
TECHNOLOGY	\$ 933,626,287	10.8%	12.2%	(1.4%)
INDUSTRIAL	\$ 879,362,454	10.1%	9.5%	0.6%
CONSUMER CYCLICAL	\$ 873,654,519	10.1%	10.4%	(0.3%)
COMMUNICATIONS	\$ 787,537,547	9.1%	13.1%	(4.0%)
FUNDS	\$ 564,961,524	6.5%	0.0%	6.5%
ENERGY	\$ 544,397,886	6.3%	7.3%	(1.0%)
UTILITIES	\$ 324,919,776	3.7%	3.3%	0.4%
BASIC MATERIALS	\$ 242,465,669	2.8%	2.6%	0.2%
CASH	\$ 87,289,071	1.0%	0.0%	1.0%
GOVERNMENT	\$ 28,012,065	0.3%	0.0%	0.3%
INDEX	\$ 3,921,274	0.0%	0.0%	0.0%
DIVERSIFIED	\$ 1,354,549	0.0%	0.0%	(0.0%)
GRAND TOTAL	\$ 8,667,232,513	100.0%	100.0%	0.0%

Country Category (Total Plan)	\$ Value	% Value	*Blended TOTAL BM	Difference
NORTH AMERICA	\$ 25,279,557,669	75.0%	68.2%	6.8%
EUROPE DEVELOPED	\$ 5,174,760,725	15.3%	16.5%	(1.2%)
ASIA DEVELOPED	\$ 2,067,531,397	6.1%	9.0%	(2.8%)
ASIA EM	\$ 750,793,400	2.2%	4.2%	(2.0%)
LATIN AMERICA	\$ 208,330,321	0.6%	1.2%	(0.6%)
MIDDLE EAST	\$ 98,371,498	0.3%	0.3%	0.0%
AFRICA	\$ 97,940,323	0.3%	0.5%	(0.2%)
EUROPE EM	\$ 48,759,779	0.1%	0.2%	(0.0%)
GRAND TOTAL	\$ 33,726,045,112	100.0%	100.0%	0.0%

Market Cap^ (Public Equities Only)	\$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	\$ 1,734,947	0.0%	0.0%	(0.0%)
2) 100M - 500M	\$ 249,219,031	1.5%	1.4%	0.0%
3) 500M - 1B	\$ 393,042,548	2.3%	3.2%	(0.9%)
4) 1B - 5B	\$ 2,583,217,039	15.4%	21.3%	(5.9%)
5) 5B - 10B	\$ 1,848,265,452	11.0%	9.8%	1.2%
6) 10B - 50B	\$ 5,759,149,489	34.3%	30.5%	3.8%
7) >50B	\$ 5,936,365,703	35.4%	33.7%	1.7%
GRAND TOTAL	\$ 16,770,994,209	100.0%	100.0%	0.0%

^Excludes cash and non-traded securities

Top 20 Issuer (Total Plan)	\$ Value	% Value	Market Cap	Sector	Industry Group
1 CASH**	\$ 1,796,162,741	5.3%		CASH	Cash
2 US TREASURY N/B	\$ 1,174,634,718	3.5%		GOVERNMENT	SOVEREIGN
3 FANNIE MAE	\$ 689,699,407	2.1%		MORTGAGE SECURITIES	FNMA COLLATERAL
4 FREDDIE MAC	\$ 241,645,330	0.7%		MORTGAGE SECURITIES	FGLMC COLLATERAL
5 TREASURY BILL	\$ 222,193,726	0.7%		GOVERNMENT	SOVEREIGN
6 ISHARES MSCI USA QUALITY FACTOR E	\$ 159,890,233	0.5%	4) 1B - 5B	FUNDS	EQUITY FUND
7 ISHARES MSCI USA SIZE FACTOR ETF	\$ 150,368,837	0.5%	2) 100M - 500M	FUNDS	EQUITY FUND
8 EXXON MOBIL CORP	\$ 139,817,153	0.4%	7) 50B+	ENERGY	OIL&GAS
9 APPLE INC	\$ 137,742,023	0.4%	7) 50B+	TECHNOLOGY	COMPUTERS
10 ISHARES MSCI USA VALUE FACTOR ETF	\$ 136,341,240	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
11 JOHNSON & JOHNSON	\$ 134,386,475	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
12 GOVERNMENT NATIONAL MORTGAGE A	\$ 130,602,673	0.4%		MORTGAGE SECURITIES	GNMA2 COLLATERAL
13 MICROSOFT CORP	\$ 130,333,468	0.4%	7) 50B+	TECHNOLOGY	SOFTWARE
14 AT&T INC	\$ 121,484,894	0.4%	7) 50B+	COMMUNICATIONS	TELECOMMUNICATIONS
15 ISHARES MSCI USA MOMENTUM FACTO	\$ 118,361,214	0.4%	4) 1B - 5B	FUNDS	EQUITY FUND
16 NESTLE SA	\$ 111,785,312	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	FOOD
17 ISHARES MSCI EMERGING MARKETS E1	\$ 107,480,459	0.3%	6) 10B - 50B	FUNDS	EQUITY FUND
18 ALPHABET INC	\$ 102,789,368	0.3%	7) 50B+	COMMUNICATIONS	INTERNET
19 ROCHE HOLDING AG	\$ 97,856,397	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
20 JPMORGAN CHASE & CO	\$ 95,388,191	0.3%	7) 50B+	FINANCIAL	BANKS

*Blended TOTAL BM: 23% SP500, 3% SP400, 3% SP600, 7% R2000, 18% MSCI EAFE, 5% MSCI EM, 2% MSCI Sml Cap, 16% BC US AGG, 6% BC US HY, 6% FTSE NAREIT GLOBAL, 2% DJ-UBS COMMODITY, 5% CUSTOM MULTI-ASSET CLASS, 4% S&P/LSTA LEVERED LOAN.

**Blended US BM: 80% SP500, 10% SP400, 10% SP600.

***Cash does not represent an IMD tactical view; Cash includes the ASRS Cash balance, manager-level portfolio cash & equivalents and cash collateralizing sundry portfolio-level futures contracts.

ARIZONA STATE RETIREMENT SYSTEM

As of April 30, 2016

Sector (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
CONSUMER NON-CYCLICAL	\$ 1,913,173,978	23.2%	22.2%	0.9%
FINANCIAL	\$ 1,877,168,015	22.7%	24.3%	(1.6%)
CONSUMER CYCLICAL	\$ 1,118,229,897	13.5%	11.9%	1.6%
INDUSTRIAL	\$ 977,683,159	11.8%	11.6%	0.2%
COMMUNICATIONS	\$ 699,572,163	8.5%	9.0%	(0.5%)
BASIC MATERIALS	\$ 436,346,779	5.3%	6.2%	(1.0%)
ENERGY	\$ 433,125,657	5.2%	5.5%	(0.2%)
TECHNOLOGY	\$ 335,844,673	4.1%	4.8%	(0.7%)
UTILITIES	\$ 269,232,210	3.3%	3.5%	(0.2%)
CASH	\$ 117,242,003	1.4%	0.0%	1.4%
DIVERSIFIED	\$ 57,905,424	0.7%	0.9%	(0.2%)
INDEX	\$ 20,269,250	0.2%	0.0%	0.2%
FX	\$ (99,760)	(0.0%)	0.0%	(0.0%)
GRAND TOTAL	\$ 8,255,693,447	100.0%	100.0%	0.0%

Top 20 Industry Groups (Public Intl Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1 BANKS	\$ 956,505,481	11.6%	12.3%	(0.7%)
2 PHARMACEUTICALS	\$ 679,096,985	8.2%	7.6%	0.7%
3 TELECOMMUNICATIONS	\$ 454,952,396	5.5%	5.7%	(0.2%)
4 INSURANCE	\$ 424,866,803	5.1%	4.9%	0.2%
5 FOOD	\$ 415,289,503	5.0%	4.5%	0.5%
6 OIL&GAS	\$ 393,066,966	4.8%	5.0%	(0.2%)
7 RETAIL	\$ 310,792,776	3.8%	2.8%	0.9%
8 AUTO MANUFACTURERS	\$ 245,433,769	3.0%	3.2%	(0.2%)
9 CHEMICALS	\$ 241,491,749	2.9%	3.3%	(0.4%)
10 BEVERAGES	\$ 198,717,420	2.4%	2.4%	(0.0%)
11 ELECTRIC	\$ 183,838,259	2.2%	2.3%	(0.1%)
12 DIVERSIFIED FINAN SERV	\$ 179,784,054	2.2%	2.5%	(0.3%)
13 COMMERCIAL SERVICES	\$ 175,818,088	2.1%	2.0%	0.2%
14 REAL ESTATE	\$ 157,744,460	1.9%	2.2%	(0.3%)
15 SEMICONDUCTORS	\$ 156,851,204	1.9%	2.4%	(0.5%)
16 BUILDING MATERIALS	\$ 146,760,051	1.8%	1.3%	0.5%
17 TRANSPORTATION	\$ 146,148,828	1.8%	1.8%	0.0%
18 COSMETICS/PERSONAL CARE	\$ 133,694,055	1.6%	1.7%	(0.1%)
19 MINING	\$ 125,916,335	1.5%	1.8%	(0.3%)
20 AUTO PARTS&EQUIPMENT	\$ 122,914,628	1.5%	1.3%	0.2%

*Blended NON-US BM: 72% MSCI EAFE, 20% MSCI EM, 8% MSCI Sml Cap.

INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Country Category (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
EUROPE DEVELOPED	\$ 4,869,906,568	59.0%	50.9%	8.1%
ASIA DEVELOPED	\$ 2,037,088,829	24.7%	29.2%	(4.5%)
ASIA EM	\$ 753,265,094	9.1%	14.0%	(4.9%)
LATIN AMERICA	\$ 187,872,329	2.3%	2.8%	(0.5%)
NORTH AMERICA	\$ 178,720,660	2.2%	0.1%	2.1%
MIDDLE EAST	\$ 96,864,130	1.2%	1.0%	0.2%
AFRICA	\$ 84,301,174	1.0%	1.5%	(0.5%)
EUROPE EM	\$ 47,674,662	0.6%	0.5%	0.1%
GRAND TOTAL	\$ 8,255,693,447	100.0%	100.0%	0.0%

Market Cap** (Public Intl Equities Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	\$ 1,575,010	0.0%	0.0%	0.0%
2) 100M - 500M	\$ 68,206,299	0.8%	0.4%	0.4%
3) 500M - 1B	\$ 142,237,304	1.8%	1.2%	0.5%
4) 1B - 5B	\$ 977,514,603	12.0%	12.6%	(0.5%)
5) 5B - 10B	\$ 1,090,308,774	13.4%	13.2%	0.3%
6) 10B - 50B	\$ 3,438,421,053	42.4%	40.4%	2.0%
7) >50B	\$ 2,396,976,015	29.5%	32.2%	(2.7%)
GRAND TOTAL	\$ 8,115,239,057	100.0%	100.0%	0.0%

**Excludes cash and non-traded securities

ARIZONA STATE RETIREMENT SYSTEM

TOTAL FIXED INCOME EXPOSURE OVERVIEW

As of April 30, 2016

Sector (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
GOVERNMENT	\$ 1,458,175,661	29.3%	31.9%	(2.5%)
MORTGAGE SECURITIES	\$ 1,065,066,104	21.4%	21.6%	(0.2%)
FINANCIAL	\$ 392,300,663	7.9%	9.1%	(1.2%)
INDEX	\$ 387,768,095	7.8%	0.0%	7.8%
COMMUNICATIONS	\$ 354,514,654	7.1%	7.6%	(0.5%)
CONSUMER NON-CYCLICAL	\$ 335,751,428	6.8%	7.6%	(0.9%)
CONSUMER CYCLICAL	\$ 227,095,269	4.6%	5.1%	(0.5%)
ENERGY	\$ 209,131,743	4.2%	5.6%	(1.4%)
INDUSTRIAL	\$ 163,681,854	3.3%	3.9%	(0.6%)
TECHNOLOGY	\$ 113,013,844	2.3%	2.2%	0.1%
UTILITIES	\$ 90,150,010	1.8%	2.2%	(0.4%)
BASIC MATERIALS	\$ 80,298,143	1.6%	2.8%	(1.1%)
CASH	\$ 45,942,878	0.9%	0.0%	0.9%
BANK LOANS	\$ 26,882,567	0.5%	0.0%	0.5%
ASSET BACKED SECURITIES	\$ 18,154,380	0.4%	0.4%	0.0%
DIVERSIFIED	\$ 2,550,295	0.1%	0.1%	(0.1%)
GRAND TOTAL	\$ 4,970,477,590	100.0%	100.0%	0.0%

Top 20 Industry Groups (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
1 SOVEREIGN	\$ 1,385,251,443	28.2%	30.0%	(1.8%)
2 FNMA COLLATERAL	\$ 618,248,325	12.6%	9.2%	3.3%
3 BLANK	\$ 406,718,267	8.3%	0.0%	8.3%
4 FGLMC COLLATERAL	\$ 214,131,470	4.4%	5.7%	(1.3%)
5 BANKS	\$ 202,267,829	4.1%	5.1%	(1.0%)
6 TELECOMMUNICATIONS	\$ 151,575,963	3.1%	3.7%	(0.6%)
7 MEDIA	\$ 145,036,660	3.0%	3.3%	(0.4%)
8 GNMA2 COLLATERAL	\$ 104,258,409	2.1%	4.8%	(2.7%)
9 OIL&GAS	\$ 100,787,141	2.1%	3.1%	(1.1%)
10 HEALTHCARE-SERVICES	\$ 94,024,296	1.9%	1.9%	(0.0%)
11 COMMERCIAL MBS	\$ 92,824,511	1.9%	1.3%	0.6%
12 DIVERSIFIED FINAN SERV	\$ 90,240,088	1.8%	2.0%	(0.1%)
13 ELECTRIC	\$ 83,972,352	1.7%	2.0%	(0.3%)
14 PHARMACEUTICALS	\$ 78,634,744	1.6%	1.5%	0.1%
15 RETAIL	\$ 74,145,048	1.5%	1.7%	(0.2%)
16 PIPELINES	\$ 71,227,722	1.5%	1.4%	0.0%
17 CASH	\$ 64,245,102	1.3%	0.0%	1.3%
18 SOFTWARE	\$ 58,305,970	1.2%	1.0%	0.2%
19 CHEMICALS	\$ 53,656,226	1.1%	0.9%	0.2%
20 MUNICIPAL	\$ 49,723,155	1.0%	0.6%	0.4%

Credit Rating Group** (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
01) AAA	\$ 2,915,679,905	58.7%	52.3%	6.4%
02) AA	\$ 152,511,808	3.1%	3.1%	(0.0%)
03) A	\$ 376,904,137	7.6%	7.9%	(0.3%)
04) BBB	\$ 545,097,046	11.0%	11.1%	(0.2%)
05) BB	\$ 435,855,814	8.8%	13.0%	(4.3%)
06) B	\$ 439,203,365	8.8%	9.4%	(0.5%)
07) CCC	\$ 94,721,648	1.9%	2.9%	(1.0%)
08) CC	\$ 793,932	0.0%	0.2%	(0.1%)
09) C	\$ 52,240	0.0%	0.0%	(0.0%)
10) D	\$ 7,928,901	0.2%	0.0%	0.1%
11) Not Rated	\$ 1,728,795	0.0%	0.1%	(0.0%)
GRAND TOTAL	\$ 4,970,477,591	100.0%	100.0%	0.0%

Maturity Bucket (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
0-1Y	\$ 138,315,071	3.0%	0.8%	2.2%
1Y-3Y	\$ 690,698,546	15.0%	18.8%	(3.7%)
3Y-5Y	\$ 709,492,044	15.5%	18.1%	(2.7%)
5Y-10Y	\$ 1,519,297,859	33.1%	29.4%	3.7%
10Y-15Y	\$ 154,623,044	3.4%	4.4%	(1.0%)
15Y+	\$ 1,377,704,404	30.0%	28.6%	1.5%
GRAND TOTAL	\$ 4,590,130,970	100.0%	100.0%	0.0%

*Blended TOTAL BM: 73% BC US AGG, 27% BC US HY.

ARIZONA STATE RETIREMENT SYSTEM
As of April 30, 2016

TOTAL PLAN RISK OVERVIEW

Strategy	\$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
MONTHLY RISK																
CASH - UNASSETIZED	\$ 36,372,161	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(0.6%)	(0.0%)	0.0%
CASH - ASSETIZED	\$ 362,661,450	1%	(6.3%)	(0.1%)	1.1%	(6.1%)	(0.1%)	0.9%	(10.2%)	(0.1%)	0.9%	(23.8%)	4.0%	(3.2%)	(0.0%)	0.9%
INTEREST RATE SENSITIVE	\$ 4,970,477,590	15%	(2.4%)	(0.0%)	0.7%	(2.2%)	(0.0%)	0.4%	(3.2%)	(0.0%)	0.1%	(5.4%)	1.4%	(1.3%)	(0.0%)	0.7%
US EQUITY	\$ 8,667,232,513	26%	(8.3%)	(2.2%)	32.5%	(8.1%)	(2.0%)	29.6%	(14.1%)	(3.6%)	31.1%	(29.5%)	5.6%	(4.1%)	(1.0%)	29.8%
INTERNATIONAL EQUITY	\$ 8,255,693,447	24%	(10.0%)	(2.1%)	30.9%	(9.5%)	(2.2%)	32.9%	(15.0%)	(3.5%)	30.4%	(35.5%)	6.3%	(4.6%)	(1.1%)	32.2%
REAL ESTATE	\$ 3,069,878,225	9%	(10.3%)	(0.9%)	13.8%	(10.7%)	(0.9%)	13.3%	(18.6%)	(1.6%)	13.8%	(38.6%)	7.0%	(5.3%)	(0.5%)	13.1%
FARMLAND & TIMBER	\$ 186,940,434	1%	(10.9%)	(0.1%)	0.9%	(11.3%)	(0.1%)	0.9%	(19.7%)	(0.1%)	0.9%	(40.8%)	7.3%	(5.6%)	(0.0%)	0.8%
PRIVATE EQUITY	\$ 2,667,939,829	8%	(11.5%)	(0.9%)	13.6%	(10.8%)	(0.8%)	11.7%	(18.2%)	(1.4%)	12.2%	(36.4%)	7.0%	(5.3%)	(0.4%)	11.8%
PRIVATE DEBT	\$ 2,534,069,913	8%	(2.4%)	0.0%	(0.2%)	(4.0%)	(0.2%)	2.8%	(7.7%)	(0.4%)	3.2%	(17.3%)	2.7%	(2.2%)	(0.1%)	3.1%
OPPORTUNISTIC EQUITY	\$ 309,012,775	1%	(10.8%)	(0.1%)	1.5%	(10.1%)	(0.1%)	1.3%	(17.0%)	(0.2%)	1.3%	(34.1%)	6.5%	(5.0%)	(0.0%)	1.3%
OPPORTUNISTIC DEBT	\$ 1,088,751,787	3%	(7.3%)	(0.1%)	1.9%	(9.3%)	(0.2%)	3.4%	(14.4%)	(0.4%)	3.2%	(28.6%)	5.8%	(4.3%)	(0.1%)	3.3%
GLOBAL INFLATION LINKED	\$ 208,581,853	1%	(8.7%)	(0.0%)	0.5%	(8.7%)	(0.0%)	0.5%	(12.8%)	(0.1%)	0.5%	(28.2%)	5.1%	(4.3%)	(0.0%)	0.6%
INFRASTRUCTURE	\$ 325,444,190	1%	(9.4%)	(0.1%)	1.3%	(9.1%)	(0.1%)	1.3%	(15.1%)	(0.1%)	1.3%	(35.1%)	5.8%	(4.6%)	(0.0%)	1.3%
MULTI-ASSET CLASS	\$ 1,042,988,946	3%	(4.8%)	(0.1%)	1.6%	(4.7%)	(0.1%)	1.1%	(6.7%)	(0.1%)	1.1%	(10.3%)	2.8%	(2.5%)	(0.0%)	1.2%
GRAND TOTAL	\$ 33,726,045,112	100%	(6.8%)	(6.8%)	100.0%	(6.8%)	(6.8%)	100.0%	(11.5%)	(11.5%)	100.0%	(26.8%)	4.6%	(3.5%)	(3.5%)	100.0%
INTERIM POLICY BENCHMARK			(6.6%)			(6.6%)			(10.9%)			(25.8%)	4.5%	(3.3%)		

ANNUALIZED RISK																
CASH - UNASSETIZED	\$ 36,372,161	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	(2.2%)	(0.0%)	0.0%
CASH - ASSETIZED	\$ 362,661,450	1%	(21.8%)	(0.2%)	1.1%	(21.0%)	(0.2%)	0.9%	(35.4%)	(0.4%)	0.9%	N/A	13.7%	(10.9%)	(0.1%)	0.9%
INTEREST RATE SENSITIVE	\$ 4,970,477,590	15%	(8.2%)	(0.2%)	0.7%	(7.7%)	(0.1%)	0.4%	(11.2%)	(0.1%)	0.1%	N/A	4.9%	(4.5%)	(0.1%)	0.7%
US EQUITY	\$ 8,667,232,513	26%	(28.8%)	(7.7%)	32.5%	(28.0%)	(7.0%)	29.6%	(48.8%)	(12.4%)	31.1%	N/A	19.4%	(14.2%)	(3.6%)	29.8%
INTERNATIONAL EQUITY	\$ 8,255,693,447	24%	(34.6%)	(7.3%)	30.9%	(33.0%)	(7.8%)	32.9%	(52.0%)	(12.1%)	30.4%	N/A	21.7%	(16.0%)	(3.9%)	32.2%
REAL ESTATE	\$ 3,069,878,225	9%	(35.7%)	(3.3%)	13.8%	(37.0%)	(3.1%)	13.3%	(64.4%)	(5.5%)	13.8%	N/A	24.1%	(18.2%)	(1.6%)	13.1%
FARMLAND & TIMBER	\$ 186,940,434	1%	(37.7%)	(0.2%)	0.9%	(39.2%)	(0.2%)	0.9%	(68.1%)	(0.4%)	0.9%	N/A	25.5%	(19.2%)	(0.1%)	0.8%
PRIVATE EQUITY	\$ 2,667,939,829	8%	(40.0%)	(3.2%)	13.6%	(37.3%)	(2.8%)	11.7%	(62.9%)	(4.9%)	12.2%	N/A	24.1%	(18.5%)	(1.4%)	11.8%
PRIVATE DEBT	\$ 2,534,069,913	8%	(8.3%)	0.0%	(0.2%)	(13.9%)	(0.7%)	2.8%	(26.6%)	(1.3%)	3.2%	N/A	9.4%	(7.7%)	(0.4%)	3.1%
OPPORTUNISTIC EQUITY	\$ 309,012,775	1%	(37.4%)	(0.3%)	1.5%	(34.9%)	(0.3%)	1.3%	(58.9%)	(0.5%)	1.3%	N/A	22.6%	(17.4%)	(0.2%)	1.3%
OPPORTUNISTIC DEBT	\$ 1,088,751,787	3%	(25.3%)	(0.5%)	1.9%	(32.1%)	(0.8%)	3.4%	(49.9%)	(1.3%)	3.2%	N/A	20.1%	(14.8%)	(0.4%)	3.3%
GLOBAL INFLATION LINKED	\$ 208,581,853	1%	(30.1%)	(0.1%)	0.5%	(30.0%)	(0.1%)	0.5%	(44.4%)	(0.2%)	0.5%	N/A	17.8%	(15.0%)	(0.1%)	0.6%
INFRASTRUCTURE	\$ 325,444,190	1%	(32.7%)	(0.3%)	1.3%	(31.5%)	(0.3%)	1.3%	(52.2%)	(0.5%)	1.3%	N/A	20.0%	(16.0%)	(0.2%)	1.3%
MULTI-ASSET CLASS	\$ 1,042,988,946	3%	(16.5%)	(0.4%)	1.6%	(16.3%)	(0.3%)	1.1%	(23.1%)	(0.4%)	1.1%	N/A	9.5%	(8.7%)	(0.1%)	1.2%
GRAND TOTAL	\$ 33,726,045,112	100%	(23.7%)	(23.7%)	100.0%	(23.6%)	(23.6%)	100.0%	(40.0%)	(40.0%)	100.0%	N/A	15.8%	(12.1%)	(12.1%)	100.0%
INTERIM POLICY BENCHMARK			(23.0%)			(22.7%)			(37.9%)			N/A	15.4%	(11.5%)		

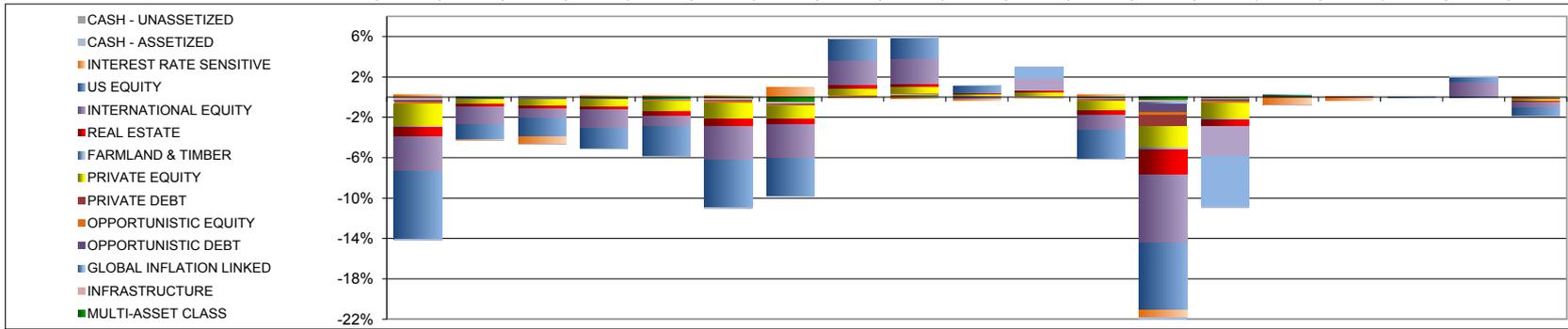
Strategy	\$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
CASH - UNASSETIZED	\$ 36,372,161	0%	0.00		0.00				\$ 36,372,161	\$ 36,372,161	100.0%
CASH - ASSETIZED	\$ 362,661,450	1%	0.29	0.94	0.25	0.94			\$ 869,966,471	\$ 362,661,450	100.0%
INTEREST RATE SENSITIVE	\$ 4,970,477,590	15%	0.01	0.02	0.02	0.10	5.27	0.135	\$ 4,695,030,985	\$ 4,970,653,750	100.0%
US EQUITY	\$ 8,667,232,513	26%	1.03	0.99	0.80	0.90	0.61	0.004	\$ 8,774,021,092	\$ 8,677,372,062	100.1%
INTERNATIONAL EQUITY	\$ 8,255,693,447	24%	1.06	0.90	1.00	0.99			\$ 8,264,106,781	\$ 8,310,607,673	100.7%
REAL ESTATE	\$ 3,069,878,225	9%	1.13	0.87	0.98	0.88			\$ 3,069,878,225	\$ 3,069,878,225	100.0%
FARMLAND & TIMBER	\$ 186,940,434	1%	1.20	0.87	1.03	0.88			\$ 186,940,434	\$ 186,940,434	100.0%
PRIVATE EQUITY	\$ 2,667,939,829	8%	1.24	0.95	0.95	0.85			\$ 2,667,939,829	\$ 2,667,939,829	100.0%
PRIVATE DEBT	\$ 2,534,069,913	8%	0.31	0.61	0.26	0.59	0.65	0.009	\$ 2,526,240,319	\$ 2,534,087,498	100.0%
OPPORTUNISTIC EQUITY	\$ 309,012,775	1%	1.16	0.95	0.89	0.85			\$ 309,012,775	\$ 309,012,775	100.0%
OPPORTUNISTIC DEBT	\$ 1,088,751,787	3%	0.75	0.69	0.65	0.70			\$ 1,088,751,787	\$ 1,088,751,787	100.0%
GLOBAL INFLATION LINKED	\$ 208,581,853	1%	0.30	0.64	0.27	0.68	0.15	0.000	\$ 432,476,412	\$ 208,581,853	100.0%
INFRASTRUCTURE	\$ 325,444,190	1%	1.05	0.97	0.90	0.98			\$ 325,444,190	\$ 325,444,190	100.0%
MULTI-ASSET CLASS	\$ 1,042,988,946	3%	0.07	0.56	0.05	0.46	(8.16)	(0.847)	\$ (4,070,910,137)	\$ 3,658,823,870	350.8%
GRAND TOTAL	\$ 33,726,045,112	100%	0.95	0.96	0.80	0.96	4.84	0.118	\$ 29,175,271,323	\$ 36,407,127,556	107.9%

ARIZONA STATE RETIREMENT SYSTEM
As of April 30, 2016

TOTAL PLAN STRESS TESTS

Strategy	\$ Value	% Value	Historical Scenarios													Predictive Scenarios					
			Black Monday - 5 Day	Gulf War - 5 Day	Bond Crash: Feb 94 - May 94	Asian Crisis 97-98 - 5 day	Russian Crisis - 5 Day	Nasdaq Correction: July 98 - Aug 98	Russian Debt Crisis Aug- Oct	IR Steepening: Sept 98 - Nov 98	Emerging Markets Rally: Jan 99 - May 99	Fed Tightening: April - June 99	Nasdaq Rally: Nov 99 - Jan 00	9/11 Attack - 5 Day	09-10-2008	S&P 500 -20%	IR Parallel Shift +100bps	Spread Up 100bps	Inflation +1%	Gold Shock -20%	Oil Shock -20%
Stress Test Stand Alone																					
CASH - UNASSETIZED	\$ 36,372,161	0.1%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CASH - ASSETIZED	\$ 362,661,450	1.1%	(14.6)	(3.7)	(8.8)	(4.2)	(6.4)	(13.8)	(3.1)	4.9	11.1	2.9	4.7	(5.6)	(19.1)	(11.2)	(3.8)	0.0	0.5	0.9	(1.5)
INTEREST RATE SENSITIVE	\$ 4,970,477,511	14.7%	1.4	(0.2)	(4.5)	0.7	0.7	1.2	6.6	(0.2)	(0.8)	(0.6)	(1.0)	1.3	(5.0)	0.5	(5.1)	(0.3)	0.5	0.0	0.4
US EQUITY	\$ 8,667,232,513	25.7%	(26.1)	(5.7)	(7.4)	(7.9)	(11.5)	(18.2)	(14.8)	8.2	7.5	2.7	4.0	(11.1)	(26.0)	(19.2)	(0.0)	0.0	1.8	(2.9)	0.0
INTERNATIONAL EQUITY	\$ 8,255,861,873	24.5%	(14.0)	(7.4)	(3.7)	(7.5)	(4.2)	(13.8)	(13.6)	9.8	10.3	(0.9)	5.2	(6.1)	(27.3)	(12.0)	(0.0)	0.0	(0.0)	6.0	(2.3)
REAL ESTATE	\$ 3,069,878,225	9.1%	(10.7)	(2.4)	(3.1)	(3.3)	(4.8)	(7.6)	(6.1)	3.4	3.1	1.1	1.6	(4.6)	(27.5)	(7.9)	0.0	0.0	0.0	0.0	(1.0)
FARMLAND & TIMBER	\$ 186,940,434	0.6%	(11.4)	(2.5)	(3.3)	(3.4)	(5.0)	(8.0)	(6.5)	3.6	3.3	1.2	1.7	(4.8)	(29.0)	(8.4)	0.0	0.0	0.0	0.0	(1.0)
PRIVATE EQUITY	\$ 2,667,939,829	7.9%	(27.6)	(6.1)	(7.9)	(8.3)	(12.2)	(19.4)	(15.7)	8.7	7.9	2.8	4.2	(11.8)	(27.1)	(20.3)	0.0	0.0	0.0	0.0	(3.2)
PRIVATE DEBT	\$ 2,534,069,913	7.5%	(0.4)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.1)	0.1	0.1	0.0	0.1	(0.2)	(15.7)	(0.3)	(0.0)	(0.0)	0.0	0.0	(0.1)
OPPORTUNISTIC EQUITY	\$ 309,012,775	0.9%	(25.8)	(5.7)	(7.4)	(7.8)	(11.4)	(18.2)	(14.7)	8.2	7.4	2.7	3.9	(11.0)	(25.4)	(19.0)	0.0	0.0	0.0	0.0	(3.0)
OPPORTUNISTIC DEBT	\$ 1,088,751,787	3.2%	(5.4)	(1.2)	(1.5)	(1.6)	(2.4)	(3.8)	(3.1)	1.7	1.5	0.6	0.8	(2.3)	(27.3)	(4.0)	0.0	0.0	0.0	0.0	(1.2)
GLOBAL INFLATION LINKED	\$ 208,581,853	0.6%	(0.0)	0.0	0.1	(0.0)	(0.0)	(0.0)	(0.2)	(0.0)	0.0	0.0	0.0	(0.0)	(18.0)	0.0	0.1	0.0	(0.0)	(3.8)	(6.5)
INFRASTRUCTURE	\$ 325,444,190	1.0%	(21.1)	(4.7)	(6.0)	(6.4)	(9.3)	(14.9)	(12.0)	6.7	6.1	2.2	3.2	(9.0)	(28.3)	(15.5)	0.0	0.0	0.0	0.0	(2.7)
MULTI-ASSET CLASS	\$ 1,042,988,946	3.1%	(2.6)	(2.6)	(1.9)	(2.7)	(5.5)	(5.1)	(17.3)	(0.2)	7.2	1.7	1.9	(4.2)	(7.9)	(3.5)	6.8	0.0	(0.5)	2.1	(1.3)
GRAND TOTAL	\$ 33,726,213,459	100.0%	(14.0)	(4.3)	(4.7)	(5.1)	(5.8)	(10.9)	(8.9)	5.8	5.8	0.9	2.9	(6.0)	(22.1)	(10.9)	(0.6)	(0.3)	0.1	2.0	(1.8)
INTERIM POLICY BENCHMARK			(14.4)	(4.6)	(5.3)	(5.6)	(5.6)	(11.5)	(7.9)	6.7	6.8	0.8	3.2	(6.0)	(21.2)	(11.2)	(1.2)	(0.6)	0.1	2.1	(1.9)

Stress Test Contribution																					
CASH - UNASSETIZED	\$ 36,372,161	0.1%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASH - ASSETIZED	\$ 362,661,450	1.1%	(0.2)	(0.0)	(0.1)	(0.0)	(0.1)	(0.1)	(0.0)	0.1	0.1	0.0	0.1	(0.1)	(0.2)	(0.1)	(0.0)	0.0	0.0	0.0	(0.0)
INTEREST RATE SENSITIVE	\$ 4,970,477,511	14.7%	0.2	(0.0)	(0.7)	0.1	0.1	0.2	1.0	(0.0)	(0.1)	(0.1)	(0.1)	0.2	(0.7)	0.1	(0.7)	(0.3)	0.1	0.0	0.1
US EQUITY	\$ 8,667,232,513	25.7%	(6.7)	(1.5)	(1.9)	(2.0)	(3.0)	(4.7)	(3.8)	2.1	1.9	0.7	1.0	(2.9)	(6.7)	(4.9)	(0.0)	0.0	0.5	(0.7)	0.0
INTERNATIONAL EQUITY	\$ 8,255,861,873	24.5%	(3.4)	(1.8)	(0.9)	(1.8)	(1.0)	(3.4)	(3.3)	2.4	2.5	(0.2)	1.3	(1.5)	(6.7)	(2.9)	(0.0)	0.0	(0.0)	1.5	(0.6)
REAL ESTATE	\$ 3,069,878,225	9.1%	(1.0)	(0.2)	(0.3)	(0.3)	(0.4)	(0.7)	(0.6)	0.3	0.3	0.1	0.1	(0.4)	(2.5)	(0.7)	0.0	0.0	0.0	0.0	(0.1)
FARMLAND & TIMBER	\$ 186,940,434	0.6%	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.2)	(0.0)	0.0	0.0	0.0	0.0	(0.0)
PRIVATE EQUITY	\$ 2,667,939,829	7.9%	(2.2)	(0.5)	(0.6)	(0.7)	(1.0)	(1.5)	(1.2)	0.7	0.6	0.2	0.3	(0.9)	(2.1)	(1.6)	0.0	0.0	0.0	0.0	(0.3)
PRIVATE DEBT	\$ 2,534,069,913	7.5%	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(1.2)	(0.0)	(0.0)	(0.0)	0.0	0.0	(0.0)
OPPORTUNISTIC EQUITY	\$ 309,012,775	0.9%	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(0.2)	(0.2)	0.0	0.0	0.0	0.0	(0.0)
OPPORTUNISTIC DEBT	\$ 1,088,751,787	3.2%	(0.2)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	0.1	0.0	0.0	0.0	(0.1)	(0.9)	(0.1)	0.0	0.0	0.0	0.0	(0.0)
GLOBAL INFLATION LINKED	\$ 208,581,853	0.6%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.1)	0.0	0.0	0.0	(0.0)	(0.0)	(0.0)
INFRASTRUCTURE	\$ 325,444,190	1.0%	(0.2)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(0.3)	(0.1)	0.0	0.0	0.0	0.0	(0.0)
MULTI-ASSET CLASS	\$ 1,042,988,946	3.1%	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.5)	(0.0)	0.2	0.1	0.1	(0.1)	(0.2)	(0.1)	0.2	0.0	(0.0)	0.1	(0.0)
GRAND TOTAL	\$ 33,726,213,459	100.0%	(14.0)	(4.3)	(4.7)	(5.1)	(5.8)	(10.9)	(8.9)	5.8	5.8	0.9	2.9	(6.0)	(22.1)	(10.9)	(0.6)	(0.3)	0.1	2.0	(1.8)
INTERIM POLICY BENCHMARK			(14.4)	(4.6)	(5.3)	(5.6)	(5.6)	(11.5)	(7.9)	6.7	6.8	0.8	3.2	(6.0)	(21.2)	(11.2)	(1.2)	(0.6)	0.1	2.1	(1.9)



GLOSSARY	DEFINITION	INTERPRETATION
Historical VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, <u>making no assumption of the tail distribution</u> , and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
HVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
HVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Parametric VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, <u>making a Normal distribution assumption of the tail distribution</u> , and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20.	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
PVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
PVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Exp Tail Loss 95%	Also known as Conditional VaR or ETL, it is derived by taking a weighted average between the VaR and losses exceeding the VaR. If VaR is reported at 95.0%, then ETL will average the losses between 95.1% to 99.9%. It is a risk measure that assesses the risk beyond VaR and into the tail end of the distribution of loss.	A measure that produces better incentives for traders than VaR is expected shortfall. This is also sometimes referred to as Conditional VaR, or tail loss. <u>Where VaR asks the question 'how bad can things get?', expected shortfall asks 'if things do get bad, what is our expected loss?'</u>
Exp Tail Loss Contri 95%	This is the decomposition of the ETL making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Exp Tail Loss Contri % to Total	This is the ETL contribution displayed in percent.	
Max Loss	The maximum projected loss.	
Downside Risk (8.7%)	A risk metric that distinguishes between "good" and "bad" returns by assigning risk only to those returns below a return specified by an investor. Downside risk is considered a more effective risk measure than standard deviation (volatility) for two important reasons: 1) it is investor specific, and 2) it identifies return distributions that have higher probabilities for negative ("left tail") market events. Downside risk is also referred to as downside deviation or target semi-deviation.	A 5% downside risk with an 8.7% MAR means that the conditional average underperformance (below 8.7% annual) is 5%, adjusted for a positive skew (greater than the MAR). Effectively, downside risk amplifies a big loss (by squaring the distance of that loss to the target) and smoothes out the risk measure by taking into account the gains setting them up to be equal to the target MAR.
Downside Risk Contri (8.7%)	This is the decomposition of the downside risk, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Downside Risk Contri (8.7%) to Total	This is the downside risk contribution displayed in percent.	

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Agenda Item #5



NEPC, LLC

To: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board

From: Mr. Allan Martin, Partner, Consultant, NEPC
Mr. Dan LeBeau, Consultant, NEPC

Date: June 14, 2016

Subject: Agenda Item #5: Presentation, Discussion and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund Q1-16

Purpose

To present and discuss information regarding the independent reporting, monitoring and oversight of the ASRS Investment Program.

Recommendation

Informational only; no action required.

Background

NEPC is responsible for providing an independent reporting; monitoring and oversight function from the Investment Program information which is presented by the CIO and IMD.

As a result, NEPC has developed reports for both the Investment Committee and Board designed to 1) provide the appropriate level of investment information for the purposes of independent oversight (ASRS SAAP compliance, Asset Class Committee minutes review, investment selection due diligence packet compliance, etc.); 2) provide ASRS investment program performance relative to its goals/objectives (presented quarterly); and 3) communicate NEPC's perspectives on the market environment, investment outlook or other initiatives or topics they believe are important to convey to the Board.

As of March 31, 2016, the Total Fund's market value was approximately \$33.7 billion.

For the one-year period ending March 31, 2016, the Total Fund returned 0.0% (net of fees), outperforming the Interim SAA Policy by 1.4%. For the three-year period, the Total Fund produced a return of 6.7% per annum, outperforming the Interim SAA Policy by 1.3%. Over the past ten years, the Total Fund has returned 5.7% per annum, and since inception, the portfolio's performance is 9.7%.

NEPC will provide a review of Total Fund performance and an independent assessment of the ASRS investment program.

Attachments:

- NEPC's Independent Reporting, Monitoring and Oversight reports

Arizona State Retirement System

Independent ASRS Investment Program Oversight for the Period Ending March 31, 2016

June 24, 2016

Allan Martin, Partner, NEPC
Dan LeBeau, Consultant, NEPC



- ASRS Investment Objectives/Performance
- Independent Oversight/Compliance
 - SAA Policy Compliance
 - Total Fund and Asset Class Analysis
 - Asset Class Committee Monitoring
- Market Environment Update and Outlook
- Appendix: SAA Policy History

ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of March 31, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Macro

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.
- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAAP) Benchmark.
- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.
- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Micro

Source: ASRS Strategic Plan, March 2013

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.

	<u>20 Year Annualized Return</u>
Total Fund	7.4%
Constant 8%	<u>8.0%</u>
Excess Return	(0.6)%

**Goal Met:
No**

- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAA) Benchmark.

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	1.4%	0.0%	6.7%	7.1%	5.7%	9.7%
Interim SAA Policy¹	1.4%	-1.4%	5.4%	6.2%	5.4%	9.4%
Excess Return	0.0%	1.4%	1.3%	0.9%	0.3%	0.3%

1 Year Goal Met: Yes
3 Year Goal Met: Yes

¹Composition of SAA Policy can be found in the appendix.

Arizona State Retirement System
Total Fund Attribution Analysis

Total Plan	1 Year	3 Years	5 Years
Allocation Effect ¹	0.03%	0.65%	0.38%
Manager Selection Effect ²	1.33%	0.63%	0.56%
Residual ³	0.03%	-0.02%	-0.05%
Excess Return	1.39%	1.26%	0.89%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

1. Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights. (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio – Weight Asset Class Interim Policy Index)

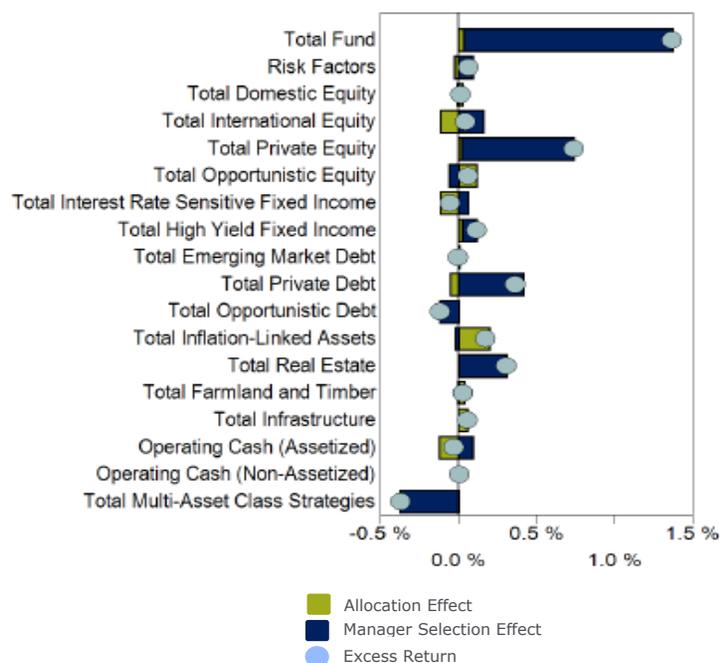
2. Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)] + **Interaction Effect:** Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio – Weight Asset Class Policy Index)) – (Return Asset Class Index (Weight Asset Class Portfolio – Weight Asset Class Index))

3. Residual: Contribution to excess return not captured in Allocation Effect and Manager Selection Effect.

Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects
1 Year Ending March 31, 2016



1 Year Excess Return: +1.39%

- Allocation Effect: +0.03%
 - Commodities tactical underweight (+0.19%)
 - Opportunistic Equity tactical allocation (+0.12%)
 - Infrastructure overweight (+0.06%)
 - Assetized Operating Cash overweight (-0.12%)
 - International Equity overweight (-0.11%)
 - Public Markets Fixed Income underweight (-0.09%)
- Manager Selection Effect: +1.33%
 - Private Equity outperformed due to various managers (+0.72%)
 - Private Debt outperformed due to various managers (+0.41%)
 - Real Estate outperformed due to various managers (+0.30%)
 - Risk Factors outperformed (+0.09%)
 - Opportunistic Debt underperformed (-0.12%)
 - Opportunistic Equity Underperformed (-0.06%)
- Residual: +0.03%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights. $(\text{Return Asset Class Index} - \text{Total Interim Policy Index Return}) \times (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Interim Policy Index})$

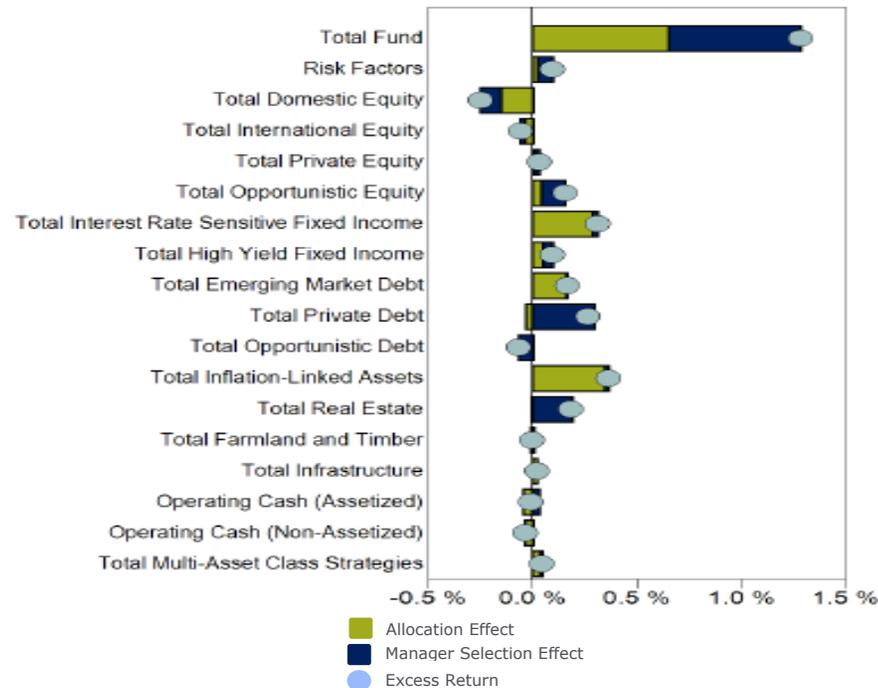
Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy Index})]$ + **Interaction Effect:** Measures the impact of over/under weighting decisions and over/under performance. $(\text{Return Asset Class Portfolio} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Policy Index})) - (\text{Return Asset Class Index} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Index}))$

Residual: Contribution to excess return not captured in Allocation Effect and Manager Selection Effect.

Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects 3 Years Ending March 31, 2016



3 Year Excess Return: +1.26%

- Allocation Effect: +0.65%
 - Commodities tactical underweight (+0.34%)
 - Public Markets Fixed Income tactical underweight (+0.33%)
 - Emerging Market Debt tactical underweight (+0.16%)
 - Domestic Equity tactical underweight (-0.16%)
 - Private Debt underweight (-0.03%)
- Manager Selection Effect: +0.63%
 - Private Debt outperformed due to various managers (+0.29%)
 - Real Estate outperformed due to various managers (+0.19%)
 - Opportunistic Equity outperformed due to various managers (+0.11%)
 - Risk Factors outperformed (+0.07%)
 - Public Markets Fixed Income outperformed (+0.07%)
 - Domestic Equity underperformed (-0.10%)
- Residual: -0.02%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights. $(\text{Return Asset Class Index} - \text{Total Interim Policy Index Return}) \times (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Interim Policy Index})$

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy Index})]$ + **Interaction Effect:** Measures the impact of over/under weighting decisions and over/under performance. $(\text{Return Asset Class Portfolio} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Policy Index})) - (\text{Return Asset Class Index} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Index}))$

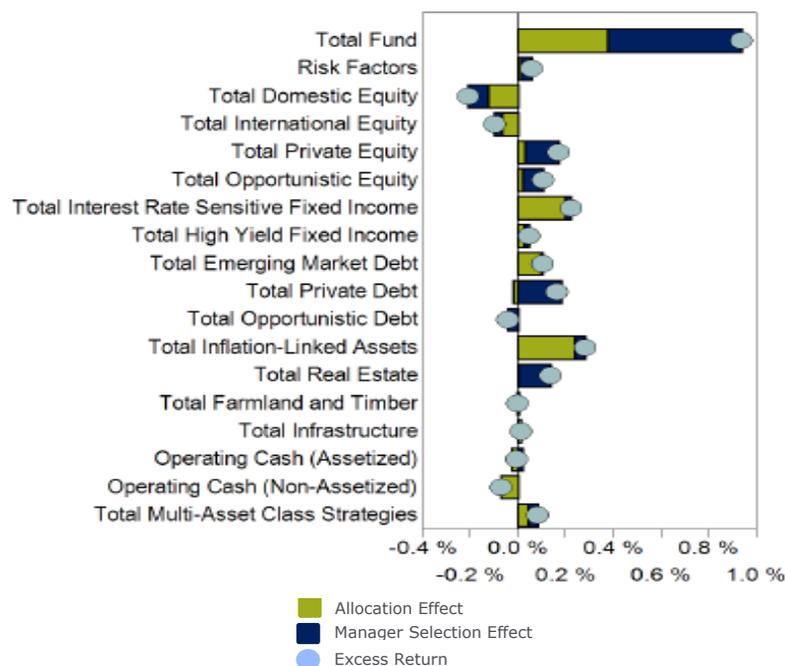
Residual: Contribution to excess return not captured in Allocation Effect and Manager Selection Effect.



Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects 5 Years Ending March 31, 2016



5 Year Excess Return: +0.89%

- Allocation Effect: +0.38%
 - Public Markets Fixed Income tactical underweight (+0.33%)
 - Commodities tactical underweight (+0.24%)
 - Domestic Equity tactical underweight (-0.13%)
 - International Equity tactical overweight (-0.07%)
- Manager Selection Effect: +0.56%
 - Private Debt outperformed due to various managers (+0.18%)
 - Private Equity outperformed due to various managers (+0.14%)
 - Real Estate outperformed due to various managers (+0.13%)
 - Opportunistic Equity outperformed due to various managers (+0.08%)
 - Commodities outperformed (+0.04%)
 - Risk Factor outperformed (+0.04%)
 - Domestic Equity underperformed due to various managers (-0.08%)
- Residual: -0.05%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights. $(\text{Return Asset Class Index} - \text{Total Interim Policy Index Return}) \times (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Interim Policy Index})$

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy Index})]$ + **Interaction Effect:** Measures the impact of over/under weighting decisions and over/under performance. $(\text{Return Asset Class Portfolio} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Policy Index})) - (\text{Return Asset Class Index} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Index}))$

Residual: Contribution to excess return not captured in Allocation Effect and Manager Selection Effect.



Asset Class Performance vs. Benchmark – Public Markets

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return
ASRS Total Domestic and Int'l Equity ¹	-3.2%	6.9%
ASRS Custom Total Equity Benchmark	-3.6%	6.9%
Excess Return	0.4%	0.0%
ASRS Domestic Equity	0.7%	11.2%
ASRS Custom Domestic Equity Benchmark	0.6%	11.4%
Excess Return	0.1%	-0.2%
ASRS International Equity	-7.4%	1.0%
ASRS Custom Int'l Equity Benchmark	-8.1%	1.1%
Excess Return	0.7%	-0.1%
ASRS Public Markets Fixed Income	1.8%	1.6%
ASRS Custom Fixed Income Benchmark	0.5%	0.8%
Excess Return	1.3%	0.8%
ASRS Inflation-Linked	-21.6%	-16.8%
ASRS Custom Inflation-Linked Benchmark	-19.6%	-16.9%
Excess Return	-2.0%	0.1%
ASRS Multi-Asset Class Strategies	-10.4%	3.7%
ASRS Multi-Asset Class Strategies Benchmark	-1.5%	5.7%
Excess Return	-8.9%	-2.0%

¹Performance of ASRS Total Domestic and Int'l Equity includes the performance of the ASRS Domestic Equity and ASRS International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013.

