

# HOW...

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## **ASRS Employees Deliver Service With PRIDE!**

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### **PROFESSIONALISM**

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

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

### **RESULTS**

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

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

### **IMPROVEMENT**

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

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

### **DIVERSITY**

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

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

### **EXCELLENCE**

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

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



**ARIZONA STATE  
RETIREMENT SYSTEM**



# ARIZONA STATE RETIREMENT SYSTEM

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*Paul Matson  
Director*

## AGENDA

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

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

Monday, June 22, 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 June 22, 2015 beginning at 2:30 p.m., in the 14<sup>th</sup> 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 April 20, 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. Paul Matson  
Director, ASRS  
..... Mr. Gary Dokes  
Chief Investment Officer, ASRS  
..... Mr. Dave Underwood  
Assistant Chief Investment Officer, ASRS  
..... 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. Tactical Portfolio Positioning
  - e. IMD Projects, Research, and Initiatives
  - f. Investment Risk Reports and Securities Lending Risk Metrics

*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 Q1-15 (Informational and discussion item; estimated time 40 min.) ..... Mr. Allan Martin  
Partner, NEPC  
..... Mr. Dan LeBeau  
Consultant, NEPC
5. Presentation, Discussion, and Appropriate Action Regarding Total Fixed Income (Private and Public) Asset Class Presentation (Informational and discussion item; estimated time 45 min.) ..... Mr. Gary Dokes  
..... Mr. Al Alaimo
6. Presentation, Discussion, and Appropriate Action Regarding an ASRS Risk Assessment of the Agency Investment Management Program (estimated time 30 min.) ..... Mr. Paul Matson  
..... Mr. Anthony Guarino  
ASRS Deputy Director and Chief Operations Officer  
..... Mr. Gary Dokes

- 7. Presentation, Discussion, Update and Appropriate Action with Respect to New Investment Strategies and Industry Investment Trends (Informational and discussion item; estimated time 5 min.) .....Mr. Tom Connelly  
.....Mr. Paul Matson  
.....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 scheduled for Monday, August 24, 2015 at 2:30 p.m., at 3300 N. Central Avenue, 14<sup>th</sup> 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 June 16, 2015

ARIZONA STATE RETIREMENT SYSTEM

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Gloria Trujillo  
Committee Administrator

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Gary R. Dokes  
Chief Investment Officer

# Agenda Item #2



# ARIZONA STATE RETIREMENT SYSTEM

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*Paul Matson*  
Director

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

HELD ON  
Monday, April 20, 2015  
1:00 p.m.

The Arizona State Retirement System (ASRS) Investment Committee (IC) met at 3300 N. Central Avenue, 14<sup>th</sup> Floor, Phoenix, AZ 85012. Mr. Tom Connelly, Chair, called the meeting to order at 1:32 p.m.

### 1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Tom Connelly, Chair (via teleconference)  
Prof. Dennis Hoffman, Vice-chair (via teleconference)

A quorum was present for the purpose of conducting business.

### 2. Approval of Minutes of the February 9, 2015 and February 23, 2015 Investment Committee Meeting Minutes

**Motion:** Prof. Dennis Hoffman moved to approve the minutes of the February 9, 2015 and February 23, 2015 public meetings. Mr. Tom Connelly seconded the motion.

By a vote of 2 in favor, 0 opposed, 0 abstentions, 0 excused, and 1 vacancy, the motion was approved.

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

Mr. Gary Dokes, ASRS Chief Investment Officer (CIO), provided the Committee with an update on the implementation of the Board approved Strategic Asset Allocation (SAAP) and commented on changes within the Total Fund Portfolio as they related to the new SAAP. He provided a general overview of the Total Fund performance and advised the Committee that changes to the new SAAP were effective April 1, 2015, and will be incorporated into the total fund positioning, performance/attribution and risk reports at the next IC meeting.

Mr. Connelly questioned the approach of the ASRS investments in commodities, due to inflation in the near future. Mr. Eric Glass, Private Markets Portfolio Manager, provided detailed information on IMD's approach to this type of investment, noting growth and supply as the main contributing factors in their investment approach. He noted from a supply standpoint, he sees no major commodities that are supply constrained and from a demand standpoint, although growth is good, it is not rampant enough to warrant a change in the current allocation to that type of investment.

Mr. Kien Trinh, State Street Investment Analytics, presented the State Street Risk Report. He discussed the monthly reallocation summary, month-end risk profile and total plan overview exposure. He noted, due to a steady market environment, historical risk for all asset classes remains reasonably constant from prior months with only slight changes.

**4. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q4-14**

Mr. Dan LeBeau, New England Pension Consultants (NEPC) Consultant, presented information on the investment performance and monitoring/oversight of the ASRS investment program. He provided detailed information on NEPC's compliance of the Strategic Asset Allocation Policy (SAAP) and noted the Fund continues to make significant progress moving the interim SAAP toward the long-term SAAP. He further provided his perspective on the market, a brief overview of the House Views and investment outlooks.

Professor Hoffman inquired if there were any areas of concern and their level of involvement in ASRS Private and Public Market Committee meetings. Mr. LeBeau replied stating NEPC does attempt to participate in all meetings when their schedules permit and confirmed NEPC reviews all meeting minutes in the event they are unable to attend. He further noted there were no areas of concern.

**5. Presentation, Discussion, and Appropriate Action Regarding Total Equities Asset Class Presentation**

Mr. Dokes provided the Committee with a brief overview of the agenda item and turned the meeting to Dave Underwood, ASRS Assistant CIO, and Karl Polen, ASRS Head of Private Markets. Each gave their perspective on their respective asset classes and provided the Committee with detailed information on current program strategies, portfolio composition and performance. Mr. Underwood presented on the Public Equity asset class and Mr. Polen presented on the Private Markets asset class.

**6. Presentation, Discussion, and Appropriate Action Regarding the Investment Policy Statement (IPS)**

Mr. Paul Matson, ASRS Director, presented the IPS and the recommended changes for approval. He advised the Committee the changes made were minor and consisted mostly of clarification of current verbiage in the existing IPS as denoted in red lettering in the attached material. Changes reflect the ASRS Cash Management Program, and the Transition Management section that were initially in the draft.

**Motion:** Prof. Dennis Hoffman moved to approve the recommended changes to the IPS. Mr. Tom Connelly seconded the motion.

By a vote of 2 in favor, 0 opposed, 0 abstentions, 0 excused, and 1 vacancy, the motion was approved.

**7. Presentation, Discussion, and Appropriate Action Regarding Proposed Modifications to the ASRS Long Term Disability (LTD) Strategic Asset Allocation (SAA)**

Mr. Matson provided the Committee with the history and a general overview of the LTD program, the current Strategic Asset Allocation (SAA) and recommended changes as denoted in Exhibit 2 of the materials.

**Motion:** Prof. Dennis Hoffman moved to approve the recommended changes to the LTD SAA. Mr. Tom Connelly seconded the motion.

By a vote of 2 in favor, 0 opposed, 0 abstentions, 0 excused, and 1 vacancy, the motion was approved.

**8. Presentation, Discussion, and Appropriate Action Regarding Proposed Modifications to the ASRS System Strategic Asset Allocation (SAA)**

Mr. Matson provided the Committee with the history and a general overview of the System's current SAA, and recommended changes as denoted in Exhibit 2 of the materials.

**Motion:** Prof. Dennis Hoffman moved to approve the recommended changes to the System SAA. Mr. Tom Connelly seconded the motion.

By a vote of 2 in favor, 0 opposed, 0 abstentions, 0 excused, and 1 vacancy, the motion was approved.

**9. Presentation, Discussion, Update and Appropriate Action with Respect to New Investment Strategies and Industry Investment Trends**

There were no requests from Trustees for this agenda item.

**10. Call to the Public**

No members of the public requested to speak.

**11. Adjournment**

The meeting adjourned at 2:54 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:** June 8, 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. Tactical Portfolio Positioning
- e. IMD Projects, Research, and Initiatives
- f. Investment Risk Reports and Short-Term Cash Management Risks

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 Metric

Attachments:

From ASRS

- Investment Program Updates Report

From State Street

- truView Risk Report – as of March 31, 2015

From ASRS

- Short-Term Cash Management Risk Report – as of May 31, 2015

# Arizona State Retirement System

## Investment Committee

### Investment Program Updates

June 22, 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

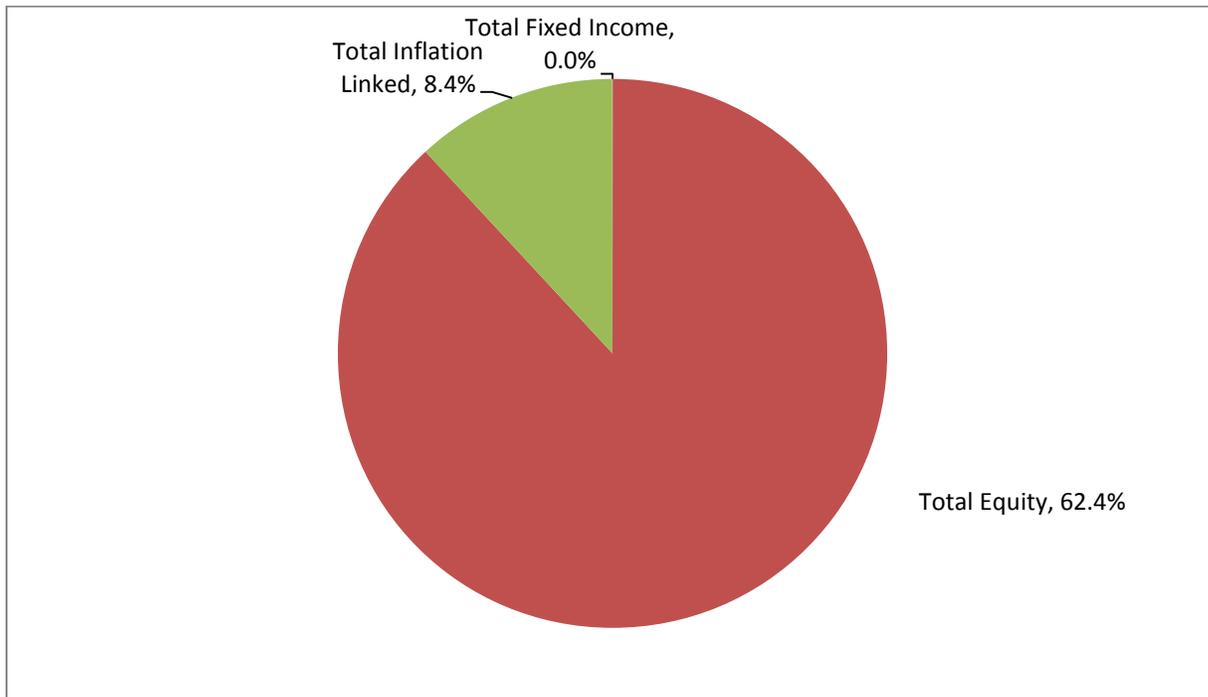


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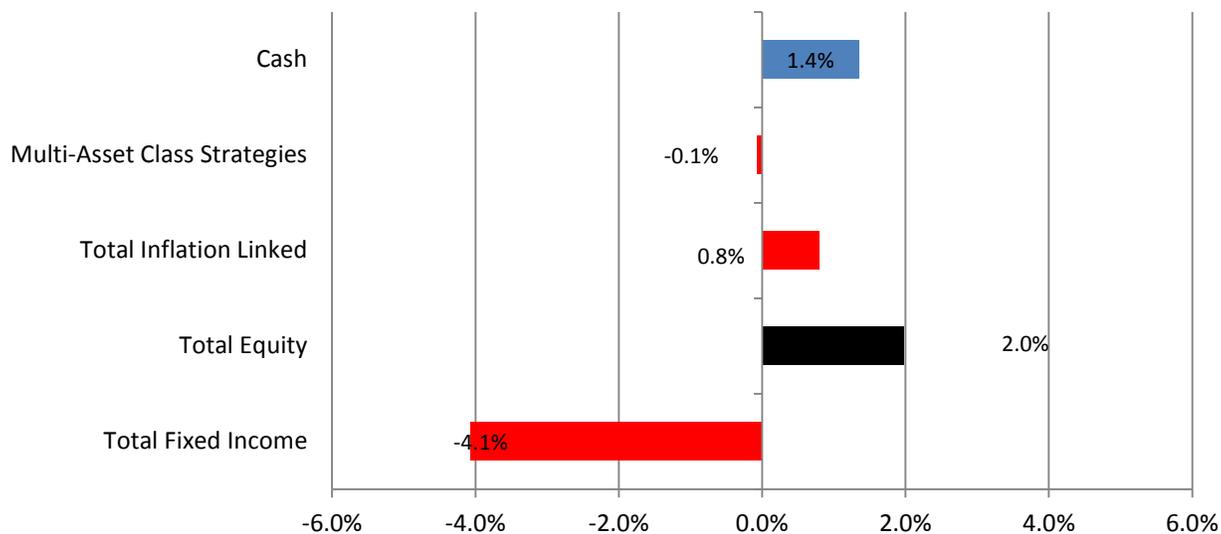
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# TOTAL FUND POSITIONING – 5/29/2015

## ACTUAL PORTFOLIO



## ACTUAL PORTFOLIO (ASSUMED GTAA ALLOCATION VS. ADJUSTED SAA POLICY \*)



\*Real Estate and Private Equity actual weight is equal to policy weight during the implementation of the asset class.

\*Over/Underweights include both GTAA positions as well as IMD tactical considerations.

Note: Opportunistic & Private Debt, Opportunistic Private Equity, Farmland & Timber, Real Estate and Private Equity market values are reported on a quarter-lag and adjusted to include the current quarter's cash flows. Within the Assumed GTAA Allocation vs. Adjusted SAA Policy chart, Real Estate was prorated to domestic equity, international equity and fixed income. Private Equity was prorated to domestic equity.

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%
	Operating Cash (non-assetized)		46,948,803					46,948,803	0.13%
	Operating Cash (assetized)		432,058,652					432,058,652	1.22%
	<b>Cash Total</b>							<b>\$479,007,455</b>	<b>1.35%</b>
								<b>Cash Policy Range: 0%</b>	<b>0.00%</b>
	<b>Treasuries (Long Duration) Total</b>							<b>\$0</b>	<b>0.00%</b>
								<b>Treasuries (Long Duration) Policy</b>	<b>0.00%</b>
Blackrock: San Francisco	Passive (Intermediate Gov Credit)		24,426,118					24,426,118	0.07%
ASRS: Phoenix	Enhanced Passive F2		1,893,920,922					1,893,920,922	5.35%
Blackrock: San Francisco	Passive (US Debt Index)		1,919,453,545					1,919,453,545	5.42%
	<b>Core Fixed Income Total</b>							<b>\$3,837,962,221</b>	<b>10.84%</b>
								<b>Interest Rate Sensitive: 11%</b>	<b>11.00%</b>
Columbia: Minneapolis	Active	825,551,433						825,551,433	2.33%
JP Morgan: Indianapolis	Active	492,388,960						492,388,960	1.39%
	<b>High Yield Fixed Income Total</b>							<b>\$1,317,954,147</b>	<b>3.72%</b>
								<b>High Yield Fixed Income Policy</b>	<b>4.00%</b>
	<b>Opportunistic Debt</b>	1,037,727,122						<b>\$1,037,727,122</b>	<b>2.93%</b>
								<b>Opportunistic Debt Policy Range: 0% - 10%</b>	<b>0.00%</b>
	<b>Private Debt Total</b>	1,597,503,209						<b>\$1,597,503,209</b>	<b>4.51%</b>
								<b>Total Private Debt: 8% - 12%</b>	<b>10.00%</b>
	<b>Fixed Income Total</b>							<b>\$7,791,166,528</b>	<b>22.01%</b>
								<b>Total Fixed Income Policy Range: 15% - 35%</b>	<b>25.00%</b>
Intech: FL	Active (Growth)		457,549,049					457,549,049	1.29%
LSV: Chicago	Active (Value)		814,236,025					814,236,025	2.30%
ASRS: Phoenix	Passive E2			5,226,200,997				5,226,200,997	14.77%
ASRS: Phoenix	Enhanced Passive E7			721,313,352				721,313,352	2.04%
ASRS: Phoenix	Enhanced Passive E8			554,385,961				554,385,961	1.57%
ASRS: Phoenix	Risk Factor Portfolio			566,277,501				566,277,501	1.60%
	<b>Large Cap Equity Total</b>							<b>\$8,339,962,884</b>	<b>23.56%</b>
								<b>Large Cap Policy</b>	<b>20.00%</b>
Wellington: Boston	Active (Core)		298,361,515					298,361,515	0.84%
ASRS: Phoenix	Passive E3 (Growth)			413,637,200				413,637,200	1.17%
ASRS: Phoenix	Passive E4 (Value)			379,652,430				379,652,430	1.07%
	<b>Mid Cap Equity Total</b>							<b>\$1,091,708,049</b>	<b>3.08%</b>
								<b>Mid Cap Policy</b>	<b>3.00%</b>
TimesSquare: New York	Active SMID (Growth)		394,602,590					394,602,590	1.11%
DFA: Santa Monica	Active (Value)		313,621,907					313,621,907	0.89%
ASRS: Phoenix	Passive E6			359,029,106				359,029,106	1.01%
	<b>Small Cap Equity Total</b>							<b>\$1,067,316,275</b>	<b>3.02%</b>
								<b>Small Cap Policy</b>	<b>3.00%</b>
	<b>U.S. Equity Total</b>							<b>\$10,498,987,208</b>	<b>29.66%</b>
								<b>US Equity Policy Range: 16% - 36%</b>	<b>26.00%</b>
Brandes: San Diego	Active (Value)		608,975,308					608,975,308	1.72%
American Century	Active (EAFE)		594,234,704					594,234,704	1.68%
Trinity Street	Active (EAFE)		341,327,627					341,327,627	0.96%
Thompson Siegel Walmsley	Active (EAFE)		321,175,881					321,175,881	0.91%
Int'l Transition				609,827				609,827	0.00%
Blackrock: San Francisco	Passive (EAFE)			3,524,933,705				3,524,933,705	9.96%
	<b>Large Cap Developed Non-US Equity Total</b>							<b>\$5,393,092,298</b>	<b>15.24%</b>
								<b>Large Cap Developed Policy</b>	<b>17.00%</b>
AQR: Greenwich	Active (EAFE SC)		187,257,231					187,257,231	0.53%
DFA: Santa Monica	Active (EAFE SC)		221,557,389					221,557,389	0.63%
Franklin Templeton: San Mateo	Active (EAFE SC)		415,593,431					415,593,431	1.17%
Blackrock: San Francisco	Passive (EAFE SC)			482,695,611				482,695,611	1.36%
	<b>Small Cap Developed Non-US Equity Total</b>							<b>\$1,307,106,080</b>	<b>3.69%</b>
								<b>Small Cap Developed Policy</b>	<b>2.00%</b>
William Blair: Chicago	Active (EM)		486,315,374					486,315,374	1.37%
Eaton Vance: Boston	Active (EM)		481,589,296					481,589,296	1.36%
LSV: Chicago	Active (EM)		308,560,563					308,560,563	0.87%
Blackrock: San Francisco	Passive (EM)			683,967,141				683,967,141	1.93%
	<b>Emerging Markets Equity Total</b>							<b>\$1,960,432,374</b>	<b>5.54%</b>
								<b>Emerging Markets Policy</b>	<b>5.00%</b>
	<b>Non-US Equity Total</b>							<b>\$8,660,630,752</b>	<b>24.47%</b>
								<b>Non-US Equity Policy Range: 14% - 34%</b>	<b>24.00%</b>
	<b>Private Equity Total</b>		2,440,278,564					<b>\$2,440,278,564</b>	<b>6.89%</b>
								<b>Private Equity Policy Range: 6% - 10%</b>	<b>8.00%</b>
	<b>Opportunistic Equity</b>		492,825,188					<b>\$492,825,188</b>	<b>1.39%</b>
								<b>Opportunistic Equity Policy Range: 0% - 3%</b>	<b>0.00%</b>
	<b>Equity Total</b>							<b>\$22,092,721,712</b>	<b>62.42%</b>
								<b>Total Equity Policy Range: 48% - 68%</b>	<b>58.00%</b>
Gresham: New York	<b>Commodities Total</b>					558,916,732		558,916,732	1.58%
								<b>Commodities Policy Range: 0% - 4%</b>	<b>2.00%</b>
	<b>Real Estate Total</b>					2,270,794,019		<b>\$2,270,794,019</b>	<b>6.42%</b>
								<b>Real Estate Policy Range: 8% - 12%</b>	<b>10.00%</b>
	<b>Infrastructure Total</b>					300,710,400		<b>\$300,710,400</b>	<b>0.85%</b>
								<b>Infrastructure Policy Range: 0% - 3%</b>	<b>0.00%</b>
	<b>Farmland &amp; Timber Total</b>					154,690,846		<b>\$154,690,846</b>	<b>0.44%</b>
								<b>Opportunistic I/L Policy Range: 0% - 3%</b>	<b>0.00%</b>
	<b>Inflation Linked Total</b>							<b>\$3,285,111,996</b>	<b>9.28%</b>
								<b>Inflation Linked Policy Range: 8% - 16%</b>	<b>12.00%</b>
Windham							590,423,033	590,423,033	1.67%
Bridgewater							1,156,348,753	1,156,348,753	3.27%
	<b>Multi-Asset Class Strategies</b>							<b>\$1,746,771,786</b>	<b>4.94%</b>
								<b>Multi-Asset Class Policy Range: 0% - 10%</b>	<b>5.00%</b>
	<b>TOTAL Amounts</b>	\$3,953,204,307	\$4,316,969,676	\$9,180,018,883	\$12,912,702,830	\$3,285,111,996	\$1,746,771,786	<b>\$35,394,779,477</b>	<b>Total Fund</b>
	<b>TOTAL Percent</b>	11.17%	12.20%	25.94%	36.48%	9.28%	4.94%		

Asset Class	Actual	SAAP	Interim SAA*	Actual - Interim SAA**		Policy Band check
	Portfolio	Target (Range)	Adj Policy	% diff	\$ diff	Actual - Adj Policy
Tactical Cash	0.00%	0% (0-3%)	0.00%	0.00%		
Cash	1.35%	0.00%	0.00%	1.35%	479,007,455	
Interest Rate Sensitive	10.84%	11%	16.10%	-5.26%		
High Yield	3.72%	4%	5.46%	-1.74%		
Opportunistic Debt	2.93%	0%	0.00%	2.93%	\$1,037,727,122	
Private Debt	4.51%	10% (8-12%)	4.51%	0.00%		
<b>Total Fixed Income</b>	<b>22.01%</b>	<b>25% (18-35%)</b>	<b>26.08% (19-36%)</b>	<b>-4.06%</b>	<b>-\$1,438,133,520</b>	<b>OK</b>
Large Cap	23.56%	20%	22.50%	1.06%	\$374,916,462	
Mid Cap	3.08%	3%	3.00%	0.08%	\$29,864,664	
Small Cap	3.02%	3%	3.00%	0.02%	\$5,472,891	
US Equity	<b>29.66%</b>	<b>26% (16-36%)</b>	<b>28.5% (19-39%)</b>	<b>1.16%</b>	<b>\$410,254,018</b>	<b>OK</b>
Developed Large Cap	15.24%	17%	18.04%	-2.80%	-\$991,938,553	
Developed Small Cap	3.89%	2%	2.00%	1.69%	\$599,210,490	
Emerging Markets	5.54%	5%	5.00%	0.54%	\$190,693,400	
Non-US Equity	<b>24.47%</b>	<b>24% (14-34%)</b>	<b>25.04% (15-35%)</b>	<b>-0.57%</b>	<b>-\$202,034,662</b>	<b>OK</b>
Private Equity	6.89%	8% (6-10%)	6.89%	0.00%	\$0	OK
Opportunistic Equity	1.39%	0%	0.00%	1.39%	\$492,825,188	
<b>Total Equity</b>	<b>62.42%</b>	<b>58% (48-65%)</b>	<b>60.44% (50-67%)</b>	<b>1.98%</b>	<b>\$701,044,544</b>	<b>OK</b>
Commodities	1.58%	2% (0-4%)	2.07%	-0.49%	-\$174,352,537	OK
Real Estate	6.42%	10% (8-12%)	6.42%	0.00%	\$0	OK
Infrastructure	0.85%	0% (0-3%)	0.00%	0.85%	\$300,710,400	OK
Farmland & Timber	0.44%	0% (0-3%)	0.00%	0.44%	\$154,690,846	OK
Opportunistic I/L	0.00%	0%	0.00%	0.00%	\$0	
<b>Total Inflation Linked</b>	<b>9.28%</b>	<b>12% (10-16%)</b>	<b>8.49% (6-12%)</b>	<b>0.79%</b>	<b>\$281,048,709</b>	<b>OK</b>
<b>Multi-Asset Strategies***</b>	<b>4.94%</b>	<b>5% (0-12%)</b>	<b>5% (0-12%)</b>	<b>-0.06%</b>	<b>-\$22,967,188</b>	<b>OK</b>
<b>Total</b>	<b>100.00%</b>	<b>100%</b>	<b>100.00%</b>	<b>0.00%</b>	<b>\$0</b>	
						<b>Internally Managed Portfolios:</b>
						<b>\$9,548,139,967</b>
						<b>27%</b>
*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						
<b>Opportunistic definitions:</b>						
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.						
<b>Total Opportunistic</b>						
Opportunistic Debt	\$1,037,727,122	2.9%				
Opportunistic Equity	\$492,825,188	1.4%				
Opportunistic IL	\$0	0.0%				
	<b>\$1,530,552,311</b>	<b>4.3%</b>				

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

## JUNE 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 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**

- **US 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, 15.7x-17.6x; S&P MID, 16.4x-19.5x; S&P SC600, 18.5x-20.9x.**
- Historic P/Es imply advances of 5-10% for mid and small caps; 9-12% 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:

The “NEUTRAL” opinions on Sentiment and Valuations are unchanged as is the “POSITIVE” opinion on Fundamentals

We reduced the allocation of U.S. equities during 1Q2015 to align toward the newly adopted Strategic Asset Allocation Policy (SAA) and to move in concert with our tactical views. We prefer to be at, or marginally below, policy targets for the short-to-intermediate term. After reallocating nearly 4% of assets in April to the non-U.S.

Equities/EAFE sub-class, U.S. equities are now about 28.5% of Total Fund, down from 32% and in line with the “*Interim SAA*”. Another 2%-3% will move from the class once it can be absorbed by non-U.S. Equities and by other asset classes, at which point equity allocations would align with our tactical view in relation to the 27<sup>th</sup> February 2015 SAA.

Midway through 2015, long-term prospects for the U.S. equities markets remain constructive even if the current phase of price fluctuations appear to weaken that case. The major indexes of U.S. stocks have responded generally as anticipated. Robust, macro-driven momentum of the past two years was overdue for some deceleration, even a downright pause, if only to allow fundamentals time to catch up with prices. Having reached an all-time high, prices have backed off a bit, snuffing out positive year-to-date returns and eroding investor confidence.

There is a positive macro environment for domestic equities, with an essentially sound U.S. economy in a setting of unusually low interest rates. Although some stumbling is likely as the cycle of rising interest rates gets underway, and perhaps the markets have prematurely telescoped-in some of that already this year, history has shown that stocks tend to fare reasonably well as interest rates ascend. The Federal Reserve Open Market Committee, underscored recently in a speech by Chairperson Yellen, and echoed in June by New York Federal Reserve Bank president William Dudley, has been clear that it expects to normalize the level of the federal funds rate only gradually and reflect the slow, but continuing diminution of economic headwinds. Thus any interest rates increases will be a function of sustained improvement in the U.S. economy, not because the FOMC wants to forestall an overheated economy and induce recession. That’s hardly a precursor for falling corporate earnings and stock prices.

Almost perversely, analysts have been taking down 2015 earnings estimates since last November, coinciding with a period in which the both the rise of the exchange rate of the U.S. Dollars and the decline in oil prices accelerated. Reductions in estimates for energy sector earnings and the effects of the higher USD exchange rate account for the 2015 year-on-year growth rate of S&P 500 earnings tumbling to 2%. Viewed at the index level and not necessarily from a top-down context, nor sector by sector, the markets seemed to have inferred that business was undergoing a widespread weakening. However, the benefits derived from quantitative easing provoking global reflation haven’t been translated into the present cohort of non-energy corporate earnings estimates. They are apt to be meaningful catalysts to stocks as 2015 rolls on.

Misconceptions about the speed and magnitude by which the FOMC will move interest rates upward compounded by apprehension over the direction of earnings estimates revisions have triggered the latest bout of relatively minor volatility in the equities markets. This is likely to go on until visible signs appear later this year from the positive combined follow-on effects of ex-U.S. QE programs, of the favorable relative exchange rates engendered by those programs, and from low energy prices. As those signs appear, widespread U.S. corporate earnings growth rates should also turn up.

**CURRENT PORTFOLIO POSTURE: OVERWEIGHT vs. SAA target**

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## NON – U.S. EQUITIES

### Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**

- Eurozone and Japanese economic conditions are firming, if irregularly; they remain soft in lesser-developed economies.

- Relatively inexpensive and available money supports a shift toward risk assets.
- Monetary and economic policies are focused on promoting economic growth and stemming disinflation.

2. Valuations: **POSITIVE**

- Reasonable global valuations relative to U.S.; price-to-book values of **1.4x - 1.6x**; P/Es of **11.0x – 15.3x** on trend earnings.
- Dividend yields are incrementally more favorable -ranging from **1.1x to 1.9x** that of the S&P500.

3. Sentiment: **POSITIVE**

- With the exception of the emerging markets, money flows continue toward the developed counterparts, biased more toward non-U.S. equities than to domestic U.S. markets. Investors are less guarded and remain constructive on global risks despite some near term risk aversion volatility.
- Major non-U.S. markets performance have mostly strengthened in 2015.

**Commentary:**

The “POSITIVE” opinions on Fundamentals, Sentiment and Valuations are unchanged.

Staff raised the allocation to the overall Non-U.S. Equities class in April. It now essentially aligns with the ca February 2015 SAA policy target. Later in the cycle it may exceed that slightly. We are reducing both the Emerging Markets sub-class and EAFE/Small-cap asset subclasses during June to move them to the new policy target weights. Proceeds are being reapportioned to the developed markets EAFE asset subclass to also align its weight with the new policy target weight.

Overall Non-U.S. equities allocations have been more neutral to the (previous) SAA policy since late 4Q2013, awaiting sustainably stronger ex-U.S. economic growth before moving to increase the proportion relative to that of U.S. equities. These preconditions have begun to materialize.

The case for global equities is still upbeat on the back of the global reflationary effort. Flow-driven major markets remain capable of posting high, single digit returns (in USD terms) by year- end. Both the distant past and recent history have shown that liquidity injections, when delivered in sufficient size and duration, can greatly surpass most other market influences. ECB quantitative easing of over a trillion Euros certainly meets those criteria.

Some risks still threaten, e.g.: Investor leverage, threats to profitability, crowding of trades and mounting geopolitical risks. The effects of moving foreign exchange rates dominate most factors and have led to Japanese and European equities responding to profitability-driven margin expansion. The markets don't seem to have priced this in completely, yet momentum risk-on, and reflation oriented strategies, especially in the European markets, seem to be prevailing.

Support from robust liquidity in Europe, and a stronger than expected economy, are impressive enticements to under-owned, low-leverage equities. Upside potential remains, although an overly strong rise too early in the process could burn that out. The impact of quantitative and qualitative easing in Japan has effectively collared the downside of its markets even as overall returns on corporate equity are normalizing further to the upside.

That large, globally-exposed corporations now face more significant revenue and earnings headwinds is one negative consequence in the US from a stronger US Dollar (USD). In contrast, the weakening of currencies against the USD should help augment the revenues of large, multinational equities based outside the U.S. Similarly, European corporate earnings are destined to grow at a double-digit pace, despite lingering weakness in the peripheral regional economies. European equities currently benefit from three significant tailwinds: the fall in the EUR exchange rate; a reduction in borrowing costs; and the resulting boost to growth from protracting lower oil prices. The European Central Bank's quantitative easing program should continue to support the first two tailwinds in the near term, while oil prices should continue to fall in year-on-year terms for several months, even should the clearing price cease falling further, which supports the third tailwind. UK equities have fallen out of favor since the Scottish referendum in September last year. Although, the recent UK elections outcomes aren't necessarily capital markets friendly the markets seem discounted the political risks even though the UK market faces a zero expected return in 2015.

Emerging market economies are still beset by political interference, intractable labor markets and structural problems with what drives those economies. Despite sustained liquidity coursing through their capital markets, the stocks are largely unresponsive. Moreover, capital flows into the USD will continue weighing on the EMs.

A persistently rising USD is not a common theme in markets. It appears to be less prevalent during a "risk on" trend – driven by economics and fundamentals – rather than during a "risk-off" mode. Still, the ramifications of a strong USD in 2015 will be important globally and across assets. Many of the first-round consequences of a strong USD have already been felt. The strength of the USD has helped to push commodity prices and inflation down, restraining bond yields and leading to increased flows into U.S. equities and bonds. These trends should persist and even second-round influences may emerge. The latter might surface as financial conditions in some EM economies tighten further and should any further firming in U.S. consumption elevate the rate of GDP growth. Again, this bolsters the case for multinational non-U.S. companies with sizeable revenues from exports to the U.S.

Also, a rising USD has significant effect on the global flows of capital. The implications are substantial for financial conditions globally and probably felt most acutely by those countries running current account deficits and where a higher proportion of debt is issued in USD. Economic, asset price and currency outperformance in the U.S. may hinder domestic investors from aggressively deploying assets abroad. Meanwhile, investors in weak economies where currencies are depreciating and asset price performance is equally meager are apt to invest the U.S. These potential secondary forces suggest to us that the significant outperformance of U.S. and of developed non-U.S., equity markets relative to those of emerging economies is a multi-year, structural theme.

**CURRENT PORTFOLIO POSTURE: SLIGHT UNDERWEIGHT vs. SAA target**

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## FIXED INCOME

### Primary Markets Metrics & Indicators:

1. Fundamentals: **NEUTRAL**

- Over the past few years, fundamentals in the fixed income markets have been dominated by an extremely accommodative monetary policy by the Federal Reserve. This has included massive, unprecedented bond buying programs of both treasury bonds and agency MBS securities known as "quantitative easing" that began in 2009 during the credit crisis and ended for the most part in

2014. In addition, the Fed has kept the target Fed Funds rate at effectively zero for several years. With a seemingly improved economy, the bond market is facing the prospect that the accommodative Fed policy is likely near its end. Most economists believe the Fed will likely raise short-term rates in the next several months. It is possible that long-term rates may rise as well, which would be negative for the returns of core fixed income. That being said, 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 including most notably the recent adoption of quantitative easing by the European Central Bank (“ECB”), and very low competing long-term interest rates in other developed countries.

2. Valuations: **NEGATIVE**

- The core fixed income market is likely to generate low returns due to low overall yields as Treasury rates remain at low levels and investment-grade credit and agency MBS spreads are relatively tight. 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.
- With a benign outlook for corporate defaults (excluding the energy sector of the high yield market) and an overall demand in the market for yield, the valuation of high yield bonds is much less attractive than in the immediate years after the credit crisis of 2008-2009. Despite the potential for defaults in the energy sector, the outlook for the vast majority of industries the high yield market remains quite favorable and we believe the high yield market will likely achieve low to mid-single-digit returns this year.
- Private debt offers the most attractive opportunity in the fixed income markets with double-digit yields readily available for investors willing to accept illiquidity.
- Select areas of opportunistic debt such as distressed debt (both corporate and structured credit) and excess mortgage-servicing rights (“MSRs”) also offer opportunities to potentially achieve double-digit returns.

3. Sentiment: **NEUTRAL**

- Following a multi-decade period of declining interest rates, IMD has modest concerns that investors sentiment is shifting away from fixed income. That being said, going forward, IMD believes demand will continue for income producing assets particularly those which offer a yield premium.

**Commentary:**

IMD remains underweight in Total Fixed Income relative to its SAAP policy. Core fixed income offers important defensive characteristics which help to balance out the overall risks of the total fund portfolio however the current low levels of U.S. Treasuries and tight spreads in the investment-grade bond markets are relatively unattractive compared to other select credit markets -- particularly private debt and opportunistic debt -- where compelling yield and total return opportunities exist. Opportunistic debt includes a number of mandates mostly in distressed debt and that are not included in SAAP.

**CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target**

### Primary Market Metrics & Indicators:

#### 1. Fundamentals: **POSITIVE**

- Improved levels of demand and easing 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.
- **At Mid-June, REITs are trading at an average dividend yield of 4.06% (156bp above 10 yr treasury) and price to book of 2.34. Both are in line with historic norms.**

#### 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 2015 real estate pacing plan called for \$700 million to \$1.2 billion in new commitments; including \$500 to \$750M allocated to new managers, \$100M to \$200M in closed-end funds, and \$100M to \$300M to existing separate account managers.

## PRIVATE EQUITY

### Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**

- The U.S. economy continues to show steady improvement.
  - ◇ Oil has recently undergone a significant price correction which will reduce service costs and temper 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**

- US 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 US 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, \$495B (994 funds) have closed in 2014 compared to \$528B (1,187 funds) in 2013. Dry powder of nearly \$1.2T globally has remained flat.
- The global number of buyout deals rose from 3,260 in 2013 to 3,423 in 2014 while the aggregate value of deals increased from \$302B to \$332B.
- Exits were up in 2014 to 1,691 from 1,622 in 2013 while the 2014 aggregate value of \$441B was considerably higher than the \$330B in 2013.
- The IPO market in 2014 remained strong (\$87B) but was down slightly from the 2013 level (\$91B).

### 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. IMD’s pacing plan called for \$600M in commitments for 2015.

## COMMODITIES

### Primary Market Metrics & Indicators:

#### 1. Fundamentals: **NEGATIVE**

- The Fed ended its tapering program in November but reiterated that inflation continues to run below the FOMC's long-term objective. As Europe has begun to deal with its economic weakness with stimulus, the US dollar has strengthened on a relative basis.
- Most commodity sectors appear well supplied, particularly for the current global growth environment.
- The decision by Saudi Arabia not to reduce production in spite of increased global supply growth has roiled the energy markets with the short term effect of rig lay downs in the US while the budgetary impacts globally begin 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 US production as WTI and Brent prices have fallen by more than \$50 from their June highs. Metals have weakened as precious metals have suffered from US dollar strength while industrial metals still exhibit weak demand.

#### 2. Valuations: **NEUTRAL**

- **The Bloomberg Commodities Index improved from lows in March, 2015 influenced by some strengthening in energy markets.**
- **On a trailing twelve-month basis, commodities are down 23% with precious metals being the least impacted sector with a decline of 9%.**

#### 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.
- Exogenous geopolitical shocks have not resulted in price spikes. Looking across the individual commodities, most remain well supplied, which has been reflected in prices as inflationary fears have abated.

