

Arizona State Retirement System

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

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ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of December 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	7.5%
Constant 8%	<u>8.0%</u>
Excess Return	(0.5)%

Goal Met:
No

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

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	2.7%	1.3%	8.3%	7.8%	6.1%	9.7%
Interim SAA Policy¹	1.6%	-0.4%	6.7%	6.9%	5.6%	9.4%
Excess Return	1.1%	1.7%	1.6%	0.9%	0.5%	0.3%

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

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

Arizona State Retirement System
Total Fund Attribution Analysis

Total Plan	1 Year	3 Years	5 Years
Allocation Effect ¹	0.46%	0.87%	0.44%
Manager Selection Effect ²	1.19%	0.70%	0.53%
Residual ³	0.00%	-0.02%	-0.04%
Excess Return	1.65%	1.55%	0.93%

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

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

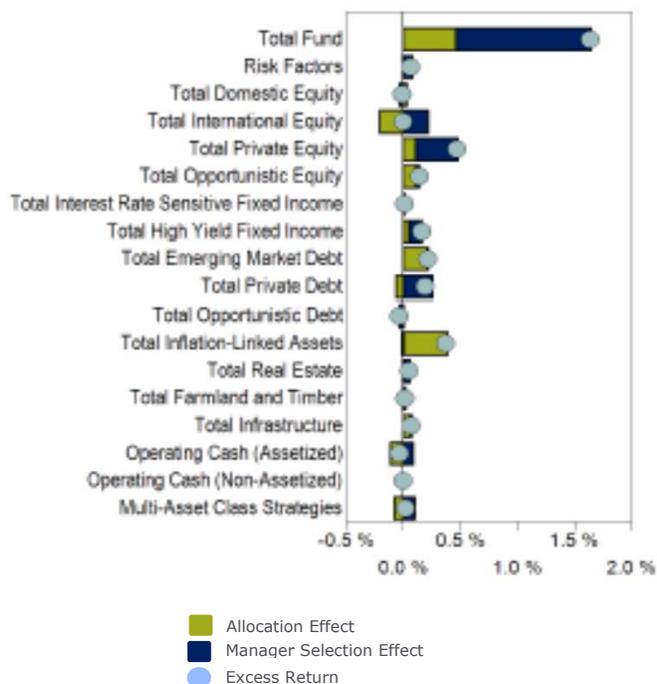
2. Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)] + **Interaction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

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

Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects
1 Year Ending December 31, 2015



1 Year Excess Return: +1.65%

- Allocation Effect: +0.46%
 - Commodities tactical underweight (+0.38%)
 - Emerging Market Debt tactical underweight (+0.20%)
 - Opportunistic Equity tactical allocation (+0.10%)
 - Private Equity overweight (+0.10%)
 - International Equity tactical underweight (-0.21%)
 - Multi-Asset Strategies tactical underweight (-0.08%)
- Manager Selection Effect: +1.19%
 - Private Equity outperformed due to various managers (+0.36%)
 - Private Debt outperformed due to various managers (+0.25%)
 - International Equity outperformed due to various managers (+0.21%)
 - Multi-Asset Strategies outperformed (+0.09%)
 - Operating Cash outperformed (+0.08%)
 - Risk Factors outperformed (+0.07%)
- Residual: 0.00%

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

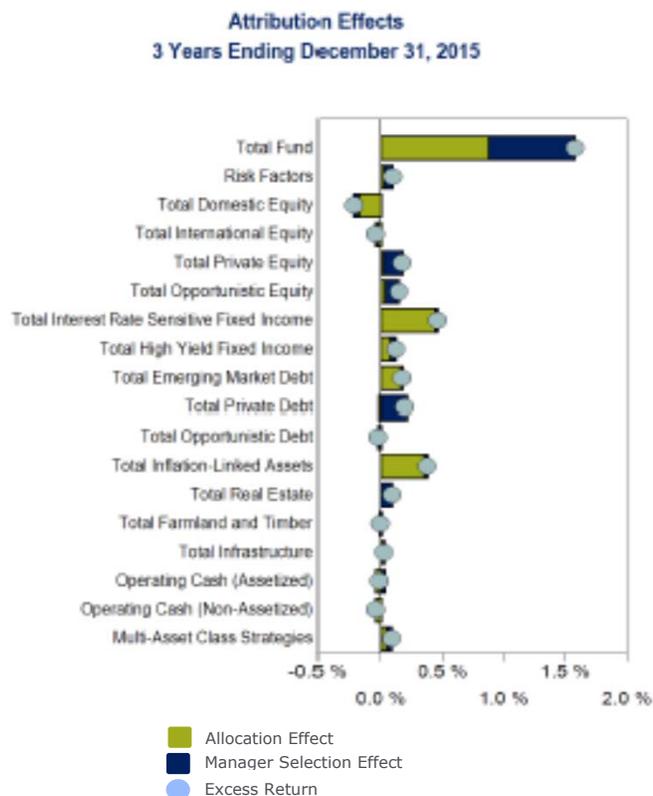
Allocation Effect: Measures the impact of the decision to over/under weight asset classes relative to Interim SAAP benchmark weights. $(\text{Return Asset Class Index} - \text{Total Interim Policy Index Return}) \times (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Interim Policy Index})$

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. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy Index})] + \text{Interaction Effect}$
Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. $(\text{Return Asset Class Portfolio} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Policy Index})) - (\text{Return Asset Class Index} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Index}))$

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

Arizona State Retirement System

Total Fund Attribution Detail



3 Year Excess Return: +1.55%

- Allocation Effect: +0.87%
 - Public Markets Fixed Income tactical underweight (+0.67%)
 - Commodities tactical underweight (+0.36%)
 - Domestic Equity tactical underweight (-0.18%)
- Manager Selection Effect: +0.70%
 - Private Debt outperformed due to various managers (+0.21%)
 - Private Equity outperformed due to various managers (+0.15%)
 - Opportunistic Equity outperformed due to various managers (+0.11%)
 - Real Estate outperformed due to various managers (+0.09%)
 - Risk Factors outperformed (+0.07%)
 - Public Markets Fixed Income outperformed due to various managers (+0.07%)
- 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. $(\text{Return Asset Class Index} - \text{Total Interim Policy Index Return}) \times (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Interim Policy Index})$

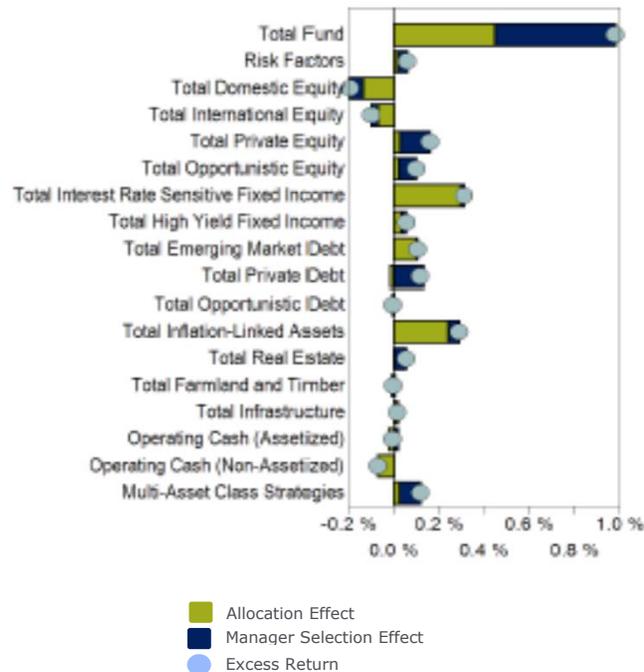
Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy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

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

Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects
5 Years Ending December 31, 2015



5 Year Excess Return: +0.93%

- Allocation Effect: +0.44%
 - Public Markets Fixed Income tactical underweight (+0.43%)
 - Commodities tactical underweight (+0.24%)
 - Domestic Equity tactical underweight (-0.14%)
 - International Equity tactical overweight (-0.07%)
- Manager Selection Effect: +0.53%
 - Private Equity outperformed due to various managers (+0.13%)
 - Private Debt outperformed due to various managers (+0.13%)
 - Multi-Asset Strategies outperformed (+0.09%)
 - Opportunistic Equity outperformed due to various managers (+0.08%)
 - Commodities outperformed (+0.05%)
 - Real Estate outperformed due to various managers (+0.05%)
- Residual: -0.04%

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. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy Index})] + \text{Interaction Effect}$: Measures the impact of over/under weighting decisions and over/under performance. $(\text{Return Asset Class Portfolio} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Policy Index})) - (\text{Return Asset Class Index} (\text{Weight Asset Class Portfolio} - \text{Weight Asset Class Index}))$

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

Asset Class Performance vs. Benchmark – Public Markets

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

	1 Year Return	3 Year Return
ASRS Total Domestic and Int'l Equity ¹	-0.9%	9.8%
ASRS Custom Total Equity Benchmark	-1.1%	9.6%
Excess Return	0.2%	0.2%
ASRS Domestic Equity	0.8%	14.7%
ASRS Custom Domestic Equity Benchmark	0.9%	14.8%
Excess Return	-0.1%	-0.1%
ASRS International Equity	-2.2%	2.7%
ASRS Custom Int'l Equity Benchmark	-3.2%	2.8%
Excess Return	1.0%	-0.1%
ASRS Public Markets Fixed Income	0.2%	0.7%
ASRS Custom Fixed Income Benchmark	-1.8%	0.0%
Excess Return	2.0%	0.7%
ASRS Inflation-Linked	-26.0%	-17.1%
ASRS Custom Inflation-Linked Benchmark	-24.7%	-17.3%
Excess Return	-1.3%	0.2%
ASRS Multi-Asset Class Strategies	-1.4%	7.1%
ASRS Multi-Asset Class Strategies Benchmark	0.3%	7.6%
Excess Return	-1.7%	-0.5%

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

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

**Goal Met:
Partially**

Asset Class Performance vs. Benchmark – Private Markets¹

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

	1 Year Return	3 Year Return	IRR Since Inception	Inception Date
ASRS Private Equity	5.4%	12.6%	11.4%	Oct-07
Russell 2000	-0.8%	8.6%	9.5%	
Excess Return	6.2%	4.0%	1.9%	
ASRS Opportunistic Equity ²	12.0%	23.2%	23.9%	Apr-11
ASRS Private Debt	8.7%	11.3%	11.4%	Jul-12
S&P/LSTA Leveraged Loan Index + 250 bps	3.3%	4.7%	4.9%	
Excess Return	5.4%	6.6%	6.5%	
ASRS Opportunistic Debt ²	-0.1%	6.5%	10.3%	Jan-08
ASRS Real Estate	14.8%	14.0%	7.5%	Oct-05
NFI - ODCE Index	13.9%	12.4%	6.8%	
Excess Return	0.9%	1.6%	0.7%	
ASRS Farmland and Timber	3.6%	--	2.8%	Jul-13
CPI ex-Food and Energy + 350 bps	5.5%	--	5.5%	
Excess Return	-1.9%		-2.7%	
ASRS Total Infrastructure	--	--	4.9%	Dec-14
CPI ex-Food and Energy + 350 bps	--	--	5.4%	
Excess Return			-0.5%	

1- Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of September 30, 2015.

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

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

**Goal Met:
Partially**

Cash Management

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

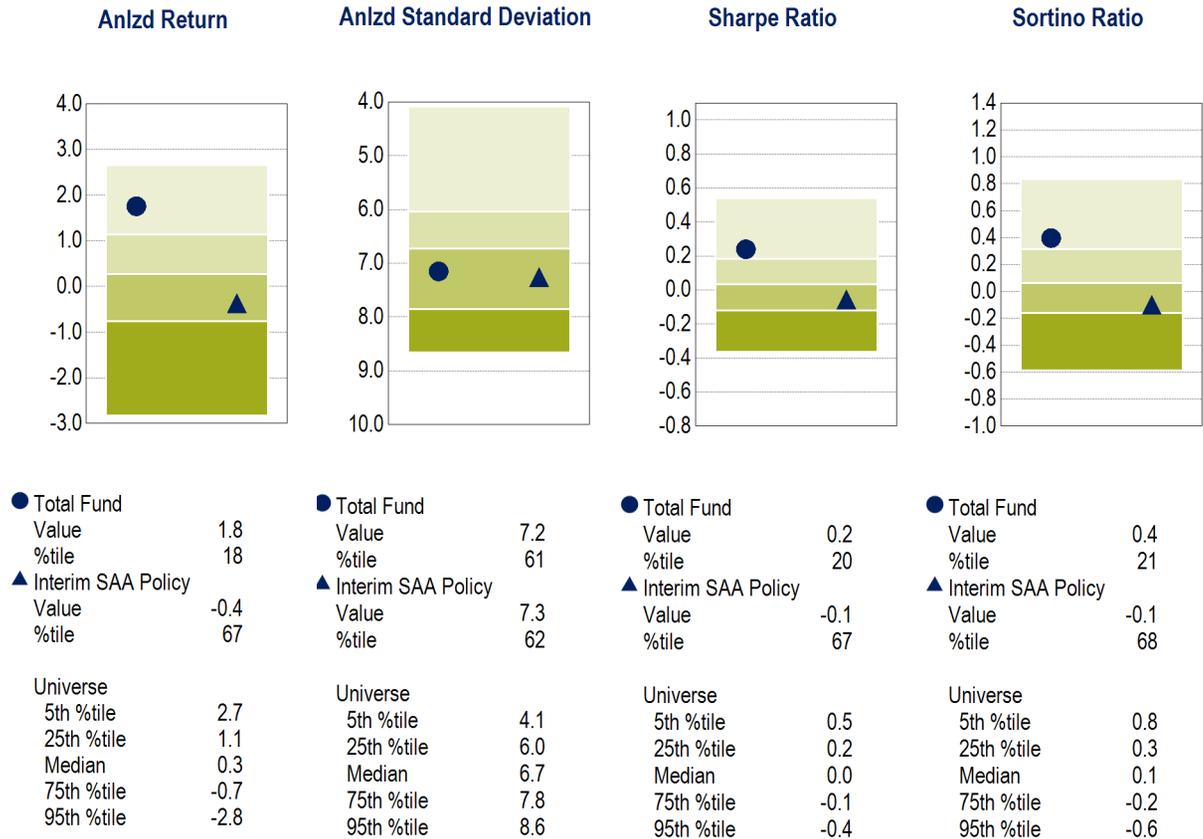
Month	External CFs +	Internal CFs =	Total CFs during the Month	Last day of the Month Ending Balance*
Jan – 15	(\$82.9)	(\$39.8)	(\$122.7)	\$140.1
Feb – 15	(\$123.2)	\$7.2	(\$116.0)	\$80.4
Mar – 15	(\$64.8)	(\$19.3)	(\$84.1)	\$418.0
Apr – 15	(\$90.9)	(\$154.8)	(\$245.7)	\$550.1
May – 15	(\$47.8)	(\$37.8)	(\$85.6)	\$479.0
Jun – 15	(\$74.4)	(\$117.1)	(\$191.5)	\$318.3
Jul – 15	(\$150.0)	(\$205.8)	(\$355.8)	\$405.5
Aug – 15	(\$136.3)	(\$115.6)	(\$251.9)	\$351.7
Sep – 15	(\$103.3)	(\$333.9)	(\$437.2)	\$392.0
Oct – 15	(\$73.0)	(\$43.3)	(\$116.3)	\$394.5
Nov – 15	(\$107.8)	(\$129.9)	(\$237.7)	\$705.5
Dec – 15	(\$65.4)	(\$302.6)	(\$368.0)	\$966.1