Note: Composition of ASRS Custom Asset Class Benchmarks can be found in the appendix.

**Goal Met:
Partially**

Asset Class Performance vs. Benchmark – Private Markets¹

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return	IRR Since Inception	Inception Date
ASRS Private Equity	5.5%	11.0%	11.0%	Oct-07
Russell 2000	-5.9%	9.3%	9.7%	
Excess Return	11.4%	1.7%	1.3%	
ASRS Opportunistic Equity ²	3.8%	22.2%	23.1%	Apr-11
ASRS Private Debt	8.5%	10.7%	10.9%	Jul-12
S&P/LSTA Leveraged Loan Index + 250 bps	1.1%	3.1%	3.3%	
Excess Return	7.4%	7.6%	7.6%	
ASRS Opportunistic Debt ²	-3.1%	4.2%	9.3%	Jan-08
ASRS Real Estate	14.9%	14.5%	8.1%	Oct-05
NFI - ODCE Index	14.3%	12.9%	7.0%	
Excess Return	0.6%	1.6%	1.1%	
ASRS Farmland and Timber	4.5%	--	4.3%	Jul-13
CPI ex-Food and Energy + 350 bps	5.7%	--	5.5%	
Excess Return	-1.2%		-1.2%	
ASRS Total Infrastructure	5.3%	--	5.1%	Dec-14
CPI ex-Food and Energy + 350 bps	5.7%	--	5.5%	
Excess Return	-0.4%		-0.4%	

1- Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of December 31, 2015.

2- Net absolute rate of return expectations range from 10-14% per annum.

Note: Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of the performance of ASRS private markets portfolios.

**Goal Met:
Partially**



Cash Management

- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Month	External CFs	Last day of the Month Ending Balance*
Feb – 15	(\$123.2)	\$80.4
Mar – 15	(\$64.8)	\$418.0
Apr – 15	(\$90.9)	\$550.1
May – 15	(\$47.8)	\$479.0
Jun – 15	(\$74.4)	\$318.3
Jul – 15	(\$150.0)	\$405.5
Aug – 15	(\$136.3)	\$351.7
Sep – 15	(\$103.3)	\$392.0
Oct – 15	(\$73.0)	\$394.5
Nov – 15	(\$107.8)	\$705.5
Dec – 15	(\$65.4)	\$966.1
Jan – 16	(\$108.6)	\$788.9
Feb – 16	(\$109.2)	\$545.2
Mar - 16	(\$94.4)	\$517.3

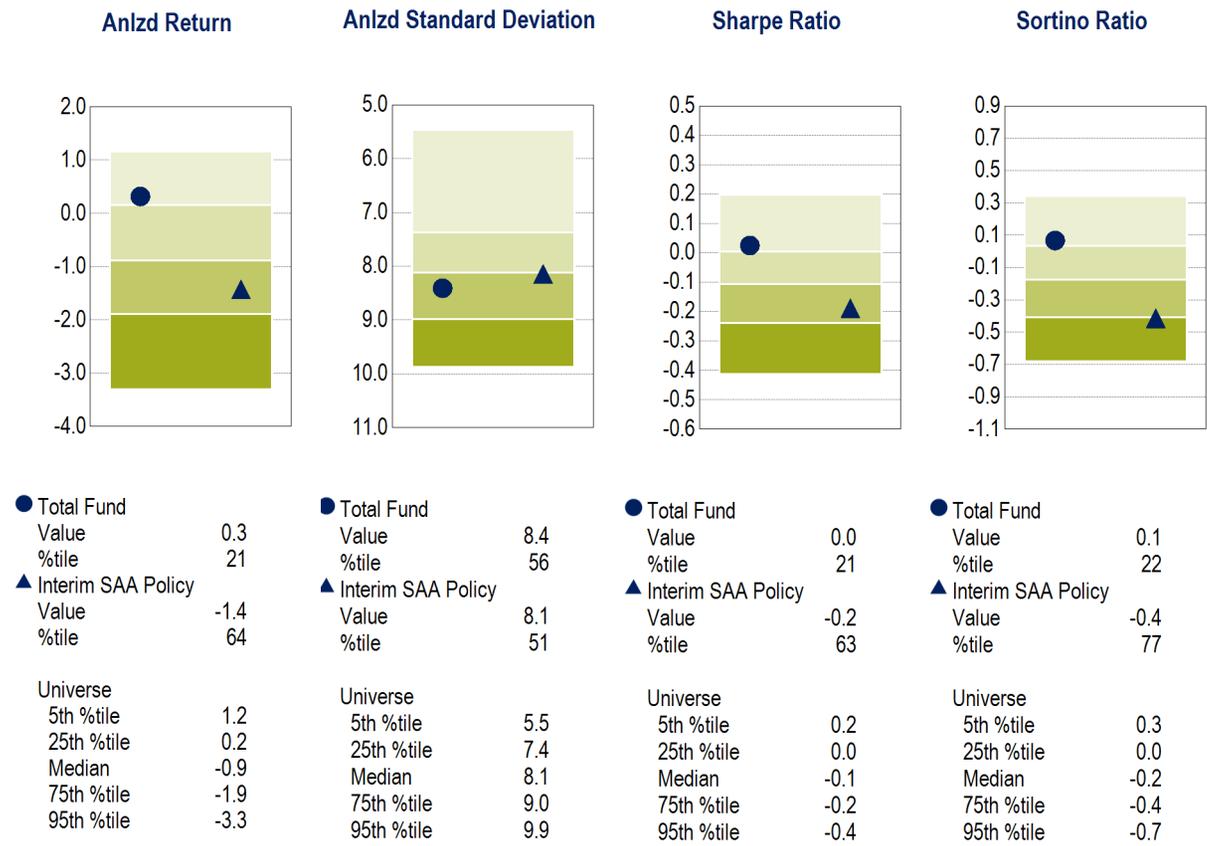
***Includes assetized & unassetized cash balances (Inception of 1/26/15); represents monies to be used for funding needs that occur in subsequent month(s). Generally, monthly pension payments occur on the first day of month.**

**Goal Met:
Yes**

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

1 Year



Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > \$1 Billion Universe.

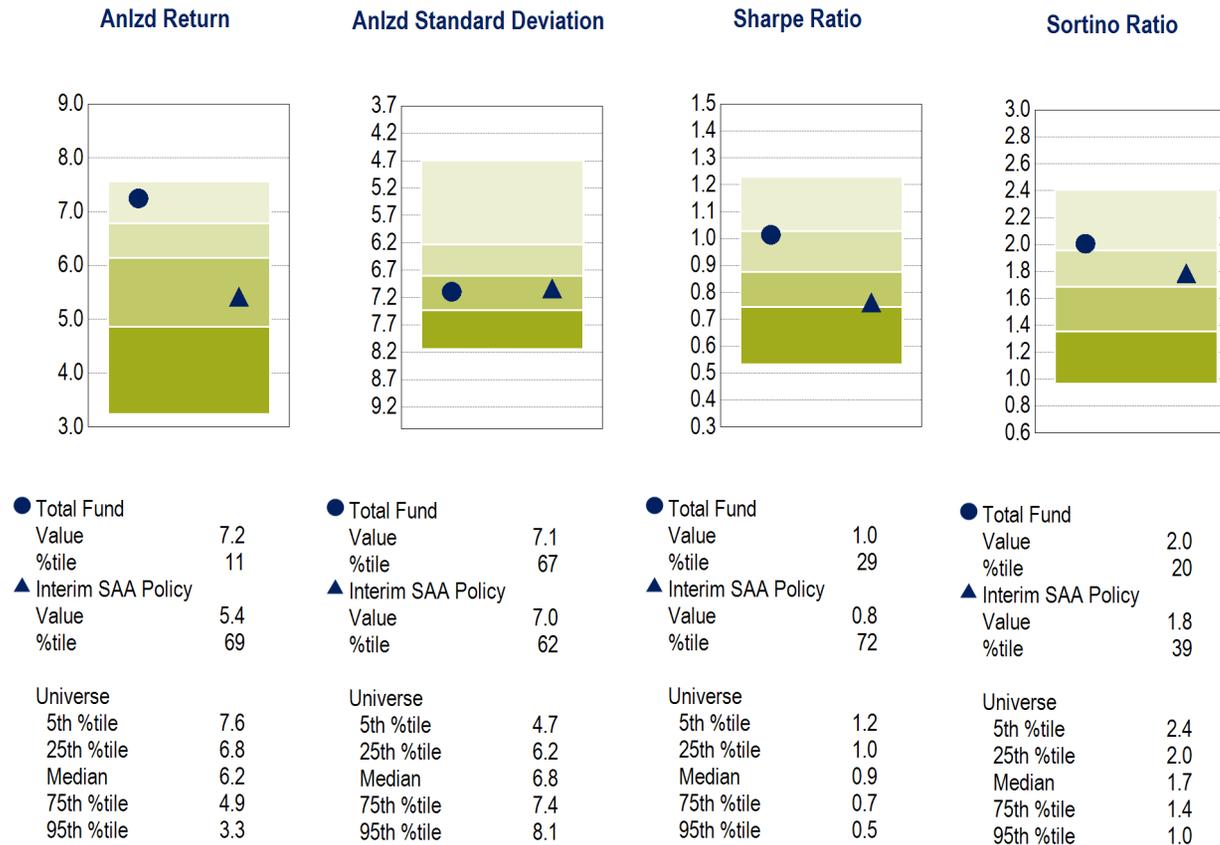
The InvestorForce Public Funds > \$1 Billion Universe contains 106 observations for the period ending March 31, 2016, with total assets of \$1.9 trillion.

Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

3 Year



Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > \$1 Billion Universe.

The InvestorForce Public Funds > \$1 Billion Universe contains 106 observations for the period ending March 31, 2016, with total assets of \$1.9 trillion.

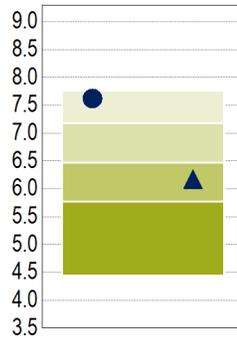
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

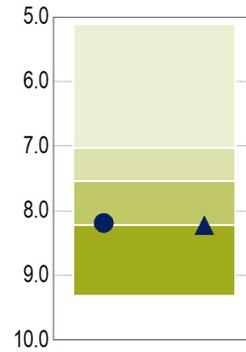
5 Year

Anlzd Return



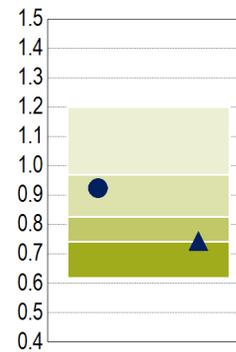
● Total Fund	
Value	7.6
%tile	9
▲ Interim SAA Policy	
Value	6.2
%tile	67
Universe	
5th %tile	7.8
25th %tile	7.2
Median	6.5
75th %tile	5.8
95th %tile	4.5

Anlzd Standard Deviation



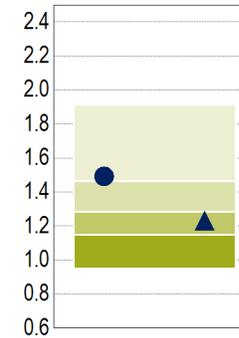
● Total Fund	
Value	8.2
%tile	75
▲ Interim SAA Policy	
Value	8.2
%tile	76
Universe	
5th %tile	5.1
25th %tile	7.0
Median	7.5
75th %tile	8.2
95th %tile	9.3

Sharpe Ratio



● Total Fund	
Value	0.9
%tile	29
▲ Interim SAA Policy	
Value	0.7
%tile	75
Universe	
5th %tile	1.2
25th %tile	1.0
Median	0.8
75th %tile	0.7
95th %tile	0.6

Sortino Ratio



● Total Fund	
Value	1.5
%tile	23
▲ Interim SAA Policy	
Value	1.2
%tile	60
Universe	
5th %tile	1.9
25th %tile	1.5
Median	1.3
75th %tile	1.2
95th %tile	1.0

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > \$1 Billion Universe.

The InvestorForce Public Funds > \$1 Billion Universe contains 106 observations for the period ending March 31, 2016, with total assets of \$1.9 trillion.

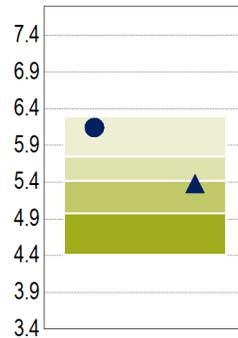
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

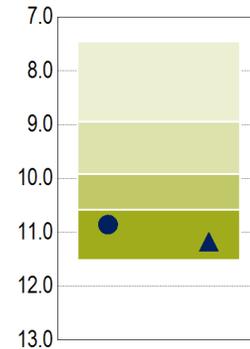
Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

10 Year

Anlzd Return



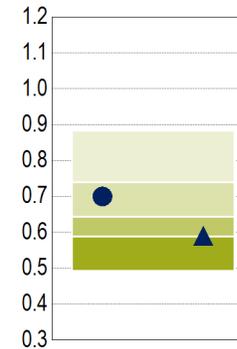
Anlzd Standard Deviation



Sharpe Ratio



Sortino Ratio



● Total Fund

Value 6.1
%tile 7

▲ Interim SAA Policy

Value 5.4
%tile 52

Universe

5th %tile 6.3
25th %tile 5.8
Median 5.4
75th %tile 5.0
95th %tile 4.4

● Total Fund

Value 10.9
%tile 86

▲ Interim SAA Policy

Value 11.2
%tile 90

Universe

5th %tile 7.5
25th %tile 8.9
Median 9.9
75th %tile 10.6
95th %tile 11.5

● Total Fund

Value 0.5
%tile 33

▲ Interim SAA Policy

Value 0.4
%tile 83

Universe

5th %tile 0.6
25th %tile 0.5
Median 0.5
75th %tile 0.4
95th %tile 0.3

● Total Fund

Value 0.7
%tile 33

▲ Interim SAA Policy

Value 0.6
%tile 77

Universe

5th %tile 0.9
25th %tile 0.7
Median 0.6
75th %tile 0.6
95th %tile 0.5

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may no longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > \$1 Billion Universe.

The InvestorForce Public Funds > \$1 Billion Universe contains 106 observations for the period ending March 31, 2016, with total assets of \$1.9 trillion.

Composition of Interim SAA Policy can be found in the appendix.

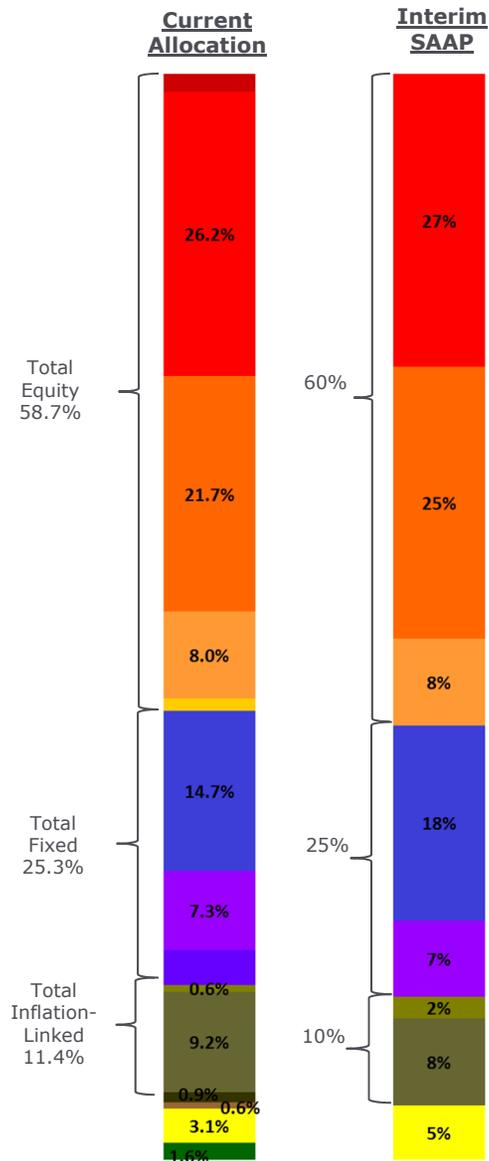
Independent Oversight/Compliance

Note: All of the data shown on the following pages is as of March 31, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Arizona State Retirement System

SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Interim SAAP Difference	Policy Range	Within Range	SAAP
Total Domestic and International Equity	\$16,705,833,499	49.5%	52%	-2.5%			50%
Equity Risk Factor Portfolio	\$567,997,998	1.7%	0%	1.7%			0%
Domestic Equity¹	\$8,824,255,565	26.2%	27%	-0.8%	16% - 36%	Yes	26%
U.S. Large Cap	\$6,845,947,067	20.3%	21%	-0.7%			20%
U.S. Mid Cap	\$1,039,309,790	3.1%	3%	0.1%			3%
U.S. Small Cap	\$938,998,277	2.8%	3%	-0.2%			3%
International Equity¹	\$7,313,579,937	21.7%	25%	-3.3%	14% - 34%	Yes	24%
Developed Large Cap	\$5,588,709,335	16.6%	18%	-1.4%			17%
Developed Small Cap	\$669,097,034	2.0%	2%	0.0%			2%
Emerging Markets	\$1,055,311,717	3.1%	5%	-1.9%			5%
Private Equity²	\$2,687,844,373	8.0%	8%	0.0%	6% - 10%	Yes	8%
Opportunistic Equity^{2,4}	\$396,147,125	1.2%	0%	1.2%			0%
Total Equity	\$19,789,824,996	58.7%	60%	-1.3%	48% - 65%	Yes	58%
Public Markets Fixed Income¹	\$4,965,178,558	14.7%	18%	-3.3%			15%
Treasuries Long Duration	\$382,039,530	1.1%	0%	1.1%	0% - 10%	Yes	0%
Interest Rate Sensitive	\$3,544,981,075	10.5%	14%	-3.5%			11%
High Yield	\$1,038,157,952	3.1%	4%	-0.9%			4%
Private Debt²	\$2,464,453,293	7.3%	7%	0.3%	8% - 12%	No	10%
Opportunistic Debt^{2,4}	\$1,095,566,540	3.2%	0%	3.2%			0%
Total Fixed Income	\$8,525,198,391	25.3%	25%	0.3%	18% - 35%	Yes	25%
Commodities	\$207,002,874	0.6%	2%	-1.4%	0% - 4%	Yes	2%
Real Estate²	\$3,119,892,653	9.2%	8%	1.2%	8% - 12%	Yes	10%
Infrastructure²	\$316,552,244	0.9%	0%	0.9%	0% - 3%	Yes	0%
Farmland and Timber²	\$188,451,439	0.6%	0%	0.6%	0% - 3%	Yes	0%
Opportunistic Inflation-Linked⁴	\$0	0.0%	0%	0.0%			0%
Total Inflation-Linked	\$3,831,899,209	11.4%	10%	1.4%	10% - 16%	Yes	12%
Multi-Asset Class Strategies	\$1,053,935,722	3.1%	5%	-1.9%	0% - 12%	Yes	5%
Cash³	\$529,104,951	1.6%	0%	1.6%			0%
Operating Cash (Non-Assetized)	\$70,663,468	0.2%	0%	0.2%			0%
Operating Cash (Assetized)	\$458,441,483	1.4%	0%	1.4%			0%
Total	\$33,729,963,270	100%	100%	0%			100%

¹Domestic Equity, International Equity and Public Markets Fixed Income market values include residual values remaining in terminated manager accounts.

²Values shown for private markets portfolios include cash flows that occurred during 1Q 2016.

³Cash includes money for the upcoming monthly pension distribution.

⁴Aggregate Opportunistic asset classes not to exceed 10%.

Note: Interim SAA Policy includes proration of 3% Private Debt and 2% Real Estate, which are unfunded.

Policy Ranges shown are relative to the long-term SAAP, causing some asset classes to be out of range while implementation of the long-term SAAP is in process.

Market values include manager held cash.

Arizona State Retirement System

Asset Class Performance Summary - Public Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	FYTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
Total Fund	33,729,963,270	100.0	1.4	--	-0.7	--	0.0	--	6.7	--	7.1	--	5.7	--	9.7	Jul-75
<i>Interim SAA Policy</i>			<u>1.4</u>	--	<u>-2.1</u>	--	<u>-1.4</u>	--	<u>5.4</u>	--	<u>6.2</u>	--	<u>5.4</u>	--	<u>9.4</u>	<i>Jul-75</i>
Over/Under			0.0		1.4		1.4		1.3		0.9		0.3		0.3	
<i>Actual Benchmark</i>			<u>1.4</u>	--	<u>-2.0</u>	--	<u>-1.3</u>	--	<u>6.0</u>	--	<u>6.5</u>	--	<u>5.3</u>	--	--	<i>Jul-75</i>
Total Domestic and International Equity¹	16,705,833,499	49.5	0.4	--	-3.7	--	-3.2	--	6.9	--	7.2	--	5.3	--	6.3	Jan-98
<i>ASRS Custom Total Equity Benchmark</i>			<u>0.4</u>	--	<u>-4.1</u>	--	<u>-3.6</u>	--	<u>6.9</u>	--	<u>7.3</u>	--	<u>5.6</u>	--	<u>5.7</u>	<i>Jan-98</i>
Over/Under			0.0		0.4		0.4		0.0		-0.1		-0.3		0.6	
Total Domestic Equity	8,824,255,565	26.2	1.9	1	0.7	8	0.7	8	11.2	8	10.9	16	7.4	6	11.1	Jul-75
<i>ASRS Custom Domestic Equity Benchmark</i>			<u>1.8</u>	4	<u>0.5</u>	8	<u>0.6</u>	8	<u>11.4</u>	4	<u>11.2</u>	3	<u>7.4</u>	6	<u>11.2</u>	<i>Jul-75</i>
Over/Under			0.1		0.2		0.1		-0.2		-0.3		0.0		-0.1	
<i>InvestorForce Public DB > \$1 Billion US Equity Net Median</i>			<u>0.6</u>		<u>-2.2</u>		<u>-2.1</u>		<u>10.3</u>		<u>10.0</u>		<u>6.5</u>		<u>11.1</u>	<i>Jul-75</i>
Total International Equity	7,313,579,937	21.7	-1.5	81	-8.9	78	-7.4	65	1.0	75	1.2	70	1.9	76	5.7	Apr-87
<i>ASRS Custom Int'l Equity Benchmark</i>			<u>-1.0</u>	68	<u>-8.9</u>	78	<u>-8.1</u>	77	<u>1.1</u>	72	<u>1.4</u>	65	<u>2.7</u>	20	<u>5.4</u>	<i>Apr-87</i>
Over/Under			-0.5		0.0		0.7		-0.1		-0.2		-0.8		0.3	
<i>InvestorForce Public DB > \$1 Billion Global ex-US Equity Net Median</i>			<u>-0.1</u>		<u>-8.1</u>		<u>-7.1</u>		<u>1.6</u>		<u>1.6</u>		<u>2.1</u>		<u>5.7</u>	<i>Apr-87</i>
Total Public Markets Fixed Income	4,965,178,558	14.7	3.4	28	3.0	24	1.8	26	1.6	57	3.6	71	5.0	62	8.2	Jan-00
<i>ASRS Custom Public Markets Fixed Income Benchmark</i>			<u>3.1</u>	36	<u>1.7</u>	38	<u>0.5</u>	53	<u>0.8</u>	74	<u>3.0</u>	90	<u>4.5</u>	85	--	<i>Jul-75</i>
Over/Under			0.3		1.3		1.3		0.8		0.6		0.5		--	
<i>InvestorForce Public DB > \$1 Billion Fixed Income Net Median</i>			<u>2.9</u>		<u>1.0</u>		<u>0.5</u>		<u>1.6</u>		<u>3.9</u>		<u>5.3</u>		<u>8.2</u>	<i>Jul-75</i>
Total Inflation-Linked Assets	207,002,874	0.6	-0.2	80	-24.7	99	-21.6	94	-16.8	99	-13.1	99	--	--	-7.4	Feb-10
<i>ASRS Custom Inflation-Linked Benchmark</i>			<u>0.4</u>	65	<u>-23.1</u>	93	<u>-19.6</u>	91	<u>-16.9</u>	99	<u>-13.9</u>	99	--	--	<u>-8.3</u>	<i>Feb-10</i>
Over/Under			-0.6		-1.6		-2.0		0.1		0.8		--		0.9	
<i>InvestorForce Public DB > \$1 Billion Real Assets/Commodities Net Median</i>			<u>1.3</u>		<u>-6.8</u>		<u>-7.3</u>		<u>-2.6</u>		<u>2.5</u>		<u>5.1</u>		<u>4.2</u>	<i>Feb-10</i>
Total Multi-Asset Class Strategies	1,053,935,722	3.1	-4.4	99	-9.1	99	-10.4	99	3.7	1	5.7	12	6.0	1	6.6	Jan-04
<i>Multi-Asset Class Strategies Custom Benchmark</i>			<u>0.1</u>	84	<u>-1.0</u>	1	<u>-1.5</u>	1	<u>5.7</u>	1	<u>6.5</u>	1	<u>5.2</u>	36	<u>5.9</u>	<i>Jan-04</i>
Over/Under			-4.5		-8.1		-8.9		-2.0		-0.8		0.8		0.7	
<i>InvestorForce Public DB > \$1 Billion Global Tactical Net Median</i>			<u>1.2</u>		<u>-4.8</u>		<u>-6.1</u>		<u>0.5</u>		<u>4.4</u>		<u>5.0</u>		<u>5.8</u>	<i>Jan-04</i>
Operating Cash (Assetized)	458,441,483	1.4	1.7	--	-4.4	--	-3.4	--	--	--	--	--	--	--	0.4	Feb-15
<i>ASRS Cash Assetization Custom Benchmark</i>			<u>1.5</u>	--	<u>-9.8</u>	--	<u>-9.9</u>	--	--	--	--	--	--	--	<u>-6.0</u>	<i>Feb-15</i>
Over/Under			0.2		5.4		6.5		--		--		--		6.4	

¹Performance of ASRS Total Domestic and International Equity includes the performance of the ASRS Domestic and International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013.

NEPC began calculating Total Domestic and International Equity performance in January 2009. Monthly performance data from January 1998 - December 2008 was provided by State Street.

Note: Performance, ranks and medians are based on net of fee performance data. Rankings are from highest (1) to lowest (100) in the eVestment Universe.

Universe shown for Total Public Markets Fixed Income includes all U.S. fixed income strategies and does not accurately represent the exposures of the ASRS Public Markets Fixed Income allocation, which has included allocations ranging from 10% - 25% to emerging markets debt historically.

Composition of Interim SAA Policy and ASRS Custom Asset Class Benchmarks can be found in the appendix.

Arizona State Retirement System

Asset Class Performance Summary - Private Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception (%)	Since		
Total Fund	33,729,963,270	100.0	1.4	--	0.0	--	6.7	7.1	9.7	Jul-75
<i>Interim SAA Policy</i>			<u>1.4</u>	--	<u>-1.4</u>	--	<u>5.4</u>	--	<u>6.2</u>	<i>Jul-75</i>
Over/Under			0.0		1.4		1.3		0.9	
<i>Actual Benchmark</i>			<u>1.4</u>	--	<u>-1.3</u>	--	<u>6.0</u>	--	<u>6.5</u>	<i>Jul-75</i>
Total Private Equity	2,622,714,403	7.8	1.0	5.5	11.0	12.5	11.0	11.0	11.0	Oct-07
<i>Russell 2000 1 QTR Lagged</i>			<u>3.2</u>	--	<u>-5.9</u>	--	<u>9.3</u>	--	<u>8.1</u>	<i>Oct-07</i>
Over/Under			-2.2		11.4		1.7		4.4	
Total Opportunistic Equity¹	509,891,102	1.5	3.7	3.8	22.2		23.1			Apr-11
Total Private Debt	2,381,652,235	7.1	1.9	8.5	10.7		10.9			Jul-12
<i>S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged</i>			<u>-1.5</u>	--	<u>1.1</u>	--	<u>3.1</u>	--	<u>3.3</u>	<i>Jul-12</i>
Over/Under			3.4		7.4		7.6		--	
Total Opportunistic Debt¹	1,117,282,802	3.3	-3.7	-3.1	4.2	5.5	9.3			Jan-08
Total Real Estate	2,961,890,110	8.8	8.2	14.9	14.5	14.0	8.1			Oct-05
<i>NCREIF ODCE 1 QTR Lagged (net)</i>			<u>3.4</u>	--	<u>14.3</u>	--	<u>12.9</u>	--	<u>12.7</u>	<i>Oct-05</i>
Over/Under			4.8		0.6		1.6		1.3	
Total Farmland and Timber	188,451,439	0.6	3.1	4.5			4.3			Jul-13
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.4</u>	--	<u>5.7</u>	--	<u>5.5</u>	--	<u>5.5</u>	<i>Jul-13</i>
Over/Under			1.7		-1.2		--		--	
Total Infrastructure	316,552,244	0.9	0.6	5.3			5.1			Dec-14
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.4</u>	--	<u>5.7</u>	--	<u>5.5</u>	--	<u>5.5</u>	<i>Dec-14</i>
Over/Under			-0.8		-0.4		--		--	

¹Net absolute rate of return expectations range from 10-14% per annum.

Note: Performance in private markets asset classes is based on net of fee dollar-weighted (IRR) performance data.

Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return, is a more appropriate measure of ASRS private markets portfolios.

Performance data for Total Private Equity, Total Opportunistic Equity, Total Private Debt, Total Opportunistic Debt, Total Real Estate, Total Farmland and Timber, and Total Infrastructure and corresponding benchmarks is lagged by one quarter. Performance data and market values provided by State Street.

Prior to 3Q 2012, the performance of the Total Private Debt and Total Opportunistic Debt asset classes was reported in aggregate. Effective 6/30/2012, the Fund's allocations to Private Debt and Opportunistic Debt were separated and will be reported separately going forward.

Composition of Interim SAA Policy can be found in the appendix.

Arizona State Retirement System

Public Market Asset Class Analysis

3 Years Ending March 31, 2016

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Anlzd AJ	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	6.7%	--	7.1%	--	1.2%	--	1.0	--	1.3%	--	1.0	0.9
Interim SAA Policy	--	5.4%	--	7.0%	--	--	--	--	--	--	--	--	0.8
Total Domestic and International Equity	49.5%	6.9%	--	11.6%	--	0.6%	--	0.0	--	0.2%	--	1.0	0.6
ASRS Custom Total Equity Benchmark	--	6.9%	--	11.9%	--	--	--	--	--	--	--	--	0.6
Total Domestic Equity	26.2%	11.2%	8	11.4%	20	0.4%	3	-0.6	61	-0.1%	14	1.0	1.0
ASRS Custom Domestic Equity Benchmark	--	11.4%	4	11.5%	32	--	--	--	--	--	12	--	1.0
Total International Equity	21.7%	1.0%	75	13.2%	82	0.8%	1	-0.1	90	-0.1%	90	1.0	0.1
ASRS Custom Int'l Equity Benchmark	--	1.1%	72	13.5%	95	--	--	--	--	--	86	--	0.1
Total Public Markets Fixed Income	14.7%	1.6%	57	4.0%	69	0.8%	23	0.9	6	0.7%	23	1.0	0.4
ASRS Custom Public Markets Fixed Income Benchmark	--	0.8%	74	3.9%	66	--	--	--	--	--	53	--	0.2
Total Inflation-Linked Assets	0.6%	-16.8%	99	13.1%	99	2.4%	8	0.0	62	0.2%	47	1.0	-1.3
ASRS Custom Inflation-Linked Benchmark	--	-16.9%	99	12.7%	93	--	--	--	--	--	50	--	-1.3
Total Multi-Asset Class Strategies	3.1%	3.7%	1	8.3%	70	4.6%	54	-0.4	7	-3.2%	67	1.2	0.4
Multi-Asset Class Strategies Custom Benchmark	--	5.7%	1	5.8%	10	--	--	--	--	--	18	--	1.0

Note: Performance is reported net of fees.

Underlying composites do not add up to 100% because the chart excludes private market composites.

Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.

Rankings are from highest (1) to lowest (100) in the eVestment Universe.

Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Arizona State Retirement System

Public Market Asset Class Analysis

5 Years Ending March 31, 2016

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Anlzd AJ	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	7.1%	--	8.2%	--	1.2%	--	0.8	--	1.0%	--	1.0	0.9
Interim SAA Policy	--	6.2%	--	8.2%	--	--	--	--	--	--	--	--	0.7
Total Domestic and International Equity	49.5%	7.2%	--	13.1%	--	0.6%	--	-0.2	--	0.0%	--	1.0	0.5
ASRS Custom Total Equity Benchmark	--	7.3%	--	13.3%	--	--	--	--	--	--	--	--	0.5
Total Domestic Equity	26.2%	10.9%	16	12.8%	25	0.5%	3	-0.5	41	-0.3%	14	1.0	0.9
ASRS Custom Domestic Equity Benchmark	--	11.2%	3	12.8%	26	--	--	--	--	--	9	--	0.9
Total International Equity	21.7%	1.2%	70	15.2%	65	0.8%	1	-0.2	94	-0.1%	90	1.0	0.1
ASRS Custom Int'l Equity Benchmark	--	1.4%	65	15.6%	87	--	--	--	--	--	87	--	0.1
Total Public Markets Fixed Income	14.7%	3.6%	71	3.4%	48	0.7%	9	0.9	6	0.6%	48	1.0	1.0
ASRS Custom Public Markets Fixed Income Benchmark	--	3.0%	90	3.3%	43	--	--	--	--	--	78	--	0.9
Total Inflation-Linked Assets	0.6%	-13.1%	99	14.6%	99	2.4%	12	0.3	33	0.7%	50	1.0	-0.9
ASRS Custom Inflation-Linked Benchmark	--	-13.9%	99	14.6%	99	--	--	--	--	--	66	--	-1.0
Total Multi-Asset Class Strategies	3.1%	5.7%	12	9.0%	99	3.7%	56	-0.2	45	-1.2%	89	1.1	0.6
Multi-Asset Class Strategies Custom Benchmark	--	6.5%	1	7.7%	26	--	--	--	--	--	45	--	0.8

Note: Performance is reported net of fees.

Underlying composites do not add up to 100% because the chart excludes private market composites.

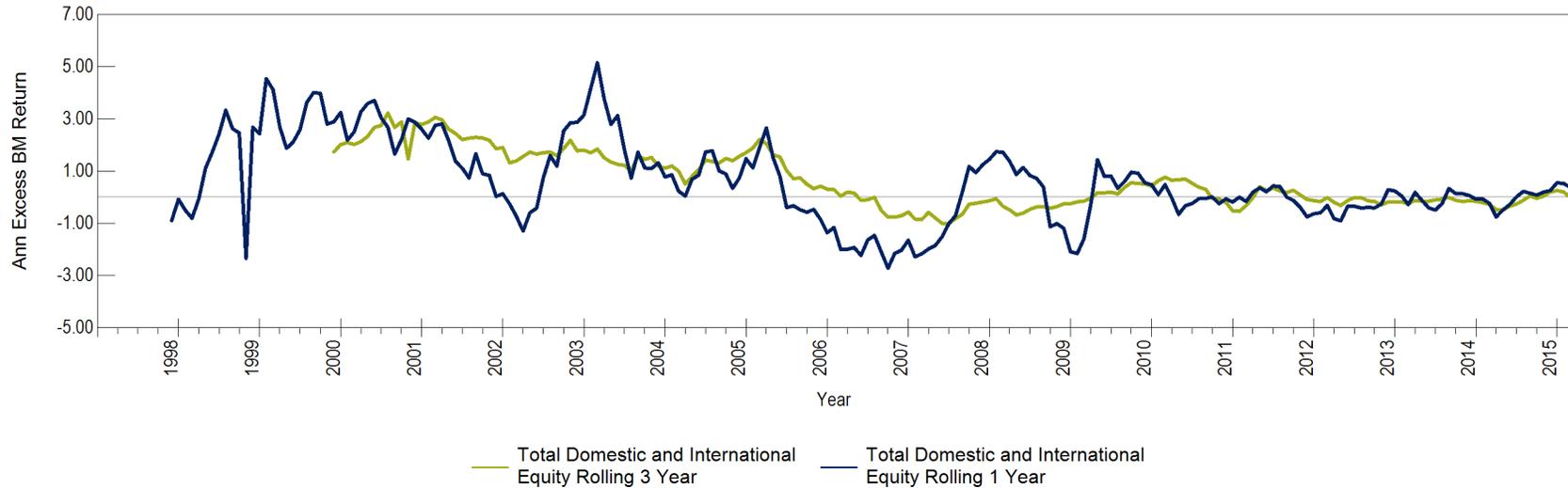
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.

Rankings are from highest (1) to lowest (100) in the eVestment Universe.

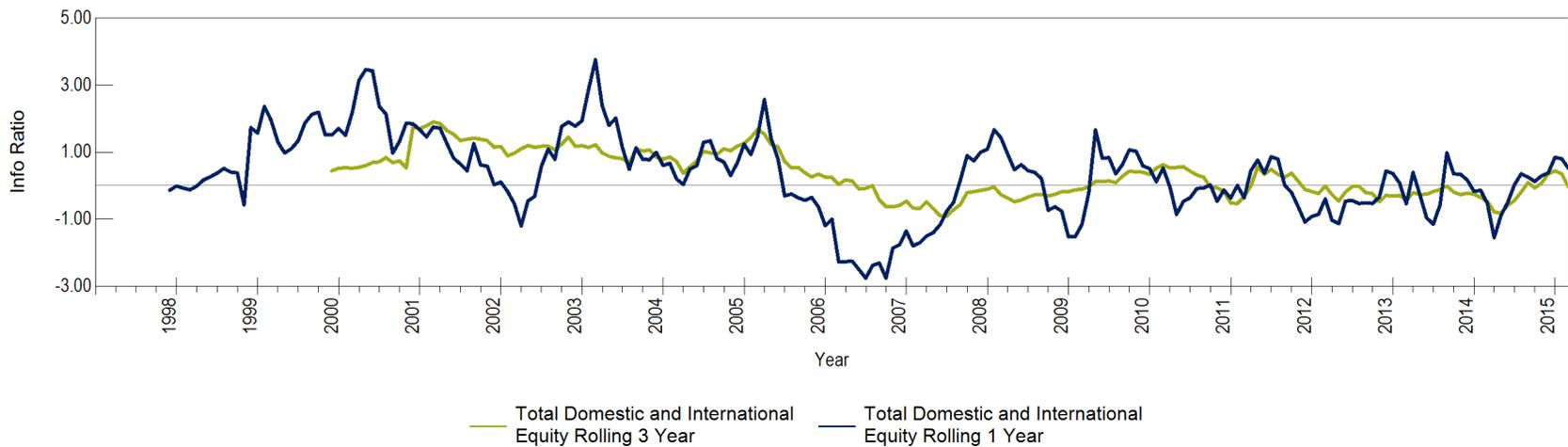
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Asset Class Analysis - Total Domestic and International Equity

Rolling Annual Excess Benchmark Return

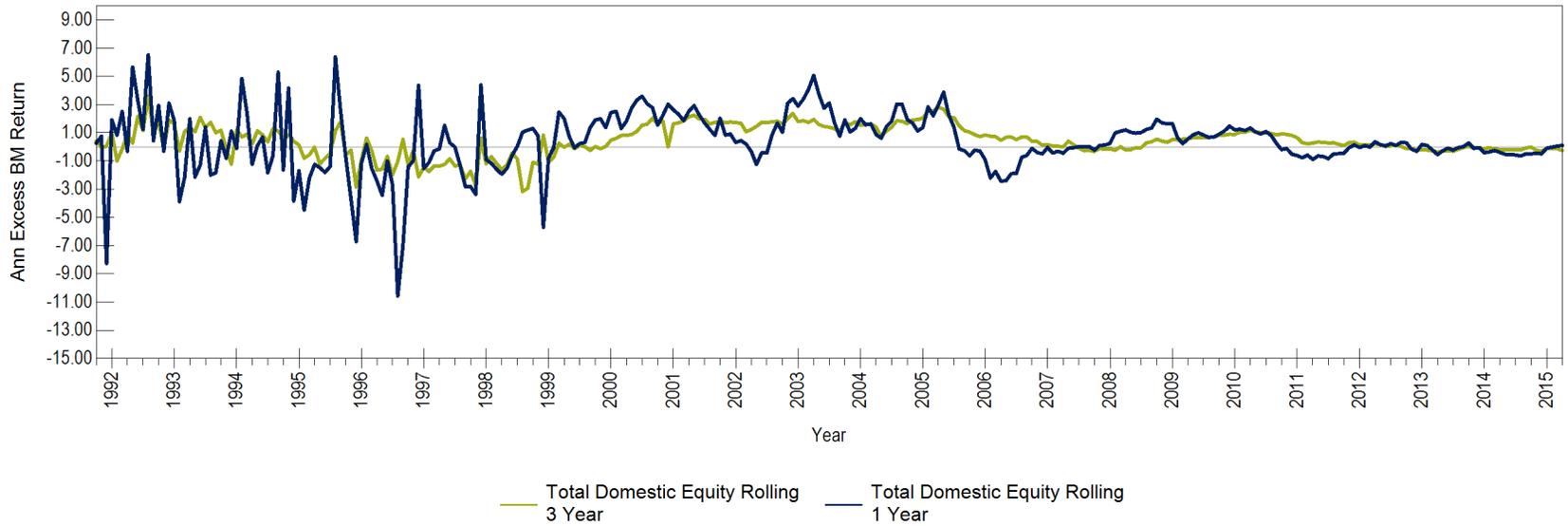


Rolling Information Ratio

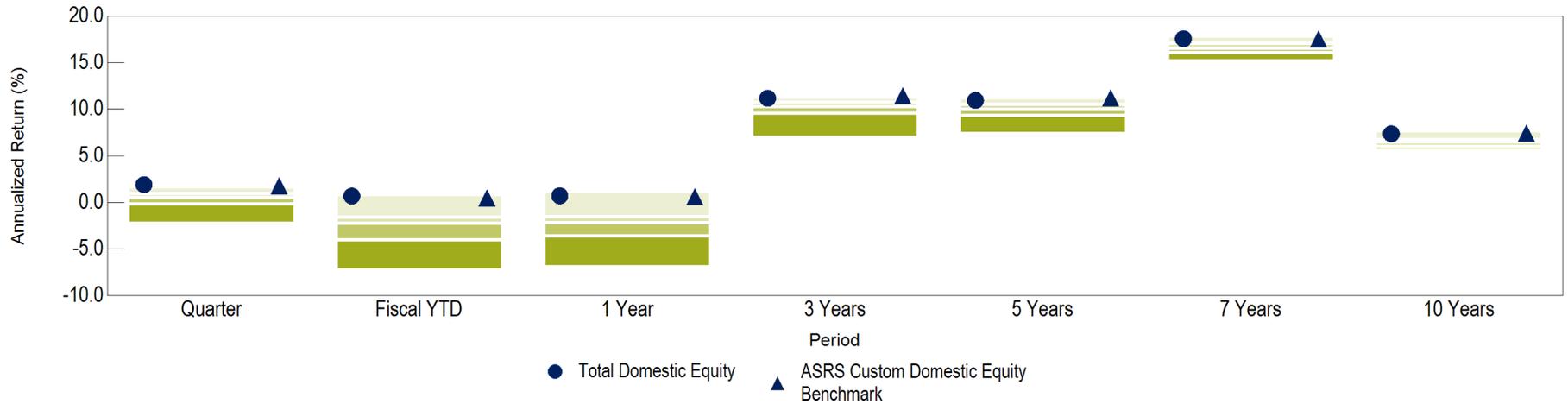


Asset Class Analysis - Total Domestic Equity

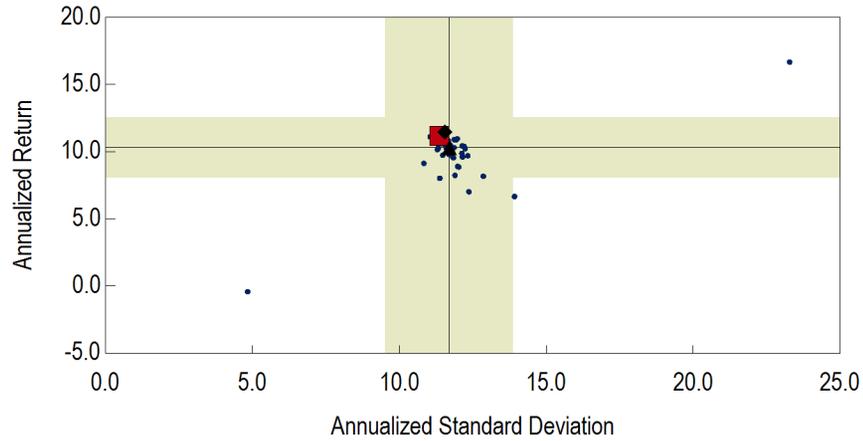
Rolling Annual Excess Benchmark Return



InvestorForce Public DB > \$1 Billion US Equity Net Accounts

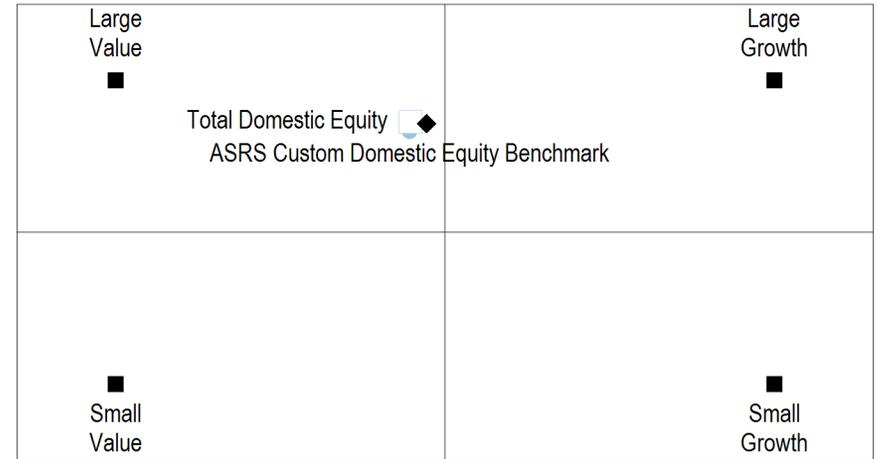


3 Year Risk Return

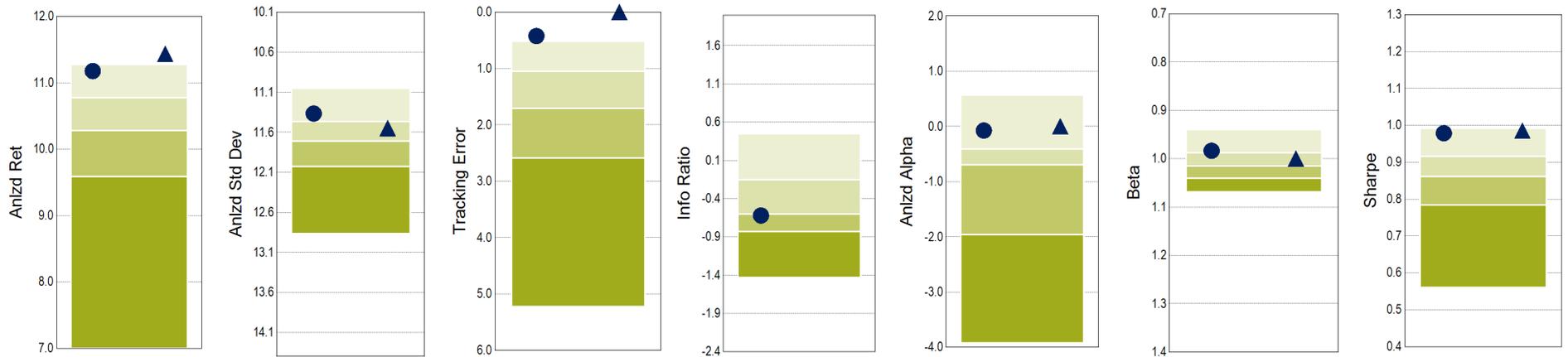


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion US Equity Net

3 Year Style Map



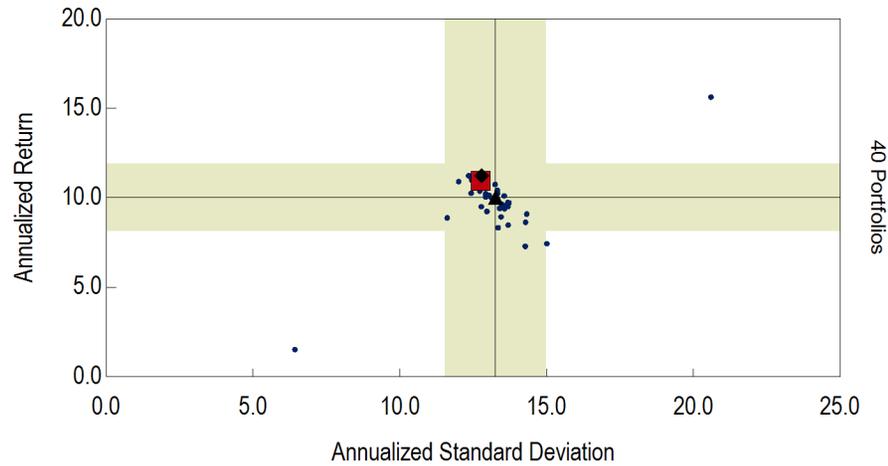
- First Rolling Period
- ◆ Last Rolling Period



- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

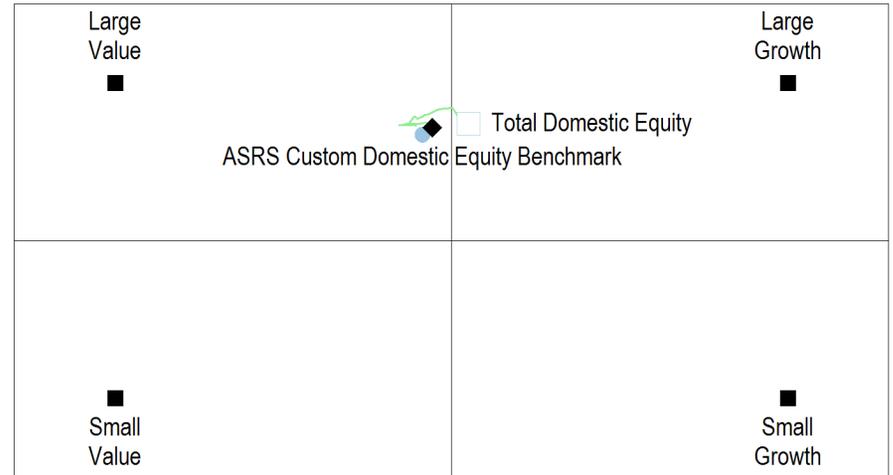
Asset Class Analysis - Total Domestic Equity

