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

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
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EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

AGENDA

NOTICE OF A PUBLIC MEETING OF THE
ARIZONA STATE RETIREMENT SYSTEM (ASRS)
INVESTMENT COMMITTEE

3300 North Central Avenue
14th Floor Conference Room
Phoenix, Arizona 85012

Monday, November 30, 2015
2:30 p.m.

Pursuant to A.R.S. § 38-431.02, notice is hereby given to the members of the Arizona State Retirement System (ASRS) Investment Committee (IC) and to the general public that the ASRS Investment Committee will hold a public meeting November 30, 2015 beginning at 2:30 p.m., in the 14th Floor Conference Room of the Arizona State Retirement System office, 3300 North Central Avenue, Phoenix, Arizona. Trustees of the Committee may attend either in person or by telephone conference call.

This is a regularly scheduled meeting of the Investment Committee; however, due to possible attendance by other ASRS Board Trustees, this meeting may technically become a meeting of the Board or one of its Committees. Actions taken will be consistent with Investment Committee governance procedures. Actions requiring Board authority will be presented to the full Board for final decision.

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 Committee Administrator.

This meeting will be teleconferenced to the ASRS office in Tucson, 7660 E. Broadway Blvd., Suite 108, Tucson, AZ 85710. The conference call to Tucson will be disconnected after 15 minutes if there are no attendees in the Tucson audience.

The Agenda for the meeting is as follows:

1. Call to Order; Roll Call (estimated time 4 min.)..Mr. Tom Connelly
Chair, Investment Committee

2. Approval of Minutes of the October 26, 2015 Investment Committee Meeting (Action item; estimated time 1 min.)..Mr. Tom Connelly

3. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates (Informational and discussion item; estimated time 20 min.) .... Mr. Gary Dokes
   .... Mr. Dave Underwood
   .... Mr. Al Alaimo
   Portfolio Manager of Fixed Income, ASRS
   .... Mr. Karl Polen
   Head of Private Markets Investing, ASRS
   .... Mr. Eric Glass
   Portfolio Manager of Private Markets, ASRS
   .... Mr. Kien Trinh
   Assistant Vice President, Risk Services, State Street Investment Analytics
   a. ASRS Fund Positioning
   b. IMD Investment House Views
   c. Asset Class Committee (ACC) Activities
   d. Fund Repositioning, Research, Projects & Initiatives
   e. State Street Risk Reports

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(2) and A.R.S. § 38-718(P) notice is hereby given to Trustees of the ASRS Investment Committee and the general public that the ASRS Investment Committee may vote to go into executive session, in the event specific manager data is discussed that is deemed confidential/non-public information. The executive session will take place in the 14th floor conference room.

4. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program - Includes Total Fund and Investment Performance Report Q3-15 (Informational and discussion item; estimated time 20 min.) .... Mr. Allan Martin
   Partner, NEPC
   .... Mr. Dan LeBeau
   Consultant, NEPC

5. Presentation, Discussion, and Appropriate Action Regarding ASRS Inflation-Linked Asset Class (Informational and discussion item; estimated time 20 min.) .... Mr. Gary Dokes
   .... Mr. Karl Polen
   .... Mr. Eric Glass

6. Presentation, Discussion, and Appropriate Action Regarding Proposed Modifications to the ASRS Plan and Long Term Disability Existing Strategic Investment Policies (SIPs) and Newly Created SIPs for the ASRS System *(*Action item: estimated time 20 minutes*)..............*
   .... Mr. Paul Matson
   Director, ASRS
   .... Mr. Gary Dokes
   .... Ms. Lupita Breland
   Portfolio Analyst, ASRS

7. Presentation, Discussion, and Appropriate Action Regarding the IC Meeting 2016 Schedule (Action item; estimated time 10 min.) .... Mr. Tom Connelly
   .... Mr. Gary Dokes

8. Request for Future Agenda Items (Informational and discussion item; estimated time 5 min.)
   ....Mr. Tom Connelly
   ....Mr. Gary Dokes

9. Call to the Public ....Mr. Tom Connelly

Those wishing to address the ASRS Committee 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 Committee Administrator. Trustees of the Committee 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 Committee Chair may direct staff to study and/or reschedule the matter for discussion and decision at a later date.

10. The next ASRS Investment Committee Meeting is tentatively scheduled for Monday, February 22, 2016 at 2:30 p.m., at 3300 N. Central Avenue, 14th Floor Conference room, Phoenix, Arizona.

11. Adjournment of the ASRS Investment Committee Meeting

A copy of the agenda background material provided to Committee 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 7660 East Broadway Boulevard, Suite 108, 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 with a disability 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 November 20, 2015

ARIZONA STATE RETIREMENT SYSTEM

Gloria Trujillo
Committee Administrator

Gary R. Dokes
Chief Investment Officer

Agenda Item #2

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
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Paul Matson
Director

MINUTES OF THE PUBLIC MEETING OF THE
ARIZONA STATE RETIREMENT SYSTEM
INVESTMENT COMMITTEE

HELD ON
Monday, October 26, 2015
2:30 p.m.

The Arizona State Retirement System (ASRS) Investment Committee (IC) met at 3300 N. Central Avenue, 14th Floor, Phoenix, AZ 85012. Mr. Tom Connelly, Chair, called the meeting to order at 2:42 p.m.

1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Tom Connelly, Chair
Prof. Dennis Hoffman, Vice-chair
Mr. Robert Wadsworth

A quorum was present for the purpose of conducting business.

Also in attendance was Board Trustee Dr. Richard Jacob.

2. Approval of Minutes of the August 24, 2015 Investment Committee Meeting Minutes

Motion: Prof. Dennis Hoffman moved to approve the minutes of the August 24, 2015 public meeting. Mr. Tom Connelly seconded the motion.

By a vote of 3 in favor, 0 opposed, 0 abstentions, and 0 excused, the motion was approved.

3. Presentation, Discussion, and Appropriate Action Regarding the Methods and Possible Impacts of Various Possible Federal Reserve Policy Actions

Mr. Gary Dokes, Chief Investment Officer, opened up the meeting with an explanation of the agenda item. He noted the topic of discussion would focus on the Federal Reserve and the anticipated effects of the Global Economy as interest rates switch to normalization. He further introduced keynote speakers, Dr. Stuart G. Hoffman, Chief Economist with The PNC Financial Services Group; Ian MacFarlane, Chief Strategist with BCA Research; and Patrick Dimick, Senior Portfolio Strategist with Bridgewater Associates, each whom gave their perspective.

Dr. Hoffman introduced himself to the Committee and provided a brief description of his background history and experience. He noted his views on the market and advised the Committee the U.S. economy is in a better state relatively due to the American consumer who is delevered with higher income, lower gas prices, and a continued decrease in the unemployment rate. He further provided trends from a global standpoint, manufacturing, and the housing market. Dr. Hoffman stated he foresees the Federal Rate normalizing in the next 3-4 years, largely in part to the current conditions.

Mr. Dokes solicited Dr. Hoffman's perspective on the Phillips curve, the historical inverse relationship between rates of unemployment and the corresponding rates of inflation that result in an economy. Dr. Hoffman stated he is not a big believer in the Phillips curve, PNC Financial Services Group has a macro model they run when there is a slack in the economy. He stated he felt inflation is largely due to demand and growth within the economy, not an increase in wages.

Mr. MacFarlane provided his perspective on the global economy, noting income inequality as a major factor of growth in the economy. He noted a global slowdown has occurred due to the slowdown in China. He further elaborated on the effects of secular stagnation on the U.S. economy, noting the rise in inequality as a contributing factor of the adverse impact on domestic demand.

Mr. Dimick addressed the Committee with his perspective of the Federal Reserve interest rates and BCA's methodology behind the Federal Reserve's next move to more than likely be a monetary easing vs. a monetary tightening. He noted the current interest rate set by the Federal Reserve is an unwinding of the debt levels incurred prior to 2008, so lowering debt levels relative to income generally takes a decade or two; therefore, it is normal for the Federal Reserve to set the interest rate as low as it has been over a longer period of time.

4. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates

Mr. Dokes provided the Committee with an explanation of the general structure of his CIO Report to assist new IC Trustee, Robert Wadsworth, with an understanding of the materials referenced in the IC packet. He stated the report provides information on the ASRS Fund Positioning, activities of the Asset Class Committees, the Investment Management Division's (IMD) perspectives on the market, as well as ongoing activities and projects within IMD.

5. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q2-15

Mr. Allen Martin, NEPC Consultant, provided the Committee with a brief overview of their oversight of the ASRS Investment Program. Mr. Martin noted as of October 8, 2015, the Total Fund's market value is approximately $33.7 billion. Mr. Martin confirmed staff has operated the portfolio within policy ranges, and the over-weights and under-weights of each asset class in the CIO Report are consistent with NEPC's analysis.

6. Presentation, Discussion, and Appropriate Action Regarding the Supplemental Retirement Savings Plan (SRSP)

Mr. Paul Matson, Director, provided the Committee with a brief overview of the SRSP. He noted the plan is a Defined Contribution plan with a structured fixed contribution rate. The SRSP came into existence as the savings vehicle for the Modified Deferred Retirement Option Plan (MDROP) enacted in 1999. The ASRS soon after determined the MDROP was not a sustainable plan and consequently initiated legislation to repeal authorization for the MDROP plan and as a result, the SRSP remained as an optional tax deferred compensation vehicle for members to use to supplement their retirement savings.

7. Presentation, Discussion, and Appropriate Action Regarding the Supplemental Salary Deferral Plan (SSDP)

Mr. Matson addressed the Committee with detailed information regarding the SSDP. The SSDP Plan is tax deferred retirement plan, which consists of a 403(b) and 457 plan, that is offered to teachers and other non-state employees as a supplement to the ASRS Defined Benefit (DB) Plan. Mr. Matson advised the Committee the plan has a total asset value of approximately $15 million and 649 employees. He further mentioned the SSDP administrator's services agreement currently with TIAA-CREF has been awarded to Nationwide Retirement Solutions through a Request For Proposal (RFP) process that occurred earlier this year. Member account balances will, where possible, be transferred and mapped to similar investment options currently offered through the ASRS SRSP Plan.

8. Request for Future Agenda Items

Mr. Connelly asked that IMD share what they concluded from the various presentations and what additional research and actions, if any, should be considered.

9. Call to the Public

No members of the public requested to speak.

10. Adjournment

The meeting adjourned at 4:31 p.m.

Respectfully submitted,

ARIZONA STATE RETIREMENT SYSTEM

Gloria Trujillo Date Investment Committee Administrator	Gary R. Dokes Date Chief Investment Officer

Agenda Item #3

ARIZONA STATE RETIREMENT SYSTEM

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Paul Matson
Director

MEMORANDUM

TO: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Paul Matson, Director
Mr. Gary Dokes, Chief Investment Officer (CIO)
Mr. Dave Underwood, Assistant Chief Investment Officer
Mr. Al Alaimo, Fixed Income Portfolio Manager
Mr. Karl Polen, Head of Private Markets Investing
Mr. Eric Glass, Portfolio Manager of Private Markets

DATE: November 20, 2015

RE: **Agenda Item #3:** Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates

Purpose
To present and discuss information regarding ASRS investment program updates and Investment Risk Reports.

Recommendation
Informational only; no action required.

Background
The CIO and IMD Portfolio Managers will present and facilitate a discussion of the ASRS Investment Program.

The topics listed below are intended to comprehensively cover how ASRS investments are managed, what and why recent strategic/tactical investment decisions have been made and share other information regarding the investment activities of the ASRS.

a. ASRS Fund Positioning
b. IMD Investment House Views
c. Asset Class Committee (ACC) Activities
d. Fund Repositioning, Research, Projects & Initiatives
e. State Street Risk Reports

Additionally, on a quarterly basis; the Director includes in the Board Packet the two primary Investment Risk reports IMD uses to help monitor and manage macro-level Total Fund investment risk. These reports along with other portfolio risk and positioning reports provide the CIO with valuable information needed to manage the ASRS Total Fund.

The Director and CIO will discuss the Total Fund, State Street truView Risk Report as well as IMD's Securities Lending Risk Metrics.

Attachments:

From ASRS
- Investment Program Updates Report

From State Street
- truView Risk Report – as of September 30, 2015

Arizona State Retirement System

Investment Committee

Investment Program Updates

November 30, 2015

Presented by:
Gary R. Dokes, Chief Investment Officer, ASRS
David Underwood, Assistant Chief Investment Officer, ASRS
Karl Polen, Head of Private Markets Investing, ASRS
Al Alaimo, Fixed Income Portfolio Manager, ASRS
Eric Glass, Portfolio Manager of Private Markets, ASRS

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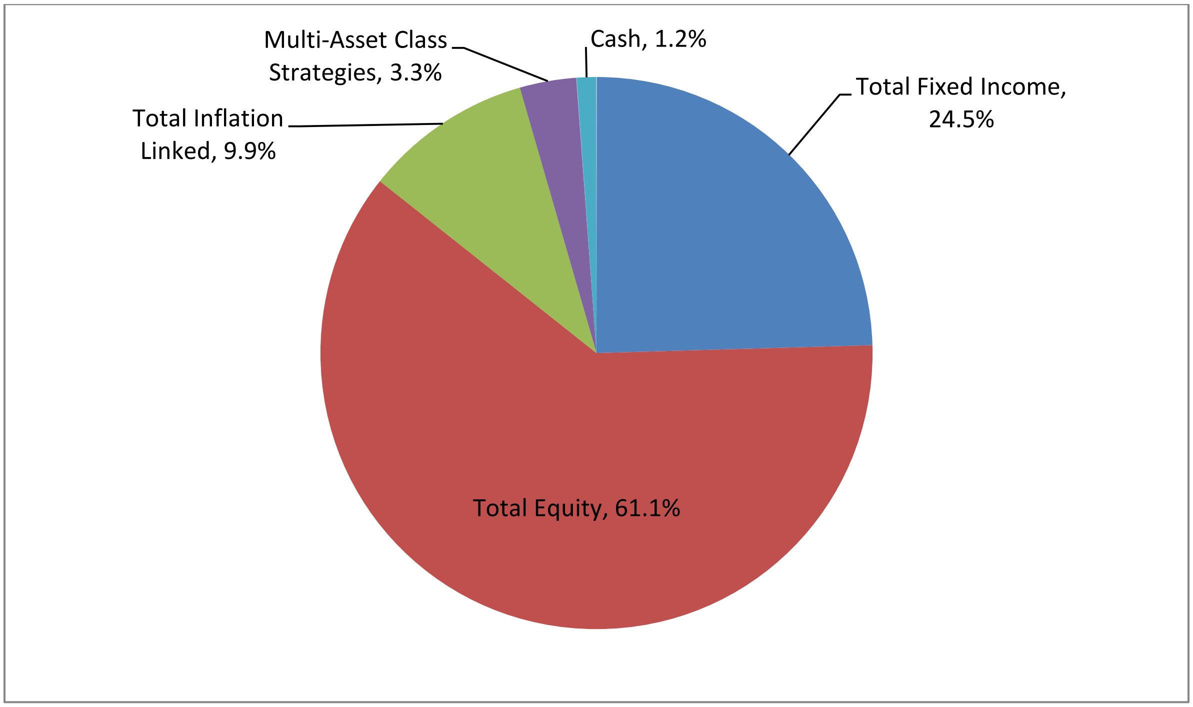
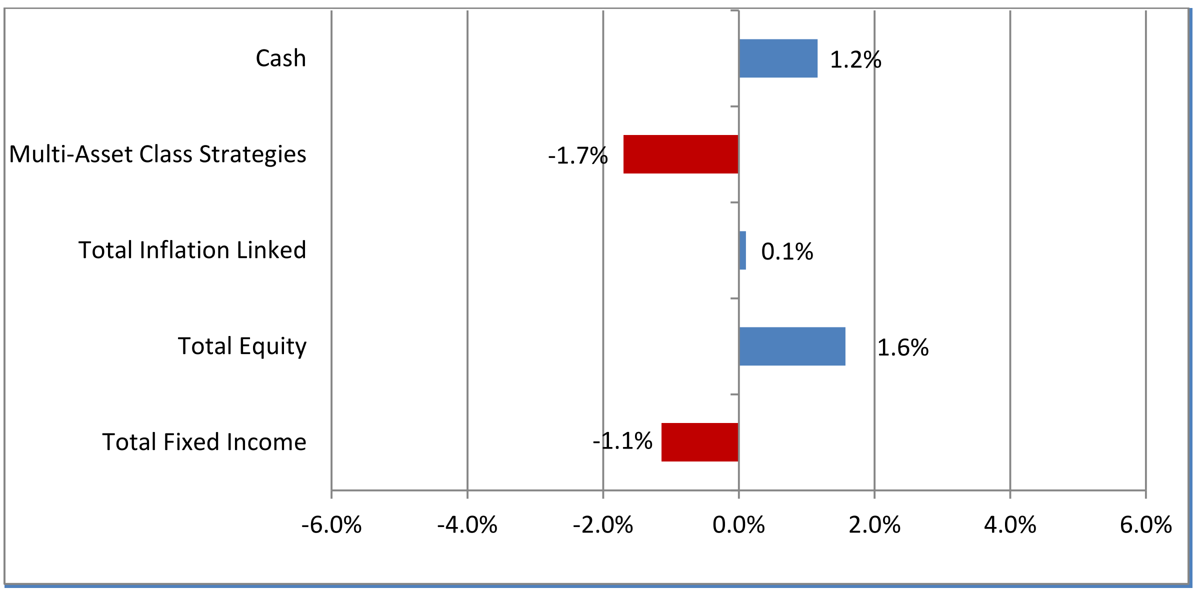
TOTAL FUND POSITIONING 10/30/2015

ACTUAL PORTFOLIO



ACTUAL PORTFOLIO VS. INTERIM SAA POLICY *



**The Interim SAA Policy is prorated thusly: Real Estate was prorated to domestic equity, international equity and fixed income, Private Equity was prorated to domestic equity, and Private Debt was prorated to core fixed income and U.S. high yield. All Private asset classes' market values are reported on a quarter-lag and adjusted to include the current quarter's cash flows.*

Pension (Plan, System, HBS Assets) — ASRS Market Value Report — Friday, October 30, 2015

Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked	Multi-Asset	Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive	Active	Active		
State Street B&T: Boston	Tactical Cash (non-assetized)							0	0.00%
								Tactical Cash Policy Range: 0% - 3%	0.00%
	Operating Cash (non-assetized)		40,615,200					40,615,200	0.12%
	Operating Cash (assetized)		353,872,975					353,872,975	1.04%
	Cash Total							**$394,488,175**	1.16%
								Cash Policy: 0%	0.00%
Blackrock: San Francisco	Treasuries (Long Duration)		386,321,341					386,321,341	1.14%
	Treasuries (Long Duration) Total							**$386,321,341**	1.14%
								Treasuries (Long Duration) Policy Range: 0% - 10%	0.00%
Blackrock: San Francisco	Passive (Intermediate Gov Credit)		24,521,944					24,521,944	0.07%
ASRS: Phoenix	Enhanced Passive F2		1,881,462,220					1,881,462,220	5.54%
Blackrock: San Francisco	Passive (US Debt Index)		1,822,639,019					1,822,639,019	5.37%
	Core Fixed Income Total							**$4,115,107,054.65**	12.13%
								Interest Rate Sensitive: 11%	11.00%
Columbia: Minneapolis	Active	690,169,090						690,169,090	2.03%
JP Morgan: Indianapolis	Active	355,666,392						355,666,392	1.05%
	High Yield Fixed Income Total							**$1,045,849,236**	3.08%
								High Yield Fixed Income Policy	4.00%
	Opportunistic Debt	1,166,208,958						**$1,166,208,958**	3.44%
								Opportunistic Debt Policy:	0.00%
	Private Debt Total	2,004,420,377						**$2,004,420,377**	5.91%
								Total Private Debt: 8% - 12%	10.00%
	Fixed Income Total							**$8,331,603,971**	24.55%
								Total Fixed Income Policy Range: 18% - 35%	25.00%
Intech: FL	Active (Growth)			432,441,721				432,441,721	1.27%
LSV: Chicago	Active (Value)			743,441,908				743,441,908	2.19%
ASRS: Phoenix	Passive E2				5,110,322,560			5,110,322,560	15.06%
ASRS: Phoenix	Enhanced Passive E7				671,412,049			671,412,049	1.98%
ASRS: Phoenix	Enhanced Passive E8				565,898,281			565,898,281	1.67%
ASRS: Phoenix	Risk Factor Portfolio				567,485,632			567,485,632	1.67%
	Large Cap Equity Total							**$8,091,002,152**	23.84%
								Large Cap Policy	20.00%
Wellington: Boston	Active (Core)			282,243,046				282,243,046	0.83%
ASRS: Phoenix	Passive E3 (Growth)				380,600,115			380,600,115	1.12%
ASRS: Phoenix	Passive E4 (Value)				334,382,773			334,382,773	0.99%
	Mid Cap Equity Total							**$997,225,934**	2.94%
								Mid Cap Policy	3.00%
TimesSquare: New York	Active (Growth)			355,470,455				355,470,455	1.05%
DFA: Santa Monica	Active (Value)			271,324,967				271,324,967	0.80%
ASRS: Phoenix	Passive E6				326,241,547			326,241,547	0.96%
	Small Cap Equity Total							**$953,036,969**	2.81%
								Small Cap Policy	3.00%
	U.S. Equity Total							**$10,041,265,055**	29.59%
								US Equity Policy Range: 16% - 36%	26.00%
Brandes: San Diego	Active (Value)			580,734,586				580,734,586	1.71%
American Century	Active (EAFE)			571,745,890				571,745,890	1.68%
Trinity Street	Active (EAFE)			330,722,796				330,722,796	0.97%
Thompson Siegel Walmsley	Active (EAFE)			305,320,608				305,320,608	0.90%
Blackrock: San Francisco	Passive (EAFE)				4,092,837,228			4,092,837,228	12.06%
	Large Cap Developed Non-US Equity Total							**$5,883,413,613**	17.34%
								Large Cap Developed Policy	17.00%
AQR: Greenwich	Active (EAFE SC)			96,585,405				96,585,405	0.28%
DFA: Santa Monica	Active (EAFE SC)			103,900,156				103,900,156	0.31%
Franklin Templeton: San Mateo	Active (EAFE SC)			223,148,440				223,148,440	0.66%
Blackrock: San Francisco	Passive (EAFE SC)				249,964,378			249,964,378	0.74%
	Small Cap Developed Non-US Equity Total							**$673,600,816**	1.98%
								Small Cap Developed Policy	2.00%
William Blair: Chicago	Active (EM)			359,762,633				359,762,633	1.06%
Eaton Vance: Boston	Active (EM)			267,564,023				267,564,023	0.79%
LSV: Chicago	Active (EM)			116,560,437				116,560,437	0.34%
Blackrock: San Francisco	Passive (EM)				317,783,219			317,783,219	0.94%
	Emerging Markets Equity Total							**$1,061,670,312**	3.13%
								Emerging Markets Policy	5.00%
	Non-US Equity Total							**$7,618,684,740**	22.45%
								Non-US Equity Policy Range: 14% - 34%	24.00%
	Private Equity Total			2,621,978,520				**$2,621,978,520**	7.73%
								Private Equity Policy Range: 6% - 10%	8.00%
	Opportunistic Equity			463,829,055				**$463,829,055**	1.37%
								Opportunistic Equity Policy:	0.00%
	Equity Total							**$20,745,757,370**	61.13%
								Total Equity Policy Range: 48% - 65%	58.00%
Gresham: New York						231,943,640		231,943,640	0.68%
	Commodities Total							**$231,943,640**	0.68%
								Commodities Policy Range: 0% - 4%	2.00%
	Real Estate Total					2,613,684,572		**$2,613,684,572**	7.70%
								Real Estate Policy Range: 8% - 12%	10.00%
	Infrastructure Total					314,726,632		**$314,726,632**	0.93%
								Infrastructure Policy Range: 0% - 3%	0.00%
	Farmland & Timber Total					182,866,866		**$182,866,866**	0.54%
								Farmland & Timber Policy Range: 0% - 3%	0.00%
	Inflation Linked Total							**$3,343,221,711**	9.85%
								Inflation Linked Policy Range: 10% - 16%	12.00%
Bridgewater							1,121,492,520	1,121,492,520	3.30%
	Multi-Asset Class Strategies							**$1,121,492,520**	3.30%
								Multi-Asset Class Policy Range: 0% - 12%	5.00%
	TOTAL Amounts	$4,216,496,916	$4,509,595,230	$8,128,526,266	$12,617,231,104	$3,343,221,711	$1,121,492,520	**$33,936,563,747**	**Total Fund**
	TOTAL Percent	12.42%	13.29%	23.95%	37.18%	9.85%	3.30%		

Asset Class	Actual Portfolio	SAAP Target (Range)	Interim SAA* Adj Policy	Actual - Interim SAA** % diff	$ diff	Policy Band check Actual - Adj Policy	
Tactical Cash	0.00%	0% (0-3%)	0.00%	0.00%			
Cash	1.16%	0.00%	0.00%	1.16%	394,488,175		
Interest Rate Sensitive	12.13%	11%	14.69%	-2.57%			
High Yield	3.08%	4%	5.09%	-2.01%			
Opportunistic Debt	3.44%	0%	0.00%	3.44%	$1,166,208,958		
Private Debt	5.91%	10% (8-12%)	5.91% (4-8%)	0.00%			
Total Fixed Income	**24.55%**	**25% (18-35%)**	**25.69% (19-36%)**	**-1.14%**	**-$386,528,506**	**OK**	
Large Cap	23.84%	20%	21.17%	2.67%	$906,553,820		
Mid Cap	2.94%	3%	3.00%	-0.06%	-$20,870,979		
Small Cap	2.81%	3%	3.00%	-0.19%	-$65,059,944		
US Equity	**29.59%**	**26% (16-36%)**	**27.17% (17-37%)**	**2.42%**	**$820,622,898**	**OK**	
Developed Large Cap	17.34%	17%	17.67%	-0.33%	-$111,994,047		
Developed Small Cap	1.98%	2%	2.00%	-0.02%	-$5,130,459		
Emerging Markets	3.13%	5%	5.00%	-1.87%	-$635,157,876		
Non-US Equity	**22.45%**	**24% (14-34%)**	**24.67% (15-35%)**	**-2.22%**	**-$752,282,382**	**OK**	
Private Equity	7.73%	8% (6-10%)	7.73%	0.00%	$0	**OK**	
Opportunistic Equity	1.37%	0%	0.00%	1.37%	$463,829,055		
Total Equity	**61.13%**	**58% (48-65%)**	**59.56% (50-67%)**	**1.57%**	**$532,169,571**	**OK**	
Commodities	0.68%	2% (0-4%)	2.05%	-1.36%	-$462,387,071	**OK**	
Real Estate	7.70%	10% (8-12%)	7.70%	0.00%	$0	**OK**	
Infrastructure	0.93%	0% (0-3%)	0.00%	0.93%	$314,726,632	**OK**	
Farmland & Timber	0.54%	0% (0-3%)	0.00%	0.54%	$182,866,866	**OK**	
Opportunistic I/L	0.00%	0%	0.00%	0.00%	$0		
Total Inflation Linked	**9.85%**	**12% (10-16%)**	**9.75% (8-12%)**	**0.10%**	**$35,206,427**	**OK**	
Multi-Asset Strategies* **	**3.30%**	**5% (0-12%)**	**5% (0-12%)**	**-1.70%**	**-$575,335,668**	**OK**	
Total	**100.00%**	**100%**	**100.00%**	**0.00%**	**$0**		
						Internally Managed Portfolios:	
						$9,270,319,545	**27%**

***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	**$1,166,208,958**	**3.4%**
Opportunistic Equity	**$463,829,055**	**1.4%**
Opoprtunistic IL	**$0**	**0.0%**
	$1,630,038,013	**4.8%**

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

NOVEMBER 2015

U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - Economic data still shows stable, sub-trend growth in 2015.
   - U.S. unemployment, is displaying sustained improvement. Income growth has not, although some localized instances of upward pressure has begun to surface.
   - At possible risk longer term due to stimulus measures, inflation remains generally subdued.
   - Liquidity remains ample; Federal Reserve policy remains accommodative without its asset purchases program.
   - Overall U.S. corporate profits growth has decelerated, mostly due to the impact of lower energy prices; revenues are still in a modest uptrend; high profit margins are no longer expanding.

2. Valuations: **NEUTRAL**
   - U.S. equity markets have been trendless since reaching highs first in March, then and again in May, apparently buffeted by mixed macro data, downward revisions to earnings estimates and anxiety over the timing and scale of the first upward reset to interest rates and more volatility in foreign exchange markets.
   - Though marginally rich, price/earnings multiples remain near historic averages: S&P 500, 15.9x-17.4x; S&P MID, 15.8x-19.1x; S&P SC600, 18.1x-21.0x.
   - Historic P/Es imply advances of 9-13% for mid and small caps; 7-10% for S&P 500.
   - Still rising earnings and low yields on 10-Yr Treasury notes combine for equity risk premiums that are favorably above the 4.0% long-range average for large caps, whereas those of mid- and small-caps are around 4.0%.

3. Sentiment: **NEUTRAL**
   - Short-term caution has moved up a notch following the sustained advance of equity markets without a significant pullback throughout 2013 and 2014.
   - Lessened near-term equity market volatility (i.e., VIX Index) still reflects growing acceptance of risk-oriented assets.
   - The relative strength of the U.S. Dollar continues to encourage assets into U.S. equities.

Commentary:

Following the strong upward trade from the August low-point, the U.S. equity market, in the short run, is obviously less attractive only by a matter of degrees. The November respite is not unprecedented. While potential remains for further advancement, it most likely will be more labored in its progress. The prospect of the initial step in December by the Federal Open Market Committee (FOMC) toward normalization of the Federal Funds rate has inexplicably undermined investment sentiment despite the fact that FOMC began walking back Quantitative Easing over a year ago with no ill effects on the equity markets. Neither has the relatively stronger U.S. Dollar which has resulted from both U.S. monetary policy and the slow, but lasting economic expansion hurt overall equities until now. Valuations, in general, have for some time been ample, but not grossly overvalued. But has been experienced since the Great Recession, valuation has been outdone by liquidity, which remains abundant.

It is premature and incorrect for investors to think that an economic breakdown lies immediately ahead, barring some worldwide negative exogenous shock. Rising consumer confidence, waning levels of unemployment and rising hiring trends are markedly opposite of what is experienced prior to recessions. The equity markets have struggled of late to interpret the macroeconomic setting, as some companies, in the course of reporting 3Q2015 earnings, have suggested that a broad global industrial slowdown may have begun. Intermediate and end marketplaces of those industries sensitive to energy and mining have undergone severe retrenchments while in contrast, consumer-facing industries such as autos and housing continue to experience strong marketplaces. The Federal Reserve's most recent senior loan officers' survey displayed a degree of contraction in commercial and industrial lending terms. This is the opposite of pre-recession conditions and credit availability is still plentiful, especially for small businesses. Further, the weaknesses besetting the capital goods, mining and energy industries is being overly discounted by the capital markets; further major declines aren't likely, neutral-to-positive developments would likely be received well. The stocks are oversold, under-owned and most investors appear unwilling to buy into stocks even remotely related to energy, materials and industrials.

Market fundamentals are still supportive of a high-single digit rate of advance for the 2015 year. Conditions in 2016 seem more mixed. Earnings should continue to advance well into the year, but risk some pressures on profit margins later on; the "dividends" to operating margins derived from falling energy and industrial commodities prices will have ebbed. More problematic for sentiment will be mounting anxiety as the U.S. presidential election comes to finality.

CURRENT PORTFOLIO POSTURE: OVERWEIGHT vs. SAA target

NON – U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEUTRAL**
    - Progress of Eurozone and Japanese economic conditions plateauing; economic continues are weakening in many lesser-developed economies.
    - Although relatively inexpensive, liquidity is shifting away from these developing, US Dollar-sensitive economies.
    - Monetary and economic policies that are focused on promoting economic growth and stemming disinflation seem to be blunted by the collateral impact of the change in drivers of the Chinese economy.

2. Valuations: **POSITIVE**
    - Reasonable global valuations relative to U.S.; price-to-book values of 1.4x - 1.6x; P/Es of 10.8x – 15.5x on trend earnings.
    - Dividend yields are incrementally more favorable -ranging from 1.1x to 1.9x that of the S&P500.

3. Sentiment: **NEUTRAL**
    - Excepting the Emerging Markets, money flows continue toward developed market counterparts, both non-U.S. and domestic U.S. equities. The late 3Q 2015 anxiety and accompanying volatility notwithstanding, investors remain overall constructive on global equities.
    - Until recently, major non-U.S. markets performance had mostly strengthened in 2015; postponement of normalization of U.S. monetary policy is supportive for the markets.

Commentary:

Developed economies (DM) equities still present reasonably favorable return vs. risks tradeoffs and are likely to play a greater role in the worldwide quest for return/yield. Reflation efforts are ongoing, so liquidity flow-driven major markets are still capable of posting high, single digit advances (in USD terms). Liquidity fostered by simulative monetary policy has historically dominated other market influences. It is abundant currently.

The current global macro backdrop supporting the current cycle differs from previous cycles in which the Federal Reserve increased short-term interest rates. Most other central banks are instead loosening monetary policies; the ECB is disposed toward even more Quantitative Easing. Economic growth, though sluggish overall, is mixed across most of the developed economies.

Historically, central banks' initial interest rate increases have had negligible impact on DM equities markets. Not presently in the picture, lengthy rate increase/tightening programs have proved otherwise, however. The economic cycle in the Euro area is a phase behind that of the U.S.; labor cost pressures are less there. European Central Bank easing against the opposite in the U.S., coupled with a weaker EURO versus the US Dollar, makes for relatively attractive risk premiums for European shares, and those of most non-U.S. developed markets. For reasons set forth above, risk premiums among the EM equity markets are justifiably high. Even so, sustained, widespread appreciation is therefore, less likely until those fundamentals improve.

The Emerging Economies (EM), on the whole, are still contending with persistently weak demand, resultant over-capacity, high debt and follow-on disinflation. In past periods preceding the advent of FOMC rate increases, global economic growth was accelerating. It is not in the present cycle, suggesting a protracted period until those economic hindrances dissipate. However, the EM equity markets and companies that are less exposed those trends offer a somewhat more optimistic picture. They will still be vulnerable to volatility from occasional short run "risk-off" market events, but are capable of increasing value over the balance of the current cycle.

At the very least, 2015 has been eventful for the global capital markets; they have had to navigate through an oil plunge, a continuation of the Greek debt crisis, turmoil in the Chinese stock market and implications of evolving U.S. Federal Reserve Open Market Committee rate policy, among others. The FOMC's decision in September to leave rates near zero was followed by another mini risk-off trend, and the weak job data and subsequent release of FOMC minutes triggered a sharp risk-preference rally.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

FIXED INCOME

Primary Markets Metrics & Indicators:

1. Fundamentals: **NEGATIVE**
   - Concerns about slowing global growth driven by weakening fundamentals in China and emerging markets have spilled over into the U.S. markets in a variety of ways. Credit spreads have materially widened in both the investment grade and high yield bond markets. While initially led by commodity sectors such as energy and mining, the spread widening has repriced a number of other sectors in these markets as well as trading liquidity has diminished due to regulatory changes. In addition, China is exerting significant deflationary pressure in the global markets while other developed economies are struggling with disinflation. In the U.S., the economy has improved enough that it is likely the Federal Reserve will begin raising short-term rates in the coming months. Despite the likelihood that the Fed will raise short-term rates, 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 competing long-term interest rates in other developed markets.