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

**Goal Met:
Yes**

Total Fund Risk Statistics vs. Peer Universe

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



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

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

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

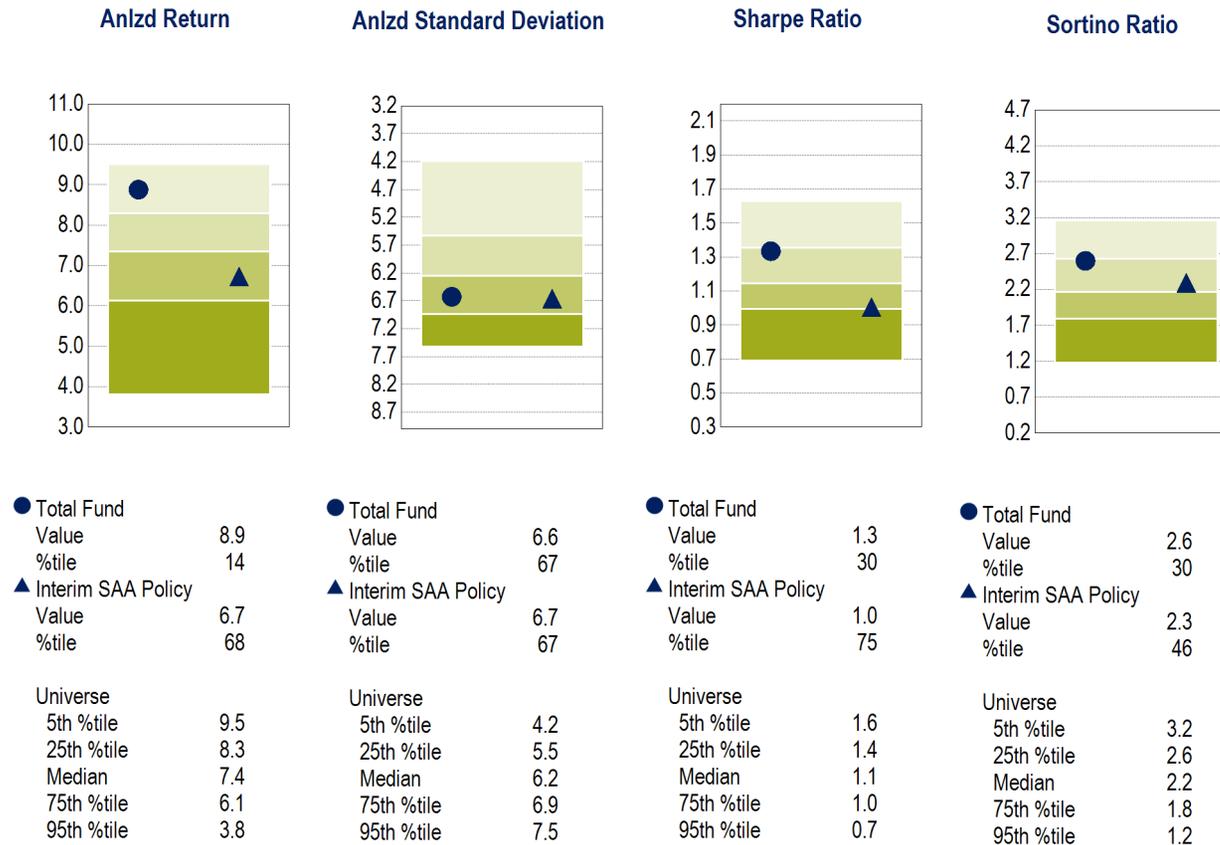
The InvestorForce Public Funds > \$1 Billion Universe contains 105 observations for the period ending December 31, 2015, with total assets of \$1.9 trillion.

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

Total Fund Risk Statistics vs. Peer Universe

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

3 Year



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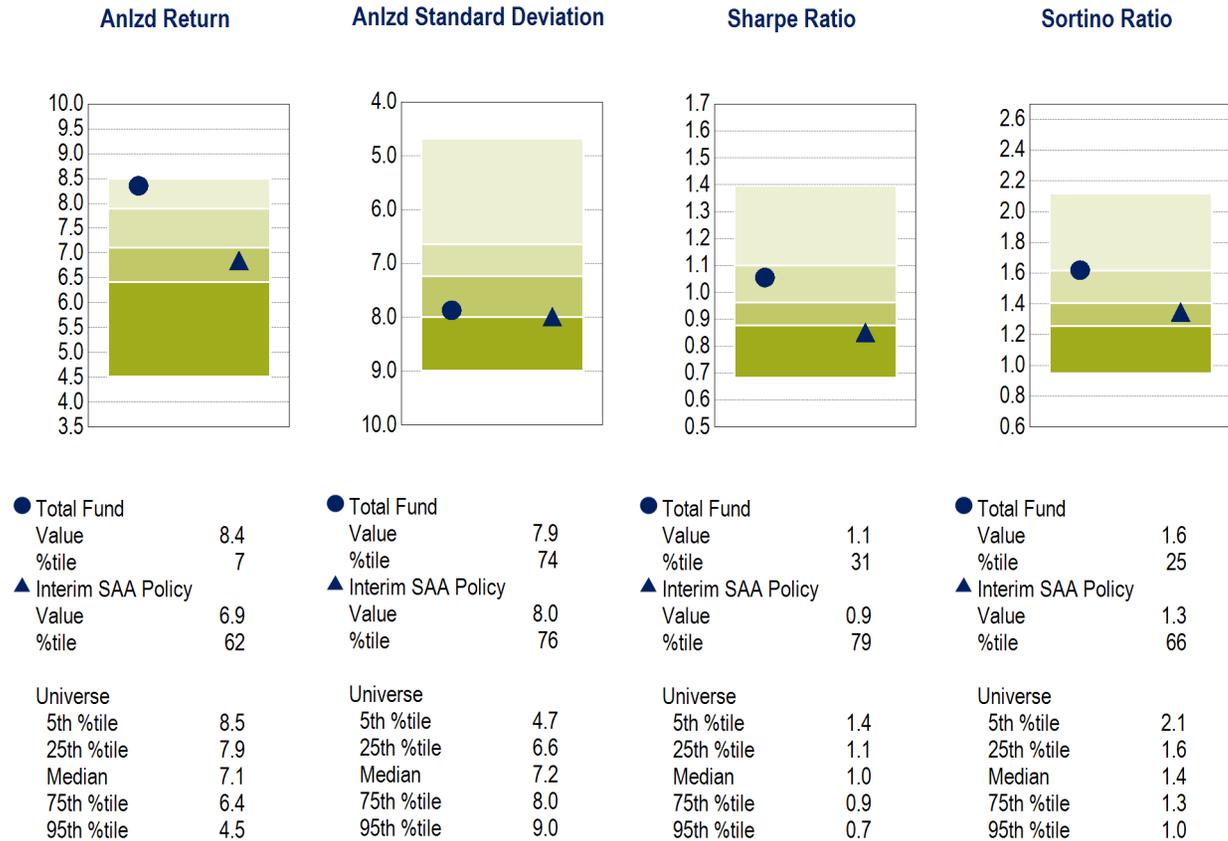
The InvestorForce Public Funds > \$1 Billion Universe contains 105 observations for the period ending December 31, 2015, with total assets of \$1.9 trillion.

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Total Fund Risk Statistics vs. Peer Universe

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

5 Year



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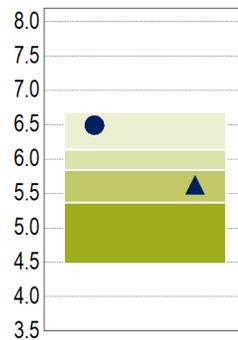
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Total Fund Risk Statistics vs. Peer Universe

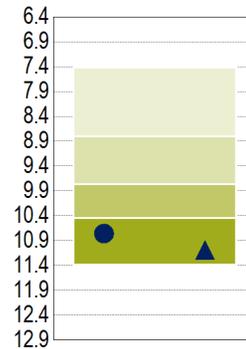
Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

10 Year

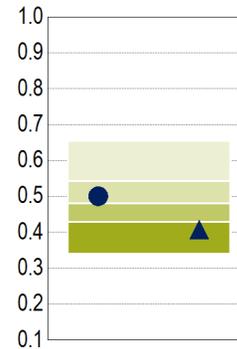
Anlzd Return



Anlzd Standard Deviation



Sharpe Ratio



Sortino Ratio



● Total Fund

Value 6.5
%tile 13

▲ Interim SAA Policy

Value 5.6
%tile 63

Universe

5th %tile 6.7
25th %tile 6.1
Median 5.9
75th %tile 5.4
95th %tile 4.5

● Total Fund

Value 10.8
%tile 86

▲ Interim SAA Policy

Value 11.1
%tile 89

Universe

5th %tile 7.4
25th %tile 8.8
Median 9.8
75th %tile 10.4
95th %tile 11.4

● Total Fund

Value 0.5
%tile 39

▲ Interim SAA Policy

Value 0.4
%tile 84

Universe

5th %tile 0.7
25th %tile 0.5
Median 0.5
75th %tile 0.4
95th %tile 0.3

● Total Fund

Value 0.7
%tile 34

▲ Interim SAA Policy

Value 0.6
%tile 84

Universe

5th %tile 0.9
25th %tile 0.8
Median 0.7
75th %tile 0.6
95th %tile 0.5

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

The InvestorForce Public Funds > \$1 Billion Universe contains 105 observations for the period ending December 31, 2015, with total assets of \$1.9 trillion.

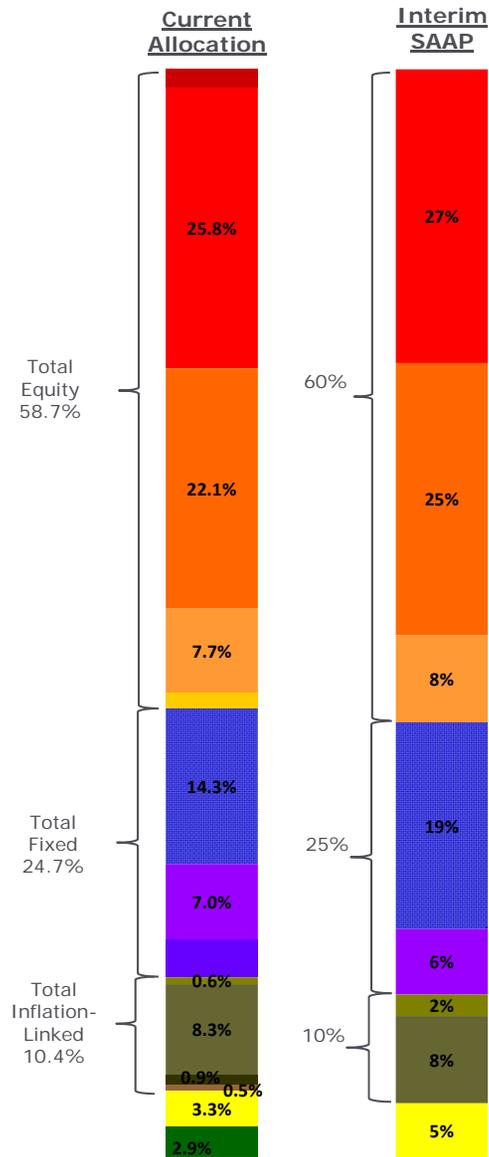
Composition of Interim SAA Policy can be found in the appendix.

Independent Oversight/Compliance

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



SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Interim SAAP Difference	Policy Range	Within Range	SAAP
Total Domestic and International Equity	\$16,659,606,097	49.6%	52%	-2.4%			50%
Equity Risk Factor Portfolio	\$562,019,772	1.7%	0%	1.7%			0%
Domestic Equity¹	\$8,678,821,543	25.8%	27%	-1.2%	16% - 36%	Yes	26%
U.S. Large Cap	\$6,729,564,209	20.0%	21%	-1.0%			20%
U.S. Mid Cap	\$1,015,270,164	3.0%	3%	0.0%			3%
U.S. Small Cap	\$933,986,739	2.8%	3%	-0.2%			3%
International Equity¹	\$7,418,764,782	22.1%	25%	-2.9%	14% - 34%	Yes	24%
Developed Large Cap	\$5,743,461,936	17.1%	18%	-0.9%			17%
Developed Small Cap	\$671,643,280	2.0%	2%	0.0%			2%
Emerging Markets	\$1,003,197,802	3.0%	5%	-2.0%			5%
Private Equity²	\$2,595,648,652	7.7%	8%	-0.3%	6% - 10%	Yes	8%
Opportunistic Equity^{2,4}	\$492,306,669	1.5%	0%	1.5%			0%
Total Equity	\$19,747,561,418	58.7%	60%	-1.3%	48% - 65%	Yes	58%
Public Markets Fixed Income¹	\$4,801,990,242	14.3%	19%	-4.7%			15%
Treasuries Long Duration	\$353,386,638	1.1%	0%	1.1%	0% - 10%	Yes	0%
Interest Rate Sensitive	\$3,441,507,011	10.2%	15%	-4.8%			11%
High Yield	\$1,007,096,593	3.0%	4%	-1.0%			4%
Private Debt²	\$2,341,189,989	7.0%	6%	1.0%	8% - 12%	No	10%
Opportunistic Debt^{2,4}	\$1,159,052,291	3.4%	0%	3.4%			0%
Total Fixed Income	\$8,302,232,522	24.7%	25%	-0.3%	18% - 35%	Yes	25%
Commodities	\$207,223,345	0.6%	2%	-1.4%	0% - 4%	Yes	2%
Real Estate²	\$2,802,448,299	8.3%	8%	0.3%	8% - 12%	Yes	10%
Infrastructure²	\$314,726,752	0.9%	0%	0.9%	0% - 3%	Yes	0%
Farmland and Timber²	\$182,760,364	0.5%	0%	0.5%	0% - 3%	Yes	0%
Opportunistic Inflation-Linked⁴	\$0	0.0%	0%	0.0%			0%
Total Inflation-Linked	\$3,507,158,761	10.4%	10%	0.4%	10% - 16%	Yes	12%
Multi-Asset Class Strategies	\$1,097,519,198	3.3%	5%	-1.7%	0% - 12%	Yes	5%
Cash³	\$966,194,256	2.9%	0%	2.9%			0%
Operating Cash (Non-Assetized)	\$57,137,677	0.2%	0%	0.2%			0%
Operating Cash (Assetized)	\$909,056,579	2.7%	0%	2.7%			0%
Total	\$33,620,666,155	100%	100%	0%			100%

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

²Values shown for private markets portfolios include cash flows that occurred during 4Q 2015.

³Cash includes money for the upcoming monthly pension distribution.

⁴Aggregate Opportunistic asset classes not to exceed 10%.

Note: Interim SAA Policy includes proration of 4% Private Debt and 2% Real Estate, which are unfunded.

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

Market values include manager held cash.