### Commentary:

IMD has maintained a tactical underweight relative to the SAAP in 2013 and so far in 2014 after recognizing the potential effects of Fed tapering and Chinese transition. IMD recognizes that Fed's actions will be data dependent but the QE program has ended. As a result of the changing dynamics in the energy markets IMD reduced its exposure to commodities in December and will continue to monitor the situation closely.

The North American shale play has resulted in increased US 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 US 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 new SAAP while closely monitoring the growth and inflation dynamics globally. 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**

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## 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. 5.5% of ASRS TOTAL MARKET VALUE**

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## GLOSSARY

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

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

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

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

## 2015 ASSET CLASS COMMITTEE 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	
1 <sup>st</sup>	January	01/23	01/29	2					
	February	02/27		1			02/09	02/23	2
	March	03/19	03/20	3					
03/27									
2 <sup>nd</sup>	April	04/21		1			04/20/15	1	
	May	05/18		1					
	June	06/04		1					
3 <sup>rd</sup>	July								
	August								
	September								
4 <sup>th</sup>	October								
	November								
	December								
<b>Totals</b>				<b>9</b>				<b>3</b>	<b>11</b>

## PRIVATE MARKETS COMMITTEE (PRIVMC)

### 04/21/2015

#### ➤ Private Equity

- The Committee approved a 50 million Euro commitment to a European private equity investor. Legal negotiations are pending.
- The Committee approved a \$50 million commitment to an operationally focused private equity investor. Legal negotiations are pending.
- The Committee confirmed the following future meeting date: June 23, 2015.

### 05/18/2015

#### ➤ Real Estate

- The Committee approved an increase to \$400 million from \$200 million to an existing real estate manager. Legal negotiations are pending.

#### ➤ Private Equity

- The Committee reviewed a revised private equity pacing analysis and approved a target of \$700 million in new commitments to private equity during the calendar year 2015.

### 06/04/2015

#### ➤ Ad-Hoc Private Debt

- The Committee approved up to \$10 million co-investment for the Highbridge Mezzanine Private Debt Partnership. Legal negotiations are pending.

## TACTICAL PORTFOLIO POSITIONING

IMD continues to migrate ASRS Total Fund Portfolio consistent with the Board approved Strategic Asset Allocation (SAAP) Policy and ASRS Investment House Views. The new SAAP became effective April 1, 2015 and was incorporated in Fund positioning, performance/attribution and risk reports. In short, most or all public asset classes (equities, fixed income and commodities) have been repositioned and the unfunded private market policy commitments prorated to appropriate public asset classes which are reflected in the interim SAAP policy. The interim SAAP changes over time as private investment capital are called which is anticipated to be invested over the next 2 years.

From an Investment House Views perspective and post-new SAAP transition, the Fund remains net underweight in total fixed income vs policy with a bias to private/opportunistic over public debt; net overweight in total equity; slightly underweight net inflation-linked; and hold a policy weight in the multi-asset strategies.

The CIO will discuss the implementation of the SAAP and Investment House Views in more detail at the IC meeting.

Note: tactical portfolio positioning is captured in the ASRS Asset Allocation report; the performance results of tactical positioning (vs. policy targets) are reflected in the ASRS Quarterly Total Fund Performance Attribution Analysis.

## IMD (INVESTMENT MANAGEMENT DIVISION) ACTIVITIES, PROJECTS AND RESEARCH INITIATIVES

- Dave Underwood received an Investor Intelligence Innovator Award for his work on equity risk factors and their implementation within ASRS equity portfolio. Use of equity risk factors help to manage various systemic risks, which reside in the public equity markets. Investor Intelligence awards are granted by Institutional Investor, a leading international business-to-business publisher that recognizes significant accomplishments made by organizations and individuals in the field of finance.
- IMD continues to manage ASRS Securities Lending Program (base and opportunistic) consistent with a risk/return profile and parameters reflecting IMD's assessment of the securities lending opportunities and of the condition that exist in the market. IMD anticipates that ASRS securities lending program will earned approximately \$6.4 million for FY2015
- The Director initiated an informational session called Breakaway Republics: A New Normal in Eastern Europe with the objective to discuss political and historic considerations and, to what extent, they may be successfully utilized to consider investment opportunities by the ASRS in Eastern Europe. This session will be hosted by DelMar L. Beene, a Senior Fulbright Scholar in Eastern Europe and a former faculty at Arizona State University.
- In June, IMD refined some of the procedures of the ASRS Cash Management "Assetization" Program to address some operational issues that surfaced since the Program's January inauguration. The goals of Program are to provide Fund liquidity, mitigate cash drag, minimize transaction costs and optimize manager portfolios rebalancing. Rather than raising cash frequently from across the Fund to cover internal

and external cash flow needs, a pool of monies are maintained that approximates cash requirements for a 3-6 month period. Until drawn, those monies are assetized, i.e., exposed to the capital markets via index futures in proportions that reflect ASRS SAAP/Investment House Views.

- Effective June 1, ASRS engaged State Street's Premium Compliance System to assist in monitoring ASRS public equity and fixed income portfolios (separate account, non-commingled). The system applies investment guidelines set forth in a manager's Investment Management Agreement, Letters of Direction and Clarification and incorporates applicable AZ State statutes and Federally-mandated investment rules (CFTC, SEC, U.S. Treasury Department, etc.).
- 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 has met via conference call or in-person with a total of 90 investment managers: Private markets (RE, PE, Debt) – 64 and Public markets (Equity and Debt) – 26.
- IMD internally manages 7 public equities and fixed income portfolios which had an approximate aggregate market value of over \$10 billion or 30% of Total Fund. On a calendar YTD through May 29, 2015 6 of 7 met or exceeded their benchmarks, and 7 of 7 portfolios met or exceeded their benchmarks on an inception-to-date basis.

# **Executive Presentation**

**To: Arizona State Retirement System**

**truView Risk Report March 31, 2015**

**Produced by State Street Investment Analytics, Risk Services**

## Monthly Reallocation Summary\*

Month Ending March 31, 2015

### Portfolio Reductions

- TOTAL FIXED INCOME
  - \$204M – PIMCO (Emerging Market Debt)
  - \$208M – ASHMORE (Emerging Market Debt)
- TOTAL GTAA
  - \$30M – BRIDGEWATER (GTAA)
- TOTAL CASH
  - \$90M – MASTER CASH
- TOTAL REDUCTIONS\*\*
  - \$532M

### Portfolio Additions

- TOTAL FIXED INCOME
  - \$222M – BGI US DEBT (Core Fixed Income)
- TOTAL CASH
  - \$310M – CASH – ASSETIZED
- TOTAL ADDITIONS\*\*
  - \$532M

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

\*\*Reductions and additions do not include plan distributions.

## Monthly Reallocation Summary\*

Month Ending April 30, 2015

### Portfolio Reductions

- TOTAL US EQUITY
  - \$0.6M – INTECH US Large Cap)
  - \$2.4M – LSV (US Large Cap)
  - \$4.3M – CRM (US Mid Cap)
  - \$0.4M – WELLINGTON (US Mid Cap)
  - \$5.7M – CHAMPLAIN (US Small Cap)
  - \$4.8M – TIMESSQUARE (US Small Cap)
- TOTAL GTAA
  - \$221M – BRIDGEWATER (GTAA)
- TOTAL TRANSITION
  - \$394.7M – DOMESTIC TRANSITION
  - \$226.7M – GTAA TRANSITION
- TOTAL CASH
  - \$222.7M – MASTER CASH
- **TOTAL REDUCTIONS\*\***
  - **\$1,083.3M**

### Portfolio Additions

- TOTAL FIXED INCOME
  - \$445.7M – BGI US DEBT (Core Fixed Income)
- TOTAL CASH
  - \$625.7M – CASH-ASSETIZED
- TOTAL TRANSITION
  - \$11.9M – TOTAL EQUITY TRANSITION
- **TOTAL ADDITIONS\*\***
  - **\$1,083.3M**

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

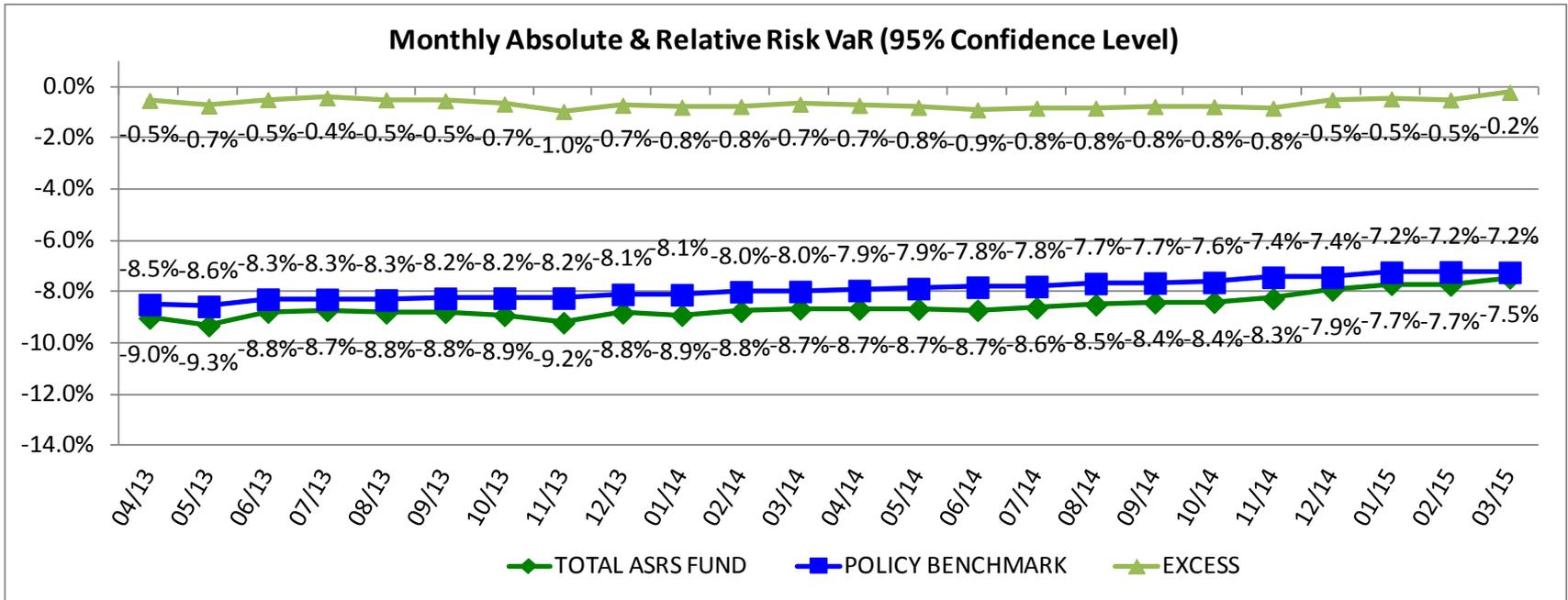
\*\*Reductions and additions do not include plan distributions.

# Monthly Risk Summary

Month Ending March 31, 2015

## Month-end Risk Profile

- Historical Risk (95% VaR) for all asset classes remain relatively constant from prior months with the exception of GTAA. As the GTAA managers transition to the new Multi-Asset Class investment guidelines, its risk has dropped from -6.2% to -3.9%. GTAA’s risk reduction is the largest factor to Total Plan’s risk reduction of 28bps while the Policy Benchmark increased a marginal 2bps. A steady market environment has helped produce a stable risk profile since the beginning of last year.
- Excess risk over the Policy Benchmark has dropped to a historic low of -0.2%



ARIZONA STATE RETIREMENT SYSTEM

TOTAL PLAN EXPOSURE OVERVIEW

As of March 31, 2015

Sector (Public US Equity Only)	\$ Value	% Value	**Blended US BM	Difference
CONSUMER NON-CYCLICAL	\$ 2,659,173,673	23.1%	23.3%	(0.2%)
FINANCIAL	\$ 1,830,604,557	15.9%	16.6%	(0.7%)
TECHNOLOGY	\$ 1,327,204,689	11.5%	13.4%	(1.9%)
INDUSTRIAL	\$ 1,302,499,468	11.3%	10.3%	1.0%
CONSUMER CYCLICAL	\$ 1,192,891,149	10.4%	10.6%	(0.2%)
COMMUNICATIONS	\$ 968,282,723	8.4%	11.7%	(3.3%)
ENERGY	\$ 780,552,967	6.8%	8.1%	(1.3%)
FUNDS	\$ 548,898,383	4.8%	0.0%	4.8%
UTILITIES	\$ 391,556,633	3.4%	3.0%	0.4%
BASIC MATERIALS	\$ 342,266,979	3.0%	2.9%	0.1%
CASH	\$ 125,034,166	1.1%	0.0%	1.1%
GOVERNMENT	\$ 28,112,561	0.2%	0.0%	0.2%
INDEX	\$ 8,662,439	0.1%	0.0%	0.1%
DIVERSIFIED	\$ 4,608,657	0.0%	0.0%	0.0%
<b>GRAND TOTAL</b>	<b>\$ 11,510,349,045</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Country Category (Total Plan)	\$ Value	% Value	*Blended TOTAL BM	Difference
NORTH AMERICA	\$ 26,690,165,607	78.5%	66.8%	11.7%
EUROPE DEVELOPED	\$ 3,680,881,138	10.8%	14.3%	(3.5%)
ASIA DEVELOPED	\$ 1,915,875,823	5.6%	9.1%	(3.5%)
ASIA EM	\$ 1,051,195,860	3.1%	4.6%	(1.5%)
LATIN AMERICA	\$ 330,871,942	1.0%	2.9%	(1.9%)
AFRICA	\$ 179,450,550	0.5%	1.0%	(0.5%)
MIDDLE EAST	\$ 84,631,164	0.2%	0.4%	(0.2%)
EUROPE EM	\$ 59,938,805	0.2%	0.9%	(0.7%)
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Market Cap^ (Public Equities Only)	\$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	\$ 3,664,639	0.0%	0.0%	0.0%
2) 100M - 500M	\$ 306,407,841	1.5%	1.2%	0.3%
3) 500M - 1B	\$ 656,542,334	3.3%	3.0%	0.3%
4) 1B - 5B	\$ 3,619,380,256	18.0%	22.7%	(4.6%)
5) 5B - 10B	\$ 2,040,387,093	10.2%	10.3%	(0.1%)
6) 10B - 50B	\$ 6,032,460,066	30.1%	29.2%	0.9%
7) >50B	\$ 7,399,131,572	36.9%	33.7%	3.2%
<b>GRAND TOTAL</b>	<b>\$ 20,057,973,800</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

^Excludes cash and non-traded securities

Top 20 Issuer (Total Plan)	\$ Value	% Value	Market Cap	Sector	Industry Group
1 CASH**	\$ 2,414,466,817	7.1%		CASH	Cash
2 SPDR S&P 500 ETF TRUST	\$ 1,050,130,053	3.1%	7) 50B+	FUNDS	EQUITY FUND
3 US TREASURY N/B	\$ 876,145,557	2.6%		GOVERNMENT	SOVEREIGN
4 FANNIE MAE	\$ 634,958,573	1.9%		MORTGAGE SECURITIES	FNMA COLLATERAL
5 TREASURY BILL	\$ 479,812,474	1.4%		GOVERNMENT	SOVEREIGN
6 APPLE INC	\$ 249,793,591	0.7%	7) 50B+	TECHNOLOGY	COMPUTERS
7 MICROSOFT CORP	\$ 166,220,353	0.5%	7) 50B+	TECHNOLOGY	SOFTWARE
8 EXXON MOBIL CORP	\$ 160,772,060	0.5%	7) 50B+	ENERGY	OIL&GAS
9 FREDDIE MAC	\$ 146,315,051	0.4%	3) 500M - 1B	CONSUMER CYCLICAL	FGLMC COLLATERAL
10 ISHARES MSCI USA MOMENTUM FACTOR	\$ 141,724,598	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
11 ISHARES MSCI USA QUALITY FACTOR	\$ 138,892,435	0.4%	4) 1B - 5B	FUNDS	EQUITY FUND
12 ISHARES MSCI USA VALUE FACTOR	\$ 134,282,150	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
13 ISHARES MSCI USA SIZE FACTOR ETF	\$ 133,999,200	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
14 JOHNSON & JOHNSON	\$ 133,575,119	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
15 PFIZER INC	\$ 132,459,911	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
16 ISHARES MSCI EMERGING MARKETS	\$ 113,112,585	0.3%	6) 10B - 50B	FUNDS	EQUITY FUND
17 CHEVRON CORP	\$ 105,697,718	0.3%	7) 50B+	ENERGY	OIL&GAS
18 JPMORGAN CHASE & CO	\$ 105,298,324	0.3%	7) 50B+	FINANCIAL	BANKS
19 PROCTER & GAMBLE CO/THE	\$ 101,341,939	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	COSMETICS/PERSONAL CARE
20 WELLS FARGO & CO	\$ 100,597,296	0.3%	7) 50B+	FINANCIAL	BANKS

\*Blended TOTAL BM: 26% SP500, 5% SP400, 5% SP600, 5% R2000, 14% MSCI EAFE, 6% MSCI EM, 3% MSCI Sml Cap, 17% BC US AGG, 5% BC US HY, 6% FTSE NAREIT GLOBAL, 4% DJ-UBS COMMODITY, 4% JPM EMBI.

\*\*Blended US BM: 72% SP500, 14% SP400, 14% SP600.

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

## ARIZONA STATE RETIREMENT SYSTEM

As of March 31, 2015

Sector (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
FINANCIAL	\$ 1,765,546,172	25.1%	25.8%	(0.7%)
CONSUMER NON-CYCLICAL	\$ 1,318,971,477	18.8%	19.5%	(0.7%)
CONSUMER CYCLICAL	\$ 963,977,310	13.7%	12.2%	1.5%
INDUSTRIAL	\$ 893,277,102	12.7%	11.8%	0.9%
COMMUNICATIONS	\$ 572,615,431	8.2%	8.9%	(0.7%)
TECHNOLOGY	\$ 394,240,999	5.6%	5.5%	0.1%
BASIC MATERIALS	\$ 372,705,429	5.3%	6.6%	(1.3%)
ENERGY	\$ 356,219,501	5.1%	5.5%	(0.4%)
UTILITIES	\$ 202,915,270	2.9%	3.2%	(0.3%)
CASH	\$ 102,431,916	1.5%	0.0%	1.5%
DIVERSIFIED	\$ 67,767,919	1.0%	1.0%	(0.0%)
INDEX	\$ 10,903,865	0.2%	0.0%	0.2%
FX	\$ 6,567	0.0%	0.0%	0.0%
<b>GRAND TOTAL</b>	<b>\$ 7,021,578,958</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Top 20 Industry Groups (Public Intl Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1 BANKS	\$ 902,976,538	12.9%	13.5%	(0.6%)
2 PHARMACEUTICALS	\$ 442,198,502	6.3%	6.8%	(0.5%)
3 INSURANCE	\$ 366,449,860	5.2%	5.0%	0.3%
4 TELECOMMUNICATIONS	\$ 356,088,736	5.1%	5.7%	(0.6%)
5 FOOD	\$ 326,755,925	4.7%	4.4%	0.2%
6 OIL&GAS	\$ 322,988,223	4.6%	4.9%	(0.3%)
7 RETAIL	\$ 281,765,730	4.0%	3.0%	1.0%
8 AUTO MANUFACTURERS	\$ 221,004,121	3.1%	3.4%	(0.2%)
9 SEMICONDUCTORS	\$ 216,238,221	3.1%	3.1%	0.0%
10 DIVERSIFIED FINAN SERV	\$ 187,709,814	2.7%	2.8%	(0.1%)
11 CHEMICALS	\$ 182,852,385	2.6%	3.2%	(0.6%)
12 REAL ESTATE	\$ 167,486,860	2.4%	2.3%	0.1%
13 COMMERCIAL SERVICES	\$ 160,455,297	2.3%	1.8%	0.5%
14 ELECTRIC	\$ 144,318,147	2.1%	2.2%	(0.1%)
15 TRANSPORTATION	\$ 125,884,221	1.8%	1.6%	0.1%
16 BEVERAGES	\$ 125,509,509	1.8%	2.1%	(0.3%)
17 BUILDING MATERIALS	\$ 120,751,499	1.7%	1.3%	0.4%
18 ENGINEERING&CONSTRUCTIC	\$ 116,774,915	1.7%	1.5%	0.2%
19 ELECTRONICS	\$ 115,310,337	1.6%	1.6%	0.1%
20 MINING	\$ 114,268,538	1.6%	2.1%	(0.4%)

\*Blended NON-US BM: 61% MSCI EAFE, 26% MSCI EM, 13% MSCI Sml Cap.

## INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Country Category (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
EUROPE DEVELOPED	\$ 3,289,443,456	46.8%	47.1%	(0.3%)
ASIA DEVELOPED	\$ 1,895,000,824	27.0%	31.5%	(4.5%)
ASIA EM	\$ 1,054,529,135	15.0%	14.0%	1.0%
LATIN AMERICA	\$ 306,847,000	4.4%	3.7%	0.6%
AFRICA	\$ 173,855,541	2.5%	2.2%	0.3%
NORTH AMERICA	\$ 156,131,599	2.2%	0.1%	2.1%
MIDDLE EAST	\$ 84,010,127	1.2%	0.9%	0.3%
EUROPE EM	\$ 61,761,277	0.9%	0.6%	0.3%
<b>GRAND TOTAL</b>	<b>\$ 7,021,578,958</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Market Cap** (Public Intl Equities Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	\$ 3,353,061	0.0%	0.0%	0.0%
2) 100M - 500M	\$ 121,217,123	1.8%	0.8%	0.9%
3) 500M - 1B	\$ 248,251,695	3.6%	1.9%	1.7%
4) 1B - 5B	\$ 1,314,652,617	19.1%	15.5%	3.6%
5) 5B - 10B	\$ 875,245,110	12.7%	12.3%	0.4%
6) 10B - 50B	\$ 2,597,844,193	37.7%	37.5%	0.2%
7) >50B	\$ 1,738,211,635	25.2%	32.0%	(6.8%)
<b>GRAND TOTAL</b>	<b>\$ 6,898,775,433</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

\*\*Excludes cash and non-traded securities

ARIZONA STATE RETIREMENT SYSTEM

As of March 31, 2015

TOTAL FIXED INCOME EXPOSURE OVERVIEW

Sector (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
GOVERNMENT	\$ 1,077,683,123	27.5%	40.9%	(13.4%)
MORTGAGE SECURITIES	\$ 789,670,547	20.1%	19.6%	0.5%
COMMUNICATIONS	\$ 365,630,963	9.3%	5.4%	3.9%
FINANCIAL	\$ 331,162,688	8.4%	8.4%	0.0%
CONSUMER NON-CYCLICAL	\$ 322,121,623	8.2%	5.3%	2.9%
ENERGY	\$ 234,681,854	6.0%	6.4%	(0.4%)
CONSUMER CYCLICAL	\$ 220,524,892	5.6%	4.0%	1.6%
INDUSTRIAL	\$ 145,281,728	3.7%	3.2%	0.5%
TECHNOLOGY	\$ 105,404,445	2.7%	1.5%	1.2%
CASH	\$ 88,959,628	2.3%	0.0%	2.3%
BASIC MATERIALS	\$ 87,915,222	2.2%	2.3%	(0.1%)
UTILITIES	\$ 66,029,196	1.7%	2.2%	(0.5%)
BANK LOANS	\$ 41,743,888	1.1%	0.0%	1.1%
INDEX	\$ 31,277,868	0.8%	0.3%	0.5%
ASSET BACKED SECURITIES	\$ 8,636,851	0.2%	0.3%	(0.1%)
DIVERSIFIED	\$ 8,295,800	0.2%	0.2%	0.0%
FX	\$ 623,061	0.0%	0.0%	0.0%
<b>GRAND TOTAL</b>	<b>\$ 3,925,643,379</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Top 20 Industry Groups (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
1 SOVEREIGN	\$ 999,810,537	25.5%	39.2%	(13.7%)
2 FNMA COLLATERAL	\$ 546,795,793	13.9%	8.3%	5.6%
3 TELECOMMUNICATIONS	\$ 193,549,596	4.9%	2.9%	2.0%
4 OIL&GAS	\$ 155,332,728	4.0%	4.6%	(0.7%)
5 BANKS	\$ 137,118,321	3.5%	5.0%	(1.5%)
6 MEDIA	\$ 133,488,355	3.4%	2.0%	1.4%
7 DIVERSIFIED FINAN SERV	\$ 127,206,534	3.2%	1.9%	1.3%
8 FGLMC COLLATERAL	\$ 110,433,097	2.8%	5.0%	(2.2%)
9 HEALTHCARE-SERVICES	\$ 100,429,793	2.6%	1.2%	1.3%
10 CASH	\$ 88,959,628	2.3%	0.0%	2.3%
11 PHARMACEUTICALS	\$ 69,680,288	1.8%	1.1%	0.7%
12 COMMERCIAL MBS	\$ 69,535,593	1.8%	1.3%	0.5%
13 PIPELINES	\$ 68,543,515	1.7%	1.2%	0.5%
14 RETAIL	\$ 68,533,947	1.7%	1.3%	0.4%
15 SOFTWARE	\$ 64,972,580	1.7%	0.7%	1.0%
16 ELECTRIC	\$ 64,957,326	1.7%	2.1%	(0.4%)
17 CHEMICALS	\$ 59,607,476	1.5%	0.7%	0.8%
18 COMMERCIAL SERVICES	\$ 50,599,898	1.3%	0.8%	0.5%
19 MUNICIPAL	\$ 45,675,427	1.2%	0.6%	0.5%
20 BANK LOANS	\$ 41,743,888	1.1%	0.0%	1.1%

Credit Rating Group** (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
01) AAA	\$ 1,918,307,444	48.9%	47.3%	1.6%
02) AA	\$ 156,709,563	4.0%	3.8%	0.2%
03) A	\$ 317,081,307	8.1%	9.1%	(1.0%)
04) BBB	\$ 297,344,886	7.6%	14.3%	(6.7%)
05) BB	\$ 552,173,542	14.1%	12.5%	1.6%
06) B	\$ 518,956,139	13.2%	9.8%	3.4%
07) CCC	\$ 140,888,666	3.6%	2.6%	1.0%
08) CC	\$ -	0.0%	0.0%	(0.0%)
09) C	\$ -	0.0%	0.0%	0.0%
10) D	\$ 6,822,625	0.2%	0.0%	0.2%
11) Not Rated	\$ 17,359,207	0.4%	0.5%	(0.0%)
<b>GRAND TOTAL</b>	<b>\$ 3,925,643,379</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

Maturity Bucket (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
0-1Y	\$ 199,599,076	5.1%	0.7%	4.4%
1Y-3Y	\$ 488,447,925	12.5%	18.4%	(5.9%)
3Y-5Y	\$ 539,668,410	13.8%	16.1%	(2.2%)
5Y-10Y	\$ 1,524,340,874	39.1%	30.4%	8.7%
10Y-15Y	\$ 152,731,678	3.9%	5.4%	(1.4%)
15Y+	\$ 996,400,173	25.5%	29.0%	(3.5%)
<b>GRAND TOTAL</b>	<b>\$ 3,901,188,136</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

\*Blended TOTAL BM: 66% BC US AGG, 19% BC US HY, 15% JPM EMBI.

ARIZONA STATE RETIREMENT SYSTEM  
As of March 31, 2015

TOTAL PLAN RISK OVERVIEW

Strategy	\$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
<b>MONTHLY RISK</b>																
CASH - UNASSETIZED	\$ 101,643,079	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	\$ 316,339,458	1%	(7.0%)	(0.1%)	0.9%	(6.3%)	(0.1%)	0.8%	(11.2%)	(0.1%)	0.8%	(23.3%)	4.1%	(3.3%)	(0.0%)	0.9%
TOTAL FIXED INCOME	\$ 3,925,643,379	12%	(1.9%)	(0.0%)	0.4%	(1.6%)	(0.0%)	0.4%	(2.6%)	(0.0%)	0.4%	(4.4%)	1.0%	(1.1%)	(0.0%)	0.7%
US EQUITY	\$ 11,510,349,045	34%	(9.1%)	(3.3%)	43.8%	(8.5%)	(2.8%)	40.5%	(15.5%)	(5.2%)	41.7%	(30.3%)	6.0%	(4.3%)	(1.5%)	40.6%
INTERNATIONAL EQUITY	\$ 7,021,578,958	21%	(10.3%)	(1.8%)	24.7%	(9.8%)	(1.9%)	27.8%	(15.9%)	(3.2%)	25.5%	(36.4%)	6.6%	(4.7%)	(1.0%)	26.9%
REAL ESTATE	\$ 1,707,952,166	5%	(12.5%)	(0.6%)	8.2%	(11.5%)	(0.5%)	7.7%	(20.5%)	(1.0%)	7.7%	(39.6%)	7.5%	(5.7%)	(0.3%)	7.5%
FARMLAND & TIMBER	\$ 153,550,869	0%	(12.9%)	(0.1%)	0.8%	(11.8%)	(0.0%)	0.7%	(21.1%)	(0.1%)	0.7%	(40.8%)	7.7%	(5.9%)	(0.0%)	0.7%
PRIVATE EQUITY	\$ 2,207,965,586	6%	(12.0%)	(0.8%)	10.2%	(10.8%)	(0.7%)	9.5%	(19.0%)	(1.2%)	9.7%	(36.0%)	7.1%	(5.4%)	(0.3%)	9.6%
PRIVATE DEBT	\$ 1,535,748,142	5%	(2.9%)	(0.0%)	0.3%	(3.9%)	(0.1%)	1.5%	(7.9%)	(0.3%)	2.0%	(16.0%)	2.7%	(2.2%)	(0.1%)	1.7%
OPPORTUNISTIC EQUITY	\$ 361,774,550	1%	(11.3%)	(0.1%)	1.6%	(10.0%)	(0.1%)	1.5%	(17.9%)	(0.2%)	1.5%	(34.4%)	6.6%	(5.1%)	(0.1%)	1.5%
OPPORTUNISTIC DEBT	\$ 1,066,666,906	3%	(6.8%)	(0.2%)	2.2%	(9.2%)	(0.2%)	3.2%	(15.2%)	(0.4%)	3.3%	(28.6%)	5.9%	(4.3%)	(0.1%)	3.1%
GLOBAL INFLATION LINKED	\$ 538,387,248	2%	(8.5%)	(0.1%)	1.3%	(8.2%)	(0.1%)	1.3%	(12.7%)	(0.2%)	1.3%	(26.3%)	5.0%	(4.1%)	(0.0%)	1.3%
GTAA	\$ 3,545,411,501	10%	(3.9%)	(0.4%)	5.6%	(3.5%)	(0.4%)	5.1%	(6.4%)	(0.7%)	5.3%	(13.7%)	2.3%	(2.0%)	(0.2%)	5.4%
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100%</b>	<b>(7.5%)</b>	<b>(7.5%)</b>	<b>100.0%</b>	<b>(7.0%)</b>	<b>(7.0%)</b>	<b>100.0%</b>	<b>(12.5%)</b>	<b>(12.5%)</b>	<b>100.0%</b>	<b>(26.5%)</b>	<b>4.8%</b>	<b>(3.8%)</b>	<b>(3.8%)</b>	<b>100.0%</b>
<b>INTERIM POLICY BENCHMARK</b>			<b>(7.2%)</b>			<b>(6.8%)</b>			<b>(11.8%)</b>			<b>(25.4%)</b>	<b>5.9%</b>	<b>(3.4%)</b>		

<b>ANNUALIZED RISK</b>																
CASH - UNASSETIZED	\$ 101,643,079	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	\$ 316,339,458	1%	(24.3%)	(0.2%)	0.9%	(21.9%)	(0.2%)	0.8%	(38.6%)	(0.4%)	0.8%	N/A	14.3%	(11.6%)	(0.1%)	0.9%
TOTAL FIXED INCOME	\$ 3,925,643,379	12%	(6.7%)	(0.1%)	0.4%	(5.5%)	(0.1%)	0.4%	(9.0%)	(0.2%)	0.4%	N/A	3.3%	(3.9%)	(0.1%)	0.7%
US EQUITY	\$ 11,510,349,045	34%	(31.6%)	(11.3%)	43.8%	(29.6%)	(9.8%)	40.5%	(53.7%)	(18.0%)	41.7%	N/A	20.8%	(15.0%)	(5.1%)	40.6%
INTERNATIONAL EQUITY	\$ 7,021,578,958	21%	(35.8%)	(6.4%)	24.7%	(34.0%)	(6.7%)	27.8%	(55.2%)	(11.0%)	25.5%	N/A	23.0%	(16.4%)	(3.3%)	26.9%
REAL ESTATE	\$ 1,707,952,166	5%	(43.4%)	(2.1%)	8.2%	(39.8%)	(1.9%)	7.7%	(70.9%)	(3.3%)	7.7%	N/A	26.0%	(19.7%)	(0.9%)	7.5%
FARMLAND & TIMBER	\$ 153,550,869	0%	(44.7%)	(0.2%)	0.8%	(41.0%)	(0.2%)	0.7%	(73.1%)	(0.3%)	0.7%	N/A	26.8%	(20.3%)	(0.1%)	0.7%
PRIVATE EQUITY	\$ 2,207,965,586	6%	(41.5%)	(2.6%)	10.2%	(37.4%)	(0.9%)	9.5%	(65.8%)	(4.2%)	9.7%	N/A	24.7%	(18.7%)	(1.2%)	9.6%
PRIVATE DEBT	\$ 1,535,748,142	5%	(10.1%)	(0.1%)	0.3%	(13.4%)	(0.4%)	1.5%	(27.4%)	(0.9%)	2.0%	N/A	9.2%	(7.6%)	(0.2%)	1.7%
OPPORTUNISTIC EQUITY	\$ 361,774,550	1%	(39.2%)	(0.4%)	1.6%	(34.7%)	(0.4%)	1.5%	(62.1%)	(0.7%)	1.5%	N/A	23.0%	(17.6%)	(0.2%)	1.5%
OPPORTUNISTIC DEBT	\$ 1,066,666,906	3%	(23.7%)	(0.6%)	2.2%	(31.8%)	(0.8%)	3.2%	(52.7%)	(1.4%)	3.3%	N/A	20.4%	(14.8%)	(0.4%)	3.1%
GLOBAL INFLATION LINKED	\$ 538,387,248	2%	(29.6%)	(0.3%)	1.3%	(28.4%)	(0.3%)	1.3%	(43.9%)	(0.6%)	1.3%	N/A	17.3%	(14.3%)	(0.2%)	1.3%
GTAA	\$ 3,545,411,501	10%	(13.5%)	(1.4%)	5.6%	(12.1%)	(1.2%)	5.1%	(22.1%)	(2.3%)	5.3%	N/A	8.0%	(6.9%)	(0.7%)	5.4%
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100%</b>	<b>(25.8%)</b>	<b>(25.8%)</b>	<b>100.0%</b>	<b>(24.3%)</b>	<b>(24.3%)</b>	<b>100.0%</b>	<b>(43.2%)</b>	<b>(43.2%)</b>	<b>100.0%</b>	<b>N/A</b>	<b>16.6%</b>	<b>(12.5%)</b>	<b>(12.5%)</b>	<b>100.0%</b>
<b>INTERIM POLICY BENCHMARK</b>			<b>(25.1%)</b>			<b>(23.4%)</b>			<b>(40.7%)</b>			<b>N/A</b>	<b>20.6%</b>	<b>(11.9%)</b>		

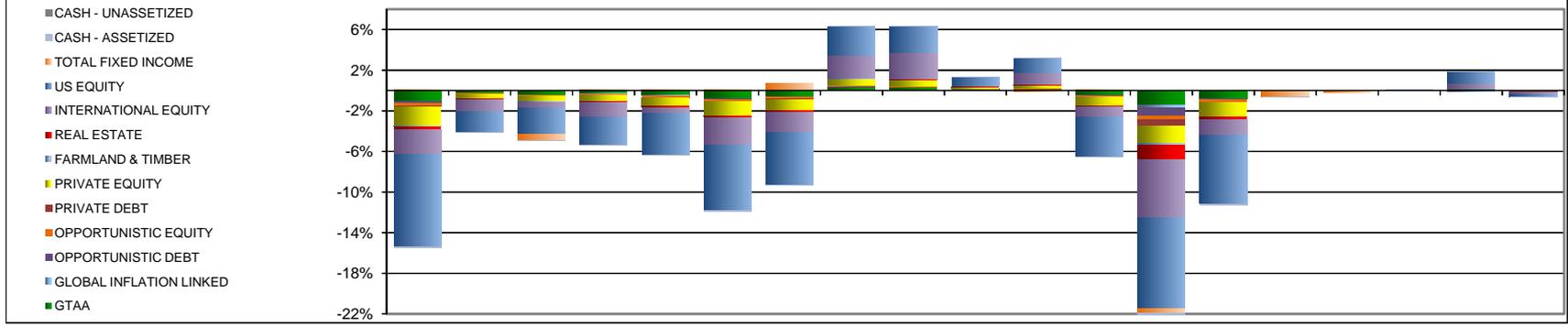
Strategy	\$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
CASH - UNASSETIZED	\$ 101,643,079	0%	0.00		0.00				\$ 101,643,079	\$ 101,643,079	100.0%
CASH - ASSETIZED	\$ 316,339,458	1%	0.37	0.98	0.31	0.96			\$ 626,069,551	\$ 316,339,458	100.0%
TOTAL FIXED INCOME	\$ 3,925,643,379	12%	0.02	0.09	0.03	0.17	5.04	(0.020)	\$ 3,631,873,151	\$ 4,042,654,598	103.0%
US EQUITY	\$ 11,510,349,045	34%	1.07	0.99	0.82	0.90	0.77	0.006	\$ 11,690,782,124	\$ 11,518,312,817	100.1%
INTERNATIONAL EQUITY	\$ 7,021,578,958	21%	1.09	0.90	1.01	0.98	0.74	0.006	\$ 7,021,687,943	\$ 7,072,396,221	100.7%
REAL ESTATE	\$ 1,707,952,166	5%	1.20	0.87	1.02	0.88			\$ 1,707,952,166	\$ 1,707,952,166	100.0%
FARMLAND & TIMBER	\$ 153,550,869	0%	1.23	0.87	1.05	0.88			\$ 153,550,869	\$ 153,550,869	100.0%
PRIVATE EQUITY	\$ 2,207,965,586	6%	1.24	0.95	0.94	0.85			\$ 2,207,965,586	\$ 2,207,965,635	100.0%
PRIVATE DEBT	\$ 1,535,748,142	5%	0.29	0.60	0.24	0.58	0.57	0.004	\$ 1,535,718,592	\$ 1,536,384,224	100.0%
OPPORTUNISTIC EQUITY	\$ 361,774,550	1%	1.18	0.97	0.89	0.87			\$ 361,774,550	\$ 361,774,550	100.0%
OPPORTUNISTIC DEBT	\$ 1,066,666,906	3%	0.75	0.70	0.65	0.71			\$ 1,066,666,906	\$ 1,066,666,906	100.0%
GLOBAL INFLATION LINKED	\$ 538,387,248	2%	0.30	0.65	0.26	0.69	0.32	0.001	\$ 1,076,723,704	\$ 538,387,248	100.0%
GTAA	\$ 3,545,411,501	10%	0.42	0.99	0.34	0.93	7.36	1.133	\$ 3,557,269,749	\$ 4,367,573,397	123.2%
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100%</b>	<b>0.82</b>	<b>0.97</b>	<b>0.68</b>	<b>0.95</b>	<b>4.51</b>	<b>0.037</b>	<b>\$ 34,739,677,970</b>	<b>\$ 34,991,601,170</b>	<b>102.9%</b>