5 Year Risk Return

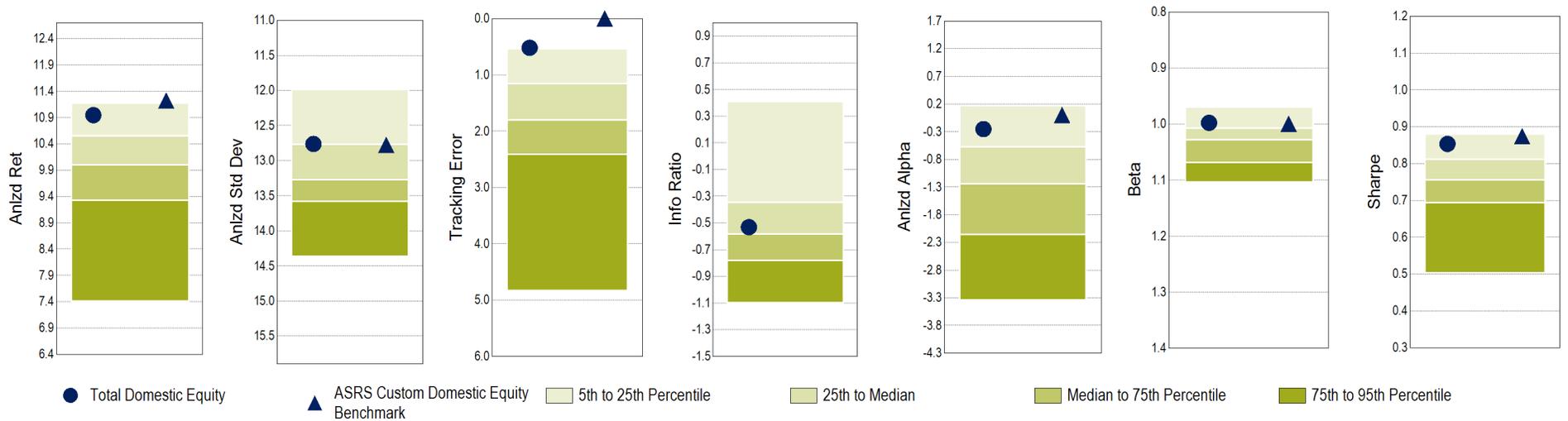


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion US Equity Net

5 Year Style Map



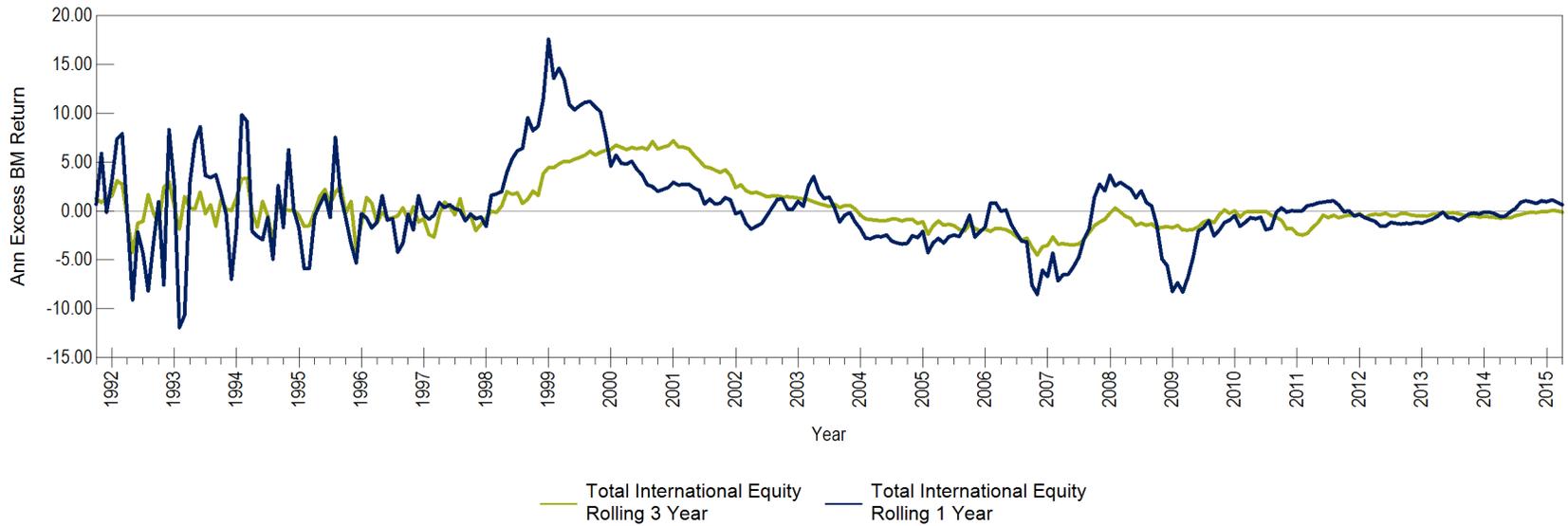
- First Rolling Period
- ◆ Last Rolling Period



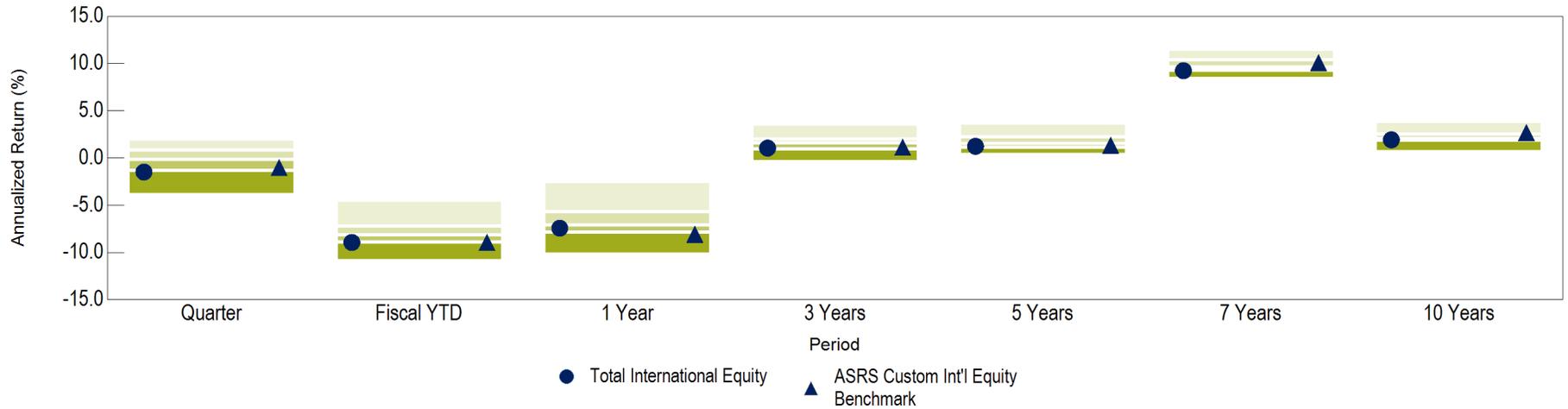
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total International Equity

Rolling Annual Excess Benchmark Return

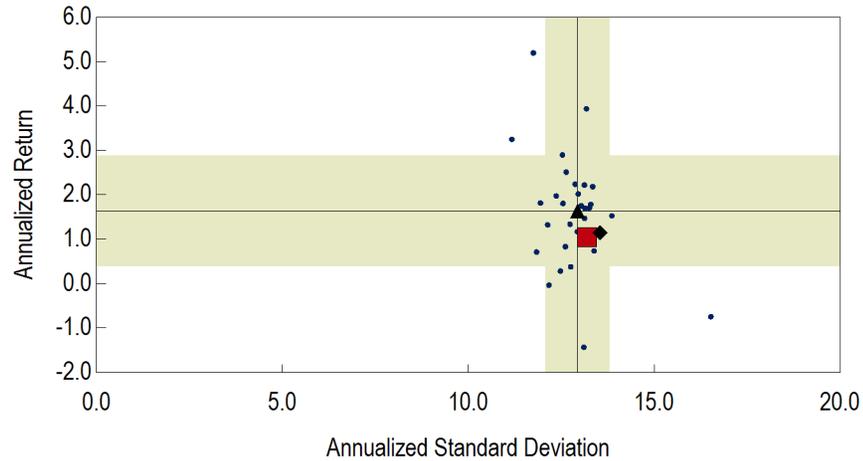


InvestorForce Public DB > \$1 Billion Global ex-US Equity Net Accounts



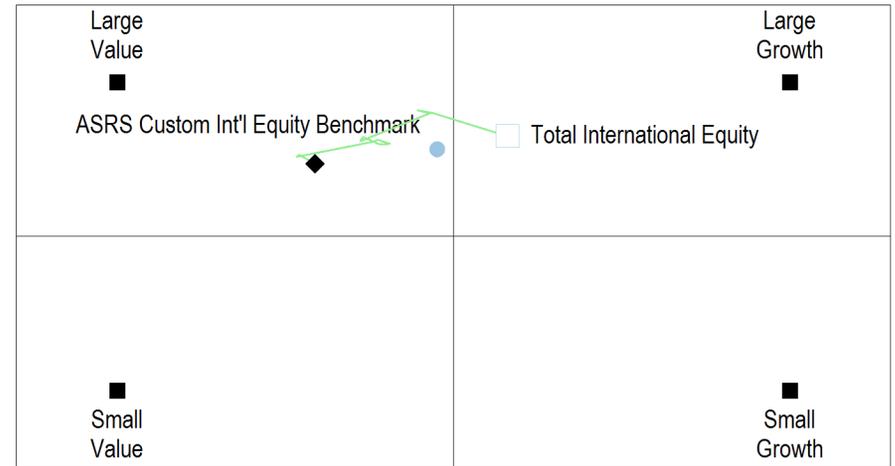
Asset Class Analysis - Total International Equity

3 Year Risk Return

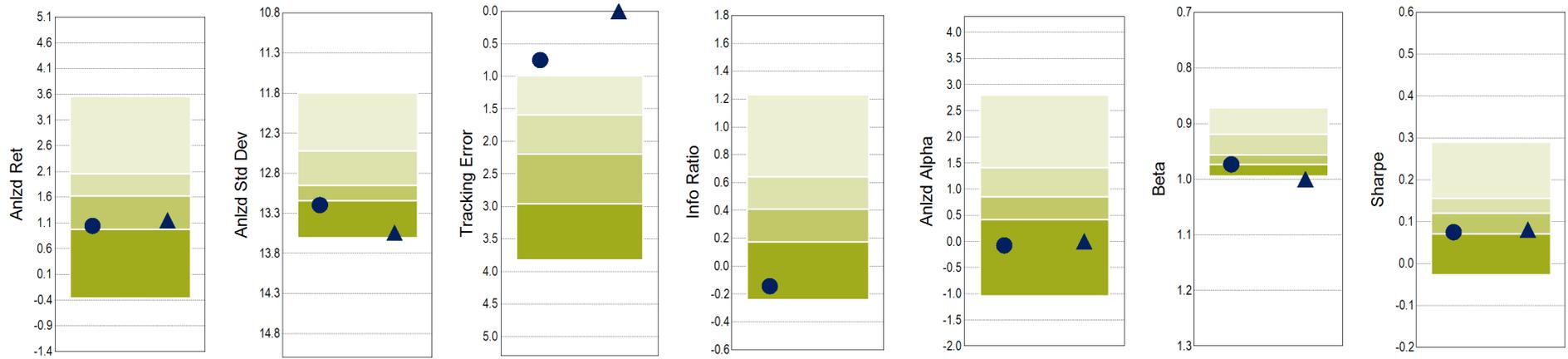


- Total International Equity
- ◆ ASRS Custom Int'l Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Global ex-US Equity Net

3 Year Style Map

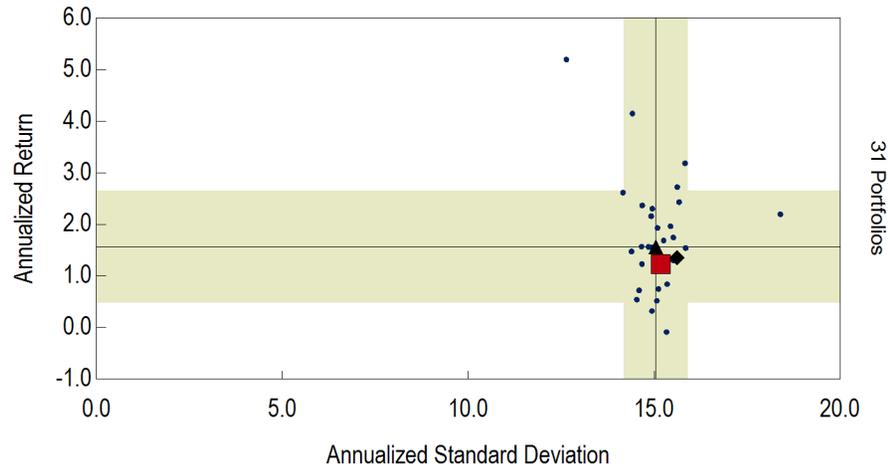


- First Rolling Period
- ◆ Last Rolling Period



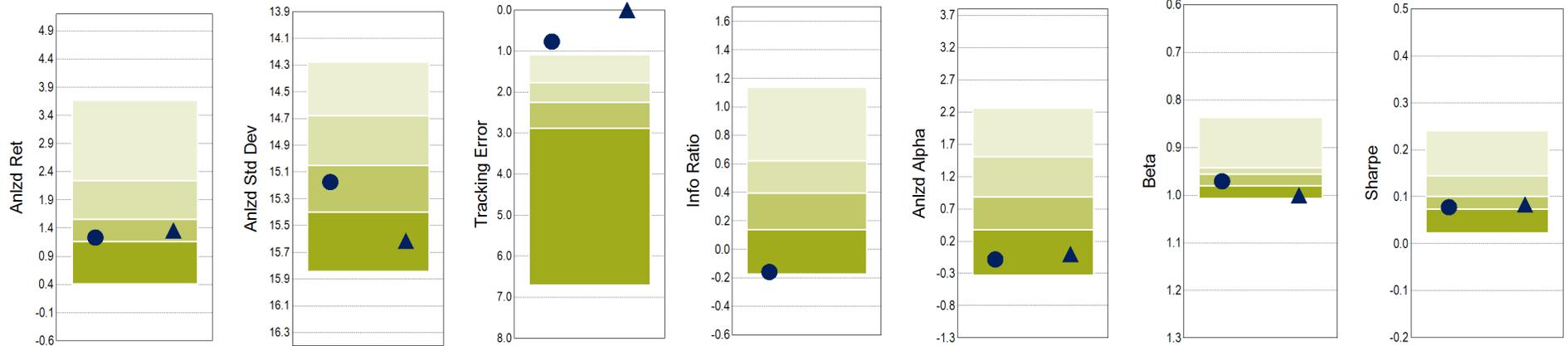
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Year Risk Return



- Total International Equity
- ◆ ASRS Custom Int'l Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Global ex-US Equity Net

5 Year Style Map

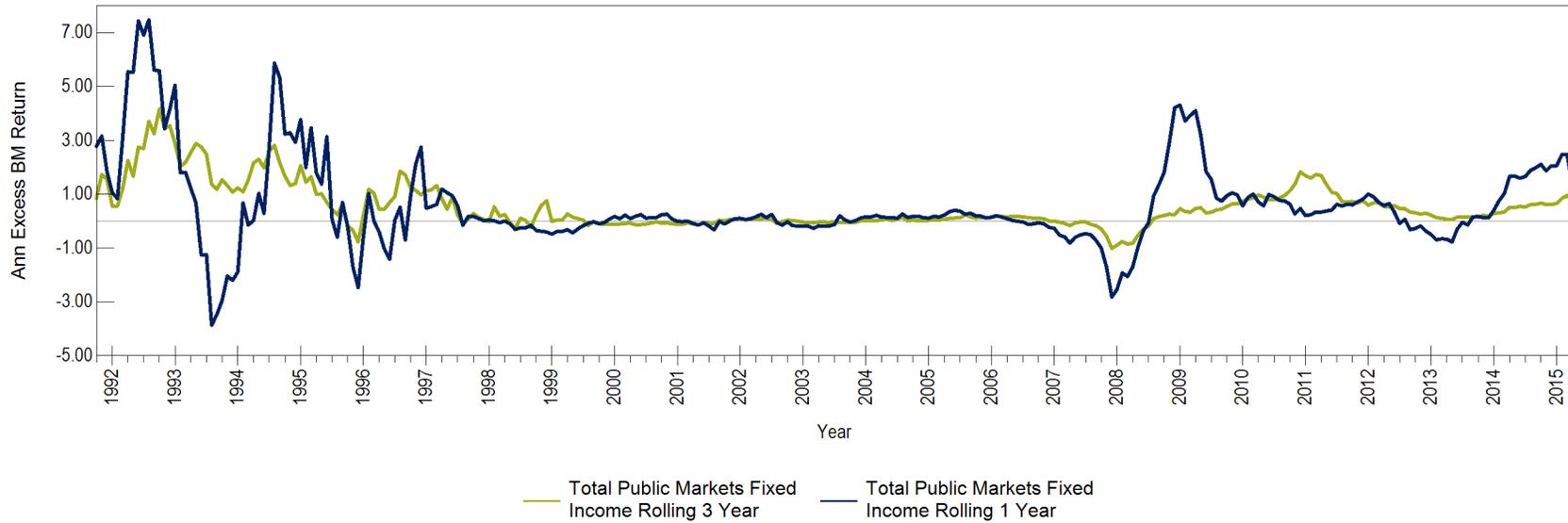


- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile



Asset Class Analysis - Total Public Markets Fixed Income

Rolling Annual Excess Benchmark Return

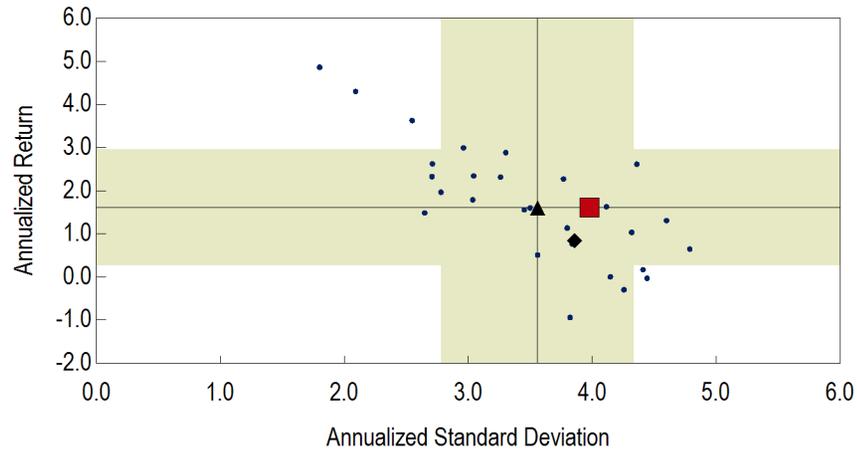


InvestorForce Public DB > \$1 Billion Fixed Income Net Accounts



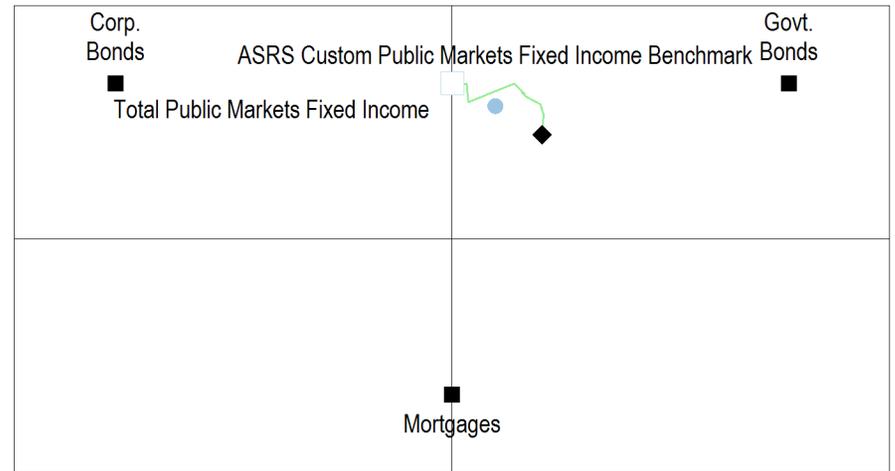
Asset Class Analysis - Total Public Markets Fixed Income

3 Year Risk Return

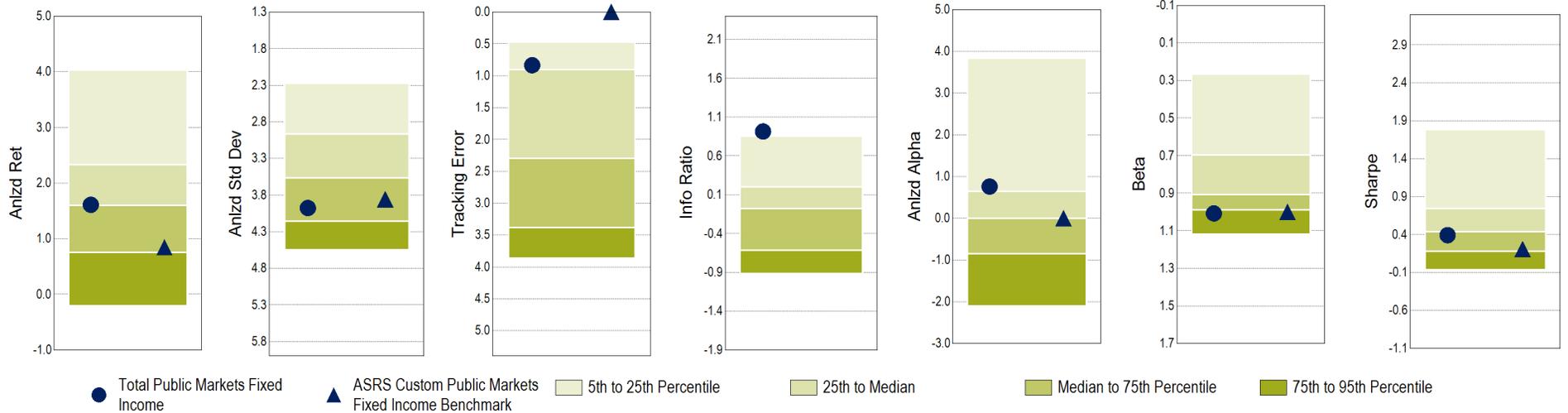


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Fixed Income Net

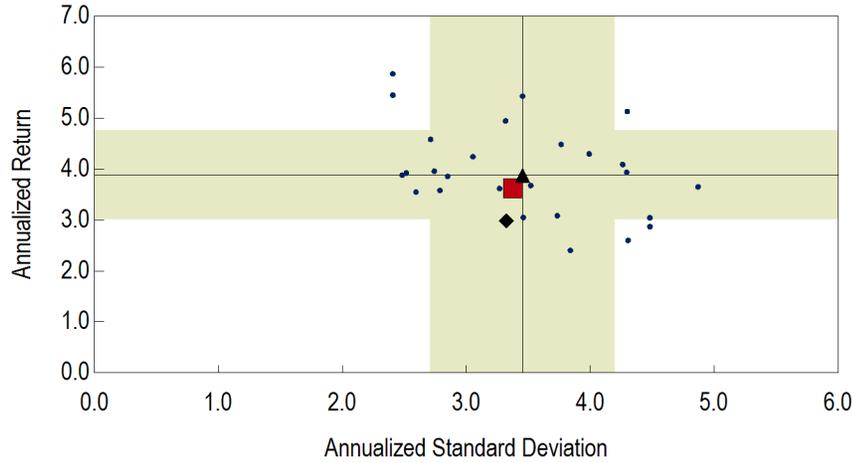
3 Year Style Map



- First Rolling Period
- ◆ Last Rolling Period

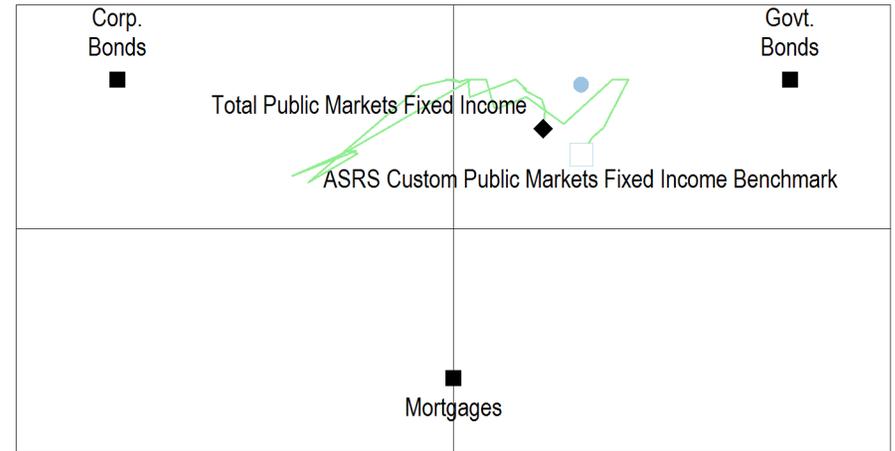


5 Year Risk Return

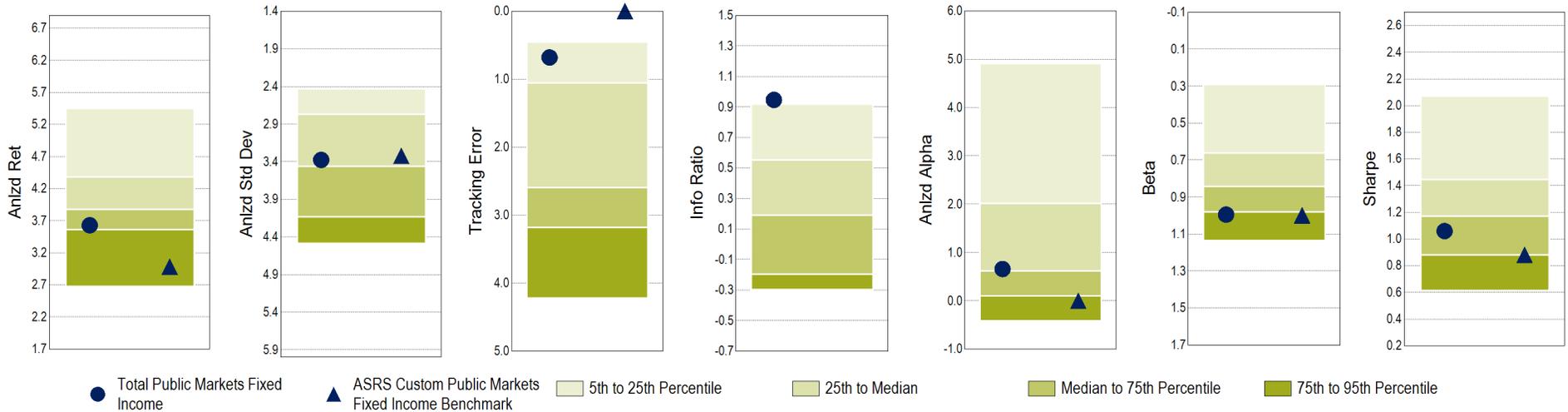


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Fixed Income Net

5 Year Style Map

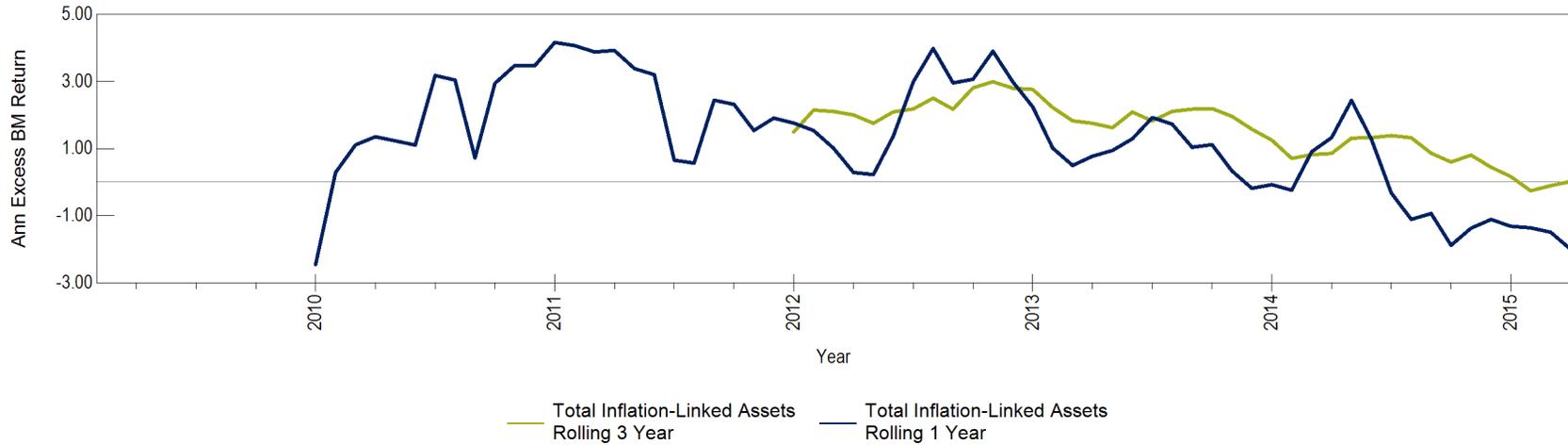


- First Rolling Period
- ◆ Last Rolling Period

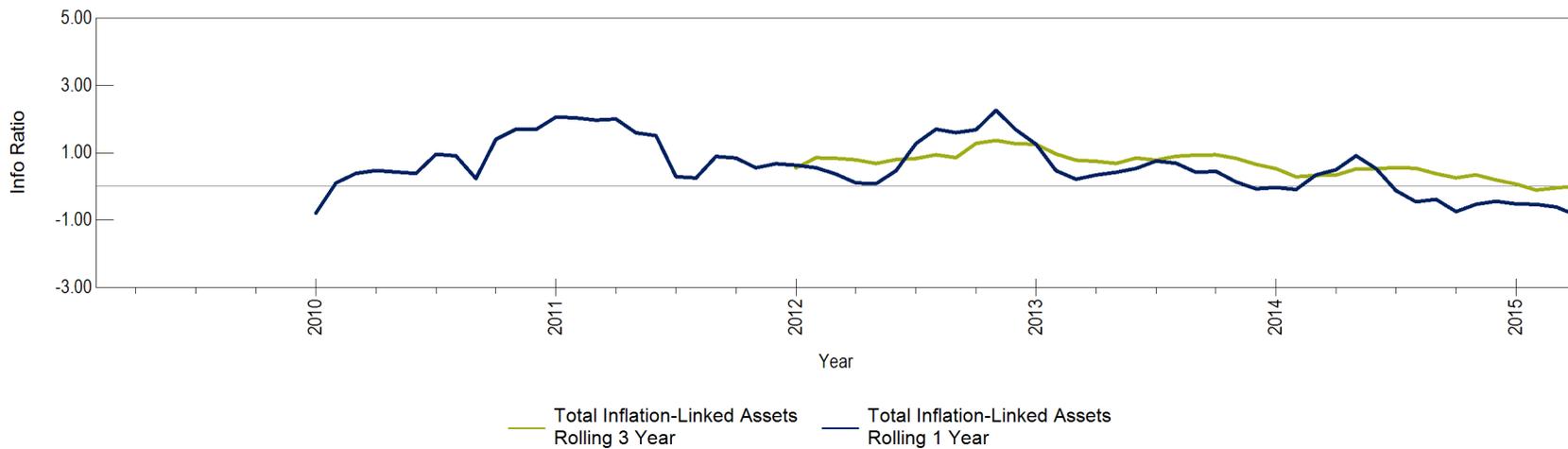


Asset Class Analysis - Total Inflation-Linked Assets

Rolling Annual Excess Benchmark Return

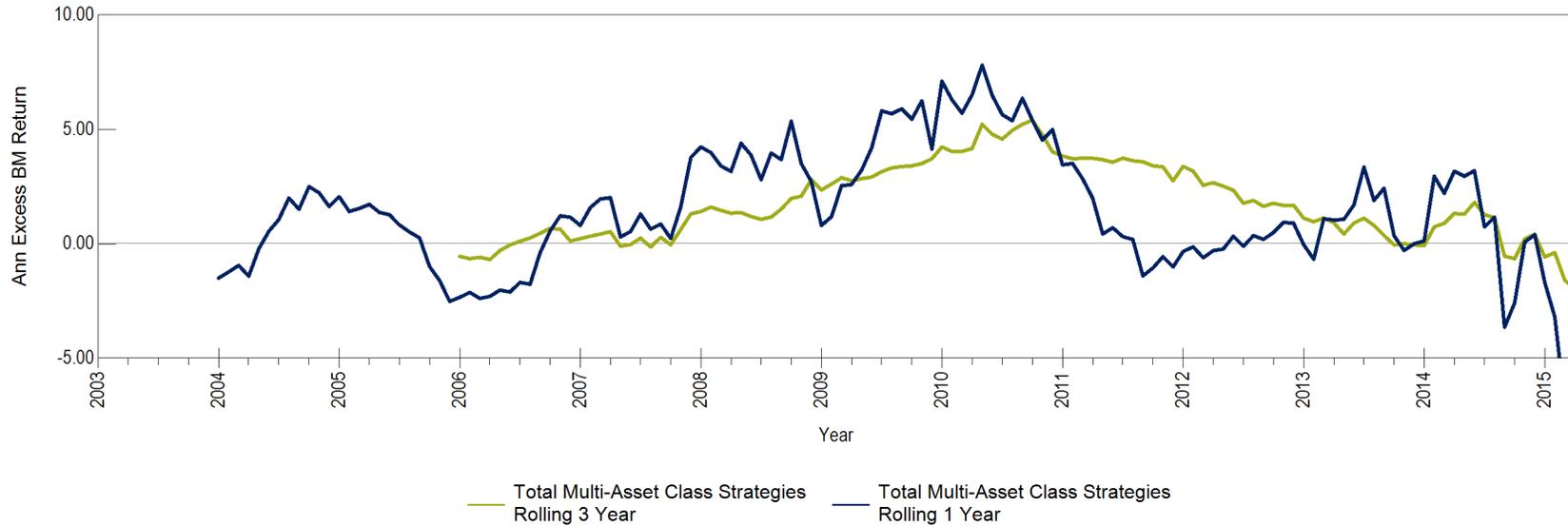


Rolling Information Ratio

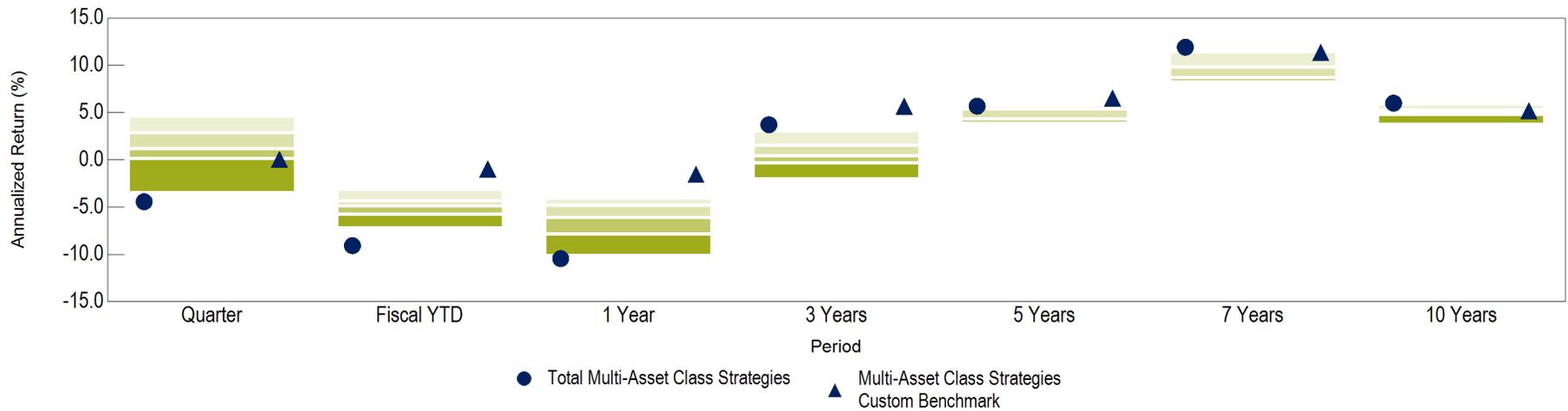


Asset Class Analysis - Total Multi-Asset Class Strategies

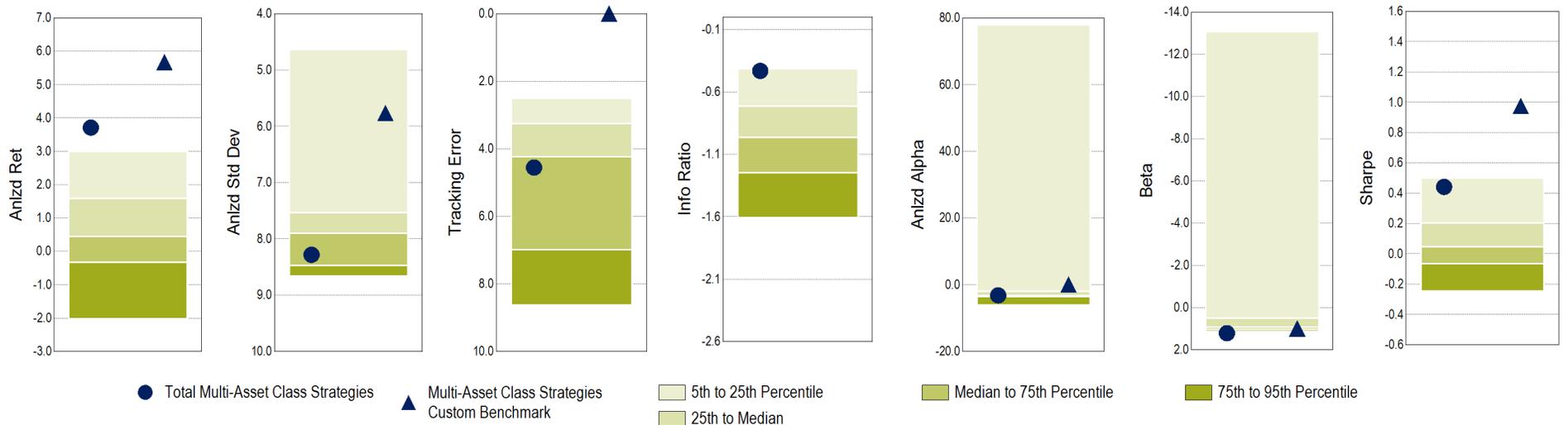
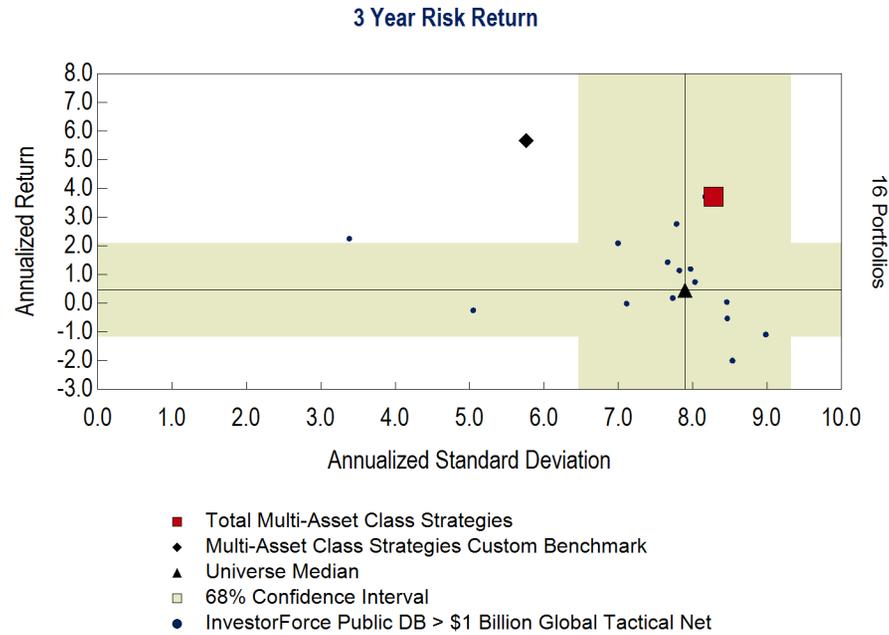
Rolling Annual Excess Benchmark Return



InvestorForce Public DB > \$1 Billion Global Tactical Net Accounts

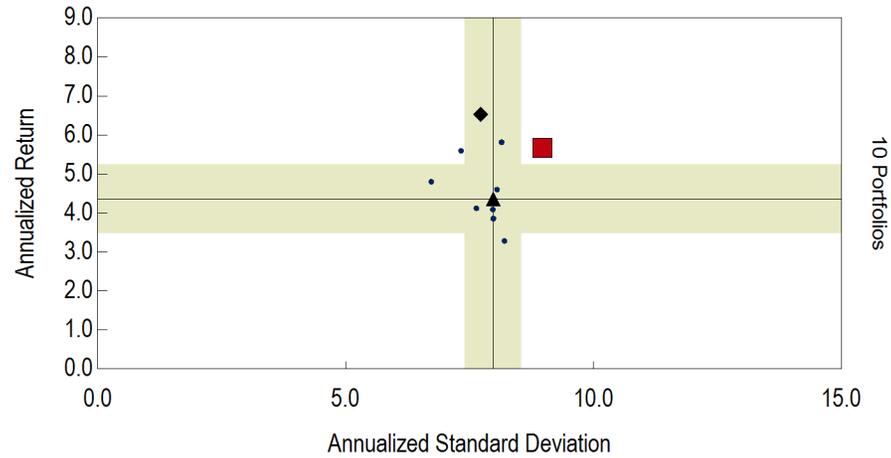


Asset Class Analysis - Total Multi-Asset Class Strategies

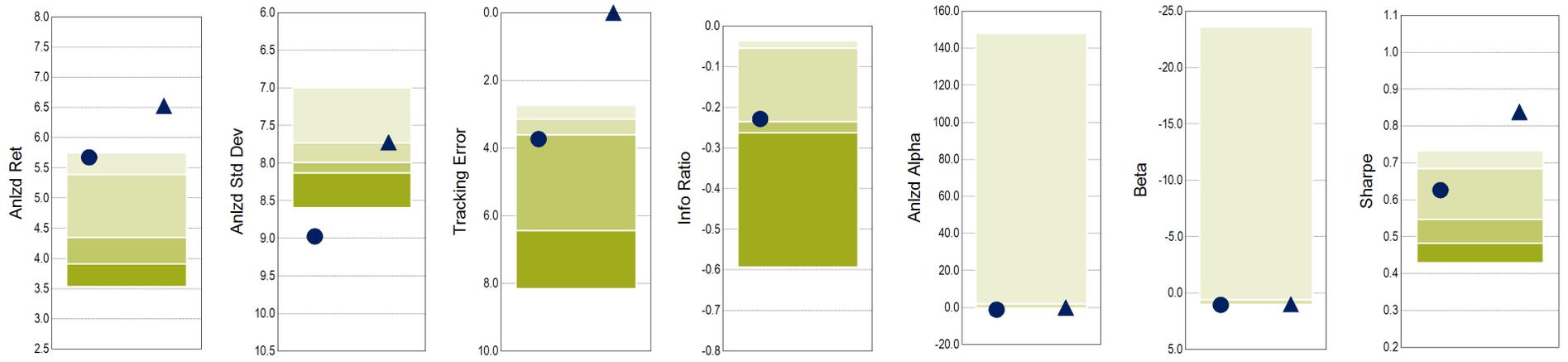


Asset Class Analysis - Total Multi-Asset Class Strategies

5 Year Risk Return



- Total Multi-Asset Class Strategies
- ◆ Multi-Asset Class Strategies Custom Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Global Tactical Net



- Total Multi-Asset Class Strategies
- ▲ Multi-Asset Class Strategies...
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile

- **Two Asset Class Committee meetings have been held since the last time we provided an update on the ASRS Asset Class Committee Meetings.**

- **April 22, 2016- Private Markets Committee**
 - Monthly Status Report, General Discussion and Deal Flow
 - Private Equity Manager Recommendation (\$40 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The ASRS has invested with this manager in a prior fund.
 - Amendment to project expenditures Recommendation (\$30 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 10%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - Expenditure is to expand a multi-unit building resulting in accretion to IRR.

- **May 2, 2016- Public Markets Committee**
 - Opportunistic Debt Manager Recommendation (\$300 million commitment)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation

- **May 26, 2016- Private Markets Committee**

- Monthly Status Report, General Discussion and Deal Flow
- Private Equity Manager Recommendation (\$30 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The ASRS has invested with this manager in a prior fund.

General Observations

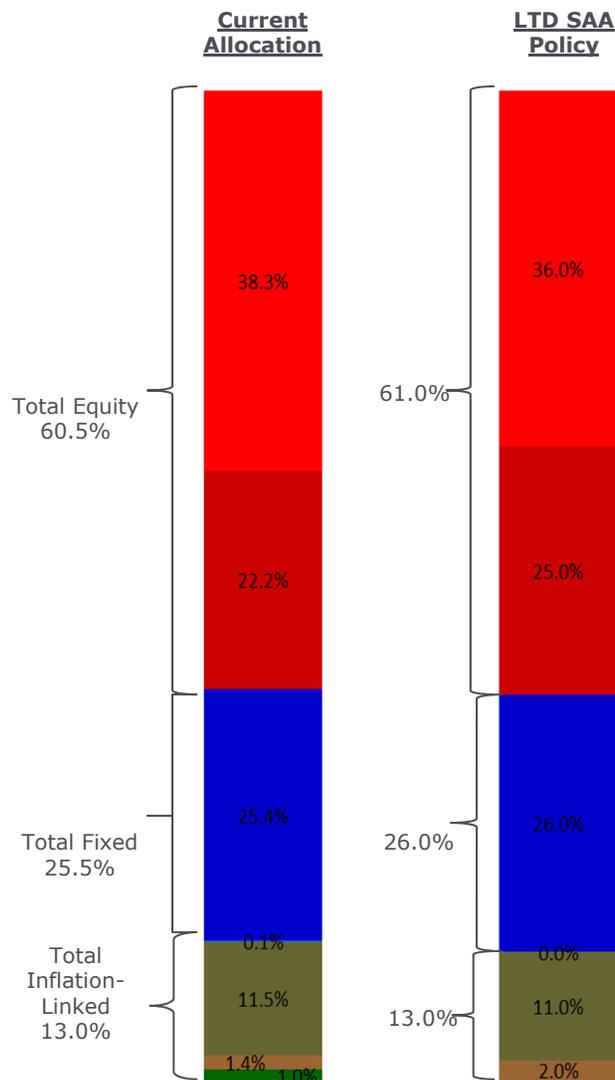
- **The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP. New long-term SAAP adopted as of April 1, 2015.**
 - Current Interim SAAP includes proration of 3% Private Debt and 2% Real Estate, which are unfunded.
 - Continued build out of private markets asset classes provides opportunity to take advantage of illiquidity premium to produce expected returns in excess of what we believe can be achieved in the public markets.
- **IMD has already taken significant steps to move the Fund toward implementation of the recently approved SAAP.**
 - The largest single underweight position in the Fund is Private Debt, which was increased from a 3% SAAP target to a 10% SAAP target with an 8% - 12% range (current actual is 7.3%).
 - \$5.1 billion in commitments to private debt strategies equates to approximately 15.2% of Total Fund assets vs. the SAAP target of 10%.
 - Multi-Asset Class Strategies (formerly GTAA) has been restructured and moved 'above the line', and now has an explicit 5% target within the SAAP.
- **Tactical positioning in Public Markets Fixed Income and Inflation-Linked Assets has added significant value (nearly half of the outperformance) over the past 5 years.**
- **ASRS Private Markets programs have added significant value at the Total Fund level over the three- and five-year time periods.**
- **Volatility is being realized across markets; Long Treasuries mandate funded in August 2015 to mitigate volatility has realized some very positive gains (+8.1%) in Q1.**
- **Tactical positioning consistent with IMD House Views.**

Independent Oversight/Compliance: LTD

Note: All of the data shown on the following pages is as of March 31, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Long Term Disability SAAP Policy Compliance



	Current Mkt Value	Current Allocation	LTD SAAP	Difference
U.S. Equity	\$77,877,534	38.3%	36.0%	2.3%
U.S. Large Cap	\$49,488,141	24.4%	24.0%	0.4%
U.S. Small Cap	\$28,389,393	14.0%	12.0%	2.0%
International Equity	\$44,993,335	22.2%	25.0%	-2.8%
Developed Large Cap	\$30,382,587	15.0%	18.0%	-3.0%
Developed Small Cap	\$4,004,610	2.0%	2.0%	0.0%
Emerging Markets	\$10,606,138	5.2%	5.0%	0.2%
Total Equity	\$122,870,869	60.5%	61.0%	-0.5%
U.S. Fixed Income	\$51,629,321	25.4%	26.0%	-0.6%
Core	\$37,170,461	18.3%	19.0%	-0.7%
High Yield	\$14,458,860	7.1%	7.0%	0.1%
Emerging Market Debt	\$127,273	0.1%	0.0%	0.1%
Total Fixed Income	\$51,756,594	25.5%	26.0%	-0.5%
Real Estate	\$23,404,187	11.5%	11.0%	0.5%
Commodities	\$2,936,113	1.4%	2.0%	-0.6%
Total Inflation-Linked	\$26,340,300	13.0%	13.0%	0.0%
Cash¹	\$2,108,865	1.0%	0.0%	1.0%
Total	\$203,076,626	100.0%	100.0%	0.0%

¹Cash includes money for the upcoming monthly pension distribution.

Note: Market values include manager held cash.

ASRS LTD rebalanced to the new SAA Policy in February 2016, with an effective date of 2/18/2016.

Long Term Disability Performance Summary

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (July-02)
Long Term Disability	1.4%	-2.5%	5.4%	6.2%	4.5%	6.1%
LTD SAA Policy ¹	1.7%	-2.6%	5.1%	6.0%	5.0%	6.3%
Excess Return	-0.3%	0.1%	0.3%	0.2%	-0.5%	-0.2%

¹LTD SAA Policy composition can be found in the appendix.

Market Environment Update and Outlook

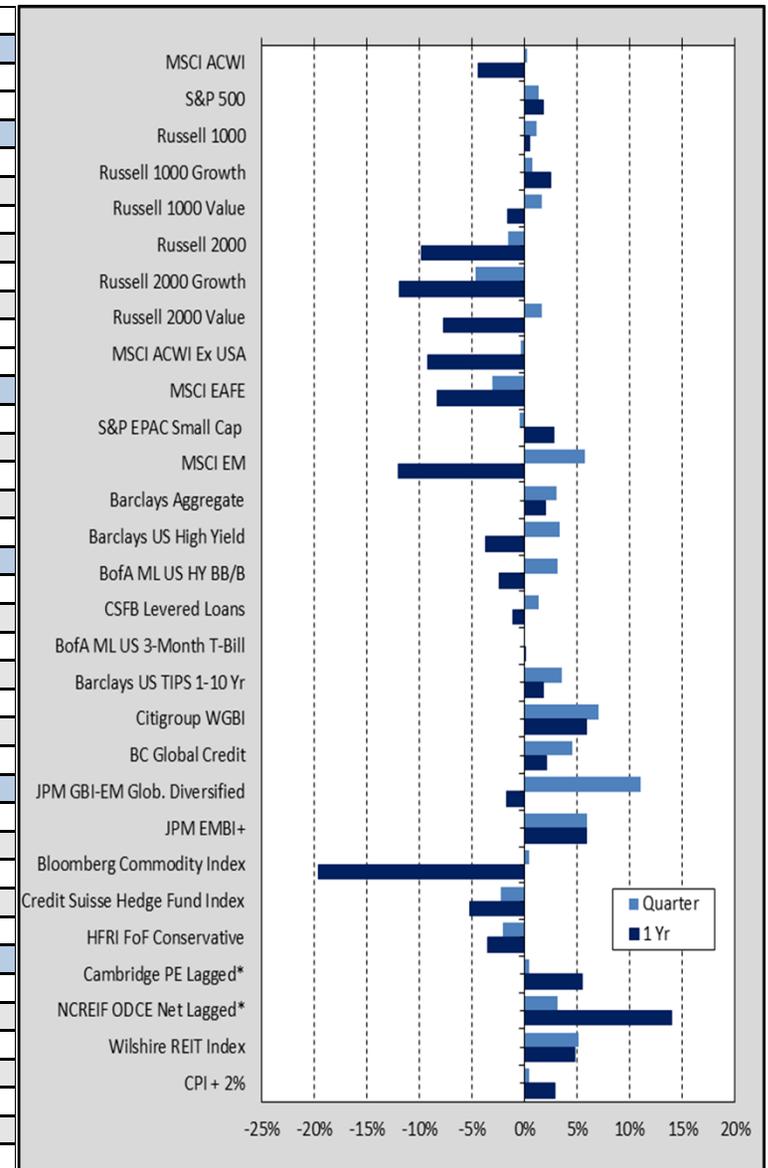


Economic Environment

- **First quarter GDP growth rate (advance estimate) printed at a meager 0.5%.**
 - Retail sales ended February at +3.1% on a year-over-year growth rate basis. In the same period last year the YoY growth rate was 1.2%.
 - The inventory-to-sales ratio ended February was flat at 1.4 and has remained relatively flat since early 2010.
 - Corporate profits (ended October) as a percent of GDP declined slightly to 9.3% from 9.9% and remain elevated relative to historical levels.
 - The U.S. trade deficit widened 2.6% in February due to increased imports.
- **The unemployment rate remained unchanged at 5.0% in Q1; U-6, a broader measure of unemployment, fell to 9.8% during the first quarter.**
- **The Case-Shiller Home Price Index (ended January) increased slightly to 175.4 from 175.3 September and is at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally adjusted CPI increased to 0.8% from 0.06% at the end of December; Capacity Utilization decreased to 74.8 in March from 75.4% in December.**
- **Fed Funds rate was unchanged at 0.50%. The 10-year Treasury Yield (constant maturity) finished Q1 at 1.9% down from 2.2% ended December.**
- **The Fed balance sheet decreased slightly during Q1 2016, while the European Central Bank balance sheet continues to increase.**
 - ECB cut interest rates to -0.4% and expanded asset purchases from €60 billion to €80 billion per month.
- **S&P valuations decreased in March remaining above the 10-year and long-term averages**
 - Cyclically adjusted Shiller PE ratio (25.38x) is above the long-term average of 16.6x and above the 10-year average of 22.8x.
- **Global currencies strengthened against the dollar amid commodity price stabilization and investor confidence.**

Market Environment – Q1 2016 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI	World	0.2%	-4.3%	5.5%	5.2%	4.1%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	1.3%	1.8%	11.8%	11.6%	7.0%
Russell 1000	Large Core	1.2%	0.5%	11.5%	11.4%	7.1%
Russell 1000 Growth	Large Growth	0.7%	2.5%	13.6%	12.4%	8.3%
Russell 1000 Value	Large Value	1.6%	-1.5%	9.4%	10.2%	5.7%
Russell 2000	Small Core	-1.5%	-9.8%	6.8%	7.2%	5.3%
Russell 2000 Growth	Small Growth	-4.7%	-11.8%	7.9%	7.7%	6.0%
Russell 2000 Value	Small Value	1.7%	-7.7%	5.7%	6.7%	4.4%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	-0.4%	-9.2%	0.3%	0.3%	1.9%
MSCI EAFE	Int'l Developed	-3.0%	-8.3%	2.2%	2.3%	1.8%
S&P EPAC Small Cap	Small Cap Int'l	-0.4%	2.8%	7.9%	5.9%	4.5%
MSCI EM	Emerging Equity	5.7%	-12.0%	-4.5%	-4.1%	3.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	3.0%	2.0%	2.5%	3.8%	4.9%
Barclays US High Yield	High Yield	3.4%	-3.7%	1.8%	4.9%	7.0%
BofA ML US HY BB/B	High Yield	3.1%	-2.4%	2.5%	5.2%	6.5%
CSFB Levered Loans	Bank Loans	1.3%	-1.1%	2.2%	3.5%	4.0%
BofA ML US 3-Month T-Bill	Cash	0.1%	0.1%	0.1%	0.1%	1.1%
Barclays US TIPS 1-10 Yr	Inflation	3.6%	1.8%	-0.7%	1.9%	4.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	7.1%	5.9%	0.5%	1.2%	4.2%
BC Global Credit	Global Bonds	4.6%	2.1%	1.6%	3.3%	4.8%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	11.0%	-1.6%	-6.7%	-2.0%	5.0%
JPM EMBI+	Em. Mkt. Bonds	5.9%	5.9%	2.8%	6.1%	7.1%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
Bloomberg Commodity Index	Commodity	0.4%	-19.6%	-16.9%	-14.1%	-6.2%
Credit Suisse Hedge Fund Index	Hedge Fund	-2.2%	-5.2%	2.4%	2.7%	4.2%
HFRI FoF Conservative	Fund of Funds	-2.0%	-3.5%	2.1%	1.7%	1.4%
Cambridge PE Lagged*	Private Equity	0.4%	5.5%	12.5%	12.5%	11.4%
NCREIF ODCE Net Lagged*	Real Estate	3.1%	14.0%	12.8%	12.6%	5.6%
Wilshire REIT Index	REIT	5.2%	4.8%	11.1%	12.1%	6.3%
CPI + 2%	Inflation/Real Assets	0.4%	2.9%	2.8%	3.3%	3.8%



* As of 12/31/2015

Global Equity

- **U.S. equities posted modest gains in the first quarter (+1.3%) rallying in March from a rocky beginning to 2016.**
- **Small cap stocks underperformed large cap stocks during the quarter, with the Russell 2000 Index returning -1.5% and the Russell 1000 Index returning 1.2%.**
- **International equities underperformed U.S. markets during the quarter, returning -0.4%, as measured by the MSCI ACWI ex-U.S. Index. Emerging markets returned 5.7% as measured by the MSCI Emerging Markets Index in U.S. dollar terms.**
 - Developed international markets returned -3.0% as measured by the MSCI EAFE Index.