Arizona State Retirement System

Asset Class Performance Summary - Public Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	Rank	FYTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
Total Fund	33,620,666,155	100.0	2.7	--	-2.0	--	1.3	--	8.3	--	7.8	--	6.1	--	9.7	Jul-75
<i>Interim SAA Policy</i>			<u>1.6</u>	--	<u>-3.4</u>	--	<u>-0.4</u>	--	<u>6.7</u>	--	<u>6.9</u>	--	<u>5.6</u>	--	<u>9.4</u>	<i>Jul-75</i>
Over/Under			1.1		1.4		1.7		1.6		0.9		0.5		0.3	
<i>Actual Benchmark</i>			1.8	--	<u>-3.3</u>	--	<u>0.0</u>	--	<u>7.4</u>	--	<u>7.2</u>	--	<u>5.6</u>	--	--	<i>Jul-75</i>
Total Domestic and International Equity¹	16,659,606,097	49.6	5.1	--	-4.0	--	-0.9	--	9.8	--	8.4	--	5.9	--	6.4	Jan-98
<i>ASRS Custom Total Equity Benchmark</i>			<u>5.1</u>	--	<u>-4.5</u>	--	<u>-1.1</u>	--	<u>9.6</u>	--	<u>8.4</u>	--	<u>6.1</u>	--	<u>5.7</u>	<i>Jan-98</i>
Over/Under			0.0		0.5		0.2		0.2		0.0		-0.2		0.7	
Total Domestic Equity	8,678,821,543	25.8	6.0	27	-1.2	24	0.8	35	14.7	34	12.1	32	7.8	40	11.1	Jul-75
<i>ASRS Custom Domestic Equity Benchmark</i>			<u>6.2</u>	24	<u>-1.3</u>	24	<u>0.9</u>	34	<u>14.8</u>	33	<u>12.3</u>	28	<u>7.7</u>	43	<u>11.2</u>	<i>Jul-75</i>
Over/Under			-0.2		0.1		-0.1		-0.1		-0.2		0.1		-0.1	
<i>eA All US Equity Net Median</i>			4.4		-4.7		-1.3		13.4		10.9		7.4		12.6	<i>Jul-75</i>
Total International Equity	7,418,764,782	22.1	3.8	71	-7.6	71	-2.2	65	2.7	76	2.1	75	3.0	81	5.8	Apr-87
<i>ASRS Custom Int'l Equity Benchmark</i>			<u>4.0</u>	68	<u>-8.0</u>	74	<u>-3.2</u>	72	<u>2.8</u>	76	<u>2.2</u>	75	<u>3.7</u>	67	<u>5.5</u>	<i>Apr-87</i>
Over/Under			-0.2		0.4		1.0		-0.1		-0.1		-0.7		0.3	
<i>eA All ACWI ex-US Equity Net Median</i>			4.7		-6.0		-0.4		4.9		3.6		4.4		7.4	<i>Apr-87</i>
Total Public Markets Fixed Income	4,801,990,242	14.3	-0.6	63	-0.4	69	0.2	57	0.7	82	3.1	60	4.7	45	8.2	Jan-00
<i>ASRS Custom Public Markets Fixed Income Benchmark</i>			<u>-1.0</u>	82	<u>-1.4</u>	78	<u>-1.8</u>	80	<u>0.0</u>	97	<u>2.5</u>	73	<u>4.1</u>	61	--	<i>Jul-75</i>
Over/Under			0.4		1.0		2.0		0.7		0.6		0.6		--	
<i>eA All US Fixed Inc Net Median</i>			-0.5		0.1		0.4		1.5		3.5		4.6		8.0	<i>Jul-75</i>
Total Inflation-Linked Assets	207,223,345	0.6	-10.9	--	-24.6	--	-26.0	--	-17.1	--	-12.1	--	--	--	-7.7	Feb-10
<i>ASRS Custom Inflation-Linked Benchmark</i>			<u>-10.5</u>	--	<u>-23.5</u>	--	<u>-24.7</u>	--	<u>-17.3</u>	--	<u>-13.3</u>	--	<u>-3.2</u>	--	<u>-8.7</u>	<i>Feb-10</i>
Over/Under			-0.4		-1.1		-1.3		0.2		1.2		--		1.0	
Total Multi-Asset Class Strategies	1,097,519,198	3.3	0.6	80	-4.9	62	-1.4	33	7.1	4	7.7	1	6.9	2	7.1	Jan-04
<i>Multi-Asset Class Strategies Custom Benchmark</i>			<u>0.0</u>	83	<u>-1.0</u>	14	<u>0.3</u>	9	<u>7.6</u>	2	<u>7.4</u>	2	<u>5.5</u>	29	<u>6.0</u>	<i>Jan-04</i>
Over/Under			0.6		-3.9		-1.7		-0.5		0.3		1.4		1.1	
<i>eA Global TAA Net Median</i>			2.3		-3.7		-3.0		3.4		3.9		5.0		6.4	<i>Jan-04</i>
Operating Cash (Assetized)	909,056,579	2.7	-1.8	--	-6.0	--	--	--	--	--	--	--	--	--	-1.1	Feb-15
<i>ASRS Cash Assetization Custom Benchmark</i>			<u>-2.6</u>	--	<u>-10.5</u>	--	<u>-8.7</u>	--	--	--	--	--	--	--	<u>-7.7</u>	<i>Feb-15</i>
Over/Under			0.8		4.5		--		--		--		--		6.6	

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

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

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

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

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

Arizona State Retirement System

Asset Class Performance Summary - Private Markets

	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	Inception (%)	Since			
Total Fund	33,620,666,155	100.0	2.7	--	1.3	--	8.3	7.8	9.7	Jul-75	
<i>Interim SAA Policy</i>			<u>1.6</u>	--	<u>-0.4</u>	--	<u>6.7</u>	--	<u>6.9</u>	<u>9.4</u>	<i>Jul-75</i>
Over/Under			1.1		1.7		1.6		0.9	0.3	
<i>Actual Benchmark</i>			1.8	--	0.0	--	7.4	--	7.2	--	<i>Jul-75</i>
Total Private Equity	2,612,677,353	7.8	-0.7	5.4	12.6	13.3	11.4	11.4	11.4	Oct-07	
<i>Russell 2000 1 QTR Lagged</i>			<u>-12.3</u>	--	<u>-0.8</u>	--	<u>8.6</u>	--	<u>9.4</u>	<u>9.5</u>	<i>Oct-07</i>
Over/Under			11.6		6.2		4.0		3.9	1.9	
Total Opportunistic Equity¹	482,107,520	1.4	0.3	12.0	23.2	--	23.9	23.9	23.9	Apr-11	
Total Private Debt	1,994,407,118	5.9	1.8	8.7	11.3	--	11.4	11.4	11.4	Jul-12	
<i>S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged</i>			<u>-0.8</u>	--	<u>3.3</u>	--	<u>4.7</u>	--	<u>4.9</u>	<u>4.9</u>	<i>Jul-12</i>
Over/Under			2.6		5.4		6.6		--	6.5	
Total Opportunistic Debt¹	1,117,410,462	3.3	-2.5	-0.1	6.5	7.2	10.3	10.3	10.3	Jan-08	
Total Real Estate	2,706,475,430	8.1	3.6	14.8	14.0	13.9	7.5	7.5	7.5	Oct-05	
<i>NCREIF ODCE 1 QTR Lagged (net)</i>			<u>3.4</u>	--	<u>13.9</u>	--	<u>12.4</u>	--	<u>12.9</u>	<u>6.8</u>	<i>Oct-05</i>
Over/Under			0.2		0.9		1.6		1.0	0.7	
Total Farmland and Timber	183,239,540	0.5	0.2	3.6	--	--	2.8	2.8	2.8	Jul-13	
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.3</u>	--	<u>5.5</u>	--	<u>--</u>	--	<u>5.5</u>	<u>5.5</u>	<i>Jul-13</i>
Over/Under			-1.1		-1.9		--		--	-2.7	
Total Infrastructure	314,726,752	0.9	2.1	--	--	--	4.9	4.9	4.9	Dec-14	
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.3</u>	--	<u>--</u>	--	<u>--</u>	--	<u>5.4</u>	<u>5.4</u>	<i>Dec-14</i>
Over/Under			0.8		--		--		--	-0.5	

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

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

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

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

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

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

Arizona State Retirement System

Public Market Asset Class Analysis

3 Years Ending December 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%	8.3%	--	6.6%	--	1.2%	--	1.3	--	1.7%	--	1.0	1.2
Interim SAA Policy	--	6.7%	--	6.7%	--	--	--	--	--	--	--	--	1.0
Total Domestic and International Equity	49.6%	9.8%	--	10.6%	--	0.6%	--	0.4	--	0.4%	--	1.0	0.9
ASRS Custom Total Equity Benchmark	--	9.6%	--	10.8%	--	--	--	--	--	--	--	--	0.9
Total Domestic Equity	25.8%	14.7%	34	10.7%	19	0.5%	1	-0.3	--	0.0%	34	1.0	1.4
ASRS Custom Domestic Equity Benchmark	--	14.8%	33	10.8%	22	--	--	--	--	--	34	--	1.4
Total International Equity	22.1%	2.7%	76	11.9%	57	0.7%	1	-0.1	--	0.0%	76	1.0	0.2
ASRS Custom Int'l Equity Benchmark	--	2.8%	76	12.2%	69	--	--	--	--	--	76	--	0.2
Total Public Markets Fixed Income	14.3%	0.7%	82	3.8%	73	0.7%	1	1.0	17	0.7%	81	1.0	0.2
ASRS Custom Public Markets Fixed Income Benchmark	--	0.0%	97	3.7%	72	--	--	--	--	--	96	--	0.0
Total Inflation-Linked Assets	0.6%	-17.1%	--	13.1%	--	2.3%	--	0.1	--	0.4%	--	1.0	-1.3
ASRS Custom Inflation-Linked Benchmark	--	-17.3%	--	12.7%	--	--	--	--	--	--	--	--	-1.4
Total Multi-Asset Class Strategies	3.3%	7.1%	4	8.1%	62	3.9%	2	-0.2	--	-2.0%	28	1.2	0.9
Multi-Asset Class Strategies Custom Benchmark	--	7.6%	2	6.0%	24	--	--	--	--	--	16	--	1.3

Note: Performance is reported net of fees.

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

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

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

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

Arizona State Retirement System

Public Market Asset Class Analysis

5 Years Ending December 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%	7.8%	--	7.9%	--	1.1%	--	0.8	--	1.1%	--	1.0	1.0
Interim SAA Policy	--	6.9%	--	8.0%	--	--	--	--	--	--	--	--	0.9
Total Domestic and International Equity	49.6%	8.4%	--	12.5%	--	0.6%	--	-0.1	--	0.1%	--	1.0	0.7
ASRS Custom Total Equity Benchmark	--	8.4%	--	12.7%	--	--	--	--	--	--	--	--	0.7
Total Domestic Equity	25.8%	12.1%	32	12.2%	25	0.5%	1	-0.4	--	-0.2%	31	1.0	1.0
ASRS Custom Domestic Equity Benchmark	--	12.3%	28	12.2%	25	--	--	--	--	--	28	--	1.0
Total International Equity	22.1%	2.1%	75	14.4%	36	0.8%	1	-0.1	--	0.0%	75	1.0	0.1
ASRS Custom Int'l Equity Benchmark	--	2.2%	75	14.9%	59	--	--	--	--	--	75	--	0.1
Total Public Markets Fixed Income	14.3%	3.1%	60	3.3%	65	0.6%	1	1.2	6	0.6%	89	1.0	0.9
ASRS Custom Public Markets Fixed Income Benchmark	--	2.5%	73	3.2%	63	--	--	--	--	--	97	--	0.8
Total Inflation-Linked Assets	0.6%	-12.1%	--	14.5%	--	2.4%	--	0.5	--	1.1%	--	1.0	-0.8
ASRS Custom Inflation-Linked Benchmark	--	-13.3%	--	14.5%	--	--	--	--	--	--	--	--	-0.9
Total Multi-Asset Class Strategies	3.3%	7.7%	1	8.8%	64	3.2%	1	0.1	1	-0.1%	26	1.0	0.9
Multi-Asset Class Strategies Custom Benchmark	--	7.4%	2	7.8%	41	--	--	--	--	--	25	--	0.9

Note: Performance is reported net of fees.

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

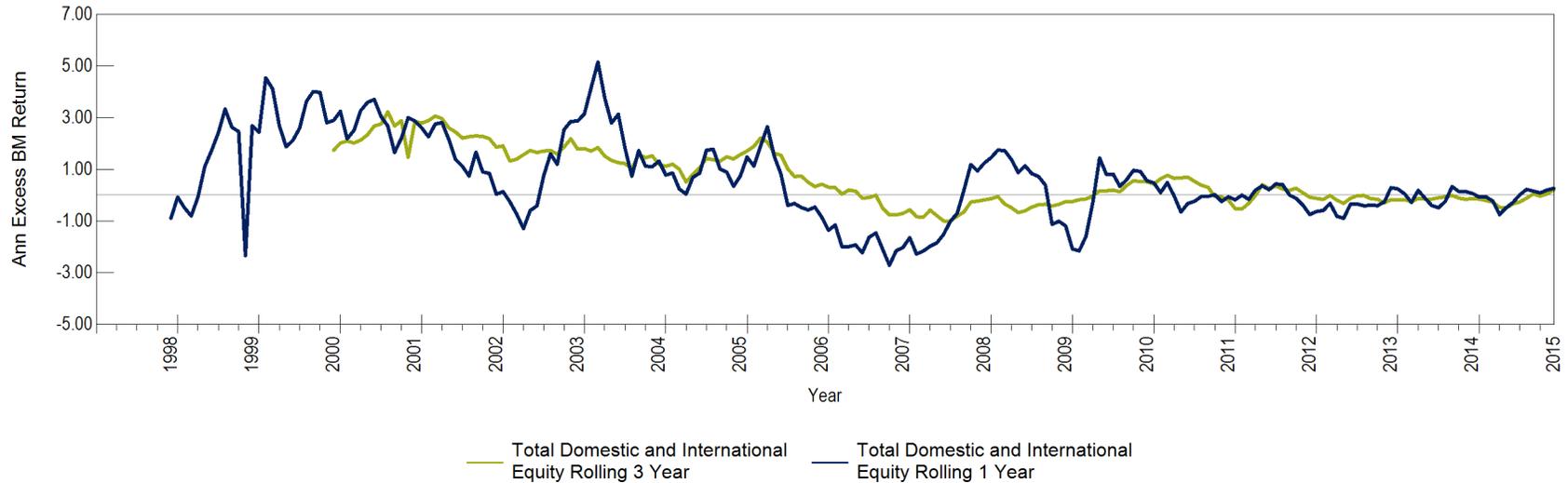
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.