ARIZONA STATE RETIREMENT SYSTEM  
As of March 31, 2015

TOTAL PLAN STRESS TESTS

Strategy	\$ Value	% Value	Historical Scenarios												Predictive Scenarios							
			Black Monday - 5 Day	Gulf War - 3 Day	Bond Crash: Feb 94 - May 94	Asian Crisis 97-98 - 5 day	Russian Crisis - 5 Day	Nasdaq Correction: July 99 - Aug 99	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 - 3 Day	09-10-2008	S&P 500 -20%	IR Parallel Shift +100bps	Spread Up 100bps	Inflation +1%	Gold Shock -20%	Oil Shock -20%	
<b>Stress Test Stand Alone</b>																						
CASH - UNASSETIZED	\$ 101,643,079	0.3%	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	\$ 316,339,458	0.9%	(15.1)	(3.5)	(6.6)	(4.5)	(6.7)	(13.1)	(6.8)	4.9	9.1	2.6	4.2	(6.2)	(19.2)	(11.3)	(1.3)	0.0	0.1	1.7	(0.4)	
TOTAL FIXED INCOME	\$ 3,925,643,379	11.5%	0.8	(0.4)	(5.0)	0.5	0.4	0.7	6.3	0.0	(0.6)	(0.6)	(1.0)	1.1	(3.3)	0.0	(5.1)	(0.2)	0.5	0.0	0.3	
US EQUITY	\$ 11,510,349,045	33.9%	(27.2)	(6.0)	(7.7)	(8.2)	(12.0)	(18.9)	(15.4)	8.5	7.8	2.8	4.1	(11.6)	(26.4)	(20.0)	0.0	0.0	0.0	3.6	(1.0)	
INTERNATIONAL EQUITY	\$ 7,021,578,958	20.7%	(11.6)	(5.9)	(2.8)	(6.9)	(2.8)	(13.0)	(9.5)	10.6	12.6	0.0	5.8	(4.7)	(28.1)	(7.6)	0.0	0.0	0.0	2.5	(0.5)	
REAL ESTATE	\$ 1,707,952,166	5.0%	(5.0)	(1.1)	(1.4)	(1.5)	(2.2)	(3.5)	(2.8)	1.6	1.4	0.5	0.8	(2.1)	(28.2)	(3.7)	0.0	0.0	0.0	0.0	(0.0)	
FARMLAND & TIMBER	\$ 153,550,869	0.5%	(5.1)	(1.1)	(1.5)	(1.6)	(2.3)	(3.6)	(2.9)	1.6	1.5	0.5	0.8	(2.2)	(29.0)	(3.8)	0.0	0.0	0.0	0.0	(0.0)	
PRIVATE EQUITY	\$ 2,207,965,586	6.5%	(30.3)	(6.7)	(8.7)	(9.2)	(13.4)	(21.3)	(17.2)	9.6	8.7	3.1	4.6	(12.9)	(26.8)	(22.3)	0.0	0.0	0.0	0.0	(1.1)	
PRIVATE DEBT	\$ 1,535,748,142	4.5%	(1.0)	(0.2)	(0.3)	(0.3)	(0.4)	(0.7)	(0.5)	0.3	0.3	0.1	0.1	(0.4)	(14.3)	(0.7)	(0.1)	(0.0)	0.0	0.0	(0.0)	
OPPORTUNISTIC EQUITY	\$ 361,774,550	1.1%	(29.6)	(6.5)	(8.5)	(9.0)	(13.1)	(20.8)	(16.8)	9.4	8.5	3.1	4.5	(12.6)	(27.1)	(21.8)	0.0	0.0	0.0	0.0	(1.1)	
OPPORTUNISTIC DEBT	\$ 1,066,666,906	3.1%	(4.0)	(0.9)	(1.2)	(1.2)	(1.8)	(2.9)	(2.3)	1.3	1.2	0.4	0.6	(1.7)	(27.3)	(3.0)	0.0	0.0	0.0	0.0	(0.1)	
GLOBAL INFLATION LINKED	\$ 538,387,248	1.6%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.1	(0.0)	0.0	0.0	0.0	(0.0)	(17.0)	0.0	(0.1)	0.0	0.0	(5.6)	(5.2)	
GTA	\$ 3,545,411,501	10.4%	(10.3)	(2.4)	(3.8)	(3.1)	(4.6)	(7.4)	(5.6)	3.5	2.9	0.9	1.5	(4.3)	(13.5)	(7.7)	(0.4)	(0.0)	0.1	1.2	(0.4)	
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100.0%</b>	<b>(15.5)</b>	<b>(4.2)</b>	<b>(5.0)</b>	<b>(5.3)</b>	<b>(6.4)</b>	<b>(11.8)</b>	<b>(8.7)</b>	<b>6.3</b>	<b>6.3</b>	<b>1.3</b>	<b>3.1</b>	<b>(6.5)</b>	<b>(22.1)</b>	<b>(11.3)</b>	<b>(0.6)</b>	<b>(0.3)</b>	<b>0.1</b>	<b>1.8</b>	<b>(0.6)</b>	
<b>INTERIM POLICY BENCHMARK</b>			<b>(14.5)</b>	<b>(4.3)</b>	<b>(5.6)</b>	<b>(5.4)</b>	<b>(5.7)</b>	<b>(11.5)</b>	<b>(7.2)</b>	<b>6.7</b>	<b>6.7</b>	<b>1.0</b>	<b>3.1</b>	<b>(5.9)</b>	<b>(20.4)</b>	<b>(10.5)</b>	<b>(1.4)</b>	<b>(0.6)</b>	<b>0.1</b>	<b>1.9</b>	<b>(0.7)</b>	

<b>Stress Test Contribution</b>																						
CASH - UNASSETIZED	\$ 101,643,079	0.3%	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	\$ 316,339,458	0.9%	(0.1)	(0.0)	(0.1)	(0.0)	(0.1)	(0.1)	(0.1)	0.0	0.1	0.0	0.0	(0.1)	(0.2)	(0.1)	(0.0)	0.0	0.0	0.0	(0.0)	
TOTAL FIXED INCOME	\$ 3,925,643,379	11.5%	0.1	(0.0)	(0.6)	0.1	0.1	0.7	0.0	(0.1)	(0.1)	(0.1)	0.1	(0.4)	0.0	(0.6)	(0.2)	0.1	0.0	0.0	0.0	
US EQUITY	\$ 11,510,349,045	33.9%	(9.2)	(2.0)	(2.6)	(2.8)	(4.1)	(6.4)	(5.2)	2.9	2.6	0.9	1.4	(3.9)	(9.0)	(6.8)	0.0	0.0	0.0	1.2	(0.3)	
INTERNATIONAL EQUITY	\$ 7,021,578,958	20.7%	(2.4)	(1.2)	(0.6)	(1.4)	(0.6)	(2.7)	(2.0)	2.2	2.6	0.0	1.2	(1.0)	(5.8)	(1.6)	0.0	0.0	0.0	0.5	(0.1)	
REAL ESTATE	\$ 1,707,952,166	5.0%	(0.3)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(1.4)	(0.2)	0.0	0.0	0.0	0.0	(0.0)	
FARMLAND & TIMBER	\$ 153,550,869	0.5%	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.1)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	
PRIVATE EQUITY	\$ 2,207,965,586	6.5%	(2.0)	(0.4)	(0.6)	(0.6)	(0.9)	(1.4)	(1.1)	0.6	0.6	0.2	0.3	(0.8)	(1.7)	(1.4)	0.0	0.0	0.0	0.0	(0.1)	
PRIVATE DEBT	\$ 1,535,748,142	4.5%	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.6)	(0.0)	(0.0)	(0.0)	0.0	0.0	(0.0)	
OPPORTUNISTIC EQUITY	\$ 361,774,550	1.1%	(0.3)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	0.1	0.1	0.0	0.0	(0.1)	(0.3)	(0.2)	0.0	0.0	0.0	0.0	(0.0)	
OPPORTUNISTIC DEBT	\$ 1,066,666,906	3.1%	(0.1)	(0.0)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	0.0	0.0	0.0	0.0	(0.1)	(0.9)	(0.1)	0.0	0.0	0.0	0.0	(0.0)	
GLOBAL INFLATION LINKED	\$ 538,387,248	1.6%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	(0.0)	0.0	0.0	0.0	(0.0)	(0.3)	0.0	(0.0)	0.0	0.0	(0.1)	(0.1)	
GTA	\$ 3,545,411,501	10.4%	(1.1)	(0.2)	(0.4)	(0.3)	(0.5)	(0.8)	(0.6)	0.4	0.3	0.1	0.2	(0.5)	(1.4)	(0.8)	(0.0)	(0.0)	0.0	0.1	(0.0)	
<b>GRAND TOTAL</b>	<b>\$ 33,993,010,889</b>	<b>100.0%</b>	<b>(15.5)</b>	<b>(4.2)</b>	<b>(5.0)</b>	<b>(5.3)</b>	<b>(6.4)</b>	<b>(11.8)</b>	<b>(8.7)</b>	<b>6.3</b>	<b>6.3</b>	<b>1.3</b>	<b>3.1</b>	<b>(6.5)</b>	<b>(22.1)</b>	<b>(11.3)</b>	<b>(0.6)</b>	<b>(0.3)</b>	<b>0.1</b>	<b>1.8</b>	<b>(0.6)</b>	
<b>INTERIM POLICY BENCHMARK</b>			<b>(14.5)</b>	<b>(4.3)</b>	<b>(5.6)</b>	<b>(5.4)</b>	<b>(5.7)</b>	<b>(11.5)</b>	<b>(7.2)</b>	<b>6.7</b>	<b>6.7</b>	<b>1.0</b>	<b>3.1</b>	<b>(5.9)</b>	<b>(20.4)</b>	<b>(10.5)</b>	<b>(1.4)</b>	<b>(0.6)</b>	<b>0.1</b>	<b>1.9</b>	<b>(0.7)</b>	



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

## Short-Term Cash Management Risks

	2 – Year Swap Spread (bps)	S&P/ISDA U.S. Financials Select 10 Index	5-Year Financial OAS (bps)	TED Spread (bps)	CBOE VIX Index (vol)	Windham Systemic Risk	Windham Turbulance
5/31/2015	24	61	119	28	14	Low	High
4/30/2015	25	60	118	28	15	Low	High
3/31/2015	25	62	118	25	15	High	High
2/28/2015	25	56	112	25	13	High	High
1/31/2015	24	62	123	25	21	High	High
12/31/2014	23	58	117	22	19	High	High
11/30/2014	22	55	113	22	13	Low	Moderate
10/31/2014	21	59	112	23	14	Low	Moderate
9/30/2014	25	67	107	22	16	Low	Low
8/31/2014	22	53	99	21	12	Low	Low
7/31/2014	20	59	95	22	17	Low	Low
6/30/2014	13	53	96	21	12	Low	Low
5/31/2014	14	54	99	20	11	Low	Low
4/30/2014	12	56	99	20	13	Low	Low
3/31/2014	13	61	103	20	14	Low	Low
2/28/2014	13	60	104	19	14	Low	Low
1/31/2014	13	71	111	22	18	Low	Low
12/31/2013	11	60	109	18	14	Low	Low
11/30/2013	9	68	118	18	14	Low	Low
10/31/2013	12	79	125	21	14	Low	Moderate
9/30/2013	14	90	139	24	17	Low	Moderate
8/31/2013	16	89	142	24	17	Low	High
7/31/2013	17	91	142	23	13	Low	High
6/30/2013	16	106	158	24	17	Low	High
5/31/2013	16	84	134	25	16	Low	Moderate
4/30/2013	14	91	137	23	14	Low	Moderate
3/31/2013	18	101	142	21	13	Low	Low
2/28/2013	15	99	141	18	16	Low	Low
1/31/2013	17	101	146	23	14	Low	Low
12/31/2012	14	116	155	27	18	Low	Low
11/30/2012	12	126	163	23	16	Low	Moderate
10/31/2012	10	130	158	21	19	Low	Moderate
9/30/2012	13	142	179	27	16	Low	Moderate
8/31/2012	18	164	206	35	17	Low	High
7/31/2012	20	179	223	35	19	Low	High
6/30/2012	25	191	253	38	17	Low	Moderate
5/31/2012	35	221	272	40	24	Low	Moderate
4/30/2012	29	179	239	37	17	Low	Moderate
3/31/2012	25	158	227	40	16	Low	Moderate
2/29/2012	26	171	245	41	18	Low	Moderate
1/31/2012	30	186	278	49	19	High	Moderate
12/31/2011	48	248	337	57	23	High	Moderate
11/30/2011	42	263	349	53	28	High	Moderate
10/31/2011	33	219	281	44	30	High	Moderate
9/30/2011	33	268	332	35	43	High	Moderate

## LEGEND

RISK FACTORS		Green	Yellow	Red
1	<b>2 – Year Swap Spread</b>	< 40 bps	40 - 60 bps	> 60 bps
2	<b>S&amp;P/ISDA US Financial Select 10</b>	< 100 bps	100 - 200 bps	> 200 bps
3	<b>5-Year Financial OAS</b>	< 125 bps	125 - 200 bps	> 200 bps
4	<b>TED Spread</b>	< 50 bps	50 - 100 bps	> 100 bps
5	<b>CBOE VIX Index</b>	< 25 Vol	25 - 35 Vol	> 35 Vol
6	<b>Windham Systemic Risk</b>	Low	n/a	High
7	<b>Windham Turbulence</b>	Low	Moderate	High

<b>2 – Year Swap Spread</b>	The spread paid by the fixed-rate payer of an interest rate swap over the rate of the 2-year Treasury. The reported 2-year swap spread from Bloomberg is a composite price - calculated average of best bid/ask pricing.
<b>S&amp;P/ISDA US Financial Select 10</b>	The S&P/ISDA US Financial Select 10 tracks major domestic financial 5-year CDS rates. The Index uses an average weighting methodology of the current liquid, "on the run" active contract.
<b>5-Year Financial OAS</b>	The Barclay's U.S. Aggregate Financial Average Option Adjusted Spread; the option adjusted investment grade financial corporate bond spread over 5-year Treasury bonds.
<b>TED Spread</b>	The TED Spread is calculated as the difference between three-month LIBOR expressed in USD and the corresponding yield on 3-month Treasury Bills, expressed in basis points.
<b>CBOE VIX Index</b>	The Chicago Board Options Exchange VIX Index measures the weighted average implied volatility of the S&P 500 using call and put prices over the front two months with a wide range of strike prices.
<b>Windham Systemic Risk</b>	Windham Capital's proprietary measure of the extent to which markets are unified or tightly coupled, called the absorption ratio. When markets are tightly coupled, they are more fragile and negative shocks propagate more quickly and broadly than when markets are loosely linked. Windham reports Systemic Risk as High or Low; there is no Moderate designation for Systemic Risk.
<b>Windham Turbulence</b>	Windham Capital's proprietary measure of the statistical unusualness of a set of returns given their historical pattern of behavior; including extreme price moves, decoupling of correlated assets and convergence of uncorrelated assets. Windham reports Turbulence as High, Moderate, or Low.

# 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:** June 16, 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 Q1-15

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### **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 March 31, 2015 the Total Fund's market value was approximately \$34.9 billion.

For the one-year period ending March 31, 2015, the Total Fund returned 6.5% (net of fees), outperforming the Interim SAA Policy by 2.1%. For the three-year period, the Total Fund produced a return of 10.4% per annum, outperforming the Interim SAA Policy by 0.8%. Over the past ten years, the Total Fund has returned 7.0% per annum, and since inception, the portfolio's performance is 9.9%.

Attachments:

- NEPC's Independent Reporting, Monitoring and Oversight reports
- ASRS Investment Performance Report (IPR) for period ending March 31, 2015. (Confidential/Non-Public) – distributed at the meeting

# Arizona State Retirement System

## Independent ASRS Investment Program Oversight for the Period Ending March 31, 2015

June 22, 2015

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



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

# ASRS Investment Objectives/Performance

**Note: All of the data shown on the following pages is as of March 31, 2015 and reflects the deduction of investment manager fees, unless otherwise noted.**



Macro

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

Micro

Source: ASRS Strategic Plan, March 2013

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

	<u>20 Year Annualized Return</u>
Total Fund	8.5%
Constant 8%	<u>8.0%</u>
Excess Return	0.5%

**Goal Met: Yes**

- 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)
<b>Total Fund</b>	2.8%	<b>6.5%</b>	<b>10.4%</b>	10.2%	7.0%	9.9%
<b>Interim SAA Policy<sup>1</sup></b>	2.5%	<b>4.4%</b>	<b>9.6%</b>	9.5%	6.7%	9.7%
<b>Excess Return</b>	0.3%	<b>2.1%</b>	<b>0.8%</b>	0.7%	0.3%	0.2%

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

<sup>1</sup>Composition of SAA Policy can be found in the appendix.

Arizona State Retirement System  
**Total Fund Attribution Analysis**

<b>Total Plan</b>	<b>1 Year</b>	<b>3 Years</b>	<b>5 Years</b>
Allocation Effect <sup>1</sup>	0.89%	0.67%	0.34%
Manager Selection Effect <sup>2</sup>	1.27%	0.21%	0.38%
Residual <sup>3</sup>	-0.02%	-0.09%	-0.05%
<b>Excess Return</b>	<b>2.14%</b>	<b>0.79%</b>	<b>0.67%</b>

*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)

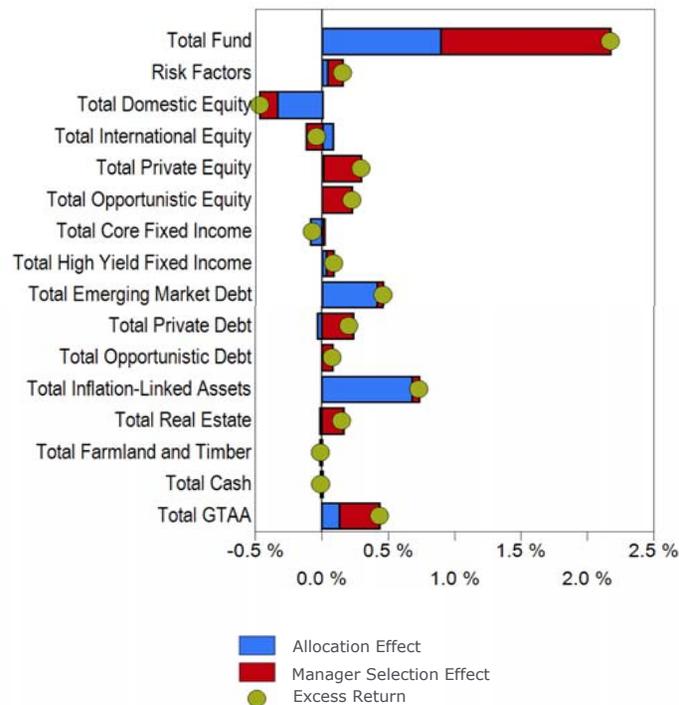
**2 Manager Selection Effect:** Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)]

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

# Arizona State Retirement System

## Total Fund Attribution Detail

Attribution Effects  
1 Year Ending March 31, 2015



### 1 Year Excess Return: +2.14%

- Allocation Effect: +0.89%
  - Commodities tactical underweight (+0.68%)
  - Emerging Market Debt tactical underweight (+0.41%)
  - Domestic Equity tactical underweight (-0.34%)
- Manager Selection Effect: +1.27%
  - GTAA outperformed due to Bridgewater (+0.30%)
  - Private Equity outperformed due to various managers (+0.28%)
  - Private Debt outperformed due to various managers (+0.23%)
  - Opportunistic Equity outperformed due to various managers (+0.22%)
  - Real Estate outperformed due to various managers (+0.16%)
  - Domestic Equity underperformed due to various managers (-0.13%)
  - International Equity underperformed due to various managers (-0.12%)
- Residual: -0.02%

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

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

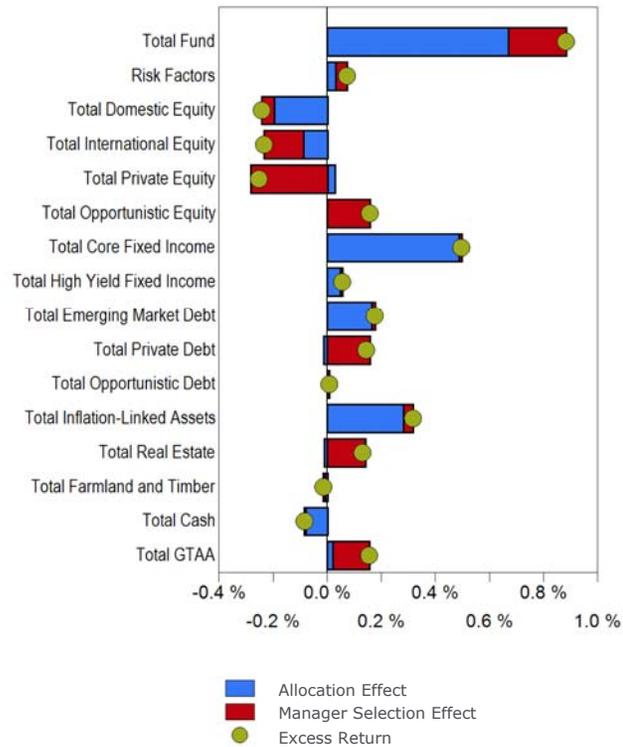
**Manager Selection Effect:** Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark.  $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim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

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

# Arizona State Retirement System

## Total Fund Attribution Detail

Attribution Effects  
3 Years Ending March 31, 2015



### 3 Year Excess Return: +0.79%

- Allocation Effect: +0.67%
  - Public Markets Fixed Income tactical underweight (+0.71%)
  - Commodities tactical underweight (+0.28%)
  - Domestic Equity tactical underweight (-0.20%)
- Manager Selection Effect: +0.21%
  - Opportunistic Equity outperformed due to various managers (+0.16%)
  - Private Debt outperformed due to various managers (+0.16%)
  - Real Estate outperformed due to various managers (+0.14%)
  - GTAA outperformed due to Bridgewater (+0.13%)
  - Private Equity underperformed due to various managers (-0.28%)
  - International Equity underperformed due to various managers (-0.15%)
- Residual: -0.09%

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

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

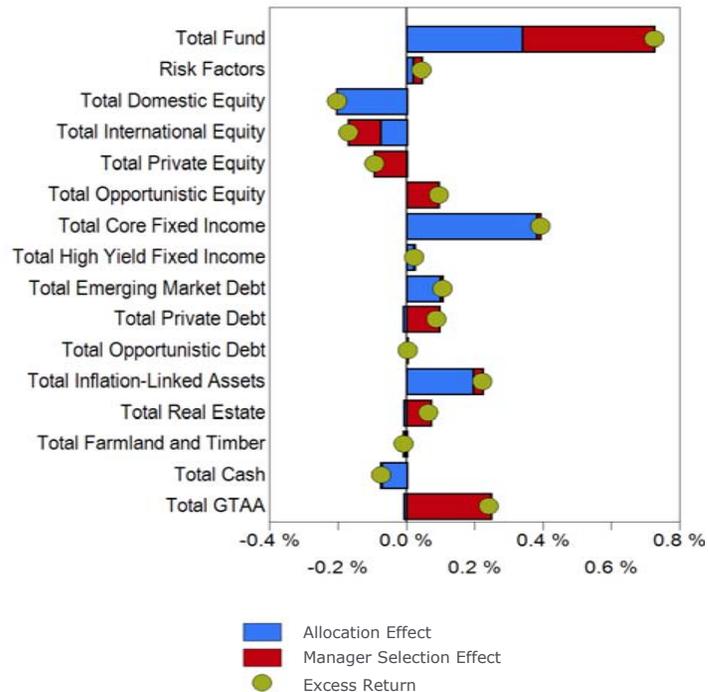
**Manager Selection Effect:** Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark.  $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim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

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

# Arizona State Retirement System

## Total Fund Attribution Detail

**Attribution Effects**  
5 Years Ending March 31, 2015



### 5 Year Excess Return: +0.67%

- Allocation Effect: +0.34%
  - Public Markets Fixed Income tactical underweight (+0.50%)
  - Commodities tactical underweight (+0.20%)
  - Domestic Equity tactical underweight (-0.20%)
- Manager Selection Effect: +0.38%
  - GTAA outperformed due to Bridgewater (+0.25%)
  - Private Debt outperformed due to various managers (+0.10%)
  - Opportunistic Equity outperformed due to various managers (+0.09%)
  - Real Estate outperformed due to various managers (+0.07%)
  - International Equity underperformed due to various managers (-0.09%)
  - Private Equity underperformed due to various managers (-0.09%)
- Residual: -0.05%

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

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

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

**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 <sup>1</sup>	6.5%	12.6%
ASRS Custom Total Equity Benchmark	6.8%	12.8%
Excess Return	<b>-0.3%</b>	<b>-0.2%</b>
ASRS Domestic Equity	11.7%	16.3%
ASRS Custom Domestic Equity Benchmark	12.1%	16.5%
Excess Return	<b>-0.4%</b>	<b>-0.2%</b>
ASRS International Equity	<b>-1.3%</b>	6.6%
ASRS Custom Int'l Equity Benchmark	<b>-0.8%</b>	7.3%
Excess Return	<b>-0.5%</b>	<b>-0.7%</b>
ASRS Public Markets Fixed Income	3.5%	2.9%
ASRS Custom Fixed Income Benchmark	1.7%	2.3%
Excess Return	1.8%	0.6%
ASRS Inflation-Linked	<b>-25.7%</b>	<b>-10.7%</b>
ASRS Custom Inflation-Linked Benchmark	<b>-27.0%</b>	<b>-11.5%</b>
Excess Return	1.3%	0.8%
ASRS GTAA	8.7%	11.1%
ASRS Custom GTAA Benchmark	5.5%	9.8%
Excess Return	3.2%	1.3%

<sup>1</sup>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<sup>1</sup>

- 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	10.9%	14.3%	12.4%	Oct-07
Russell 2000	4.9%	19.2%	14.0%	
Excess Return	6.0%	-4.9%	-1.6%	
ASRS Opportunistic Equity <sup>2</sup>	28.5%	33.6%	35.2%	Apr-11
ASRS Private Debt	10.8%	--	13.1%	Jul-12
S&P/LSTA Levered Loan Index + 250 bps	4.1%	--	5.5%	
Excess Return	6.7%	--	7.6%	
ASRS Opportunistic Debt <sup>2</sup>	7.6%	10.4%	11.5%	Jan-08
ASRS Real Estate	14.3%	13.9%	6.9%	Oct-05
NFI - ODCE Index	11.5%	11.4%	6.0%	
Excess Return	2.8%	2.5%	0.9%	
ASRS Farmland and Timber	3.4%	--	4.1%	Jul-13
CPI ex-Food and Energy + 350 bps	5.2%	--	5.0%	
Excess Return	-1.8%	--	-0.9%	
ASRS Total Infrastructure			0.2%	Oct-14
CPI - Infrastructure + 350bps			1.2%	
Excess Return			-1.0%	

<sup>1</sup>Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of June 30, 2014.

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

Note: Time-weighted performance of private markets portfolios shown for the one- and three-year periods to reconcile Total Fund performance as it is reported on a time-weighted basis. Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of the performance of ASRS private markets portfolios.

**Goal Met:  
Partially**

Cash Management

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

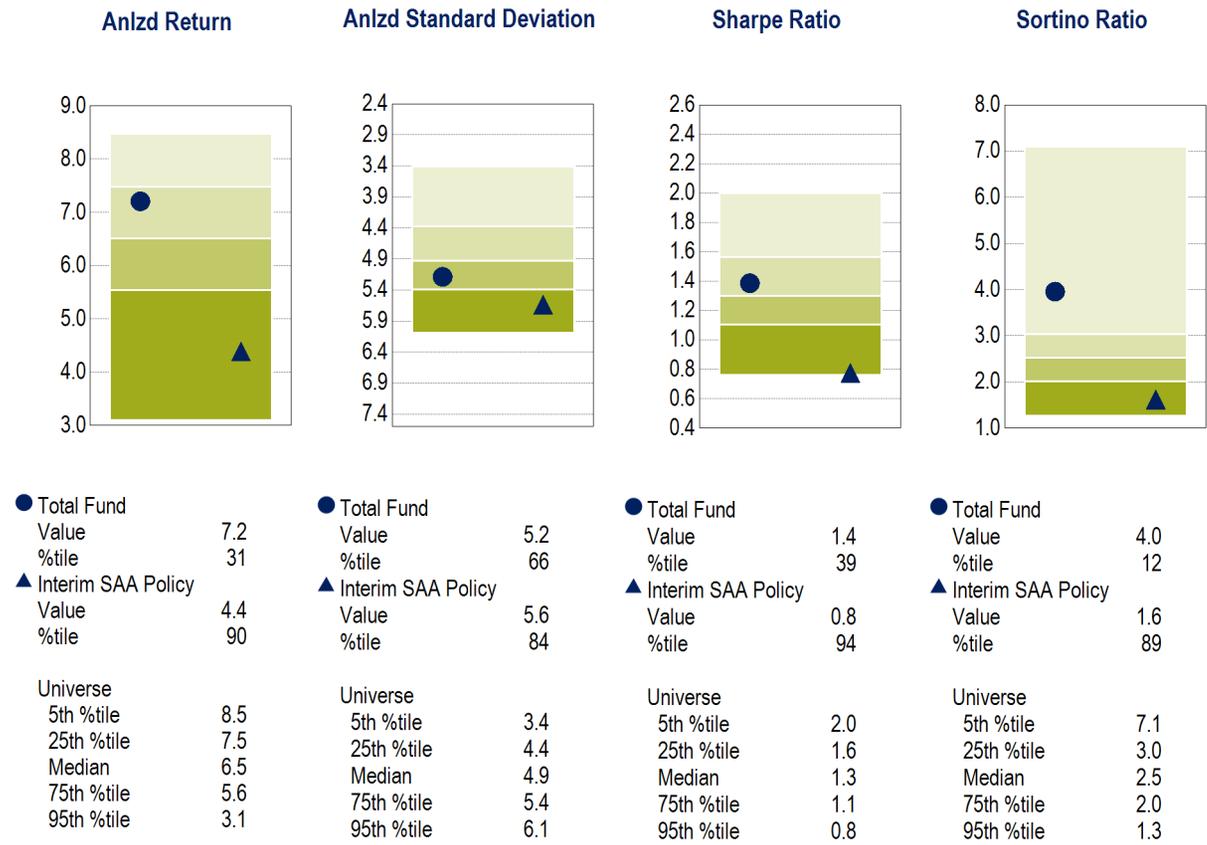
Month	External CFs +	Internal CFs =	Total CFs during the Month	Last day of the Month Ending Balance*
Apr-14	(\$91.6)	(\$50.8)	(\$142.4)	\$455.5
May-14	(\$15.2)	(\$76.4)	(\$91.6)	\$162.8
Jun-14	(\$89.3)	(\$284.2)	(\$373.5)	\$146.8
Jul-14	(\$153.7)	(\$59.0)	(\$212.7)	\$249.6
Aug-14	(\$117.4)	(\$133.1)	(\$250.5)	\$141.8
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

\* Aggregate assetized & unassetized cash balances. Assetized balance maintains market exposure consistent with ASRS SAAP; unassetized balance (at month end) is primarily used to fund ASRS monthly pension payments which occurs on the first day of subsequent month.

Goal Met: Yes

Total Fund Risk Statistics vs. Peer Universe

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



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

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

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

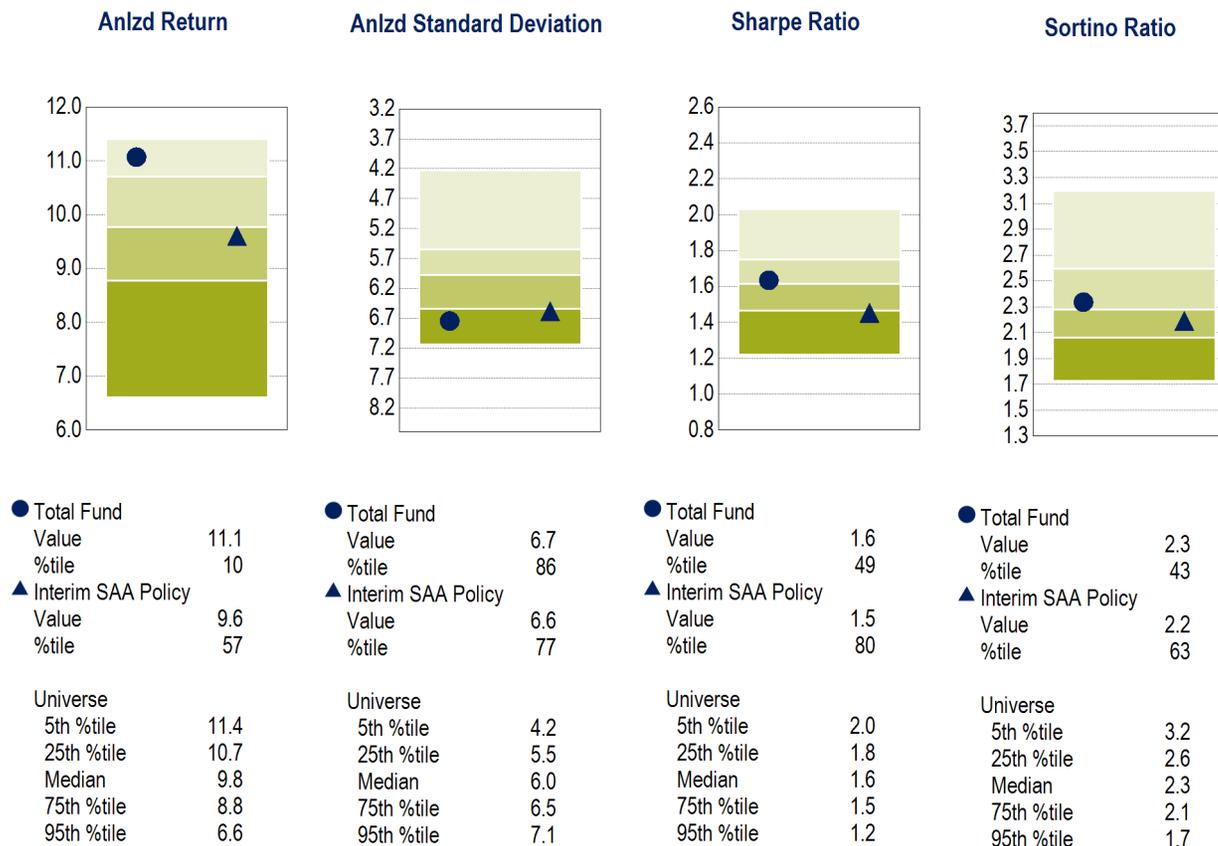
The InvestorForce Public Funds > \$1 Billion Universe contains 103 observations for the period ending March 31, 2015, with total assets of \$1,653.3 billion.

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

Total Fund Risk Statistics vs. Peer Universe

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

3 Year



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

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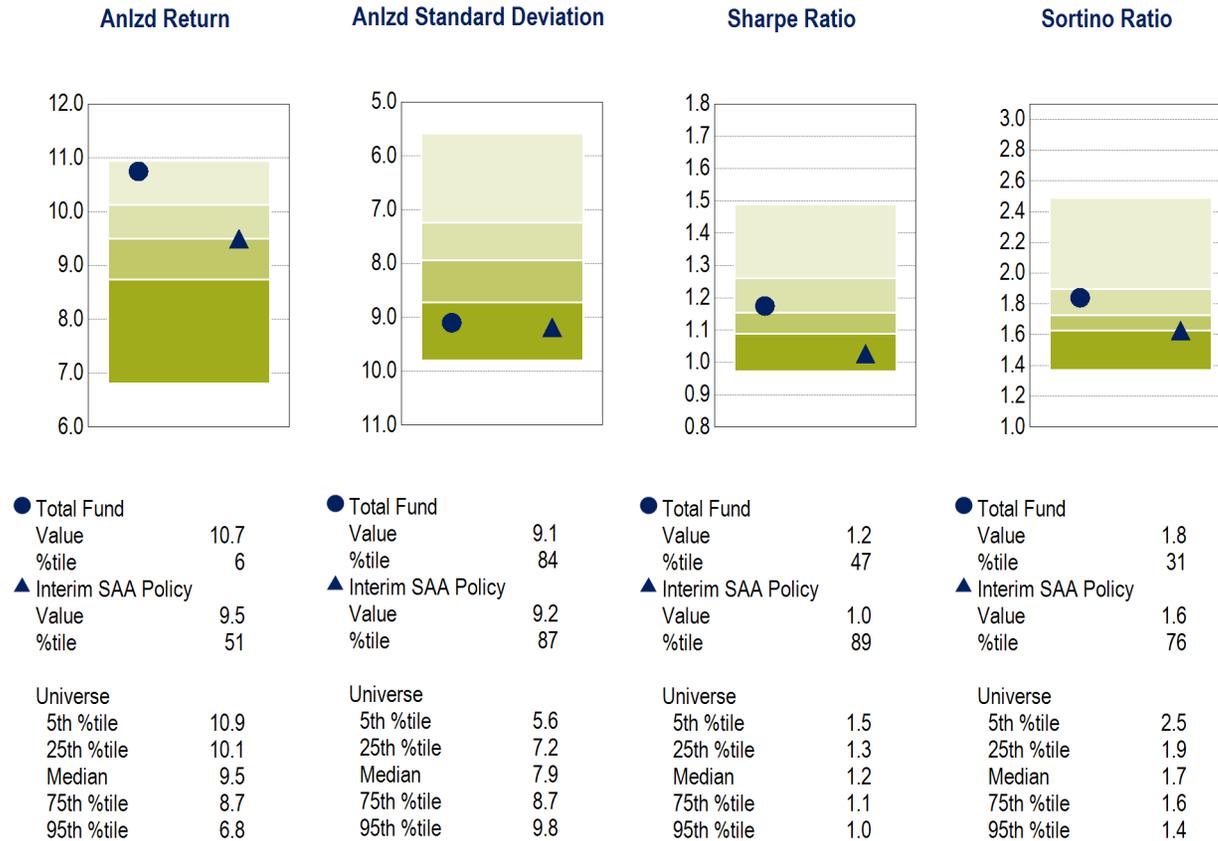
The InvestorForce Public Funds > \$1 Billion Universe contains 103 observations for the period ending March 31, 2015, with total assets of \$1,653.3 billion.