Private Equity

- **Private equity fundraising totaled \$130.5 billion in Q1 2016.**
- **Buyout and Special Situations fundraising totaled \$48.1 billion in Q1 2016.**
 - 55% of fundraising activity was in North America, 42% in Europe and 2.7% in Asia/Emerging Markets.
- **Venture capital fundraising totaled \$9.2 billion.**
 - VC fundraising as a percent of total new PE funds is in line with historical post-dot com levels at approximately 14%.
- **Fund of fund and multi-manager co-investment fundraising totaled \$7.8 billion.**
- **Growth equity fundraising totaled \$3.4 billion.**

Fixed Income

- **The yield curve shifted down for maturities greater than 6 months. Intermediate yields decreased 44-49 basis points and long duration yields decreased 40 basis points.**
- **The spread between two and 10-year rates decreased to 105 basis points from 121 basis points ended March. Treasury Inflation-Protected Securities, or TIPS, returned +3.6% during the quarter, as measured by the Barclays US TIPS 1-10 Yr Index.**
- **The Barclays Long Duration Credit Index gained +6.82% as the long end of the curve ended the quarter 40 basis points lower.**
- **Long Treasuries gained +8.49% and investment-grade corporate debt gained 3.03%.**
- **The Barclays 1-3 year Government/ Credit Index returned +0.97% and US high yield bonds gained +3.4%.**
- **Emerging markets debt gained broadly and were especially pronounced in local currency as relative dollar weakness spurred strong gains.**
 - US dollar-denominated debt, as measured by the JP Morgan EMBI Index, gained 5.9%; local currency debt gained +11.0%, according to the JP Morgan GBI-EM Index.

Real Assets/Inflation-Linked Assets

- **Massive energy market dislocation.**
 - Seek inflation sensitive asset classes that offer positive yield
 - Oil prices stabilizing and remain low.
 - Private equity and private debt opportunities may be relatively attractive.
 - Potential for public stressed/distressed credit, equity and commodity plays.
- **OPEC, Saudi Arabia and oil producing countries continue to show a willingness to allow lower oil prices to persist in efforts to cement market share and reduce marginal supply.**
- **Select infrastructure opportunities showing signs of being attractive.**
 - Target opportunistic strategies in niche sub-sectors to take advantage of market dislocations.
 - Secular opportunities may exist within the shipping industry as traditional financing sources (both debt and equity) are less abundant
- **Timber opportunities remain elusive.**
 - Income yields (net) are low as assets are predominantly traded between like-minded institutions
 - Private strategies are illiquid and constrain quick entrance/exit (i.e. long-term lock-up)
 - Liquid strategies have limited pure timber exposure (and limited active-play options)

Commodities

- **Commodities ended quarter with a meager +0.51% as measured by the Bloomberg Commodity Index.**
 - Volatility continued in oil markets as price discovery continues into 2016 with oil reaching multi-year lows in February preceding a rebound in March.
 - Precious metals were the best performing group appreciating nearly 9.5% on average.

Real Estate

- **NEPC continues to be neutral on core real estate in the US and remains positive on non-core real estate, that is, value-add and opportunistic strategies.**
- **Within U.S. core real estate, strong fundamentals continue to be the story along with attractive income spreads relative to interest rates.**
 - Real estate fundamentals and debt terms are attractive, however valuations are high and the possibility of rising interest rates and the impact on cap rates causes concern.
- **Overall, the non-core real estate investment environment in the U.S. is normalizing; however, select areas remain attractive.**
- **Europe is viewed as the best place for a marginal dollar of non-core real estate investment.**
 - Europe is emerging from multi-year recession, but recovery is slow and uneven with global markets experiencing large capital inflows.
 - Banks in EU are still overleveraged and have significant real estate exposure to jettison.

Highlights of First Quarter Happenings at NEPC

NEPC Research

Recent White Papers

- *2016 First Quarter Market Thoughts*
- *Market Chatter: Is it really All About China?* (January 2016)
- *Market Chatter: Monetary Policy Divergence and Developed Currency* (April 2016)

Upcoming Events

- ‘Opportunities for Future Investments’ is the theme for NEPC’s 21st Annual Investment Conference – May 10-11, 2016 at the Hynes Convention Center in Boston, MA. Keynote Speakers are:
 - Michael Cembalest, Chairman of Market and Investment Strategy, J.P. Morgan Asset Management
 - Dr. Dambisa Moyo, Global Economist and Author
- Register at www.NEPC.com

NEPC Client Recognitions

We are excited to announce that three of NEPC’s clients were nominated for the 2016 “Chief Investment Officer of the Year” Investor Intelligence Award. The winners will be announced at Institutional Investor’s annual Roundtable for Public Funds, taking place April 27-29, 2016 in Los Angeles, CA. We wish them luck!

- Arn Andrews, CIO, City of San Jose Department of Retirement Services
- Ryan Parham, CIO, Arizona Public Safety Personnel Retirement Systems
- Girard Miller, CIO, Orange County Employees Retirement System



NEPC Client Recognitions (continued)

A number of NEPC clients were named on TrustedInsight’s list of Top 30 Pension Fund Chief Investment Officers. According to the January 2016 issue, “these 30 chief investment officers manage more than \$1.3 trillion in assets for millions of retirees in the United States. These professionals are at the forefront of an industry that’s slow to evolve, under constant scrutiny and vital to the wellbeing of many average Americans. Nonetheless, they operate at the top of their field to prudently protect the benefits of their constituency.” NEPC clients that made the list include:

- Scott Evans, CIO, New York Employees Retirement System - \$78.5B AUM
- David Villa, CIO, State of Wisconsin Investment Board - \$102B AUM
- Gary Dokes, CIO, Arizona State Retirement System - \$31B AUM
- Michael Trotsky, Executive Director, CIO, Massachusetts PRIM Board - \$62B AUM
- Robert Beale, CIO, Louisiana State Employees’ Retirement System - \$5.2B AUM
- Richard Shafer, CIO, Ohio Public Employees’ Retirement System - \$91.5B AUM
- James Perry, CIO, Dallas Police and Fire Pension System - \$3B AUM
- William Coaker, CIO, San Francisco Employees Retirement System - \$20.3B AUM
- Bob Jacksha, CIO, New Mexico Education Retirement Fund - \$11B AUM
- Girard Miller, CIO, Orange County Employees Retirement System - \$12.1B AUM
- Sam Masoudi, CFA, CAIA, CIO, Wyoming Retirement System - \$7.8B AUM

Appendix: SAA Policy History



Strategic Asset Allocation Policy (SAAP) History

- 7/1/75 – 12/31/79 – 40% S&P 500/60% Barclays Capital Aggregate
- 1/1/80 – 12/31/83 – 50% S&P 500/50% Barclays Capital Aggregate
- 1/1/84 – 12/31/91 – 60% S&P 500/40% Barclays Capital Aggregate
- 1/1/92 – 12/31/94 – 50% S&P 500/10% MSCI EAFE/40% Barclays Capital Aggregate
- 1/1/95 – 6/30/97 – 45% S&P 500/15% MSCI EAFE/40% Barclays Capital Aggregate
- 7/1/97 – 12/31/99 – 50% S&P 500/15% MSCI EAFE/35% Barclays Capital Aggregate
- 1/1/00 – 9/30/03 – 53% S&P 500/17% MSCI EAFE/30% Barclays Capital Aggregate
- 10/1/03 – 12/31/06 – 53% S&P 500/15% MSCI EAFE/ACWI ex-U.S.¹/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 1/1/07 – 10/31/2009 – 31% S&P 500/7% S&P 400/7% S&P 600/18% MSCI ACWI ex-U.S./5% Russell 2000 (lagged one quarter)/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 11/1/2009 – 6/30/2012 – 28% S&P 500/6% S&P 400/6% S&P 600/13% MSCI EAFE/2% MSCI EAFE Small Cap/3% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/24% Barclays Capital Aggregate/2% Barclays Capital High Yield/6% NCREIF ODCE (lagged one quarter)/3% Dow Jones/UBS Commodities Index
- 7/1/2012 – 3/31/2015 – 23% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/13% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/3% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/8% NCREIF ODCE (lagged one quarter)/4% Dow Jones/UBS Commodities Index
- **4/1/2015 - present – 20% S&P 500/3% S&P 400/3% S&P 600/17% MSCI EAFE/2% MSCI EAFE Small Cap/5% MSCI Emerging Markets/8% Russell 2000 (lagged one quarter)/11% Barclays Capital Aggregate/4% Barclays Capital High Yield/10% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/10% NCREIF ODCE (lagged one quarter)/2% Bloomberg Commodities Index TR/5% Multi-Asset Class Custom Index**
- ***Interim SAA Policy:** 21% S&P 500/3% S&P 400/3% S&P 600/18% MSCI EAFE/2% MSCI EAFE Small Cap/5% MSCI Emerging Markets/8% Russell 2000 (lagged one quarter)/15% Barclays Capital Aggregate/4% Barclays Capital High Yield/6% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/8% NCREIF ODCE (lagged one quarter)/2% Bloomberg Commodity Index/5% Multi-Asset Class Custom Index

Note: Interim SAA Policy includes proration of 2% Real Estate and 4% Private Debt which are unfunded. Real Estate was prorated to equity and fixed income; Private Debt was prorated to fixed income. Recently approved Strategic Asset Allocation Policy effective April 1, 2015.

¹MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net dividend withholding taxes effective 1/1/2014.



ASRS Custom Asset Class Benchmark History

- **ASRS Custom Total Equity Benchmark** was 77% S&P 500, 23% MSCI EAFE through 12/31/1999; 76% S&P 500, 24% MSCI EAFE through 9/30/2003; 78% S&P 500, 22% MSCI EAFE/ACWI ex-U.S.¹ through 12/31/2006; 49% S&P 500, 11% S&P 400, 11% S&P 600, 29% MSCI ACWI ex-U.S. through 10/31/2009; 48% S&P 500, 10% S&P 400, 10% S&P 600, 23% MSCI EAFE, 4% MSCI EAFE Small Cap, 5% MSCI Emerging Markets through 6/30/2012; 41% S&P 500, 9% S&P 400, 9% S&P 600, 25% MSCI EAFE, 5% MSCI EAFE Small Cap, 11% MSCI Emerging Markets through 3/31/2015; 40% S&P 500, 6% S&P 400, 6% S&P 600, 34% MSCI EAFE, 4% MSCI EAFE Small Cap, 10% MSCI Emerging Markets thereafter.
- **ASRS Custom Domestic Equity Benchmark** was S&P 500 through 12/31/2006; 74% S&P 500, 13% S&P 400, 13% S&P 600 through 12/31/2010; 70% S&P 500, 15% S&P 400, 15% S&P 600 through 3/31/2015.; 77% S&P 500, 11.5% S&P 400, 11.5% S&P 600 thereafter.
- **ASRS Custom International Equity Benchmark** was MSCI EAFE through 9/30/2005; MSCI ACWI ex-U.S. through 12/31/2010; 72% MSCI EAFE, 11% MSCI EAFE Small Cap and 17% MSCI Emerging Markets through 6/30/2012; 61% MSCI EAFE, 13% MSCI EAFE Small Cap and 26% MSCI Emerging Markets through 3/31/2015; 71% MSCI EAFE, 8% MSCI EAFE Small Cap and 21% MSCI Emerging Markets thereafter.
- **ASRS Custom Public Markets Fixed Income Benchmark** was Barclays Capital U.S. Aggregate Index through 12/31/2010; 93% Barclays Capital U.S. Aggregate Index, 7% Barclays Capital U.S. High Yield Bond Index through 12/31/2012; 59% Barclays Capital U.S. Aggregate Index, 23% Barclays Capital U.S. High Yield Bond Index, 18% JP Morgan GBI-EM Global Diversified through 3/31/2015; 73% Barclays Capital U.S. Aggregate Index, 27% Barclays Capital U.S. High Yield Bond Index thereafter.
- **ASRS Custom Inflation-Linked Benchmark** was 100% Barclays Capital U.S. TIPS through 7/31/2010; 50% Barclays Capital U.S. TIPS, 50% Bloomberg Commodity Index through 8/31/2010; 30% Barclays Capital U.S. TIPS, 70% Bloomberg Commodity Index through 5/31/2011; 100% Bloomberg Commodity Index thereafter.
- **Multi-Asset Class Strategies Custom Benchmark** was 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital Aggregate, and 3% Bloomberg Commodity Index through 06/30/2012; 43% S&P 500, 25% MSCI EAFE, 28% Barclays Capital Aggregate, and 4% Bloomberg Commodity Index through 3/31/2015; market value weighted average of the benchmarks for Bridgewater (91 Day T-Bill) and Windham (52% MSCI ACWI net, 30% Citi WGBI, 9% DJ US REIT, and 9% Bloomberg Commodities Index) thereafter.
- **ASRS Cash Assetization Custom Benchmark** is 33% S&P 500, 14% Russell 2000, 25% MSCI EAFE, 28% Barclays Treasury Index through 8/24/2015; 100% Barclays US Long Treasury Index through 11/13/2015; 15% S&P 500, 15% Russell 2000, 16% MSCI EAFE, 4% MSCI Emerging Markets Index, 50% Barclays US Treasury Index thereafter.

¹MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net of dividend withholding taxes effective 1/1/2014.

Agenda Item #6



ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Anthony Guarino, Deputy Director and Chief Operations Officer
Mr. Dave King, Assistant Director, Member Services Division
Ms. Julie Lockwood, Program Manager
Mr. Frank Perri, Benefits Program Administrator

DATE: June 7, 2016

RE: **Agenda Item #6:** Presentation, Discussion, and Appropriate Action Regarding the ASRS Retiree Health Insurance Program Contract Renewal

Purpose

To review UnitedHealthCare's (UHC) renewal for the 2017 plan year for Medicare and non-Medicare eligible ASRS, Public Safety Personnel Retirement System, Corrections Officer Retirement Plan, Elected Officials Retirement Plan and University Optional Retirement Plan retirees, eligible disabled members, and eligible dependents.

Recommendation

Informational only, no action required.

Background

The ASRS staff and consultants from Mercer negotiated with UHC regarding UHC's 2017 health insurance plans renewal. The current contract was awarded January 1, 2015, for one year with four annual renewals through December 31, 2019. 2017 will be the third year of the contract (2nd renewal).

Each medical plan's cost, trend, revenue, and other critical data were reviewed, verified and discussed. Our efforts this year primarily focused on affordability for pre-65 retirees. The monthly single premium for the existing non-Medicare plan (Choice, for in-state members) equates to more than 50% of the average retiree plan benefit, net of taxes. The family pre-65 premium often exceeds the average retiree benefit. New membership in the pre-65 Choice plan has been trending down each year.

Last fall, the ASRS researched the Affordable Care Act (ACA) marketplace offerings to consider other lower-cost alternatives to the existing UHC Choice plan for pre-65 retirees. In addition, staff surveyed our retirees and met with representatives from several retiree associations for their feedback and preference on plan offerings.

Staff engaged UHC very early in the year to offer more choices to pre-65 retirees at a lower premium and have devised a host of new plans for these retirees with varying benefit levels and premium costs. See the attached for more details.

New pre-65 plans will offer slightly reduced benefit provisions and/or a narrow provider network (Navigate) in exchange for a lower monthly premium. The most expensive plan this year is the current Choice plan at a 4% increase from 2016, which will experience no changes in benefit provisions from 2016. The least expensive plan represents a nearly 20% discount on premiums from 2016 and a 24% savings over the most expensive plan in 2017. In most utilization scenarios, the new plans offer substantial total out-of-pocket savings to our retirees versus the original Choice plan.

Our negotiations also resulted in a \$5 premium reduction for the Senior Supplement Plan. In addition, a one-year federal moratorium on certain fees enabled UHC to offer a \$20 reduction on the Medicare HMO plan. This reduction will be reversed when the federal moratorium is lifted in 2018 or beyond. Plan provisions for both Medicare plans will remain unchanged for the 2017 plan year.

In addition, the ASRS continues to utilize a one-way Retrospective Rate Adjustment Agreement (RRAA) with UHC that provides a reimbursement to the ASRS if total claims expenses do not exceed 93% of revenues (i.e., the negotiated medical loss ratio). Revenues include premiums enrolled members pay, other funds and reimbursements from The Centers for Medicare and Medicaid Services for administering Medicare plans, and prescription drug rebates.

The 2014 medical loss ratio (claims expenses to revenues) across all plans was 85.8% and this resulted in a \$31,507,222 reimbursement from UHC. The preliminary 2015 medical loss ratio across all plans is currently expected to be 91.6%, and will be finalized late August 2016.

**Arizona State Retirement System
 Current and 2017 Plan Premiums**

ASRS Medical Plan	Approx. Subscribers	Current Plan Year Premiums - Single	2017 Plan Year Premiums - Single
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Non-Medicare Plan

UHC Choice Plan (in state, in-network)	7,700	\$793	\$824.72 (+4.0%)
UHC Navigate	<i>New</i>	-	\$745.33 (-6.0% from 2016 Choice)
UHC Choice with 2K Deductible	<i>New</i>	-	\$767.26 (-3.2%)
UHC Navigate with 2K Deductible	<i>New</i>	-	\$693.41 (-12.6%)
UHC Choice with 4K Deductible	<i>New</i>	-	\$702.81 (-11.4%)
UHC Navigate with 4K Deductible	<i>New</i>	-	\$635.16 (-19.9%)
UHC Choice Plus (out of state)	130	\$1,112	\$1,156 (+4.0%)

Medicare Plan

Senior Supplement + PDP	12,200	\$337	\$332 (-1.5%)
Medicare Advantage HMO	24,000	\$194	\$174 (-10.3%)

Your Guide to Health Care Benefits



Consider Your Choices

1

**Enroll for
medical
coverage?**

Consider your
likely health care
needs, other
available
coverage, cost

2

**Which
medical
plan?**

Consider your
estimated total cost

Medical Options: Compare and Contrast

	Choice 1 – Current No Deduct	Choice 2 PPO \$2,000/\$4,000	Choice 3 PPO \$4,000/\$8,000
Routine and preventive care?	100% covered	100% covered	100% covered
Are there copays?	PCP \$20, SPC \$50, IP \$100 POD, UC \$50, ER \$150, Maj Diag \$150 RX: \$10 / \$50 / \$100	PCP \$30 , SPC \$60 , IP \$100 POD, UC \$75 , ER \$300 , Maj Diag \$150 RX: \$10 / \$50 / \$100	PCP \$40 , SPC \$80 , IP N/A , UC \$75 , ER \$300 , Maj Diag \$250 RX: \$10 / \$50 / \$100
What is the deductible?*	N/A	\$2,000 Individual \$4,000 Family	\$4,000 Individual \$8,000 Family
Coinsurance?	70%	70%	70%
The most you'll pay out-of-pocket in a year if you stay in the network?	\$3,500 Individual \$7,000 Family	\$4,000 Individual \$8,000 Family	\$6,000 Individual \$12,000 Family
Monthly Individual Premium - Choice	\$824.72	\$767.26	\$702.81
Monthly Individual Premium - Navigate	\$745.33	\$693.40	\$635.15

**Deductible applies only to services not otherwise noted with a copay, such as out-patient procedures.*



Example #1

Teresa – Minimal utilization.

Service	UHC Average Approved Amount*	Choice 1 - Current No Deduct	Choice 2 PPO \$2,000/\$4,000	Choice 3 PPO \$4,000/\$8,000
Routine Preventive Care (1 visit)	\$120	\$0	\$0	\$0
Primary Care Office Visit (2 visits)	\$160	\$40	\$60	\$80
Specialist Office Visit (1 visit)	\$120	\$50	\$60	\$80
Tier 1 Prescription Monthly for Preventative (\$10 x 12 scripts)	\$204	\$120	\$120	\$120
Tier 2 Prescription (\$50 x 1 script)	<u>\$140</u>	<u>\$50</u>	<u>\$50</u>	<u>\$50</u>
Subtotal	\$744	\$260	\$290	\$330
Retiree Annual Premium		\$9,897	\$9,207	\$8,434
TOTAL ANNUAL COST		\$10,157	\$9,497	\$8,764
Difference from Current			(\$660)	(\$1,393)
Difference from Current with Navigate		(\$953)	(\$1,546)	(\$2,205)



Example #2

Teresa – Low medical / high prescription utilization.

Service	UHC Average Approved Amount*	Choice 1 - Current No Deduct	Choice 2 PPO \$2,000/\$4,000	Choice 3 PPO \$4,000/\$8,000
Routine Preventive Care (1 visit)	\$120	\$0	\$0	\$0
Primary Care Office Visit (2 visits)	\$160	\$40	\$60	\$80
Specialist Office Visit (1 visit)	\$120	\$50	\$60	\$80
Tier 1 Prescription Monthly for Preventative (\$10 x 12 scripts)	\$204	\$120	\$120	\$120
Tier 2 Prescription, 3 per Month - (\$50 x 36 scripts)	<u>\$4,800</u>	<u>\$1,800</u>	<u>\$1,800</u>	<u>\$1,800</u>
Subtotal	\$5,404	\$2,010	\$2,040	\$2,080
Retiree Annual Premium		\$9,897	\$9,207	\$8,434
TOTAL ANNUAL COST		\$11,907	\$11,247	\$10,514
Difference from Current			(\$660)	(\$1,393)
Difference from Current with Navigate		(\$953)	(\$1,546)	(\$2,205)



Example #3

Teresa – Moderate member utilization.

Service	UHC Average Approved Amount*	Choice 1 - Current No Deduct	Choice 2 PPO \$2,000/\$4,000	Choice 3 PPO \$4,000/\$8,000
Routine Preventive Care (1 visit)	\$120	\$0	\$0	\$0
Emergency Room (1 visit)	\$3,500	\$150	\$300	\$300
Physical Therapy - (20 visits)	\$1,100	\$800	\$600	\$800
Primary Care Office Visit (6 visits)	\$480	\$120	\$180	\$240
Specialist Office Visit (3 visits)	\$360	\$150	\$180	\$240
Tier 1 Prescription (\$10 x 24 scripts)	\$396	\$240	\$240	\$240
Tier 2 Prescription (\$50 x 3 scripts)	\$420	\$150	\$150	\$150
Subtotal	\$6,376	\$1,610	\$1,650	\$1,970
Retiree Annual Premium		\$9,897	\$9,207	\$8,434
TOTAL ANNUAL COST		\$11,507	\$10,857	\$10,404
Difference from Current			(\$650)	(\$1,103)
Difference from Current with Navigate		(\$953)	(\$1,536)	(\$1,915)

*Illustration only; actual costs may vary by geography, provider type and/or services provided.



Example #4

Teresa – Higher member utilization.

Service	UHC Average Approved Amount*	Choice 1 - Current No Deduct	Choice 2 PPO \$2,000/\$4,000	Choice 3 PPO \$4,000/\$8,000
Routine Preventive Care (1 visit)	\$120	\$0	\$0	\$0
Inpatient Hospital Stay (1 visit)	\$40,000	\$3,500 <i>\$100 POD + 30% up to max OOP</i>	\$4,000 <i>\$100 POD + 30% up to max OOP</i>	\$6,000 <i>\$4,000 deductible + 30% up to max OOP</i>
Outpatient Surgery (1 visit)	\$15,000			
Primary Care Office Visit (6 visits)	\$640			
Specialist Office Visit (6 visits)	\$720	<u>\$0 - max OOP met</u>	<u>\$0 - max OOP met</u>	<u>\$0 - max OOP met</u>
Tier 1 Prescription (12 scripts)	\$204			
Tier 2 Prescription (4 scripts)	<u>\$240</u>			
Subtotal	\$56,924	\$3,500	\$4,000	\$6,000
Retiree Annual Premium		\$9,897	\$9,207	\$8,434
TOTAL ANNUAL COST		\$13,397	\$13,207	\$14,434
Difference from Current			(\$190)	\$1,037
Difference from Current with Navigate		(\$953)	(\$1,076)	\$225

*Illustration only; actual costs may vary by geography, provider type and/or services provided.

About This Guide

Coverage Examples are not cost estimators. You can't use the examples to estimate costs for an actual condition. They are for comparative purposes only. Your own costs will be different depending on the care you receive, the prices your providers charge, and the reimbursement your health plan allows.

This guide describes the benefit plans and policies available to you. The details of these plans and policies are contained in the official plan and policy documents, including some insurance contracts. This guide is meant only to cover the major points of each plan or policy. It doesn't contain all of the details that are included in your *Summary Plan Descriptions* (as required by ERISA) found in your other employee benefit materials. If there's ever a question about one of these plans and policies, or if there's a conflict between the information in this guide and the formal language of the plan or policy documents, the formal wording in the plan or policy documents will govern. **Note:** The benefits described in this guide may be changed at any time and don't represent a contractual obligation – either implied or expressed – on the part of ASRS.

Agenda Item #7



ARIZONA STATE RETIREMENT SYSTEM

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*Paul Matson
Director*

MEMORANDUM

TO: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Anthony Guarino, Deputy Director and Chief Operations Officer
Mr. Dave King, Assistant Director, Member Services Division
Mr. Brian Crockett, Sr. Strategic Planning Analyst, Strategic Planning and Analysis

DATE: June 7, 2016

RE: **Agenda Item #7:** Presentation, Discussion, and Appropriate Action Regarding the Analysis of ASRS Benefit Estimates Compared to Actual Annuities

Purpose

Discuss the analysis performed by staff comparing estimated pension benefit amounts to actual pension amounts.

Recommendation

Informational only, no action required.

Background

At its April 29, 2016, meeting the Board requested that staff perform an analysis of actual pension amounts compared to estimated pension amounts provided to members prior to retirement. Attached is a summary of the analysis performed by staff.

By way of background, the ASRS offers members the ability to estimate their retirement benefits at any point prior to retirement via their secure only myASRS account.

The system projects relevant retirement dates (early retirement, normal retirement, Age 65, Next Multiplier) and estimated pension benefits based on un-audited contributions reported by employers. Contributions may not be audited until the member files for retirement, at which time any unusual contributions and ending-payroll contributions are reconciled.

The system makes a series of assumptions that generally estimate a member's retirement benefit very close to their final, audited benefit. But differences can arise for various reasons, including but not limited to:

- 1) Balance of contract payments;
- 2) A pay period with an outsized contribution amount (might have been an adjustment to cover multiple pay periods);
- 3) Missing contributions;
- 4) More than 2 contributions in a month;
- 5) Contributions reported in the wrong pay period;
- 6) Election changes to Optional Forms of Retirement and Partial Lump Sum; or

7) Service Purchase.

In most cases, the closer a member is to their projected retirement date the more accurate the estimate.

The ASRS does not save the calculation data/assumptions on benefit estimates at any point prior to the member filing online for retirement. Attached is an analysis of estimates saved at the time of filing for retirement versus the finalized calculation after the pension audit was complete.

Estimate Amount less than Actual Pension

<u>Variance</u>	<u>Count (Percentage⁴)</u>	<u>Average Monthly Annuity</u>	<u>Average Difference Between Estimate and Actual</u>
Less Than 1%	1,628 (58.7%)	\$1,744	\$7
Between 1% and 2%	567 (20.4%)	\$1,883	\$25
Between 2% and 3%	211 (7.6%)	\$1,798	\$43
Between 3% and 4%	110 (4.0%)	\$1,908	\$63
Between 4% and 5%	61 (2.2%)	\$2,148	\$90
Between 5% and 10%	108 (3.9%)	\$2,271	\$147
Greater Than 10%	<u>89 (3.2%)</u>	<u>\$1,498</u>	<u>\$236</u>
Total/Overall Average:	2,744	\$1,804.69	\$30.42 (1.7%)

Estimate Amount greater than Actual Pension

<u>Variance</u>	<u>Count (Percentage⁴)</u>	<u>Average Monthly Annuity</u>	<u>Average Difference Between Estimate and Actual</u>
Less Than 1%	1,134 (49.5%)	\$1,595	\$6
Between 1% and 2%	454 (19.8%)	\$1,927	\$29
Between 2% and 3%	291 (12.7%)	\$1,980	\$51
Between 3% and 4%	156 (6.8%)	\$2,179	\$78
Between 4% and 5%	69 (3.0%)	\$2,079	\$96
Between 5% and 10%	119 (5.2%)	\$1,484	\$110
Greater Than 10%	<u>66 (2.9%)</u>	<u>\$1,330</u>	<u>\$295</u>
Total/Overall Average:	2,289	\$1,750.67	\$37.44 (2.1%)

Aggregate Differences

<u>Variance</u>	<u>Count (Percentage⁴)</u>	<u>Average Monthly Annuity</u>	<u>Average Difference Between Estimate and Actual</u>
Less Than 1%	2,762 (54.6%)	\$1,683	\$7
Between 1% and 2%	1,021 (20.2%)	\$1,903	\$27
Between 2% and 3%	502 (9.9%)	\$1,903	\$49
Between 3% and 4%	266 (5.3%)	\$2,067	\$72
Between 4% and 5%	130 (2.6%)	\$2,111	\$93
Between 5% and 10%	227 (4.5%)	\$1,858	\$128
Greater Than 10%	<u>155 (3.1%)</u>	<u>\$1,426</u>	<u>\$261</u>
Total/Overall Average:	5,063	\$1,780.27	\$33.60 (1.9%)

Notes:

1. Includes online retirement inceptions from January 1, 2015 through December 31, 2015.
2. Excludes Lump Sum retirees.
3. Excludes six retirement inceptions where the estimate amount was exactly equal to the actual pension.
4. Percentages may not add to 100% due to rounding.

Agenda Item #8



ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Anthony Guarino, Deputy Director and Chief Operations Officer

DATE: June 10, 2016

RE: **Agenda Item #8:** Presentation, Discussion, and Appropriate Action Regarding Strategic Topics to be Discussed by the Board in Fiscal Year 2017

Purpose

To present suggestions for strategically focused topics to be discussed at Board meetings during fiscal year 2017.

Recommendation

Information item only; no action required.

Background

At the Board meeting in May, staff summarized the strategic topics discussed during fiscal year 2016 and items already scheduled for discussion in fiscal year 2017.

Staff also requested input and guidance from trustees for additional topics to be discussed.

Attached is the list of topics suggested by trustees and executive staff. Once accepted, staff will plan accordingly to schedule the topics for discussion at a future board meeting.

Staff recommends adopting the list contained on the subsequent pages. This includes a re-examination in the spring of 2017 of strategic priorities last adopted by the Board March 2013. This re-examination is intended to be a full engagement with the Board to determine if changes to our existing priorities are warranted.

Suggested Strategic Topics – Fiscal Year 2017

1. Strategic Plan Reporting: Priority #5 – Ensure High Productivity

Provide the board with an annual update on the agency's ability to meet this strategic plan priority, including:

1. Actual performance versus objectives.
2. Potential changes to this priority (strategic plan language, objectives and measures).
3. Actions currently planned or needed for this priority.

Planned Board Presentation Date: August 2016

2. National Public Pension Landscape (*Trustee request*)

A representative from the National Association of State Retirement Administrators (NASRA) will make a presentation on the current legislative, legal, and political trends related to public retirement systems from a national perspective, including:

1. Pertinent federal legislation that may impact large public pension funds.
2. Pertinent regulatory actions or proposals (IRS, SEC, GASB, etc.) that may impact large public pension funds.
3. Current legal cases across the country and the potential implications for other large public pension funds.
4. Current trends across the U.S. that Trustees may find interesting, including national trends in:
 - a. Actuarial assumptions
 - b. Investment assumptions
 - c. Investment policies
 - d. Funding policies
 - e. Governance
 - f. Retirement plan design
 - g. Disability plan design
 - h. Health care programs
 - i. Security/privacy concerns

Planned Board Presentation Date: August 2016

3. Health Care

ASRS staff will present recommendations for the following topics related to the ASRS health insurance program:

1. Reaffirm or change Health Insurance Program Goals.
2. Whole Case Underwriting & Resulting Cross Subsidizations: Discuss future direction.
3. Direction of non-Medicare and Medicare coverage.
4. Retrospective Rate Adjustment Agreement Fund: Current balance, utilization options, allocation options.

Planned Board Presentation Date: September 2016

4. Workforce Planning (*Trustee request*)

ASRS staff will provide information related to current workforce planning efforts underway, including:

1. The approach the ASRS is using to prepare for future turnover in key positions.
2. Key outcomes the ASRS expects to receive through the creation/utilization of a workforce plan at the ASRS.
3. Next steps and expected timelines.

Planned Board Presentation Date: Fall 2016

5. Board Governance and Management Concepts and Practices (*Trustee request*)

An external expert will make a presentation on Highly Effective Board (public and private) Governance and Management Concepts and Practices. Topics discussed may include, but will not be limited to:

1. Assisting the Board in determining which items a Board should ideally focus on, and which items it should not focus on.
2. How a Board can be most effective as a group.
3. How individual Board members can be most effective.
4. Other governance practices, including:
 - a. Decision-making
 - b. Delegation
 - c. Conflict of interest practices
 - d. Ethics policies
 - e. Strategic planning
 - f. Continuing professional education
 - g. Team-building
 - h. Paid vs. volunteer boards
 - i. Time commitment
 - j. Compensation
 - k. Open meeting law
 - l. Other topics identified by the external speaker

Planned Board Presentation Date: Fall 2016 – Winter 2017

6. Director's Perspective on ASRS Programs, Plans, and the Retirement Landscape

The Director will provide his assessment of each ASRS benefit program (Retirement, Disability, Health Insurance Programs and Health Benefit Supplement) regarding:

1. Governance and Design.
2. Fiscal Integrity.
3. Core Member Services.
4. Administrative Effectiveness.
5. External Environment.

Planned Board Presentation Date: Fall 2016 – Winter 2017

7. Discussion & Re-Examination of Strategic Priorities

The Deputy Director and Chief Operations Officer will discuss each of the 5 strategic priorities in the current strategic plan to:

1. Provide a staff assessment of current strategic priorities.
2. Provide staff suggestions for additions, deletions, or changes to agency priorities.
3. Solicit Board feedback and ideas.

Planned Board Presentation Date: Spring 2017

8. Schedule Reports on Strategic Priorities as Determined by the Board

Staff will recommend a schedule for reports on each of the Agency's strategic priorities based on the outcomes of #7 above.

Planned Board Presentation Date: Spring 2017

Agenda Item #9

Note: There are no materials for this agenda item.

Agenda Item #10

Director's Report

10a - Investments

10b - Operations

10c - Budget & Staffing

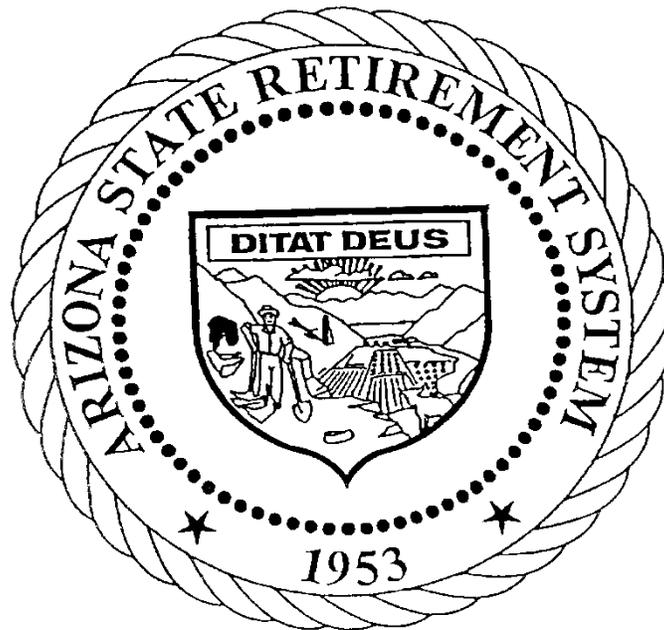
**10d - Cash Flow
Statement**

10e - Appeals

**10f - Employers
Reporting**

Agenda Item #10a

Director's Report Investments



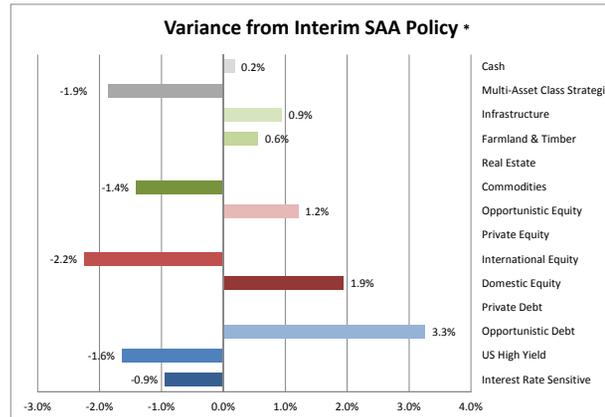
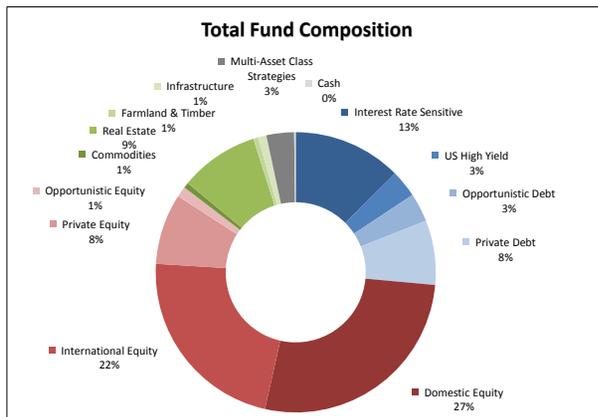
Investment Report

Arizona State Retirement System

June 24, 2016

Portfolio Positioning

Total Fund Positioning May 31, 2016



All Private Markets asset classes' market values are reported on a quarter-lag basis and adjusted to include the current quarter's cash flow.

Asset Allocation

Pension (Plan, System, HBS Assets)		ASRS Market Value Report					Tuesday, May 31, 2016		
Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked	Multi-Asset	Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive				
Slate Street B&T: Boston	Tactical Cash (non-assetized)							0	0.00%
	Operating Cash (non-assetized)		10,637,295					10,637,295	0.03%
	Cash Total							\$10,756,256	0.03%
									0.00%
Blackrock: San Francisco	Treasuries (Long Duration)		383,285,368					383,285,368	1.15%
	Treasuries (Long Duration) Total							\$383,285,368	1.15%
									0.00%
Operating Cash (assetized)	US Treasuries		124,456,355					124,456,355	0.37%
ASRS: Phoenix	Enhanced Passive F2		1,878,655,560					1,878,655,560	5.63%
Blackrock: San Francisco	Passive (US Debt Index)		1,598,851,129					1,598,851,129	4.79%
	Core Fixed Income Total							\$3,601,963,045	10.80%
	Interest Rate Sensitive							\$3,985,248,413	11.94%
									11.00%
Columbia: Minneapolis	Active	708,895,771						708,895,771	2.12%
JP Morgan: Indianapolis	Active	362,038,935						362,038,935	1.09%
	High Yield Fixed Income Total							\$1,070,948,473	3.21%
									4.00%
	Opportunistic Debt	1,076,649,725						\$1,076,649,725	3.23%
									0.00%
	Private Debt Total	2,641,141,748						\$2,641,141,748	7.92%
									10.00%
	Fixed Income Total							\$8,773,988,360	26.30%
									25.00%
LSV: Chicago	Active (Value)			564,944,557				564,944,557	1.69%
ASRS: Phoenix	Passive E2			4,483,347,626				4,483,347,626	13.44%
ASRS: Phoenix	Enhanced Passive E7			567,644,107				567,644,107	1.70%
Operating Cash (assetized)	S&P 500			215,724,349				215,724,349	0.65%
ASRS: Phoenix	Enhanced Passive E8			543,950,552				543,950,552	1.63%
	Large Cap Equity Total							\$6,375,611,624	19.11%
									20.00%
Wellington: Boston	Active (Core)			283,375,065				283,375,065	0.85%
ASRS: Phoenix	Passive E3 (Growth)			402,721,152				402,721,152	1.21%
Operating Cash (assetized)	Russell 2000			37,336,907				37,336,907	0.11%
ASRS: Phoenix	Passive E4 (Value)			373,767,983				373,767,983	1.12%
	Mid Cap Equity Total							\$1,097,201,107	3.29%
									3.00%
TimesSquare: New York	Active (Growth)			358,449,236				358,449,236	1.07%
Operating Cash (assetized)	Russell 2000			37,336,907				37,336,907	0.11%
DFA: Santa Monica	Active (Value)			277,228,950				277,228,950	0.83%
ASRS: Phoenix	Passive E6			327,082,904				327,082,904	0.98%
	Small Cap Equity Total							\$1,000,097,998	3.00%
									3.00%
	U.S. Equity Total							\$8,472,910,729	25.39%
									26.00%
Brandes: San Diego	Active (Value)			560,548,800				560,548,800	1.68%
American Century	Active (EAFE)			550,205,620				550,205,620	1.65%
Trinity Street	Active (EAFE)			325,037,872				325,037,872	0.97%
Thompson Siegel Walmsley	Active (EAFE)			295,419,682				295,419,682	0.89%
Int'l Transition					4,842,077			4,842,077	0.01%
Blackrock: San Francisco	Passive (EAFE)				3,974,702,191			3,974,702,191	11.91%
	Large Cap Developed Non-US Equity Total							\$5,711,262,484	17.12%
									17.00%
AQR: Greenwich	Active (EAFE SC)			99,349,745				99,349,745	0.30%
DFA: Santa Monica	Active (EAFE SC)			104,530,631				104,530,631	0.31%
Franklin Templeton: San Mateo	Active (EAFE SC)			221,445,920				221,445,920	0.66%
Blackrock: San Francisco	Passive (EAFE SC)				259,439,533			259,439,533	0.78%
	Small Cap Developed Non-US Equity Total							\$684,768,283	2.05%
									2.00%
	Small Cap Developed Policy								

Asset Allocation (Continued)

Pension (Plan, System, HBS Assets)		ASRS Market Value Report					Tuesday, May 31, 2016		
Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked	Multi-Asset	Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive	Active	Active		
William Blair: Chicago	Active (EM)			350,939,423				350,939,423	1.05%
Eaton Vance: Boston	Active (EM)			255,135,420				255,135,420	0.76%
LSV: Chicago	Active (EM)			109,672,032				109,672,032	0.33%
Blackrock: San Francisco	Passive (EM)				306,100,857			306,100,857	0.92%
	Emerging Markets Equity Total							\$1,021,847,732	3.06%
	Non-US Equity Total							\$7,417,878,498	22.23%
								Non-US Equity Policy Range: 14% - 34%	24.00%
ASRS: Phoenix	Risk Factor Portfolio				578,758,380			578,758,380	1.73%
	Public Equity Total							\$16,469,547,606	49.36%
	Private Equity Total			2,725,561,527				\$2,725,561,527	8.17%
								Private Equity Policy Range: 6% - 10%	8.00%
	Opportunistic Equity			324,050,179				\$324,050,179	0.97%
								Opportunistic Equity Policy:	0.00%
	Equity Total							\$19,519,159,312	58.50%
								Total Equity Policy Range: 48% - 65%	58.00%
Gresham: New York	Commodities Total					224,244,845		224,244,845	0.67%
								\$224,244,845	0.67%
								Commodities Policy Range: 0% - 4%	2.00%
	Real Estate Total					3,284,339,897		\$3,284,339,897	9.84%
								Real Estate Policy Range: 8% - 12%	10.00%
	Infrastructure Total					325,444,191		\$325,444,191	0.98%
								Infrastructure Policy Range: 0% - 3%	0.00%
	Farmland & Timber Total					188,017,561		\$188,017,561	0.56%
								Farmland & Timber Policy Range: 0% - 3%	0.00%
	Inflation Linked Total							\$4,022,046,494	12.05%
								Inflation Linked Policy Range: 10% - 16%	12.00%
Bridgewater	Multi-Asset Class Strategies						1,039,005,367	1,039,005,367	3.11%
								\$1,039,005,367	3.11%
								Multi-Asset Class Policy Range: 0% - 12%	5.00%
	TOTAL Amounts	\$4,788,739,947	\$3,996,004,669	\$7,406,403,356	\$12,112,755,956	\$4,022,046,494	\$1,039,005,367	\$33,364,955,789	Total Fund
	TOTAL Percent	14.35%	11.98%	22.20%	36.30%	12.05%	3.11%		

Asset Allocation Summary

Pension (Plan, System, HBS Assets) ASRS Market Value Report Tuesday, May 31, 2016

Asset Class	Actual Portfolio	SAAP Target (Range)	Interim SAA* Adj Policy	Actual - Interim SAA** % diff	Actual - Interim SAA** \$ diff	Policy Band check Actual - Adj Policy
Tactical Cash	0.00%	0% (0-3%)	0.00%	0.00%		
Cash	0.03%	0.00%	0.00%	0.03%	10,756,256	
Interest Rate Sensitive	11.94%	11%	12.58%	-0.63%		
High Yield	3.21%	4%	4.56%	-1.35%		
Opportunistic Debt	3.23%	0%	0.00%	3.23%	\$1,076,649,725	
Private Debt	7.92%	10% (8-12%)	7.92% (6-10%)	0.00%		
Total Fixed Income	26.30%	25% (18-35%)	25.05% (18-35%)	1.25%	\$417,102,708	OK
Large Cap	19.11%	20%	18.38%	0.73%	\$241,912,970	
Mid Cap	3.29%	3%	2.77%	0.51%	\$171,742,657	
Small Cap	3.00%	3%	3.00%	0.00%	-\$850,676	
US Equity	25.39%	26% (16-36%)	24.16% (14-34%)	1.24%	\$412,804,951	OK
Developed Large Cap	17.12%	17%	17.05%	0.07%	\$24,094,851	
Developed Small Cap	2.05%	2%	2.00%	0.05%	\$17,469,167	
Emerging Markets	3.06%	5%	5.00%	-1.94%	-\$646,400,058	
Non-US Equity	22.23%	24% (14-34%)	24.05% (14-34%)	-1.81%	-\$604,836,039	OK
Risk Factors	1.73%	0%	1.73%	0.00%		
Private Equity	8.17%	8% (6-10%)	8.17%	0.00%	\$0	OK
Opportunistic Equity	0.97%	0%	0.00%	0.97%	\$324,050,179	
Total Equity	58.50%	58% (48-65%)	58.11% (48-65%)	0.40%	\$132,019,090	OK
Commodities	0.67%	2% (0-4%)	2.00%	-1.33%	-\$444,097,384	OK
Real Estate	9.84%	10% (8-12%)	9.84%	0.00%	\$0	OK
Infrastructure	0.98%	0% (0-3%)	0.00%	0.98%	\$325,444,191	OK
Farmland & Timber	0.56%	0% (0-3%)	0.00%	0.56%	\$188,017,561	OK
Opportunistic I/L	0.00%	0%	0.00%	0.00%	\$0	
Total Inflation Linked	12.05%	12% (10-16%)	11.85% (10-14%)	0.21%	\$69,364,368	OK
Multi-Asset Strategies***	3.11%	5% (0-12%)	5% (0-12%)	-1.89%	-\$629,242,422	OK
Total	100.00%	100%	100.00%	0.00%	\$0	

Internally Managed Portfolios:	
\$8,577,169,885	26%

*Interim SAA includes a proration of unfunded Private Equity, Private Debt, and Real Estate
**Private Equity is prorated to domestic equity; Real Estate is prorated to equity, commodities, and fixed income; Private Debt is prorated to Interest Rate Sensitive and High Yield

Opportunistic definitions:
An investment in a category that is not included in the ASRS Asset Allocation policy and represents an investment opportunity that is tactical in nature.
Opportunistic investments have a 0% target (0%-10% range), regardless of asset class.

Total Opportunistic		
Opportunistic Debt	\$1,076,649,725	3.2%
Opportunistic Equity	\$324,050,179	1.0%
Opportunistic I.L.	\$0	0.0%
	\$1,400,699,904	4.2%

Total Public Equity Returns as of April 30, 2016

Arizona State Retirement System

Total Domestic and International Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Domestic and International Equity	16,941,257,961	50.09	1.55	8.39	-2.18	-3.78	6.70	6.82	5.26	6.34	Jan-98
ASRS Custom Total Equity Benchmark			1.43	8.51	-2.74	-4.58	6.59	6.86	5.48	5.71	Jan-98
Over/Under			0.12	-0.12	0.56	0.80	0.11	-0.04	-0.22	0.63	
Equity Risk Factor Portfolio	568,470,283	1.68	0.08	6.90	1.87	2.21	--	--	--	11.09	Jun-13
ASRS Custom Total Equity Benchmark			1.43	8.51	-2.74	-4.58	6.59	6.86	5.48	6.57	Jun-13
Over/Under (vs. Net)			-1.35	-1.61	4.61	6.79				4.52	
Total Domestic and Int'l Equity ex-Equity Risk Factor Portfolio	16,372,787,677	48.41	1.60	8.44	-2.30	-3.96	6.58	6.75	5.23	6.32	Jan-98
ASRS Custom Total Equity Benchmark			1.43	8.51	-2.74	-4.58	6.59	6.86	5.48	5.71	Jan-98
Over/Under			0.17	-0.07	0.44	0.62	-0.01	-0.11	-0.25	0.61	

1. Total Domestic and International Equity market value includes \$772,987,554 remaining in terminated manager and transition accounts.
 2. Performance of ASRS Total Domestic and International Equity includes the performance of the ASRS Domestic Equity and ASRS International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013. NEPC began calculating Total Domestic and International Equity performance in January 2009. Monthly performance data from January 1998 - December 2008 was provided by State Street.
 Note: Performance is based on net of fee performance data.
 Composition of ASRS Custom Total Equity Benchmark can be found in the appendix.

