

HOW...

ASRS Employees Deliver Service With PRIDE!

PROFESSIONALISM

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

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

RESULTS

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

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

IMPROVEMENT

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

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

DIVERSITY

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

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

EXCELLENCE

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

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



**ARIZONA STATE
RETIREMENT SYSTEM**



ARIZONA STATE RETIREMENT SYSTEM

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

NOTICE AND AGENDA OF PUBLIC MEETING AND POSSIBLE EXECUTIVE SESSION OF THE ARIZONA STATE RETIREMENT SYSTEM INVESTMENT COMMITTEE

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

August 22, 2016
2:30 p.m.

Pursuant to A.R.S. § 38-431.02, notice is hereby given Trustees of the Arizona State Retirement System (ASRS) Investment Committee (IC) and to the general public that the IC will hold a public meeting on Monday, August 22, 2016, beginning at 2:30 p.m. in the 14th Floor Conference Room of the ASRS office, 3300 North Central Avenue, Phoenix, Arizona 85012. Trustees of the Committee may attend either in person or by telephone conference call.

This is a regularly scheduled meeting of the IC; 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 IC 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.

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

This meeting will be teleconferenced to the ASRS office in Tucson, 4400 E. Broadway Blvd., Suite 200, Tucson, AZ 85711. 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 the Minutes of the June 20, 2016, Public Meeting and Executive Sessions of the ASRS IC Meeting (Action item; estimated time 1 min.).....Mr. Tom Connelly

3. Presentation, Discussion, and Appropriate Action Regarding the ASRS House Views and General Discussion (Informational and discussion item; estimated time 20 min.).....
..... Mr. Karl Polen
Chief Investment Officer, ASRS
..... Ms. Kerry White
Assistant Chief Investment Officer for Reporting, Compliance & Administration, ASRS
..... Mr. Al Alaimo
Sr. Portfolio Manager of Fixed Income, Cash, and Liquid Alternatives, ASRS
..... Mr. Eric Glass
Sr. Portfolio Manager of Private Markets, ASRS
..... Mr. Cole Smith
Portfolio Manager of Equities, ASRS
..... Mr. John Kwon
Portfolio Manager of Equities, ASRS
..... Mr. Micheal Copeland
Assistant Portfolio Manager of Real Estate, ASRS
..... Ms. Lupita Breland
Sr. Portfolio Analyst, ASRS
..... Mr. John Doran
Assistant Portfolio Manager of Cash and Liquid Alternatives, ASRS

Objective:

The IC and the ASRS team will discuss House Views and other matters of interest. *The House Views will be presented in a new format and members of the Committee may provide suggestions regarding the format.*

The IC may vote to discuss the following matter in executive session pursuant to A.R.S. §§ 38-431.03(A)(2) and 38-718(P) to consider specific manager data that is deemed proprietary information.

4. Presentation, Discussion, and Appropriate Action Regarding the Portfolio Position and Performance (Informational and discussion item; estimated time 15 min.) Mr. Paul Matson
Director, ASRS
..... Mr. Karl Polen
..... Mr. Al Alaimo
..... Mr. Eric Glass
..... Ms. Kerry White

Objective:

The Committee will discuss portfolio positioning, current tactical views and investment performance. *No action is expected on this item, but the IC may express views or offer guidance on the matters discussed.*

5. Presentation, Discussion, and Appropriate Action Regarding State Street's Risk Management Reporting (Informational and discussion item; estimated time 10 min.).....
..... Mr. Kien Trinh
Assistant Vice President, Risk Services, State Street Analytics

Objective:

State Street will present a risk analysis report on the ASRS total fund investments. *No action is expected on this item, but the IC may express views or offer guidance on the matters discussed.*

6. Presentation, Discussion, and Appropriate Action Regarding the ASRS Investment Compliance and Monitoring of Public and Private Market Investments (Informational and discussion item; estimated time 10 min.)Mr. Dan Gillespie
Vice President and Unit Head, State Street
..... Mr. Steve McCourt
Managing Principle, Meketa Investment Group

Objective:

State Street will present the results of their compliance monitoring for public markets portfolios. Meketa will present the results of their compliance monitoring for certain private equity and other private markets investments.

The IC may vote to discuss the following matter in executive session pursuant to A.R.S. §§ 38-431.03(A)(2) and 38-718(P) to consider specific manager data that is deemed proprietary information.

7. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q2-16 (Informational and discussion item; estimated time 30 min.)Mr. Allan Martin
Partner, NEPC
..... Mr. Dan LeBeau
Consultant, NEPC

Objective:

NEPC will report on the second quarter investment results and their monitoring of the ASRS investment program. *No action is expected on this item, but the IC may express views or offer guidance on the matters discussed.*

8. Presentation, Discussion, and Appropriate Action Regarding IMD Activities and Asset Class Committee Reports (Informational and discussion item; estimated time 10 min.)
..... Mr. Karl Polen
..... Mr. Paul Matson

Objective:

The CIO will present recent activities and work plans for IMD. The chairs of the asset class committees will report on any activity since the last IC meeting. *No action is expected on this item, but the IC may express views or offer guidance on the matters discussed.*

The IC may vote to discuss the following matter in executive session pursuant to A.R.S. §§ 38-431.03(A)(2) and 38-718(P) to consider specific manager data that is deemed proprietary information.

9. Presentation, Discussion, and Appropriate Action Regarding Workgroup Reports (Informational and discussion item; estimated time 30 min.) Mr. Eric Glass
..... Mr. Cole Smith
..... Mr. John Kwon
..... Mr. Micheal Copeland

Objective:

Members of the equities performance measurement workgroup will present a new format for analysis of equities including return and holdings based analysis. *No action is expected on this item, but the IC may express views or offer guidance on the matters discussed.*

The IC may vote to discuss the following matter in executive session pursuant to A.R.S. §§ 38-431.03(A)(2) and 41-2534(D) for the purpose of considering and/or discussing records exempt by law from public inspection.

10. Presentation, Discussion, and Possible Action Item Regarding the Private Equity Consultant Request for Proposal (estimated time 30 min.)..... Mr. Eric Glass
..... Mr. Micheal Copeland

Objective:

In accordance with state procurement law, the ASRS has conducted a Request for Proposal for its private equity consulting requirements. The evaluation committee may recommend a firm or firms to fulfill its private equity consulting requirements. *The IC may decide whether to approve this recommendation.*

11. Request for Future Agenda Items (Discussion item; estimated time 5 min.)
.....Mr. Tom Connelly
..... Mr. Karl Polen

12. Call to the PublicMr. Tom Connelly

Those wishing to address the IC 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 IC Administrator. IC Trustees may not discuss items that are not specifically identified on the agenda. Therefore, pursuant to A.R.S. § 38-431.01(H), action taken as a result of public comment will be limited to directing staff to study the matter, responding to any criticism or scheduling the matter for further consideration and decision at a later date.

13. The next ASRS IC Meeting is scheduled for Monday, October 24, 2016 at 2:30 p.m., at 3300 N. Central Avenue, 14th Floor Conference room, Phoenix, Arizona.

14. Adjournment of the ASRS IC Meeting

A copy of the agenda background material provided to IC Trustees (with the exception of material relating to possible executive sessions) is available for public inspection at the ASRS offices located at 3300 North Central Avenue, 14th Floor, Phoenix, Arizona, and 4400 E. East Broadway Boulevard, Suite 200, Tucson, Arizona 85711. 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 August 15, 2016

ARIZONA STATE RETIREMENT SYSTEM

SIGNED COPY ON FILE

Gloria Montiel
Committee Administrator

SIGNED COPY ON FILE

Karl Polen
Chief Investment Officer

Confidential Materials

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, June 20, 2016
2:30 p.m.

The Arizona State Retirement System (ASRS) Investment Committee (IC) met at 3300 N. Central Avenue, 14th Floor, Phoenix, AZ 85012. The meeting was also teleconferenced to the ASRS office at 4400 E. Broadway Boulevard, Suite 200, Tucson, Arizona 85711.

Mr. Tom Connelly, IC Chair, called the meeting to order at 2:35 p.m.

1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Tom Connelly, Chair
Mr. Lorenzo Romero
Mr. Robert Wadsworth

Absent: Prof. Dennis Hoffman

A quorum was present for the purpose of conducting business.

2. Approval of Minutes of the February 22, 2016 and April 25, 2016 Investment Committee Meeting Minutes

Motion: Mr. Robert Wadsworth moved to approve the minutes of the February 22, 2016, and April 25, 2016, public meetings. Mr. Lorenzo Romero seconded the motion.

By a vote of 3 in favor, 0 opposed, 0 abstention, and 1 excused, the motion was approved

3. Presentation, Discussion, and Appropriate Action Regarding the ASRS House Views and General Discussion

Mr. Karl Polen, Chief Investment Officer, introduced himself to the Committee and provided a brief overview of the overweights and underweights of various asset classes. He then turned the meeting over to ASRS Portfolio Managers to provide their perspectives on the market and an update on their respective asset classes.

Mr. Cole Smith, Portfolio Manager of Equities, presented on the portfolio positioning and House Views relating to U.S. Equities and non U.S. Equities. Mr. Al Alaimo, Sr. Portfolio Manager of Fixed Income, Cash and Liquid Alternatives, presented on the portfolio positioning and House Views relating to Fixed Income. Mr. Micheal Copeland, Assistant Portfolio Manager of Real

Estate, presented on the portfolio positioning and House Views relating to Real Estate, and Mr. Polen closed the discussions with a presentation on the Private Equity and Commodities asset classes.

Mr. Connelly offered general comments relating to the new format changes to the investment reports and House Views presented, and solicited additional information to better understand the portfolio positioning and deviations from the benchmark. Mr. Polen provided an overview of the thought process and reasoning behind the changes. Mr. Matson, Director, further explained House Views are presented at each IC as a means of communication to give Trustees an insight on the ongoing activities within the Investment Management Division (IMD). The ASRS sees the importance of these materials and will continue to provide them to ensure Trustees have a clear understanding of their tactical views on the market and investment decisions.

4. Presentation, Discussion, and Appropriate Action Regarding the Portfolio Position and Performance

Mr. Polen briefly introduced the topic of discussion to the Committee and noted since a large amount of the materials provided for this agenda had already been discussed in the prior agenda item, Trustees could refer to the materials provided in their packet for additional information.

5. Presentation, Discussion, and Appropriate Action Regarding Investment Compliance Review and Risk Management Reporting

Ms. Lupita Breland, Senior Portfolio Analyst, presented a review of the various investment compliance programs currently in place for the ASRS's public and private investments. Ms. Breland mentioned this is the first Independent Investment Compliance Report presented to the IC, then proceeded to provide an overview of the Pre-Trade Compliance Program for the internally managed Equities and Fixed Income portfolios, which are managed by the IMD using the Compliance & Audit functions of the Bloomberg Trade Order Management System.

Mr. Dan Gillespie, Vice President and Unit Head of the State Street Compliance Group, presented the results of the Daily Investment Compliance Program for the internally and externally managed portfolios, which is done on a post-trade basis for the months of January-April 2016. Mr. Gillespie noted since the Program has been in place, all of the exceptions have been researched and resolved to both State Street's and the IMD's satisfaction. Mr. Gillespie also presented the results of the Total Fund Monthly Statutory Investment Compliance Program for the months of January-April 2016, and noted since the program has been in place, the ASRS has passed all tests with results well below the statutory requirements.

Mr. Rick Pollack, Vice President of RCLCO Real Estate Advisors, presented the results of the 2014, Real Estate Separate Account Investment Compliance Review. Mr. Pollack noted the compliance review process was instructive and ensured all parties met operating agreement requirements and ASRS standards. The 2015, compliance review process is underway and expected to conclude in August 2016.

Meketa Investment Group is still in the process of reviewing the 2014, audits for the annual Commingled Fund & Non-Real Estate Separate Accounts Investment Compliance Review and is scheduled to have the review completed by July 31, 2016, and will present to the IC in August 2016. No representatives from Meketa were present at the meeting, the overview was provided by Ms. Breland.

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 historical risk for most asset classes reported a slight up-tick from prior months, which were reflective of the increasingly volatile market. In aggregate, the Total Plan risk increased 19 basis points, which was primarily driven by the allocation shift of \$740 million from U.S. Equity to non U.S. Equity.

6. Presentation, Discussion, and Appropriate Action Regarding IMD Activities and Asset Class Committee Reports

Mr. Polen provided the Committee with an overview of the completed reorganization of the IMD. The reorganization entailed the appointment of Mr. Eric Glass as the Senior Portfolio Manager of Equities and Real Estate, who will oversee Public Equities, Private Equities, Commodities and Real Estate. Mr. Al Alaimo, will oversee Fixed Income, Cash and Liquid Alternatives, and Ms. Kerry White, Assistant Chief Investment Officer, will oversee compliance reporting, legal and the administrative efforts of the IMD department. In addition, starting with the June 24, 2016, meeting, the Public Markets Committee will meet monthly in a joint session with the Private Markets Committee. Mr. Polen ended the discussion with a highlight of the portfolio cash optimization and investment accomplishments as referenced in the IC packet materials.

7. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund and Investment Performance Report Q1-16

Mr. Allan Martin, NEPC Partner, provided the Committee with a brief overview of the fund performance as of March 31, 2016, and provided a detailed explanation of the ASRS investment objectives, performance and the compliance of the fund in accordance with the SAA policy.

Performance results: (as of March 31, 2016)

- 7.4% (20-year annualized net return) vs. 8.0% (actuarial assumer interest rate.)

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception
Total Fund	1.4%	0.0%	6.7%	7.1%	5.7%	9.7%
Interim SAA Policy*	1.4%	-1.4%	5.4%	6.2%	5.4%	9.4%
Excess Return	0.0%	1.4%	1.3%	0.9%	0.3%	0.3%

***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.

8. Presentation, Discussion, and Appropriate Action Regarding Working Group Reports

Due to timing matters, the IC felt it was necessary to review agenda item #9 prior to agenda item #8 to ensure all required staff were available for the discussion.

Mr. John Doran, Assistant Portfolio Manager of Cash and Liquid Alternatives, presented to the IC the results of the analysis of the Multi-Asset Class. Due to proprietary information relating to Bridgewater's investment strategies that would be presented, the IC voted to go into executive session pursuant to A.R.S. § 38-431.03(A)(2) and 38-718(P) for the purpose of considering and/or discussing records exempt by law from public inspection.

Motion: Mr. Robert Wadsworth moved to go into executive session. Mr. Lorenzo seconded the motion.

By a vote of 3 in favor, 0 opposed, 0 abstention, and 1 excused, the motion was approved

The Committee convened to Executive Session at 6:02 p.m.

The Committee reconvened to Public Session at 6:26 p.m.

9. Presentation, Discussion, and Appropriate Action Regarding the Real Estate Consultant Contract Award

Due to timing matters, the IC felt it was necessary to review agenda item #9 prior to agenda item #8 to ensure all required staff were available for the discussion.

Mr. Copeland presented to the Committee the findings and evaluations of the contract award for the investment real estate consultant. Due to the discussion of proprietary information relating to the Request for Proposals submitted by all potential real estate consultants, the IC voted to go into executive session pursuant to A.R.S. § 38-431.03(A)(2) and 41-2534(D) for the purpose of considering and/or discussing records exempt by law from public inspection.

Motion: Mr. Robert Wadsworth moved to go into executive session. Mr. Lorenzo seconded the motion.

By a vote of 3 in favor, 0 opposed, 0 abstention, and 1 excused, the motion was approved

The Committee convened to Executive Session at 5:54p.m.

The Committee reconvened to Public Session at 6:00 p.m.

Motion: Mr. Robert Wadsworth moved to accept the recommendation of the Evaluation Committee on the ASRS real estate contract award. Mr. Lorenzo seconded the motion.

By a vote of 3 in favor, 0 opposed, 0 abstention, and 1 excused, the motion was approved

10. Presentation, Discussion, and Appropriate Action Regarding the Fixed Income Asset Class Presentation

Mr. Al Alaimo, Fixed Income Portfolio Manager, provided the IC with a review of the ASRS Fixed Income Program, including the program's strategies, portfolio structure, and performance.

11. Request for Future Agenda Items

There were no requests for future agenda items.

12. Call to the Public

No members of the public requested to speak.

13. Adjournment

The meeting adjourned at 6:28 p.m.

Respectfully submitted,

ARIZONA STATE RETIREMENT SYSTEM

Gloria Montiel
Investment Committee Administrator

Date

Karl Polen
Chief Investment Officer

Date

DRAFT

**Confidential
Meeting
Materials
Removed**

**Confidential
Meeting
Materials
Removed**

Agenda Item #3

House Views and Portfolio Positioning

Arizona State Retirement System

August 9, 2016

Outline

- 1 Summary View and Positioning
- 2 Macro Environment
- 3 Equities
 - Commentary
 - Trends
 - Valuation
 - Private Equity
- 4 Fixed Income
 - Commentary
 - Interest Rate Sensitive Fixed Income
 - High Yield and Private Debt
- 5 Real Estate
 - Commentary
 - Supply and Demand
 - Capital Markets Dynamics
- 6 Commodities
- 7 Historic Data

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- 1 Summary View and Positioning
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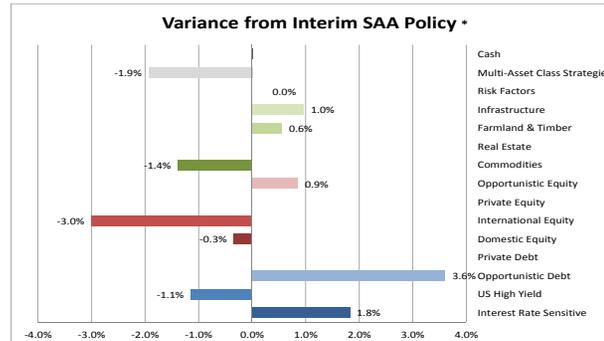
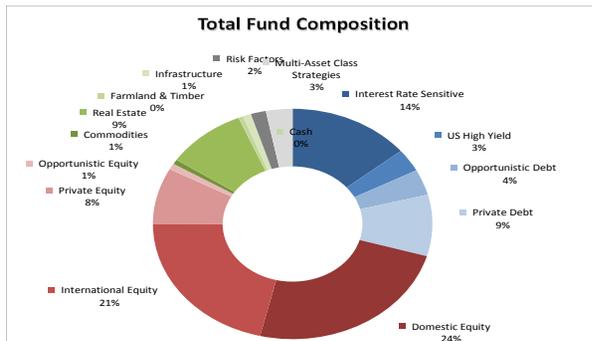
Summary View

- Global economy continues to grow slowly with few warning signs of recession
- But. . .
 - Corporate profitability is soft
 - High levels of political and economic uncertainty in Europe
 - Slowing growth in China
 - Pricy valuations in US
 - Strong dollar is worrisome for US growth and problematic for international investments
- We think risks in equities are asymmetric to the downside
- Interest rates are likely to stay low and risks of inflation don't seem imminent
 - US rates are attractive compared to the rest of the world

Portfolio Position

We are positioned slightly defensively with excess liquidity available in core bonds ready to rebalance to equities should the opportunity arise.

Total Fund Positioning August 8, 2016



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

Outline

- 1 Summary View and Positioning
- 2 **Macro Environment**
- 3 Equities
 - Commentary
 - Trends
 - Valuation
 - Private Equity
- 4 Fixed Income
 - Commentary
 - Interest Rate Sensitive Fixed Income
 - High Yield and Private Debt
- 5 Real Estate
 - Commentary
 - Supply and Demand
 - Capital Markets Dynamics
- 6 Commodities
- 7 Historic Data

Commentary

- Growth is slow globally
 - Picking up a bit in Japan and Europe but from a low starting point
 - Employment improving and becoming tight in some markets
 - China growth is slowing
- Inflation generally low
 - Wage inflation appearing in US
 - But moderated by low commodity costs
- Rates low everywhere as central banks attempt to stimulate

Macro Indicators

Slow growth, muted inflation but strong employment

8/9/2016

Economy		Moving Average		
			2 Yr.	1 Yr.
EHUPUS Index	US Unemp	4.9	5.3	5.0
EHUPEUN Index	EUR Unemp	9.2	9.5	9.1
EHUPGB Index	UK Unemp	5.1	5.7	5.3
EHUPJP Index	Japan Unemp	3.2	3.4	3.3
GDP CYOY Index	US GDP	1.2	2.3	1.7
EHGDEUR Index	EUR GDP	1.6	1.6	1.9
EHGDGB Index	UK GDP	2.2	2.4	2.0
EHGDJP Index	Japan GDP	1.9	0.7	0.6
EHGDCN Index	China GDP	6.7	7.0	6.9
CPI YOY Index	US CPI	1.0	0.8	0.4
CPI XYOY Index	US CPI X fd nrg	2.3	1.9	2.0
CPEXEUY Index	EU CPI X fd nrg	0.8	0.9	0.9
JCPNEFEY Index	Jpn CPI X fd nrg	0.4	1.5	0.8
CNCPIYOY Index	China CPI	1.8	1.7	1.7

Global Interest Rates

Interest rates at or near record lows. Comparative attractiveness of US rates drawing foreign capital.

August 9, 2016

		Price	100 day moving average	50 day moving average	30 day relative strength	Hurst Exponent
Global Interest Rates						
USGG10YR Index	US 10 Year	1.54	1.69	1.56	48	78
GDBR10 Index	German 10 Year	-0.08	0.06	-0.04	45	57
GUKG10 Index	UK 10 Year	0.58	1.20	0.95	34	32
JGBS10 Index	Japan 10 Year	-0.05	-0.14	-0.19	60	47

Currency

Strong dollar and yen, but euro, renminbi and pound are weak

August 9, 2016

Currency		Price	200 day moving average	100 day moving average	50 day moving average	30 day relative strength	Hurst Exponent	6 month return	6 month volatility annualized	Momentum Index
EURUSD Curncy	Euro/USD	1.11	1.11	1.12	1.12	48	67	-1.25	9.42	-0.13
GBPUSD Curncy	GBP/USD	1.30	1.43	1.40	1.36	40	105	-10.15	15.39	-0.66
JPYUSD Curncy	Yen/USD	0.0098	0.0089	0.0094	0.0096	57	44	11.94	13.16	0.91
CNY BGN Curncy	CNY/USD	0.1502	0.1533	0.1522	0.1507	56	65	-2.40	3.43	-0.70

Consensus Economic Forecasts

Bloomberg

Economic Forecasts

Contributor

Composite

See Previous forecasts

Period

Yearly

See Last Actuals

	Real GDP (yoy %)			CPI (yoy %)			Unemployment (%)			Curr Acct (% of GDP)			Budget (% of GDP)		
	16	17	18	16	17	18	16	17	18	16	17	18	16	17	18
LatAm	-1.26	1.85	2.34	25.43	19.95	5.84	9	9.28		-2.18	-2.03		-6.39	-5.72	
E. Europe	1.6	2.46	2.68	5.41	5.12	4.83	7.81	7.56	7.76	-0.03	0.03	0.03	-2.8	-2.42	-2.18
Middle East & Africa	2.43	2.88		3.84	4.01					-3.23	-0.15		-8.97	-5.22	
Asia	5.58	5.77	5.84	1.98	2.58	2.92	4.04	4.12	4.08	3.58	2.65	1.87	-2.5	-2.73	-3.21
China	6.5	6.2	6.2	2	2	2.55	4.1	4.2	4.2	2.8	2.5	2.15	-3.05	-3.5	-3.5
G-10	1.65	1.93	1.84	0.83	1.8	1.97	6.27	6.02	5.93	-0.21	-0.27	-0.58	-2.73	-2.51	-2.15
USA	1.9	2.3	2.1	1.3	2.3	2.3	4.8	4.6	4.6	-2.7	-2.8	-2.9	-2.9	-2.9	-3
Japan	0.6	0.8	0.6	0	0.9	1.5	3.2	3.1	3.2	3.7	3.3	3.55	-5.8	-5	-2
Euro	1.5	1.6	1.6	0.3	1.4	1.6	10.15	9.7	9.35	3	2.85	2.4	-1.9	-1.7	-1.4
United Kingdom	1.8	2.05	2.15	0.7	1.7	1.95	5.1	5	5	-4.9	-4.3	-4	-3.3	-2.5	-2.1
Canada	1.4	2	2.2	1.6	2	2	7.2	7.05	6.7	-3.15	-2.25	-2	-1.45	-1.4	-1
Australia	2.9	2.9	3	1.3	2.1	2.5	5.9	5.6	5.6	-4.3	-3.9	-3.8	-2.4	-2.1	-1.4
Sweden	3.5	2.6	2.1	0.9	1.7	2	6.9	6.7	6.8	5.8	5.5		-0.7	-0.75	
New Zealand	2.45	2.5	2.4	0.75	1.8	2	5.7	5.7	5.35	-4.35	-4.45	-3.75	-0.2	0.05	
Switzerland	1.2	1.6	1.75	-0.5	0.4	0.9	3.5	3.5	3.4	9.3	8.9	10.7	-0.2	-0.05	0.4
Denmark	1.2	1.8		0.6	1.4		4.2	4.1		6.7	6.65		-2.5	-2	
Norway	0.95	1.7	1.9	3	2.3	2.4	4.75	4.5	4.75	6.9	7.3	8	5.75	6.25	8
Germany	1.6	1.6	1.55	0.4	1.6	1.6	6.2	6.4	6.3	8.15	7.6	7.2	0.1	0.1	0.3
France	1.4	1.3	1.25	0.3	1.1	1.6	10.05	9.8	9.2	-0.1	0.1	-1	-3.3	-3	-2.7
Italy	1	1.1	1.1	0.1	1.2	1.5	11.4	11	11	2.2	1.9	2	-2.5	-2.1	-1.75
Europe	1.66	1.73	1.76	0.44	1.42	1.68	8.29	8.04	7.68	2.71	2.63	2.13	-1.91	-1.51	-1.16

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Commentary

- We are 3.3% of total fund underweight equities with substantially all of the underweight in international equities
- On a valuation basis, US looks expensive vs ROW
- However. . .
 - Economic fundamentals of Europe are weak
 - Likelihood of continued strengthening of the dollar is negative for international equities
 - China is slowing and Latin America is troubled
 - rest of EM is commodity dependant
- Momentum measures favor US and are comparatively weak elsewhere
- Fund flows have favored US vs ROW
- Comparatively strong economic fundamentals justify, to some extent, the differential valuation between US and international equities

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Equity Price Trends

US and EM outperforming Europe

August 9, 2016

		Price	200 day moving average	100 day moving average	50 day moving average	30 day relative strength	Hurst Exponent	6 month return	6 month volatility annualized	Momentum Index
Stocks										
SPX Index	S&P 500	2182	2046	2093	2121	60	56	17.91	15.46	1.16
MID Index	S&P Mid	1563	1429	1483	1515	59	54	24.67	17.50	1.41
SML Index	S&P Small	746	680	703	721	59	91	25.17	19.02	1.32
MXEA Index	EAFE	1675	1646	1646	1637	54	47	10.52	19.86	0.53
MSDLEAFE Index	EAFE Local	965	955	940	937	55	78	9.98	18.84	0.53
MXEASC Index	EAFE Small	206	200	203	202	53	91	13.24	18.65	0.71
NCLDEAFE Index	EAFE Small Local	294	287	288	288	54	78	12.97	17.40	0.75
MXEF Index	EM	896	804	831	842	64	38	23.64	18.50	1.28
NDLEEGF Index	EM Local	451	413	424	430	64	46	18.60	13.92	1.34

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Relative Valuation of Global Indices

99<G0> to save current settings, Right click in table for actions

4) Output to Excel Market Relative Valuation

Index Basket v2 As of Date 08/10/2016

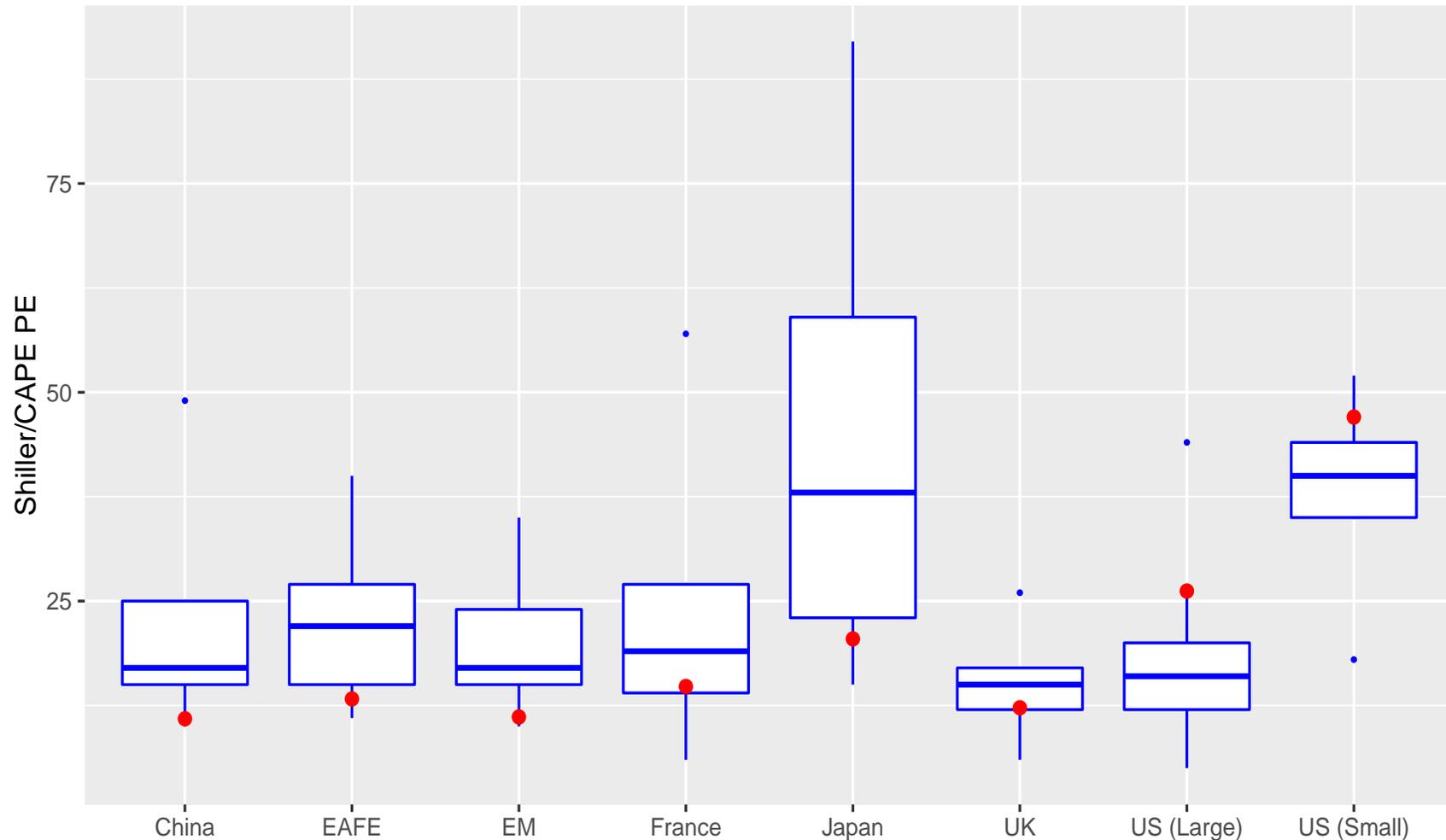
1) Valuations 2) Performance 3) Estimates 4) Custom

Name	Valuation Score ↑	P/E	P/B	Dvd Yld	P/S	EV/EBITDA
MSCI EM	0.94	15.96	1.57	2.64%	1.26	9.01
MSCI EAFE	0.68	24.27	1.57	3.51%	1.10	10.78
MSCI EAFE SMALL CAP	0.06	33.24	1.47	2.65%	0.85	12.64
S&P 500 INDEX	-0.43	20.43	2.87	2.11%	1.94	13.22
S&P 400 MIDCAP INDEX	-0.56	22.72	2.33	1.71%	1.22	15.22
S&P 600 SMALLCAP INDEX	-0.69	25.62	2.09	1.47%	1.11	15.50



Cyclically Adjusted PEs

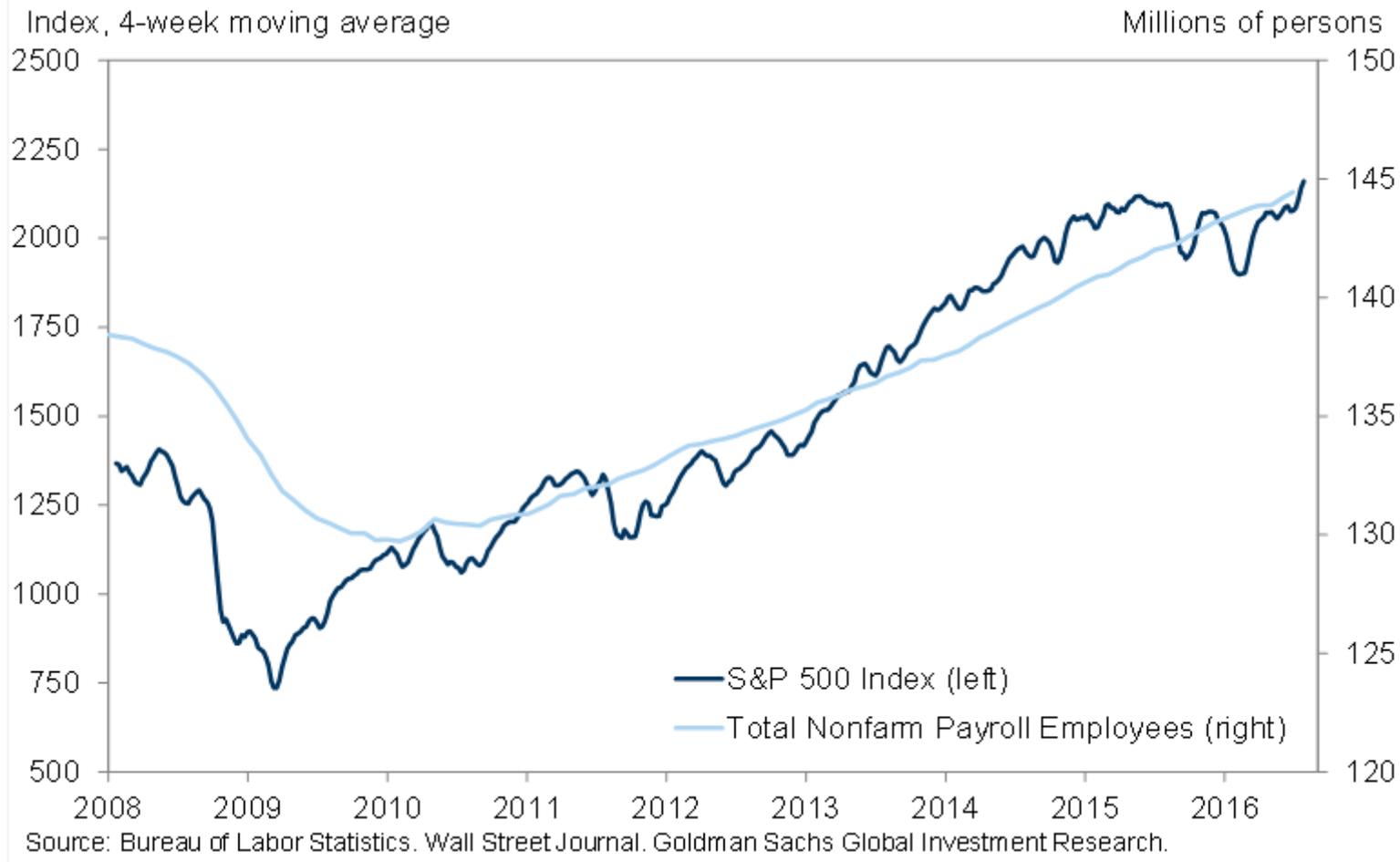
Comparative Shiller/CAPE PEs
(red dot is value at 07/2016)



Valuation Model with Currency

	Inter Asset Class Wghts	Valuation: avg Z Score	CAPE: Z score	Valuation & CAPE equal weighted Z score		Intra Asset Class Wghts	Valuation: avg Z Score	CAPE: Z score	equal weighted Z score		Currency Forecast vs Fwd
US	26%	-0.77	-0.71		Large	77%	-0.57	-0.71	-0.61	USD	
			-0.74		Mid	12%	-0.63				
			-0.37		Small	12%	-0.67	-0.37	-0.59		
EAFE	19%	0.25			Europe ex UK	30%	0.29	0.13	0.25	Euro	-2%
			0.56	0.33	Japan	24%	0.68	1.06	0.78	Yen	2%
					UK	19%	0.00	0.18	0.04	Pound	-2%
EM	5%	0.52	0.27	0.46	Asia ex Japan	63%	0.89	0.15	0.71	Remnimbi	0%

Employment



Fund Flows

99) Settings							ETF Flows			
View	Highest/Lowest	Chart	Netflow	Market	All	Period	3M	History	In Millions of USD	
Country	Netflow	Netflow	Flow%	Assets	#Funds	Inflow	In/Out	Outflow		
Highest										
10) United States		+74,695	+3.8	1,951,606	1,514	254,967		-180,278		
11) Japan		+6,510	+3.0	217,445	302	24,411		-17,901		
12) Canada		+3,647	+6.5	56,228	197	8,319		-4,672		
13) Asia Pac ex Japan*		+1,646	+10.1	16,339	46	2,172		-526		
14) Taiwan		+514	+5.5	9,351	31	2,494		-1,981		
15) United kingdom		+376	+1.2	30,264	110	3,155		-2,779		
16) Asia Pacific*		+297	+3.5	8,505	26	606		-309		
17) North America*		+280	+4.4	6,370	28	506		-227		
18) Australia		+241	+2.1	11,344	90	1,541		-1,300		
19) Singapore		+135	+7.9	1,717	9	194		-59		
Lowest										
20) Switzerland		-278	-1.7	16,540	50	867		-1,145		
21) Brazil		-349	-5.3	6,584	34	294		-642		
22) Spain		-405	-12.9	3,148	18	271		-676		
23) Russia		-409	-7.0	5,857	23	236		-646		
24) Italy		-685	-14.0	4,907	39	914		-1,599		
25) Mexico		-874	-22.3	3,922	26	529		-1,402		
26) Germany		-1,545	-3.6	42,960	151	3,296		-4,840		
27) Eurozone*		-3,530	-2.1	167,620	314	14,553		-18,084		
28) European Region*		-5,505	-5.4	102,838	331	10,786		-16,290		
29) China		-6,569	-7.1	92,138	298	12,583		-19,151		

Outline

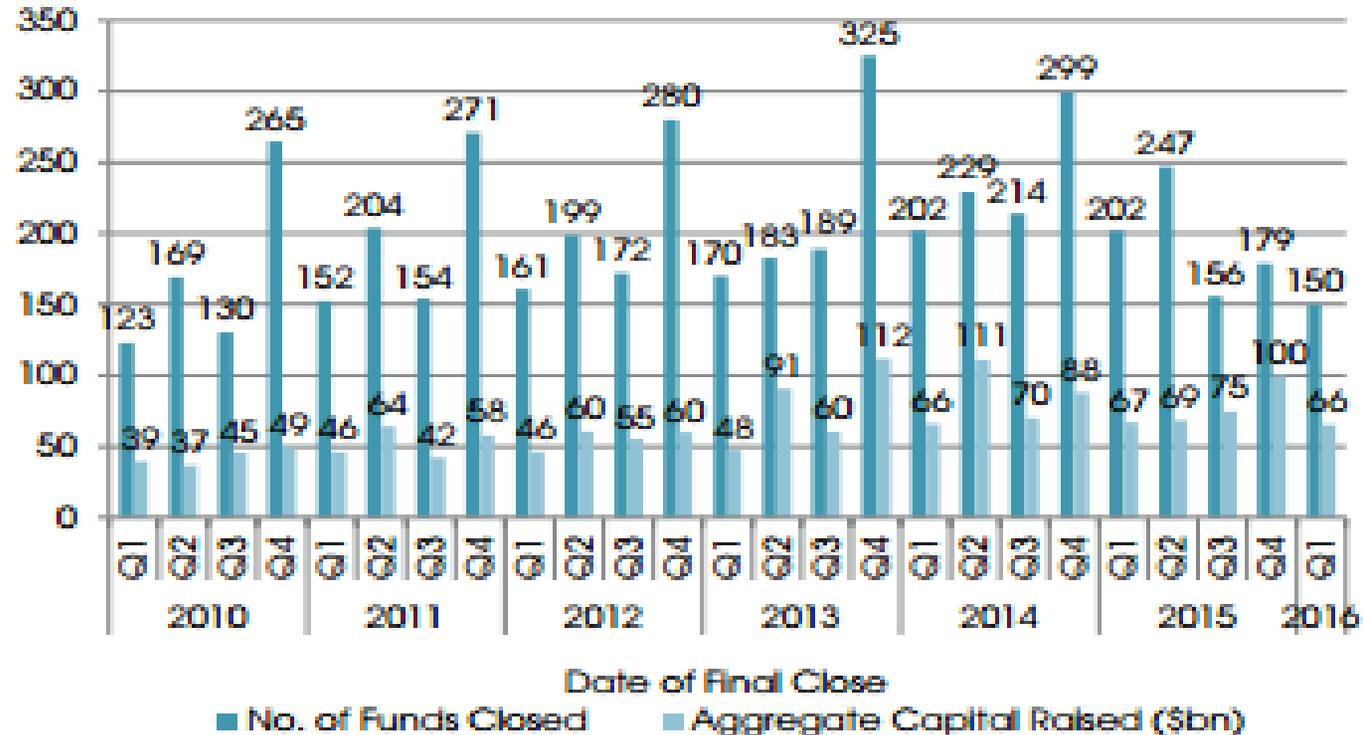
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Private Equity Fund Raising

- Pace of fundraising has slowed
- Deal volume & size has also tapered
- While IPOs have fallen, other exit channels remain open
- Dry powder has steadily risen

Private Equity Fund Raising

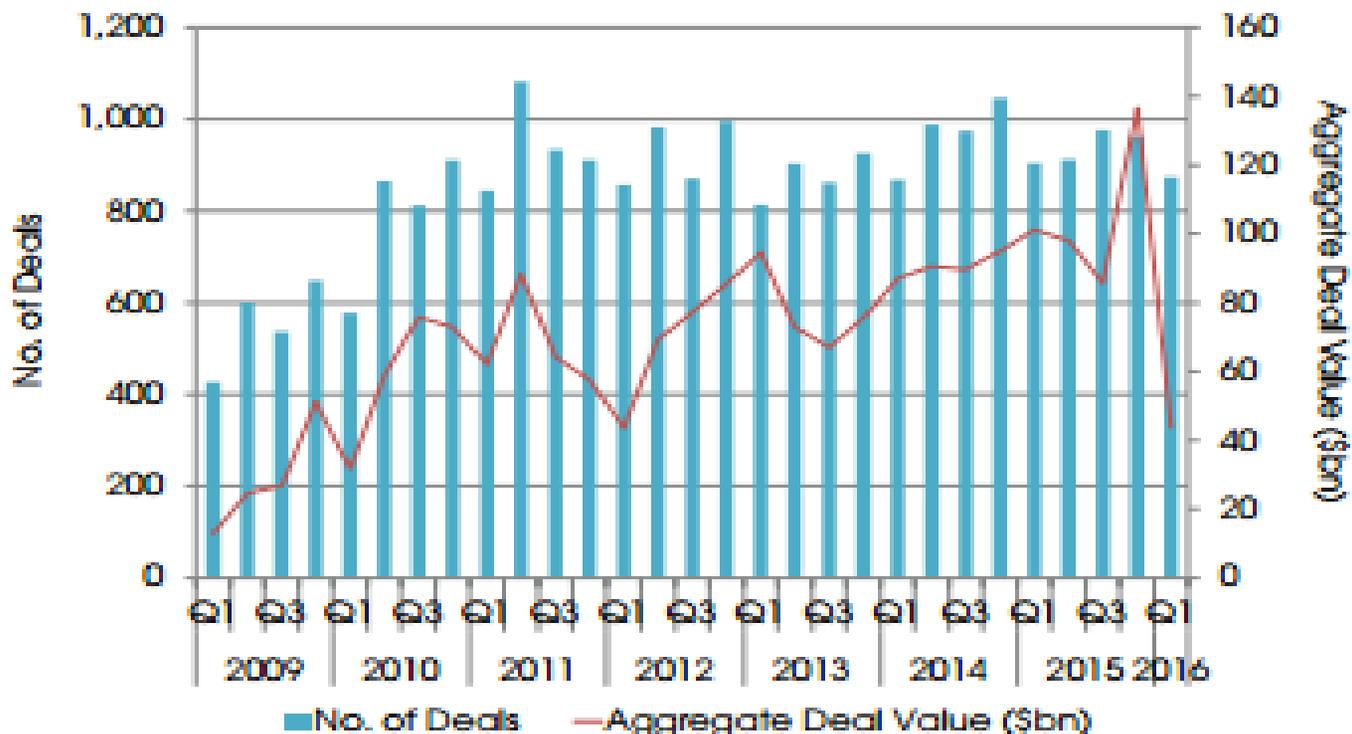
Fig. 1: Global Quarterly Private Equity Fundraising, Q1 2010 - Q1 2016



Source: Preqin Private Equity Online

Private Equity M&A Deal Volume

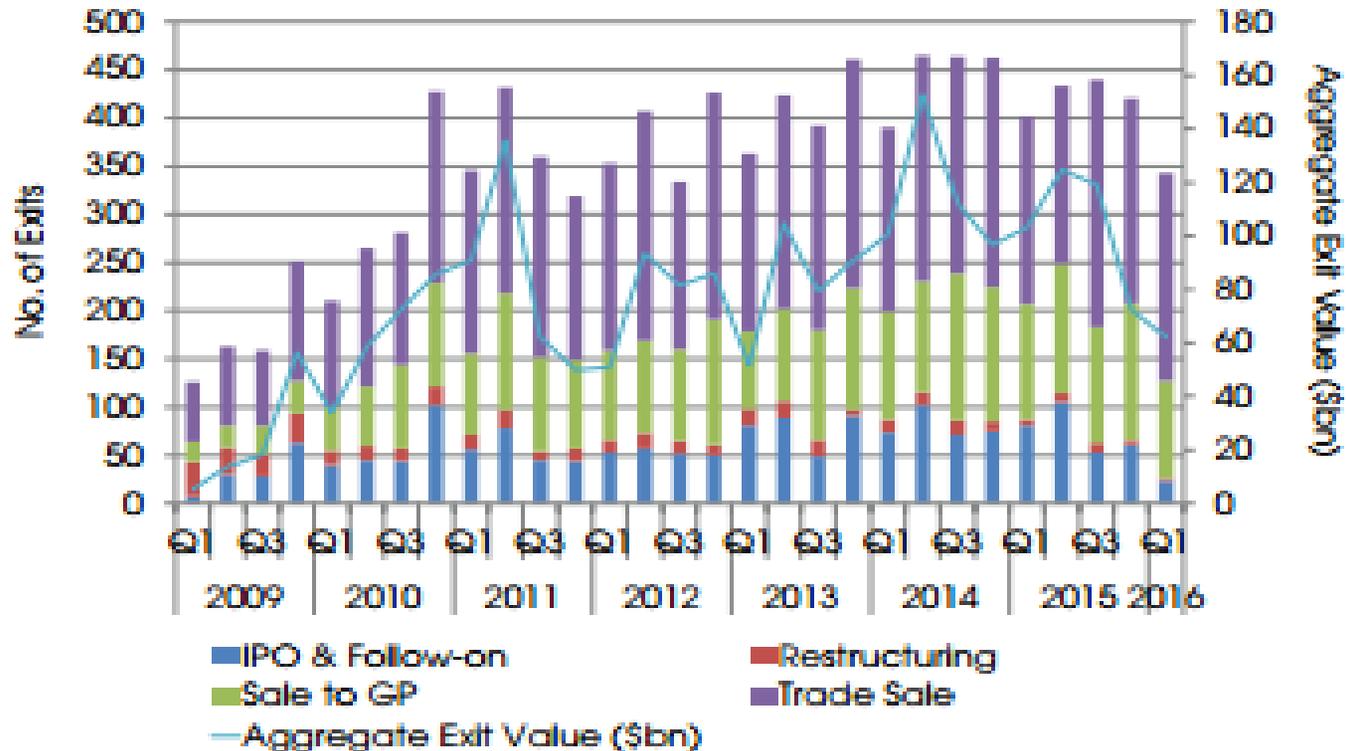
Fig. 1: Quarterly Number and Aggregate Value of Private Equity-Backed Buyout Deals Globally, Q1 2009 - Q1 2016



Source: Preqin Private Equity Online

Private Equity Exits

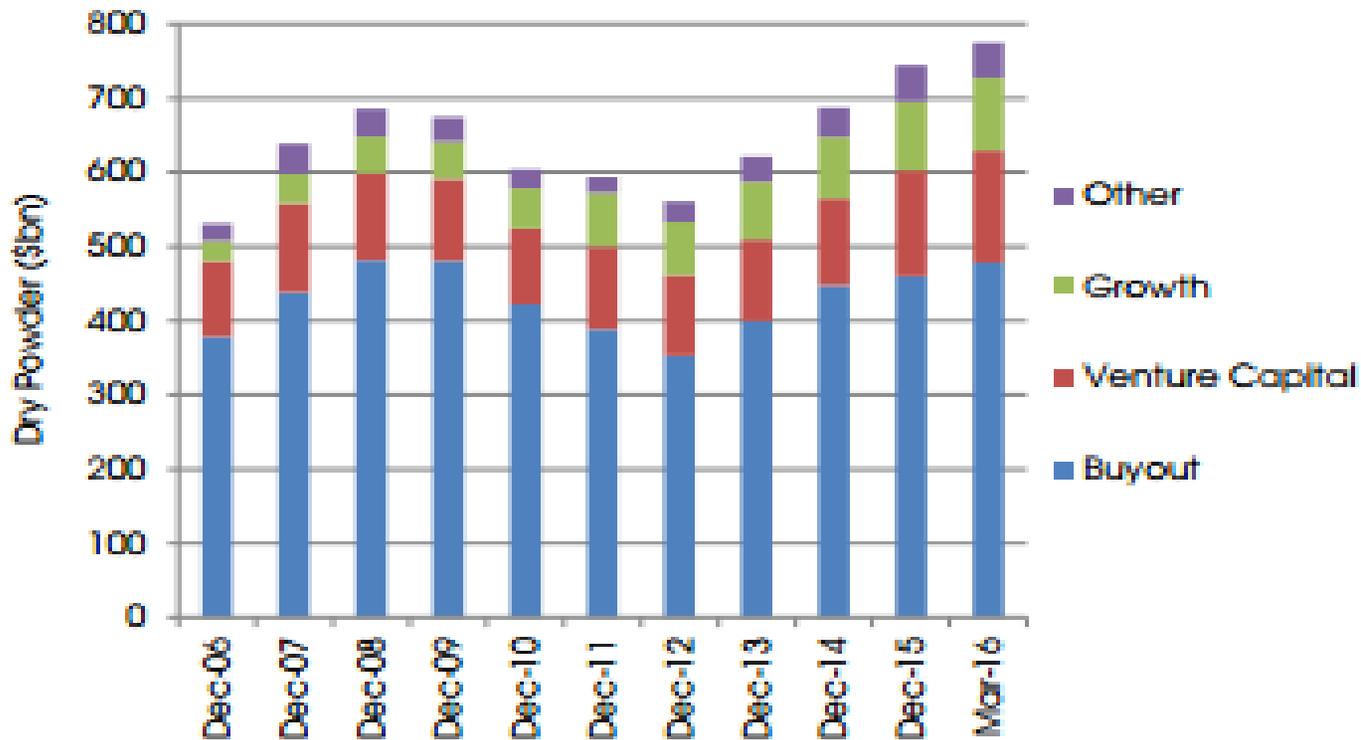
Fig. 3: Global Number of Private Equity-Backed Exits by Type and Aggregate Exit Value, Q1 2009 - Q1 2016



Source: Preqin Private Equity Online

Private Equity Dry Powder

Fig. 1: Private Equity Dry Powder by Fund Type, December 2006 - March 2016



Source: Preqin Private Equity Online

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Commentary

Fixed Income

- In July, we increased our allocation in Fixed Income from neutral to overweight vs. the SAA target (29.7% vs. a 25.1% target). The increase reflects a reallocation from international equities to Interest Rate Sensitive Fixed Income as a defensive measure for the overall total fund following the Brexit vote in the United Kingdom.
- The overweight in Fixed Income reflects an overweight in Interest Rate Sensitive Fixed Income (14.6% vs. a 12.2% target), an underweight in High Yield Fixed Income (3.2% vs. a 4.4% target) and an overweight in Opportunistic Debt (3.5% vs. a 0.0% target).
- We continue to believe that the Private Debt asset class offers the most attractive opportunity in fixed income. We have increased our allocation to over 8% of the total fund vs. a SAA policy target of 10%. We hope to reach the 10% target in the first half of 2017. Our partnership commitments represent approximately 15% of the total fund.

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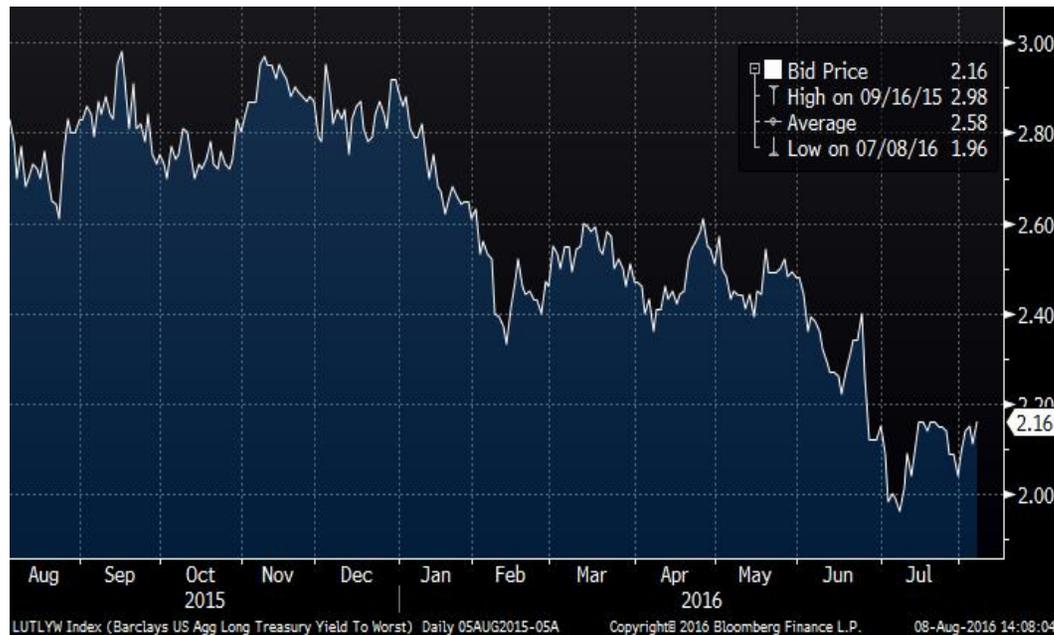
Rates

Interest Rate Sensitive Fixed Income

- Long-term U.S. interest rates have fallen significantly over the course of 2016 with the yield on the Barclays U.S. Long Treasury Index falling by approximately 90 bps. The decline reflects a combination of factors including slowing global growth expectations, aggressive monetary policies in Europe and Japan that has contributed to negative interest rates in competing “safe haven” sovereign debt markets, and benign inflation.
- We believe that long-term U.S. interest rates will likely remain relatively low by historical standards for the foreseeable future and may fall further as U.S. rates remain attractive in the global sovereign bond market.
- In early July, we increased our allocation to both Core Fixed Income and Treasuries (Long Duration) as a defensive measure for the overall total fund. We are now overweight Interest Rate Sensitive Fixed Income vs. the SAA target.

Long Treasury

Barclays U.S. Long Treasury Index Yield 2015 – 2016



3

German Bund

10 Year German Bund Yield 2015 - 2016



Japanese Bonds

10 Year Japanese Government Bond Yield 2015 - 2016



5

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High Yield

High Yield

- Valuations as measured by credit spreads in the high yield bond market appear attractive relative to the tighter levels experienced in recent years; however, we believe the wider spreads primarily reflect deteriorating credit quality.
- Over the coming years, we expect both a rise in corporate defaults and ratings downgrades. Initially, this deterioration in credit quality is being led by sectors that have been adversely affected by the severe decline in global commodity prices including energy, energy services, metals and mining. However, as we are likely in the later stages of credit cycle (that began with an upturn in 2009), credit ratings will likely decline and defaults will likely increase in other sectors as well. We believe this may lead to a spike in defaults (probably in 2017) and further spread widening before the market bottoms. Higher defaults should create attractive investment opportunities for our managers in the Opportunistic Debt asset class.
- With this view, we are underweight High Yield vs. the SAA target.
- Our underweight also reflects our view that the Opportunistic Debt asset class will likely deliver higher returns over the long-term than the high yield bond market. ASRS' investments in Opportunistic Debt are primarily in distressed corporate debt that tends to exhibit a meaningful correlation with the broader credit markets including high yield bonds. Overall, we believe we have ample exposure to credit in the total fund.

High Yield Credit Spread

Barclays US Corporate High Yield Index Option Adjusted Spread (OAS) 2015 – 2016



7

High Yield Yield-to-Worst

Barclays US Corporate High Yield Index Yield-to-Worst 2015 – 2016



8

Private Debt

Private Debt

- We believe the Private Debt asset class 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.
- The opportunity in Private Debt has become more attractive in the past few years.
- Regulatory constraints limiting banks ability to make below investment-grade, illiquid loans (typically to middle market companies) has become more severe due to a number of policies: the adoption of Basel III, Dodd-Frank financial regulation and new “Leveraged Lending Guidelines” of US bank regulators.
- Business Development Companies (“BDCs”), a competing source of illiquid loans, have pulled back on lending due to their depressed equity valuations.
- Anecdotally, expected returns for middle market loans appear to be 50 - 100 bps higher or more since a year ago in many situations while the credit quality of the underlying loans has either improved or not deteriorated.
- When the public credit markets have “seized up” as they did in the latter part of 2015 and in the first quarter of 2016, our private debt managers quickly capitalized on very attractive investment opportunities that materialized when borrowers were forced to turn to the much more expensive private markets for financing. Going forward, we expect these periods of dislocation in the public credit markets to happen from time-to-time particularly with a weakening global growth outlook and the prospect that we are in the late stages of a credit cycle in the U.S.