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



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 103 observations for the period ending March 31, 2015, with total assets of \$1,653.3 billion.

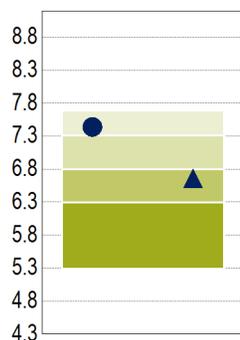
Composition of Interim SAA Policy can be found in the appendix.

# Total Fund Risk Statistics vs. Peer Universe

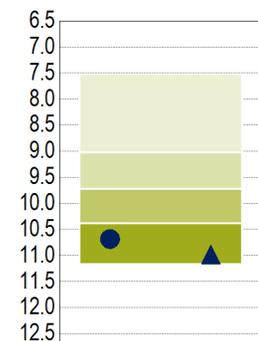
## Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

10 Year

Anlzd Return



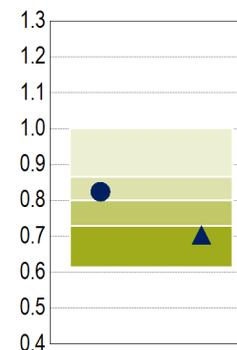
Anlzd Standard Deviation



Sharpe Ratio



Sortino Ratio



● Total Fund

Value 7.4  
%tile 16

▲ Interim SAA Policy

Value 6.7  
%tile 63

Universe

5th %tile 7.7  
25th %tile 7.3  
Median 6.8  
75th %tile 6.3  
95th %tile 5.3

● Total Fund

Value 10.7  
%tile 88

▲ Interim SAA Policy

Value 11.0  
%tile 91

Universe

5th %tile 7.5  
25th %tile 9.0  
Median 9.7  
75th %tile 10.4  
95th %tile 11.2

● Total Fund

Value 0.6  
%tile 53

▲ Interim SAA Policy

Value 0.5  
%tile 85

Universe

5th %tile 0.7  
25th %tile 0.6  
Median 0.6  
75th %tile 0.5  
95th %tile 0.4

● Total Fund

Value 0.8  
%tile 38

▲ Interim SAA Policy

Value 0.7  
%tile 84

Universe

5th %tile 1.0  
25th %tile 0.9  
Median 0.8  
75th %tile 0.7  
95th %tile 0.6

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 103 observations for the period ending March 31, 2015, with total assets of \$1,653.3 billion.

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

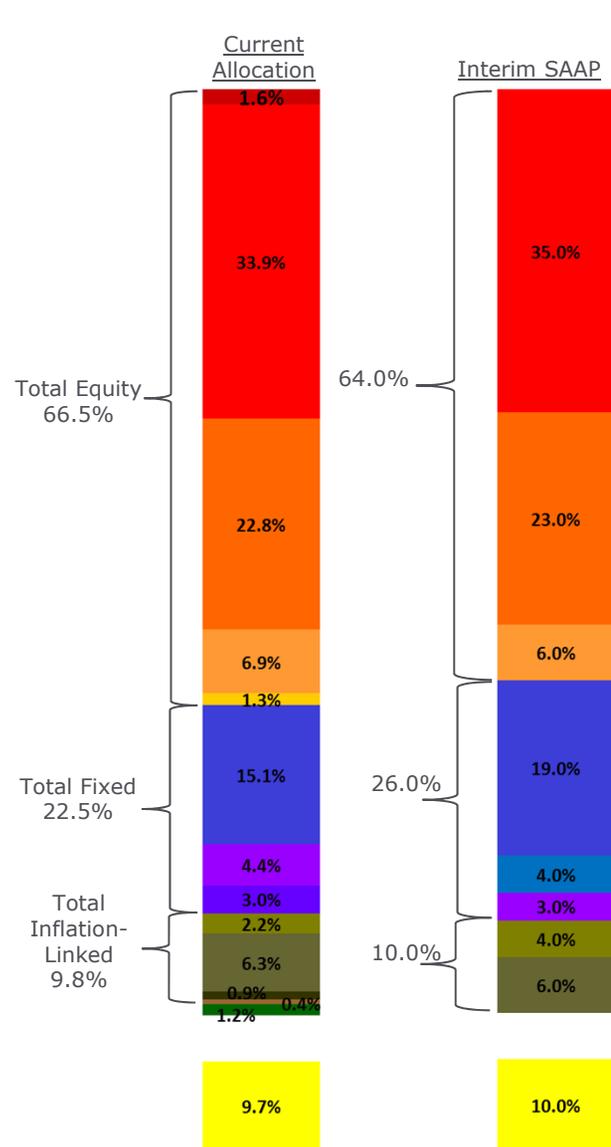
# Independent Oversight/Compliance

**Note: All of the data shown on the following pages is as of March 31, 2015 and reflects the deduction of investment manager fees, unless otherwise noted.**



# Arizona State Retirement System

## SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Difference	Policy Range	Within Range
<b>Total Domestic and International Equity<sup>1</sup></b>	<b>\$20,347,927,116</b>	<b>58.4%</b>	<b>58.0%</b>	<b>0.4%</b>		
<b>Domestic Equity<sup>3</sup></b>	<b>\$11,831,906,004</b>	<b>33.9%</b>	<b>35.0%</b>	<b>-1.1%</b>	<b>26% - 38%</b>	<b>Yes</b>
U.S. Large Cap <sup>2</sup>	\$8,754,241,597	25.1%	25.0%	0.1%		
U.S. Mid Cap	\$1,652,586,192	4.7%	5.0%	-0.3%		
U.S. Small Cap	\$1,425,067,251	4.1%	5.0%	-0.9%		
<b>International Equity<sup>3</sup></b>	<b>\$7,958,927,341</b>	<b>22.8%</b>	<b>23.0%</b>	<b>-0.2%</b>	<b>16% - 28%</b>	<b>Yes</b>
Developed Large Cap <sup>2</sup>	\$4,838,107,364	13.9%	14.0%	-0.1%		
Developed Small Cap	\$1,234,365,426	3.5%	3.0%	0.5%		
Emerging Markets	\$1,886,055,413	5.4%	6.0%	-0.6%		
<b>Private Equity<sup>4</sup></b>	<b>\$2,399,015,537</b>	<b>6.9%</b>	<b>6.0%</b>	<b>0.9%</b>	<b>5% - 9%</b>	<b>Yes</b>
<b>Opportunistic Equity<sup>4,6</sup></b>	<b>\$445,055,827</b>	<b>1.3%</b>	<b>0.0%</b>	<b>1.3%</b>	<b>0% - 3%</b>	<b>Yes</b>
<b>Total Equity</b>	<b>\$23,191,998,479</b>	<b>66.5%</b>	<b>64.0%</b>	<b>2.5%</b>	<b>53% - 70%</b>	<b>Yes</b>
<b>U.S. Fixed Income</b>	<b>\$5,248,415,116</b>	<b>15.1%</b>	<b>19.0%</b>	<b>-3.9%</b>	<b>8% - 28%</b>	<b>Yes</b>
Core <sup>2</sup>	\$3,948,670,012	11.3%	14.0%	-2.7%		
High Yield	\$1,299,745,104	3.7%	5.0%	-1.3%		
<b>Emerging Market Debt</b>	<b>\$2,632,265</b>	<b>0.0%</b>	<b>4.0%</b>	<b>-4.0%</b>		
<b>Private Debt<sup>4</sup></b>	<b>\$1,533,887,137</b>	<b>4.4%</b>	<b>3.0%</b>	<b>1.4%</b>		
<b>Opportunistic Debt<sup>4,6</sup></b>	<b>\$1,059,167,206</b>	<b>3.0%</b>	<b>0.0%</b>	<b>3.0%</b>	<b>0% - 10%</b>	<b>Yes</b>
<b>Total Fixed Income</b>	<b>\$7,844,101,724</b>	<b>22.5%</b>	<b>26.0%</b>	<b>-3.5%</b>	<b>15% - 35%</b>	<b>Yes</b>
<b>Commodities<sup>2</sup></b>	<b>\$754,765,966</b>	<b>2.2%</b>	<b>4.0%</b>	<b>-1.8%</b>	<b>1% - 7%</b>	<b>Yes</b>
<b>Real Estate<sup>2,4</sup></b>	<b>\$2,195,202,777</b>	<b>6.3%</b>	<b>6.0%</b>	<b>0.3%</b>	<b>6% - 10%</b>	<b>Yes</b>
<b>Infrastructure</b>	<b>\$300,710,360</b>	<b>0.9%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>0% - 3%</b>	<b>Yes</b>
<b>Farmland and Timber</b>	<b>\$153,550,845</b>	<b>0.4%</b>	<b>0.0%</b>	<b>0.4%</b>	<b>0% - 3%</b>	<b>Yes</b>
<b>Opportunistic Inflation-Linked<sup>5</sup></b>	<b>\$0</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0% - 3%</b>	<b>Yes</b>
<b>Total Inflation-Linked</b>	<b>\$3,404,229,948</b>	<b>9.8%</b>	<b>10.0%</b>	<b>-0.2%</b>	<b>8% - 16%</b>	<b>Yes</b>
<b>Cash<sup>5</sup></b>	<b>\$418,906,459</b>	<b>1.2%</b>	<b>0.0%</b>	<b>1.2%</b>		
Operating Cash (Non-Assetized)	\$101,643,079	0.3%	0.0%	0.3%		
Operating Cash (Assetized)	\$317,259,621	0.9%	0.0%	0.9%		
<b>Total</b>	<b>\$34,859,236,611</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>		

**Global Tactical Asset Allocation (GTAA)<sup>2</sup>** \$3,387,309,107 9.7% 10.0% -0.3% 5% - 15% Yes

<sup>1</sup>Total Domestic and International Equity includes Equity Risk Factor Portfolio with assets of \$557.1 million.

<sup>2</sup>GTAA allocation distributed into U.S. Large Cap Equity, Int'l Developed Large Cap Equity, Core Fixed Income, Commodities and Real Estate.

<sup>3</sup>Domestic Equity, International Equity and U.S. Fixed Income market values include residual values remaining in terminated manager accounts. <sup>4</sup>Values shown for private markets portfolios include cash flows that occurred during 1Q 2015.

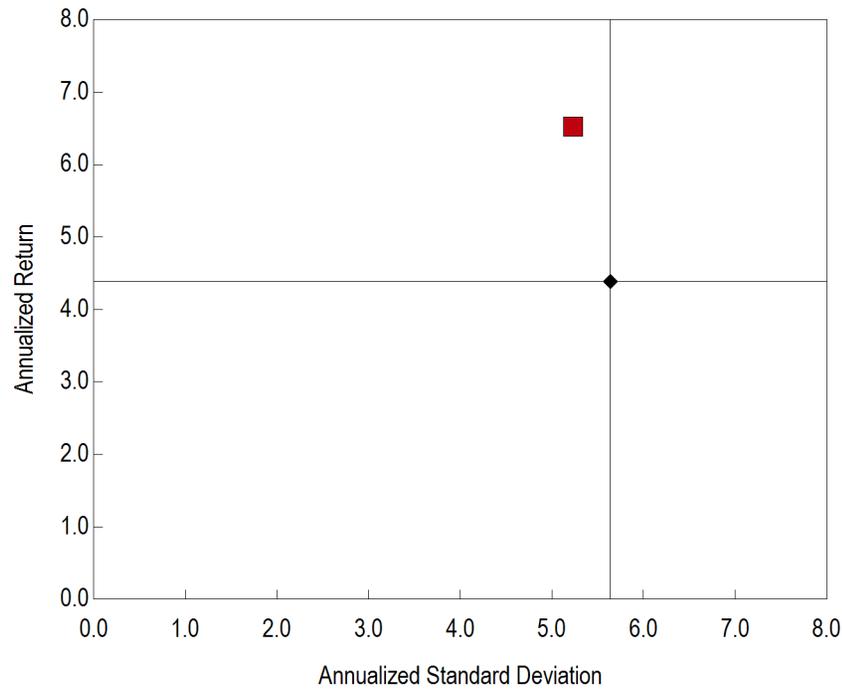
<sup>5</sup>Non-assetized cash reflects funds required for near term external and internal cashflows.

<sup>6</sup>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.

1 Year Ending March 31, 2015

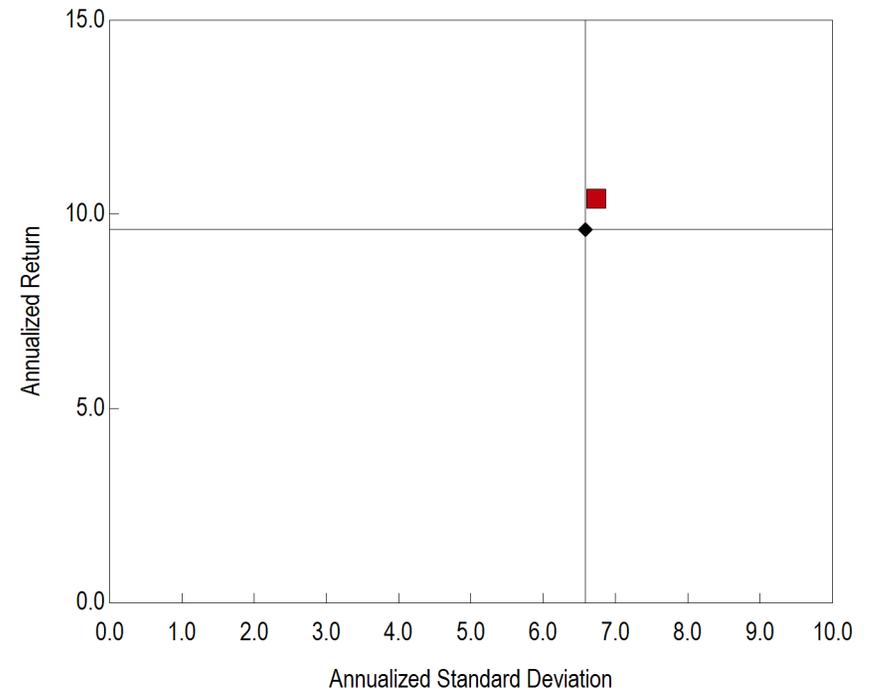


■ Total Fund  
◆ Interim SAA Policy

1 Year Ending March 31, 2015

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	6.5%	5.2%	1.2	2.7
Interim SAA Policy	4.4%	5.6%	0.8	1.6

3 Years Ending March 31, 2015



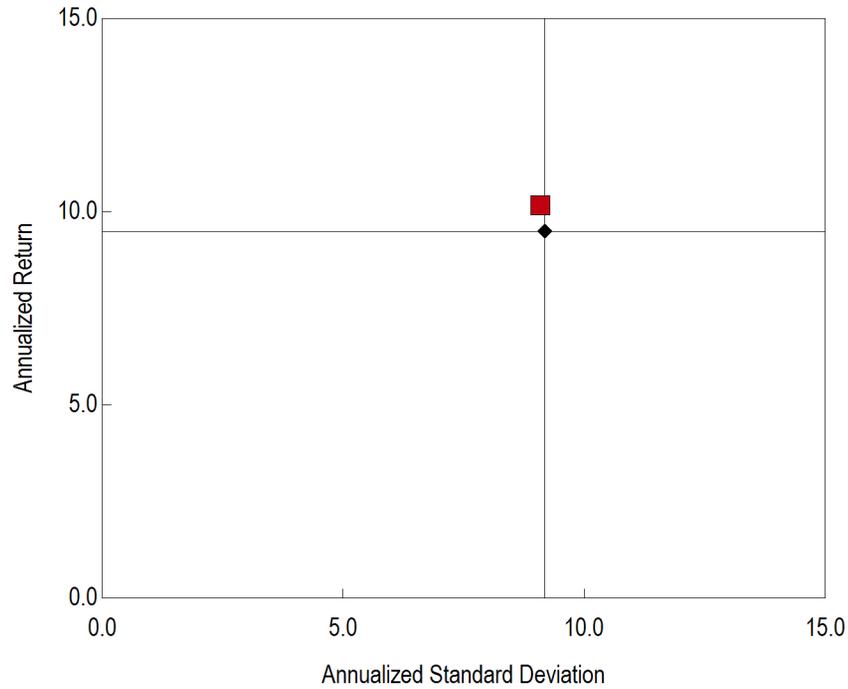
■ Total Fund  
◆ Interim SAA Policy

3 Years Ending March 31, 2015

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	10.4%	6.7%	1.5	2.2
Interim SAA Policy	9.6%	6.6%	1.5	2.2

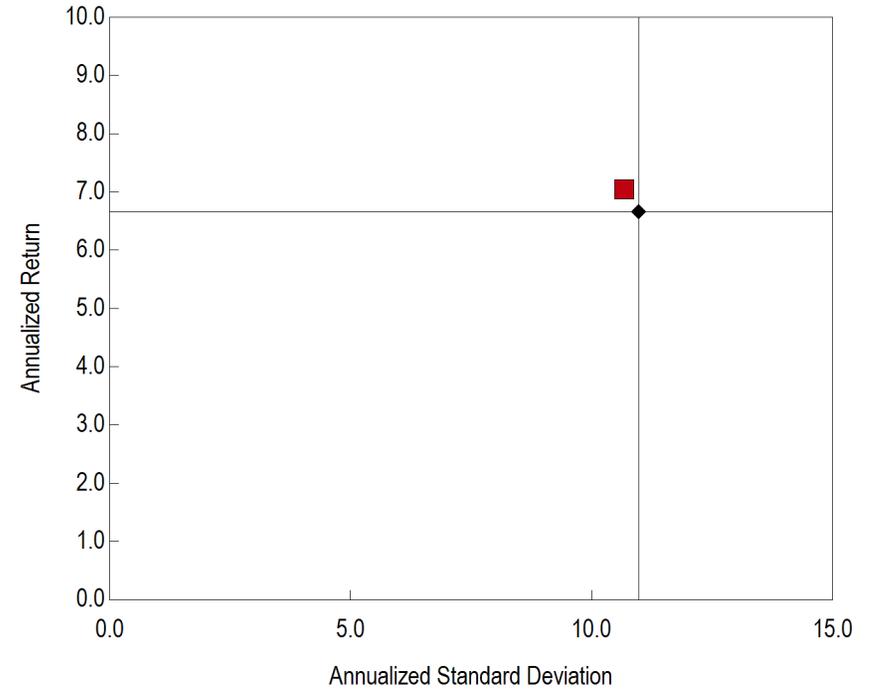
Total Fund Analysis

5 Years Ending March 31, 2015



■ Total Fund  
◆ Interim SAA Policy

10 Years Ending March 31, 2015



■ Total Fund  
◆ Interim SAA Policy

5 Years Ending March 31, 2015

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	10.2%	9.1%	1.1	1.7
Interim SAA Policy	9.5%	9.2%	1.0	1.6

10 Years Ending March 31, 2015

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	7.0%	10.7%	0.5	0.8
Interim SAA Policy	6.7%	11.0%	0.5	0.7

# Arizona State Retirement System

## Asset Class Performance Summary - Public Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	FYTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
<b>Total Fund</b>	<b>34,859,236,611</b>	<b>100.0</b>	<b>2.8</b>	<b>--</b>	<b>2.5</b>	<b>--</b>	<b>6.5</b>	<b>--</b>	<b>10.4</b>	<b>--</b>	<b>10.2</b>	<b>--</b>	<b>7.0</b>	<b>--</b>	<b>9.9</b>	<b>Jul-75</b>
<i>Interim SAA Policy</i>			<u>2.5</u>	--	<u>0.9</u>	--	<u>4.4</u>	--	<u>9.6</u>	--	<u>9.5</u>	--	<u>6.7</u>	--	<u>9.7</u>	<i>Jul-75</i>
Over/Under			0.3		1.6		2.1		0.8		0.7		0.3		0.2	
<i>Actual Benchmark</i>			2.8	--	1.8	--	5.4	--	10.1	--	9.6	--	6.7	--	--	<i>Jul-75</i>
<b>Total Domestic and International Equity<sup>1</sup></b>	<b>18,560,058,845</b>	<b>53.2</b>	<b>2.8</b>	<b>--</b>	<b>1.9</b>	<b>--</b>	<b>6.5</b>	<b>--</b>	<b>12.6</b>	<b>--</b>	<b>11.5</b>	<b>--</b>	<b>7.3</b>	<b>--</b>	<b>6.9</b>	<b>Jan-98</b>
<i>ASRS Custom Total Equity Benchmark</i>			<u>3.0</u>	--	<u>2.1</u>	--	<u>6.8</u>	--	<u>12.8</u>	--	<u>11.6</u>	--	<u>7.4</u>	--	<u>6.2</u>	<i>Jan-98</i>
Over/Under			-0.2		-0.2		-0.3		-0.2		-0.1		-0.1		0.7	
<b>Total Domestic Equity</b>	<b>10,969,827,465</b>	<b>31.5</b>	<b>2.0</b>	<b>66</b>	<b>6.7</b>	<b>51</b>	<b>11.7</b>	<b>41</b>	<b>16.3</b>	<b>43</b>	<b>14.9</b>	<b>45</b>	<b>8.8</b>	<b>53</b>	<b>11.4</b>	<b>Jul-75</b>
<i>ASRS Custom Domestic Equity Benchmark</i>			<u>2.1</u>	65	<u>7.2</u>	45	<u>12.1</u>	37	<u>16.5</u>	40	<u>14.9</u>	44	<u>8.5</u>	59	<u>11.5</u>	<i>Jul-75</i>
Over/Under			-0.1		-0.5		-0.4		-0.2		0.0		0.3		-0.1	
<i>eA All US Equity Net Median</i>			3.2		6.7		10.4		15.8		14.6		8.9		12.7	<i>Jul-75</i>
<b>Total International Equity</b>	<b>7,033,137,610</b>	<b>20.2</b>	<b>4.1</b>	<b>51</b>	<b>-5.4</b>	<b>66</b>	<b>-1.3</b>	<b>65</b>	<b>6.6</b>	<b>76</b>	<b>5.3</b>	<b>77</b>	<b>4.8</b>	<b>88</b>	<b>6.2</b>	<b>Apr-87</b>
<i>ASRS Custom Int'l Equity Benchmark</i>			<u>4.3</u>	43	<u>-5.0</u>	62	<u>-0.8</u>	58	<u>7.3</u>	63	<u>5.7</u>	72	<u>5.9</u>	69	<u>5.9</u>	<i>Apr-87</i>
Over/Under			-0.2		-0.4		-0.5		-0.7		-0.4		-1.1		0.3	
<i>eA All ACWI ex-US Equity Net Median</i>			4.1		-3.7		-0.1		8.2		7.0		6.7		6.6	<i>Apr-87</i>
<b>Total Public Markets Fixed Income</b>	<b>3,902,526,857</b>	<b>11.2</b>	<b>1.8</b>	<b>35</b>	<b>1.0</b>	<b>68</b>	<b>3.5</b>	<b>53</b>	<b>2.9</b>	<b>60</b>	<b>4.5</b>	<b>55</b>	<b>5.1</b>	<b>43</b>	<b>8.4</b>	<b>Jul-75</b>
<i>ASRS Custom Fixed Income Benchmark</i>			<u>0.8</u>	77	<u>-0.8</u>	94	<u>1.7</u>	76	<u>2.3</u>	70	<u>4.0</u>	64	<u>4.7</u>	55	--	<i>Jul-75</i>
Over/Under			1.0		1.8		1.8		0.6		0.5		0.4		--	
<i>eA All US Fixed Inc Net Median</i>			1.5		2.1		3.6		3.5		4.7		4.9		8.2	<i>Jul-75</i>
<b>Total Inflation-Linked Assets</b>	<b>538,387,248</b>	<b>1.5</b>	<b>-5.8</b>	<b>--</b>	<b>-27.1</b>	<b>--</b>	<b>-25.7</b>	<b>--</b>	<b>-10.7</b>	<b>--</b>	<b>-4.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>-4.4</b>	<b>Feb-10</b>
<i>ASRS Custom Inflation-Linked Benchmark</i>			<u>-5.9</u>	--	<u>-27.1</u>	--	<u>-27.0</u>	--	<u>-11.5</u>	--	<u>-5.9</u>	--	<u>-0.7</u>	--	<u>-5.9</u>	<i>Feb-10</i>
Over/Under			0.1		0.0		1.3		0.8		1.6		--		1.5	
<b>Total GTAA</b>	<b>3,387,309,107</b>	<b>9.7</b>	<b>5.2</b>	<b>1</b>	<b>3.4</b>	<b>27</b>	<b>8.7</b>	<b>8</b>	<b>11.1</b>	<b>1</b>	<b>11.8</b>	<b>1</b>	<b>8.5</b>	<b>6</b>	<b>8.3</b>	<b>Jan-04</b>
<i>ASRS Custom GTAA Benchmark</i>			<u>1.9</u>	56	<u>1.6</u>	39	<u>5.5</u>	29	<u>9.8</u>	12	<u>9.4</u>	8	<u>6.4</u>	47	<u>6.5</u>	<i>Jan-04</i>
Over/Under			3.3		1.8		3.2		1.3		2.4		2.1		1.8	
<i>eA Global TAA Net Median</i>			2.1		0.9		4.3		6.1		5.9		6.2		6.2	<i>Jan-04</i>

<sup>1</sup>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.

# Arizona State Retirement System

## Asset Class Performance Summary - Private Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception (%)	IRR (%)	Since
<b>Total Fund</b>	<b>34,859,236,611</b>	<b>100.0</b>	<b>2.8</b>	<b>6.5</b>	<b>10.4</b>	<b>10.2</b>	<b>9.9</b>	<b>--</b>	<b>Jul-75</b>
<i>Interim SAA Policy</i>			<u>2.5</u>	<u>4.4</u>	<u>9.6</u>	<u>9.5</u>	<u>9.7</u>	--	<i>Jul-75</i>
Over/Under			0.3	2.1	0.8	0.7	0.2	--	
<i>Actual Benchmark</i>			2.8	5.4	10.1	9.6	--	--	<i>Jul-75</i>
<b>Total Private Equity</b>	<b>2,354,091,556</b>	<b>6.8</b>	<b>0.9</b>	<b>10.9</b>	<b>14.3</b>	<b>14.6</b>	<b>5.2</b>	<b>12.4</b>	<b>Oct-07</b>
<i>Russell 2000 1 QTR Lagged</i>			<u>9.7</u>	<u>4.9</u>	<u>19.2</u>	<u>15.6</u>	<u>6.5</u>	<u>14.0</u>	<i>Oct-07</i>
Over/Under			-8.8	6.0	-4.9	-1.0	-1.3	-1.6	
<b>Total Opportunistic Equity<sup>1</sup></b>	<b>422,631,977</b>	<b>1.2</b>	<b>12.8</b>	<b>28.5</b>	<b>33.6</b>	<b>--</b>	<b>26.0</b>	<b>35.2</b>	<b>Apr-11</b>
<b>Total Private Debt</b>	<b>1,500,947,146</b>	<b>4.3</b>	<b>2.1</b>	<b>10.8</b>	<b>--</b>	<b>--</b>	<b>14.7</b>	<b>13.1</b>	<b>Jul-12</b>
<i>S&amp;P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged</i>			<u>0.1</u>	<u>4.1</u>	<u>=</u>	<u>=</u>	<u>7.3</u>	<u>5.5</u>	<i>Jul-12</i>
Over/Under			2.0	6.7			7.3	7.6	
<b>Total Opportunistic Debt<sup>1</sup></b>	<b>1,080,618,285</b>	<b>3.1</b>	<b>-0.8</b>	<b>7.6</b>	<b>10.4</b>	<b>--</b>	<b>8.6</b>	<b>11.5</b>	<b>Jan-08</b>
<b>Total Real Estate</b>	<b>2,156,445,546</b>	<b>6.2</b>	<b>6.3</b>	<b>14.3</b>	<b>13.9</b>	<b>14.2</b>	<b>4.6</b>	<b>6.9</b>	<b>Oct-05</b>
<i>NCREIF ODCE 1 QTR Lagged (net)</i>			<u>3.0</u>	<u>11.5</u>	<u>11.4</u>	<u>12.9</u>	<u>5.4</u>	<u>6.0</u>	<i>Oct-05</i>
Over/Under			3.3	2.8	2.5	1.3	-0.8	0.9	
<b>Total Farmland and Timber</b>	<b>155,283,916</b>	<b>0.4</b>	<b>2.6</b>	<b>3.4</b>	<b>--</b>	<b>--</b>	<b>-32.7</b>	<b>4.1</b>	<b>Jul-13</b>
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.2</u>	<u>5.2</u>	<u>=</u>	<u>=</u>	<u>5.2</u>	<u>5.0</u>	<i>Jul-13</i>
Over/Under			1.4	-1.8			-37.9	-0.9	
<b>Total Infrastructure</b>	<b>300,710,360</b>	<b>0.9</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>0.2</b>	<b>Oct-14</b>
<i>CPI - Infrastructure + 350 bps</i>			<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>1.2</u>	
Over/Under								-1.0	

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

Note: Performance is based on net of fee performance data.

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 Grosvenor Capital Management.

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.

Time-weighted performance of private markets portfolios shown to reconcile Total Fund performance as it is reported on a time-weighted basis. 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.

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

# Arizona State Retirement System

## Public Market Asset Class Analysis

3 Years Ending March 31, 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%	10.4%	--	6.7%	--	1.1%	--	0.7	--	0.7%	--	1.0	1.5
Interim SAA Policy	--	9.6%	--	6.6%	--	--	--	--	--	--	--	--	1.5
Total Domestic and International Equity	53.2%	12.6%	--	10.0%	--	0.6%	--	-0.5	--	0.0%	--	1.0	1.3
ASRS Custom Total Equity Benchmark	--	12.8%	--	10.2%	--	--	--	--	--	--	--	--	1.3
Total Domestic Equity	31.5%	16.3%	43	9.8%	17	0.5%	1	-0.4	64	-0.1%	35	1.0	1.6
ASRS Custom Domestic Equity Benchmark	--	16.5%	40	9.9%	18	--	--	--	--	--	35	--	1.7
Total International Equity	20.2%	6.6%	76	12.3%	64	0.6%	1	-1.1	99	-0.5%	81	1.0	0.5
ASRS Custom Int'l Equity Benchmark	--	7.3%	63	12.6%	74	--	--	--	--	--	75	--	0.6
Total Public Markets Fixed Income	11.2%	2.9%	60	3.8%	71	0.6%	1	0.9	38	0.5%	89	1.0	0.7
ASRS Custom Public Markets Fixed Income Benchmark	--	2.3%	70	3.6%	70	--	--	--	--	--	96	--	0.6
Total Inflation-Linked Assets	1.5%	-10.7%	--	12.6%	--	2.5%	--	0.3	--	0.5%	--	1.0	-0.9
ASRS Custom Inflation-Linked Benchmark	--	-11.5%	--	12.7%	--	--	--	--	--	--	--	--	-0.9
Total GTAA	9.7%	11.1%	1	8.0%	78	2.0%	2	0.7	1	0.4%	32	1.1	1.4
ASRS Custom GTAA Benchmark	--	9.8%	12	7.1%	66	--	--	--	--	--	40	--	1.4

Note: Performance is reported net of fees.

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

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

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

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

# Arizona State Retirement System

## Public Market Asset Class Analysis

5 Years Ending March 31, 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%	10.2%	--	9.1%	--	1.1%	--	0.6	--	0.8%	--	1.0	1.1
Interim SAA Policy	--	9.5%	--	9.2%	--	--	--	--	--	--	--	--	1.0
Total Domestic and International Equity	53.2%	11.5%	--	13.9%	--	0.6%	--	-0.2	--	0.0%	--	1.0	0.8
ASRS Custom Total Equity Benchmark	--	11.6%	--	14.0%	--	--	--	--	--	--	--	--	0.8
Total Domestic Equity	31.5%	14.9%	45	13.7%	30	0.6%	1	-0.1	51	-0.1%	39	1.0	1.1
ASRS Custom Domestic Equity Benchmark	--	14.9%	44	13.6%	29	--	--	--	--	--	37	--	1.1
Total International Equity	20.2%	5.3%	77	15.9%	40	0.8%	1	-0.5	96	-0.3%	77	1.0	0.3
ASRS Custom Int'l Equity Benchmark	--	5.7%	72	16.2%	48	--	--	--	--	--	73	--	0.3
Total Public Markets Fixed Income	11.2%	4.5%	55	3.4%	63	0.6%	1	0.9	26	0.5%	89	1.0	1.3
ASRS Custom Public Markets Fixed Income Benchmark	--	4.0%	64	3.3%	61	--	--	--	--	--	97	--	1.2
Total Inflation-Linked Assets	1.5%	-4.3%	--	13.6%	--	2.5%	--	0.6	--	1.3%	--	1.0	-0.3
ASRS Custom Inflation-Linked Benchmark	--	-5.9%	--	14.0%	--	--	--	--	--	--	--	--	-0.4
Total GTAA	9.7%	11.8%	1	9.8%	94	2.0%	4	1.2	1	2.3%	7	1.0	1.2
ASRS Custom GTAA Benchmark	--	9.4%	8	9.5%	85	--	--	--	--	--	67	--	1.0

Note: Performance is reported net of fees.

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

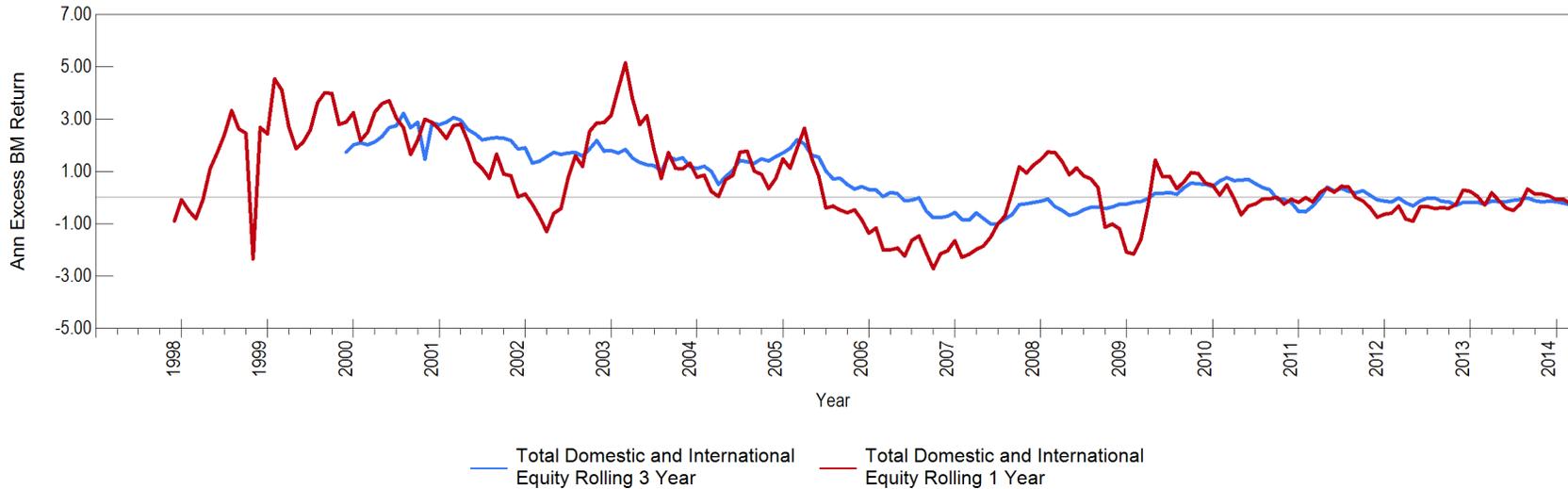
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.