Domestic Equity Returns as of April 30, 2016

Arizona State Retirement System

Domestic and Large Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Domestic Equity	8,105,489,684	23.96	0.65	8.06	1.33	0.95	10.90	10.47	7.30	11.09	Jul-75
ASRS Custom Domestic Equity Benchmark			0.57	7.96	1.06	0.88	11.13	10.72	7.33	11.16	Jul-75
Over/Under			0.08	0.10	0.27	0.07	-0.23	-0.25	-0.03	-0.07	
Total Large Cap Equity	6,109,864,712	18.06	0.38	7.26	2.75	1.85	11.10	10.81	6.94	7.72	Jul-02
S&P 500			0.39	7.05	1.89	1.21	11.26	11.02	6.91	7.63	Jul-02
Over/Under			-0.01	0.21	0.86	0.64	-0.16	-0.21	0.03	0.09	
Active Large Cap Equity											
LSV	560,602,450	1.66	1.10	8.67	-3.35	-4.03	10.18	10.29	6.60	10.26	Jan-03
S&P/Citigroup 500 Value			2.11	9.71	1.54	0.28	9.56	9.90	5.35	8.48	Jan-03
Over/Under			-1.01	-1.04	-4.89	-4.31	0.62	0.39	1.25	1.78	
Enhanced/Passive Large Cap Equity											
Internally Managed E2	4,447,875,446	13.15	0.39	7.07	1.90	1.19	11.22	11.00	6.95	7.44	Apr-97
S&P 500			0.39	7.05	1.89	1.21	11.26	11.02	6.91	7.38	Apr-97
Over/Under (vs. Net)			0.00	0.02	0.01	-0.02	-0.04	-0.02	0.04	0.06	
Internally Managed E7	562,700,285	1.66	0.33	7.80	9.22	6.08	10.84	--	--	13.12	Aug-12
MSCI USA High Dividend Yield Index			0.33	7.79	9.45	6.26	10.86	12.30	8.40	13.15	Aug-12
Over/Under (vs. Net)			0.00	0.01	-0.23	-0.18	-0.02	--	--	-0.03	
Internally Managed E8	538,686,532	1.59	-0.52	6.62	10.24	8.94	11.83	--	--	14.06	Aug-12
MSCI USA Minimum Volatility Index			-0.45	6.69	10.42	9.12	11.67	13.37	8.73	13.75	Aug-12
Over/Under (vs. Net)			-0.07	-0.07	-0.18	-0.18	0.16	--	--	0.31	

1. Total Domestic Equity includes \$431 in terminated manager and transition accounts

2. In mid-December, 2005 the S&P/Citigroup style indices replaced the S&P/Barra style indices. Returns are a blend of S&P/Barra indices prior to mid-December 2005 and S&P/Citigroup indices going forward.

Note: Performance is reported net of fees.

Domestic Equity Returns as of April 30, 2016

Arizona State Retirement System

Mid Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Mid Cap Equity	1,043,381,404	3.08	1.16	11.05	-1.79	-1.29	9.99	9.12	7.70	9.73	Jul-02
S&P 400 MidCap			1.22	11.39	-1.37	-0.94	9.67	9.20	7.76	9.74	Jul-02
Over/Under			-0.06	-0.34	-0.42	-0.35	0.32	-0.08	-0.06	-0.01	
Active Mid Cap Equity											
Wellington	275,241,334	0.81	1.01	10.45	-2.32	-1.73	11.53	9.65	8.42	10.70	Jul-02
S&P 400 MidCap			1.22	11.39	-1.37	-0.94	9.67	9.20	7.76	9.74	Jul-02
Over/Under			-0.21	-0.94	-0.95	-0.79	1.86	0.45	0.66	0.96	
Passive Mid Cap Equity											
Internally Managed E3	396,862,135	1.17	0.72	8.38	-2.47	-0.83	9.39	8.83	8.86	8.24	Dec-00
S&P/Citigroup 400 Growth			0.68	8.25	-2.39	-0.77	9.38	8.70	8.34	7.74	Dec-00
Over/Under (vs. Net)			0.04	0.13	-0.08	-0.06	0.01	0.13	0.52	0.50	
Internally Managed E4	371,277,935	1.10	1.73	14.52	-0.73	-1.54	9.71	9.53	7.36	9.81	Jul-02
S&P/Citigroup 400 Value			1.72	14.55	-0.62	-1.45	9.79	9.62	7.10	9.64	Jul-02
Over/Under (vs. Net)			0.01	-0.03	-0.11	-0.09	-0.08	-0.09	0.26	0.17	

1. In mid-December, 2005 the S&P/Citigroup style indices replaced the S&P/Barra style indices. Returns are a blend of S&P/Barra indices prior to mid-December 2005 and S&P/Citigroup indices going forward.

Note: Performance is reported net of fees.



NEPC, LLC

April 30, 2016

Domestic Equity Returns as of April 30, 2016

Arizona State Retirement System

Small Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Small Cap Equity	952,243,136	2.82	1.62	10.30	-5.92	-3.65	9.29	9.19	7.24	9.79	Jul-02
ASRS Custom Small Cap Equity Blended Benchmark			<u>1.17</u>	<u>10.69</u>	<u>-2.25</u>	<u>0.26</u>	<u>10.91</u>	<u>10.10</u>	<u>7.31</u>	<u>9.49</u>	Jul-02
Over/Under			0.45	-0.39	-3.67	-3.91	-1.62	-0.91	-0.07	0.30	
Active Small/Mid Cap Equity											
TimesSquare	350,867,647	1.04	2.65	8.78	-9.34	-5.95	8.80	9.86	9.14	10.80	Apr-05
Times Square Blended Benchmark			<u>1.00</u>	<u>7.97</u>	<u>-12.69</u>	<u>-8.27</u>	<u>8.55</u>	<u>7.69</u>	<u>6.80</u>	<u>8.41</u>	Apr-05
Over/Under			1.65	0.81	3.35	2.32	0.25	2.17	2.34	2.39	
Active Small Cap Equity											
DFA - US Small Cap	275,260,487	0.81	1.26	12.30	-5.45	-4.88	8.52	8.16	6.28	11.15	Sep-98
DFA Blended Benchmark			<u>2.08</u>	<u>14.08</u>	<u>-0.56</u>	<u>0.72</u>	<u>10.52</u>	<u>10.34</u>	<u>6.89</u>	<u>10.49</u>	Sep-98
Over/Under			-0.82	-1.78	-4.89	-5.60	-2.00	-2.18	-0.61	0.66	
Passive Small Cap Equity											
Internally Managed E6	326,115,002	0.96	0.83	10.29	-2.42	0.12	10.82	9.99	--	7.52	Feb-07
S&P 600 SmallCap			<u>1.17</u>	<u>10.69</u>	<u>-2.25</u>	<u>0.26</u>	<u>10.91</u>	<u>10.10</u>	<u>7.12</u>	<u>7.24</u>	Feb-07
Over/Under (vs. Net)			-0.34	-0.40	-0.17	-0.14	-0.09	-0.11		0.28	

Note: Performance is reported net of fees.

Composition of ASRS Custom Small Cap Equity Blended Benchmark, Times Square Blended Benchmark and DFA Blended Benchmark can be found in the appendix.



NEPC, LLC

April 30, 2016

International Equity Returns as of April 30, 2016

Arizona State Retirement System

International and International Developed Markets Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total International Equity	8,267,297,993	24.44	2.48	8.59	-6.68	-9.66	0.67	0.69	1.70	5.77	Apr-87
ASRS Custom Int'l Equity Benchmark			2.35	9.10	-6.80	-10.29	0.63	0.74	2.39	5.47	Apr-87
Over/Under			0.13	-0.51	0.12	0.63	0.04	-0.05	-0.69	0.30	
Total International Developed Markets Equity	6,427,725,125	19.00	2.70	7.86	-5.26	-7.43	2.40	2.31	2.73	6.14	Apr-87
ASRS Custom Int'l Developed Markets Equity Benchmark			2.83	7.89	-5.40	-8.23	2.24	2.38	3.28	5.78	Apr-87
Over/Under			-0.13	-0.03	0.14	0.80	0.16	-0.07	-0.55	0.36	
Active Large Cap International Equity											
Brandes	569,331,416	1.68	2.74	7.27	-5.47	-7.36	4.29	3.08	2.15	8.39	Oct-98
Brandes Custom Benchmark			2.90	7.58	-6.19	-9.32	1.55	1.94	2.87	5.55	Oct-98
Over/Under			-0.16	-0.31	0.72	1.96	2.74	1.14	-0.72	2.84	
American Century	547,771,639	1.62	1.57	5.10	-6.00	-7.03	--	--	--	-3.56	Jul-14
MSCI EAFE			2.90	7.58	-6.19	-9.32	1.48	1.69	1.61	-5.67	Jul-14
Over/Under			-1.33	-2.48	0.19	2.29	--	--	--	2.11	
Trinity Street	327,195,364	0.97	3.20	9.70	-3.45	-4.99	--	--	--	-3.79	Jul-14
MSCI EAFE			2.90	7.58	-6.19	-9.32	1.48	1.69	1.61	-5.67	Jul-14
Over/Under			0.30	2.12	2.74	4.33	--	--	--	1.88	
TS&W International	297,798,995	0.88	2.27	8.07	-4.45	-7.52	--	--	--	-3.69	Jul-14
MSCI EAFE			2.90	7.58	-6.19	-9.32	1.48	1.69	1.61	-5.67	Jul-14
Over/Under			-0.63	0.49	1.74	1.80	--	--	--	1.98	

1. Total International Equity market value includes \$772,987,122 in terminated manager and transition accounts.

2. Total International Developed Markets Equity market value includes \$185,557 in terminated manager accounts.

3. American Century, Trinity Street and TS&W were funded in mid-June 2014. Inception date for performance reporting purposes is July 1, 2014.

Note: Performance is reported net of fees.

Composition of ASRS Custom Int'l Equity Benchmark, ASRS Custom Int'l Developed Markets Equity Benchmark, and Brandes Custom Benchmark can be found in the appendix.



NEPC, LLC

April 30, 2016

International Equity Returns as of April 30, 2016

Arizona State Retirement System

International and International Developed Markets Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Passive Large Cap International Equity											
BlackRock EAFE Equity Index	4,003,347,771	11.84	2.98	7.79	-5.99	-9.04	1.74	1.98	--	7.11	Jul-09
MSCI EAFE			2.90	7.58	-6.19	-9.32	1.55	1.94	1.98	7.09	Jul-09
Over/Under			0.08	0.21	0.20	0.28	0.19	0.04		0.02	
Active Small Cap International Equity											
DFA - International Small Cap	105,977,464	0.31	4.35	12.71	-3.64	-4.07	4.57	2.67	2.83	5.01	Sep-05
MSCI EAFE Small Cap			2.30	10.37	1.17	0.94	6.90	5.16	3.51	5.84	Sep-05
Over/Under			2.05	2.34	-4.81	-5.01	-2.33	-2.49	-0.68	-0.83	
Franklin Templeton	218,888,936	0.65	0.83	9.51	-3.96	-3.21	4.74	5.34	--	6.41	Apr-11
MSCI EAFE Small Cap			2.30	10.37	1.17	0.94	6.90	5.16	3.51	6.15	Apr-11
Over/Under			-1.47	-0.86	-5.13	-4.15	-2.16	0.18		0.26	
AQR Capital	98,285,691	0.29	0.81	7.77	1.28	1.89	--	--	--	9.06	Jun-13
MSCI EAFE Small Cap			2.30	10.37	1.17	0.94	6.90	5.16	3.51	7.95	Jun-13
Over/Under			-1.49	-2.60	0.11	0.95				1.11	
Passive Small Cap International Equity											
BlackRock EAFE Small Cap Equity Index	258,939,767	0.77	2.34	10.49	1.29	1.04	6.97	5.05	--	10.64	Jun-10
MSCI EAFE Small Cap			2.30	10.37	1.17	0.94	6.90	5.16	3.51	10.72	Jun-10
Over/Under			0.04	0.12	0.12	0.10	0.07	-0.11		-0.08	

Note: Performance is reported net of fees.



April 30, 2016

International Equity Returns as of April 30, 2016

Arizona State Retirement System

International Emerging Markets Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total International Emerging Markets Equity	1,066,773,829	3.15	1.08	13.11	-12.35	-17.77	-4.41	-3.88	--	-1.76	Oct-10
<i>MSCI Emerging Markets</i>			<u>0.54</u>	<u>13.66</u>	<u>-12.16</u>	<u>-17.87</u>	<u>-4.49</u>	<u>-4.43</u>	<u>2.61</u>	<u>-1.85</u>	<u>Oct-10</u>
Over/Under			0.54	-0.55	-0.19	0.10	0.08	0.55	--	0.09	
Active Emerging Markets Equity											
Eaton Vance	279,833,965	0.83	2.48	15.69	-7.93	-12.92	-3.90	-3.66	--	-1.47	Dec-10
<i>MSCI Emerging Markets</i>			<u>0.54</u>	<u>13.66</u>	<u>-12.16</u>	<u>-17.87</u>	<u>-4.49</u>	<u>-4.43</u>	<u>2.61</u>	<u>-1.94</u>	<u>Dec-10</u>
Over/Under			1.94	2.03	4.23	4.95	0.59	0.77	--	0.47	
LSV Emerging Market	115,237,808	0.34	0.81	14.62	-15.52	-22.46	-6.15	-5.00	--	-2.12	Dec-10
<i>MSCI Emerging Markets</i>			<u>0.54</u>	<u>13.66</u>	<u>-12.16</u>	<u>-17.87</u>	<u>-4.49</u>	<u>-4.43</u>	<u>2.61</u>	<u>-1.94</u>	<u>Dec-10</u>
Over/Under			0.27	0.96	-3.36	-4.59	-1.66	-0.57	--	-0.18	
William Blair	353,911,459	1.05	0.58	10.30	-14.19	-18.58	-3.08	-1.46	--	-0.46	Nov-10
<i>MSCI Emerging Markets</i>			<u>0.54</u>	<u>13.66</u>	<u>-12.16</u>	<u>-17.87</u>	<u>-4.49</u>	<u>-4.43</u>	<u>2.61</u>	<u>-2.39</u>	<u>Nov-10</u>
Over/Under			0.04	-3.36	-2.03	-0.71	1.41	2.97	--	1.93	
Passive Emerging Markets Equity											
BlackRock Emerging Markets Equity Index	317,790,596	0.94	0.51	13.56	-12.31	-18.06	-4.76	-4.81	--	-2.22	Oct-10
<i>MSCI Emerging Markets</i>			<u>0.54</u>	<u>13.66</u>	<u>-12.16</u>	<u>-17.87</u>	<u>-4.49</u>	<u>-4.43</u>	<u>2.61</u>	<u>-1.85</u>	<u>Oct-10</u>
Over/Under			-0.03	-0.10	-0.15	-0.19	-0.27	-0.38	--	-0.37	

Note: Performance is reported net of fees.



April 30, 2016

Fixed Income and Commodity Returns as of April 30, 2016

Arizona State Retirement System

Fixed Income and Interest Rate Sensitive Fixed Income Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Public Markets Fixed Income	4,944,833,200	14.62	0.80	3.00	3.78	2.50	1.27	3.51	5.14	8.25	Jul-75
ASRS Custom Public Markets Fixed Income Benchmark			1.34	3.93	3.06	1.73	0.75	2.99	4.68	--	Jul-75
Over/Under			-0.54	-0.93	0.72	0.77	0.52	0.52	0.46		
Total Interest Rate Sensitive Fixed Income	3,878,154,654	11.47	0.28	2.02	4.48	3.13	2.55	3.78	5.17	8.25	Jul-75
Barclays Aggregate			0.38	2.02	4.10	2.72	2.29	3.60	4.95	--	Jul-75
Over/Under			-0.10	0.00	0.38	0.41	0.26	0.18	0.22		
Long Duration Fixed Income											
BlackRock Long Gov't Bond Index	380,346,620	1.12	-0.45	2.57	--	--	--	--	--	7.84	Sep-15
Barclays U.S. Treasury Long TR USD			-0.50	2.46	11.52	5.54	4.58	9.15	8.13	7.76	Sep-15
Over/Under			0.05	0.11						0.08	
Enhanced Passive Core Fixed Income											
BlackRock US Debt Index	1,599,299,306	4.73	0.40	2.01	4.20	2.76	--	--	--	3.74	May-14
Barclays Aggregate			0.38	2.02	4.10	2.72	2.29	3.60	4.95	3.59	May-14
Over/Under			0.02	-0.01	0.10	0.04				0.15	
Internally Managed F2	1,898,508,727	5.61	0.33	1.94	4.23	2.98	2.61	3.86	5.21	5.44	Oct-00
Barclays Aggregate			0.38	2.02	4.10	2.72	2.29	3.60	4.95	5.28	Oct-00
Over/Under (vs. Net)			-0.05	-0.08	0.13	0.26	0.32	0.26	0.26	0.16	

1. Total Public Markets Fixed Income market value includes \$13,766 remaining in terminated manager accounts.
2. BlackRock Long Gov't Bond Index was funded in mid-August 2015. Inception date for performance reporting purposes is September 1, 2015.
3. BlackRock US Debt Index was funded in mid-April 2014. Inception date for performance reporting purposes is May 1, 2014.

Note: Performance is reported net of fees.

Composition of ASRS Custom Public Markets Fixed Income Benchmark can be found in the appendix.



NEPC, LLC

April 30, 2016

Fixed Income and Commodity Returns as of April 30, 2016

Arizona State Retirement System

Total High Yield Fixed Income Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total High Yield Fixed Income	1,066,678,547	3.15	2.75	6.75	1.63	0.56	3.31	5.74	--	7.96	Oct-09
Barclays High Yield			3.92	9.15	0.07	-1.12	2.54	5.41	7.35	8.19	Oct-09
Over/Under			-1.17	-2.40	1.56	1.68	0.77	0.33		-0.23	
Active High Yield Fixed Income											
Columbia Management	707,475,471	2.09	2.36	6.20	2.72	1.48	3.73	6.22	--	8.44	Oct-09
Barclays High Yield			3.92	9.15	0.07	-1.12	2.54	5.41	7.35	8.19	Oct-09
Over/Under			-1.56	-2.95	2.65	2.60	1.19	0.81		0.25	
JP Morgan High Yield	359,189,311	1.06	3.51	7.84	-0.34	-1.15	--	--	--	3.85	Jul-13
Barclays High Yield			3.92	9.15	0.07	-1.12	2.54	5.41	7.35	3.87	Jul-13
Over/Under			-0.41	-1.31	-0.41	-0.03				-0.02	

1. Total High Yield Fixed Income includes \$13,765 in terminated manager and transition accounts.
 Note: Performance is reported net of fees.

Fixed Income and Commodity Returns as of April 30, 2016

Arizona State Retirement System

Inflation-Linked Assets Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Inflation-Linked Assets	223,607,319	0.66	8.02	11.03	-18.70	-20.57	-13.69	-12.24	--	-6.16	Feb-10
ASRS Custom Inflation-Linked Benchmark			8.51	10.83	-16.60	-17.45	-13.76	-13.03	-2.12	-6.98	Feb-10
Over/Under			-0.49	0.20	-2.10	-3.12	0.07	0.79		0.82	
Total Commodities	223,607,319	0.66	8.02	11.03	-18.70	-20.57	-13.69	-12.66	--	-6.45	Sep-10
Bloomberg Commodity Index			8.51	10.83	-16.60	-17.45	-13.76	-13.32	-6.01	-7.15	Sep-10
Over/Under			-0.49	0.20	-2.10	-3.12	0.07	0.66		0.70	
Gresham	223,607,319	0.66	8.02	11.03	-18.70	-20.57	-13.66	-12.43	--	-5.85	Sep-10
Bloomberg Commodity Index			8.51	10.83	-16.60	-17.45	-13.76	-13.32	-6.01	-7.15	Sep-10
Over/Under			-0.49	0.20	-2.10	-3.12	0.10	0.89		1.30	

Note: Performance is reported net of fees.
 Composition of ASRS Custom Inflation-Linked Benchmark can be found in the appendix.

Multi-Asset Class Returns as of April 30, 2016

Arizona State Retirement System

Multi-Asset Class Strategies Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Multi-Asset Class Strategies	1,042,417,566	3.08	-1.09	-6.09	-10.07	-11.66	2.50	4.51	5.73	6.45	Jan-04
<i>Multi-Asset Class Strategies Custom Benchmark</i>			<i>0.02</i>	<i>0.06</i>	<i>-0.95</i>	<i>-1.82</i>	<i>4.87</i>	<i>5.91</i>	<i>5.02</i>	<i>5.81</i>	<i>Jan-04</i>
Over/Under			-1.11	-6.15	-9.12	-9.84	-2.37	-1.40	0.71	0.64	
Bridgewater	1,042,417,566	3.08	-1.09	-6.09	-8.57	-9.96	3.82	5.84	6.95	7.58	Jan-04
<i>ASRS Bridgewater Custom Benchmark</i>			<i>0.02</i>	<i>0.06</i>	<i>0.10</i>	<i>0.10</i>	<i>5.44</i>	<i>6.25</i>	<i>5.19</i>	<i>5.95</i>	<i>Jan-04</i>
Over/Under			-1.11	-6.15	-8.67	-10.06	-1.62	-0.41	1.76	1.63	

Note: Performance is reported net of fees.

Composition of Multi-Asset Class Strategies Custom Benchmark and ASRS Bridgewater Custom Benchmark can be found in the appendix.



NEPC, LLC

April 30, 2016

Private Markets Returns

Returns as of December 31, 2015

	Benchmark	Portfolio Return	Benchmark Return	Excess Return
Private Equity	Russell 2000	11.01	9.66	1.35
Private Real Estate	ODCE Net	8.14	7.01	1.13
Private Opportunistic Equity	Absolute Eight	23.06	8.00	15.06
Opportunistic Fixed Income	Absolute Eight	9.32	8.00	1.32
Private Debt	Lev Loan+250	10.87	3.34	7.53
Farmland	Core CPI+350	4.71	5.50	-0.79

LTD Plan

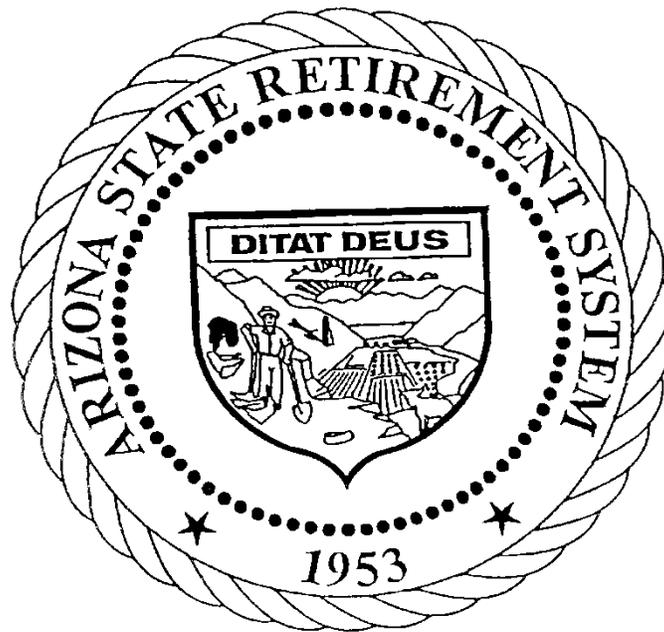
Long Term Disability (LTD)

Tuesday, May 31, 2016

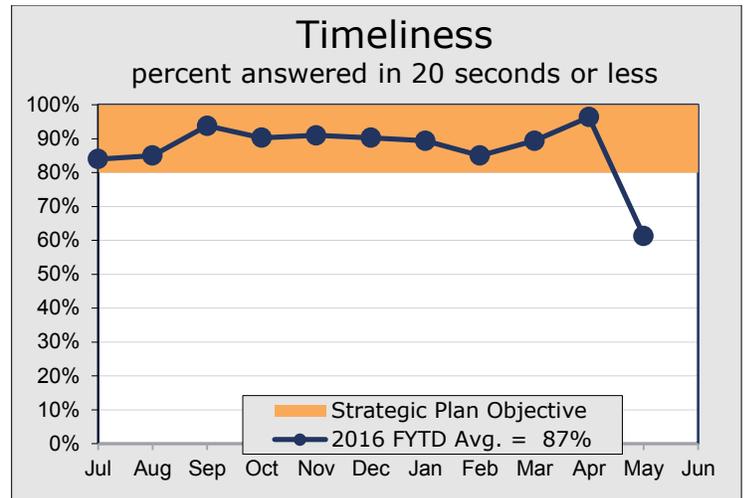
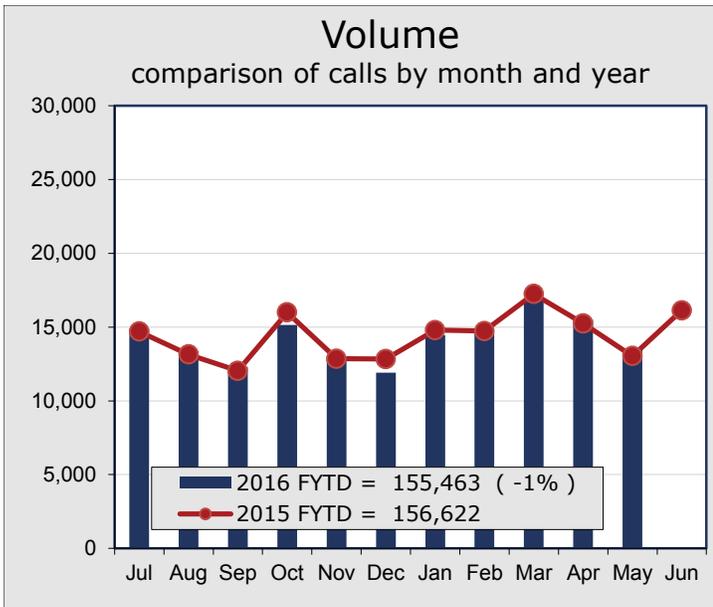
Account Manager	Account Manager Style	Fixed Income	Equity	Inflation Linked	Total	Pct of Fund	Target (Range)
StateStreet B&T: Boston	Cash	\$ 2,154,838			\$2,154,838	1.08%	
BlackRock: San Francisco	Fixed Core (Passive)	\$37,309,764			\$37,309,764	18.73%	19%
BlackRock: San Francisco	Fixed High Yield (Passive)	\$15,079,506			\$15,079,506	7.57%	7%
BlackRock: San Francisco	Emerging Market Debt (Passive)	\$123,529			\$123,529	0.06%	0%
						26.36%	26% (19-36%)
BlackRock: San Francisco	Russell 1000 (Passive)		\$45,013,426		\$45,013,426	22.59%	24%
BlackRock: San Francisco	Russell 2000 (Passive)		\$27,802,024		\$27,802,024	13.95%	12%
						36.55%	36% (26-46%)
BlackRock: San Francisco	EAFE (Passive)		\$31,011,509		\$31,011,509	15.57%	18%
BlackRock: San Francisco	EAFE SC (Passive)		\$4,104,436		\$4,104,436	2.06%	2%
BlackRock: San Francisco	Emerging Markets (Passive)		\$10,274,742		\$10,274,742	5.16%	5%
						22.78%	25% (15-35%)
BlackRock: San Francisco	Dow Jones UBS Commodities (Passive)			\$3,186,875	\$3,186,875	1.60%	2% (0-4%)
BlackRock: San Francisco	US Real Estate (Passive)			\$23,171,427	\$23,171,427	11.63%	11% (9-13%)
						13.23%	13% (10-16%)
	TOTAL Amounts	\$54,667,637	\$118,206,137	\$26,358,303	\$199,232,076		
	TOTAL Percent	27.44%	59.33%	13.23%			
	Actual Portfolio	27.44%	59.33%	13.23%			
	Policy	26% (19-36%)	61% (51-68%)	13% (10-16%)			

Agenda Item #10b

Director's Report Operations

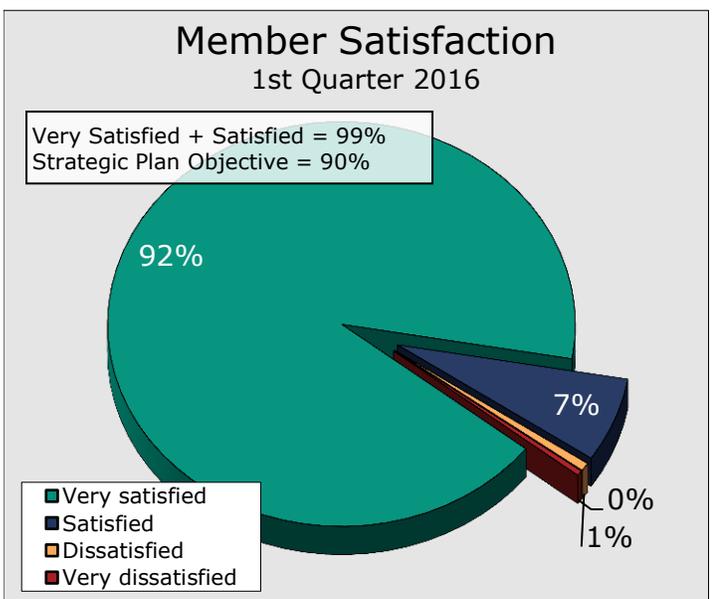
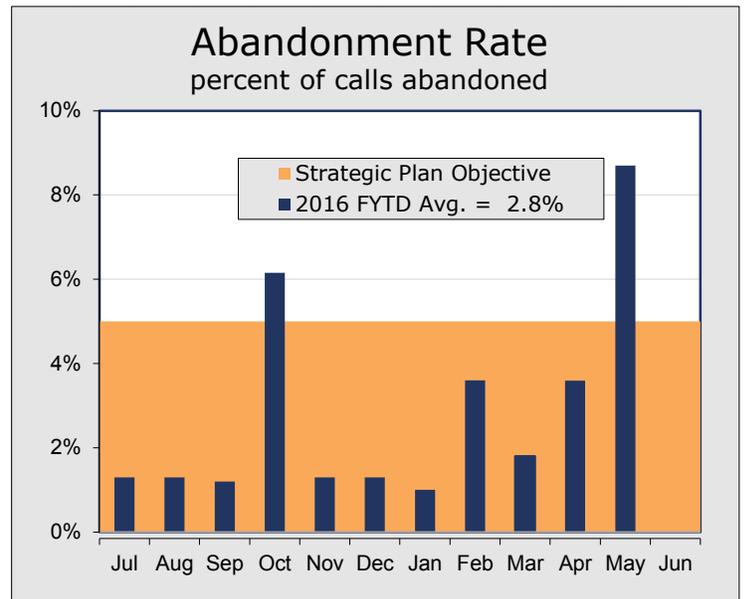
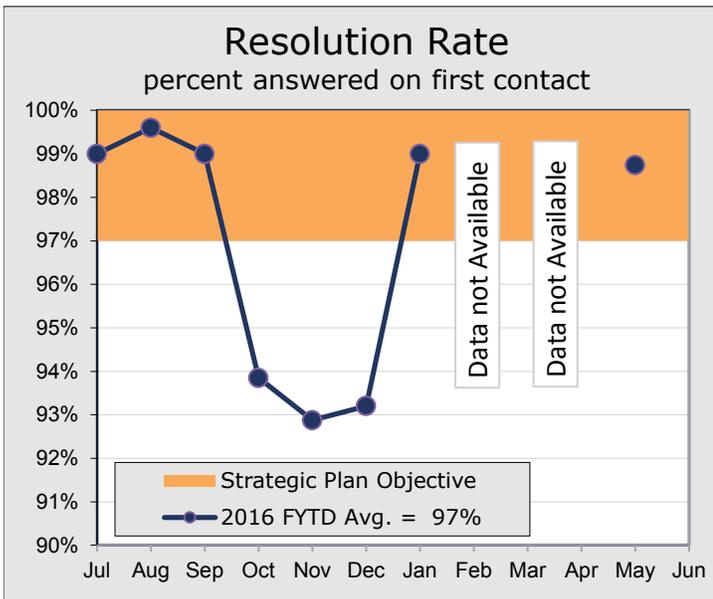


Member Advisory Center: Phone

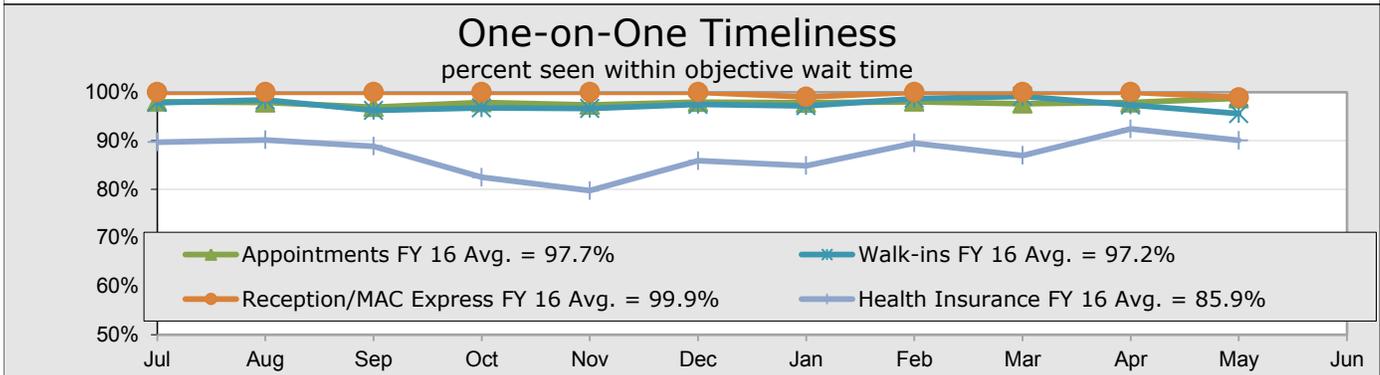
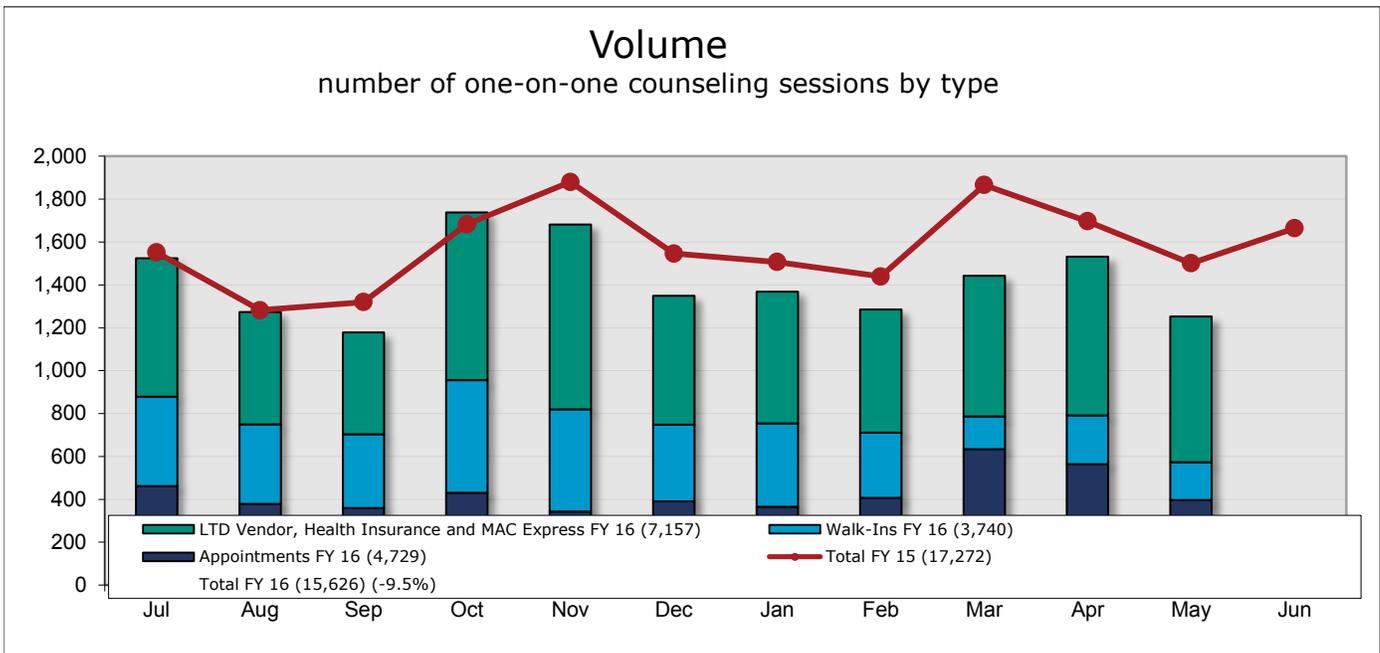


Timeliness (average wait time in seconds)

Month	2016 FYTD Avg.
Jul	20
Aug	20
Sep	7
Oct	DNA
Nov	DNA
Dec	DNA
Jan	DNA
Feb	DNA
Mar	DNA
Apr	DNA
May	DNA
Jun	DNA

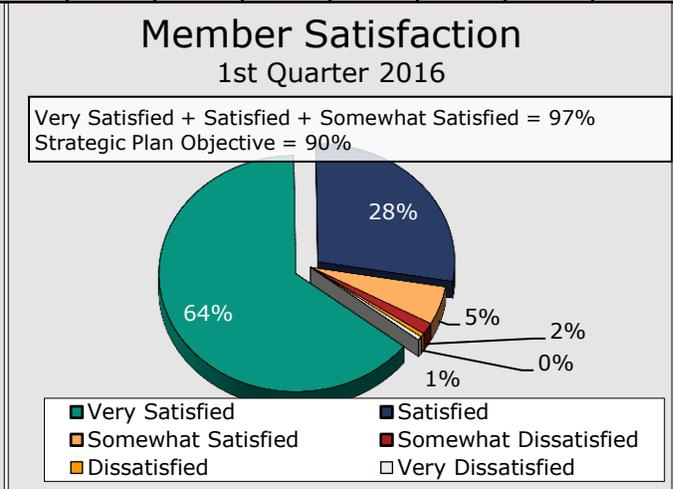
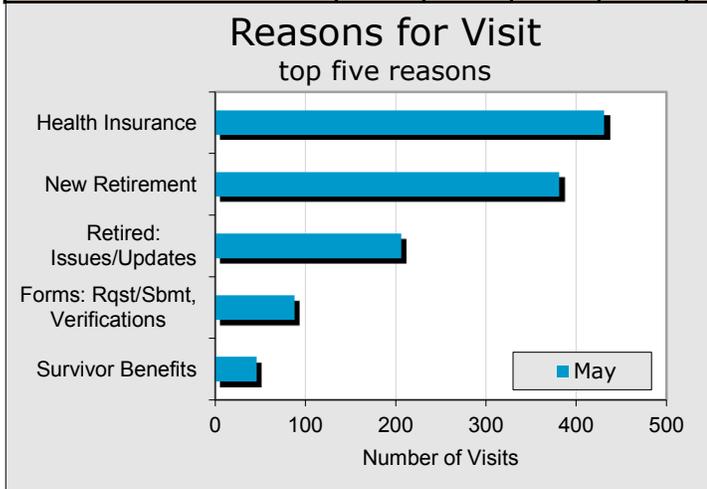


Member Advisory Center: One-on-One

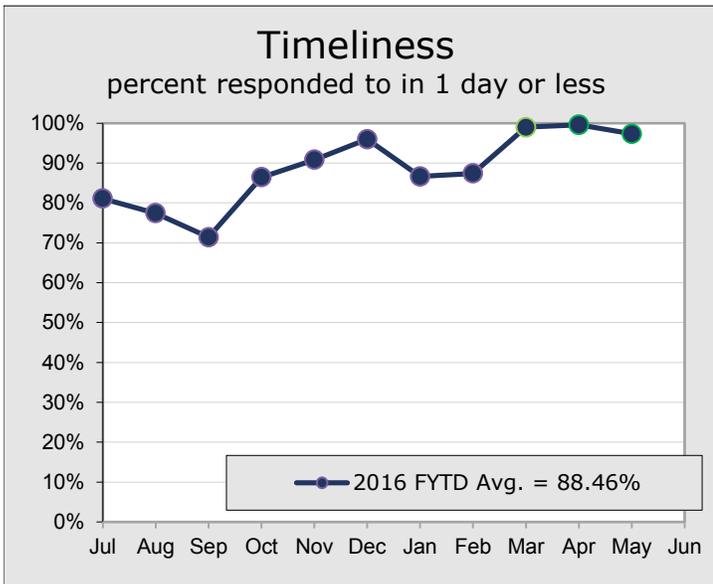
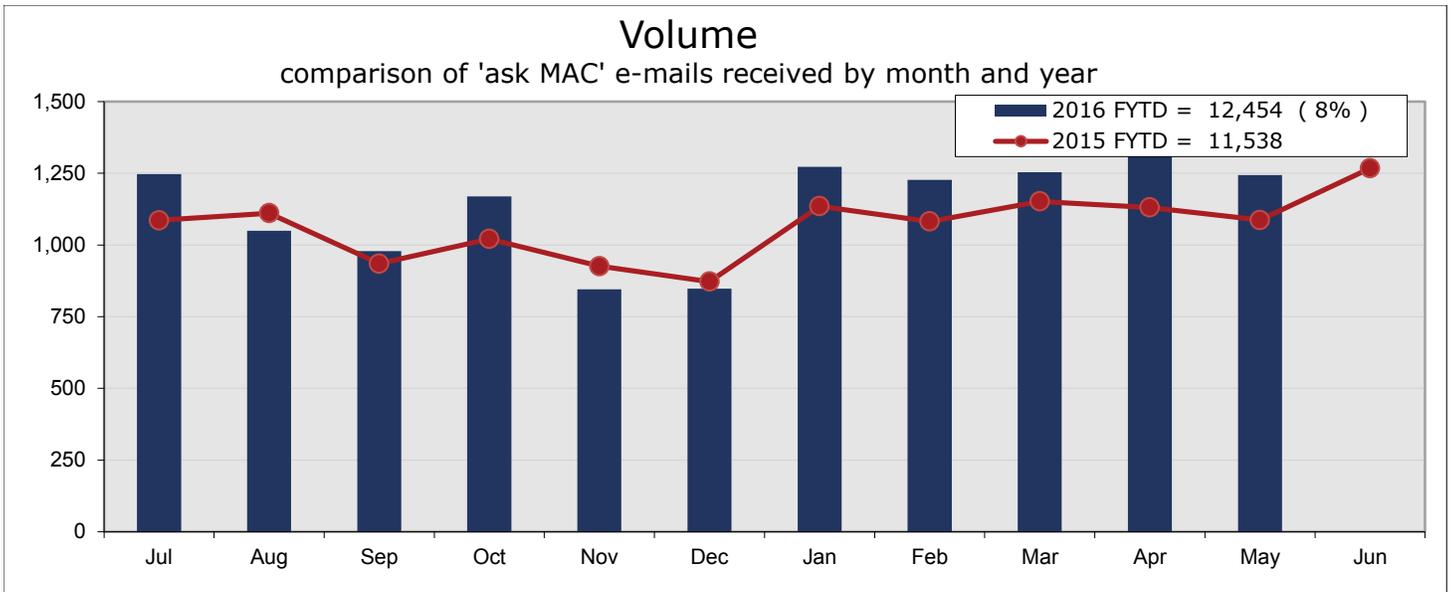


Timeliness (average wait time in minutes)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Appointments	0	0	1	0	1	1	1	0	1	1	0	
Walk-Ins	5	5	7	5	5	4	7	4	3	5	5	
Reception/MAC Express	0	0	0	0	0	0	0	0	0	0	1	
Health Insurance	5	5	7	8	9	6	8	5	7	6	7	
LTD Vendor	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

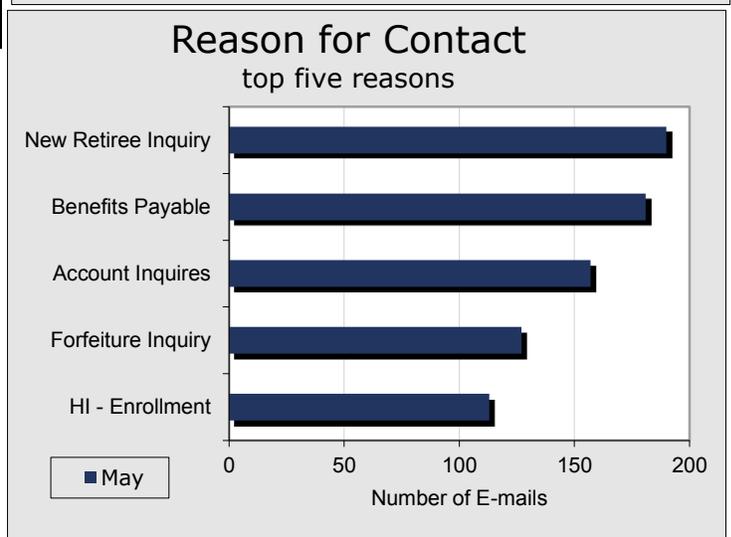
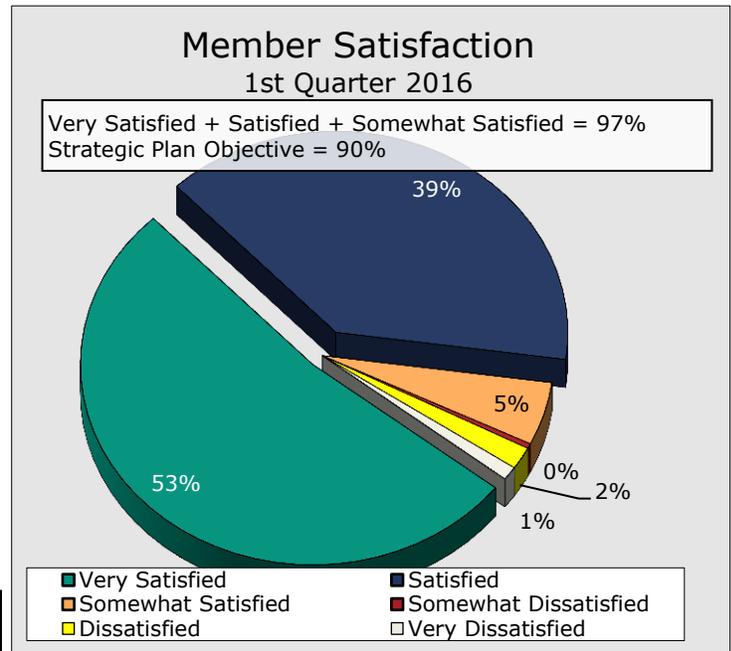


Member Advisory Center: E-Mail

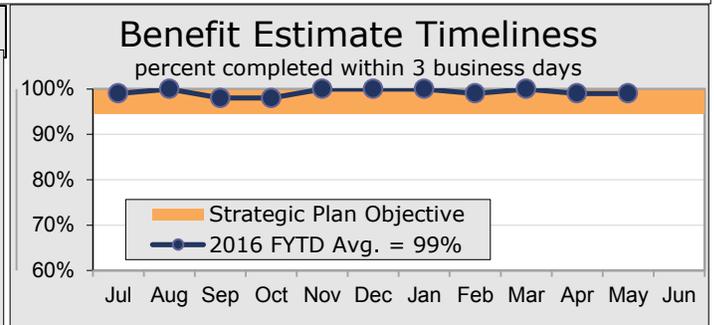
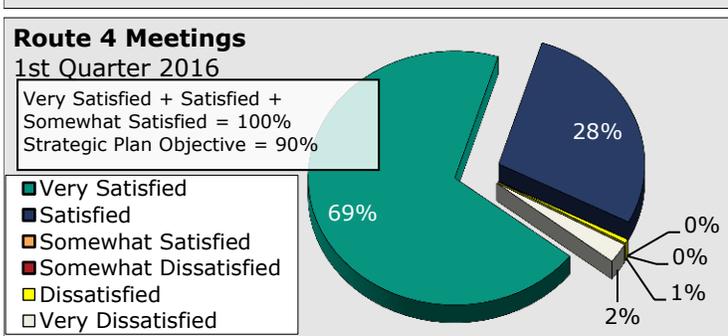
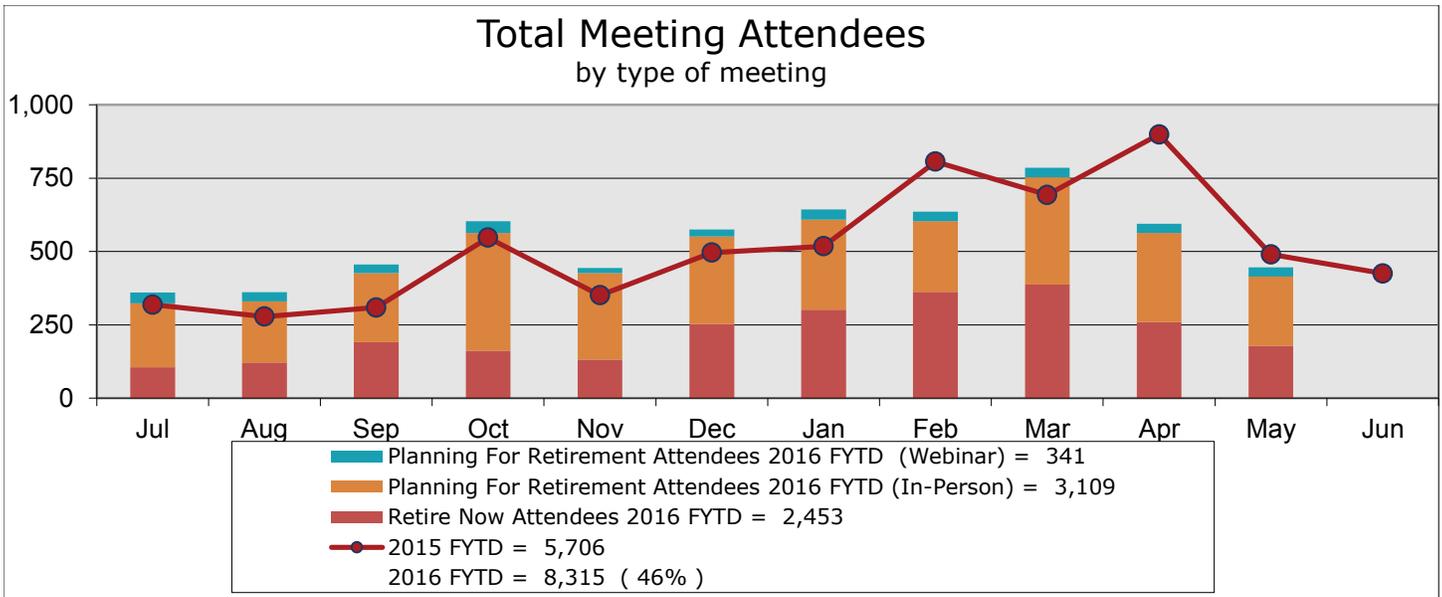


Timeliness (average response in hours)

15	18	20	10	8	7	13	11	4	4	0	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

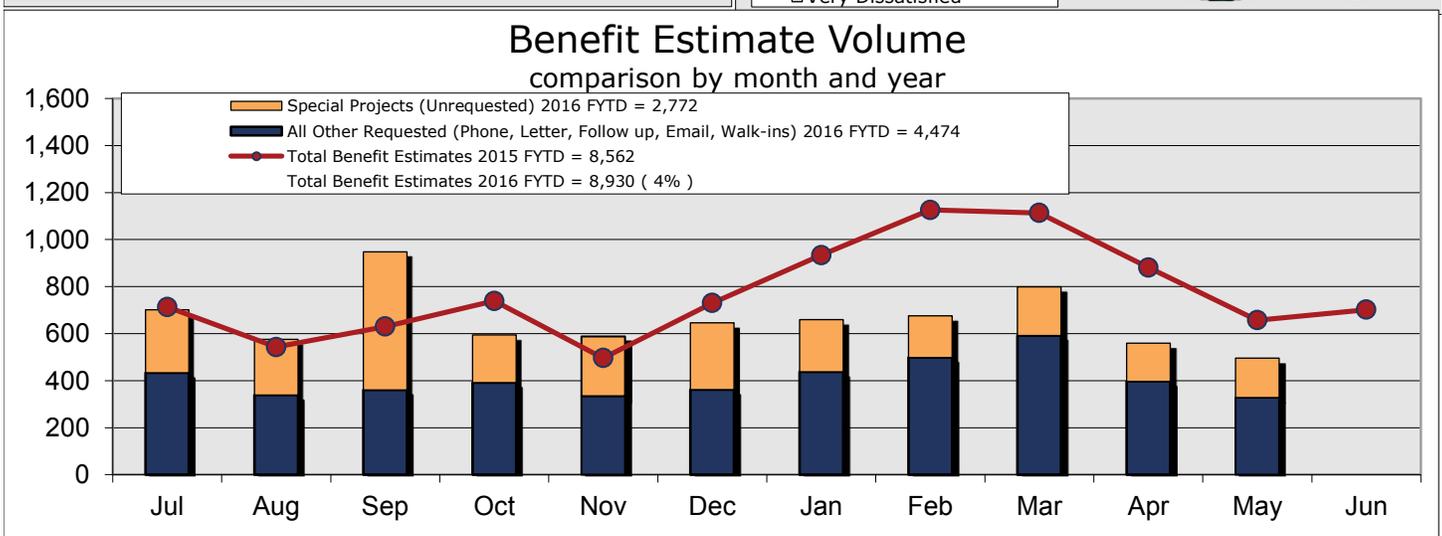
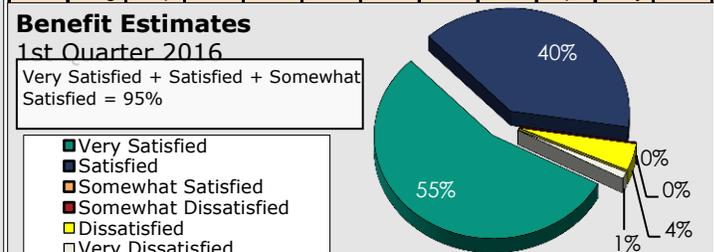