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Commentary

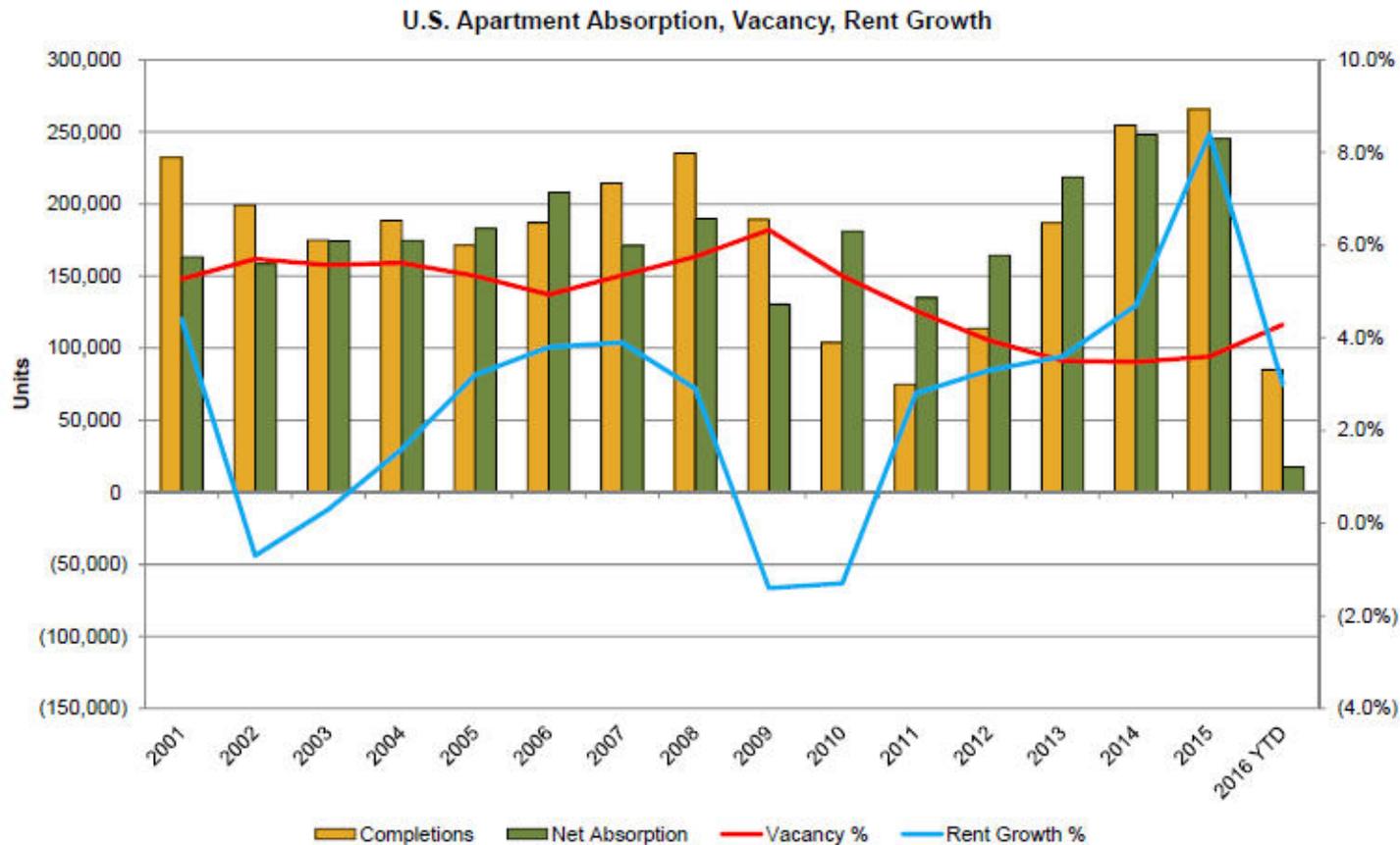
- Property markets are generally moving out of a recovery phase to a mature phase
- Fundamentals leads us to emphasize apartments, industrial properties, medical office buildings, senior housing, self-storage, and student housing for demographic and macro policy reasons
 - Suburban office and certain retail categories require a substantial discount because of weak demand fundamentals
 - For sale housing remains a potential target for opportunistic investing because financing and entitlement constraints have kept the market under-supplied
- CMBS spread widening has lead to a contraction in the availability of credit and reduced new issuance
- Dry powder remains robust at \$239 billion at 6/30/16 with 52% of funds closed in the first half of 2016 exceeded fundraising targets according to Preqin

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Occupancy Trends and New Supply

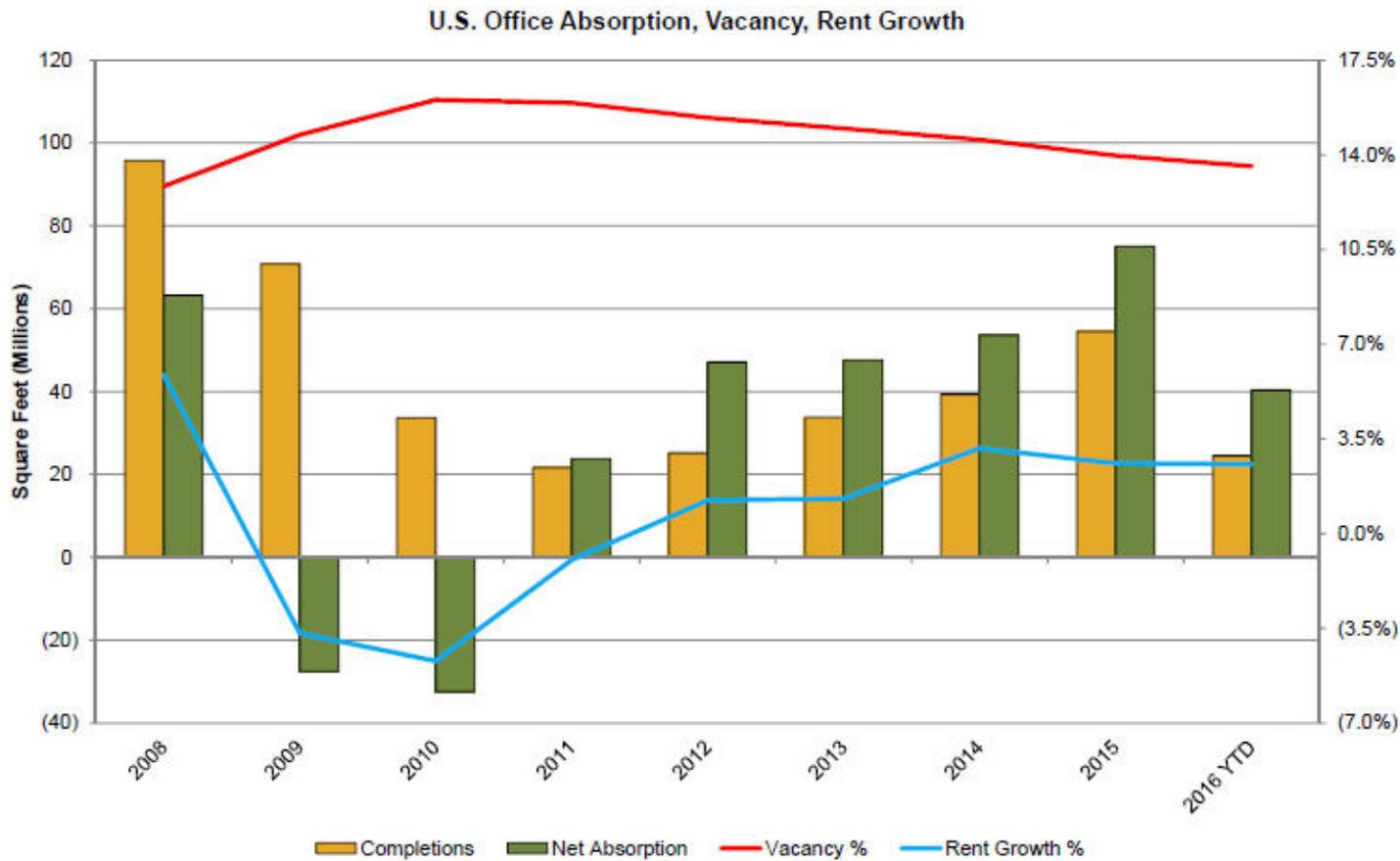
Multifamily



Source: CoStar, RCLCO

Occupancy Trends and New Supply

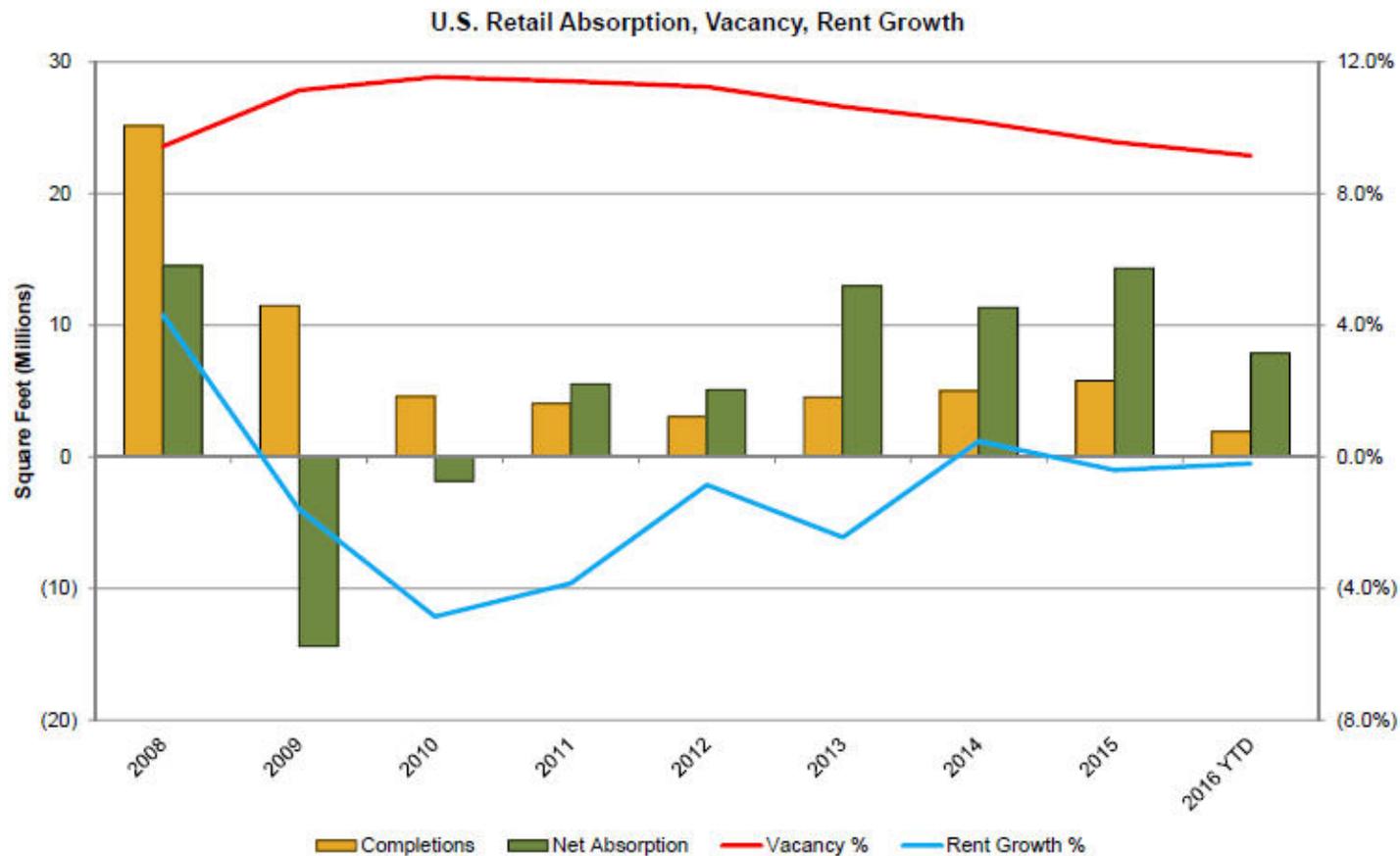
Office



Source: CoStar, RCLCO

Occupancy Trends and New Supply

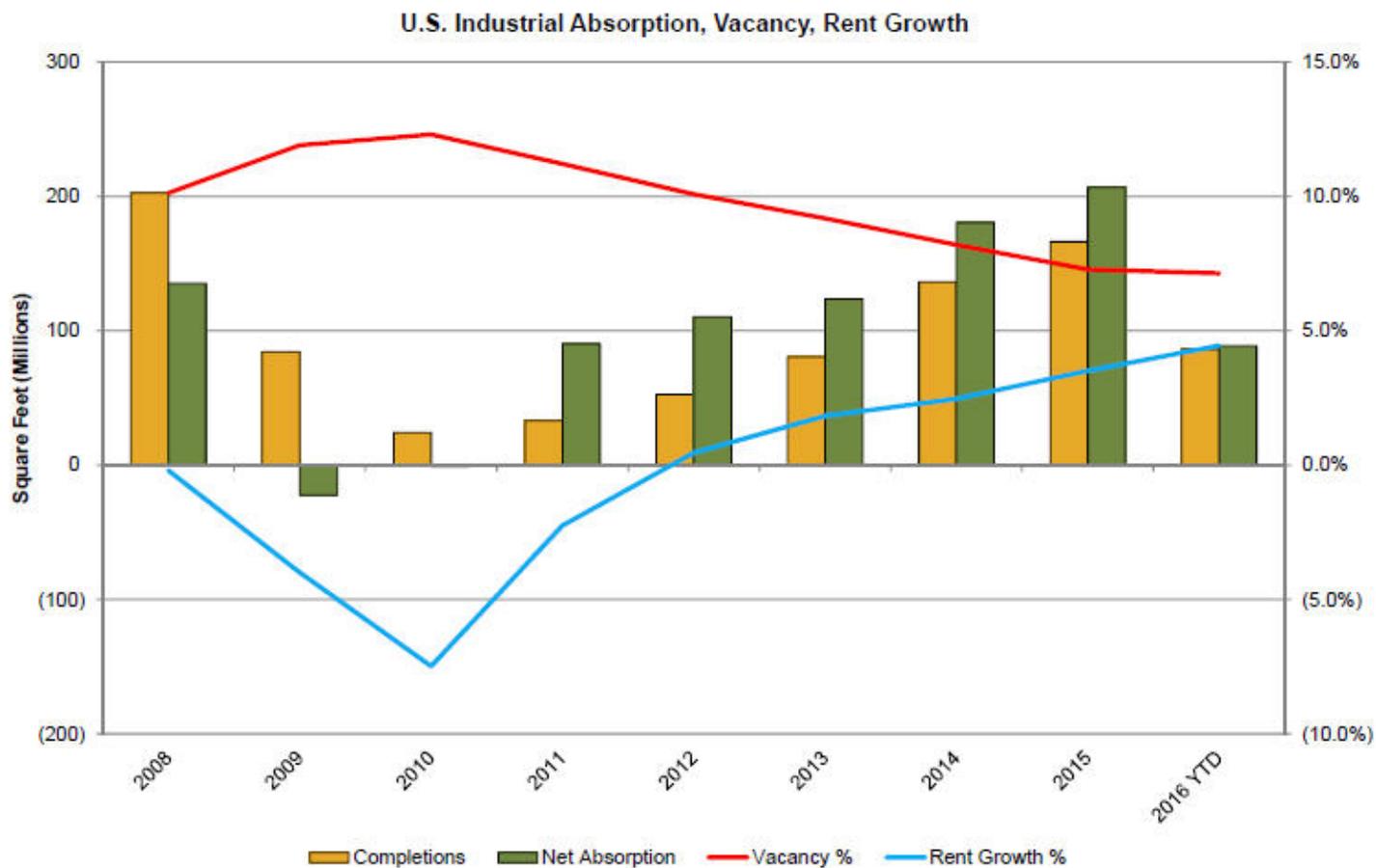
Retail



Note: Above data is for neighborhood and community centers only
 Source: CoStar, RCLCO

Occupancy Trends and New Supply

Industrial



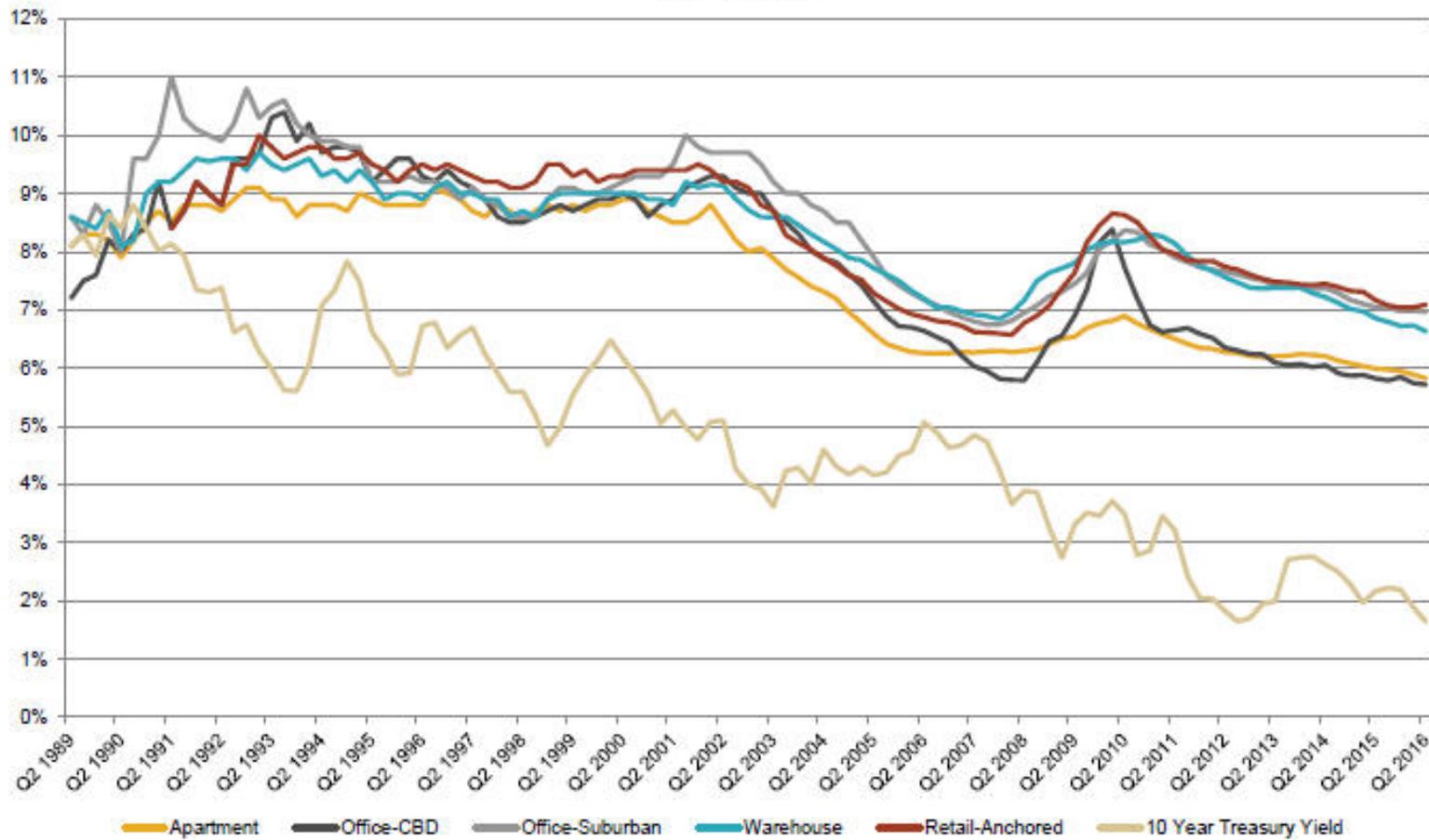
Source: CoStar; RCLCO

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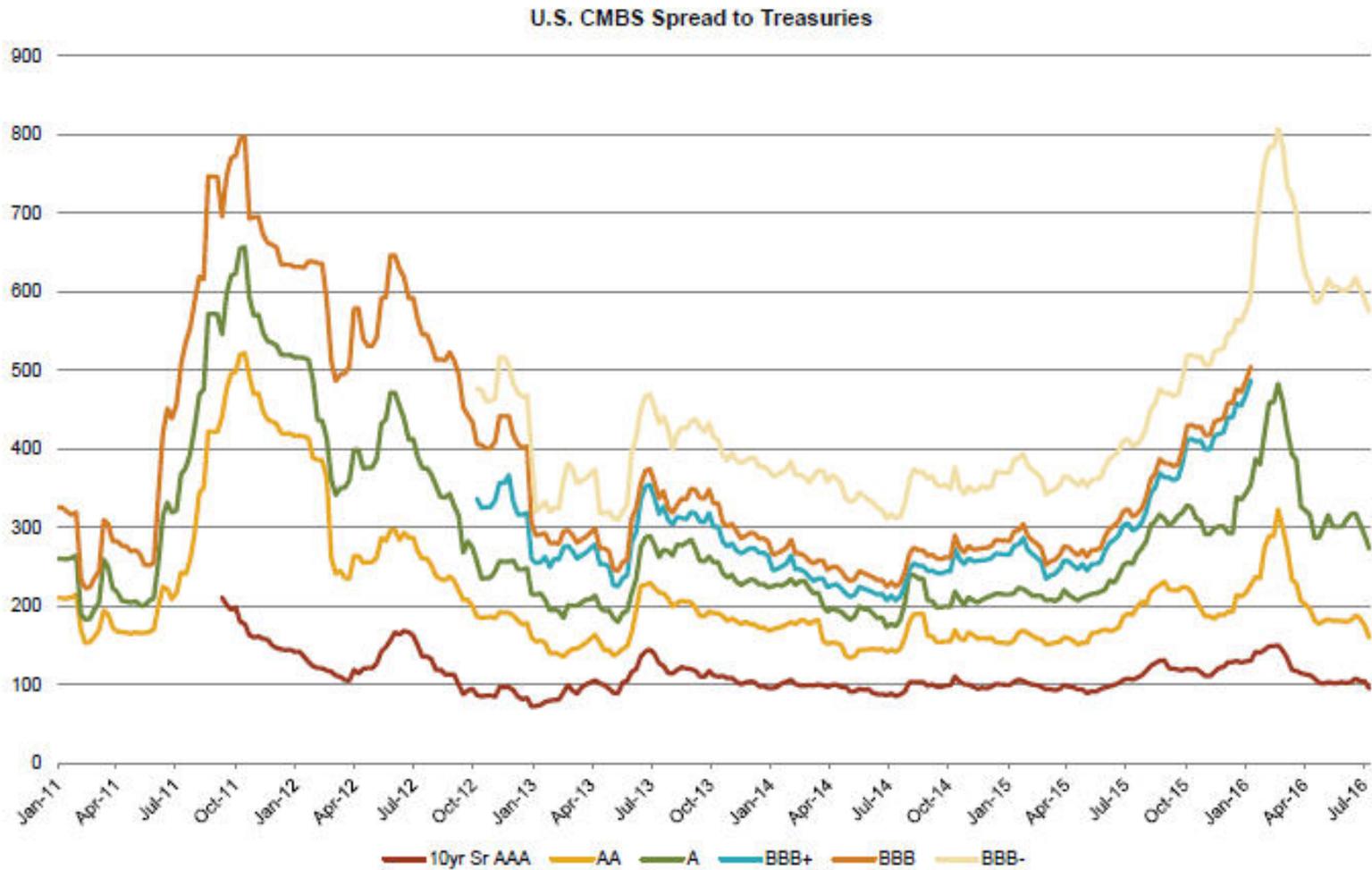
Cap Rate Trends

Cap Rates by Property Type
 1989 - Q2 2016



Source: RERC; RCA

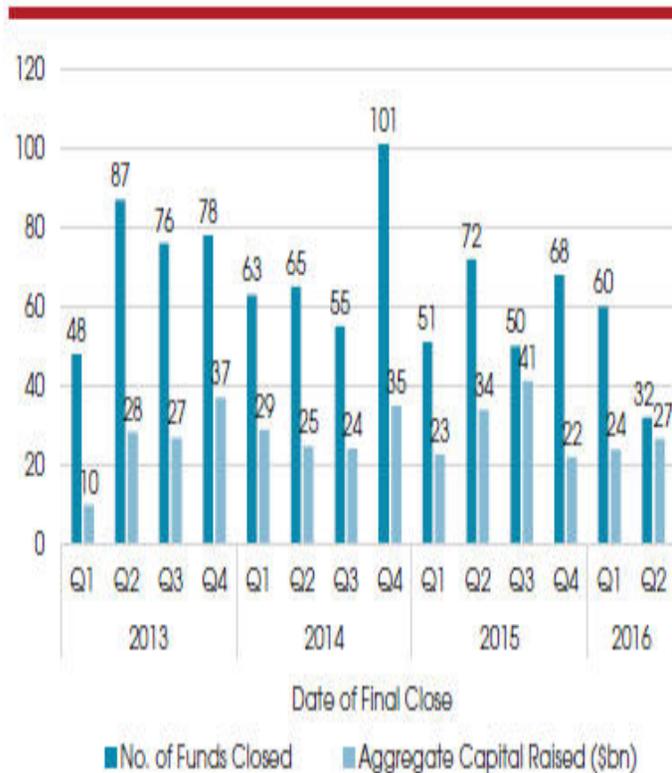
Credit Availability



Source: Commercial Real Estate Finance Council; JP Morgan; Urban Land Institute (ULI); RCLCO

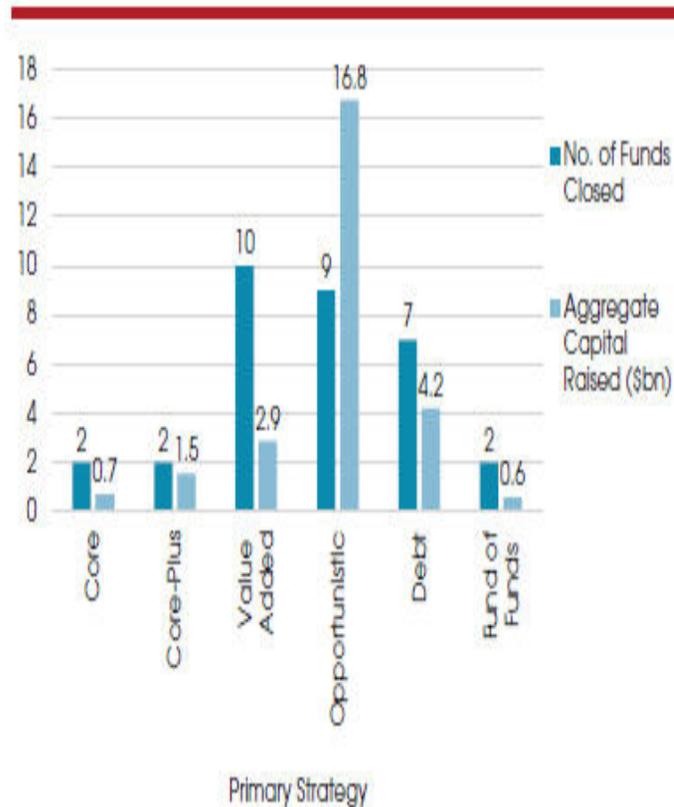
Investor Demand

Fig. 1: Global Quarterly Closed-End Private Real Estate Fundraising, Q1 2013 - Q2 2016



Source: Preqin Real Estate Online

Fig. 2: Closed-End Private Real Estate Fundraising in Q2 2016 by Primary Strategy



Source: Preqin Real Estate Online

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Commentary

- Bottoms up model shows a small expected decline
 - flat in energy markets
 - up in ags
 - down in metals
- Top down model also shows a small expected decline
 - dollar strength and slow projected global growth is negative for commodities

Bottoms up model

1-3 month horizon as of:	8/9/2016	Index DJUBS	Current price	60 day volatility	-1 st dev	+1 st dev	prob +	prob -	prob price	% ret	wght'd ret		
AGRICULTURE													
Corn		8.0%	332.50	12%	293	372	60%	40%	340	2%	0.2%		
Soybeans		5.7%	988.00	13%	860	1,116	60%	40%	1,014	1%	0.0%		
Wheat		4.4%	417.00	11%	370	464	60%	40%	426	-2%	-0.1%		
Soybean Meal		2.5%	333.30	13%	290	377	60%	40%	342	2%	0.0%		
Soybean Oil		3.2%	31.65	9%	29	34	60%	40%	32	3%	0.1%		
Group SubTotal		23.7%											
ENERGY													
Crude Oil WTI		7.4%	42.68	15%	36	49	50%	50%	43	-2%	-0.1%		
Crude Oil Brent		6.3%	44.93	15%	38	52	50%	50%	45	-1%	-0.1%		
Heating Oil		3.1%	133.08	14%	114	152	50%	50%	133	-2%	-0.1%		
Natural Gas		8.8%	2.62	17%	2.18	3.06	50%	50%	2.62	-2%	-0.2%		
Unleaded Gas (RE)		4.2%	134.65	13%	117	152	60%	40%	138	8%	0.4%		
Group SubTotal		29.8%											
INDUSTRIAL METALS													
Aluminum		4.7%	1630.50	7%	1,523	1,738	40%	60%	1,609	-2%	-0.1%		
Copper (NY)		7.1%	214.90	8%	198	232	50%	50%	215	0%	0.0%		
Nickel		1.5%	10731.00	12%	9,409	12,053	40%	60%	10,467	-3%	0.0%		
Zinc		2.2%	2275.00	9%	2,074	2,476	33%	67%	2,207	-3%	-0.1%		
Group SubTotal		15.5%											
LIVESTOCK													
Live Cattle		3.3%	115.00	8%	105	125	50%	50%	115	0%	0.0%		
Lean Hogs		1.8%	58.20	9%	53	63	50%	50%	58	0%	0.0%		
Group SubTotal		5.1%											
PRECIOUS METALS													
Gold		12.7%	1346.40	7%	1,258	1,434	50%	50%	1,346	0%	0.1%		
Silver		4.3%	19.87	9%	18	22	40%	60%	19	-2%	-0.1%		
Group SubTotal		17.0%											
FOODS & FIBERS													
Cotton		1.9%	73.05	10%	66	80	33%	67%	71	-3%	-0.1%		
Sugar		5.0%	20.39	12%	18	23	33%	67%	20	-6%	-0.3%		
Coffee (ICE)		2.0%	144.75	13%	126	163	40%	60%	141	-3%	0.0%		
Group SubTotal		8.9%											
											100.0%		
											Total	-0.4%	
												total weighted expected return: bottoms up	

Top down model

$$\Delta p = -16.8 + 5.3 * \Delta \text{WorldGDP} - 0.9 * \Delta \text{Dollar}$$

1

2.9%	World GDP
1.2%	USD
-0.3%	expected price change

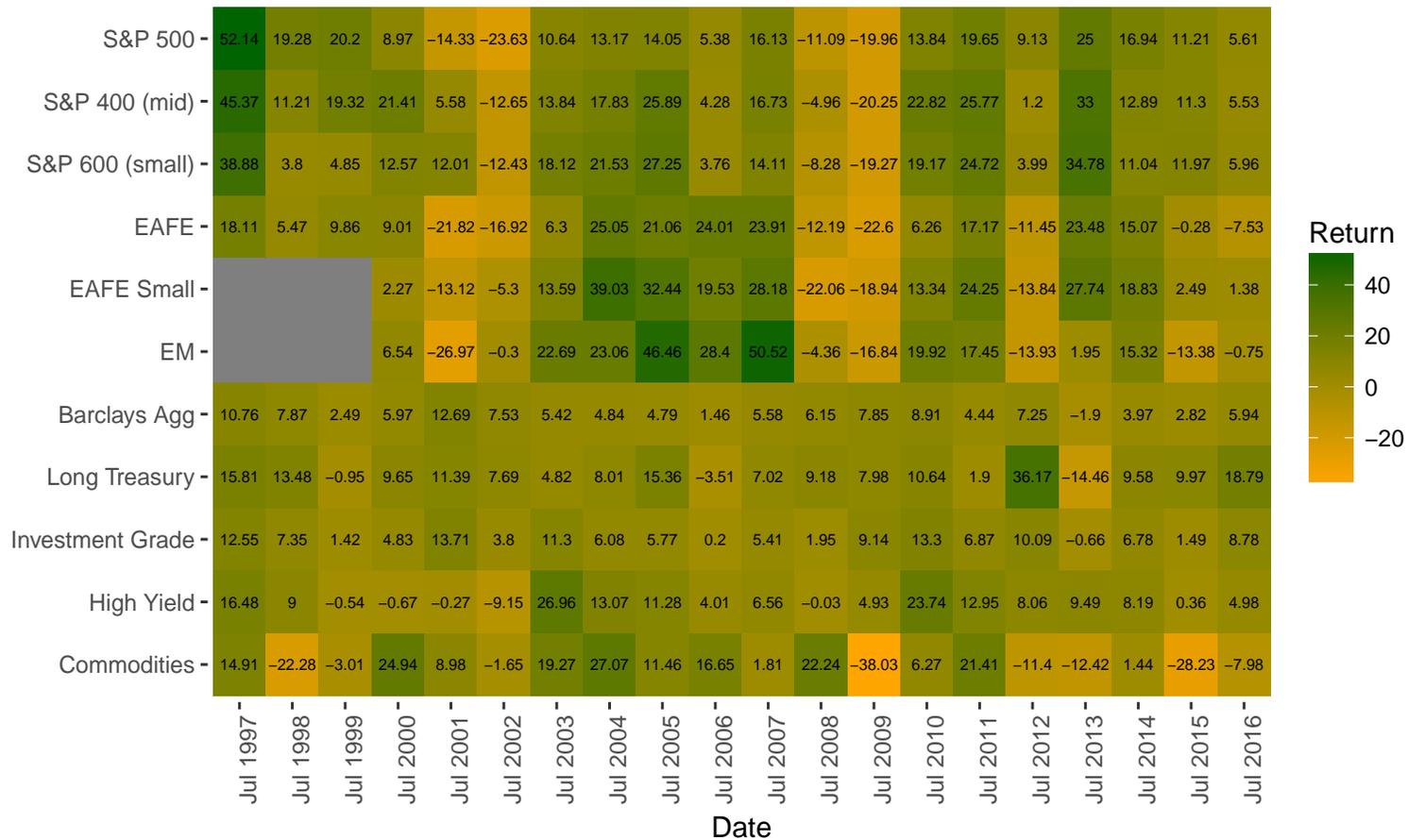
¹ <http://libertystreeteconomics.newyorkfed.org/2016/03/what-tracks-commodity-prices.html>

Outline

- 1 Summary View and Positioning
- 2 Macro Environment
- 3 Equities
 - Commentary
 - Trends
 - Valuation
 - Private Equity
- 4 Fixed Income
 - Commentary
 - Interest Rate Sensitive Fixed Income
 - High Yield and Private Debt
- 5 Real Estate
 - Commentary
 - Supply and Demand
 - Capital Markets Dynamics
- 6 Commodities
- 7 Historic Data

One Year Returns

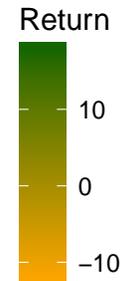
One Year Returns
 for indicated end dates



Hold Period Returns

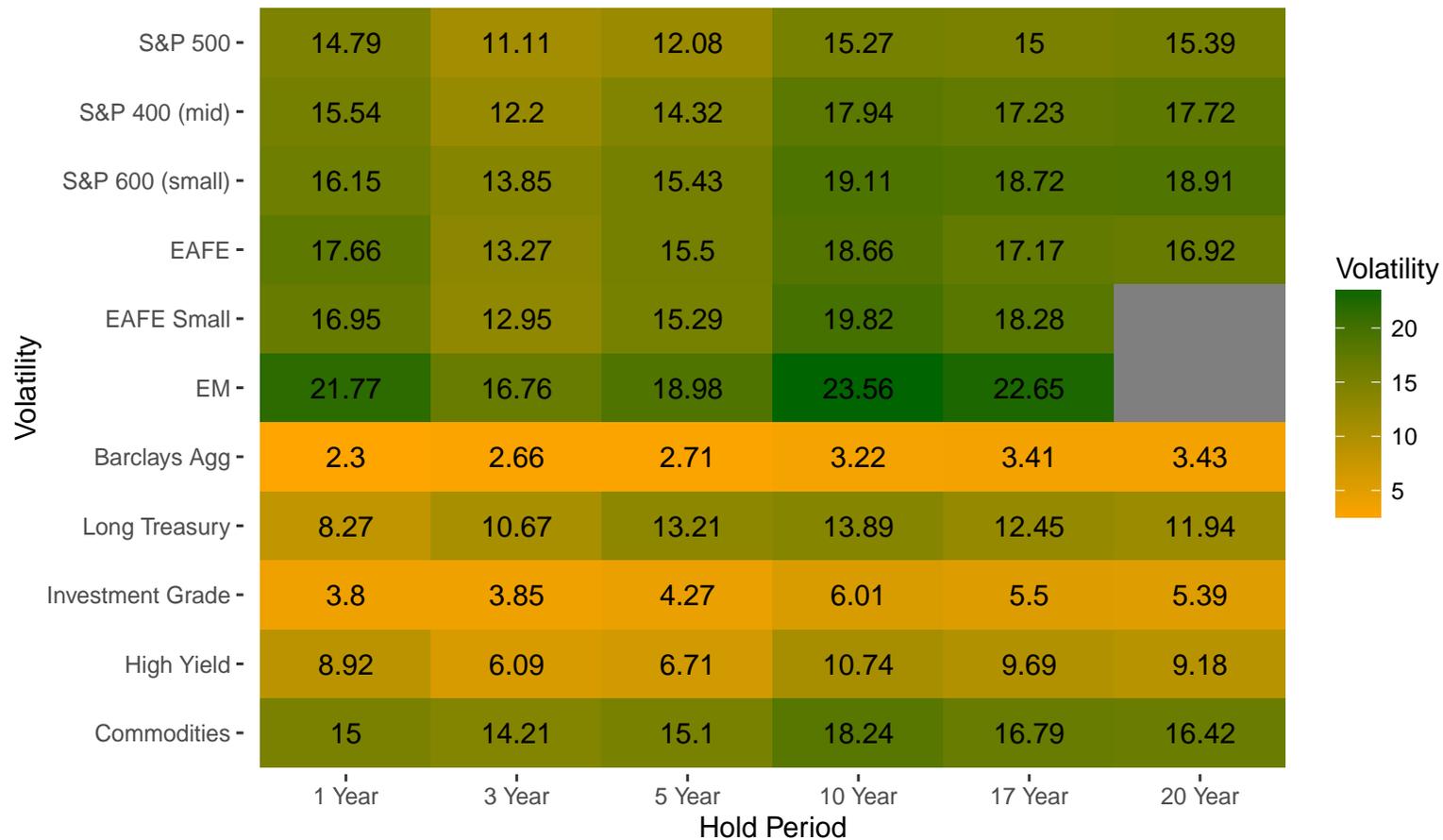
Annualized Returns and Growth of a Dollar
 for hold periods ending Jul 2016

Annualized Return/Growth of \$	Hold Period					
	1 Year	3 Year	5 Year	10 Year	17 Year	20 Year
S&P 500 -	5.61/1.06	11.16/1.37	13.38/1.87	7.75/2.11	4.92/2.26	8.31/4.94
S&P 400 (mid) -	5.53/1.06	9.86/1.33	12.28/1.78	9.33/2.44	9.68/4.81	11.78/9.28
S&P 600 (small) -	5.96/1.06	9.62/1.32	13.05/1.85	8.77/2.32	9.74/4.85	10.48/7.33
EAFE -	-7.53/0.92	2/1.06	3.02/1.16	1.98/1.22	3.24/1.72	4.37/2.35
EAFE Small -	1.38/1.01	7.28/1.23	6.32/1.36	4.48/1.55	7.2/3.26	NA/NA
EM -	-0.75/0.99	-0.29/0.99	-2.75/0.87	3.91/1.47	7.14/3.23	NA/NA
Barclays Agg -	5.94/1.06	4.23/1.13	3.57/1.19	5.06/1.64	5.47/2.47	5.69/3.03
Long Treasury -	18.79/1.19	12.7/1.43	10.76/1.67	9.02/2.37	8.39/3.93	8.51/5.12
Investment Grade -	8.78/1.09	5.64/1.18	5.21/1.29	6.24/1.83	6.32/2.84	6.42/3.47
High Yield -	4.98/1.05	4.46/1.14	6.16/1.35	7.74/2.11	6.98/3.15	7.15/3.98
Commodities -	-7.98/0.92	-12.5/0.67	-12.27/0.52	-6.38/0.52	1.85/1.37	0.84/1.18



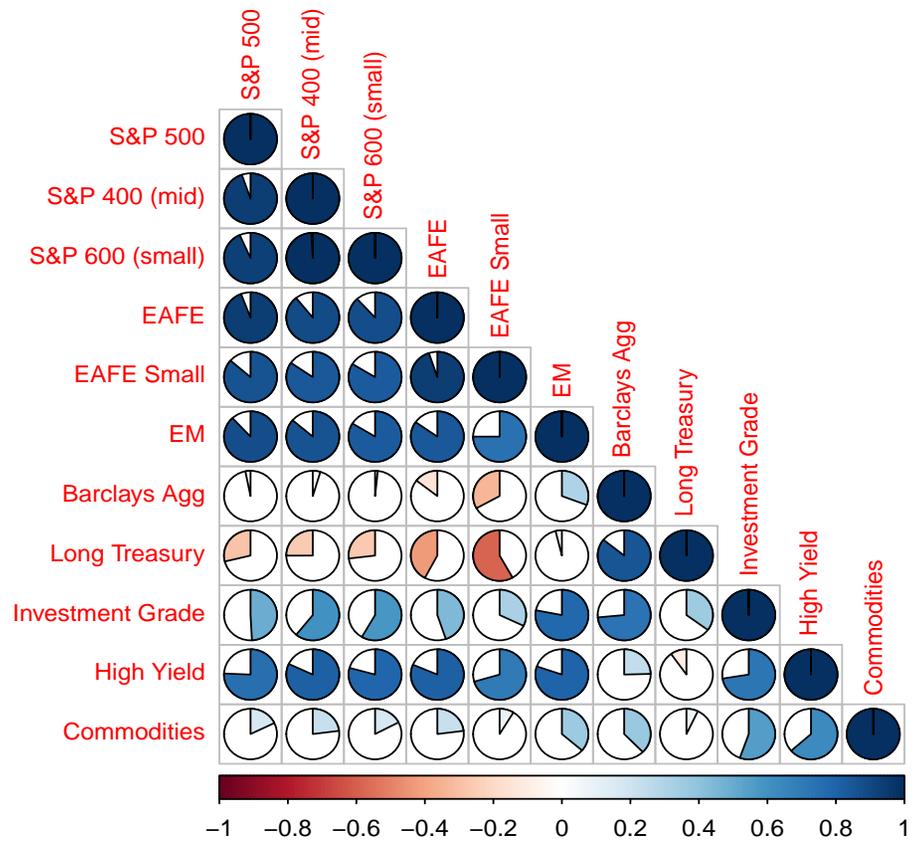
Volatility

Volatility
 for hold periods ending Jul 2016



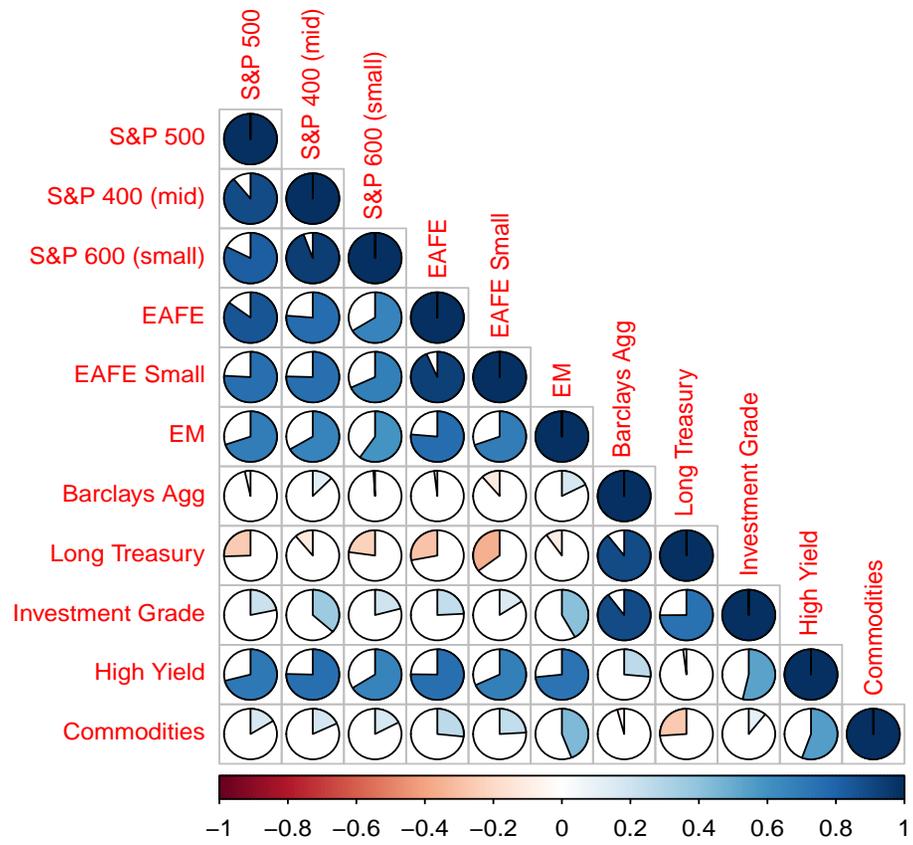
One Year Correlation

1 Year Correlation Matrix



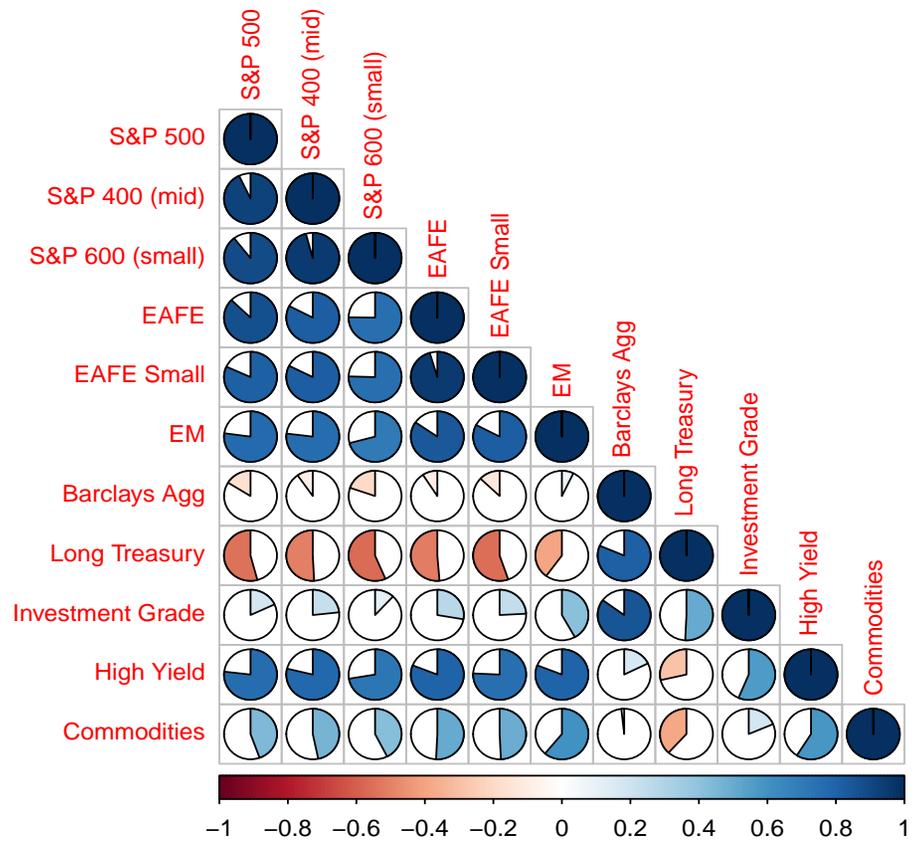
Three Year Correlation

3 Year Correlation Matrix



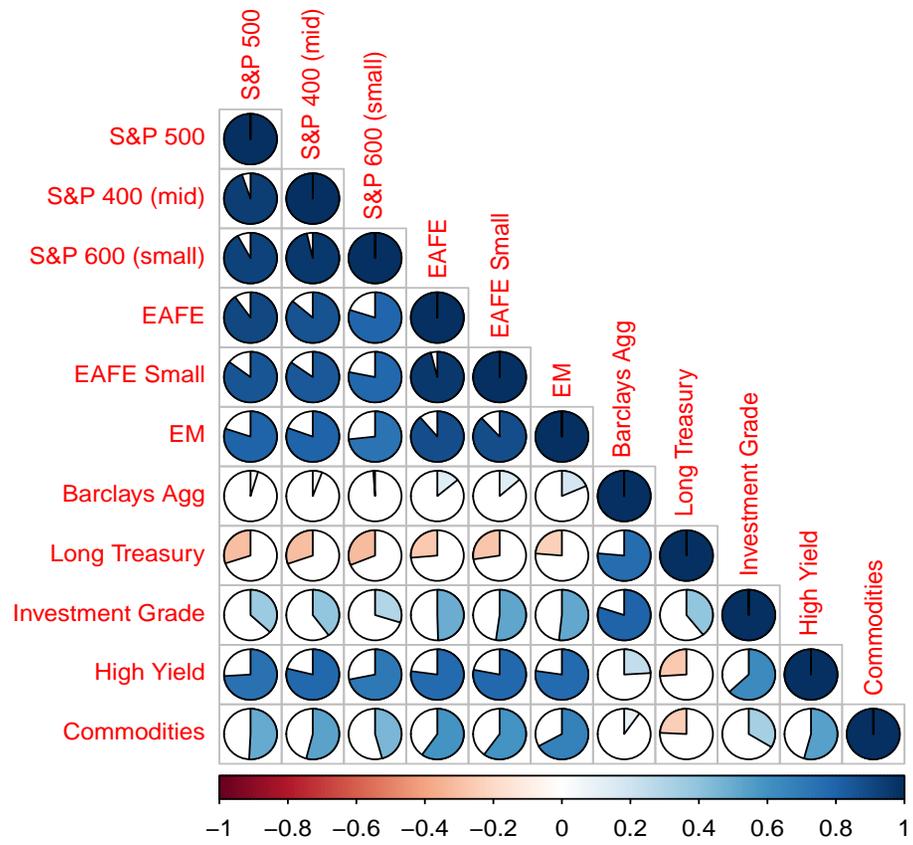
Five Year Correlation

5 Year Correlation Matrix



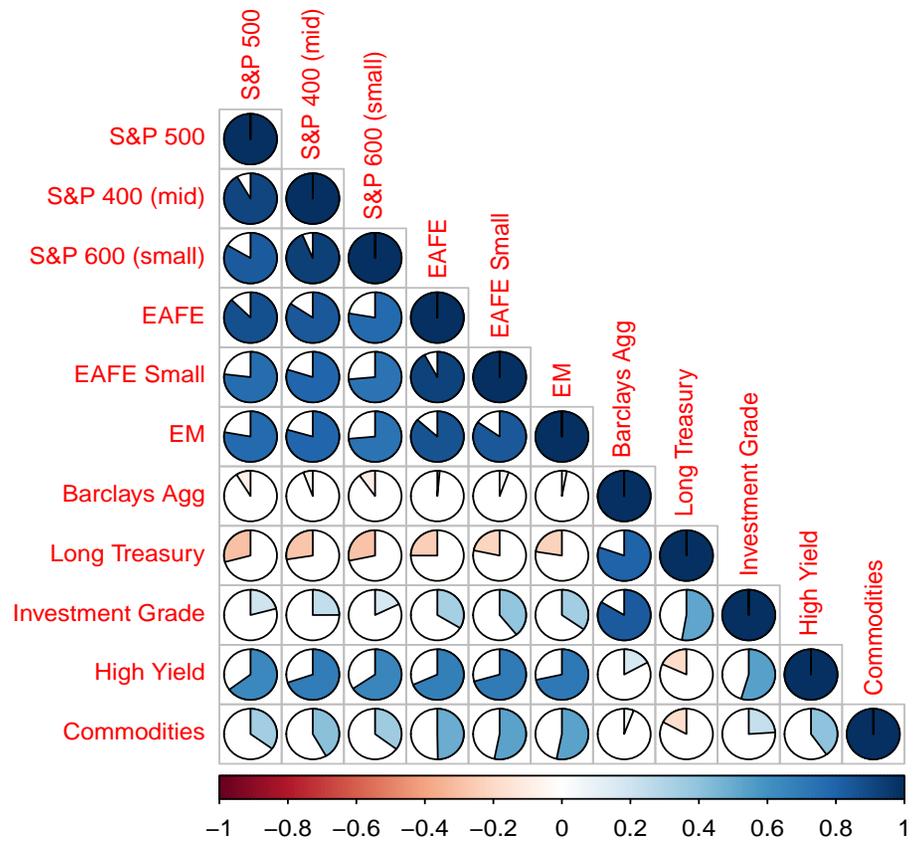
Ten Year Correlation

10 Year Correlation Matrix



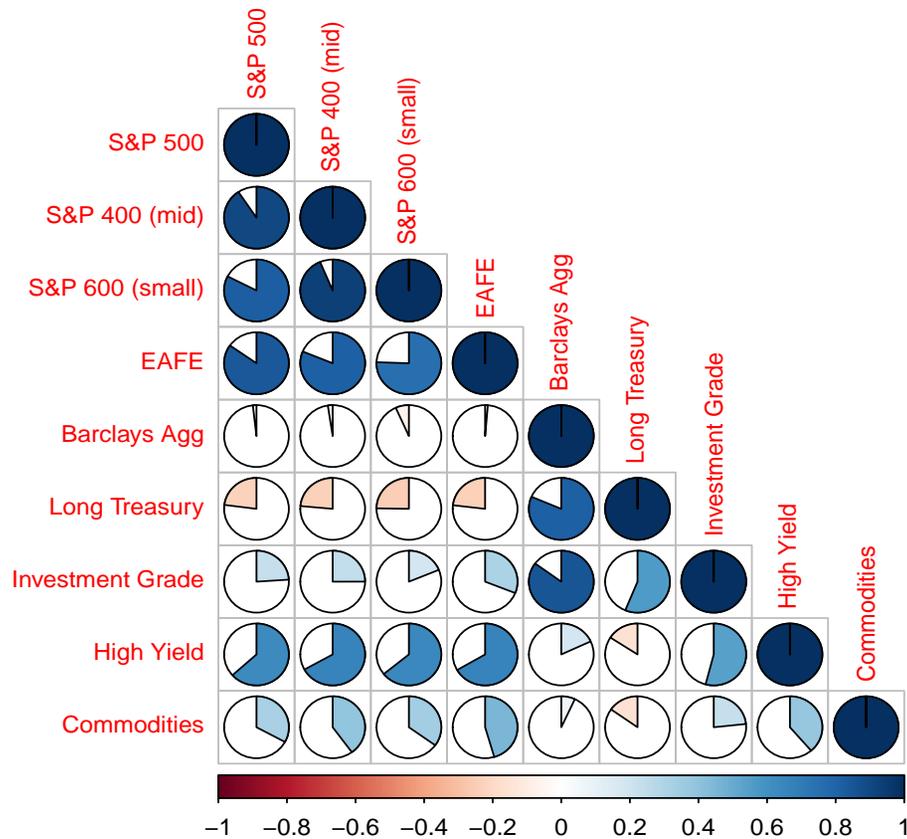
Seventeen Year Correlation

17 Year Correlation Matrix



Twenty Year Correlation

20 Year Correlation Matrix



Confidential Materials

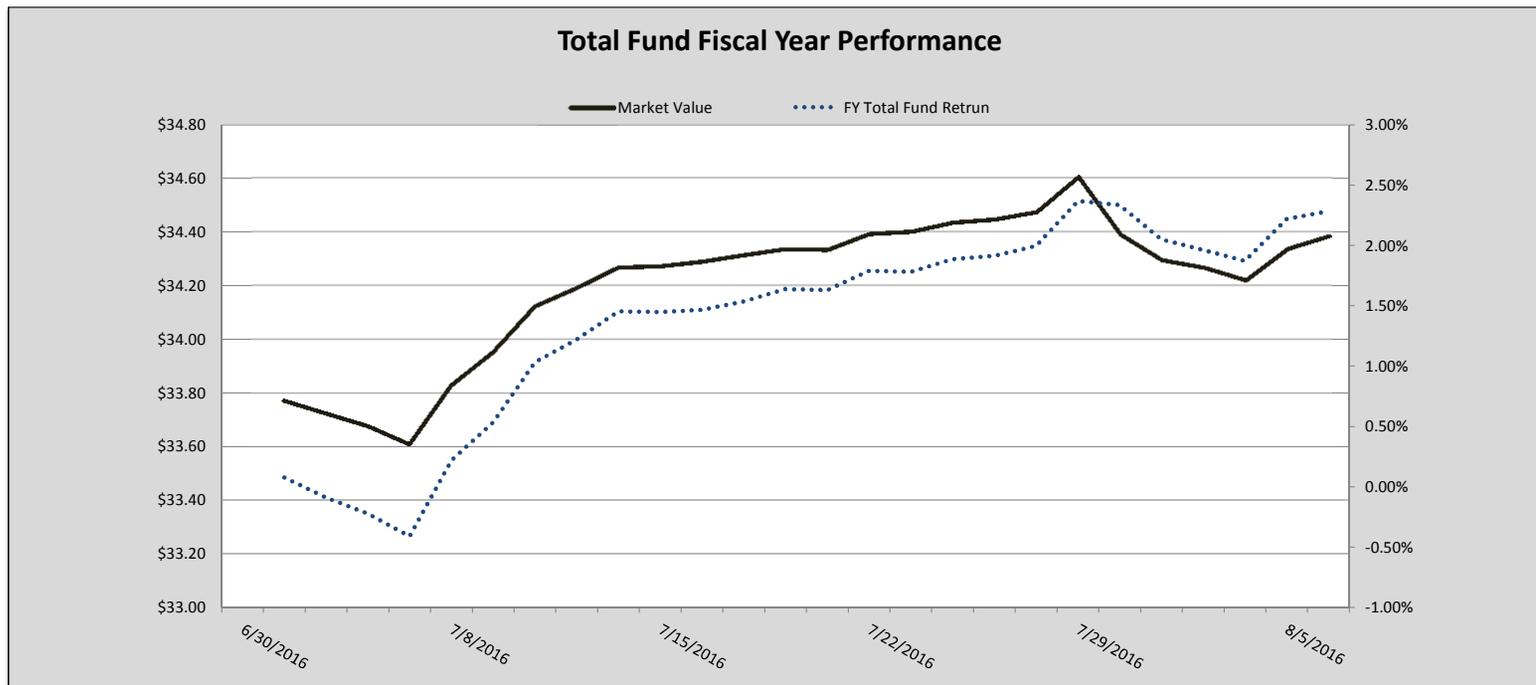
Agenda Item #4

Investment Report

Arizona State Retirement System

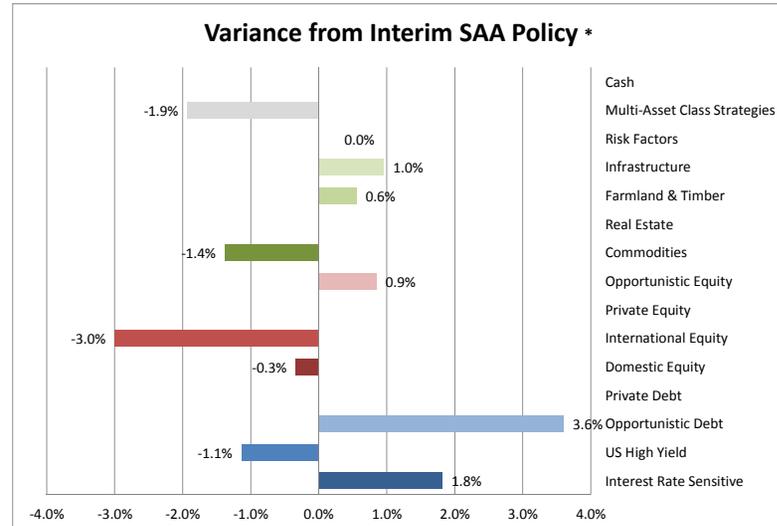
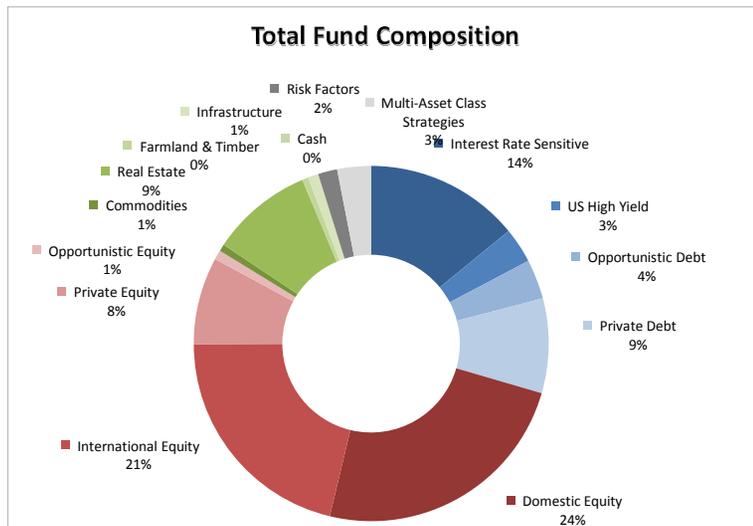
August 22, 2016

Fiscal Year Performance



Total Fund Positioning

Total Fund Positioning August 8, 2016



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

Asset Allocation

Total Fund		ASRS Market Value Report						Monday, August 08, 2016	
Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked	Multi-Asset	Market Value	%
		Active	Passive	Active	Passive				
Master Cash	Operating Cash (non-assetized)		4,412,130					4,412,130	0.01%
	Cash Total							\$4,412,130	0.01%
								Total Cash	0.00%
Blackrock: San Francisco	Treasuries (Long Duration)		557,343,135					557,343,135	1.62%
	Treasuries (Long Duration) Total							\$557,343,135	1.62%
								Long Treasuries (Range: 0% - 10%)	0.00%
ASRS: Phoenix	Enhanced Passive F2		1,915,238,753					1,915,238,753	5.57%
Blackrock: San Francisco	Passive (US Debt Index)		1,931,578,805					1,931,578,805	5.61%
Assetized Cash	US Treasuries		436,800,850					436,800,850	1.27%
	Core Fixed Income Total							\$4,283,618,408	12.45%
	Interest Rate Sensitive							\$4,840,961,543	14.07%
								Interest Rate Sensitive Policy	11.00%
Columbia: Minneapolis	Active	733,465,224						733,465,224	2.13%
JP Morgan: Indianapolis	Active	378,106,910						378,106,910	1.10%
	High Yield Fixed Income Total							\$1,111,572,141	3.23%
								High Yield Policy	4.00%
	Opportunistic Debt	1,239,871,537						\$1,239,871,537	3.60%
								Opportunistic Debt Policy	0.00%
	Private Debt Total	2,959,900,407						\$2,959,900,407	8.60%
								Private Debt (Range: 8% - 12%)	10.00%
	Fixed Income Total							\$10,152,305,628	29.50%
								Total Fixed Income (Range: 18% - 35%)	25.00%
LSV: Chicago	Active (Value)			583,647,571				583,647,571	1.70%
ASRS: Phoenix	Passive E2				4,656,015,916			4,656,015,916	13.53%
ASRS: Phoenix	Enhanced Passive E7				596,207,741			596,207,741	1.73%
ASRS: Phoenix	Enhanced Passive E8				569,337,616			569,337,616	1.65%
	Large Cap Equity Total							\$6,405,209,276	18.61%
								U.S. Equity Large Cap Policy	20.00%
Wellington: Boston	Active (Core)			289,411,375				289,411,375	0.84%
ASRS: Phoenix	Passive E3 (Growth)				323,895,507			323,895,507	0.94%
ASRS: Phoenix	Passive E4 (Value)				316,614,415			316,614,415	0.92%
	Mid Cap Equity Total							\$929,921,297	2.70%
								U.S. Equity Mid Cap Policy	3.00%
TimesSquare: New York	Active (Growth)			377,674,398				377,674,398	1.10%
DFA: Santa Monica	Active (Value)			287,810,782				287,810,782	0.84%
ASRS: Phoenix	Passive E6				338,784,771			338,784,771	0.98%
	Small Cap Equity Total							\$1,004,269,951	2.92%
								U.S. Equity Small Cap Policy	3.00%
	U.S. Equity Total							\$8,339,400,524	24.23%
								U.S. Equity (Range: 16% - 36%)	26.00%

Asset Allocation (Continued)

LSV: Chicago	Active (Value)		583,647,571					583,647,571	1.70%
ASRS: Phoenix	Passive E2			4,656,015,916				4,656,015,916	13.53%
ASRS: Phoenix	Enhanced Passive E7			596,207,741				596,207,741	1.73%
ASRS: Phoenix	Enhanced Passive E8			569,337,616				569,337,616	1.65%
	Large Cap Equity Total							\$6,405,209,276	18.61%
								U.S. Equity Large Cap Policy	20.00%
Wellington: Boston	Active (Core)		289,411,375					289,411,375	0.84%
ASRS: Phoenix	Passive E3 (Growth)			323,895,507				323,895,507	0.94%
ASRS: Phoenix	Passive E4 (Value)			316,614,415				316,614,415	0.92%
	Mid Cap Equity Total							\$929,921,297	2.70%
								U.S. Equity Mid Cap Policy	3.00%
TimesSquare: New York	Active (Growth)		377,674,398					377,674,398	1.10%
DFA: Santa Monica	Active (Value)		287,810,782					287,810,782	0.84%
ASRS: Phoenix	Passive E6			338,784,771				338,784,771	0.98%
	Small Cap Equity Total							\$1,004,269,951	2.92%
								U.S. Equity Small Cap Policy	3.00%
	U.S. Equity Total							\$8,339,400,524	24.23%
								U.S. Equity (Range: 16% - 36%)	26.00%
Brandes: San Diego	Active (EAFE)		551,412,851					551,412,851	1.60%
American Century	Active (EAFE)		538,833,816					538,833,816	1.57%
Trinity Street	Active (EAFE)		316,610,093					316,610,093	0.92%
Thompson Siegel Walmsley	Active (EAFE)		297,291,846					297,291,846	0.86%
Blackrock: San Francisco	Passive (EAFE)			4,023,013,202				4,023,013,202	11.69%
	Large Cap Developed Non-US Equity Total							\$5,727,692,921	16.64%
								Large Cap Developed Policy	17.00%
AQR: Greenwich	Active (EAFE SC)		98,690,073					98,690,073	0.29%
DFA: Santa Monica	Active (EAFE SC)		105,616,674					105,616,674	0.31%
Franklin Templeton: San Mateo	Active (EAFE SC)		99,945,843					99,945,843	0.29%
Blackrock: San Francisco	Passive (EAFE SC)			127,848,114				127,848,114	0.37%
	Small Cap Developed Non-US Equity Total							\$432,103,146	1.26%
								Small Cap Developed Policy	2.00%
William Blair: Chicago	Active (EM)		380,704,036					380,704,036	1.11%
Eaton Vance: Boston	Active (EM)		292,098,435					292,098,435	0.85%
LSV: Chicago	Active (EM)		125,327,581					125,327,581	0.36%
Blackrock: San Francisco	Passive (EM)			342,737,405				342,737,405	1.00%
	Emerging Markets Equity Total							\$1,140,867,457	3.32%
								Emerging Markets Policy	5.00%
	Non-US Equity Total							\$7,300,663,525	21.21%
								Non-US Equity (Range: 14% - 34%)	24.00%
ASRS: Phoenix	Risk Factor Portfolio			602,617,035				602,617,035	1.75%
	Public Equity Total							\$16,244,123,632	47.20%
	Private Equity Total		2,740,702,706					\$2,740,702,706	7.96%
								Private Equity (Range: 6% - 10%)	8.00%
	Opportunistic Equity		291,745,981					\$291,745,981	0.85%
								Opportunistic Equity Policy:	0.00%
	Equity Total							\$19,276,572,319	56.01%
								Total Equity (Range: 48% - 65%)	58.00%
Gresham: New York						220,187,490		220,187,490	0.64%
	Commodities Total							\$220,187,490	0.64%
								Commodities (Range: 0% - 4%)	2.00%
	Real Estate Total				3,185,482,170			\$3,185,482,170	9.26%
								Real Estate (Range: 8% - 12%)	10.00%
	Infrastructure Total				331,287,205			\$331,287,205	0.96%
								Infrastructure (Range: 0% - 3%)	0.00%
	Farmland & Timber Total				188,017,561			\$188,017,561	0.55%
								Farmland & Timber (Range: 0% - 3%)	0.00%
	Inflation Linked Total							\$3,924,974,426	11.41%
								Inflation Linked (Range: 10% - 16%)	12.00%
Bridgewater						1,055,460,331		1,055,460,331	3.07%
	Multi-Asset Class Strategies							1,055,460,331	3.07%
								Multi-Asset Class (Range: 0% - 12%)	5.00%
	TOTAL Amounts	\$5,311,344,085	\$4,845,373,672	\$7,377,719,574	\$11,898,852,745	\$3,924,974,426	\$1,055,460,331	\$34,413,724,833	100.00%
	TOTAL Percent	15.43%	14.08%	21.44%	34.58%	11.41%	3.07%		

Asset Allocation (Continued)

Asset Class	Actual Portfolio	SAAP		Interim SAA		Actual - Interim SAA		Policy Band check Actual - Adj Policy
		Target	Range	Adj Policy	Range	% diff	\$ diff	
Tactical Cash	0.00%	0%	(0-3%)	0.00%	(0-3%)	0.00%	0	
Cash	0.01%	0%		0.00%		0.01%	4,412,130	
Total Cash	0.01%	0%	(0-3%)	0.00%	(0-3%)	0.01%	\$4,412,129.79	
Interest Rate Sensitive	14.07%	11%		12.25%		1.82%	625,605,194	
High Yield	3.23%	4%		4.37%		-1.14%	-\$393,369,406	
Opportunistic Debt	3.60%	0%		0.00%		3.60%	\$1,239,871,537	
Private Debt	8.60%	10%	(8-12%)	8.60%	(7-11%)	0.00%	\$0	
Total Fixed Income	29.50%	25%	(18-35%)	25.22%	(18-35%)	4.28%	\$1,472,107,326	OK
Large Cap	18.61%	20%		18.80%		-0.19%	-\$64,730,099	
Mid Cap	2.70%	3%		2.77%		-0.07%	-\$24,150,234	
Small Cap	2.92%	3%		3.00%		-0.08%	-\$28,141,794	
US Equity	24.23%	26%	(16-36%)	24.57%	(15-35%)	-0.34%	-\$117,022,127	OK
Developed Large Cap	16.64%	17%		17.21%		-0.57%	-\$196,127,217	
Developed Small Cap	1.26%	2%		2.00%		-0.74%	-\$256,171,350	
Emerging Markets	3.32%	5%		5.00%		-1.68%	-\$579,818,784	
Non-US Equity	21.21%	24%	(14-34%)	24.21%	(14-34%)	-3.00%	-\$1,032,117,352	OK
Total Equity Transition	0.00%	0%		0.00%		0.00%	\$0	
Risk Factors	1.75%	0%		1.75%		0.00%	\$0	
Total Public Equity	47.20%			1.76%		0.00%	\$0	
Private Equity	7.96%	8%		7.96%	(6-10%)	0.00%	\$0	OK
Opportunistic Equity	0.85%	0%		0.00%		0.85%	\$291,745,981	
Total Equity	56.01%	58%	(48-65%)	58.51%	(48-65%)	-2.49%	-\$857,393,498	OK
Commodities	0.64%	2%	(0-4%)	2.01%	(0-4%)	-1.38%	-\$473,204,813	OK
Real Estate	9.26%	10%	(8-12%)	9.26%	(7-11%)	0.00%	\$0	OK
Infrastructure	0.96%	0%	(0-3%)	0.00%	(0-3%)	0.96%	\$331,287,205	OK
Farmland & Timber	0.55%	0%	(0-3%)	0.00%	(0-3%)	0.55%	\$188,017,561	OK
Opportunistic I/L	0.00%	0%		0.00%		0.00%	\$0	
Total Inflation Linked	11.41%	12%	(10-14%)	11.27%		0.13%	\$46,099,953	OK
Multi-Asset Strategies	3.07%	5%	(0-12%)	5.00%	(0-12%)	-1.93%	-\$665,225,911	OK
Total	100.00%	100.00%		100.00%		0.00%	\$0	

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

Internally Managed Portfolios:	25%
\$8,716,094,719	

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

Total Opportunistic		
Opportunistic Debt	\$1,239,871,537	3.6%
Opportunistic Equity	\$291,745,981	0.8%
Opportunistic I/L	\$0	0.0%
	\$1,531,617,518	4.5%

Total Public Equity Returns as of June 30, 2016

Arizona State Retirement System

Total Domestic and International Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Domestic and International Equity	15,720,048,177	46.30	-1.14	0.83	-2.84	-2.84	7.02	7.39	5.57	6.24	Jan-98
ASRS Custom Total Equity Benchmark			-0.79	0.93	-3.23	-3.23	7.11	7.46	5.77	5.63	Jan-98
Over/Under			-0.35	-0.10	0.39	0.39	-0.09	-0.07	-0.20	0.61	
Equity Risk Factor Portfolio	582,483,089	1.72	0.64	2.55	4.38	4.38	12.30	--	--	11.33	Jun-13
ASRS Custom Total Equity Benchmark			-0.79	0.93	-3.23	-3.23	7.11	7.46	5.77	6.04	Jun-13
Over/Under			1.43	1.62	7.61	7.61	5.19			5.29	
Total Domestic and Int'l Equity ex-Equity Risk Factor Portfolio	15,137,565,088	44.58	-1.20	0.77	-3.07	-3.07	6.91	7.33	5.55	6.23	Jan-98
ASRS Custom Total Equity Benchmark			-0.79	0.93	-3.23	-3.23	7.11	7.46	5.77	5.63	Jan-98
Over/Under			-0.41	-0.16	0.16	0.16	-0.20	-0.13	-0.22	0.60	

- Total Domestic and International Equity market value includes \$1,979,854 remaining in terminated manager and transition accounts.
- Performance of ASRS Total Domestic and International Equity includes the performance of the ASRS Domestic Equity and ASRS International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013. NEPC began calculating Total Domestic and International Equity performance in January 2009. Monthly performance data from January 1998 - December 2008 was provided by State Street.
Note: Performance is based on net of fee performance data.
Composition of ASRS Custom Total Equity Benchmark can be found in the appendix.