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

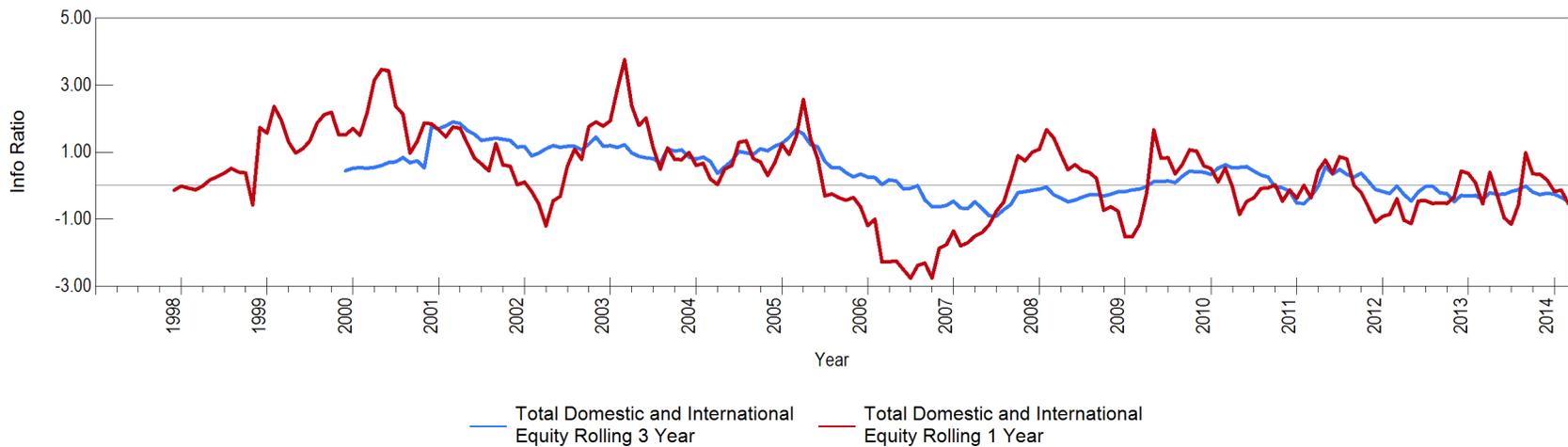
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Asset Class Analysis - Total Domestic and International Equity

Rolling Annual Excess Benchmark Return

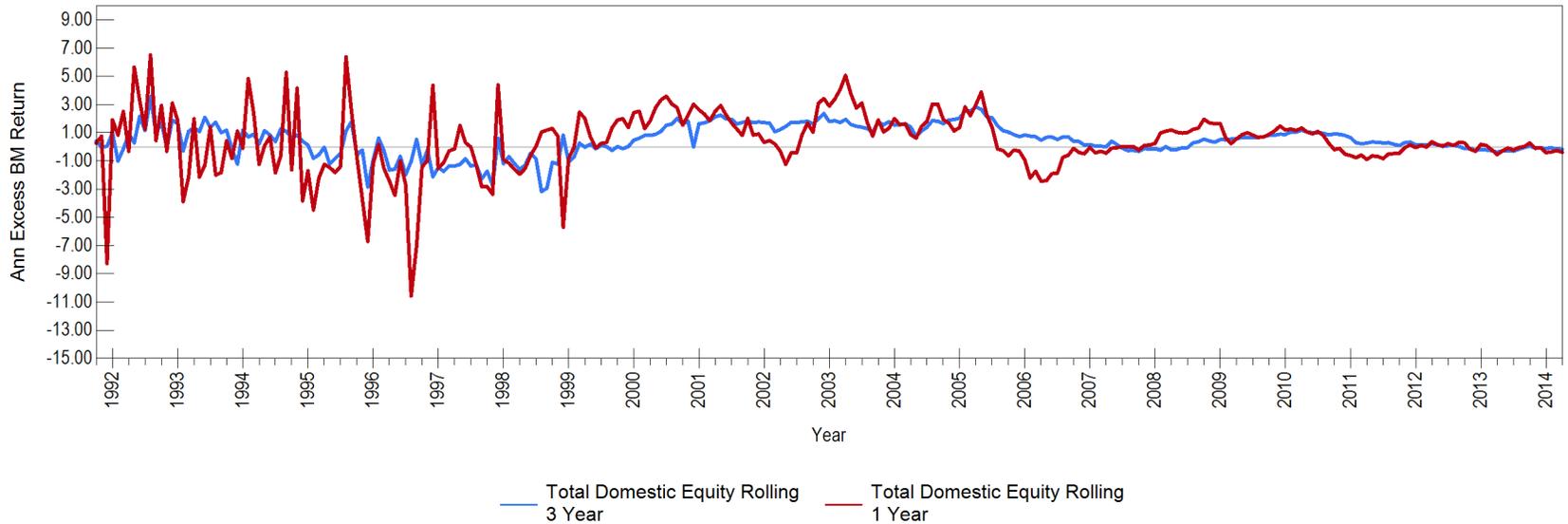


Rolling Information Ratio



Asset Class Analysis - Total Domestic Equity

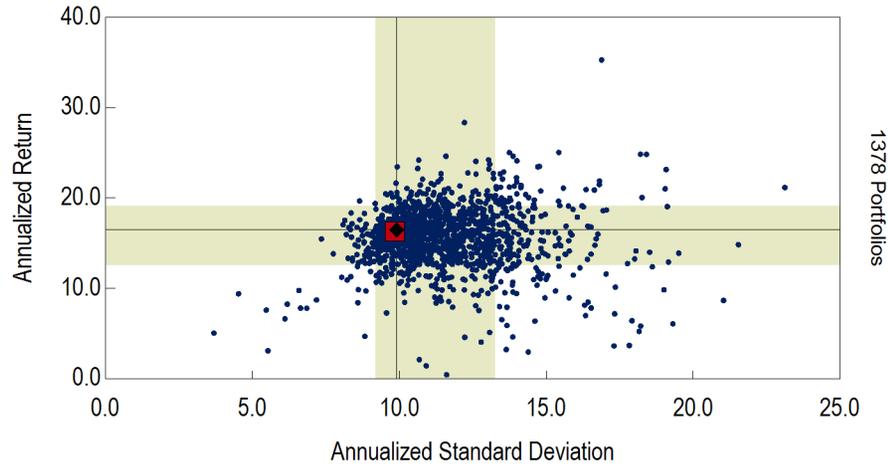
Rolling Annual Excess Benchmark Return



eA All US Equity Net Accounts

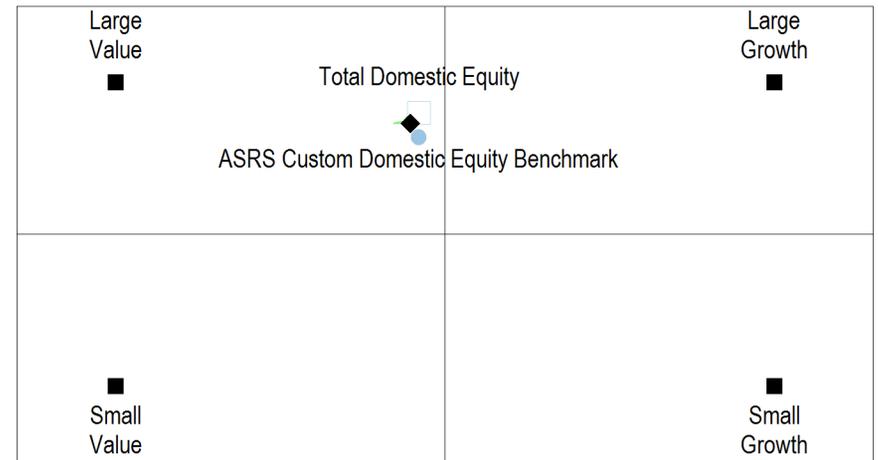


3 Year Risk Return

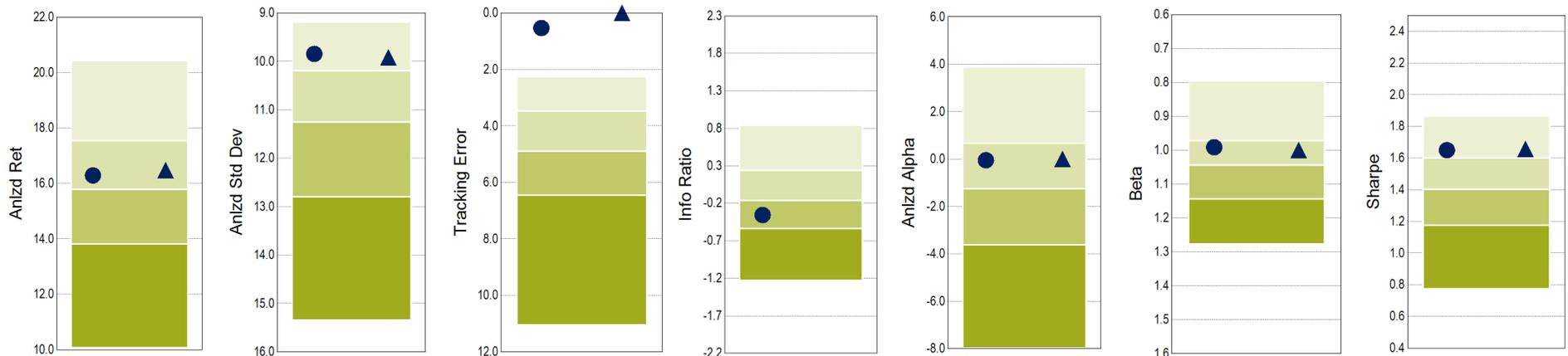


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

3 Year Style Map



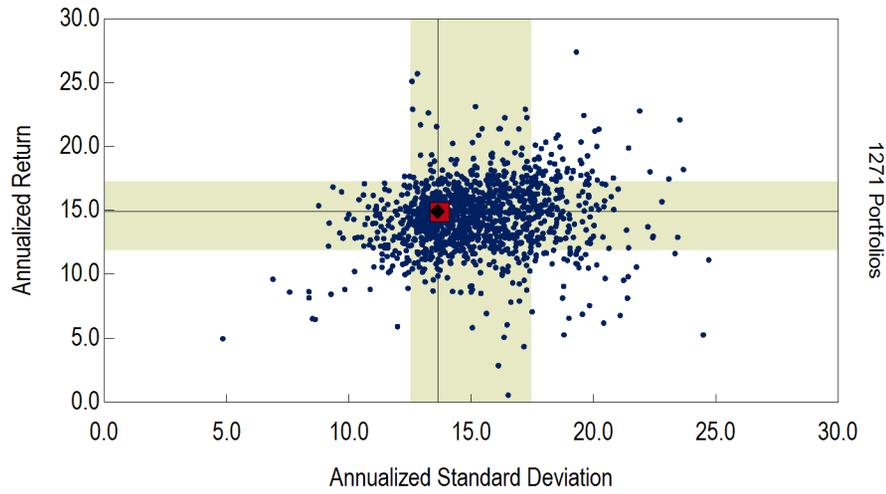
- First Rolling Period
- ◆ Last Rolling Period



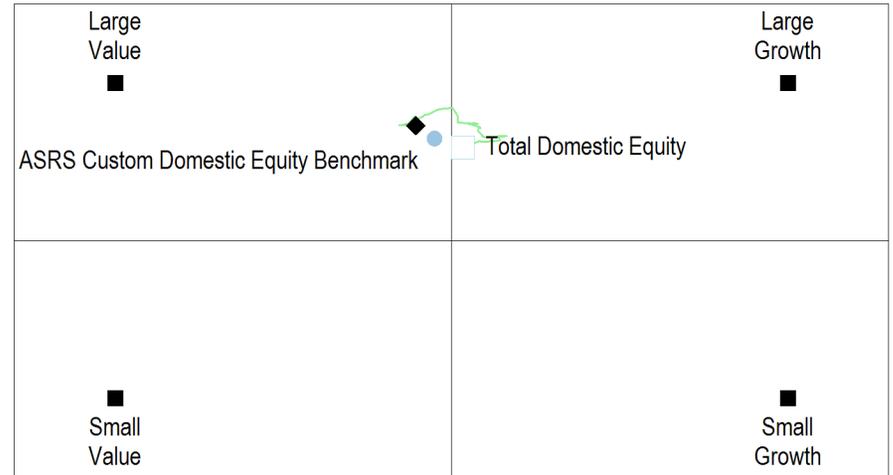
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Domestic Equity

5 Year Risk Return

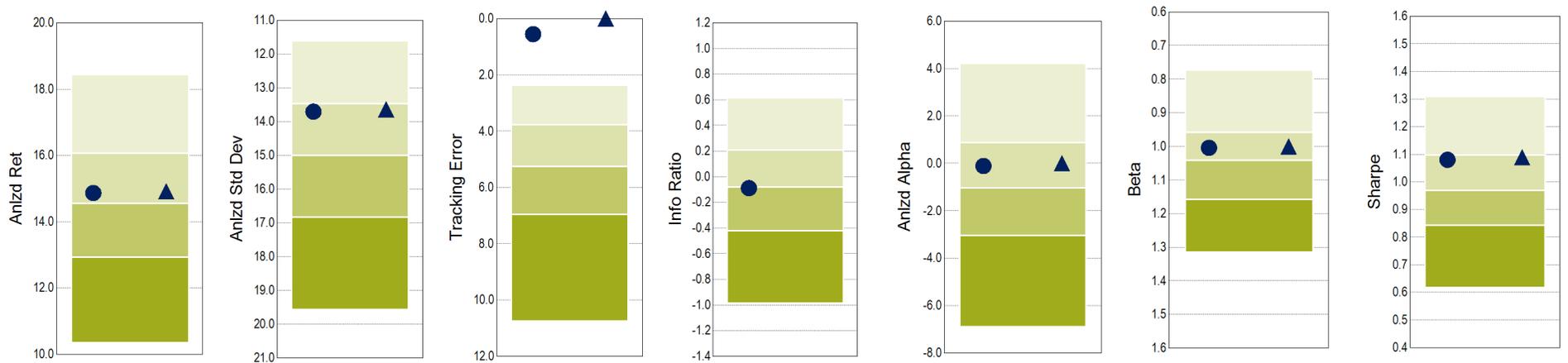


5 Year Style Map



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

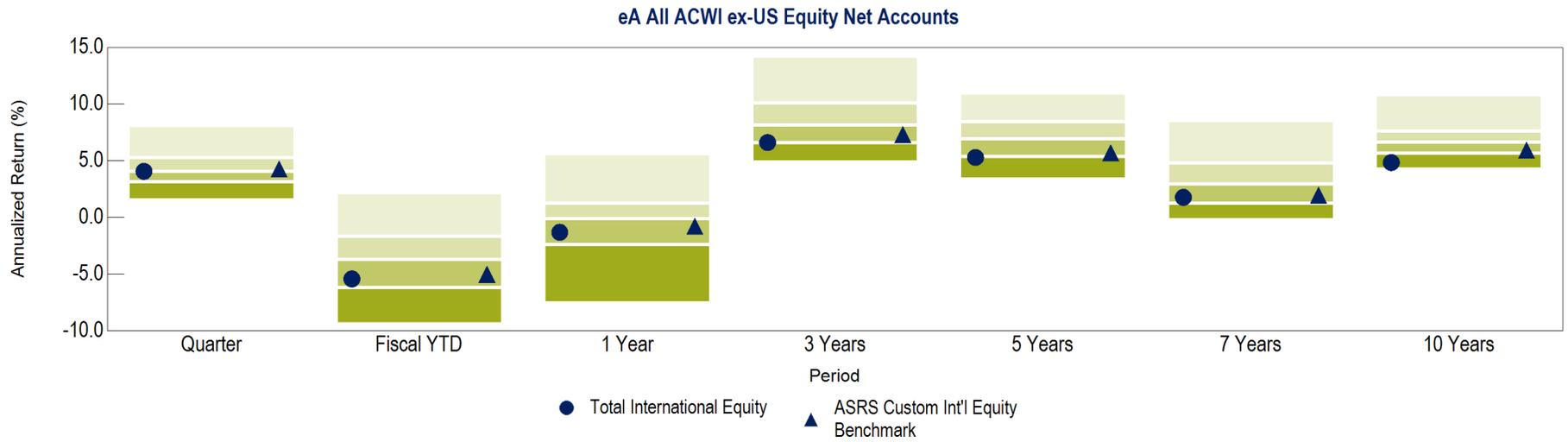
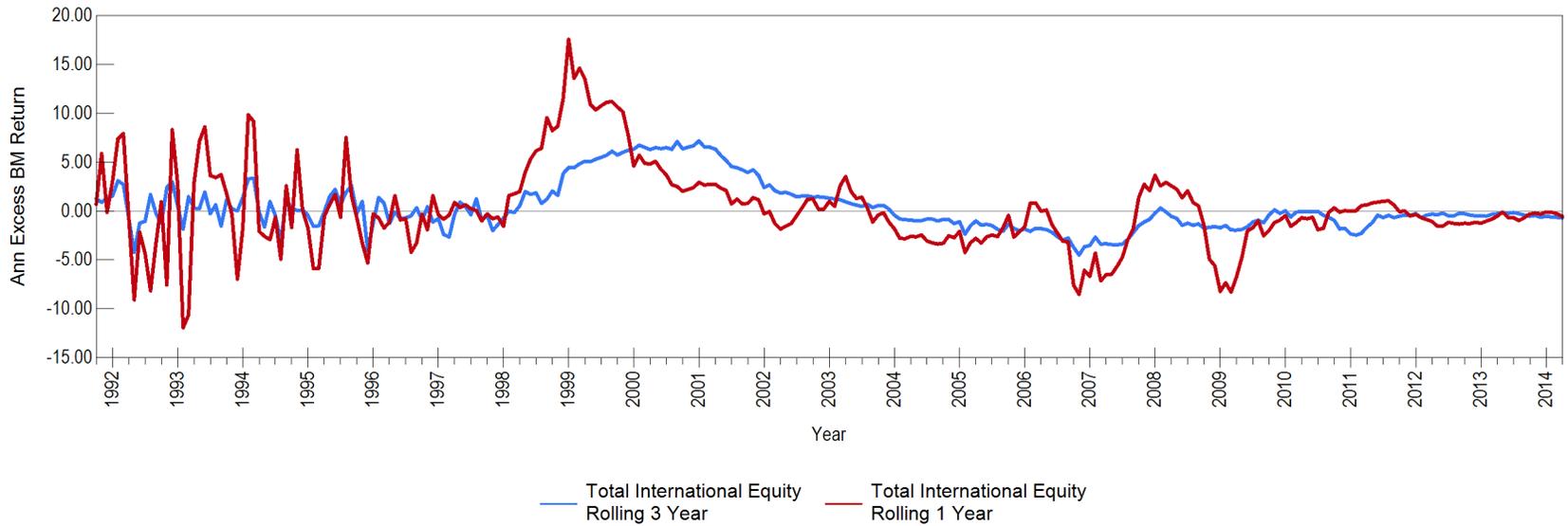
- First Rolling Period
- ◆ Last Rolling Period



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

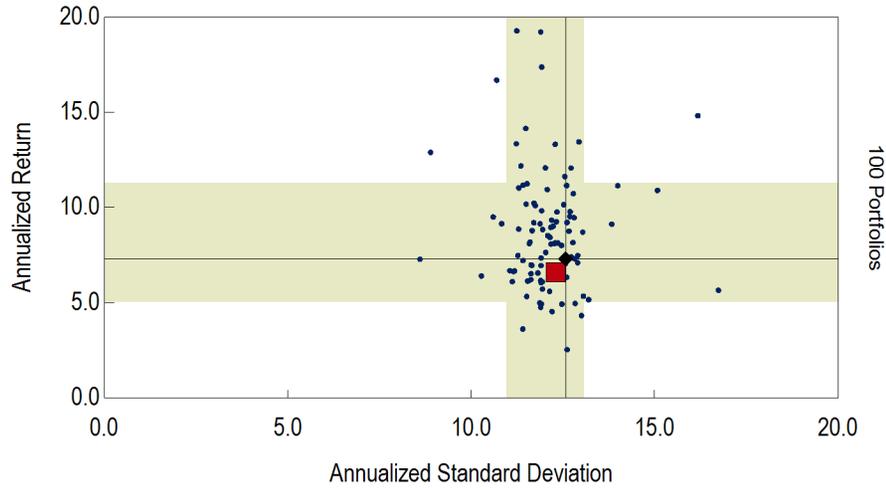
Asset Class Analysis - Total International Equity

Rolling Annual Excess Benchmark Return



Asset Class Analysis - Total International Equity

3 Year Risk Return

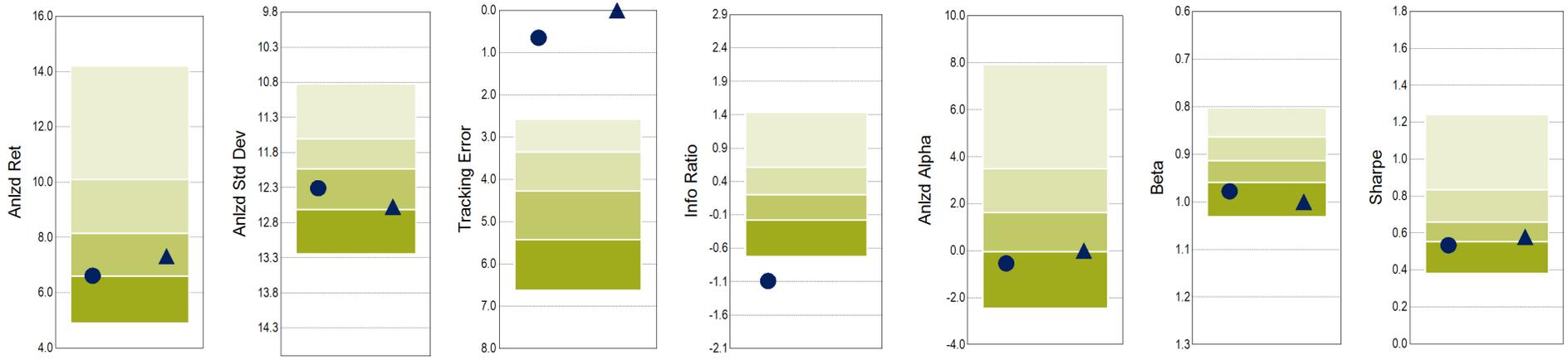


3 Year Style Map



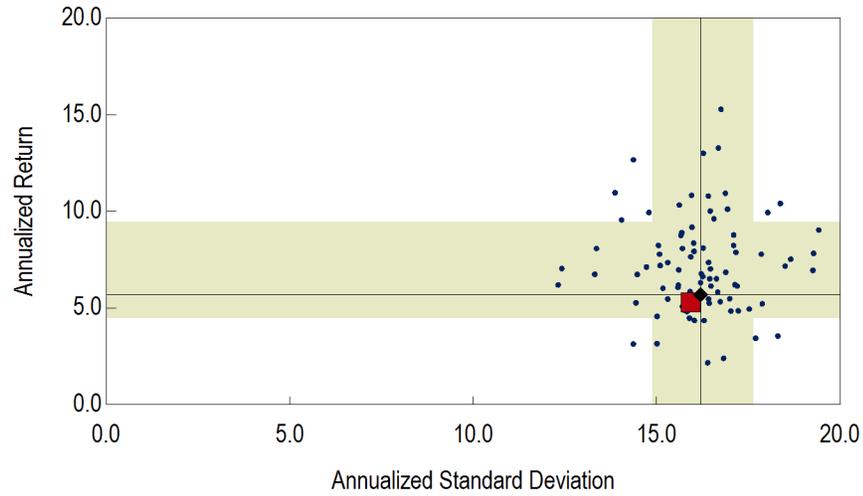
- Total International Equity
- ◆ ASRS Custom Int'l Equity Benchmark
- 68% Confidence Interval
- eA All ACWI ex-US Equity Net

- First Rolling Period
- ◆ Last Rolling Period



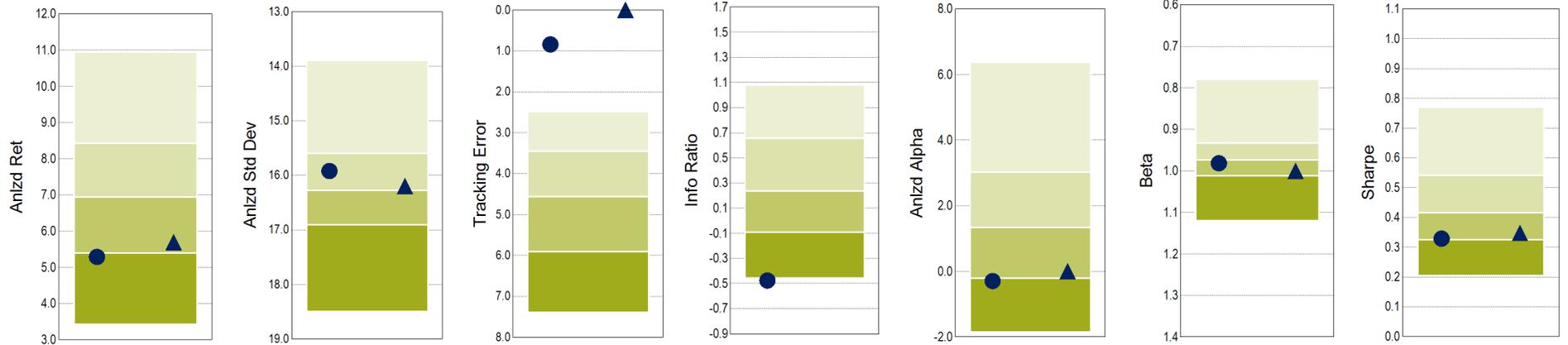
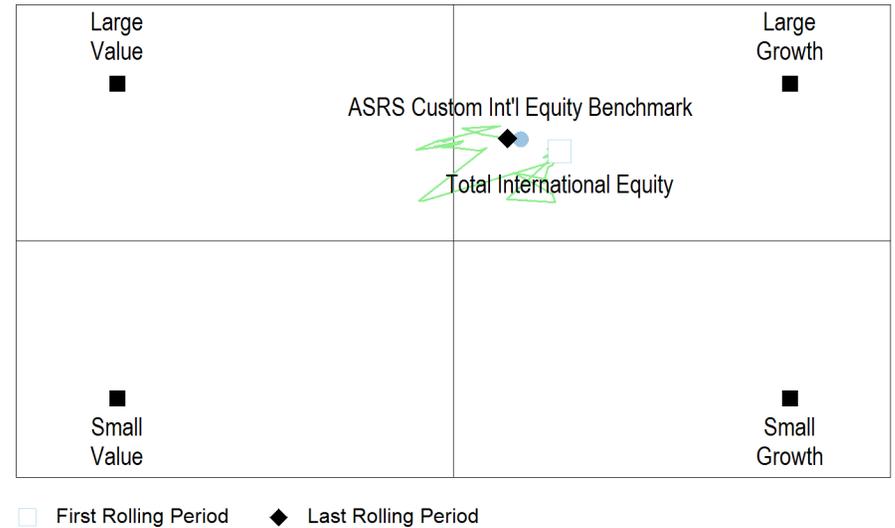
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Year Risk Return



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

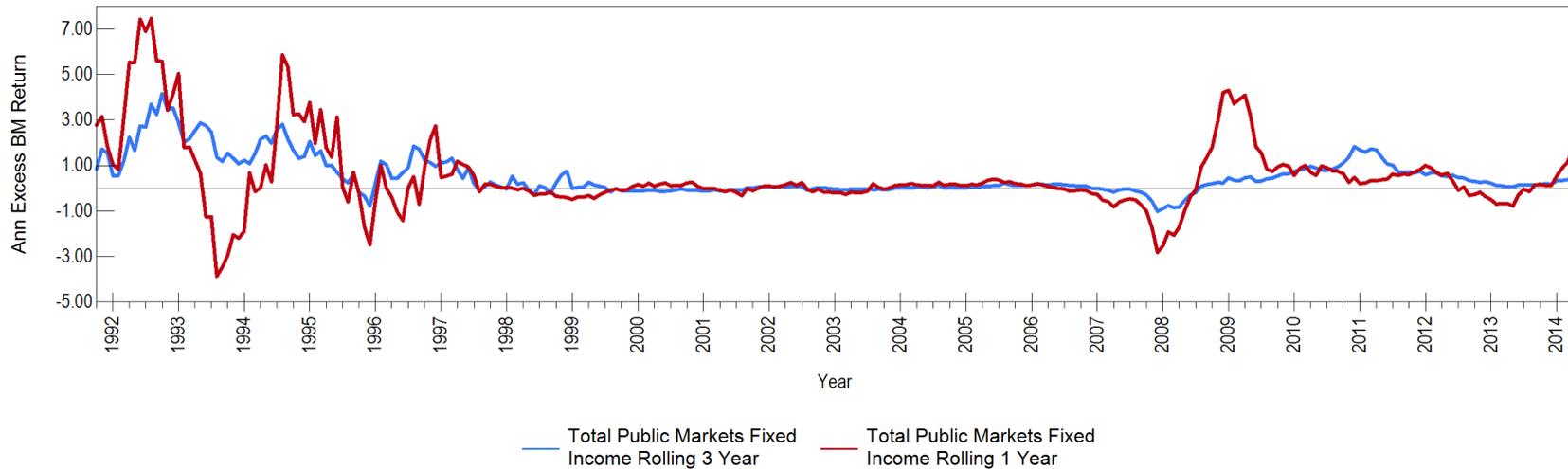
5 Year Style Map



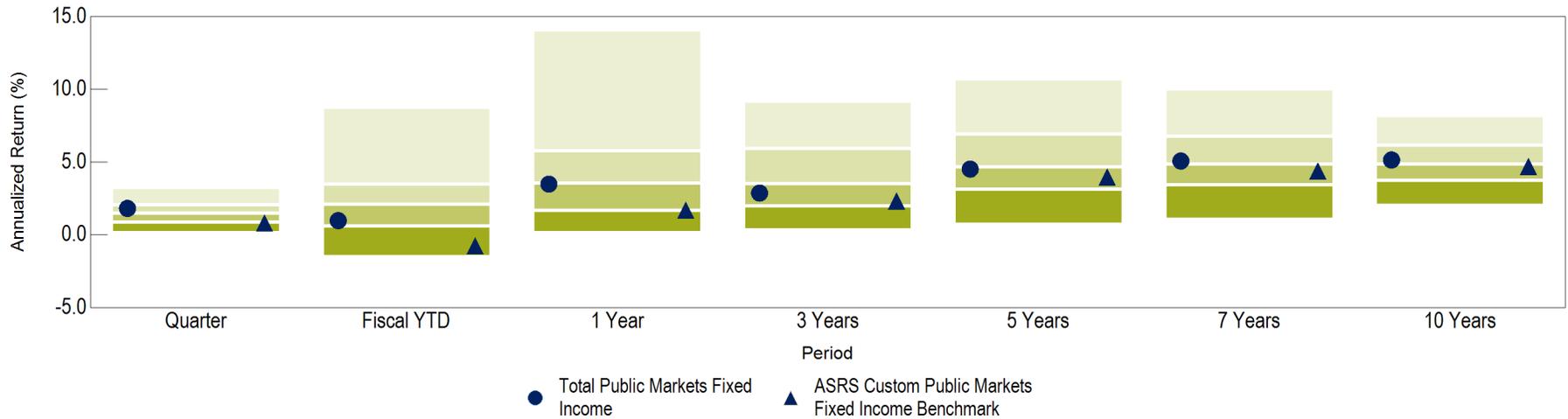
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Public Markets Fixed Income

Rolling Annual Excess Benchmark Return

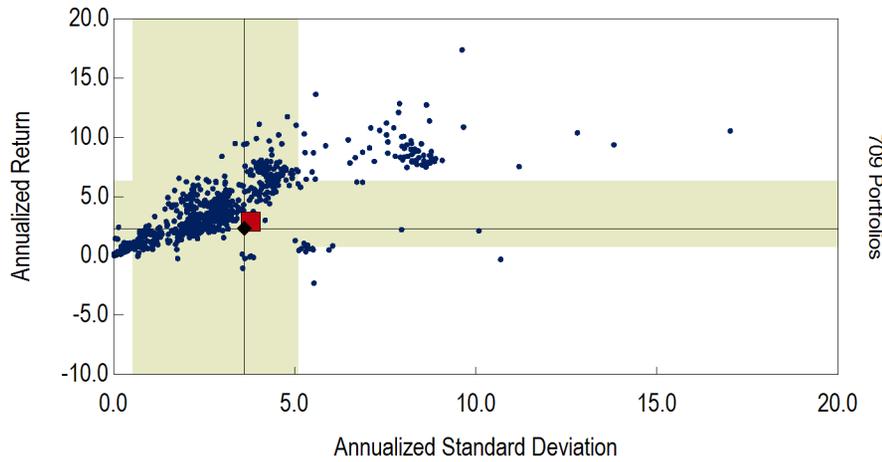


eA All US Fixed Inc Net Accounts



Asset Class Analysis - Total Public Markets Fixed Income

3 Years Ending March 31, 2015

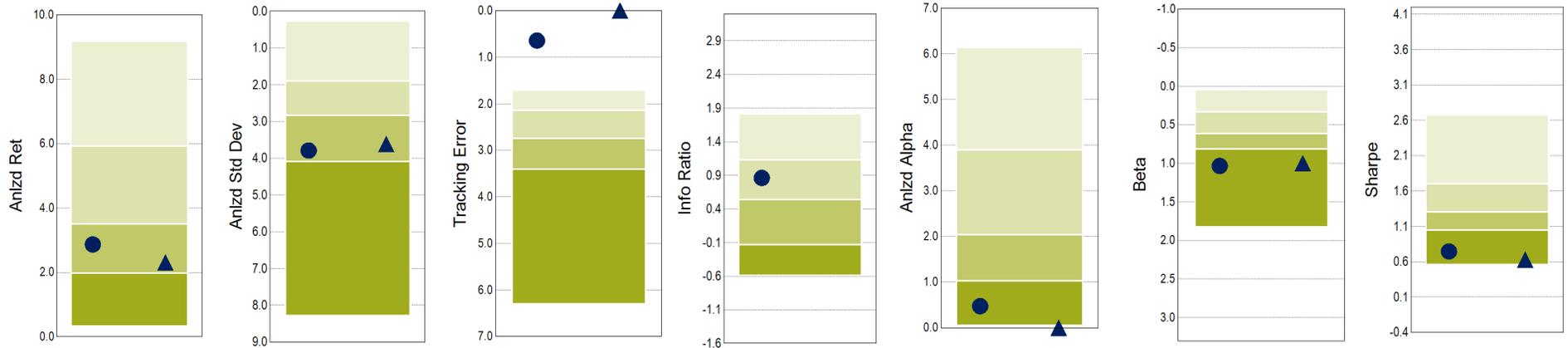


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- 68% Confidence Interval
- eA All US Fixed Inc Net

3 Year Style Map

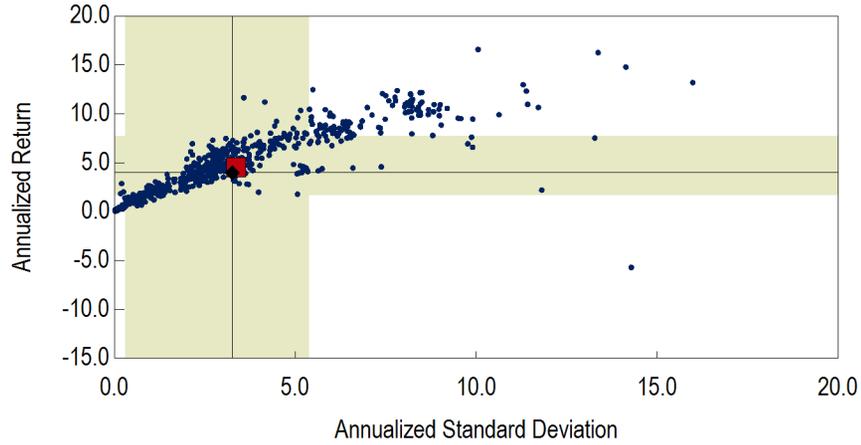


- First Rolling Period
- ◆ Last Rolling Period



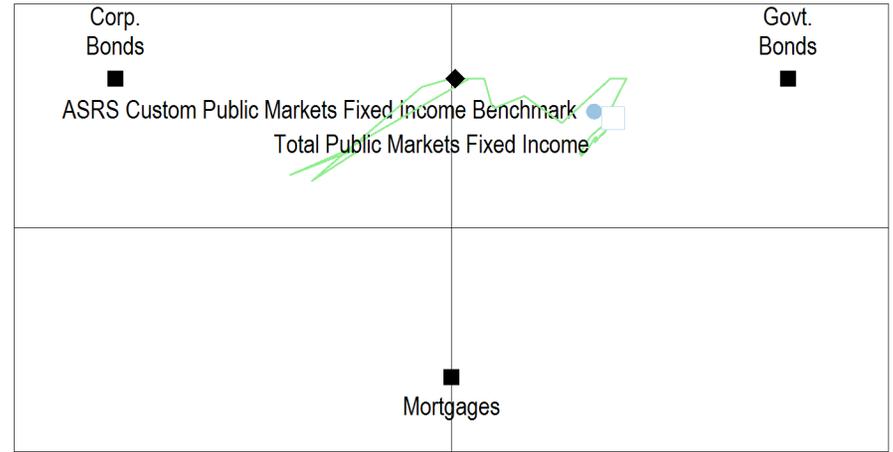
- Total Public Markets Fixed Income
- ▲ ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Years Ending March 31, 2015

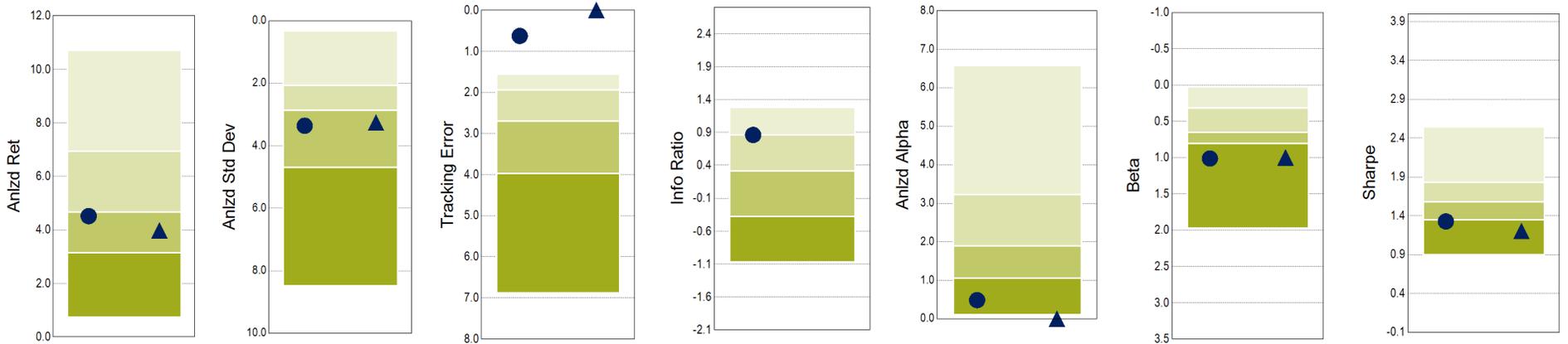


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- 68% Confidence Interval
- eA All US Fixed Inc Net

5 Year Style Map



- First Rolling Period
- ◆ Last Rolling Period

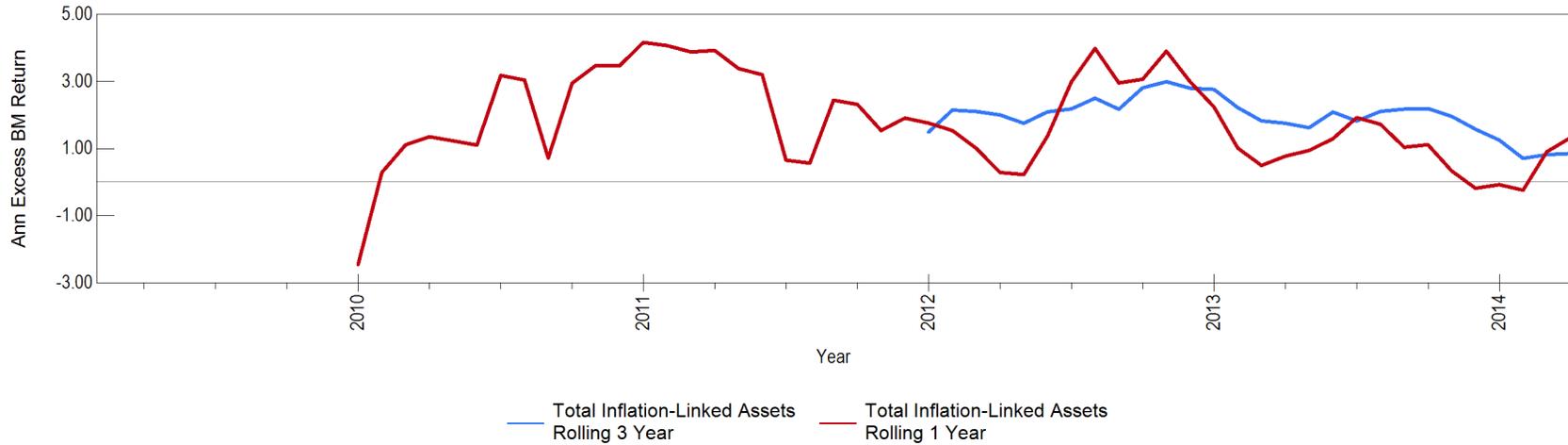


- Total Public Markets Fixed Income
- ▲ ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