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

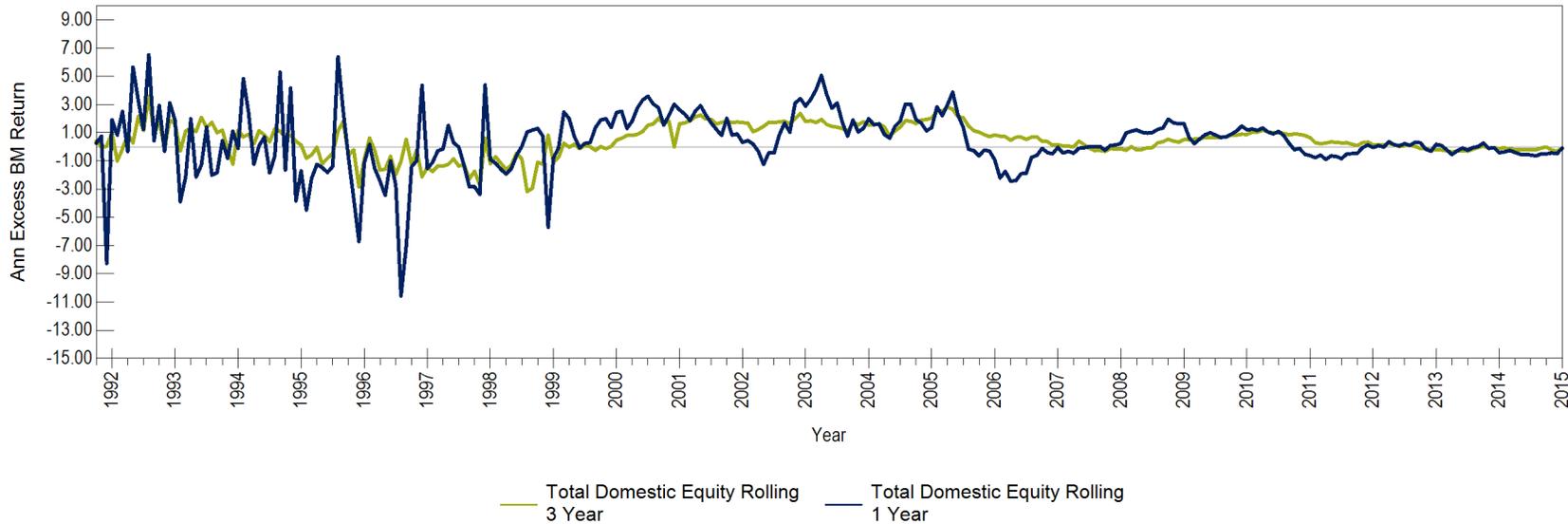


Rolling Information Ratio

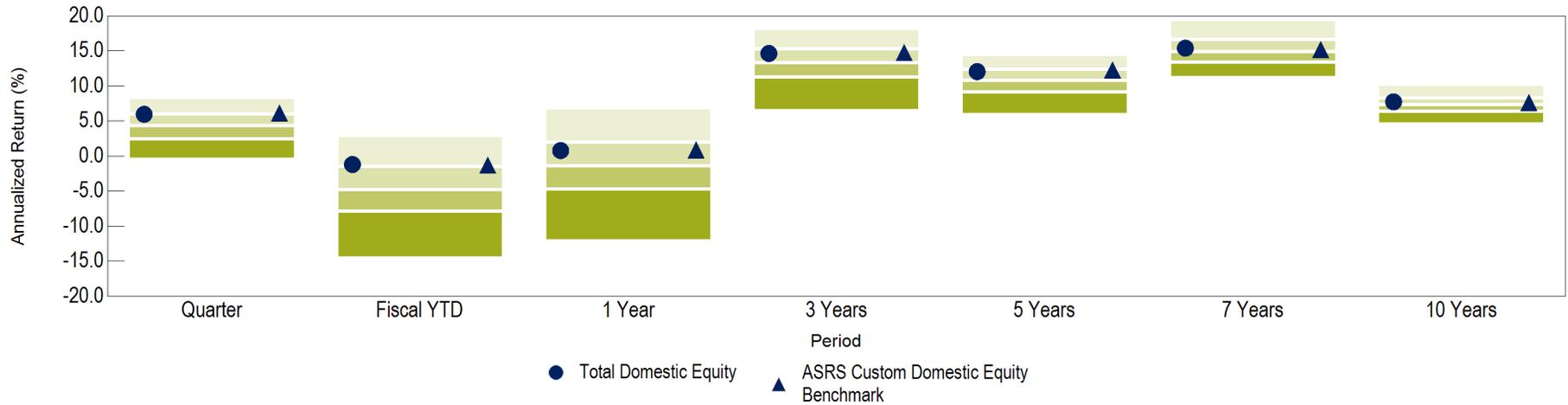


Asset Class Analysis - Total Domestic Equity

Rolling Annual Excess Benchmark Return

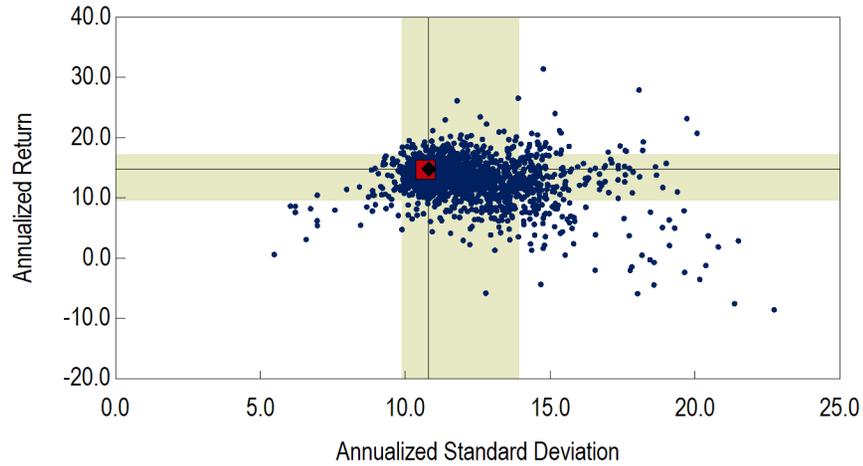


eA All US Equity Net Accounts



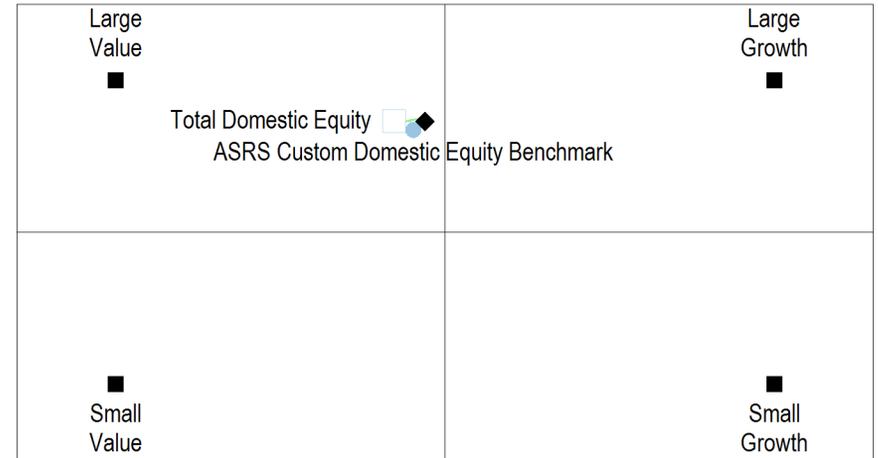
Asset Class Analysis - Total Domestic Equity

3 Year Risk Return

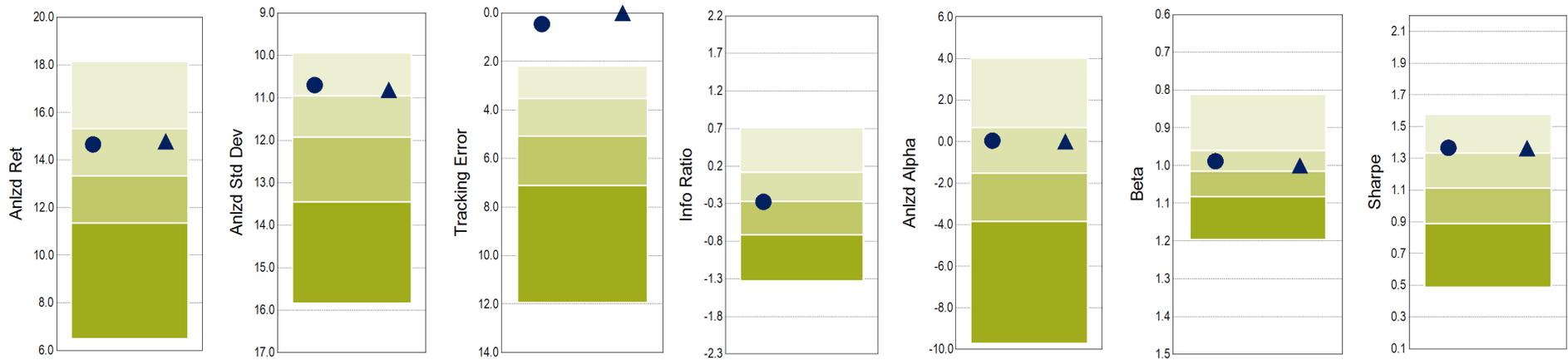


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- 68% Confidence Interval
- eA All US Equity Net

3 Year Style Map



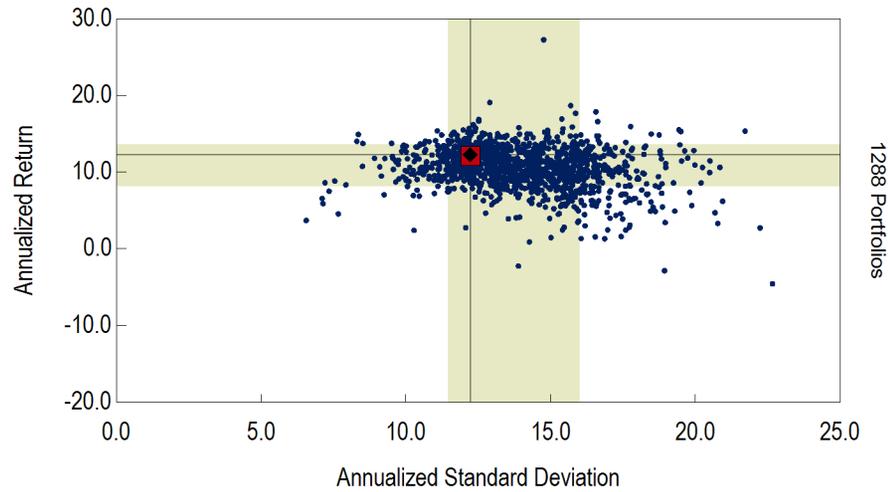
- First Rolling Period
- ◆ Last Rolling Period



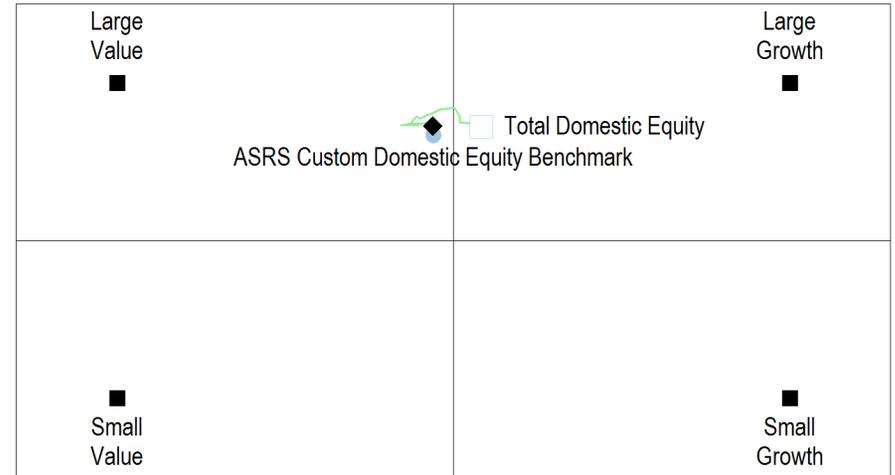
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Domestic Equity

5 Year Risk Return

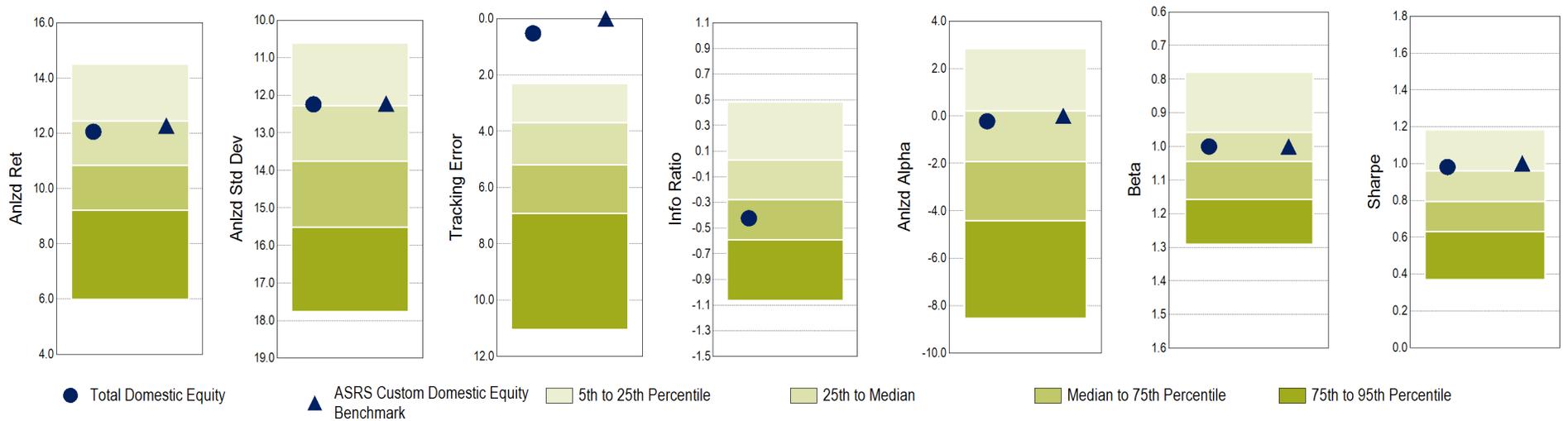


5 Year Style Map



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

- First Rolling Period
- ◆ Last Rolling Period



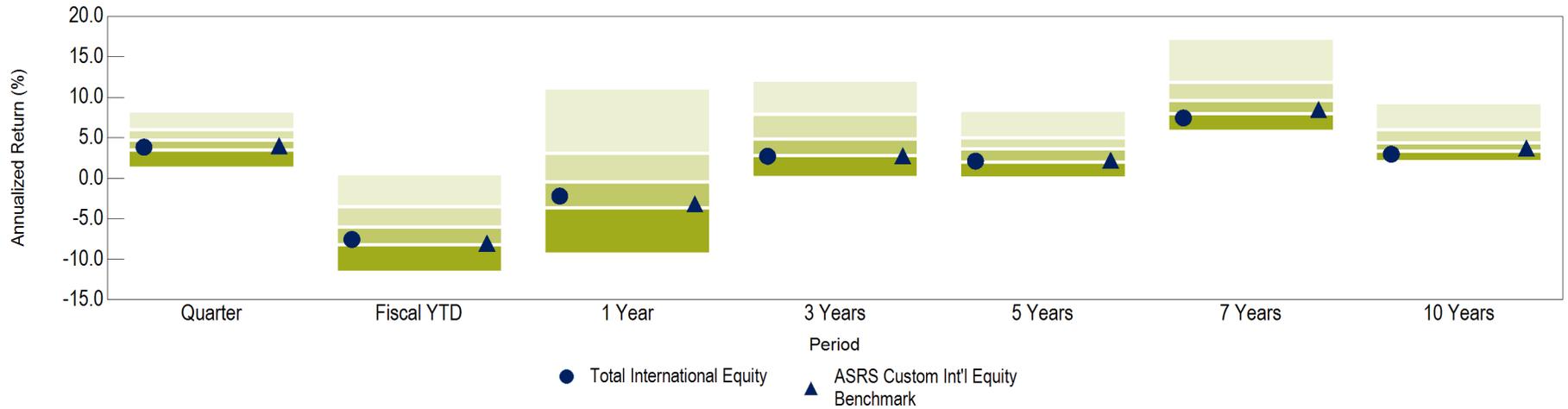
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total International Equity