Domestic Equity Returns as of June 30, 2016

Arizona State Retirement System

Domestic and Large Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Domestic Equity	8,048,988,456	23.70	0.56	2.98	3.67	3.67	11.31	11.63	7.90	11.10	Jul-75
ASRS Custom Domestic Equity Benchmark			0.32	2.75	3.24	3.24	11.43	11.84	7.86	11.17	Jul-75
Over/Under			0.24	0.23	0.43	0.43	-0.12	-0.21	0.04	-0.07	
Total Large Cap Equity	6,194,076,417	18.24	0.77	2.84	5.26	5.26	11.80	11.95	7.49	7.81	Jul-02
S&P 500			0.26	2.46	3.99	3.99	11.66	12.10	7.42	7.69	Jul-02
Over/Under			0.51	0.38	1.27	1.27	0.14	-0.15	0.07	0.12	
Active Large Cap Equity											
LSV	558,733,181	1.65	-1.10	0.68	-3.76	-3.76	8.75	11.03	6.81	10.09	Jan-03
S&P/Citigroup 500 Value			0.89	3.96	3.38	3.38	9.66	11.18	5.77	8.52	Jan-03
Over/Under			-1.99	-3.28	-7.14	-7.14	-0.91	-0.15	1.04	1.57	
Enhanced/Passive Large Cap Equity											
Internally Managed E2	4,486,400,132	13.21	0.26	2.46	3.99	3.99	11.65	12.08	7.45	7.49	Apr-97
S&P 500			0.26	2.46	3.99	3.99	11.66	12.10	7.42	7.42	Apr-97
Over/Under			0.00	0.00	0.00	0.00	-0.01	-0.02	0.03	0.07	
Internally Managed E7	582,806,219	1.72	3.08	5.10	14.41	14.41	12.76	--	--	13.87	Aug-12
MSCI USA High Dividend Yield Index			3.08	5.11	14.65	14.65	12.88	13.63	9.11	13.90	Aug-12
Over/Under			0.00	-0.01	-0.24	-0.24	-0.12	--	--	-0.03	
Internally Managed E8	566,136,835	1.67	4.56	5.68	17.10	17.10	15.06	--	--	15.17	Aug-12
MSCI USA Minimum Volatility Index			4.58	5.78	17.33	17.33	15.02	14.77	9.48	14.90	Aug-12
Over/Under			-0.02	-0.10	-0.23	-0.23	0.04	--	--	0.27	

1. Total Domestic Equity includes \$482 in terminated manager and transition accounts

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

Note: Performance is reported net of fees.

Composition of ASRS Custom Domestic Equity Benchmark can be found in the appendix.



NEPC, LLC

June 30, 2016

Domestic Equity Returns as of June 30, 2016

Arizona State Retirement System

Mid Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Mid Cap Equity	898,662,281	2.65	-0.06	3.66	0.66	0.66	10.53	10.38	8.53	9.81	Jul-02
S&P 400 MidCap			0.42	3.99	1.33	1.33	10.53	10.55	8.55	9.83	Jul-02
Over/Under			-0.48	-0.33	-0.67	-0.67	0.00	-0.17	-0.02	-0.02	
Active Mid Cap Equity											
Wellington	280,036,805	0.82	-1.43	2.50	-0.88	-0.88	11.34	10.76	9.29	10.68	Jul-02
S&P 400 MidCap			0.42	3.99	1.33	1.33	10.53	10.55	8.55	9.83	Jul-02
Over/Under			-1.85	-1.49	-2.21	-2.21	0.81	0.21	0.74	0.85	
Passive Mid Cap Equity											
Internally Managed E3	309,118,090	0.91	0.46	4.51	1.20	1.20	10.82	10.19	9.85	8.40	Dec-00
S&P/Citigroup 400 Growth			0.35	4.35	1.17	1.17	10.77	10.07	9.29	7.90	Dec-00
Over/Under			0.11	0.16	0.03	0.03	0.05	0.12	0.56	0.50	
Internally Managed E4	309,507,386	0.91	0.50	3.71	1.20	1.20	10.03	10.81	8.01	9.84	Jul-02
S&P/Citigroup 400 Value			0.48	3.67	1.28	1.28	10.13	10.96	7.75	9.67	Jul-02
Over/Under			0.02	0.04	-0.08	-0.08	-0.10	-0.15	0.26	0.17	

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

Note: Performance is reported net of fees.



NEPC, LLC

June 30, 2016

Domestic Equity Returns as of June 30, 2016

Arizona State Retirement System

Small Cap Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Small Cap Equity	956,249,325	2.82	-0.20	2.94	-4.70	-4.70	8.36	10.29	7.92	9.77	Jul-02
ASRS Custom Small Cap Equity Blended Benchmark			<u>0.61</u>	<u>3.48</u>	<u>-0.03</u>	<u>-0.03</u>	<u>10.23</u>	<u>11.20</u>	<u>8.11</u>	<u>9.55</u>	Jul-02
Over/Under			-0.81	-0.54	-4.67	-4.67	-1.87	-0.91	-0.19	0.22	
Active Small Cap Equity											
TimesSquare	357,943,561	1.05	-0.14	4.50	-7.71	-7.71	8.38	10.97	9.95	10.80	Apr-05
Times Square Blended Benchmark			<u>-0.46</u>	<u>3.24</u>	<u>-10.75</u>	<u>-10.75</u>	<u>8.33</u>	<u>8.83</u>	<u>7.74</u>	<u>8.49</u>	Apr-05
Over/Under			0.32	1.26	3.04	3.04	0.05	2.14	2.21	2.31	
Active Small Cap Equity											
DFA - US Small Cap	273,912,432	0.81	-1.25	0.71	-5.96	-5.96	6.72	9.08	6.57	11.01	Sep-98
DFA Blended Benchmark			<u>0.78</u>	<u>3.40</u>	<u>0.72</u>	<u>0.72</u>	<u>9.43</u>	<u>11.36</u>	<u>7.35</u>	<u>10.47</u>	Sep-98
Over/Under			-2.03	-2.69	-6.68	-6.68	-2.71	-2.28	-0.78	0.54	
Passive Small Cap Equity											
Internally Managed E6	324,393,332	0.96	0.62	3.19	-0.14	-0.14	10.17	11.14	--	7.65	Feb-07
S&P 600 SmallCap			<u>0.61</u>	<u>3.48</u>	<u>-0.03</u>	<u>-0.03</u>	<u>10.23</u>	<u>11.20</u>	<u>7.86</u>	<u>7.37</u>	Feb-07
Over/Under			0.01	-0.29	-0.11	-0.11	-0.06	-0.06		0.28	

Note: Performance is reported net of fees.

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



NEPC, LLC

June 30, 2016

International Equity Returns as of June 30, 2016

Arizona State Retirement System

International Developed Markets Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total International Equity	7,087,123,001	20.87	-2.84	-1.64	-10.43	-10.43	1.47	0.75	1.76	5.59	Apr-87
ASRS Custom Int'l Equity Benchmark			-1.97	-1.05	-9.90	-9.90	1.77	0.89	2.54	5.31	Apr-87
Over/Under			-0.87	-0.59	-0.53	-0.53	-0.30	-0.14	-0.78	0.28	
Total International Developed Markets Equity	6,013,441,965	17.71	-3.79	-1.84	-9.45	-9.45	2.69	2.28	2.74	5.94	Apr-87
ASRS Custom Int'l Developed Markets Equity Benchmark			-3.57	-1.58	-9.46	-9.46	2.77	2.32	3.33	5.59	Apr-87
Over/Under			-0.22	-0.26	0.01	0.01	-0.08	-0.04	-0.59	0.35	
Active Large Cap International Equity											
Brandes	537,161,799	1.58	-4.17	-3.15	-10.89	-10.89	3.81	2.78	1.93	7.95	Oct-98
Brandes Custom Benchmark			-3.36	-1.46	-10.16	-10.16	2.09	1.89	2.92	5.24	Oct-98
Over/Under			-0.81	-1.69	-0.73	-0.73	1.72	0.89	-0.99	2.71	
American Century	523,712,929	1.54	-4.82	-2.99	-10.21	-10.21	--	--	--	-5.46	Jul-14
MSCI EAFE			-3.36	-1.46	-10.16	-10.16	2.09	1.89	1.92	-7.24	Jul-14
Over/Under			-1.46	-1.53	-0.05	-0.05	--	--	--	1.78	
Trinity Street	300,105,238	0.88	-7.67	-5.53	-11.63	-11.63	--	--	--	-7.66	Jul-14
MSCI EAFE			-3.36	-1.46	-10.16	-10.16	2.09	1.89	1.92	-7.24	Jul-14
Over/Under			-4.31	-4.07	-1.47	-1.47	--	--	--	-0.42	
TS&W International	280,891,221	0.83	-4.92	-3.65	-9.98	-9.98	--	--	--	-6.23	Jul-14
MSCI EAFE			-3.36	-1.46	-10.16	-10.16	2.09	1.89	1.92	-7.24	Jul-14
Over/Under			-1.56	-2.19	0.18	0.18	--	--	--	1.01	

1. Total International Equity market value includes \$1,979,372 in terminated manager and transition accounts.

2. Total International Developed Markets Equity market value includes \$192,971 in terminated manager accounts.

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

Note: Performance is reported net of fees.

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



NEPC, LLC

June 30, 2016

International Equity Returns as of June 30, 2016

Arizona State Retirement System

International Developed Markets Equity Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Passive Large Cap International Equity											
BlackRock EAFE Equity Index	3,858,562,248	11.36	-3.33	-1.25	-9.85	-9.85	2.35	1.96	--	6.29	Jul-09
MSCI EAFE			-3.36	-1.46	-10.16	-10.16	2.09	1.89	1.92	6.26	Jul-09
Over/Under			0.03	0.21	0.31	0.31	0.26	0.07		0.03	
Active Small Cap International Equity											
DFA - International Small Cap	98,245,173	0.29	-6.17	-3.42	-10.82	-10.82	3.87	2.49	2.69	4.18	Sep-05
MSCI EAFE Small Cap			-5.28	-2.60	-3.67	-3.67	7.28	5.00	3.83	5.27	Sep-05
Over/Under			-0.89	-0.82	-7.15	-7.15	-3.41	-2.51	-1.14	-1.09	
Franklin Templeton	198,190,014	0.58	-10.50	-8.87	-13.20	-13.20	1.80	4.43	--	4.17	Apr-11
MSCI EAFE Small Cap			-5.28	-2.60	-3.67	-3.67	7.28	5.00	3.83	4.96	Apr-11
Over/Under			-5.22	-6.27	-9.53	-9.53	-5.48	-0.57		-0.79	
AQR Capital	94,413,827	0.28	-4.97	-3.32	-2.86	-2.86	8.36	--	--	7.09	Jun-13
MSCI EAFE Small Cap			-5.28	-2.60	-3.67	-3.67	7.28	5.00	3.83	5.80	Jun-13
Over/Under			0.31	-0.72	0.81	0.81	1.08			1.29	
Passive Small Cap International Equity											
BlackRock EAFE Small Cap Equity Index	121,964,094	0.36	-5.20	-2.40	-3.40	-3.40	7.42	4.95	--	9.48	Jun-10
MSCI EAFE Small Cap			-5.28	-2.60	-3.67	-3.67	7.28	5.00	3.83	9.53	Jun-10
Over/Under			0.08	0.20	0.27	0.27	0.14	-0.05		-0.05	

Note: Performance is reported net of fees.



June 30, 2016

Fixed Income and Commodity Returns as of June 30, 2016

Arizona State Retirement System

Fixed Income and Interest Rate Sensitive Fixed Income Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Public Markets Fixed Income	5,473,275,115	16.12	1.82	2.84	5.88	5.88	3.78	3.79	5.35	8.26	Jul-75
ASRS Custom Public Markets Fixed Income Benchmark			<u>1.56</u>	<u>3.11</u>	<u>4.87</u>	<u>4.87</u>	<u>2.91</u>	<u>3.17</u>	<u>4.85</u>	--	Jul-75
Over/Under			0.26	-0.27	1.01	1.01	0.87	0.62	0.50		
Total Interest Rate Sensitive Fixed Income	4,396,892,443	12.95	2.20	2.66	6.95	6.95	4.46	4.10	5.40	8.28	Jul-75
Barclays Aggregate			<u>1.80</u>	<u>2.21</u>	<u>6.00</u>	<u>6.00</u>	<u>4.06</u>	<u>3.76</u>	<u>5.13</u>	--	Jul-75
Over/Under			0.40	0.45	0.95	0.95	0.40	0.34	0.27		
Treasuries (Long Duration)											
BlackRock Long Gov't Bond Index	556,096,406	1.64	6.14	6.48	--	--	--	--	--	15.35	Sep-15
Barclays U.S. Treasury Long TR USD			<u>6.14</u>	<u>6.44</u>	<u>19.30</u>	<u>19.30</u>	<u>10.46</u>	<u>10.32</u>	<u>8.77</u>	<u>15.29</u>	Sep-15
Over/Under			0.00	0.04						0.06	
Core Fixed Income											
BlackRock US Debt Index	1,928,330,908	5.68	1.77	2.25	6.12	6.12	--	--	--	4.32	May-14
Barclays Aggregate			<u>1.80</u>	<u>2.21</u>	<u>6.00</u>	<u>6.00</u>	<u>4.06</u>	<u>3.76</u>	<u>5.13</u>	<u>4.17</u>	May-14
Over/Under			-0.03	0.04	0.12	0.12				0.15	
Internally Managed F2	1,912,465,128	5.63	1.80	2.26	6.23	6.23	4.30	4.06	5.40	5.51	Oct-00
Barclays Aggregate			<u>1.80</u>	<u>2.21</u>	<u>6.00</u>	<u>6.00</u>	<u>4.06</u>	<u>3.76</u>	<u>5.13</u>	<u>5.34</u>	Oct-00
Over/Under			0.00	0.05	0.23	0.23	0.24	0.30	0.27	0.17	

1. Total Public Markets Fixed Income market value includes \$13,774 remaining in terminated manager accounts.
2. BlackRock Long Gov't Bond Index was funded in mid-August 2015. Inception date for performance reporting purposes is September 1, 2015.
3. BlackRock US Debt Index was funded in mid-April 2014. Inception date for performance reporting purposes is May 1, 2014.

Note: Performance is reported net of fees.

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



NEPC, LLC

June 30, 2016

Fixed Income and Commodity Returns as of June 30, 2016

Arizona State Retirement System

Total High Yield Fixed Income Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total High Yield Fixed Income	1,076,382,672	3.17	0.48	3.60	2.47	2.47	4.83	6.15	--	7.89	Oct-09
Barclays High Yield			0.92	5.52	1.62	1.62	4.18	5.84	7.56	8.22	Oct-09
Over/Under			-0.44	-1.92	0.85	0.85	0.65	0.31		-0.33	
Active High Yield Fixed Income											
Columbia Management	711,566,900	2.10	0.38	2.87	3.22	3.22	5.23	6.53	--	8.30	Oct-09
Barclays High Yield			0.92	5.52	1.62	1.62	4.18	5.84	7.56	8.22	Oct-09
Over/Under			-0.54	-2.65	1.60	1.60	1.05	0.69		0.08	
JP Morgan High Yield	364,801,998	1.07	0.68	5.05	1.14	1.14	4.14	--	--	4.14	Jul-13
Barclays High Yield			0.92	5.52	1.62	1.62	4.18	5.84	7.56	4.18	Jul-13
Over/Under			-0.24	-0.47	-0.48	-0.48	-0.04			-0.04	

1. Total High Yield Fixed Income includes \$13,773 in terminated manager and transition accounts.
 Note: Performance is reported net of fees.

Fixed Income and Commodity Returns as of June 30, 2016

Arizona State Retirement System

Inflation-Linked Assets Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Inflation-Linked Assets	231,422,935	0.68	3.20	11.70	-15.92	-15.92	-11.06	-10.42	--	-5.51	Feb-10
ASRS Custom Inflation-Linked Benchmark			4.13	12.78	-13.32	-13.32	-10.55	-10.82	-1.80	-6.24	Feb-10
Over/Under			-0.93	-1.08	-2.60	-2.60	-0.51	0.40		0.73	
Total Commodities	231,422,935	0.68	3.20	11.70	-15.92	-15.92	-11.06	-10.39	--	-5.73	Sep-10
Bloomberg Commodity Index			4.13	12.78	-13.32	-13.32	-10.55	-10.82	-5.59	-6.34	Sep-10
Over/Under			-0.93	-1.08	-2.60	-2.60	-0.51	0.43		0.61	
Gresham	231,422,935	0.68	3.20	11.70	-15.92	-15.92	-11.07	-10.23	--	-5.14	Sep-10
Bloomberg Commodity Index			4.13	12.78	-13.32	-13.32	-10.55	-10.82	-5.59	-6.34	Sep-10
Over/Under			-0.93	-1.08	-2.60	-2.60	-0.52	0.59		1.20	

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

Multi-Asset Class Returns as of June 30, 2016

Arizona State Retirement System

Multi-Asset Class Strategies Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Return (%)	Since
Total Multi-Asset Class Strategies	1,024,888,651	3.02	-1.75	-3.25	-12.02	-12.02	2.78	4.61	5.74	6.18	Jan-04
<i>Multi-Asset Class Strategies Custom Benchmark</i>			<i>0.02</i>	<i>0.06</i>	<i>-0.91</i>	<i>-0.91</i>	<i>5.68</i>	<i>6.33</i>	<i>5.25</i>	<i>5.74</i>	<i>Jan-04</i>
Over/Under			-1.77	-3.31	-11.11	-11.11	-2.90	-1.72	0.49	0.44	
Bridgewater	1,024,888,651	3.02	-1.75	-3.25	-10.56	-10.56	3.99	5.88	6.94	7.29	Jan-04
<i>ASRS Bridgewater Custom Benchmark</i>			<i>0.02</i>	<i>0.06</i>	<i>0.14</i>	<i>0.14</i>	<i>6.25</i>	<i>6.67</i>	<i>5.42</i>	<i>5.87</i>	<i>Jan-04</i>
Over/Under			-1.77	-3.31	-10.70	-10.70	-2.26	-0.79	1.52	1.42	

Note: Performance is reported net of fees.

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



NEPC, LLC

June 30, 2016

Private Markets Returns

Returns as of March 31, 2016

	Benchmark	Portfolio Return	Benchmark Return	Excess Return
Private Equity	Russell 2000	10.65	8.78	1.87
Private Real Estate	ODCE Net	8.07	7.26	0.81
Private Opportunistic Equity	Absolute Eight	23.59	8.00	15.59
Opportunistic Fixed Income	Absolute Eight	8.96	8.00	0.96
Private Debt	Lev Loan+250	10.59	4.10	6.49
Farmland	Core CPI+350	5.26	5.63	-0.37

**Confidential
Meeting
Materials
Removed**

Agenda Item #5

Executive Presentation

To: Arizona State Retirement System

truView Risk Report June 30, 2016

Produced by State Street Global Exchange, Risk Services

Monthly Reallocation Summary*

Month Ending June 30, 2016

Portfolio Reductions

- TOTAL DOMESTIC EQUITY
 - \$19M – E2 (Large Cap)
 - \$2.2M – E7 (Large Cap)
 - \$2.5M – E8 (Large Cap)
 - \$94M – E3 (Mid Cap)
 - \$66M – E4 (Mid Cap)
 - \$4.6M – E6 (Small Cap)
 - \$155M – EQUITY TRANSITION
- TOTAL INTERNATIONAL EQUITY
 - \$710M – BLACKROCK EAFE FUND (EAFE)
 - \$125M – BLACKROCK EAFE SMALL CAP (EAFE Small Cap)
- TOTAL CASH
 - \$340M – CASH–ASSETIZED
- **TOTAL REDUCTIONS****
 - **\$1,518M**

Portfolio Additions

- TOTAL FIXED INCOME
 - \$300M – BGI US DEBT FUND (Core)
 - \$150M – BLACKROCK LONGTERM GOVT BOND (Core)
- TOTAL CASH
 - \$1,068M – CASH–UNASSETIZED
- **TOTAL ADDITIONS****
 - **\$1,518M**

*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 July 31, 2016

Portfolio Reductions

- TOTAL DOMESTIC EQUITY
 - \$6.9M – E2 (Large Cap)
 - \$0.6M – E7 (Large Cap)
 - \$1.2M – E8 (Large Cap)
 - \$0.3M – E3 (Mid Cap)
 - \$6.1M – E4 (Mid Cap)
 - \$1.2M – E6 (Small Cap)
- TOTAL CASH
 - \$433.7M – CASH-UNASSETIZED
- **TOTAL REDUCTIONS****
 - **\$450M**

Portfolio Additions

- TOTAL INTERNATIONAL EQUITY
 - \$100M – FRANKLIN TEMPLETON (EAFE Small Cap)
- TOTAL CASH
 - \$350M – CASH-ASSETIZED
- **TOTAL ADDITIONS****
 - **\$450M**

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

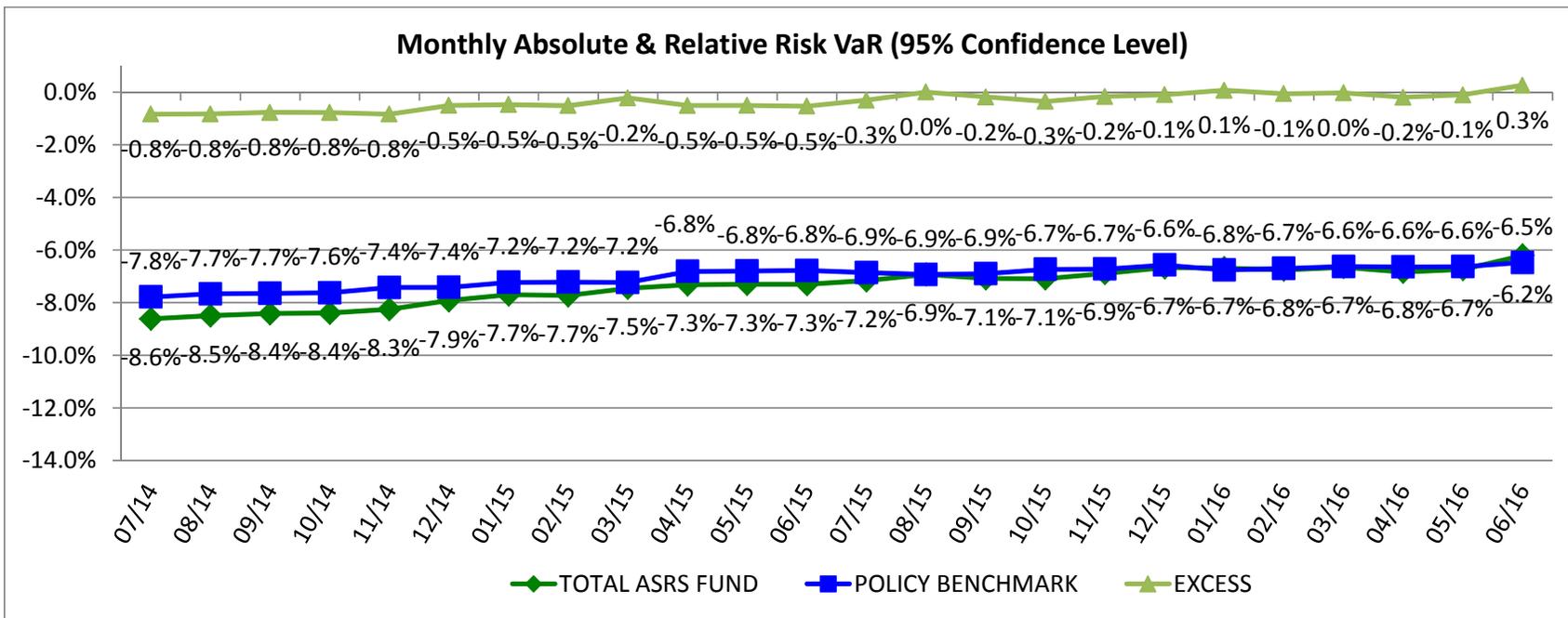
**Reductions and additions do not include plan distributions.

Monthly Risk Summary

Month Ending June 30, 2016

Month-end Risk Profile

- Historical Risk (95% VaR) for all asset classes remain relatively constant from prior months. In aggregate, Total Plan risk decreased 52bps. The drop in Total Plan risk is driven by various factors such as the \$450m increased allocation to Total Fixed Income focused on core higher quality managers and the \$835m decreased allocation in International Equity. The Policy Benchmark risk decreased 16bps.
- Surplus risk under the Policy Benchmark is now 26bps.



ARIZONA STATE RETIREMENT SYSTEM
As of June 30, 2016

TOTAL PLAN EXPOSURE OVERVIEW

Sector (Public US Equity Only)	\$ Value	% Value	**Blended US BM	Difference
CONSUMER NON-CYCLICAL	\$ 2,004,239,151	23.2%	24.7%	(1.4%)
FINANCIAL	\$ 1,412,568,472	16.4%	16.8%	(0.4%)
TECHNOLOGY	\$ 967,799,182	11.2%	12.5%	(1.3%)
INDUSTRIAL	\$ 863,998,661	10.0%	9.6%	0.4%
CONSUMER CYCLICAL	\$ 832,213,973	9.7%	10.0%	(0.4%)
COMMUNICATIONS	\$ 794,714,526	9.2%	12.9%	(3.7%)
FUNDS	\$ 576,242,066	6.7%	0.0%	6.7%
ENERGY	\$ 537,897,234	6.2%	7.4%	(1.2%)
UTILITIES	\$ 350,969,753	4.1%	3.6%	0.4%
BASIC MATERIALS	\$ 227,957,223	2.6%	2.5%	0.2%
CASH	\$ 47,131,028	0.5%	0.0%	0.5%
GOVERNMENT	\$ 3,880,890	0.0%	0.0%	0.0%
DIVERSIFIED	\$ 1,417,733	0.0%	0.0%	(0.0%)
INDEX	\$ 1,648	0.0%	0.0%	0.0%
GRAND TOTAL	\$ 8,621,031,540	100.0%	100.0%	0.0%

Country Category (Total Plan)	\$ Value	% Value	*Blended TOTAL BM	Difference
NORTH AMERICA	\$ 26,906,880,820	78.7%	67.1%	11.6%
EUROPE DEVELOPED	\$ 4,096,470,071	12.0%	16.8%	(4.9%)
ASIA DEVELOPED	\$ 1,986,553,290	5.8%	9.8%	(4.0%)
ASIA EM	\$ 749,970,220	2.2%	4.2%	(2.0%)
LATIN AMERICA	\$ 231,753,042	0.7%	1.1%	(0.5%)
AFRICA	\$ 100,859,801	0.3%	0.5%	(0.2%)
MIDDLE EAST	\$ 89,250,197	0.3%	0.3%	(0.1%)
EUROPE EM	\$ 44,236,066	0.1%	0.2%	(0.0%)
GRAND TOTAL	\$ 34,205,973,507	100.0%	100.0%	0.0%

Market Cap ^A (Public Equities Only)	\$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	\$ 2,209,989	0.0%	0.0%	0.0%
2) 100M - 500M	\$ 258,530,012	1.7%	1.7%	(0.0%)
3) 500M - 1B	\$ 351,555,315	2.3%	3.2%	(1.0%)
4) 1B - 5B	\$ 2,405,661,186	15.5%	21.3%	(5.8%)
5) 5B - 10B	\$ 1,805,270,666	11.6%	10.3%	1.3%
6) 10B - 50B	\$ 5,206,132,684	33.5%	30.4%	3.1%
7) >50B	\$ 5,515,326,685	35.5%	33.1%	2.4%
GRAND TOTAL	\$ 15,544,686,538	100.0%	100.0%	0.0%

^AExcludes cash and non-traded securities

Top 20 Issuer (Total Plan)	\$ Value	% Value	Market Cap	Sector	Industry Group
1 CASH***	\$ 2,443,372,201	7.1%		CASH	Cash
2 US TREASURY N/B	\$ 1,322,090,589	3.9%		GOVERNMENT	SOVEREIGN
3 FANNIE MAE	\$ 712,150,556	2.1%		MORTGAGE SECURITIES	FNMA COLLATERAL
4 FREDDIE MAC	\$ 263,623,903	0.8%		MORTGAGE SECURITIES	FGLMC COLLATERAL
5 TREASURY BILL	\$ 226,050,129	0.7%		GOVERNMENT	SOVEREIGN
6 ISHARES EDGE MSCI USA QUALITY FAC	\$ 161,455,866	0.5%	4) 1B - 5B	FUNDS	EQUITY FUND
7 ISHARES EDGE MSCI USA SIZE FACTOR	\$ 154,354,166	0.5%	2) 100M - 500M	FUNDS	EQUITY FUND
8 GOVERNMENT NATIONAL MORTGAGE A	\$ 148,617,085	0.4%		MORTGAGE SECURITIES	GNMA COLLATERAL
9 EXXON MOBIL CORP	\$ 146,660,167	0.4%	7) 50B+	ENERGY	OIL&GAS
10 JOHNSON & JOHNSON	\$ 143,392,536	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
11 APPLE INC	\$ 139,097,393	0.4%	7) 50B+	TECHNOLOGY	COMPUTERS
12 MICROSOFT CORP	\$ 136,635,816	0.4%	7) 50B+	TECHNOLOGY	SOFTWARE
13 AT&T INC	\$ 136,290,856	0.4%	7) 50B+	COMMUNICATIONS	TELECOMMUNICATIONS
14 ISHARES EDGE MSCI USA VALUE FACT	\$ 135,944,194	0.4%	3) 500M - 1B	FUNDS	EQUITY FUND
15 ISHARES EDGE MSCI USA MOMENTUM I	\$ 124,487,841	0.4%	4) 1B - 5B	FUNDS	EQUITY FUND
16 ALPHABET INC	\$ 103,220,955	0.3%	7) 50B+	COMMUNICATIONS	INTERNET
17 PFIZER INC	\$ 100,598,417	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
18 JPMORGAN CHASE & CO	\$ 96,090,679	0.3%	7) 50B+	FINANCIAL	BANKS
19 PROCTER & GAMBLE CO/THE	\$ 88,460,297	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	COSMETICS/PERSONAL CARE
20 ISHARES MSCI EMERGING MARKETS ET	\$ 87,441,942	0.3%	6) 10B - 50B	FUNDS	EQUITY FUND

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

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

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

ARIZONA STATE RETIREMENT SYSTEM

As of June 30, 2016

Sector (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
CONSUMER NON-CYCLICAL	\$ 1,662,282,255	23.9%	23.5%	0.4%
FINANCIAL	\$ 1,512,418,695	21.7%	22.9%	(1.1%)
CONSUMER CYCLICAL	\$ 958,658,052	13.8%	11.6%	2.2%
INDUSTRIAL	\$ 831,201,569	11.9%	11.6%	0.4%
COMMUNICATIONS	\$ 649,285,213	9.3%	9.5%	(0.1%)
ENERGY	\$ 393,630,202	5.7%	5.5%	0.1%
BASIC MATERIALS	\$ 360,537,375	5.2%	6.1%	(0.9%)
TECHNOLOGY	\$ 305,864,381	4.4%	5.1%	(0.7%)
UTILITIES	\$ 234,046,841	3.4%	3.5%	(0.2%)
DIVERSIFIED	\$ 51,063,524	0.7%	0.8%	(0.1%)
INDEX	\$ 17,990,699	0.3%	0.0%	0.3%
FX	\$ 2,138	0.0%	0.0%	0.0%
CASH	\$ (16,863,610)	(0.2%)	0.0%	(0.2%)
GRAND TOTAL	\$ 6,960,117,333	100.0%	100.0%	0.0%

Top 20 Industry Groups (Public Intl Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1 BANKS	\$ 732,988,712	10.5%	11.2%	(0.7%)
2 PHARMACEUTICALS	\$ 570,442,982	8.2%	8.0%	0.2%
3 TELECOMMUNICATIONS	\$ 411,032,618	5.9%	5.6%	0.3%
4 OIL&GAS	\$ 358,926,407	5.2%	5.0%	0.1%
5 FOOD	\$ 353,030,232	5.1%	4.7%	0.4%
6 INSURANCE	\$ 338,604,784	4.9%	4.6%	0.3%
7 RETAIL	\$ 268,526,246	3.9%	2.8%	1.0%
8 AUTO MANUFACTURERS	\$ 210,790,545	3.0%	3.0%	0.1%
9 CHEMICALS	\$ 192,962,011	2.8%	3.3%	(0.5%)
10 BEVERAGES	\$ 174,846,017	2.5%	2.6%	(0.1%)
11 DIVERSIFIED FINAN SERV	\$ 165,235,915	2.4%	2.4%	(0.1%)
12 ELECTRIC	\$ 156,803,227	2.3%	2.3%	(0.1%)
13 COMMERCIAL SERVICES	\$ 155,927,554	2.2%	2.0%	0.2%
14 SEMICONDUCTORS	\$ 149,694,426	2.2%	2.5%	(0.4%)
15 REAL ESTATE	\$ 142,326,991	2.0%	2.2%	(0.1%)
16 TRANSPORTATION	\$ 127,423,972	1.8%	1.8%	0.1%
17 COSMETICS/PERSONAL CARE	\$ 120,361,684	1.7%	1.9%	(0.1%)
18 BUILDING MATERIALS	\$ 119,836,608	1.7%	1.3%	0.4%
19 MINING	\$ 109,481,848	1.6%	1.8%	(0.2%)
20 INTERNET	\$ 108,813,007	1.6%	2.2%	(0.7%)

INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Country Category (Public Intl Equity Only)	\$ Value	% Value	*Blended NON-US BM	Difference
EUROPE DEVELOPED	\$ 3,776,191,088	54.3%	49.6%	4.6%
ASIA DEVELOPED	\$ 1,957,448,975	28.1%	30.0%	(1.9%)
ASIA EM	\$ 751,525,397	10.8%	14.3%	(3.5%)
LATIN AMERICA	\$ 196,243,768	2.8%	2.7%	0.1%
AFRICA	\$ 89,736,541	1.3%	1.5%	(0.2%)
MIDDLE EAST	\$ 87,453,012	1.3%	1.1%	0.2%
NORTH AMERICA	\$ 59,980,960	0.9%	0.4%	0.5%
EUROPE EM	\$ 41,537,592	0.6%	0.4%	0.2%
GRAND TOTAL	\$ 6,960,117,333	100.0%	100.0%	0.0%

Market Cap** (Public Intl Equities Only)	\$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	\$ 1,920,250	0.0%	0.0%	0.0%
2) 100M - 500M	\$ 75,095,487	1.1%	0.6%	0.5%
3) 500M - 1B	\$ 106,795,753	1.5%	1.3%	0.3%
4) 1B - 5B	\$ 856,618,969	12.4%	13.0%	(0.6%)
5) 5B - 10B	\$ 1,056,474,125	15.3%	13.9%	1.4%
6) 10B - 50B	\$ 2,885,313,612	41.8%	40.6%	1.3%
7) >50B	\$ 1,917,840,592	27.8%	30.6%	(2.8%)
GRAND TOTAL	\$ 6,900,058,787	100.0%	100.0%	0.0%

**Excludes cash and non-traded securities

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

ARIZONA STATE RETIREMENT SYSTEM

As of June 30, 2016

TOTAL FIXED INCOME EXPOSURE OVERVIEW

Sector (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
GOVERNMENT	\$ 1,625,895,700	27.4%	31.8%	(4.4%)
MORTGAGE SECURITIES	\$ 1,135,816,819	19.2%	21.4%	(2.2%)
INDEX	\$ 563,768,505	9.5%	0.0%	9.5%
CASH	\$ 488,888,384	8.2%	0.0%	8.2%
FINANCIAL	\$ 411,021,349	6.9%	9.1%	(2.2%)
COMMUNICATIONS	\$ 364,149,729	6.1%	7.5%	(1.3%)
CONSUMER NON-CYCLICAL	\$ 343,128,280	5.8%	7.4%	(1.7%)
ENERGY	\$ 236,250,871	4.0%	5.8%	(1.8%)
CONSUMER CYCLICAL	\$ 232,343,720	3.9%	5.2%	(1.3%)
INDUSTRIAL	\$ 175,144,235	3.0%	3.9%	(0.9%)
TECHNOLOGY	\$ 136,124,417	2.3%	2.4%	(0.1%)
UTILITIES	\$ 101,500,377	1.7%	2.3%	(0.6%)
BASIC MATERIALS	\$ 70,804,627	1.2%	2.7%	(1.5%)
BANK LOANS	\$ 22,377,853	0.4%	0.0%	0.4%
ASSET BACKED SECURITIES	\$ 19,494,865	0.3%	0.3%	(0.0%)
DIVERSIFIED	\$ 2,659,900	0.0%	0.1%	(0.1%)
GRAND TOTAL	\$ 5,929,369,633	100.0%	100.0%	0.0%

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

Credit Rating Group** (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
01) AAA	\$ 3,768,451,522	63.6%	52.1%	11.5%
02) AA	\$ 167,461,146	2.8%	3.1%	(0.3%)
03) A	\$ 415,956,289	7.0%	7.9%	(0.9%)
04) BBB	\$ 607,408,521	10.2%	11.3%	(1.0%)
05) BB	\$ 440,802,900	7.4%	13.3%	(5.9%)
06) B	\$ 427,958,658	7.2%	9.2%	(2.0%)
07) CCC	\$ 88,860,008	1.5%	2.8%	(1.3%)
08) CC	\$ 1,849,325	0.0%	0.2%	(0.1%)
09) C	\$ 298,832	0.0%	0.0%	(0.0%)
10) D	\$ 8,504,183	0.1%	0.0%	0.1%
11) Not Rated	\$ 1,818,249	0.0%	0.1%	(0.0%)
GRAND TOTAL	\$ 5,929,369,633	100.0%	100.0%	0.0%

Maturity Bucket (Public Fixed Income Only)	\$ Value	% Value	*Blended FI BM	Difference
0-1Y	\$ 644,572,564	12.0%	0.8%	11.2%
1Y-3Y	\$ 668,764,364	12.4%	18.5%	(6.1%)
3Y-5Y	\$ 767,129,761	14.3%	18.1%	(3.8%)
5Y-10Y	\$ 1,588,198,682	29.6%	29.1%	0.5%
10Y-15Y	\$ 209,304,276	3.9%	4.8%	(0.9%)
15Y+	\$ 1,495,296,492	27.8%	28.7%	(0.9%)
GRAND TOTAL	\$ 5,373,266,140	100.0%	100.0%	0.0%

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

ARIZONA STATE RETIREMENT SYSTEM
As of June 30, 2016

TOTAL PLAN RISK OVERVIEW

Strategy	\$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
MONTHLY RISK																
CASH - UNASSETIZED	\$ 683,416,843	2%	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	\$ 29,694,326	0%	(25.1%)	0.0%	(0.1%)	(26.0%)	0.0%	(0.1%)	(31.1%)	0.0%	(0.1%)	(43.6%)	16.9%	(10.5%)	0.0%	(0.1%)
INTEREST RATE SENSITIVE	\$ 5,929,369,633	17%	(2.3%)	0.0%	(0.2%)	(2.1%)	(0.0%)	0.3%	(3.1%)	0.0%	(0.1%)	(5.1%)	1.4%	(1.3%)	(0.0%)	0.8%
US EQUITY	\$ 8,621,031,540	25%	(8.0%)	(2.0%)	32.5%	(7.9%)	(1.9%)	30.9%	(13.7%)	(3.4%)	32.4%	(29.3%)	5.5%	(4.0%)	(1.0%)	30.9%
INTERNATIONAL EQUITY	\$ 6,960,117,333	20%	(9.7%)	(1.9%)	31.0%	(9.3%)	(1.8%)	29.1%	(14.6%)	(2.8%)	26.5%	(35.4%)	6.1%	(4.5%)	(0.9%)	28.4%
REAL ESTATE	\$ 3,226,028,417	9%	(9.9%)	(0.8%)	13.5%	(10.5%)	(0.9%)	14.8%	(18.2%)	(1.6%)	15.2%	(38.2%)	6.8%	(5.2%)	(0.5%)	14.5%
FARMLAND & TIMBER	\$ 188,017,564	1%	(10.6%)	(0.1%)	0.8%	(11.2%)	(0.1%)	0.9%	(19.4%)	(0.1%)	0.9%	(40.8%)	7.3%	(5.5%)	(0.0%)	0.9%
PRIVATE EQUITY	\$ 2,738,412,881	8%	(11.3%)	(0.9%)	14.1%	(10.6%)	(0.8%)	12.7%	(18.0%)	(1.4%)	13.3%	(36.4%)	6.9%	(5.3%)	(0.4%)	12.8%
PRIVATE DEBT	\$ 2,809,787,934	8%	(2.3%)	(0.1%)	0.8%	(3.9%)	(0.2%)	3.3%	(7.5%)	(0.4%)	4.0%	(17.2%)	2.7%	(2.2%)	(0.1%)	3.6%
OPPORTUNISTIC EQUITY	\$ 297,101,924	1%	(10.5%)	(0.1%)	1.4%	(9.9%)	(0.1%)	1.3%	(16.8%)	(0.1%)	1.3%	(34.0%)	6.4%	(5.0%)	(0.0%)	1.3%
OPPORTUNISTIC DEBT	\$ 1,149,856,863	3%	(6.7%)	(0.1%)	2.2%	(8.5%)	(0.2%)	3.5%	(13.3%)	(0.4%)	3.5%	(26.7%)	5.4%	(4.0%)	(0.1%)	3.4%
GLOBAL INFLATION LINKED	\$ 224,630,081	1%	(8.4%)	(0.0%)	0.6%	(8.3%)	(0.0%)	0.6%	(12.4%)	(0.1%)	0.6%	(27.8%)	5.0%	(4.2%)	(0.0%)	0.6%
INFRASTRUCTURE	\$ 325,444,190	1%	(9.4%)	(0.1%)	1.4%	(9.0%)	(0.1%)	1.3%	(14.9%)	(0.1%)	1.3%	(35.1%)	5.7%	(4.6%)	(0.0%)	1.4%
MULTI-ASSET CLASS	\$ 1,023,063,979	3%	(5.4%)	(0.1%)	2.0%	(5.1%)	(0.1%)	1.4%	(7.1%)	(0.1%)	1.2%	(11.3%)	2.9%	(2.7%)	(0.0%)	1.5%
GRAND TOTAL	\$ 34,205,973,507	100%	(6.2%)	(6.2%)	100.0%	(6.3%)	(6.3%)	100.0%	(10.6%)	(10.6%)	100.0%	(25.1%)	4.2%	(3.2%)	(3.2%)	100.0%
INTERIM POLICY BENCHMARK			(6.5%)			(6.4%)			(10.7%)			(25.7%)	4.4%	(3.3%)		

ANNUALIZED RISK																
CASH - UNASSETIZED	\$ 683,416,843	2%	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	\$ 29,694,326	0%	(86.9%)	0.0%	(0.1%)	(90.1%)	0.0%	(0.1%)	(107.8%)	0.1%	(0.1%)	N/A	58.4%	(36.2%)	0.0%	(0.1%)
INTEREST RATE SENSITIVE	\$ 5,929,369,633	17%	(7.9%)	0.1%	(0.2%)	(7.4%)	(0.1%)	0.3%	(10.7%)	0.0%	(0.1%)	N/A	4.8%	(4.4%)	(0.1%)	0.8%
US EQUITY	\$ 8,621,031,540	25%	(27.9%)	(7.0%)	32.5%	(27.3%)	(6.7%)	30.9%	(47.6%)	(11.9%)	32.4%	N/A	18.9%	(13.9%)	(3.5%)	30.9%
INTERNATIONAL EQUITY	\$ 6,960,117,333	20%	(33.7%)	(6.7%)	31.0%	(32.3%)	(6.3%)	29.1%	(50.7%)	(9.7%)	26.5%	N/A	21.3%	(15.7%)	(3.2%)	28.4%
REAL ESTATE	\$ 3,226,028,417	9%	(34.3%)	(2.9%)	13.5%	(36.2%)	(3.2%)	14.8%	(62.9%)	(5.6%)	15.2%	N/A	23.6%	(17.9%)	(1.6%)	14.5%
FARMLAND & TIMBER	\$ 188,017,564	1%	(36.7%)	(0.2%)	0.8%	(38.7%)	(0.2%)	0.9%	(67.2%)	(0.3%)	0.9%	N/A	25.2%	(19.0%)	(0.1%)	0.9%
PRIVATE EQUITY	\$ 2,738,412,881	8%	(39.0%)	(3.0%)	14.1%	(36.9%)	(2.8%)	12.7%	(62.2%)	(4.9%)	13.3%	N/A	23.9%	(18.3%)	(1.4%)	12.8%
PRIVATE DEBT	\$ 2,809,787,934	8%	(7.8%)	(0.2%)	0.8%	(13.7%)	(0.7%)	3.3%	(25.9%)	(1.5%)	4.0%	N/A	9.3%	(7.6%)	(0.4%)	3.6%
OPPORTUNISTIC EQUITY	\$ 297,101,924	1%	(36.4%)	(0.3%)	1.4%	(34.4%)	(0.3%)	1.3%	(58.1%)	(0.5%)	1.3%	N/A	22.3%	(17.2%)	(0.1%)	1.3%
OPPORTUNISTIC DEBT	\$ 1,149,856,863	3%	(23.3%)	(0.5%)	2.2%	(29.6%)	(0.8%)	3.5%	(46.0%)	(1.3%)	3.5%	N/A	18.7%	(13.7%)	(0.4%)	3.4%
GLOBAL INFLATION LINKED	\$ 224,630,081	1%	(29.0%)	(0.1%)	0.6%	(28.9%)	(0.1%)	0.6%	(43.0%)	(0.2%)	0.6%	N/A	17.4%	(14.4%)	(0.1%)	0.6%
INFRASTRUCTURE	\$ 325,444,190	1%	(32.4%)	(0.3%)	1.4%	(31.2%)	(0.3%)	1.3%	(51.7%)	(0.5%)	1.3%	N/A	19.8%	(15.8%)	(0.2%)	1.4%
MULTI-ASSET CLASS	\$ 1,023,063,979	3%	(18.7%)	(0.4%)	2.0%	(17.5%)	(0.3%)	1.4%	(24.5%)	(0.4%)	1.2%	N/A	10.1%	(9.2%)	(0.2%)	1.5%
GRAND TOTAL	\$ 34,205,973,507	100%	(21.5%)	(21.5%)	100.0%	(21.7%)	(21.7%)	100.0%	(36.7%)	(36.7%)	100.0%	N/A	14.5%	(11.2%)	(11.2%)	100.0%
INTERIM POLICY BENCHMARK			(22.4%)			(22.2%)			(37.1%)			N/A	15.1%	(11.3%)		

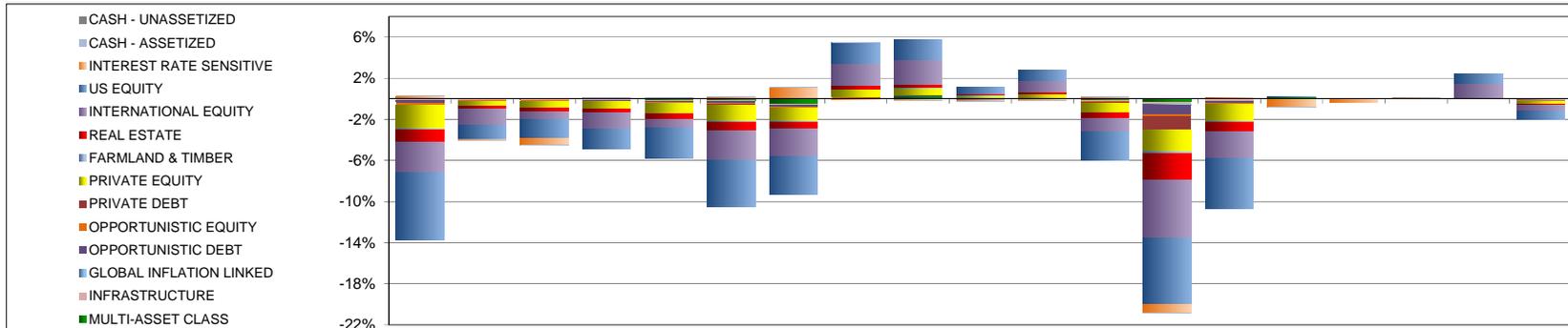
Strategy	\$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
CASH - UNASSETIZED	\$ 683,416,843	2%	0.00		0.00				\$ 683,416,843	\$ 683,416,843	100.0%
CASH - ASSETIZED	\$ 29,694,326	0%	(0.10)	(0.34)	(0.07)	(0.29)			\$ 344,227,623	\$ 29,694,326	100.0%
INTEREST RATE SENSITIVE	\$ 5,929,369,633	17%	(0.00)	(0.01)	0.01	0.07	5.38	0.199	\$ 5,590,912,924	\$ 5,929,369,633	100.0%
US EQUITY	\$ 8,621,031,540	25%	1.03	0.99	0.79	0.90	0.44	0.002	\$ 8,649,452,107	\$ 8,625,271,149	100.0%
INTERNATIONAL EQUITY	\$ 6,960,117,333	20%	1.06	0.90	0.99	0.99			\$ 6,960,167,407	\$ 7,242,799,119	104.1%
REAL ESTATE	\$ 3,226,028,417	9%	1.12	0.87	0.96	0.87			\$ 3,226,028,417	\$ 3,226,028,598	100.0%
FARMLAND & TIMBER	\$ 188,017,564	1%	1.20	0.87	1.03	0.87			\$ 188,017,564	\$ 188,017,564	100.0%
PRIVATE EQUITY	\$ 2,738,412,881	8%	1.24	0.95	0.95	0.85			\$ 2,738,412,881	\$ 2,738,412,881	100.0%
PRIVATE DEBT	\$ 2,809,787,934	8%	0.31	0.60	0.25	0.59	0.69	0.010	\$ 2,802,624,627	\$ 2,809,787,934	100.0%
OPPORTUNISTIC EQUITY	\$ 297,101,924	1%	1.16	0.95	0.88	0.85			\$ 297,101,924	\$ 297,101,924	100.0%
OPPORTUNISTIC DEBT	\$ 1,149,856,863	3%	0.70	0.68	0.60	0.69			\$ 1,149,856,863	\$ 1,149,856,863	100.0%
GLOBAL INFLATION LINKED	\$ 224,630,081	1%	0.29	0.62	0.26	0.66	0.29	0.001	\$ 456,527,446	\$ 224,630,081	100.0%
INFRASTRUCTURE	\$ 325,444,190	1%	1.05	0.97	0.90	0.98			\$ 325,444,190	\$ 325,444,190	100.0%
MULTI-ASSET CLASS	\$ 1,023,063,979	3%	0.11	0.58	0.09	0.54	(41.62)	(21.600)	\$ (3,075,734,250)	\$ 2,799,747,847	273.7%
GRAND TOTAL	\$ 34,205,973,507	100%	0.86	0.96	0.72	0.95	4.93	0.154	\$ 30,336,456,566	\$ 36,269,578,951	106.0%

ARIZONA STATE RETIREMENT SYSTEM
As of June 30, 2016

TOTAL PLAN STRESS TESTS

Strategy	\$ Value	% Value	Historical Scenarios													Predictive Scenarios						
			Black Monday - 5 Day	Gulf War - 5 Day	Bond Crash: Feb 94 - May 94	Asian Crisis 97-98 - 5 day	Russian Crisis - 5 Day	Nasdaq Correction: July 98 - Aug 98	Russian Debt Crisis Aug - Oct	IR Steepening: Sept 98 - Nov 98	Emerging Markets Rally: Jan 99 - May 99	Fed Tightening: April - June 99	Nasdaq Rally: Nov 99 - Jan 00	9/11 Attack - 5 Day	09-10-2008	S&P 500 -20%	IR Parallel Shift +100bps	Spread Up 100bps	Inflation +1%	Gold Shock -20%	Oil Shock -20%	
Stress Test Stand Alone																						
CASH - UNASSETIZED	\$ 683,416,843	2.0%	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	0.0	0.0
CASH - ASSETIZED	\$ 29,694,326	0.1%	8.4	(3.8)	(50.0)	6.0	4.8	8.1	89.7	0.2	(6.9)	(6.0)	(10.1)	11.7	(1.0)	0.0	(61.4)	0.0	6.1	0.0	5.5	
INTEREST RATE SENSITIVE	\$ 5,929,369,392	17.3%	1.4	(0.1)	(3.3)	0.6	0.7	1.1	6.2	(0.3)	(0.7)	(0.5)	(0.8)	1.1	(4.6)	0.6	(4.7)	(0.3)	0.4	0.0	0.3	
US EQUITY	\$ 8,621,031,540	25.2%	(26.1)	(5.8)	(7.4)	(7.9)	(11.6)	(18.2)	(14.8)	8.2	7.5	2.7	4.0	(11.1)	(25.9)	(19.2)	0.0	0.0	(0.0)	3.5	(3.1)	
INTERNATIONAL EQUITY	\$ 6,960,117,333	20.3%	(14.5)	(7.5)	(3.8)	(7.7)	(4.2)	(14.0)	(13.2)	10.3	11.6	(0.7)	5.2	(6.3)	(27.6)	(12.9)	(0.0)	0.0	0.0	7.3	(2.9)	
REAL ESTATE	\$ 3,226,028,417	9.4%	(12.8)	(2.8)	(3.7)	(3.9)	(5.6)	(9.0)	(7.2)	4.0	3.7	1.3	1.9	(5.4)	(27.2)	(9.4)	0.0	0.0	0.0	0.0	(1.2)	
FARMLAND & TIMBER	\$ 188,017,564	0.5%	(13.5)	(3.0)	(3.9)	(4.1)	(6.0)	(9.5)	(7.7)	4.3	3.9	1.4	2.1	(5.8)	(29.0)	(9.9)	0.0	0.0	0.0	0.0	(1.3)	
PRIVATE EQUITY	\$ 2,738,412,881	8.0%	(28.4)	(6.3)	(8.1)	(8.6)	(12.6)	(20.0)	(16.1)	9.0	8.2	2.9	4.3	(12.1)	(27.1)	(20.9)	0.0	0.0	0.0	0.0	(3.5)	
PRIVATE DEBT	\$ 2,809,787,934	8.2%	(0.5)	(0.1)	(0.2)	(0.1)	(0.2)	(0.3)	(0.2)	0.2	0.1	0.0	0.1	(0.2)	(15.6)	(0.4)	(0.0)	(0.0)	0.0	0.0	(0.2)	
OPPORTUNISTIC EQUITY	\$ 297,101,924	0.9%	(26.5)	(5.8)	(7.6)	(8.0)	(11.7)	(18.7)	(15.1)	8.4	7.6	2.7	4.0	(11.3)	(25.3)	(19.5)	0.0	0.0	0.0	0.0	(3.3)	
OPPORTUNISTIC DEBT	\$ 1,149,856,863	3.4%	(5.2)	(1.1)	(1.5)	(1.8)	(2.3)	(3.7)	(2.9)	1.6	1.5	0.5	0.8	(2.2)	(25.5)	(3.8)	0.0	0.0	0.0	0.0	(1.3)	
GLOBAL INFLATION LINKED	\$ 224,630,081	0.7%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	0.0	(0.0)	(16.9)	0.0	(0.0)	0.0	0.0	(2.9)	(6.3)	
INFRASTRUCTURE	\$ 325,444,190	1.0%	(22.2)	(4.9)	(6.4)	(6.7)	(9.8)	(15.6)	(12.6)	7.0	6.4	2.3	3.4	(9.5)	(28.3)	(16.3)	0.0	0.0	0.0	0.0	(3.1)	
MULTI-ASSET CLASS	\$ 1,023,063,979	3.0%	0.3	(2.7)	(2.0)	(2.4)	(5.0)	(4.2)	(18.2)	(0.9)	8.1	1.3	1.6	(3.6)	(8.6)	(2.5)	5.8	0.0	(0.3)	2.0	(2.1)	
GRAND TOTAL	\$ 34,205,973,266	100.0%	(13.5)	(4.0)	(4.5)	(4.8)	(5.7)	(10.3)	(8.2)	5.4	5.6	0.9	2.6	(5.8)	(20.8)	(10.5)	(0.7)	(0.4)	0.1	2.4	(1.9)	
INTERIM POLICY BENCHMARK			(14.6)	(4.6)	(5.1)	(5.6)	(5.7)	(11.5)	(8.0)	6.7	6.8	0.8	3.2	(6.1)	(21.1)	(11.5)	(1.3)	(0.6)	0.1	3.2	(2.2)	

Stress Test Contribution																						
CASH - UNASSETIZED	\$ 683,416,843	2.0%	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	0.0	
CASH - ASSETIZED	\$ 29,694,326	0.1%	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)	0.0	(0.1)	0.0	0.0	0.0	0.0	
INTEREST RATE SENSITIVE	\$ 5,929,369,392	17.3%	0.2	(0.0)	(0.6)	0.1	0.1	0.2	1.1	(0.0)	(0.1)	(0.1)	(0.1)	0.2	(0.8)	0.1	(0.8)	(0.3)	0.1	0.0	0.1	
US EQUITY	\$ 8,621,031,540	25.2%	(6.6)	(1.4)	(1.9)	(2.0)	(2.9)	(4.6)	(3.7)	2.1	1.9	0.7	1.0	(2.8)	(6.5)	(4.8)	0.0	0.0	(0.0)	0.9	(0.8)	
INTERNATIONAL EQUITY	\$ 6,960,117,333	20.3%	(2.9)	(1.5)	(0.8)	(1.8)	(0.8)	(2.8)	(2.7)	2.1	2.4	(0.1)	1.1	(1.3)	(5.6)	(2.6)	(0.0)	0.0	0.0	1.5	(0.6)	
REAL ESTATE	\$ 3,226,028,417	9.4%	(1.2)	(0.3)	(0.3)	(0.4)	(0.5)	(0.8)	(0.7)	0.4	0.3	0.1	0.2	(0.5)	(2.6)	(0.9)	0.0	0.0	0.0	0.0	(0.1)	
FARMLAND & TIMBER	\$ 188,017,564	0.5%	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(0.2)	(0.1)	0.0	0.0	0.0	0.0	(0.0)	
PRIVATE EQUITY	\$ 2,738,412,881	8.0%	(2.3)	(0.5)	(0.7)	(0.7)	(1.0)	(1.6)	(1.3)	0.7	0.7	0.2	0.3	(1.0)	(2.2)	(1.7)	0.0	0.0	0.0	0.0	(0.3)	
PRIVATE DEBT	\$ 2,809,787,934	8.2%	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	(0.0)	(1.3)	(0.0)	(0.0)	(0.0)	0.0	0.0	(0.0)	
OPPORTUNISTIC EQUITY	\$ 297,101,924	0.9%	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(0.2)	(0.2)	0.0	0.0	0.0	0.0	(0.0)	
OPPORTUNISTIC DEBT	\$ 1,149,856,863	3.4%	(0.2)	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(0.9)	(0.1)	0.0	0.0	0.0	0.0	(0.0)	
GLOBAL INFLATION LINKED	\$ 224,630,081	0.7%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.0	0.0	(0.0)	(0.1)	0.0	(0.0)	0.0	0.0	(0.0)	(0.0)	
INFRASTRUCTURE	\$ 325,444,190	1.0%	(0.2)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	0.1	0.1	0.0	0.0	(0.1)	(0.3)	(0.2)	0.0	0.0	0.0	0.0	(0.0)	
MULTI-ASSET CLASS	\$ 1,023,063,979	3.0%	0.0	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.5)	(0.0)	0.2	0.0	0.0	(0.1)	(0.3)	(0.1)	0.2	0.0	(0.0)	0.1	(0.1)	
GRAND TOTAL	\$ 34,205,973,266	100.0%	(13.5)	(4.0)	(4.5)	(4.8)	(5.7)	(10.3)	(8.2)	5.4	5.6	0.9	2.6	(5.8)	(20.8)	(10.5)	(0.7)	(0.4)	0.1	2.4	(1.9)	
INTERIM POLICY BENCHMARK			(14.6)	(4.6)	(5.1)	(5.6)	(5.7)	(11.5)	(8.0)	6.7	6.8	0.8	3.2	(6.1)	(21.1)	(11.5)	(1.3)	(0.6)	0.1	3.2	(2.2)	



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. Where VaR asks the question 'how bad can things get?', <u>expected shortfall asks 'if things do get bad, what is our expected loss?'</u>
Exp Tail Loss Contri 95%	This is the decomposition of the ETL making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Exp Tail Loss Contri % to Total	This is the ETL contribution displayed in percent.	
Max Loss	The maximum projected loss.	
Downside Risk (8.7%)	A risk metric that distinguishes between "good" and "bad" returns by assigning risk only to those returns below a return specified by an investor. Downside risk is considered a more effective risk measure than standard deviation (volatility) for two important reasons: 1) it is investor specific, and 2) it identifies return distributions that have higher probabilities for negative ("left tail") market events. Downside risk is also referred to as downside deviation or target semi-deviation.	A 5% downside risk with an 8.7% MAR means that the conditional average underperformance (below 8.7% annual) is 5%, adjusted for a positive skew (greater than the MAR). Effectively, downside risk amplifies a big loss (by squaring the distance of that loss to the target) and smoothes out the risk measure by taking into account the gains setting them up to be equal to the target MAR.
Downside Risk Contri (8.7%)	This is the decomposition of the downside risk, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Downside Risk Contri (8.7%) to Total	This is the downside risk contribution displayed in percent.	

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Agenda Item #6

Investment Compliance Reporting

Arizona State Retirement System

Investment Committee

August 22, 2016

TABLE OF CONTENTS

- **Public Markets & Total Fund Investment Compliance**
 - **State Street Global Services Investment Compliance Review**

- **Private Markets Investment Compliance**
 - **Meketa Investment Group - Commingled Funds & Non-Real Estate Separate Accounts Investment Compliance Review**

Public Markets & Total Fund Investment Compliance

Public Markets Portfolios Independent Investment Compliance Program.

- State Street provides daily and monthly compliance monitoring at the individual portfolio level, for all the internal and external investment portfolios on a post-trade basis.

Total Fund Monthly Statutory Investment Compliance.

- State Street Compliance Group provides compliance reporting and monitoring at the Total Fund level, known as the “Monthly Statute Tests Compliance” for:
 - Five mandated Arizona Revised Statutes on investment limits, under §A.R.S. 38-718.H-L.
 - Arizona Restricted Country Test.

Private Markets Investment Compliance

Meketa - Commingled Funds & Non-Real Estate Separate Accounts.

- Meketa has completed its review of the 2014 audits from managers.
- 42 funds were reviewed:
 - 5 Separately Managed Accounts, and
 - 37 Comingled Funds.
- The funds reviewed are 50% of the NAV at 12/31/2014.
- Review managers' calculations of:
 - Asset management fees
 - Partnership expenses
 - Carried interest
- Review investment valuation policy
- Ensure calculation and policy agree to investment documentation, agreements, and manager policies.
- If a deficiency is noted, the consultant will address with the sponsor and work to resolve deficiencies.
- All results are communicated to the ASRS in a summary report on an annual basis.

State Street Global Services: Investment Compliance Review

Arizona State
Retirement
System

Arizona State Retirement System Overview

For background purposes, following is a brief description of the compliance services provided for the Arizona State Retirement System (ASRS) investment portfolios:

Service Overview:

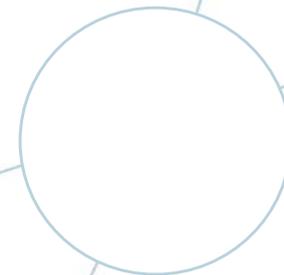
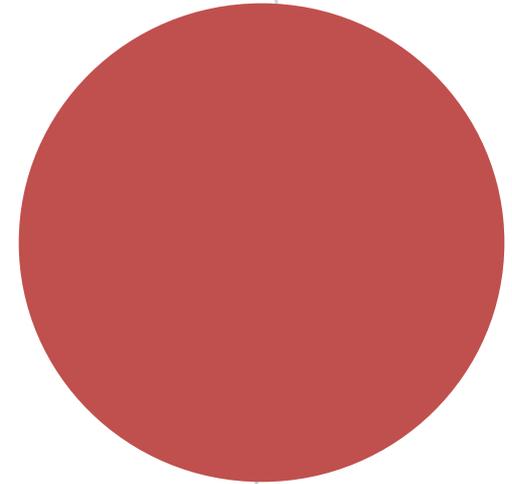
State Street works closely with the ASRS to interpret investment guidelines and advise on different monitoring approaches. The compliance specialists will maintain the existing tests and add new tests as requested by the customers. Testing for the ASRS's portfolios is provided on a daily and monthly basis in a post-trade, pre-settlement environment. This includes:

- Clarification of rules
- Set up and ongoing modification of rules
- Validation and exception research
- Reporting provided daily or monthly.
- Comments and research posted within the Compliance Dashboard (MySS.com)

Additional Services:

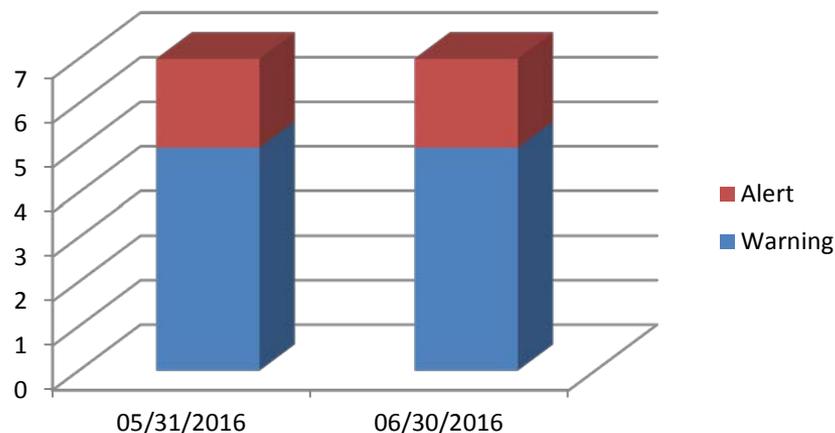
To satisfy the needs of more sophisticated customers, like the ASRS, State Street provides additional assistance with the below:

- Alert validation with Investment Managers
- Quarterly governance meetings



Report Card: Summary & Projects

Alerts & Warnings May – June 2016



Alert** : includes compliance rules which are hard limits and /or prohibition according to the Letters of Direction

Warning: includes compliance rules which have been designed as soft notification or flags (informational flag)

Note: Alerts and Warnings do not necessarily mean a violation has occurred. They could be a result of any of the following:

1. A data error/omission
2. A future action needs to occur to prevent a violation from taking place (i.e. future benchmark inclusion)
3. A violation has occurred

Breakdown

- May: 2 Alerts – 2 Recurring / 5 Warnings – 5 Recurring
- June: 2 Alerts – 2 Recurring / 5 Warnings – 5 Recurring

New Alerts/Warnings**

- May: No New Alerts or Warnings
- June: No New Alerts or Warnings

Additional Items

- Additional compliance testing and reporting:
 - Downgrades reporting
 - Non – Testable Rules Summary & Testing Coverage
- Explore Additional Applicable Regulatory Testing
- Report Alerts & Warnings by Asset Classes

**** All alerts/warnings were researched and resolved to both State Street and ASRS's satisfaction. All alerts/warnings have valid responses/actions taken.**

Report Card: Summary & Projects (cont'd)

Arizona Statutes on Investment Limits

Max 80% equity test (Law 38-718 H) –

All Passes

May

60.21% of Market Value

57.79% of Cost

June

57.14% of Market Value

54.94% of Cost

Max 40% foreign investments test (Law 38-718 I) –

All Passes

May

31.89% of Market Value

36.44% of Cost

June

29.21% of Market Value

34.59% of Cost

Max 60% internally managed assets test (Law 38-718 J) – All Passes

May

27.30% of Market Value

22.29% of Cost

June

26.37% of Market Value

21.15% of Cost

Max 5% Issuer test (Law 38-718 K)

Test Results:

May: Largest holding – **Apple Inc. 0.674% - Pass**

June: Largest holding – **Exxon Mobil Corp 0.427% - Pass**

Max 10% Debt of Multinational Development Banks (Law 38-718 L)

Test Results:

May: **0.042% - Pass**

June: **0.020% - Pass**

Arizona Restricted Country List

As of May 31st, June 30th, 2016 the ASRS's funds were not invested in countries that support terrorism.