2. Valuations: **NEUTRAL**
   - The core fixed income market is likely to generate low returns due to low overall yields as Treasury rates remain at low levels. That being said, core fixed income remains a safe haven in times of market turbulence and tends to perform well when risky assets such as equities sell off. We are underweight Interest Rate Sensitive fixed income vs. the SAA target.
   - We believe the tradable, public credit markets are not particularly compelling. While valuations as measured by credit spreads in both the investment-grade and high yield bond markets have become more attractive, wider spreads may primarily reflect deteriorating credit quality. Over the coming years, we expect both an increase in the number of bond issuers that are likely to lose their investment-grade ratings and a rise in corporate defaults. 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 may be in the later stages of credit cycle (that began with an upturn in 2009), credit ratings may decline and defaults may increase in other sectors as well. 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; and 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. We recently expanded our commitments to take advantage of the attractive opportunities in the private debt asset class.
   - Select areas of opportunistic debt such as distressed debt also offer opportunities to potentially achieve double-digit returns. That being said, in the near-term, returns for distressed debt may be adversely impacted by the recent sell-off in the credit markets.

3. Sentiment: **NEGATIVE**

   Sentiment has declined in the credit markets due to a combination of weakening fundamentals and diminished trading liquidity. While U.S. Treasuries remain a safe haven for investors looking to reduce risk, these securities may face technical selling pressure from central banks in China and other emerging market countries that may sell U.S. dollar assets to support their currencies to counteract recent U.S. dollar appreciation.

Commentary:

IMD views of the fixed income markets are bifurcated: 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: UNDERWEIGHT vs. SAA target

REAL ESTATE

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - Improved levels of demand and supportive credit conditions, combined with broad improvement in the economy, are supportive of continued expansion of commercial lending and building. Better levels of occupancy while there is a lack of construction has resulted in rising rents.
   - Our review of property market fundamentals leads 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.
   - There are relatively few foreclosures on high quality property, but there continues to be pressures on refinancing of legacy leverage structures and we participate in those transactions through several of our manager relationships.
   - Single family housing continues to exhibit tight supply and moderate demand driven by healing household balance sheets, improved employment conditions, and continued affordability. This should lead to reacceleration of new construction and continued moderate price increases. Recovery in construction and NOI has been led by apartments to date.

2. Valuations: **NEUTRAL**
   - On a total market basis, valuations have recovered from recession lows but are still about 5% below prior peak. However, coastal markets have rebounded more strongly than interior markets.
   - High quality coastal market properties are trading at historic low cap rates; however these cap rates still reflect approximately a normal spread to treasury. The financing market for assets of this quality has recovered and supports these valuations by providing fixed rate financing that mitigates the risk of later cap rate expansion. International investors looking for safe assets have contributed to demand in the coastal markets.
   - 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.

- In September, REITs were trading at an average dividend yield of 3.82% (168bp above 10y treasury) and a 2% discount to NAV. The dividend yield spread is above the historical average of 111 while the historical difference to NAV is a 4% premium.

3. Sentiment: **POSITIVE**
   - U.S. focused real estate fund raising rose 13% to $76 billion per year. U.S. focused dry powder has trended down to approximately $80 billion.
   - Global commercial real estate transaction volume peaked at around $700 billion in 2007, but dropped to about a third of that during the global financial crisis. Current volume of approximately $550 billion is double the recession trough, but still well below the peak.
   - Debt availability has improved considerably since the depth of the recession, but is still tight by historic standards for all but the most desirable properties. Construction financing remains a considerable challenge, even for well justified projects.

Commentary:

IMD continues to implement its separate account real estate strategic manager program. ASRS 2016 RE Program Implementation Plan (sector valuations, pacing, etc.) is scheduled to occur in Q4-15.

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 continues to show steady improvement.
     - ◊ Oil prices have remained in the range of their 2014 price correction which will result in reduced service costs and 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 production hedged.
     - ◊ 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 increasing its stimulus efforts by buying €60B 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**
   - U.S. median purchase price multiples in 2014 were 8.9x, down from the 10.0x 2013 levels (which were close to the previous peak).
   - The leveraged loan and high yield debt markets were active in 2014 but down from 2013 highs. Single B high yield spreads have widened to ~530bps.
   - The U.S. median Debt/EBITDA ratio of 5.8x in 2014 was down from 6.5X in 2013 (slightly above the previous peak).

3. Sentiment: **NEUTRAL**
    - Globally, $242B (484 funds) have closed in 2015 (as of 6/30/2015) compared to $545B (1,237 funds) for all of 2014 and $539B (1,281 funds) for all of 2013.
    - Dry powder of nearly $1.3T globally has ticked up from $1.2T for 2014 and 2013.
    - The global number of buyout deals was 1,595 (as of 6/30/2015) compared to 3,648 for all of 2014 and 3,383 for all of 2013. The aggregate value of deals was $199B (as of 6/30/2015) compared to $345B for all of 2014 and $305B for all of 2013.
    - There were 755 exits representing $219B (as of 6/30/2015). For all of 2014 there were 1,622 exits representing $448B compared to 1,583 exits representing $327B in 2013.
    - The IPO market in 2015 has softened to a level of $20B (as of 6/30/2015) versus $67B for all of 2014 and $48B for all of 2013.

Commentary:

Areas of emphasis are U.S. middle market buyout with focus on managers with strong operational capability. Vertical strategies in energy, 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 PE Program Implementation Plan (sector valuations, pacing, etc.) is scheduled to occur in Q4-15.

CURRENT PORTFOLIO POSTURE: EQUAL WEIGHT vs. SAA target

COMMODITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEGATIVE**
    - The U.S. dollar has strengthened on a relative basis as the Fed appears poised to raise interest rates. China's economy has slowed down while Europe has begun to deal with its economic weakness with stimulus.
    - Most commodity sectors appear well supplied, particularly for the current global growth environment.
    - The decision by Saudi Arabia not to reduce production with the potential addition of Iranian supply has kept energy markets depressed, resulting in rig lay downs in the U.S. while the budgetary impacts globally continue to add up.
    - Corn and wheat stockpiles have recently hit multi-year highs while world food prices continue to slide. Energy markets reflect the continued growth in global production as WTI and Brent prices are both near $45. Metals have weakened as precious metals have suffered from U.S. dollar strength while industrial metals still exhibit weak demand.

2. Valuations: **NEGATIVE**
    - The Bloomberg Commodities Index is just above its 13 year low as global supplies outpace demand.
    - On a trailing twelve-month basis, commodities are down 30% with ags being the least impacted sector with a decline of 11%.

3. Sentiment: **NEGATIVE**
    - The moderate growth and weak inflation environment in the U.S. has tempered investor enthusiasm for commodities and resulted in outflows from commodities.
    - The slowdown in the Chinese economy and its equity market has tempered enthusiasm for commodities.
    - Geopolitical news has not been constructive for energy prices. Looking across the individual commodities, most remain well supplied, which is reflected in prices as inflationary fears are muted.

Commentary:

IMD has maintained a tactical underweight relative to the SAA approved in 2015 which reduced the commodities target from 4% to 2%, recognizing the effects of the Chinese slowdown and sufficient global supplies. As a result of the changing dynamics in the energy markets IMD reduced its exposure to commodities in December and further reduced its exposure in July as inflationary pressures are still soft.

The North American shale play has resulted in increased U.S. energy production and represents a long-term phenomenon. China's growth rate is also moderating and the era of infrastructure build-out which fueled a portion of the demand for commodities (particularly industrial metals) is abating. Precious metals may also be challenged as the U.S. has moved to the front of the global recovery and other countries' stimulus should result in US dollar strength at the margin. While grains are currently well supplied, the unpredictability of weather inhibits long-term forecasting.

IMD will maintain a tactical underweight relative to the SAAP and monitor global supply and demand swings for inflationary pressures. Improving economic conditions and inflationary pressures would serve as a catalyst to initiate a neutral position should the conditions arise.

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

<u>Commentary</u>: 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.

<u>Current Portfolio Posture</u>: 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.

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

<u>Primary Market Metrics and Indicators</u>: 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.

2015 ASSET CLASS COMMITEE AND IC MEETINGS								
2015		Asset Class Committees				Board Committee		Grand Totals
		Private Market Committee (PRIVMC)		Public Market Committee (PUBMC)		Investment Committee (IC)		
Quarter	Month	Dates	Total	Dates	Total	Dates	Total	
1st	January	01/23 01/29	2					8
	February	02/27	1			02/09 02/23	2	
	March	03/19 03/20 03/27	3					
2nd	April	04/21	1			04/20/15	1	6
	May	05/18	1					
	June	06/04 06/23	2			06/22	1	
3rd	July	07/20 07/29	2					6
	August	08/28	1	08/14	1	08/24	1	
	September	09/15	1					
4th	October	10/15	1			10/26	1	4
	November	11/18	1			11/30	1	
	December							
Totals			16		1		7	24

INVESTMENT MANAGEMENT DIVISION (IMD) ACTIVITIES: FUND REPOSITIONING, RESEARCH, PROJECTS & INITIATIVES

- In August, the ASRS cash assetization benchmark was modified to a "risk off" composition which reflected IMD defensive Investment House Views: 1) concern that the capital markets of emerging economies most sensitive to a continuation of robust Chinese industrial growth would likely remain volatile and may weaken further; 2) that this volatility could spill over to the developed-world capital markets; and 3) should the FOMC implement increase the Fed Funds rate at the September meeting, the capital markets would react undesirably.

  Though the ASRS benefited from a further reductions in exposure to high yield and commodities (which continues to perform poorly), the rebound in the prices of equity risk assets in September that followed our repositioning resulted in an unforeseen opportunity cost as we raised cash needed to meet internal and external cash flow needs.

  Given market volatility has since subsided and IMD remains somewhat defensive, the new cash benchmark reflects a 50/50 mix of a US Treasury basket and equities that reflects IMDs house views. The equity allocation reflects a neutral view on international equity and a view that 1) large cap US equity is likely to face greater-headwinds from US dollar strength as monetary policy firms in contrast to ~~vs~~ greater easing across Europe and Japan, and from continued economic slowdown across commodity producing emerging market countries; and 2) US mid and small cap companies offer better relative value and are more exposed to the strengthening US economy. The 50/50 mix of US equity exposure between S&P 500 and Russell 2000 in the Assetization allocation reflects that thinking.

- In November, approximately $300 million was raised from U.S Equities to replenish ASRS Cash Assetization Program to meet external cash flow needs and anticipated capital calls for private markets commitments through the end of calendar year 2015.

- IMD annually prepares pacing and implementation plans for the private equity and real estate programs in order to establish target investment levels and strategies for the ensuing calendar year. The private equity pacing and implementation plan was completed and presented to the private markets committee on November 18 and a target commitment amount of $700 million was approved for calendar 2016. The real estate plan will be presented to the private markets committee in December.

- As a standard course of business, IMD meets with both incumbent and potential investment managers to discuss macro-economies and capital markets as well as providing a means to review new initiatives, relationships and new strategy offerings. Since the last IC meeting, IMD met (conference call or in-person) with 66 investment managers: Private markets (RE, PE, Debt) – 41 and Public markets (Equity and Debt) – 25.

- IMD internally manages 7 public equities and fixed income portfolios with an approximate aggregate market value of $9 billion or 27% of Total Fund. For CY 2015 thru October 31, 2015, 3 of 7 met or exceeded their benchmarks, and 7 of 7 portfolios met or exceeded their benchmarks on an inception-to-date basis.

STATE STREET GLOBAL SERVICES.

STATE STREET INVESTMENT ANALYTICS

Executive Presentation

To: Arizona State Retirement System

truView Risk Report September 30, 2015

Produced by State Street Investment Analytics, Risk Services

Monthly Reallocation Summary*

Month Ending September 30, 2015

Portfolio Reductions

- TOTAL TRANSITION
  - $398M – TOTAL EQUITY TRANSITION
- TOTAL FIXED INCOME
  - $62.5M – JP MORGAN (High Yield)
- TOTAL MULTI-ASSET CLASS
  - $3.7M – WINDHAM (Multi-Asset Class)

- **TOTAL REDUCTIONS****
  - **$464.2M**

Portfolio Additions

- TOTAL CASH
  - $354M – CASH–ASSETIZED
  - $110.2M – CASH–UNASSETIZED

- **TOTAL ADDITIONS****
  - **$464.2M**

***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 October 31, 2015

Portfolio Reductions

- TOTAL EQUITY
  - $160M – BLACKROCK EMERGING MARKETS (Emg Mkts)
  - $90M – EATON VANCE (Emg Mkts)
  - $100M – LSV EMERGING MARKETS (Emg Mkts)

- **TOTAL REDUCTIONS****
  - **$350M**

Portfolio Additions

- TOTAL CASH
  - $350M – CASH–UNASSETIZED

- **TOTAL ADDITIONS****
  - **$350M**

***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 September 30, 2015

Month-end Risk Profile

- Historical Risk (95% VaR) for all asset classes remain relatively constant from prior months. Total Plan risk increased 16bps which was primarily driven by market fluctuations and underlying active manager positioning. The Policy Benchmark decreased a marginal 2bps.

- Excess risk over the Policy Benchmark increased to 18bps.

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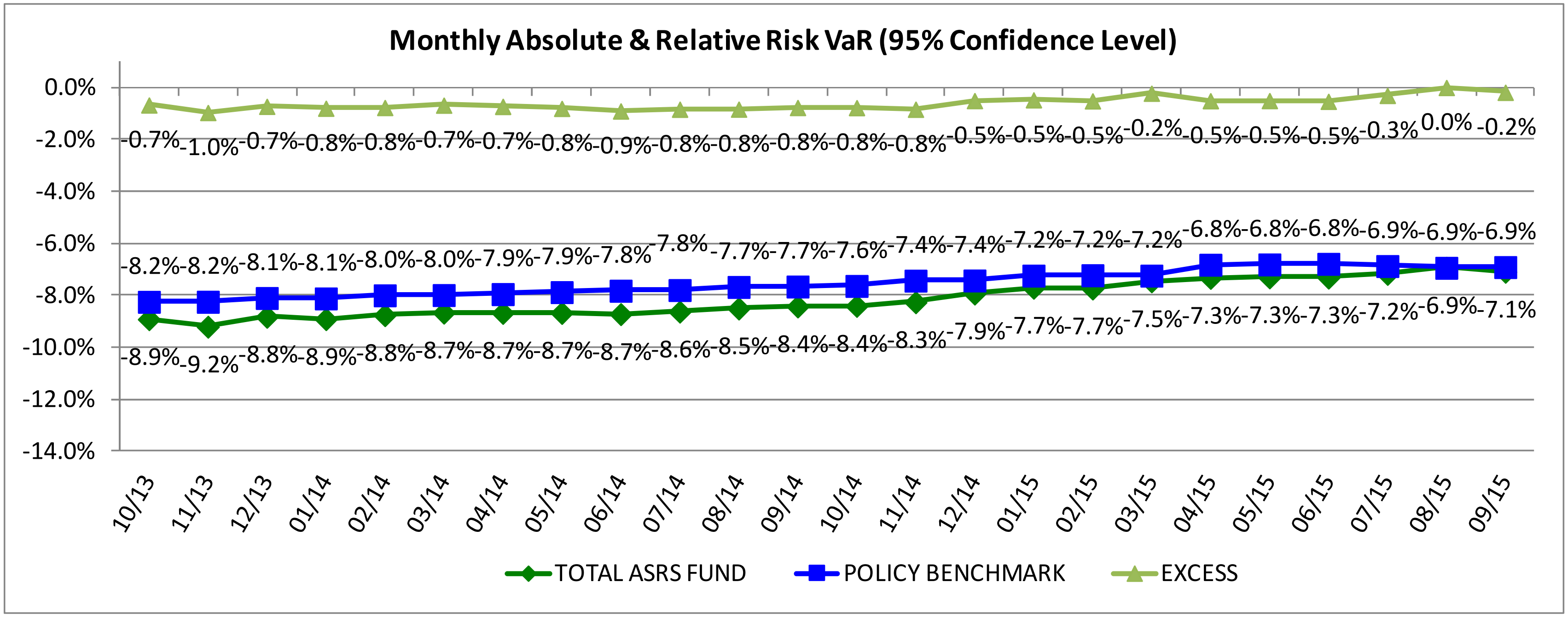


ARIZONA STATE RETIREMENT SYSTEM
As of September 30, 2015

TOTAL PLAN EXPOSURE OVERVIEW

Sector (Public US Equity Only)		$ Value	% Value	**Blended US BM	Difference
CONSUMER NON-CYCLICAL	$	2,196,261,009	23.6%	23.9%	(0.4%)
FINANCIAL	$	1,510,206,332	16.2%	17.1%	(0.9%)
TECHNOLOGY	$	1,091,312,782	11.7%	13.4%	(1.7%)
CONSUMER CYCLICAL	$	975,477,781	10.5%	10.8%	(0.4%)
INDUSTRIAL	$	919,570,546	9.9%	9.7%	0.1%
COMMUNICATIONS	$	838,695,667	9.0%	12.4%	(3.4%)
ENERGY	$	552,192,494	5.9%	6.9%	(1.0%)
FUNDS	$	515,614,035	5.5%	0.0%	5.5%
UTILITIES	$	329,906,428	3.5%	3.1%	0.4%
BASIC MATERIALS	$	241,716,081	2.6%	2.4%	0.1%
CASH	$	113,707,732	1.2%	0.0%	1.2%
GOVERNMENT	$	28,112,561	0.3%	0.0%	0.3%
INDEX	$	6,362,074	0.1%	0.0%	0.1%
DIVERSIFIED	$	1,870,160	0.0%	0.0%	(0.0%)
GRAND TOTAL	**$**	**9,321,005,680**	**100.0%**	**100.0%**	**0.0%**

Country Category (Total Plan)		$ Value	% Value	*Blended TOTAL BM	Difference
NORTH AMERICA	$	24,907,930,111	76.3%	67.1%	9.3%
EUROPE DEVELOPED	$	4,352,904,819	13.3%	17.4%	(4.1%)
ASIA DEVELOPED	$	2,142,092,757	6.6%	10.2%	(3.6%)
ASIA EM	$	696,193,734	2.1%	3.2%	(1.1%)
LATIN AMERICA	$	238,584,844	0.7%	1.1%	(0.4%)
AFRICA	$	146,082,824	0.4%	0.5%	(0.1%)
MIDDLE EAST	$	96,416,928	0.3%	0.3%	0.0%
EUROPE EM	$	48,351,547	0.1%	0.1%	(0.0%)
GRAND TOTAL	**$**	**32,628,557,563**	**100.0%**	**100.0%**	**0.0%**

Market Cap^ (Public Equities Only)		$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	$	2,785,156	0.0%	0.0%	0.0%
2) 100M - 500M	$	237,856,303	1.4%	1.7%	(0.2%)
3) 500M - 1B	$	581,948,083	3.5%	3.6%	(0.1%)
4) 1B - 5B	$	2,434,545,385	14.7%	21.4%	(6.7%)
5) 5B - 10B	$	1,860,866,108	11.2%	9.9%	1.3%
6) 10B - 50B	$	5,650,160,349	34.0%	30.8%	3.2%
7) >50B	$	5,845,097,145	35.2%	32.6%	2.6%
GRAND TOTAL	**$**	**16,613,258,529**	**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***	$	1,950,540,621	6.0%		CASH	Cash
2	US TREASURY N/B	$	1,256,711,778	3.9%		GOVERNMENT	SOVEREIGN
3	FANNIE MAE	$	700,817,324	2.1%		MORTGAGE SECURITIES	FNMA COLLATERAL
4	FREDDIE MAC	$	245,795,408	0.8%		MORTGAGE SECURITIES	FGLMC COLLATERAL
5	TREASURY BILL	$	233,674,161	0.7%		GOVERNMENT	SOVEREIGN
6	APPLE INC	$	212,832,034	0.7%	7) 50B+	TECHNOLOGY	COMPUTERS
7	MICROSOFT CORP	$	154,833,635	0.5%	7) 50B+	TECHNOLOGY	SOFTWARE
8	GOVERNMENT NATIONAL MORTGAGE /	$	146,346,051	0.4%		MORTGAGE SECURITIES	GNMA COLLATERAL
9	ISHARES MSCI USA MOMENTUM FACT(	$	137,511,360	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
10	EXXON MOBIL CORP	$	132,591,478	0.4%	7) 50B+	ENERGY	OIL&GAS
11	ISHARES MSCI USA QUALITY FACTOR I	$	131,992,575	0.4%	4) 1B - 5B	FUNDS	EQUITY FUND
12	JOHNSON & JOHNSON	$	130,709,183	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
13	ISHARES MSCI USA SIZE FACTOR ETF	$	124,301,360	0.4%	2) 100M - 500I	FUNDS	EQUITY FUND
14	ISHARES MSCI USA VALUE FACTOR ET	$	121,808,740	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
15	AT&T INC	$	116,049,911	0.4%	7) 50B+	COMMUNICATIONS	TELECOMMUNICATIONS
16	PFIZER INC	$	114,430,349	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
17	JPMORGAN CHASE & CO	$	106,567,541	0.3%	7) 50B+	FINANCIAL	BANKS
18	ALPHABET INC	$	104,486,419	0.3%	7) 50B+	COMMUNICATIONS	INTERNET
19	NESTLE SA	$	98,985,204	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	FOOD
20	NOVARTIS AG	$	89,599,385	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS

***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 September 30, 2015

INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Sector (Public Intl Equity Only)	$ Value	% Value	*Blended NON-US BM	Difference
FINANCIAL	$ 1,885,175,843	24.9%	26.0%	(1.1%)
CONSUMER NON-CYCLICAL	$ 1,674,105,803	22.1%	22.2%	(0.1%)
CONSUMER CYCLICAL	$ 1,070,070,009	14.1%	12.3%	1.8%
INDUSTRIAL	$ 875,327,003	11.6%	11.3%	0.2%
COMMUNICATIONS	$ 606,386,692	8.0%	8.6%	(0.5%)
BASIC MATERIALS	$ 370,295,646	4.9%	5.9%	(1.0%)
ENERGY	$ 358,657,385	4.7%	5.1%	(0.4%)
TECHNOLOGY	$ 311,647,006	4.1%	4.6%	(0.4%)
UTILITIES	$ 252,950,324	3.3%	3.5%	(0.1%)
CASH	$ 102,433,620	1.4%	0.0%	1.4%
DIVERSIFIED	$ 46,152,414	0.6%	0.7%	(0.0%)
INDEX	$ 17,751,953	0.2%	0.0%	0.2%
FX	$ (8,401)	(0.0%)	0.0%	(0.0%)
GRAND TOTAL	**$ 7,570,945,295**	**100.0%**	**100.0%**	**0.0%**

Country Category (Public Intl Equity Only)	$ Value	% Value	*Blended NON-US BM	Difference
EUROPE DEVELOPED	$ 4,066,539,655	53.7%	52.0%	1.7%
ASIA DEVELOPED	$ 2,120,368,506	28.0%	31.4%	(3.4%)
ASIA EM	$ 714,829,107	9.4%	10.8%	(1.4%)
LATIN AMERICA	$ 223,273,421	2.9%	2.6%	0.3%
NORTH AMERICA	$ 175,321,739	2.3%	0.1%	2.2%
AFRICA	$ 126,848,697	1.7%	1.7%	0.0%
MIDDLE EAST	$ 94,714,403	1.3%	1.0%	0.3%
EUROPE EM	$ 49,049,769	0.6%	0.5%	0.2%
GRAND TOTAL	**$ 7,570,945,295**	**100.0%**	**100.0%**	**0.0%**

	Top 20 Industry Groups (Public Intl Only	$ Value	% Value	*Blended NON-US BM	Difference
1	BANKS	$ 993,694,604	13.1%	13.7%	(0.5%)
2	PHARMACEUTICALS	$ 599,121,389	7.9%	7.9%	(0.0%)
3	TELECOMMUNICATIONS	$ 422,698,269	5.6%	5.8%	(0.2%)
4	INSURANCE	$ 387,564,895	5.1%	5.1%	(0.0%)
5	FOOD	$ 377,149,261	5.0%	4.6%	0.4%
6	OIL&GAS	$ 326,097,908	4.3%	4.6%	(0.3%)
7	RETAIL	$ 315,375,758	4.2%	3.1%	1.1%
8	AUTO MANUFACTURERS	$ 240,193,029	3.2%	3.3%	(0.1%)
9	CHEMICALS	$ 206,282,216	2.7%	3.2%	(0.5%)
10	DIVERSIFIED FINAN SERV	$ 188,582,140	2.5%	2.6%	(0.1%)
11	COMMERCIAL SERVICES	$ 174,809,611	2.3%	2.0%	0.4%
12	REAL ESTATE	$ 174,737,711	2.3%	2.4%	(0.1%)
13	ELECTRIC	$ 171,949,491	2.3%	2.3%	(0.0%)
14	BEVERAGES	$ 157,715,881	2.1%	2.3%	(0.2%)
15	SEMICONDUCTORS	$ 141,691,467	1.9%	2.2%	(0.4%)
16	TRANSPORTATION	$ 126,500,974	1.7%	1.7%	(0.1%)
17	COSMETICS/PERSONAL CARE	$ 112,197,139	1.5%	1.6%	(0.1%)
18	BUILDING MATERIALS	$ 111,935,349	1.5%	1.2%	0.3%
19	AUTO PARTS&EQUIPMENT	$ 111,367,005	1.5%	1.3%	0.2%
20	ENGINEERING&CONSTRUCTI(	$ 110,827,212	1.5%	1.4%	0.0%

Market Cap** (Public Intl Equities Only)	$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	$ 2,468,702	0.0%	0.0%	0.0%
2) 100M - 500M	$ 77,707,081	1.0%	0.5%	0.5%
3) 500M - 1B	$ 175,579,301	2.4%	1.4%	1.0%
4) 1B - 5B	$ 1,040,455,139	14.0%	13.1%	0.9%
5) 5B - 10B	$ 1,054,065,656	14.2%	13.2%	1.0%
6) 10B - 50B	$ 2,981,397,183	40.1%	39.3%	0.8%
7) >50B	$ 2,109,880,355	28.4%	32.6%	(4.2%)
GRAND TOTAL	**$ 7,441,553,418**	**100.0%**	**100.0%**	**0.0%**

**Excludes cash and non-traded securities

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

ARIZONA STATE RETIREMENT SYSTEM

As of September 30, 2015

TOTAL FIXED INCOME EXPOSURE OVERVIEW

Sector (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
GOVERNMENT	$ 1,589,471,224	33.4%	32.2%	1.2%
MORTGAGE SECURITIES	$ 1,110,560,085	23.3%	21.9%	1.5%
FINANCIAL	$ 407,654,067	8.6%	9.4%	(0.8%)
COMMUNICATIONS	$ 329,823,882	6.9%	7.4%	(0.5%)
CONSUMER NON-CYCLICAL	$ 320,474,061	6.7%	7.1%	(0.3%)
ENERGY	$ 213,181,908	4.5%	5.6%	(1.1%)
CONSUMER CYCLICAL	$ 211,416,356	4.4%	5.2%	(0.7%)
INDUSTRIAL	$ 138,411,601	2.9%	3.9%	(1.0%)
TECHNOLOGY	$ 104,277,970	2.2%	2.1%	0.1%
UTILITIES	$ 88,971,278	1.9%	2.2%	(0.3%)
BASIC MATERIALS	$ 83,958,044	1.8%	2.5%	(0.7%)
CASH	$ 66,138,215	1.4%	0.0%	1.4%
INDEX	$ 30,919,337	0.7%	0.0%	0.7%
BANK LOANS	$ 29,863,622	0.6%	0.0%	0.6%
ASSET BACKED SECURITIES	$ 25,708,827	0.5%	0.4%	0.1%
DIVERSIFIED	$ 5,385,472	0.1%	0.2%	(0.1%)
GRAND TOTAL	**$ 4,756,215,950**	**100.0%**	**100.0%**	**0.0%**

Top 20 Industry Groups (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
1 SOVEREIGN	$ 1,486,919,491	31.3%	30.1%	1.1%
2 FNMA COLLATERAL	$ 639,865,773	13.5%	9.2%	4.2%
3 BANKS	$ 212,995,630	4.5%	5.1%	(0.6%)
4 FGLMC COLLATERAL	$ 211,988,837	4.5%	5.6%	(1.1%)
5 TELECOMMUNICATIONS	$ 177,948,649	3.7%	4.2%	(0.5%)
6 OIL&GAS	$ 133,805,182	2.8%	3.6%	(0.8%)
7 MEDIA	$ 121,548,502	2.6%	2.7%	(0.1%)
8 GNMA2 COLLATERAL	$ 113,924,563	2.4%	4.5%	(2.1%)
9 DIVERSIFIED FINAN SERV	$ 109,949,931	2.3%	2.3%	0.0%
10 COMMERCIAL MBS	$ 107,316,438	2.3%	1.4%	0.9%
11 HEALTHCARE-SERVICES	$ 91,569,722	1.9%	1.8%	0.1%
12 ELECTRIC	$ 86,189,345	1.8%	2.0%	(0.2%)
13 PHARMACEUTICALS	$ 83,385,659	1.8%	1.5%	0.3%
14 RETAIL	$ 77,988,841	1.6%	1.7%	(0.1%)
15 PIPELINES	$ 72,981,615	1.5%	1.5%	0.0%
16 Cash	$ 66,138,215	1.4%	0.0%	1.4%
17 SOFTWARE	$ 64,392,622	1.4%	1.0%	0.4%
18 CHEMICALS	$ 53,812,447	1.1%	0.9%	0.2%
19 MUNICIPAL	$ 51,279,262	1.1%	0.6%	0.4%
20 REITS	$ 44,531,606	0.9%	0.9%	0.0%

Credit Rating Group** (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
01) AAA	$ 2,728,742,877	57.4%	52.8%	4.6%
02) AA	$ 195,549,423	4.1%	3.2%	0.9%
03) A	$ 448,183,069	9.4%	8.3%	1.2%
04) BBB	$ 411,656,289	8.7%	9.4%	(0.7%)
05) BB	$ 440,047,505	9.3%	13.6%	(4.4%)
06) B	$ 415,102,792	8.7%	9.7%	(0.9%)
07) CCC	$ 106,033,664	2.2%	3.0%	(0.8%)
08) CC	$ 332,086	0.0%	0.0%	(0.0%)
09) C	$ -	0.0%	0.0%	(0.0%)
10) D	$ 6,360,963	0.1%	0.0%	0.1%
11) Not Rated	$ 4,207,283	0.1%	0.0%	0.1%
GRAND TOTAL	**$ 4,756,215,951**	**100.0%**	**100.0%**	**0.0%**

Maturity Bucket (Public Fixed Income Only)	$ Value	% Value	*Blended FI BM	Difference
0-1Y	$ 146,730,179	3.1%	0.6%	2.5%
1Y-3Y	$ 738,045,416	15.6%	19.4%	(3.8%)
3Y-5Y	$ 730,203,455	15.4%	17.0%	(1.5%)
5Y-10Y	$ 1,540,527,388	32.6%	30.3%	2.2%
10Y-15Y	$ 182,038,217	3.8%	4.6%	(0.8%)
15Y+	$ 1,394,112,922	29.5%	28.0%	1.5%
GRAND TOTAL	**$ 4,731,657,576**	**100.0%**	**100.0%**	**0.0%**

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

STATE STREET GLOBAL SERVICES.