Outreach Education and Benefit Estimates

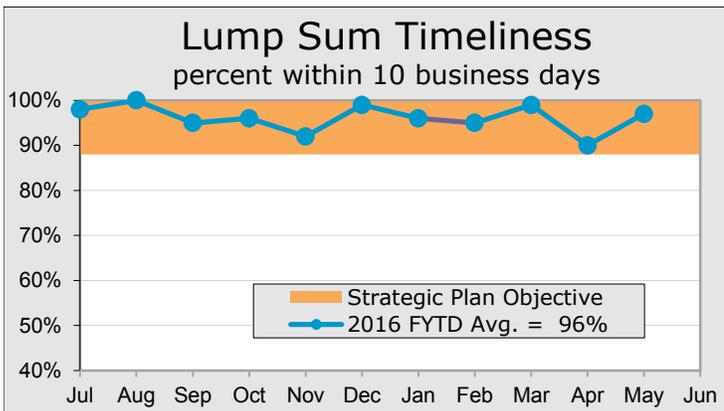
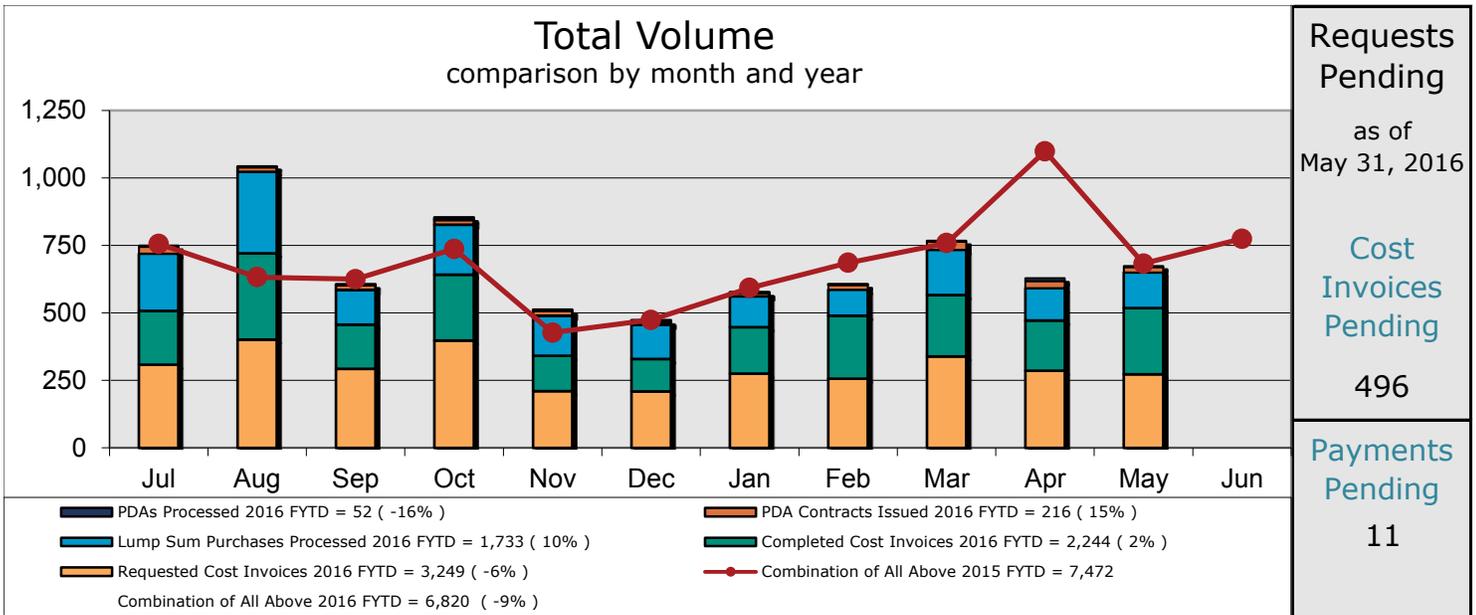


Benefit Estimate Timeliness (average TAT in days)

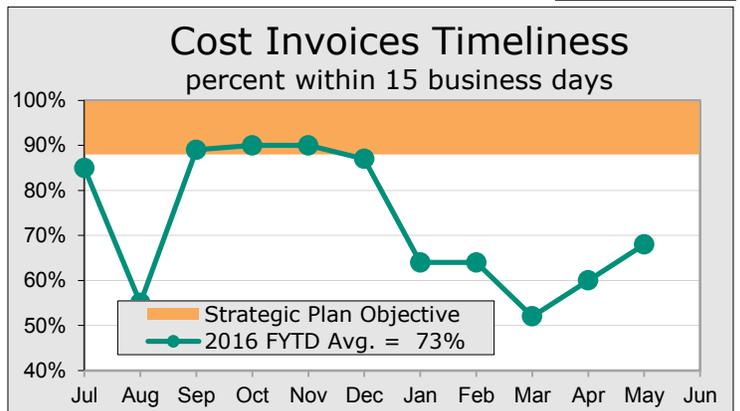
1	1	1	1	1	1	1	1	1	1	1	1
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun



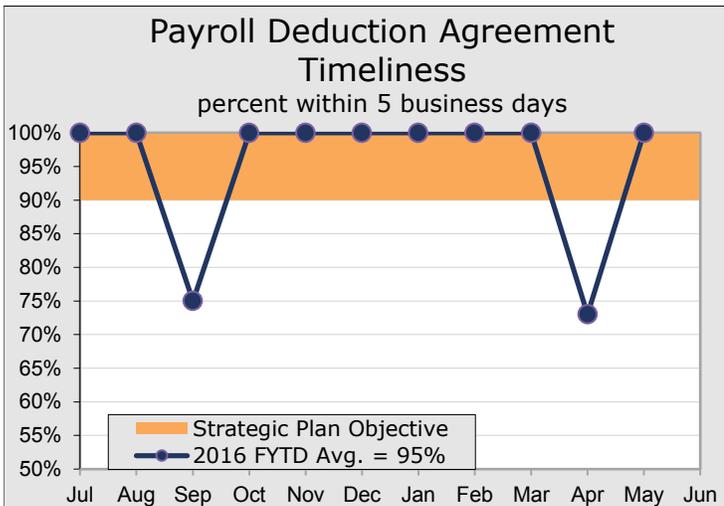
Service Purchase



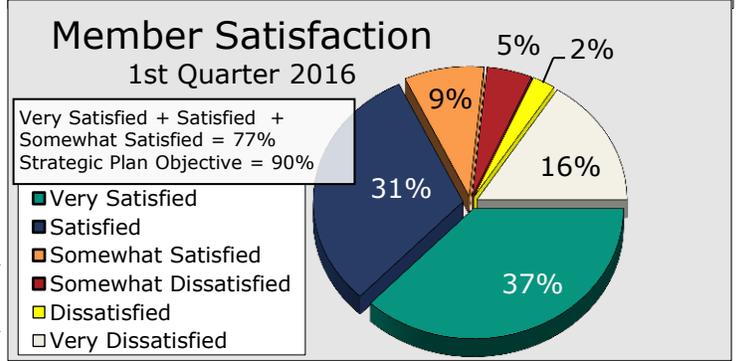
Timeliness (average turnaround time in business days)											
2	2	2	2	3	3	2	3	2	2	2	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun



Timeliness (average turnaround time in business days)											
9	11	6	8	8	11	11	21	60	11	9	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun



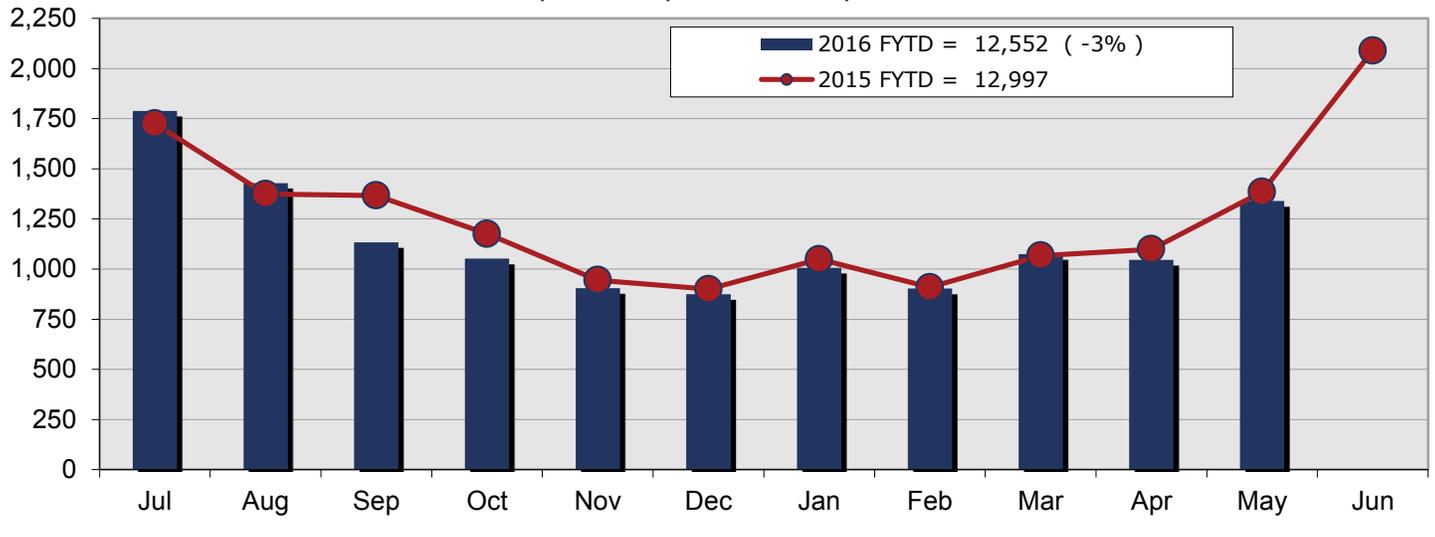
Timeliness (average turnaround time in business days)											
1	2	3	1	1	1	1	2	1	4	1	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun



Refunds

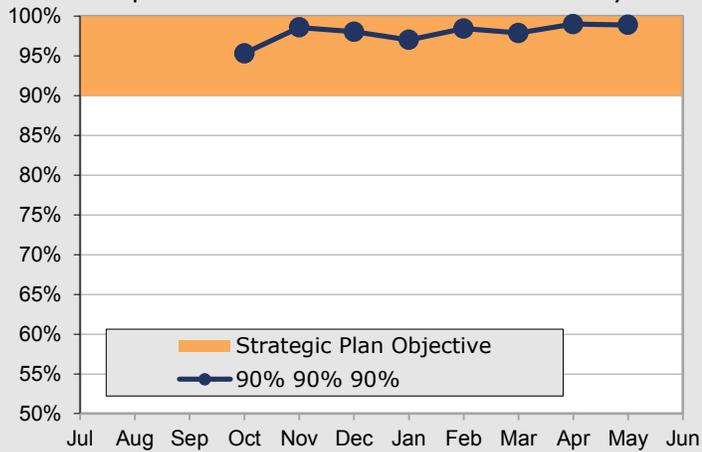
Volume

comparison by month and year

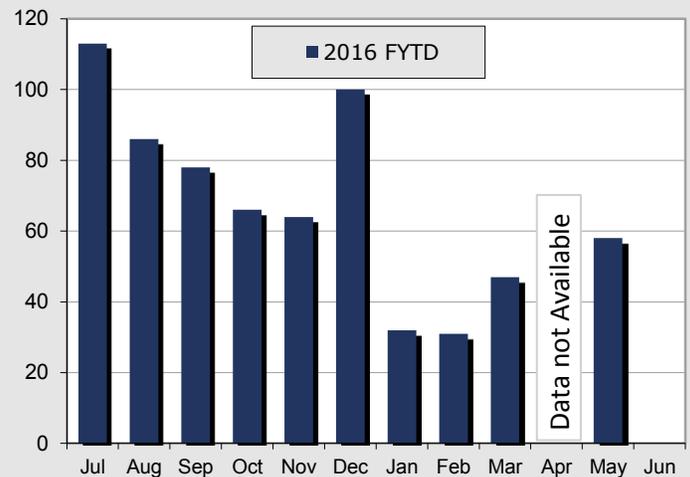


Timeliness

percent disbursed in 10 business days



Requests Pending



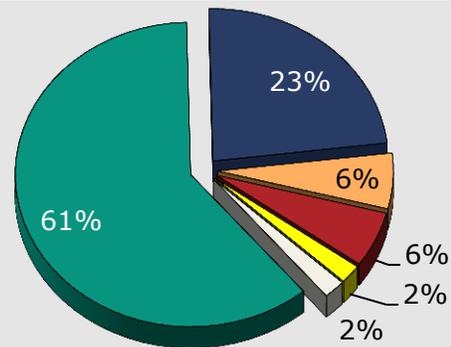
Timeliness (average turnaround time in business days)

DNA	DNA	DNA	3	2	2	2	2	2	2	1	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Member Satisfaction

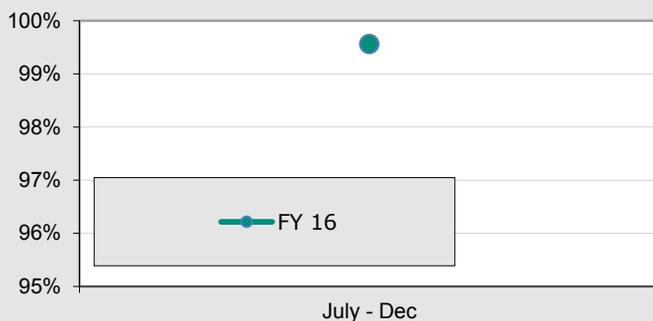
1st Quarter 2016

Very Satisfied + Satisfied + Somewhat Satisfied = 90%
Strategic Plan Objective = 90%



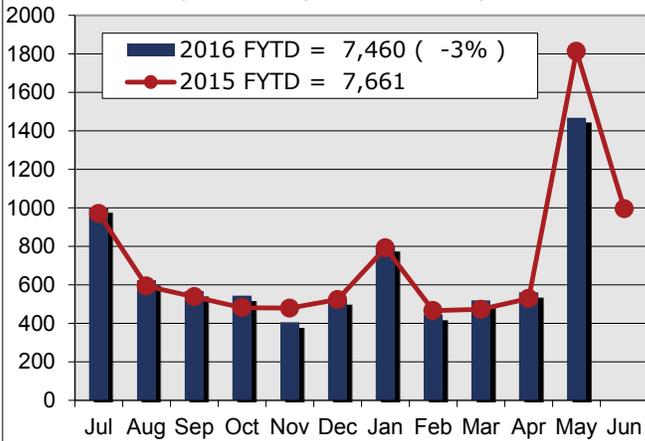
Refund Quality Rating

FY 2016

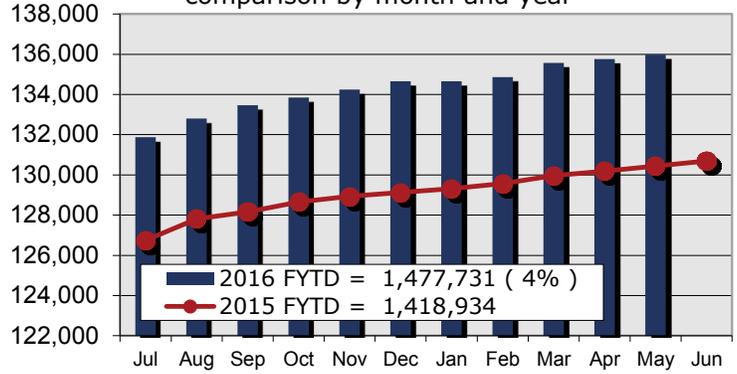


New Retiree and Pension Payroll

First Payment Volume comparison by month and year



Pension Volume comparison by month and year



Pension Payment (percent disbursed by 1st of the months)

100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

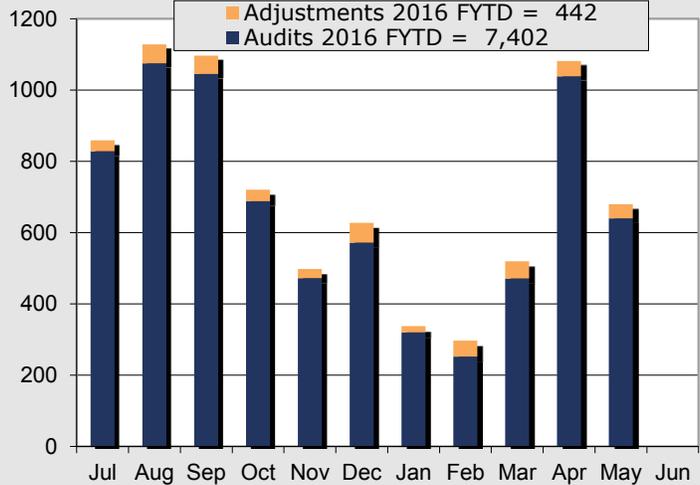
First Payment Timeliness percent disbursed in 10 business days



First Payment Timeliness (average turnaround time in days)

5	6	6	7	10	8	5	9	14	12	7	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

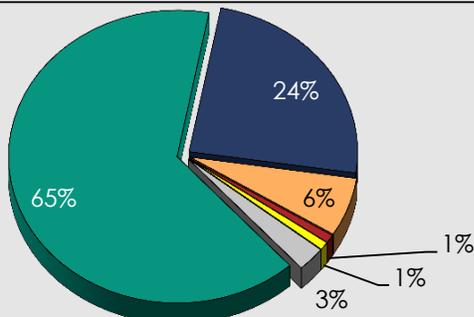
Audits & Adjustments comparison by month and year



Member Satisfaction

1st Quarter 2016

Very Satisfied + Satisfied + Somewhat Satisfied = 95%
Strategic Plan Objective = 90%



- Very Satisfied
- Satisfied
- Somewhat Satisfied
- Somewhat Dissatisfied
- Dissatisfied
- Very Dissatisfied

Adjustments Timeliness

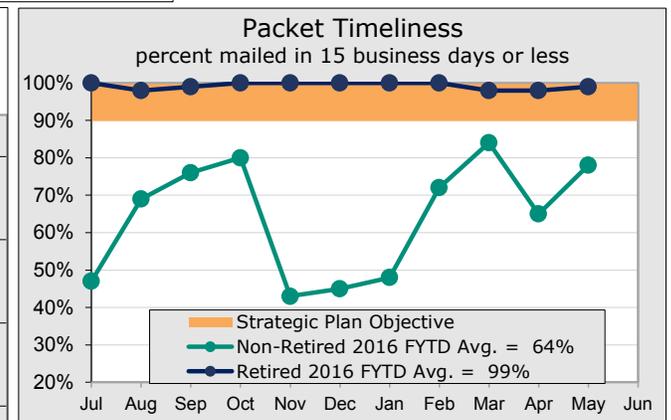
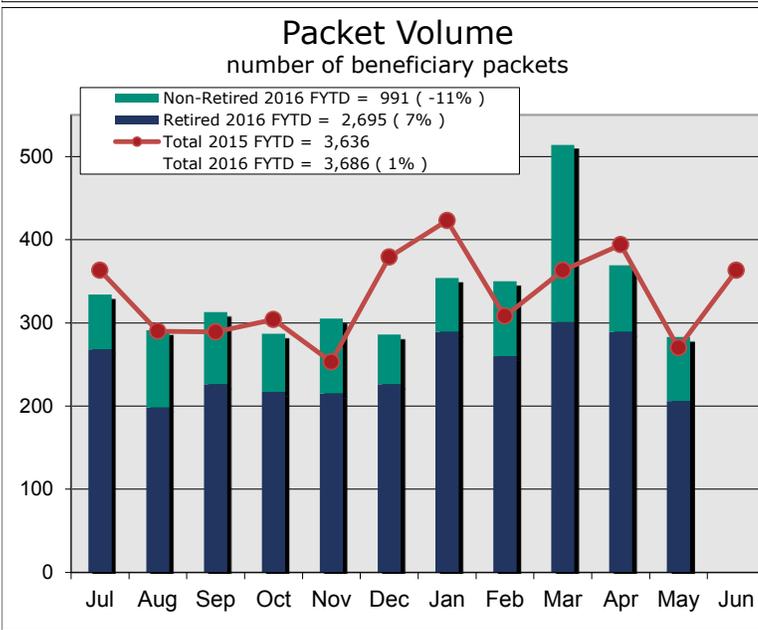
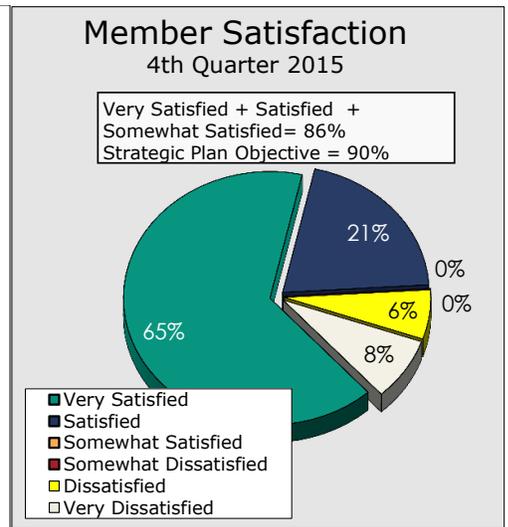
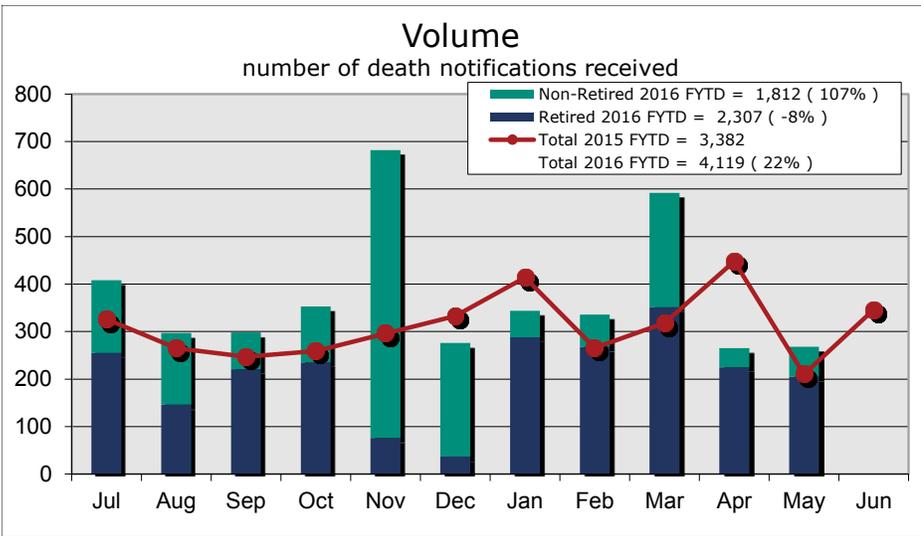
Percent completed in 20 business days



Adjustments Timeliness (average turnaround time in days)

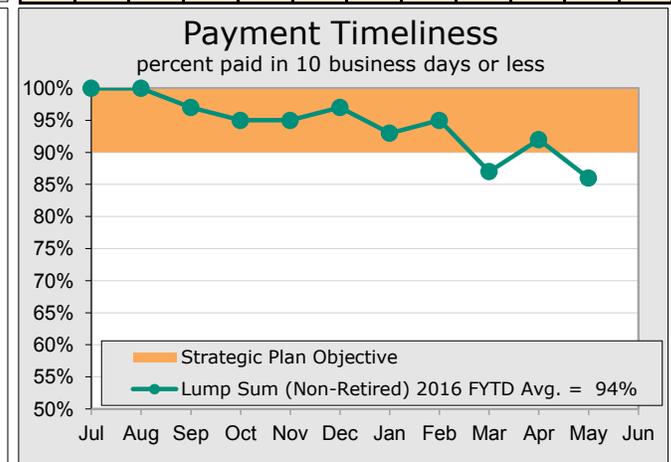
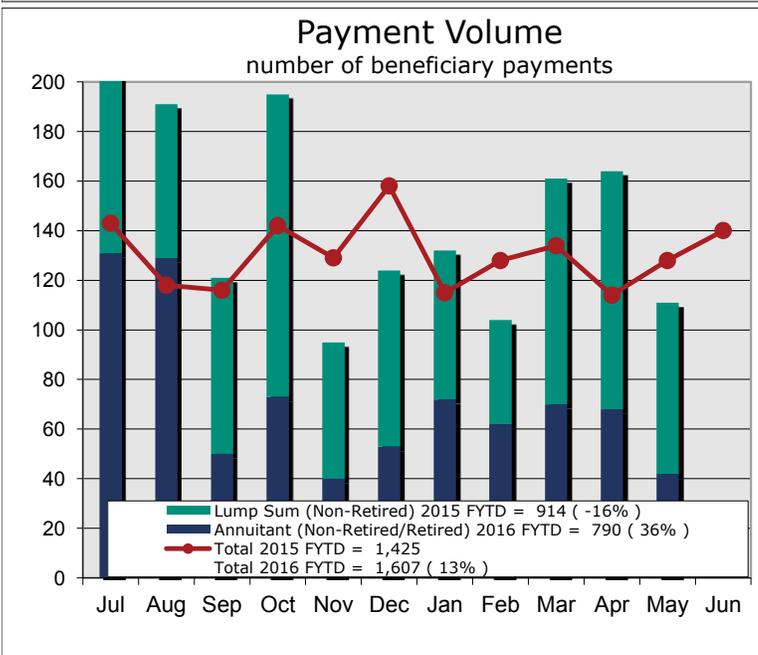
4	5	2	3	4	11	4	6	6	5	6	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Survivor Benefits



Packet Timeliness (average TAT in days)

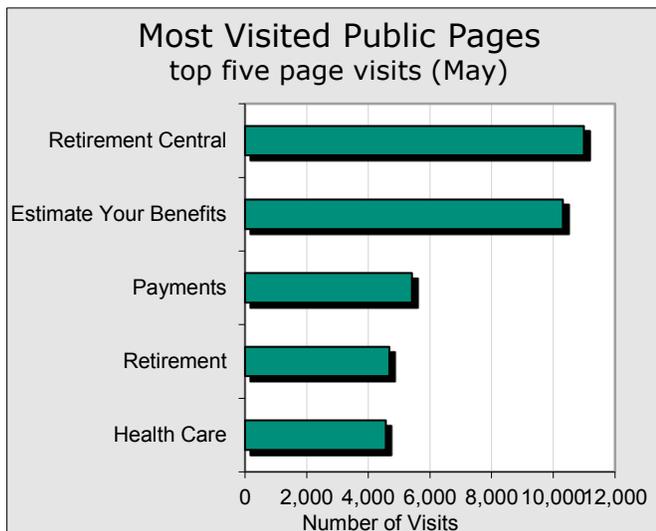
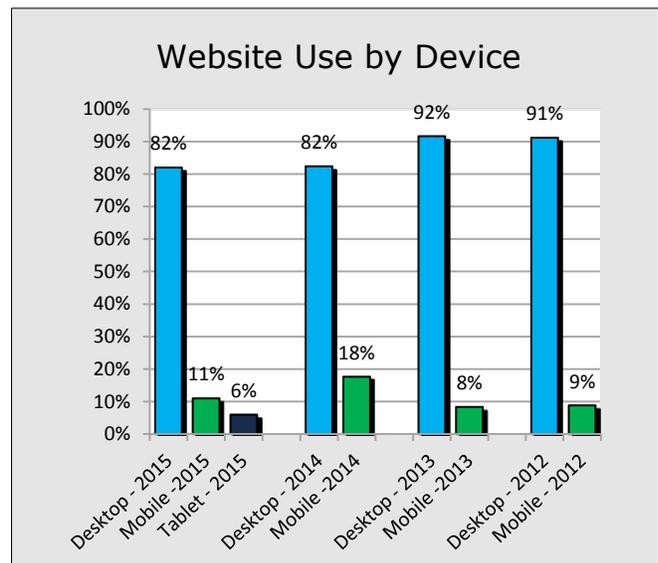
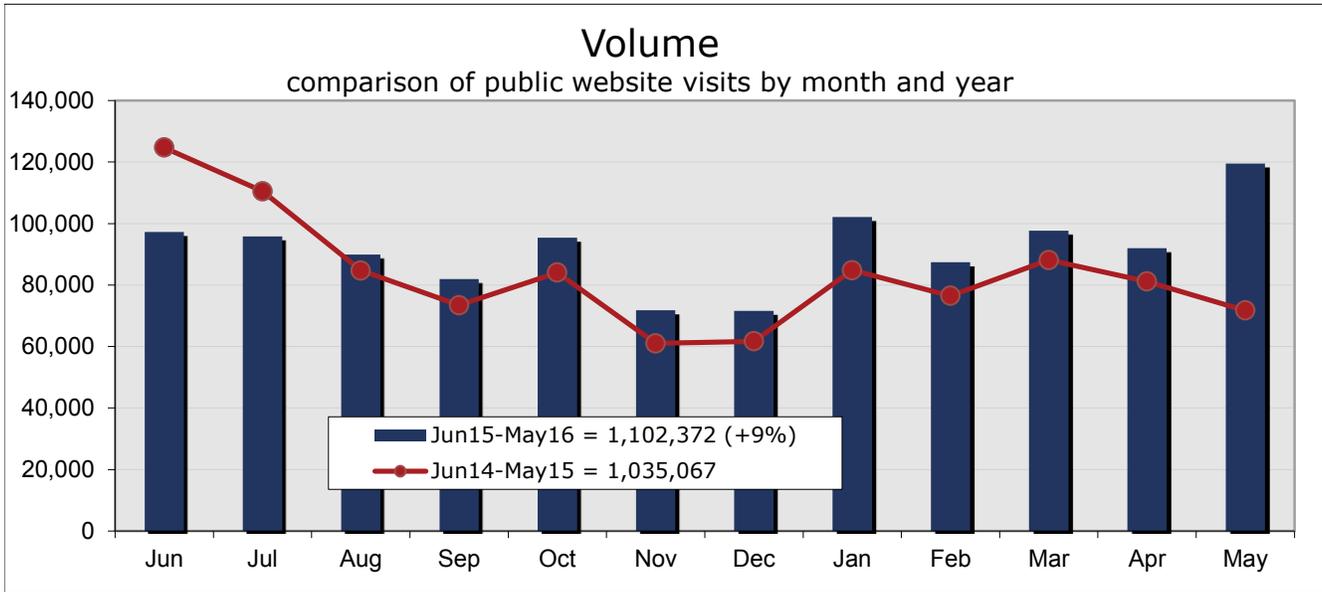
Month	Non Retired	Retired
Jul	40	2
Aug	40	2
Sep	22	2
Oct	7	2
Nov	20	3
Dec	157	3
Jan	86	2
Feb	39	2
Mar	53	2
Apr	42	3
May	61	3
Jun		



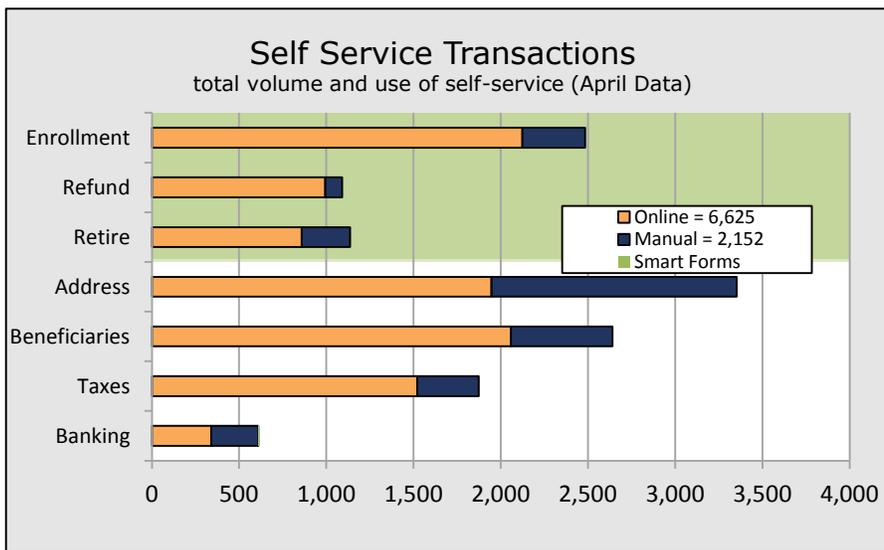
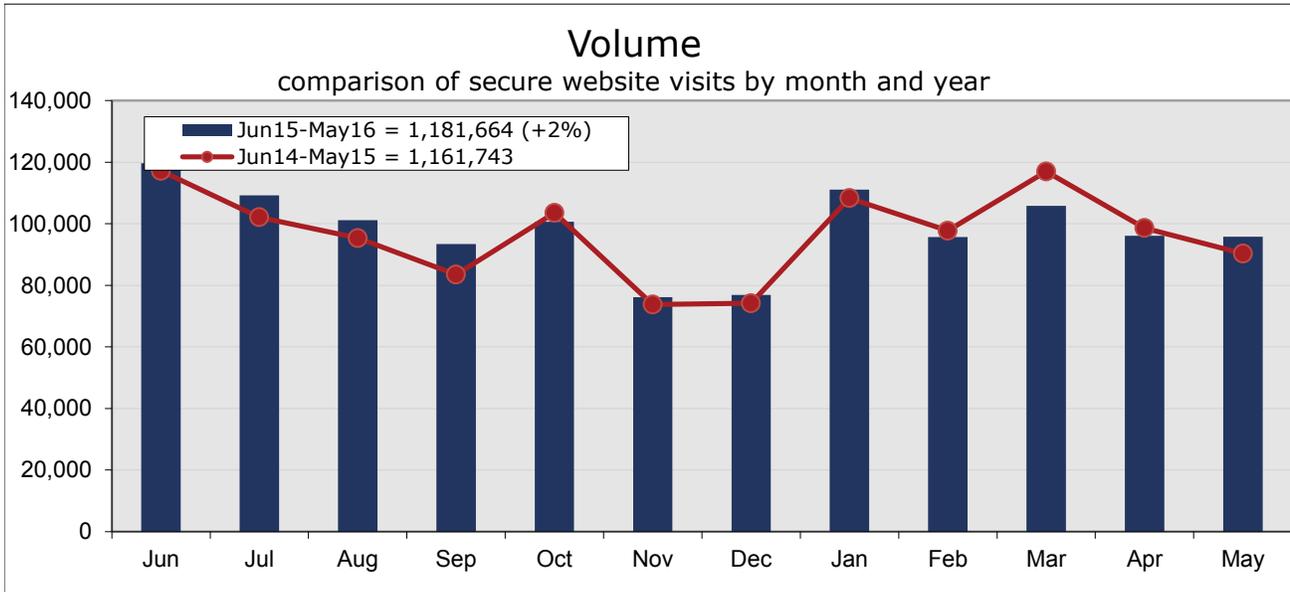
Payment Timeliness (average TAT in days)

Month	Lump Sum (Non-Retired)	Annuity (Retired and Non-Retired)
Jul	4	3
Aug	3	2
Sep	5	4
Oct	5	3
Nov	5	2
Dec	5	3
Jan	7	3
Feb	6	5
Mar	7	6
Apr	6	4
May	7	4
Jun		

Public Website: www.azasrs.gov



Secure Website: secure.azasrs.gov

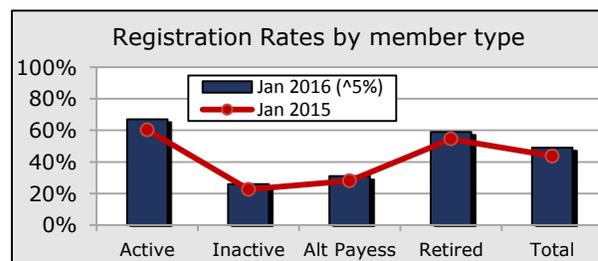
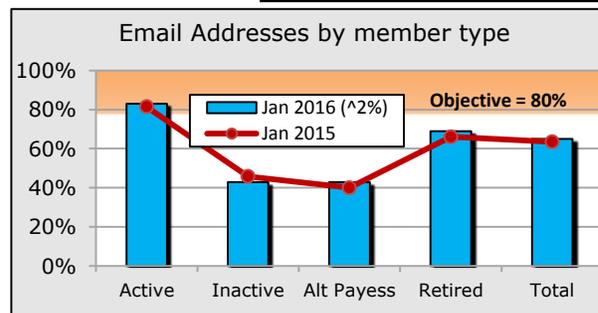
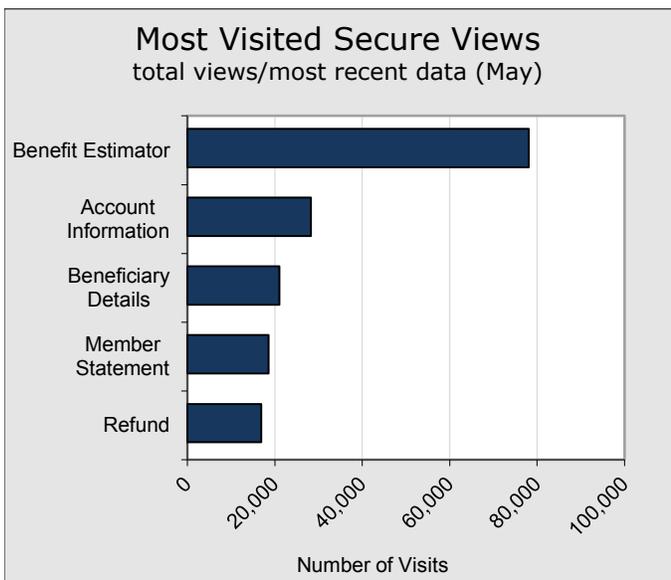


Historical Comparison of Online Usage

	This month	12mo Min	12mo Max	12mo Avg	Objective
Enrol	86%	86%	97%	92%	99%
Ref	91%	88%	98%	92%	90%
Ret	76%	69%	79%	72%	90%
Add	76%	70%	86%	77%	75%
Bene	78%	61%	87%	80%	75%
Tax	81%	67%	93%	79%	75%
DD	56%	41%	61%	55%	75%

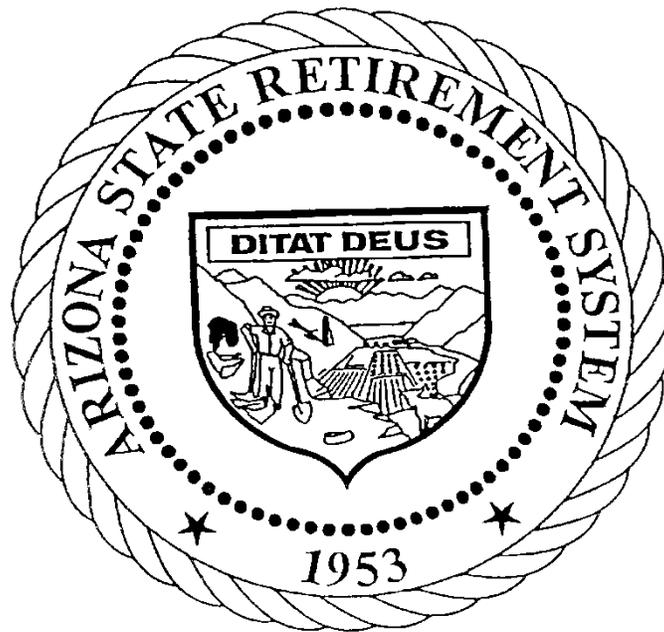
Total online this month

75%



Agenda Item #10c

Director's Report Budget & Staffing



Arizona State Retirement System
FY 2016 Appropriated Budget
(as of May 31, 2016)

	APPROPRIATIONS FISCAL YEAR 2016	EXPENDED YTD	% EXPENDED
OPERATING BUDGET			
Personal Services	\$ 13,091,900	\$ 11,517,900	87.98%
Employee Related Expenses	\$ 5,063,500	\$ 4,334,900	85.61%
Professional & Outside Services	\$ 1,292,400	\$ 1,563,200	120.95%
Travel	\$ 79,900	\$ 89,600	112.14%
Other Operating Expenses	\$ 2,732,800	\$ 1,618,900	59.24%
Equipment	\$ 651,100	\$ 271,100	41.64%
Operating Subtotal	\$ 22,911,600	\$ 19,395,600	84.65%
OTHER APPROPRIATIONS			
Long Term Disability Administration	\$ 2,800,000	\$ 1,912,400	68.30%
Oracle Forms and Reports Modernization (Yr. 3)	\$ 2,270,000	\$ 558,100	24.59%
TOTAL FY 2016 Appropriated Funds	\$ 27,981,600	\$ 21,866,100	78.14%

	APPROPRIATIONS	EXPENDED PRIOR YEARS	EXPENDED CURRENT YEAR	% EXPENDED
PRIOR YEAR APPROPRIATIONS (NON-LAPSING)				
FY 2015 - Oracle Forms and Reports Modernization (Yr. 2)	\$ 4,484,500	\$ 1,463,600	\$ 351,000	40.46%
FY 2011 - HB 2389 - ASRS Plan Design Changes	\$ 1,341,700	\$ 1,247,100	\$ -	92.95%
FY 2011 - ASRS Operating Budget	\$ 20,570,100	\$ 19,901,200	\$ -	96.75%

Budget Summary for Fiscal Year 2016 As of May 31, 2016

Operating Budget

The operating budget information on the previous page is based on funding approved by the Board and the Legislature for fiscal year July 1, 2015 through June 30, 2016. These ASRS operating expenses are distinguished from other areas of ASRS spending authority: such as expenditures for investment management and benefits payments. Administrative salaries and employee benefits, supplies, equipment and ongoing operational costs associated with information and financial systems for the ASRS Board and ASRS employees are funded from the operating budget. Expenditures to date include twenty-four pay periods (92.3% of the annual payrolls) of fiscal year 2016.

Other Appropriations

Other appropriations, which are considered part of the annual budget, represent other appropriations for specific programs or services authorized by the Board and the Legislature.

- **Long Term Disability Administration Fund**
The amount appropriated for the administration costs of the LTD program.

- **Oracle Forms and Reports Modernization**
The amount appropriated (non-lapsing) for the third year of the software modernization project.

Non-Lapsing Appropriations for Legislative Initiatives

The amount appropriated by the Legislature for the implementation of:

- FY 2015 - Oracle Forms and Reports Modernization (Yr. 2)
- FY 2011 - HB 2389 - ASRS Plan Design Changes
- FY 2011 - ASRS Operating Budget and LTD Admin
 - HB 2024, Section 93 modified the FY 2011 ASRS appropriations to be non-lapsing appropriations. The ASRS has the ability to utilize the unspent portion of these appropriations in ensuing fiscal years.

Explanation of Columns

- 1) The *Appropriations* column represents funds that have been approved by the Legislature and the ASRS Board for FY 2016, and includes prior year legislative appropriations.

- 2) The *Expended* column represents the expenditures to date.

- 3) The *% Expended* column identifies the portion of each line item that has been expended to date. This column is intended to be a guide to the rate of spending during the fiscal year.

ASRS FISCAL YEAR 2016, CONTINUOUSLY APPROPRIATED REPORT

(with summarized Appropriated Expenses)

DESCRIPTION	EXPENDED YTD as of 5/31/16	ESTIMATED ANNUAL EXPENSES (Projections updated 5/31/16)	EST. ANNUAL EXPENSES AS % OF TOTAL AUM	EST. ANNUAL EXPENSES PER MEMBER
Custodial Banking, Security Lending and Master Cash STIF Fees	2,472,000	3,579,000		
Internal Investment Management (Salaries and Benefits)	1,498,000	1,608,000		
<i>Public Markets</i>				
External Investment Management Fees	42,390,000	58,692,000		
Transactional and Other Fees	2,486,000	2,600,000		
<i>Private Markets</i>				
Private Debt and Equity Management Fees	43,784,000	52,000,000		
Private Debt and Equity Performance Incentive and Other Fees	46,160,000	58,000,000		
Real Estate, Farmland and Timber and Infrastructure Management Fees	25,558,000	30,000,000		
Real Estate, Farmland and Timber and Infrastructure Performance Incentive and Other Fees	74,452,000	82,000,000		
Opportunistic Debt and Equity Management Fees	8,935,000	11,000,000		
Opportunistic Debt and Equity Performance Incentive and Other Fees	20,437,000	24,000,000		
Investment Management Expenses	\$ 268,172,000	\$ 323,479,000	0.959%	\$ 578.78
Investment Consulting Services	3,072,000	4,062,000		
Investment Related Legal Services	1,101,000	1,600,000		
Investment Electronic Information Services	1,470,000	2,450,000		
External Financial Consulting Services	49,000	115,000		
Investment Related Consulting, Legal and Information Services	\$ 5,692,000	\$ 8,227,000	0.024%	\$ 14.72
Rent	1,422,000	1,565,000	0.005%	\$ 2.80
Actuarial Consulting Fees	227,000	375,000	0.001%	\$ 0.67
Retiree Payroll (Disbursement Administration)	2,609,000	3,240,000	0.010%	\$ 5.80
Total Continuously Appropriated Expenses	\$ 278,122,000	\$ 336,886,000	0.999%	\$ 602.77
*Total Current Year Appropriated Expenses	\$ 22,217,100	\$ 28,331,600	0.084%	\$ 50.69
<i>* Includes estimated prior year non-lapsing appropriations of \$350,000 related to the Oracle Forms and Reports Modernization Project</i>				
Total Expenses (Continuously Appropriated and Appropriated)	\$ 300,339,100	\$ 365,217,600	1.083%	\$ 653.46

ASRS Estimated Total Market Value of Assets Under Management (AUM) as of March 31, 2016
ASRS Total Membership as of June 30, 2015

\$ 33,729,963,000
558,900

Continuously Appropriated Expenses for FY 2016 Estimated Expenditures

The Arizona State Retirement System (ASRS) investment and administrative costs are expended in accordance with Arizona Revised Statutes (A.R.S.), Title 38, Chapter 5, Article 2, Section 38-721. A.R.S. Section 38-721, Subsection C, lists specific expenditures that are continuously appropriated and are allowable in the amount deemed necessary by the Board.

These specific expenditures are described below:

1. Investment management fees and related consulting fees necessary to meet the Board's investment objectives

Internal Investment management

- ASRS Investment Management Division staff base salaries and employer portion of staff benefits and payroll taxes.

External investment management fees

- Public Markets
 - External investment management fees (public).
 - Management fees (public) year-to-date expenditure amounts reflect the fees paid for the first two quarters and eighty-five percent paid of the total estimated due for the third quarter of FY 2016.
 - Transactional and other fees include foreign taxes and commissions on derivatives and other incidental costs.
- Private Markets
 - Private Debt and Equity, Real Estate, Farmland and Timber and Infrastructure and Opportunistic Debt and Equity investment management fees.
 - Performance incentive fees include performance incentives and carried interest, which are only paid upon successful performance of the manager after other return hurdles are met. Other fees are the ASRS proportional share of the transactional and operational cost of the underlying investment structure. Each of these fees is only paid if earned or incurred, and therefore may vary each quarter.
 - Management and performance incentive fees year-to-date expenditure amounts reflect the fees due for the first three quarters of FY 2016.

Consulting fees

- Includes investment related consulting and legal fees, electronic information services and subscriptions, custodial banking administrative fees, external auditing service fees.

2. Rent

- Costs associated with rent as tenants for occupancy in the 3300 Tower in Phoenix and in the satellite office in Tucson.

3. Actuarial consulting fees

- Costs associated with actuarial services related to plan design, administration and valuations.

4. Retiree Payroll

- Costs associated with administering retiree pension benefits and disbursements, including third-party payroll administration fees, postage and benefit related consulting fees and the beginning phase of the ASRS Benefit Disbursement project.

The report includes projected expenditures for the current fiscal year. Actual expenditures are reported monthly and estimated annual expenses are reviewed and adjusted periodically. The estimated annual expenses reflected were last updated as of May 31, 2016.

**Arizona State Retirement System
Staffing Report
(May 31, 2016)**

ASRS by Division	252 Full Time Equivalents (FTEs)	New Hires	New Exits	Vacancies	Vacancy Rate
Administrative Services Division (ASD)	16	0.0	0.0	3.25	20.31%
Director's Office (DIR)	14	0.0	0.0	0.0	0.00%
External Affairs (EAD)	3	0.0	0.0	0.0	0.00%
Financial Services (FSD)	62	2.0	2.0	6.5	10.48%
Technology Services (TSD)	52	2.0	0.0	4.0	7.69%
Internal Audit (IAD)	6	0.0	1.0	2.75	45.83%
Investment Management (IMD)	13	0.0	0.0	3.0	23.08%
Member Services (MSD)	86	0.0	2.0	10.75	12.50%
	252	4.0	5.0	30.25	12.00%

Turnover	May 2016 New Hires	May 2016 Exits	Total Exits (Last 12 Months)	Annualized Turnover %
	4.0	5.0	34.25	15.12%

Recruitments

Beginning February 2015, all ASRS recruitments were placed on hold until further notice due to the State of Arizona Hiring Freeze. Specific ASRS positions are critical to the core functions and operations of the agency and if left unfilled will negatively impact the agency's ability to meet goals and objectives. Recruitment for these "mission critical" positions may proceed after hiring supervisors complete and submit appropriate justification documents and upon approval of the agency director. In some instances, these additional steps have extended the recruitment turnaround time and contributed to the yellow or red status of some business units as noted on the following pages. We continue to work within the State of Arizona Hiring Freeze guidelines implemented February 2015.