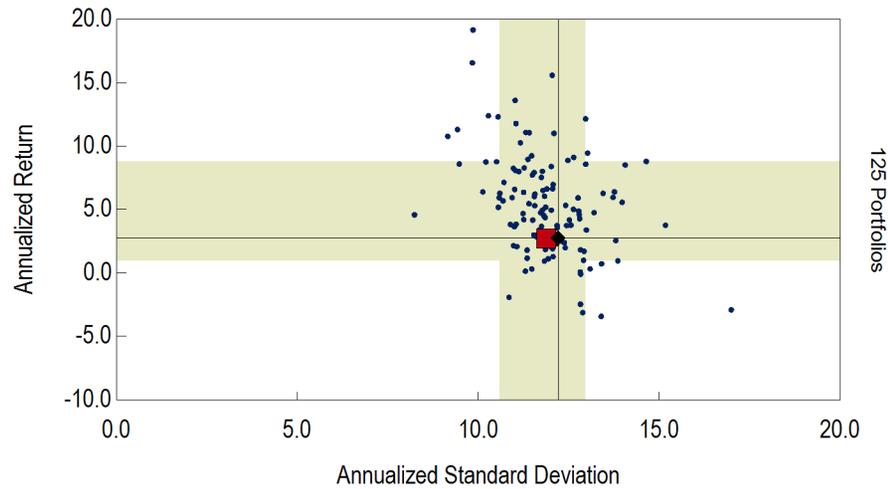
Rolling Annual Excess Benchmark Return



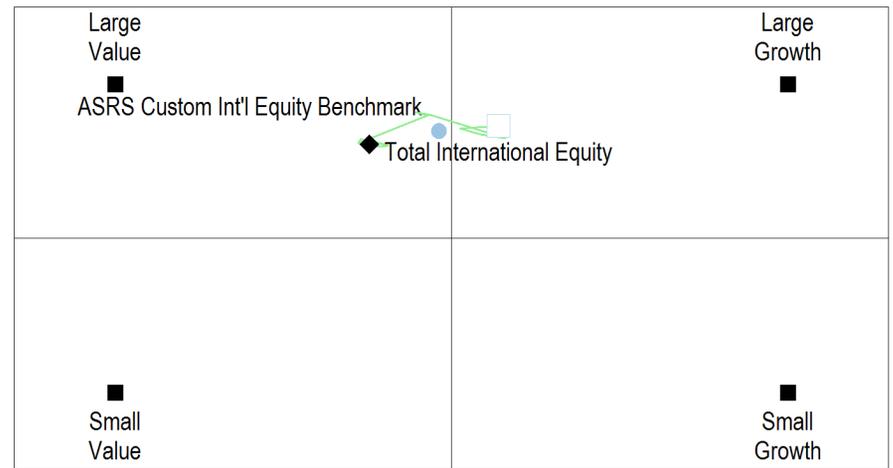
eA All ACWI ex-US Equity Net Accounts



3 Year Risk Return

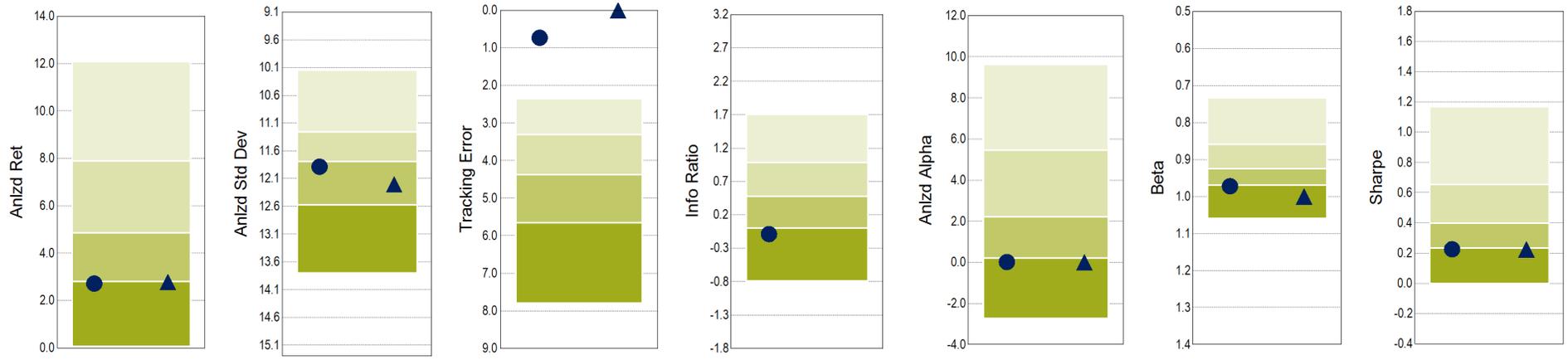


3 Year Style Map



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

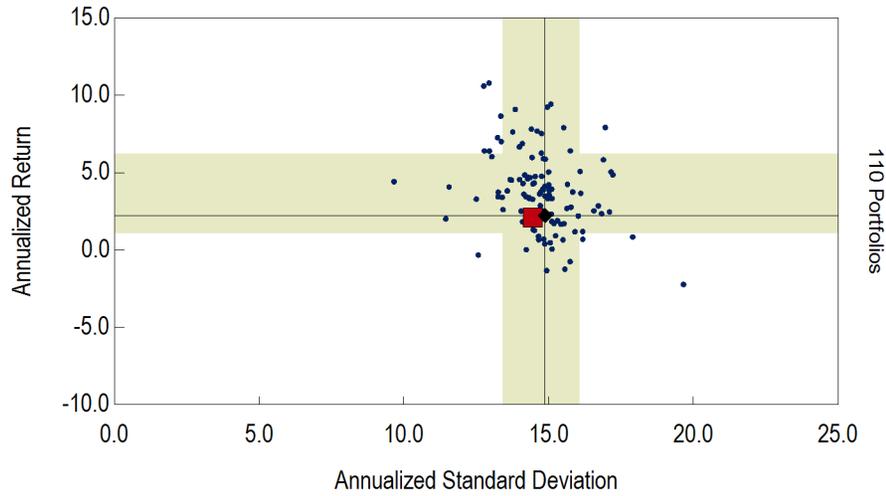
- First Rolling Period
- ◆ Last Rolling Period



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

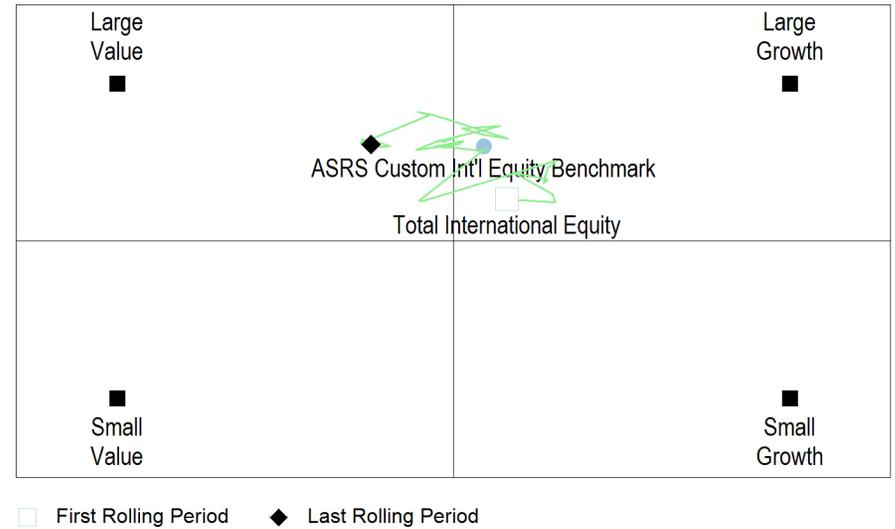
Asset Class Analysis - Total International Equity

5 Year Risk Return

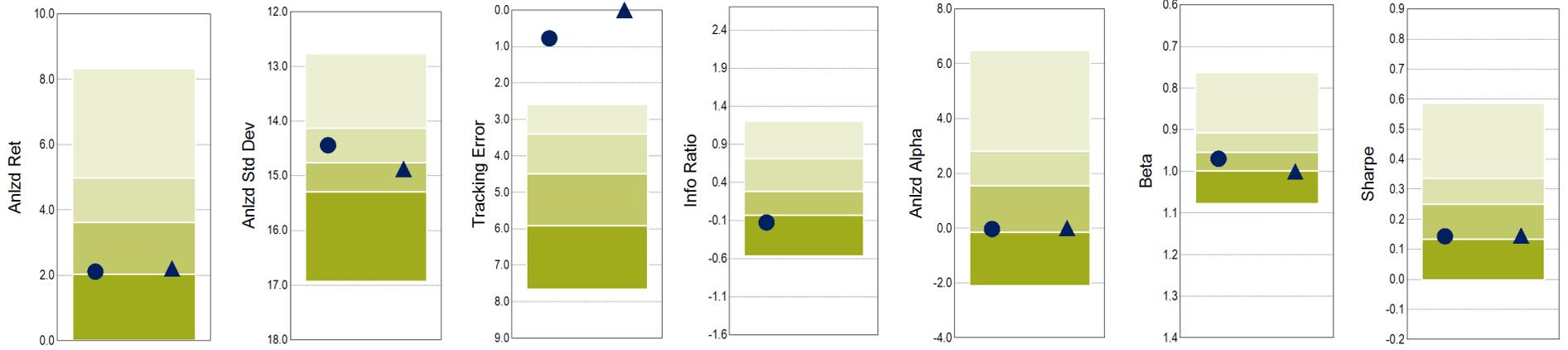


- Total International Equity
- ◆ ASRS Custom Int'l Equity Benchmark
- 68% Confidence Interval
- eA All ACWI ex-US Equity Net

5 Year Style Map



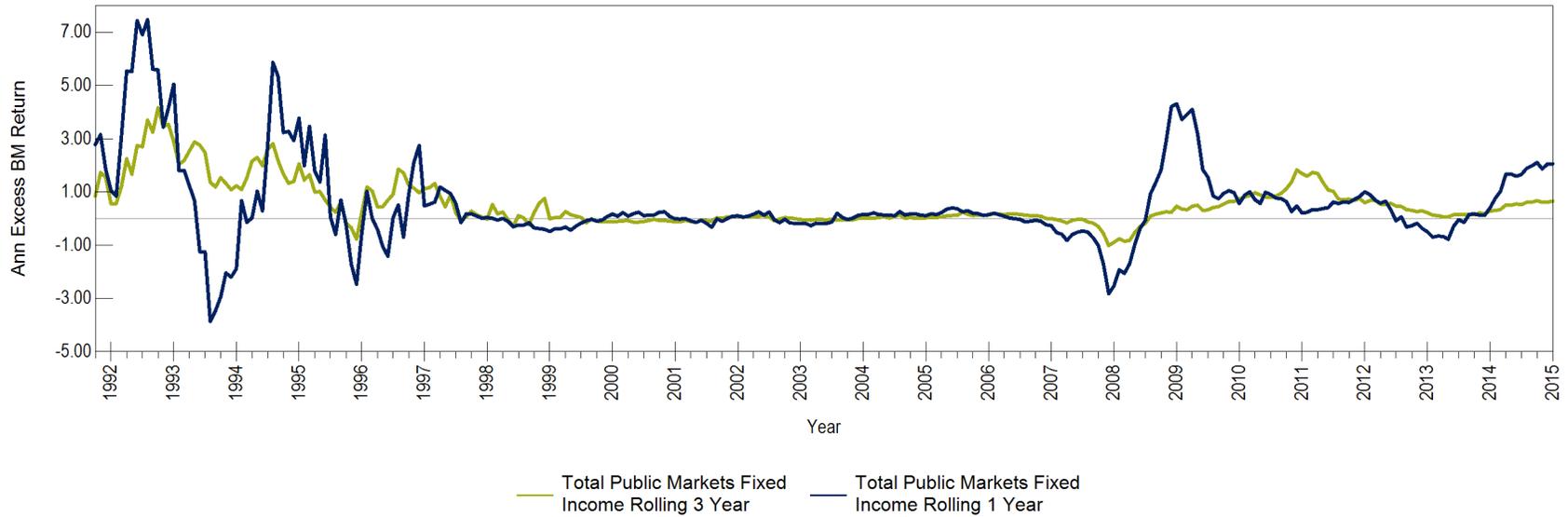
- First Rolling Period
- ◆ Last Rolling Period



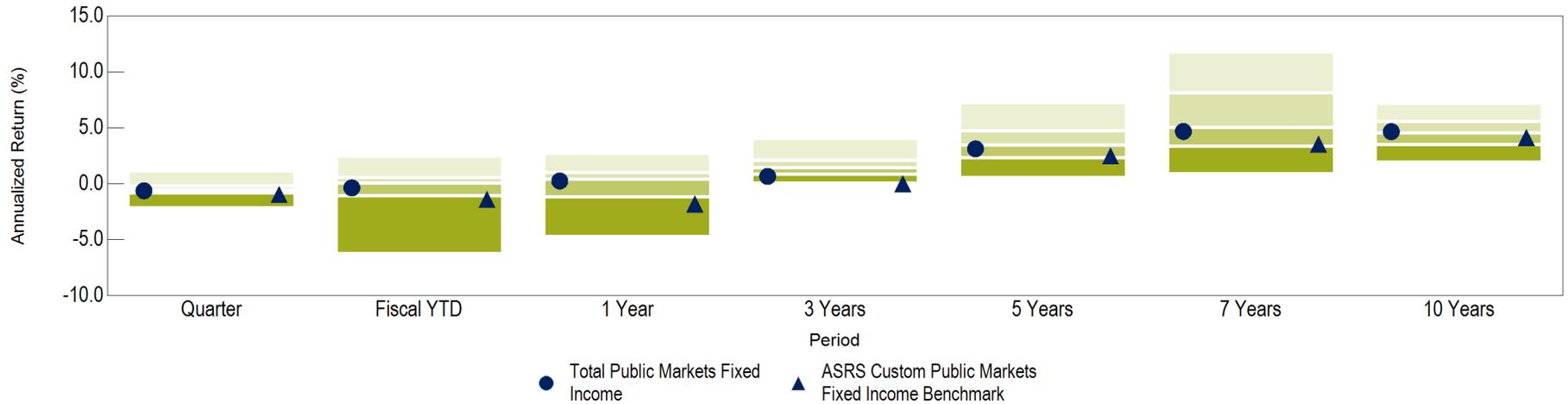
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile



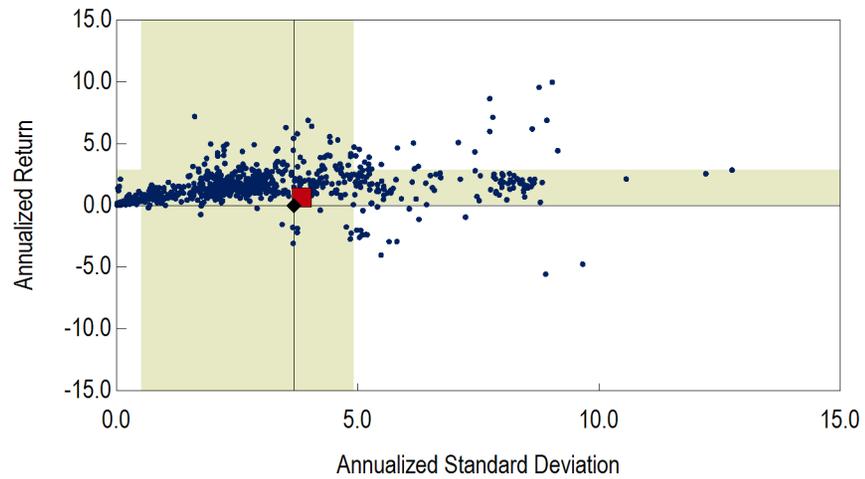
Rolling Annual Excess Benchmark Return



eA All US Fixed Inc Net Accounts

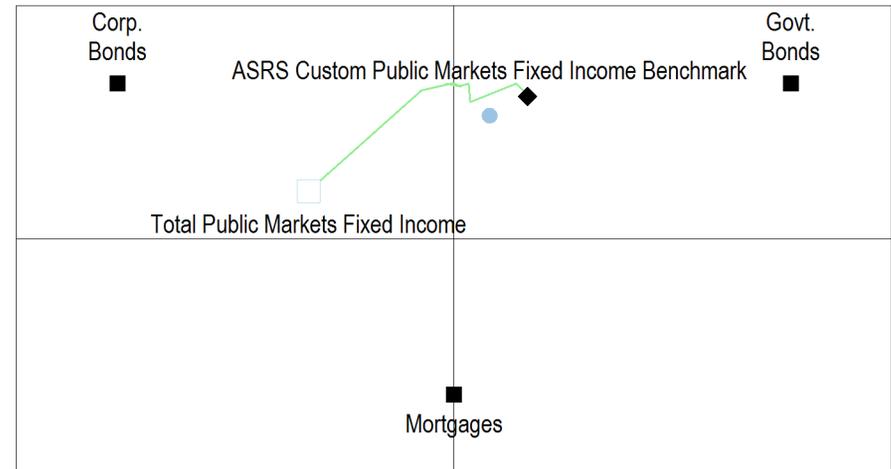


3 Year Risk Return

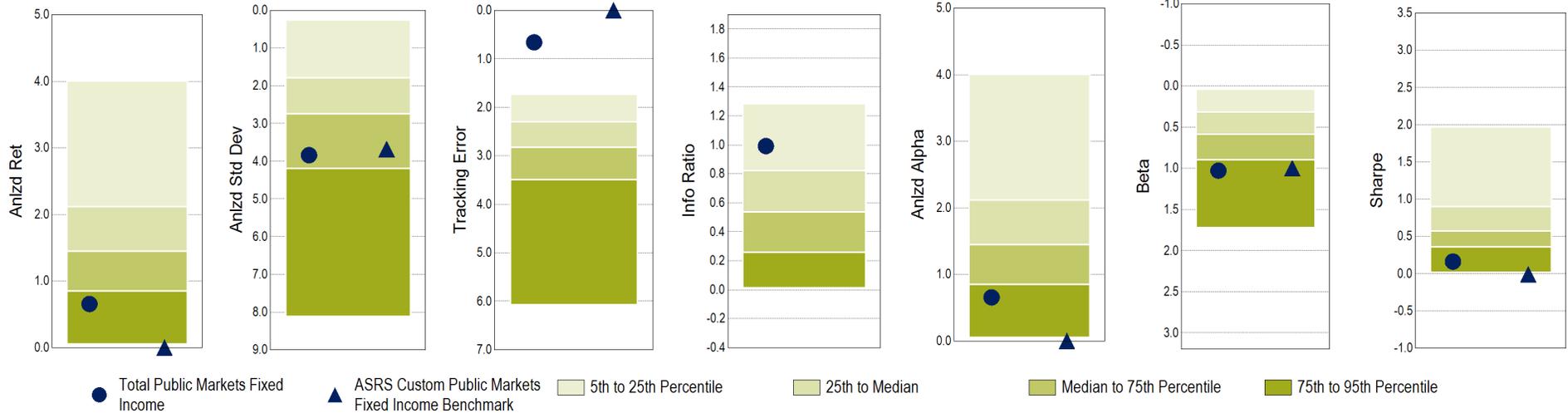


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- 68% Confidence Interval
- eA All US Fixed Inc Net