STATE STREET INVESTMENT ANALYTICS

ARIZONA STATE RETIREMENT SYSTEM **TOTAL PLAN RISK OVERVIEW**

As of September 30, 2015

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	$ 28,917,423	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	$ 359,999,988	1%	(5.6%)	0.0%	(0.1%)	(5.8%)	0.0%	(0.2%)	(7.3%)	0.0%	(0.3%)	(11.7%)	3.6%	(2.7%)	0.0%	(0.2%)
TOTAL FIXED INCOME	$ 4,756,215,950	15%	(1.7%)	(0.0%)	0.7%	(1.6%)	(0.0%)	0.5%	(2.4%)	(0.0%)	0.3%	(3.9%)	0.9%	(1.1%)	(0.0%)	0.8%
US EQUITY	$ 9,321,005,680	29%	(8.5%)	(2.5%)	34.7%	(8.2%)	(2.3%)	33.4%	(14.6%)	(4.1%)	34.9%	(29.5%)	5.7%	(4.1%)	(1.2%)	33.5%
INTERNATIONAL EQUITY	$ 7,570,945,295	23%	(10.2%)	(2.2%)	31.7%	(9.6%)	(2.1%)	31.5%	(15.4%)	(3.4%)	28.7%	(35.3%)	6.4%	(4.7%)	(1.1%)	30.8%
REAL ESTATE	$ 2,553,164,508	8%	(11.9%)	(0.9%)	12.4%	(11.4%)	(0.8%)	12.3%	(20.1%)	(1.5%)	12.6%	(40.0%)	7.4%	(5.6%)	(0.4%)	12.1%
FARMLAND & TIMBER	$ 182,866,865	1%	(12.1%)	(0.1%)	0.9%	(11.7%)	(0.1%)	0.9%	(20.5%)	(0.1%)	0.9%	(40.8%)	7.5%	(5.7%)	(0.0%)	0.9%
PRIVATE EQUITY	$ 2,631,978,589	8%	(11.6%)	(0.9%)	12.5%	(10.8%)	(0.8%)	12.0%	(18.7%)	(1.5%)	12.6%	(36.5%)	7.0%	(5.4%)	(0.4%)	12.1%
PRIVATE DEBT	$ 1,974,751,209	6%	(2.6%)	(0.0%)	0.3%	(3.9%)	(0.1%)	2.1%	(7.7%)	(0.3%)	2.6%	(16.4%)	2.6%	(2.2%)	(0.1%)	2.3%
OPPORTUNISTIC EQUITY	$ 479,312,505	1%	(11.6%)	(0.2%)	2.3%	(10.8%)	(0.1%)	2.2%	(18.7%)	(0.3%)	2.3%	(36.5%)	7.0%	(5.4%)	(0.1%)	2.2%
OPPORTUNISTIC DEBT	$ 1,137,618,267	3%	(6.5%)	(0.2%)	2.2%	(9.0%)	(0.2%)	3.6%	(14.6%)	(0.4%)	3.6%	(28.6%)	5.7%	(4.2%)	(0.1%)	3.5%
GLOBAL INFLATION LINKEI	$ 242,648,147	1%	(7.5%)	(0.0%)	0.5%	(7.4%)	(0.0%)	0.5%	(11.3%)	(0.1%)	0.5%	(24.2%)	4.4%	(3.7%)	(0.0%)	0.6%
INFRASTRUCTURE	$ 305,645,438	1%	(9.8%)	(0.1%)	1.3%	(9.2%)	(0.1%)	1.2%	(15.6%)	(0.1%)	1.2%	(35.1%)	5.8%	(4.7%)	(0.0%)	1.3%
MULTI-ASSET CLASS	$ 1,083,487,696	3%	(3.5%)	(0.0%)	0.4%	(3.4%)	(0.0%)	0.0%	(5.0%)	0.0%	(0.0%)	(8.5%)	2.2%	(1.8%)	(0.0%)	0.1%
GRAND TOTAL	**$ 32,628,557,563**	**100%**	**(7.1%)**	**(7.1%)**	**100.0%**	**(6.8%)**	**(6.8%)**	**100.0%**	**(11.9%)**	**(11.9%)**	**100.0%**	**(26.0%)**	**4.6%**	**(3.5%)**	**(3.5%)**	**100.0%**
INTERIM POLICY BENCHMARK			***(6.9%)***			***(6.7%)***			***(11.4%)***			***(25.5%)***	***5.8%***	***(3.4%)***		
ANNUALIZED RISK																
CASH - UNASSETIZED	$ 28,917,423	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	$ 359,999,988	1%	(19.4%)	0.0%	(0.1%)	(20.0%)	0.1%	(0.2%)	(25.4%)	0.1%	(0.3%)	N/A	12.5%	(9.5%)	0.0%	(0.2%)
TOTAL FIXED INCOME	$ 4,756,215,950	15%	(6.1%)	(0.2%)	0.7%	(5.4%)	(0.1%)	0.5%	(8.4%)	(0.1%)	0.3%	N/A	3.3%	(3.8%)	(0.1%)	0.8%
US EQUITY	$ 9,321,005,680	29%	(29.3%)	(8.5%)	34.7%	(28.3%)	(7.9%)	33.4%	(50.6%)	(14.3%)	34.9%	N/A	19.6%	(14.4%)	(4.0%)	33.5%
INTERNATIONAL EQUITY	$ 7,570,945,295	23%	(35.5%)	(7.8%)	31.7%	(33.4%)	(7.4%)	31.5%	(53.5%)	(11.8%)	28.7%	N/A	22.1%	(16.2%)	(3.7%)	30.8%
REAL ESTATE	$ 2,553,164,508	8%	(41.2%)	(3.0%)	12.4%	(39.7%)	(2.9%)	12.3%	(69.7%)	(5.2%)	12.6%	N/A	25.6%	(19.5%)	(1.5%)	12.1%
FARMLAND & TIMBER	$ 182,866,865	1%	(42.0%)	(0.2%)	0.9%	(40.4%)	(0.2%)	0.9%	(71.0%)	(0.4%)	0.9%	N/A	26.1%	(19.8%)	(0.1%)	0.9%
PRIVATE EQUITY	$ 2,631,978,589	8%	(40.0%)	(3.1%)	12.5%	(37.4%)	(2.8%)	12.0%	(64.8%)	(5.2%)	12.6%	N/A	24.3%	(18.6%)	(1.5%)	12.1%
PRIVATE DEBT	$ 1,974,751,209	6%	(9.0%)	(0.1%)	0.3%	(13.4%)	(0.5%)	2.1%	(26.8%)	(1.1%)	2.6%	N/A	9.1%	(7.5%)	(0.3%)	2.3%
OPPORTUNISTIC EQUITY	$ 479,312,505	1%	(40.0%)	(0.6%)	2.3%	(37.4%)	(0.5%)	2.2%	(64.9%)	(0.9%)	2.3%	N/A	24.3%	(18.6%)	(0.3%)	2.2%
OPPORTUNISTIC DEBT	$ 1,137,618,267	3%	(22.6%)	(0.6%)	2.2%	(31.2%)	(0.8%)	3.6%	(50.7%)	(1.5%)	3.6%	N/A	19.8%	(14.4%)	(0.4%)	3.5%
GLOBAL INFLATION LINKEI	$ 242,648,147	1%	(26.1%)	(0.1%)	0.5%	(25.6%)	(0.1%)	0.5%	(39.2%)	(0.2%)	0.5%	N/A	15.3%	(13.0%)	(0.1%)	0.6%
INFRASTRUCTURE	$ 305,645,438	1%	(33.9%)	(0.3%)	1.3%	(31.9%)	(0.3%)	1.2%	(54.2%)	(0.5%)	1.2%	N/A	20.2%	(16.2%)	(0.2%)	1.3%
MULTI-ASSET CLASS	$ 1,083,487,696	3%	(12.1%)	(0.1%)	0.4%	(11.8%)	(0.0%)	0.0%	(17.3%)	0.0%	(0.0%)	N/A	7.5%	(6.4%)	(0.0%)	0.1%
GRAND TOTAL	**$ 32,628,557,563**	**100%**	**(24.5%)**	**(24.5%)**	**100.0%**	**(23.6%)**	**(23.6%)**	**100.0%**	**(41.1%)**	**(41.1%)**	**100.0%**	**N/A**	**15.8%**	**(12.1%)**	**(12.1%)**	**100.0%**
INTERIM POLICY BENCHMARK			***(23.9%)***			***(23.2%)***			***(39.6%)***			***N/A***	***20.0%***	***(11.7%)***		

Strategy	$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
CASH - UNASSETIZED	$ 28,917,423	0%	0.00		0.00				$ 28,917,423	$ 28,917,423	100.0%
CASH - ASSETIZED	$ 359,999,988	1%	(0.10)	(0.30)	(0.07)	(0.27)			$ 747,936,045	$ 359,999,988	100.0%
TOTAL FIXED INCOME	$ 4,756,215,950	15%	0.01	0.05	0.02	0.14	5.34	0.276	$ 4,528,643,506	$ 4,756,215,950	100.0%
US EQUITY	$ 9,321,005,680	29%	1.03	0.99	0.79	0.90	0.27	0.001	$ 9,476,468,033	$ 9,321,005,680	100.0%
INTERNATIONAL EQUITY	$ 7,570,945,295	23%	1.07	0.90	0.99	0.99			$ 7,571,071,507	$ 7,585,698,358	100.2%
REAL ESTATE	$ 2,553,164,508	8%	1.20	0.87	1.02	0.88			$ 2,553,164,508	$ 2,553,164,508	100.0%
FARMLAND & TIMBER	$ 182,866,865	1%	1.22	0.87	1.04	0.88			$ 182,866,865	$ 182,866,865	100.0%
PRIVATE EQUITY	$ 2,631,978,589	8%	1.24	0.95	0.94	0.85			$ 2,631,978,589	$ 2,644,456,136	100.5%
PRIVATE DEBT	$ 1,974,751,209	6%	0.29	0.60	0.24	0.58	0.46	0.003	$ 1,974,388,039	$ 1,974,827,856	100.0%
OPPORTUNISTIC EQUITY	$ 479,312,505	1%	1.24	0.95	0.94	0.85			$ 479,312,505	$ 479,312,505	100.0%
OPPORTUNISTIC DEBT	$ 1,137,618,267	3%	0.74	0.70	0.64	0.71			$ 1,137,618,267	$ 1,137,618,267	100.0%
GLOBAL INFLATION LINKEI	$ 242,648,147	1%	0.27	0.65	0.24	0.68	0.23	0.001	$ 474,989,973	$ 242,648,147	100.0%
INFRASTRUCTURE	$ 305,645,438	1%	1.05	0.97	0.90	0.98			$ 305,645,438	$ 305,645,438	100.0%
MULTI-ASSET CLASS	$ 1,083,487,696	3%	0.00	0.04	0.00	0.03	(7.08)	(0.801)	$ 13,286,112,717	$ 3,769,551,033	347.9%
GRAND TOTAL	**$ 32,628,557,563**	**100%**	**0.59**	**0.97**	**0.49**	**0.95**	**4.65**	**0.223**	**$ 45,379,113,418**	**$ 35,341,928,157**	**108.3%**

ARIZONA STATE RETIREMENT SYSTEM
As of September 30, 2015

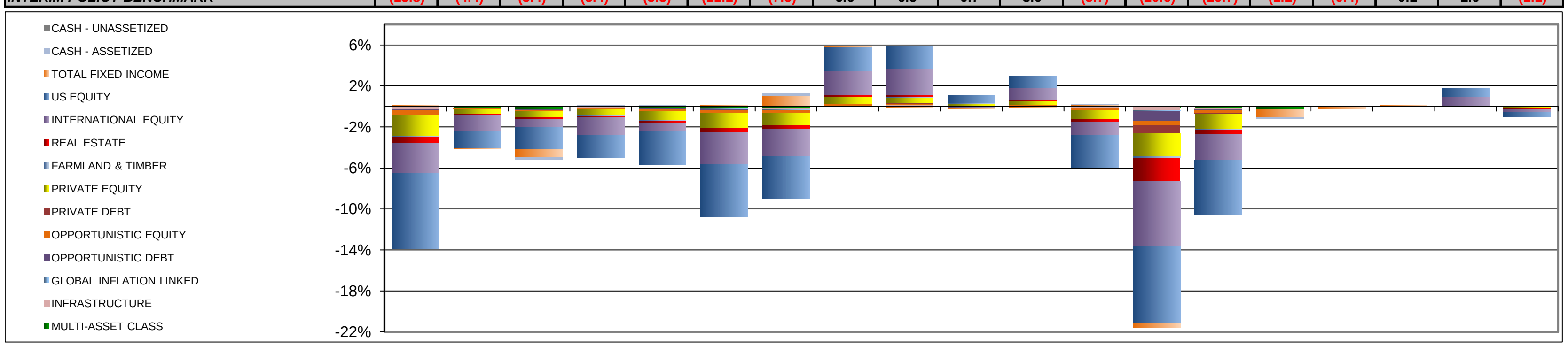
TOTAL PLAN STRESS TESTS

Stress Test Stand Alone

Strategy	$ Value	% Value	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%
			Historical Scenarios													Predictive Scenarios					
CASH - UNASSETIZED	$ 28,917,423	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	$ 359,999,988	1.1%	3.6	(1.6)	(20.1)	2.6	2.1	3.5	23.5	0.1	(2.9)	(2.6)	(4.3)	5.1	(0.4)	0.0	(14.8)	0.0	2.1	0.0	1.5
TOTAL FIXED INCOME	$ 4,756,215,950	14.6%	0.9	(0.4)	(5.4)	0.6	0.5	0.8	6.8	0.0	(0.7)	(0.6)	(1.1)	1.2	(2.8)	0.0	(5.4)	(1.5)	0.6	(0.0)	0.4
US EQUITY	$ 9,321,005,680	28.6%	(25.9)	(5.7)	(7.3)	(7.8)	(11.4)	(18.0)	(14.7)	8.1	7.5	2.6	3.9	(11.0)	(26.3)	(19.0)	0.0	0.0	(0.0)	2.9	(1.6)
INTERNATIONAL EQUITY	$ 7,570,945,295	23.2%	(12.9)	(6.8)	(3.6)	(7.2)	(3.4)	(13.3)	(11.5)	10.2	11.2	(0.6)	5.3	(5.5)	(27.6)	(10.8)	0.0	0.0	0.0	3.7	(1.4)
REAL ESTATE	$ 2,553,164,508	7.8%	(7.5)	(1.7)	(2.2)	(2.3)	(3.3)	(5.3)	(4.3)	2.4	2.2	0.8	1.1	(3.2)	(28.5)	(5.5)	0.0	0.0	0.0	0.0	(0.4)
FARMLAND & TIMBER	$ 182,866,865	0.6%	(7.7)	(1.7)	(2.2)	(2.3)	(3.4)	(5.4)	(4.4)	2.4	2.2	0.8	1.2	(3.3)	(29.0)	(5.6)	0.0	0.0	0.0	0.0	(0.5)
PRIVATE EQUITY	$ 2,631,978,589	8.1%	(25.8)	(5.7)	(7.4)	(7.8)	(11.4)	(18.2)	(14.6)	8.2	7.4	2.7	3.9	(11.0)	(27.1)	(19.0)	0.0	0.0	0.0	0.0	(1.7)
PRIVATE DEBT	$ 1,974,751,209	6.1%	(0.8)	(0.2)	(0.2)	(0.2)	(0.4)	(0.6)	(0.4)	0.3	0.2	0.1	0.1	(0.4)	(14.6)	(0.6)	(0.0)	(0.2)	0.0	0.0	(0.1)
OPPORTUNISTIC EQUITY	$ 479,312,505	1.5%	(25.8)	(5.7)	(7.4)	(7.8)	(11.4)	(18.2)	(14.7)	8.2	7.4	2.7	3.9	(11.0)	(27.1)	(19.0)	0.0	0.0	0.0	0.0	(1.7)
OPPORTUNISTIC DEBT	$ 1,137,618,267	3.5%	(4.1)	(0.9)	(1.2)	(1.2)	(1.8)	(2.9)	(2.3)	1.3	1.2	0.4	0.6	(1.8)	(27.3)	(3.0)	0.0	0.0	0.0	0.0	(0.4)
GLOBAL INFLATION LINKEI	$ 242,648,147	0.7%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)	0.0	0.0	0.0	(0.0)	(16.1)	0.0	0.1	0.0	(0.0)	(5.6)	(5.4)
INFRASTRUCTURE	$ 305,645,438	0.9%	(20.3)	(4.5)	(5.8)	(6.1)	(9.0)	(14.3)	(11.5)	6.4	5.8	2.1	3.1	(8.7)	(28.3)	(14.9)	0.0	0.0	0.0	0.0	(1.6)
MULTI-ASSET CLASS	$ 1,083,487,696	3.3%	(2.2)	(3.0)	(7.7)	(2.0)	(3.9)	(3.4)	(6.2)	(0.5)	2.4	(0.2)	1.6	(1.9)	(2.0)	(4.4)	(7.8)	0.4	0.9	2.1	0.7
GRAND TOTAL	**$ 32,628,557,563**	**100.0%**	**(13.8)**	**(4.2)**	**(5.2)**	**(4.9)**	**(5.6)**	**(10.6)**	**(7.8)**	**5.8**	**5.7**	**0.8**	**2.7**	**(5.7)**	**(21.6)**	**(10.6)**	**(1.2)**	**(0.2)**	**0.1**	**1.7**	**(0.9)**
INTERIM POLICY BENCHMARK			**(13.8)**	**(4.4)**	**(5.4)**	**(5.4)**	**(5.3)**	**(11.1)**	**(7.5)**	**6.6**	**6.5**	**0.7**	**3.0**	**(5.7)**	**(20.6)**	**(10.7)**	**(1.2)**	**(0.4)**	**0.1**	**2.0**	**(1.1)**

Stress Test Contribution

Strategy	$ Value	% Value	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%
CASH - UNASSETIZED	$ 28,917,423	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	$ 359,999,988	1.1%	0.0	(0.0)	(0.2)	0.0	0.0	0.0	0.3	0.0	(0.0)	(0.0)	(0.0)	0.1	(0.0)	0.0	(0.2)	0.0	0.0	0.0	0.0
TOTAL FIXED INCOME	$ 4,756,215,950	14.6%	0.1	(0.1)	(0.8)	0.1	0.1	0.1	1.0	0.0	(0.1)	(0.1)	(0.2)	0.2	(0.4)	0.0	(0.8)	(0.2)	0.1	(0.0)	0.1
US EQUITY	$ 9,321,005,680	28.6%	(7.4)	(1.6)	(2.1)	(2.2)	(3.3)	(5.1)	(4.2)	2.3	2.1	0.8	1.1	(3.2)	(7.5)	(5.4)	0.0	0.0	(0.0)	0.8	(0.4)
INTERNATIONAL EQUITY	$ 7,570,945,295	23.2%	(3.0)	(1.6)	(0.8)	(1.7)	(0.8)	(3.1)	(2.7)	2.4	2.6	(0.1)	1.2	(1.3)	(6.4)	(2.5)	0.0	0.0	0.0	0.9	(0.3)
REAL ESTATE	$ 2,553,164,508	7.8%	(0.6)	(0.1)	(0.2)	(0.2)	(0.3)	(0.4)	(0.3)	0.2	0.2	0.1	0.1	(0.3)	(2.2)	(0.4)	0.0	0.0	0.0	0.0	(0.0)
FARMLAND & TIMBER	$ 182,866,865	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)	(0.2)	(0.0)	0.0	0.0	0.0	0.0	(0.0)
PRIVATE EQUITY	$ 2,631,978,589	8.1%	(2.1)	(0.5)	(0.6)	(0.6)	(0.9)	(1.5)	(1.2)	0.7	0.6	0.2	0.3	(0.9)	(2.2)	(1.5)	0.0	0.0	0.0	0.0	(0.1)
PRIVATE DEBT	$ 1,974,751,209	6.1%	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.9)	(0.0)	(0.0)	(0.0)	0.0	0.0	(0.0)
OPPORTUNISTIC EQUITY	$ 479,312,505	1.5%	(0.4)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.2)	0.1	0.1	0.0	0.1	(0.2)	(0.4)	(0.3)	0.0	0.0	0.0	0.0	(0.0)
OPPORTUNISTIC DEBT	$ 1,137,618,267	3.5%	(0.1)	(0.0)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	0.0	0.0	0.0	0.0	(0.1)	(1.0)	(0.1)	0.0	0.0	0.0	0.0	(0.0)
GLOBAL INFLATION LINKEI	$ 242,648,147	0.7%	(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	$ 305,645,438	0.9%	(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	$ 1,083,487,696	3.3%	(0.1)	(0.1)	(0.3)	(0.1)	(0.1)	(0.1)	(0.2)	(0.0)	0.1	(0.0)	0.1	(0.1)	(0.1)	(0.1)	(0.3)	0.0	0.0	0.1	0.0
GRAND TOTAL	**$ 32,628,557,563**	**100.0%**	**(13.8)**	**(4.2)**	**(5.2)**	**(4.9)**	**(5.6)**	**(10.6)**	**(7.8)**	**5.8**	**5.7**	**0.8**	**2.7**	**(5.7)**	**(21.6)**	**(10.6)**	**(1.2)**	**(0.2)**	**0.1**	**1.7**	**(0.9)**
INTERIM POLICY BENCHMARK			**(13.8)**	**(4.4)**	**(5.4)**	**(5.4)**	**(5.3)**	**(11.1)**	**(7.5)**	**6.6**	**6.5**	**0.7**	**3.0**	**(5.7)**	**(20.6)**	**(10.7)**	**(1.2)**	**(0.4)**	**0.1**	**2.0**	**(1.1)**



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, making no assumption of the tail distribution, 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, making a Normal distribution assumption of the tail distribution, 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. Where VaR asks the question 'how bad can things get?', expected shortfall asks 'if things do get bad, what is our expected loss?
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.	

Agenda Item #4

NEPC, LLC

To: The Arizona State Retirement System (ASRS) Investment Committee (IC)

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

Mr. Dan LeBeau, Consultant, NEPC

Date: November 23, 2015

Subject: Agenda Item #4: Presentation, Discussion and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q3-15

Purpose

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

In addition to the Total Fund Report, NEPC and IMD Staff will provide a detailed review of the quarterly ASRS Investment Performance Report (IPR).

Recommendation

Informational only; no action required.

Notice

Regarding this agenda item, pursuant to A.R.S. § 38-431.03(A)(2) and A.R.S. § 38-718(P) notice is hereby given to Trustees of the ASRS Investment Committee and the general public that the ASRS Investment Committee may vote to go into executive session, in the event specific manager data is discussed that is deemed confidential/non-public information.

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 IC 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 IC and Board.

More specific to the IC, NEPC will provide the IC with an ASRS Investment Performance Report (IPR) on a quarterly basis, which will provide investment manager-level detail information for discussion by NEPC and IMD staff. In addition, IMD will provide one or more staff reports related to ASRS private investments or other asset class/managers. These reports will be marked as confidential/non-public and, prior to a discussion of individual manager performance, the IC will move to executive session.

As of September 30, 2015 the Total Fund's market value was approximately $33.0 billion.

For the one-year period ending September 30, 2015, the Total Fund returned -0.2% (net of fees), outperforming the Interim SAA Policy by 1.3%. For the three-year period, the Total Fund produced a return of 8.0% per annum, outperforming the Interim SAA Policy by 1.1%. Over the past ten years, the Total Fund has returned 6.0% per annum, and since inception, the portfolio's performance is 9.7%.

Attachments:

- NEPC's Independent Reporting, Monitoring and Oversight reports
- ASRS Investment Performance Report (IPR) for period ending September 30, 2015. (Confidential/Non-Public) – distributed at the meeting

Arizona State Retirement System

Independent ASRS Investment Program Oversight for the Period Ending September 30, 2015

November 30, 2015

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

NEPC, LLC

Contents

ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of September 30, 2015 and reflects the deduction of investment manager fees, unless otherwise noted.

ASRS Investment Objectives

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

Total Fund Performance

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

	20 Year Annualized Return
Total Fund	7.6%
Constant 8%	8.0%
Excess Return	(0.4)%

Goal Met: No

Total Fund Performance

- 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.

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	-4.6%	-0.2%	8.0%	8.8%	6.0%	9.7%
Interim SAA Policy[1]	-4.9%	-1.5%	6.9%	8.1%	5.7%	9.4%
Excess Return	0.3%	1.3%	1.1%	0.7%	0.3%	0.3%

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

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

Total Fund Attribution Analysis

Total Plan	1 Year	3 Years	5 Years
Allocation Effect[1]	0.50%	0.74%	0.50%
Manager Selection Effect[2]	0.76%	0.45%	0.33%
Residual[3]	0.00%	-0.05%	-0.07%
Excess Return	**1.26%**	**1.14%**	**0.76%**

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:

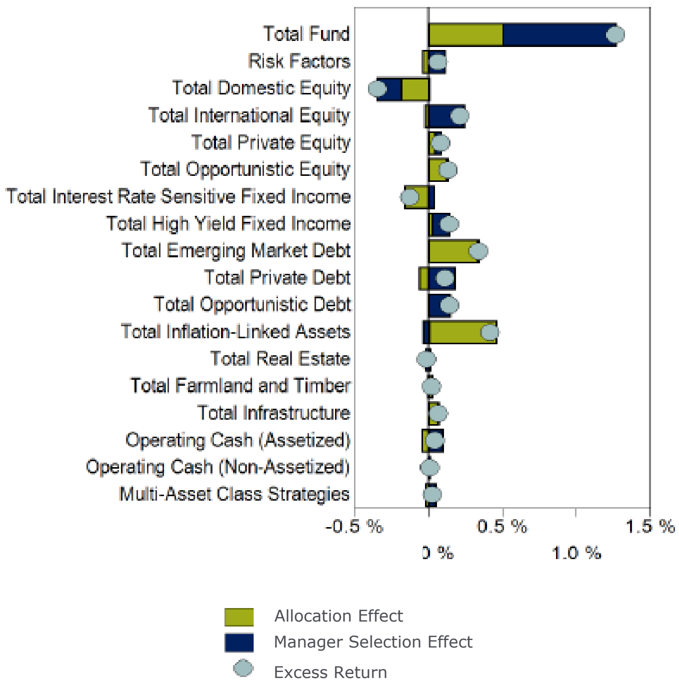
1. Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

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.

Total Fund Attribution Detail

Attribution Effects
1 Year Ending September 30, 2015



1 Year Excess Return: +1.26%

- Allocation Effect: +0.50%
  - Commodities tactical underweight (+0.45%)
  - Emerging Market Debt tactical underweight (+0.33%)
  - Opportunistic Equity tactical overweight (+0.12%)
  - Domestic Equity tactical underweight (-0.19%)
  - Interest Rate Sensitive Fixed Income tactical underweight (-0.16%)
- Manager Selection Effect: +0.76%
  - International Equity outperformed due to various managers (+0.24%)
  - Private Debt outperformed due to various managers (+0.17%)
  - Public Markets Fixed Income outperformed due to various managers (+0.15%)
  - Opportunistic Debt outperformed (+0.14%)
  - Risk Factors outperformed (+0.10%)
  - Domestic Equity underperformed due to various managers (-0.16%)
- Residual: 0.00%

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:

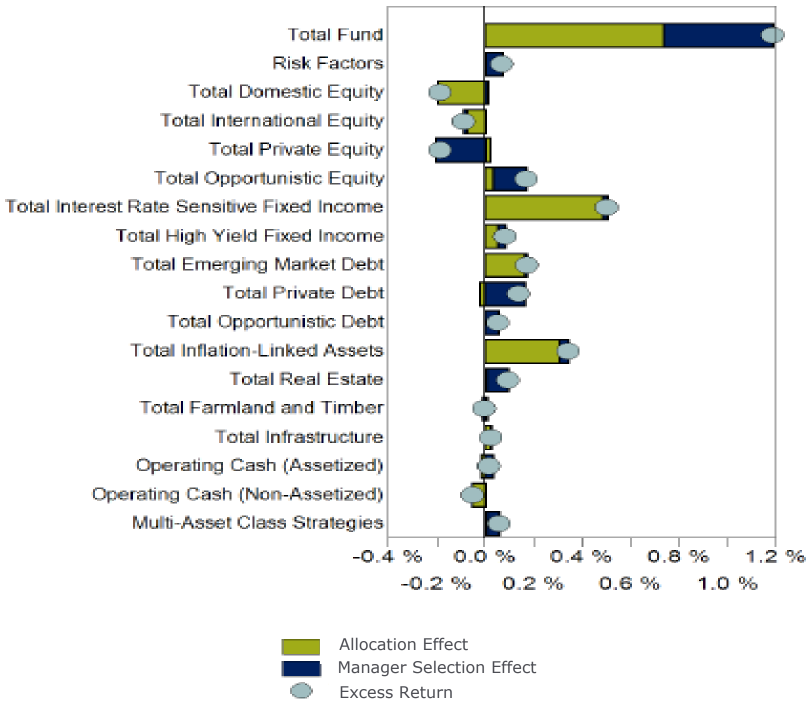
Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

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. [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))

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

Total Fund Attribution Detail

Attribution Effects
3 Years Ending September 30, 2015



3 Year Excess Return: +1.14%

- Allocation Effect: +0.74%
  - Public Markets Fixed Income tactical underweight (+0.70%)
  - Commodities tactical underweight (+0.31%)
  - Domestic Equity tactical underweight (-0.20%)
  - International Equity tactical overweight (-0.08%)
- Manager Selection Effect: +0.45%
  - Private Debt outperformed due to various managers (+0.16%)
  - Opportunistic Equity outperformed due to various managers (+0.14%)
  - Real Estate outperformed due to various managers (+0.09%)
  - Risk Factors outperformed (+0.06%)
  - Public Markets Fixed Income outperformed due to various managers (+0.06%)
  - Multi-Asset Class Strategies outperformed due to Bridgewater (+0.05%)
  - Opportunistic Debt outperformed due to various managers (+0.05%)
  - Commodities outperformed (+0.03%)
  - Private Equity underperformed due to various managers (-0.20%)
- 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:

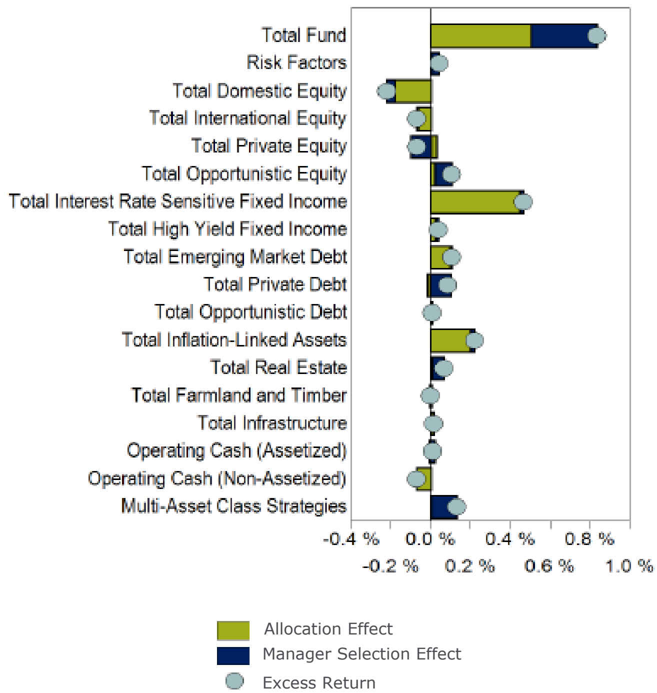
Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − Weight Asset Class Interim Policy Index)

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. [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))

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

Total Fund Attribution Detail

Attribution Effects
5 Years Ending September 30, 2015



5 Year Excess Return: +0.76%

- Allocation Effect: +0.50%
  - Public Markets Fixed Income tactical underweight (+0.57%)
  - Commodities tactical underweight (+0.20%)
  - Domestic Equity tactical underweight (-0.18%)
  - International Equity tactical overweight (-0.06%)
- Manager Selection Effect: +0.33%
  - Multi-Asset Class Strategies outperformed due to Bridgewater (+0.13%)
  - Private Debt outperformed due to various managers (+0.10%)
  - Opportunistic Equity outperformed due to various managers (+0.08%)
  - Real Estate outperformed due to various managers (+0.06%)
  - Private Equity underperformed due to various managers (-0.10%)
- Residual: -0.07%

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**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio − 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. [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))

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]	-4.0%	8.9%
ASRS Custom Total Equity Benchmark	-4.2%	8.8%
Excess Return	0.2%	0.1%
ASRS Domestic Equity	0.1%	12.7%
ASRS Custom Domestic Equity Benchmark	0.6%	12.7%
Excess Return	-0.5%	0.0%
ASRS International Equity	-9.3%	3.4%
ASRS Custom Int'l Equity Benchmark	-10.3%	3.5%
Excess Return	1.0%	-0.1%
ASRS Public Markets Fixed Income	1.0%	1.1%
ASRS Custom Fixed Income Benchmark	-1.1%	0.5%
Excess Return	2.1%	0.6%
ASRS Inflation-Linked	-27.9%	-15.4%
ASRS Custom Inflation-Linked Benchmark	-26.0%	-16.0%
Excess Return	-1.9%	0.6%
ASRS Multi-Asset Class Strategies	-1.1%	7.4%
ASRS Multi-Asset Class Strategies Benchmark	1.5%	8.1%
Excess Return	-2.6%	-0.7%

[1]Performance 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 Markets[1]

- 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	8.1%	14.2%	12.3%	Oct-07
Russell 2000	5.4%	15.9%	13.4%	
Excess Return	2.7%	-1.7%	-1.1%	
ASRS Opportunistic Equity[2]	10.4%	28.4%	26.8%	Apr-11
ASRS Private Debt	9.1%	--	12.1%	Jul-12
S&P/LSTA Levered Loan Index + 250 bps	4.6%	--	6.3%	
Excess Return	4.5%	--	5.8%	
ASRS Opportunistic Debt[2]	4.4%	9.3%	11.1%	Jan-08
ASRS Real Estate	14.7%	13.8%	7.2%	Oct-05
NFI - ODCE Index	13.4%	12.1%	6.5%	
Excess Return	1.3%	1.7%	0.7%	
ASRS Farmland and Timber	4.0%	--	3.3%	Jul-13
CPI ex-Food and Energy + 350 bps	5.6%	--	5.5%	
Excess Return	-1.6%		-2.2%	
ASRS Total Infrastructure	--	--	2.8%	Dec-14
CPI ex-Food and Energy + 350 bps	--	--	4.6%	
Excess Return			-1.8%	

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

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

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 +	Internal CFs =	Total CFs during the Month	Last day of the Month Ending Balance*
Sep – 14	($84.7)	($6.8)	($91.5)	$365.4
Oct – 14	($64.8)	$57.7	($7.1)	$139.9
Nov – 14	($109.5)	($72.2)	($181.7)	$314.7
Dec – 14	($56.7)	($571.9)	($628.6)	$467.3
Jan – 15	($82.9)	($39.8)	($122.7)	$140.1
Feb – 15	($123.2)	$7.2	($116.0)	$80.4
Mar – 15	($64.8)	($19.3)	($84.1)	$418.0
Apr – 15	($90.9)	($154.8)	($245.7)	$550.1
May – 15	($47.8)	($37.8)	($85.6)	$479.0
Jun – 15	($74.4)	($117.1)	($191.5)	$318.3
Jul – 15	($150.0)	($205.8)	($355.8)	$405.5
Aug – 15	($136.3)	($115.6)	($251.9)	$351.7
Sep – 15	($103.3)	($333.9)	($437.2)	$392.0

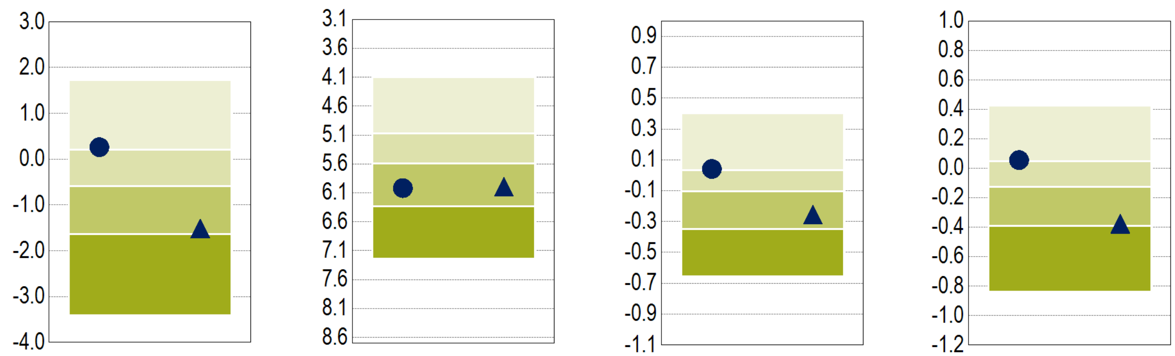
*** Includes assetized & unassetized cash balances (Inception of 1/26/15); represent monies to be used for funding needs that occur in subsequent month(s). Generally, monthly pension payments occur on the first day of month.**

Goal Met: Yes

Total Fund Risk Statistics vs. Peer Universe

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

1 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	0.3	6.0	0.0	0.1
%tile	24	63	24	24
▲ Interim SAA Policy				
Value	-1.5	6.0	-0.3	-0.4
%tile	70	63	70	72
Universe				
5th %tile	1.7	4.1	0.4	0.4
25th %tile	0.2	5.1	0.0	0.1
Median	-0.6	5.6	-0.1	-0.1
75th %tile	-1.6	6.3	-0.3	-0.4
95th %tile	-3.4	7.2	-0.7	-0.8