**Meketa Investment Group
Commingled Funds &
Non-Real Estate Separate Accounts
Investment Compliance Review**

FUND REVIEWS

Arizona State Retirement System

2014 Fund Reviews
July 26, 2016



M E K E T A I N V E S T M E N T G R O U P

BOSTON
MASSACHUSETTS

CHICAGO
ILLINOIS

MIAMI
FLORIDA

PORTLAND
OREGON

SAN DIEGO
CALIFORNIA

LONDON
UNITED KINGDOM

www.meketagroup.com

Fund Reviews
As of December 31, 2014

- 1. Critical Assumptions and General Limiting Conditions**
- 2. Fund Review Goals and Objectives**
- 3. Fund Review Process**
- 4. Fund Review Results**
- 5. Conclusion**
- 6. Appendix: Noted Inconsistencies**

1. Critical Assumptions and General Limiting Conditions

- The Arizona State Retirement System (“ASRS”) has tasked Meketa Investment Group, Inc. (“MIG”) with reviewing a variety of policies, calculations, processes, and practices with respect to the accounting for and the administration of certain vehicles in which it is invested (each, a “Fund”). MIG reviewed each Fund’s manager’s (each, a “Manager”) policies and calculations in regards to management fees, carried interest, asset valuation, and Fund expenses in respect of ASRS’s investment.
- MIG provided the Managers of the Funds with an operations questionnaire requesting information and documentation necessary to review such policies and calculations. MIG completed reviews through a combination of independent recalculations, review of accuracy of the Manager’s supporting documents and models, and comparison of disclosed information with Fund Documents (defined below), Manager policies, and applicable industry standards.
- As directed by ASRS, the reviews involved general evaluations of accounting and administrative processes for appropriateness, and not financial or policy audits. This memorandum includes summaries of any inconsistencies, inaccuracies, or information gaps identified during our review which will serve as the basis for ASRS to potentially conduct further dialogue with and review of the Managers, if appropriate.
- Please note that the scope of the reviews did not include an independent factual investigation of the books of the Funds. MIG relied solely on the documents, information, and statements provided by the Managers, which we assume were true, complete, and accurate. The following documents (“Fund Documents”), or similar documentation, were generally provided by the Managers and were relied upon during the reviews: a completed operations questionnaire, a schedule of expenses and fees charged to the Fund since inception, a schedule of management fees and expenses charged to ASRS since the Fund’s inception, valuation summaries or support for the two most recent year ends, the Fund’s valuation policy, the Fund’s expense allocation policy, audited financial statements for 2013 and 2014, capital account statements from Fund inception through 2014, the offering memorandum of the Fund, and the limited partnership agreement (or equivalent) of the Fund.

2. Fund Review Goals and Objectives

- Determine if management fees and any related offsets have been calculated in accordance with Fund Documents from inception through December 31, 2014.
- Determine if ASRS's capital account and the Fund's distribution waterfall have been calculated in accordance with Fund Documents from inception through December 31, 2014.
- Determine if the investment valuation methodologies applied by each Manager are in line with the investment valuation policies of its Fund and any relevant Fund Documents.
- Determine if the expense allocation methodologies applied by each Manager are in line with the expense allocation policy of its Fund and any relevant Fund Documents.

3. Fund Review Process

- Review and summarize Fund policies regarding management fees and management fee offsets.
- Review and recalculate annual management fees charged to ASRS, including any related management fee offsets, from inception through December 31, 2014.
- Review and summarize Fund policies regarding the calculation of capital accounts and the Fund's distribution waterfall.
- Review and recalculate carried interest/performance fees charged to ASRS by the Fund from inception through December 31, 2014.
- Review and compare ASRS's ownership percentage of the Fund as of December 31, 2014 to its capital commitment percentage.
- Review income and expense allocations from inception through December 31, 2014.
- Review and summarize Fund policies regarding investment valuation and methodologies.
- Review investment valuations for the two most recent year-ends to determine if valuation methodologies applied are in line with the Manager's investment valuation policies.
- Review and summarize Fund policies regarding expense allocations.
- Review expense allocations from inception through December 31, 2014 to determine if the methodologies applied are in line with the expense allocation policies of the Manager.

4. Fund Review Results

MIG performed reviews on forty-two Funds selected by ASRS for review for the period from inception through December 31, 2014. The overall results of our review have been summarized below. For our full review of each Fund please see the associated Fund report that was distributed to ASRS.

X – Indicates all information/documentation reviewed and/or recalculated by MIG did not materially deviate from the policies and agreements of the Manager and Fund.

Fund	Manager	Management Fee Calculations	Capital Account & Waterfall Calculations	Asset Valuation Policies	Expense Allocation Policies
AEW Core Property Trust (U.S.), Inc.	AEW Capital Management L.P.	X	X	X	X
Apollo Investment Fund VII, L.P.	Apollo Management VII, L.P.	X	X	X	X
Apollo Investment Fund VIII, L.P.	Apollo Management VIII, L.P.	X	X	X	X
Apollo Natural Resources Partners, L.P.	Apollo Commodities Management, L.P.	X	X	X	X
Avenue Europe Special Situations Fund II (U.S.), L.P.	Avenue Europe International Management, L.P.	X	X	X	X
Blackstone Capital Partners VI, L.P.	Blackstone Management Partners, L.L.C	X	X	X	X
Blackstone Energy Partners, L.P.	Blackstone Management Partners, L.L.C.	X	X	X	X
Blackstone Real Estate Partners VII, L.P.	Blackstone Real Estate Advisors L.P.	X	X	X	X
Catalyst Fund Limited Partnership III	The Catalyst Capital Group, Inc.	X	X	X	X
Catalyst Fund Limited Partnership IV	The Catalyst Capital Group, Inc.	X	X	X	X
Centerbridge Capital Partners II, L.P.	Centerbridge Advisors II, LLC	X	X	X	X
Cerberus ASRS Credit Opportunities Fund, L.P.	Cerberus Capital Management II, L.P.	X	X	X	X
CIM Fund III, L.P.	CIM Group, LP	X	X	X	X
CIM Fund VIII, L.P.	CIM Group, LP	X	X	X	X
CIM Urban REIT, LLC	CIM Urban REIT Management, LP	X	X	X	X

Arizona State Retirement System Fund Reviews

Fund Review Results

Fund	Manager	Management Fee Calculations	Capital Account & Waterfall Calculations	Asset Valuation Policies	Expense Allocation Policies
CIM VI (Urban REIT), LLC	CIM Group, LP	X	X	X	X
Energy Capital Partners II-A, LP	Energy Capital Partners Management II, LP	X	X	X	X
First Reserve Fund XII, L.P.	First Reserve XII Advisors, L.L.C.	X	X	X	X
GSO Cactus Credit Opportunities Fund LP	GSO Capital Partners LP	X	X	X	X
Highbridge Principal Strategies - AP Mezzanine Partners II, L.P.	Highbridge Mezzanine Partners II, LLC	X	X	X	X
Levine Leichtman Capital Partners IV, L.P.	Levine Leichtman Capital Partners, Inc.	X	X	X	X
Levine Leichtman Capital Partners Private Capital Solutions, L.P.	Levine Leichtman Capital Partners, Inc.	X	X	X	X
Levine Leichtman Capital Partners V, L.P.	Levine Leichtman Capital Partners, Inc.	X	X	X	X
LLR Equity Partners III, L.P.	LLR Management L.P.	X	X	X	X
LLR Equity Partners IV, L.P.	LLR Management L.P.	X	X	X	X
Oak Hill Capital Partners III, L.P.	Oak Hill Capital Management, LLC	X	X	X	X
Onex Partners III, L.P.	Onex Partners Manager LP	X	X	X	X
Pine Brook Capital Partners II, L.P.	Pine Brook Fund Manager II, LLC	X	X	X	X
Pine Brook Capital Partners, L.P.	Pine Brook Fund Manager, LLC	X	X	X	X
RFM Cactus Holding Company, LLC	Related Fund Management, LLC	X	X	X	X
The Resolute Fund II, L.P.	The Jordan Company II, L.P.	X	X	X	X
The Resolute Fund III, L.P.	The Jordan Company III, L.P.	X	X	X	X
The Veritas Capital Fund IV, L.P.	Veritas Capital Fund Management, L.L.C.	X	X	X	X
U.S. Farming Realty Trust II, LP	IFC Investment Management, LLC	X	X	X	X
Vista Equity Partners Fund IV, L.P.	Vista Equity Partners III, LLC	X	X	X	X
Vista Equity Partners Fund IV Co-Invest 2, L.P.	Vista Equity Partners III, LLC	X	X	X	X
Vista Equity Partners Fund V, L.P.	Vista Equity Partners III, LLC	X	X	X	X



Fund	Manager	Management Fee Calculations	Capital Account & Waterfall Calculations	Asset Valuation Policies	Expense Allocation Policies
Waterton Residential Property Venture XI, L.P.	Waterton Associates L.L.C.	X	X	X	X
White Deer Energy L.P. II	White Deer Management LLC	X	X	X	X
White Deer Energy L.P.	White Deer Management LLC	X	X	X	X
White Oak Global Advisors, LLC – Separately Managed Account	White Oak Global Advisors, LLC	X	X	X	X
Yucaipa American Alliance Fund II, L.P.	Yucaipa Alliance Management, LLC	X	X	X	X

5. Conclusion

- Overall, the Managers reviewed were responsive and provided adequate information and documentation to be used in the review of the forty-two Funds selected by ASRS.
- Based on our review, we found no material deficiencies in regards to our review of management fee calculations, capital account and distribution waterfall calculations, investment valuation policies, and expense allocation policies for the forty-two Funds selected by ASRS. Although evaluated on a Fund-by-Fund basis, generally our materiality threshold for our recalculations was 1% of the total fee amount or offset amount being recalculated. We have noted non-material deficiencies which we investigated in the appendix to this report.

6. Appendix: Noted Inconsistencies

Management Fee Policies

- During our review, MIG noted that the Manager of Vista Equity Partners Fund V, L.P. had misstated their management fee offset policy within their audited financial statements for the year ended December 31, 2014.
 - Based on the limited partnership agreement and the operations questionnaire responses provided by the Manager, any income received from the Fund's portfolio companies by partners, employees, or affiliates of the Manager or general partner (except for fees related to consulting, advisory or similar services at market rates) would be 100% offset against management fees. Per review of the 2014 audited financial statements MIG noted a discrepancy between the management fee offset policies outlined in the limited partnership agreement/offering memorandum and the policies described in the financial statements. The audited financial statements indicate that 80% of the fees described above will be offset against management fees, however both the limited partnership agreement and offering memorandum indicate the offset rate should be 100%. Due to the fact that no portfolio company fees have yet been received by the Manager, general partner, or other affiliated entities there has been no material impact on the calculation of management fee offsets as of 12/31/14. Per discussion with Sathya Shanthakumar, Vice President of Investor Relations at Vista Equity, this was a typographical error within the financial statements and the correct and actual offset rate is 100%.

Capital Account and Distribution Waterfall Policies

- During our review of Catalyst Fund Limited Partnership III and Catalyst Fund Limited Partnership IV, MIG noted discrepancies in the calculation of carried interest for both Funds. MIG presented these discrepancies to Chester Dawes, CFO of Catalyst, who explained the reasoning for the differences as outlined below.
 - Per discussion with Chester Dawes, CFO at Catalyst, there will always be a variance when calculating using inception to date net income due to the Callidus Dividend Reinvestment Plan (DRIP). Per Mr. Dawes, "The Callidus DRIP (Dividend Reinvestment Plan) shares are a

distribution to investors and are treated appropriately as such. These DRIP shares however are still held on the balance sheet of the funds and are subject to mark-to-market gains and losses that flow through the income statement. 100% of this gain or loss on the DRIP shares is for the account of the investor as it has been “distributed” to the investor. Note that the gain/loss on the DRIP shares depends on the average purchase price of the DRIP shares compared to the current trading price. The Manager cannot earn/lose carry on something that has been distributed to the investor despite that fact that the earnings/loss continue to flow through the income statement. A second adjustment is also necessary since the DRIP shares have been distributed to the investor, however the initial DRIP shares now earn additional DRIP shares so we cannot charge carry on something that has already been distributed to the investor.” Additionally, the General Partner’s share of the Callidus IPO in April 2014 is included in the total carried interest amount shown on the 12/31/14 capital account statement and 12/31/14 audited financial statements.

- During our review of Cerberus ASRS Credit Opportunities Fund, MIG noted that, although allowed per the limited partnership agreement, the Manager calculates carried interest using a higher net income amount than presented in the audited financial statements due to non-GAAP treatment of organizational expenses in the calculation of carried interest.
 - As of 12/31/14, carried interest per the general partner is \$38,483 higher than our recalculations due to a difference between the treatment of organizational costs in the Manager’s carried interest calculations and the audited financial statements. Per review of the limited partnership agreement this net income difference results from Cerberus expensing organizational costs as incurred for financial reporting purposes, while amortizing organizational expenses over a sixty month period for their internal books and records used in the calculation of carried interest. Although this treatment is allowed per the limited partnership agreement, it results in a higher net income number used in the calculation of carried interest than is reported in the financial statements, which thereby causes a higher carried interest amount than would have been calculated if net income numbers as reported had been used. Although this deviation will

decrease as the organizational costs continue to be amortized, a deviation will exist until all organizational costs have been fully amortized per the internal books and records of the Fund (and the internal books and records reconcile with the net asset value of the audited financial statements).

- During our review of LLR Equity Partners III, MIG noted that carried interest as calculated by the Manager from inception through December 31, 2014 was \$2,552 higher than the amount calculated per MIG's recalculation.
 - We recalculated carried interest per the limited partnership agreement and noted that carried interest as calculated by the general partner was overstated by approximately \$2,552 as of 12/31/14. We provided the Manager with our recalculation and the associated variance and Noah Becker, Chief Financial Officer of LLR Partners, provided the following response:
 - "Over time there can be small differences in the carry relative to the exact 20% due to how carry is booked at fund level vs. LP by LP. All such minor differences get trued and corrected both as carry starts to pay out (to date 100% of carry is accrued and though tax distributions related to taxable income related to carry have been made, no carry has been paid to the GP) and each LP will pay the exact 20% carry."

Agenda Item #7

Arizona State Retirement System

Independent ASRS Investment Program Oversight for the Period Ending June 30, 2016

August 22, 2016

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



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

ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of June 30, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Macro

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

Micro

Source: ASRS Strategic Plan, March 2013

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

	<u>20 Year Annualized Return</u>
Total Fund	7.3%
Constant 8%	<u>8.0%</u>
Excess Return	(0.7)%

**Goal Met:
No**

Total Fund Performance

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

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	1.2%	0.5%	7.1%	7.1%	6.0%	9.6%
Interim SAA Policy¹	1.5%	-0.6%	5.9%	6.3%	5.6%	9.3%
Excess Return	-0.3%	1.1%	1.2%	0.8%	0.4%	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	-0.21%	0.44%	0.33%
Manager Selection Effect ²	1.31%	0.79%	0.55%
Residual ³	0.01%	-0.03%	-0.05%
Excess Return	1.11%	1.20%	0.83%

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).

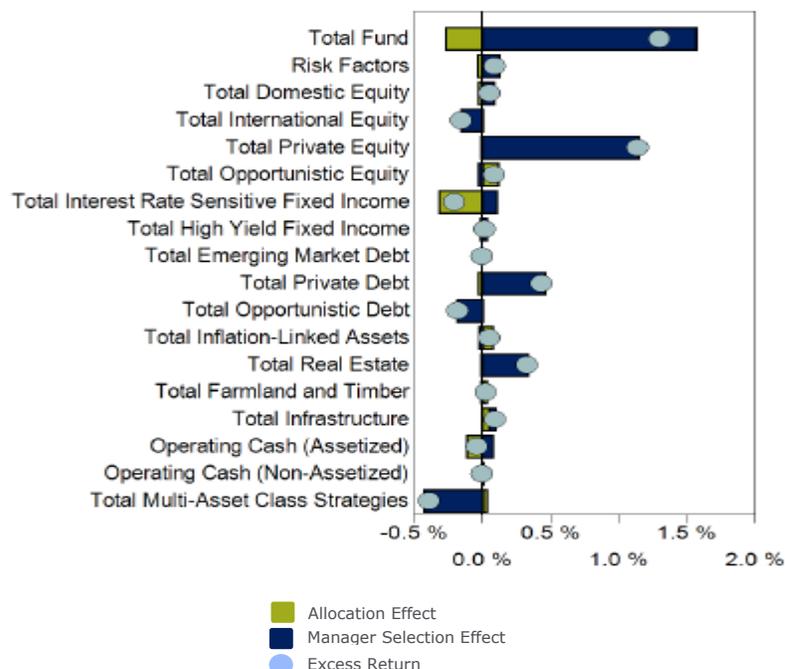
2. Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)] + **Interaction 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 June 30, 2016



1 Year Excess Return: +1.11%

- Allocation Effect: -0.21%
 - Public Markets Fixed Income tactical underweight (-0.32%)
 - International Equity tactical overweight (-0.01%)
 - Opportunistic Equity tactical allocation (+0.11%)
- Manager Selection Effect: +1.31%
 - Private Equity outperformed due to various managers (+1.14%)
 - Private Debt outperformed due to various managers (+0.46%)
 - Real Estate outperformed due to various managers (+0.33%)
 - Risk Factors outperformed (+0.12%)
 - Domestic Equity outperformed (+0.08%)
 - Multi-Asset Class Strategies underperformed (-0.43%)
 - Opportunistic Debt underperformed (-0.18%)
 - International Equity underperformed (-0.15%)
 - Opportunistic Equity underperformed (-0.03%)
 - Inflation-Linked Assets underperformed (-0.02%)
- Residual: +0.01%

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

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

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

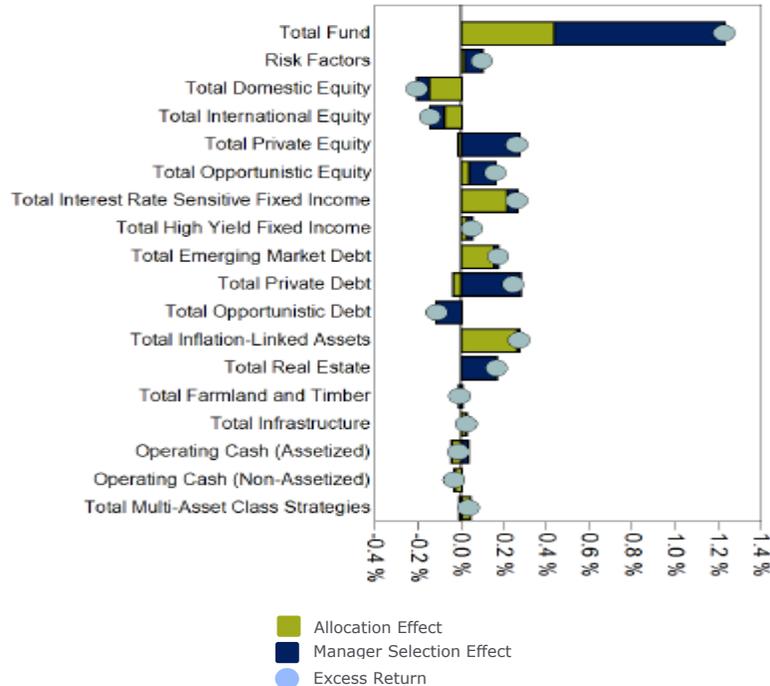
Residual: Contribution to excess return not captured in Allocation Effect and Manager Selection Effect.



Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects
3 Years Ending June 30, 2016



3 Year Excess Return: +1.20%

- Allocation Effect: +0.44%
 - Public Markets Fixed Income tactical underweight (+0.41%)
 - Inflation-Linked Assets tactical underweight (+0.26%)
 - Domestic Equity tactical underweight (-0.15%)
 - International Equity tactical overweight (-0.08%)
- Manager Selection Effect: +0.79%
 - Private Debt outperformed due to various managers (+0.28%)
 - Private Equity outperformed due to various managers (+0.27%)
 - Real Estate outperformed due to various managers (+0.16%)
 - Risk Factors outperformed (+0.08%)
- Residual: -0.03%

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

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

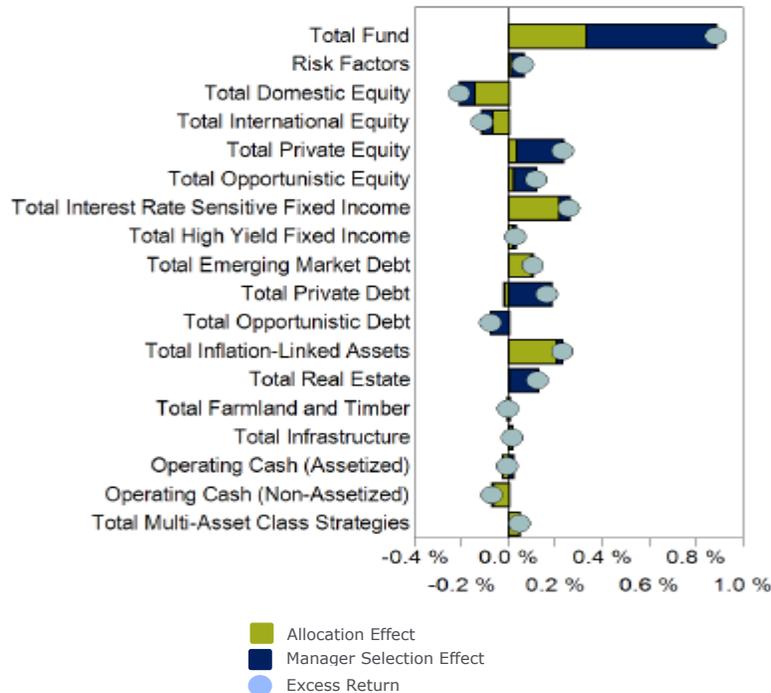
Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. $[\text{Weight Asset Class Benchmark} \times (\text{Return Portfolio Asset Class} - \text{Return Asset Class in Interim Policy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

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

Arizona State Retirement System

Total Fund Attribution Detail

Attribution Effects 5 Years Ending June 30, 2016



5 Year Excess Return: +0.83%

- Allocation Effect: +0.33%
 - Public Markets Fixed Income tactical underweight (+0.34%)
 - Inflation-Linked Assets tactical underweight (+0.21%)
 - Domestic Equity tactical underweight (-0.15%)
 - International Equity tactical overweight (-0.07%)
- Manager Selection Effect: +0.55%
 - Private Equity outperformed due to various managers (+0.20%)
 - Private Debt outperformed due to various managers (+0.18%)
 - Real Estate outperformed due to various managers (+0.12%)
 - Opportunistic Equity outperformed (+0.09%)
 - Public Markets Fixed Income outperformed (+0.06%)
 - Risk Factors outperformed (+0.05%)
 - Opportunistic Debt underperformed (-0.08%)
 - Domestic Equity underperformed (-0.06%)
- Residual: -0.05%

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

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

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

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



Asset Class Performance vs. Benchmark – Public Markets

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

	1 Year Return	3 Year Return
ASRS Total Domestic and Int'l Equity ¹	-2.8%	7.0%
ASRS Custom Total Equity Benchmark	-3.2%	7.1%
Excess Return	0.4%	-0.1%
ASRS Domestic Equity	3.7%	11.3%
ASRS Custom Domestic Equity Benchmark	3.2%	11.4%
Excess Return	0.5%	-0.1%
ASRS International Equity	-10.4%	1.5%
ASRS Custom Int'l Equity Benchmark	-9.9%	1.8%
Excess Return	-0.5%	-0.3%
ASRS Public Markets Fixed Income	5.9%	3.8%
ASRS Custom Fixed Income Benchmark	4.9%	2.9%
Excess Return	1.0%	0.9%
ASRS Inflation-Linked	-15.9%	-11.1%
ASRS Custom Inflation-Linked Benchmark	-13.3%	-10.6%
Excess Return	-2.6%	-0.5%
ASRS Multi-Asset Class Strategies	-12.0%	2.8%
ASRS Multi-Asset Class Strategies Benchmark	-0.9%	5.7%
Excess Return	-11.1%	-2.9%

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	5.8%	10.6%	10.8%	Oct-07
Russell 2000	-10.9%	5.2%	8.8%	
Excess Return	16.7%	5.4%	2.0%	
ASRS Opportunistic Equity ²	6.2%	22.0%	23.6%	Apr-11
ASRS Private Debt	8.5%	10.1%	10.6%	Jul-12
S&P/LSTA Leveraged Loan Index + 250 bps	1.4%	3.7%	4.1%	
Excess Return	7.1%	6.4%	6.5%	
ASRS Opportunistic Debt ²	-5.1%	3.2%	9.0%	Jan-08
ASRS Real Estate	13.8%	13.8%	8.1%	Oct-05
NFI - ODCE Index	14.2%	13.1%	7.3%	
Excess Return	-0.4%	0.7%	0.8%	
ASRS Farmland and Timber	4.3%	--	4.0%	Jul-13
CPI ex-Food and Energy + 350 bps	5.8%	--	5.6%	
Excess Return	-1.5%		-1.6%	
ASRS Total Infrastructure	10.3%	--	6.3%	Dec-14
CPI ex-Food and Energy + 350 bps	5.8%	--	5.5%	
Excess Return	4.5%		0.8%	

¹Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of March 31, 2016.

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

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

**Goal Met:
Partially**



Cash Management

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

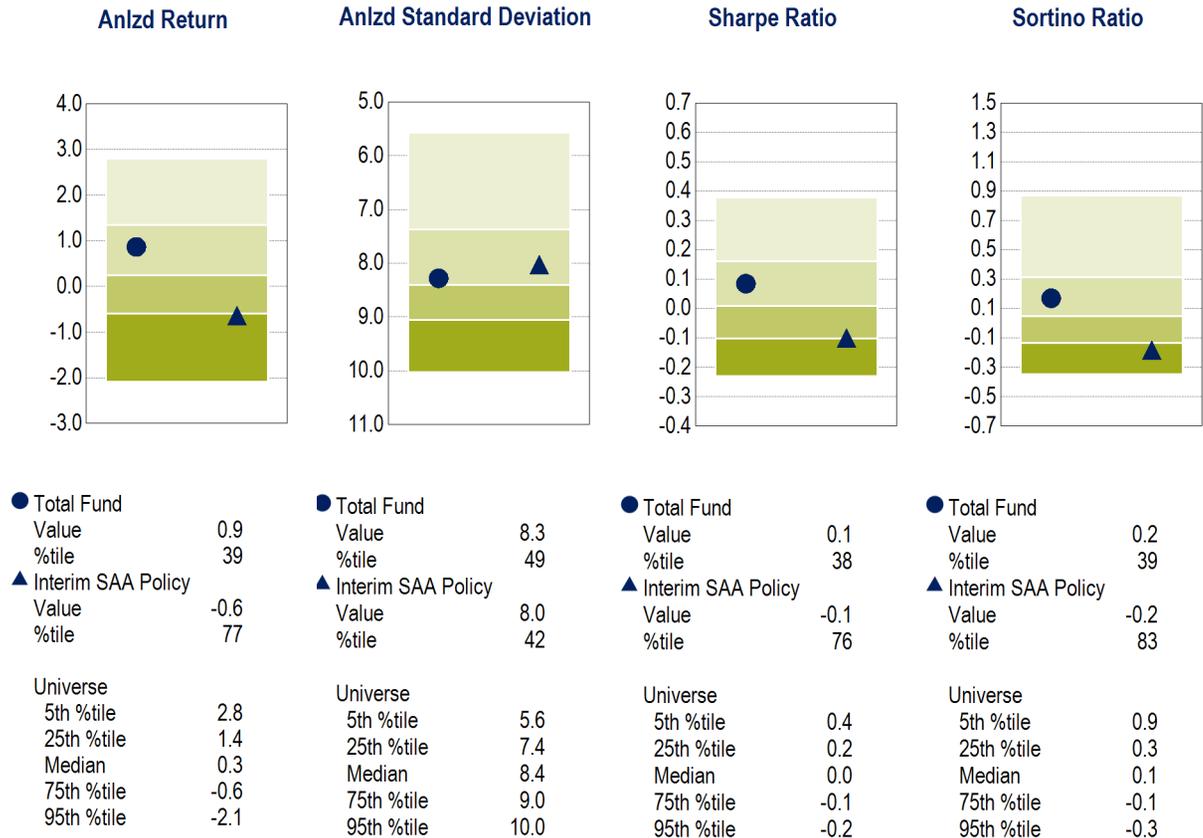
Month	External CFs	Last day of the Month Ending Balance*
Jul – 15	(\$150.0)	\$405.5
Aug – 15	(\$136.3)	\$351.7
Sep – 15	(\$103.3)	\$392.0
Oct – 15	(\$73.0)	\$394.5
Nov – 15	(\$107.8)	\$705.5
Dec – 15	(\$65.4)	\$966.1
Jan – 16	(\$108.6)	\$788.9
Feb – 16	(\$109.2)	\$545.2
Mar - 16	(\$94.4)	\$517.3
Apr – 16	(\$77.5)	\$394.7
May - 16	(\$91.4)	\$425.5
Jun - 16	(\$62.9)	\$274.6

***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.

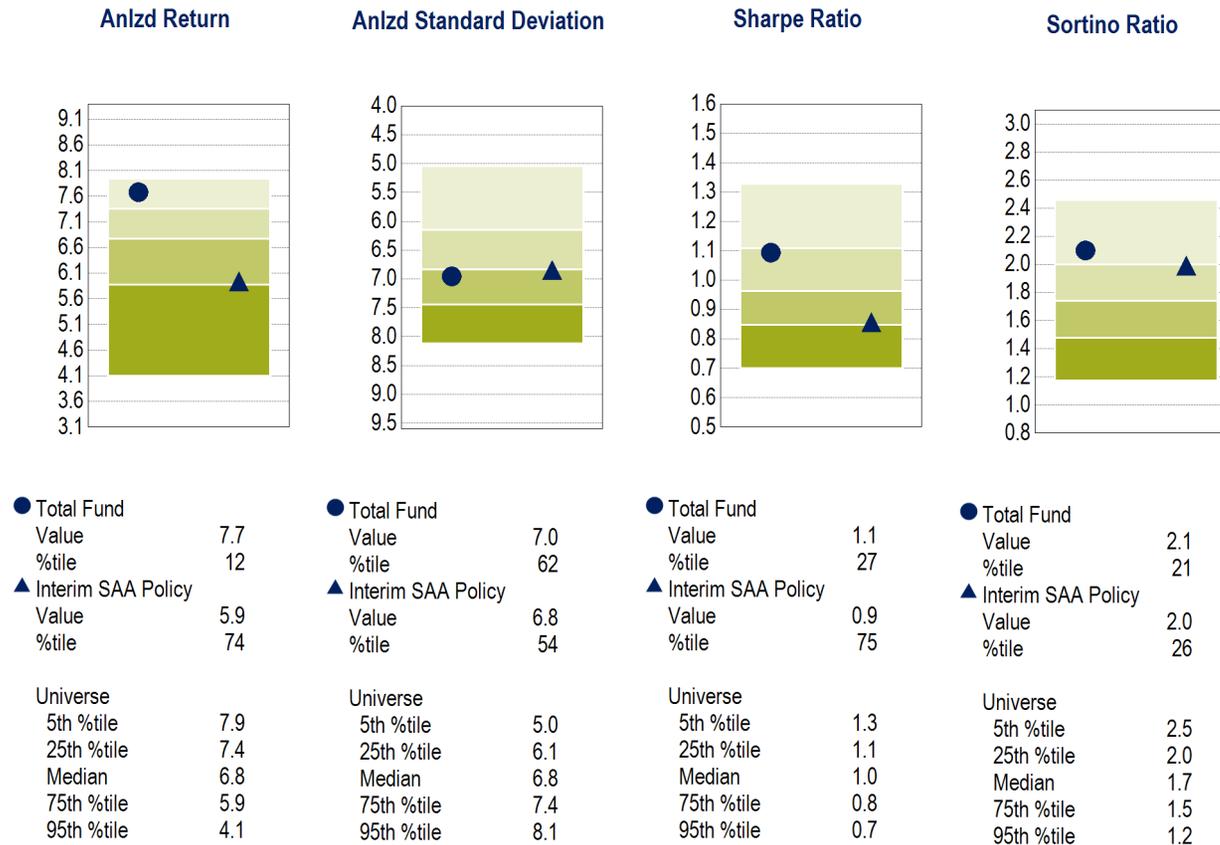
The InvestorForce Public Funds > \$1 Billion Universe contains 95 observations for the period ending June 30, 2016, with total assets of \$1.9 trillion.

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

Total Fund Risk Statistics vs. Peer Universe

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

3 Year



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

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

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

The InvestorForce Public Funds > \$1 Billion Universe contains 95 observations for the period ending June 30, 2016, with total assets of \$1.9 trillion.

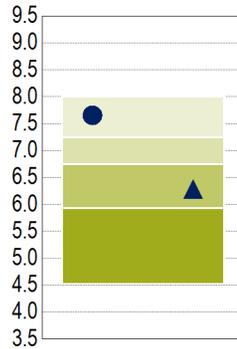
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

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

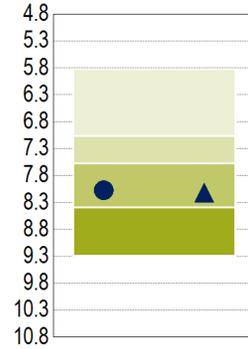
5 Year

Anlzd Return



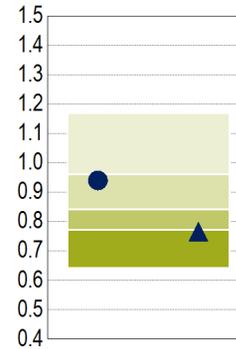
● Total Fund	
Value	7.7
%tile	13
▲ Interim SAA Policy	
Value	6.3
%tile	67
Universe	
5th %tile	8.0
25th %tile	7.3
Median	6.8
75th %tile	5.9
95th %tile	4.5

Anlzd Standard Deviation



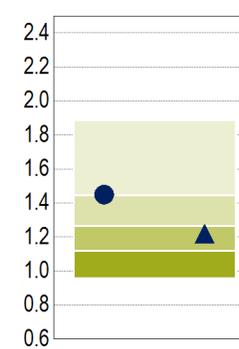
● Total Fund	
Value	8.1
%tile	70
▲ Interim SAA Policy	
Value	8.1
%tile	70
Universe	
5th %tile	5.8
25th %tile	7.1
Median	7.6
75th %tile	8.4
95th %tile	9.3

Sharpe Ratio



● Total Fund	
Value	0.9
%tile	29
▲ Interim SAA Policy	
Value	0.8
%tile	77
Universe	
5th %tile	1.2
25th %tile	1.0
Median	0.8
75th %tile	0.8
95th %tile	0.6

Sortino Ratio



● Total Fund	
Value	1.4
%tile	24
▲ Interim SAA Policy	
Value	1.2
%tile	57
Universe	
5th %tile	1.9
25th %tile	1.4
Median	1.3
75th %tile	1.1
95th %tile	1.0

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

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

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

The InvestorForce Public Funds > \$1 Billion Universe contains 95 observations for the period ending June 30, 2016, with total assets of \$1.9 trillion.

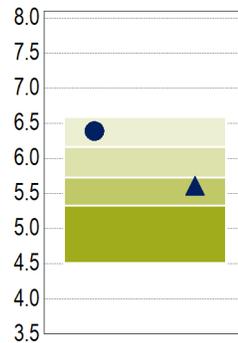
Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

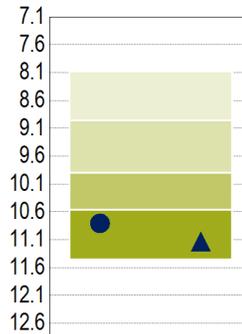
Total Fund vs. IFx Public DB > \$1B Gross(USD)(peer)

10 Year

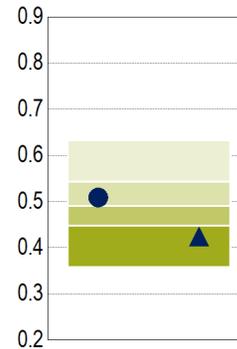
Anlzd Return



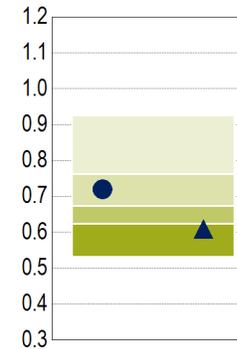
Anlzd Standard Deviation



Sharpe Ratio



Sortino Ratio



● Total Fund

Value 6.4
%tile 13

▲ Interim SAA Policy

Value 5.6
%tile 57

Universe

5th %tile 6.6
25th %tile 6.2
Median 5.7
75th %tile 5.3
95th %tile 4.5

● Total Fund

Value 10.8
%tile 84

▲ Interim SAA Policy

Value 11.1
%tile 89

Universe

5th %tile 8.1
25th %tile 8.9
Median 9.9
75th %tile 10.6
95th %tile 11.4

● Total Fund

Value 0.5
%tile 42

▲ Interim SAA Policy

Value 0.4
%tile 87

Universe

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

● Total Fund

Value 0.7
%tile 36

▲ Interim SAA Policy

Value 0.6
%tile 82

Universe

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

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

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

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

The InvestorForce Public Funds > \$1 Billion Universe contains 95 observations for the period ending June 30, 2016, with total assets of \$1.9 trillion.

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

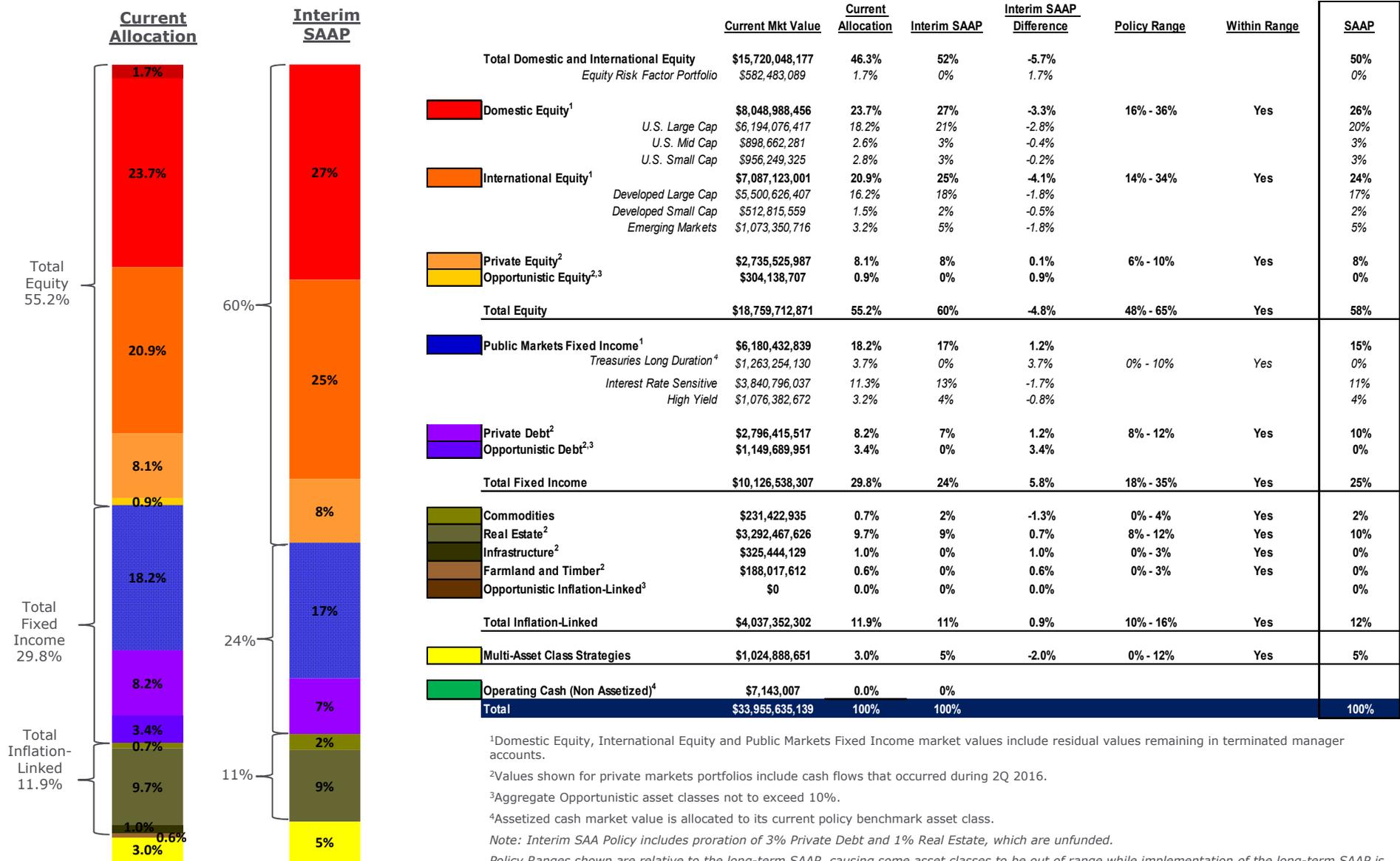
Independent Oversight/Compliance

Note: All of the data shown on the following pages is as of June 30, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Arizona State Retirement System

SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Interim SAAP Difference	Policy Range	Within Range	SAAP
Total Domestic and International Equity	\$15,720,048,177	46.3%	52%	-5.7%			50%
Equity Risk Factor Portfolio	\$582,483,089	1.7%	0%	1.7%			0%
Domestic Equity¹	\$8,048,988,456	23.7%	27%	-3.3%	16% - 36%	Yes	26%
U.S. Large Cap	\$6,194,076,417	18.2%	21%	-2.8%			20%
U.S. Mid Cap	\$898,662,281	2.6%	3%	-0.4%			3%
U.S. Small Cap	\$956,249,325	2.8%	3%	-0.2%			3%
International Equity¹	\$7,087,123,001	20.9%	25%	-4.1%	14% - 34%	Yes	24%
Developed Large Cap	\$5,500,626,407	16.2%	18%	-1.8%			17%
Developed Small Cap	\$512,815,559	1.5%	2%	-0.5%			2%
Emerging Markets	\$1,073,350,716	3.2%	5%	-1.8%			5%
Private Equity²	\$2,735,525,987	8.1%	8%	0.1%	6% - 10%	Yes	8%
Opportunistic Equity^{2,3}	\$304,138,707	0.9%	0%	0.9%			0%
Total Equity	\$18,759,712,871	55.2%	60%	-4.8%	48% - 65%	Yes	58%
Public Markets Fixed Income¹	\$6,180,432,839	18.2%	17%	1.2%			15%
Treasuries Long Duration ⁴	\$1,263,254,130	3.7%	0%	3.7%	0% - 10%	Yes	0%
Interest Rate Sensitive	\$3,840,796,037	11.3%	13%	-1.7%			11%
High Yield	\$1,076,382,672	3.2%	4%	-0.8%			4%
Private Debt²	\$2,796,415,517	8.2%	7%	1.2%	8% - 12%	Yes	10%
Opportunistic Debt^{2,3}	\$1,149,689,951	3.4%	0%	3.4%			0%
Total Fixed Income	\$10,126,538,307	29.8%	24%	5.8%	18% - 35%	Yes	25%
Commodities	\$231,422,935	0.7%	2%	-1.3%	0% - 4%	Yes	2%
Real Estate²	\$3,292,467,626	9.7%	9%	0.7%	8% - 12%	Yes	10%
Infrastructure²	\$325,444,129	1.0%	0%	1.0%	0% - 3%	Yes	0%
Farmland and Timber²	\$188,017,612	0.6%	0%	0.6%	0% - 3%	Yes	0%
Opportunistic Inflation-Linked³	\$0	0.0%	0%	0.0%			0%
Total Inflation-Linked	\$4,037,352,302	11.9%	11%	0.9%	10% - 16%	Yes	12%
Multi-Asset Class Strategies	\$1,024,888,651	3.0%	5%	-2.0%	0% - 12%	Yes	5%
Operating Cash (Non Assetized)⁴	\$7,143,007	0.0%	0%				
Total	\$33,955,635,139	100%	100%				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 2Q 2016.

³Aggregate Opportunistic asset classes not to exceed 10%.

⁴Assetized cash market value is allocated to its current policy benchmark asset class.

Note: Interim SAA Policy includes proration of 3% Private Debt and 1% 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	YTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
Total Fund	33,955,635,139	100.0	1.2	--	2.6	--	0.5	--	7.1	--	7.1	--	6.0	--	9.6	Jul-75
<i>Interim SAA Policy</i>			<u>1.5</u>	--	<u>2.9</u>	--	<u>-0.6</u>	--	<u>5.9</u>	--	<u>6.3</u>	--	<u>5.6</u>	--	<u>9.3</u>	<i>Jul-75</i>
<i>Over/Under</i>			-0.3		-0.3		1.1		1.2		0.8		0.4		0.3	
<i>Actual Benchmark</i>			1.5	--	2.8	--	-0.5	--	6.5	--	6.7	--	5.6	--	--	<i>Jul-75</i>
Total Domestic and International Equity¹	15,720,048,177	46.3	0.8	--	1.2	--	-2.8	--	7.0	--	7.4	--	5.6	--	6.2	Jan-98
<i>ASRS Custom Total Equity Benchmark</i>			<u>0.9</u>	--	<u>1.4</u>	--	<u>-3.2</u>	--	<u>7.1</u>	--	<u>7.5</u>	--	<u>5.8</u>	--	<u>5.6</u>	<i>Jan-98</i>
<i>Over/Under</i>			-0.1		-0.2		0.4		-0.1		-0.1		-0.2		0.6	
Total Domestic Equity	8,048,988,456	23.7	3.0	7	4.9	5	3.7	3	11.3	5	11.6	10	7.9	6	11.1	Jul-75
<i>ASRS Custom Domestic Equity Benchmark</i>			<u>2.7</u>	17	<u>4.6</u>	10	<u>3.2</u>	4	<u>11.4</u>	3	<u>11.8</u>	3	<u>7.9</u>	6	<u>11.2</u>	<i>Jul-75</i>
<i>Over/Under</i>			0.3		0.3		0.5		-0.1		-0.2		0.0		-0.1	
<i>InvestorForce Public DB > \$1 Billion US Equity Net Median</i>			2.3		2.8		-0.1		10.1		10.6		7.0		11.1	<i>Jul-75</i>
Total International Equity	7,087,123,001	20.9	-1.6	86	-3.1	80	-10.4	86	1.5	80	0.7	79	1.8	71	5.6	Apr-87
<i>ASRS Custom Int'l Equity Benchmark</i>			<u>-1.1</u>	75	<u>-2.0</u>	74	<u>-9.9</u>	81	<u>1.8</u>	66	<u>0.9</u>	68	<u>2.5</u>	26	<u>5.3</u>	<i>Apr-87</i>
<i>Over/Under</i>			-0.5		-1.1		-0.5		-0.3		-0.2		-0.7		0.3	
<i>InvestorForce Public DB > \$1 Billion Global ex-US Equity Net Median</i>			-0.5		-0.6		-8.3		2.2		1.2		2.1		5.6	<i>Apr-87</i>
Total Public Markets Fixed Income	5,473,275,115	16.1	2.8	31	6.3	21	5.9	1	3.8	38	3.8	71	5.3	57	8.3	Jan-00
<i>ASRS Custom Public Markets Fixed Income Benchmark</i>			<u>3.1</u>	19	<u>6.3</u>	20	<u>4.9</u>	26	<u>2.9</u>	74	<u>3.2</u>	88	<u>4.8</u>	84	--	<i>Jul-75</i>
<i>Over/Under</i>			-0.3		0.0		1.0		0.9		0.6		0.5		--	
<i>InvestorForce Public DB > \$1 Billion Fixed Income Net Median</i>			2.6		5.5		3.6		3.4		3.9		5.5		8.3	<i>Jul-75</i>
Total Inflation-Linked Assets	231,422,935	0.7	11.7	1	11.5	12	-15.9	99	-11.1	99	-10.4	99	--	--	-5.5	Feb-10
<i>ASRS Custom Inflation-Linked Benchmark</i>			<u>12.8</u>	1	<u>13.3</u>	4	<u>-13.3</u>	92	<u>-10.6</u>	99	<u>-10.8</u>	99	--	--	<u>-6.2</u>	<i>Feb-10</i>
<i>Over/Under</i>			-1.1		-1.8		-2.6		-0.5		0.4		--		0.7	
<i>InvestorForce Public DB > \$1 Billion Real Assets/Commodities Net Median</i>			3.3		5.4		-1.9		1.2		2.7		5.2		4.8	<i>Feb-10</i>
Total Multi-Asset Class Strategies	1,024,888,651	3.0	-3.2	99	-7.5	99	-12.0	99	2.8	80	4.6	34	5.7	1	6.2	Jan-04
<i>Multi-Asset Class Strategies Custom Benchmark</i>			<u>0.1</u>	92	<u>0.1</u>	90	<u>-0.9</u>	35	<u>5.7</u>	1	<u>6.3</u>	1	<u>5.2</u>	50	<u>5.7</u>	<i>Jan-04</i>
<i>Over/Under</i>			-3.3		-7.6		-11.1		-2.9		-1.7		0.5		0.5	
<i>InvestorForce Public DB > \$1 Billion Global Tactical Net Median</i>			3.5		4.8		-1.3		3.8		4.4		5.2		5.6	<i>Jan-04</i>
Operating Cash (Assetized)	714,297,198	2.1	0.5	--	2.1	--	-4.0	--	--	--	--	--	--	--	0.7	Feb-15
<i>ASRS Cash Assetization Custom Benchmark</i>			<u>0.5</u>	--	<u>2.0</u>	--	<u>-9.4</u>	--	--	--	--	--	--	--	<u>-4.6</u>	<i>Feb-15</i>
<i>Over/Under</i>			0.0		0.1		5.4		--		--		--		5.3	

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 eInvestment 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	33,955,635,139	100.0	1.2	0.5	7.1	7.1	9.6	Jul-75
<i>Interim SAA Policy</i>			<u>1.5</u>	<u>-0.6</u>	<u>5.9</u>	<u>6.3</u>	<u>9.3</u>	<i>Jul-75</i>
Over/Under			-0.3	1.1	1.2	0.8	0.3	
<i>Actual Benchmark</i>			<u>1.6</u>	<u>-0.4</u>	<u>6.5</u>	<u>6.7</u>	<u>--</u>	<i>Jul-75</i>
Total Private Equity	2,735,636,430	8.1	1.8	5.8	10.6	11.8	10.8	Oct-07
<i>Russell 2000 1 QTR Lagged</i>			<u>-1.7</u>	<u>-10.9</u>	<u>5.2</u>	<u>6.5</u>	<u>8.8</u>	<i>Oct-07</i>
Over/Under			3.5	16.7	5.4	5.3	2.0	
Total Opportunistic Equity¹	429,089,379	1.3	6.6	6.2	22.0	--	23.6	Apr-11
Total Private Debt	2,515,741,330	7.4	2.1	8.5	10.1	--	10.6	Jul-12
<i>S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged</i>			<u>2.2</u>	<u>1.4</u>	<u>3.7</u>	<u>--</u>	<u>4.1</u>	<i>Jul-12</i>
Over/Under			-0.1	7.1	6.4	--	6.5	
Total Opportunistic Debt¹	1,093,593,530	3.2	-0.2	-5.1	3.2	4.5	9.0	Jan-08
Total Real Estate	3,168,397,049	9.3	1.6	13.8	13.8	13.3	8.1	Oct-05
<i>NCREIF ODCE 1 QTR Lagged (net)</i>			<u>3.1</u>	<u>14.2</u>	<u>13.1</u>	<u>12.5</u>	<u>7.3</u>	<i>Oct-05</i>
Over/Under			-1.5	-0.4	0.7	0.8	0.8	
Total Farmland and Timber	189,528,685	0.6	0.6	4.3	--	--	4.0	Jul-13
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.5</u>	<u>5.8</u>	<u>--</u>	<u>--</u>	<u>5.6</u>	<i>Jul-13</i>
Over/Under			-0.9	-1.5	--	--	-1.6	
Total Infrastructure	325,444,129	1.0	2.8	10.3	--	--	6.3	Dec-14
<i>CPI ex-Food and Energy + 350 bps 1 QTR Lagged</i>			<u>1.5</u>	<u>5.8</u>	<u>--</u>	<u>--</u>	<u>5.5</u>	<i>Dec-14</i>
Over/Under			1.3	4.5	--	--	0.8	

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 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 (IRR), is a more appropriate measure of the performance of ASRS private markets portfolios.

Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of March 31, 2016. Performance data and market values provided by State Street.

Prior to 3Q 2012, 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 June 30, 2016

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Anlzd AJ	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	7.1%	--	6.9%	--	1.3%	--	0.9	--	1.2%	--	1.0	1.0
Interim SAA Policy	--	5.9%	--	6.8%	--	--	--	--	--	--	--	--	0.9
Total Domestic and International Equity	46.3%	7.0%	--	11.5%	--	0.6%	--	-0.2	--	0.1%	--	1.0	0.6
ASRS Custom Total Equity Benchmark	--	7.1%	--	11.8%	--	--	--	--	--	--	--	--	0.6
Total Domestic Equity	23.7%	11.3%	5	11.3%	22	0.4%	3	-0.3	22	0.1%	10	1.0	1.0
ASRS Custom Domestic Equity Benchmark	--	11.4%	3	11.5%	34	--	--	--	--	--	11	--	1.0
Total International Equity	20.9%	1.5%	80	12.9%	86	0.9%	1	-0.3	95	-0.3%	83	1.0	0.1
ASRS Custom Int'l Equity Benchmark	--	1.8%	66	13.2%	93	--	--	--	--	--	80	--	0.1
Total Public Markets Fixed Income	16.1%	3.8%	38	3.2%	57	0.9%	19	1.0	1	1.1%	23	0.9	1.1
ASRS Custom Public Markets Fixed Income Benchmark	--	2.9%	74	3.3%	63	--	--	--	--	--	65	--	0.8
Total Inflation-Linked Assets	0.7%	-11.1%	99	14.2%	99	2.4%	9	-0.2	76	-0.5%	76	1.0	-0.8
ASRS Custom Inflation-Linked Benchmark	--	-10.6%	99	14.1%	99	--	--	--	--	--	66	--	-0.8
Total Multi-Asset Class Strategies	3.0%	2.8%	80	8.1%	99	4.7%	54	-0.6	67	-4.2%	99	1.2	0.3
Multi-Asset Class Strategies Custom Benchmark	--	5.7%	1	5.5%	10	--	--	--	--	--	19	--	1.0

Note: Performance is reported net of fees.

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

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

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

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

Arizona State Retirement System

Public Market Asset Class Analysis

5 Years Ending June 30, 2016

	% of Tot	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Anlzd AJ	Rank	Beta	Sharpe Ratio
Total Fund	100.0%	7.1%	--	8.1%	--	1.2%	--	0.7	--	0.9%	--	1.0	0.9
Interim SAA Policy	--	6.3%	--	8.1%	--	--	--	--	--	--	--	--	0.8
Total Domestic and International Equity	46.3%	7.4%	--	13.0%	--	0.6%	--	-0.1	--	0.0%	--	1.0	0.6
ASRS Custom Total Equity Benchmark	--	7.5%	--	13.2%	--	--	--	--	--	--	--	--	0.6
Total Domestic Equity	23.7%	11.6%	10	12.6%	28	0.5%	5	-0.4	27	-0.2%	13	1.0	0.9
ASRS Custom Domestic Equity Benchmark	--	11.8%	3	12.7%	29	--	--	--	--	--	10	--	0.9
Total International Equity	20.9%	0.7%	79	15.0%	63	0.8%	1	-0.2	91	-0.1%	88	1.0	0.0
ASRS Custom Int'l Equity Benchmark	--	0.9%	68	15.4%	89	--	--	--	--	--	86	--	0.1
Total Public Markets Fixed Income	16.1%	3.8%	71	3.4%	47	0.7%	9	0.8	5	0.6%	49	1.0	1.1
ASRS Custom Public Markets Fixed Income Benchmark	--	3.2%	88	3.3%	41	--	--	--	--	--	89	--	0.9
Total Inflation-Linked Assets	0.7%	-10.4%	99	15.0%	99	2.4%	12	0.2	36	0.2%	46	1.0	-0.7
ASRS Custom Inflation-Linked Benchmark	--	-10.8%	99	15.1%	99	--	--	--	--	--	54	--	-0.7
Total Multi-Asset Class Strategies	3.0%	4.6%	34	8.8%	99	3.8%	56	-0.5	89	-2.0%	99	1.0	0.5
Multi-Asset Class Strategies Custom Benchmark	--	6.3%	1	7.6%	28	--	--	--	--	--	59	--	0.8

Note: Performance is reported net of fees.

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

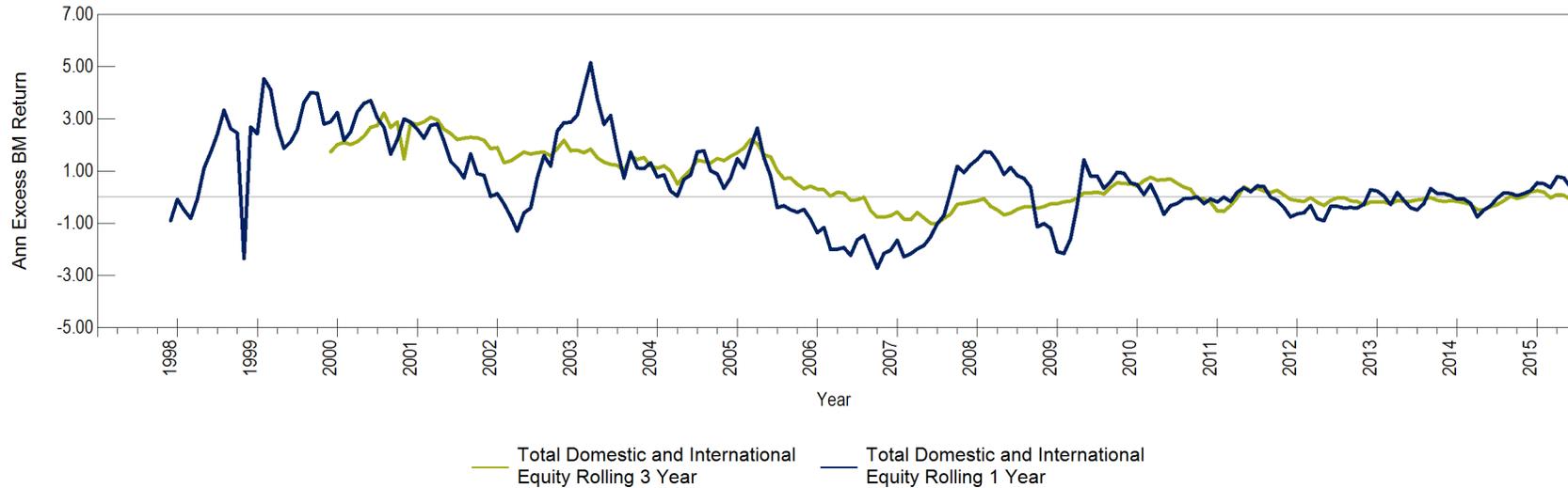
Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis.