3 Year Style Map

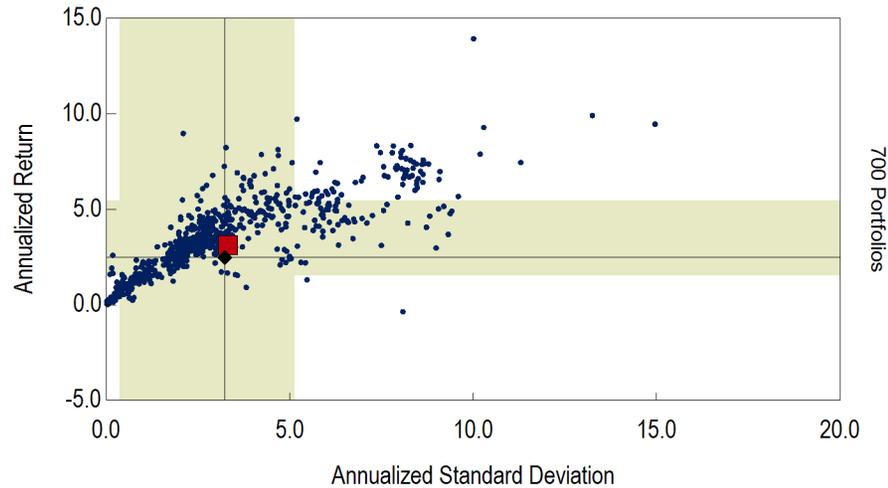


- First Rolling Period
- ◆ Last Rolling Period



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

5 Year Risk Return

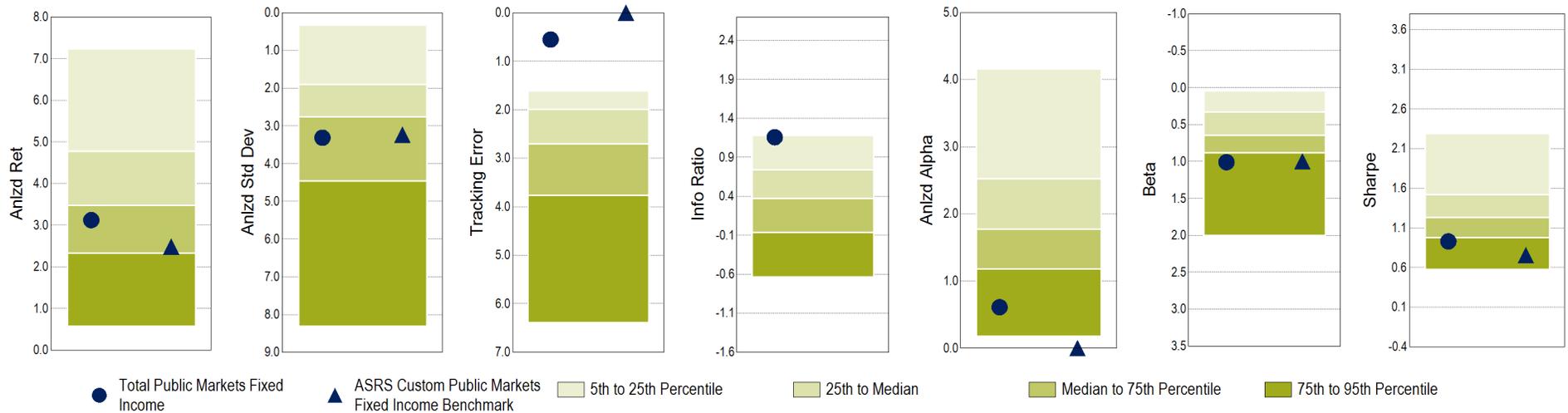


5 Year Style Map



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

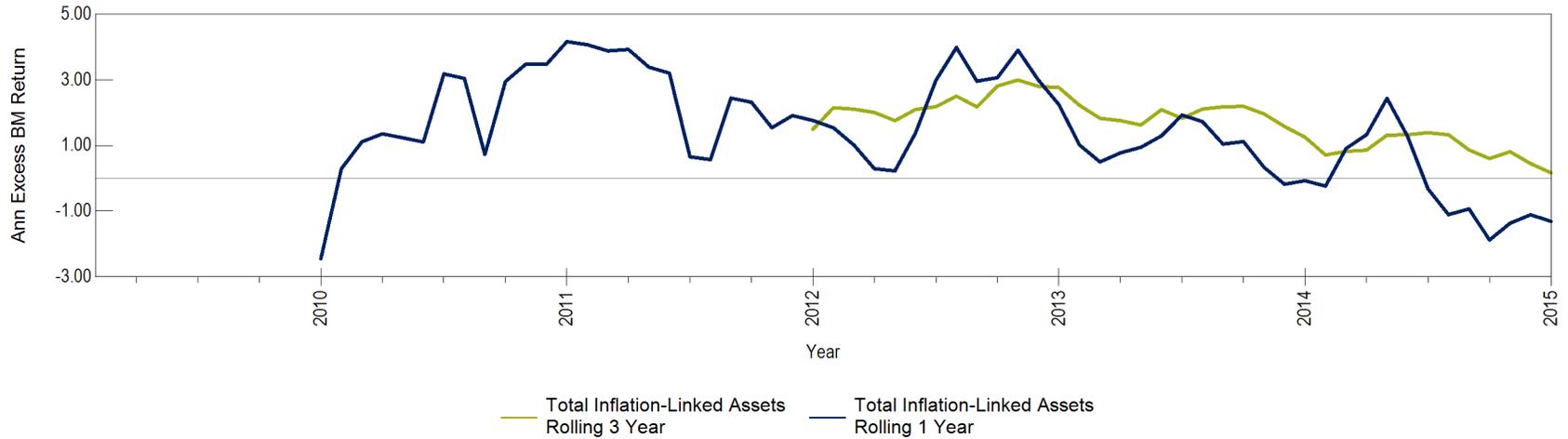
- First Rolling Period
- ◆ Last Rolling Period



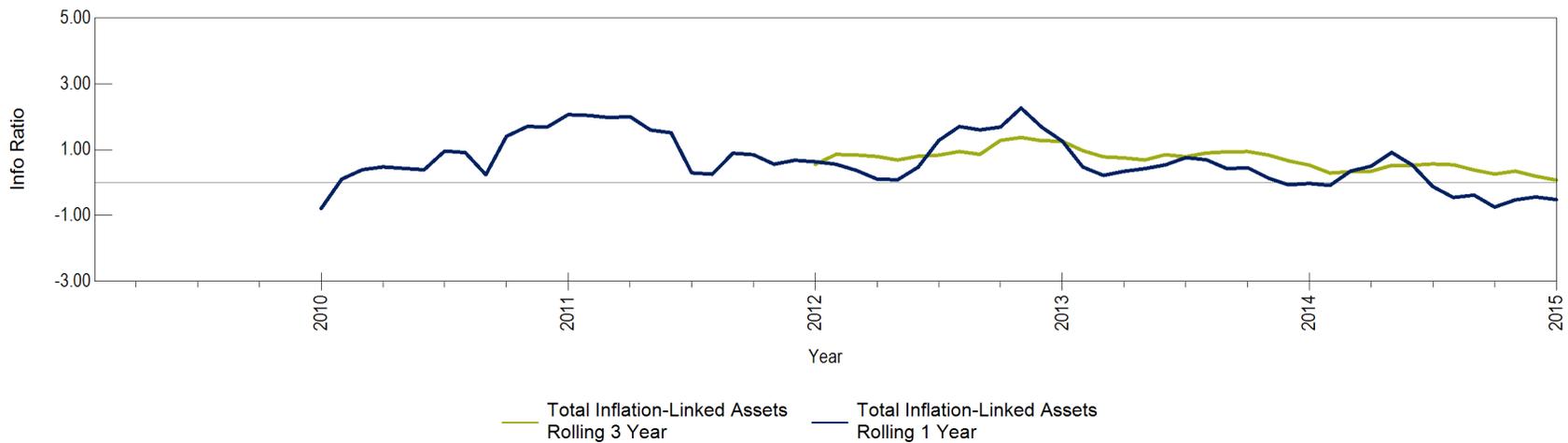
- Total Public Markets Fixed Income
- ▲ ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Inflation-Linked Assets