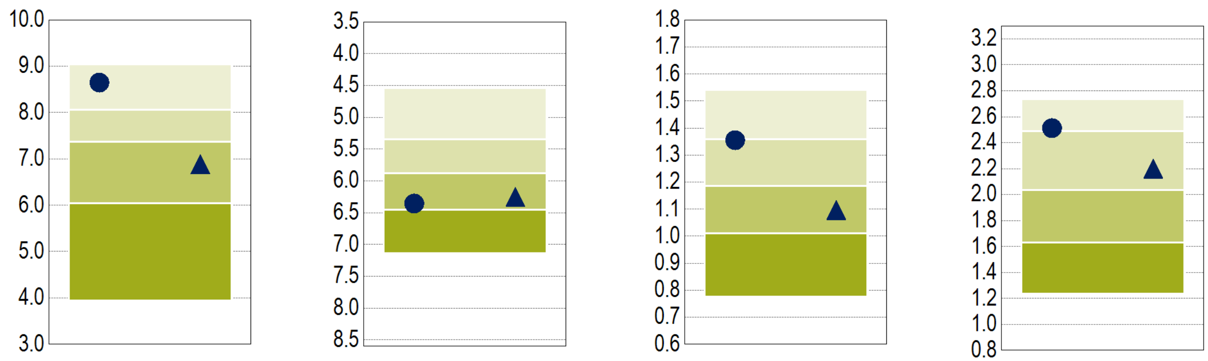
Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross 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 95 observations for the period ending September 30, 2015, with total assets of $1.7 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

Anlzd Return | Anlzd Standard Deviation | Sharpe Ratio | Sortino Ratio



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	8.6	6.4	1.4	2.5
%tile	10	72	28	22
▲ Interim SAA Policy				
Value	6.9	6.2	1.1	2.2
%tile	58	67	69	42
Universe				
5th %tile	9.0	4.5	1.5	2.7
25th %tile	8.1	5.3	1.4	2.5
Median	7.4	5.9	1.2	2.0
75th %tile	6.1	6.4	1.0	1.6
95th %tile	4.0	7.1	0.8	1.2

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.
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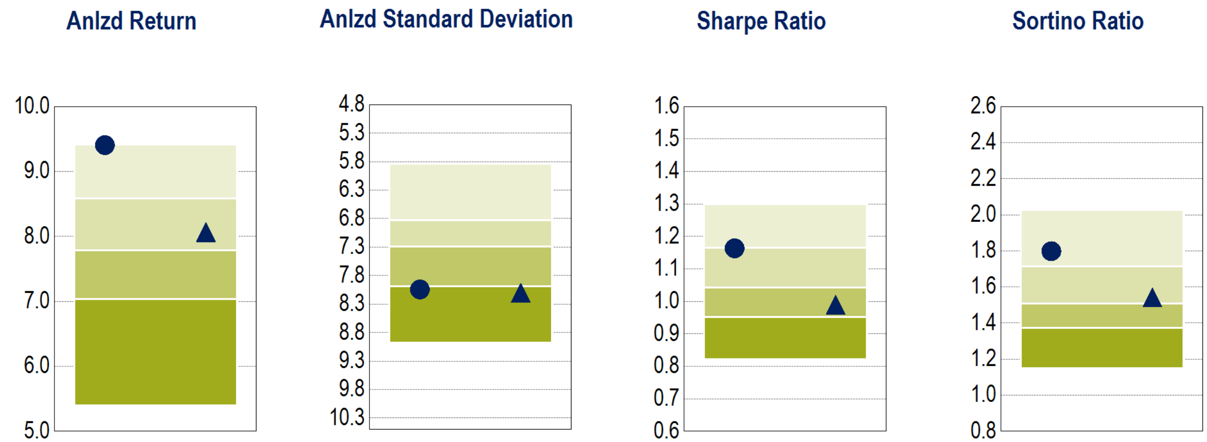
The InvestorForce Public Funds > $1 Billion Universe contains 95 observations for the period ending September 30, 2015, with total assets of $1.7 trillion.
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

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

5 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	9.4	8.0	1.2	1.8
%tile	6	78	26	18
▲ Interim SAA Policy				
Value	8.1	8.1	1.0	1.5
%tile	45	78	64	42
Universe				
5th %tile	9.4	5.8	1.3	2.0
25th %tile	8.6	6.8	1.2	1.7
Median	7.8	7.3	1.0	1.5
75th %tile	7.0	8.0	1.0	1.4
95th %tile	5.4	9.0	0.8	1.2

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.
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The InvestorForce Public Funds > $1 Billion Universe contains 95 observations for the period ending September 30, 2015, with total assets of $1.7 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	6.5	10.7	0.5	0.7
%tile	7	84	36	31
▲ Interim SAA Policy				
Value	5.7	11.1	0.4	0.6
%tile	54	87	79	76
Universe				
5th %tile	6.6	8.0	0.6	0.9
25th %tile	6.2	9.2	0.5	0.8
Median	5.8	9.8	0.5	0.7
75th %tile	5.2	10.5	0.4	0.6
95th %tile	4.6	11.3	0.3	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.
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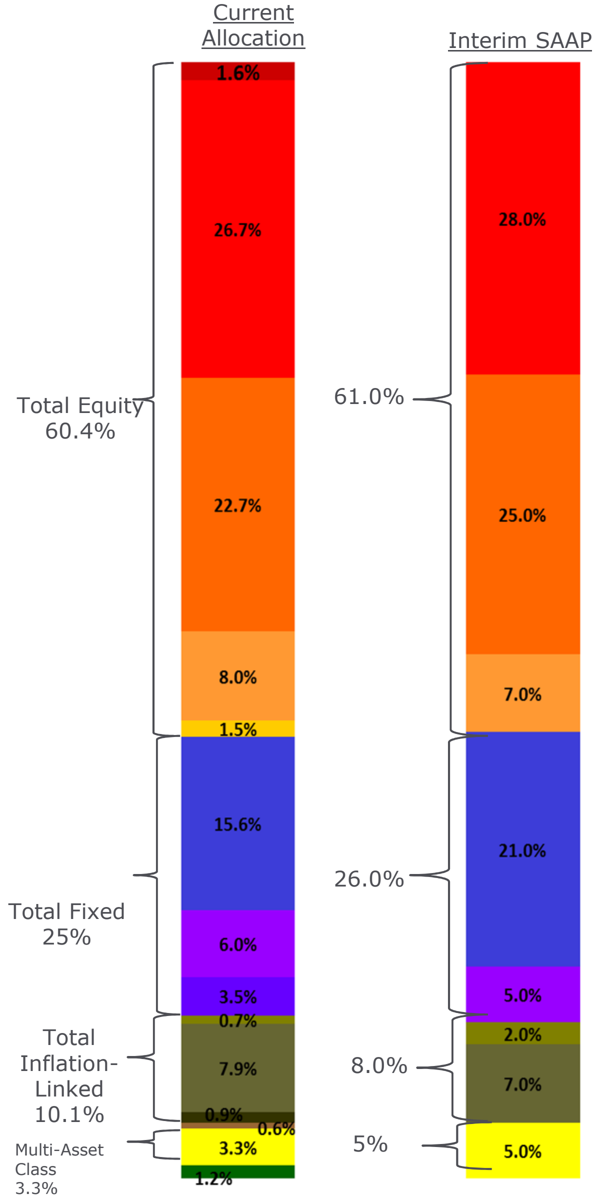
The InvestorForce Public Funds > $1 Billion Universe contains 95 observations for the period ending September 30, 2015, with total assets of $1.7 trillion.
Composition of Interim SAA Policy can be found in the appendix.

Independent Oversight/Compliance

Note: All of the data shown on the following pages is as of September 30, 2015 and reflects the deduction of investment manager fees, unless otherwise noted.

SAA Policy Compliance



		Current Mkt Value	Current Allocation	Interim SAAP	Difference	Policy Range	Within Range
Total Domestic and International Equity[1]		$16,823,835,177	51.0%	53.0%	-2.0%		
Domestic Equity[2]		$8,804,975,453	26.7%	28.0%	-1.3%	16% - 36%	Yes
	U.S. Large Cap	*$6,958,889,493*	*21.1%*	*22.0%*	*-0.9%*		
	U.S. Mid Cap	*$941,088,936*	*2.9%*	*3.0%*	*-0.1%*		
	U.S. Small Cap	*$904,997,024*	*2.7%*	*3.0%*	*-0.3%*		
International Equity[2]		$7,490,182,873	22.7%	25.0%	-2.3%	14% - 34%	Yes
	Developed Large Cap	*$5,496,020,109*	*16.7%*	*18.0%*	*-1.3%*		
	Developed Small Cap	*$641,867,052*	*1.9%*	*2.0%*	*-0.1%*		
	Emerging Markets	*$1,351,557,075*	*4.1%*	*5.0%*	*-0.9%*		
Private Equity[3]		$2,630,672,223	8.0%	7.0%	1.0%	6% - 10%	Yes
Opportunistic Equity[3,5]		$480,673,177	1.5%	0.0%	1.5%	0% - 3%	Yes
Total Equity		$19,935,180,577	60.4%	60.0%	0.4%	48% - 65%	Yes
U.S. Fixed Income		$5,131,640,536	15.6%	21.0%	-5.4%	8% - 28%	Yes
	Treasuries Long Duration	*$388,053,348*	*1.2%*	*0.0%*	*1.2%*		
	Core	*$3,731,607,177*	*11.3%*	*16.0%*	*-4.7%*		
	High Yield	*$1,011,962,598*	*3.1%*	*5.0%*			
Private Debt[3]		$1,963,196,587	6.0%	5.0%	1.0%	8% - 12%	
Opportunistic Debt[3,5]		$1,145,367,306	3.5%	0.0%	3.5%	0% - 3%	Yes
Total Fixed Income		$8,240,204,429	25.0%	26.0%	-1.0%	18% - 35%	Yes
Commodities		$232,059,332	0.7%	2.0%	-1.3%	0% - 4%	Yes
Real Estate[3]		$2,618,473,818	7.9%	7.0%	0.9%	8% - 12%	Yes
Infrastructure		$308,318,001	0.9%	0.0%	0.9%	0% - 3%	Yes
Farmland and Timber		$182,866,836	0.6%	0.0%	0.6%	0% - 3%	Yes
Opportunistic Inflation-Linked[4]		$0	0.0%	0.0%	0.0%	0% - 3%	Yes
Total Inflation-Linked		$3,341,717,987	10.1%	9.0%	1.1%	8% - 16%	Yes
Multi-Asset Class Strategies		$1,085,617,751	3.3%	5.0%	-1.7%	0% - 12%	Yes
Cash[4]		$392,075,938	1.2%	0.0%	1.2%		
	Operating Cash (Non-Assetized)	*$28,920,981*	*0.1%*	*0.0%*	*0.1%*		
	Operating Cash (Assetized)	*$363,154,956*	*1.1%*	*0.0%*	*1.1%*		
Total		**$32,994,796,681**	**100.0%**	**100.0%**	**0.0%**		

[1]Total Domestic and International Equity includes Equity Risk Factor Portfolio with assets of $528.7 million.

[2]Domestic Equity, International Equity and U.S. Fixed Income market values include residual values remaining in terminated manager accounts.

[3]Values shown for private markets portfolios include cash flows that occurred during 2Q 2015.

[4]Cash includes money for the upcoming monthly pension distribution.

[5]Aggregate Opportunistic asset classes not to exceed 10%.

Note: Interim SAA Policy includes proration of 1% Private Equity 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.

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	**32,994,796,681**	**100.0**	**-4.6**	**--**	**-4.6**	**--**	**-0.2**	**--**	**8.0**	**--**	**8.8**	**--**	**6.0**	**--**	**#**	**9.7**	**Jul-75**
Interim SAA Policy			*-4.9*	--	*-4.9*	--	*-1.5*	--	*6.9*	--	*8.1*	--	*5.7*	--		*9.4*	*Jul-75*
Over/Under			0.3		0.3		1.3		1.1		0.7		0.3			0.3	
Actual Benchmark			*-5.0*	--	*-5.0*	--	*-1.1*	--	*7.5*	--	*8.4*	--	*5.7*	--		--	*Jul-75*
Total Domestic and International Equity[1]	**16,823,835,177**	**51.0**	**-8.6**	**--**	**-8.6**	**--**	**-4.0**	**--**	**8.9**	**--**	**9.5**	**--**	**5.7**	**--**	**#**	**6.1**	**Jan-98**
ASRS Custom Total Equity Benchmark			*-9.2*	--	*-9.2*	--	*-4.2*	--	*8.8*	--	*9.5*	--	*5.8*	--		*5.5*	*Jan-98*
Over/Under			0.6		0.6		0.2		0.1		0.0		-0.1			0.6	
Total Domestic Equity	**8,804,975,453**	**26.7**	**-6.8**	**28**	**-6.8**	**28**	**0.1**	**49**	**12.7**	**44**	**13.3**	**35**	**7.4**	**42**		**11.0**	**Jul-75**
ASRS Custom Domestic Equity Benchmark			*-7.0*	*31*	*-7.0*	*31*	*0.6*	*45*	*12.7*	*43*	*13.5*	*34*	*7.2*	*47*		*11.1*	*Jul-75*
Over/Under			0.2		0.2		-0.5		0.0		-0.2		0.2			-0.1	
eA All US Equity Net Median			*-8.4*		*-8.4*		*0.0*		*12.3*		*12.6*		*7.1*			*12.4*	*Jul-75*
Total International Equity	**7,490,182,873**	**22.7**	**-11.0**	**61**	**-11.0**	**61**	**-9.3**	**68**	**3.4**	**73**	**2.8**	**77**	**3.0**	**80**		**5.7**	**Apr-87**
ASRS Custom Int'l Equity Benchmark			*-11.6*	*67*	*-11.6*	*67*	*-10.3*	*74*	*3.5*	*72*	*2.8*	*77*	*3.8*	*65*		*5.4*	*Apr-87*
Over/Under			0.6		0.6		1.0		-0.1		0.0		-0.8			0.3	
eA All ACWI ex-US Equity Net Median			*-10.4*		*-10.4*		*-7.2*		*5.4*		*4.4*		*4.3*			*7.2*	*Apr-87*
Total Public Markets Fixed Income	**5,131,640,536**	**15.6**	**0.3**	**60**	**0.3**	**60**	**1.0**	**63**	**1.1**	**76**	**3.1**	**58**	**4.8**	**45**		**8.3**	**Jul-75**
ASRS Custom Fixed Income Benchmark			*-0.4*	*78*	*-0.4*	*78*	*-1.1*	*88*	*0.5*	*91*	*2.4*	*72*	*4.3*	*59*		--	*Jul-75*
Over/Under			0.7		0.7		2.1		0.6		0.7		0.5			--	
eA All US Fixed Inc Net Median			*0.5*		*0.5*		*1.6*		*1.8*		*3.4*		*4.6*			*8.1*	*Jul-75*
Total Inflation-Linked Assets	**232,059,332**	**0.7**	**-15.4**	**--**	**-15.4**	**--**	**-27.9**	**--**	**-15.4**	**--**	**-8.2**	**--**	**--**	**--**		**-6.1**	**Feb-10**
ASRS Custom Inflation-Linked Benchmark			*-14.5*	--	*-14.5*	--	*-26.0*	--	*-16.0*	--	*-9.6*	--	*-2.1*	--		*-7.3*	*Feb-10*
Over/Under			-0.9		-0.9		-1.9		0.6		1.4					1.2	
Total Multi-Asset Class Strategies	**1,085,617,751**	**3.3**	**-5.4**	**41**	**-5.4**	**41**	**-1.1**	**22**	**7.4**	**1**	**9.3**	**1**	**7.1**	**1**		**7.2**	**Jan-04**
Multi-Asset Class Strategies Custom Benchm			*-1.0*	*5*	*-1.0*	*5*	*1.5*	*10*	*8.1*	*1*	*8.7*	*1*	*5.8*	*20*		*6.1*	*Jan-04*
Over/Under			-4.4		-4.4		-2.6		-0.7		0.6		1.3			1.1	
eA Global TAA Net Median			*-5.8*		*-5.8*		*-4.3*		*3.0*		*4.5*		*4.8*			*6.2*	*Jan-04*
Operating Cash (Assetized)	**363,154,956**	**1.1**	**-4.2**	**--**	**-4.2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**		**0.7**	**Feb-15**
ASRS Cash Assetization Custom Benchmark			-8.1	--	-8.1	--	--	--	--	--	--	--	--	--		-5.2	Feb-15
Over/Under			*3.9*		*3.9*											*5.9*	

[1]Performance 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.

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

Asset Class Performance Summary - Private Markets

	Market Value ($)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception (%)	Since
Total Fund	**32,994,796,681**	**100.0**	**-4.6**	**-0.2**	**8.0**	**8.8**	**9.7**	**Jul-75**
Interim SAA Policy			*-4.9*	*-1.5*	*6.9*	*8.1*	*9.4*	*Jul-75*
Over/Under			0.3	1.3	1.1	0.7	0.3	
Actual Benchmark			*-5.0*	*-1.1*	*7.5*	*8.4*		*Jul-75*
Total Private Equity	**2,562,010,302**	**7.8**	**3.6**	**8.1**	**14.2**	**14.7**	**12.3**	**Oct-07**
Russell 2000 1 QTR Lagged			*0.1*	*5.4*	*15.9*	*14.9*	*13.4*	*Oct-07*
Over/Under			3.5	2.7	-1.7	-0.2	-1.1	
Total Opportunistic Equity[1]	**464,608,128**	**1.4**	**-4.2**	**10.4**	**28.4**		**26.8**	**Apr-11**
Total Private Debt	**1,671,047,905**	**5.1**	**2.6**	**9.1**			**12.1**	**Jul-12**
S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged			*1.3*	*4.6*			*6.3*	*Jul-12*
Over/Under			1.3	4.5			5.8	
Total Opportunistic Debt[1]	**1,103,397,755**	**3.3**	**1.3**	**4.4**	**9.3**	**8.7**	**11.1**	**Jan-08**
Total Real Estate	**2,393,418,366**	**7.3**	**2.2**	**14.7**	**13.8**	**14.3**	**7.2**	**Oct-05**
NCREIF ODCE 1 QTR Lagged (net)			*3.6*	*13.4*	*12.1*	*13.2*	*6.5*	*Oct-05*
Over/Under			-1.4	1.3	1.7	1.1	0.7	
Total Farmland and Timber	**170,722,650**	**0.5**	**0.2**	**4.0**			**3.3**	**Jul-13**
CPI ex-Food and Energy + 350 bps 1 QTR Lagged			*1.5*	*5.6*			*5.5*	*Jul-13*
Over/Under			-1.3	-1.6			-2.2	
Total Infrastructure	**308,318,001**	**0.9**	**4.6**				**2.8**	**Dec-14**
CPI ex-Food and Energy + 350 bps 1 QTR Lagged			*1.5*				*4.6*	
Over/Under			3.1				-1.8	

Note: Performance in private markets asset classes is based on net of fee money-weighted (IRR) performance data.
Composition of Interim SAA Policy can be found in the appendix.
Performance data for Total Private Equity, Total Opportunistic Equity, Total Private Debt, Total Opportunistic Debt, Total Real Estate, and Total Farmland and Timber 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.
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 ASRS private markets portfolios.

Public Market Asset Class Analysis

3 Years Ending September 30, 2015

	% 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%	8.0%	27	6.3%	71	1.1%	50	1.0	14	1.1%	10	1.0	1.3
Interim SAA Policy	--	6.9%	58	6.2%	67	--	--	--	--	--	59	--	1.1
Total Domestic and International Equity	51.0%	8.9%	--	9.8%	--	0.6%	--	0.1	--	0.2%	--	1.0	0.9
ASRS Custom Total Equity Benchmark	--	8.8%	--	10.0%	--	--	--	--	--	--	--	--	0.9
Total Domestic Equity	26.7%	12.7%	44	9.9%	16	0.5%	1	0.0	44	0.1%	36	1.0	1.3
ASRS Custom Domestic Equity Benchmark	--	12.7%	43	10.0%	18	--	--	--	--	--	38	--	1.3
Total International Equity	22.7%	3.4%	73	11.3%	51	0.7%	1	-0.1	78	0.0%	74	1.0	0.3
ASRS Custom Int'l Equity Benchmark	--	3.5%	72	11.6%	64	--	--	--	--	--	74	--	0.3
Total Public Markets Fixed Income	15.6%	1.1%	76	3.8%	72	0.6%	1	1.1	17	0.6%	85	1.0	0.3
ASRS Custom Public Markets Fixed Income Benchmark	--	0.5%	91	3.6%	70	--	--	--	--	--	97	--	0.1
Total Inflation-Linked Assets	0.7%	-15.4%	--	12.6%	--	2.3%	--	0.3	--	0.7%	--	1.0	-1.2
ASRS Custom Inflation-Linked Benchmark	--	-16.0%	--	12.3%	--	--	--	--	--	--	--	--	-1.3
Multi-Asset Class Strategies	3.3%	7.4%	1	7.9%	74	3.4%	26	-0.2	1	-2.2%	21	1.2	0.9
Multi-Asseet Class Strategies Custom Benchmark	--	8.1%	1	6.1%	29	--	--	--	--	--	11	--	1.3

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.

Public Market Asset Class Analysis

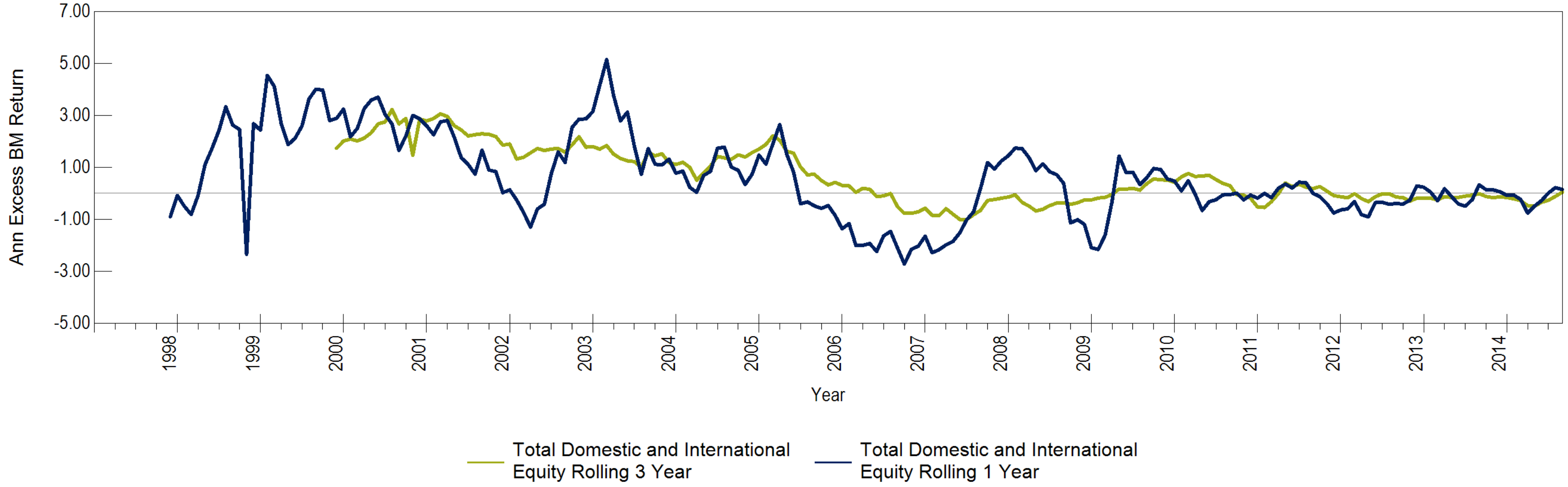
5 Years Ending September 30, 2015

	% 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%	8.8%	12	8.0%	78	1.1%	41	0.7	28	0.9%	18	1.0	1.1
Interim SAA Policy	--	8.1%	45	8.1%	78	--	--	--	--	--	66	--	1.0
Total Domestic and International Equity	51.0%	9.5%	--	12.5%	--	0.6%	--	0.0	--	0.2%	--	1.0	0.8
ASRS Custom Total Equity Benchmark	--	9.5%	--	12.6%	--	--	--	--	--	--	--	--	0.7
Total Domestic Equity	26.7%	13.3%	35	12.1%	25	0.5%	1	-0.3	57	-0.2%	32	1.0	1.1
ASRS Custom Domestic Equity Benchmark	--	13.5%	34	12.1%	24	--	--	--	--	--	31	--	1.1
Total International Equity	22.7%	2.8%	77	14.7%	38	0.8%	1	0.0	77	0.1%	75	1.0	0.2
ASRS Custom Int'l Equity Benchmark	--	2.8%	77	15.0%	53	--	--	--	--	--	77	--	0.2
Total Public Markets Fixed Income	15.6%	3.1%	58	3.3%	64	0.6%	1	1.2	4	0.6%	87	1.0	0.9
ASRS Custom Public Markets Fixed Income Benchmark	--	2.4%	72	3.2%	62	--	--	--	--	--	98	--	0.7
Total Inflation-Linked Assets	0.7%	-8.2%	--	14.7%	--	2.4%	--	0.6	--	1.1%	--	1.0	-0.6
ASRS Custom Inflation-Linked Benchmark	--	-9.6%	--	14.8%	--	--	--	--	--	--	--	--	-0.6
Multi-Asset Class Strategies	3.3%	9.3%	1	9.1%	77	2.9%	6	0.2	1	-0.1%	18	1.1	1.0
Multi-Asseet Class Strategies Custom Benchmark	--	8.7%	1	8.1%	53	--	--	--	--	--	17	--	1.1

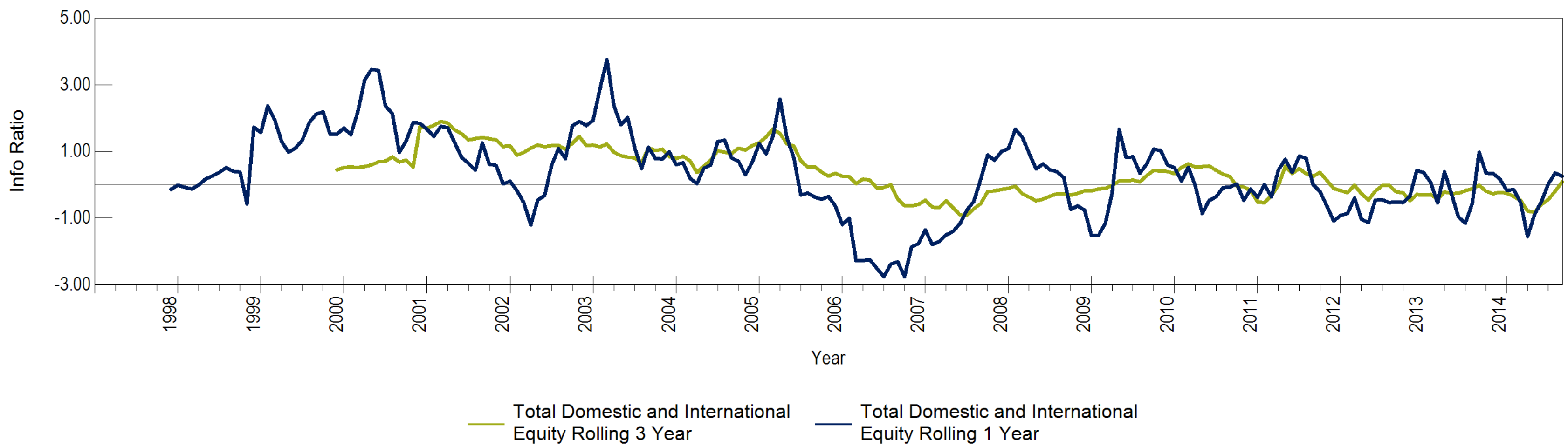
Note: Performance is reported net of fees.
Underlying composites do not add up to 100% because the chart excludes private market composites.
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes 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

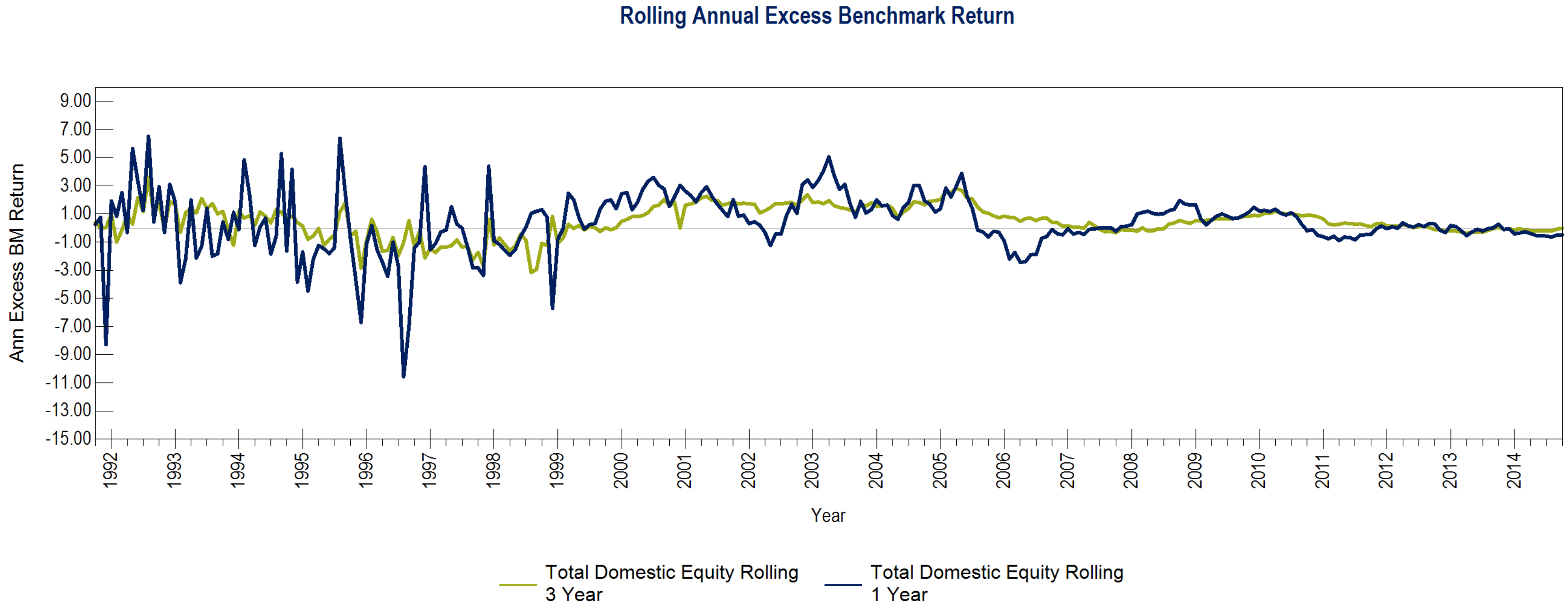
Rolling Annual Excess Benchmark Return

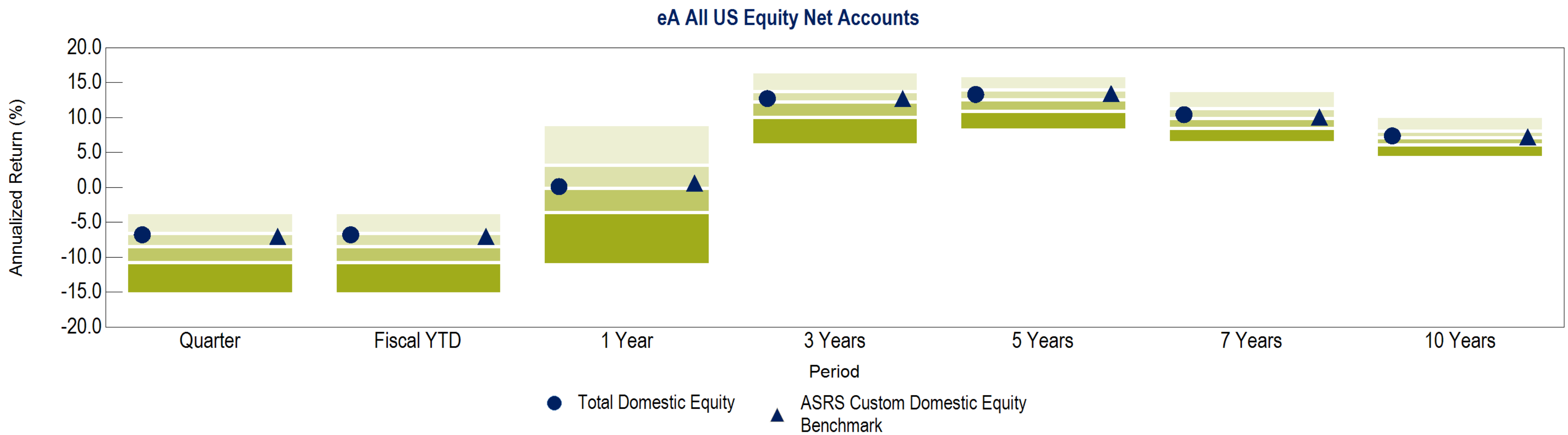


Rolling Information Ratio



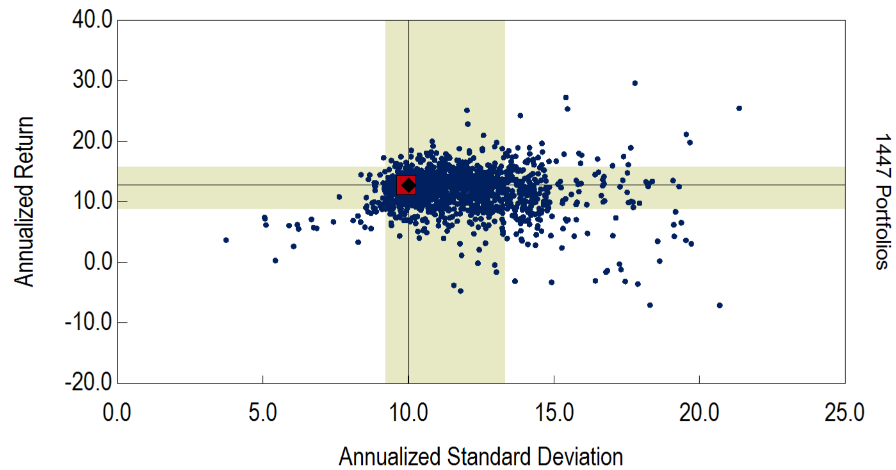
Asset Class Analysis - Total Domestic Equity





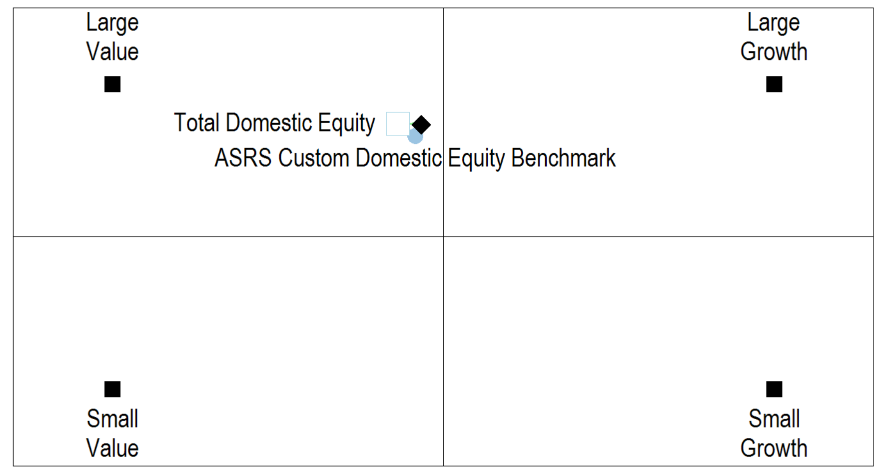
Asset Class Analysis - Total Domestic Equity