- Four positions are under recruitment – AUD IT Auditor, FSD Assistant Controller, and FSD Pension Calculation Specialists (2)
- Two recruitments have not yet commenced – FSD-BA Fiscal Services Specialist III and IMD Manager of Applied Research
- One position has been filled with a future start date – TSD IT Security Engineer (Start date: 06/27/2016)

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations: Green = Normal risk Yellow = Greater than normal risk Red = Negative impact			
MSD	MAC (Call Center)	○ ○ ●	In May 2016, strategic objectives were not met. Six call-taking positions are vacant. Staff from other MSD business units assisted in handling calls. Negative impact will be reevaluated once two newly hired FTEs are fully trained and taking calls.
MSD	One-on-one Counseling (Appointments/Walk-ins)	● ○ ○	
MSD	E-mail and Written Correspondence	● ○ ○	
MSD	Outreach Education	● ○ ○	
MSD	Tucson: Appointments/Walk-ins/Outreach	○ ● ○	In May 2016, strategic objectives were met. However, two of nine positions are vacant and one FTE was in Benefit Advisor training throughout May. Phoenix staff cannot assist Tucson staff to help reach their primary objectives. Greater than normal risk will remain through June 2016 and will be reevaluated after the new Benefit Advisor is fully trained and in the Tucson office.
MSD	Benefit Estimates	● ○ ○	
MSD	Employer Relations	● ○ ○	
MSD	Health Insurance/LTD Benefits Administration and Communication	● ○ ○	
MSD	Survivor Benefit Processing	● ○ ○	
MSD	Refund Processing	● ○ ○	

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations: Green = Normal risk Yellow = Greater than normal risk Red = Negative impact			
MSD	New Retiree Processing		
MSD/FSD	Service Purchase Processing		The Service Purchase process is going through a modernization project which is requiring significant staffing resources. Greater than normal risk will remain until the Service Purchase project is completed.
FSD	Monthly Pension Payroll Processing		
FSD	New Retiree Processing		During May 2016, the New Retirees strategic objectives were met; however the post-pension audit objectives were not met. Four positions are vacant and six FTEs are in training. Current FTEs are working overtime, FTEs in other work units are assisting, and one temporary resource is assigned to the business unit to help with the workload. Greater than normal risk will remain until the vacant positions have been filled and the FTEs are fully trained.
FSD	Survivor Benefit Processing		
FSD	Records Management (data processing/imaging)		
FSD	LTD/Health Benefit Supplement Processing		The Records Management staff is meeting strategic goals. However, there has been an increase in not enrolled accounts due to lack of submissions by employers/new employees.
FSD	Transfer Processing		
FSD	General Accounting		General Accounting did not meet one of its strategic objectives. Two FTEs are currently learning their new roles and the Assistant Controller

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

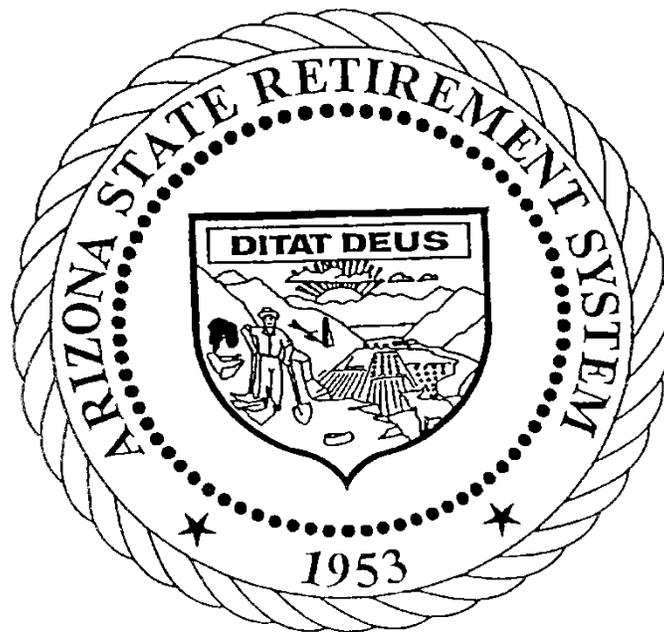
Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations: Green = Normal risk Yellow = Greater than normal risk Red = Negative impact			
			position is vacant and under recruitment. Greater than normal risk will remain until the Assistant Controller position is filled and all new FTEs are fully trained.
FSD	Contribution Collections and Posting	● ○ ○	
TSD	Network Support	● ○ ○	
TSD	IT Security	○ ○ ●	The IT Security team is unable to meet all business demands and Strategic Objectives. The recruitment for two critical vacancies is complete with one FTE starting in May and one FTE starting in June. Negative impact will remain until both FTEs are on board and fully trained.
TSD	Business Applications Development and Support	● ○ ○	Our complement of resources for May was 46 (30 FTEs and 16 external resources). In May, two external Report Writers and one FTE Software Engineer started.
IMD	Investment Management	● ○ ○	
DIR	Board/Executive Staff Support	● ○ ○	
DIR	Strategic Planning/Analysis	● ○ ○	
DIR	Strategic Communications	● ○ ○	
DIR	Public Affairs	● ○ ○	

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations: Green = Normal risk Yellow = Greater than normal risk Red = Negative impact			
IA	Internal Audit	○●○	The IT Auditor position became vacant in April 2016. With this position vacant, three audits originally scheduled to be completed in the biennial plan will not be completed. Greater than normal risk will remain until this position is filled and the FTE is fully trained.
EA	Rule Writing	●○○	
EA	Legislative Relations	●○○	
EA	Defined Contributions Plans	●○○	
ASD	Human Resources	●○○	
ASD	Training and Development	○●○	Training and Development is unable to meet all current business needs and future training requests have been postponed due to limited staffing. Recruitment is completed and new resources will start in June 2016. Greater than normal risk will remain until the resources are fully trained.
ASD	Contracts and Procurement	●○○	
ASD	Facilities Management	●○○	
ASD	Budget Administration	●○○	

Agenda Item #10d

Director's Report Cash Flow Statement



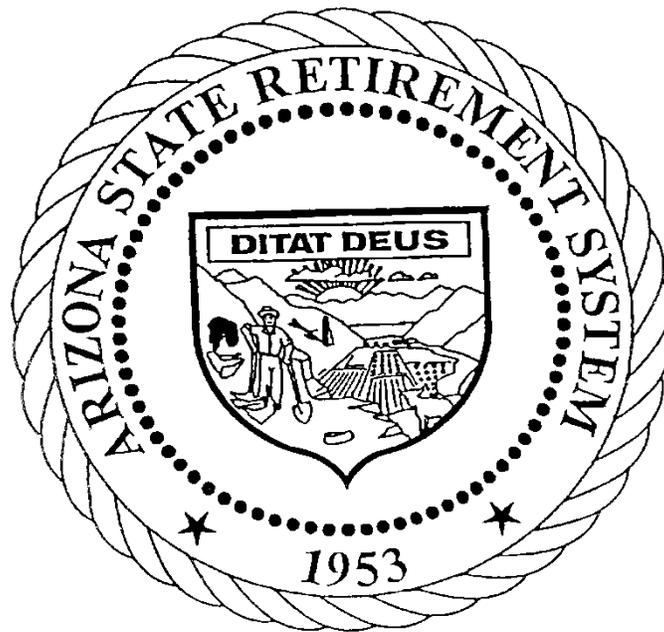
ARIZONA STATE RETIREMENT SYSTEM
COMBINED STATEMENT OF CHANGES IN TOTAL FUND CASH
FOR THE MONTH ENDED MAY 31, 2016

	Retirement Plan Fund	Retirement System Fund	Health Benefit Supplement Fund	Long-Term Disability Fund	Current Period May	Fiscal 2016 YTD May	Fiscal 2015 YTD May
ADDITIONS							
Contributions							
Member contributions	\$ 91,269,764	\$ 3,222	\$ -	\$ 966,580	\$ 92,239,566	\$ 937,151,424	\$ 942,152,047
Employer contributions	86,577,561	3,222	4,021,182	966,595	91,568,559	932,553,453	940,953,111
Alternative contributions (ACR)	2,521,993	-	35,810	16,527	2,574,329	23,664,548	24,002,600
Transfers from other plans	97,620	-	-	-	97,620	1,473,378	952,149
Purchased service	1,845,502	-	-	-	1,845,502	23,261,541	22,660,463
TOTAL CONTRIBUTIONS	182,312,439	6,444	4,056,991	1,949,701	188,325,575	1,918,104,343	1,930,720,370
DEDUCTIONS							
Investment management fees	11,193,023	-	-	-	11,193,023	57,704,448	70,995,640
Custody fees	173,865	-	-	-	173,865	921,152	1,055,000
Consultant and legal fees	652,703	-	-	-	652,703	4,090,127	3,848,267
Internal investment activity expense	60,861	-	-	-	60,861	3,201,144	3,185,247
Retirement and disability benefits	228,044,720	3,125,458	7,674,402	5,018,279	243,862,859	2,676,050,946	2,572,011,585
Survivor benefits	2,991,369	3,182	-	-	2,994,552	35,761,979	30,254,331
Refunds to withdrawing members, including interest	18,537,389	-	-	-	18,537,389	224,473,444	220,119,277
Administrative expenses	2,051,241	-	-	194,733	2,245,974	26,384,831	27,622,031
Transfers to other plans	30,785	-	-	-	30,785	973,907	455,658
Other	-	-	-	-	-	44,437	10,937
TOTAL DEDUCTIONS	263,735,956	3,128,641	7,674,402	5,213,012	279,752,010	3,029,606,416	2,929,557,972
INCREASE (DECREASE)	(81,423,517)	(3,122,197)	(3,617,411)	(3,263,310)	(91,426,435)	(1,111,502,073)	(998,837,602)
From securities lending activities:							
Security loan program	413,322	-	-	-	413,322	5,329,432	4,286,203
Security loan interest expense / (Rebate)	(215,428)	-	-	-	(215,428)	(1,518,819)	(727,868)
* Net income from securities lending activities	628,749	-	-	-	628,749	6,848,251	5,014,071
Capital Calls / (Distributions)							
Farmland and Timber	-	-	-	-	-	10,153,937	43,709,092
Infrastructure	-	-	-	-	-	-	300,000,000
Opportunistic Debt	(11,619,599)	(108,549)	(527,748)	-	(12,255,896)	44,784,391	93,569,489
Opportunistic Equity	4,686,911	47,196	208,464	-	4,942,572	(182,769,597)	91,090,469
Private Debt	97,966,013	826,999	4,415,349	-	103,208,361	843,433,232	306,427,065
Private Equity	20,782,807	177,916	924,191	-	21,884,915	101,491,806	160,914,889
Real Estate	99,716,153	899,714	4,516,738	-	105,132,605	606,723,549	34,689,944
TOTAL Capital Calls	211,532,286	1,843,277	9,536,995	-	222,912,558	1,423,817,317	1,030,400,948
NET INCREASE (DECREASE)	\$ (292,327,054)	\$ (4,965,474)	\$ (13,154,406)	\$ (3,263,310)	\$ (313,710,244)	\$ (2,528,471,139)	\$ (2,024,224,480)

* Securities lending activities reported on a one month lag.

Agenda Item #10e

Director's Report Appeals



OUTSTANDING ASRS APPEALS

Date Received	Appeals	Issues/Questions Regarding	Status/Comments
4/29/2016	Arizona State University Board of Regents	Appellant is disputing the final Maricopa County Order signed on 3/11/2016 and filed on 3/14/2016 concerning interest.	Superior Court awarded 4.25% interest and denied ASU request for 10% interest. ASU filed Notice of Appeal to Court of Appeals in 1 CA-CV 16-0239 on 4/1/2016 concerning interest. Appellant's opening brief is due 7/5/16.
7/14/2014	Sharon Di Giacinto & Richard K. Hillis	Appealing the ASRS determination that a Domestic Relations Order term is unacceptable.	Board upheld Administrative Law Judge Decision on 1/30/2015. Appellant filed Notice of Appeal on 02/02/2015 with the AZ Superior Court, Case No. LC2015-000048. Oral Argument held 7/29/2015. Superior Court Decision in favor of the ASRS issued on 9/25/15. Appellant Di Giacinto appealed to AZ Court of Appeals on 9/30/2015. Appellant Reply Brief filed 4/8/2016. Awaiting Oral Argument to be scheduled.
12/17/2014	The Griffin Foundation	Appellant is appealing the ASRS determination that the Appellant owes contributions from October 2010 to present for its employees.	OAH hearing held on 5/14/2015 and 7/9/2015. ASRS Board accepted the Administrative Law Judge Decision on 12/4/2015. Appellant Griffin Foundation filed an appeal to Maricopa County Superior Court on 1/11/2016. Briefing schedule to be ordered.
12/28/2015	Valerie Fields	Appealing ASRS decision regarding service purchase credit.	OAH hearing scheduled for 4/27/2016. Administrative Law Judge Decision due 6/06/2016. Decision not received as of 6/7/2016.
2/19/2016	Carol Teel	Appealing ASRS determination that Appellant is no longer disabled and therefore ineligible for ASRS Long-Term Disability benefits.	OAH hearing continued to 7/6/2016.

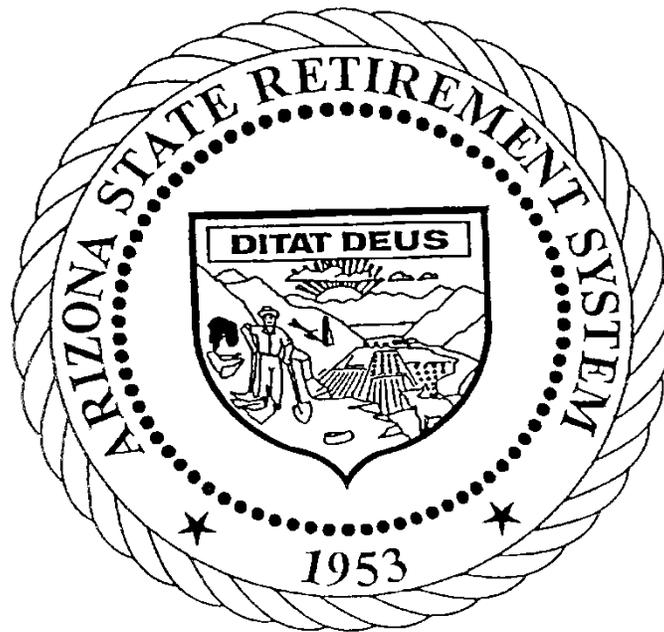
Information as of June 7, 2016. Updates are noted in bold font.

OUTSTANDING ASRS APPEALS

3/14/2016	Carol Kurtis	Appealing ASRS determination that Appellant is no longer disabled and therefore ineligible for ASRS Long-Term Disability benefits.	OAH hearing continued to 6/22/2016.
5/17/2016	Lorena Tarazon	Appealing an overpayment of ASRS Long Term Disability benefits in the amount of \$11,778.86.	OAH hearing scheduled for 7/13/2016.
5/20/2016	Artamus Coleman	Appealing ASRS determination that he cannot change his annuity option from Joint & Survivor 50% to the Straight Life Annuity.	OAH hearing scheduled for 7/19/2016.

Agenda Item #10f

Director's Report Employers Reporting





ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
4400 EAST BROADWAY BOULEVARD • SUITE 200 • TUCSON, AZ 85711-3554 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW.AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Kevin McCarthy, Chair, Arizona State Retirement System (ASRS) Board
FROM: Mr. Paul Matson, Director
DATE: June 9, 2016
RE: Delinquent Employers

As of June 9, 2016, the following employers have failed to remit contributions by a date certain. These employers have received a letter advising them that the ASRS will initiate collection procedures unless they contact us within five days:

TELESIS CENTER FOR LEARNING	28,000.*
CENTRAL AZ ASSOCIATION OF GOVERNMENT	15,000.
FRANKLIN PHONETIC PRIMARY SCHOOL	13,000.*
PUERCO VALLEY FIRE DISTRICT	<u>18,000.*</u>
	74,000.*

Additionally, the following employers have filed for Chapter 11 Bankruptcy Protection and are delinquent in their ASRS contributions:

LUZ ACADEMY OF TUCSON	18,600*
STARSHINE ACADEMY	<u>33,200*</u>
TOTAL	<u>125,800*</u>

*Estimated amount

Agenda Items

#11 - 14

Note: There are no materials for these agenda items

Agenda Item #15

Private Markets

Arizona State Retirement System

June 24, 2016

Outline

- Overview
- 2 Why Private Markets?
- 3 The Structure of Private Markets Investments
- 4 Private Markets Portfolios
 - Real Estate and Real Assets
 - Private Equity
 - Private Debt
 - Private Opportunistic Equity
- 5 Monitoring and Compliance

Outline

- 1 Overview
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Private Markets Program

ASRS invests in private markets assets pursuant to its strategic asset allocation. The current allocation to private markets assets is as follows:

Asset	Allocation Range
Private Equity	8% +/- 2%
Real Estate	10% +/- 2%
Private Debt	10% +/- 2%
Private Opportunistic Equity	0% to 3%
Farmland & Infrastructure	0% to 3% each

Current Investments

Cash Adjusted NAVs as of May 24, 2016

Portfolio	\$ Millions	Percent of Total Fund
Private Equity	2,707	8.01
Private Real Estate	3,258	9.64
Private Debt	2,619	7.75
Private Opportunistic Equity	306	0.91
Farmland and Infrastructure	513	1.52
Total	9,404	27.83

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Strategies and Diversification

- Investment strategies and diversification benefits are unique to each asset class.

Real estate (and we believe the closely related infrastructure and agriculture activities) is generally regarded a distinct asset class with its own risk and return characteristics. MSCI lays out the case in their “PRE2” white paper in which they conclude

Although there is commonality with both stocks and bonds, the majority of real estate risk is driven by endogenous factors. Ultimately, real estate is its own asset class.¹

In the case of private equity and private debt, we consider them extensions of the related equity and fixed income asset classes.

We invest in private equity in order to pursue specialized strategies and to expand the opportunity set to include firms not listed on public exchanges.

We invest in private debt largely because of favorable risk/return characteristics due to dislocations resulting from increased regulatory restrictions on commercial bank lending and the opportunities created thereby.

¹<https://support.msci.com/support/research-paper/model-insight-the-barra-private/016525200>

Private Markets Returns

- Returns for private markets assets are in the below table.
 Benchmark returns are calculated using daily cash flows as though investments in the benchmark were made on the same and in the same amount as investments in the portfolio.

Inception to date IRR as of December 31, 2015

	Benchmark	Portfolio Return	Benchmark Return	Excess Return
Private Equity	Russell 2000	11.01	9.66	1.35
Private Real Estate	ODCE Net	8.14	7.01	1.13
Private Opportunistic Equity	Absolute Eight	23.06	8.00	15.06
Private Debt	Lev Loan+250	10.87	3.34	7.53
Farmland	Core CPI+350	4.71	5.50	-0.79

Private Equity Current vs Legacy Returns

- In September 2010, ASRS appointed new senior management with responsibility for the real estate and private equity portfolios.

Since that time, ASRS has changed its PE investment process with improved diligence methods and modified strategic focus.

The results of the current management team compared to the rest of the PE portfolio are shown below.

Inception to date IRR as of December 31, 2015

	Cash Adjusted NAV	Portfolio Return	Benchmark Return	Excess Return
Total PE Current Portfolio	1,487	8.90	5.38	3.52
Total PE Legacy Portfolio	1,220	11.60	10.87	0.73
Total PE	2,707	11.01	9.66	1.36

Real Estate Current vs Legacy Returns

- ASRS has substantially restructured its approach to real estate under the current management.

A new strategic plan calls for implementation of the plan primarily through separate accounts and substantial progress has been made implementing this plan.

A new consultant was retained.

New underwriting standards and monitoring processes have been put in place.

Inception to date IRR as of December 31, 2015

	Cash Adjusted NAV	Portfolio Return	Benchmark Return	Excess Return
Total RE Current Portfolio	2,343	17.79	12.86	4.93
Total RE Legacy Portfolio	916	6.16	5.88	0.28
Total RE	3,258	8.14	7.01	1.12

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The Legal Structure of Private Markets Investments

- Private markets investments are normally made by purchasing a partnership interest or membership interest in an LLC.
 - Partnership and LLC structures are functionally equivalent and lawyers representing ASRS consider either to be acceptable.
For simplicity, we will use partnership terms in this presentation.

These partnerships are normally managed by a general partner responsible for the business operations of the partnership.

These partnerships are in various forms which are discussed in this section.

Separate Accounts

- A separate account is a partnership formed to make investments in which ASRS is the only investor other than the general partner.

As the sole investor, ASRS is ordinarily able to negotiate bespoke terms including:

- liquidity rights including the ability to terminate the investment period and commence liquidation,
customized investment parameters,
accordion features allowing the investment to be increased,
enhanced information and monitoring features,
and customized fee arrangements.

These are usually implemented as evergreen structures intended as long term relationships, but with termination rights favoring ASRS.

The separate account has become the dominant form for ASRS private markets investing.

Closed End Funds

- Closed end funds (“CEFs”) are partnerships with many limited partners organized by a GP to pursue a business strategy.

CEFs are the dominant form of legal organization for private equity and much of real estate.

CEFs have the following features:

- Finite life, typically 10 to 15 years including
 - an investment period of 3 to 5 years
 - a harvest period of 5 to 7 years plus optional extensions,

Strong control by the GP with little influence available to LPs, and
Funding commitments are legally binding on the LPs.

CEFs have the advantage of strong commitment of the partnership group to each other creating certainty about the continued availability of funds to pursue a strategy.

But CEFs have weak governance from the perspective of the LP.

ASRS uses CEFs in its private equity portfolio where they are the only viable option for pursuing the strategy and on a limited basis in the real estate portfolio for certain specialized strategies.

Open End Funds

- An open fund is a partnership with many limited partners and a managing general partner.
Open funds are common in core real estate and infrastructure investments.
Features of an open end fund include:
 - Organized for an indefinite time period,
New partners are admitted from time to time and buy in at current asset value,
Existing partners may redeem their interests, usually on quarterly basis.
- ASRS has invested in open end funds for real estate and infrastructure.

Co-Investment

- Co-investments are investments, typically at reduced or no fees, alongside a sponsoring fund.
They are offered as a benefit to larger limited partners who have the infrastructure to implement them.
Typically on a single investment which is usually too large to be accommodated in the sponsoring fund.
Held in a partnership of one managed by the GP which controls all business and liquidity decisions.
ASRS has executed a number of co-investments with its GPs and
Co-investments are the dominant mode of investing for the private opportunistic equity program.

Comparison of Structures

The following table summarizes a comparison of these structures:

	Separate Account	Closed End Fund	Open End Fund	Co-Investment
Alignment of Interest	Strong through custom investment terms and liquidity features	Weak	Neutral	Neutral
Fee Structure	Customized to enhance alignment and better than market	Market	Market	Reduced and often waived
Liquidity	Good	No control	Quarterly, but could be gated	No control
Investment Criteria	Customized with visibility and ability to influence	GP discretion within broad parameters	GP discretion within broad parameters	Investment specific with transparency on underwriting and opportunity to perform individual diligence

Structure of ASRS Investments

ASRS has targeted the following structure for its private markets investments:

	Separate Account	Closed End Fund	Open End Fund	Co-Investment
Private Equity		100%		
Real Estate	65% to 85%	Balance across the other three structures		
Private Debt	95%			5%
Private Opportunistic Equity				100%

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Real Estate Strategy

- ASRS Implements its real estate program pursuant to a strategic plan
ASRS updated this plan in September, 2015
The ASRS Real Estate Strategic Plan can be found at the following link
www.azasrs.gov/content/key-investment-documents

Real Estate Objectives

- Generate attractive risk adjusted returns at or above the actuarial target return of 8%

Enhance the overall diversification of the ASRS investment program

Generate regular cash flow from stabilized properties

The program is benchmarked against the NCREIF ODCE index. The real estate strategic plan provides the following guidance regarding the target return and selection of the benchmark:

“By selecting the NFI-ODCE as benchmark, the ASRS considers this benchmark as an opportunity cost, not a model portfolio. The ASRS expects that its portfolio will vary significantly from the ODCE index. The ASRS will manage its investments actively and dynamically in the real estate asset class in order to target a net return expectation of 8%. The 8% net objective represents a significant premium over the 6.5% net long term expectation for passive, stable, equity real estate positions.”

Real Estate Portfolio Structure

- 75% of the portfolio is planned for implementation in separate account structures
 - In these structures, ASRS will be a majority owner with significant control rights including control over liquidity events and the right to utilize a consultant to validate each property meets the investment criteria and return hurdles applicable to the investment
ASRS favors separate account structures because of the ability to negotiate custom investment criteria, enhanced controls and enhanced liquidity
 - 25% of the portfolio is planned for implementation in commingled structures
Commingled structures will be used for differentiated strategies that are only available in a commingled structure or not feasible to implement in a separate account
- ASRS commenced building the separate account portfolio in 2013 and this portfolio now constitutes approximately one third of the real estate portfolio. We anticipate the target portfolio structure will be achieved in three to five years as we continue to build out the separate accounts and the legacy commingled funds run off.

Risk Management – Property Markets

- Real estate performance is strongly influenced by observable and durable demographic and economic trends

Rental increases occur in situations with high demand and constraints on supply

Some important trends are:

- The demographics of baby boomers and their children profoundly affect real estate demand
 - E-commerce affects utilization of industrial and retail space
 - The structure of employment away from goods producing to service occupations affects the geographic dispersion of economic activity
 - Urbanization is a continuing trend with a pattern of globally significant cities emerging
 - Office utilization is becoming much more efficient with a strong downward trend of space utilization per employee

Risk Management – Demand Driven Investing

- In order to capitalize on these trends, we are creating a customized investment strategy that we like to call “demand driven investing”
 - We believe the risk of real estate is not having tenants
We search for opportunities with strong demand fundamentals driven by age and income demographics, education levels, concentrations of high quality jobs and other relevant location criteria

We identify sectors that have favorable demand dynamics with demographic or other economic tailwinds and search for markets with supply barriers

Apartments, industrial, self-storage, medical office, senior housing, student housing are overweight sectors for us

We have implemented a robust search and recruitment process to find the most qualified parties to be our partners in this program

Identify first tier operators in each of these sectors to implement through custom separate account arrangement

Risk Management – Property Level Underwriting

- All of our separate account agreements require consultant confirmation that each property acquired meets investment criteria and meets applicable return hurdles
 - While there are national real estate statistics, property markets are inherently local
We underwrite every property in the context of its competitiveness in the supply/demand dynamic of its neighborhood

We are supported in this process by a consultant with deep expertise in this type of property level underwriting and with extensive contacts in the real estate industry

Risk Management – Diversification and Leverage

- As required by the strategic plan, the portfolio will be well diversified across
 - Property types
 - Geography
 - Life Cycle Stage
 - Vintage Year

The portfolio will levered at 50% to 60% loan to value

Leverage is measured at the portfolio level, allowing latitude at the property level

Higher leverage is permitted on stable properties with access to fixed rate financing but offset by lower leverage on properties in the process of implementing a value creation business plan

Risk Management – Capital Markets

- Like other asset classes, real estate faces challenges as we approach what may be the end of an extended period of very low interest rates
 - While real estate cap rates are low, spreads to treasuries are higher than historic norms indicating some degree of interest rate increase is already priced into values

Our strategy in this context is:

Focus on diversification, especially by vintage year

Highly disciplined underwriting at the property level anticipating future increases in interest rates and cap rates

Avoid the most expensive core properties which in the current market are “priced to perfection”

Focus on niche property types such as medical office priced wide of traditional property categories

Focus on properties with value creation potential through operational improvement investing directly with expert operators

Farm Land Investing

- ASRS invests in farm land for its long-term inflation protection linked to the value of land and its income generation

ASRS invested \$175 million International Farming Corp (IFC)

- IFC is a multi-generational U.S. farming corporation with deep operational expertise

They pursue a diversified and value add approach to agricultural investing

Diverse crop mix and geography with high crop optionality

Prefer properties with natural resource optionality (water and mineral rights)

Avoids the expensive Midwest 'I' states (Iowa, Illinois, and Indiana)

ASRS negotiated custom structure with right-of-first-offer (ROFO) rights to buy assets upon sale from the fund

Infrastructure

- ASRS invests in infrastructure for long-term inflation protected income streams from assets and systems that support transportation, energy, shipping, and communications
 - Global needs exist to support rising populations and antiquated operations

ASRS invested \$300 million with Industry Funds Management (IFM), an Australian-based infrastructure manager that invests globally using a core strategy in an open-end fund structure

Fund structure provides diversity of exposure across strategies and geography
Long term vehicle structure is aligned with long term character of assets
Focused on OECD countries; current portfolio invests across US, UK, and Europe

Investments include airports, toll roads, a petroleum pipeline, power generation & transmission facilities, a regulated water & wastewater treatment company, and broadcast and wireless communication infrastructure

Projects are heavily regulated and have predictable revenue patterns

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- 2 Why Private Markets?
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 - Real Estate and Real Assets
 - Private Equity**
 - Private Debt
 - Private Opportunistic Equity
- 5 Monitoring and Compliance

Investment Philosophy

We believe successful private equity investing hinges on three considerations

- Strategy
 - Track Record
 - Organizational Dynamics

Strategy

- Academic research provides evidence on the performance of private equity²
 - Private equity buyout funds have outperformed public markets by about 20% in total value over the life of a fund
 - Venture Capital has underperformed

A review of the ASRS portfolio leads to conclusions about comparative performance

Mid sized buyout funds deliver the best and most consistent returns
Firms with specialized expertise in restructuring or an industry sector often do well

²Harris, Jenkinson and Kaplan. Private Equity Performance: What Do We Know? The Journal of Finance, October 2014.

Strategy

ASRS favors

- Buyout strategies that emphasize organizational transformation instead of mere financial engineering

Investments in growing sectors with high revenue growth potential
(technology, healthcare)

Investments in sectors impacted by regulatory change (financial services)

Investments with sponsors having specialized expertise in restructuring, bankruptcy and turnaround situations

ASRS is underweight

- Venture Capital
 - Europe
 - Emerging Markets

Track Record

- Private equity performance has a high level of dispersion
 - “Top quartile” funds outperform median funds by 5% to 10%
It is exceedingly rare for managers to perform persistently in the top quartile, but we do find managers persistently above median
ASRS implements private equity to provide diversification by manager, strategy and vintage year

ASRS utilizes “PME” methods for performance assessment

PME (public market equivalent) measurements compare private equity returns to public markets as if one invested in public markets on the same days and in the same amounts as were invested in the PE fund

ASRS has been a leader in this realm, implementing software for PME methods nearly two years before it was commercially available through Bloomberg and other services ³

³For a more detailed explanation of PME methods, see this conference presentation <http://www.rinfinance.com/agenda/2014/talk/KarlPolen.pdf>

Performance Tracking

- In connection with creation of the software for the PME calculations, ASRS has built a performance tracking and reporting system for private assets
State Street is the official book of the record and the ASRS system works from information downloaded from the State Street system
The ASRS system generates
 - a monthly reporting package
 - a quarterly performance chart pack
 - an internal website with cash flow and performance metrics on each partnership

“Hunter, not hunted”

- ASRS uses quantitative screens from the Preqin database and PME methods to discern private equity sponsors with persistent excellent results
ASRS has established an outbound program to pursue investments with the most highly qualified sponsors

Organization Dynamics

- Although we place much emphasis on quantitative analysis to discern performance
 - this analysis is not securities analysis
 - the investor does not participate in the track record deals
 - private equity investing is best thought of as a team hiring decision

Traditional private equity diligence places emphasis on stability

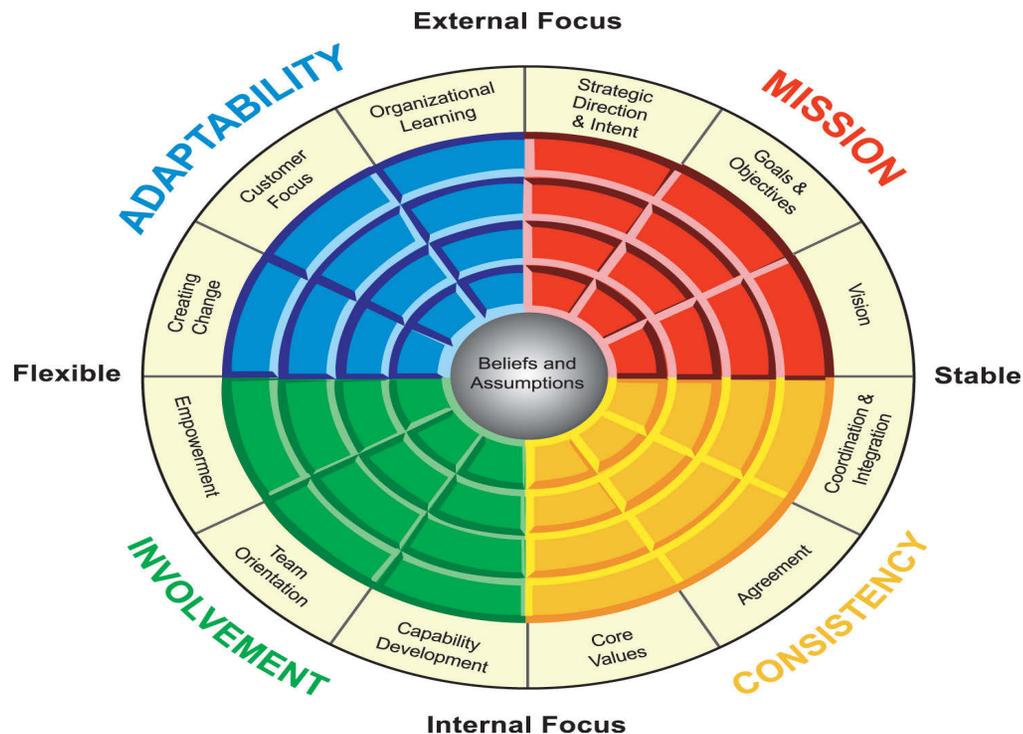
But common sense suggests that the best firms will be dynamic, evolving with changing conditions, weeding out weak performers and promoting high performers

Research has found that stability is a negative indicator of performance ⁴

So, the question becomes one of attempting to discern a positive dynamic

⁴Cornelli, Simintzi and Vig. Team Stability and Performance in Private Equity. 2014 Working Paper. <http://www.collierinstitute.com/Research/Paper/264>

Organization Assessment



- ASRS has adopted a framework for organizational assessment modeled from Denison Consulting
 - Developed interview questions to explore organizational attributes of adaptability, mission, involvement and consistency
 - Ongoing work to explore deeper dive organizational assessment

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Private Debt Overview

- Private Debt is comprised of illiquid loans and bonds that typically fund highly leveraged companies and real estate properties that are typically too small in size to meet the requirements of the tradable leveraged loan, high yield bond, or commercial mortgage-backed securities markets. For example, Private Debt may consist of secured loans funding leveraged buyouts of small to mid-size companies or mezzanine financing for real estate properties. Returns in the asset class are determined by: 1) the expected returns of individual investments (based on the cash coupon rate or spread over LIBOR and other sources of return including underwriting fees, original issuance discounts and premium call features) and 2) the actual level of credit losses experienced in the underlying portfolios.

IMD House View: Private Debt offers the most attractive opportunity in the fixed income markets with double-digit yields readily available for investors willing to accept illiquidity. The market opportunity is principally driven by regulatory constraints that make it unattractive for banks to hold illiquid loans or other debt of below investment-grade credit quality.

Private Debt Characteristics

- Pros

- High Expected Net Returns (10-11% on average)

Substantially higher gross returns (a combination of yield, fees, OID, and call premiums) than comparable public market securities (high yield bonds, tradable bank loans, asset-backed securities, CMBS)

Low loss history in underlying portfolios

Primarily Floating Rate

Approximately 80% of ASRS's ongoing private debt commitments are expected to be floating rate investments

Full Due Diligence by Managers Customized Covenants and Credit Monitoring

Cons

Illiquid

Delayed Deployment of Capital

Private Debt Market Environment

- Demand for corporate loans are driven by: 1) middle market buyout and acquisition activities which need financing, and 2) middle market borrowers which need to refinance existing loans from banks.

Regulatory constraints limit banks ability to make below investment-grade, illiquid loans (typically to middle market companies)

- Basel III
Dodd-Frank
“Leveraged Lending Guidelines” of OCC/Fed/FDIC

Business Development Companies (“BDCs”) have pulled back on lending due to their depressed equity valuations.

ASRS Private Debt Program

Lending Strategies Diversified Across 10 Managers

- US Corporate
 - Five managers targeting unique areas of the middle market
 - One manager targeting larger companies

European Corporate

One manager targeting middle market lending

Real Estate Finance

Two managers targeting three market segments

Asset Backed

One manager targeting unique market opportunity

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Private Opportunistic Equity

- The private opportunistic equity program was created to pursue unique opportunities with superior risk return characteristics due to
 - Market dislocations
 - Unique situations not well addressed by the market or not fitting traditional asset classes
 - Emerging firms with experienced personnel
- ASRS has committed over \$600 million to such opportunities since program inception
- The structure of the investments has dominantly been as co-investments with existing sponsors

Realized and Mature Investments

- \$150 million to a de novo REIT investing in triple net leased assets
 - fully realized at 23% IRR
- \$75 million committed to a de novo BDC
 - fully realized at 17% IRR
- \$10 million in LNG processing facility
 - all capital returned and expected to achieve 3X
- \$50 million in mid-town Manhattan condominium development
 - half capital returned, 80% sold out and >2X expected

Investments in Process

- \$140 million invested in firm providing senior financing to home construction firms
- \$100 million committed to a firm investing in asset manager platforms
- \$50 million invested in a financial services firm primarily in the annuities business
- \$45 million invested in a firm providing receivables factoring services to small and medium sized businesses
- \$30 million invested in a firm operating eating disorder centers
- \$25 million invested in a Canadian exploration and production energy company

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Overview

- ASRS has implemented a comprehensive program for monitoring and compliance for its private markets investments.

Because of criticisms in the press and compliance activities by the SEC, ASRS reassessed and strengthened its compliance program in 2015.

ASRS team members made a comprehensive presentation to the investment committee on these in August of 2015. A copy of this report is included in the materials for today's board meeting.

We will summarize the report and the activities here.

Monitoring and Compliance Roles and Responsibilities (1)

- ASRS team

- Prepares various reports including monthly private markets holdings and performance, quarterly chart pack and annual reports to the investment committee

Conducts ongoing investment accounting including capital calls and quarterly reconciliation of cash flows to capital account statements

Attends quarterly update calls

Prepares the Comprehensive Annual Financial Report which includes an investment section describing private markets investments and fees paid to asset managers

Attends annual meetings with asset managers

Participates on advisory boards when applicable

The back office provider

maintains an official book of record for investments

calculates returns

maintains a data base of reports and other documents

Monitoring and Compliance Roles and Responsibilities (2)

- Investment consultants
 - Validate capital calls
 - Prepare compliance reports annually for SMAs and on a rotating basis for other investments including
 - Review of valuation policy
 - Review of fee calculations including asset management and incentive fees
 - Review of expense policies to determine all expense charges to a partnership are appropriate

External auditor

reviews on a sampling basis individual investments to verify that appropriate financial statements and other records exist for each investment, the capital account is reconciled to the financial statements and with respect to a sample of new investments that appropriate diligence procedures were followed and appropriate legal documents are executed memorializing the investment

Special Requirements for Real Estate SMAs

- The real estate consultant performs the following additional services for real estate SMAs
 - Review all investments for compliance with investment criteria
 - Maintain a dynamic risk management system to monitor forecast risk characteristics
 - Prepare monthly reports on the portfolio
 - Review quarterly financial statements and attend quarterly meetings
 - Review annual budgets and business plans
 - Annual update of property pro formas and appraisals

Fee Management and Negotiations

- Management of cost is one of the most important jobs in achieving a successful investment program.

However, given the dispersion of outcomes, fees cannot be a primary driver in manager selection. An inferior manager cannot discount fees enough to compensate for performance differences.

The ASRS process starts for screening managers for consistent superior performance.

For each mandate, we attempt to identify multiple highly qualified managers to compete for the assignment.

Only then do we commence negotiation of fees and terms.

Methods for reducing fees

- The bulk of ASRS private markets investments are now implemented in separate accounts
 - These are larger relationships affording negotiating leverage to ASRS
 - Custom fee arrangements are negotiated which typically minimize guaranteed while offering incentive fees when earned through high performance
- For commingled funds, ASRS often receives discounts based on
 - Size of investment through most favored nation clauses assuring ASRS receives best fees for its investment size
 - Fee reductions for first close
- Participation in no fee or reduced fee co-investments

Private Markets Investing

Selection, Diligence, Fees and Monitoring

August 10, 2015

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1 Introduction

1.1 Background

ASRS invests a portion of its assets in a variety private markets strategies. This paper describes the strategies and ASRS policies and processes it employs in implementing the strategies. This paper is prompted by concerns about private markets investing which have been raised in the financial press and by the SEC in their new role regulating such investments under Dodd-Frank. The outline of the paper will be to commence with a summary of the main concerns which have been raised. We will then proceed with a fairly detailed account of ASRS processes in selection, diligence and monitoring private markets investments. We then consider the effectiveness and adequacy of ASRS processes in light of industry standards as reflected in CAIA materials. We will close by revisiting the concerns and discussing how our processes address or mitigate them.

1.2 The Role of Private Markets Investments

Private Markets Investments are investments in less liquid assets that are generally not traded on exchanges. In accordance with the strategic asset allocation, ASRS has established target allocations in private markets assets as follows:

Asset Class	Allocation
Private Debt	10%
Real Estate	10%
Private Equity	8%
Infrastructure & Farmland	0-3%
Private Opportunistic Equity	0-3%

Following a rigorous and extended analysis, ASRS has integrated private markets assets in its strategic asset allocation because of their risk and return characteristics in relation to liquid assets. ASRS believes the inclusion of private markets assets supports and is critical to attaining its investment goals including, but not limited to, the achievement of the actuarial target return.

1.3 Concerns Expressed in the Financial Press and by the SEC

A number of articles have recently appeared in the financial press asking questions and directing criticism at managers in the alternative asset management space. Journalists and bloggers, notably but by no means exclusively Gretchen Morgenson of the New York Times¹ and Yves Smith of Naked Capitalism², have been pointed in these critical remarks.

Under Dodd-Frank, many alternative asset managers are now required to register with the SEC as registered investment advisors and regulated under

¹http://topics.nytimes.com/top/reference/timestopics/people/m/gretchen_morgenson/index.html

²<http://www.nakedcapitalism.com/>

the Investment Advisors Act of 1940. Advisors are required to maintain and update a form ADV and are subject to a variety of rules including reporting and disclosure requirements and are subject to periodic examination by the SEC. These rules went in to effect in 2011 with phased compliance requirements through 2012. So, this is a very new program with standards that are only now settling in place.

Under these rules, the SEC Office of Compliance Inspections and Examinations (“OCIE”) began their examinations in late 2012. Directors of the OCIE have made public statements about their examination programs and concerns based on those examinations providing guidance on their planned focus in on-going exams.^{3 4}

While we will not attempt to address every criticism, broadly the concerns raised include:

- Criticism of the diligence methods of investors and their consultants
- Inadequate transparency on fees
- Misallocation of expenses among the asset managers and portfolio companies or parallel vehicles
- Favoritism among partners in allocation of co-invest cost and opportunities.

The press, bloggers and the SEC have been very helpful to investors in bringing these issues to light and encouraging focus on them.

1.4 The Role of ASRS

ASRS is responsible for the prudent and diligent implementation of the private markets investment program. The remainder of this document will describe the processes used by ASRS in order to achieve the goals of the program.

2 Selection and Diligence

2.1 Introduction

We will begin this section with a discussion of the governance documents and processes which regulate our investment activities. We will then describe our sourcing and diligence methods for each of the private markets asset classes.

2.2 Governance Documents

2.2.1 Strategic Plans

The real estate program and private equity program operate pursuant strategic plans approved by the ASRS board. The strategic plans generally set forth

³<http://www.sec.gov/news/speech/private-equity-look-back-and-glimpse-ahead.html>.

⁴<http://www.sec.gov/news/speech/2014-spch05062014ab.html>

the investment goals and objectives for their respective asset class including portfolio composition, portfolio structure and risk management provisions.. The real estate strategic plan was last updated on October 21, 2011 and the private equity strategic plan was last updated on December 10, 2010.

2.2.2 SIP006

SIP006 is a governing rule that provides policy direction on “Investment Manager, Partner, and Co-Investment Selection and Oversight”. It establishes roles and responsibilities with respect to its subject matter among ASRS staff, the asset class committees and the consultants. It describes due diligence processes and responsibilities. SIP006 provides a diligence check list and every investment report is required to include a copy of the check list confirming that all required has been completed. A copy of SIP006 is found in Appendix A.

2.2.3 Pacing and Implementation Plans

In the fourth quarter of each year, the private markets committee reviews pacing and implementation plans for private equity, private debt and real estate. The purpose of these plans is to provide more detailed implementation guidance for investments in the ensuing year. The plans establish investment levels for new commitments and investment themes for consideration. The pacing and implementation plans for private equity and private debt are prepared by ASRS staff. The pacing and implementation plans for real estate are prepared by the real estate consultant.

2.3 Private Equity

2.3.1 Sourcing

ASRS staff takes the lead in sourcing private equity investments. ASRS researches private equity funds through the Preqin database to find consistent high performers. ASRS maintains its own tracking to monitor private equity sponsors of interest and proactively reaches out to them in an effort to secure allocations in their offerings.

ASRS maintains a tracking spreadsheet which focuses its initial screening on funds that consistently perform in the first or second quartile of their vintage. Research supports concentration of efforts on managers with consistent high performance. Harris, et al (2014) ⁵ survey the literature on performance persistence. Though not unequivocal, this research continues to support the, perhaps obvious, conclusion that a private equity investor should select among high performing asset managers.

⁵Robert S. Harris, Tim Jenkinson, Steven N. Kaplan and Rudiger Stucke. Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds. Available at SSRN. 2014.

As would not be surprising based on this research, managers who always perform in the top quartile are exceedingly rare. Among the thousands of managers monitored in the Preqin database, only four North American managers with at least three funds of track record have performed in the top quartile in all of their funds. ASRS has sought to invest with all four and is invested with two of them. Of the remaining two, one did not grant ASRS an allocation and the other granted an allocation but the investment was not completed because the manager would not negotiate legal terms required by ASRS.

In light of this research, ASRS goal in the initial screening is to identify managers persistently in the top half of performance and call on those managers as they come to market with fund offerings.

2.3.2 Reinvestment

A substantial portion of ASRS private equity investments are reinvestments with a firm with which ASRS has prior experience. Investing in multiple funds with the same firm allows the parties to become better acquainted and tends to increase access to co-invest deal flow. By attending annual meetings, participating on advisory boards and other contact, ASRS becomes well acquainted with its partners, their organizations and their business methods. However, the performance and underwriting expectations for renewals are the same as for new investments.

2.3.3 PME methods and other quantitative analysis

ASRS has adopted PME and Direct Alpha methods⁶⁷ as its primary means for quantitative performance underwriting. The advantage of PME methods is that they manage performance of an investment relevant to a public index. This method of benchmarking removes the headwind or tailwind of market context and provides an objective view of value added by the private equity sponsor. Recent updates to this research⁸ indicate that a median private equity sponsor should be expected to outperform a relevant market index with a PME of 1.2 and Direct Alpha of 3%. So, our next layer of screening is to conduct a more detailed analysis of fund performance using these methods.

ASRS began using these methods nearly three years ago. At that time, no commercially available service provided these calculations. So, a member of the ASRS team with a background in computer programming created software to efficiently process fund cash flows combined with data extracted from Bloomberg to perform these calculations.

In addition to PME methods, ASRS analyzes traditional performance measures of loss ratio, IRR and TVPI as part of its performance analysis systems.

⁶Steven N. Kaplan and Antoinette Schoar. Private Equity Performance: Returns, Persistence and Capital Flows; *The Journal of Finance*, 60(4), August 2005.

⁷Oleg Gredil, Barry E Griffiths, and Rudiger Stucke. Benchmarking Private Equity: The Direct Alpha Method. Available at SSRN, 2014.

⁸Robert S. Harris, Tim Jenkinson and Steven N. Kaplan. Private Equity Performance: What Do We Know? *The Journal of Finance*, 69(5), October 2014.

For funds which pass quantitative screens described, ASRS undertakes more detailed due diligence. ASRS will meet with an investment manager at least once prior to making an investment decision and often twice, once at ASRS offices and also at the sponsors offices. ASRS reviews the PPM for the fund and contents of a data room for the fund. A diligence check list for such review is provided in SIP006, referenced above. ASRS emphasizes a review of investments at the portfolio company level to understand the source of value add by the sponsor.

2.3.4 Organizational Assessment

ASRS considers private equity investing to be a team hiring decision. While ASRS engages in robust quantitative analysis of prior investments, those prior investments are, in essence, illustrations of the sponsor's investment approach and skill and the new fund will be populated with all new investments. Thus, ASRS emphasizes organizational assessment as part of its private equity program.

In 2014, ASRS retained the services of an organizational consulting firm, Denison Consulting, to help it refine its efforts in organizational underwriting. ASRS believes that firms with a healthy culture are more likely to perform at a high level and maintain that performance. The signs of a healthy culture include

- a clearly stated mission with well understood goals and objectives
- consistency and congruence of the organization structure, resources and skill sets with the tasks it pursues
- high involvement with appropriate empowerment at different levels of the organization, appropriate compensation and sharing of rewards in a team oriented environment
- adaptability with evidence of ability to learn from experience and evolve with a changing environment and market context.

ASRS considers the stability of an organization in its assessment and expects a firm to be reasonably stable. However, a static firm is unlikely to be a positive sign. Cornelli, et al (2014) find that static firms under-perform firms with some turnover.⁹ Healthy firms are dynamic and ASRS uses the factors described above in an effort to discern a healthy dynamic in the firms it is considering for an investment partnership relationship.

As you might reasonably expect, the best firms are growing. A firm needs to grow in order to be able to offer attractive career paths to employees at all levels of the organization. Static or declining firms will have trouble attracting and retaining the most qualified personnel. Research by Hamilton Lane finds that growing firms, even rapidly growing firms, are more likely to outperform private

⁹Francesca Cornelli, Elena Simintzi, Vikrant Vig. Team Stability and Performance in Private Equity. Collier Institute of Private Equity. <http://www.collierinstitute.com/Research/Paper/264> . 2014.

equity median performance than stable or declining firms. Similarly, firms that come back to the fund-raising market regularly outperform firms that have been out of the market for more than five years.¹⁰

2.3.5 External Consultant Report

ASRS outsources much fund due diligence to its private equity investment consultant, Meketa. Meketa does an extensive review culminating in a report of over 50 pages describing the potential investment. This work includes:

- a thorough review of the PPM and other materials in the sponsor data room
- a lengthy due diligence questionnaire
- one or more onsite meetings
- full track record analysis
- reference calls
- credit and background checks
- a review of pipeline and pending investments
- a review of legal terms to determine if they are in line with market and appropriate for ASRS]
- SIP006 check list confirming all required diligence has been completed.

2.3.6 Planned enhancements to diligence

Starting in mid-2015, ASRS has expanded its diligence to consider matters identified in SEC exams. We will request to review any deficiency letters received from the SEC and the sponsor's response to such letter. We will request information about the sponsor's expense allocation policies. We will request information about the sponsor's policies on monitoring and other fees and how those are handled in any fee offset provisions.

2.3.7 Legal process

ASRS has retained counsel with a high level of expertise in representing institutional investors in investment partnerships and other structures. Counsel negotiates the terms of partnership agreements, subscription agreements and a custom side letter incorporating ASRS specific terms.

Figure 1: ASRS Private Equity IRRs compared to Burgiss Index

	One Quarter	One Year	Three Years	Five Years	Inception
Private Equity IRR	0.93%	10.78%	14.23%	14.72%	12.44%
Russell 2000	9.37%	3.75%	17.26%	14.62%	13.96%
Burgiss IRR	1.98%	11.67%	13.95%	13.36%	11.35%

2.3.8 Results

If ASRS is successful in its efforts, it will achieve investment results with returns in excess of median private equity fund results and, over the long run, returns in excess of public market indices.

The policy benchmark for the private equity program is Russell 2000. This benchmark is an index of smaller publicly listed companies which may be comparable in size to many private equity portfolio company holdings. It also reflects an opportunity cost for the private equity program – over the long run, private equity should be expected to provide a return premium to a relevant public index. The disadvantage to the approach is lack of comparability in the valuation metrics of daily market value versus quarterly appraisal based marks which can lead to large tracking error over shorter time spans.

The results of a comparison to Russell 2000 are presented in figure 1. As you can see, the private equity inception IRR has trailed the Russell 2000 by 1.52%. However, in the most recent year private equity beat R2K by 7.03%. Although lower than the public market benchmark, the 12.44% inception return is an attractive absolute return and the Russell 2000 is not expected to continue to earn returns at the level it has during the post-GFC bull market.

ASRS also assesses its private equity fund selection performance by comparing its results with funds in the Burgiss database from 2007 (the inception of the ASRS private equity program) and later vintages. The advantage of this approach is that it is an “in sample” performance assessment compared to similar assets avoiding the mismatches which can result when comparing appraisal based valuations with daily market valuations. The results in figure 1 show that ASRS private equity has outperformed the Burgiss index on an inception to date basis by 1.09% per year.

2.4 Real Estate

2.4.1 Background

Pursuant to 2011 modifications to the strategic plan, the ASRS real estate program is planned to be implemented primarily through a separate account program, sometimes called the “strategic manager” program, although a portion of the program will continue to be implemented through commingled funds. A

¹⁰Hamilton Lane. 2015 Market Overview. <http://www.hamiltonlane.com/MediaRoom/zzdzd/>

substantial portion of the assets of the real estate program is still reflected in legacy assets which are expected to run off over the next several years.

2.4.2 The separate account program

The separate account program is being implemented in order to achieve the following benefits:

- Customized investment criteria reflecting ASRS goals and portfolio targets
- Enhanced liquidity through ability to terminate investment period and direct liquidation of assets
- Reduced risk by increasing portion of stabilized assets in the portfolio
- Reduced fees by direct operator relationships avoiding double promote
- Enhanced operational performance by partnering with property type experts
- Reduced transaction cost from a buy and hold strategy avoiding unnecessary trading based on arbitrary fund lives

In order to implement this program, ASRS retained the services of a consultant with very deep contacts in the universe of real estate operators and underwriting expertise at the property level. Each of the separate accounts is implemented as a “discretion in a box” mandate. The consultant serves in a role to ensure compliance with the investment criteria. Every property proposed for acquisition is presented to the consultant for review to determine if it complies with the investment criteria.

The sourcing of relationships for the separate account program is implemented through an outbound search managed by the consultant. Typically dozens of operators will apply for allocation of funds. The applicants are reduced to a short list of finalists for deeper diligence and negotiations and competitive negotiation of fees and terms.

The diligence for real estate managers is comparable to what is described for private equity firms and includes complete review of track record, organizational assessment, pipeline, background checks and reference calls. The real estate consultant reports include the SIP006 checklist confirming all required diligence has been completed.

The legal process for separate account investments is highly customized and accomplished with counsel with expertise in documenting this type of investment.

2.4.3 Commingled funds

A portion of the ASRS program will continue to be invested in commingled funds. The process for selecting, diligizing and investing in real estate commingled funds is accomplished pursuant to SIP006 and is substantially similar to the process described for private equity above.

Figure 2: ASRS Real Estate Performance Compared to ODCE

	One Quarter	One Year	Three Years	Five Years	Inception
Real Estate IRR	6.33%	14.83%	13.84%	14.33%	6.91%
ODCE IRR	3.02%	11.45%	11.38%	12.79%	6.04%

Figure 3: ASRS Current Real Estate Portfolio Compared to Legacy Portfolio

	Portfolio IRR	ODCE IRR	Outperformance
Total RE Legacy Portfolio	5.67	5.42	0.25
Total RE Current Portfolio	17.90	11.72	6.17

2.4.4 Results

ASRS benchmarks its real estate portfolio against the ODCE index. The results of the ASRS portfolio compared to the ODCE index are presented in figure 2. ASRS real estate outperformed its benchmark in every time frame and outperformed the benchmark by 0.87% on the inception IRR.