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

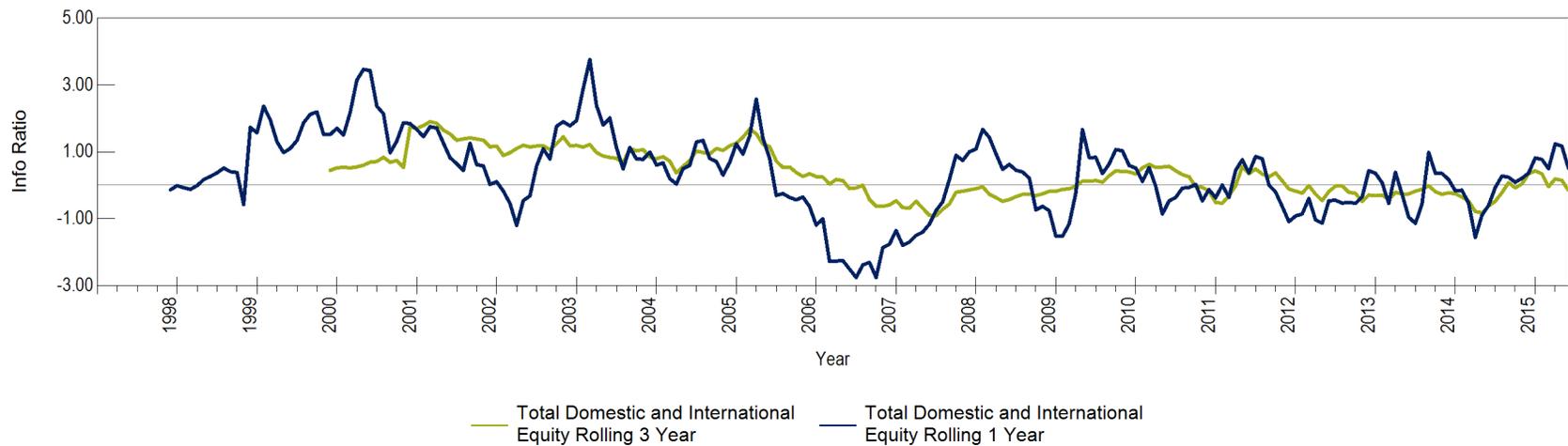
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Asset Class Analysis - Total Domestic and International Equity

Rolling Annual Excess Benchmark Return

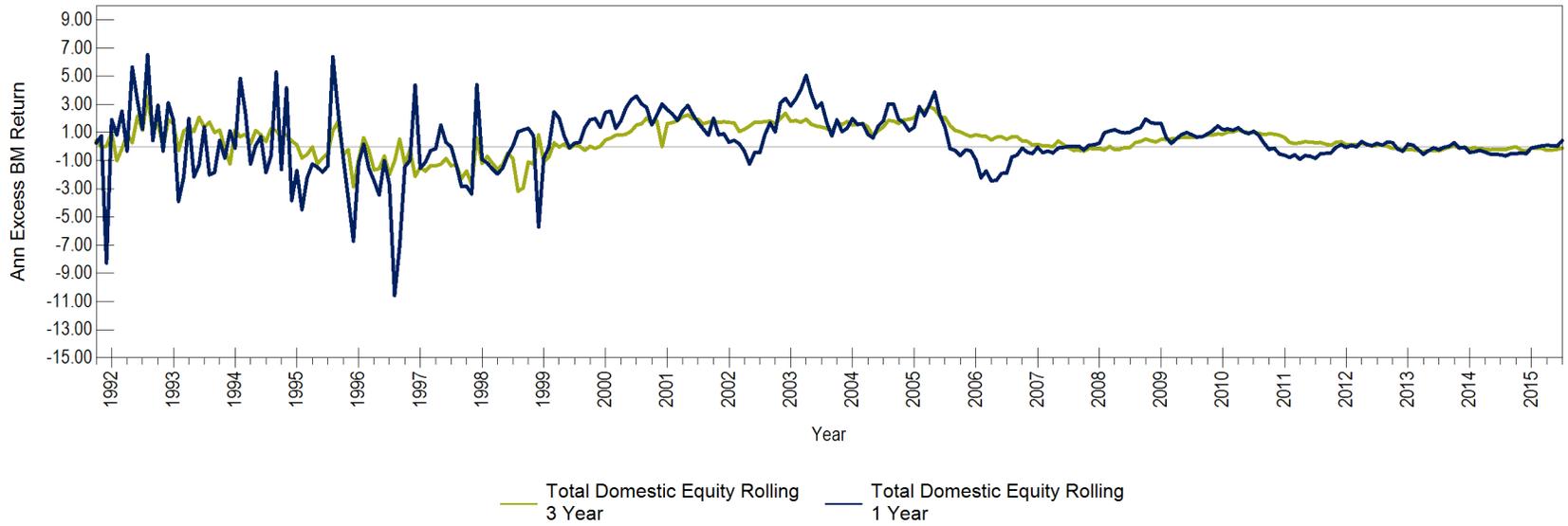


Rolling Information Ratio



Asset Class Analysis - Total Domestic Equity

Rolling Annual Excess Benchmark Return

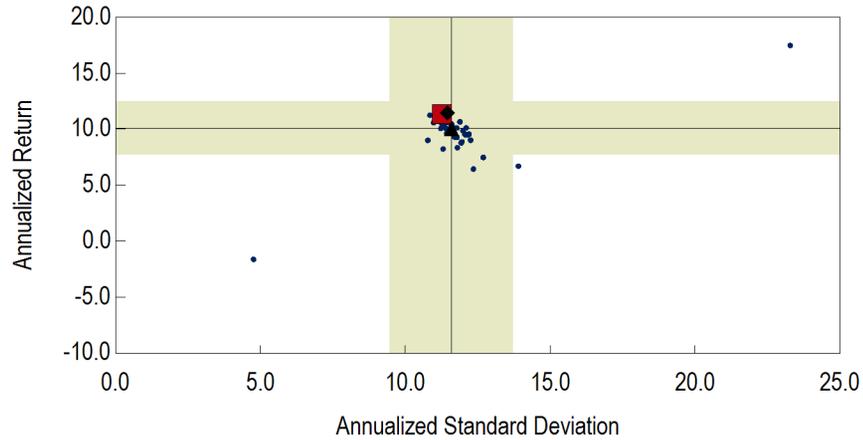


InvestorForce Public DB > \$1 Billion US Equity Net Accounts



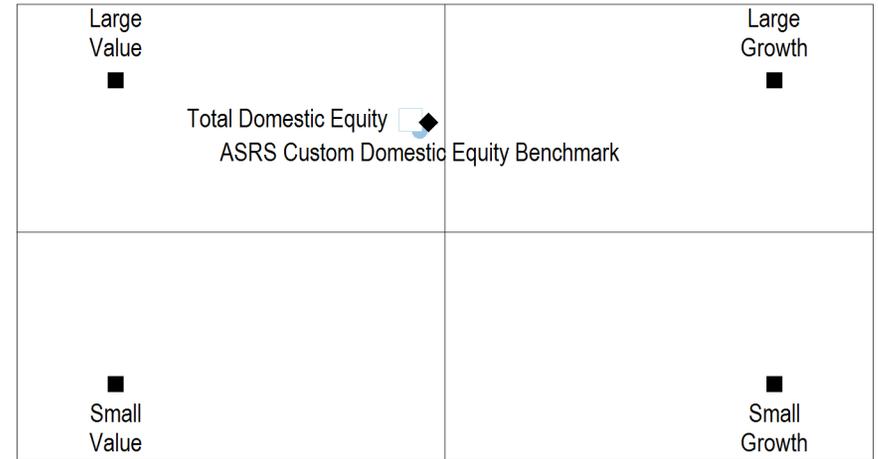
Asset Class Analysis - Total Domestic Equity

3 Year Risk Return

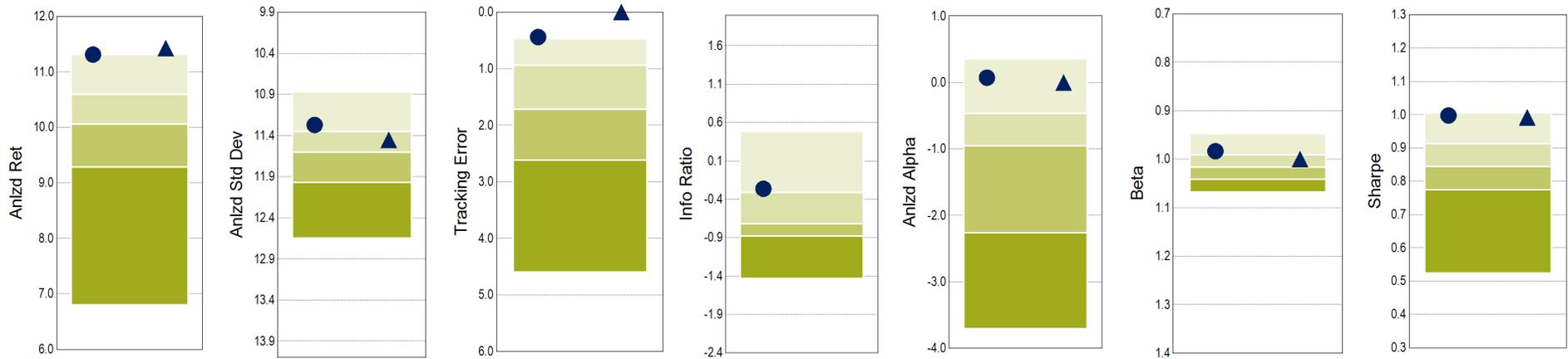


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion US Equity Net

3 Year Style Map

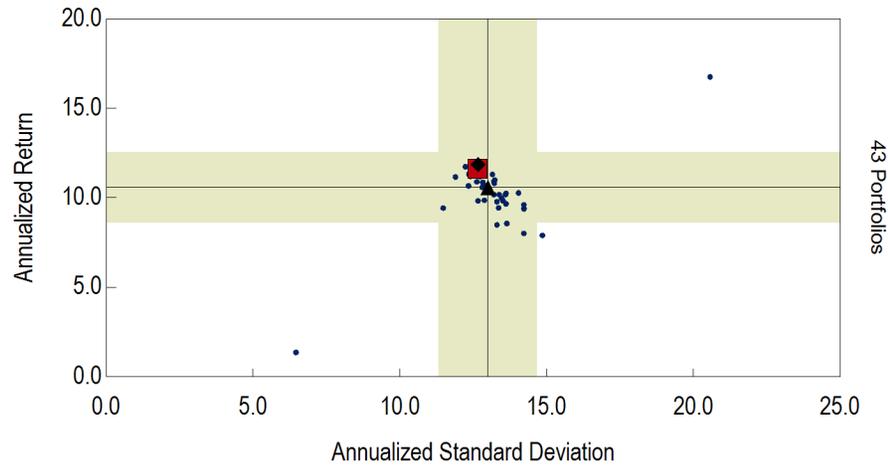


- First Rolling Period
- ◆ Last Rolling Period



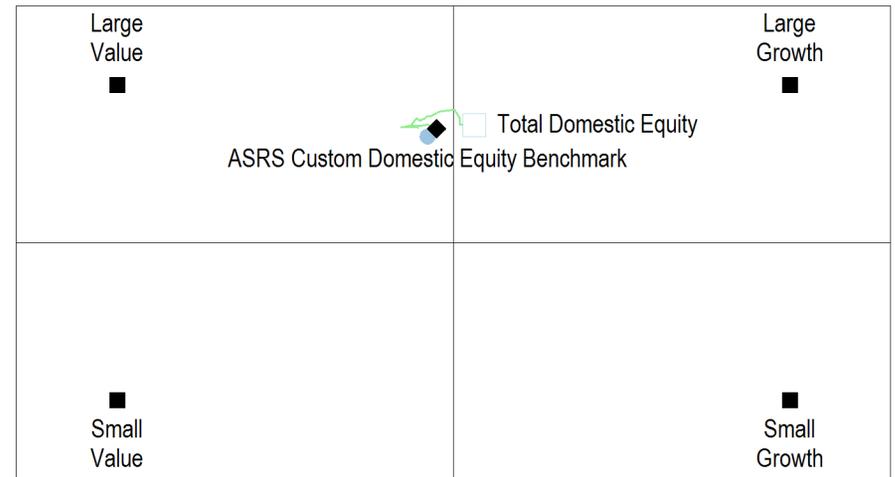
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Year Risk Return

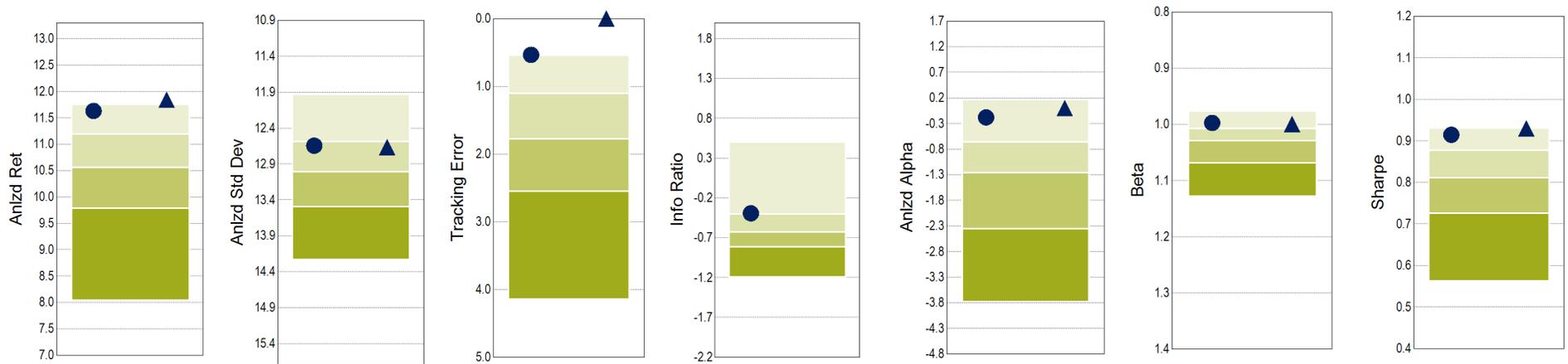


- Total Domestic Equity
- ◆ ASRS Custom Domestic Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion US Equity Net

5 Year Style Map



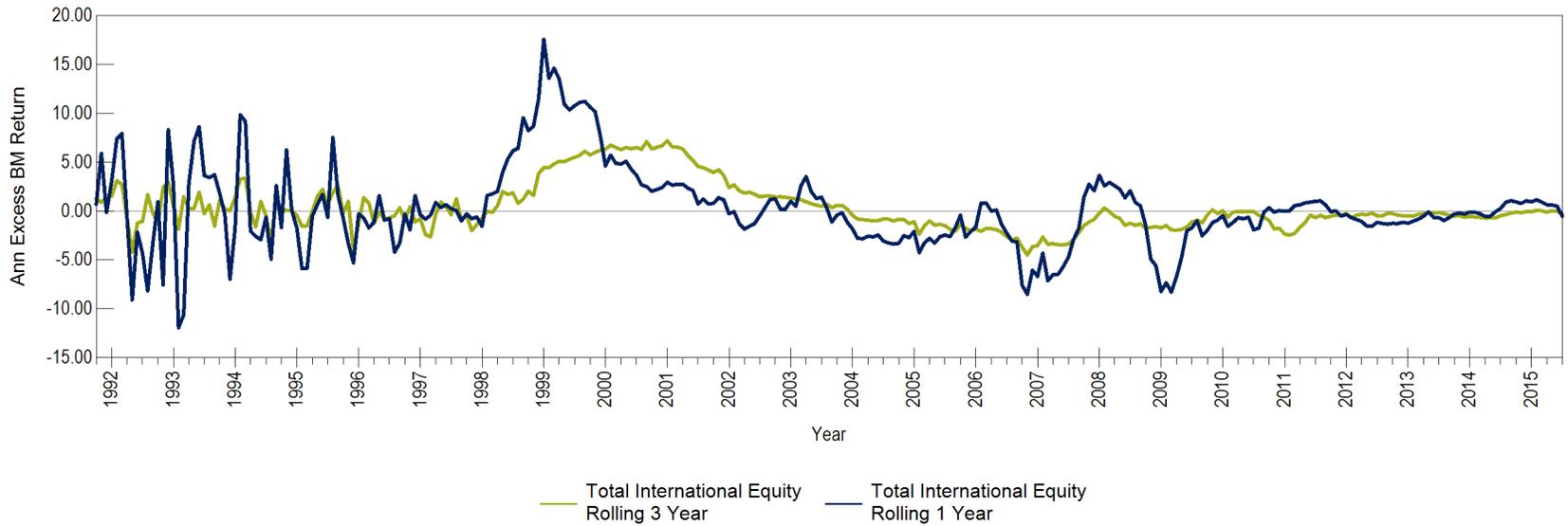
- First Rolling Period
- ◆ Last Rolling Period



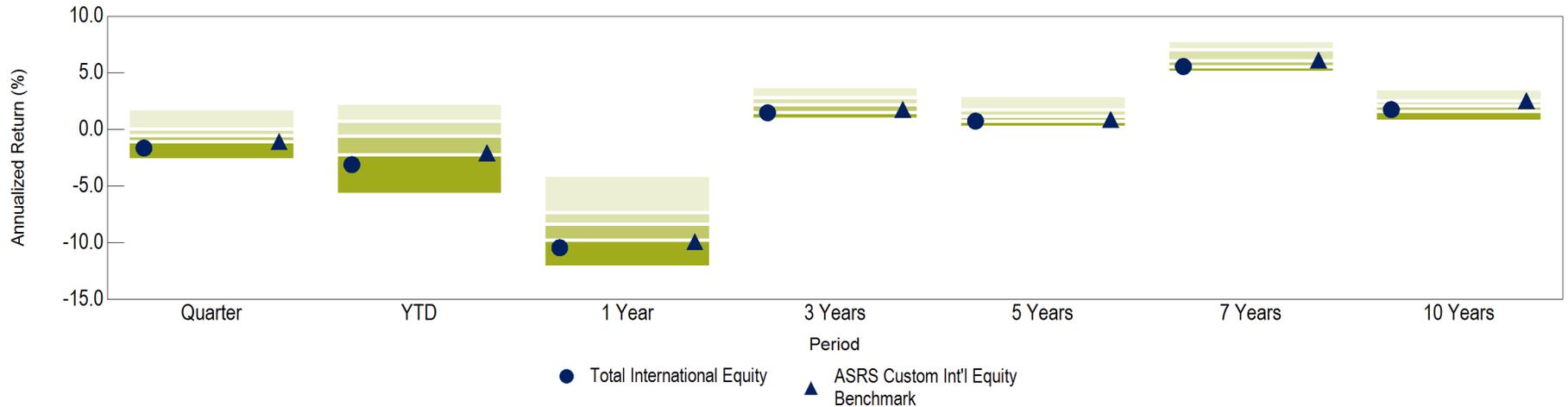
- Total Domestic Equity
- ▲ ASRS Custom Domestic Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total International Equity

Rolling Annual Excess Benchmark Return

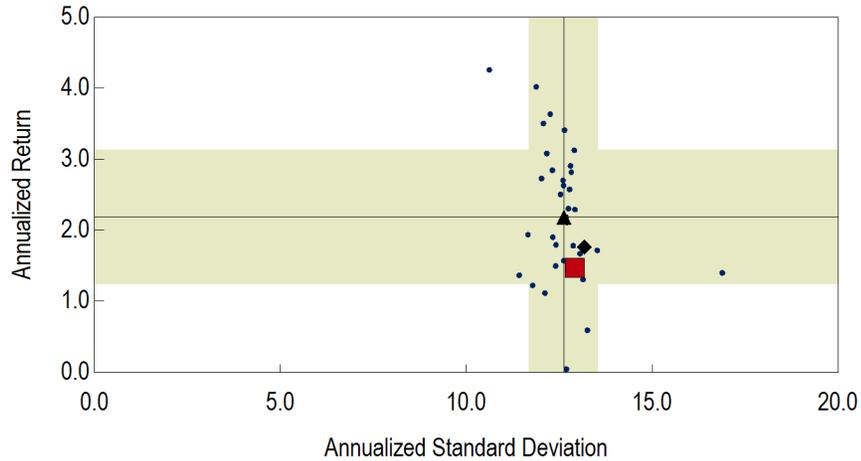


InvestorForce Public DB > \$1 Billion Global ex-US Equity Net Accounts



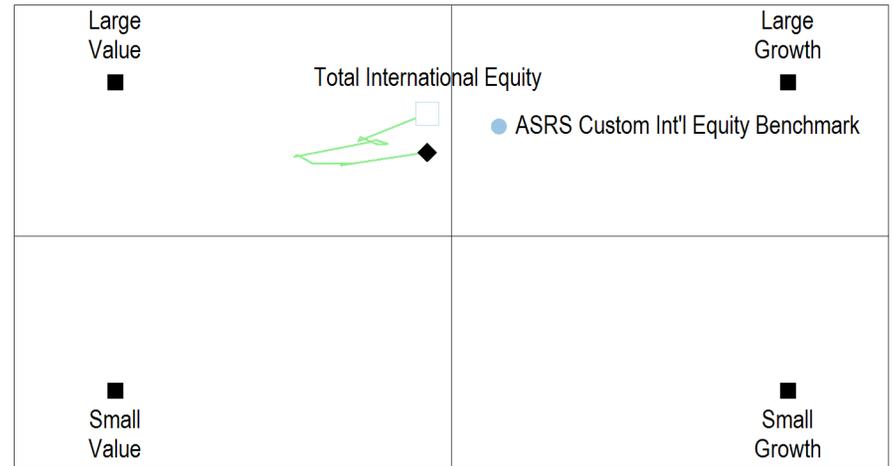
Asset Class Analysis - Total International Equity

3 Year Risk Return

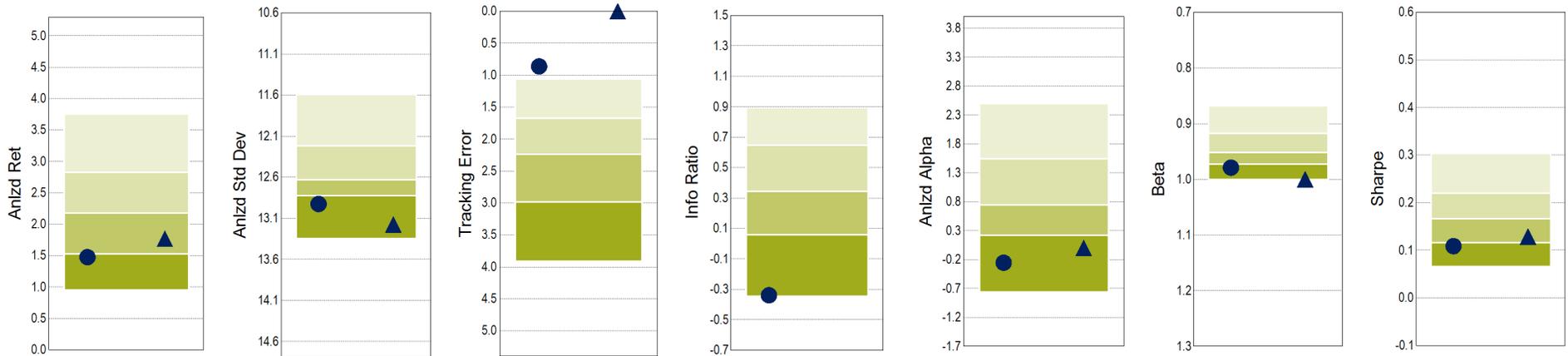


- Total International Equity
- ◆ ASRS Custom Int'l Equity Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Global ex-US Equity Net

3 Year Style Map

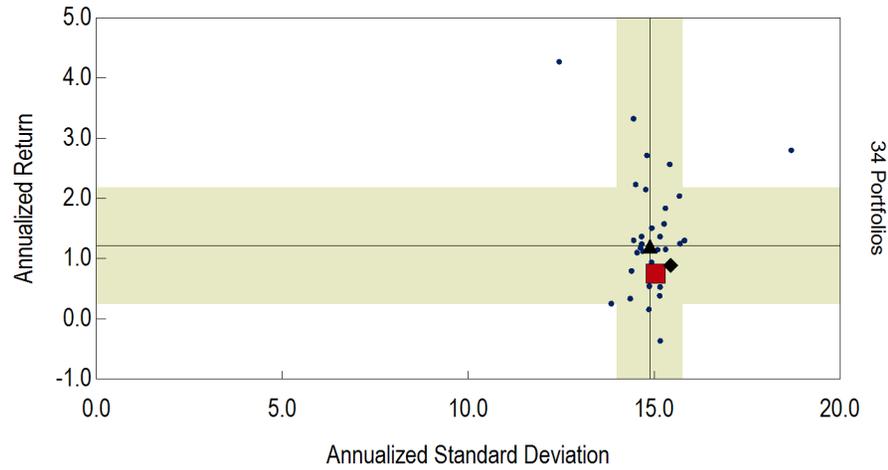


- First Rolling Period
- ◆ Last Rolling Period



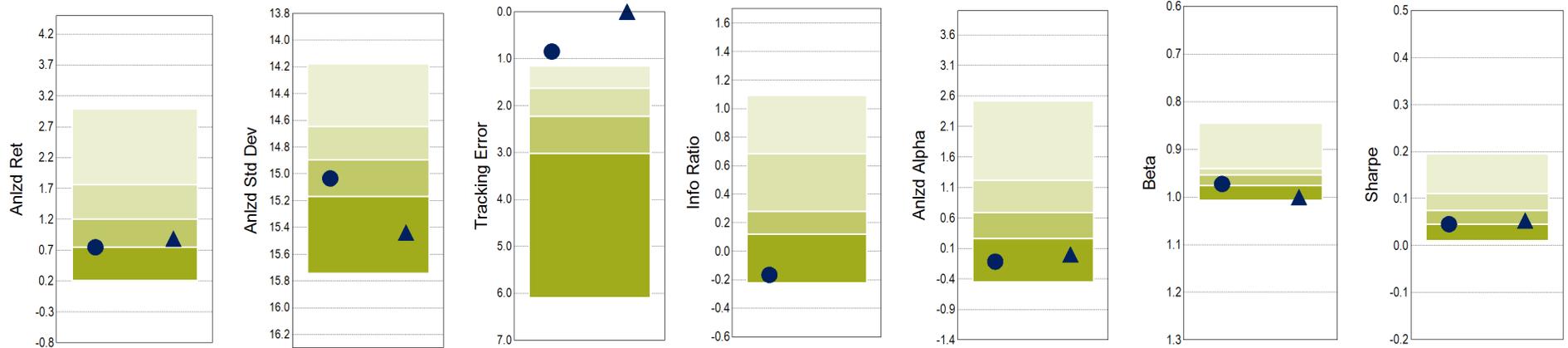
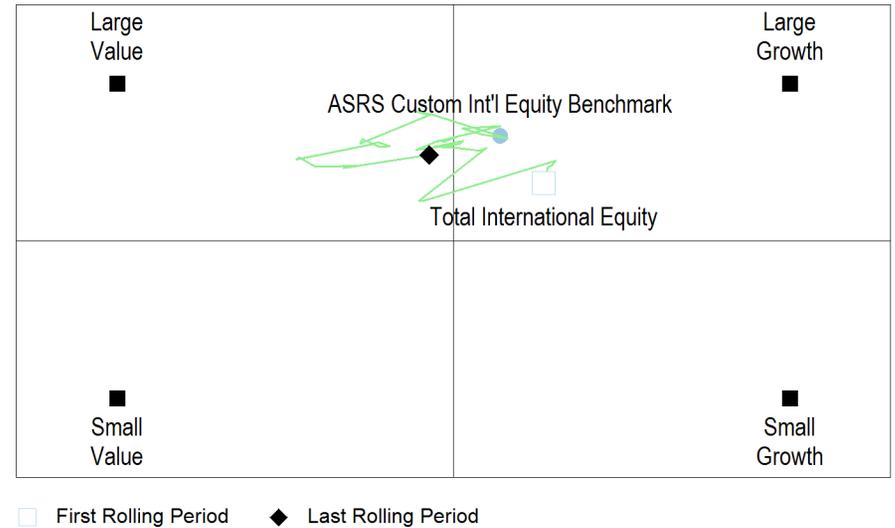
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Year Risk Return



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

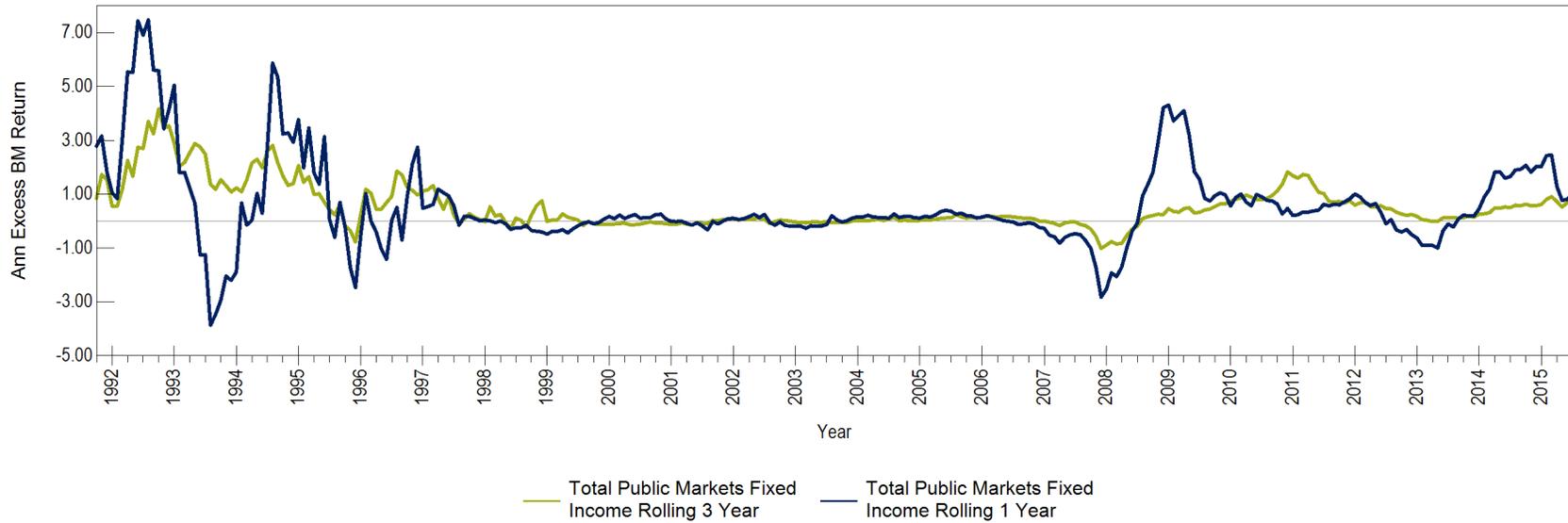
5 Year Style Map



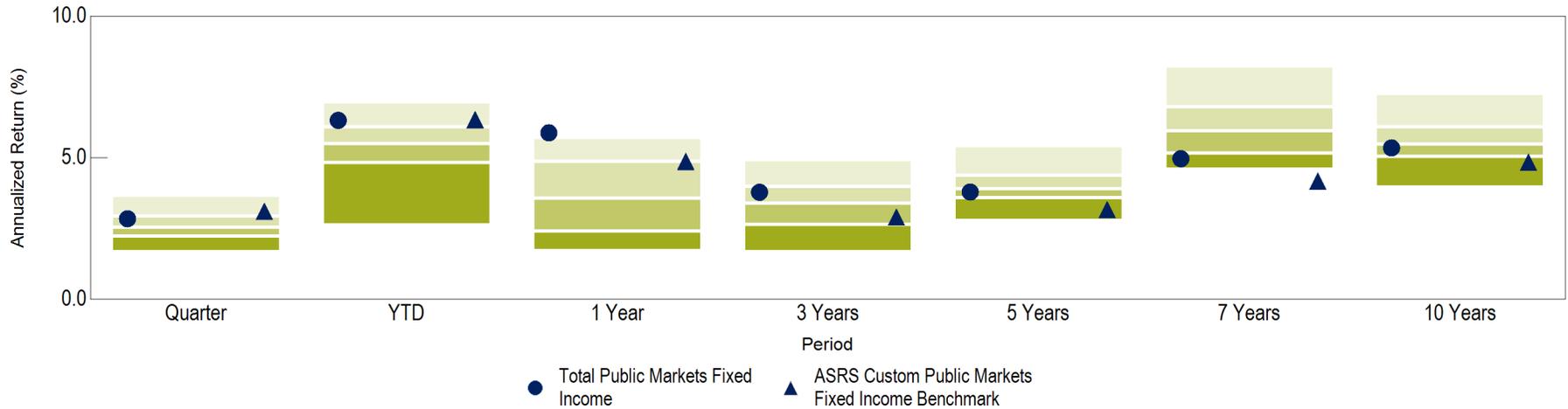
- Total International Equity
- ▲ ASRS Custom Int'l Equity Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Public Markets Fixed Income

Rolling Annual Excess Benchmark Return

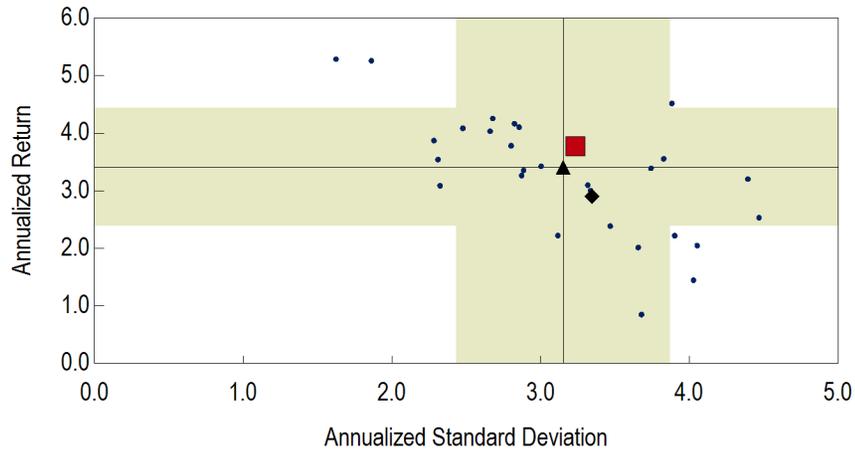


InvestorForce Public DB > \$1 Billion Fixed Income Net Accounts



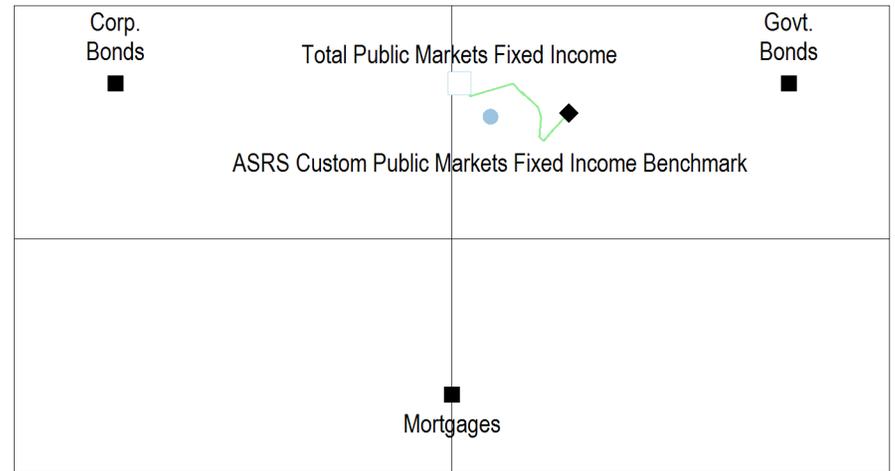
Asset Class Analysis - Total Public Markets Fixed Income

3 Year Risk Return

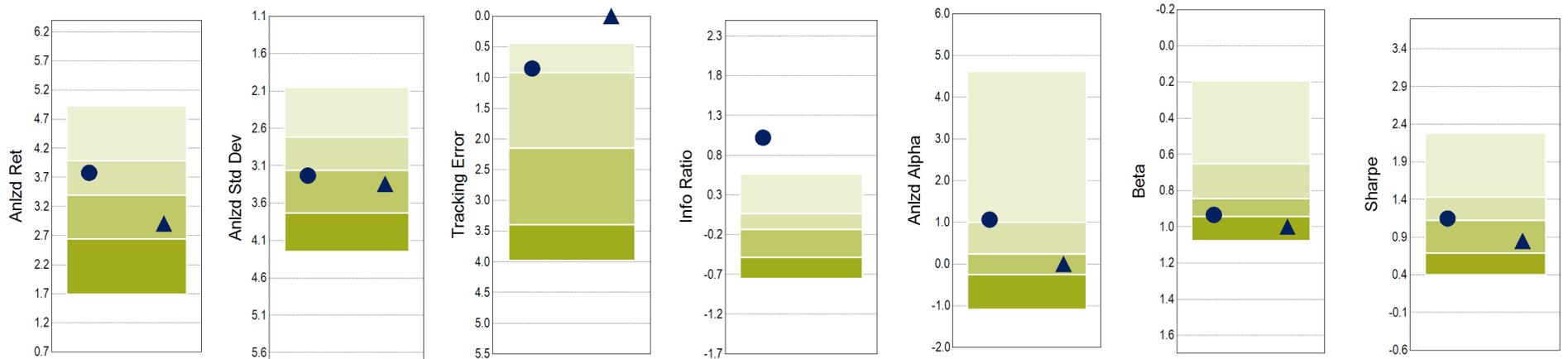


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Fixed Income Net

3 Year Style Map

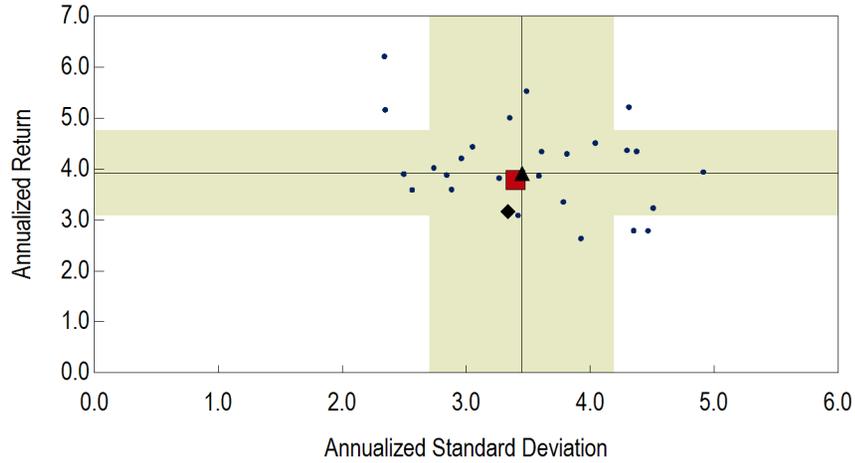


- First Rolling Period
- ◆ Last Rolling Period



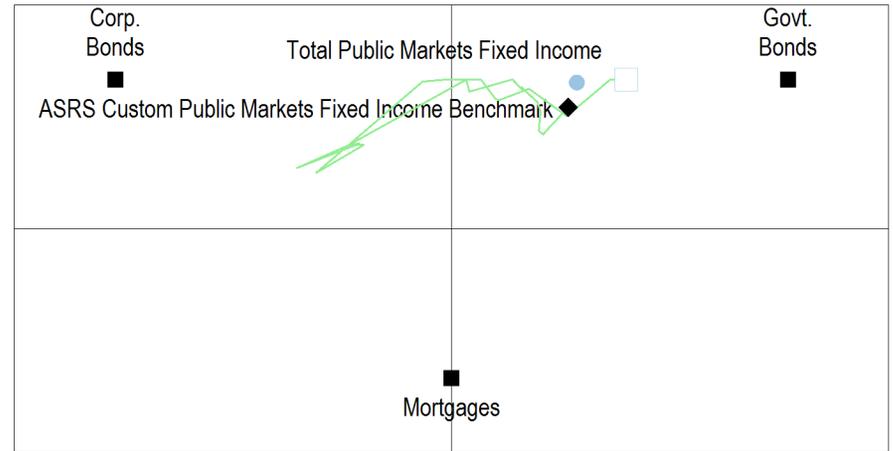
- Total Public Markets Fixed Income
- ▲ ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

5 Year Risk Return

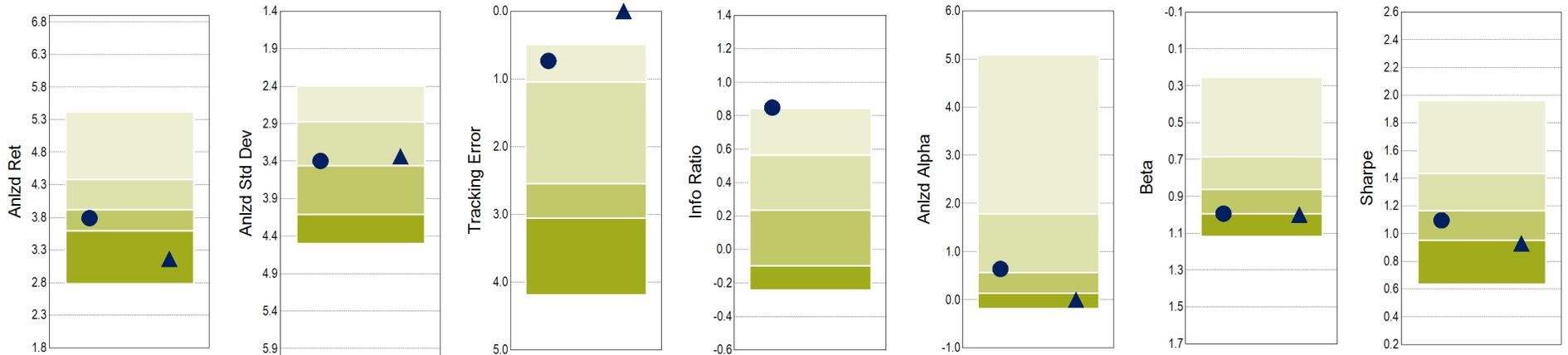


- Total Public Markets Fixed Income
- ◆ ASRS Custom Public Markets Fixed Income Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Fixed Income Net

5 Year Style Map



- First Rolling Period
- ◆ Last Rolling Period

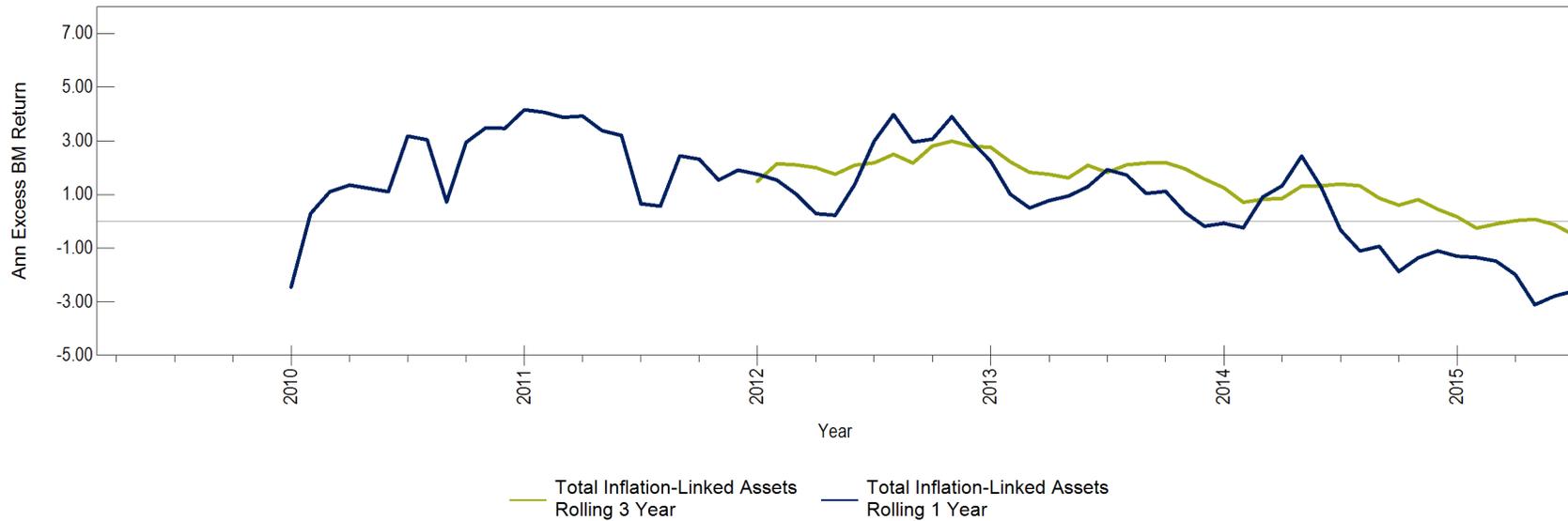


- Total Public Markets Fixed Income
- ▲ ASRS Custom Public Markets Fixed Income Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

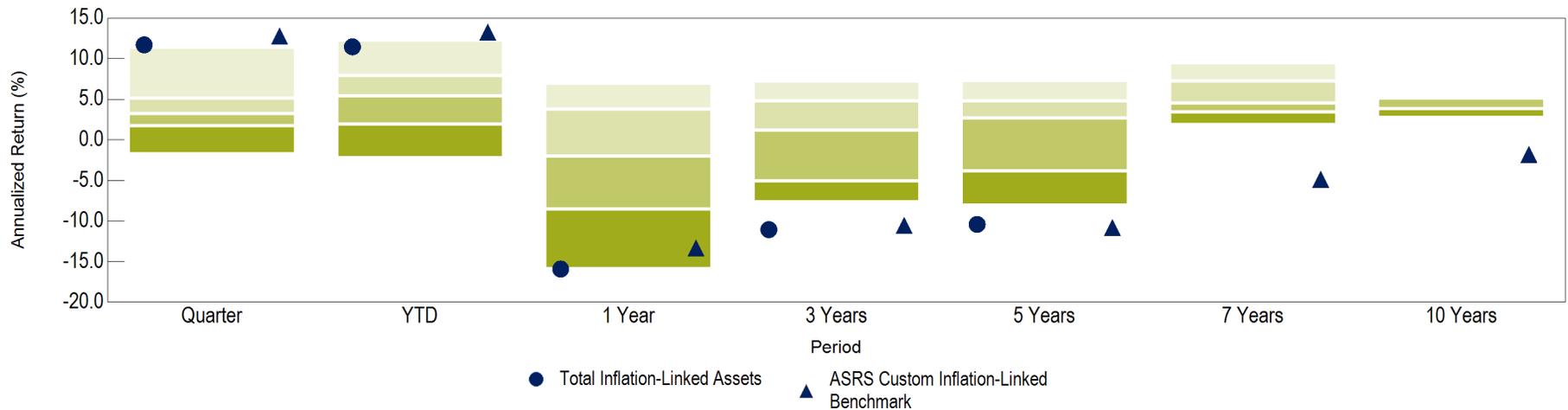


Asset Class Analysis - Total Inflation-Linked Assets

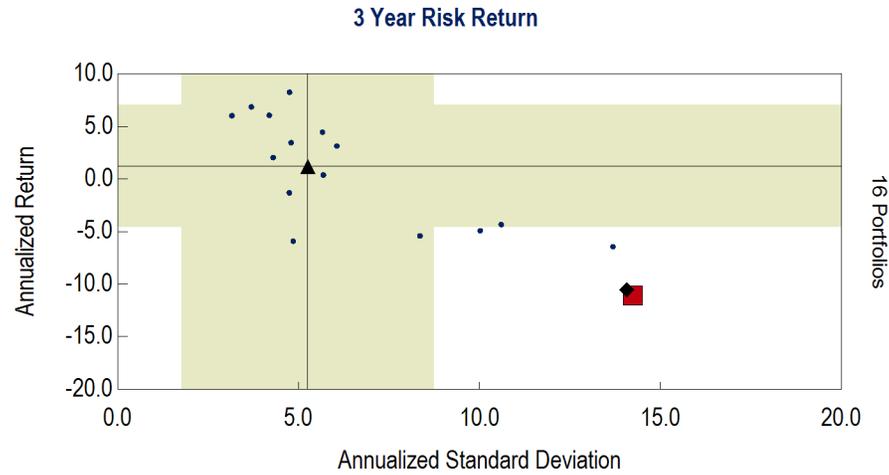
Rolling Annual Excess Benchmark Return



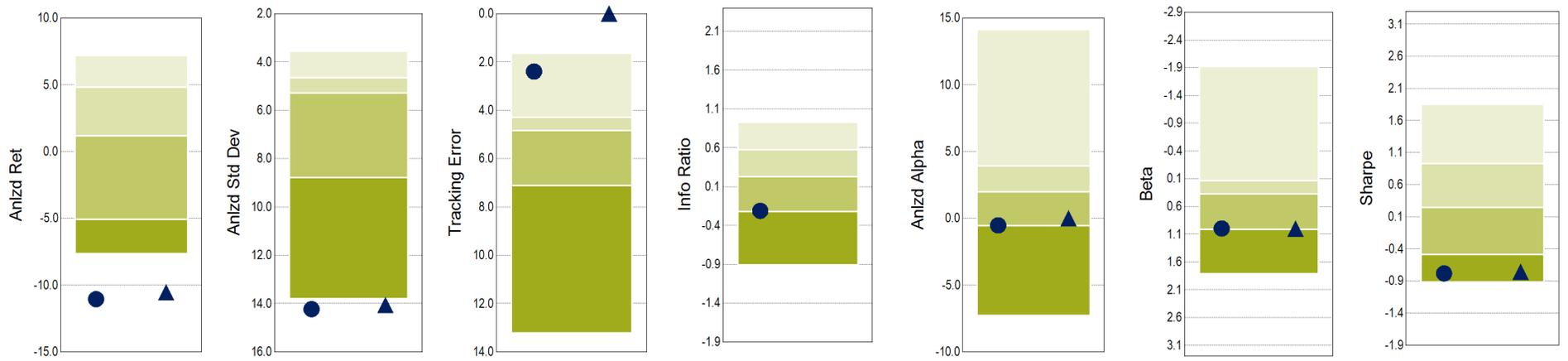
InvestorForce Public DB > \$1 Billion Real Assets/Commodities Net Accounts



Asset Class Analysis - Total Inflation-Linked Assets

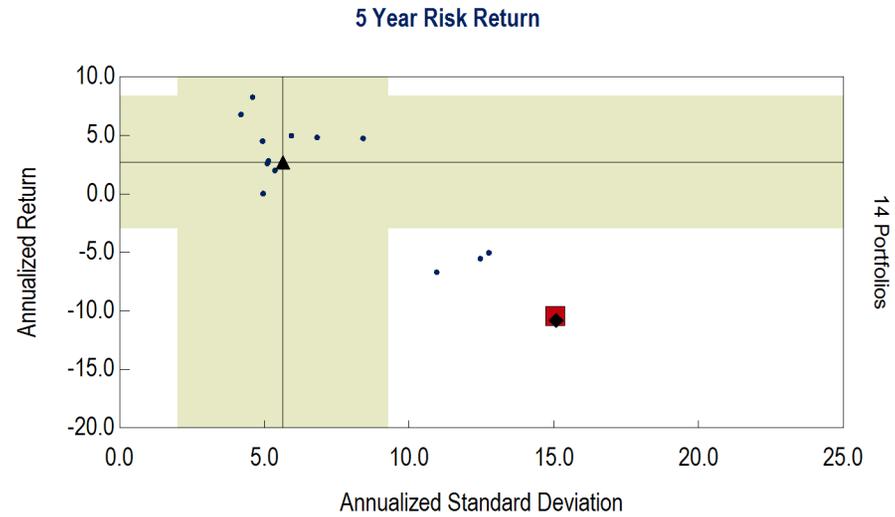


- Total Inflation-Linked Assets
- ◆ ASRS Custom Inflation-Linked Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Real Assets/Commodities Net

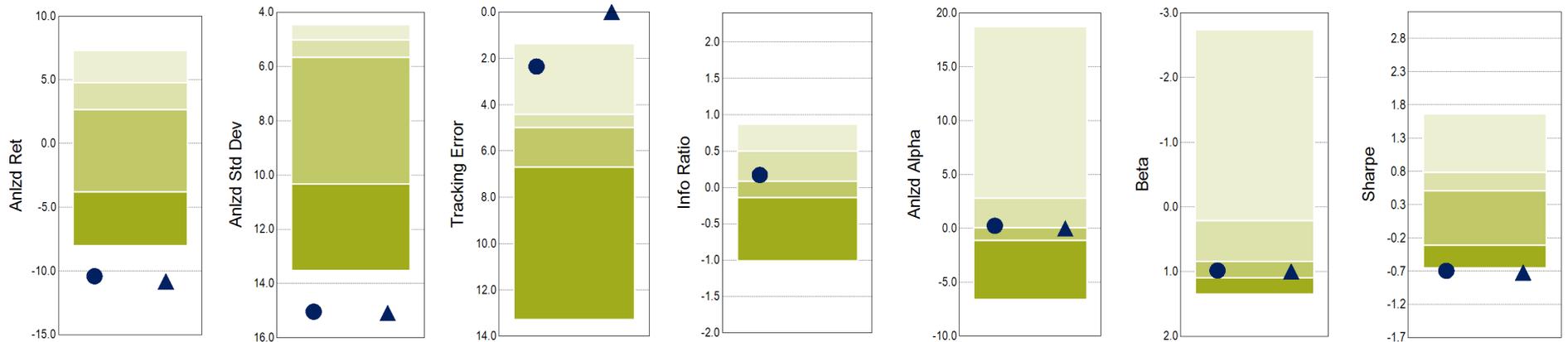


- Total Inflation-Linked Assets
- ▲ ASRS Custom Inflation-Linked Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Inflation-Linked Assets



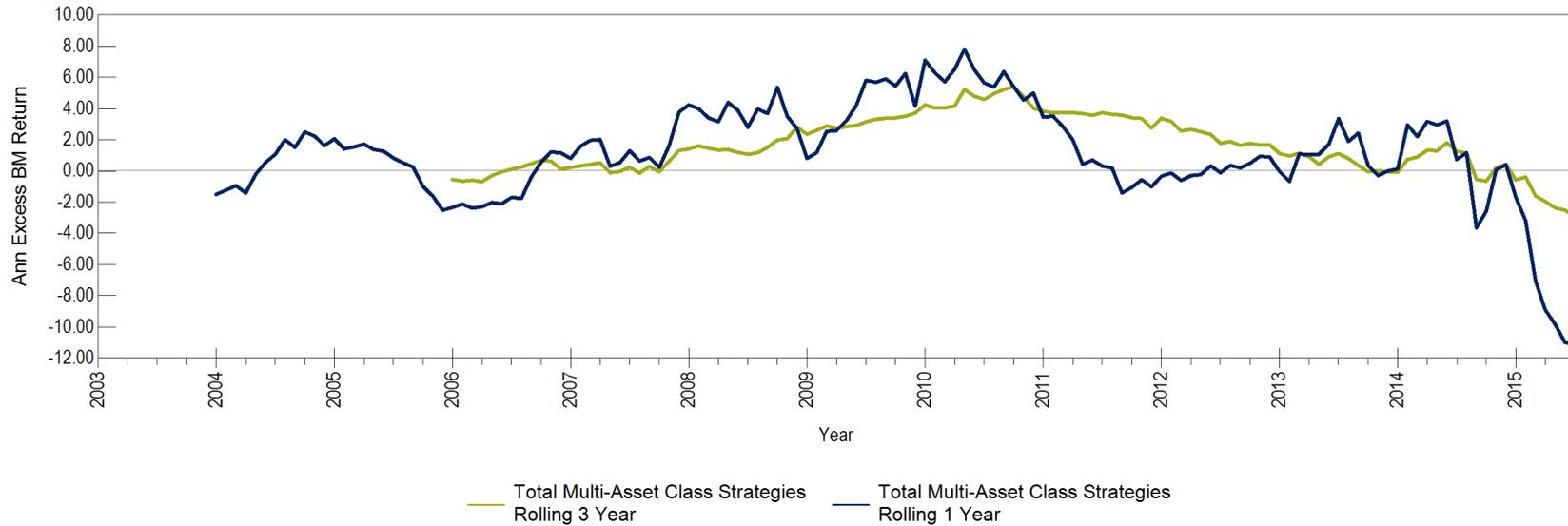
- Total Inflation-Linked Assets
- ◆ ASRS Custom Inflation-Linked Benchmark
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1 Billion Real Assets/Commodities Net



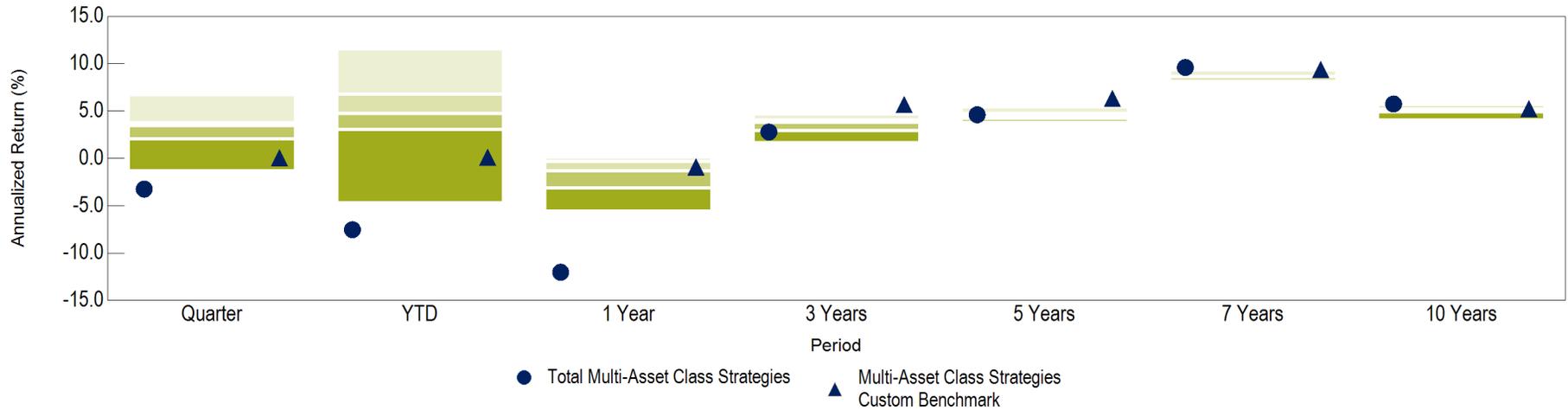
- Total Inflation-Linked Assets
- ▲ ASRS Custom Inflation-Linked Benchmark
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Percentile
- 75th to 95th Percentile

Asset Class Analysis - Total Multi-Asset Class Strategies

Rolling Annual Excess Benchmark Return

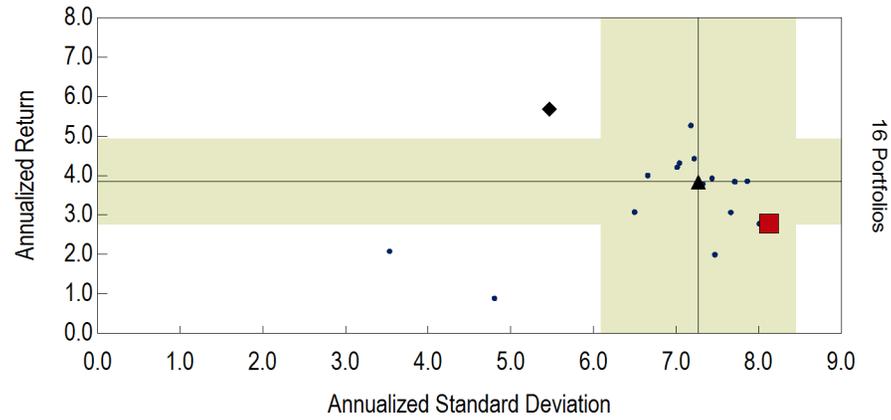


InvestorForce Public DB > \$1 Billion Global Tactical Net Accounts

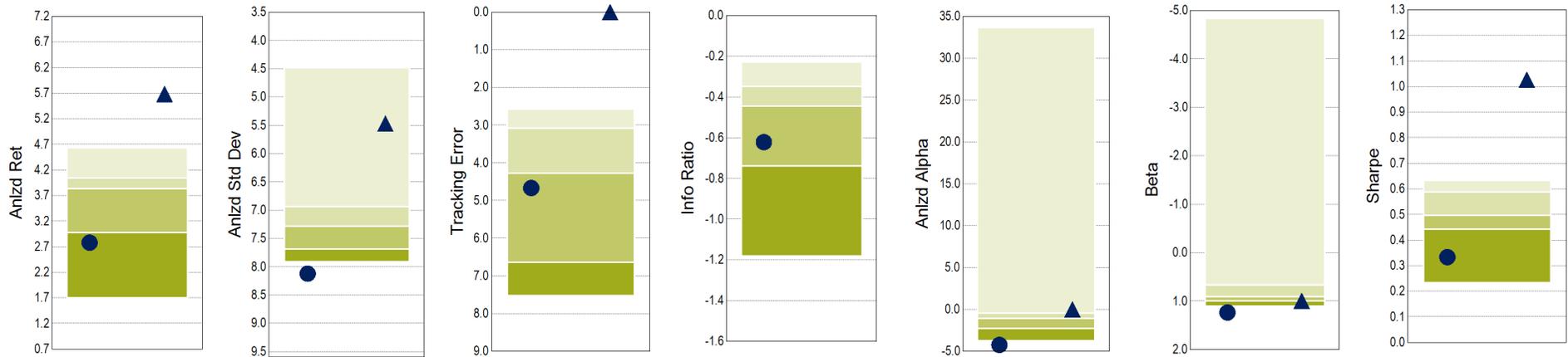


Asset Class Analysis - Total Multi-Asset Class Strategies

3 Year Risk Return



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

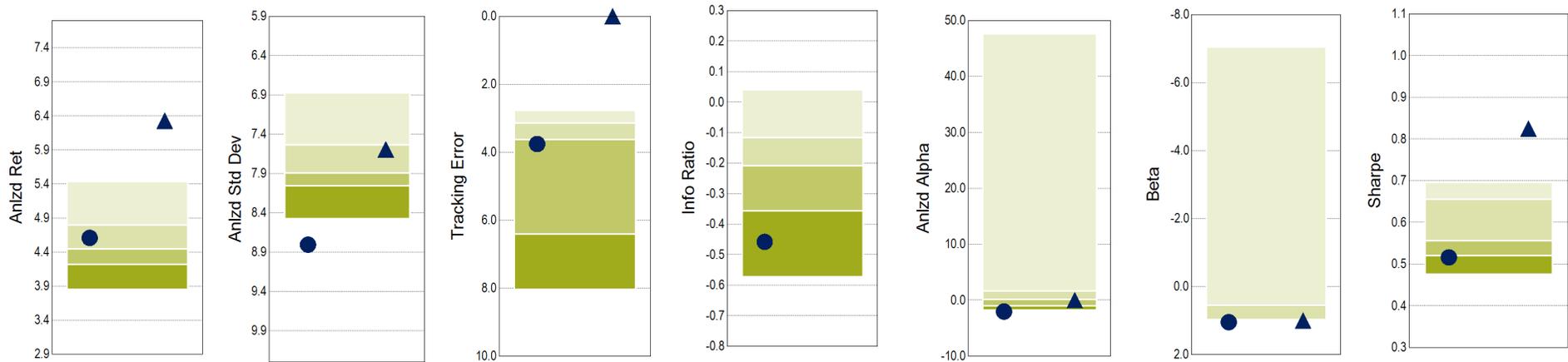


- Total Multi-Asset Class Strategies
- ▲ Multi-Asset Class Strategies Custom Benchmark
- 5th to 25th Percentile
- Median to 75th Percentile
- 75th to 95th Percentile
- 25th to Median

Asset Class Analysis - Total Multi-Asset Class Strategies



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



- Total Multi-Asset Class Strategies
- ▲ Multi-Asset Class Strategies Custom Benchmark
- 5th to 25th Percentile
- Median to 75th Percentile
- 75th to 95th Percentile
- 25th to Median

- **Two Asset Class Committee meetings have been held since the last time we provided an update on the ASRS Asset Class Committee Meetings.**
- **June 24, 2016 – Combined Public and Private Markets Committee**
 - Public Markets Monthly Status Report
 - Private Markets Monthly Status Report, General Discussion and Review of Deal Flow
 - Mid-Year review and update of pacing plans for Private Equity, Private Debt and Real Estate
 - Opportunistic Equity Manager Recommendation (\$300 million investment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target is 0%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation

- **July 18, 2016 - Combined Public and Private Markets Committee**

- Public Markets Monthly Status Report
- Private Markets Monthly Status Report, General Discussion and Review of Deal Flow
- Opportunistic Debt Manager Recommendation (\$350 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target is 0%)
 - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight
 - Committee approved the recommendation
- Private Equity Manager Recommendation (\$50 million commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target 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
- Private Equity Manager Recommendation (\$75 million co-investment commitment)
 - Consistent with strategic plan at the Total Fund level (SAAP Target 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

General Observations

- The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP. New long-term SAAP adopted as of April 1, 2015.**

 - Current Interim SAAP includes proration of 3% Private Debt and 1% Real Estate, which are unfunded.
 - Continued build out of private markets asset classes provides opportunity to take advantage of illiquidity premium to produce expected returns in excess of what we believe can be achieved in the public markets.
- IMD has already taken significant steps to move the Fund toward implementation of the recently approved SAAP.**

 - The largest single underweight position in the Fund is Private Debt, which was increased from a 3% SAAP target to a 10% SAAP target with an 8% - 12% range (current actual is 7.3%).
 - \$5.1 billion in commitments to private debt strategies equates to approximately 15.2% of Total Fund assets vs. the SAAP target of 10%.
- Manager selection within Private Markets asset classes (Private Equity, Private Debt, and Real Estate) has been the largest contributor to the Fund’s outperformance vs. the Interim SAAP over the past one-, three- and five-year periods.**
- Strength of U.S. Dollar in recent years has negatively impacted performance of non-U.S. equity allocation.**

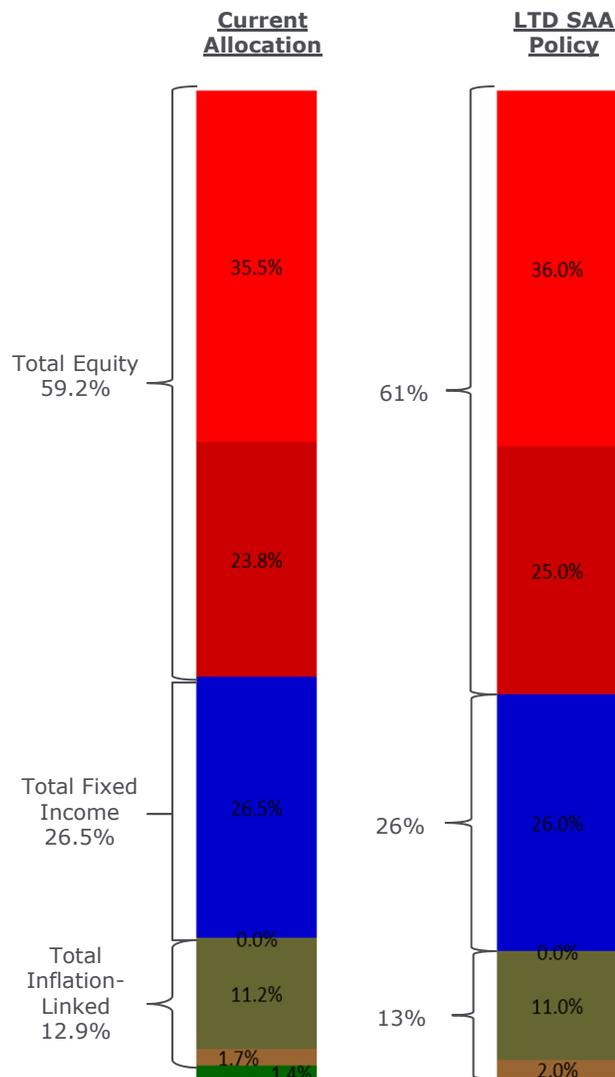
	One Year	Three Year	Five Year	Ten Year
MSCI EAFE	-10.2%	2.1%	1.7%	1.6%
MSCI EAFE (Local)	<u>-9.8%</u>	<u>6.3%</u>	<u>6.7%</u>	<u>2.6%</u>
Over/Under	-0.4%	-4.2%	-5.0%	-1.0%
MSCI EAFE Small Cap	-3.7%	7.3%	4.8%	3.6%
MSCI EAFE Small Cap (Local)	<u>-4.9%</u>	<u>11.2%</u>	<u>9.8%</u>	<u>4.3%</u>
Over/Under	1.2%	-3.9%	-5.0%	-0.7%
MSCI Emerging Markets	-12.1%	-1.6%	-3.8%	3.5%
MSCI Emerging Markets (Local)	<u>-7.7%</u>	<u>3.7%</u>	<u>2.0%</u>	<u>5.7%</u>
Over/Under	-4.4%	-5.3%	-5.8%	-2.2%
- Current tactical positioning is consistent with IMD House Views.**

Independent Oversight/Compliance: LTD

Note: All of the data shown on the following pages is as of June 30, 2016 and reflects the deduction of investment manager fees, unless otherwise noted.



Long Term Disability SAAP Policy Compliance



	Current Mkt Value	Current Allocation	LTD SAAP	Difference
U.S. Equity	\$70,301,621	35.5%	36.0%	-0.5%
U.S. Large Cap	\$42,401,779	21.4%	24.0%	-2.6%
U.S. Small Cap	\$27,899,841	14.1%	12.0%	2.1%
International Equity	\$47,110,534	23.8%	25.0%	-1.2%
Developed Large Cap	\$32,528,274	16.4%	18.0%	-1.6%
Developed Small Cap	\$3,906,631	2.0%	2.0%	0.0%
Emerging Markets	\$10,675,628	5.4%	5.0%	0.4%
Total Equity	\$117,412,154	59.2%	61.0%	-1.8%
U.S. Fixed Income	\$52,518,554	26.5%	26.0%	0.5%
Core	\$37,289,681	18.8%	19.0%	-0.2%
High Yield	\$15,228,873	7.7%	7.0%	0.7%
Emerging Market Debt	\$128	0.0%	0.0%	0.0%
Total Fixed Income	\$52,518,682	26.5%	26.0%	0.5%
Real Estate	\$22,197,919	11.2%	11.0%	0.2%
Commodities	\$3,313,602	1.7%	2.0%	-0.3%
Total Inflation-Linked	\$25,511,521	12.9%	13.0%	-0.1%
Cash¹	\$2,839,215	1.4%	0.0%	1.4%
Total	\$198,281,572	100.0%	100.0%	0.0%

¹Cash includes money for the upcoming monthly pension distribution.

Note: Market values include manager held cash.

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

Long Term Disability Performance Summary

	Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception (July-02)
Long Term Disability	2.3%	0.4%	6.4%	6.5%	4.8%	6.1%
LTD SAA Policy ¹	2.5%	0.4%	6.2%	6.4%	5.3%	6.4%
Excess Return	-0.2%	0.0%	0.2%	0.1%	-0.5%	-0.3%

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

Market Environment Update and Outlook

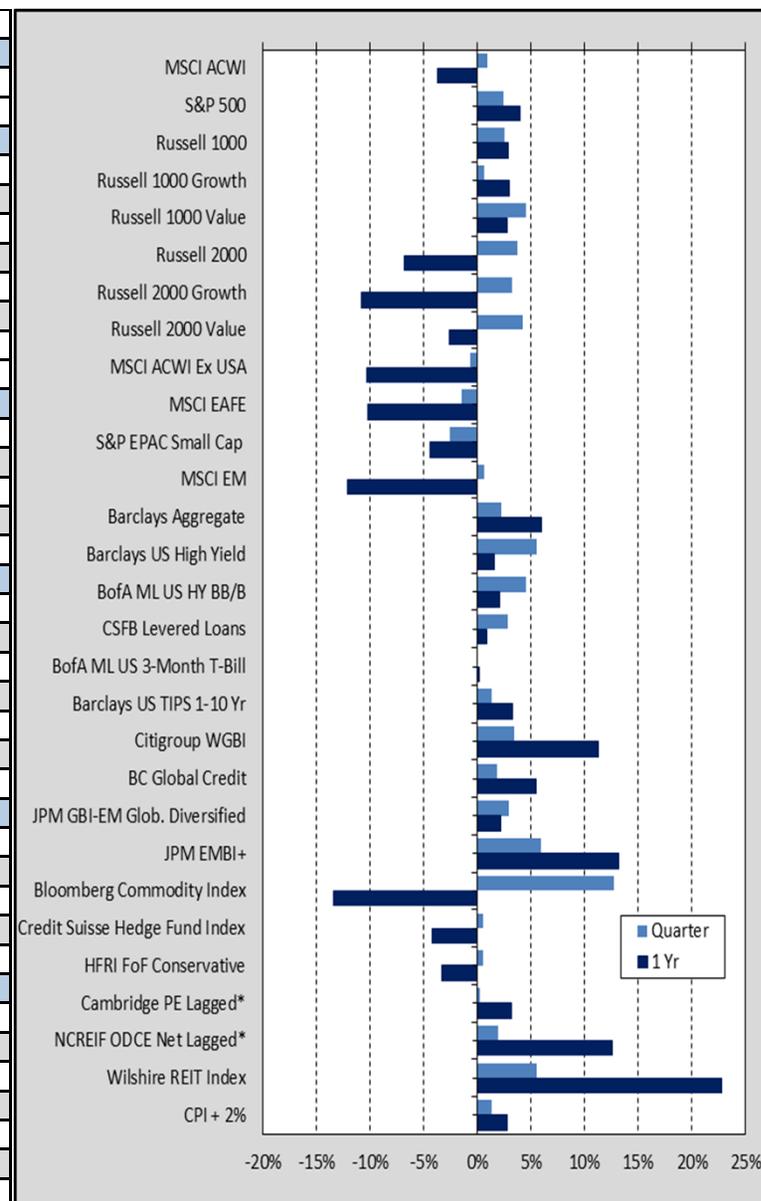


- **Second quarter GDP growth rate (first estimate) printed at a modest 1.2%.**
 - Retail sales ended May at +1.8% on a year-over-year basis. Over the same period last year, the YoY growth rate was 1.6%.
 - The inventory-to-sales ratio ended May flat at 1.4 and has remained relatively flat since early 2010.
 - Corporate profits (ended January) as a percent of GDP increased slightly to 9.3% from 9.9% (in September) and remain elevated relative to historical levels.
 - The U.S. trade deficit widened ending May due to a strong dollar and higher oil prices.
- **The unemployment rate decreased 0.1% to 4.9% in Q2; U-6, a broader measure of unemployment, fell to 9.6% during the second quarter.**
- **The Case-Shiller Home Price Index (ended May) increased to 180.7 from 176.9 in March and is at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally adjusted CPI saw a meager uptick to 0.8% at the end of June; Capacity Utilization increased to 75.4% in Q2 from 74.8% in Q1.**
- **Fed Funds rate was unchanged at 0.50%. The 10-year Treasury Yield (constant maturity) finished Q2 at 1.6% down from 1.9% in Q1.**
- **The Fed balance sheet decreased slightly during Q2 2016, while the European Central Bank balance sheet continues to increase.**
 - ECB held its benchmark refinance rate at 0%, deposit rates -0.4% and asset purchases at €80 billion per month.
- **S&P valuations increased slightly in Q2 remaining above the 10-year and long-term averages.**
 - Cyclically adjusted Shiller PE ratio (25.83x) is above the long-term average of 16.67x and above the 10-year average of 22.88x.