3 Year Risk Return

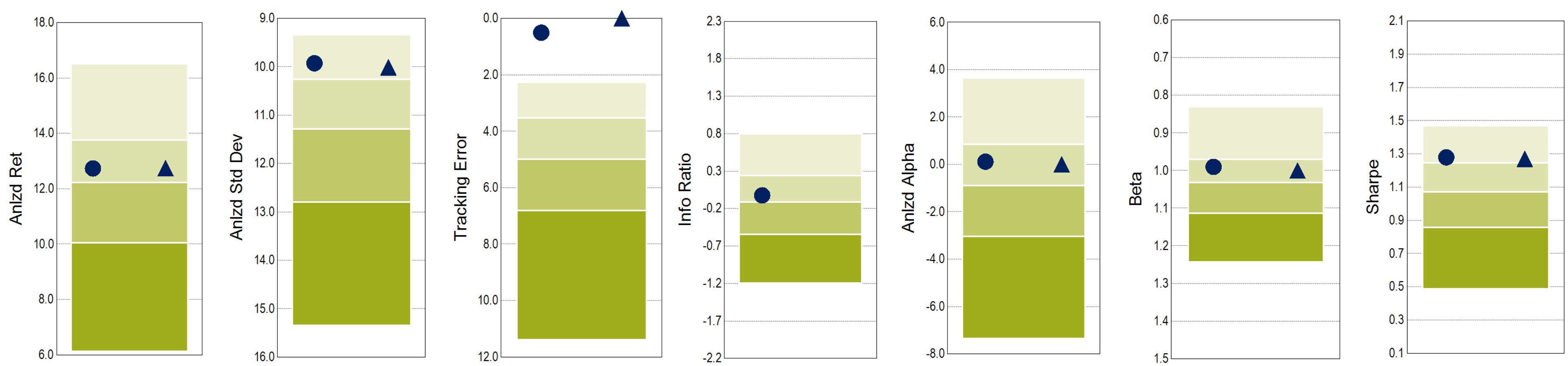


- Total Domestic Equity
- ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

3 Year Style Map



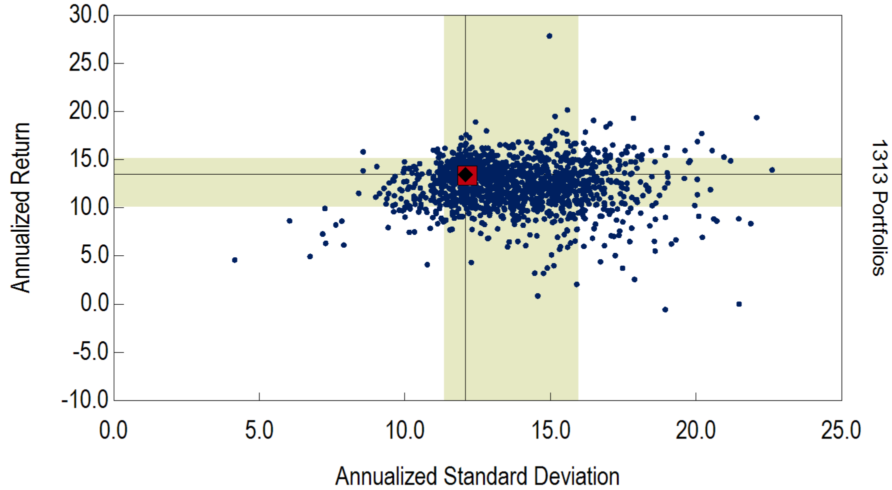
First Rolling Period | Last Rolling Period



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

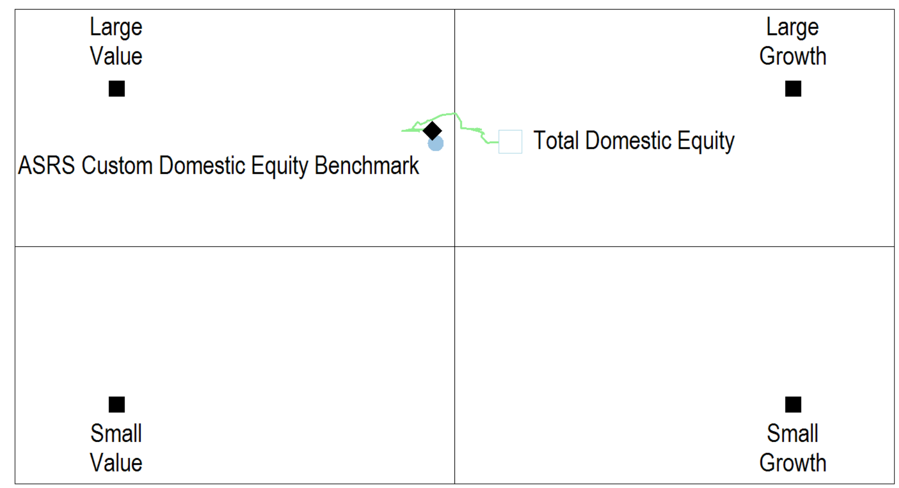
Asset Class Analysis - Total Domestic Equity

5 Year Risk Return

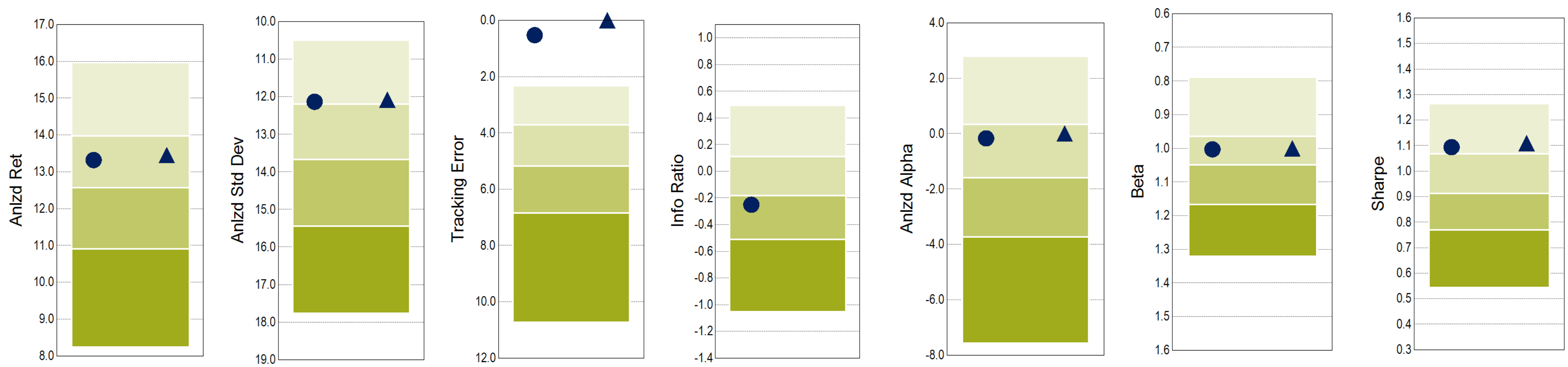


- Total Domestic Equity
- ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

5 Year Style Map

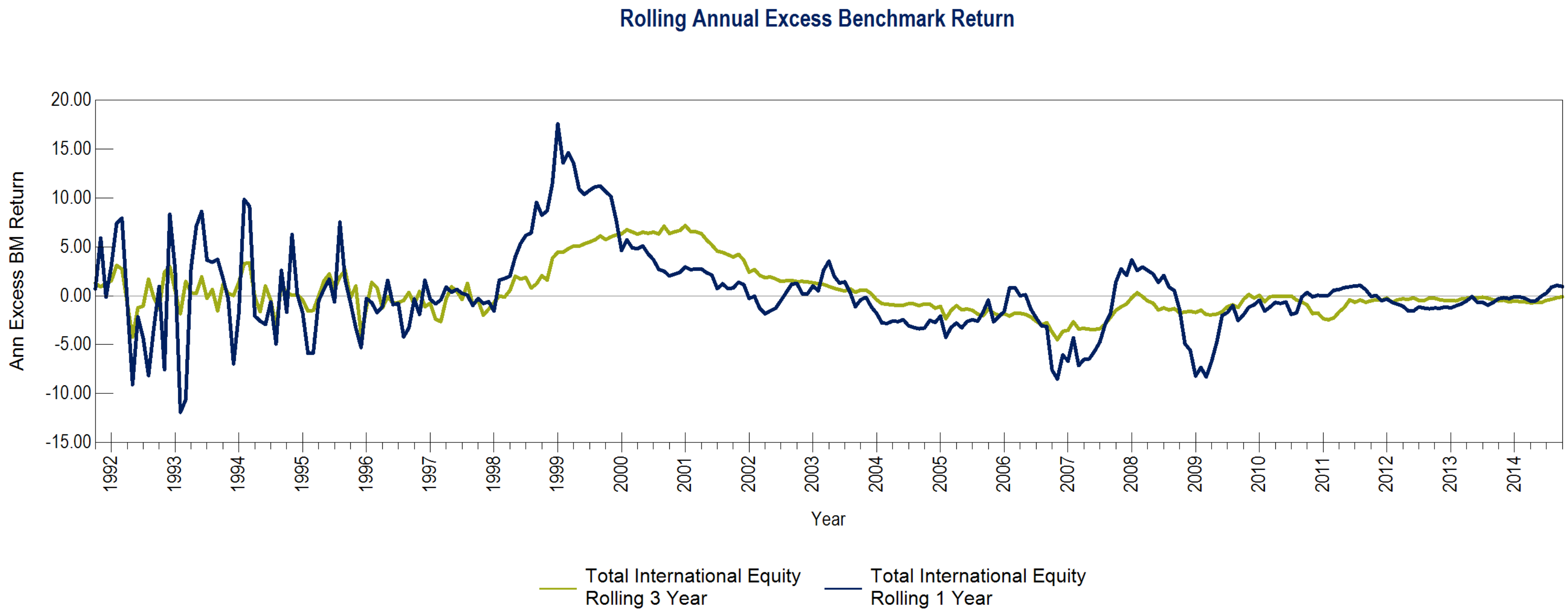


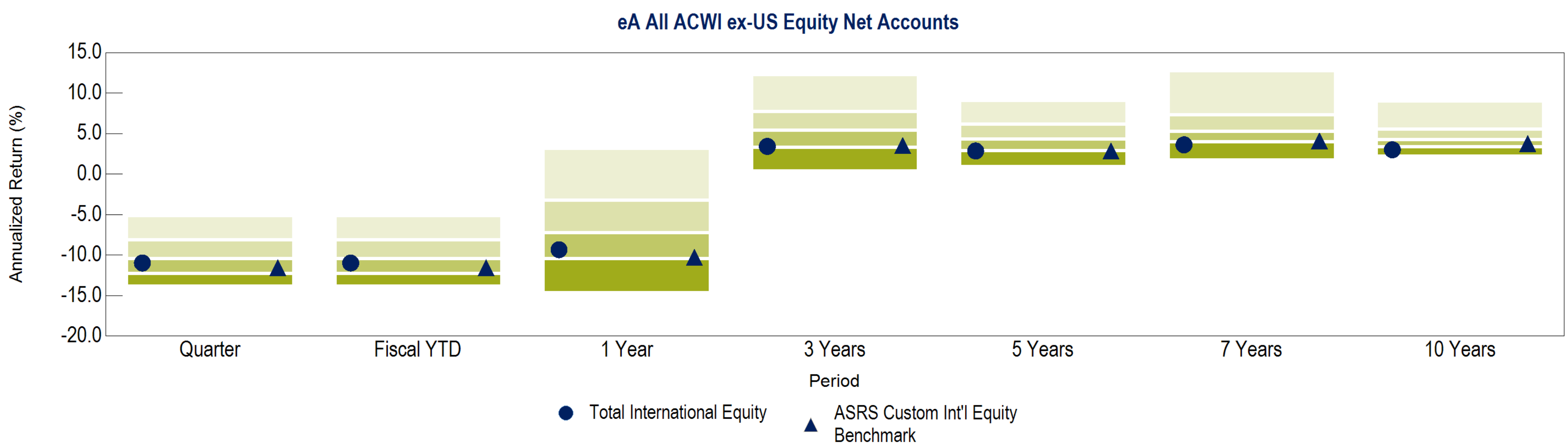
First Rolling Period　Last Rolling Period



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

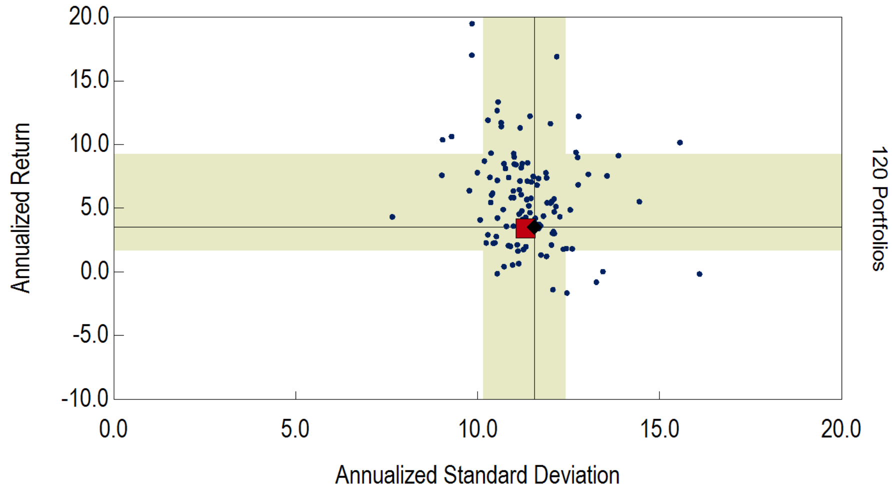
Asset Class Analysis - Total International Equity





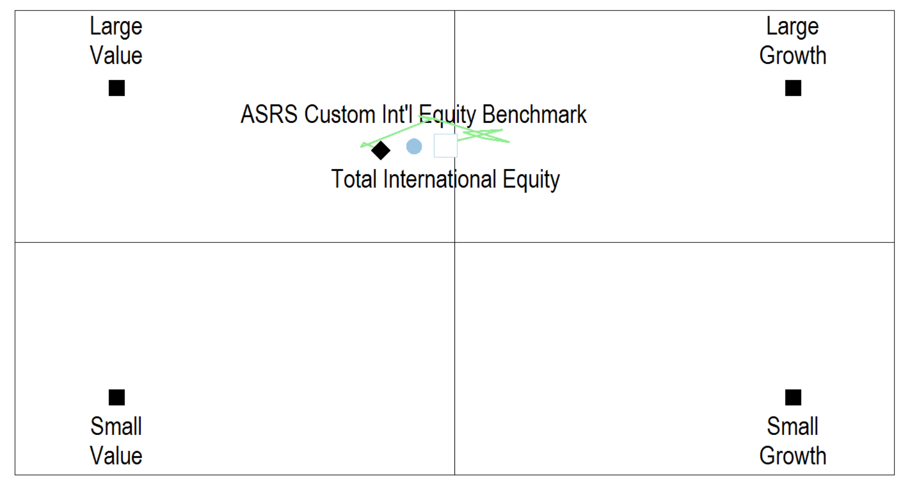
Asset Class Analysis - Total International Equity

3 Year Risk Return

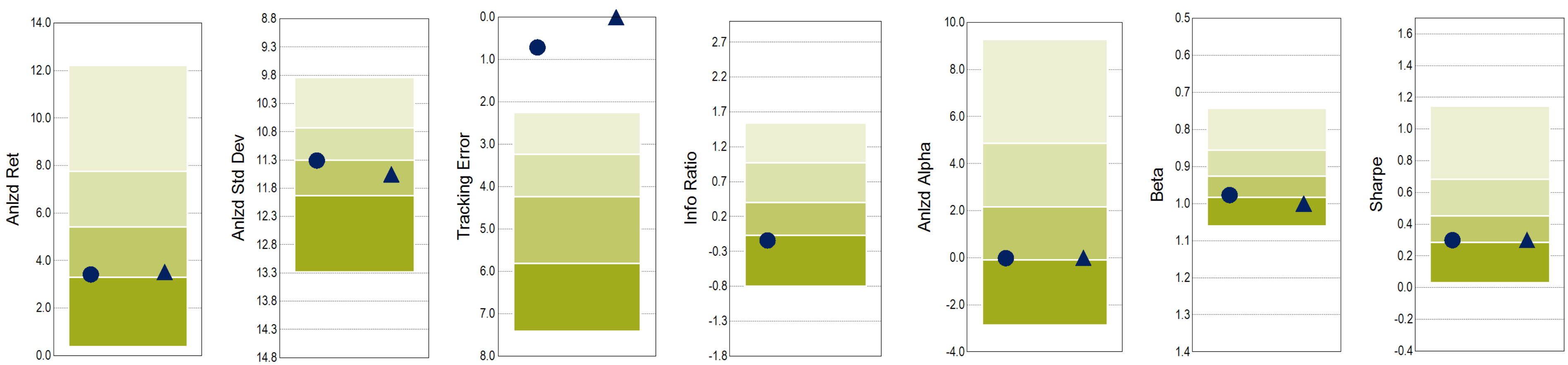


- Total International Equity
- ASRS Custom Int'l Equity Benchmark
- 68% Confidence Interval
- eA All ACWI ex-US Equity Net

3 Year Style Map



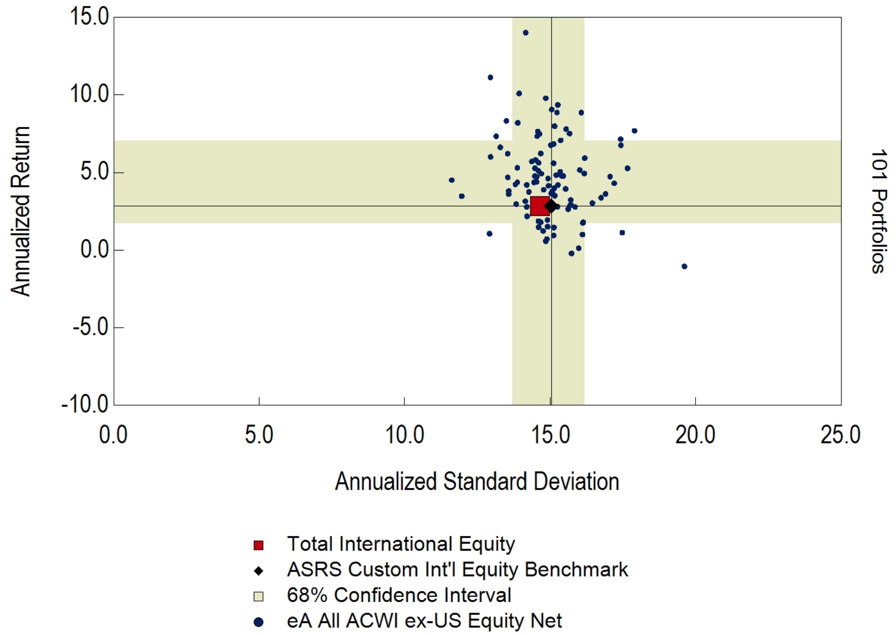
First Rolling Period ◆ Last Rolling Period



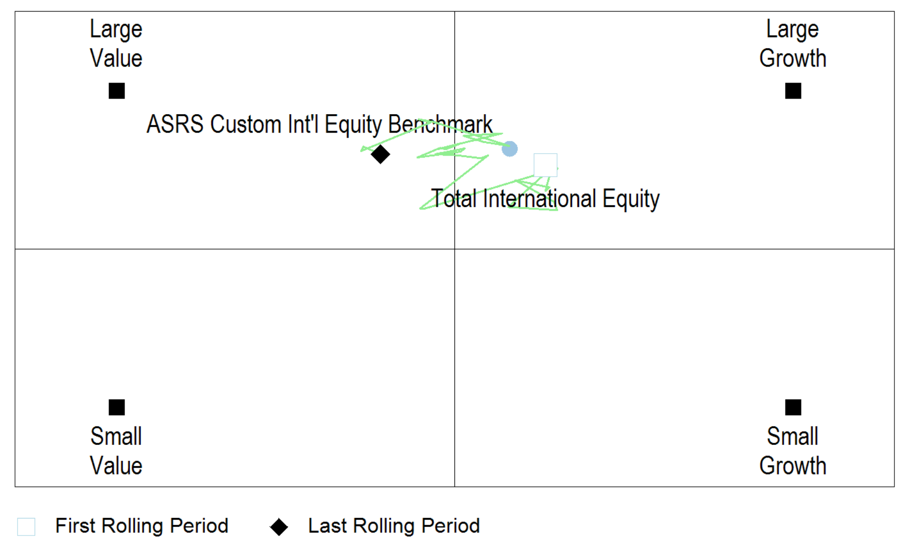
Total International Equity | ASRS Custom Int'l Equity Benchmark | 5th to 25th Percentile | 25th to Median | Median to 75th Percentile | 75th to 95th Percentile

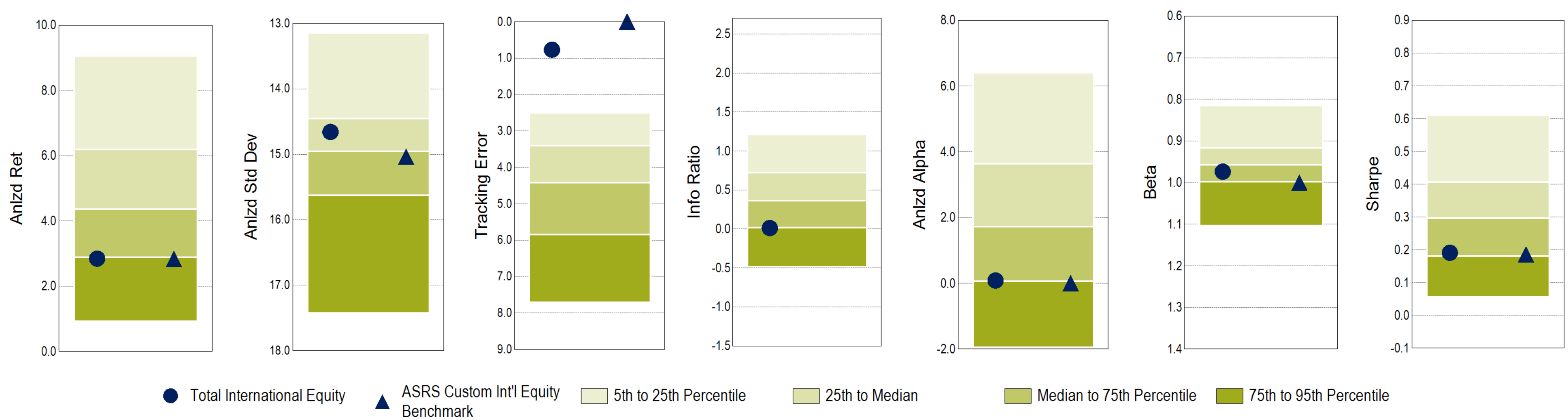
Asset Class Analysis - Total International Equity

5 Year Risk Return

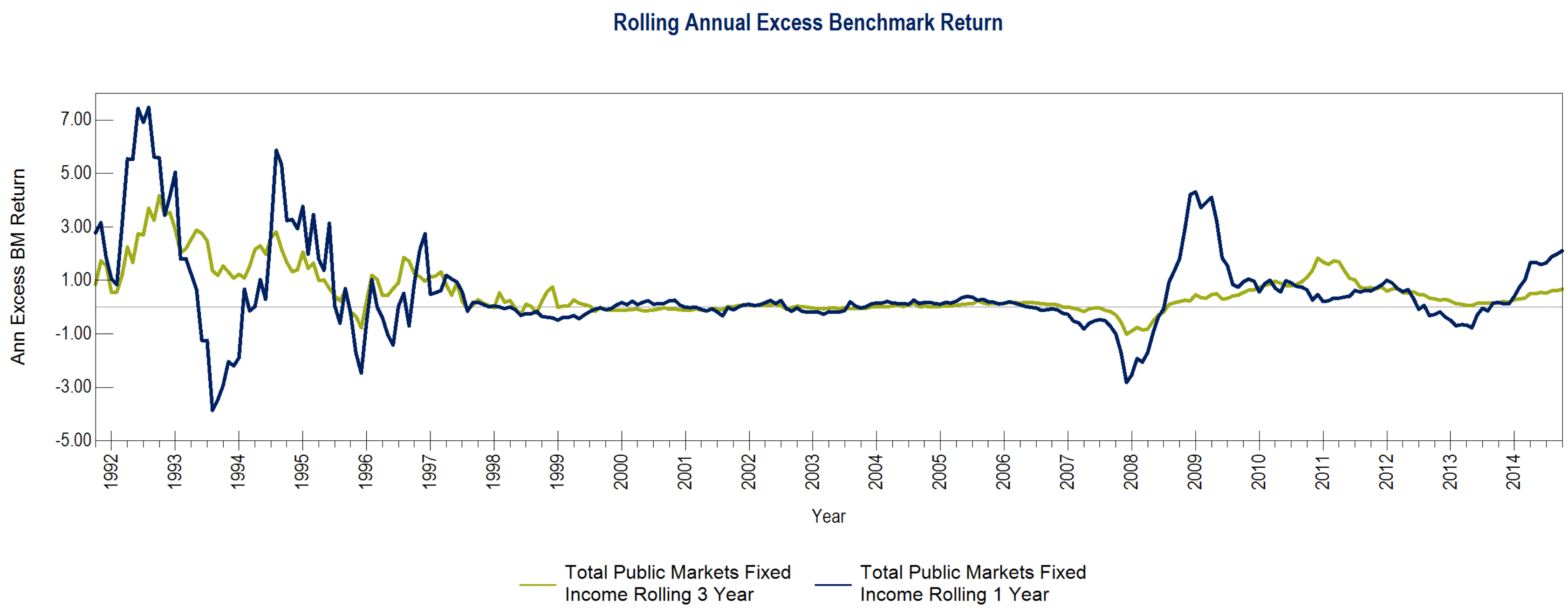


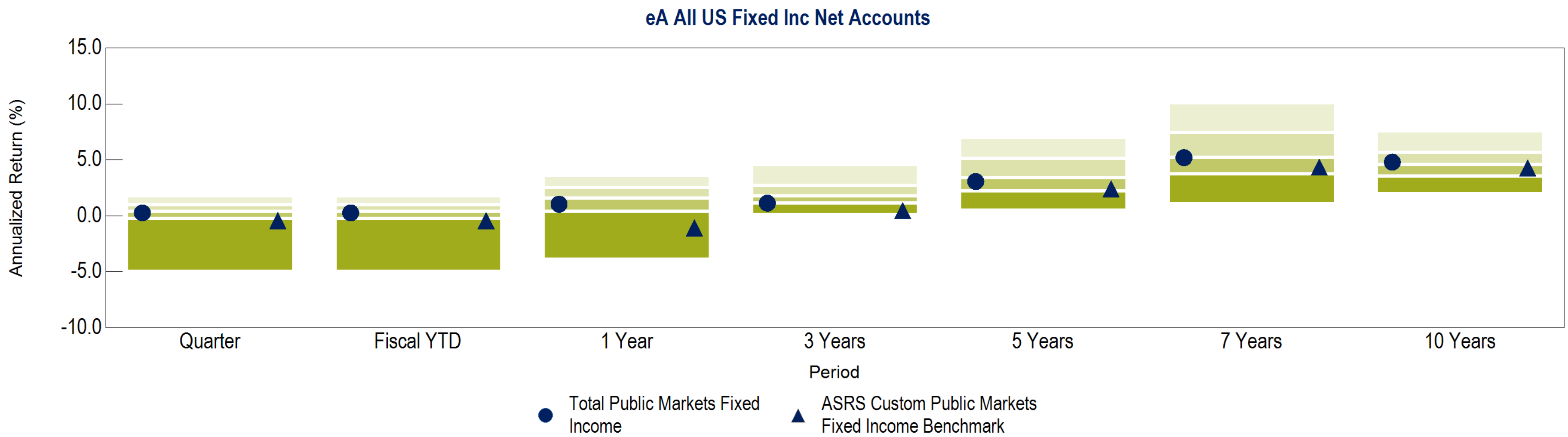
5 Year Style Map





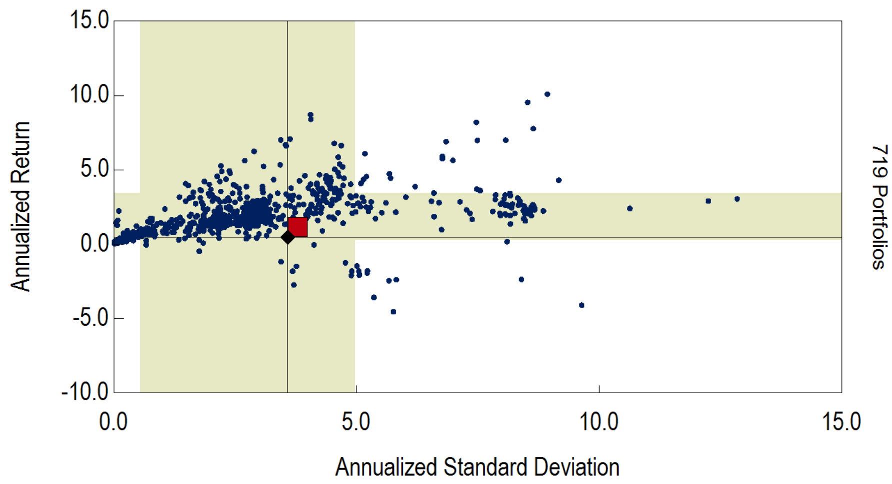
Asset Class Analysis - Total Public Markets Fixed Income





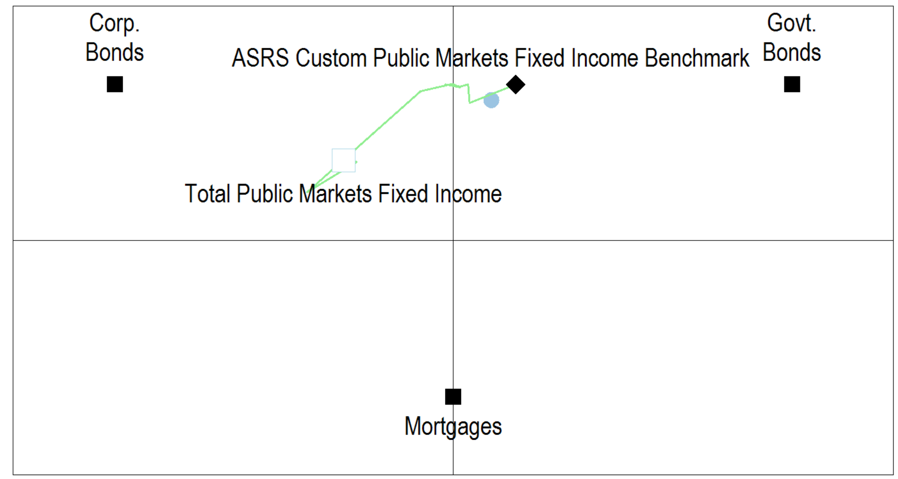
Asset Class Analysis - Total Public Markets Fixed Income

3 Year Risk Return

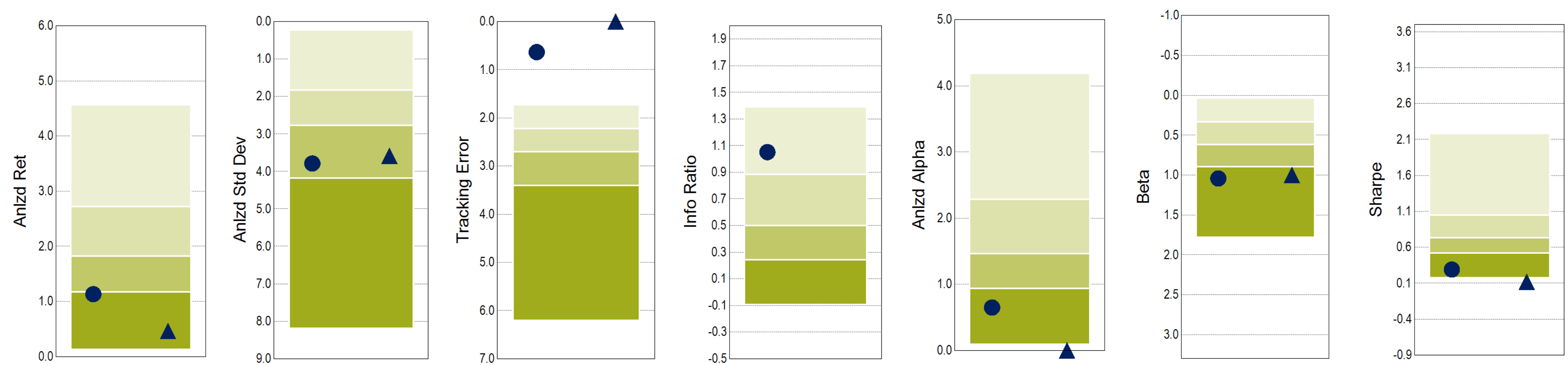


■ Total Public Markets Fixed Income
◆ ASRS Custom Public Markets Fixed Income Benchmark
□ 68% Confidence Interval
● eA All US Fixed Inc Net

3 Year Style Map

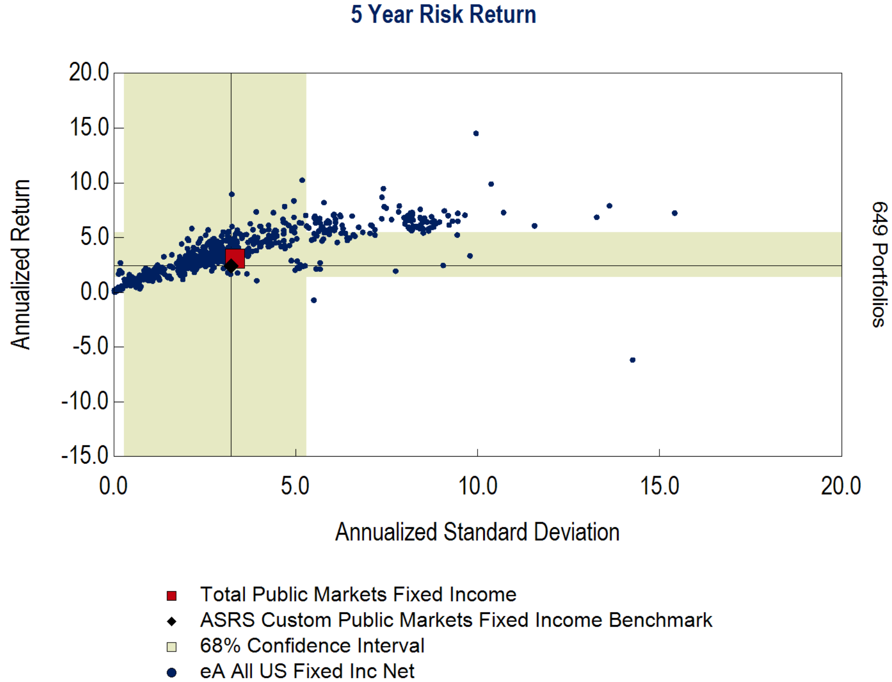


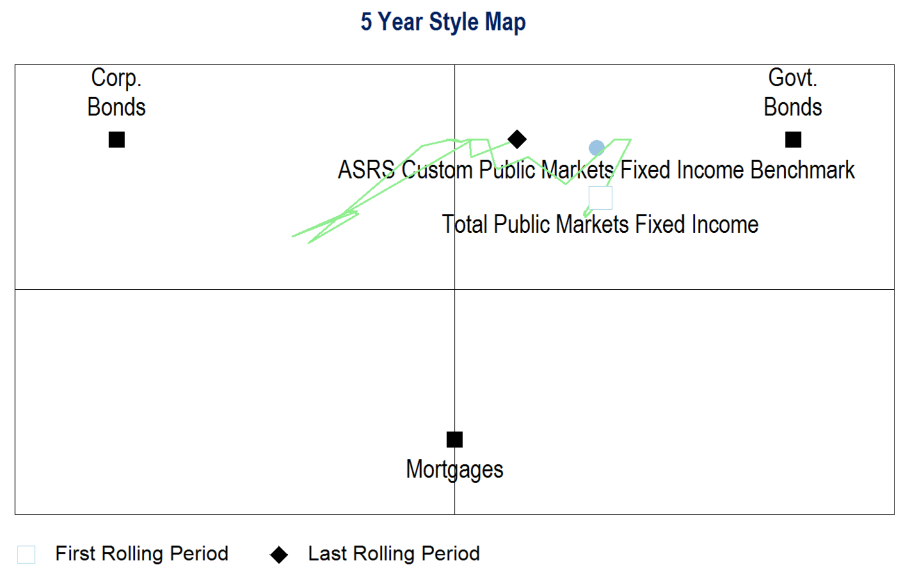
□ First Rolling Period ◆ Last Rolling Period