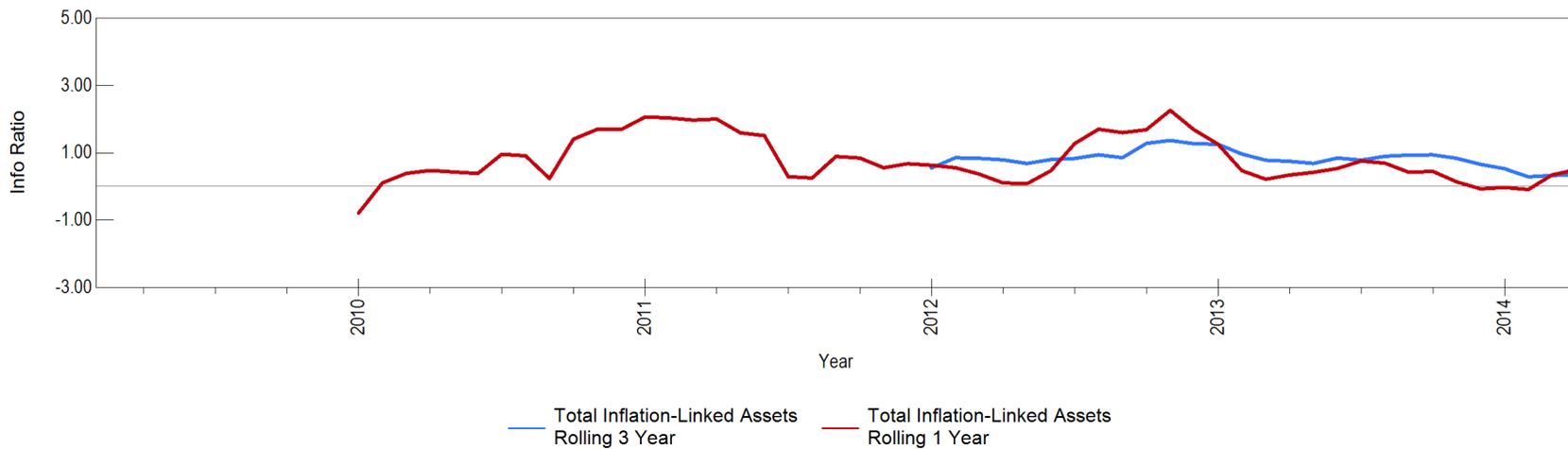


Asset Class Analysis - Total Inflation-Linked Assets

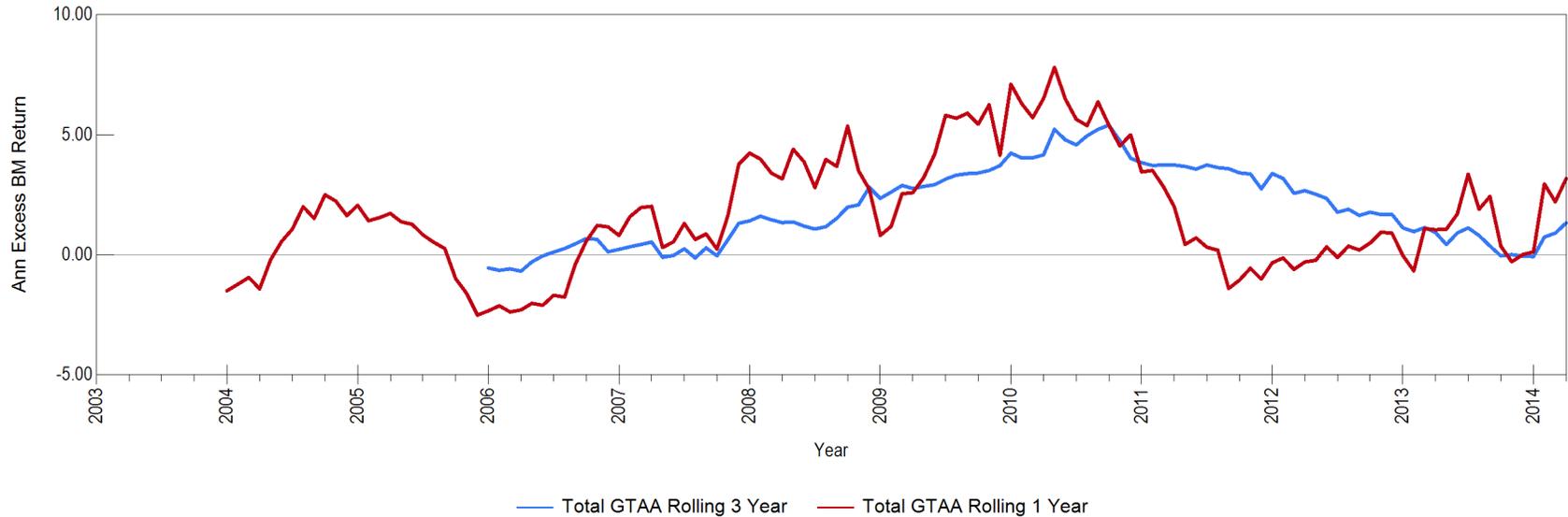
Rolling Annual Excess Benchmark Return



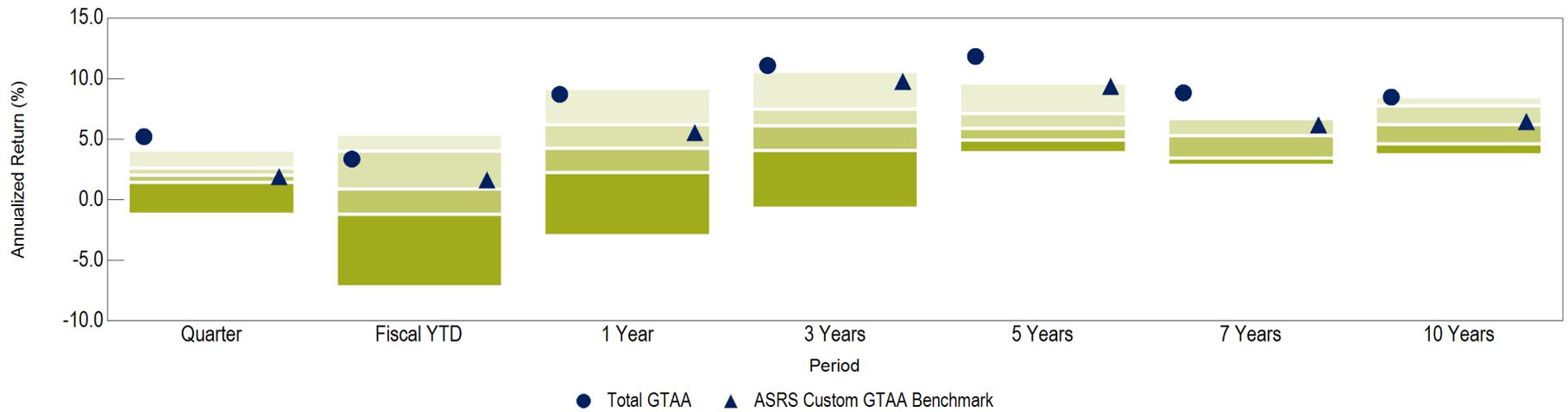
Rolling Information Ratio

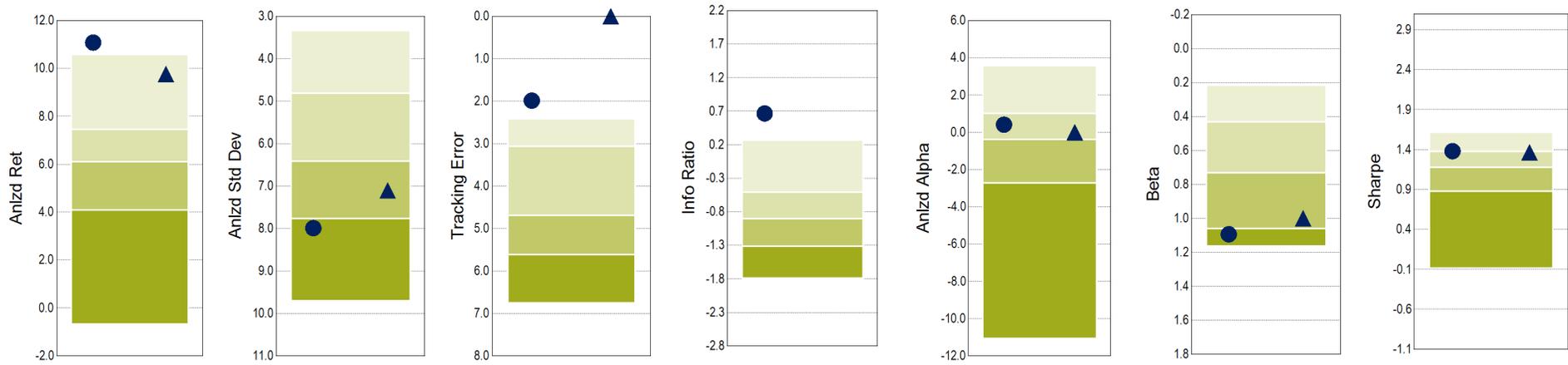
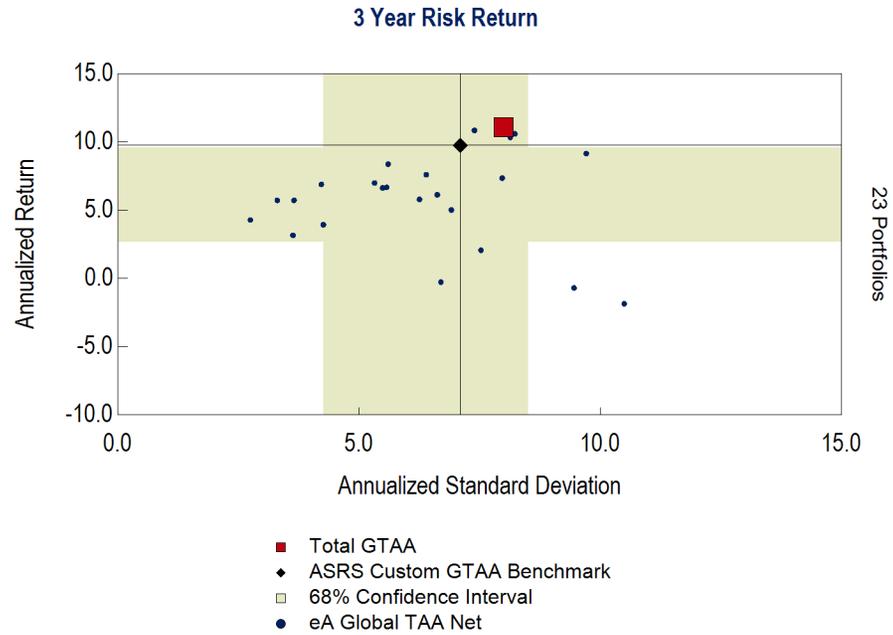


Rolling Annual Excess Benchmark Return

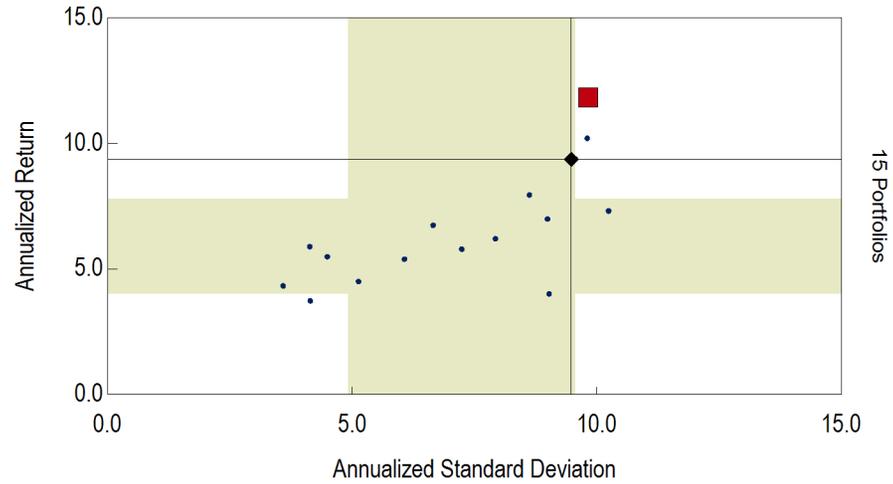


eA Global TAA Net Accounts

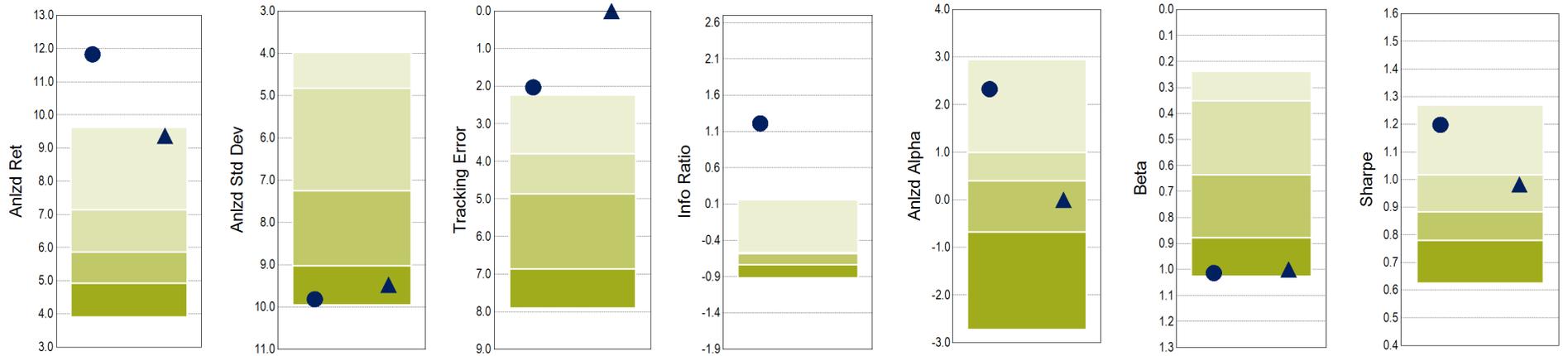




5 Year Risk Return



- Total GTAA
- ◆ ASRS Custom GTAA Benchmark
- 68% Confidence Interval
- eA Global TAA Net



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

- **Seven Asset Class Committee meetings have been held since the last time we provided an update on the ASRS Asset Class Committee Meetings.**
  
- **February 27, 2015 – Private Markets Committee**
  - Monthly Status Report, General Discussion and Deal Flow
  - Real Estate Pipeline Discussion
    - Informational item to provide an update on real estate investment pipeline and to solicit guidance as necessary
  - Real Estate Manager Recommendation (\$100 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 10%)
    - The ASRS is currently invested with this manager in multiple funds across the ASRS private markets landscape
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation
  - Variance Request
    - RCLCO and the ASRS private markets team recommended the ASRS approve a variance request from an existing real estate manager to amend the financing criteria required to make an investment
      - Availability of bank debt remains highly constrained, and in order to obtain debt for this particular account, cross collateralized fund level debt is required
    - Committee approved the variance request, allowing up to \$75 million of ASRS capital to be invested in entities with a cross collateralized bank loan limited to an amount no greater than 45% loan to cost
  - Private Equity Manager Recommendation (\$50-\$75 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
    - The ASRS is currently invested with this manager in a prior fund
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
    - Committee approved the recommendation for \$50 million, delegating authority for the private markets team to increase the size of the investment up to \$75 million after an evaluation of the potential benefit of a fee break for increasing the size of the commitment

- **February 27, 2015 – Private Markets Committee (continued)**

- Private Debt Manager Recommendation – Additional Commitment (\$400 million; \$600 million original commitment)
  - 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
- Private Debt Manager Recommendation – Additional Commitment (\$200 million; \$300 million original commitment)
  - 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

- **March 19, 2015 – Ad Hoc Private Markets Committee**

- Private Debt Manager Recommendation (\$350 million)
  - 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, subject to the concurrence of the Director, who was not present for the discussion. The Director subsequently concurred at the March 20, 2015 PRIVMC meeting.
- Private Debt Manager Recommendation (\$350 million)
  - 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
  - No recommendation was made at this meeting

- **March 20, 2015 – Private Markets Committee**

- Monthly Status Report, General Discussion and Deal Flow
- Real Estate Pipeline Discussion
  - Informational item to provide an update on real estate investment pipeline and to solicit guidance where appropriate
- Real Estate Manager Recommendation – Additional Commitment (\$100 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
- Private Debt Manager Recommendation (\$350 million)
  - 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
- Private Equity Manager Recommendation (\$100 million)
  - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
  - The ASRS is currently invested with this manager in prior funds
  - 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 (\$80 million)
  - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
  - The ASRS is currently invested with this manager in multiple funds across the ASRS private markets landscape
  - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
  - Committee approved the recommendation

• **March 20, 2015 – Private Markets Committee (continued)**

- Private Equity Manager Recommendation (\$100 million)
  - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
  - The ASRS is currently invested with this manager in a prior fund
  - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
  - Committee approved the recommendation
- Opportunistic Equity Manager Recommendation (\$30 million co-investment)
  - Consistent with strategic plan at the Total Fund level (SAAP Target to Opportunistic Equity is 0%, with a range of 0%-3%)
  - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
  - Committee approved the recommendation
- Variance Request
  - RCLCO recommended the ASRS approve a variance request from an existing real estate manager to allow for the continued development of a property that will require a longer period of time to achieve stabilization than the investment guidelines require
    - Investment in question will require 4-5 years to achieve stabilization, while investment criteria require stabilization within 3 years
    - This was an error in the investment criteria language, which should have read that these types of investments will 'achieve stabilization within 3 years of completion of construction' rather than 3 years from the date of the initial investment in the asset
  - The Committee did not approve the variance request, but instead amended the investment criteria language accordingly
- Private Debt Manager Recommendation (\$350 million) – Follow Up from March 19, 2015 PRIVMC meeting
  - 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

- **March 27, 2015 – Private Markets Committee**

- Real Estate Pipeline Discussion
  - Informational item to provide an update on real estate investment pipeline and to solicit guidance where appropriate
- Real Estate Manager Recommendation – Additional Commitment (\$100 million; \$100 million original commitment)
  - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 10%)
  - The ASRS is currently invested with this manager in multiple funds across the ASRS private markets landscape
  - 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 – (\$300 million)
  - 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

- **April 21, 2015– Private Markets Committee**

- Monthly Report, General Discussion and Deal Flow
  - Private Equity and Real Estate reporting reviewed. Reviewed separate account commitment strategy.
- Private Equity Manager Recommendation (€50 million)
  - 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)
  - 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

- **May 18, 2015– Private Markets Committee**

- Monthly Report, General Discussion and Deal Flow
  - Real Estate reporting and commitment levels made to date reviewed.
- Real Estate Manager Commitment Increase Recommendation (\$200 million)
  - Recommendation to increase existing manager commitment from \$200 million to \$400 million .
  - 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 Pacing Plan Update
  - Committee approved a revised target of \$700 million in capital commitments in 2015.

- **June 4, 2015– Ad Hoc Private Markets Committee**

- Private Debt Manager Recommendation (\$10 million)
  - 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

## General Observations

- **The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP.**
  - Current Interim SAAP includes proration of 1% Private Equity and 2% Real Estate, which are unfunded.
  - Continued build out of private markets asset classes provides opportunity to take advantage of illiquidity premium to produce expected returns in excess of what we believe can be achieved in the public markets.
- **IMD has already taken significant steps to move the Fund toward implementation of the recently approved SAAP.**
  - The largest single underweight position in the Fund is Private Debt, which was increased from a 3% SAAP target to a 10% SAAP target (current actual is 4.4%).
    - \$3.7 billion in estimated exposure (12/31/2014 NAV + unfunded commitments) to private debt strategies equates to approximately 10.7% of Total Fund assets vs. the SAAP target of 10%.
  - Emerging Market Debt investment managers have been liquidated as the asset class was removed from the SAAP.
  - Multi-Asset Class Strategies (formerly GTAA) has been restructured and moved 'above the line' and now has an explicit 5% target within the SAAP.
- **Cash Assetization Program implemented:**
  - To facilitate fund liquidity by decreasing the settlement times and market frictions related to overall investment management.
  - To retain unleveraged Total Fund market (beta) exposure, and concurrently offset the hindrance on investment performance from maintaining sizeable transitional cash balances intended to meet fund payment obligations (e.g., pension, health supplement, LTD, fees, accounts payable and associated capital calls).
- **ASRS SAAP Benchmark evaluation is complete. New SAAP targets are effective April 1, 2015.**
- **Tactical positioning consistent with IMD House Views.**

# Market Environment Update and Outlook

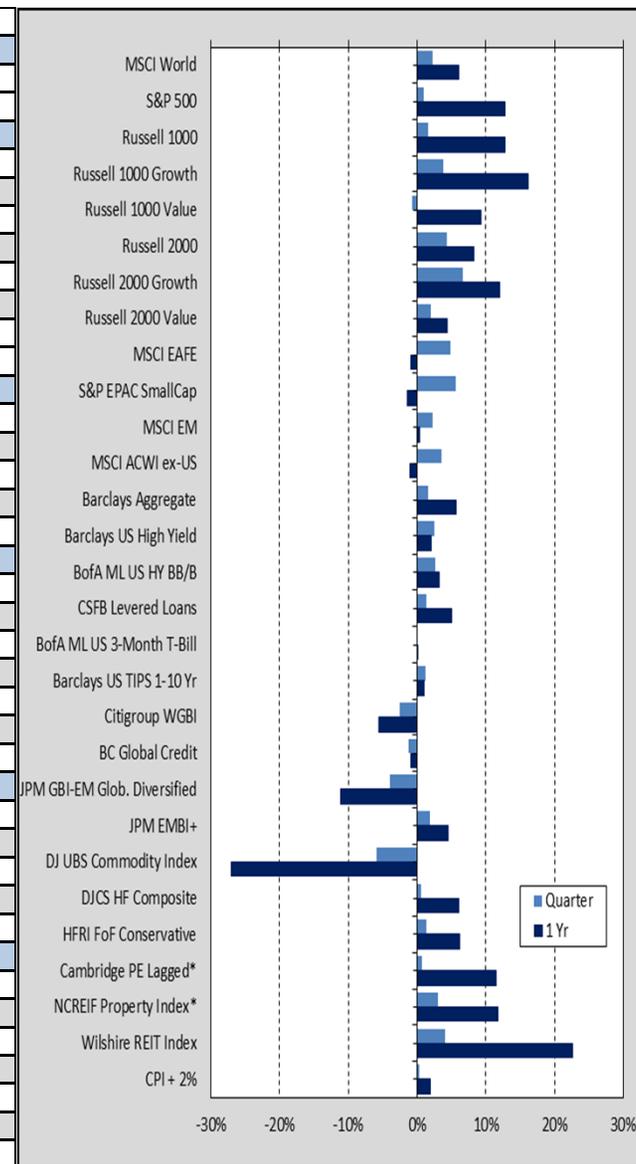


- **First quarter “advance” estimate of GDP growth printed at a weak -0.7%.**
  - Retail sales (ended March) at 0.5% on a year-over-year growth rate basis.
  - The inventory-to-sales ratio increased slightly to 1.4 in February and has remained relatively flat since early 2010.
  - Corporate profits as a percent of GDP decreased ended the fourth quarter at 10.4% and remain elevated relative to historical levels.
  - The U.S. trade deficit decreased slightly in February.
- **The unemployment rate fell to 5.5% in Q1 from 5.8% in December 2014; U-6, a broader measure of unemployment, fell to 10.9% during the first quarter.**
- **The Case-Shiller Home Price Index (as of 2/28) increased slightly to 166.8 from fourth quarter levels and is at levels higher than that of pre-financial crisis levels of 150.92.**
- **Rolling 12-month seasonally adjusted CPI decreased to -0.1% from 0.8% at the end of December; Capacity Utilization declined slightly to 77.1% in March.**
- **Fed Funds rate remains at 0.25%, while the 10-year Treasury Yield finished Q1 at 1.94%.**
- **The Fed balance sheet declined slightly in Q1 2015, while the European Central Bank balance sheet increased in the same period.**
  - ECB began asset purchases of €60 billion per month.
- **S&P valuations increased in March remaining above the 10-year and long-term averages**
  - Cyclically adjusted Shiller PE ratio is above the long-term average of 16.4x and above the 10-year average of 22.9x.
- **The U.S. Dollar continues to strengthen against a basket of major currencies as the Fed ends its quantitative easing program and the ECB ramps up easing.**

# Arizona State Retirement System

## Market Environment – Q1 2015 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>World Equity Benchmarks</b>						
MSCI World	World	2.3%	6.0%	12.2%	10.0%	6.4%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>Domestic Equity Benchmarks</b>						
S&P 500	Large Core	1.0%	12.7%	16.1%	14.5%	8.0%
Russell 1000	Large Core	1.6%	12.7%	16.5%	14.7%	8.3%
Russell 1000 Growth	Large Growth	3.8%	16.1%	16.3%	15.6%	9.4%
Russell 1000 Value	Large Value	-0.7%	9.3%	16.4%	13.8%	7.2%
Russell 2000	Small Core	4.3%	8.2%	16.3%	14.6%	8.8%
Russell 2000 Growth	Small Growth	6.6%	12.1%	17.7%	16.6%	10.0%
Russell 2000 Value	Small Value	2.0%	4.4%	14.8%	12.5%	7.5%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>International Equity Benchmarks</b>						
MSCI EAFE	International Developed	4.9%	-0.9%	9.0%	6.2%	5.0%
S&P EPAC SmallCap	Small Cap Int'l	5.6%	-1.5%	11.4%	9.2%	7.1%
MSCI EM	Emerging Equity	2.2%	0.4%	0.3%	1.8%	8.5%
MSCI ACWI ex-US	World ex-US	3.5%	-1.0%	6.4%	4.8%	5.5%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>Domestic Fixed Income Benchmarks</b>						
Barclays Aggregate	Core Bonds	1.6%	5.7%	3.1%	4.4%	4.9%
Barclays US High Yield	High Yield	2.5%	2.0%	7.5%	8.6%	8.2%
BofA ML US HY BB/B	High Yield	2.7%	3.2%	7.4%	8.4%	7.5%
CSFB Levered Loans	Bank Loans	1.3%	5.0%	5.3%	12.2%	5.0%
BofA ML US 3-Month T-Bill	Cash	0.0%	0.0%	0.1%	0.1%	1.5%
Barclays US TIPS 1-10 Yr	Inflation	1.2%	1.1%	-0.1%	2.9%	4.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>Global Fixed Income Benchmarks</b>						
Citigroup WGBI	World Gov. Bonds	-2.5%	-5.5%	-1.6%	3.4%	4.1%
BC Global Credit	Global Bonds	-1.2%	-0.9%	2.8%	4.4%	4.4%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	-4.0%	-11.1%	-3.9%	0.7%	6.3%
JPM EMBI+	Em. Mkt. Bonds	1.9%	4.5%	4.0%	6.6%	8.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<b>Alternative Benchmarks</b>						
DJ UBS Commodity Index	Commodity	-6.0%	-27.1%	-11.6%	-5.8%	-4.9%
DJCS HF Composite	Hedge Fund	0.6%	6.1%	2.4%	4.9%	3.1%
HFRI FoF Conservative	Fund of Funds	1.3%	6.2%	2.8%	4.6%	2.6%
Cambridge PE Lagged*	Private Equity	0.7%	11.5%	15.3%	15.4%	13.6%
NCREIF Property Index*	Real Estate	3.0%	11.8%	11.1%	12.1%	8.4%
Wilshire REIT Index	REIT	4.0%	22.7%	14.0%	15.4%	6.7%
CPI + 2%	Inflation/Real Assets	0.3%	2.0%	3.0%	3.7%	4.1%



\* As of 12/31/2014

## Positives

- **With Fed asset purchases coming to an end, divergence in monetary policies signaling different investment environments globally**
- **ECB monetary easing begins with €60 billion in monthly asset purchases**
  - ECB commits €1.3 trillion in asset purchases in the Eurozone
  - Global risk assets respond positively
  - Negative short dated interest rates in Eurozone
- **Developed world inflation is low**
  - In US, CPI for all Urban Consumers on a seasonally adjusted basis was negative in Q1 driven by Energy in January

## Negatives

- **Geopolitical instability continues to drive volatility**
  - Instability in the Mid-East, Eastern Europe, Greece
- **Fed rate hike uncertainty contributed to volatility in domestic markets**
  - Timing of Fed rate hike is “dependent on market conditions”
- **Europe continues to see ongoing political and economic growth challenges**
  - Negative currency impacts for US investors as USD appreciates
- **GDP decelerated, posting a +0.2% estimated growth rate**
  - Consumer spending decelerated, but still growing
- **Valuations remain above 10 year and long term averages**
  - Developed Equity P/Es above median

### **Global Equity**

- **U.S. equities advanced in the first quarter as global monetary accommodation ramps up.**
- **Small cap stocks outperformed large cap stocks during the quarter, with the Russell 2000 Index returning 4.3% and the S&P 500 Index returning 1.0%.**
- **International equities outperformed U.S. markets during the quarter, returning 3.5%, as measured by the MSCI ACWI ex-U.S. Index.**
  - Developed markets returned 4.9% as measured by the MSCI EAFE Index. Japan was the top performer returning 10.0%.
  - Emerging markets returned 2.2% as measured by the MSCI Emerging Markets Index in U.S. dollar terms. India and Russia bolstered returns with Russia returning 18%.

### **Private Equity**

- **New private equity commitments totaled \$83.1 billion in Q1 2015.**
  - 2015 first three month total represents 23% of total PE raised in 2014
- **Buyout and growth equity fund deal volume in both the U.S. and Europe continues to decelerate.**
  - Buyout and growth equity deals totaled \$36.7 billion with US buyout and growth equity activity experiencing a sharp reduction in Q1.
- **Venture capital raised \$11.8 billion ended March.**
  - At 14% of total private equity raised, commitments are just below the 10-year historic relative average and are buoyed by strong IPO and M&A environment.
- **Energy funds raised \$3.2 billion representing 16% of capital raised in Q1.**
  - Investors are opportunistically approaching the energy market dislocation.
- **Asian private equity commitments slowed to total 8% of total funds raised down from 10% in 2014.**
- **European commitments comprised 14% of all new PE commitments in Q1 2015**
  - 72% of European funds raised were based in the United Kingdom

**Fixed Income**

- **As yields fell amid declining inflation and monetary easing, global sovereign debt gained in the first quarter.**
- **The spread between two and 10-year rates fell 12 basis points to 1.38%. Treasury Inflation-Protected Securities, or TIPS, returned 1.4% during the quarter, as measured by the Barclays US TIPS Index.**
- **The Barclays Long Duration Credit Index gained 3.1%, bolstered by falling Treasury yields.**
- **Agency mortgage-backed securities benefitted from a decrease in mortgage rates in January and March, and posted quarterly gains of 1.1%.**
- **Investment grade credit spreads continued to widen ending March at 129 basis points.**
- **High yield bonds returned 2.5% as spreads increased to 433 basis points up from 429 basis points.**
  - High yield markets were most significantly impacted by the decline of oil prices as Energy makes up approximately 14% of the Barclays US High Yield Bond Index.
- **Emerging markets debt continued to slow in local currency posting a -4.0% return as measured by the JP Morgan GBI-EM Global Diversified Index.**
  - Hard-currency emerging market debt market trumped local currency debt, with the JPMorgan EMBI Global Diversified Index returning 2.0%. After plunging at year-end, Russian debt outperformed as oil prices stabilized and geopolitical tensions cooled. Brazilian debt underperformed amid disappointing growth, high inflation, and concerns around the mismanagement of the state-run oil giant Petrobras.

**Real Assets/Inflation-Linked Assets**

- **Massive energy market dislocation.**
  - Oil prices stabilized mid quarter.
  - 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.
  
- **Timber opportunity set limited but warrants further review**
  - 45% increase in housing starts forecasted; timber prices highly correlated

### Commodities

- **Commodities continued their losing streak for the third straight quarter with the Bloomberg Commodity Index posting a 5.9% loss.**
  - Volatility in the commodity sector trumped other asset classes, including equities, bonds and the US dollar; Brent crude dropped 9.9% in January, then sharply recovered, gaining 14.8% in February, and slipped again in March, losing 12.3% posting at a 9.3% Q1 loss.

### 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.**
  - The concerns for U.S. core real estate (and U.S. real estate, broadly) continues to be plentiful capital that is driving up pricing; and the market's expectation for higher future interest rates and their impact on capitalization rates and capital values.
- **U.S. REITs posted a strong quarter with a 4.0% return.**
  - REITs are trading at slight premiums to NAV
  - FFO multiples are up to approximately 18x remaining above the average of 12.5x since 2000.
- **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.

- **Be judicious with risk**
  - Avoid chasing risk for only marginal return enhancements
  - Less liquid opportunities may provide the best risk-adjusted approach, but liquidity needs should be incorporated (e.g., substituting direct lending for high yield)
- **Catalysts are present to drive international equity markets above pre-financial crisis highs**
  - Encourage an equal weight exposure to international developed and US equities
  - If currency hedged, encourage larger international developed equity exposure relative to US equities
- **Question the “traditional” approach; different investment environments require different perspectives of risk and return**
  - A low-return environment may require a fresh perspective
  - Continue to remove traditional portfolio constraints by adding active managers with skill to exploit inefficiencies within and across asset classes (e.g., flexible global equity, global asset allocation, absolute return fixed income)
- **Rethink fixed income portfolio structure in light of current market environment**
  - Use of an unconstrained/multi-sector fixed income portfolio may provide sound diversification and enhanced liquidity
  - Examine if alternatives are available to traditional portfolio positions (e.g., combining cash and long treasuries vs. holding core bond portfolio)

## Highlights of First Quarter Happenings at NEPC

### NEPC Research

#### Recent White Papers Posted

- *Six Years Later: A Time for Moderation? NEPC's 2015 Asset Allocation (January 2015)* - NEPC's Asset Allocation Committee
- *A Primer on US Equity REITs and Their Role in an Institutional Investment Portfolio (April 2015)* - Sean Ruhmann, Director of Real Assets Research; Tim Bruce, Director of Traditional Research; Matt Ritter, Research Analyst, Real Assets Research; Larissa Davy, Research Associate, Traditional Research - The NEPC research paper provides an overview of US REITs and examines their place in institutional portfolios.



### Professional Staff Updates

- We are also pleased to announce that Aarish Patell has joined NEPC as a Research Consultant located in our Boston, MA office. Aarish will be focusing on private markets research.
- NEPC has also added two new Research Analysts to our hedge fund research team, Christian Pieri and Victoria Margosian.

### NEPC Client Recognitions

- We are immensely gratified to consistently achieve your favorable client satisfaction ratings in relation to our peers. Last year, you ranked NEPC #1 among the 10 largest firms in the investment consulting business, as measured by the Greenwich Quality Index (GQI). We remain the only firm among the 10 largest investment consultancies with rankings in the top three in 10 of the last 11 years, according to Greenwich Associates' annual survey of over 1,000 large plan sponsors regarding their investment consulting relationships.<sup>1</sup>
- Orange County Employee Retirement System has won the Government Finance Officers Association's Award for Excellence in Government Finance, for its investment fee transparency and management initiatives.

### Upcoming Events

- NEPC's 20th Annual Client Conference – May 19-20, 2015 in Boston at the Boston Convention & Exhibition Center (BCEC)
- Headline Speakers:
  - Liz Ann Sonders, Senior Vice President, Chair of the Investment Committee, Windhaven Investment Management, Inc.
  - Don Yaeger, Sports Journalist
  - Rick Rieder, Chief Investment Officer, Fundamental Fixed Income, BlackRock
- Register at [www.nepc.com](http://www.nepc.com)

<sup>1</sup>Source: Greenwich Associates, 2014 Evaluations by U.S. Institutional Investors. Greenwich Associates is an independent research firm. Its rankings do not represent an endorsement of NEPC. 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.<sup>1</sup>/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: 25% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/6% Russell 2000 (lagged one quarter)/14% 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)/6% NCREIF ODCE (lagged one quarter)/4% Bloomberg Commodity Index

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

<sup>1</sup>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.<sup>1</sup> 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 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, and 15% 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 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 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.
- **ASRS Custom GTAA 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 thereafter.

<sup>1</sup>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.



## 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

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*Paul Matson*  
Director

## MEMORANDUM

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

**FROM:** Mr. Paul Matson, Director  
Mr. Gary R. Dokes, Chief Investment Officer  
Mr. Al Alaimo, Fixed Income Portfolio Manager

**DATE:** June 8, 2015

**RE:** **Agenda Item #5:** Presentation, Discussion, and Appropriate Action Regarding Fixed Income Asset Class Review Presentation

### Purpose

To present and discuss the annual review of the ASRS Total Fixed Income Program.

### Recommendations

Informational only, no action required.

### Background

As part of the annual asset class presentations to the IC, the CIO, IMD Portfolio Manager and NEPC will review the ASRS Total Fixed Income Program (i.e., program strategies, portfolio structure, performance, etc.).

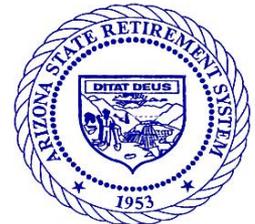
Attachments:

Fixed Income Asset Class Review

# Arizona State Retirement System Investment Committee

## Fixed Income Asset Class Review

June 22, 2015



# EXECUTIVE SUMMARY

## Fixed Income Asset Class Overview

- **Market Value as of May 29, 2015:**

- **\$7.8 B**

- **Passive Allocation: 49%**

- **Fixed Income Style Composition:**

– Core:	49%
– HY:	17%
– Private Debt:	21%
– Opp Debt:	13%

- **Portfolios:**

– 3 Passive	
• Core:	3
– 16 Active	
• HY:	2
• Private Debt:	7
• Opportunistic Debt:	8

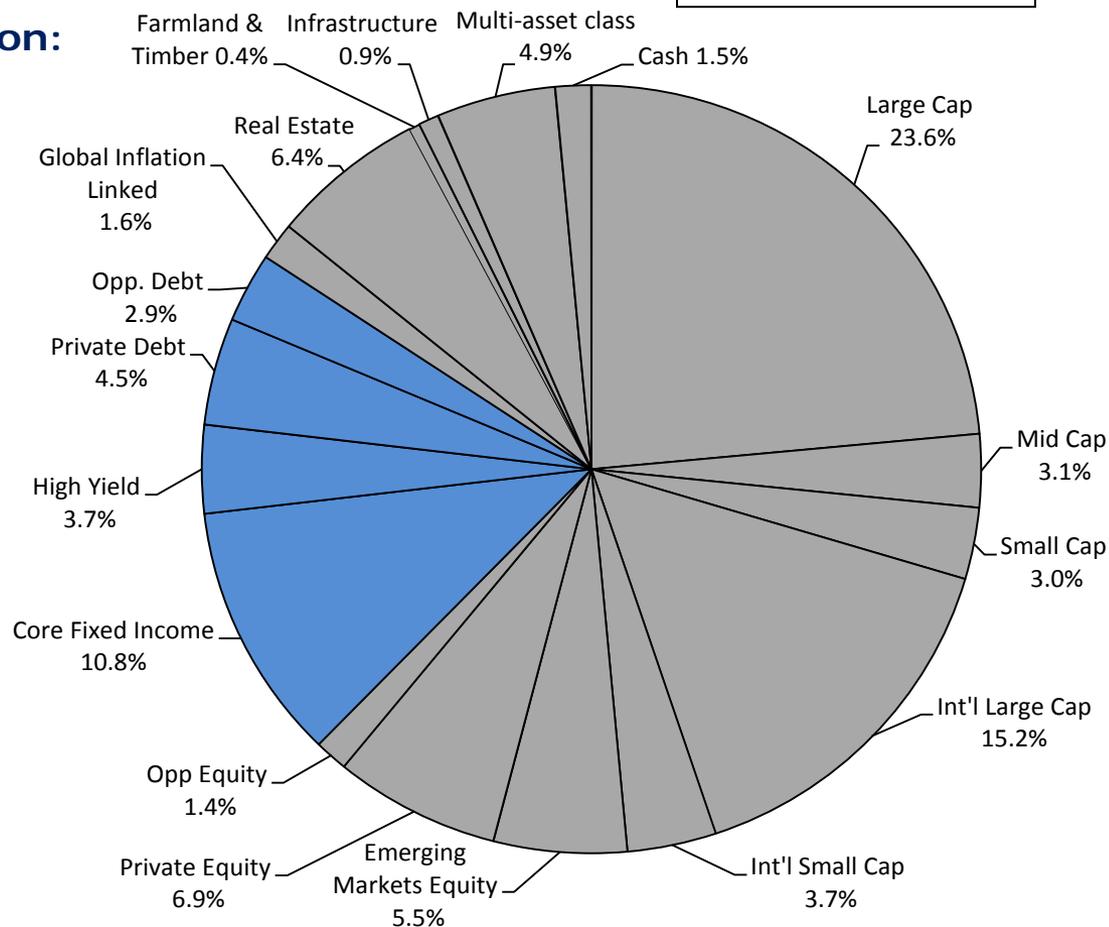
**Total Fund: \$35.4 B**

**U.S. Fixed Income SAAP**

**Policy: 25%**

**Range: 18-35%**

**Actual: 22%**



# Executive Summary

Over the past one-, three-, five- and ten-year periods, the ASRS public markets fixed income portfolio experienced annualized returns ranging from 3-5%. The portfolio produced returns in excess of its benchmark in each of these periods.