Arizona State Retirement System

Market Environment – Q2 2016 Overview

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI	World	1.0%	-3.7%	6.0%	5.4%	4.3%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	2.5%	4.0%	11.7%	12.1%	7.4%
Russell 1000	Large Core	2.5%	2.9%	11.5%	11.9%	7.5%
Russell 1000 Growth	Large Growth	0.6%	3.0%	13.1%	12.3%	8.8%
Russell 1000 Value	Large Value	4.6%	2.9%	9.9%	11.4%	6.1%
Russell 2000	Small Core	3.8%	-6.7%	7.1%	8.4%	6.2%
Russell 2000 Growth	Small Growth	3.2%	-10.8%	7.7%	8.5%	7.1%
Russell 2000 Value	Small Value	4.3%	-2.6%	6.4%	8.1%	5.2%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	-0.6%	-10.2%	1.2%	0.1%	1.9%
MSCI EAFE	Int'l Developed	-1.5%	-10.2%	2.1%	1.7%	1.6%
S&P EPAC Small Cap	Small Cap Int'l	-2.6%	-4.4%	7.6%	5.0%	4.3%
MSCI EM	Emerging Equity	0.7%	-12.1%	-1.6%	-3.8%	3.5%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	2.2%	6.0%	4.1%	3.8%	5.1%
Barclays US High Yield	High Yield	5.5%	1.6%	4.2%	5.8%	7.6%
BofA ML US HY BB/B	High Yield	4.6%	2.1%	4.6%	5.9%	7.0%
CSFB Levered Loans	Bank Loans	2.9%	0.9%	3.0%	4.0%	4.2%
BofA ML US 3-Month T-Bill	Cash	0.1%	0.2%	0.1%	0.1%	1.0%
Barclays US TIPS 1-10 Yr	Inflation	1.3%	3.3%	1.6%	1.6%	4.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	3.4%	11.3%	2.6%	1.2%	4.2%
BC Global Credit	Global Bonds	1.9%	5.5%	3.2%	3.1%	4.7%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local)	3.0%	2.2%	-3.5%	-2.2%	5.7%
JPM EMBI+	Em. Mkt. Bonds	6.0%	13.2%	7.1%	6.4%	8.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
Bloomberg Commodity Index	Commodity	12.7%	-13.4%	-10.6%	-10.8%	-5.6%
Credit Suisse Hedge Fund Index	Hedge Fund	0.6%	-4.2%	2.5%	2.9%	4.2%
HFRI FoF Conservative	Fund of Funds	0.5%	-3.3%	1.9%	1.9%	1.4%
Cambridge PE Lagged*	Private Equity	0.3%	3.2%	10.9%	11.4%	10.8%
NCREIF ODCE Net Lagged*	Real Estate	2.0%	12.6%	12.6%	12.2%	5.4%
Wilshire REIT Index	REIT	5.6%	22.8%	13.6%	12.5%	7.0%
CPI + 2%	Inflation/Real Assets	1.3%	2.8%	3.0%	3.3%	3.8%



* As of 3/31/2016

Global Equity

- **U.S. equities posted modest gains in the second quarter (+2.5%) amid volatile trading at the end of the quarter as market participants digested news of the Brexit vote.**
- **Small cap stocks outperformed large cap stocks during the quarter, with the Russell 2000 Index returning 3.8% and the Russell 1000 Index returning 2.5%.**
- **International equities trailed U.S. markets during the quarter, returning -0.6%, as measured by the MSCI ACWI ex-U.S. Index. Emerging markets returned 0.7% as measured by the MSCI Emerging Markets Index in U.S. dollar terms.**
 - Developed international markets returned -1.5% as measured by the MSCI EAFE Index.

Private Equity

- **Private equity fundraising totaled \$104 billion in Q2 2016.**
- **Buyout and Special Situations fundraising totaled \$88 billion in Q2 2016, more than twice the amount contracted in Q1.**
 - While exit volume also increased over the first quarter, the first half total for 2016 is down 33% from the prior year period. The primary driver of slower exit volume is a sharp decrease in IPOs that occurred during the first quarter, which was the slowest quarter for IPOs since 2009.
- **Venture capital fundraising totaled \$16.9 billion.**
 - VC fundraising as a percent of total new PE funds is in line with historical post-dot com levels.
- **Fund of fund and multi-manager co-investment fundraising totaled \$5.6 billion.**
- **Growth equity fundraising totaled \$3.4 billion.**

Fixed Income

- **The yield curve shifted down for maturities greater than 6 months. Intermediate yields decreased 20-29 basis points and long duration yields decreased 31-34 basis points.**
- **The spread between two and 10-year rates decreased to 91 basis points from 105 basis points ended June. Treasury Inflation-Protected Securities, or TIPS, returned +1.3% during the quarter, as measured by the Barclays U.S. TIPS 1-10 Yr Index.**
- **The Barclays Long Duration Credit Index gained +6.65% as the long end of the curve ended the quarter 31 basis points lower.**
- **Long Treasuries gained +6.44% and investment-grade U.S. corporate debt gained 2.21%.**
- **The Barclays 1-3 year Government/ Credit Index returned +0.67%. U.S. high yield bonds gained +5.52% driven by Energy names.**
- **Emerging markets debt gained broadly reversing trend with US denominated issuances gaining relative to Local Currency denominated debt.**
 - U.S. dollar-denominated debt, as measured by the JP Morgan EMBI Index, gained 6.0%; local currency debt gained +3.0%, according to the JP Morgan GBI-EM Index.

Real Assets/Inflation-Linked Assets

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

- **Select infrastructure opportunities showing signs of being attractive.**
 - Target opportunistic strategies in niche sub-sectors to take advantage of market dislocations.
 - Secular opportunities may exist within the shipping industry as traditional financing sources (both debt and equity) are less abundant.

- **Timber opportunities remain elusive.**
 - Income yields (net) are low as assets are predominantly traded between like-minded institutions.
 - Private strategies are illiquid and constrain quick entrance/exit (i.e. long-term lock-up).
 - Liquid strategies have limited pure timber exposure (and limited active-play options).

- **Metals & Mining; weakened commodity prices may be the new norm as China growth shifts.**

- **Agriculture; outlook supported by strong demographic trends.**

Commodities

- **Commodities ended quarter with a solid +12.7% as measured by the Bloomberg Commodity Index.**
 - Despite an increase in the value of the U.S. Dollar, commodity prices posted strong gains led by a 26% gain in oil.
 - Gold gained 7% in the second quarter and YTD has gained 24%.

Real Estate

- **NEPC continues to be neutral on core real estate in the U.S. 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.**
- **REIT sector has snapped back to NAV (closing out longest time trading below NAV since the Global Financial Crisis) but remain at high FFO multiples.**
- **Europe is viewed as the best place for a marginal dollar of non-core real estate investment.**
 - Current U.S. dollar denominated investors with currency exposure will feel near-term impact of Brexit, but new investors may benefit from a strong U.S. dollar. Long-term Brexit implications, however, are unclear.

NEPC Updates

June 30, 2016

Highlights of Second Quarter Happenings at NEPC

NEPC Research

Recent White Papers

- "Thinking Ahead to Stay Ahead: Strategic Private Equity Investing in Healthcare" (April 2016)
- Market Chatter: "Implications of Brexit" (June 2016)
- Market Chatter: "Brexit... What Now?" (June 2016)
- "The Disease of Doubt" (July 2016)

Webinar

- "Brexit - A Vote for Volatility" (June 2016); Panel provides perspectives on the EU Referendum.



NEPC's 21st Annual Investment Conference

"Excellent breadth of materials, plenty of concurrent sessions, and the speakers were vibrant and humorous!" is just one of many positive reviews from attendees. The conference attracted more than 200 people to the Hynes Convention Center in Boston on May 10-11, 2016.

News from NEPC

We are excited to announce NEPC's active presence on five social media channels: Facebook, Google+, LinkedIn, Twitter and YouTube, and we will continue to post on the Endowments and Foundations Twitter. We will be using these online channels to share company news, information and articles throughout the industry. Those interested in keeping up with the latest news from NEPC can follow our accounts. Company news and industry insights will continue to be available on our website, which has been updated with a new optimized search feature.



Upcoming Events

NEPC's 22nd Annual Investment Conference will be held on May 9-10, 2017 at the InterContinental Hotel in Boston, MA.

MARK YOUR CALENDAR!

NEPC Client Recognitions

We are pleased to announce that three of NEPC's public fund clients won Institutional Investor (II) Awards.

- **Arn Andrews**, CIO of San Jose Police & Fire, won the award for Chief Investment Officer of the Year.
- **Sam Masoudi**, CIO of Wyoming Retirement System, won the award for Opportunistic Investment Strategies Award.
- **Bob Jacksha**, CIO of New Mexico Employees Retirement Board, won the award for Portfolio Construction.

We are also pleased to announce that two NEPC clients, **San Bernardino County Employees' Retirement System** and **Arizona Public Safety Personnel Retirement System**, were nominated for Institutional Investor magazine's 14th Annual Hedge Fund Industry Awards in the "Public Plan of the Year, Small" category.

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)/13% Barclays Capital Aggregate/4% Barclays Capital High Yield/7% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/2% Bloomberg Commodity Index/5% Multi-Asset Class Custom Index/9% NCREIF ODCE (lagged one quarter)
- Note: Interim SAA Policy includes proration of 3% Private Debt and 1% Real Estate which are unfunded. 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** was 33% S&P500, 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 through 4/29/2016; 52% S&P 500, 18% Russell 2000, 30% Barclays US Long Treasury through 6/28/2016; 100% Barclays US Long 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.

Long Term Disability Strategic Asset Allocation Policy (SAAP) History

- 7/1/2002 – 12/31/2004 - 53% S&P 500/17% MSCI EAFE/30% Barclays Capital Aggregate Bond Index
- 1/1/2005 – 2/28/2007 - 53% Russell 3000/15% MSCI EAFE/26% Barclays Capital Aggregate Bond Index/6% DJ Wilshire Real Estate Securities Index
- 3/1/2007 – 12/31/2010 - 50% Russell 3000/18% MSCI EAFE/26% Barclays Capital Aggregate Bond Index/6% DJ Wilshire Real Estate Securities Index
- 1/1/2011 – 12/31/2012 - 40% Russell 1000/7% Russell 2000/13% MSCI EAFE/2% MSCI EAFE Small Cap/3% MSCI Emerging Markets/24% Barclays Capital Aggregate/2% Barclays Capital High Yield/6% DJ Wilshire Real Estate Securities Index/3% Bloomberg Commodity Index
- 1/1/2013 – 2/28/2016 - 34% Russell 1000/6% Russell 2000/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/13% Barclays Capital Aggregate/8% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/8% DJ Wilshire Real Estate Securities Index/4% Bloomberg Commodity Index
- **2/29/2016 – Present - 24% Russell 1000/12% Russell 2000/18% MSCI EAFE/2% MSCI EAFE Small Cap/5% MSCI Emerging Markets/19% Barclays Capital Aggregate/7% Barclays Capital High Yield/11% DJ Wilshire Real Estate Securities Index/2% Bloomberg Commodity Index**

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

**Confidential
Meeting
Materials
Removed**

Agenda Item #8

IMD Activities

Arizona State Retirement System

August 22, 2016

Asset Class Committee Schedule

- The private markets committee met on the following days during 2016:
 - January 19 (private markets)
 - February 25 (private markets)
 - March 22 (private markets)
 - April 26 (private markets)
 - May 2 (public markets)
 - May 26 (private markets)
 - June 24 (combined public and private)
 - July 18 (combined public and private)
 - August 11 (private markets)
- Combined meetings of the public and private markets committee are scheduled for:
 - August 26
 - September 22
 - Additional meetings anticipated monthly for the balance of the year

Combined Public and Private Markets Committee – June 24, 2016

- The public and private markets committees now meet in a combined format. This was the first meeting of this format.
- The committee reviewed holdings and performance reports for both private and public markets portfolios.
- Reviewed mid-year updates of the pacing plans for all private asset classes
- Approved a \$300 million investment in a separate account with a manager focused on MLPs to be held in the opportunistic public equity portfolio

Combined Public and Private Markets Committee – July 18, 2016

- Approved a \$350 million commitment to a separate account focused on European non-performing loans and performing loans, general consumer or small business, to be acquired from European banks. This investment will be part of the opportunistic fixed income portfolio.
- Approved a \$50 million commitment to U.S. mid-market buyout private equity fund.
- Approved a \$50 to \$75 million no-fee, no-carry co-investment in a for profit education company.

Private Markets Committee – August 11, 2016

- Approved a separate account of up to \$500 million focused on real estate special situations and credit to be held in the real estate portfolio.

Recent Accomplishments - Equity Performance System

- A performance system for equity portfolios is substantially complete
- Includes:
 - returns based with CAPM related statistics
 - Brinson style attribution analysis
 - Holdings based analysis using Barra risk factors
- Presented to the August 22 meeting of the investment committee

Recent Accomplishments – Internal Equity Portfolio Improvements

- Optimized cash and equitization processes
- Conducted research related to index changes to identify improved trading strategies for name changes
- During the month of July, preliminary results indicate all internal equity portfolios performed with positive excess return

Recent Accomplishments - Administrative Matters

- Improved daily asset position report to include a graph showing total fund balance trend and estimated return
- Completed plans for remodeling of space in order to
 - enhance collaboration
 - implement technology upgrades to include wireless devices and enhanced presentation/communication capabilities
- Renegotiated separate account contract to optimize regional taxes resulting in savings of \$3 to \$5 million per year
- Further progress in compliance implementation with private equity compliance being reported to investment committee on August 22

Work in Process

- Conducting a review of “SOPs” for accuracy and any needed updates
- Creating a dynamic risk model for the total fund investment process
- Ongoing work researching equity style factors for a strategy paper identifying potential modification of equity strategies
- Develop a performance analytics system for fixed income to include holdings and returns based analysis
- Conducting a review of the multi-asset class to identify strategy options
- Private equity consulting RFP is nearly complete and will be presented to investment committee in August or October

Planned and Potential Future Projects

- Enhanced processes and analytical methods for 2017 strategic asset allocation update
- Web based performance and risk reporting systems with interactive graphs
- Customized personnel systems for IMD to enhance careers, cross training, development and succession planning

Agenda Item #9

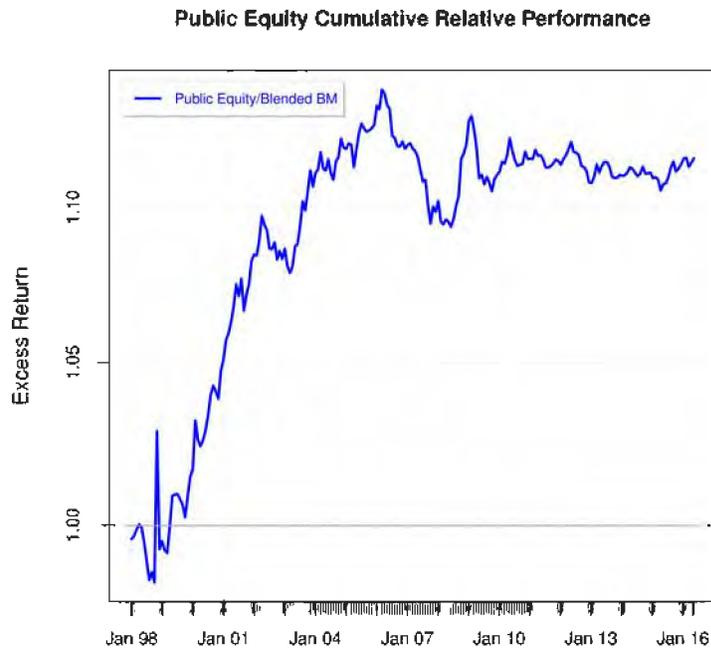
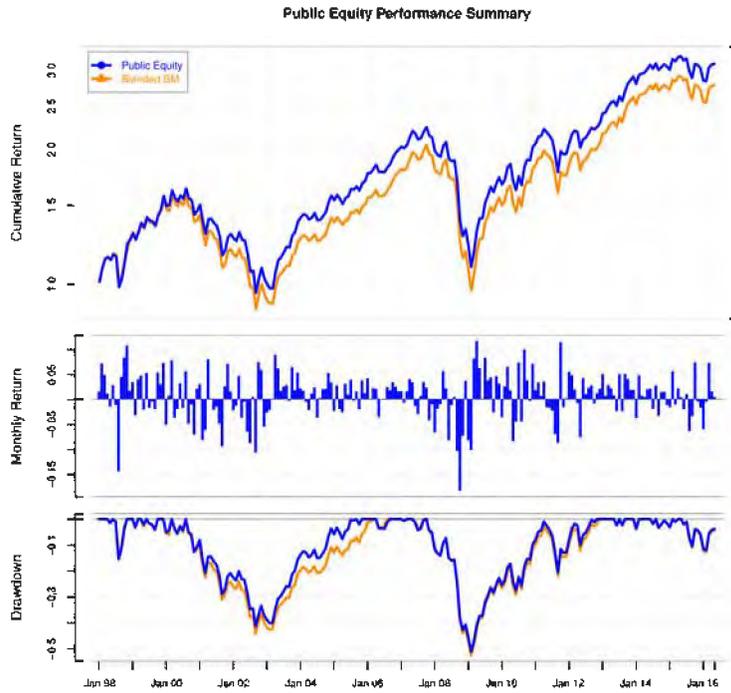
Public Markets Performance Chart Pack

Investment Management Division

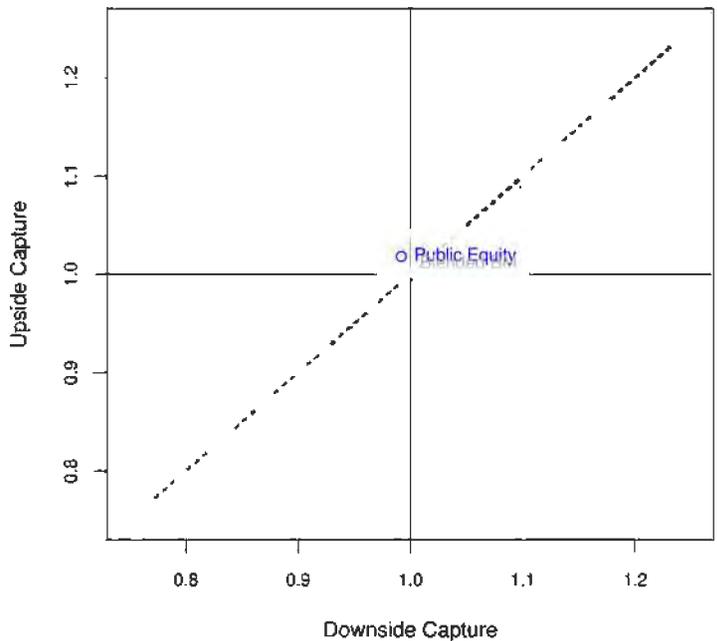
Performance through May 31, 2016

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International Developed Large Cap		94
	AQR	100
	DFA International	106
	Franklin Templeton	112
Emerging Markets		118
	Eaton Vance	124
	LSV Emerging Markets	130
	William Blair	136

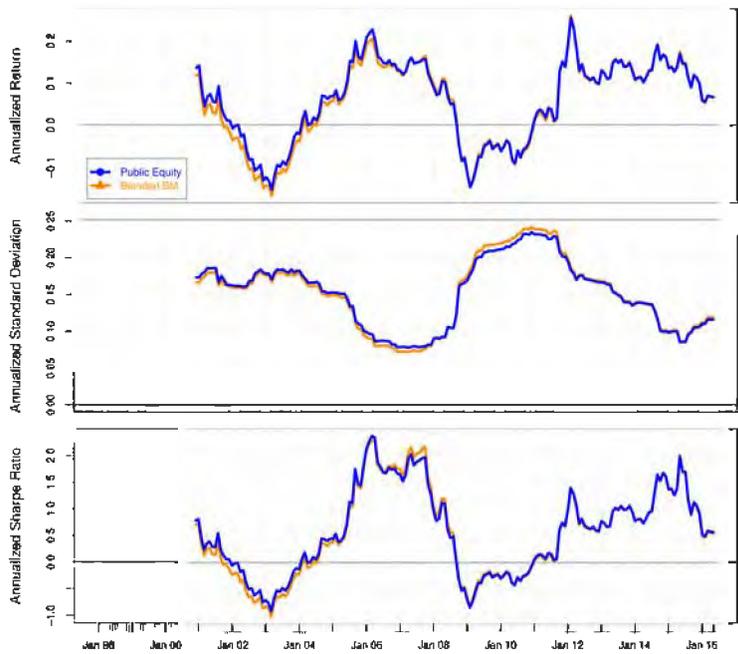
Total Public Equity



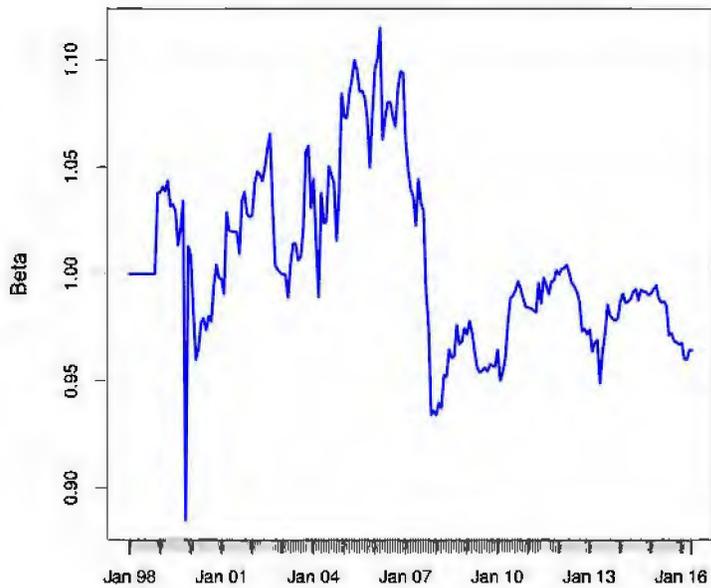
Capture Ratio



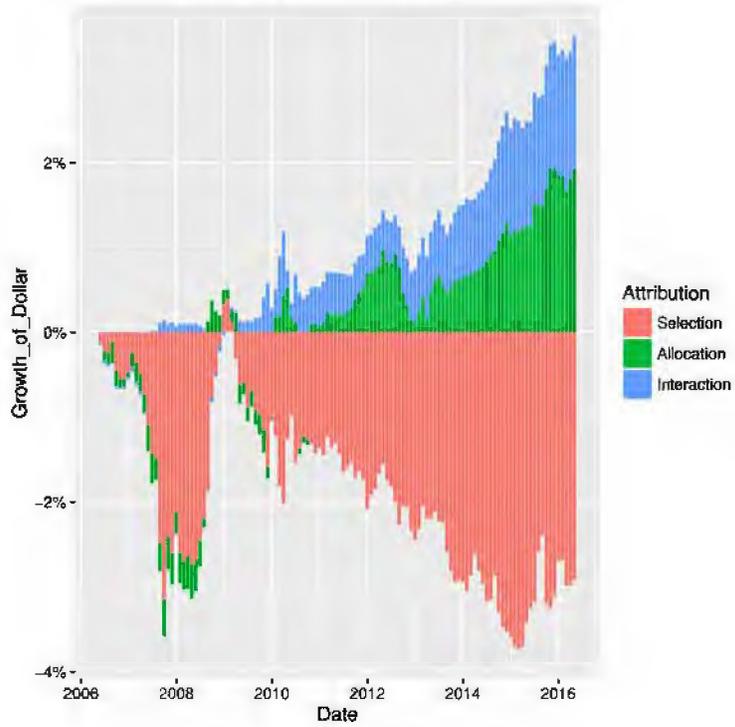
Public Equity Rolling 3 Year Performance



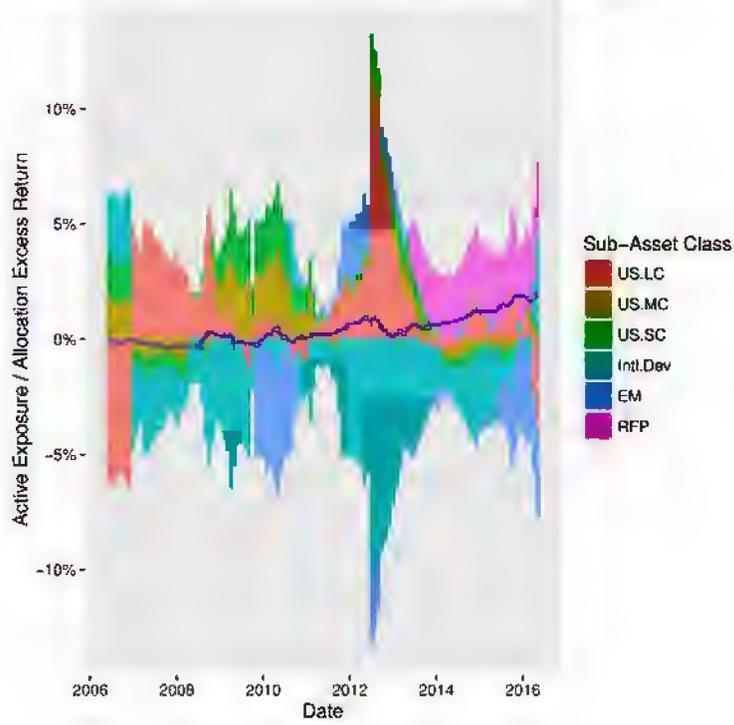
Public Equity Rolling 12 Month Beta



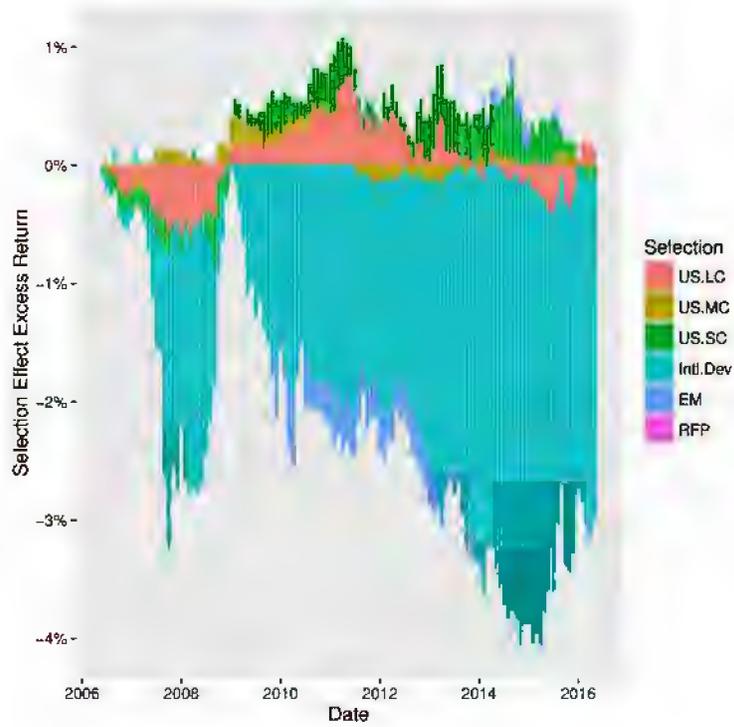
Public Equity Cumulative Attribution



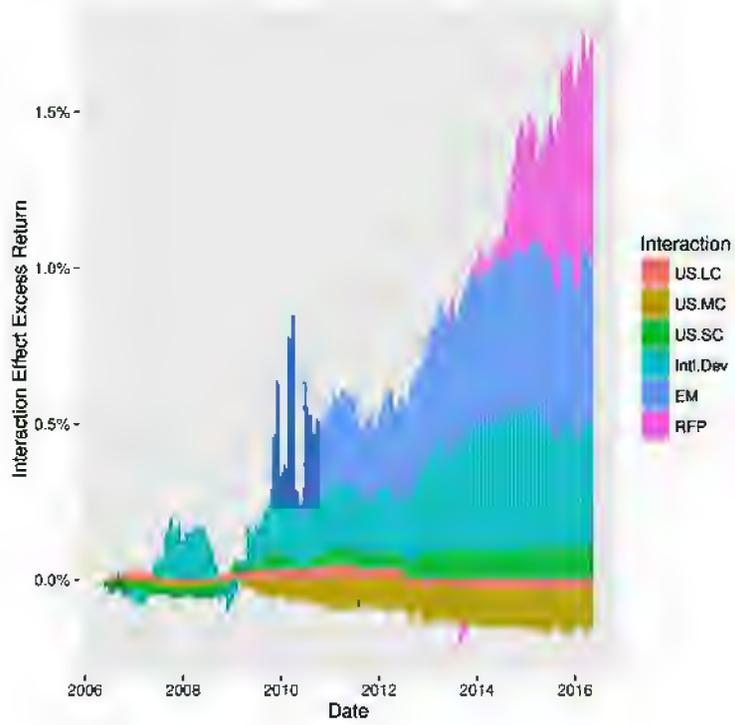
Over/Under Weights & Cumulative Allocation Effect (Line)



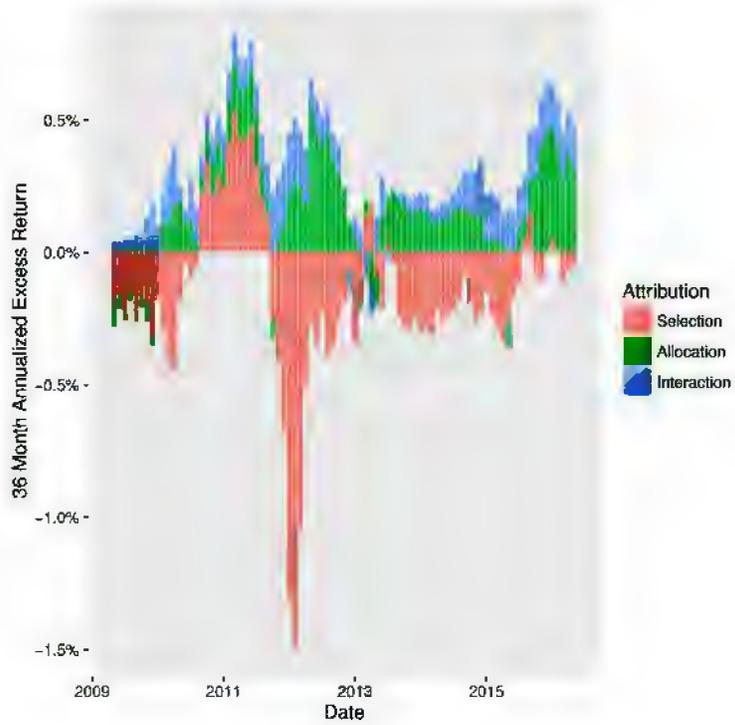
Cumulative Selection Effect



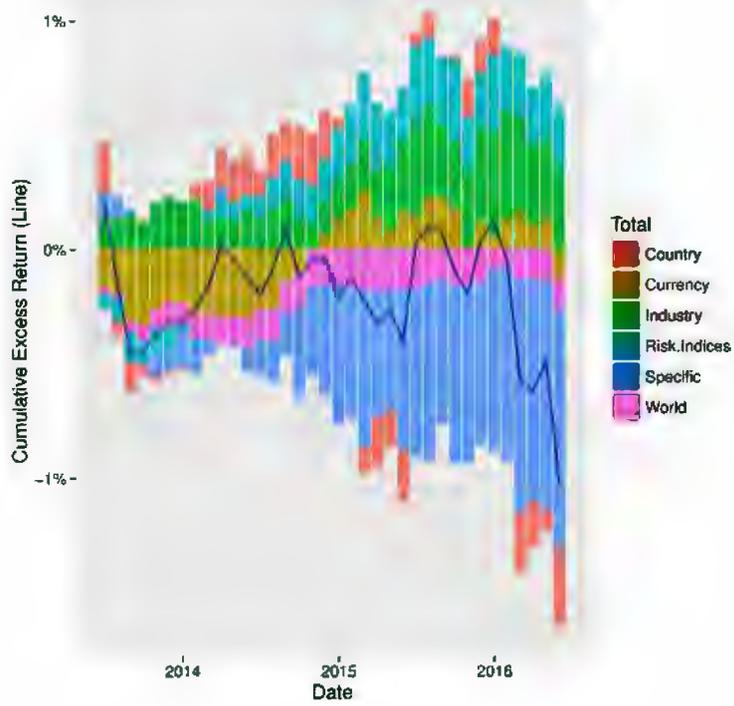
Cumulative Interaction Effect



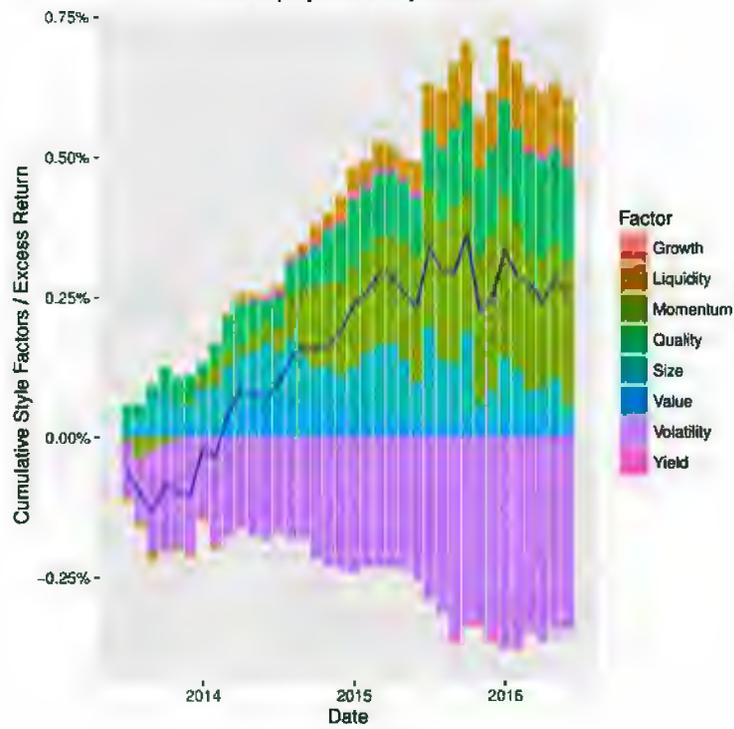
Rolling 36 Month Attribution Analysis



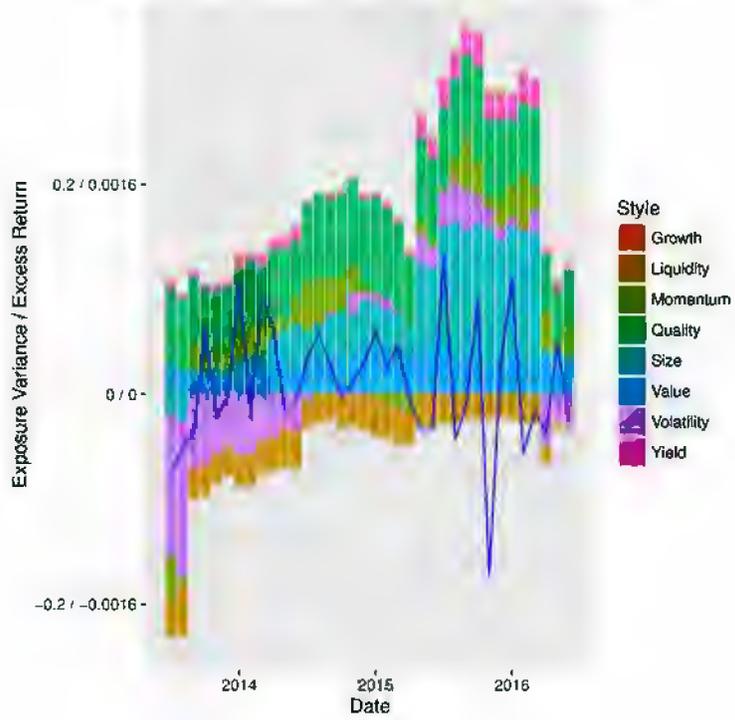
Barra Holdings Based Factor Attribution: Public Equity



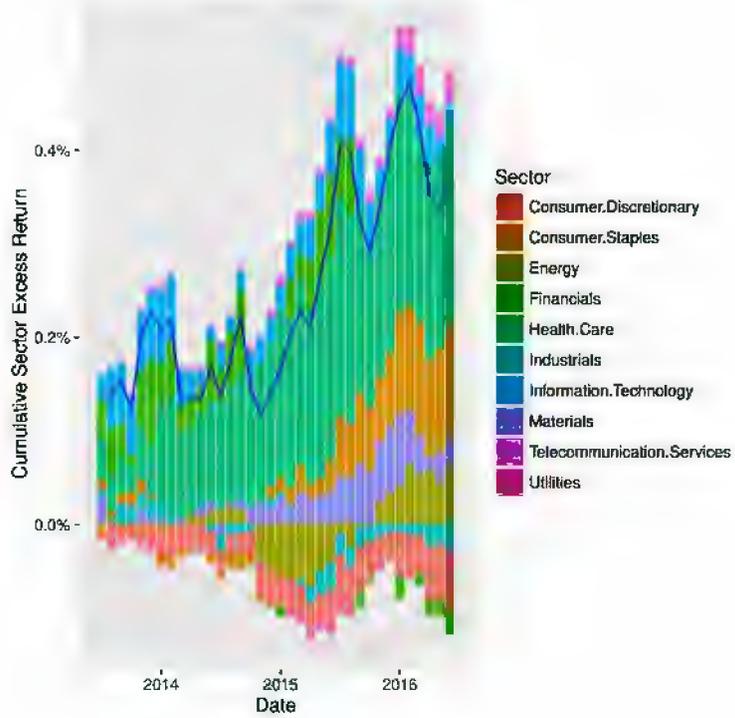
Public Equity Barra Style Factor



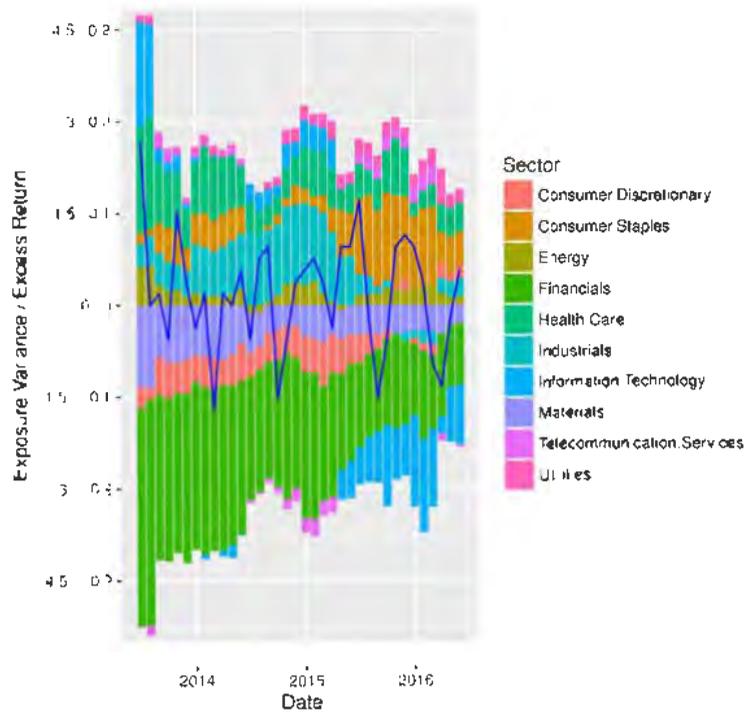
Public Equity Monthly Style Factors Active Exposure



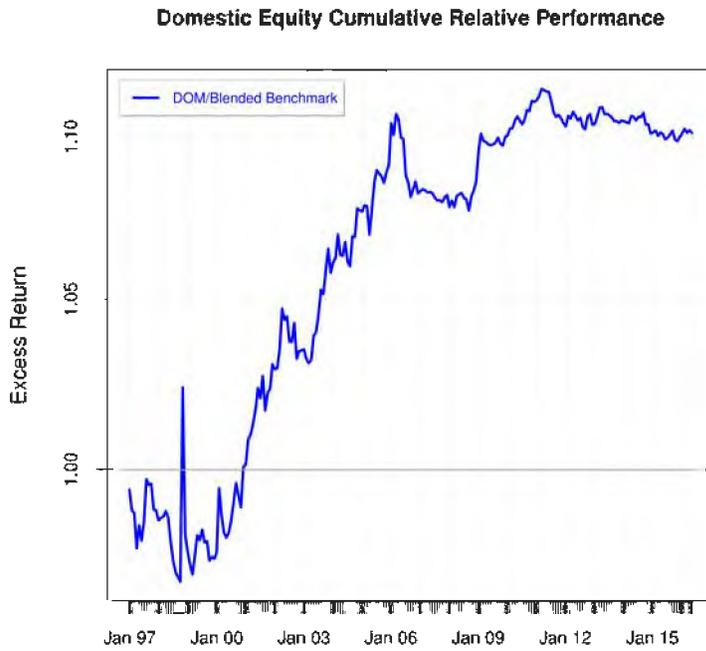
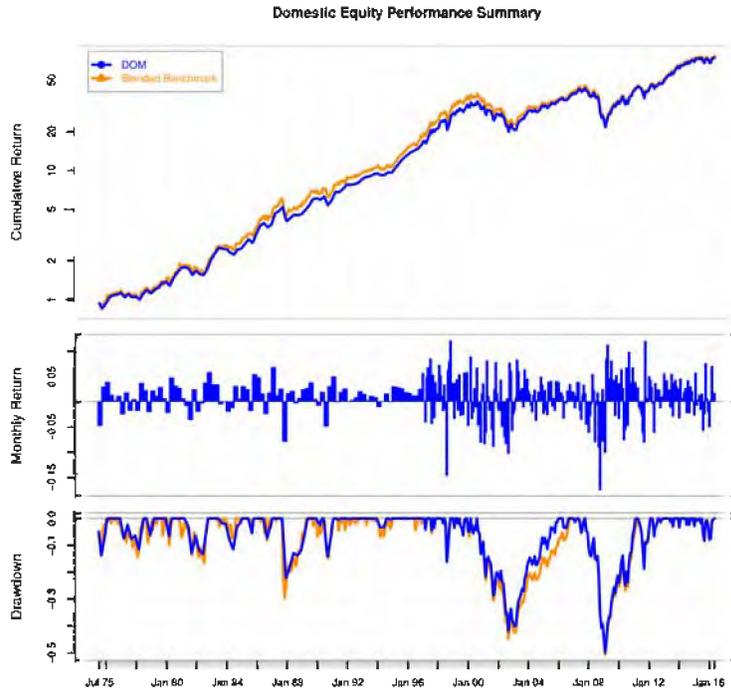
Public Equity Monthly GICS Sector Return



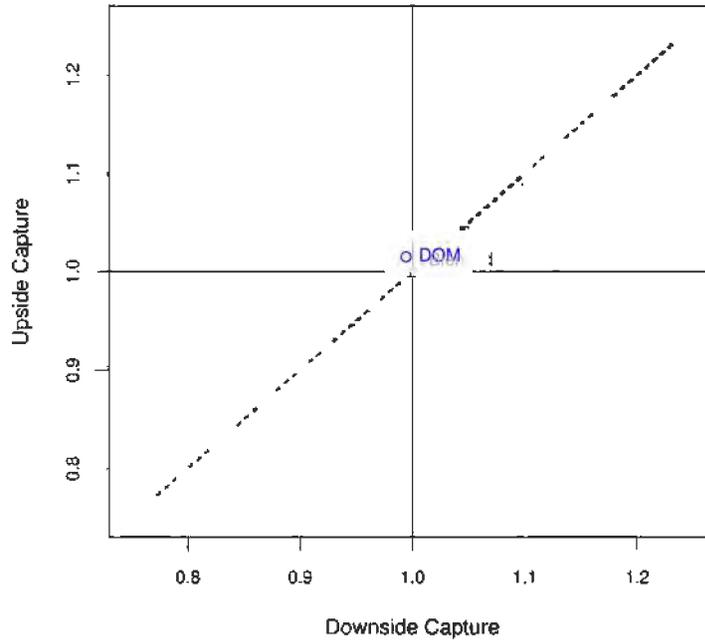
Public Equity GICS Sector Active Exposure



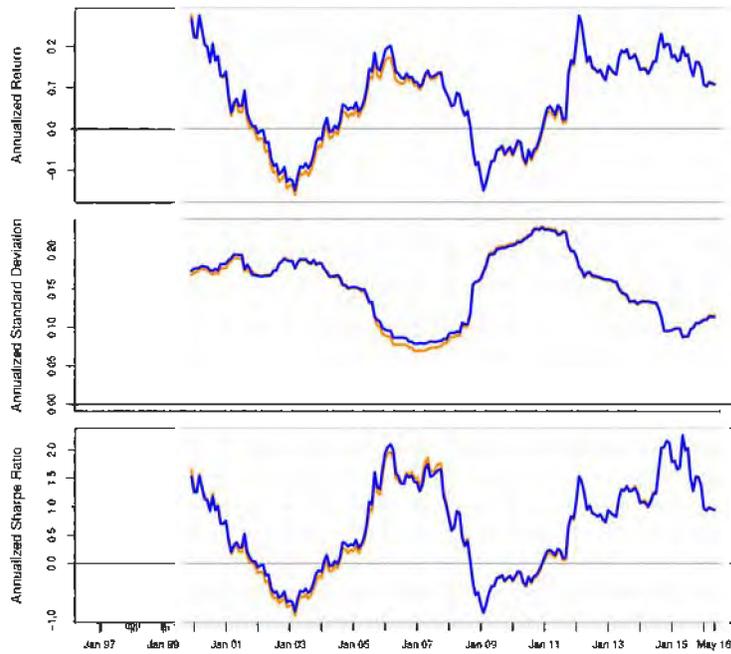
Domestic Equity & International Equity



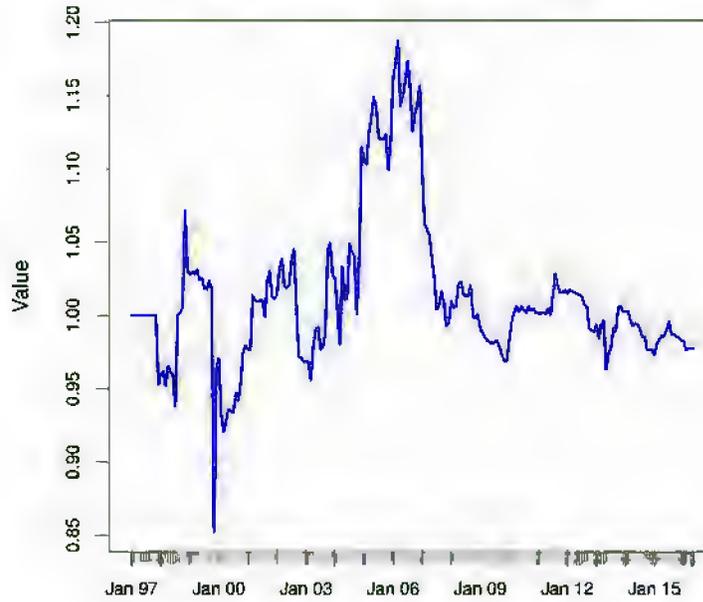
Domestic Equity Capture Ratios



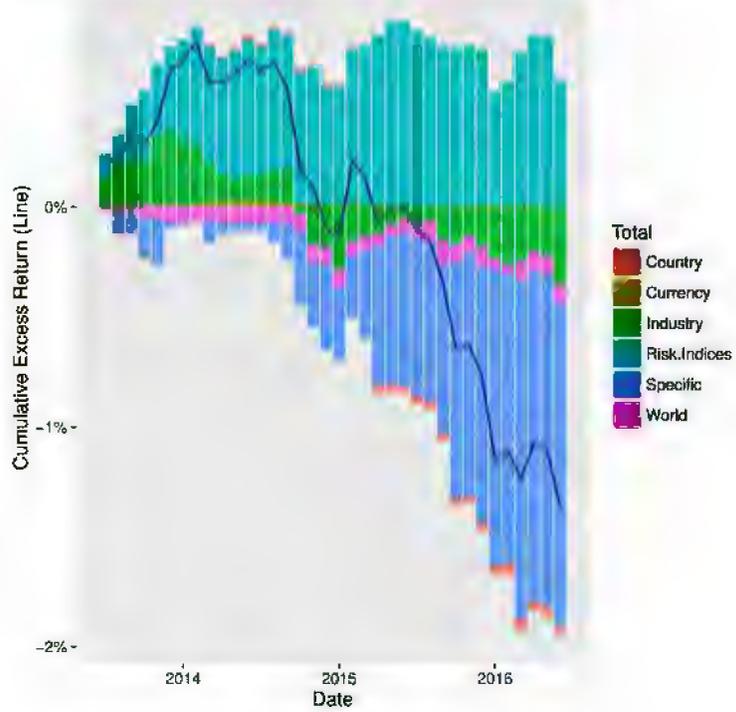
Domestic Equity Rolling 3 Year Performance



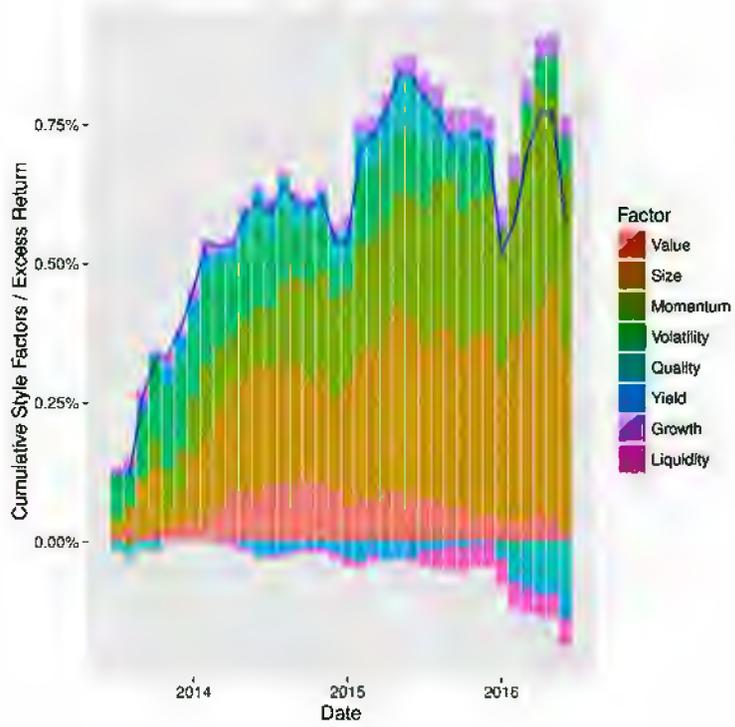
Domestic Equity Rolling 12 Month Beta



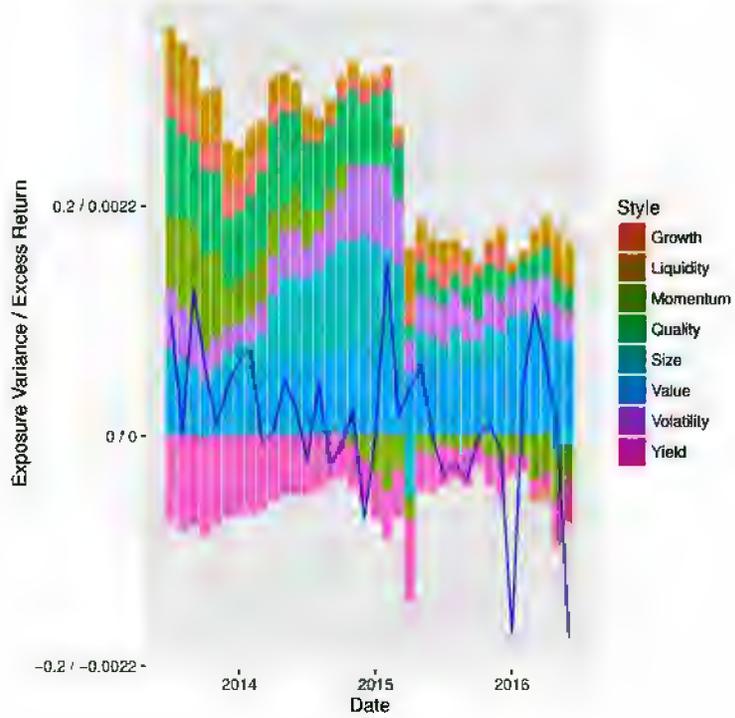
Barra Holdings Based Factor Attribution: Domestic Equity



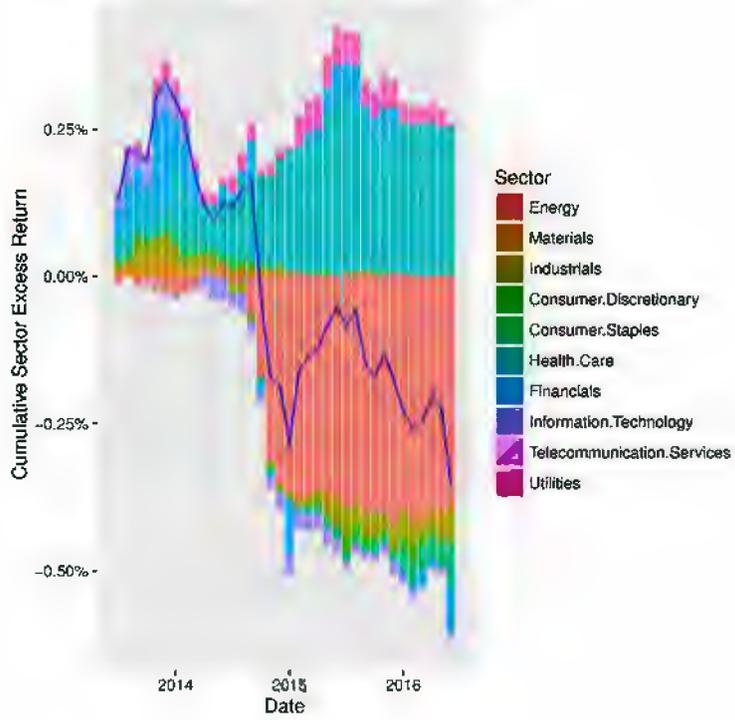
Domestic Equity Barra Style Factor



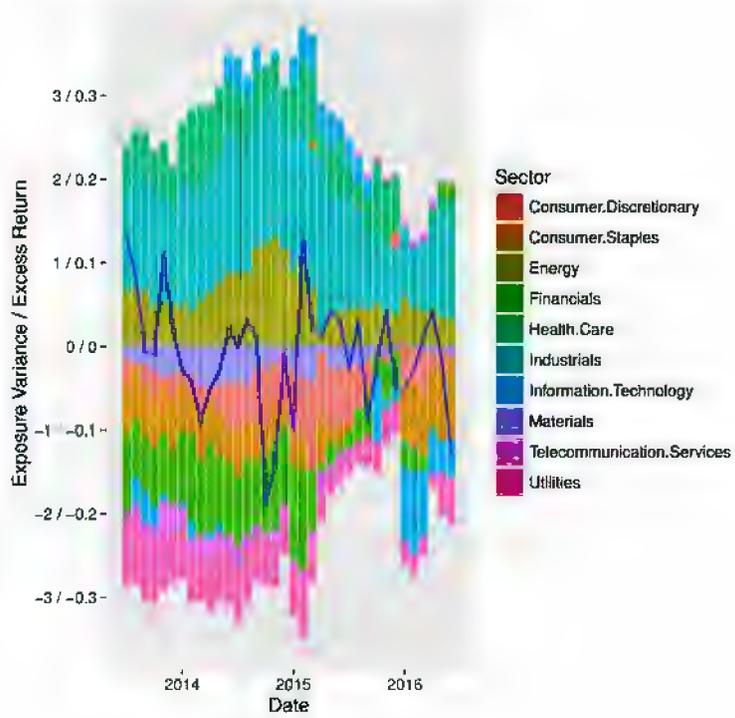
Domestic Equity Monthly Style Factors Active Exposure



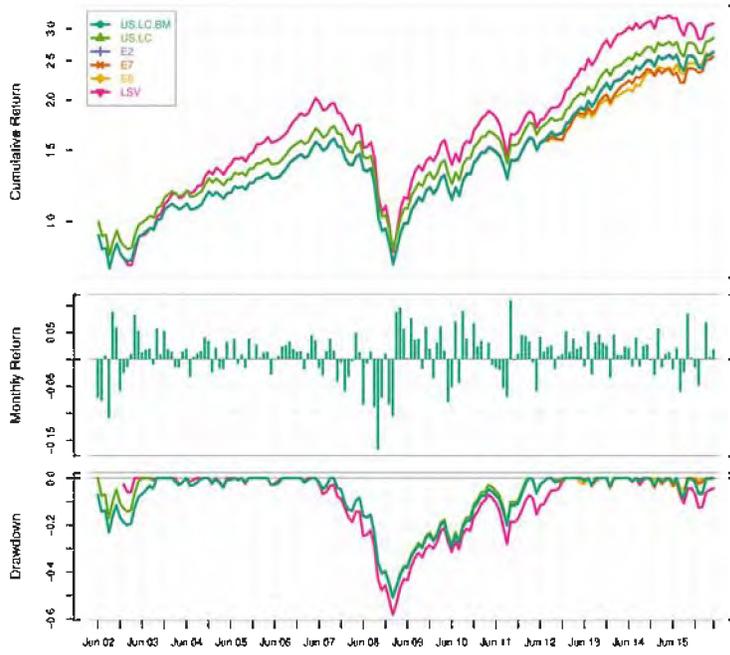
Domestic Equity Monthly GICS Sector Return



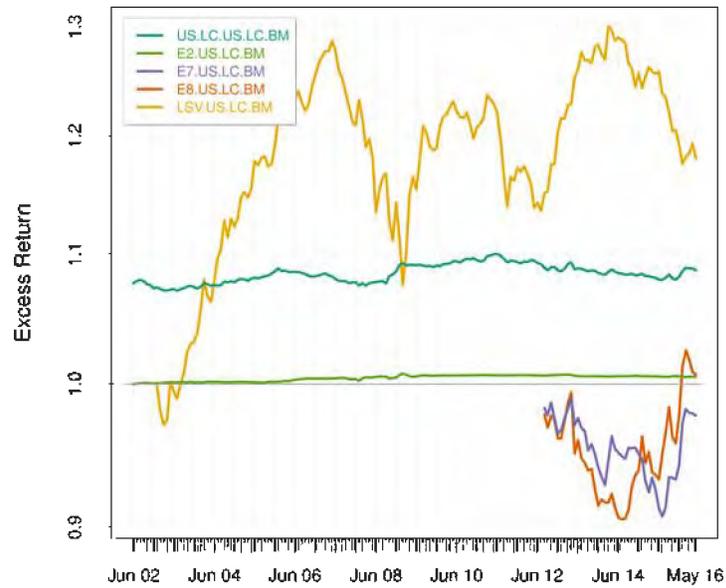
Domestic Equity GICS Sector Active Exposure



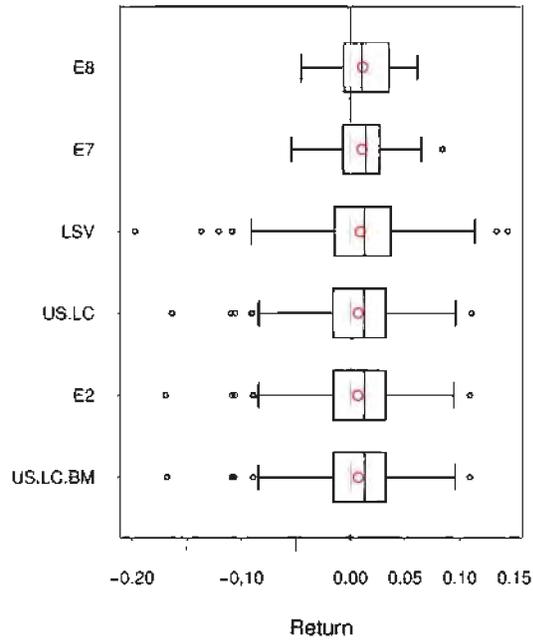
US Large Cap Performance Summary



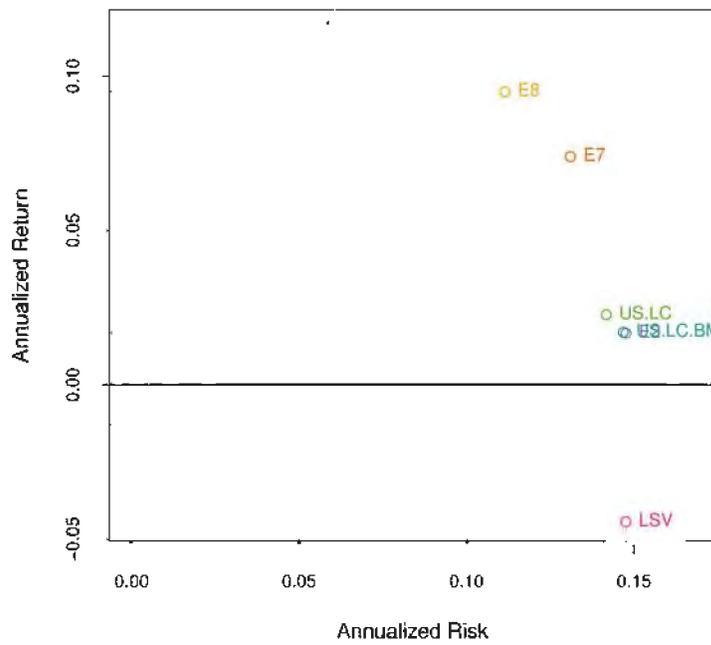
US Large Cap Cumulative Relative Performance



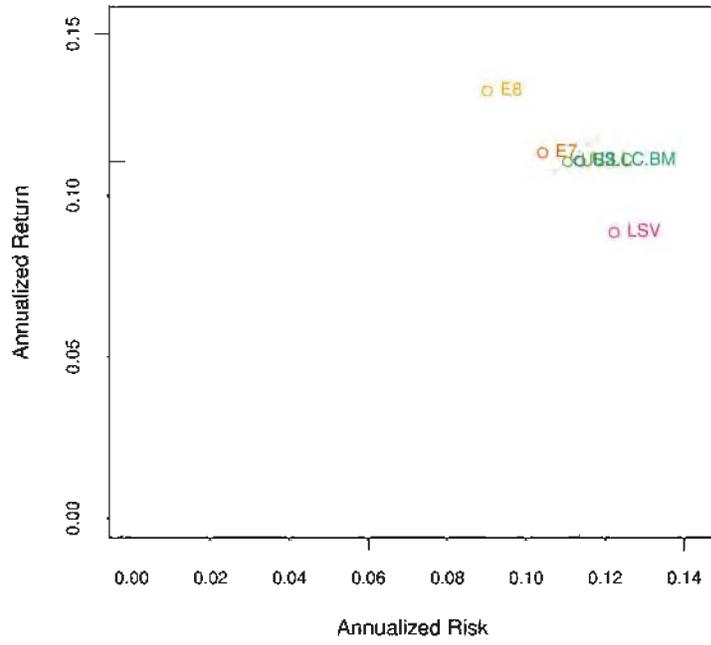
Return Distribution Comparison



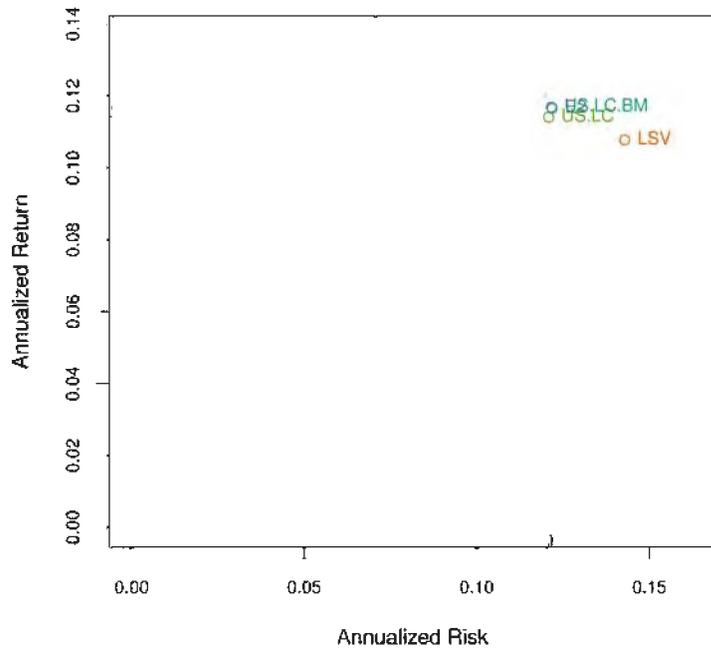
US Large Cap Trailing 1 Year Performance vs Sharpe Ratios (1,2,3)



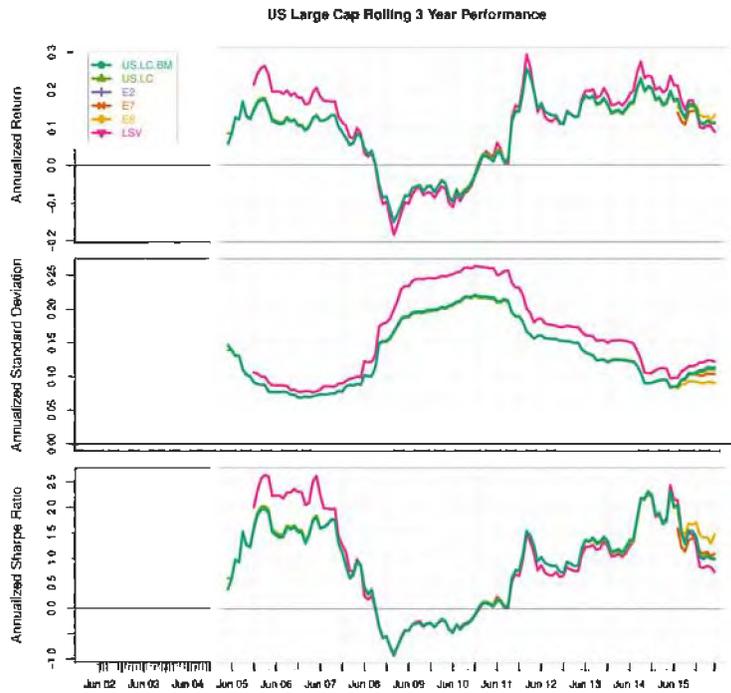
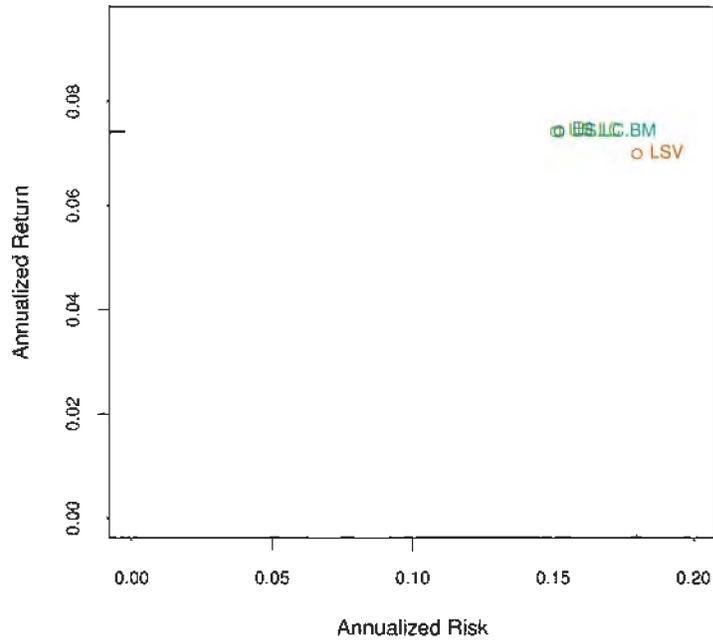
Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)