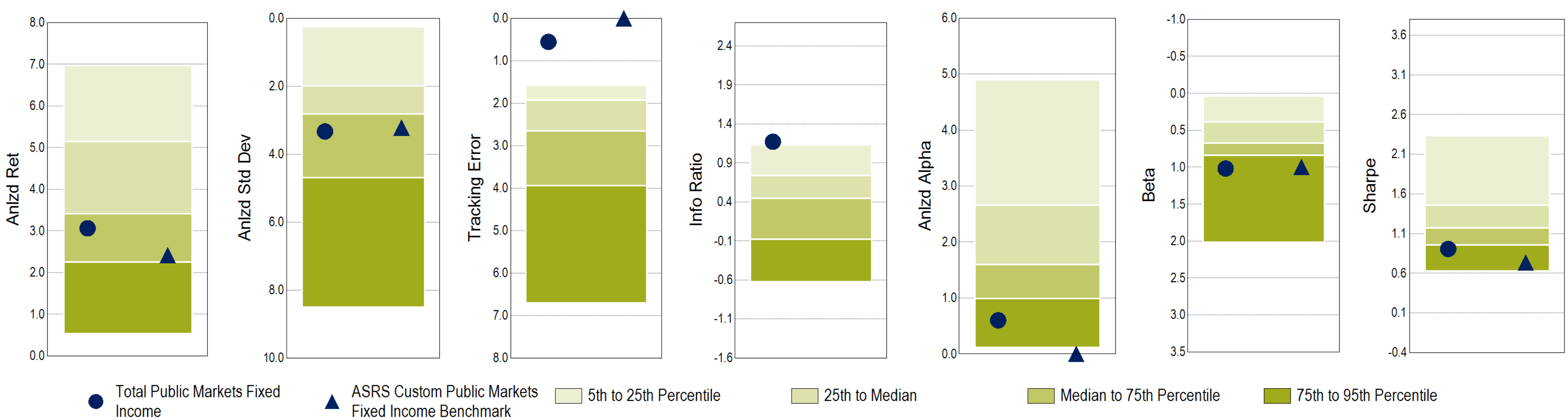


● Total Public Markets Fixed Income ▲ ASRS Custom Public Markets Fixed Income Benchmark □ 5th to 25th Percentile □ 25th to Median □ Median to 75th Percentile □ 75th to 95th Percentile

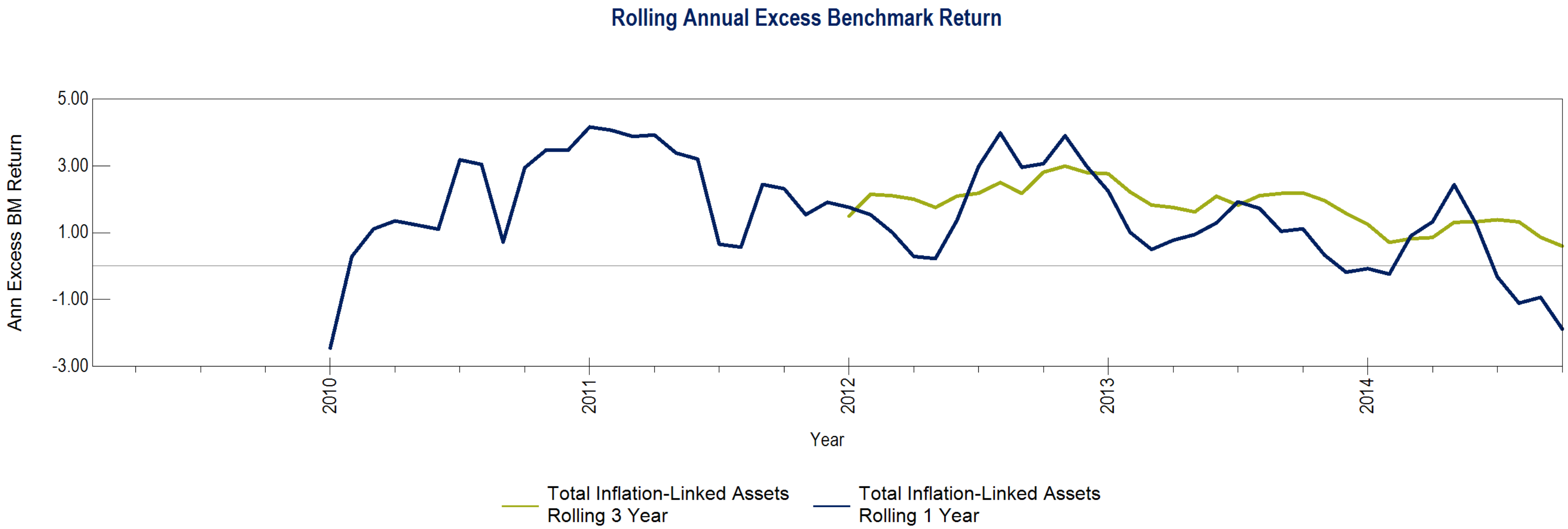
Asset Class Analysis - Total Public Markets Fixed Income

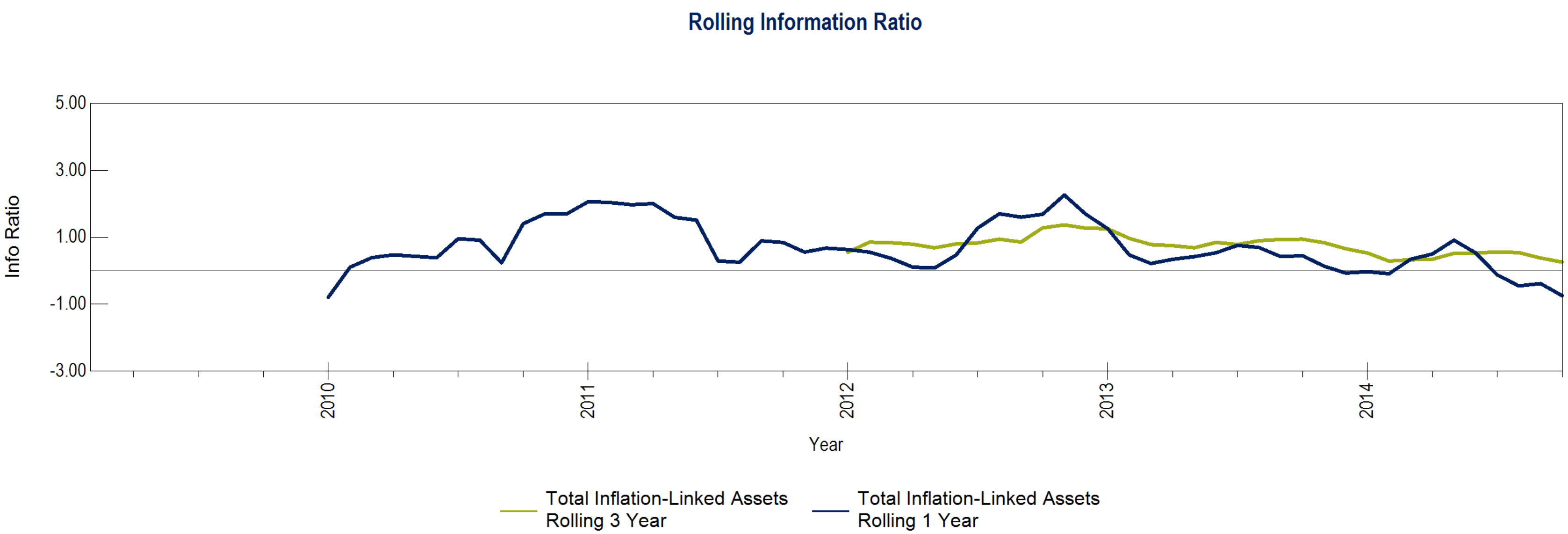




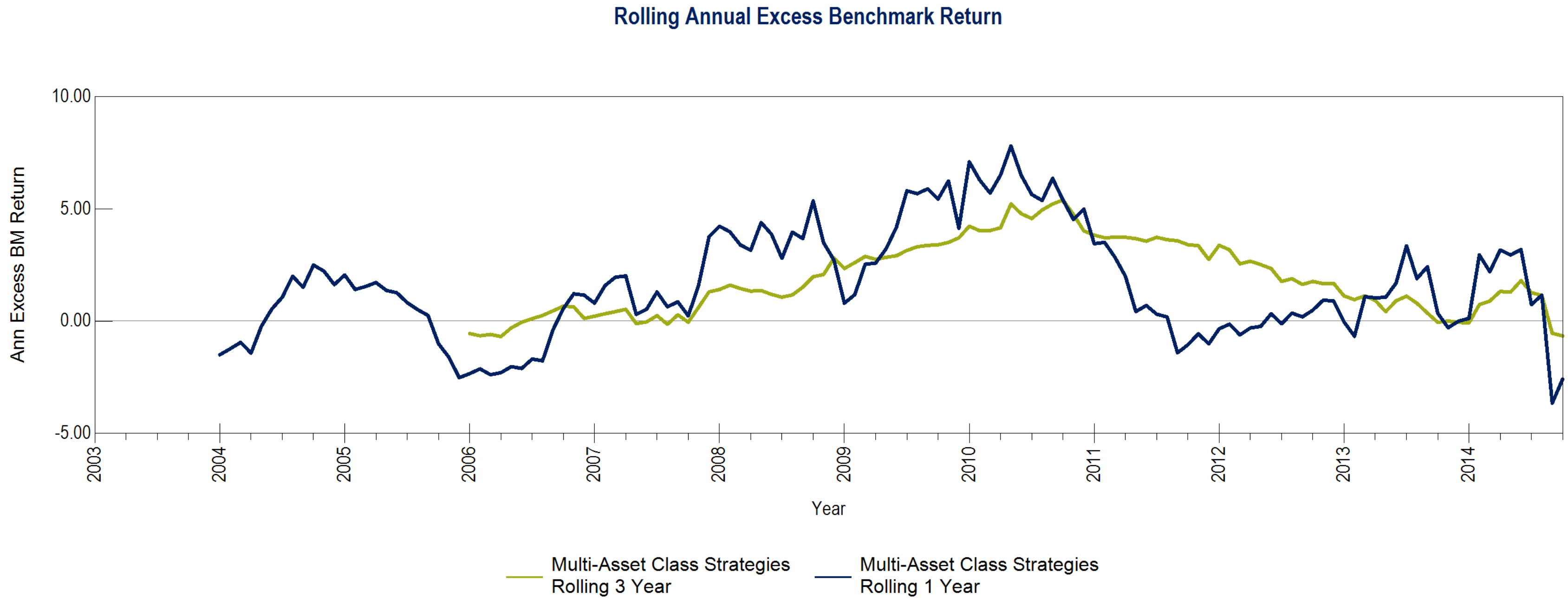


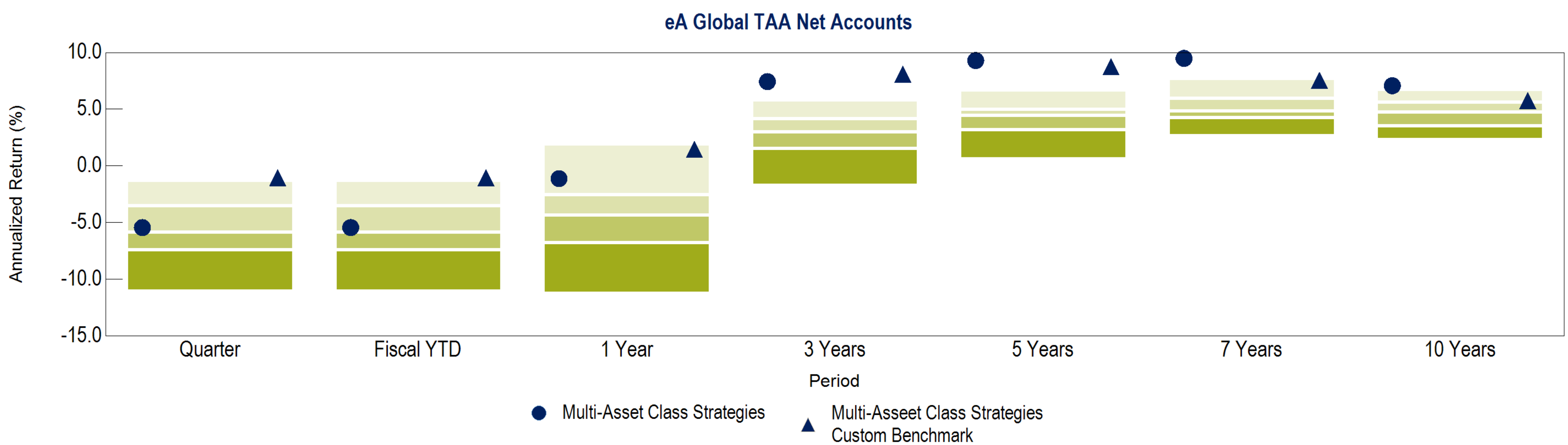
Asset Class Analysis - Total Inflation-Linked Assets



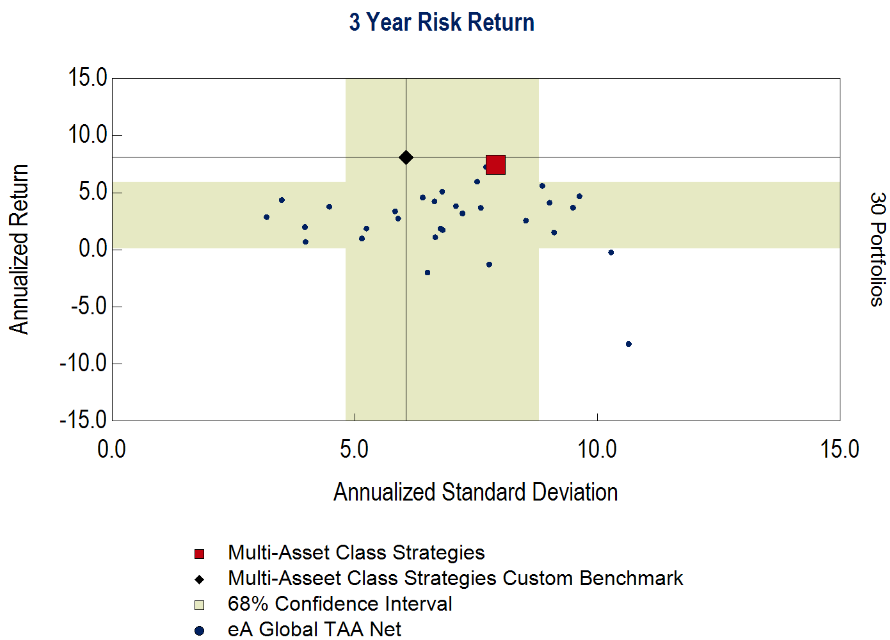


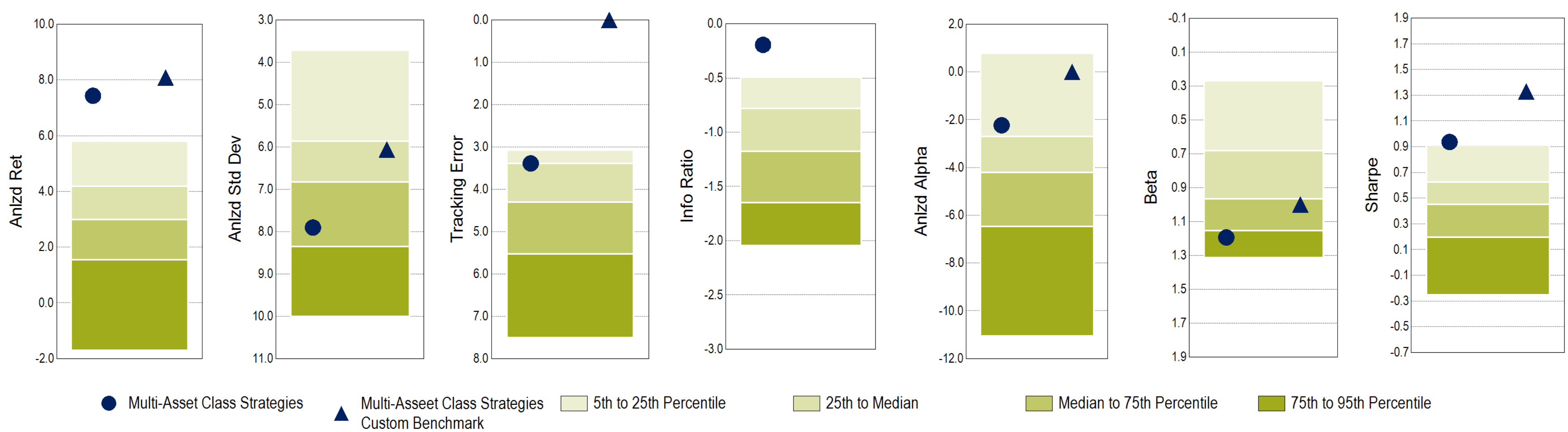
Asset Class Analysis - Multi-Asset Class Strategies



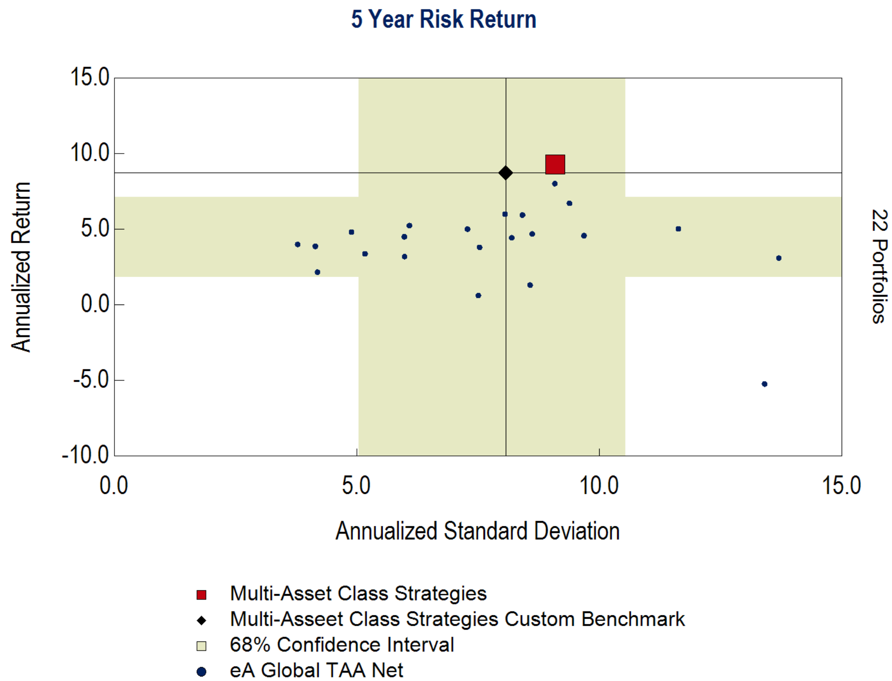


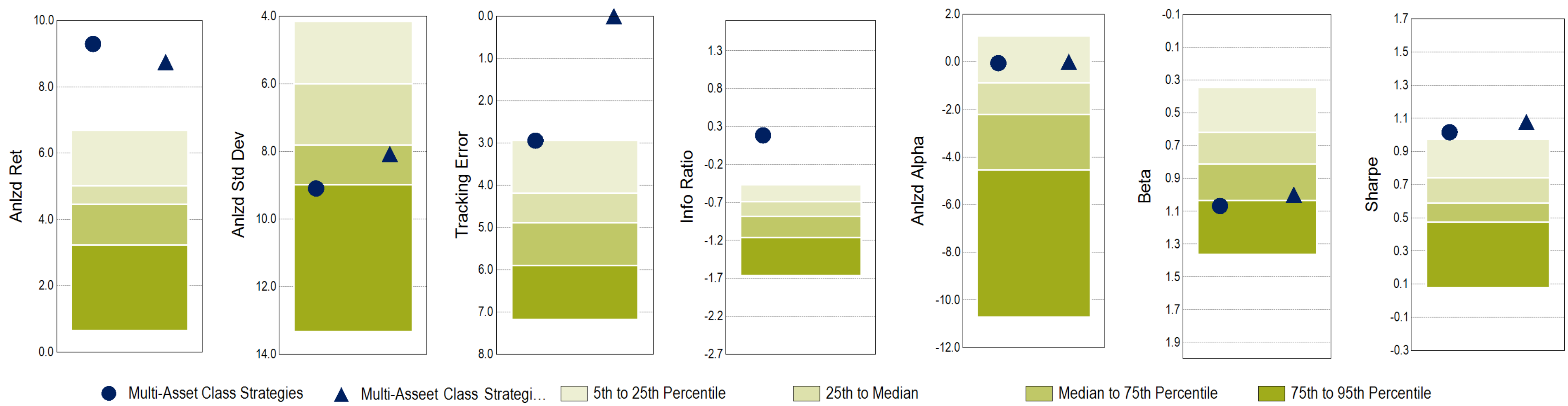
Asset Class Analysis - Multi-Asset Class Strategies





Asset Class Analysis - Multi-Asset Class Strategies





Asset Class Committee Monitoring

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

- **July 29, 2015 – Private Markets Committee**
  - Opportunistic Equity Manager Recommendation (Lesser of 20% of capital raised in this round of fundraising or $100 million co-investment) – Follow Up from July 20, 2015 PRIVMC meeting
    - The PRIVMC requested additional due diligence at the July 20, 2015 PRIVMC meeting
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Opportunistic Equity is 0%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation

- **August 14, 2015 – Public Markets Committee**
  - Public Markets Staff Reports and Capital Markets Discussion
  - Update on Cash Assetization Program and Liquidity Cash Flow Sourcing Discussion
  - Equity Risk Factor Portfolio Asset Allocation Reassignment Discussion
  - Non-U.S. Equities Portfolio Development
  - Public Equity Risk Management Options

Asset Class Committee Monitoring

- **August 28, 2015 – Private Markets Committee**
  - Variance Request
    - The Private Markets Team, in conjunction with RCLCO, recommended the ASRS approve a variance request from an existing real estate manager that would allow the manager to invest in a property that does not meet the current investment criteria for the portfolio.
      - Current investment criteria requires stabilization of an asset within four years of investment, but the asset in question is not expected to achieve stabilization until 4Q 2019, which is during the fifth year.
    - Committee approved the recommendation
  - Change in Investment Criteria
    - The Private Markets Team, in conjunction with RCLCO, recommended the ASRS approve a change to the investment criteria of an existing real estate manager that would allow the manager to pursue opportunities without the use of leverage.
      - Current investment criteria identifies IRR return hurdles that each asset must meet prior to investment. The asset in question is attractive and meets the IRR return hurdle on a levered basis; however, the private markets team believes it is preferable to pursue the opportunity on an unlevered basis at this time.
      - In addition, changing the investment criteria to allow for future investments on an unlevered basis allows for more flexibility in managing risk and focusing the use of leverage on situations where it is most advantageous to the ASRS.
    - Committee approved the recommendation

Asset Class Committee Monitoring

- **September 15, 2015 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
  - Real Estate Manager Recommendation – Additional Commitment ($40 million; $100 million original 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
      - The Committee approved the original $100 million investment at the May 12, 2014 PRIVMC meeting
      - In addition to the additional commitment, the investment criteria of the portfolio were also amended to accommodate the higher commitment amount and a proposed transaction that is currently in the pipeline.
  - Investment Valuation Discussion
    - KPMG presented the results of their valuation analysis of an existing ASRS investment
  - Private Debt Manager Recommendation – Additional Commitment ($650 million to 7 existing ASRS private debt mandates)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Debt 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
      - Fund A – $1.0 billion - $1.1 billion
      - Fund B - $0.5 billion - $0.6 billion
      - Fund C - $0.5 billion - $0.6 billion
      - Fund D - $0.35 billion - $0.5 billion
      - Fund E - $0.35 billion - $0.45 billion
      - Fund F - $0.35 billion - $0.4 billion
      - Fund G - $0.16 billion - $0.25 billion

- **October 15, 2015 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
  - Real Estate Manager Recommendation ($300 million commitment)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 10%)
    - The ASRS has invested with this manager in a prior fund in the private debt program
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
  - Real Estate Manager Recommendation – Additional Commitment ($50 million; $300 million original 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
      - The Committee approved the original $300 million investment at the October 29, 2012 PRIVMC meeting
      - In addition to the additional commitment, the investment criteria of the portfolio were also amended to allow for investments in Dallas, TX.
  - Private Equity Manager Recommendation ($50 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
  - Private Equity Manager Recommendation ($50 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

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 1% Private Equity, 5% Private Debt, and 3% 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 5.9%).
    - $4.55 billion in commitments to private debt strategies equates to approximately 13.5% of Total Fund assets vs. the SAAP target of 10%.
    - Additional $500 million commitment is currently being contemplated, which would bring commitments to $5.1 billion, or 15.1% of Total Fund assets vs. the SAAP target of 10%.
      - Estimate private debt asset class reaching 10% target by the end of 2016.
      - Estimate private debt asset class reaching 12% cap in 3Q 2017.
  - Multi-Asset Class Strategies (formerly GTAA) has been restructured and moved ‘above the line’, and now has an explicit 5% target within the SAAP.

- **Long Treasuries mandate funded in August 2015 to mitigate volatility experienced during the third quarter.**

- **Tactical positioning consistent with IMD House Views.**

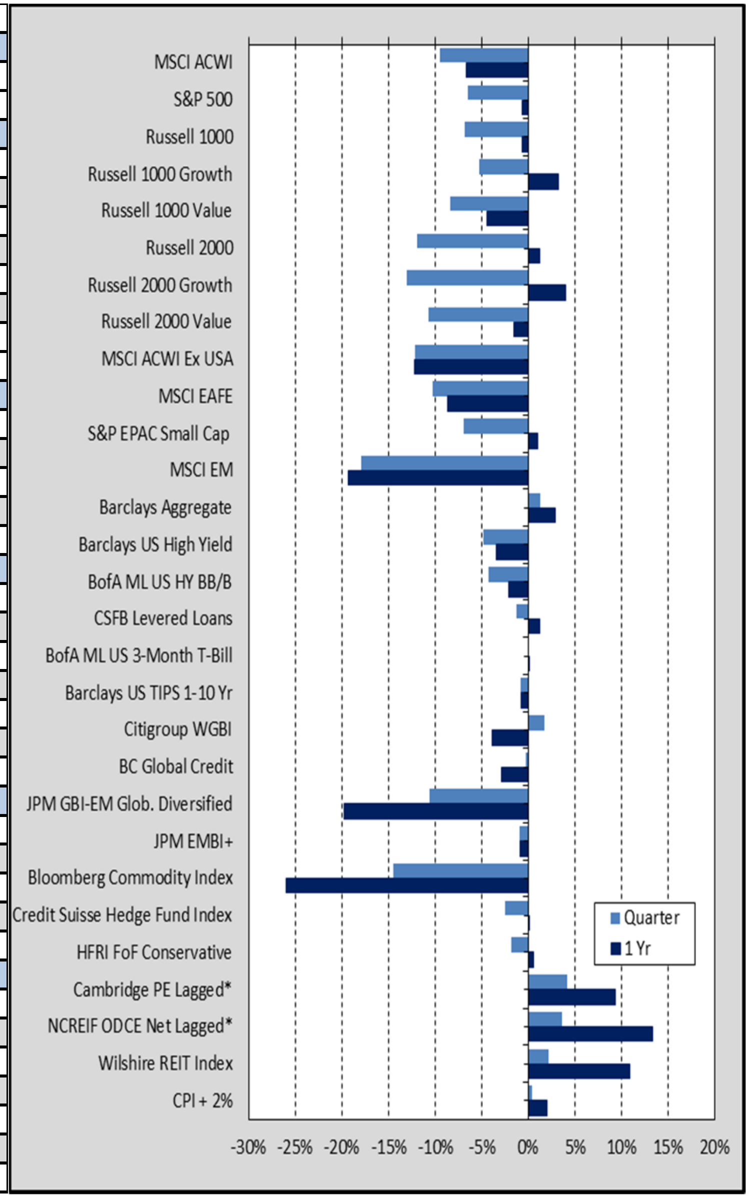
Market Environment Update and Outlook

Economic Environment

- **Third quarter GDP growth rate (first estimate) printed at a modest +1.5%.**
  - Retail sales (ended August) at +1.3% on a year-over-year growth rate basis. The same period last year YoY growth rate was 4.6%.
  - The inventory-to-sales ratio at August, 31 was flat at 1.4 and has remained relatively flat since early 2010.
  - Corporate profits (ended June) as a percent of GDP declined slightly vs first quarter GDP to 10.4% from 10.7% and remain elevated relative to historical levels.
  - The U.S. trade deficit widened in August.
- **The unemployment rate fell to 5.1% in Q3 from 5.3% in Q2 2014; U-6, a broader measure of unemployment, fell to 10.0% during the third quarter.**
- **The Case-Shiller Home Price Index (as of 9/30) increased slightly to 175.1 from second quarter levels (170.0) and is at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally adjusted CPI decreased to -0.02% from +0.2% at the end of June; Capacity Utilization decreased slightly to 77.5% in September.**
- **Fed Funds rate remains at 0.25%, while the 10-year Treasury Yield finished Q3 at 2.2% down 20 basis points from Q2.**
- **The Fed balance sheet remained flat in Q3 2015, while the European Central Bank balance sheet increased in the same period.**
  - ECB continues asset purchases of €60 billion per month.
- **S&P valuations decreased in September remaining above the 10-year and long-term averages**
  - Cyclically adjusted Shiller PE ratio (24.6x) is above the long-term average of 16.4x and above the 10-year average of 22.9x.
- **The U.S. Dollar continues its strength against a basket of major currencies as the Fed ends its quantitative easing program and the ECB continues easing.**
  - Currency volatility has seen a sustained uptick since Q1.

Market Environment – Q3 2015 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI	World	-9.4%	-6.7%	7.0%	6.8%	4.6%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	-6.4%	-0.6%	12.4%	13.3%	6.8%
Russell 1000	Large Core	-6.8%	-0.6%	12.7%	13.4%	7.0%
Russell 1000 Growth	Large Growth	-5.3%	3.2%	13.6%	14.5%	8.1%
Russell 1000 Value	Large Value	-8.4%	-4.4%	11.6%	12.3%	5.7%
Russell 2000	Small Core	-11.9%	1.2%	11.0%	11.7%	6.5%
Russell 2000 Growth	Small Growth	-13.1%	4.0%	12.8%	13.3%	7.7%
Russell 2000 Value	Small Value	-10.7%	-1.6%	9.2%	10.2%	5.3%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	-12.2%	-12.2%	2.3%	1.8%	3.0%
MSCI EAFE	Int'l Developed	-10.2%	-8.7%	5.6%	4.0%	3.0%
S&P EPAC Small Cap	Small Cap Int'l	-6.9%	1.0%	10.7%	7.8%	5.8%
MSCI EM	Emerging Equity	-17.9%	-19.3%	-5.3%	-3.6%	4.3%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	1.2%	2.9%	1.7%	3.1%	4.6%
Barclays US High Yield	High Yield	-4.9%	-3.4%	3.5%	6.1%	7.3%
BofA ML US HY BB/B	High Yield	-4.3%	-2.1%	3.7%	6.0%	6.7%
CSFB Levered Loans	Bank Loans	-1.2%	1.2%	3.8%	4.8%	4.4%
BofA ML US 3-Month T-Bill	Cash	0.0%	0.0%	0.1%	0.1%	1.3%
Barclays US TIPS 1-10 Yr	Inflation	-0.9%	-0.8%	-1.4%	1.8%	3.6%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	1.7%	-3.8%	-2.9%	-0.2%	3.4%
BC Global Credit	Global Bonds	-0.2%	-2.9%	0.6%	2.6%	4.3%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	-10.5%	-19.8%	-8.7%	-3.6%	4.5%
JPM EMBI+	Em. Mkt. Bonds	-0.9%	-0.9%	0.2%	4.2%	6.7%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
Bloomberg Commodity Index	Commodity	-14.5%	-26.0%	-16.0%	-8.9%	-5.7%
Credit Suisse Hedge Fund Index	Hedge Fund	-2.5%	0.1%	5.0%	4.5%	5.2%
HFRI FoF Conservative	Fund of Funds	-1.8%	0.6%	4.2%	2.8%	2.1%
Cambridge PE Lagged*	Private Equity	4.2%	9.3%	16.0%	15.7%	13.2%
NCREIF ODCE Net Lagged*	Real Estate	3.6%	13.4%	12.1%	13.3%	5.9%
Wilshire REIT Index	REIT	2.2%	10.9%	9.8%	12.4%	6.7%
CPI + 2%	Inflation/Real Assets	0.4%	2.0%	2.9%	3.7%	3.8%



* As of 6/30/2015

Positives

- **Divergence in monetary policies signaling different investment environments globally**
- **US Economy shows strength relative to other developed markets**
  - Low oil prices benefitting consumers
- **Global monetary stimulus flowing through to markets**
  - ECB €1.3 trillion in asset purchases in the Eurozone
  - Economic conditions in Europe and Japan responding to QE
  - China policy response remains stimulative with more tools available to deploy
- **Developed world inflation is low**
  - In US, CPI for all Urban Consumers on a seasonally adjusted basis was negative in Q3

Negatives

- **Volatility increased across global markets**
  - Financial and geo-political instability in the Mid-East, Eastern Europe, Greece
- **Slowing economic growth in China may have broad implications for many emerging economies**
  - China growth concerns sparked a rapid decline in commodities and emerging markets
- **Fed rate hike uncertainty contributed to volatility in domestic markets**
  - Fed signaled tightening to begin by year-end; market expecting a slow pace to rate increases
- **Valuations remain above 10 year and long term averages**
  - Developed Equity P/Es above median

Global Equity

- **U.S. equities posted sharp losses in the third quarter as global volatility ramped up.**
- **Small cap stocks underperformed large cap stocks during the quarter, with the Russell 2000 Index returning -11.9% and the Russell 1000 Index returning -6.8%.**
- **International equities underperformed U.S. markets during the quarter, returning -12.2%, as measured by the MSCI ACWI ex-U.S. Index.**
  - Developed markets returned -10.2% as measured by the MSCI EAFE Index. The Pacific Region led returns down posting a -13.1% with Singapore leading the group down -19.5%. Europe posted a loss of -8.7%.
  - Emerging markets returned -17.9% as measured by the MSCI Emerging Markets Index in U.S. dollar terms. Indonesia and China led to the downside returning -24.2% and -22.7% respectively.