For the one-year period ended 3/31/15, the public markets fixed income portfolio generated a 3.5% return, which exceeded its benchmark by 1.8%. The outperformance was primarily due to a tactical underweight in emerging market local currency debt, an asset class which performed poorly with a -11% return; outperformance by high yield managers (particularly Columbia) relative to the high yield bond benchmark; and outperformance by the passive core fixed income managers including the internally managed F2 portfolio.

Private debt and opportunistic debt, which are not included in the ASRS Custom Public Markets Fixed Income Benchmark, performed well and generated returns for the one year period ended 12/31/14 of 10.8% and 7.6%, respectively. (Returns for private debt and opportunistic debt are reported with a one quarter lag.) Inception-to-date IRRs for both of these asset classes have also been strong at 13.1% and 11.5%, respectively. In addition, private debt substantially outperformed its benchmark.

## Arizona State Retirement System

### Total Fixed Income Performance Summary as of March 31, 2015

	Market Value (\$)	% of Portfolio	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>Total Public Markets Fixed Income</b>	<b>3,902,526,857</b>	<b>11.2</b>	<b>1.8</b>	<b>1.0</b>	<b>3.5</b>	<b>2.9</b>	<b>4.5</b>	<b>5.1</b>	<b>8.4</b>	<b>Jul-75</b>
ASRS Custom Public Markets Fixed Income Benchmark <sup>1</sup>			<u>0.8</u>	<u>-0.8</u>	<u>1.7</u>	<u>2.3</u>	<u>4.0</u>	<u>4.7</u>	--	Jul-75
Over/Under			1.0	1.8	1.8	0.6	0.5	0.4		
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception	IRR	Since	
<b>Total Private Debt</b>	<b>1,500,947,146</b>	<b>4.3</b>	<b>2.1</b>	<b>10.8</b>			<b>14.7</b>	<b>13.1</b>	<b>Jul-12</b>	
S&P/LSTA Leveraged Loan Index +250bps 1QTR Lagged			<u>0.1</u>	<u>4.1</u>			<u>7.3</u>	<u>5.5</u>	Jul-12	
Over/Under			2.0	6.7			7.3	7.6		
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception	IRR	Since	
<b>Total Opportunistic Debt</b>	<b>1,080,618,285</b>	<b>3.1</b>	<b>-0.8</b>	<b>7.6</b>	<b>10.4</b>	<b>0.0</b>	<b>8.6</b>	<b>11.5</b>	<b>Jan-08</b>	

<sup>1</sup> **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 thereafter.

## Executive Summary (continued)

- **The adoption of the 2015 SAAP resulted in the following changes to ASRS's fixed income allocation:**
  - The policy weight for Private Debt was increased to 10% from 3%.
  - Emerging Market Debt, which previously had a 4% policy weight, was dropped as an asset class.
  - A new Interest Rate Sensitive asset class was created which includes Core Fixed Income and a new asset category, Treasuries (Long Duration). The policy weight for Interest Rate Sensitive asset class was lowered to 11% from 13%.
  - The policy weight for High Yield was lowered to 4% from 5%.
- **IMD staff has done the following to implement the 2015 SAAP:**
  - Expanded our commitments to private debt partnerships by an incremental \$2.2 billion to nearly \$4.0 billion (which represents slightly over 11% of the total fund). The expanded commitments include the upsizing of two existing partnerships and the creation of four new partnerships. We believe it may take up to 3 years to fully invest these commitments.
  - Defunded both of our Emerging Market Debt mandates.

## Executive Summary (continued)

- As a May 29, 2015, ASRS was positioned in fixed income as follows based on the SAAP adopted in 2015 and the Interim Adjusted SAAP Policy targets:

	<u>Actual</u>	<u>SAAP Target</u>	Interim Adjust. <u>SAAP</u>	Over/ <u>(Under)</u> <sup>1</sup>
Total Fixed Income	22.0%	25.0%	26.1%	(4.1%)
Treasuries Long Duration	0.0%	0.0%		
Core Fixed Income	<u>10.8%</u>	<u>11.0%</u>		
Interest Rate Sensitive	10.8%	11.0%	16.1%	(5.1%)
High Yield	3.7%	4.0%	5.5%	(1.8%)
Private Debt	4.5%	10.0%	4.5%	0.0%
Opportunistic Debt	2.9%	0.0%	0.0%	2.9%

<sup>1</sup> Versus Interim SAA adjusted policy with unfunded private debt and real estate prorated to Interest Rate Sensitive and High Yield.

## Executive Summary (continued)

- **ASRS is tactically underweight fixed income. Moreover, ASRS is tactically underweight the *public* fixed income markets as we do not see compelling opportunities to achieve the fund's overall 8% target return as yields are relatively low.**
- **As of May 29, 2015, yields and durations in select sectors of the U.S. public fixed income markets were as follows:**

	<u>Yield</u>	<u>Duration</u>
Core Fixed Income (Barclays US Aggregate Index)	2.2%	5.5
US Treasuries	1.4%	5.7
US Treasuries 20+ Year	2.8%	18.5
US Agency Mortgage-Backed Securities	2.5%	4.0
Investment Grade Corporates	3.1%	7.3
High Yield (Below Investment Grade Corporates)	5.9%	4.2

## Executive Summary (continued)

- **IMD believes that compelling opportunities to achieve the fund's 8% target return do exist in two areas of fixed income: private and opportunistic debt.**

	Expected Net Return
Private Debt Mandates Drawing Capital	10-11%
Opportunistic Debt Mandates Drawing Capital	10-12%

- **IMD believes that investment opportunities in private and opportunistic debt are relatively insensitive to rising interest rates.**
- **The ability to allocate capital to private and opportunistic debt is constrained by the respective managers' ability to source attractive investments. In addition, the investments are typically illiquid.**

# CORE FIXED INCOME

# Interest Rate Sensitive/Core Fixed Income

Core fixed income represents the US investment-grade market which includes US Treasuries and Agencies, Agency Mortgage-Backed Securities, Corporate Bonds, Commercial Mortgage-Backed Securities (CMBS) and Asset-Backed Securities (ABS). Its benchmark is the Barclays U.S. Aggregate Bond Index, which encompasses the market for U.S. dollar denominated, fixed-rate, taxable, investment-grade bonds that are SEC-registered.

The performance of core fixed income is heavily tied to the direction of US Treasury rates. In addition, core fixed income tends to perform well when equity markets decline (ex. 2008). As a result, it is an important part of the overall ASRS portfolio because it provides a source of balance and diversification.

## **IMD House View:**

The core fixed income market is relatively unattractive due to relatively low overall yields as Treasury rates remain at relatively low levels, and credit and agency MBS spreads are generally tight. The market is vulnerable to rising interest rates should the US economy demonstrate sustained improvement and higher inflation.

<b>Actual Weighting vs. SAAP Policy:</b>	<b>Underweight</b>
ASRS Actual Weighting (May 29, 2015)	10.8%
Interest Rate Sensitive Policy	11.0%
Interest Rate Sensitive Interim Adj. Policy	16.1%

# Core Fixed Income Managers

Portfolio	Market Value (\$MM) 5/29/15	%	IMD Commentary
F2 Internally Managed Account	\$1,894	49	Enhanced passive strategy with an objective to slightly outperform the Barclays U.S. Aggregate Bond Index (the "Index") through a stratified sampling strategy. History of outperformance which is slightly ahead of expectations.
Blackrock US Debt Index Fund	\$1,920	50	Passive strategy with history of modest outperformance.
Blackrock Intermediate Government/Credit Fund	\$24	1	Passive portfolio for System assets.
Total	3,838	100	

## Arizona State Retirement System

### Core Fixed Income Performance Summary as of March 31, 2015

	Market Value (\$)	% of Portfolio	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>Total Core Fixed Income</b>	<b>2,600,149,488</b>	<b>7.5</b>	<b>1.6</b>	<b>3.8</b>	<b>5.9</b>	<b>3.2</b>	<b>4.5</b>	<b>5.1</b>	<b>8.4</b>	<b>Jul-75</b>
<i>Barclays Aggregate</i>			<u>1.6</u>	<u>3.6</u>	<u>5.7</u>	<u>3.1</u>	<u>4.4</u>	<u>4.9</u>	--	<i>Jul-75</i>
<i>Over/Under</i>			0.0	0.2	0.2	0.1	0.1	0.2		
<i>eA US Core Fixed Inc Net Median</i>			1.7	3.4	5.5	3.4	4.8	5.1	--	<i>Jul-75</i>
<b>Passive Core Fixed Income</b>										
<b>BlackRock US Debt Index</b>	<b>670,974,109</b>	<b>1.9</b>	<b>1.6</b>	<b>3.7</b>	<b>5.9</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>5.0</b>	<b>May-14</b>
<i>Barclays Aggregate</i>			<u>1.6</u>	<u>3.6</u>	<u>5.7</u>	<u>3.1</u>	<u>4.4</u>	<u>4.9</u>	<u>4.8</u>	<i>May-14</i>
<i>Over/Under</i>			0.0	0.1	0.2				0.2	
<i>eA US Core Fixed Inc Net Median</i>			1.7	3.4	5.5	3.4	4.8	5.1	4.7	<i>May-14</i>
<b>Internally Managed F2</b>	<b>1,904,720,113</b>	<b>5.5</b>	<b>1.6</b>	<b>3.8</b>	<b>5.9</b>	<b>3.3</b>	<b>4.6</b>	<b>5.2</b>	<b>5.7</b>	<b>Oct-00</b>
<i>Barclays Aggregate</i>			<u>1.6</u>	<u>3.6</u>	<u>5.7</u>	<u>3.1</u>	<u>4.4</u>	<u>4.9</u>	<u>5.5</u>	<i>Oct-00</i>
<i>Over/Under</i>			0.0	0.2	0.2	0.2	0.2	0.3	0.2	
<i>eA US Core Fixed Inc Net Median</i>			1.7	3.4	5.5	3.4	4.8	5.1	5.7	<i>Oct-00</i>
<b>Passive Intermediate Gov't/Credit Fixed Income</b>										
<b>BlackRock Intermediate Gov't/Credit Bond Index</b>	<b>24,455,266</b>	<b>0.1</b>	<b>1.4</b>	<b>2.4</b>	<b>3.7</b>	<b>2.4</b>	<b>3.6</b>	<b>--</b>	<b>4.9</b>	<b>Nov-08</b>
<i>Barclays Int Gov't/Credit</i>			<u>1.4</u>	<u>2.3</u>	<u>3.6</u>	<u>2.3</u>	<u>3.5</u>	<u>4.3</u>	<u>4.8</u>	<i>Nov-08</i>
<i>Over/Under</i>			0.0	0.1	0.1	0.1	0.1		0.1	
<i>eA US Interm Duration Fixed Inc Net Median</i>			1.4	2.1	3.5	2.4	3.7	4.5	5.3	<i>Nov-08</i>

#### NOTES:

- BlackRock Intermediate Gov't/Credit Bond Index is System only.

# HIGH YIELD FIXED INCOME

# High Yield Fixed Income

High yield bonds reflect the below investment-grade corporate bond market in the US. Unlike core fixed income which has a high correlation with Treasury rates, high yield bonds have historically had a negative correlation with Treasury rates and a positive correlation with the equity markets.

Returns are heavily influenced by credit developments at highly leveraged companies whose performance is tied to factors that affect equity markets (economic outlook, earnings, cash flow, valuations, etc.)

## **IMD House View:**

Following significant spread and yield compression over the past several years, we believe expected returns in high yield market will be in the low to mid single digits going forward. As a result, we are tactically underweight the asset class as we prefer to invest in select areas of opportunistic debt which offer higher expected returns.

## **Actual Weighting vs. SAAP Policy:**

ASRS Actual Weighting (May 29, 2015)

High Yield Fixed Income Policy

High Yield Fixed Income Interim Adj. Policy

## **Underweight**

3.7%

4.0%

5.5%

# High Yield Fixed Income Managers

Portfolio	Market Value (\$MM) 5/29/15	%	IMD Commentary
Columbia Separate Account	\$826	63	Active manager with flexible investment style that adjusts portfolio risk based on the investment outlook. Columbia has outperformed the high yield benchmark for the one, three and five year periods.
JP Morgan High Yield	\$492	37	Active manager with a flexible investment style that is agnostic to credit quality. Since the inception of the mandate in 2013, JP Morgan has slightly outperformed the high yield benchmark.
Total	\$1,318	100	

# Changes to High Yield Fixed Income Managers

- In October 2014, following a selloff in the high yield market, ASRS added \$150 million to each of its high yield managers – Columbia and J.P. Morgan.

## Arizona State Retirement System

### High Yield Fixed Income Performance Summary as of March 31, 2015

	Market Value (\$)	% of Portfolio	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
<b>Total High Yield Fixed Income</b>	<b>1,299,745,104</b>	<b>3.7</b>	<b>2.8</b>	<b>1.2</b>	<b>3.4</b>	<b>7.5</b>	<b>8.5</b>	<b>-</b>	<b>9.3</b>	<b>Oct-09</b>
<i>Barclays High Yield</i>			<u>2.5</u>	<u>-0.4</u>	<u>2.0</u>	<u>7.5</u>	<u>8.6</u>	<u>8.2</u>	<u>9.9</u>	<i>Oct-09</i>
Over/Under			0.3	1.6	1.4	0.0	-0.1		-0.6	
<i>eA US High Yield Fixed Inc Net Median</i>			2.5	-0.5	1.9	7.1	8.3	7.6	9.5	<i>Oct-09</i>
<b>Active High Yield Fixed Income</b>										
Columbia Management	815,093,114	2.3	2.9	1.8	4.1	7.9	9.0	-	9.7	Oct-09
<i>Barclays High Yield</i>			<u>2.5</u>	<u>-0.4</u>	<u>2.0</u>	<u>7.5</u>	<u>8.6</u>	<u>8.2</u>	<u>9.9</u>	<i>Oct-09</i>
Over/Under			0.4	2.2	2.1	0.4	0.4		-0.2	
<i>eA US High Yield Fixed Inc Net Median</i>			2.5	-0.5	1.9	7.1	8.3	7.6	9.5	<i>Oct-09</i>
JP Morgan High Yield	484,638,236	1.4	2.5	0.2	2.3	--	--	--	6.4	Jul-13
<i>Barclays High Yield</i>			<u>2.5</u>	<u>-0.4</u>	<u>2.0</u>	<u>7.5</u>	<u>8.6</u>	<u>8.2</u>	<u>6.3</u>	<i>Jul-13</i>
Over/Under			0.0	0.6	0.3				0.1	
<i>eA US High Yield Fixed Inc Net Median</i>			2.5	-0.5	1.9	7.1	8.3	7.6	6.0	<i>Jul-13</i>

# PRIVATE DEBT

# Private Debt

Private debt is comprised of illiquid loans and bonds that fund highly leveraged companies and real estate properties that are typically too small in size to meet the requirements of the tradable leveraged loan, high yield bond, or commercial mortgage-backed securities markets. For example, private debt may consist of secured loans funding leveraged buyouts of small to mid-size companies or mezzanine financing for real estate properties.

Returns in the asset class are determined by: 1) the expected returns of individual investments (based on the cash coupon rate or spread over LIBOR and other sources of return including underwriting fees, original issuance discounts and premium call features) and 2) the actual level of credit losses experienced in the underlying portfolios.

## **IMD House View:**

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

<b>Actual Weighting vs. SAAP Policy:</b>	<b>Underweight<sup>1</sup></b>
Actual Weighting (May 29, 2015)	4.5%
Private Debt Policy	10.0% (8-12% range)
Private Debt Interim Adj. Policy	4.5%

<sup>1</sup>ASRS is tactically overweight based on commitments made of approximately 11.3% of the total fund.

# Private Debt Characteristics

## Pros

- High Expected Net Returns (10-11% on average)
  - Substantially higher gross returns (a combination of yield, fees, OID, and call premiums) than comparable public market securities (high yield bonds, tradable bank loans, asset-backed securities, CMBS)
  - Low loss history in underlying portfolios
- Primarily Floating Rate
  - Approximately 80% of ASRS's ongoing private debt commitments are expected to be floating rate investments
- Full Due Diligence by Managers
- Customized Covenants and Credit Monitoring

## Cons

- Illiquid
- Delayed Deployment of Capital

# Private Debt Market Environment

- Regulatory constraints limit banks ability to make below investment-grade, illiquid loans (typically to middle market companies)
  - Basel III
  - Dodd-Frank
  - “Leveraged Lending Guidelines” of OCC/Fed/FDIC
- Demand for loans driven by: 1) middle market buyout and acquisition activities which need financing and 2) middle market borrowers which need to refinance existing loans from banks.
- Pending exit of GE Capital, a low cost source of funding for middle market companies, could improve market pricing (spreads, yields).
- Business Development Companies (“BDC’s”) have pulled back on lending due to their depressed equity valuations.

# ASRS Private Debt Program

## Lending Strategies Diversified Across 10 Managers

### – US Corporate

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

### – European Corporate

- One manager targeting middle market lending

### – Real Estate Finance

- Two managers targeting three market segments

### – Asset Backed

- One manager targeting unique market opportunity

# ASRS Private Debt Program

- Focus on Fund-of-One Partnerships With Leading Managers
- Customized Terms:
  - Scalable
  - Evergreen
  - Termination Rights
  - Superior Fees
  - Investment Restrictions
  - Leverage Constraints (if applicable)

# Private Debt Managers

Portfolio	ASRS Commitment (\$MM)	Market Value (\$MM) 5/29/15	Target Net Return	%	IMD Commentary
Cerberus ASRS Credit Opportunities Fund	\$1,000	537	13%	33	Partnership with ASRS to invest in floating-rate secured loans primarily to fund private-equity sponsored middle market leveraged transactions . The partnership can leverage ASRS's equity investment by up to 1.25x to boost returns.
RFM Cactus Holding Company, LLC (Partnership with Related)	\$500	306	10%	19	Partnership with ASRS to invest in: 1) "Freddie B" securities (first loss tranches of multi-family property securitizations that have been pooled and sponsored by Freddie Mac;) and 2) mezzanine debt to finance real estate properties.
Highbridge Principal Strategies – Cactus Direct Lending Fund, LP	\$500	31	12%	2	Partnership with ASRS to invest in floating-rate secured loans primarily to fund middle market leveraged transactions (ex. buyouts, recapitalizations) often without a private equity sponsor. The partnership can leverage ASRS's equity investment by up to 1.25x to boost returns.
Pending European Senior Direct Lending Credit Fund	\$401	0	11%	0	Partnership with ASRS to invest in floating-rate secured loans primarily to fund private-equity sponsored middle market leveraged transactions in Europe. The partnership can leverage ASRS's equity investment by up to 1.0x to boost returns.
H/2 Core Real Estate Debt Fund	\$350	299	6%	19	Fund invests in floating-rate senior mortgage loans and other conservatively underwritten real estate finance investments. The fund will utilize leverage of up to 60%.
Ares Cactus Private Asset Backed Fund	\$350	0	10%	0	Partnership with ASRS to invest in loans backed by consumer and commercial receivables.
Monroe Private Credit Fund A	\$350	0	11%	0	Partnership with ASRS to invest in floating-rate secured loans primarily to fund smaller middle market leveraged transactions . The partnership can leverage ASRS's equity investment by up to 1.25x to boost returns.
Highbridge Principal Strategies – AP Mezzanine Partners II, LP	\$221	155	11%	10	Partnership with ASRS that invests primarily in mezzanine debt to fund highly leveraged transactions for larger capitalization companies.
White Oak Separate Account	\$160	156	12%	10	Separate account invests in floating-rate secured loans for small- to mid-size companies typically lacking a deal sponsor.
Blackstone/GSO Capital Solutions Fund	\$114	114	13%	7	Fund provided rescue financing primarily to companies seeking to avoid a bankruptcy or restructuring. Investment period ended in 2013 and portfolio is now running off.
Total	\$3,946	\$1,598		100	

# Changes to Private Debt Managers

- In 2015, ASRS increased the size of the following private debt mandates:
  - Cerberus ASRS Credit Opportunities Fund to \$1,000 million from \$600 million
  - RFM Cactus Holding Company, LLC to \$500 million from \$300 million.
- In 2015, ASRS made commitments to the following new fund-of-one partnerships:
  - \$500 million Highbridge Principal Strategies –Cactus Direct Lending Fund, LP
  - \$350 million Ares Cactus Private Asset Backed Fund
  - \$350 million Monroe Private Credit Fund A.
- In addition, a \$401 million commitment to a European private lending partnership is scheduled to close in June.
- With the closing of the European partnership, total commitments for private debt will be nearly \$4 billion or over 11% of the total fund (vs. an SAAP target of 10%). We believe it may take up to 3 years to fully invest these commitments.

# Private Debt Performance Summary as of December 31, 2014

Deal Name	Ending Market Value	Quarter		YTD		One Year		Three Year		Inception		Inception
		TGRS <sup>(3)(4)</sup>	TNET <sup>(3)(4)</sup>	IRR <sup>(5)</sup>								
<b>Corporate</b>												
Blackstone / GSO Capital Solutions Fund LP <sup>(6)</sup>	\$ 124,154,700	-4.30%	-3.44%	4.31%	3.50%	4.31%	3.50%	N/A	N/A	18.21%	14.02%	16.11%
Cerberus ASRS Credit Opportunities Fund, L.P.	492,922,540	3.17%	2.71%	16.94%	14.20%	16.94%	14.20%	N/A	N/A	16.80%	13.98%	13.99%
Highbridge Principal Strategies and Mezzanine Partners II, L.P.	152,442,310	6.37%	4.98%	20.46%	15.47%	20.46%	15.47%	N/A	N/A	17.25%	12.97%	15.23%
White Oak Global Advisors Private Debt	142,963,360	8.90%	7.35%	21.44%	17.07%	21.44%	17.07%	N/A	N/A	29.76%	23.62%	21.76%
<b>Total Corporate</b>	<b>\$ 912,482,909</b>	<b>3.21%</b>	<b>2.68%</b>	<b>16.15%</b>	<b>13.11%</b>	<b>16.15%</b>	<b>13.11%</b>	<b>N/A</b>	<b>N/A</b>	<b>20.77%</b>	<b>16.27%</b>	<b>15.52%</b>
<b>Real Estate</b>												
H/2 Core Real Estate Debt Fund L.P.	\$ 362,212,041	1.05%	0.90%	5.17%	4.51%	5.17%	4.51%	N/A	N/A	5.85%	5.19%	5.10%
RFM Cactus Holding Company, LLC	226,252,196	1.54%	1.08%	8.91%	7.81%	8.91%	7.81%	N/A	N/A	9.40%	8.10%	7.59%
<b>Total Real Estate</b>	<b>\$ 588,464,237</b>	<b>1.29%</b>	<b>0.99%</b>	<b>6.67%</b>	<b>5.81%</b>	<b>6.67%</b>	<b>5.81%</b>	<b>N/A</b>	<b>N/A</b>	<b>27.81%</b>	<b>24.66%</b>	<b>6.17%</b>
<b>Total Portfolio</b>	<b>\$ 1,500,947,146</b>	<b>2.58%</b>	<b>2.12%</b>	<b>13.09%</b>	<b>10.76%</b>	<b>13.09%</b>	<b>10.76%</b>	<b>N/A</b>	<b>N/A</b>	<b>18.62%</b>	<b>14.66%</b>	<b>13.10%</b>

S&P/LSTA INDEX <sup>(7)</sup>

S&P/LSTA Index +250 bps (for a one year period) <sup>(8)</sup>

Quarter	YTD	One Year	Three Year	Inception
-0.51%	1.60%	1.60%	N/A	4.72%
0.12%	4.10%	4.10%	N/A	7.22%

## Notes:

1. Time Weighted Returns are calculated as the geometric mean of the holding period returns of each underlying investment since the first full quarter after the investment's inception to the report date. Each holding period return is calculated on a quarterly basis by dividing the fund's gain (gross or net depending on the type of report) and income over the time-weighted net capital in every period. Time weighted net capital is equal to the sum of each period's beginning balance and the subsequent cash flows, which are weighted based on the number of days that each cash flow has been outstanding during the corresponding quarter.

2. The Time Weighted Return is a periodic return, which means that the result corresponds to the return achieved by each underlying investment during the measured period (first full quarter after inception to report date). For comparability purposes and in order to provide a more meaningful result, the TWR is annualized for the cases where funds operational period is more than a year.

3. Gross TWR includes Inside Income, Outside Income and Appreciation. Net TWR is equals to Gross TWR plus management fees and expenses (whether inside or outside of the partnership). The TWR is annualized for the cases where funds operational period is more than a year. For periods less than one year, the returns are not annualized.

TGRS- Total Gross Return ; TNET- Total Net Return

4. Returns have been compressed to begin with first full quarter and eliminate partial periods. IRR calculations use actual cash flow dates.

5. The Net IRR is calculated using all outflows to and inflows from the fund investments, including cash flows for expenses and fees paid by the portfolio of those investments.

6. Effective 07/01/12 Blackstone/GSO Capital Solutions Fund LP was transferred from ASRS Opportunistic Portfolio to ASRS Private Debt Portfolio. Cash flows are from 07/01/12.

7. S&P/LSTA Index - The S&P/LSTA U.S Leveraged Loan index

8. S&P/LSTA Index - The S&P/LSTA U.S Leveraged Loan index plus 250 bps (for a one year period). Therefore, the bps is prorated for Quarter, YTD returns and becomes static 250 bps for One Year and Three Year and Inception.

# OPPORTUNISTIC DEBT

# Opportunistic Debt

Opportunistic debt is tactical in nature and represents asset classes or strategies not encompassed in the SAAP and offer the potential to meet the fund's targeted return. Since its inclusion in ASRS's portfolio beginning in 2008, opportunistic debt, including both existing and defunded mandates, has generated an aggregate net IRR of 11.5% through 12/31/14.

## **IMD House View:**

Opportunities exist in select fixed income markets (primarily distressed debt) to achieve outsized returns or generate expected returns that exceed other fixed income asset classes in the SAAP. ASRS has \$1.2 billion of commitments (representing approximately 3.4% of the total fund) to ongoing opportunistic debt partnerships and \$0.4 billion of investments (representing approximately 1.1% of the total fund) in partnerships that are in liquidation.

## **Actual Weighting vs. SAAP Policy Target:**

ASRS Actual Weighting (May 29, 2015)	2.9%
Opportunistic Debt Policy	0.0% (0-10% <sup>1</sup> range)

<sup>1</sup> Range of 0-10% includes opportunistic debt, opportunistic equity and opportunistic inflation-linked.

# Opportunistic Debt Managers Funds Making New Investments

Portfolio	ASRS Commitment (\$MM)	Market Value (\$MM) 5/29/15	Target Net Return	%	IMD Commentary
GSO Cactus Credit Opportunities Fund	\$350	\$305	12%	47	Partnership with ASRS to exploit the highest conviction, risk-adjusted corporate credit opportunities across the GSO platform including distressed debt in the US and Europe.
Avenue-ASRS Europe Opportunities Fund & Avenue Europe Capital Partners III	\$350	\$0	12%	0	\$250 million partnership with ASRS and \$100 million co-mingled fund commitment to invest in distressed debt of European companies.
OZ Credit Opportunities Fund	\$300	\$320	12%	50	Fund utilizes a multi-strategy approach to allocate to both distressed structured and corporate credit as it sees fit based on the opportunity.
Fortress MSR Opportunities Fund II	\$200	\$21	12%	3	Fund invests in excess mortgage-servicing rights.
Total	\$1,200	\$646		100	

# Opportunistic Debt Managers Funds in Liquidation

Portfolio	ASRS Commitment (\$MM)	Market Value (\$MM) 5/29/15	Target Net Return	%	IMD Commentary
Avenue Europe Capital Partners II	\$186	\$186	15%	48	Fund invests in distressed debt of European companies. Investment period ended in 2014.
Oaktree Opportunities Fund VIIIb	\$149	\$149	15%	38	Funds invests in distressed debt primarily corporate such as leveraged loans. Investment period ended in 2014.
Oaktree Opportunities Fund VIII	\$29	\$29	15%	7	Funds invests in distressed debt primarily corporate such as leveraged loans. Investment period ended in 2012.
TCW Capital Trust	\$25	\$25	10%	6	Fund invests in four asset classes: leveraged loans, high yield bonds, private debt and mezzanine debt. Investment period ended in 2013.
Funds Close to Being Fully Liquidated	\$3	\$3	10-14%	1	Remaining funds primarily in Blackrock Credit Investors II.
Total	\$392	\$392		100	

# Changes to Opportunistic Debt Managers

- In June, ASRS added the following new opportunistic debt mandates to invest in European distressed debt:
  - \$250 million commitment to Avenue-ASRS Europe Opportunities Fund, a fund-of-one partnership; and
  - \$100 million commitment to Avenue Europe Capital Partners III, a co-mingled fund.
- The investment periods of the following mandates ended and the funds are returning capital:
  - Avenue Europe Capital Partners II
  - Oaktree Opportunities Fund VIIIb

## Opportunistic Debt Performance Summary as of December 31, 2014

Deal Name	Ending Market Value	Quarter		YTD		One Year		Three Year		Inception		Inception
		TGRS <sup>(2)(4)</sup>	TNET <sup>(2)(4)</sup>	IRR <sup>(1)</sup>								
Avenue Europe Special Situations Fund II (U.S.), L.P.	259,489,156	0.41%	0.11%	15.09%	9.66%	15.09%	9.66%	N/A	N/A	12.03%	7.46%	8.33%
Blackrock Credit Investors II, L.P.	\$ 2,464,320	-7.73%	-6.22%	10.39%	12.58%	10.39%	12.58%	14.59%	12.96%	22.44%	18.27%	15.76%
Blackrock Mortgage Investors, LP	6,224	-64.14%	-13.11%	-46.70%	1.79%	-46.70%	1.79%	-7.82%	11.08%	-0.79%	7.16%	8.15%
Blackstone / GSO Capital Solutions Fund LP <sup>(8)</sup>	-	N/A	14.61%	13.89%	12.81%							
Credit Suisse Fixed Income Opportunistic Fund <sup>(9)</sup>	-	N/A	27.71%	25.99%	10.19%							
Fortress MSR Opportunities Fund II A LP	12,425,831	2.57%	2.36%	31.46%	30.31%	31.46%	30.31%	N/A	N/A	23.72%	22.80%	19.62%
GSO Cactus Credit Opportunities Fund LP	250,100,841	-3.89%	-3.89%	7.53%	7.53%	N/A	N/A	N/A	N/A	7.53%	7.53%	7.75%
Guggenheim Partners Asset Management	-	95.17%	95.17%	93.53%	93.53%	93.53%	93.53%	34.66%	34.13%	26.40%	25.78%	15.84%
Hyperion Asset Management	-	N/A	12.36%	11.47%	17.82%							
Oaktree Opportunities Fund VIII, L.P.	33,589,610	0.38%	0.06%	4.74%	3.53%	4.74%	3.53%	13.97%	12.71%	12.44%	10.80%	11.16%
Oaktree Opportunities Fund VIIIb, L.P.	167,972,936	-2.98%	-3.27%	4.14%	2.91%	4.14%	2.91%	12.05%	9.66%	12.26%	9.34%	8.52%
OZ Credit Opportunities Domestic Partners, L.P.	320,020,001	1.45%	1.13%	12.10%	9.02%	12.10%	9.02%	N/A	N/A	12.10%	9.02%	8.04%
SANKATY ADVISORS LLC <sup>(7)</sup>	-	N/A	19.28%	18.84%	-1.98%							
TCW Capital Trust	34,569,366	0.49%	0.16%	4.85%	3.27%	4.85%	3.27%	9.43%	7.31%	10.11%	8.00%	8.35%
TCW Credit Opportunities Fund, L.P. <sup>(8)</sup>	-	N/A	17.24%	16.27%	21.48%							
<b>Total</b>	<b>\$ 1,080,618,285</b>	<b>-0.59%</b>	<b>-0.83%</b>	<b>10.48%</b>	<b>7.64%</b>	<b>10.48%</b>	<b>7.64%</b>	<b>12.65%</b>	<b>10.36%</b>	<b>10.20%</b>	<b>8.64%</b>	<b>11.46%</b>

### Notes:

1. Time Weighted Returns are calculated as the geometric mean of the holding period returns of each underlying investment since the first full quarter after the investment's inception to the report date. Each holding period return is calculated on a quarterly basis by dividing the fund's gain (gross or net depending on the type of report) and income over the time-weighted net capital in every period. Time weighted net capital is equal to the sum of each period's beginning balance and the subsequent cash flows, which are weighted based on the number of days that each cash flow has been outstanding during the corresponding quarter.

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4. Returns have been compressed to begin with first full quarter and eliminate partial periods. IRR calculations use actual cash flow dates.

5.- Hyperion Asset Management and TCW Credit Opportunity have been liquidated in Q3 2010

6. The Net IRR is calculated using all outflows to and inflows from the fund investments, including cash flows for expenses and fees paid by the portfolio of those investments.

7. Sankaty Advisors LLC has been liquidated in Q212.

8. Credit Suisse Fixed Income Opportunistic has been liquidated in Q312.

9. Blackstone/GSO cash flows were transferred effective July 1, 2012 to ASRS Private Debt Portfolio. Cash flows in ASRS Opportunistic are from inception to 6/30/12.