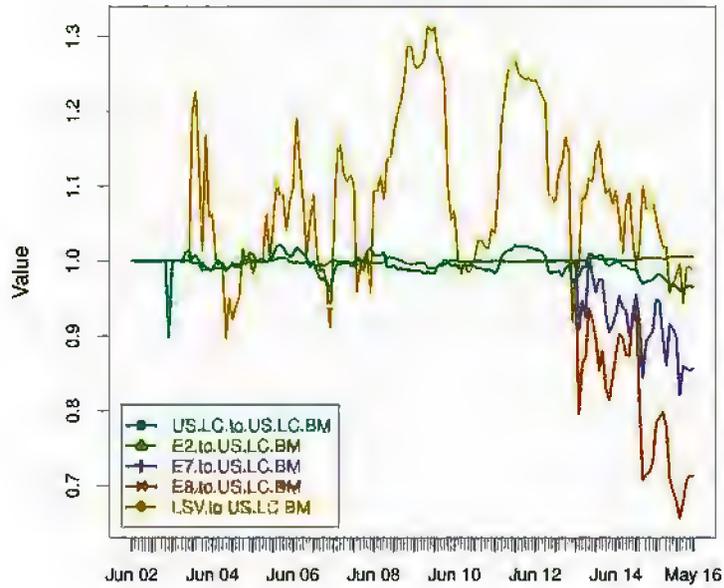
Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)



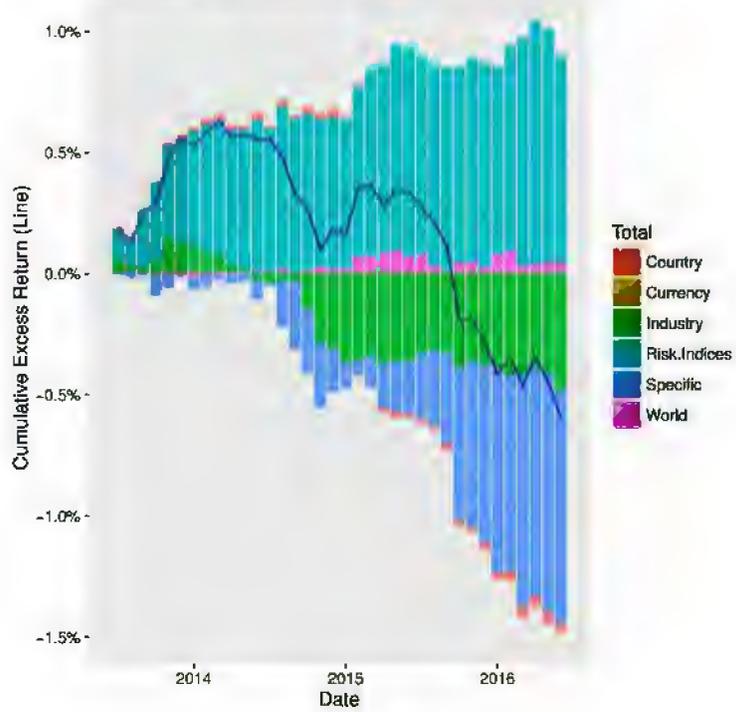
Trailing 10 Year Performance vs Sharpe Ratios (1,2,3)

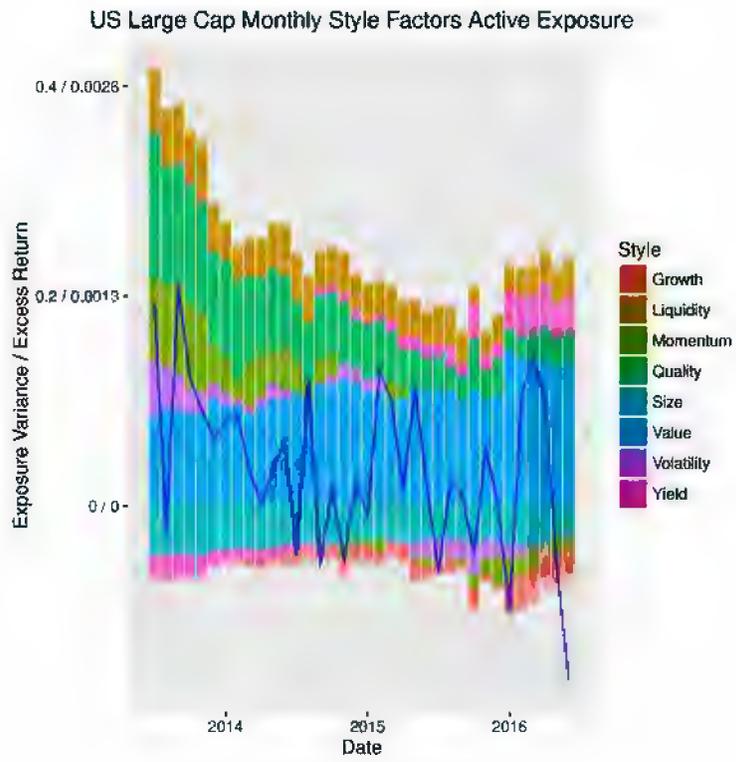
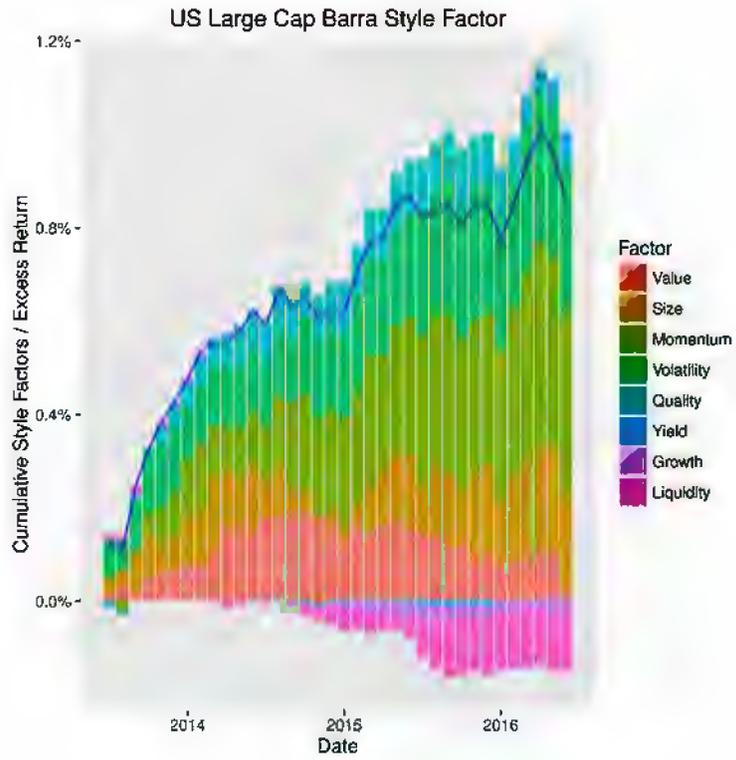


US Large Cap Rolling 12 Month Beta

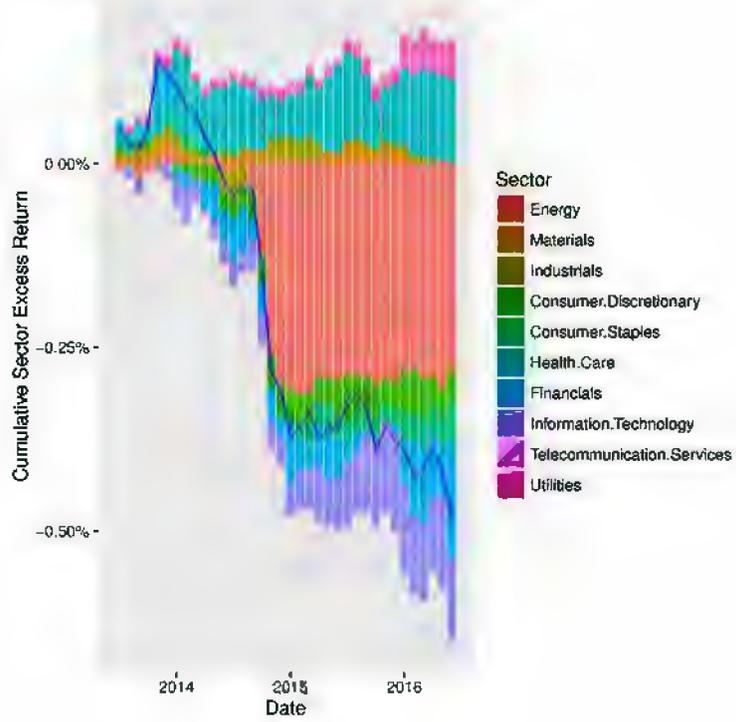


Barra Holdings Based Factor Attribution: US Large Cap

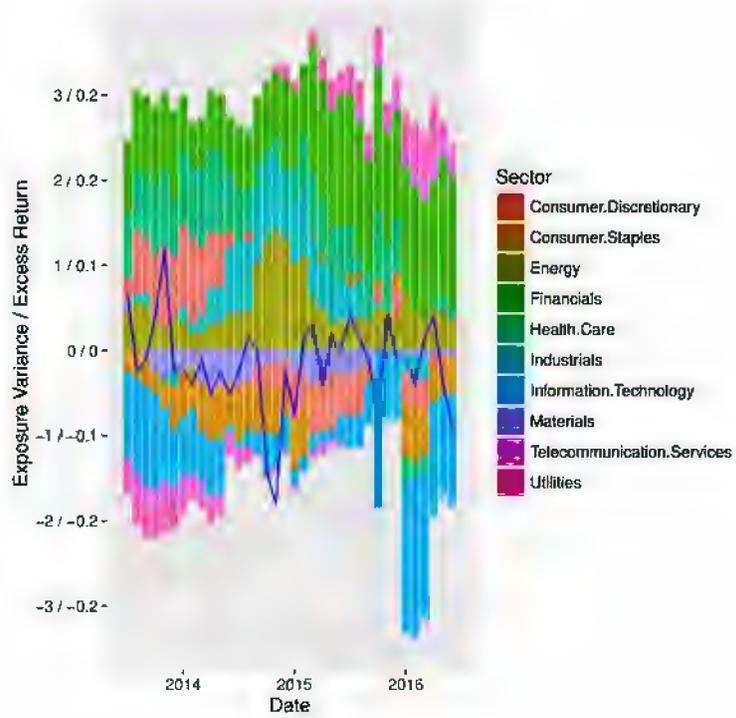




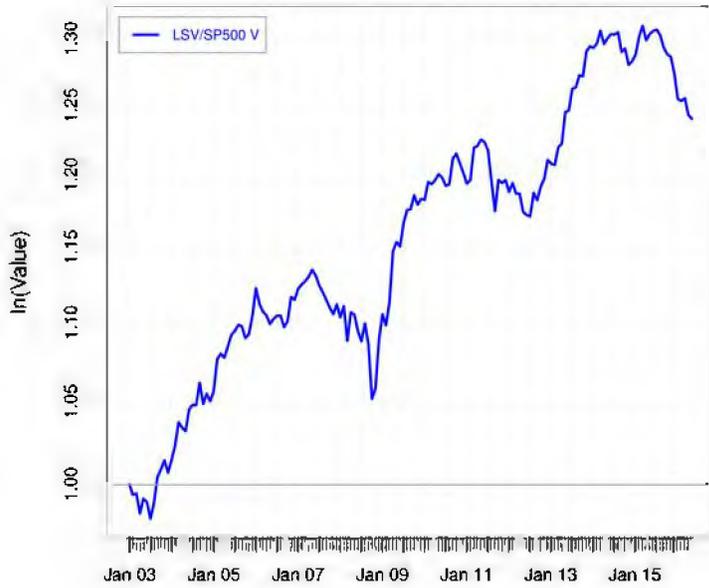
US Large Cap Monthly GICS Sector Return



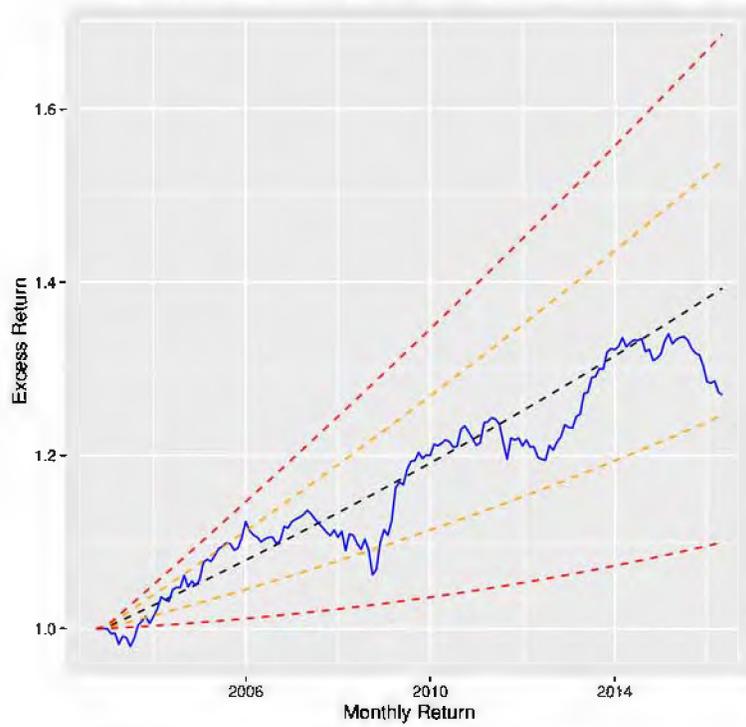
US Large Cap GICS Sector Active Exposure



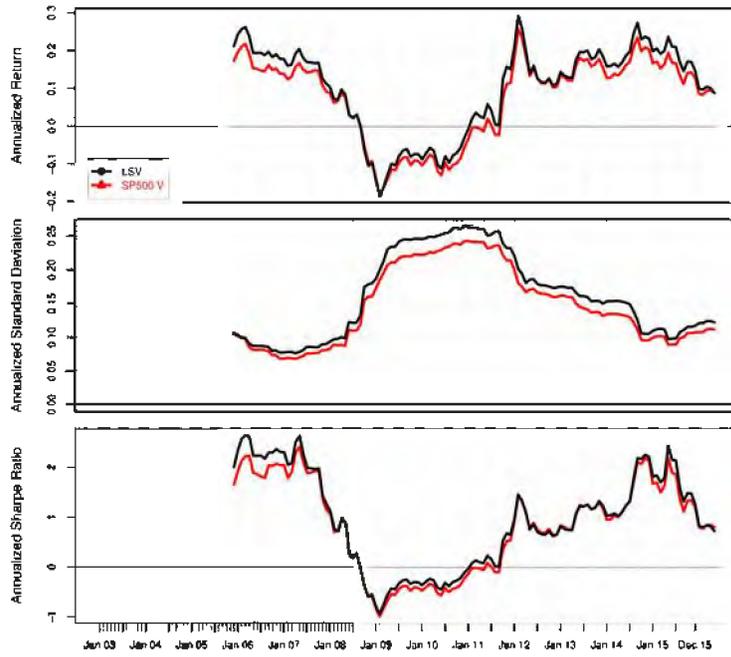
LSV Cumulative Relative Performance



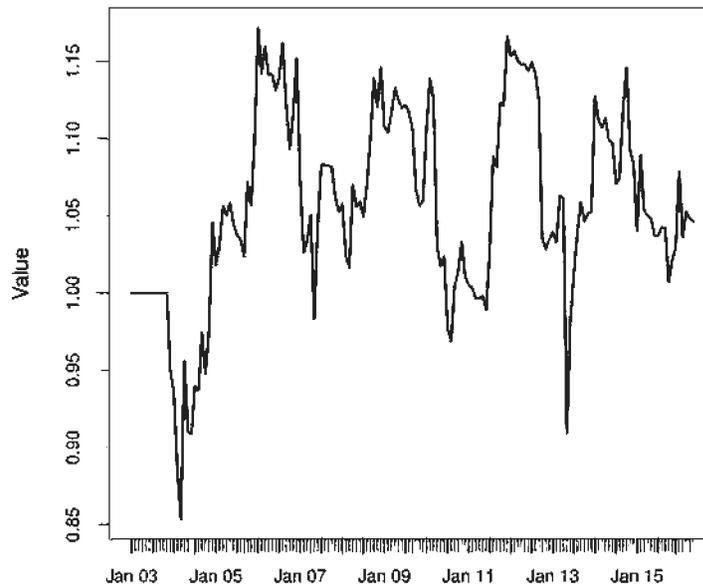
LSV Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



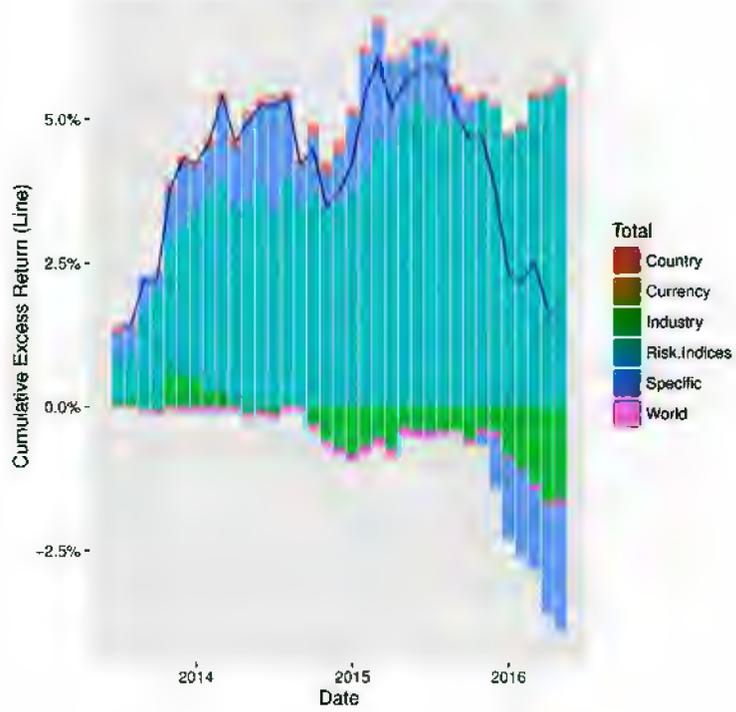
LSV Rolling 3 year Performance



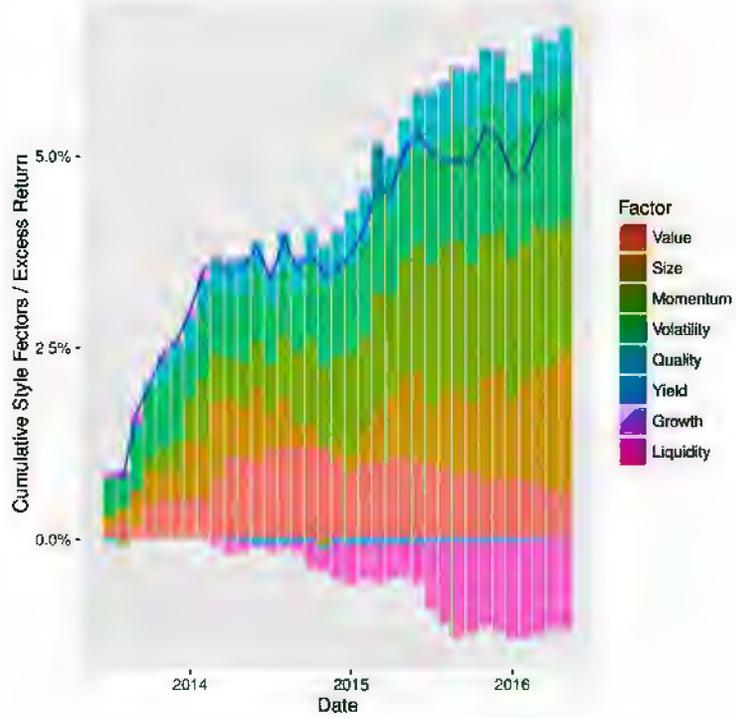
LSV Rolling 12 Month Beta



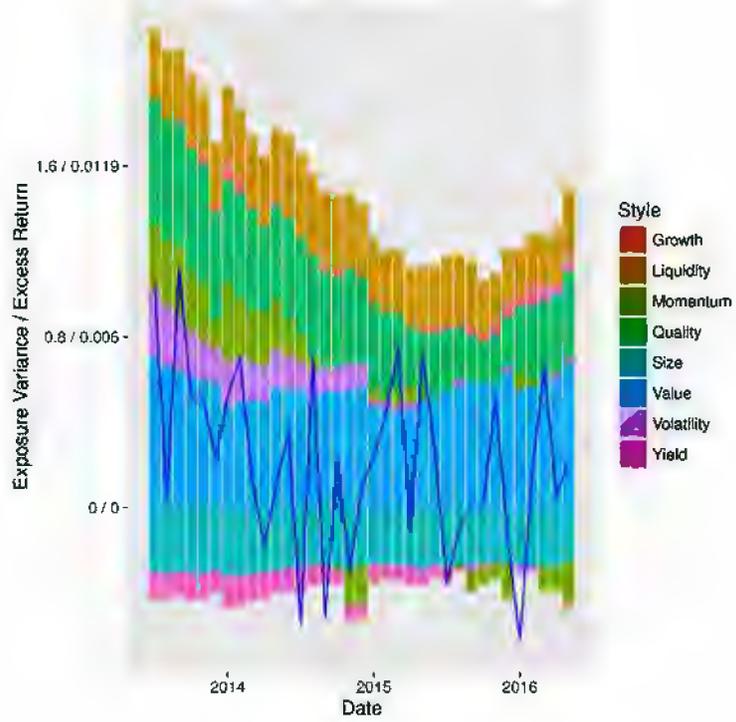
Barra Holdings Based Factor Attribution: LSV



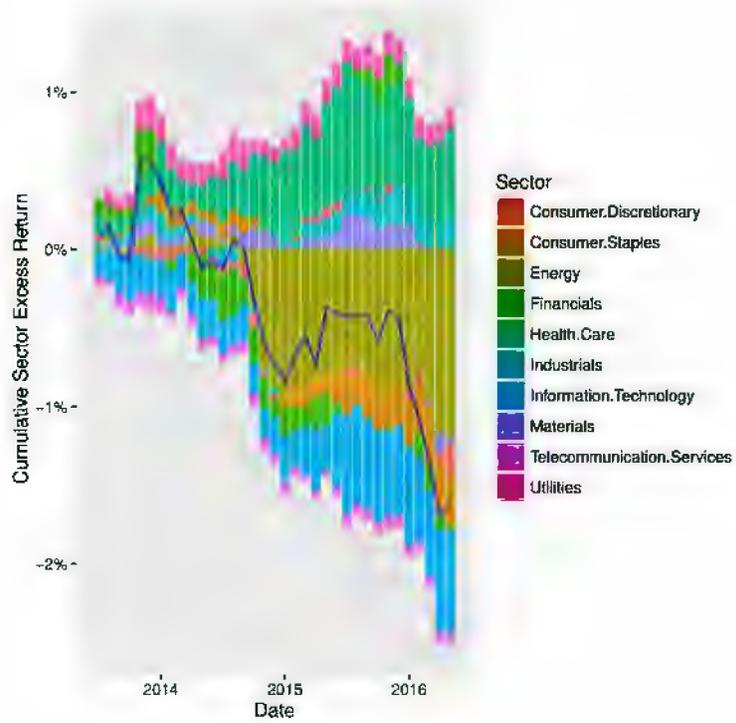
LSV Barra Style Factor



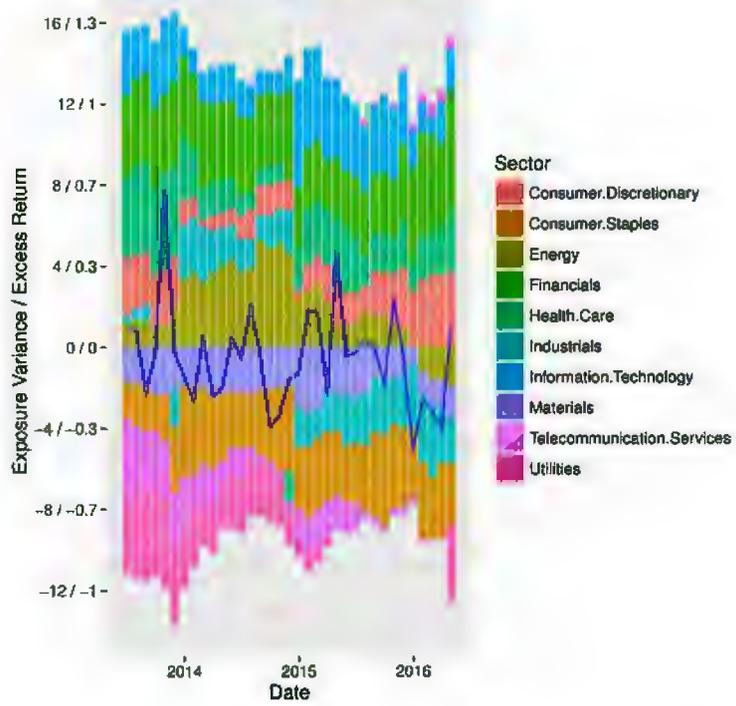
LSV Monthly Style Factors Active Exposure



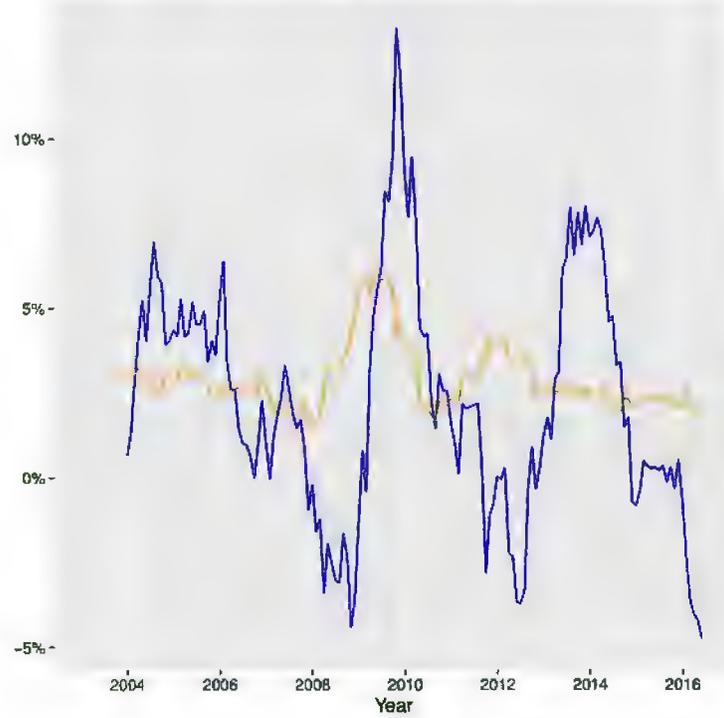
LSV Monthly GICS Sector Return



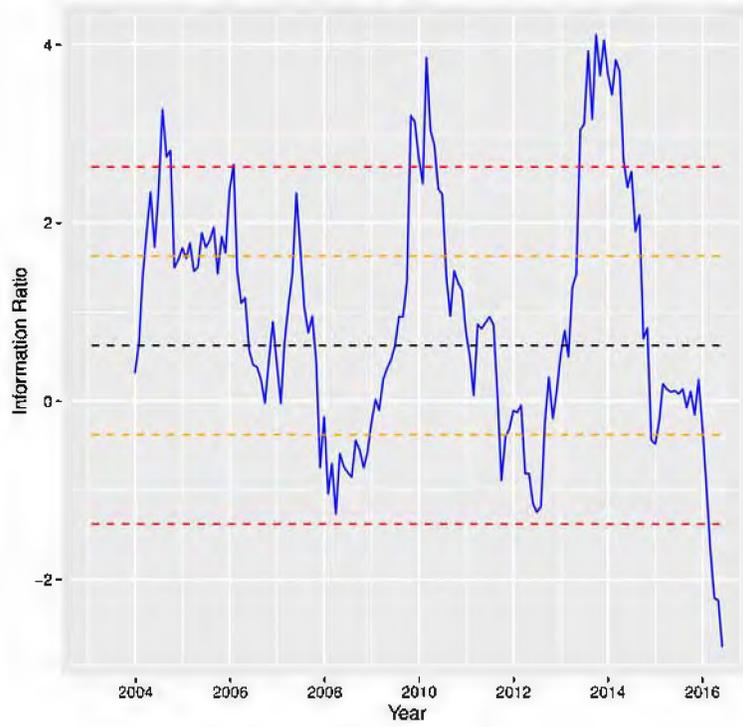
LSV GICS Sector Active Exposure



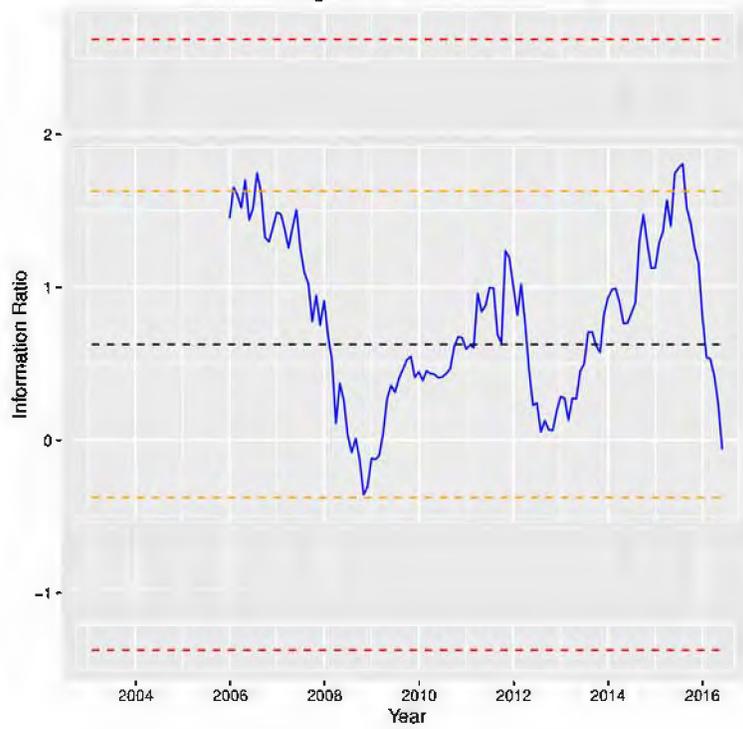
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



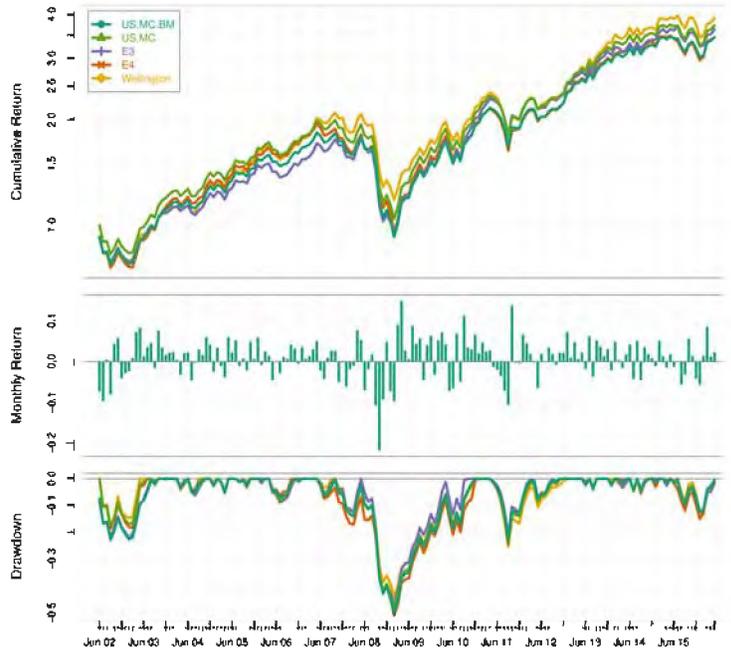
LSV Rolling 12 Month Information Ratio



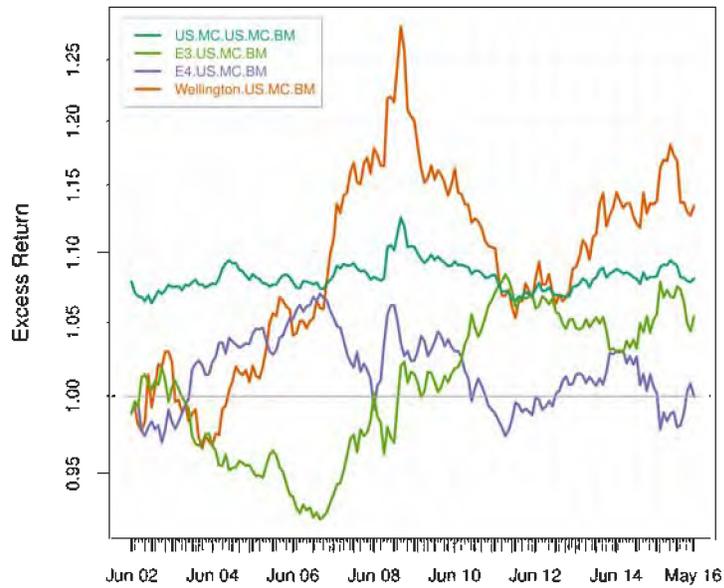
LSV Rolling 36 Month Information Ratio



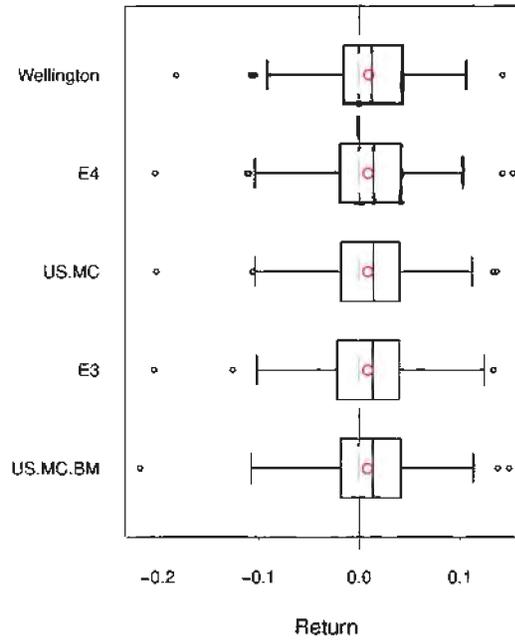
US Mid Cap Performance Summary



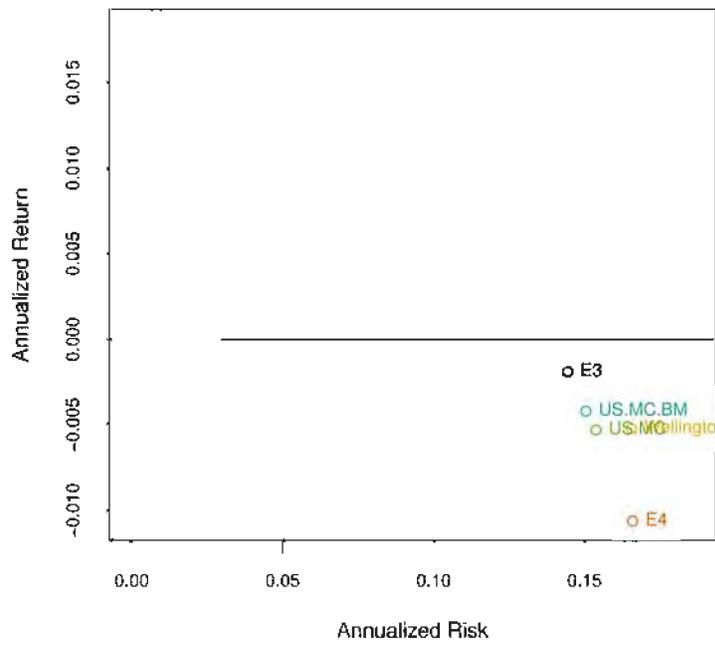
US Mid Cap Cumulative Relative Performance



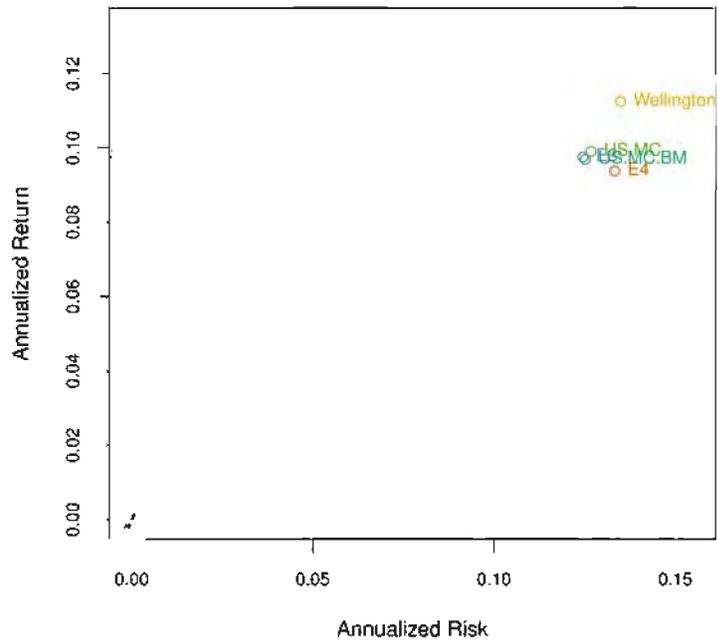
Return Distribution Comparison



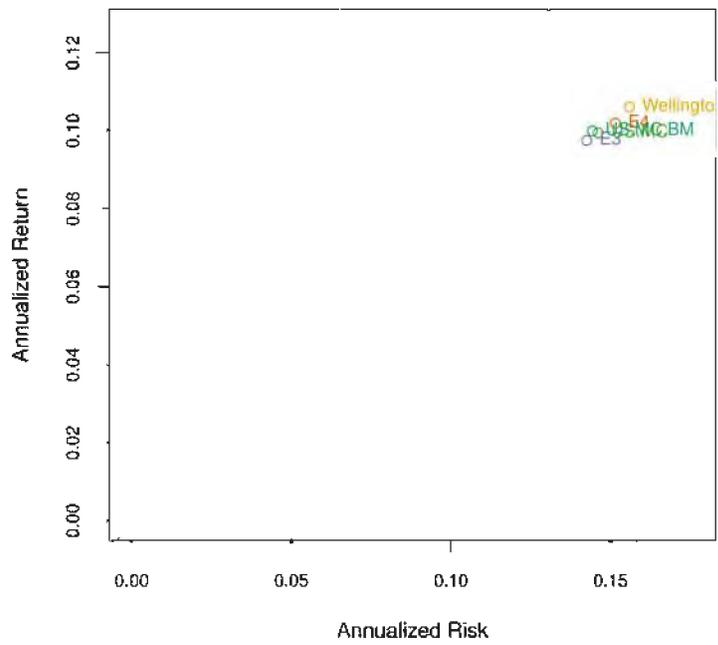
US Mid Cap Trailing 1 Year Performance vs Sharpe Ratios (1,2,3)



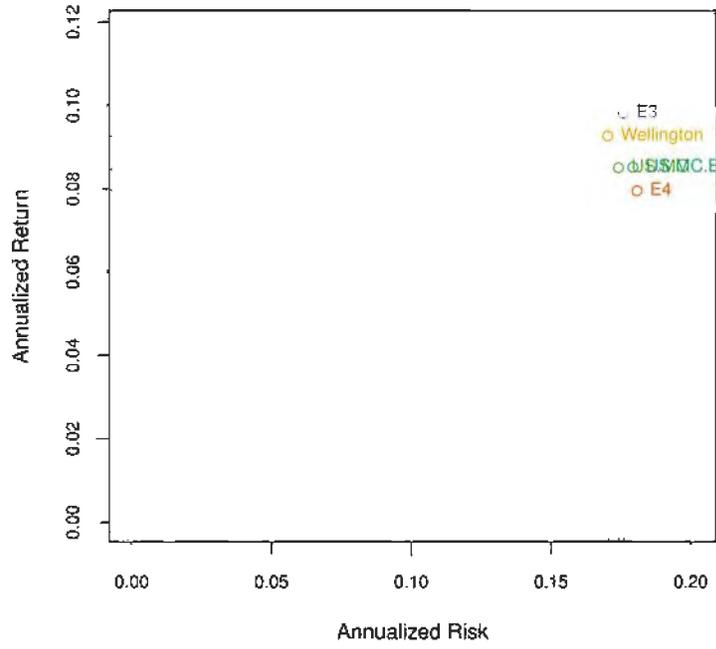
Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)



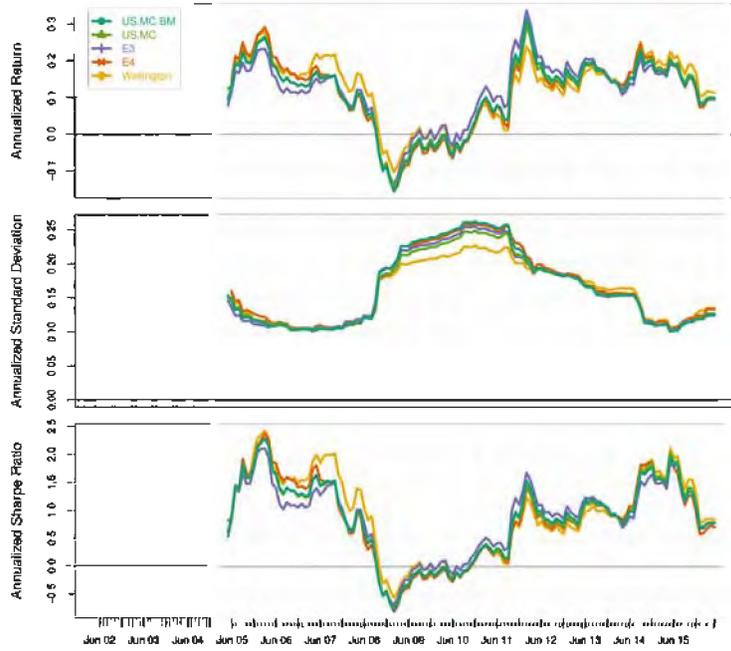
Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)



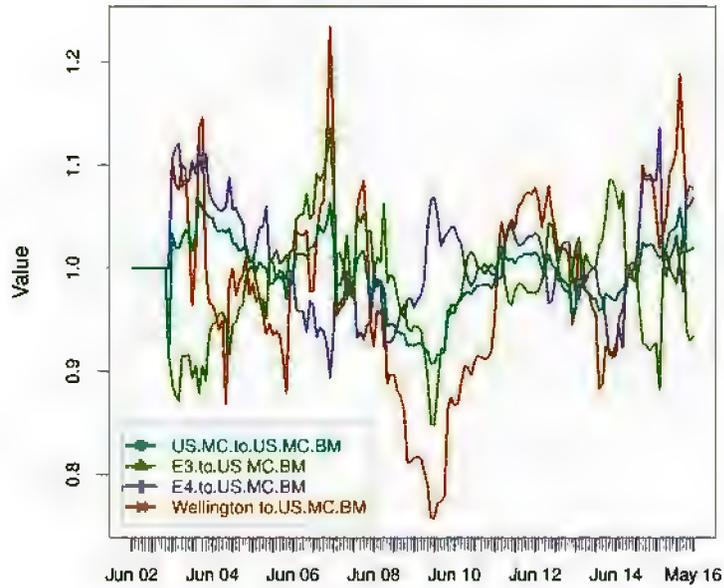
Trailing 10 Year Performance vs Sharpe Ratios (1,2,3)



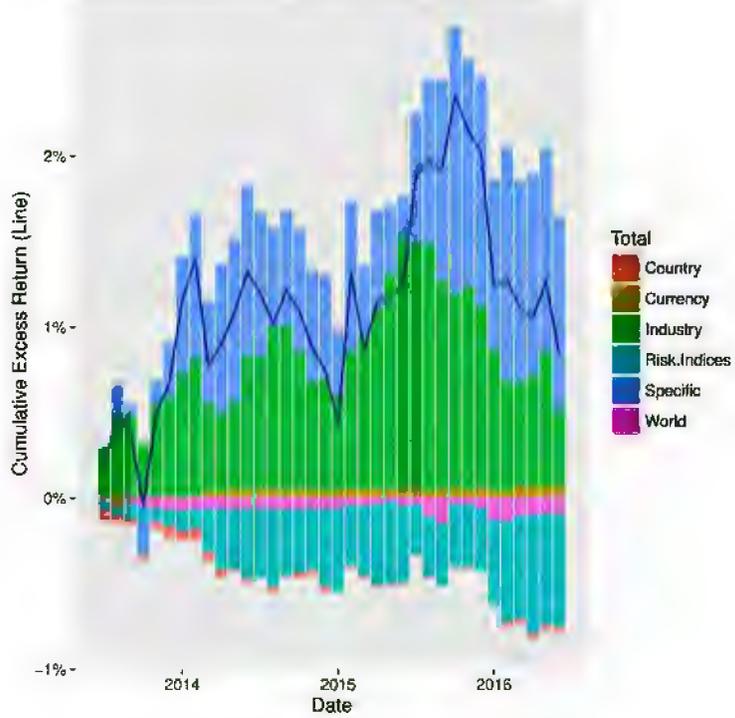
US Mid Cap Rolling 3 Year Performance



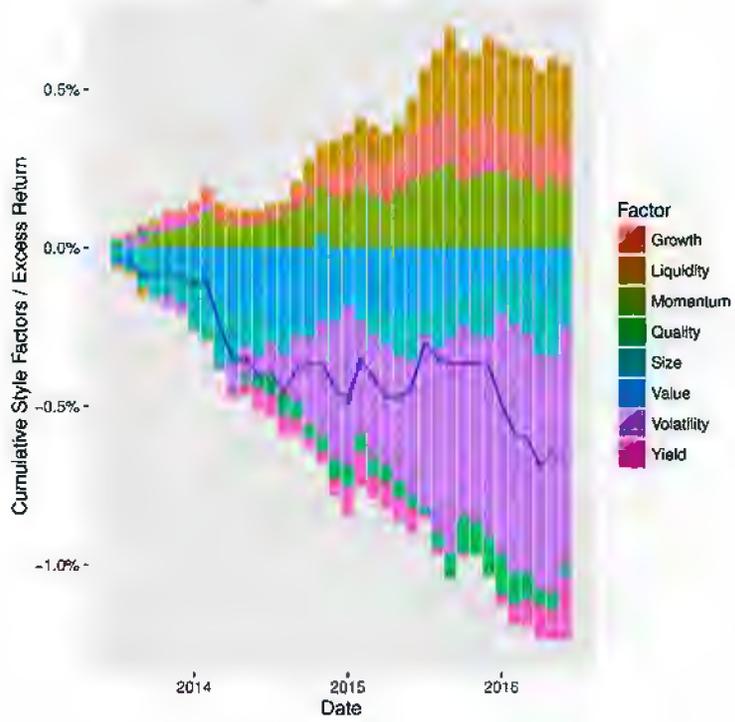
US Mid Cap Rolling 12 Month Beta



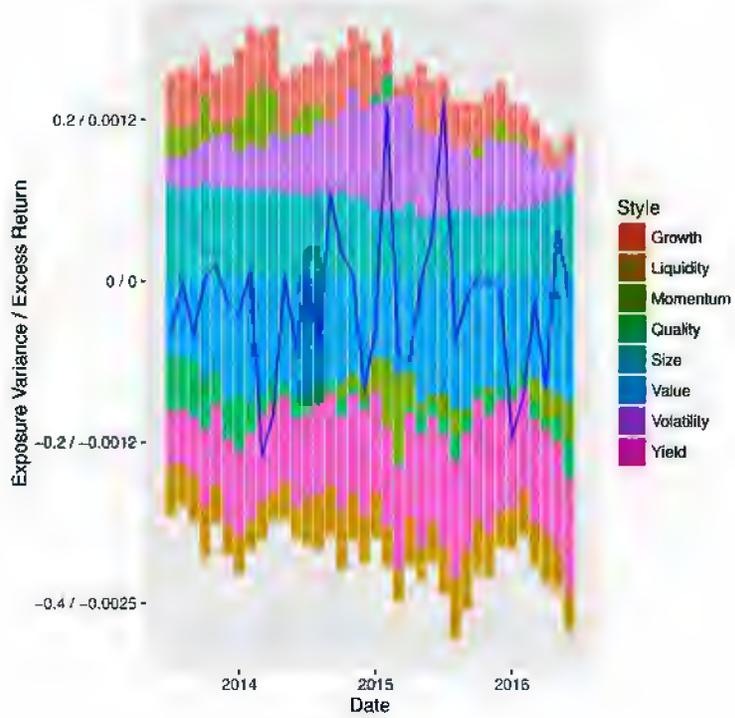
Barra Holdings Based Factor Attribution: US Mid Cap



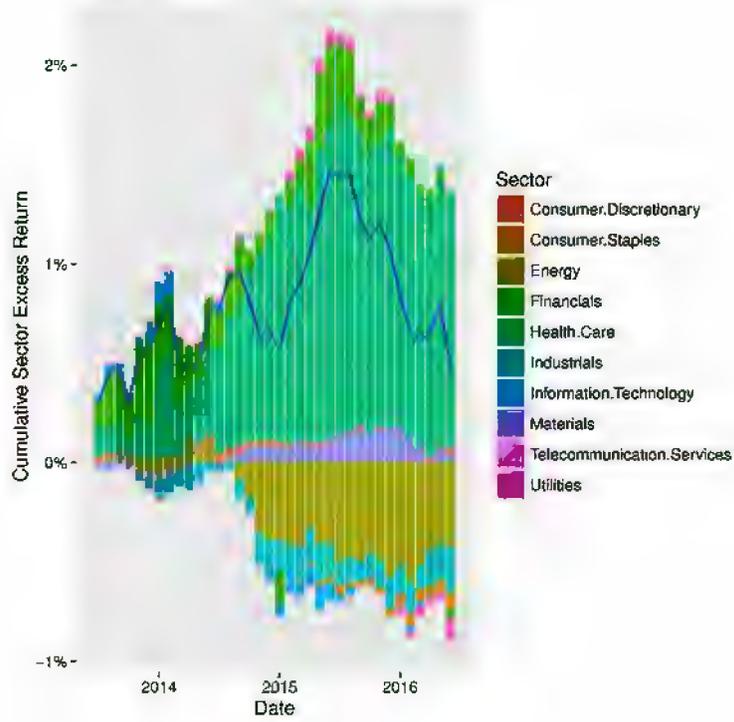
US Mid Cap Barra Style Factor



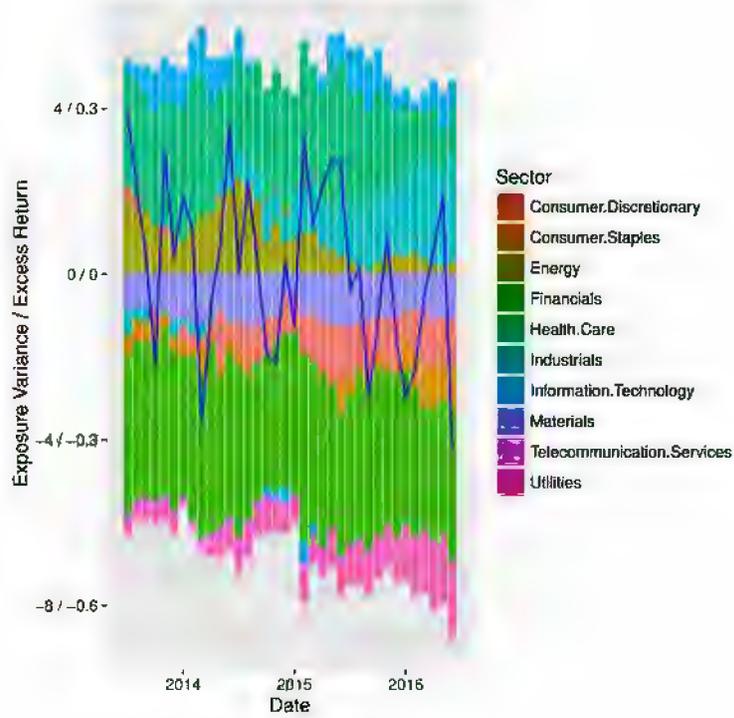
US Mid Cap Monthly Style Factors Active Exposure



US Mid Cap Monthly GICS Sector Return



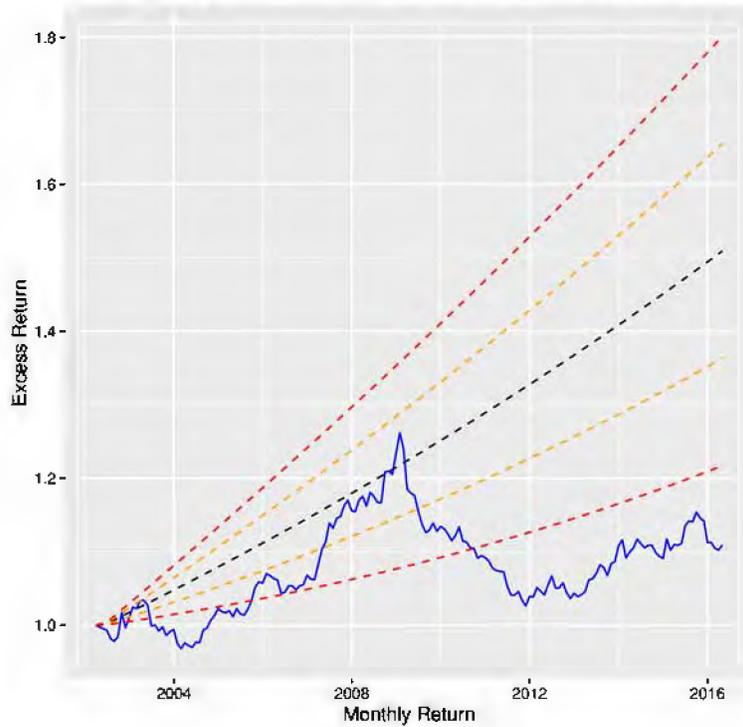
US Mid Cap GICS Sector Active Exposure



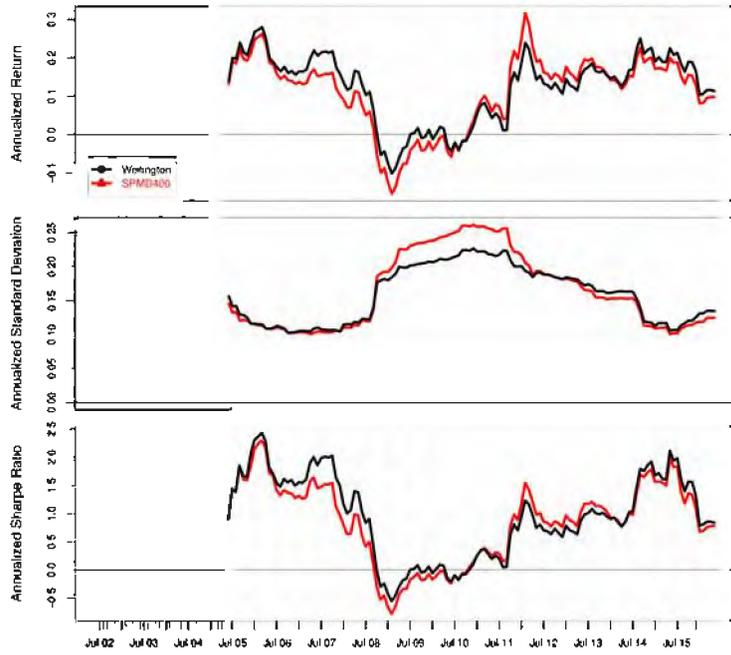
Wellington Cumulative Relative Performance



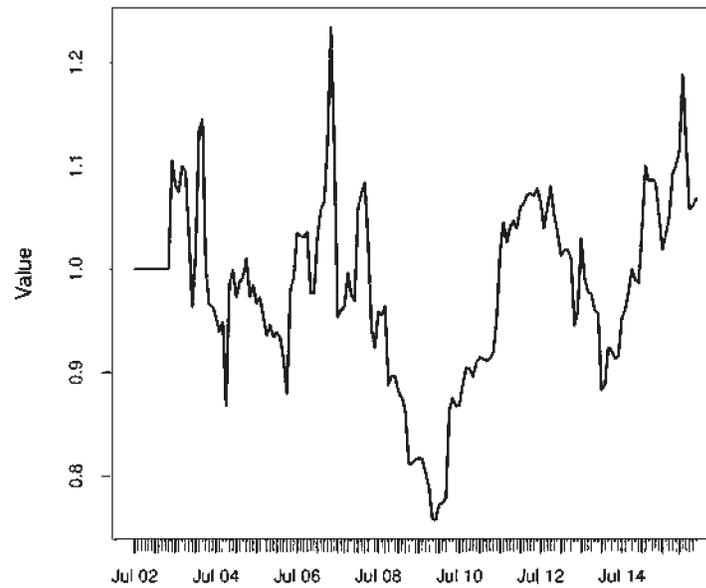
Wellington Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



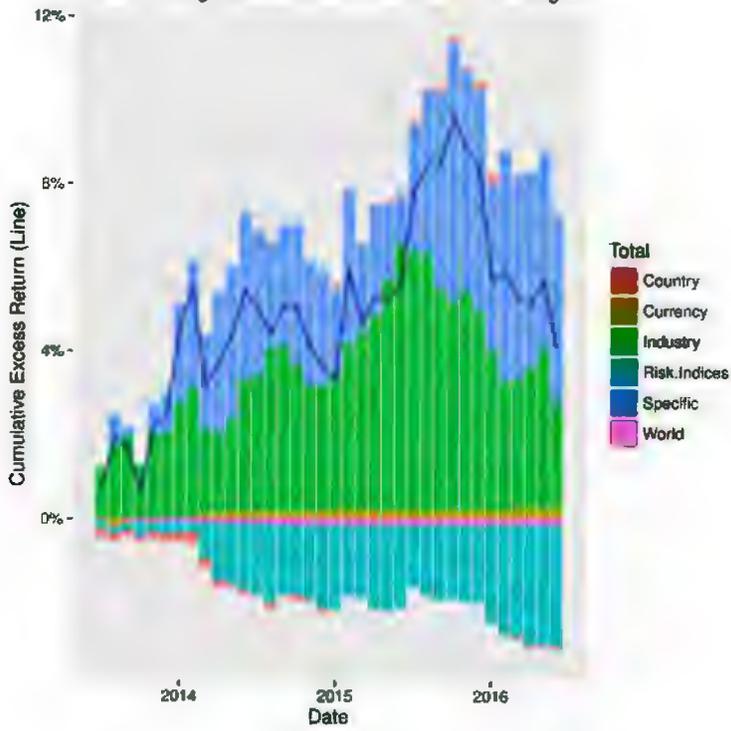
Wellington Rolling 3 year Performance



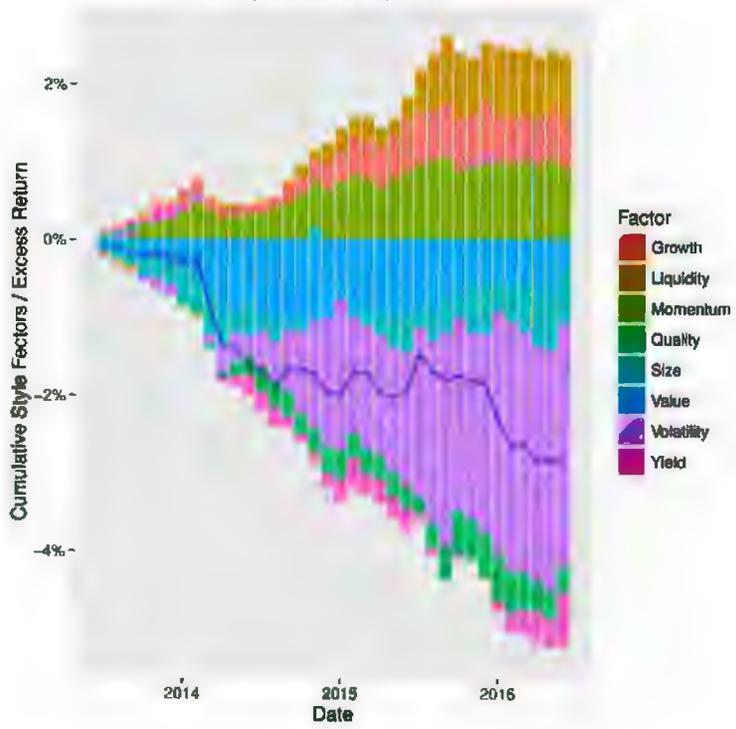
Wellington Rolling 12 Month Beta



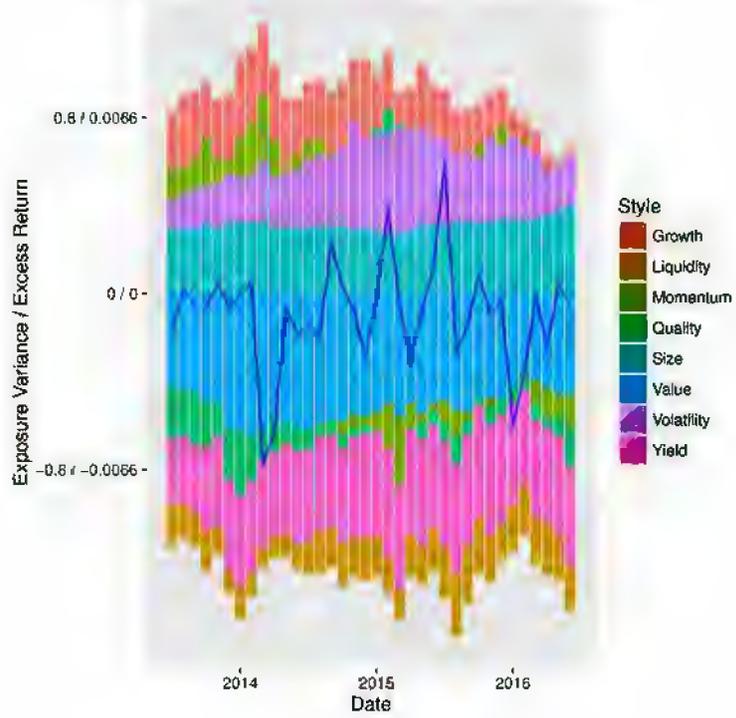
Barra Holdings Based Factor Attribution: Wellington



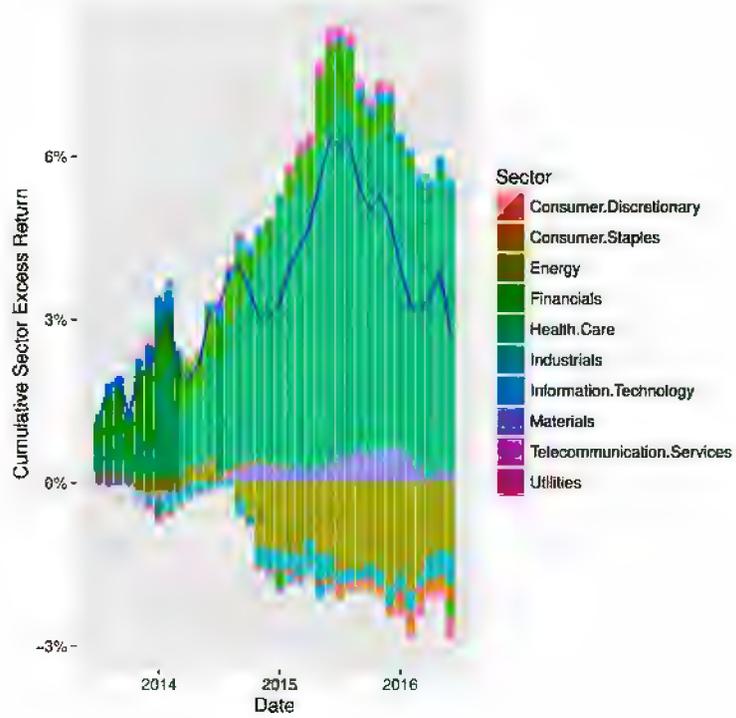
Wellington Barra Style Factor



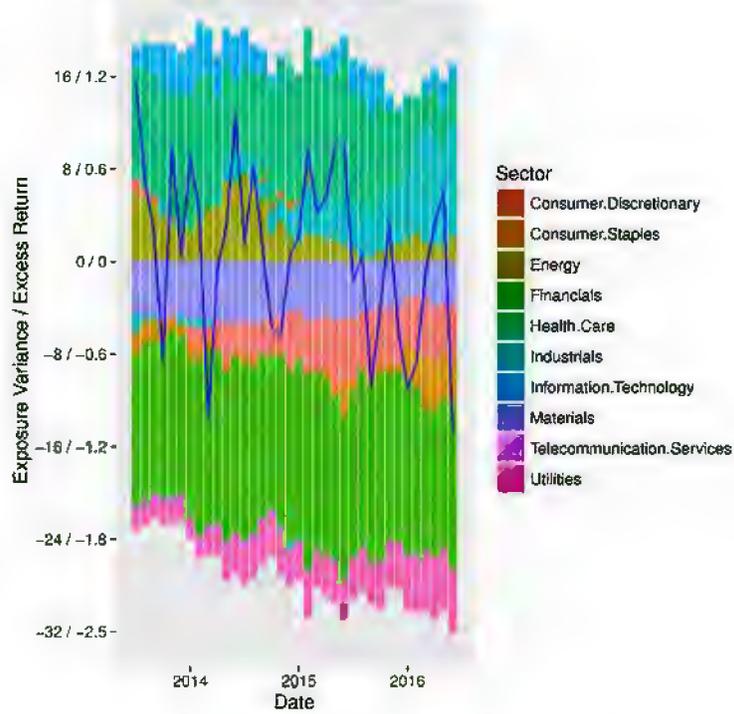
Wellington Monthly Style Factors Active Exposure