Rolling Annual Excess Benchmark Return

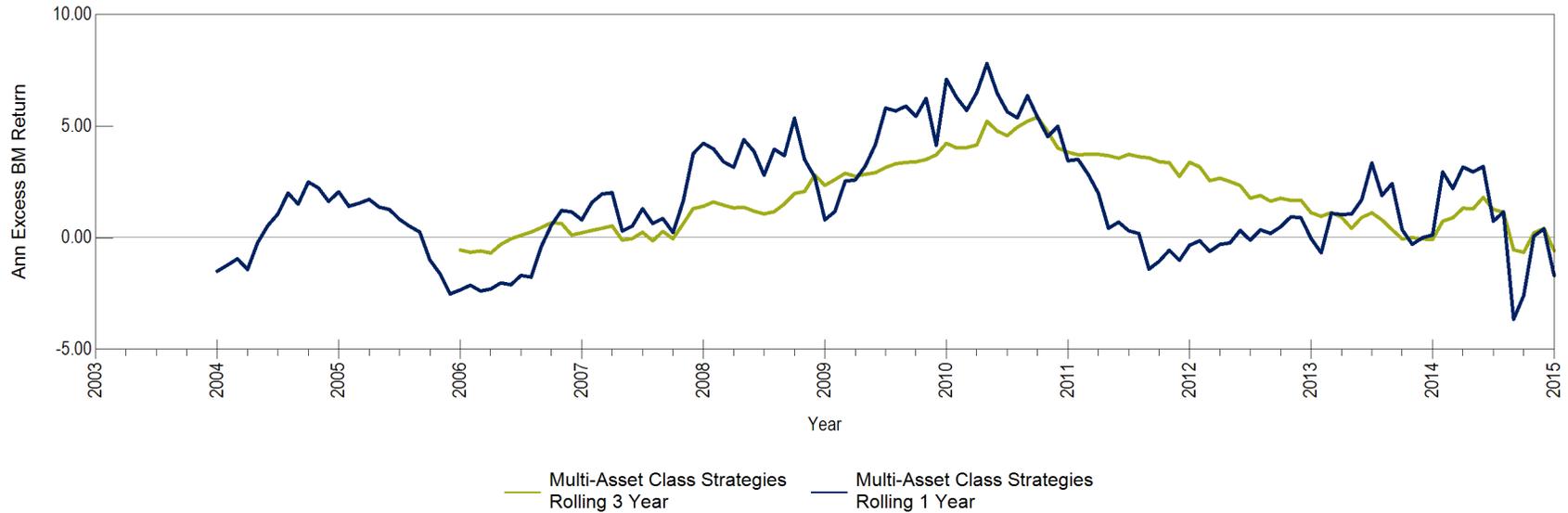


Rolling Information Ratio

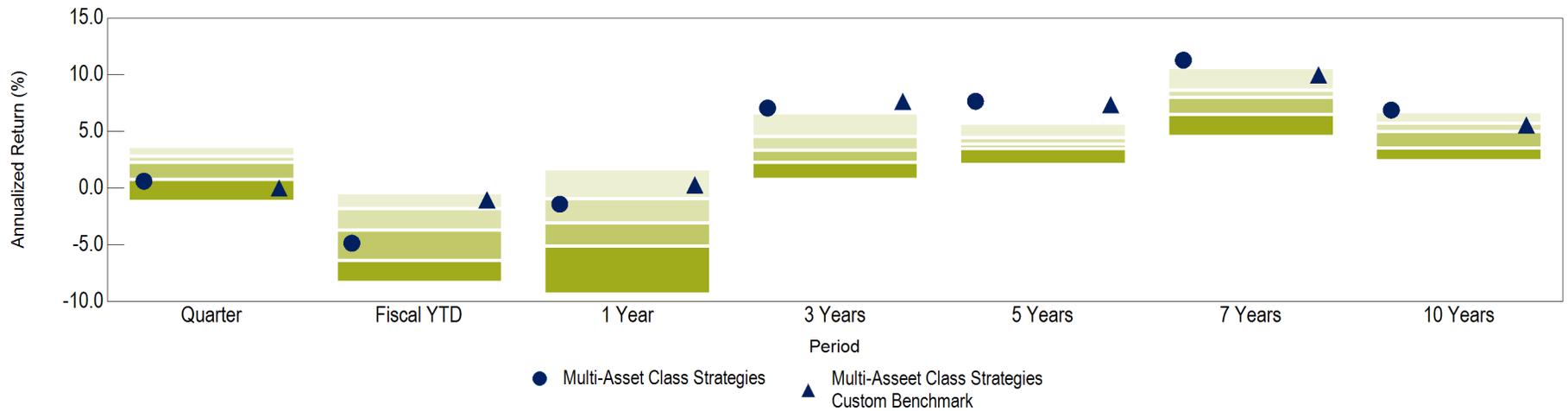


Asset Class Analysis - Multi-Asset Class Strategies

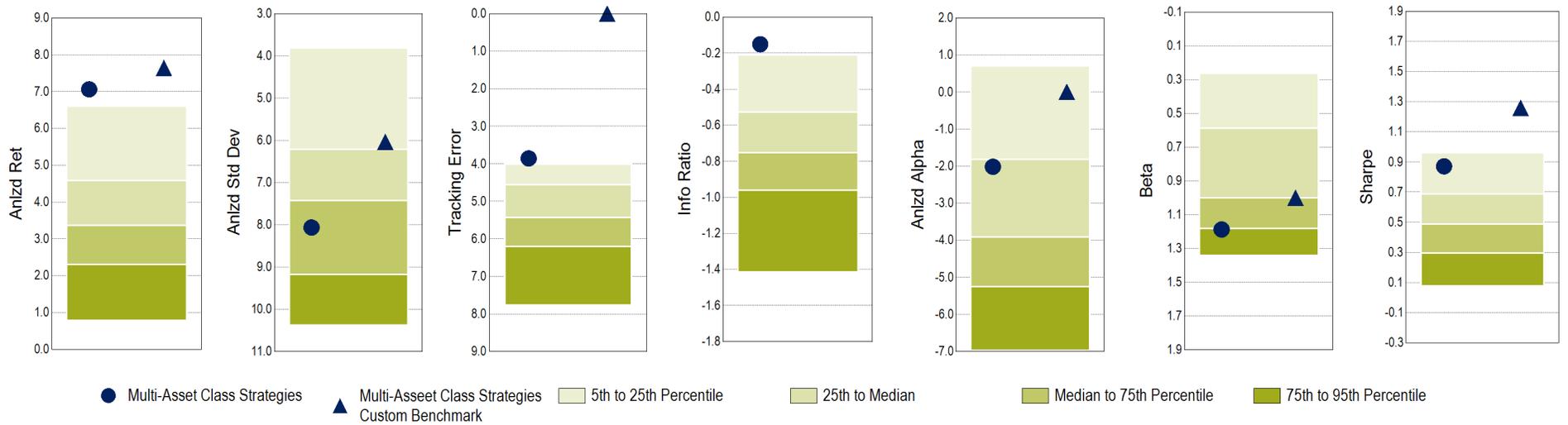
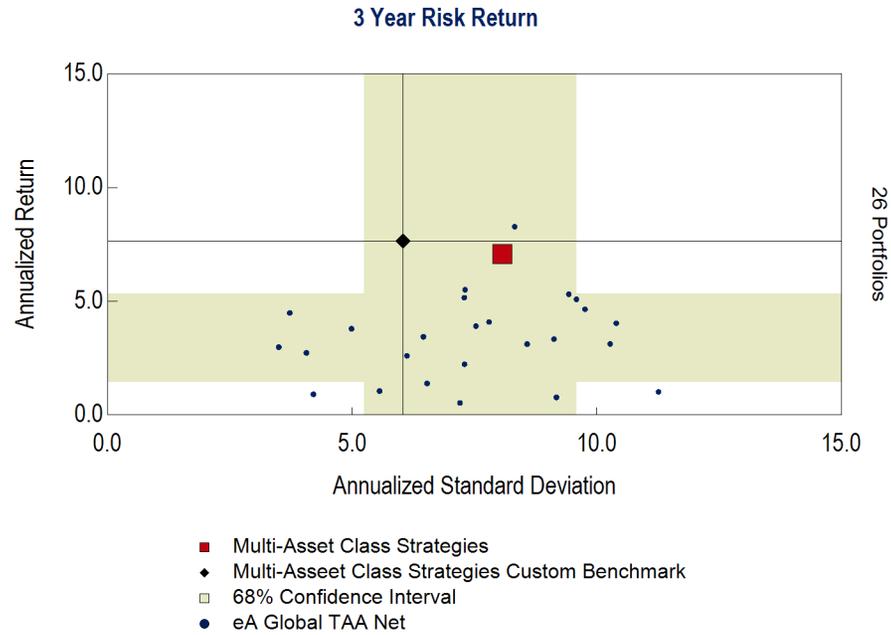
Rolling Annual Excess Benchmark Return



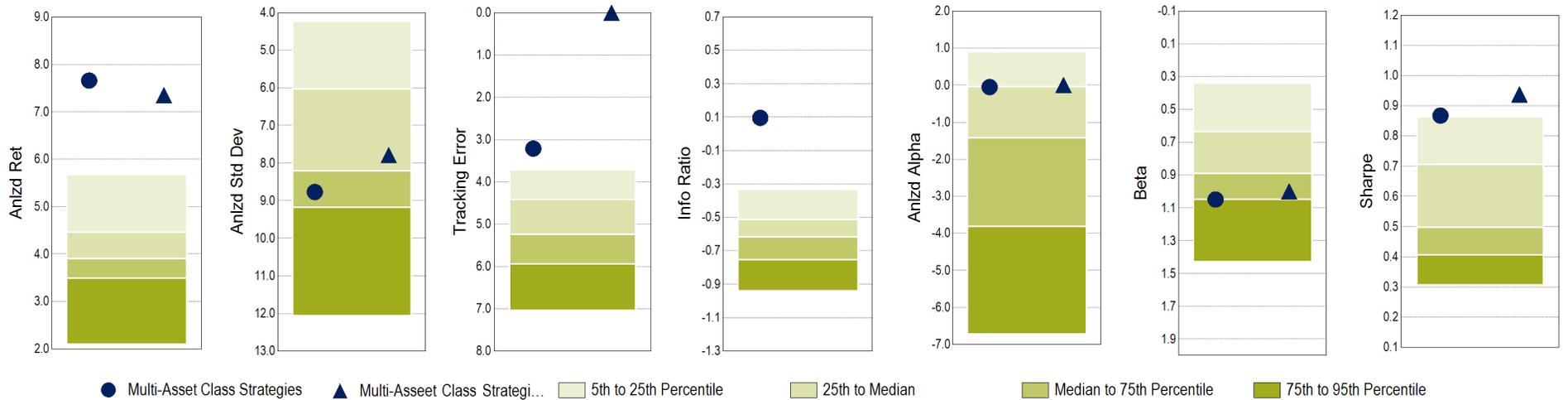
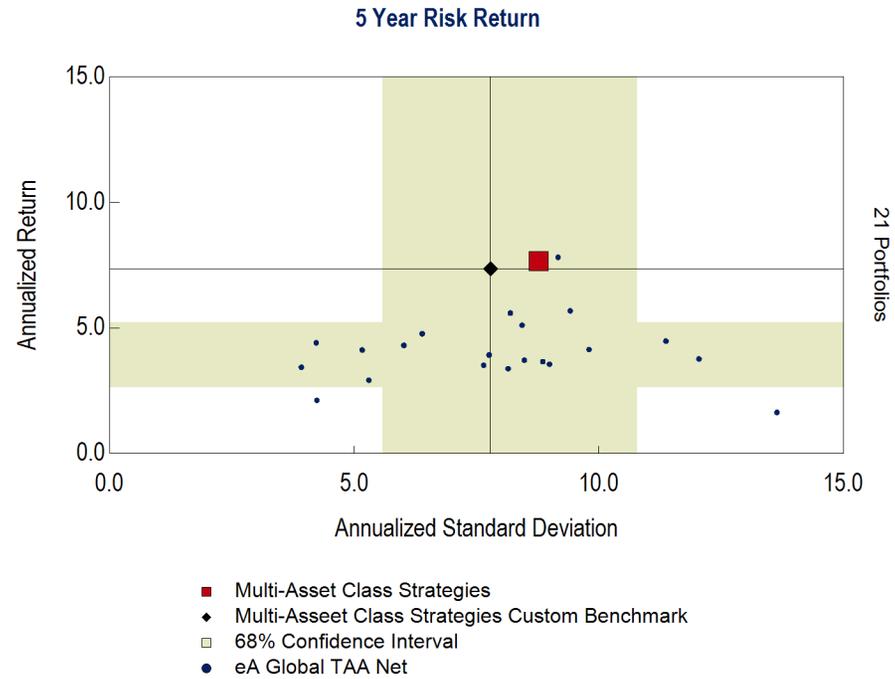
eA Global TAA Net Accounts



Asset Class Analysis - Multi-Asset Class Strategies



Asset Class Analysis - Multi-Asset Class Strategies



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

- **November 18, 2015 - Private Markets Committee**
 - Monthly Status Report, General Discussion and Deal Flow
 - Private Equity Manager Recommendation (\$50 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The ASRS has invested with this manager in a prior fund within the private debt program
 - Private Equity Manager Recommendation (\$30 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The ASRS has invested with this manager in a prior fund within the private equity program
 - 2016 Private Equity Pacing Model and Implementation Plan
 - Anticipate \$700 million of new private equity commitments in 2016
 - Committee approved the recommended commitment pace for 2016, noting that the actual amount may differ as determined by the committee as market conditions evolve throughout the year

- **November 24, 2015 - Ad-hoc Private Markets Committee**

- Private Equity Manager Recommendation – Additional Commitment (\$12.5 million; \$25 million original commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The Committee approved the original \$25 million commitment at the August 20, 2014 PRIVMC meeting
 - The ASRS has invested with this manager in multiple prior funds across the ASRS private markets programs
- Variance Request
 - RCLCO, in conjunction with the ASRS Private Markets Team, recommended the ASRS approve a variance request from an existing real estate manager that would allow the manager to invest in a property that does not meet the current investment criteria for the portfolio
 - The variance request is required as the investment mandate currently states that at least 60% of a project's value will be derived from retail occupancy and the manager is contemplating an investment that would allow for a higher percentage of the project to be allocated to office occupancy
 - Committee approved the recommendation

- **December 18, 2015 - Private Markets Committee**

- Monthly Status Report, General Discussion and Deal Flow
- Private Debt Manager Recommendation (\$500 million 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
 - The ASRS has invested with this manager in multiple prior funds within the private debt program

• **December 18, 2015 - Private Markets Committee (cont.)**

- Private Equity Manager Recommendation – Additional Commitment (\$15 million; \$30 million original commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The Committee approved the original \$25 million commitment at the March 20, 2015 PRIVMC meeting
- Private Equity Manager Recommendation – Additional Commitment (up to \$10 million; \$30 million original commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 8%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
 - The Committee approved the original \$30 million commitment at the November 18, 2015 PRIVMC meeting
 - The ASRS Private Markets Team had originally requested a \$50 million commitment, but the manager was only able to grant \$30 million due to the fund's oversubscription; a larger allocation is now available
 - The ASRS has invested with this manager in a prior fund within the private equity program
- Real Estate Asset Disposition Recommendation
 - The ASRS Private Markets Team recommended the ASRS consider the disposition of a property that no longer meets the ASRS standards for continued ownership due to its size and the condition of the property. negotiation and implementation of the transaction
 - Committee approved the recommendation, delegating to staff the negotiation and implementation of the transaction
- 2016 Real Estate Pacing Model and Implementation Plan
 - Anticipate net \$200 - \$400 million of new real estate commitments in 2016
 - Includes potential disposition of existing investments totaling approximately \$300 million
 - Committee approved the recommended commitment pace for 2016, noting that the actual amount may differ as determined by the committee as market conditions evolve throughout the year

- **January 19, 2016 – Private Markets Committee**

- Monthly Status Report, General Discussion and Deal Flow
- Separately Managed Account Portfolio Review
 - RCLCO presented the results of its semi-annual portfolio review of the separately managed real estate accounts
- Private Equity Manager Recommendation (\$100 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
 - The ASRS has invested with this manager in multiple prior funds within the private equity program
- 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
 - The ASRS has invested with this manager in a prior fund within the private equity program

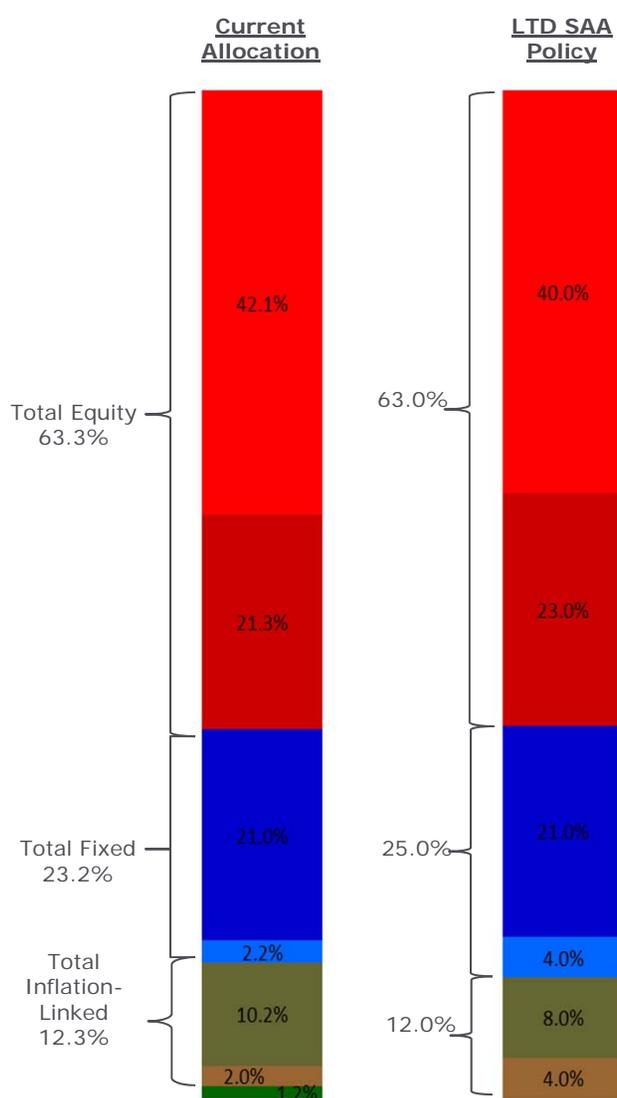
- **The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP. New long-term SAAP adopted as of April 1, 2015.**
 - Current Interim SAAP includes proration of 4% Private Debt and 2% Real Estate, which are unfunded.
 - Continued build out of private markets asset classes provides opportunity to take advantage of illiquidity premium to produce expected returns in excess of what we believe can be achieved in the public markets.
- **IMD has already taken significant steps to move the Fund toward implementation of the recently approved SAAP.**
 - The largest single underweight position in the Fund is Private Debt, which was increased from a 3% SAAP target to a 10% SAAP target with an 8% - 12% range (current actual is 7.0%).
 - \$5.1 billion in commitments to private debt strategies equates to approximately 15.2% of Total Fund assets vs. the SAAP target of 10%.
 - \$5.1 billion includes \$500 million investment approved in December 2015 that is expected to close in 1Q 2016.
 - Estimate private debt asset class reaching 10% target by the end of 2016.
 - Estimate private debt asset class reaching 12% cap in 3Q 2017.
 - Multi-Asset Class Strategies (formerly GTAA) has been restructured and moved 'above the line', and now has an explicit 5% target within the SAAP.
- **ASRS Private Markets programs have added significant value at the Total Fund level over the three- and five-year time periods.**
- **Volatility is being realized across markets; Long Treasuries mandate funded in August 2015 to mitigate volatility.**
- **Tactical positioning consistent with IMD House Views.**

Independent Oversight/Compliance: LTD

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



Long Term Disability Asset Allocation



	Current Mkt Value	Current Allocation	LTD SAA Policy	Difference
U.S. Equity	\$88,863,492	42.1%	40.0%	2.1%
U.S. Large Cap	\$73,864,359	35.0%	34.0%	1.0%
U.S. Small Cap	\$14,999,134	7.1%	6.0%	1.1%
International Equity	\$44,891,551	21.3%	23.0%	-1.7%
Developed Large Cap	\$27,389,729	13.0%	14.0%	-1.0%
Developed Small Cap	\$7,463,993	3.5%	3.0%	0.5%
Emerging Markets	\$10,037,829	4.8%	6.0%	-1.2%
Total Equity	\$133,755,043	63.3%	63.0%	0.3%
U.S. Fixed Income	\$44,356,776	21.0%	21.0%	0.0%
Core	\$27,276,513	12.9%	13.0%	-0.1%
High Yield	\$17,080,263	8.1%	8.0%	0.1%
Emerging Market Debt	\$4,648,166	2.2%	4.0%	-1.8%
Total Fixed Income	\$49,004,942	23.2%	25.0%	-1.8%
Real Estate	\$21,608,530	10.2%	8.0%	2.2%
Commodities	\$4,273,009	2.0%	4.0%	-2.0%
Total Inflation-Linked	\$25,881,539	12.3%	12.0%	0.3%
Cash¹	\$2,506,729	1.2%	0.0%	1.2%
Total	\$211,148,253	100.0%	100.0%	0.0%

¹Cash includes money for the upcoming monthly pension distribution.

Note: Market values include manager held cash.

ASRS LTD rebalanced to the new SAA Policy in December 2012, with an effective date of 1/1/2013.