# APPENDICES

1. Fixed Income Market Environment
2. ASRS Strategic Asset Allocation Policy Schematic

# APPENDIX 1

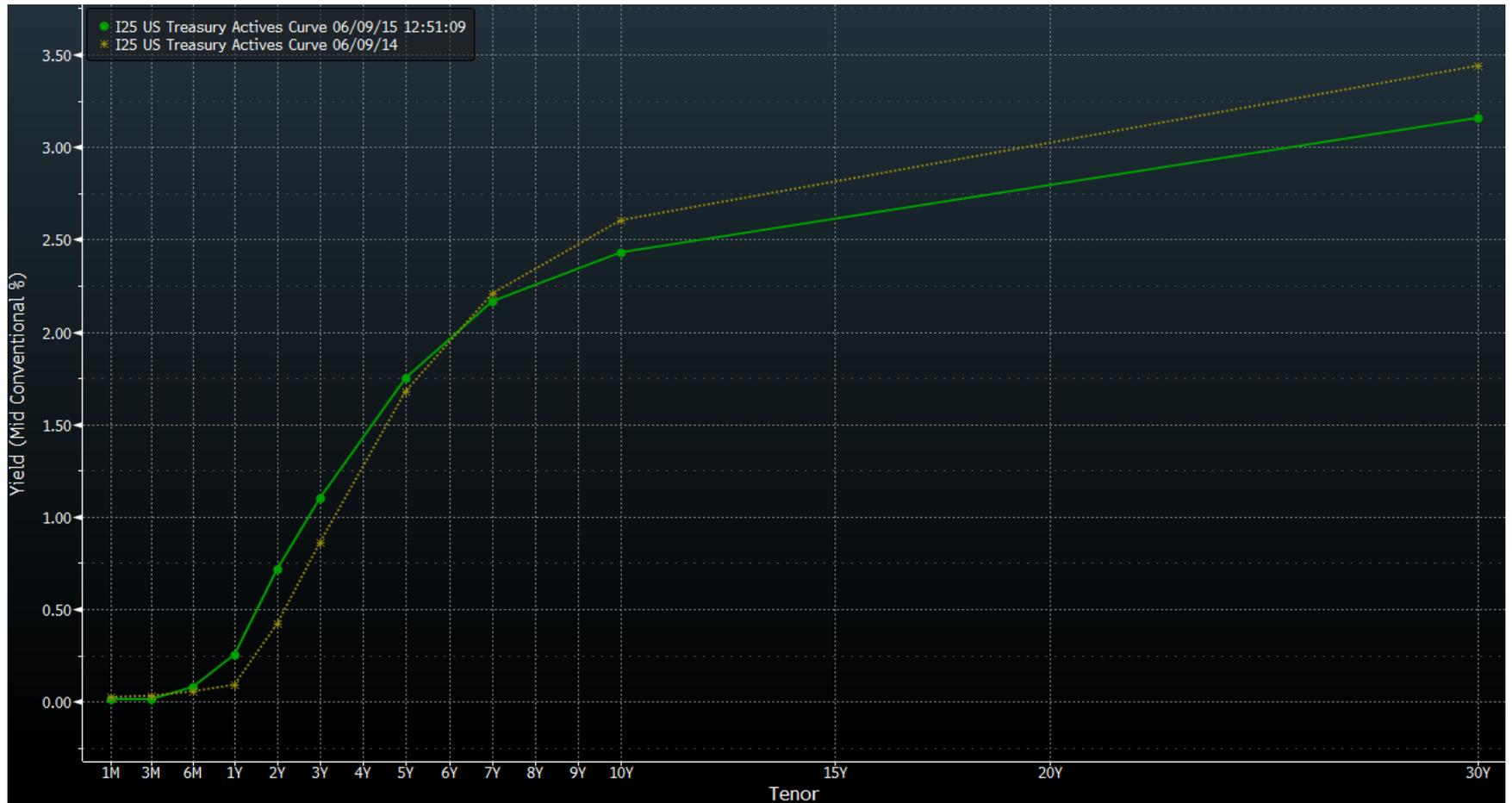
## FIXED INCOME MARKET ENVIRONMENT

# Core Fixed Income

# Barclays US Aggregate Index Yield-to-Worst 2005 – 2015



# Yield Curve



# 10 Year U.S. Treasury Bond Yield 2005 - 2015



# 30 Year U.S. Treasury Bond Yield 2005 – 2015



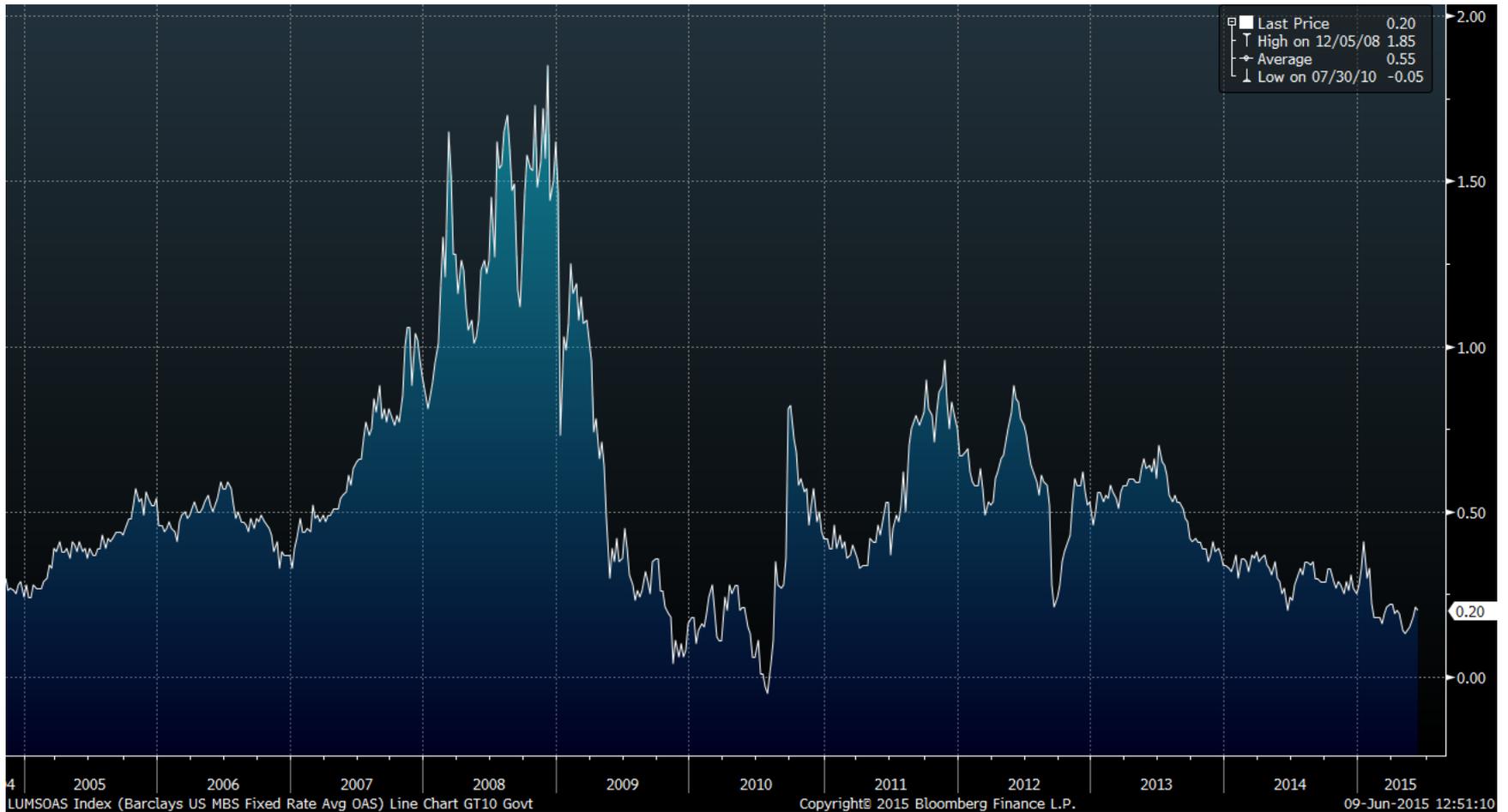
# Corporate Investment Grade Spreads

## Option Adjusted Spreads (OAS) 2005 – 2015



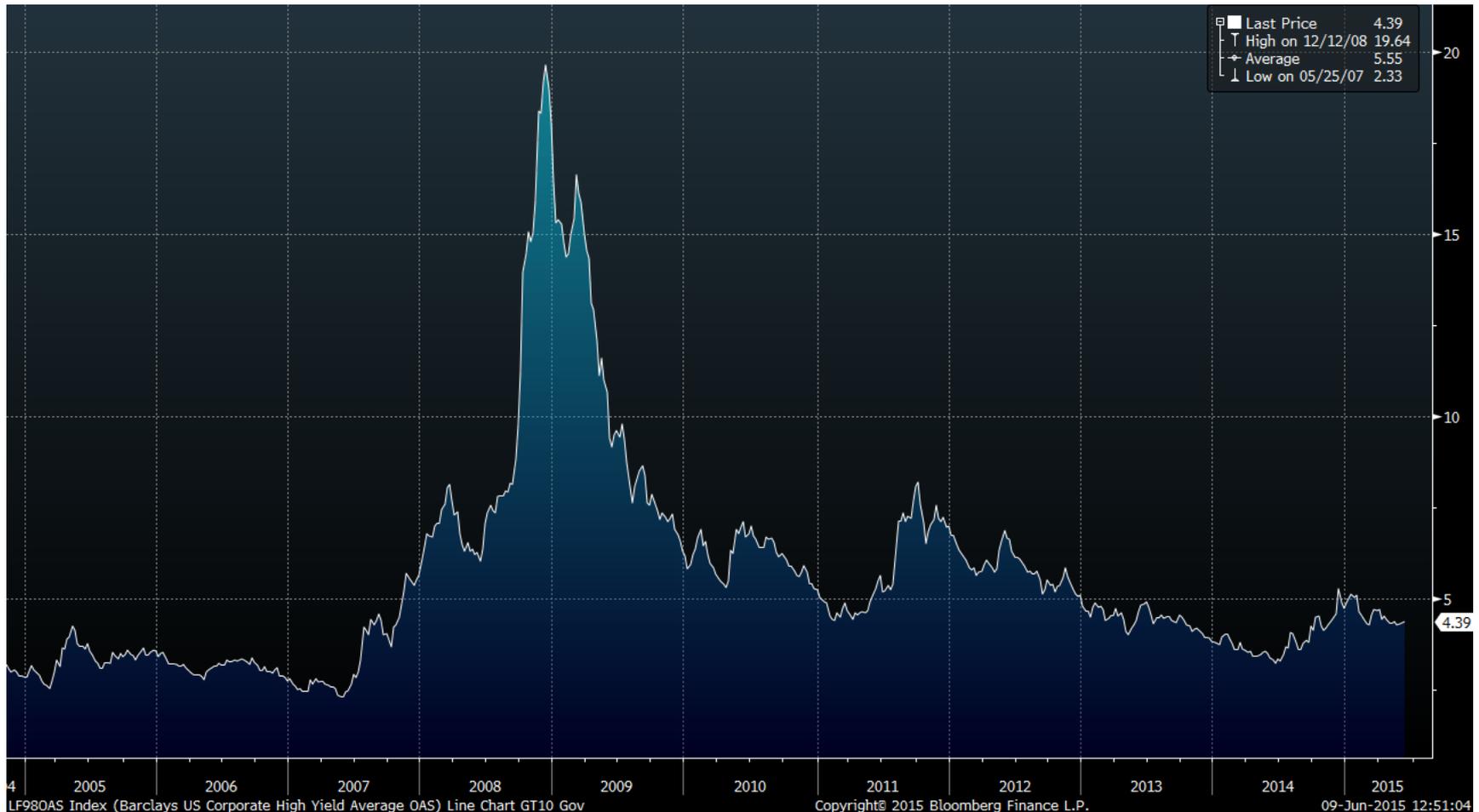
# US Mortgage-Backed Securities Spreads

## Option Adjusted Spreads (OAS) 2005 – 2015



# High Yield Fixed Income

# Barclays US Corporate High Yield Index Option Adjusted Spread (OAS) 2005 – 2015



# Barclays US Corporate High Yield Index Yield-to-Worst 2004 – 2014



# Sovereign Bond Yields

# 10 Year German Bund Yield 2005 - 2015



# 10 Year Japanese Government Bond Yield 2005 - 2015



# Emerging Market Local Debt Index 2005 - 2015



**APPENDIX 2**  
**ASRS STRATEGIC ASSET ALLOCATION**  
**POLICY SCHEMATIC**

## ASRS Strategic Asset Allocation Policy Schematic

Asset Class	Policy	Range	Benchmark
Tactical Cash (Unassetized)	0%	(0-3%)	
Operating Cash (Unassetized)	0%		
Operating Cash (Assetized)	0%		
<b>Total Cash</b>	<b>0%</b>		
<hr/>			
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
<b>Total Fixed Income</b>	<b>25%</b>	<b>(18-35%)</b>	
<hr/>			
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
<b>Total Equity</b>	<b>58%</b>	<b>(48-65%)</b>	
<hr/>			
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
<b>Total Inflation Linked Assets</b>	<b>12%</b>	<b>(10-16%)</b>	
<hr/>			
<b>Multi-Asset Class Strategies</b>	<b>5%</b>	<b>(0-12%)</b>	Investment Specific
<hr/>			
<b>TOTAL</b>	<b>100%</b>		

# Agenda Item #6



# 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. Anthony Guarino, Deputy Director and Chief Operations Officer  
Mr. Gary Dokes, Chief Investment Officer  
Enterprise Risk Management (ERM) Committee

**DATE:** June 8, 2015

**RE:** **Agenda Item #6** Presentation, Discussion and Appropriate Action Regarding an ASRS Risk Assessment of the Agency Investment Management Program

### Purpose

Staff will provide the IC with a risk assessment focusing on the agency investment management program.

### Recommendation

Informational only, no action required.

### Background

Since 2007, the ASRS has conducted risk assessments of various divisions within the ASRS and has devised control strategies to address these risks which are based on principles espoused by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission. COSO is considered an authoritative source of information and for promoting the adoption of an enterprise-wide, integrated risk management approach. These principles, as adopted by the ASRS, are intended to provide the ASRS Director and Board reasonable assurance the ASRS is taking appropriate steps to manage and mitigate risk according to its priorities.

The ASRS has organized an Enterprise Risk Management (ERM) Steering Committee, led by the Deputy Director and staffed with senior managers, to take an iterative approach and continuously assess the risks and threats facing the agency. Committee decisions and activities are monitored by the agency's Chief Internal Auditor, who has a direct reporting relationship with the ASRS Director and OAC Chair.

The ERM Committee's most recent focus has been on risks that threaten agency investment management areas. The Deputy Director will provide the framework for the ERM process and risk metric; the Director and CIO will discuss the most notable risks/threats and the associated assessment of these risks.

### Attachments:

- Enterprise Risk Management Presentation

# Enterprise Risk Management (ERM) IC Presentation

Focus on Agency Investment Management

June 2015

# Section One

ERM Process and Risk Metrics

# Enterprise Risk Management

- **Enterprise Risk Management (ERM) Committee:**
  - Led by the Deputy Director and comprised of Senior Managers
  - Under the oversight of the OAC
  - Communicates activities and findings to the Director
  - Works collaboratively with Internal Audit
  - Produces risk assessments and control strategies
- **Risk:** Any event that impacts, impedes, or interferes with the agency's ability to achieve its strategic priorities, goals, and objectives
- Risk management process conducted in accordance with principles espoused by the Committee of Sponsoring Organizations (COSO)

*"Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives."*

# COSO Components of ERM

- **Control Environment** (Board, Executive and Senior Management set tone, philosophy, risk appetite)
- **Risk Assessment** (Iterative process for identifying/analyzing risks to achieving goals/objectives and determining how risks should be managed)
- **Control Activities** (Actions established to ensure risk mitigation)
- **Information and Communication** (Enables the Board, management, staff, and other stakeholders to understand internal control responsibilities and day-to-day control activities)
- **Monitoring** (Ongoing evaluations to ensure internal control components are present and functioning)

# Risk Assessment Steps

- The risk assessment document groups major functions according to the agency's strategic plan
- **Workgroups** [comprised of Senior Managers and subject matter experts (SMEs)]:
  - Identify risks to achieving the strategic goals and objectives
  - Rank the risks and controls using a heat chart
  - Identify current risk control strategies
  - Identify control strategies under development/consideration
- **ERM Committee:**
  - Establishes the control environment, including the general internal control structure, tolerance levels, and risk parameters (impacts, likelihood)
  - Reviews the findings of SME workgroups; identifies control gaps, designates the management strategy. Strategies are:
    - Accept: Agree to accept the anticipated risk levels
    - Reduce: Take action to improve controls and reduce the likelihood and/or impact
    - Evaluate: Assess the need or cost benefit of lowering tolerance, improving controls, etc.
    - Avoid: Exit the activity
  - Ensures risk mitigation responsibilities and strategies are clearly identified
  - Monitors administration and progress
- Director and OAC receive periodic updates from the ERM Committee

# Rankings: IMPACT

*Measures the impact should the risk occur*

## Minor

**Indicates a risk occurrence would create no noticeable:**

**Disruption to normal operations**

- Vacancy, turnover rate (internal and/or external) and/or recruitment difficulties causes a minor impact to ability to meet strategic objectives
- Disruption to existing systems:
  - Phones, network down for up to one day
- System security successfully defended
- System performance is less than optimal but does not disrupt normal operations
- Current budget year can absorb the equipment, resource, software and licensing

**Financial impact**

- Market volatility has no materially negative impact on achieving total fund strategic objectives
- Trading errors/delays, account overdrafts, and wiring errors/delays cause no materially negative impact
- Incorrect valuation of portfolios causes no materially negative impact

**Reputation/public image damage**

- No inquiries from media/government agencies
- No loss of stakeholder trust in ASRS
- No loss of reputation with peers and the financial community

## Moderate

**Indicates a risk occurrence could create a modest:**

**Disruption to normal operations**

- Vacancy, turnover rate (internal and/or external) and/or recruitment difficulties causes a moderate impact to ability to meet strategic objectives
- Disruption to existing systems:
  - Phones, network down from one day to one week
- System security partially compromised but no loss occurs
- System performance impedes non-critical objectives
- Current budget year can partially absorb the equipment, resource, software and licensing
- COOP team assembled but may or may not be activated

**Financial impact**

- Market volatility has a moderate negative impact on achieving total fund strategic objectives
- Trading errors/delays, account overdrafts, and wiring errors/delays cause a moderate negative impact
- Incorrect valuation of portfolios causes a moderate negative impact

**Reputation/public image damage**

- Public statement issued
- Some loss of stakeholder trust in ASRS
- Some loss of reputation with peers and the financial community

## Major

**Indicates a risk occurrence could create a significant:**

**Disruption to normal operations**

- Vacancy, turnover rate (internal and/or external) and/or recruitment difficulties causes a major impact to ability to meet strategic objectives
- Disruption to existing systems:
  - Phones, network down for more than one week
- System security significantly compromised and loss occurs
- System performance impedes critical objectives
- Current budget year cannot absorb the equipment, resource, software and licensing
- COOP plan activated

**Financial impact**

- Market volatility has a major negative impact on achieving total fund strategic objectives
- Trading errors/delays, account overdrafts, and wiring errors/delays cause a major negative impact
- Incorrect valuation of portfolios causes a major negative impact

**Reputation/public image damage**

- Media coverage
- Results in legislation and/or lawsuits that set precedent
- Loss of stakeholder trust in ASRS
- Loss of reputation with peers and the financial community

# Rankings: CONTROLS

*Strengthen controls to lessen risk*

## Strong

**Indicates the controls in place are strong and will mitigate manageable risk**

- Goals, objectives clearly defined and supported by the organizational structure
- Duties and responsibilities are clearly delineated between the Board and Director
- Board oversight structures and consultants result in risk awareness
- Management asset committees are in place to review decisions and risk
- Strategic and tactical asset allocations define risk tolerances and targeted expectations
- Investment performance (rates of return and risks and attribution) is independently measured, reported
- Staff is credentialed as appropriate (CFA, MBA, MA, CPA, etc.)
- SMEs (internal and external) in place
- Conflicts of Interest are continuously disclosed
- Portfolios and operations of investment managers are monitored
- Technology software/hardware in place is updated/upgraded to support business processes
- Risk management and portfolio management system controls mitigate risk
- Statutes, strategic investment policies and standard operating procedures in place
- Communication channels established
- OAC and IC takes appropriate follow-up action
- IA and external auditors test control compliance and adequacy
- Staff follows up on audit issues

## Some

### Vulnerability

**Indicates the controls in place have areas of vulnerability that may not, or may not always, mitigate manageable risk**

- Missing some elements of strong controls
- External factors may exist that cannot be managed or mitigated
- Constraints on independence and autonomy may impede the agency's ability to mitigate some risks in a timely fashion
- Not all elements of strong governance are in place

## Weak

**Indicates the controls in place are not adequate to mitigate manageable risk**

- Missing many elements of strong controls
- External factors are known to exist that cannot be managed or mitigated
- Constraints on independence and autonomy impede the agency's ability to mitigate some risks in a timely fashion
- Proper governance not in place

# Rankings: LIKELIHOOD

*Probability that the risk identified would or would not occur*

<h2>Not Likely</h2> <p><b>Indicates the risk will probably not occur</b></p> <ul style="list-style-type: none"><li>• Risk event can usually be controlled</li><li>• Strong controls/low tolerance</li><li>• Not likely to occur in the next year</li></ul>	<h2>Some Likelihood</h2> <p><b>Indicates there is some probability the risk will occur</b></p> <ul style="list-style-type: none"><li>• Risk event cannot always be controlled</li><li>• Missing some elements of strong controls/some tolerance</li><li>• Some likelihood to occur in the near term if unchecked</li></ul>	<h2>Likely</h2> <p><b>Indicates it is probable the risk will occur</b></p> <ul style="list-style-type: none"><li>• Risk event cannot be controlled</li><li>• Missing numerous elements of strong controls/high tolerance</li><li>• Likely to happen if unchecked</li></ul>
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# Rankings: Tolerance

*Amount of risk willing to accept in the normal course of doing business*

<h2>High</h2> <p>Indicates a general acceptance of risk usually because the likelihood of a risk event with major impact is small</p>	<h2>Medium</h2> <p>Indicates an acceptance that a risk event could occur because the cost or effort for stronger controls may outweigh benefit</p>	<h2>Low</h2> <p>Indicates the risk should be eliminated to the extent possible because of a low risk appetite or the likelihood of a significant impact</p>
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# Section Two

Identifying Risks within broad Investment Functions  
and Topics; Thirty (30) Specific Risks Identified

# Identifying Risks within broad Investment Functions and Topics

- Strategic and Tactical – Risks 1, 3 and 5
- Legislative and Policy – Risks 7 and 8
- Ethics, Skills and Knowledge – Risks 12 and 13
- Governance – Risk 14
- Compliance and Conflict – Risks 15 and 16
- Portfolio Operational Oversight – Risks 18, 19, 20 and 21
- Internally Managed Public Equity/Fixed Income Portfolios – Risks 24 and 25
- Cash Flow – Risk 26
- Business Continuity – Risk 28
- IMD Compensation and Incentives – Risks 29 and 30

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>1. ASRS does not develop an effective strategic/tactical asset allocation by incorporating capital market assumptions to create an investment portfolio over a given time horizon that optimizes expected rate of return per unit of risk, given ASRS's risk tolerance</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Periodic asset allocation reviews are conducted at least every 3 years. Tactical asset allocations are conducted internally and externally. Quarterly feedback from the general investment consultant to the IC and Board with respect to any recommended modifications.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: None</p>	
<p>2. Benchmark misspecification for either Total Fund, asset classes, investment managers or investment strategies</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: For Total Fund and asset classes defined within, the asset allocation study process with independent input identifies the benchmark. Specific evaluation metrics, including performance benchmarks, are vetted by both internal staff as well as the general consultant.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	
<p>3. Insufficient level of due diligence to evaluate existing and new asset classes and investment strategies</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Asset categories and strategies are vetted by IMD program managers. As applicable, reviews are conducted with the CIO and Director and Asset Class Committees for appropriateness for program inclusion. Independent consultants participate in Asset Class Committee meetings.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>4. Sources of Total Fund and asset class returns and their associated attributions relative to benchmarks (performance) are not fully analyzed, understood, and/or reported</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: As a first step, external and internal investment managers reconcile all portfolios on a weekly/monthly basis with the custodial bank PRIOR to performance calculations being done by the custody's performance team. Investment program performance and benchmark attribution relative to benchmarks are generated by ASRS's custodial bank(s) and general consultant; reviewed by IMD PMs and CIO. Reports are generated monthly and analyzed by IMD/CIO with formal quarterly performance reports presented to the Investment Committee/Board by the general investment consultant and CIO.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	
<p>5. Investment program becomes non-compliant with ASRS's strategic asset allocation policy</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Various investment reports are generated and reviewed: daily market value report (external investment managers, IMD PMs, CIO, Director review), and general investment consultant's verification of ASRS's Total Fund positioning relative to the Board approval strategic asset allocation policy (SAAP). Specified consultants for private markets report to asset class committees that investments made in private markets are consistent with those approved in their respective strategic private market investment plans.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
6. Financial markets do not provide returns to achieve ASRS investment objectives	<b>Tolerance:</b> <b>Medium</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> Tactical allocations are employed to help mitigate risk, volatility and achieve expected returns. External consultants and vendors are utilized to assist with assessing investment risk. Currently, IMD receives the monthly "Risk Report" produced by the custodian's Investment Analytics team, which analyzes the Total ASRS investments through various capital markets downside scenarios and stress tests to assess the impact on portfolio returns. The SAAP is reviewed every 3 years or more frequently as determined by the IC Chair, Director or CIO, to ensure the mix of assets achieves primary investment objectives.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> None	
7. Arizona legislation, mandates, policies, and/or guidelines impact the ASRS's ability to effectively manage the investment program. (e.g. divestment, asset class limits, Environmental Social Governance (ESG), etc.)	<b>Tolerance:</b> <b>Medium</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> The Agency utilizes a legislative liaison who works with the AZ Legislature to ensure enacted legislation is not harmful to investment strategies. To date, such state related issues have not impeded the ASRS ability to manage the Total Fund.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> None	
8. Federal legislation, mandates, policies and/or guidelines impact the ASRS's ability to effectively manage the investment program	<b>Tolerance:</b> <b>High</b>	<b>Impact:</b> <b>Moderate</b>	<b>Current Controls:</b> Rely on outside counsel, the custodial bank and investment managers for updates on new and existing federal legislation. ASRS belongs to NASRA and NCTR which represent public funds in legislative matters.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> The investment compliance function will be outsourced to the custody bank effective June 2015.	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
9. Board and Executive staff fail to set an appropriate ethical tone at the top	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> The Governance Handbook is a comprehensive document containing the agency’s policies for trustees. Board members receive fiduciary training annually and must sign a Code Ethics and Conflict of Interest Statement when appointed. Investment staff must annually sign the Code of Ethics and Conflict of Interest statement. Public and private market non-conflict of interest forms must be signed. ADOA ethics training is required for state employees and gubernatorial appointees. Executive management strongly supports and displays the PRIDE values. Performance measures for the Director include leadership success.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> None	
10. Lack of competence of the Director, CIO and Senior Portfolio Managers	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> The Board performs a review of the ASRS Director annually. The Director annually evaluates the CIO who in turn evaluates the Senior Portfolio Managers. Each position in IMD is evaluated annually. Recruitment for staff includes key credentials and current staff takes continuing education.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> None	
11. Lack of competence of consultants, custodians, back-office providers	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> An RFP process is utilized to evaluate and select consultants, custody bank and back-office private market providers. These parties are evaluated and renewed contractually on an annual basis and may be terminated at any time. Operational performance and firm changes are continuously monitored and addressed by IMD staff.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> None	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
12. Lack of investment knowledge on the Board	<b>Tolerance:</b> <b>Medium</b>	<b>Impact:</b> <b>Moderate</b>	<b>Current Controls:</b> Board members are appointed by the Governor, approved by the Arizona Senate, and receive New Trustee Orientation. Statute requires that at least four of the trustees have relevant investment management experience. In addition, trustees may seek additional professional investment education. Board members perform a self-evaluation annually. Subject matter experts provide input and education on a variety of subjects to the Board.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> None	
13. IMD lacks the staffing, skill set, or resources needed to appropriately manage ASRS investment program	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> Clearly defined organizational chart in place with detailed position descriptions. The CIO and Director work collectively to assess the resources and staff needed to accomplish ASRS investment goals. Staff performance is reviewed at least annually. Recruitment for staff includes key credentials and current staff takes continuing education.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> None	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>14. Lack of documentation which explicitly addresses the segregation of duties between oversight and investment decision making</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Board duties are defined and lines of authority are provided in the Board Governance Handbook. Clearly defined organizational chart in place with detailed position descriptions. Staff duties are defined and lines of authority are provided for through strategic policies, SOPs, asset allocation matrix, strategic papers and other written policies and procedures. Asset Class Investment Committees established, with oversight from general investment consultant who reports compliance with policies and procedures to the Board Investment Committee. The external auditor issues a management letter addressing management controls annually as they impact the financial statements.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	
<p>15. Lack of written strategic investment policies (SIPs), investment policy statement (IPS) and standard operating procedures (SOPs)</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Written policies and procedures in place and updated as needed based on changes to investment strategy, personnel, operations, etc. ASRS Internal Audit reviews policies annually. External auditors review policies as part of their audit procedures. Changes to the SIP and IPS require approval of the Board.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>16. Conflicts of interest relative to making ASRS investments are not detected</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: Disclosures occur on an ongoing basis prior to an investment being contemplated. IMD works with the Assistant Attorney General to determine appropriateness. The Governance Handbook is a comprehensive document containing the agency’s policies for trustees. Board members receive fiduciary training annually and must sign a Code Ethics and Conflict of Interest Statement when appointed. Investment staff must annually sign the Code of Ethics and Conflict of Interest statement. Public and private market non-conflict of interest forms must be signed. ADOA ethics training is required for state employees and gubernatorial appointees.</p>	<p><b>Evaluate</b> the anticipated risk levels</p> <p>Management requests IA investigate options</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: Management will consult with IA regarding their research findings. Management will request that the Board’s General Investment Consultant provide input on additional value-added controls.</p>	
<p>17. Portfolio data integrity issues: impairments due to asynchronous transfers of data between internal and external investment systems (internal/external portfolios)</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: PUBLIC MARKETS INVESTMENTS: EXTERNAL &amp; INTERNALLY MANAGED PORTFOLIOS: Extensive levels of checks and balances conducted by IMD staff and external managers regarding the review of portfolio and trade activity from the prior day and reconciliation with the custodial bank records. Every trade from the internally managed portfolios is reported to Internal Audit. PRIVATE MARKETS INVESTMENTS: Capital calls are sent to ASRS Accounting, IMD staff and the back office provider. If the calls do not show timely in the back office daily cash transaction screen then IMD staff will contact the back office or the manager to address the discrepancy.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: None</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>18. Data entered into internal trading platforms differs from external custody bank system and trade executions violate approved portfolio guidelines (internal ports)</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: On a daily basis Bloomberg AIMS receives a direct feed of the holdings reports for all internally managed portfolios, via custodial bank's FTP secured file protocol. Portfolio managers reconciled the holdings between ASRS internal portfolio platforms, custody bank and Bloomberg AIMS PRIOR to trading. As part of the pre-trade compliance function, Bloomberg AIMS runs every trade vs the compliance rules applicable to each portfolio to ensure all trades are consistent with portfolio guidelines; overrides requires authorization by CIO or Director, or authorized individuals. PMs and traders are required to enter a written explanation for the override. Immediately after trades are executed, trade detail information is sent to the custody bank via Bloomberg AIMS, and IMD sends a trading report in excel format to Internal Audit via email. Every trade from the internally managed portfolios is reported to Internal Audit.</p>	<p><b>Evaluate</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: The CIO will continue to evaluate the current override process to ensure it fits within risk tolerance.</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
19. Performance calculation errors exist	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> Internal and external public portfolios are reconciled monthly by ASRS Custody. For private portfolios a quarterly reconciliation is conducted between the back office provider and ASRS accounting staff, then between ASRS accounting staff and the custodial bank. There is segregation between ASRS investment accounting and IMD duties. The back office provider is independent from ASRS but will work with ASRS to resolve operational and reporting issues. The custody bank and private market back office vendor will work with ASRS staff and its general investment consultant to manage and resolve operational reporting issues.	<b>Evaluate</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> The CIO will evaluate the need for additional controls to enhance the current process.	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>20. ASRS staff is not knowledgeable that the custody bank does not comply with ASRS's established control procedures for the movement of money or securities</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: ASRS has established control procedures for movement of money or securities. The custodial bank has been provided with a copy of the established control procedures.</p> <p>Movement of cash: There is a separation of duties between staff who initiate a request for funding and staff who approves the funding, whereby authority to instruct the custody bank to wire monies outside the bank resides with ASRS Accounting. IMD staff's authority is limited to the review and approval of investment related fees and intra-bank transfer requests between ASRS's portfolios, which requires signature by the CIO, Director or authorized appointees. For outgoing wires for either funding of accounts or other payments, ASRS accounting is responsible for copying all authorized callback staff with the documentation to facilitate a callback. The custodial bank sends an email daily to General Accounting and IMD which reports the outgoing wires for the day, ASRS Accounting reconciles against the wires entered into the custodial bank wiring system to ensure no wires scheduled for that day were missed.</p> <p>Movement of securities: For trade settlement activity, IMD staff runs a daily holdings report which will identify when a portfolio is not funded and/or a trade did not settle in the internally managed portfolios. IMD staff is notified by managers/broker dealers if monies or securities are not moved timely. External portfolio managers are responsible for reconciling holdings and trading activities directly with the custody bank, in the event there are unresolved discrepancies between the external managers and the custody bank, the managers will contact IMD Staff for assistance.</p>	<p><b>Evaluate</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: The CIO will evaluate the need for additional controls to enhance the current process. IMD and Accounting will begin meeting quarterly to review the FTTOPs (fund transfer and transaction origination protocol).</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>21. Custody bank does not comply with ASRS's established control procedures for the movement of money or the protocols set by the appropriate regulatory authority for securities</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: Movement of cash: The custodial bank has been provided with the FTTOPs. Effective April 2015 ASRS moved to eCFM (cash flow management) platform. Daily audits of cash movement are performed by the bank and ASRS is notified of any exceptions/issues.</p> <p>Movement of securities: The custodial bank has established controls for the trade settlement and notify IMD on a daily basis staff if failure of trades. Regulatory authorities have established mandatory protocols.</p>	<p><b>Evaluate</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: The CIO will evaluate the need for additional controls to enhance the current process.</p>	
<p>22. Failure to track investment management fees, manager transaction fees, foreign exchange fees and other related management fees charged to the ASRS</p>	<p><b>Tolerance:</b> <b>Medium</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: The custodial bank tracks investment management and transaction fees for external and internal managers and a report is able to be pulled at any time by ASRS staff. Regulatory authorities mandate that banks must date and time stamp transactions for foreign exchange fees. Dedicated IMD staff monitors foreign exchange transaction fees and approves all investment related expenses. Upon approval and instruction from IMD and/or the back-office service provider for private investments, ASRS Accounting instructs the custodial bank to execute payment of investment manager fees. The fees calculated by managers are audited by external auditors annually with certification and an audit report is provided.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: The CIO will evaluate the need for additional cost analysis regarding transaction and foreign exchange fees. An outside vendor will be selected to conduct a public markets portfolio trade execution cost analysis.</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
23. Lack of oversight on external portfolio asset management	<b>Tolerance:</b> <b>Medium</b>	<b>Impact:</b> <b>Moderate</b>	<p>Current Controls:</p> <p><b>PUBLIC MARKETS INVESTMENTS:</b>  <b>EXTERNALLY MANAGED PORTFOLIOS:</b> IMD staff holds quarterly conference calls/meetings with external managers to review performance, discuss upcoming news and personnel changes. Written into every outside manager’s contract is compensating ASRS for losses suffered as a result of trades being performed not according to the letter of direction (LOD). General and specialty consultants conduct due diligence visits and/or conference calls with outside asset managers and provide ASRS with a report but not always consistently.</p> <p><b>INTERNALLY MANAGED PORTFOLIOS:</b> IMD Program Managers meet with the ASRS CIO at least monthly.</p> <p><b>PRIVATE MARKETS INVESTMENTS:</b> IMD’s private markets staff participates in advisory board calls when called by the private investment manager. IMD private market staff attends annual meetings and perform due diligence as able. Performance is reviewed monthly by all IMD staff.</p>	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<p>Future Actions:</p> <p>The investment compliance function will be outsourced to the custody bank effective June 2015. These functions are designed to run an analysis of all externally and internally managed public markets portfolios vs portfolio specific investment rules, federal and state level regulations, and identify potential rules violations for further investigation by the external compliance provider. Findings will be reported by the external compliance provider to dedicated ASRS staff, as determined by the CIO &amp; Director.</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
24. Unauthorized internal portfolio trades executed	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Moderate</b>	<b>Current Controls:</b> All dealers are provided with copies of Strategy Papers but none can legally guarantee adherence to the trading restrictions. Bloomberg AIMS provides alerts and requires authorized overrides for trades that trigger an alert. Internal staff is reminded annually and must sign and acknowledge the Code of Ethics and Personal Trading Procedures. Every trade from the internally managed portfolios is reported to Internal Audit.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> The investment compliance function will be outsourced to the custody bank effective June 2015. These functions are designed to run an analysis of all externally and internally managed public markets portfolios vs portfolio specific investment rules, federal and state level regulations, and identify potential rules violations for further investigation by the external compliance provider. Findings will be reported by the external compliance provider to dedicated ASRS staff, as determined by the CIO & Director.	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
25. Internal portfolio becomes non-compliant with guidelines in strategy papers and is not communicated to CIO	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Moderate</b>	<b>Current Controls:</b> Reports are available and monitored daily by portfolio managers. Reviews are conducted with the CIO on a periodic or as needed basis. Every trade from the internally managed portfolios is reported to Internal Audit.	<b>Accept</b> the anticipated risk levels
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> The CIO will evaluate enhancements to this reporting process to create a more real-time, comprehensive report to the CIO.  The investment compliance function will be outsourced to the custody bank effective June 2015. These functions are designed to run an analysis of all externally and internally managed public markets portfolios vs portfolio specific investment rules, federal and state level regulations, and identify potential rules violations for further investigation by the external compliance provider. Findings will be reported by the external compliance provider to dedicated ASRS staff, as determined by the CIO & Director.	
26. Cash flow management is inadequate (either too much or too little on hand)	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Moderate</b>	<b>Current Controls:</b> To avoid performance cash drag, IMD implemented the cash management program which has heightened visibility and is exposed to the market consistent with SAAP and house views. To ensure sufficient cash is available to meet expected needs, current cash is monitored by IMD staff daily. One week prior to the pension run ASRS Accounting provides a report of cash needs for benefits. On an ongoing basis, Accounting communicates the funds needed for administrative expenses. Internal portfolios can be liquidated quickly if needed.	<b>Evaluate</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> The cash management program will be evaluated for potential future enhancements.	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
<p>27. A back office provider inappropriately approves a capital call due to inadequate controls</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Moderate</b></p>	<p>Current Controls: The contract with the current back office provider specifies they will confirm capital calls and distributions and management fee calculations against the current partnership agreement. The back office provider provides a confirmation to dedicated IMD and ASRS Accounting staff that this process verification has been completed. In some instances IMD may request a comfort letter from the general partner on the appropriateness of capital calls and distributions. If an erroneous payment is discovered, IMD personnel will request a justification for a refund.</p>	<p><b>Reduce</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Some Vulnerability</b></p>	<p><b>Likelihood:</b> <b>Some Likelihood</b></p>	<p>Future Actions: IMD private market staff is reviewing the existing controls with the current back office provider to ensure the controls meet the terms of the contract. IMD staff is researching possible third party vendors to provide capital call compliance service against the partnership agreements. IMD and General Accounting should determine what justification back-up is required for refunded monies.</p>	
<p>28. Lack of a Continuity of Operations Plan (COOP)</p>	<p><b>Tolerance:</b> <b>Low</b></p>	<p><b>Impact:</b> <b>Major</b></p>	<p>Current Controls: IMD participates in the agency-wide COOP. Essential positions have been identified to participate if and when the agency COOP is invoked. Technological and geographical resources are available. The CIO will ultimately instruct IMD staff how to proceed.</p>	<p><b>Accept</b> the anticipated risk levels</p>
	<p><b>Controls:</b> <b>Strong</b></p>	<p><b>Likelihood:</b> <b>Not Likely</b></p>	<p>Future Actions: None.</p>	

# Risks for Investment Management

Risk/Threat	Risk Rankings		Control Evaluation	Management Assessment & Strategies
29. Lack of appropriate total compensation and/or incentives to retain, attract, and motivate top professionals	<b>Tolerance:</b> <b>Medium</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> The implementation and objective of IMD's Incentive Compensation Plan for investment professionals (ICP) partially addresses this issue. The Office of the Auditor General is reviewing the approach of the current ICP.	<b>Evaluate</b> the anticipated risk levels
	<b>Controls:</b> <b>Some Vulnerability</b>	<b>Likelihood:</b> <b>Some Likelihood</b>	<b>Future Actions:</b> An ad-hoc committee of the Board is reviewing outstanding issues not addressed by current controls.	
30. Ability of IMD staff to deviate from approved investment strategies or processes in order to enhance incentive compensation plan payments	<b>Tolerance:</b> <b>Low</b>	<b>Impact:</b> <b>Major</b>	<b>Current Controls:</b> Existing reporting systems and checks and balances processes conducted by ASRS external investment consultants are in place to monitor compliance with strategy guidelines.	<b>Evaluate</b> the anticipated risk levels  Management requests IA review these processes
	<b>Controls:</b> <b>Strong</b>	<b>Likelihood:</b> <b>Not Likely</b>	<b>Future Actions:</b> The CIO and Director will evaluate possible control enhancements. Internal Audit will review these processes. The investment compliance function will be outsourced to the custody bank effective June 2015.	

# Agenda Item #7

Note: no documents  
are available for this  
agenda item.



# Arizona State Retirement System

## *Investment Beliefs*

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### **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.