Private Equity

- **New private equity commitments totaled $74.6 billion in Q3 2015.**
  - Represents a 25% decline from the $101.5 billion raised in Q2 2015, resulting from public equity market volatility and increased economic uncertainties
- **Buyout and growth equity funds raised $45.3 billion in Q3 2015.**
  - Annual pace is in line with the $180-190 billion that was raised in each of the past two years
- **Venture capital raised $10.0 billion ended Q3 2015.**
  - VC fundraising as a percent of total new PE funds is in line with historical post-dot com levels
- **Energy funds raised $7.8 billion representing 10% of capital raised in Q3 2015.**
  - Investors are opportunistically approaching the energy market dislocation.
- **Asian private equity commitments slowed to total 7% of total funds raised down from 11% in 2014.**
- **European commitments comprised 23% of all new PE commitments in Q3 2015.**
  - Fifteen pan-European buyout managers with closes on over $1 billion each raised over half of 2015 total

Fixed Income

- **The yield curve flattened significantly with long duration yields dropping 20-30 basis points.**
- **The spread between two and 10-year rates decreased to 142 basis points from 176 basis points ended June. Treasury Inflation-Protected Securities, or TIPS, returned -0.9% during the quarter, as measured by the Barclays US TIPS Index.**
- **The Barclays Long Duration Credit Index gained +0.5% as the long end of the curve ended the quarter 24 basis points lower.**
- **Long Treasuries gained +5.1% and investment-grade corporate debt gained +3.8%.**
- **The Barclays 1-3 year Government/ Credit Index returned 0.3% and US high yield bonds lost -4.9%.**
- **Emerging markets debt continued to slow in local and external currency.**
  - US dollar-denominated debt, as measured by the JP Morgan EMBI Index, fell 90 basis points; local currency debt fell 10.5%, according to the JP Morgan GBI-EM Index.

Real Assets/Inflation-Linked Assets

- **Massive energy market dislocation.**
  - Oil prices trending lower.
  - Private equity and private debt opportunities attractive.
  - Potential for public stressed/distressed credit, equity and commodity plays.
- **OPEC and Saudi Arabia have indicated a willingness to allow lower oil prices to persist in efforts to cement market share and reduce marginal supply.**
- **Select infrastructure opportunities are attractive.**
  - Target opportunistic strategies in niche sub-sectors to take advantage of market dislocations.
- **NEPC continues to believe in the long-term demand drivers in agriculture.**
  - Long-term commodity prices driven by growing emerging market demand.
  - Softness in commodity prices may provide attractive entry point.
- **Timber opportunity set limited but warrants further review**
  - 45% increase in housing starts forecasted; timber prices highly correlated

Commodities

- **Commodities retracted significantly with the Bloomberg Commodity Index posting a -14.5%.**
  – Energy led the way losing -24% (WTI Oil), while industrial metals, precious metals and agriculture declined.

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.

- **U.S. REITs posted modest gains with a +2.2% return.**
  – FFO multiples are high, at approximately 15x but are decreasing.
  – REITs are trading at a discount to NAV.

- **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.

NEPC Updates

September 30, 2015

Highlights of Third Quarter Happenings at NEPC

NEPC Recognitions

- Two of NEPC's Partners were named on the *Chief Investment Officer* magazine's (*CIO*) annual ranking of the world's most influential investment consultants. NEPC's Chief Investment Officer, **Tim McCusker, was named *the* most influential general consultant on the 2015** list of Knowledge Brokers. **KC Connors**, Head of NEPC's Philanthropic Practice Team, **ranked 10th on the 2015 Knowledge Brokers – Specialist list.** The lists are *CIO*'s annual rankings of the most influential investment consultants worldwide[1].

NEPC Client Recognitions

- Two of our clients were recognized for their work in the healthcare industry by *Institutional Investor* on October 7th. Mary O'Reilly, Director, Treasury and Investments at Rochester Health, received the II Investor Intelligence Award for Asset Allocation, and Joshua Rabuck, Executive Director, Investments at Indiana University Health, was accorded the II Investor Intelligence Award for Risk Management.

NEPC Research

Recent White Papers

- *Best Practices: Managing Risk in Corporate VEBA and SERP Plans* (October 2015) - Mike Valchine, CAIA, CIPM, Senior Consultant
- *NEPC's 2015 Defined Contribution Plan & Fee Survey: What a Difference a Decade Makes* (October 2015) – Ross Bremen, CFA, Partner
- *Market Chatter – Has the China Bubble Burst?* (July 2015)
- *Market Chatter – China's Devaluation of the Yuan* (August 2015)
- *2015 Third Quarter Market Thoughts*

Upcoming/Recent Events

- **Healthcare Defined Contribution Fee Survey Results** - Tuesday, November 3, 2015, 3:00 to 4:00 p.m. (EST)
- **NEPC's 2015 Defined Benefit Plan Trends Webinar -** Wednesday, October 21, 2015, 2:00 - 3:00 p.m. (EST)
- NEPC, Newton Capital Management, and the Centre for Endowment Asset Management are hosting a special event that delves into the influence of British economist John Maynard Keynes on the U.S. Endowment Model on October 15, 2015 in Boston, MA.

[1]*CIO Magazine* interviews pension and non-profit CIOs, asset managers and former consultants, to approximate what it calls "the hierarchy of today's institutional consultant industry." The results should not be considered a recommendation of any specific firm or individual consultant. For more information, please visit *CIO Magazine's* web site at http://www.ai-cio.com/2015-knowledge-brokers/. Past performance is no guarantee of future results

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:** 22% S&P 500/3% S&P 400/3% S&P 600/18% MSCI EAFE/2% MSCI EAFE Small Cap/5% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/16% Barclays Capital Aggregate/5% Barclays Capital High Yield/5% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/7% NCREIF ODCE (lagged one quarter)/2% Bloomberg Commodity Index/5% Multi-Asset Class Custom Index

Note: Interim SAA Policy includes proration of 0.9% Private Equity, 3.3% Real Estate and 5.3% Private Debt which are unfunded. Private Equity was prorated to domestic equity; Real Estate was prorated to domestic equity and fixed income; Private Debt was prorated to Core and High Yield Fixed Income. Recently approved Strategic Asset Allocation Policy effective April 1, 2015.

[1]MSCI 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 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.

[1]MSCI 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.

ASRS Custom Asset Class Benchmark History

- **ASRS Custom Small Cap Equity Blended Benchmark** was the Russell 2000 Index through 12/31/2006; S&P 600 Index thereafter.

- **DFA Blended Benchmark** was the Russell 2000 Value Index through 12/31/2006; S&P/Citigroup 600 Value Index thereafter.

- **ASRS Custom Int'l Developed Markets Equity Index** was MSCI EAFE through 9/30/2005; MSCI ACWI ex-U.S. through 12/31/2010; 87% MSCI EAFE and 13% MSCI EAFE Small Cap through 6/30/2012; 82% MSCI EAFE and 18% MSCI EAFE Small Cap through 3/31/2015; 89% MSCI EAFE and 11% MSCI EAFE Small Cap thereafter.

- **Brandes Custom Benchmark** was MSCI EAFE through 9/30/2005; MSCI ACWI ex-U.S. through 2/28/2011; MSCI EAFE thereafter.

- **Windham Custom GTAA Benchmark** was 47% S&P 500, 18% MSCI EAFE, 26% Barclays Capital Aggregate, 6% DJ REIT, and 3% Bloomberg Commodity Index through 6/30/2012; 40% S&P 500, 23% MSCI EAFE, 25% Barclays Capital Aggregate, 8% DJ REIT and 4% Bloomberg through 3/31/2015; 52% MSCI ACWI, 30% Citi World Government Bond Index, 9% Dow Jones US Reit, 9% Bloomberg Commodity 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 thereafter.

- **ASRS Bridgewater 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; Citigroup 3-Month Treasury Bill Index thereafter.

Information Disclaimer and Reporting Methodology

Information Disclaimer

- Past performance is no guarantee of future results.

- All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.

- NEPC's source for portfolio pricing, calculation of accruals, and transaction information is the plan's custodian bank. Information on market indices and security characteristics is received from other sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

- Some index returns displayed in this report or used in calculation of a policy, allocation or custom benchmark may be preliminary and subject to change.

- This report is provided as a management aid for the client's internal use only. Information contained in this report does not constitute a recommendation by NEPC.

- This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.

Reporting Methodology

- The client's custodian bank is NEPC's preferred data source unless otherwise directed. NEPC generally reconciles custodian data to manager data. If the custodian cannot provide accurate data, manager data may be used.

- Trailing time period returns are determined by geometrically linking the holding period returns, from the first full month after inception to the report date. Rates of return are annualized when the time period is longer than a year. Performance is presented gross and/or net of manager fees as indicated on each page.

- For managers funded in the middle of a month, the "since inception" return will start with the first full month, although actual inception dates and cash flows are taken into account in all Composite calculations.

- This report may contain forward-looking statements that are based on NEPC's estimates, opinions and beliefs, but NEPC cannot guarantee that any plan will achieve its targeted return or meet other goals.

Agenda Item #5

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • 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: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Gary R. Dokes, Chief Investment Officer
Mr. Karl Polen, Head of Private Markets Investing
Mr. Eric Glass, Portfolio Manager of Private Markets

DATE: November 16, 2015

RE: **Agenda Item #5**: Presentation, Discussion and Appropriate Action Regarding the Inflation-Linked Asset Class

Purpose
To present and discuss material regarding the ASRS Inflation-Linked Asset Class program.

Recommendation
Information only; no action required.

Background
The ASRS in its 2012 strategic asset allocation study added inflation linked investments as a newly defined asset class. Inflation linked investments include assets which hedge inflation because their valuation or cash flow are positively linked to inflation. The ASRS includes real estate, commodities, farm land, infrastructure and timber as members of the inflation linked asset class. The enclosed report reviews the strategies and performance of these assets.

Attachment:

- Inflation Linked Assets Presentation

Inflation Linked Assets

Asset Class Review

Karl Polen & Eric Glass

Arizona State Retirement System

November 30, 2015

Outline

Inflation Linked Assets

- Inflation linked assets are positively linked to inflation through their value and income streams
- Inflation linked assets are one of three major asset classes (along with equities and fixed income) as defined in the ASRS strategic asset allocation
- Inflation linked assets are implemented in both private and public markets
- Private market inflation linked assets are
  - Real estate
  - Farm land
  - Infrastructure
  - Timber
- Investments in commodities are generally implemented through highly liquid derivatives markets

The 2009 Asset Allocation Study

- The 2009 Strategic Asset Allocation Study established Inflation-linked as an asset class
  - Commodities & TIPS
    - Positive short and medium-term correlation to inflation
    - Diversification benefits from low correlation to traditional asset classes & low correlation among one another
- During 2009-2011 used TIPS opportunistically
  - Blackrock US TIPS passive
- In Q3 2010 ASRS hired two commodities managers
  - Gresham & Cargill

2009 Inflation Linked Allocations

Asset Class	Target	Range	Benchmark
Commodities	3%	0-5%	DJ UBS Total Return
TIPS	0%	0-5%	Barclay's TIPS
Total IL	3%	0-10%	

The 2012 Asset Allocation Study

- The 2012 Strategic Asset Allocation Study further built out the Inflation-linked program
  - Real Estate: Increased target allocation to 8% from 6%
  - Commodities: Increased target allocation from 3% to 4%
  - Farmland & Timber, Infrastructure, and Opportunistic Inflation-linked each established as asset classes, with 0% target allocation and 0-3% range

2012 Inflation Linked Allocations

Asset Class	Target	Range	Benchmark
Commodities	4%	1-7%	DJ UBS Total Return
Real Estate	8%	6-10%	NCREIF ODCE
Infrastructure	0%	0-3%	Core CPI plus 3.5%
Farmland & Timber	0%	0-3%	Core CPI plus 3.5%
Opportunisitic	0%	0-3%	Investment Specific
Total IL	12%	8-16%	

The 2015 Asset Allocation Study

- The 2015 Strategic Asset Allocation Study modified the Inflation-linked program
  - Real Estate: Increased target allocation to 10% from 8%
  - Commodities: Reduced target allocation to 2% from 4%
  - Farmland & Timber, Infrastructure, and Opportunistic Inflation-linked retained as asset classes, with no change to target allocation

2015 Inflation Linked Allocations

Asset Class	Target	Range	Benchmark
Commodities	2%	0-4%	DJ UBS Total Return
Real Estate	10%	8-12%	NCREIF ODCE
Infrastructure	0%	0-3%	Core CPI plus 3.5%
Farmland & Timber	0%	0-3%	Core CPI plus 3.5%
Opportunisitic	0%	0-3%	Investment Specific
Total IL	12%	8-16%	

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 tail wind 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 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

Current Portfolio

Real Estate Portfolio as of June 30, 2015

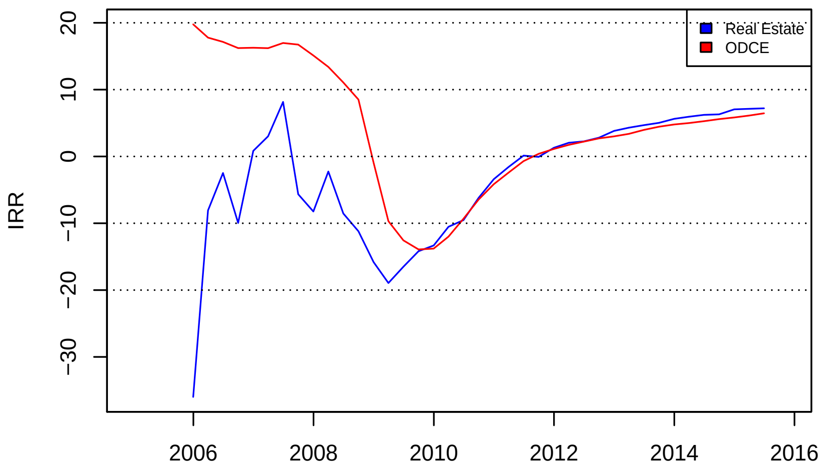
	$ millions	Percent of ASRS Total Fund
Net Asset Value	2393.42	6.87%

- Current Portfolio is $1093 million below the target funding of 10%
- We update a pacing study and implementation plan each year to determine the amount of new investment commitments to achieve the target funding

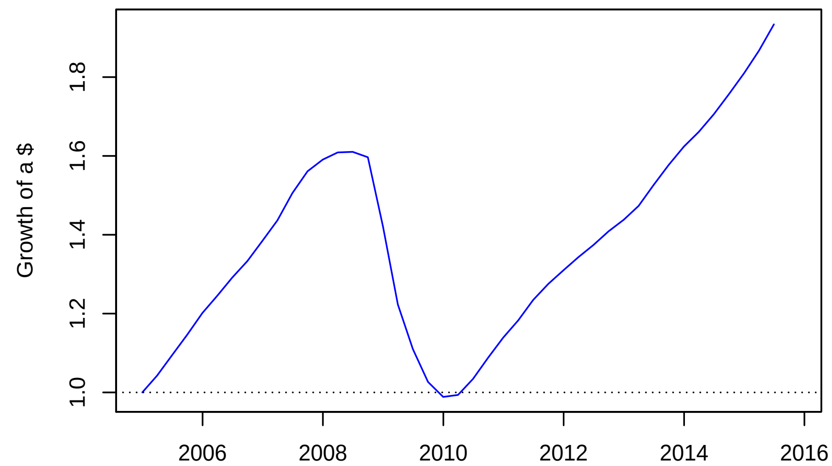
Performance

- The charts and tables on the following pages illustrate the performance of the real estate portfolio
- The real estate portfolio underperformed its benchmark in its early years, but recent out-performance has brought the inception to date performance above benchmark levels
- As noted above a majority of assets are invested in commingled opportunity funds which have, as would be expected, underperformed during down markets but outperformed in up markets

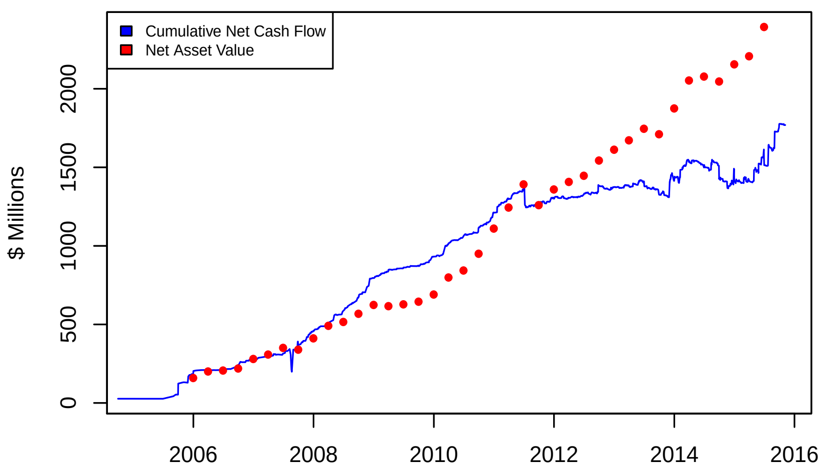
Real Estate IRRs compared to ODCE
Inception through indicated date



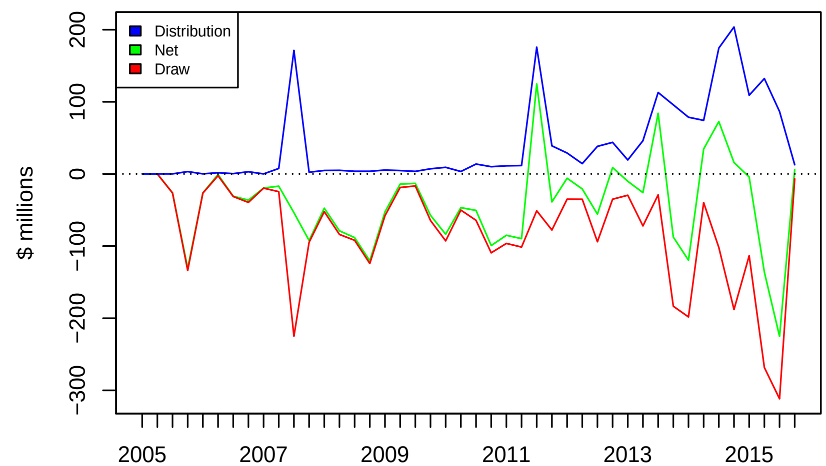
ODCE



Real Estate Cumulative Net Capital Contributed
Compared to Value



Real Estate
Quarterly Draws and Distributions



Returns for Periods Ended June 30, 2015

Time Weighted Returns

	One Quarter	One Year	Three Years	Five Years	Inception
Real Estate TWR	2.24%	14.61%	13.58%	14.11%	7.02%
ODCE TWR	3.00%	12.00%	12.00%	13.00%	6.00%

IRRs

	One Quarter	One Year	Three Years	Five Years	Inception
Real Estate IRR	2.21%	12.99%	13.76%	14.34%	7.20%
ODCE IRR	3.58%	13.38%	12.08%	13.15%	6.46%

Opportunistic Investments

Real Estate Related Opportunistic Investments

	Commitment	Net Amount Inveted	NAV	Inception IRR
56th and Park (NY) Holdings, LLC	50	40.02	96.47	63.28%
OCM STR Co-Invest 1, L.P.	150	105.95	193.70	21.68%
Saguaro Land Investor, LLC.	140	44.66	47.86	11.76%

- OCM Store is a REIT based in Scottsdale investing in single tenant net lease properties. ASRS was a founding investor in this company which has recently gone public (NYSE:STOR).
- 56th and Park is a condominium at 432 Park in Manhattan
- Saguaro Land Investor provides subdivision financing to homebuilders

Performance Accountability

The following table shows performance for legacy real estate investments and those by the current management team.

Portfolio Returns

	Portfolio IRR	ODCE IRR	Outperformance
Total RE Legacy Portfolio	5.91	5.56	0.35
Total RE Current Portfolio	15.50	12.37	3.12
Real Estate Opportunistic	27.88	12.19	15.69
Combined Current Real Estate	18.30	12.33	5.97

The following table shows performance of the current consulting team.

Consultant Returns

	Portfolio IRR	ODCE IRR	Outperformance
RCLCO Real Estate	13.67	12.98	0.70
RCLCO Opportunistic	55.35	12.61	42.73
RCLCO Combined	19.71	12.91	6.80

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
  - Inception IRR through June 30, 2015 is 3.28% which has underperformed the benchmark return of CPI+350 by over 2%
    - The portfolio is still very young with average hold of less than 2 years
    - Value add business plans are still in course of implementation with productivity improvements being realized in the current crop year
    - Recent distressed investments in citrus and organic farming seem very promising
    - Commodity grain investments have been impacted by prices

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
- The \$300 million commitment was called in December 2014
- Inception IRR through June 30, 2015 is 2.77%, which has underperformed the benchmark return of CPI+350 by 0.47%
  - The portfolio has performed well (albeit over a short measurement period) but with gains largely offset by currency impacts

Timber

- Timber is a permitted asset in the inflation linked group because it can provide long-term inflation protection income derived from the rising utilization of timber and shrinking forest sizes
- Timber has a low correlation with other asset classes combined with low volatility
- ASRS has has made no investments in timber but monitors the space
- Should ASRS pursue this strategy, it will seek alignment of asset and vehicle life similar to other private markets inflation-linked assets

Background of ASRS Commodities Program

- ASRS approved a 3% (0%-5%) strategic allocation to commodities in October 2009. After an in-depth search, ASRS invested just over half of the allocation with two long-only commodities investment managers
  - Gresham - $200M on 8/30/2010
    - Systematic rules-based approach is used to construct and rebalance the portfolio. A discretionary, market-driven approach is used to implement and roll commodity futures.
  - Cargill - $200M on 9/30/2010
    - Fundamental, bottom up approach using trading desks to construct a regional and global supply/demand balance sheet for each commodity market in which Cargill participates
  - ASRS legged into its allocation to avoid chasing returns and because of valuation concerns.
  - ASRS GTAA managers' benchmark also included a 3% allocation to commodities.

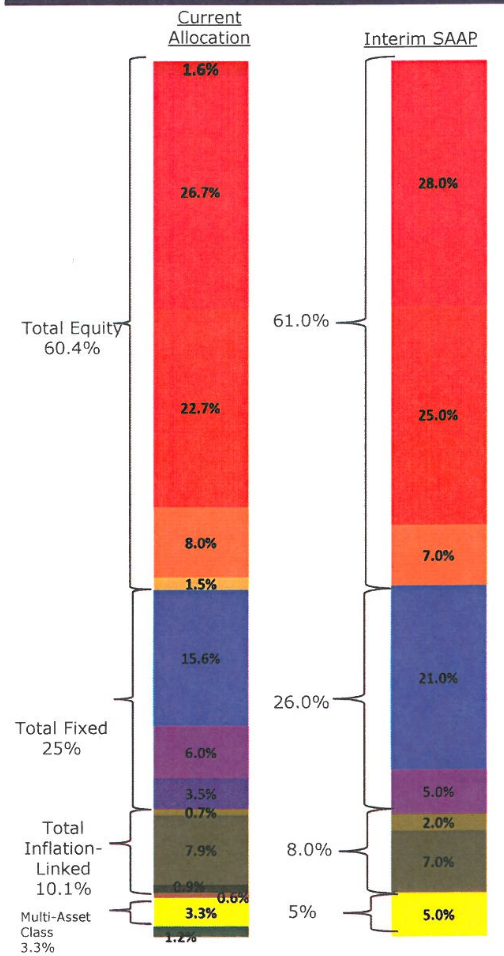
Background of ASRS Commodities Program (2)

- The 2012 Strategic Asset Allocation Study increased target allocation from 3% to 4%, with a range of 1% - 7%
- The 2015 Strategic Asset Allocation Study reduced the target allocation from 4% to 2%, with a range of 0% - 4%
    - Over the past year, ASRS has maintained its tactical underweight to commodities and reduced its exposure:
        - \$100M redemption in December 2014
        - \$50M redemption in July 2015
        - \$200M redemption in August 2015
        - These moves were consistent with the ASRS House View of maintaining an underweight position and also to provide liquidity for the Total Fund
    - Relative underperformance of asset class and redemptions resulted in further underweight to commodities from -0.7% (9/30/2014) to -1.3% (9/30/2015).
    - ASRS maintains its single manager relationship in commodities with Gresham. ASRS is comfortable with Greshams' role due to consistent outperformance, exceptional client service, and low fees

ASRS Commodities Asset Class Overview as of 9/30/2015

Arizona State Retirement System

SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Difference	Policy Range	Within Range
Total Domestic and International Equity[1]	$16,823,835,177	51.0%	53.0%	-2.0%		
Domestic Equity[2]	$8,804,975,453	26.7%	28.0%	-1.3%	16% - 36%	Yes
U.S. Large Cap	*$6,958,889,493*	*21.1%*	*22.0%*	*-0.9%*		
U.S. Mid Cap	*$941,088,936*	*2.9%*	*3.0%*	*-0.1%*		
U.S. Small Cap	*$904,997,024*	*2.7%*	*3.0%*	*-0.3%*		
International Equity[2]	$7,490,182,873	22.7%	25.0%	-2.3%	14% - 34%	Yes
Developed Large Cap	*$5,496,020,109*	*16.7%*	*18.0%*	*-1.3%*		
Developed Small Cap	*$641,867,052*	*1.9%*	*2.0%*	*-0.1%*		
Emerging Markets	*$1,351,557,075*	*4.1%*	*5.0%*	*-0.9%*		
Private Equity[3]	$2,630,736,159	8.0%	7.0%	1.0%	6% - 10%	Yes
Opportunistic Equity[3,5]	$480,673,177	1.5%	0.0%	1.5%	0% - 3%	Yes
Total Equity	$19,935,244,513	60.4%	60.0%	0.4%	48% - 65%	Yes
U.S. Fixed Income	$5,131,640,536	15.6%	21.0%	-5.4%	8% - 28%	Yes
Core	*$3,731,607,177*	*11.3%*	*16.0%*	*-4.7%*		
High Yield	*$1,011,962,598*	*3.1%*	*5.0%*	*-1.9%*		
Treasuries Long Duration	*$388,053,348*					
Private Debt[3]	$1,963,196,587	6.0%	5.0%	1.0%	8% - 12%	
Opportunistic Debt[3,5]	$1,145,367,306	3.5%	0.0%	3.5%	0% - 3%	Yes
Total Fixed Income	$8,240,204,429	25.0%	26.0%	-1.0%	18% - 35%	Yes
Commodities	$232,059,332	0.7%	2.0%	-1.3%	0% - 4%	Yes
Real Estate[3]	$2,618,473,818	7.9%	7.0%	0.9%	8% - 12%	Yes
Infrastructure	$308,318,001	0.9%	0.0%	0.9%	0% - 3%	Yes
Farmland and Timber	$182,866,836	0.6%	0.0%	0.6%	0% - 3%	Yes
Opportunistic Inflation-Linked[4]	$0	0.0%	0.0%	0.0%	0% - 3%	Yes
Total Inflation-Linked	$3,341,717,987	10.1%	9.0%	1.1%	8% - 16%	Yes
Multi-Asset Class Strategies	$1,085,617,751	3.3%	5.0%	-1.7%	0% - 12%	Yes
Cash[4]	$392,075,938	1.2%	0.0%	1.2%		
Operating Cash (Non-Assetized)	*$28,920,981*	*0.1%*	*0.0%*	*0.1%*		
Operating Cash (Assetized)	*$363,154,956*	*1.1%*	*0.0%*	*1.1%*		
Total	$32,994,860,617	100.0%	100.0%	0.0%		

[1]Total Domestic and International Equity includes Equity Risk Factor Portfolio with assets of $528.7 million.

[2]Domestic Equity, International Equity and U.S. Fixed Income market values include residual values remaining in terminated manager accounts.

[3]Values shown for private markets portfolios include cash flows that occurred during 3Q 2015.

[4]Cash includes money for the upcoming monthly pension distribution.

[5]Aggregate Opportunistic asset classes not to exceed 10%.

Note: Interim SAA Policy includes proration of 0.9% Private Equity and 3.3% Real Estate, and 5.3% Private Debt 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.

NEPC, LLC

September 30, 2015

Commodities Performance

as of 9/30/15

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 Inflation-Linked Assets	232,059,332	0.7	-15.4	--	-15.4	--	-27.9	--	-15.4	--	-8.2	--	--	--	-6.1	Feb-10
ASRS Custom Inflation-Linked Benchmark			-14.5	--	-14.5	--	-26.0	--	-16.0	--	-9.6	--	-2.1	--	-7.3	Feb-10
Over/Under			-0.9		-0.9		-1.9		0.6		1.4				1.2	

as of 10/31/15

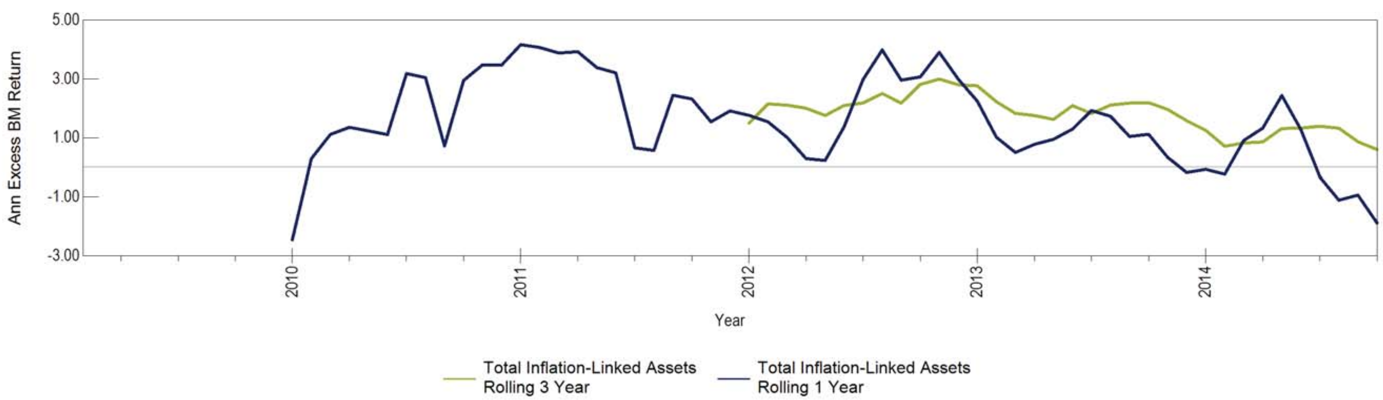
	Benchmark	Market Value ($mil.)	1 Mth	3 Mth	1 Year	3 Year	5 Year	10 Year	ITD	Inception Date
GLOBAL INFLATION LINKED										
GRESHAM	Bloomberg Commodity Index Total Return	232	-0.02	-5.09	-27.08	-14.16	-8.07		-5.67	09-01-2010
Excess			0.43	-0.36	-1.36	0.87	1.78		1.78	

Commodities Excess Return

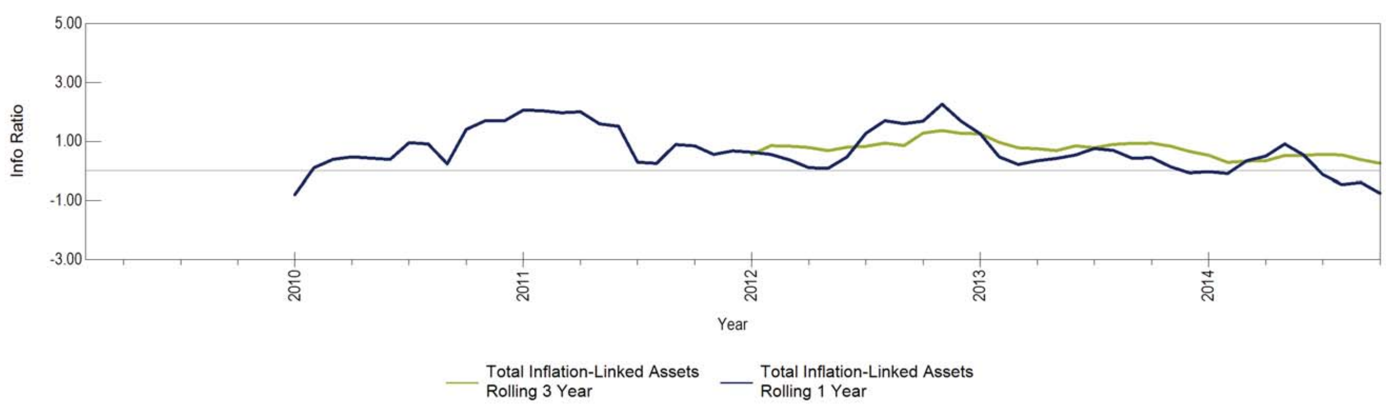
Arizona State Retirement System

Asset Class Analysis - Total Inflation-Linked Assets

Rolling Annual Excess Benchmark Return



Rolling Information Ratio

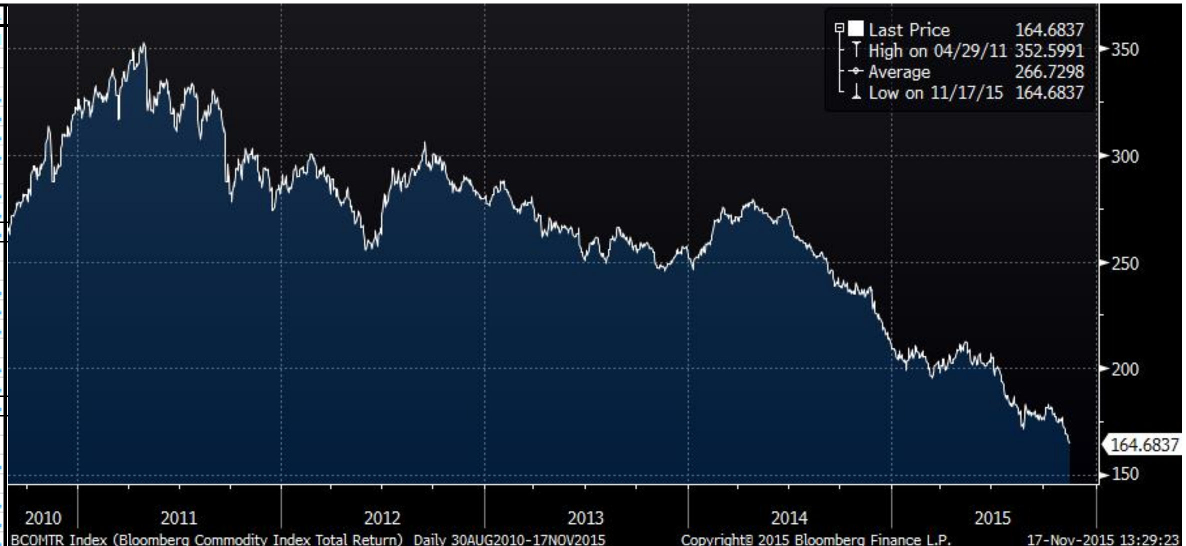


Commodities Profile

Bloomberg Commodities Total Return Index

	Pd Ending Wghts
	BCOM
AGRICULTURE	
Corn	8.00%
Soybean	5.42%
Wheat (CBOT)	3.32%
Wheat (KC)	1.07%
Wheat (MGE)	
Soybean Meal	2.71%
Soybean Oil	2.62%
Group SubTotal	23.14%
ENERGY	
WTI Crude Oil	8.13%
Brent Crude	7.70%
Heating Oil	3.90%
Gas Oil	
Natural Gas	8.69%
Unleaded Gas (RBOB)	4.14%
Group SubTotal	32.56%
INDUSTRIAL METALS	
Aluminum	4.54%
Copper (LME)	
Copper (NY)	7.22%
Nickel	1.60%
Zinc	2.15%
Lead	
Group SubTotal	15.51%
LIVESTOCK	
Live Cattle	2.96%
Lean Hogs	1.84%
Feeder Cattle	
Group SubTotal	4.81%
PRECIOUS METALS	
Gold	12.38%
Silver	4.24%
Platinum	
Palladium	
Group SubTotal	16.61%
SOFTS	
Cotton	1.71%
Sugar	3.93%
White Sugar	
Coffee	1.73%
Coffee (Robusta)	
Cocoa	
Group SubTotal	7.37%
Total	100.00%