Given the the substantial structural changes in the program, we also considered the relative performance of the legacy portfolio compared to the portfolio implemented by the current management team pursuant to the processes described herein. The results of that analysis are presented in figure 3. The current portfolio outperformed its benchmark by 6.17% compared to outperformance of 0.25% for the legacy portfolio.

2.5 Private Debt

2.5.1 Background

Commencing in 2012, the ASRS strategic asset allocation provided an allocation to private debt. The ASRS investment management team has taken the lead in implementing that portfolio with support of its consultants. For reasons discussed in response to the question 4.1, this program has been implemented as a separate account program. ASRS established an initial goal to implement the program domestically as approximately 2/3 corporate debt and 1/3 real estate debt. ASRS recently expanded the mandate to include European debt and that mandate is in the process of implementation.

2.5.2 Sourcing

Private debt is an emerging asset class with far fewer managers in the market compared to private equity or real estate. Nevertheless, ASRS identified and interviewed over 50 prospective managers for potential mandates in this program.

It identified these managers through a combination of research in the Preqin database, industry networking and consultant referrals.

2.5.3 Track Record

ASRS limited its search to firms with a demonstrable track record in implementing the mandate for which it was applying. Performance in these loan origination strategies is capped at the interest rate and fees charged. So, performance evaluation is focused more on loss avoidance and the loss track record of each manager was carefully examined to determine if the manager could successfully originate and collect loans in sufficient volume to fulfill the ASRS requirement. Emphasis was placed on evaluation of recovery ratios through the global financial crisis.

2.5.4 Organization factors

Although private debt is relatively new as an asset class, ASRS focused on managers with established teams with extensive experience in their relevant markets. ASRS looked for deep organizations including capability in origination, credit and monitoring. Firms with deep origination capability have an advantage in the market. They have a direct relationship with borrowers and financial sponsors that provide them with early access to possible transactions and better ability to negotiate favorable terms in time sensitive transactions. Such firms tend to be market makers rather than takers and are in a position to syndicate larger loans to other funds retaining a portion of origination fees as additional consideration for the benefit of the ASRS account. ASRS only invested with firms with substantial credit capability with a team providing credit analysis coverage across the range of relevant markets and industries. Finally, ASRS required an active monitoring function with regular monitoring of borrower sales and cash flow and frequent borrower calls. Active monitoring plays a key role in identifying problems early and minimizing losses with problem credits.

2.5.5 Account Structure

Private Debt SMAs are implemented as discretionary accounts with a custom investment criteria stating parameters on deal structure, concentration limits, hedging requirements for rate or currency, leverage and other relevant risk factors. The accounts provide liquidity control including the ability to terminate the investment period, usually after one year. The accounts are scalable with the ability to increase (or reduce) the size of the account in accordance with ASRS goals.

2.5.6 Results

ASRS benchmarks private against the leveraged loan index plus 250bp. The results of the private debt program are shown in figure 4. The ASRS private debt inception IRR performance exceeds its benchmark by 7.64%.

Figure 4: Private Debt Performance

	One Quarter	One Year	Three Years	Five Years	Inception
Private Debt IRR	2.13%	10.51%	NA%	NA%	13.10%
Lev Loan+250 IRR	0.06%	3.60%	NA%	NA%	5.46%

Figure 5: Private Opportunistic Equity Performance Results

	One Quarter	One Year	Three Years	Five Years	Inception
Private Opportunistic IRR	12.82%	28.97%	NA%	NA%	35.24%
Absolute 8 IRR	1.96%	8.00%	NA%	NA%	8.00%

2.6 Private Opportunistic Equity

2.6.1 Background

ASRS invests in a private opportunistic equity program. This program is structured to capture equity investment opportunities that are temporal in nature due to market dislocations, assets that do not clearly fall within the mandate of a defined asset class or other special situations.

Private opportunistic equity investments are sourced and underwritten in the same manner as other investments. Generally speaking, they are categorized as either dominantly real estate or private equity in nature and assigned to a diligence process with a consultant relevant to the nature of the investment. The process for a private equity related co-investment would be the same as described in the private equity section of this paper, and similarly for real estate related opportunistic investments. All of the opportunistic equity investments have been implemented in the form of a co-investment or direct investment.

2.6.2 Results

Opportunistic Equity investments are benchmarked for reporting purposes against an absolute 8% return. The results of the private opportunistic equity investing program are presented in figure 5. The inception to date IRR on this program is 35.24%.

2.7 Farming and Infrastructure

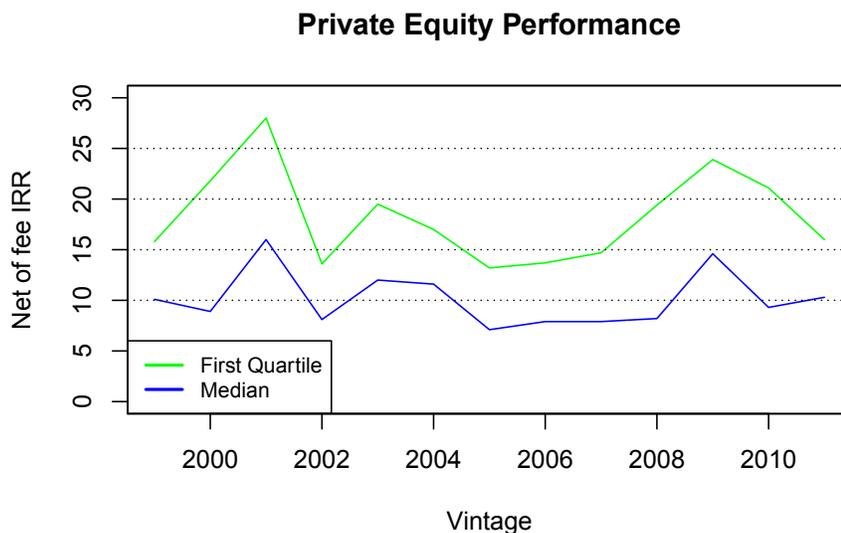
2.7.1 Background

ASRS has invested in two funds engaged in U.S. agriculture and developed markets infrastructure. The program is very new with the great bulk of the investments outstanding less than a year. The underwriting methods for this program are administered under SIP006 and are the same as those described for private equity.

Figure 6: Farming and Infrastructure Performance Results

	One Quarter	One Year	Three Years	Five Years	Inception
Farming and Infrastructure IRR	1.86%	3.86%	NA%	NA%	3.89%
CPI+350 IRR	1.12%	4.95%	NA%	NA%	4.99%

Figure 7: Comparative Private Equity Performance (Source:Preqin)



2.7.2 Results

Farming and Infrastructure investments are considered “inflation linked” assets and benchmarked against CPI+350bp. The results for this program are shown in figure 6.

3 Fees

3.1 Role of fee management and negotiation

Management of cost is one of the most important jobs in achieving a successful investment program. However, in the case of alternative assets one should be cautious about making fees the primary or driving objective when selecting investment partners. As you can see in figure 7, the difference in net of fee performance between median and first quartile private equity managers is over 500bp per year. So, an inferior manager cannot discount fees enough to compensate for performance differences.

So, the ASRS process starts with screening for consistent performance. Once

a candidate field of high performers is identified, ASRS conducts diligence on them and, after selecting firms with which it would want to have an investing relationship, it then negotiates terms and fees. ASRS works closely with outside counsel to negotiate and structure legal documents that are favorable to ASRS and include well-crafted “most favorable nation” clauses that ensure that ASRS has the best fees when compared to other investors of similar size. An investor would be at risk of adverse selection if it reversed the process and screened first on pliability of fees.

3.2 Separately Managed Accounts

3.2.1 Transition to SMAs

ASRS has transitioned a substantial portion of its alternative assets to implementation in a separately managed account (SMA) format. All but one investment in the private debt portfolio are implemented in an SMA format and plans are in place to increase the portion of real estate implemented through SMAs to approximately three-fourths over the next five years.

ASRS favors SMAs in its investing program because they have the following advantages:

- Customized investment mandate with tailored investment restrictions
- Improved liquidity by the ability to turn off investment periods or direct liquidations
- Scalable investment size with the ability to increase (or decrease) the allocation depending on performance and investment goals
- Favorable fees and terms
- In the case of real estate, ability to make direct investments with high quality operators avoiding “double promote” by going through intermediary asset managers
- In the case of private debt, ability to concentrate assets with the most capable firms

Through these programs, ASRS has initiated approximately \$5 billion in SMA relationships over the last several years.

3.2.2 Real Estate

ASRS staff and its consultant RCLCO work collaboratively to implement the real estate SMA program.

Generally, the approach is to identify a target area for investment and then conduct a search for potential managers to implement the requirement. Fees are then competitively negotiated among finalists before making a final selection. In order to compare fees, we use a model that benchmarks fees through a

standardized set of economics and then calculates a net present value fee over the life of a venture. We weight the net present value in favor of incentive fees by discounting incentive fees contingent on performance at a higher rate (8%) than the rate we use to discount guaranteed fees (4%). By doing so we rate more favorably firms who are willing to take more of their fee on at-risk basis dependent on performance.

We then compare the fees on a net present value basis across the candidates. figure 8 provides a hypothetical example of how we make that comparison. We show for each manager the composition of fees in each category and then compare the percentage of fees that are performance oriented.

The outcome of this competitive fee negotiation is that we consistently get low guaranteed fees of 50 to 75 bp, generally on invested capital only. We also negotiate favorable waterfalls that are fully crossed with no catchup. Detailed calculations comparing the asset management and performance fees are provided in a file entitled “ASRS Fee Comparison Model.xlsx” in the “Real Estate SMA Fee Analysis” folder.

Starting in mid-2015, ASRS added additional fee analysis to its process to document the evolution of fees across the negotiation and to compare those fees to market. An example redacted report is included as Appendix B.

3.2.3 Private Debt

The approach to private debt fee negotiation is very similar to what is described for real estate. For each of the mandates, we have negotiated fees in a competitive scenario with screened and well qualified asset managers. The result of this competitive negotiation is that we have achieved typical fees of 100bp on invested capital only. This is a savings of 50 to 75bp per annum on invested capital and a savings of approximately 200bp over the life of the fund because no fees are charged on committed but uncalled capital. We have purposely concentrated our allocations with individual managers to increase our leverage and negotiating power. We believe we are the largest investor (or one of the largest) with a number of managers providing substantially better negotiating leverage and resulting economics including waivers of fees on committed capital which are charged to smaller investors. Waterfalls are fully crossed, often at discounts to market terms.

3.3 Commingled Fund Investments

3.3.1 Fee management in a commingled fund context

ASRS pursues several avenues for fee reduction when it invests in commingled funds. The techniques used by ASRS in this context include:

- MFNs in side letters to ensure it receives most favorable terms for its size of investment
- Fee reductions associated with size of investment

FEE MODELING OF PROSPECTIVE MANAGERS

- **Fee Drag is Calculated for Each Manager and Compared**
- The below table illustrates total fee and promote drag from three separate account managers. This drag on performance is a critical factor in the ultimate selection of manager:

	Manager 1	Manager 2	Manager 3
Property Level Gross Return	15.25%	15.25%	15.25%
Portfolio IRR After Fees	14.12%	14.24%	14.19%
ASRS IRR After Fees, Promotes, Co-Invest	12.91%	12.92%	13.08%
Reduction from Fee/Promote Impact	2.34%	2.33%	2.17%

- Along with total drag on investment IRR returns, we also seek to understand the total dollar amount of fees paid to the manager, especially on a net present value (NPV) basis.
- Furthermore, we attempt to structure fees and promotes in such a way that aligns interest between the manager and ASRS. This is done in part by tying fees and promotes to performance of the investment itself. The following chart illustrates this:

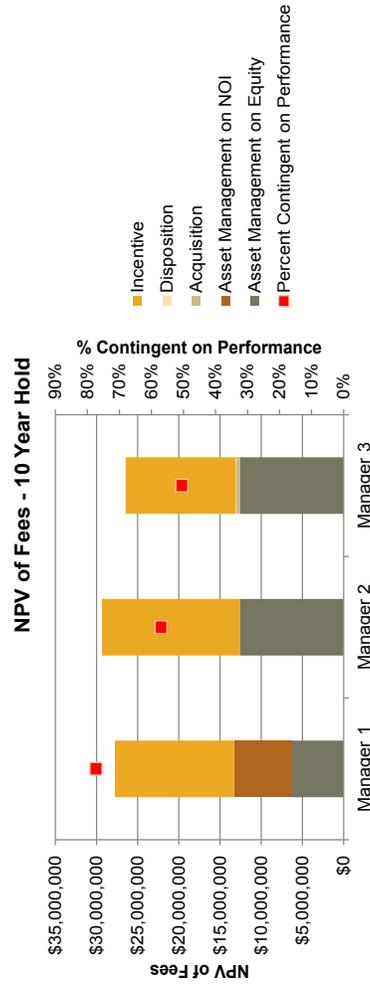


Figure 8: Fee Comparison example

- Fee reductions for first close
- No or reduced fee co-investments

3.3.2 Reduction for size of investment or first close

ASRS regularly receives reductions for size of investment or participation in a first close. In the real estate portfolio, we negotiated substantial discounts as a first closer in two different core property funds. In private debt, we negotiated a 40% reduction to less than 50bp for asset management for a core debt fund (the only commingled investment in the private debt portfolio).

3.3.3 Co-investments

Participation in co-investments is a powerful tool for fee reduction which we have used in in our private markets portfolios. ASRS has been an active co-investor, committing approximately \$600 million to co-investments since its first co-investment in 2011. ASRS policy in co-investments has been to invest in relatively concentrated positions where it feels it can conduct adequate diligence and has high conviction both in the sponsor and the opportunity. ASRS does not devote effort to co-invest opportunities if there is an inadequate time frame for diligence or the potential scale of the investment is less than \$10 to \$20 million.

Some observers have noted that co-investments have been a two edged sword for many institutional investors. On the one hand, they average down fees, but on the other performance has been inconsistent, sometimes putting a drag on performance.

ASRS has been highly selective and disciplined with its co-investment program. Not only have we achieved fee reduction, but the co-investments have been quite accretive to overall performance. The combined IRR on co-investments has been over 30%.

As noted above, the SEC has taken an interest in certain aspects of co-investment programs. It is unclear whether SEC actions will impact ASRS ability to participate in co-investments or the cost of doing so.

4 Monitoring

4.1 Background

ASRS closely monitors its private markets investments through the combined efforts of the ASRS team, the back-office provider, the investment consultants and the ASRS external auditor.

4.2 Roles and Responsibilities

4.2.1 ASRS Staff

The ASRS team performs the following functions to monitor investments

- Prepare various reports including
 - monthly portfolio report outlining portfolio composition and most recent reported performance
 - quarterly performance chart pack including PME analysis
 - annual reports to the Investment Committee
- Ongoing investment accounting
 - Accounting related to capital calls, distributions and reported NAVs
 - Quarterly reconciliation of cash flows to capital account statements
 - Review financial statements to ascertain fees charged by each manager in order to compile schedules required for quarterly and annual financial statements
- Prepare the Comprehensive Annual Financial Report which includes
 - an investment section describing private markets investments
 - a summary of asset management fees and incentive fees paid to private markets asset managers
- Attend quarterly update calls for all SMAs
- Participate in annual meetings or ASRS office face-to-face meetings with a goal of an in-person meeting with each sponsor once per year
 - In the case of real estate SMAs, an annual meeting is held at the location of a property holding in the account
- Participate on advisory boards when applicable

4.2.2 The Back-Office Provider

ASRS retains the services of a back office provider in the implementation of the private markets program. Duties of the back-office provider include maintaining the official book of record for the investments, calculation of returns, processing of capital calls, maintaining a data base of reports from managers, and preparing periodic reports to the ASRS.

4.2.3 Investment Consultants

Duties of the investment consultant include:

- Validating all capital calls
- Compliance reports
 - Annually for all SMAs
 - On a rotating basis for commingled investments
 - Contents of the compliance
 - * Review of valuation policy
 - * Review of fee calculations including assets management (net of offsets) and incentive fees
 - * Review of expense policies to determine that expenses allocated to the fund or portfolio companies are appropriate under the partnership agreement and consistent with the general partner's responsibilities
- In the case of real estate SMAs
 - Review all investments for compliance with the investment criteria
 - Maintain a dynamic risk management system to monitor and forecast risk characteristics (location, property type, life cycle stage) of the portfolio
 - Prepare monthly reports including portfolio composition, occupancy trends, sales trends, leverage analysis, construction status and investment pipeline
 - Review quarterly financial statements at the property and SMA level
 - Review standardized monitoring templates prepared quarterly by the asset manager for every property
 - Attend the quarterly update call with the manager and ASRS
 - Prepare semiannual asset management reviews for the private markets committee
 - Attend the annual meeting with the manager and ASRS
 - Review annual budgets and business plans
 - Annual update of project pro formas for all assets to monitor cash flow and risk characteristics
 - Review of appraisals to determine if appropriate appraisal methodology has been used
 - Review ancillary fees for consistency with market when required under contractual terms

4.2.4 External Auditor

The external auditor on a sampling basis reviews individual investments to verify that appropriate financial statements and other records exist for each investment, the capital account is reconciled to the financial statements and with respect to a sample of new investments that appropriate diligence procedures were followed and appropriate legal documents are executed memorializing the investment. The external reviews schedules in the CAFR, including schedules disclosing asset management and incentive fees paid to private investment partnerships.

4.3 The Reporting System

4.3.1 The back office provider quarterly reports

The back office provider prepares a quarterly report of portfolio composition and performance for each of the private markets asset classes. The composition of the portfolio is presented in relevant categories of geography, industry, property type and other categories as appropriate for the portfolio. This is the official record of the investment and is used in calculating total fund performance and asset values.

4.3.2 ASRS internal website

ASRS has developed the technology to download data from back office provider on a real-time basis, updated weekly as a matter of practice, and automatically generate an HTML formatted report for each fund showing its cash flow, NAV trend and most recent performance statistics. The results of this are posted to an internally hosted website to facilitate navigation and access to individual fund statistics. On a quarterly basis concurrently with each quarter closing accomplished by back office provider, ASRS reconciles the contents of its internal database used for the website with the back office provider to ensure accuracy and consistency.

4.3.3 Monthly reports

Each month ASRS prepares a report for the private markets committee summarizing most recent data on fund cash flow, NAV and performance. This report is generated automatically from the same database as used for the website.

Additionally, the real estate investment consultant prepares a monthly report for real estate SMAs as described in section 4.2.3

4.3.4 Quarterly chart pack

The back office provider is unable to provide PME calculations. Each quarter, ASRS prepares a performance chart pack showing the performance of private markets assets calculated on a PME basis. This report is generated automatically from the same database as used for the website.

4.3.5 Annual Asset Class Review

Each year an asset class review presentation is made to the investment committee for each of the private markets asset classes.

4.3.6 Comprehensive Annual Financial Report

Each year the ASRS produces an audited Comprehensive Annual Financial Report. This report includes a section describing investments, including private markets, and schedules detailing asset management and incentive fees paid on private markets investments.

4.3.7 Compliance Reports

In connection with compliance reviews, the investment consultants will prepare compliance reports confirming that they have reviewed asset management and incentive fee calculations including any related offset provisions, valuation policies and expense policies. The consultant will note any deficiencies found as a result of this review. In the case of real estate SMAs, an appraisal review report stating a conclusion about the appropriateness of the appraisal methods used.

5 Discussion of Adequacy and Effectiveness of ASRS processes

We will conclude this paper by revisiting concerns mentioned initially. We present a series of questions and answers deriving from those concerns.

5.1 Is ASRS sourcing and diligence of investments adequate and effective?

In order to assess the adequacy of our sourcing and diligence practices, we look to the literature of the Chartered Alternative Investment Analyst Association (CAIA). This association provides education and to certify individuals for expertise in alternative investments. The CAIA level two provides advanced training in alternative investments. The CAIA materials¹¹ describe a sourcing and diligence process that includes the following:

- Strategy formulation
- Sourcing and Screening
- Performance analysis
- Team assessment

¹¹Keith Black, Donald Chambers and Hossein Kazemi. 2012. *CAIA Level II: Advanced Core Topics in Alternative Investments*. Second Edition. John Wiley & Sons. Chapter 9.

- Comparative evaluation
- Legal diligence and negotiation

ASRS fulfills all these functions through its processes. It uses strategic plans and annual implementation to provide structural and thematic direction to the investment program. Through SIP006, ASRS clearly delineates roles, responsibilities, delegation of authority and processes for the completion of investments. ASRS has implemented proactive sourcing programs through database search and industry networking to identify leading firms for implementation of the strategies it has chosen. ASRS is an industry leader in performance evaluation implementing all standard methods (TVPI, IRR and loss ratio) and more sophisticated PME measures years ahead of more general adoption by other practitioners. In its team assessment practices, ASRS goes beyond standard assessment of team stability to a dynamic assessment of team evolution in a growing and successful organization. ASRS sourcing practices are usually successful in identifying multiple qualified candidates for a given assignment ASRS compares and conducts a comparative evaluation of those firms in making a final selection. ASRS employs expert attorneys to lead the document negotiation process on terms negotiated by the investment team.

We assess the effectiveness of these efforts by considering results. As reported above, the private debt and private opportunistic equity portfolios both substantially outperform their benchmark, as does the non-legacy portion of the real estate portfolio which was implemented by the current management team using these methods. The private equity portfolio exceeds the Burgiss benchmark of private equity investments. The farming and infrastructure investments trail their benchmark but this investment is very new with the bulk of capital deployed in the fourth quarter of 2014.

5.2 Does ASRS manage its fee negotiations effectively?

Managing cost is an extremely important part of any successful investment program. However, fee negotiations need to be put in perspective. Reduced fees make a good investment better but cannot make a bad investment good. The ASRS sourcing and diligence process is usually successful at identifying multiple highly qualified managers for a given mandate and ASRS negotiates fees and terms only with such managers in a competitive context.

ASRS is transitioning its private markets investment program to where approximately 50% of private assets will be invested through separate accounts or co-invests. By investing in larger scale with asset managers we are able to achieve significant fee savings compared to market terms in fund investments. When ASRS invests in commingled products, it negotiates most favored nation clauses to make sure it receives the most favorable terms available based on the size of its investment.

5.3 Does ASRS adequately monitor its investments?

To answer this question, we again look to the CAIA literature¹² for industry standards in monitoring. This literature identifies the following goals for monitoring:

- Performance measurement and reporting
- Risk monitoring
- Compliance monitoring
- Support in reinvestment decisions
- Liquidity planning

5.3.1 Performance measurement and financial reporting

ASRS in collaboration with its back office provider monitors and reports on fund values. Performance is measured using traditional measures of time weighted returns, IRR, and TVPI and compared to relevant benchmarks. Additionally, ASRS calculates and monitors PME measurements for comparison of fund performance across different market environments. ASRS accounting staff reconcile reported NAVs and cash flows to ensure accuracy of financial presentation.

ASRS accounting staff review investment partnership financial statements to determine the amount of fees paid. All ASRS private markets investments require annual audited financial statements. The amount of fees paid in an investment is a required accounting disclosure and this information is available in the partnership financial statements. This information is compiled and the amount of asset management and incentive fees paid in each portfolio is reported in the ASRS Comprehensive Annual Financial Report and certain reports to the board.

5.3.2 Compliance and risk monitoring

ASRS has implemented a compliance review process for its private markets investment program. The investment will review investment partnerships to (a) determine if asset management fees including any required offsets and incentive are calculated in accordance with partnership terms, (b) review valuations policies to determine if they are appropriate and (c) review expense allocation policies to determine if appropriate expenses are being absorbed by the manager in consideration of the asset management fee and not charged to the fund or portfolio holdings of the fund. Under this review program, separate accounts are reviewed every year and commingled investments are reviewed on a rolling basis such that at least 50% of private markets NAV is reviewed each year.

This information coupled with reviews by external auditors gives ASRS confidence that appropriate valuation methods are being used on its private markets

¹²Black, Chambers and Kazemi (2012). Chapters 10-12.

portfolio. Coupled with reports from the back office provider and various consultants, ASRS is able to monitor the composition of its portfolio in risk categories relevant to the type of investment. In the case of real estate separate accounts, a separate consultant report is prepared on every asset to confirm it complies with the investment criteria for the account.

ASRS monitors compliance with the partnership agreement on key economic matters of fee calculations and expense allocations.

5.3.3 Support in reinvestment decisions

ASRS investment staff build an active relationship with their managing partners through participation in regular calls, annual meetings and where applicable advisory boards. This contact helps ASRS deepen its understanding of the manager's organization and business practices which is extremely valuable in making reinvestment decisions. By building relationships across multiple investments, ASRS increases its access to co-investment opportunities.

ASRS requests the opportunity to review and potentially participate in co-investments with all its partnerships. ASRS has been an active co-investor completing about \$600 million in commitments to co-investments since it began its co-investment program in 2011.

The SEC has indicated they plan to review co-investment policies as part of its regulatory effort to ensure equitable access and fair allocation of expenses. It is unclear how this effort might impact ASRS.

5.3.4 Liquidity Planning

ASRS models its commitments and forecasts cash flow and NAVs in its annual pacing studies. The purpose of this modeling is to help ensure that the exposure to the asset class falls within the range established for it in the strategic asset allocation. Annual commitment levels to new investments are adjusted as necessary based on the results of these studies.

6 Has ASRS addressed the concerns raised in the press and by the SEC?

At the outset, we noted criticism of private assets investments in the financial press and by the SEC. The concerns were summarized as follows:

- Criticism of the diligence methods of investors and their consultants
- Inadequate transparency on fees
- Misallocation of expenses among the asset managers and portfolio companies or parallel vehicles
- Favoritism among partners in allocation of co-invest cost and opportunities.

We believe that ASRS processes address these concerns. Our diligence processes meet all the standards of the industry as reflected in CAIA literature and in many cases exceed them. We are transparent on fees and report the amount paid in our comprehensive annual financial report and in certain board reports. We are cognizant of the risks of financial sponsors misallocating expenses to their investment partnerships and have commenced a program to research and monitor this. ASRS is an active and successful co-investor and proactively seeks out co-investment opportunities with its partners.

7 Concluding Remarks

The additional sunshine of securities regulation under Dodd-Frank has been a positive development for private markets investors. The required disclosures and SEC examinations are forcing sponsors to improve disclosure and reconsider expense allocation and other practices to delivery value for the fees they charge.

The information from these required disclosures is shedding light on previously opaque practices. Perhaps ironically, the availability of this information through SEC filings has led to negative coverage in the press. So, the level of criticism has increased even as the processes of the SEC are expected to lead to improvements.

ASRS has implemented a private markets investment program with industry leading practices in sourcing, diligizing and monitoring investments. This has led to a successful program with favorable risk and return characteristics. In light of recent disclosures from increased SEC regulation, ASRS has taken steps to enhance its monitoring program to ensure it has the information it needs on fees and expense allocations to continue to make effective investment decisions.

**A Investment Manager, Partner, and Co-Investment
Selection and Diligence (“SIP006”)**



Investment Manager, Partner, and Co-Investment Selection and Oversight

Purpose:

To codify the policy to be utilized for the selection of public market and private market investment managers and partners. Throughout the remainder of this policy the term *investment manager* will refer to both public and private market investment managers and partners.

Policy:

The ASRS will establish and follow an Investment Manager, Partner, and Co-investment Selection Policy that will govern the process and activities regarding the selection of ASRS investment managers.

The process is outlined as follows:

1. Opportunity Set - Sourcing

The primary responsibility for sourcing investment managers and co-investments resides with the Investment Management Division (IMD). In addition, any other party, specifically including Director, ASRS investment consultants (both staff extension consultants as well as the general consultant), and ASRS trustees may communicate investment manager recommendations or opportunities to either the Director or Chief Investment Officer (CIO).

2. Opportunity Set - Screening

The CIO or designee will determine if the investment manager recommendations or co-investment opportunities deserve further internal or external due diligence resource allocation. This determination will be based upon the merits of the opportunity under consideration, within the context of:

- ASRS strategic asset allocation;
- IMD Investment House Views;
- Investment manager organization structure;
- Investment manager investment strategy, terms and structure; and
- ASRS investment priorities.

3. Analysis and Due Diligence

IMD staff will provide expertise in, and project-manage, the investment manager analysis and due diligence process. This process will include the development of a comprehensive due diligence packet which will be developed by staff extension consultants, IMD staff, or a combination of both. The CIO will determine which staff-extension consultants will be utilized and the related scope-of-work and product deliverables.

The due diligence packet will include sufficient information to ensure the manager has been properly vetted and enable the asset class committee to make an informed decision, and will include but not be limited to the following information, when relevant to the manager:

1. Organization
2. Staff
3. Strategy
4. Terms
5. Performance
6. Risk
 - a. Investment Risk Management
 - b. Operational Risk Management
7. Disclosures
8. Miscellaneous

As applicable, public markets managers and private markets managers may have additional factors included.

The full list of due diligence packet contents can be found in Appendix I.

Decision to hire an investment manager should primarily be evidence-based and based on a reasonable expectation of their ability to add value to ASRS investment goals and objectives. Evidence typically includes empirical data, historical statistical analysis, risk-adjusted return metrics, and risk measures (ex., alpha, beta, r-squared, standard deviation, and Sharpe ratio) in combination with a forward-looking confidence in the strategy and its theoretical logic.

The analysis and due diligence of co-investments, whereby ASRS has the opportunity to participate in a pending investment to be made by a manager of a fund or account, will be evaluated through a process as described in Appendix II.

4. Asset Class Committee Meetings – Decision Making

The CIO will determine which Asset Class Committee (Public Markets or Private Markets) is the appropriate forum to discuss the investment manager under consideration and work with IMD staff regarding the meeting dates for respective Committees.

The due diligence packet will be disseminated to the relevant Committee membership prior to the meeting in order to allow members sufficient time to review and prepare for the meeting.

The ASRS general investment consultant and Internal Audit (IA) will be notified of each Public Market Committee and Private Market Committee meeting and will be provided an agenda and due diligence packet in advance for each meeting in order to allow them sufficient time should they wish to attend or ask questions. The ASRS general investment consultant and IA may attend any Public Market Committee or Private Market Committee meeting.

Asset Class Committees will be comprised of the Director, CIO and one or more IMD portfolio managers as determined by the CIO based upon related skills and knowledge and, as applicable, staff-extension consultants.

Voting members of the Committee include the Director, CIO and one or more IMD portfolio managers. Investment manager selection decisions require the consensus of both the Director and CIO.

As applicable, the ASRS Procurement Officer will distribute Confidentiality and Disclosure forms to IMD staff, which will be completed and returned prior to commencing the meeting.

5. Post-Committee Meeting Documentation and Dissemination

Asset Class Committee meeting minutes will be prepared by IMD staff, which will include the agenda and motions or directives and decisions made by the Committee. The meeting minutes will be disseminated to voting Committee members for review and approval. Once approved, the minutes (which may be marked as confidential and non-public) will be disseminated to the Investment Committee (IC) Trustees, ASRS general investment consultant, and IA.

6. Governance Oversight

The ASRS general consultant will conduct an independent review, at least annually, of the process to determine compliance with the Policy and Appendix A, and that the investment recommendation is consistent with ASRS Strategic Asset Allocation Policy targets/ranges, House Views and, as applicable, investment programs' pacing and implementation plans. The general consultant will use the following information and resources to help make their determination: investment due diligence packet; Committee meeting minutes and motions and other presentation materials; general and specific market knowledge of the investment, and discussions with the Director, CIO, or Portfolio Managers.

If the general consultant does not believe that the Policy and Appendix are being followed, or that a prudent decision is being made, they shall contact any or all of the following parties: Board Chair; Investment Committee Chair; Chief Internal Auditor; Director.

As standard operating procedure, the CIO will keep the IC informed of the selection and termination decisions made regarding investment managers.

During each external audit, the external financial auditor will review this policy and conduct a sample process review or audit to determine possible omissions or violations, and report such omissions or violations to any or all of the following parties: Board Chair; Investment Committee Chair; Chief Internal Auditor; Director, and may include such findings in their monthly investment compliance report which resides in the Director's section of the Board packet.

7. Post-Investment Manager and Co-Investment Selection Monitoring

Public and private investment managers and co-investments are monitored by various functions performed by the CIO, IMD staff, ASRS custody bank, general consultant, staff extension consultants and other service providers and reported to the Asset Class Committees, IC and Board.

ASRS custody bank provides look-through Committee on Uniform Security Identification Procedures (CUSIP)-level capabilities for separate account public manager portfolios and generates various customizable reports on holdings, risk, and returns. IMD staff uses this and other information from a third-party research providers as the basis for staff's quarterly conference calls with the managers to review performance, attribution, and consistency of process and decision-making, and other matters related to firm personnel, Assets Under Management (AUM), and operations.

For private investments, ASRS external back-office provider calculates performance measurements as well as other services such as: document warehousing, administers ASRS approval capital calls and distributions, and various aggregate program and individual fund level reports. IMD staff may use this information in their calls, meetings, and correspondence with managers and their participation at limited partner advisory committees of which we are members.

IMD staff also provides timely private market program information such as portfolio performance, portfolio news, detail fund activity and pacing activity to the Private Markets Committee

With respect to ASRS Real Estate Strategic Manager program, staff extension consultants provide operational and an investment oversight functions that ensures that each proposed investment is in compliance with contracted investment criteria, i.e., investment type, underwriting, leverage, etc. and that, subsequent to purchase, investments are monitored on an ongoing basis.

On a quarterly basis, ASRS general consultant generates an investment performance reports containing information about both public and private managers. IMD staff and the general consultant provides asset class presentations to the Investment Committee which includes performance measurement relative to the mandate's benchmarks as well as select risk and return metrics relative to peers, and a qualitative review of the manager.

The due diligence packet will include sufficient information to ensure the manager has been properly vetted and enable the asset class committee to make an informed decision and include, but not be limited to the following information when relevant to the manager:

1. Organization

- a. History of the firm
- b. Firm ownership
- c. Office location(s)
- d. Strategy offerings and capabilities
- e. Staff allocated across and/or between strategies
- f. Assets Under Management for the firm

2. Staff

- a. Team background/biographies
- b. Organizational responsibilities
- c. Operational capabilities
- d. Technical resources
- e. Key additions/subtractions to team

3. Strategy

- a. Description of investment strategy and/or philosophy
- b. Idea sourcing resources
- c. Research sources: in-house and external
- d. Decision-making process
- e. Staff allocated to the strategy
- f. Asset under Management (AUM) for the strategy
- g. Comparison with other strategies

4. Terms

- a. Fees
- b. Fee structure
- c. Vehicle structure
- d. Benchmark definition

5. Performance

- a. Historical rates of return (public markets)
- b. Multiples of invested capital return (private markets)
- c. Internal rates of return (private markets)
- d. Peer manager universe criteria
- e. Comparative returns versus peers and/or prior funds
- f. Historical quartile ranking analysis

6. Risk

- a. Investment Risk Management

- i. Risk metrics
 - ii. Portfolio limitations
 - iii. Portfolio characteristics
 - iv. Portfolio diversification
 - b. Operational Risk Management
 - i. Personnel turnover
 - ii. Information security
 - iii. Internal controls
 - iv. Regulatory oversight
 - v. Legal inquiries/investigations
- 7. Disclosures**
- a. Placement agents
 - b. Conflict of interest
- 8. Miscellaneous**
- a. Integration of strategy with other ASRS mandates
 - b. Strategic relationship role of manager with ASRS
 - c. Composition of current investors in the strategy
 - d. Analysis of competing managers and firms

As applicable, also assess public markets managers and public markets managers for:

Public Markets

1. Terms

- e. alpha and tracking error targets
- b. Most-favored nations clauses

2. Investment Risk

- a. Portfolio turnover
- b. Correlation to benchmark
- c. Correlation to peers
- d. Volatility of returns
- e. Risk adjusted return metrics

Private Markets

1. Terms:

- a. Investment time horizon and total fund term
- b. GP commitment
- c. Co-investment policy
- d. Key man provision
- e. No-fault termination
- f. Recall/recycle provisions

2. Operational risk:

- a. Legal structure
 - b. Placement agent disclosures
 - c. GP reference checks
- 3. Investment risk:**
- a. Fund leverage
 - b. Portfolio company references
 - c. Fund Opportunity SWOT Analysis

Appendix II

For co-investments, whereby ASRS has the opportunity to participate in a pending investment to be made by the manager of a fund or account, the analysis and due diligence process will be as follows:

Debt Co-Investment Opportunities:

When evaluating debt co-investment opportunities, IMD staff and the Asset Class Committee will focus on portfolio and ASRS Total Fund construction considerations, while the merits of a particular investment will be determined by the investment manager of the fund. IMD staff will review a due diligence packet for the co-investment opportunity provided by the investment manager to determine its suitability with respect to portfolio and Total Fund considerations including but not limited to the following:

- The size of ASRS' commitment to the fund,
- The overall portfolio concentration (ex. industry, geographic etc.) of the fund,
- The fund's investment guidelines, and
- ASRS Total Fund considerations.

For suitable co-investment opportunities, IMD staff will prepare a memo summarizing its conclusions and submit it to the appropriate Asset Class Committee, along with the due diligence packet provided by the manager, to obtain approval.

Equity Co-Investment Opportunities:

Due to the higher risk associated with equity investments, equity co-investment opportunities require confirmatory due diligence by IMD staff and/or staff extension consultants. The primary due diligence will be performed by the financial sponsor. Staff or the extension consultant will perform additional diligence to confirm that appropriate diligence has been done by the sponsor and to confirm that the major results of the diligence reasonably support the investment thesis and metrics. The scope of such confirmatory diligence will be determined on a case by case basis by the CIO in consultation with the portfolio manager for the project.

B Example of Real Estate Fee Analysis

MgrX Fee Analysis

Background

ASRS is considering a SMA partnership relationship with MgrX to pursue real estate investments in the United States. This paper analyzes fees in this partnership, the fee negotiation process and compares the fees to market fees.

Discussion of Market Fees

Market Fees for real estate investment and asset management services are fees charged by well-qualified asset managers to provide these services. ASRS generally would only consider a manager qualified if it has raised at least two and usually several prior funds, has earned above average returns and is able to raise a fund of at least \$1 billion.

Based on a review of the Preqin database and our own experience, we believe market fees for such managers include an asset management fee component and an incentive fee component. Based on our experience, asset management fees range from 1.25% to 2% and we believe that 1.5% is a reasonable estimate of the asset management fee for an investor of ASRS scale. Incentive fees are more standardized with an incentive fee of 20% of profit above an 8% hurdle with a 50% catchup being the norm.

Starting in 2011, it has been ASRS policy to redirect real estate investments to separate accounts in order to achieve reduced fees, among other benefits. This analysis will demonstrate the savings from this method.

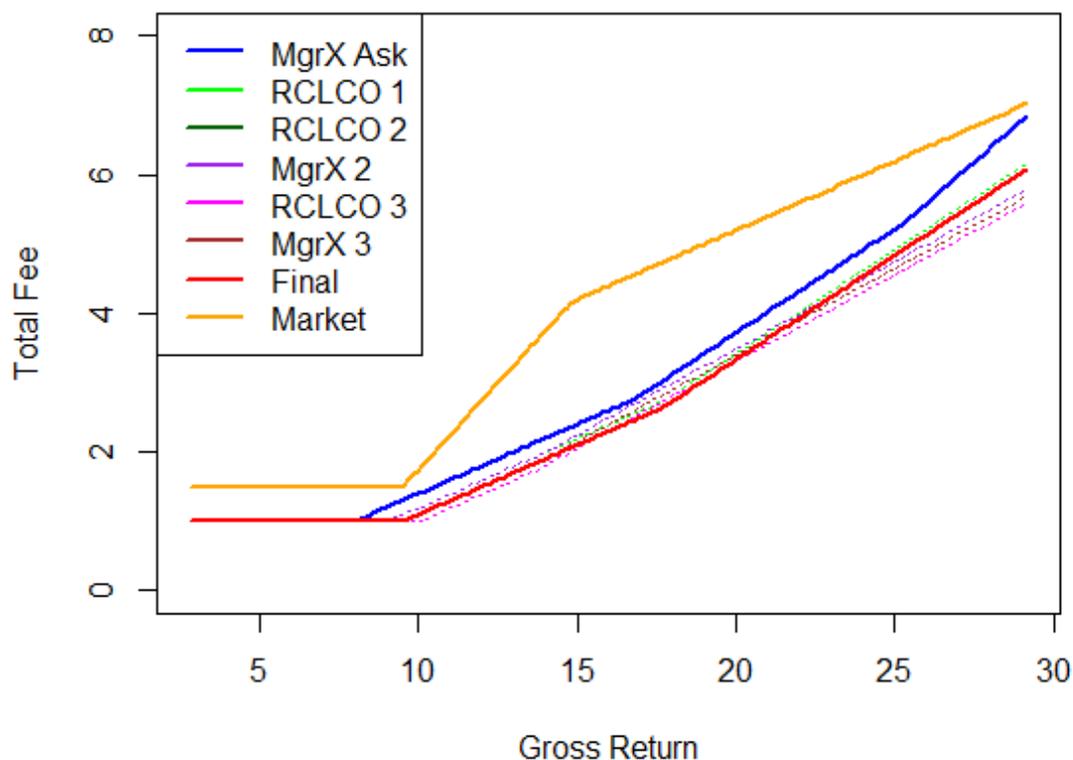
Negotiations with MgrX

ASRS policy is to engage extensive negotiations with its managers in order to achieve favorable final negotiated fees which reduce costs to ASRS, are structured to align interests and motivate the manager to high performance.

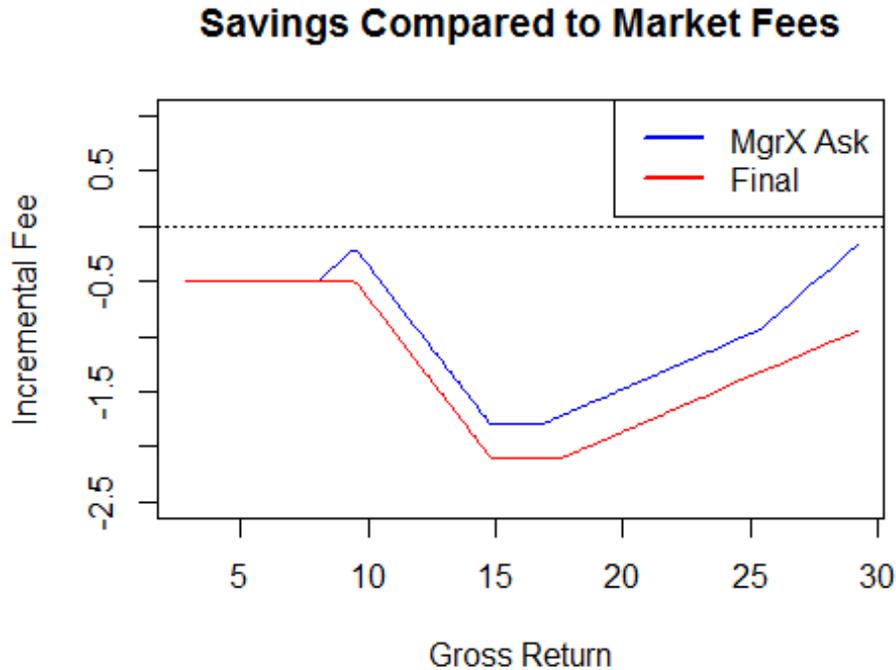
The following chart shows the evolution of fee negotiation with MgrX through a sequence of seven offers and counter-offers leading to the final negotiated result. This chart also shows Market Fees as describe above.

Description	MgrX Ask	RCLCO 1	RCLCO 2	MgrX 2	RCLCO 3	MgrX 3	Final	Market
Tier 1 Hurdle	7%	8%	9%	8%	9%	8.5%	8.5%	8%
Tier 1 Promote	20%	20%	20%	20%	20%	20%	20%	20%
Tier 2 Hurdle	14%	15%	12%	12%	12%	12%	15%	NA
Tier 2 Promote	30%	30%	25%	25%	25%	25%	30%	NA
Tier 3 Hurdle	20%	NA	NA	NA	NA	NA	NA	NA
Tier 3 Promote	40%	NA	NA	NA	NA	NA	NA	NA
Catchup	none	none	none	none	none	none	none	50%
Asset Mgmt	1%	1%	1%	1%	1%	1%	1%	1.5%

A comparison of the various fee proposals across a range of return is shown in the following graph. These graphs present a single year arithmetic return to illustrate the dynamic of the structure.



The savings of the final negotiated fees compared to market and the manager's initial ask position are shown in the following graph, again showing sensitivity to a range of potential returns in a single year arithmetic return context.



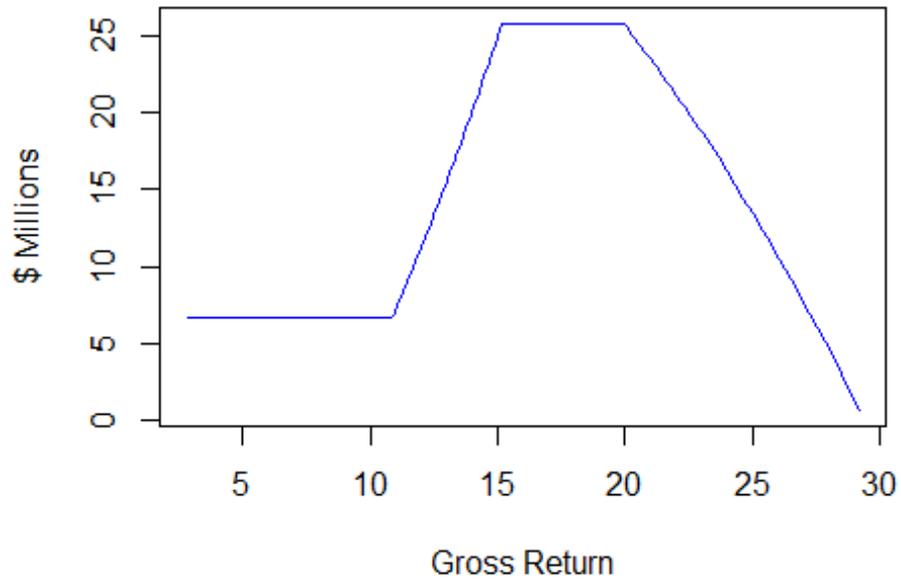
Calculation of Savings from Negotiated Fees over a fund life

The proposed investment with MgrX involves a \$200 million commitment and it is anticipated that this money will be invested over approximately three years. While these assets are intended for long term hold, for purposes of this analysis we assume a eight year hold to make it comparable to a typical weighted average fund life.

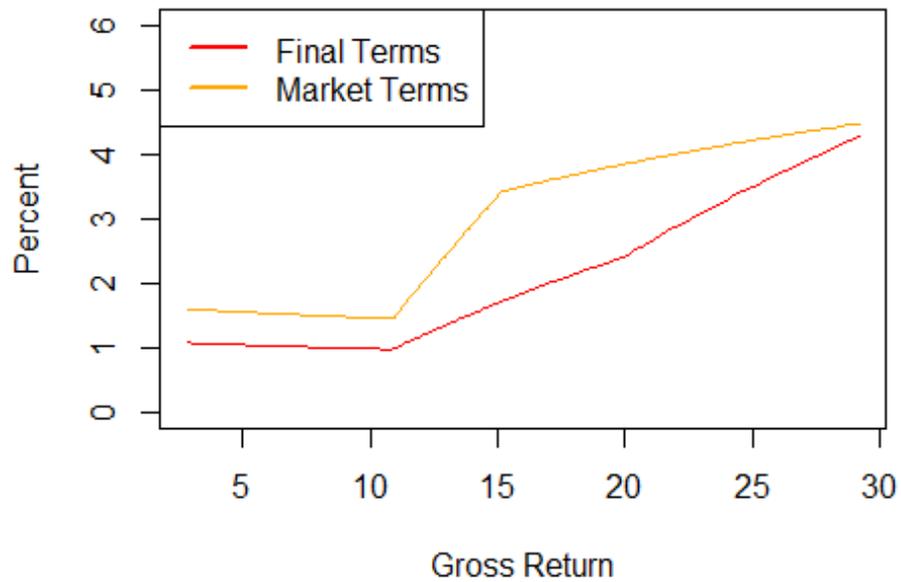
We measure fees on a net present value basis discounting non-contingent fees at 4% and discounting contingent incentive fees at 8%.

The following two graphs show the net present value savings in fees from the final negotiated deal compered to market terms and a comparison of fee drag in the two structures. These graphs illustrate computations of compound returns over the eight year assumed time frame, taking in to account fees on committed capital and the timing of payment of fees and promote.

NPV Savings of Final Terms compared to Market



Reduction in IRR due to Fees

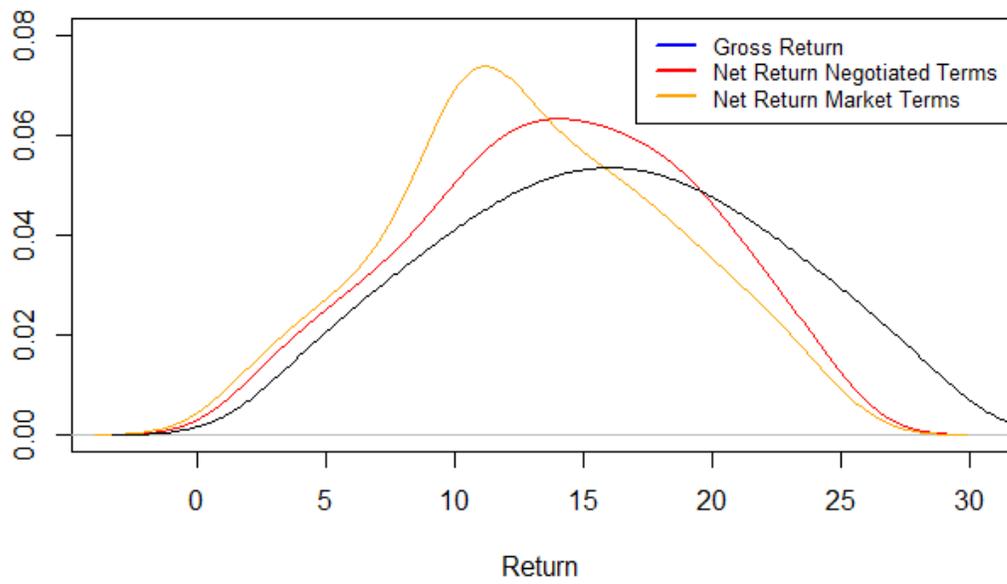


Expected Values of Returns and Fee Savings

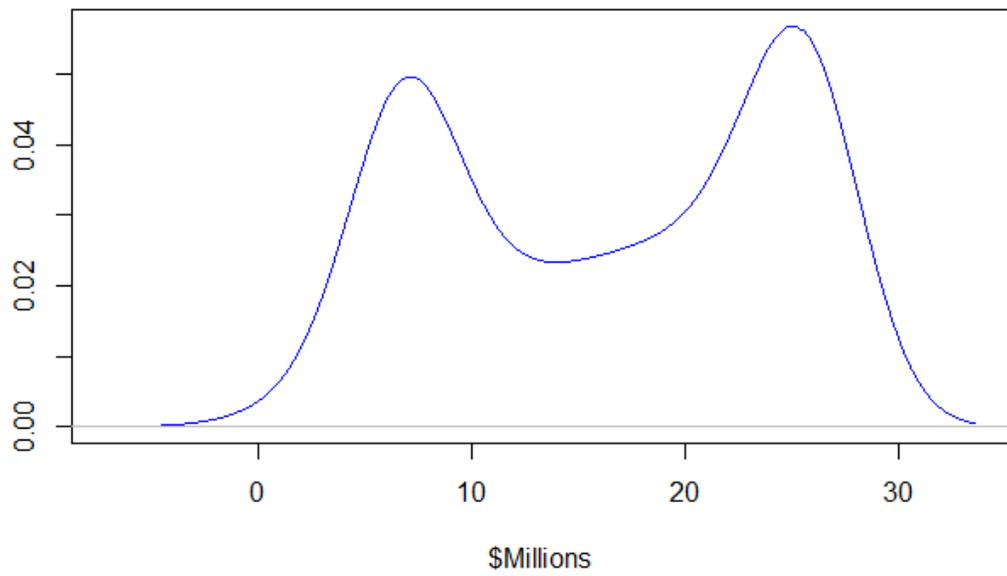
Assuming the gross returns are normally distributed with a mean 16% and a standard deviation of 8%, the following two graphs show the probability density function of gross and net returns and fee savings of the negotiated terms versus market.

The median net return under the negotiated terms is 14.15%. The median net present value fee savings is \$17.52 million.

Distribution of Returns



Distribution of NPV Fee Savings



**Confidential Materials
will be provided to the
Board at the meeting
and not included in
this book.**