Long Term Disability Performance Summary

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (July-02)
Long Term Disability	3.7%	-1.6%	7.1%	6.8%	4.9%	6.1%
LTD SAA Policy ¹	3.3%	-2.1%	6.6%	6.6%	5.3%	6.3%
Excess Return	0.4%	0.5%	0.5%	0.2%	-0.4%	-0.2%

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

Market Environment Update and Outlook



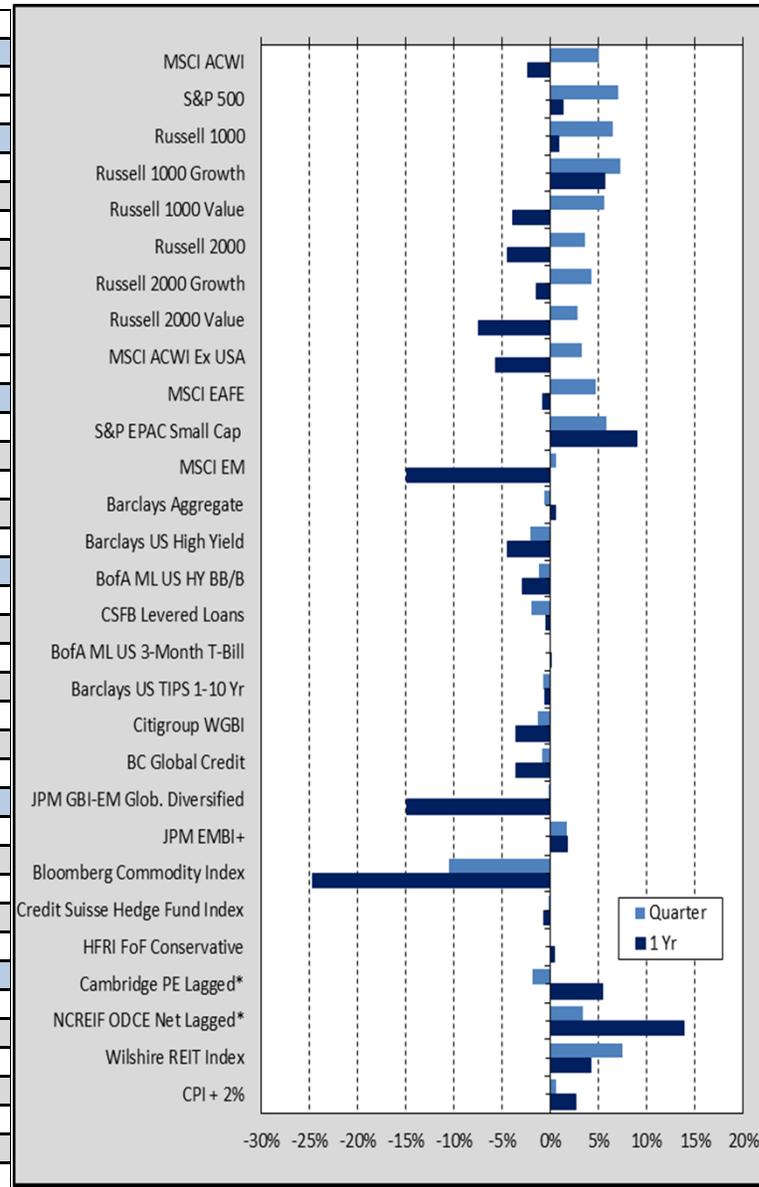
Economic Environment

- **Fourth quarter GDP growth rate (first estimate) printed at a modest 0.7%.**
 - Retail sales (ended November) at +0.9% on a year-over-year growth rate basis. In the same period last year the YoY growth rate was 4.6%.
 - The inventory-to-sales ratio ending November was flat at 1.4 and has remained relatively flat since early 2010.
 - Corporate profits (ended June) as a percent of GDP declined slightly vs first quarter GDP to 9.9% from 10.3% and remain elevated relative to historical levels.
 - The U.S. trade deficit declined slightly in November.
- **The unemployment rate fell to 5.0% in Q4 from 5.6% in Q4 2014; U-6, a broader measure of unemployment, fell to 9.9% during the fourth quarter.**
- **The Case-Shiller Home Price Index (as of 10/31) increased slightly to 175.7 from second quarter levels (170.0) and is at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally adjusted CPI increased to 0.6% from -0.02% at the end of September; Capacity Utilization decreased to 76.5% in December from 77.9% in September.**
- **Fed Funds rate was raised to 0.50% from 0.25%; The 10-year Treasury Yield (constant maturity) finished Q4 at 2.2% flat from Q3.**
- **The Fed balance sheet remained little changed in Q4 2015, while the European Central Bank balance sheet continues to increase.**
 - ECB continues asset purchases of €60 billion per month.
- **S&P valuations decreased in December remaining above the 10-year and long-term averages**
 - Cyclically adjusted Shiller PE ratio (23.95x) is above the long-term average of 16.4x and above the 10-year average of 22.9x.
- **The U.S. Dollar continues its strength against a basket of major currencies**
 - Currency volatility has seen a sustained uptick since Q1 2015.

Arizona State Retirement System

Market Environment – Q4 2015 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI	World	5.0%	-2.4%	7.7%	6.1%	4.8%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	7.0%	1.4%	15.1%	12.6%	7.3%
Russell 1000	Large Core	6.5%	0.9%	15.0%	12.4%	7.4%
Russell 1000 Growth	Large Growth	7.3%	5.7%	16.8%	13.5%	8.5%
Russell 1000 Value	Large Value	5.6%	-3.8%	13.1%	11.3%	6.2%
Russell 2000	Small Core	3.6%	-4.4%	11.7%	9.2%	6.8%
Russell 2000 Growth	Small Growth	4.3%	-1.4%	14.3%	10.7%	8.0%
Russell 2000 Value	Small Value	2.9%	-7.5%	9.1%	7.7%	5.6%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	3.2%	-5.7%	1.5%	1.1%	2.9%
MSCI EAFE	Int'l Developed	4.7%	-0.8%	5.0%	3.6%	3.0%
S&P EPAC Small Cap	Small Cap Int'l	5.9%	9.0%	10.7%	6.9%	5.7%
MSCI EM	Emerging Equity	0.7%	-14.9%	-6.8%	-4.8%	3.6%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	-0.6%	0.5%	1.4%	3.2%	4.5%
Barclays US High Yield	High Yield	-2.1%	-4.5%	1.7%	5.0%	7.0%
BofA ML US HY BB/B	High Yield	-1.1%	-2.9%	2.2%	5.3%	6.5%
CSFB Levered Loans	Bank Loans	-2.0%	-0.4%	2.6%	3.8%	4.1%
BofA ML US 3-Month T-Bill	Cash	0.0%	0.1%	0.1%	0.1%	1.2%
Barclays US TIPS 1-10 Yr	Inflation	-0.7%	-0.5%	-1.8%	1.6%	3.5%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	-1.2%	-3.6%	-2.7%	-0.1%	3.4%
BC Global Credit	Global Bonds	-0.8%	-3.5%	-0.3%	2.8%	4.3%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	-0.0%	-14.9%	-10.0%	-3.5%	4.3%
JPM EMBI+	Em. Mkt. Bonds	1.8%	1.8%	-0.3%	5.0%	6.7%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
Bloomberg Commodity Index	Commodity	-10.5%	-24.7%	-17.3%	-13.5%	-6.4%
Credit Suisse Hedge Fund Index	Hedge Fund	-0.1%	-0.7%	4.3%	3.6%	5.0%
HFRI FoF Conservative	Fund of Funds	0.1%	0.4%	3.7%	2.3%	2.0%
Cambridge PE Lagged*	Private Equity	-1.8%	5.4%	13.5%	14.1%	12.1%
NCREIF ODCE Net Lagged*	Real Estate	3.4%	13.9%	12.4%	12.9%	5.7%
Wilshire REIT Index	REIT	7.5%	4.2%	11.8%	12.4%	7.3%
CPI + 2%	Inflation/Real Assets	0.6%	2.7%	3.0%	3.6%	3.9%



* As of 9/30/2015

Global Equity

- **U.S. equities posted solid gains in the fourth quarter as global volatility continued.**
- **Small cap stocks underperformed large cap stocks during the quarter, with the Russell 2000 Index returning 3.6%% and the Russell 1000 Index returning 6.5%.**
- **International equities underperformed U.S. markets during the quarter, returning 3.2%, as measured by the MSCI ACWI ex-U.S. Index.**
 - Developed markets returned 4.7% as measured by the MSCI EAFE Index. The Pacific Region led returns posting a 9.0% gain with New Zealand leading the group up 18.2%. Europe posted modest gains, up 2.5%
 - Emerging markets returned 0.7% as measured by the MSCI Emerging Markets Index in U.S. dollar terms. Indonesia and China led gains returning 20.8% and 13.1% respectively.

Private Equity

- **New private equity commitments totaled \$312 billion in calendar year 2015.**
 - Represents a 14% decline from the \$360 billion raised in 2014, resulting from public equity market volatility and increased economic uncertainties.
- **Buyout and Special Situations fundraising down over 20% from post crisis high in 2014.**
- **Venture capital raised approximately \$43.9 billion in calendar 2015.**
 - VC fundraising as a percent of total new PE funds is in line with historical post-dot com levels at approximately 14%.
- **Energy funds raised \$38.6 billion representing 12% of capital raised in 2015.**
 - Investors are opportunistically approaching the energy market dislocation.
- **Asian private equity commitments slowed to total 8% of total funds raised down from 11% in 2014.**
- **European commitments comprised 23% of all new PE commitments in 2015.**
 - Fifteen pan-European buyout managers with closes on over \$1 billion each raised over half of 2015 total

Market Environment

Fixed Income

- **The yield curve shifted up with intermediate yields increasing 21-39 basis points and long duration yields increasing 14 basis points.**
- **The spread between two and 10-year rates decreased to 121 basis points from 141 basis points ended December. Treasury Inflation-Protected Securities, or TIPS, returned -0.7% during the quarter, as measured by the Barclays US TIPS 1-10 Yr Index.**
- **The Barclays Long Duration Credit Index lost -0.67% as the long end of the curve ended the quarter 14 basis points higher.**
- **Long Treasuries lost -1.38% and investment-grade corporate debt lost -0.52%.**
- **The Barclays 1-3 year Government/ Credit Index returned -0.36% and US high yield bonds lost -2.1%.**
- **Emerging markets debt continued to slow in local currency and was modestly positive in US denominated terms.**
 - US dollar-denominated debt, as measured by the JP Morgan EMBI Index, gained 1.8%; local currency debt was flat, according to the JP Morgan GBI-EM Index.

Real Assets/Inflation-Linked Assets

- **Massive energy market dislocation.**
 - Seek inflation sensitive asset classes that offer positive yield
 - Oil prices trending lower.
 - Private equity and private debt opportunities may be relatively attractive.
 - Potential for public stressed/distressed credit, equity and commodity plays.

- **OPEC and Saudi Arabia have indicated a willingness to allow lower oil prices to persist in efforts to cement market share and reduce marginal supply.**

- **Select infrastructure opportunities are attractive.**
 - Target opportunistic strategies in niche sub-sectors to take advantage of market dislocations.

- **NEPC continues to believe in the long-term demand drivers in agriculture.**
 - Long-term commodity prices driven by growing emerging market demand.
 - Softness in commodity prices may provide attractive entry point.

- **Timber opportunity set limited but warrants further review**
 - 45% increase in housing starts forecasted; timber prices highly correlated

Commodities

- **Commodities retracted significantly with the Bloomberg Commodity Index posting a -10.5%.**
 - Commodities ended the year down -24.6% with 21 of the 22 single-commodity indexes posting losses.

Real Estate

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

Highlights of Fourth Quarter Happenings at NEPC

After 30 Years NEPC's Founder has Transitioned to Chairman Emeritus

- NEPC's founder and chairman Richard "Dick" Charlton retired on January 1, 2016 after overseeing a decade-long succession process that involved a change in corporate structure and a planned approach to distributing his ownership shares. Dick had the foresight to begin distributing equity to partners 25 years ago and the formal succession process began in late 2007. Dick's vision for a client-focused organization continues to be the hallmark of NEPC and this deep-rooted culture will live on for generations to come. Mike Manning continues in his leadership role as Managing Partner with the guidance of our Partnership; a Partnership recognized throughout the industry for its depth, talent and culture. We are well positioned to lead in this increasingly competitive marketplace. NEPC has never been stronger.



Professional Staff Updates

- New Principals:** Lenia Ascenso, Principal and Director of Discretionary Operations; Devan Dewey, Principal and Chief Technology Officer; and Matt Lombardi, Principal and Chief Financial Officer
- We are also pleased to announce that Wyatt Crumpler joined NEPC in November as a Principal and Senior Consultant from American Beacon Advisors, Inc., and Sam Pollack joined NEPC as a Senior Consultant from DiMeo Schneider and Associates. Wyatt is a member of NEPC's Corporate consulting group and Sam is a member of NEPC's Endowment & Foundation consulting group.

Upcoming/Recent Events

- 2016 Market Outlook Webinar: January 26, 2016 at 2:00 PM EST.
- NEPC's 21st Annual Client Conference: May 10-11, 2016 in Boston at the Hynes Convention Center.
 - This year we will be offering an optional pre-conference workshop on Monday, May 9th at NEPC's Boston office.
- NEPC hosted a Manager Diversity Program event at our Boston office on October 12, 2015 in an effort to continue and enhance our firm's efforts in this area. The purpose of the gathering was to provide an opportunity for diverse managers to meet NEPC and have an open discussion about our research efforts in the arena of minority- and female-owned firms.

Highlights of Fourth Quarter Happenings at NEPC - continued

NEPC Research

Recent White Papers

- *2015 Fourth Quarter Market Thoughts*
- *Governance: The Cornerstone of Successful Investment Programs* (January 2016) – Endowment & Foundation Practice Team
- *Green Bonds: An Overview* (December 2015) – NEPC Impact Investing Committee
- *Completing the Analysis: ESG Integration* (November 2015) – NEPC Impact Investing Committee
- *NEPC's Survey on Hedge Fund Operations* (November 2015) – Hedge Fund Operational Due Diligence team
- *Market Chatter: The Rise and Fall (and Rise?) of Oil Prices* (October 2015)

NEPC Recognitions

- NEPC, LLC was awarded "Best Full-Service Investment Consulting Firm - USA" by Acquisition International for the 2016 Hedge Fund Awards ¹



NEPC Client Recognitions

- Congratulations to the following NEPC clients for their nominations as Asset Owner Finalists for the 2015 CIO Industry Innovation Awards. Five NEPC clients who won awards in their categories are also highlighted below.
 - **Foundation:** Wisconsin Alumni Research Foundation (Carrie Thome) - Category Winner; Northwest Area Foundation (Amy Jensen)
 - **Endowment:** Fordham University (Eric Wood); Texas Tech University System (Tim Barrett)
 - **Public Defined Benefit Plan Below \$15B:** Orange County Employees Retirement System (Girard Miller) - Category Winner; MoDOT and Patrol Employees' Retirement System (Larry Krummen)
 - **Public Defined Benefit Plan Between \$15B and \$100B:** Massachusetts PRIM (Michael Trotsky) - Category Winner
 - **Public Defined Benefit Plan Above \$100B:** New York City Retirement System (Scott Evans); State of Wisconsin Investment Board (David Villa)
 - **Health Care Organization:** Baylor Scott and White Health (Mark Amiri) - Category Winner; Trinity Health (Dina Richards)
 - **Next Generation:** Massachusetts PRIM (Sarah Samuels) - Category Winner

Appendix: SAA Policy History



Strategic Asset Allocation Policy (SAAP) History

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

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

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

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

ASRS Custom Asset Class Benchmark History

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

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

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

Information Disclaimer and Reporting Methodology

Information Disclaimer

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- 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.
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- 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.
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