9/30/2015 Index weights



Aug'10 – Apr'11	+33%	'risk on': positive global recovery
May'11 – May'12	-25%	'risk off': concerns regarding Europe & global growth
Jun'12 – Sep'12	+15%	Drought driven grains rally & Fed stimulus
Oct'12 – Dec'13	-15%	China slowdown, anticipation of taper
Jan'14 – Jun'14	+7%	Momentum in growth, expectation of inflation
Jul'14 – Nov'15	-39%	Saudi commitment to maintain market share, China slowdown

Commodities Index: Energy

- Performance [1]
  - YTD WTI (-21%) and Brent (-22%) have been very weak
    - The N. American shale gas story continues as the US ramps up production and reduces the Brent spread
    - Demand has not been robust as growth in the world ex-US has been weak
    - Saudi Arabia's stance to maintain its market share has oil reduced prices by ~50% since 9/30/2014
  - YTD Natural gas (-19%) has also suffered materially and is down ~45% since 9/30/2014
- Market Commentary and Outlook
  - US rig count is down ~60%, but has stabilized in recent weeks
  - Domestic growth continues to be moderate and not likely to surge
  - Geopolitical factors are unpredictable but have not been impactful

[1] as of 11/16/15

Commodities Index: Precious and Industrial Metals

- Performance YTD [2]
  - Gold (-9%) and silver (-9%) have been modestly weak as the USD has been relatively strong
  - Copper (-23%) has performed poorly as China has experienced a slowdown
- Market Commentary and Outlook
  - As a proxy for hedging against inflationary money printing and USD devaluation, gold and silver have a soft outlook
  - China's growth has moderated and its infrastructure build out for urbanization has shifted to a focus on a consumer driven economy
    - Industrial metals continue to be well supplied

[2] as of 11/16/15

Commodities Index: Ags, Livestock, and Softs

- Performance YTD [3]
  - Corn (-9%) and soybeans (-16%) have suffered meaningful losses driven by good weather and increases in global stocks
  - Cattle (-17%) and hogs (-33%) have been weak on the back of surging herds and tepid demand growth
  - Cocoa (+16%) has experienced the largest gains as Ghana has dealt with crop issues
- Market Commentary and Outlook
  - The weather largely cooperated for a strong growing season in row crops
  - Increased grain storage capacities over the past several years dampen these effects

[3] as of 11/16/15

Commodities House Views

Primary Market Metrics & Indicators:

1. Fundamentals: **NEGATIVE**
   - The U.S. dollar has strengthened on a relative basis as the Fed appears poised to raise interest rates. China's economy has slowed down while Europe has begun to deal with its economic weakness with stimulus.
   - Most commodity sectors appear well supplied, particularly for the current global growth environment.
   - The decision by Saudi Arabia not to reduce production with the potential addition of Iranian supply has kept energy markets depressed, resulting in rig lay downs in the U.S. while the budgetary impacts globally continue to add up.
   - Corn and wheat stockpiles have recently hit multi-year highs while world food prices continue to slide. Energy markets reflect the continued growth in global production as WTI and Brent prices are both near $45. Metals have weakened as precious metals have suffered from U.S. dollar strength while industrial metals still exhibit weak demand.
2. Valuations: **NEGATIVE**
   - The Bloomberg Commodities Index is just above its 13 year low as global supplies outpace demand.
   - On a trailing twelve-month basis, commodities are down 30% with ags being the least impacted sector with a decline of 11%.
3. Sentiment: **NEGATIVE**
   - The moderate growth and weak inflation environment in the U.S. has tempered investor enthusiasm for commodities and resulted in outflows from commodities.
   - The slowdown in the Chinese economy and its equity market has tempered enthusiasm for commodities.
   - Geopolitical news has not been constructive for energy prices. Looking across the individual commodities, most remain well supplied, which is reflected in prices as inflationary fears are muted.

Commentary:

IMD has maintained a tactical underweight relative to the SAA approved in 2015 which reduced the commodities target from 4% to 2%, recognizing the effects of the Chinese slowdown and sufficient global supplies. As a result of the changing dynamics in the energy markets IMD reduced its exposure to commodities in December and further reduced its exposure in July as inflationary pressures are still soft.

The North American shale play has resulted in increased U.S. energy production and represents a long-term phenomenon. China's growth rate is also moderating and the era of infrastructure build-out which fueled a portion of the demand for commodities (particularly industrial metals) is abating. Precious metals may also be challenged as the U.S. has moved to the front of the global recovery and other countries' stimulus should result in US dollar strength at the margin. While grains are currently well supplied, the unpredictability of weather inhibits long-term forecasting.

IMD will maintain a tactical underweight relative to the SAAP and monitor global supply and demand swings for inflationary pressures. Improving economic conditions and inflationary pressures would serve as a catalyst to initiate a neutral position should the conditions arise.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

Agenda Item #6

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • 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: Arizona State Retirement System Investment Committee (IC)

FROM: Mr. Paul Matson, Director
Mr. Gary R. Dokes, Chief Investment Officer (CIO)
Ms. Lupita Breland, Portfolio Analyst

DATE: November 23, 2015

RE: **Agenda Item #6**: Presentation, Discussion, and Appropriate Action Regarding Proposed Modifications to the ASRS Plan and Long Term Disability Existing Strategic Investment Policies (SIPs) and Newly Created SIPs for the ASRS System

Purpose

To present and discuss proposed additions and modifications to Plan (Pension and Health Benefit Supplement (HBS)), LTD, and System's Strategic Investment Policies (SIPs), and the respective AA Schematic Tables for LTD & System.

Recommendations

Move that the IC recommend to the Board the following:

1. Approve modifications to existing Strategic Investment Policies (SIPs) 001, 002, 003, 004 pertaining to the Asset Allocation and Fund Positioning and Rebalancing SIPs for the Plan and LTD.

2. Approve two new SIPs pertaining to System Asset Allocation and Fund Positioning and Rebalancing.

Background

Well documented Asset Allocation and Fund Positioning and Rebalancing policies assist in the effective and consistent investment management of investable assets. These policies reflect the process for identifying and determining potential courses of action associated with LTD and System's asset class over-/under-weight deviations relative to its broad Strategic Asset Allocation Policy (SAAP) and for repositioning based on market valuations and expectations. The asset allocation policies reflect investments in strategic and tactical asset classes and strategies whose collective risk/return profile are anticipated to achieve the stated investment rate of return goals and objectives.

ASRS LTD Fund

The LTD program investment assets of approximately $217 million, as of November 20, 2015, are invested in commingled passive asset class modules held at and managed by BlackRock. ASRS staff modifies the LTD fund module weights to better manage LTD program cash flow needs, maintain asset allocation policy weights within the ranges, and to tactically position the fund consistent with House Views.

ASRS System

The ASRS System is the retirement program that preceded the current Arizona State Retirement System Pension Plan (Plan). It is a hybrid program that originally contained elements of both defined benefit and defined contribution plan structures. System assets are reported separate from Plan assets, although they are associated by investing in commingled and unitization portfolios. Portfolio unitization is done to enable efficient record keeping of cash flows, balances, returns, and to allow for differences in asset allocation. Commingling of assets allows the ASRS to allocate investments effectively across System and Plan while mitigating management and transaction costs. System's current market value as of November 20, 2015 is $306 million.

The proposed modifications to the following SIPs are:

- SIP001 Asset Allocation (Plan) - reflects the correct 20 year rolling annual period to achieve the ASRS investment goals and objectives, and minor cosmetic edits.
- SIP002 Fund Positioning and Rebalancing (Plan) - reflects minor cosmetic edits.
- SIP003 Asset Allocation (LTD) - reflects minor cosmetic edits.
- SIP004 Fund Positioning and Rebalancing (LTD) - reflects minor cosmetic edits.

The proposed New SIPs are:

- SIP00X Asset Allocation (System)
- SIP00XX Fund Positioning and Rebalancing (System)

Attachments:

- *Appendix I:*
  - SIP001 Asset Allocation (Plan)
  - SIP002 Fund Positioning and Rebalancing (Plan)
  - SIP003 Asset Allocation (LTD)
  - SIP004 Fund Positioning and Rebalancing (LTD)
  - SIP00X Asset Allocation (System)
  - SIP00XX Fund Positioning and Rebalancing (System)
- *Appendix II:*
  - Exhibit 1: Board Approved Plan (Pension & HBS) SAA Policy Schematic
  - Exhibit 2: IC Approved LTD Asset Allocation Schematic Table
  - Exhibit 3: IC Approved System Asset Allocation Schematic Table

APPENDIX I

Asset Allocation: Plan (Pension & Health Benefit Supplement (HBS))

Purpose:
To codify the policy and guidelines for establishing and modifying the asset allocation policy for the Plan (Pension & Health Benefit Supplement (HBS)).

Policy:
The ASRS will establish and maintain this asset allocation policy which will govern the investment management of the Plan's assets. This policy will reflect investments in strategic and tactical asset classes and strategies whose collective risk/return profile are anticipated to achieve ASRS investment rate of return goals and objectives. A paramount investment goal and objective is for the Plan to achieve a 20-year rolling annual rate of return equal to or greater than the Plan's actuarial assumed interest rate.

The ASRS will employ a dynamic strategic asset allocation study approach whose initiation and periodicity will primarily be a function of market dynamics. The strategic asset allocation is used to determine the long-term policy asset weights in the Plan. Investment opportunities and asset classes are constantly evolving and developing, such that they may become attractive and suitable for institutional investment portfolios before the next scheduled policy review. Therefore, asset allocation reviews in addition to periodic studies will be conducted as warranted or triennially, whichever is shorter.

The study will primarily utilize an asset-only framework given it allows the Plan to focus on the long-term funded status of the Plan, maximize portfolio return, and minimize pension costs.

The Chief Investment Officer (CIO), with the concurrence of the Director and the Chair of the Investment Committee (IC), will initiate a strategic asset allocation study. Furthermore, the CIO will be responsible for the management of the process and the implementation of Board approved asset allocation policies.

The strategic asset allocation study may include, but not be limited to, the following:

- Discuss and analyze existing and evolving institutional asset classes and investment strategies.
- Evaluate expected sources of investment returns, risk and diversification (quantitatively/qualitatively)
- Review investment industry developments (academic and pragmatic)
- Utilize quantitative tools (e.g. efficient frontier mean-variance optimization, risk budgeting) and evaluate multiple scenarios
- Review and engage discussions regarding capital market assumptions.
- Review asset allocation policies from other public and non-public entities.

The CIO will determine the services needed to develop, conduct and implement the asset allocation study. These services will include those of the ASRS Investment staff and may include those of the Plan's general investment consultant and/or other consultants.

Tactical Positioning and Rebalancing:
Plan: (Pension & Health Benefit Supplement (HBS))

Purpose:
To codify the policy and guidelines for determining and managing the tactical positioning and rebalancing process for the Plan relative to the ASRS Strategic Asset Allocation Policy (SAAP).

Policy:
The ASRS will establish and maintain this tactical positioning and rebalancing policy for the Plan which will assist in the investment management of the Plan's assets. This policy will reflect the process for identifying and determining potential courses of action associated with the Plan's asset class over-/under-weight deviations relative to its broad SAAP and for repositioning based on market valuations and expectations.

A Tactical Fund Positioning Committee meeting will be initiated by the CIO and be based on 1) market events or asset class dynamic valuation assessments, 2) the occurrence of actual-to-policy asset class over-/under-weighting deviations outside of SAAP bands, and/or 3) external or internal cash-flow needs. At a minimum, the Tactical Fund Positioning Committee will meet monthly but may meet more frequently as needed.

At the Tactical Fund Positioning Committee meeting, the CIO, Portfolio Managers (PMs), Portfolio Analysts (PA) and Director, when available, will engage in asset class relative value discussions of the fundamental, technical and market sentiment metrics used to develop IMD's Investment House Views. The CIO may also utilize the research and perspectives of the ASRS investment consultants and/or select ASRS external investment managers. A PA will determine the magnitude, in percentage and dollars, of the actual-to-policy asset class over-/under-weight deviations and whether such deviations are within or exceed policy target bands. Consistent with IMD Investment House Views, asset class position movements away from policy targets but within the target's bands may occur.

The Tactical Fund Positioning Committee will determine the potential fund positioning or rebalancing courses of action and their associated preliminary trading and other market friction cost estimates. Given action is determined, the CIO will designate the investment portfolios or vehicles to be used taking into account factors such as the asset class active/passive policy targets, timing and execution costs and Plan cash-flow management considerations. Active and passive managers' portfolios may be utilized for rebalancing and repositioning purpose and, as such, may be selected for additional portfolio funding or be defunded by decrements which may result in zero portfolio balances. Defunded investment managers will remain as contracted ASRS investment managers unless termination is determined by an Asset Class Committee.

Market impact, brokerage fees, spreads, and other market frictions, as well as tracking error considerations will be considered when rebalancing and repositioning. The Tactical Fund Positioning Committee may utilize synthetic rebalancing or repositioning methodologies that more effectively implement this policy.

Rebalancing or Repositioning Rules:

1. Depending on IMD Investment House Views and consistent with valuation metrics, asset class position movements away from policy targets but within the target's bands may occur.
2. If the magnitude of the difference between actual and interim target allocations is <u>outside</u> the adjusted policy* target bands, rebalancing or repositioning back into policy bands will occur.
3. If the magnitude of the difference between actual and interim target allocations is <u>within</u> the adjusted policy target bands, rebalancing or repositioning may occur toward or away from the targets but not beyond the bands.

The magnitude of the rebalancing or repositioning decisions made and subsequently implemented may be subjective but based on the conviction of the Tactical Fund Positioning Committee which is reflected in IMD's Investment House Views.

A PA will maintain records regarding the outcome of the Tactical Fund Positioning Committee meeting and action taken therein. From a reporting perspective, performance contributions resulting from over-/under-weights relative to Plan's SAAP will be captured in the quarterly ASRS Total Fund Performance Attribution Analysis Report which is presented to the Board.

In addition, the CIO will inform the Director of such actions and, at its next meeting, provide the IC with a verbal update regarding asset class rebalancing that has or may occur as the result of either tactical Fund re-positioning or required rebalancing. The CIO will also annually review this policy with the IC.

*Private market, opportunistic investments and commodities pro-rated.

Asset Allocation: Long Term Disability (LTD)

Purpose:
To codify the policy and guidelines for establishing and modifying the asset allocation policy for the Long-term Disability (LTD) Program.

Policy:
The ASRS will establish and maintain this asset allocation policy which will govern the investment management of LTD assets. This policy will reflect an allocation to asset classes similar to those of the Plan asset allocation policy and may also use additional investment managers and vehicles to better manage the fund in terms of segregation and liquidity and additional discerning characteristics.

The strategic asset allocation is used to determine the long-term policy asset weights in the LTD program. Investment opportunities and asset classes are constantly evolving and developing, such that they may become attractive and suitable for institutional investment portfolios before the next scheduled Plan's asset allocation policy review. The LTD asset allocation review will focus on possible reasons why the strategic asset allocation should or should vary from the Plan asset allocation.

The Chief Investment Officer (CIO), and Director will present the recommended LTD asset allocation review to the Investment Committee (IC), for further recommendation to the Board. Furthermore, the CIO will be responsible for the management of the process and the implementation of Board approved asset allocation.

Arizona State Retirement System
Strategic Investment Policy (SIP004)

Tactical Positioning and Rebalancing: Long Term Disability (LTD)

Purpose:
To codify the policy and guidelines for determining and managing the positioning and rebalancing process relative to the ASRS Long Term Disability (LTD) strategic asset allocation policy (SAAP).

Policy:
The ASRS will establish and maintain this tactical positioning and rebalancing policy for the LTD which will assist in the investment management of LTD's assets. This policy will reflect the process for identifying and determining potential courses of action associated with LTD's asset class over-/under-weight deviations relative to its broad SAAP and for repositioning based on market valuations and expectations.

As a result of discussions and decisions made by the Tactical Fund Positioning Committee, IMD Staff, under the direction of the CIO, will review the positioning and rebalancing of LTD assets. LTD rebalancing may occur due to changes in IMD House Views and/or cash flow requirements or general liability or portfolio management requirements. At a minimum, such review will be conducted monthly but may be required more frequently as needed.

IMD Staff will review LTD's external cash flow needs, as well as the magnitude of the actual-to-policy asset class over-/under-weight deviations and whether such deviations are within or exceed policy target bands. Consistent with LTD positioning, asset class position movements away from policy targets but within the target's bands may occur.

IMD Staff will determine the potential fund positioning or rebalancing courses of action and their associated preliminary trading and other market friction cost estimates. LTD program assets are invested in portfolios which are managed by an ASRS external investment manager (administrator) to provide asset class exposures consistent with the LTD asset allocation policy. Given action is determined, IMD Staff will designate the investment portfolios to be used taking into account factors such as fund liquidity windows, timing and execution costs, and LTD cash-flow management considerations. Market impact, brokerage fees, spreads, and other market frictions, as well as tracking error considerations will be considered when rebalancing and repositioning.

Rebalancing or Repositioning Rules:

1. Depending on IMD Investment House Views and consistent with valuation metrics, asset class position movements away from policy targets but within the target's bands may occur.
2. If the magnitude of the difference between actual and interim target allocations is <u>outside</u> the adjusted policy* target bands, rebalancing or repositioning back into policy bands will occur.
3. If the magnitude of the difference between actual and interim target allocations is <u>within</u> the adjusted policy target bands, rebalancing or repositioning may occur toward or away from the targets but not beyond the bands.

The magnitude of the rebalancing or repositioning decisions made and subsequently implemented may be subjective but based on the conviction of the Tactical Fund Positioning Committee which is reflected in the Plan positioning.

IMD Staff will maintain records regarding the trading activity resulting from the rebalancing of the LTD assets and actions taken therein.

*Private market, opportunistic investments and commodities are pro-rated.

Asset Allocation: System

Purpose:
To codify the policy and guidelines for establishing and modifying the asset allocation policy for the Arizona State Retirement System (ASRS) System.

Policy:
The System is the retirement program that preceded the current Arizona State Retirement System Pension Plan (Plan). It is a hybrid program that originally contained elements of both defined benefit and defined contribution plan structures. The System was established in 1953 and closed to new membership when Plan came into being in fiscal year 1972. In addition to the System being a closed plan with very few active members, the average age of the System's members is approximately 80 years while the average age of the Plan's members is approximately 52 years, as of June 30, 2014. System assets are reported separate from Plan.

The ASRS will establish and maintain this asset allocation policy which will govern the investment management of the System's assets. This policy will reflect an allocation to asset classes similar to those of the Plan asset allocation policy and may also use additional investment managers and vehicles to better manage the fund in terms of segregation and liquidity and additional discerning characteristics.

The strategic asset allocation is used to determine the long-term policy asset weights in System. Investment opportunities and asset classes are constantly evolving and developing, such that they may become attractive and suitable for institutional investment portfolios before the next scheduled Plan's asset allocation policy review. The System asset allocation review will focus on possible reasons why the strategic asset allocation should or should vary from the Plan asset allocation. System is a closed plan that will consider liabilities and funding sources of unfunded liabilities.

The Chief Investment Officer (CIO) and the Director will present the recommended System asset allocation review to the Investment Committee (IC) for further recommendation to the Board. Furthermore, the CIO will be responsible for the management the process and the implementation of Board approved asset allocation policies.

Tactical Positioning and Rebalancing: System

Purpose:
To codify the policy and guidelines for determining and managing the tactical positioning and rebalancing process relative to the System strategic asset allocation policy (SAAP).

Policy:
The ASRS will establish and maintain this tactical positioning and rebalancing policy which will assist in the investment management of System's assets. This policy will reflect the process for identifying and determining potential courses of action associated with System's asset class over-/under-weight deviations relative to its broad SAAP and for repositioning based on market valuations and expectations.

As a result of discussions and decisions made by the Tactical Fund Positioning Committee, IMD Staff, under the direction of the CIO will review the positioning and rebalancing of System's assets. System rebalancing may occur due to changes in IMD House Views, cash flow requirements or general liability or portfolio management requirements. Rebalancing may occur between Plan, Health Benefit Supplement (HBS) and System assets, whereby ownership of portfolio units will be exchanged. System assets may be invested in the same portfolios as Plan & HBS to provide asset class exposures. At a minimum, such review will be conducted monthly but may be required more frequently as needed.

IMD Staff will review System's external cash flow needs, as well as the magnitude of the actual-to-policy asset class over-/under-weight deviations and whether such deviations are within or exceed policy target bands. Consistent with System positioning, asset class position movements away from policy targets but within the target's bands may occur.

IMD Staff will determine the potential fund positioning or rebalancing courses of action. Given action is determined, IMD Staff will designate the investment portfolios or vehicles to be used taking into account factors such as the asset class active/passive policy targets and System's cash-flow management considerations.

Rebalancing or Repositioning Rules:

1. Depending on IMD Investment House Views and consistent with valuation metrics, asset class position movements away from policy targets but within the target's bands may occur.
2. If the magnitude of the difference between actual and interim target allocations is <u>outside</u> the adjusted policy* target bands, rebalancing or repositioning back into policy bands will occur.
3. If the magnitude of the difference between actual and interim target allocations is <u>within</u> the adjusted policy target bands, rebalancing or repositioning may occur toward or away from the targets but not beyond the bands.

The magnitude of the rebalancing or repositioning decisions made and subsequently implemented may be subjective but based on the conviction of the Tactical Fund Positioning Committee which is reflected in IMD's Investment House Views.

IMD Staff will maintain records regarding the outcome of the activity resulting from the rebalancing of System's assets and actions taken therein.

*Private market, opportunistic investments and commodities pro-rated.

APPENDIX II

Exhibit 1

ASRS Plan (Pension & Health Benefit Supplement (HBS)) Asset Allocation Policy Schematic

Asset Class	Policy	Range	Benchmark
Tactical Cash (Unassetized)	0%	(0-3%)	
Operating Cash (Unassetized)	0%		
Operating Cash (Assetized)	0%		
Total Cash	**0%**		
Treasuries (Long Duration)	0%	(0-10%)	Barclays LT Treasuries
Core Bonds	11%		Barclays Aggregate
Interest Rate Sensitive	11%		
High Yield	4%		Barclays High Yield
Private Debt	10%	(8-12%)	S&P/LSTA Leveraged Loan Index+2.5%
Opportunistic Debt	0%		Investment Specific
	14%		
Total Fixed Income	**25%**	**(18-35%)**	
Large Cap	20%		S&P 500
Mid Cap	3%		S&P 400
Small Cap	3%		S&P 600
US Public Equity	26%	(16-36%)	
Developed Large Cap	17%		MSCI EAFE
Developed Small Cap	2%		MSCI EAFE Small Cap
Emerging	5%		MSCI EM
Non-US Public Equity	24%	(14-34%)	
Private Equity	8%	(6-10%)	Russell 2000
Opportunistic Equity	0%		Investment Specific
	8%		
Total Equity	**58%**	**(48-65%)**	
Commodities	2%	(0-4%)	Bloomberg Total Return
Real Estate	10%	(8-12%)	NCREIF ODCE
Infrastructure	0%	(0-3%)	Investment Specific
Farmland and Timber	0%	(0-3%)	Investment Specific
Opportunistic Inflation Linked	0%		Investment Specific
Total Inflation Linked Assets	**12%**	**(10-16%)**	
Multi-Asset Class Strategies	**5%**	**(0-12%)**	Investment Specific
TOTAL	**100%**		

Notes:
1)Total Opportunistic Equity, Debt and Inflation-Linked in aggregate will not exceed 10% of the Total Fund market value and is a) tactical in nature, outside of the SAAP benchmark and b) within the SAAP benchmark but are absolute return oriented.
2)Tactical cash viewed as a defensive and tactical vehicle, will be consistent with House Views and may be employed as a hedge to dampen the effects of anticipated negative returns to the aggregate market value of the Total Fund.
3)Operating cash includes a nominal balance to cover unexpected deviations in cash flow requirements. Equitized operating cash includes excess cash balances that are exposed to the markets using futures and/or ETFs to minimize cash drag while facilitating larger internal and external fund obligations.
4)Multi-Asset Class strategies invest tactically within and across asset classes, seeking to exploit quantitative or fundamental drivers of asset class returns or risk allocations as market conditions warrant.

Approved by the full Board on 03/27/2015

Exhibit 2

ASRS LTD Asset Allocation Schematic Table

Proposed SAA Policy	Target Weights	Range
Barclays Aggregate Index Fund	19%	
HY Bond Index Fund	7%	
Total Fixed Income	26%	19-36%
Russell 1000 Index Fund	24%	
Russell 2000 Index Fund	12%	
U.S. Equity (w/ PE allocation)	36%	26-46%
EAFE Index Fund	18%	
EAFE Small Cap Index Fund	2%	
Emerging Markets Index Fund	5%	
Non-U.S. Equity	25%	15-35%
Total Equity	61%	51-68%
Dow Jones UBS Commodities Index Fun	2%	0-4%
Real Estate Securities Index Fund	11%	9-13%
Total Inflation Linked	13%	10-16%
Total	**100%**	

Differences between Total Fund and LTD:

1. Private Equity exposure is attained through Russell 2000 Index exposure as the Russell 2000 is already the underlying benchmark for the Total Fund's Private Equity asset class. Russell Indices are used because BlackRock does not offer an S&P 600 product. Domestic Equity pro-ration between the Russell 1000 and the Russell 2000 (85%/15% respective mix) is proportionate with the exposure that would be attained from the Total Fund SAAP's S&P 500, S&P 400, and S&P 600 mix.

2. The 5% multi-asset class strategies allocation is prorated by the major asset classes as follows: 1% Core Fixed Income, 2% Russell 1000, 1% EAFE, and 1% Real Estate.

3. Private Debt is split proportionally between Core Fixed Income and High yield 73%/27%.

Exhibit 3

ASRS System Asset Allocation Schematic Table

	Proposed		
	Target	Ranges	Benchmark
U.S. Equity			
Large Cap	20%		S&P 500
Mid Cap	3		S&P 400
Small Cap	3		S&P 600
Total US Equity	26	16-36	Custom Benchmark
International Equity			
Developed Large Cap	17		MSCI EAFE
Developed Small Cap	2		MSCI EAFE Small Cap
Emerging Market	5		MSCI EM
Total International Equity	24	14-34	Custom Benchmark
Private Equity	8	6-10	Russell 2000
Opportunistic Equity	0		Investment Specific
Total Equity	58	48-65	Custom Benchmark
U.S. Fixed Income			
Treasuries (Long Duration)	0	0-10	Barclays LT Treasuries
Core Fixed Income	11		Barclays Agg
Interest Rate Sensitive	11		
US High Yield	4		Barclays High Yield
Private Debt	10	8-12	S&P LSTA Leveraged Loan Index + 2.5%
Opportunistic Debt	0		Investment Specific
Total Fixed Income	25	18-35	Custom Benchmark
Inflation Linked			
Commodities	2	0-4	Bloomberg Total Return
Real Estate	10	8-12	NCREIF ODCE
Infrastructure	0	0-3	Investment Specific
Farmland & Timber	0	0-3	Investment Specific
Opportunistic Inflation Linked	0		Investment Specific
Total Inflation Linked Assets	12	10-16	Custom Benchmark
Multi-Asset Class Strategies	5	0-12	Investment Specific
Total	100%		

Agenda Item #7

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • 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: The Arizona State Retirement System (ASRS) Investment Committee (IC)

FROM: Mr. Gary R. Dokes, Chief Investment Officer

DATE: November 16, 2015

RE: **Agenda Item #7:** Presentation, Discussion, and Appropriate Action Regarding the Investment Committee Meeting 2016 Schedule

Purpose
To present and discuss a proposed Arizona State Retirement System (ASRS) Investment Committee (IC) meeting schedule for the calendar year 2016.

Recommendation
The IC accept or modify the proposed IC meeting schedule for calendar year 2016.

Background
The proposed 2016 IC meeting schedule for the calendar year 2016 (six meetings per year) is similar to the meeting periodicity, dates and starting times that occurred over the past few years. To accommodate the IC Trustees' schedules, the IC meetings typically have occurred on Monday in the same week as the ASRS Board meetings are held.

Proposed IC meeting dates to include the following:

- Monday, February 22, 2016
- Monday, April 25, 2016
- Monday, June 20, 2016
- Monday, August 22, 2016
- Monday, October 24, 2016
- Monday, November 28, 2016

Scheduling bi-monthly meetings appears to work well with IC Trustees and IMD staff; meeting periodicity allows for a manageable number of agenda items to be discussed, sufficient time to generate associated investment material and help with IMD resource management.

Attachments:

- Proposed IC Meeting Schedule for the Calendar Year 2016

2016 Proposed Investment Committee (IC) Schedule

January

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

2016 IC Board Meeting Dates will be bi-monthly on the Monday preceding all Board Meetings.

IC Meetings

Board Meetings

Arizona State Retirement System
Investment Beliefs

FRAME OF REFERENCE

The following *Investment Beliefs* have been established to ensure the development of congruent and synergistic investment strategies, and to ensure the effective and efficient allocation of resources. These *Investment Beliefs* determine the general paradigm within which investment strategies are developed, investment ideas are reviewed, and investment decisions are implemented.

Modifications to these *Investment Beliefs* will occur if experiential, academic, conceptual, and/or practical perspectives suggest that a superior belief system exists.

INVESTMENT BELIEFS

1. Asset Class Decisions are Key

In general, decisions with respect to which asset classes and sub-asset classes to invest in, and the allocations to these asset classes and sub-asset classes, have a greater impact on total fund investment returns than decisions in which specific securities to invest.

2. Theories and Concepts Must be Sound

Over longer periods of time, investment outcomes (e.g. rates of return, volatility) conform to logical theories and concepts. Significant deviations (e.g. internet bubble, pre-subprime erosion of risk premiums) from theoretically and conceptually sound investment constructs are usually not sustainable and are typically self-reverting.

3. House Capital Market Views Are Imperative

The development and articulation of sound *House Views* (e.g. views on interest rates, corporate spreads, asset valuations) will ensure consistency among investment decisions, clarity of investment direction, baselines for debates, and conformity of understanding.

4. Investment Strategies Must be Forward Looking

Investment strategies will be developed based on forward-looking insights, rather than simply on successful strategies of the past.

Asset class valuations and security valuations are significantly affected by endogenous outcomes (e.g. earnings, GDP growth rates, competitive barriers) that are probabilistic, and these outcomes are typically well analyzed by the investment industry.

Asset class valuations and security valuations are also significantly affected by random outcomes (e.g. natural disasters, certain supply & demand shocks) that are virtually unpredictable, and these outcomes are typically not analyzed directly by the investment industry.

Asset class valuations and security valuations are also significantly affected by exogenous outcomes (e.g. foreign policies, global cultural interactions) that can possibly be modeled, and these outcomes are typically not analyzed by the investment industry.

5. Public Markets are Generally Informationally Efficient

Asset Class Valuations

Asset class valuations (e.g. stock market levels versus interest rate levels) are often in equilibrium with one another, but anomalous situations do occur which result in disequilibria between asset class valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

Security Valuations

Security valuations (e.g. IBM versus Cisco) are often in equilibrium with one another, but private markets and anomalous public market situations do occur which result in disequilibria between security valuations. These disequilibria offer valuable investment opportunities which we will pro-actively seek and capitalize on.

The extent of informational efficiency varies across asset classes.

Private markets offer significant opportunities for asset mispricing and manager excellence which we will pro-actively seek and capitalize on.

6. Market Frictions are Highly Relevant

Market frictions (e.g. management fees, carried interest, revenue sharing, expenses, costs, transaction spreads, market impacts, taxes, commissions) can be significantly detrimental to investment performance and as a result transactions will be initiated only to the extent there is a strong level of conviction that they will result in increased investment returns or decreased risks net of all market frictions.

7. Internal Investment Professionals are the Foundation of a Successful Investment Program

In-house investment management capability engaged in direct portfolio management results in superior investment decision-making.

In-house investment management pro-actively monitors capital markets in order to determine mispricing opportunities & allocate capital and will successfully increase risk adjusted returns.

In-house investment professionals are more closely aligned with, and have a better understanding of, the purpose and risk & reward tolerance of the ASRS than external parties.

In-house investment professionals will impact direct investment negotiations, better align economic interests, and influence investment industry conditions (e.g. private deal structures, fee levels, introduction of innovative products & strategies).

8. External Investment Management is Beneficial

External investment organizations can often offer greater expertise, resources, and/or flexibility than internal personnel for various investment strategies.

9. Investment Consultants

Investment consultants will be effectively utilized in the following four general categories, and utilization of consultants will be focused on situations where there is a demonstrable need in at least one of the four areas:

- Independence: When oversight or controls should be enhanced
- Perspective: When internal perspectives are not broad enough
- Special Skills: When internal skills are not deep enough
- Resource Allocation: When internal resources are not broad enough

10. Trustee Expertise

Trustees often have expertise in various areas of investment management, and this expertise should be utilized while ensuring separation between Board oversight and staff management.