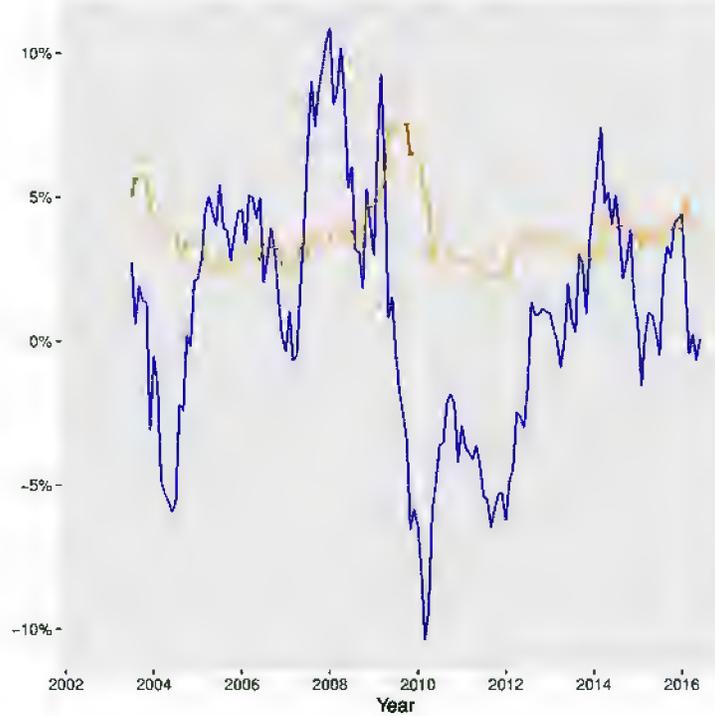
Wellington Monthly GICS Sector Return



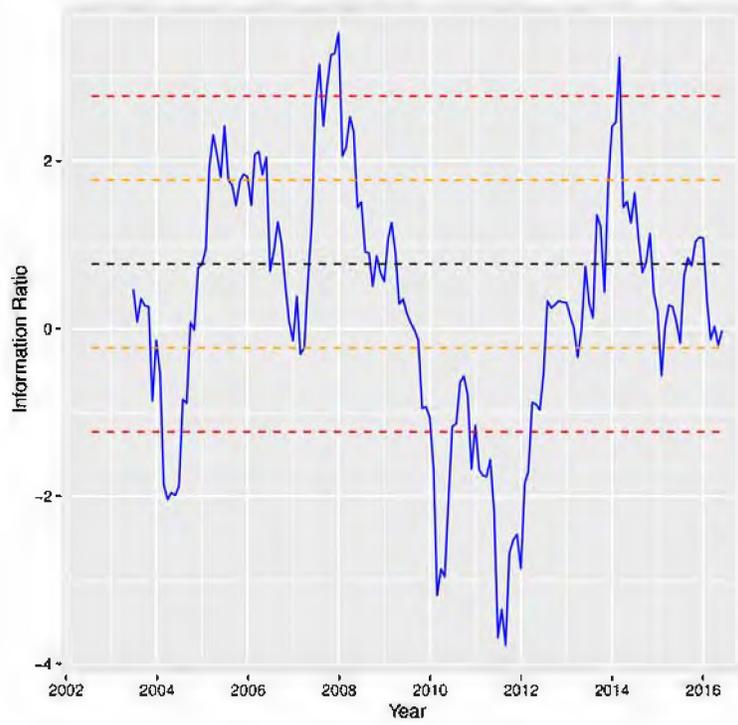
Wellington GICS Sector Active Exposure



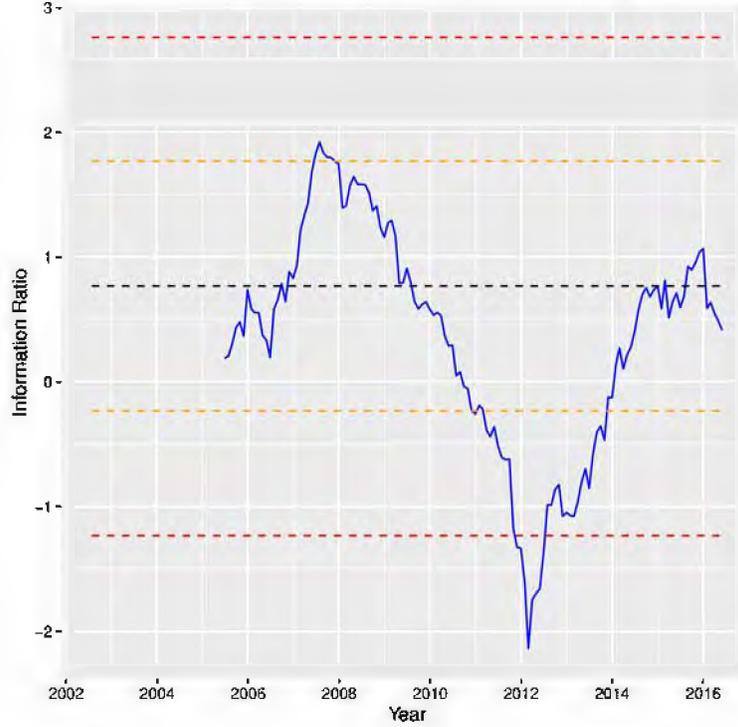
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



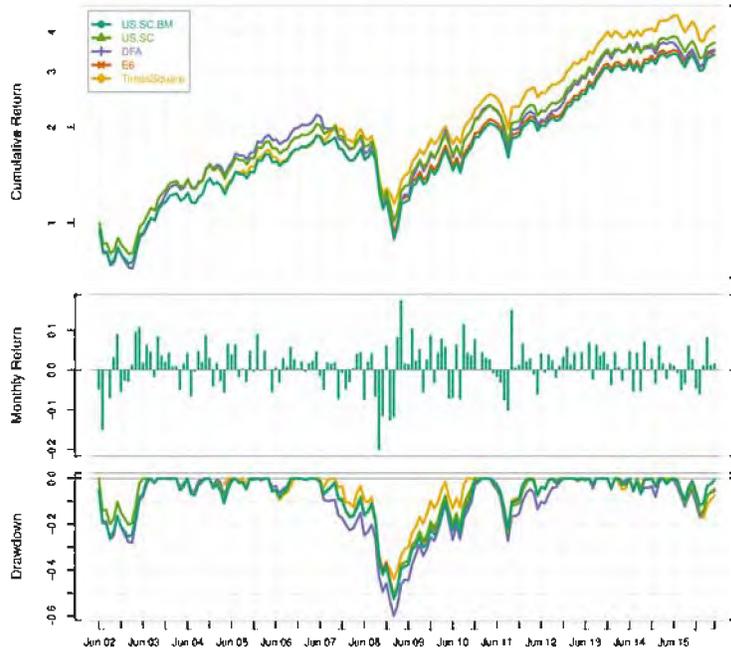
Wellington Rolling 12 Month Information Ratio



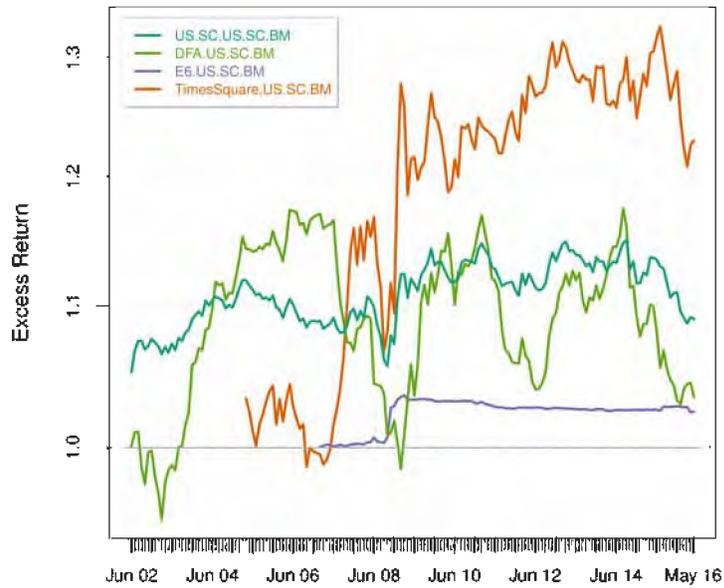
Wellington Rolling 36 Month Information Ratio



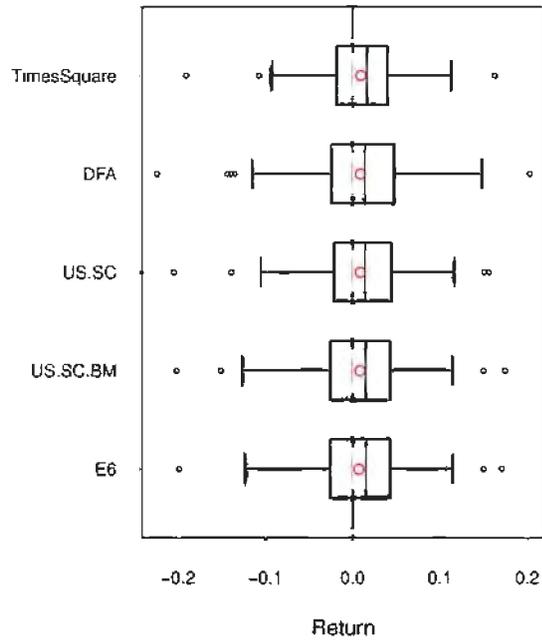
US Small Cap Performance Summary



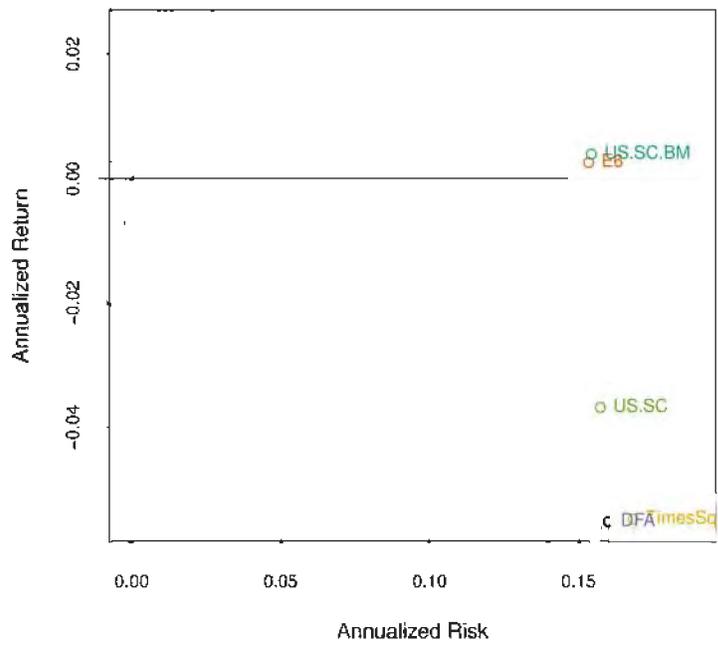
US Small Cap Cumulative Relative Performance



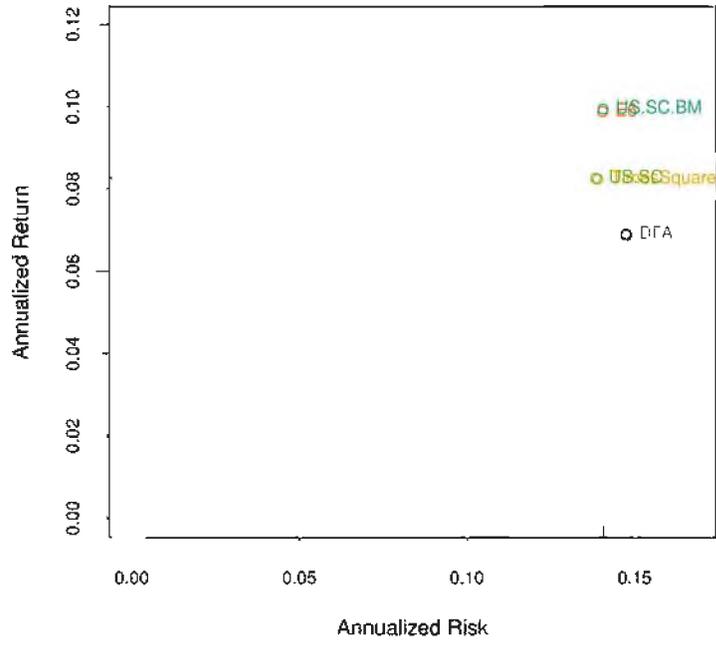
Return Distribution Comparison



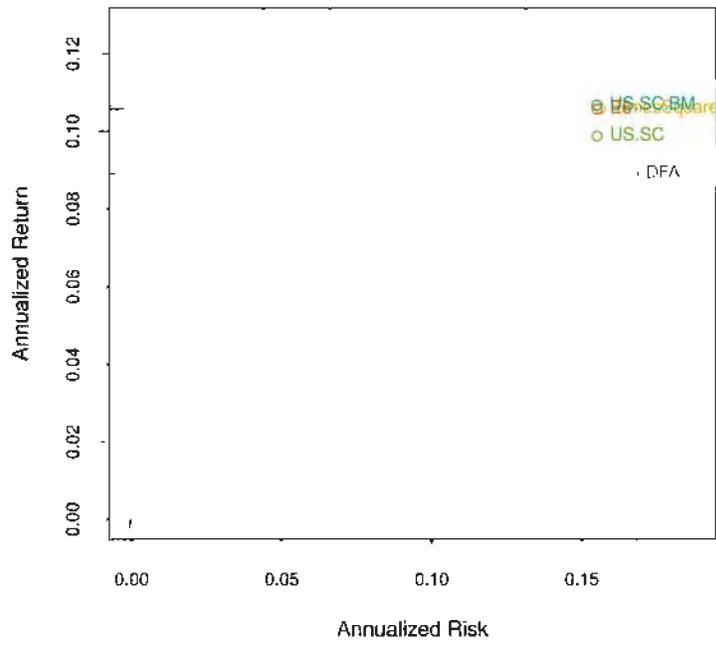
US Small Cap Trailing 1 Year Performance vs Sharpe Ratios (1,2,3)



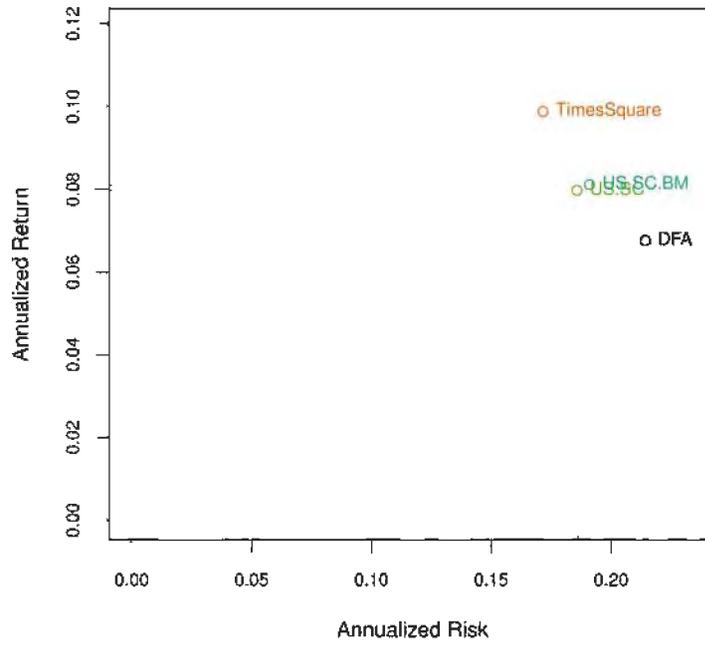
Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)



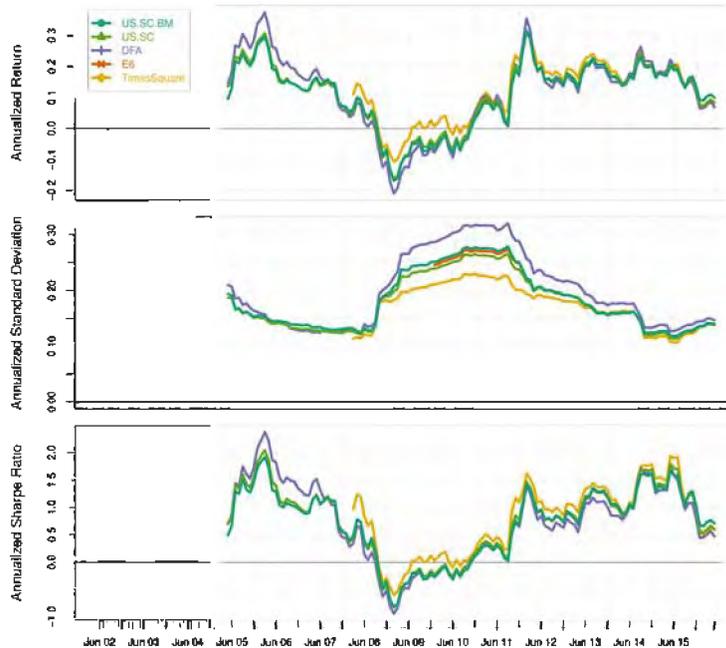
Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)



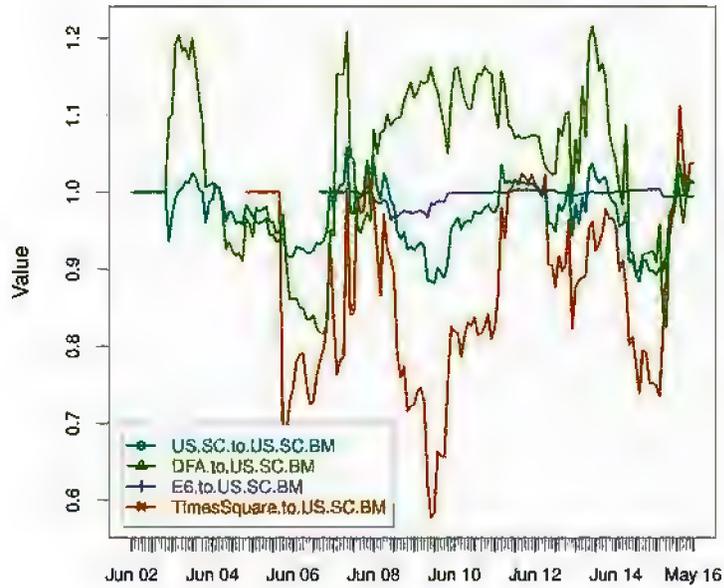
Trailing 10 Year Performance vs Sharpe Ratios (1,2,3)



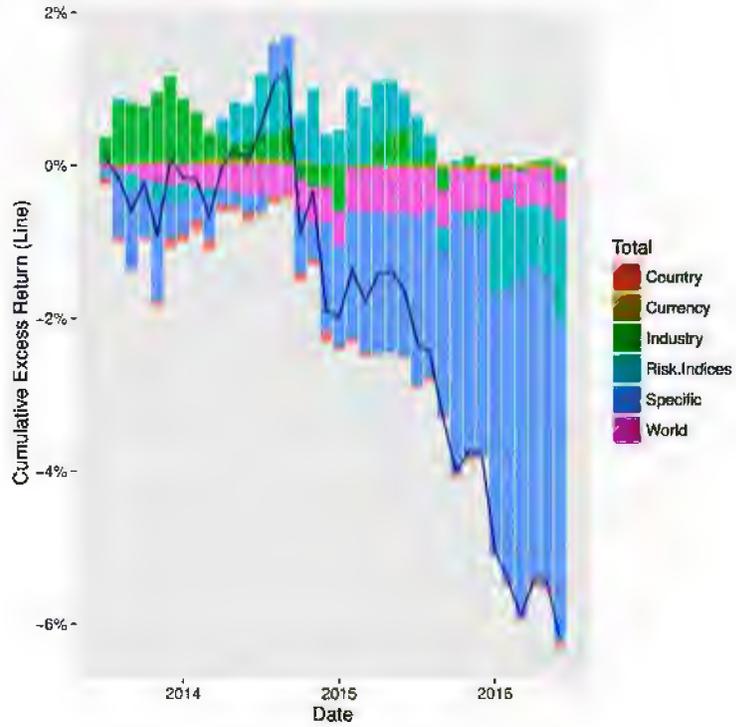
US Small Cap Rolling 3 Year Performance



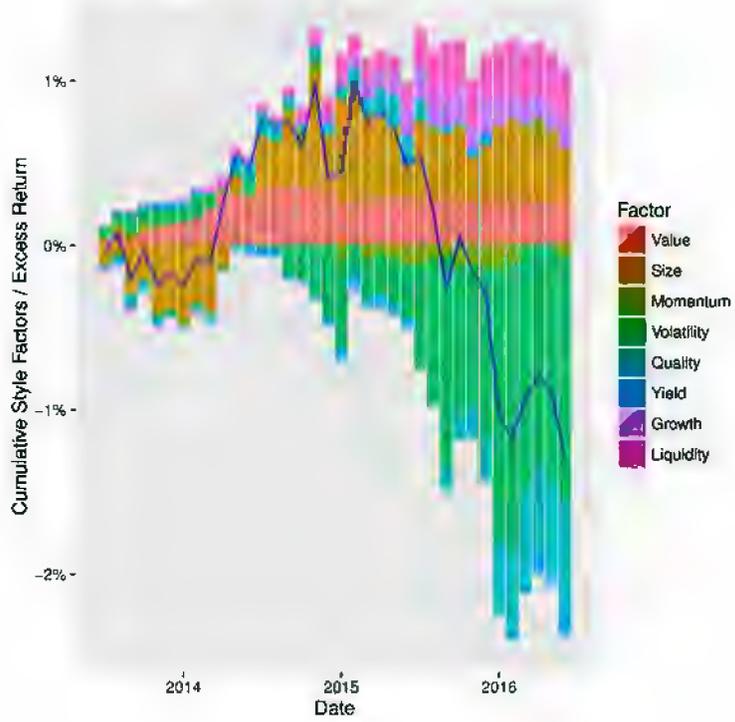
US Small Cap Rolling 12 Month Beta



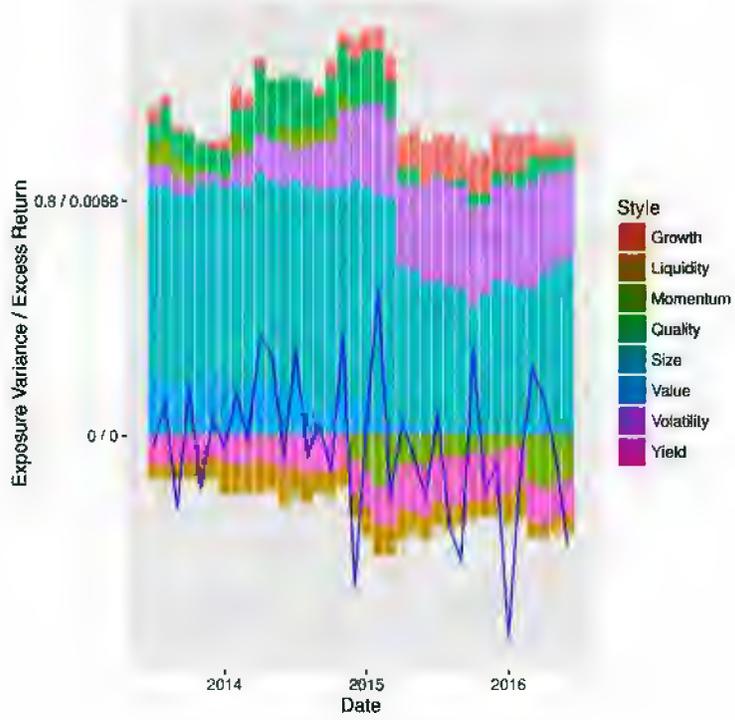
Barra Holdings Based Factor Attribution: US Small Cap



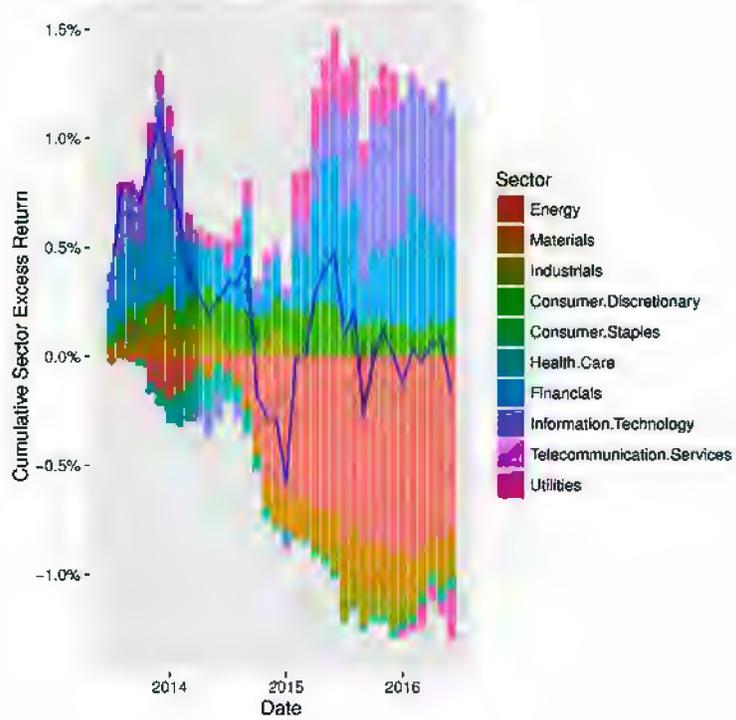
US Small Cap Barra Style Factor



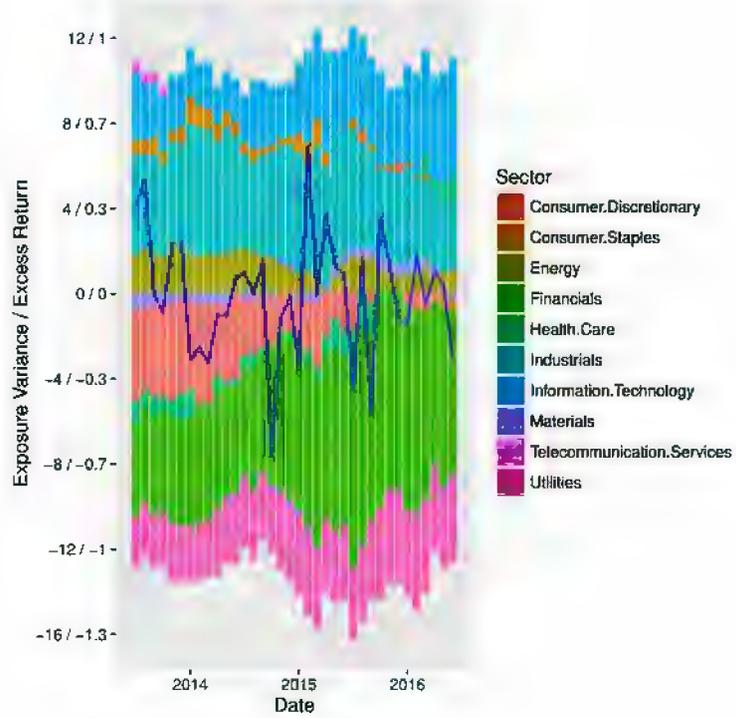
US Small Cap Monthly Style Factors Active Exposure



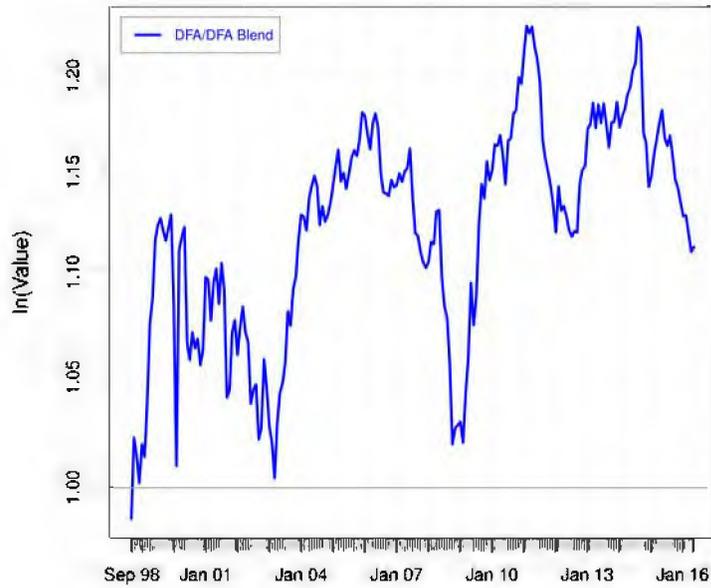
US Small Cap Monthly GICS Sector Return



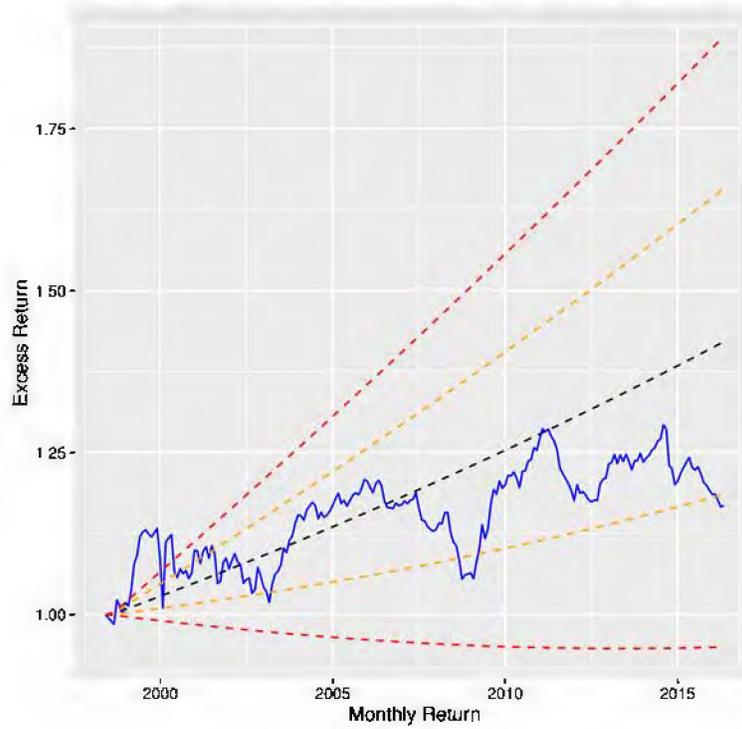
US Small Cap GICS Sector Active Exposure



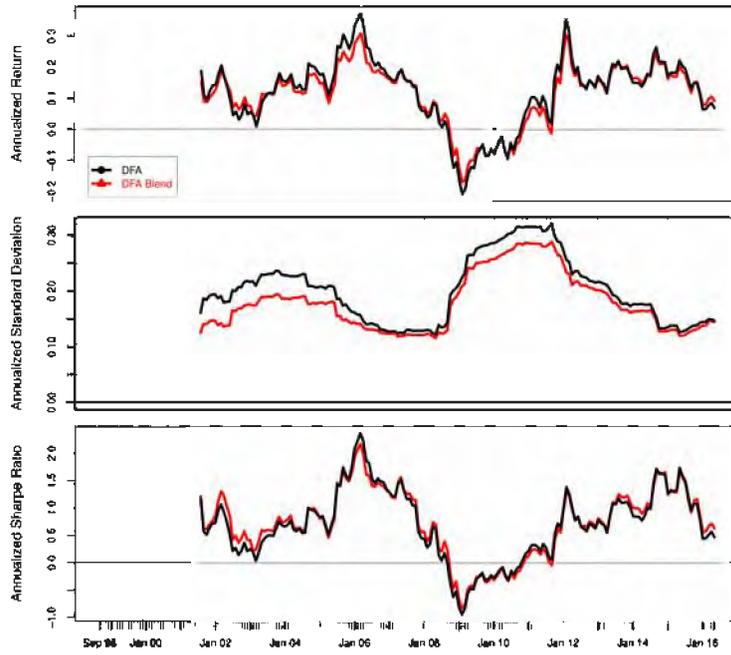
DFA Cumulative Relative Performance



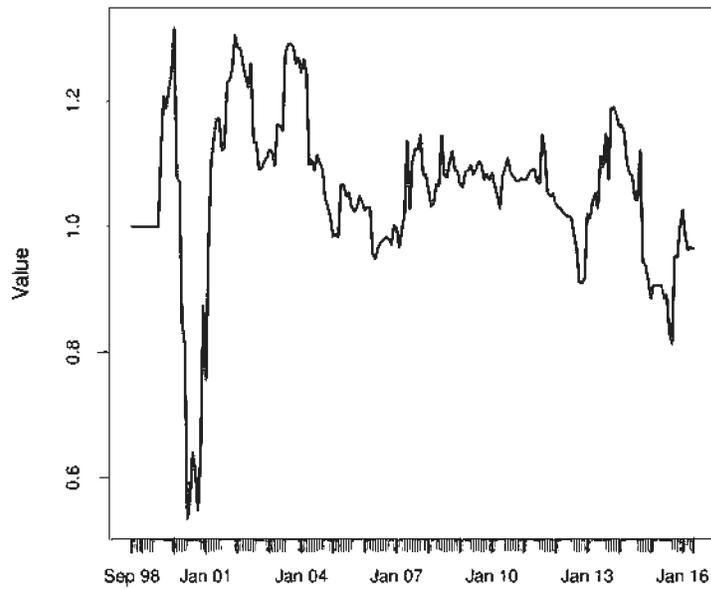
DFA Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



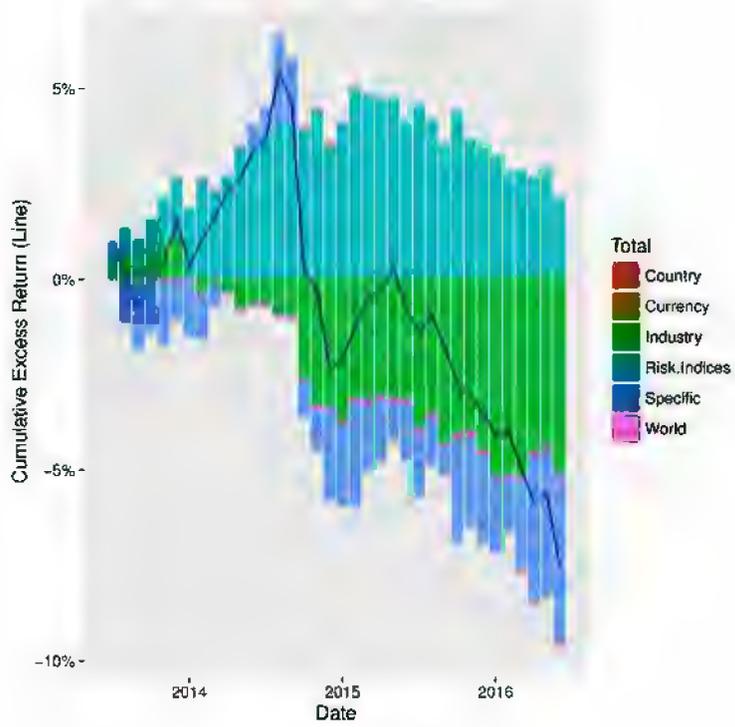
DFA Rolling 3 year Performance



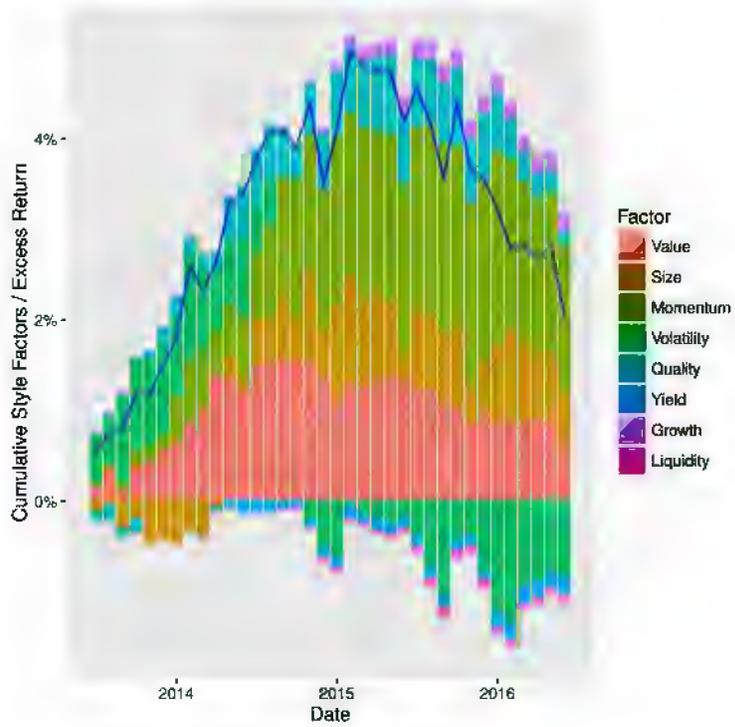
DFA Rolling 12 Month Beta



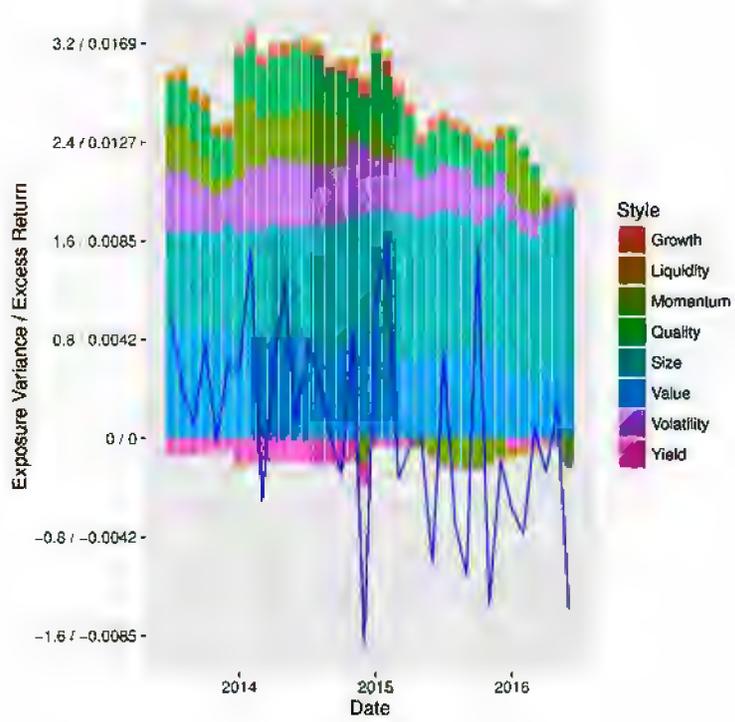
Barra Holdings Based Factor Attribution: DFA



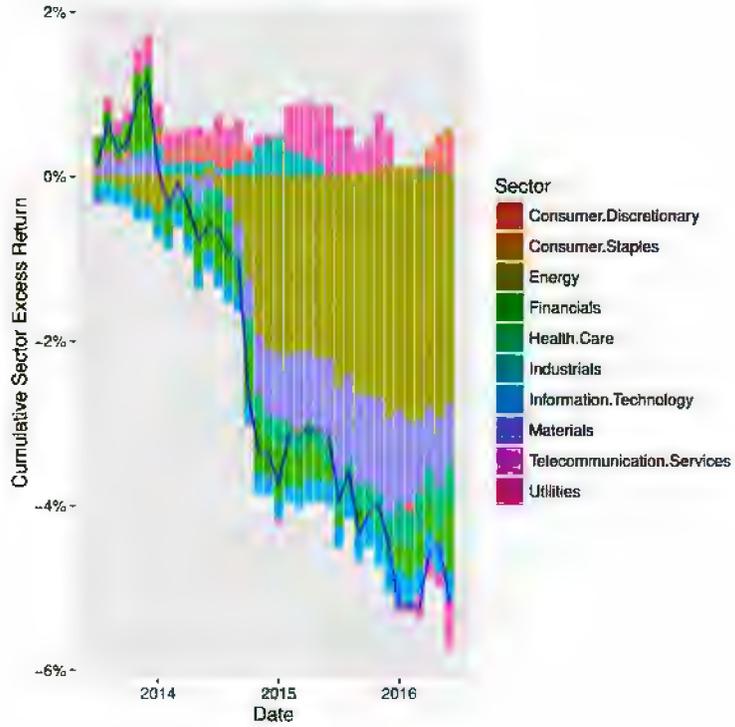
DFA Barra Style Factor



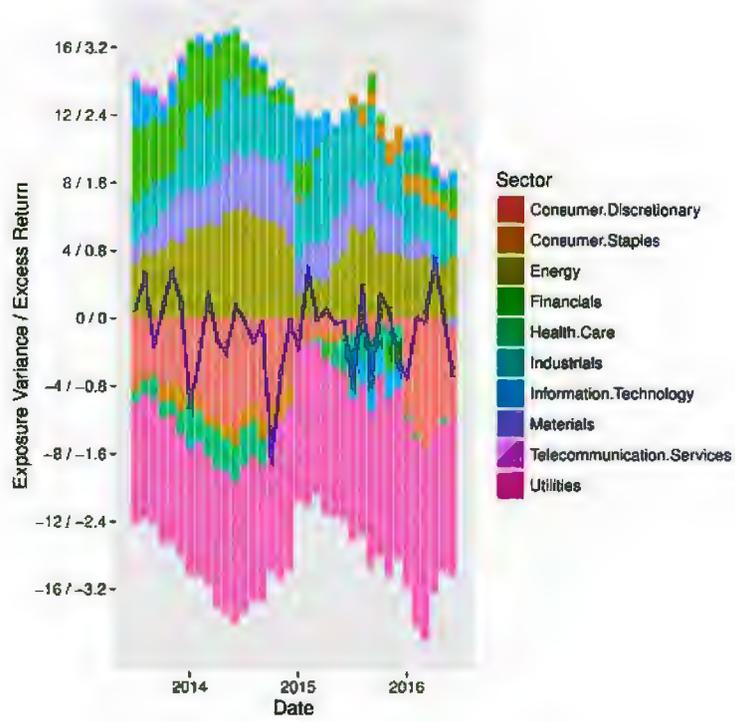
DFA Monthly Style Factors Active Exposure



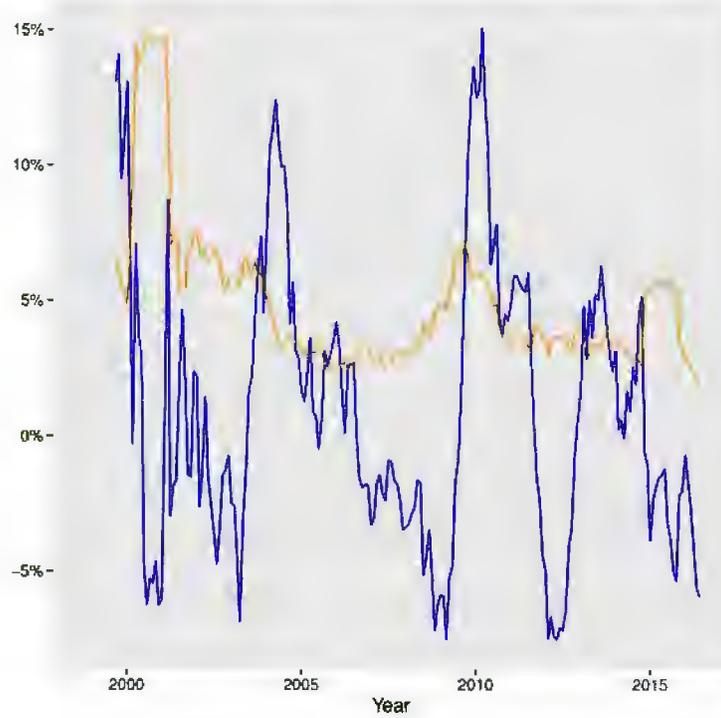
DFA Monthly GICS Sector Return



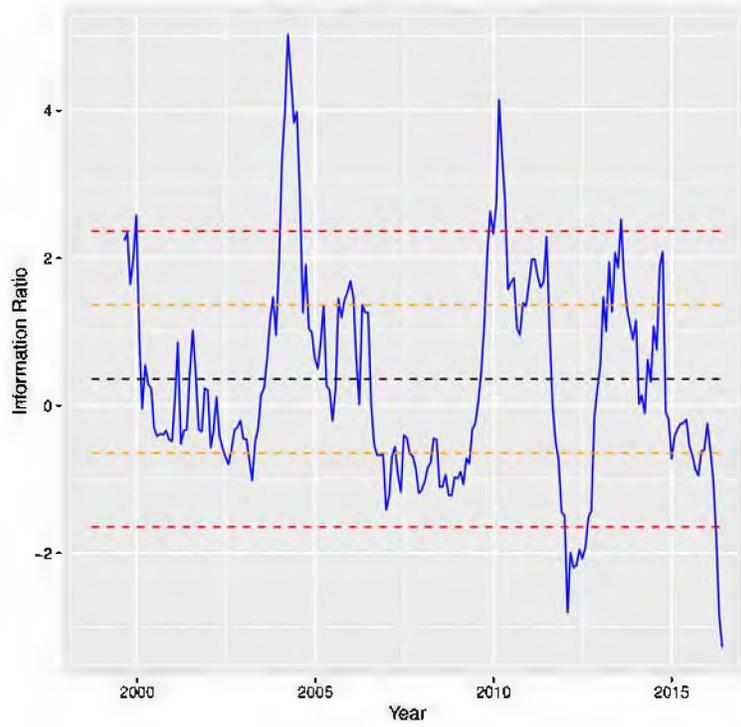
DFA GICS Sector Active Exposure



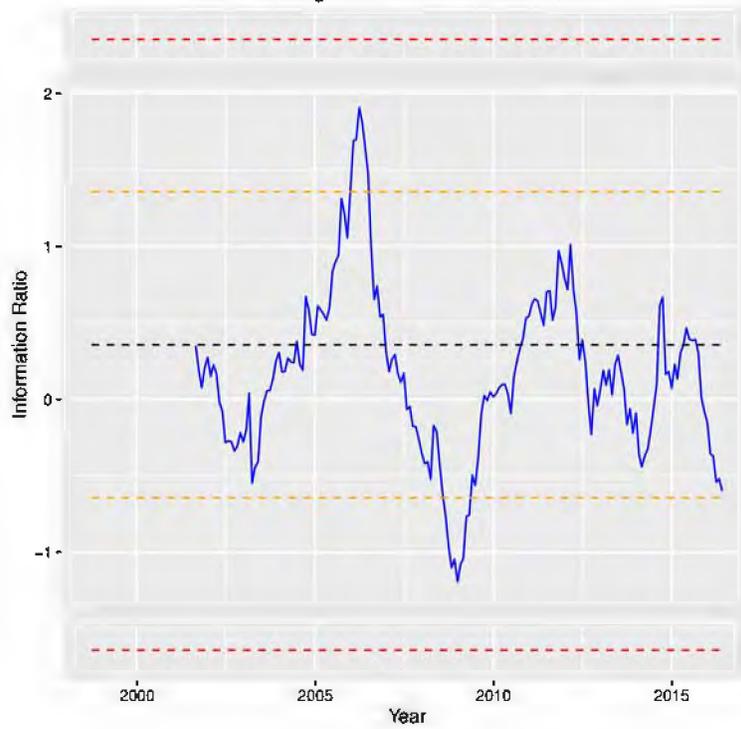
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



DFA Rolling 12 Month Information Ratio



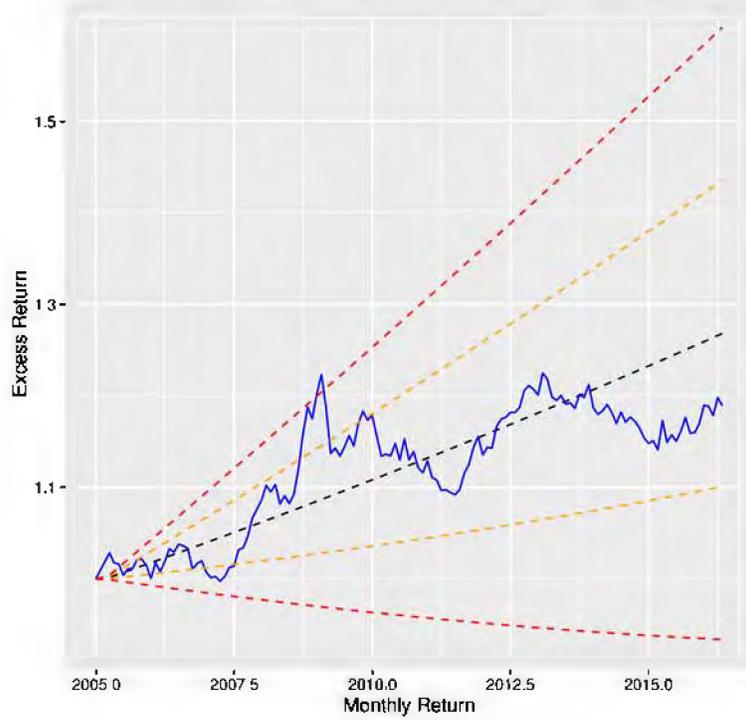
DFA Rolling 36 Month Information Ratio



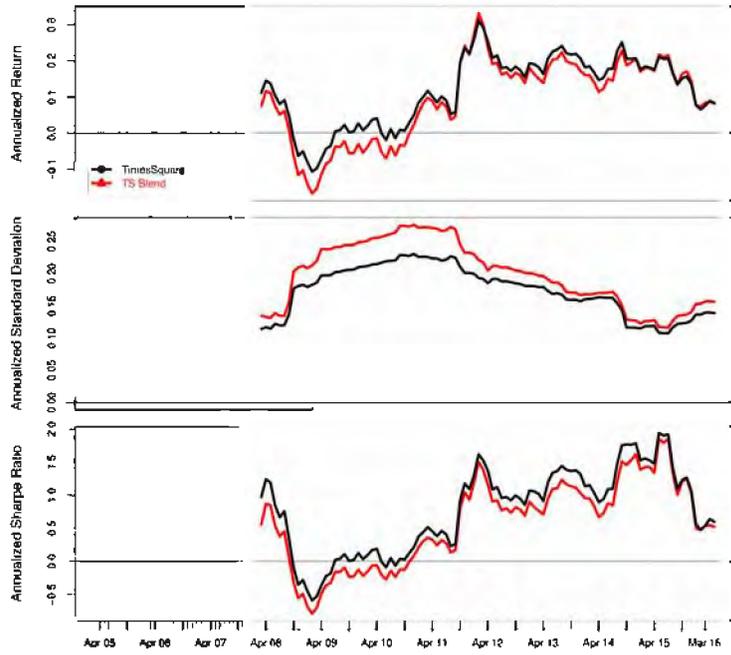
TimesSquare Cumulative Relative Performance



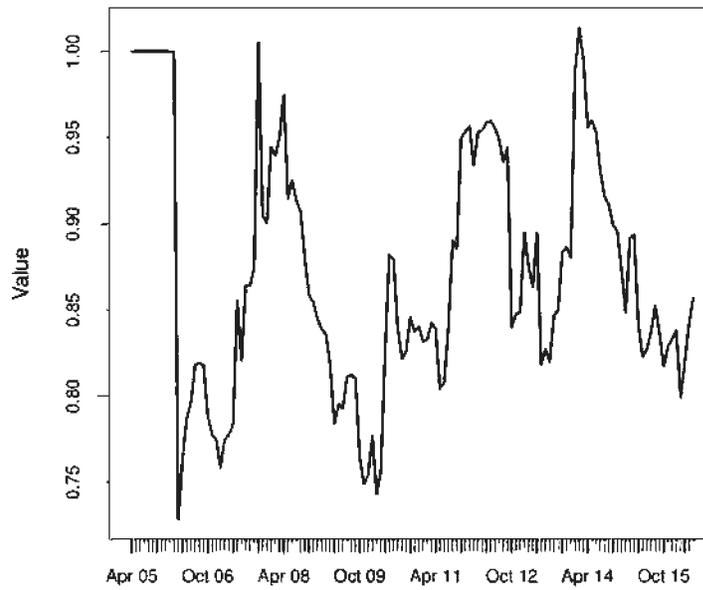
TimesSquare Actual Excess vs Expected Excess ± 1 & 2 Std Dev



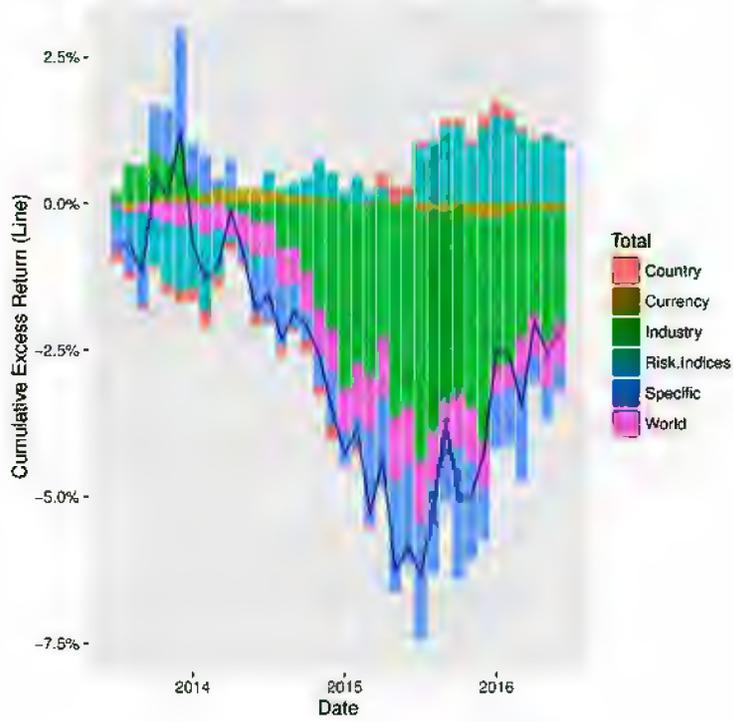
TimesSquare Rolling 3 year Performance



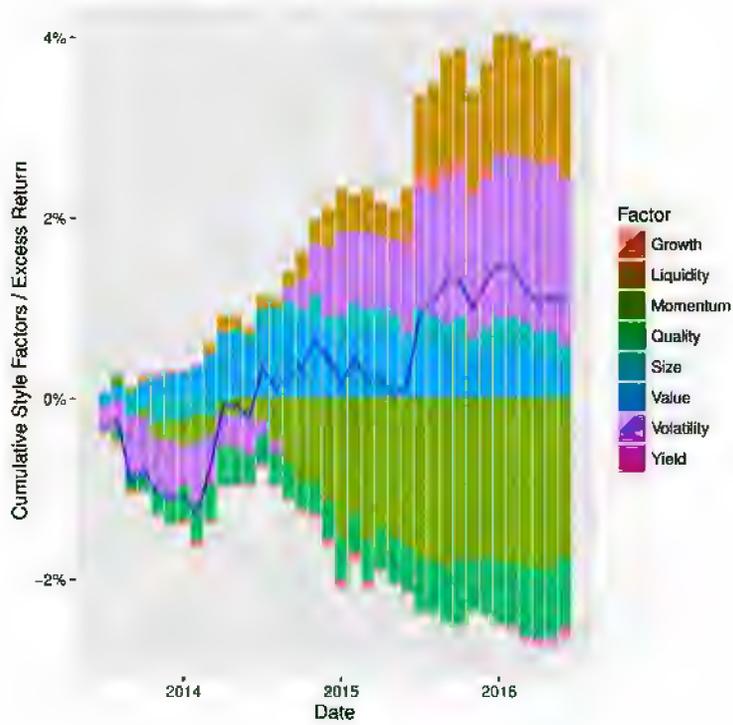
TimesSquare Rolling 12 Month Beta



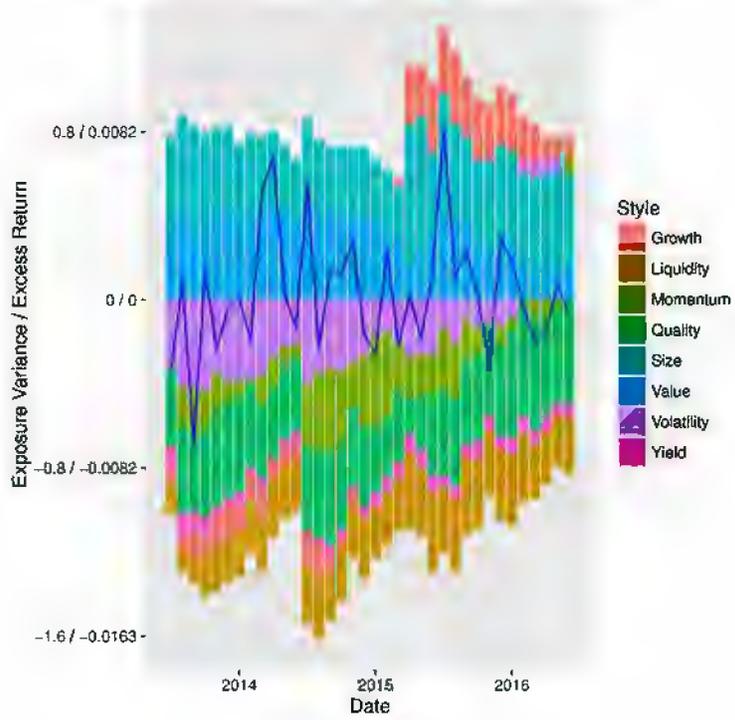
Barra Holdings Based Factor Attribution: TimesSquare



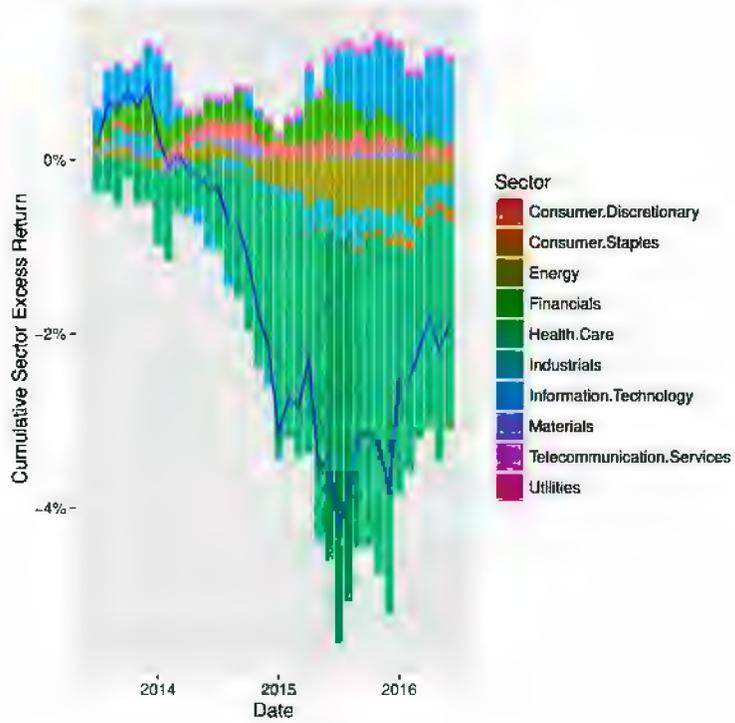
TimesSquare Barra Style Factor



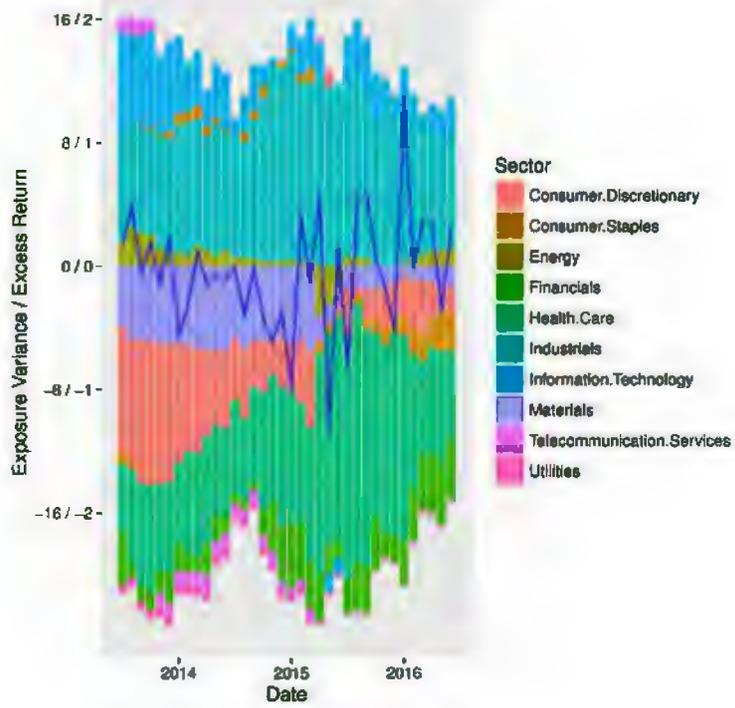
TimesSquare Monthly Style Factors Active Exposure



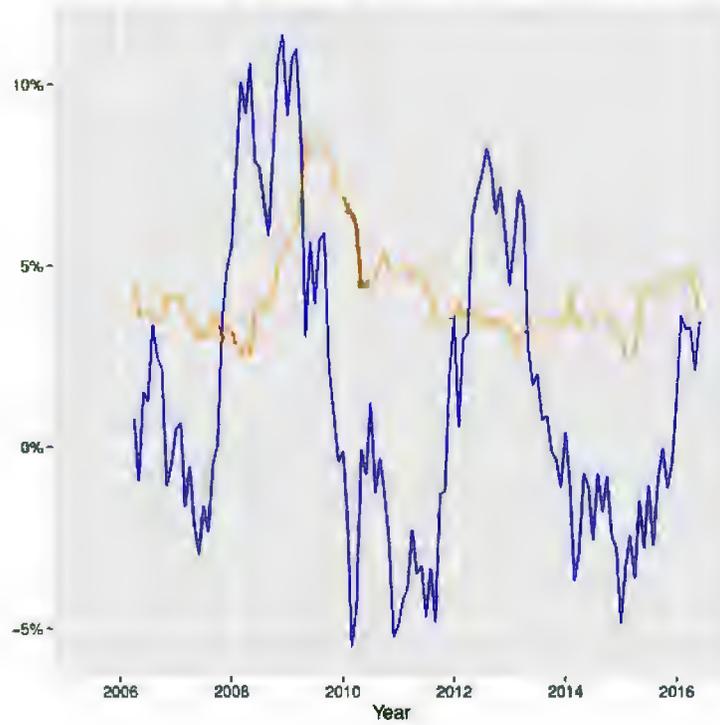
TimesSquare Monthly GICS Sector Return



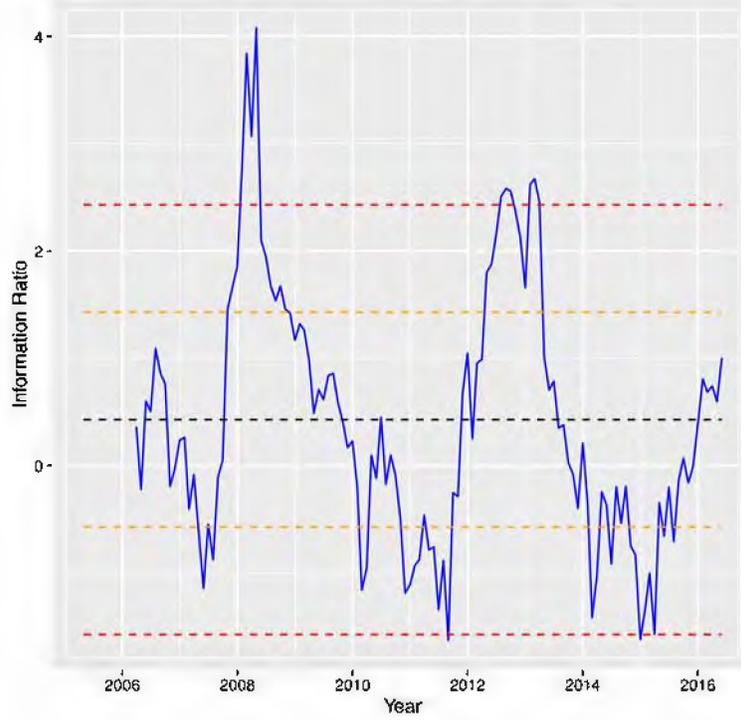
TimesSquare GICS Sector Active Exposure



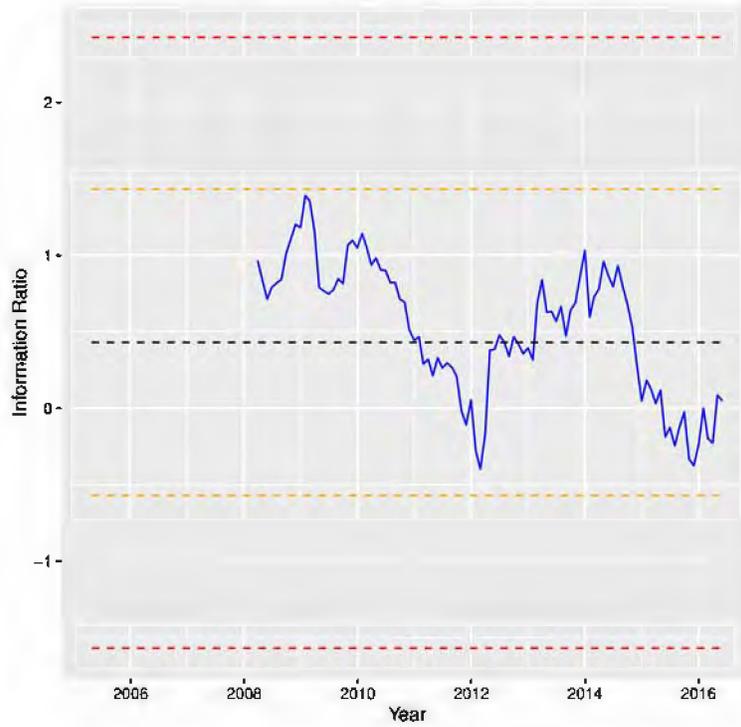
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



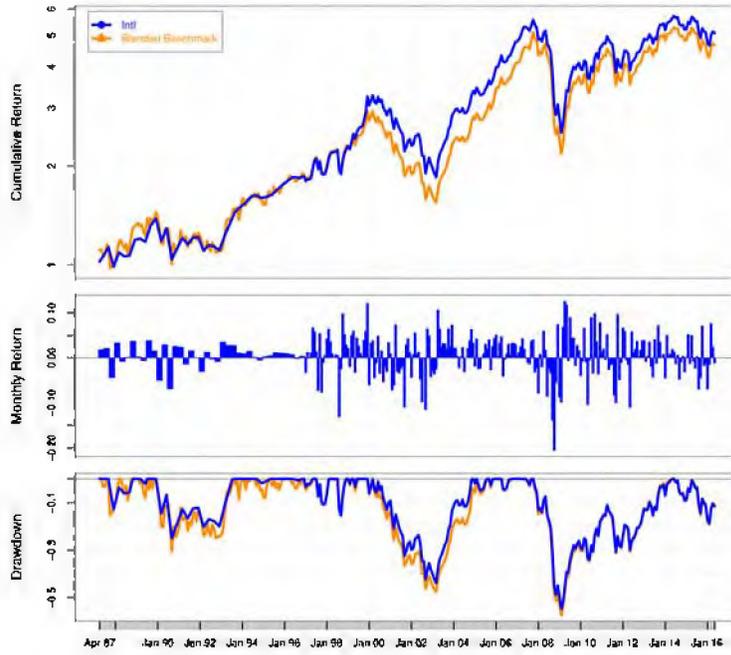
TimesSquare Rolling 12 Month Information Ratio



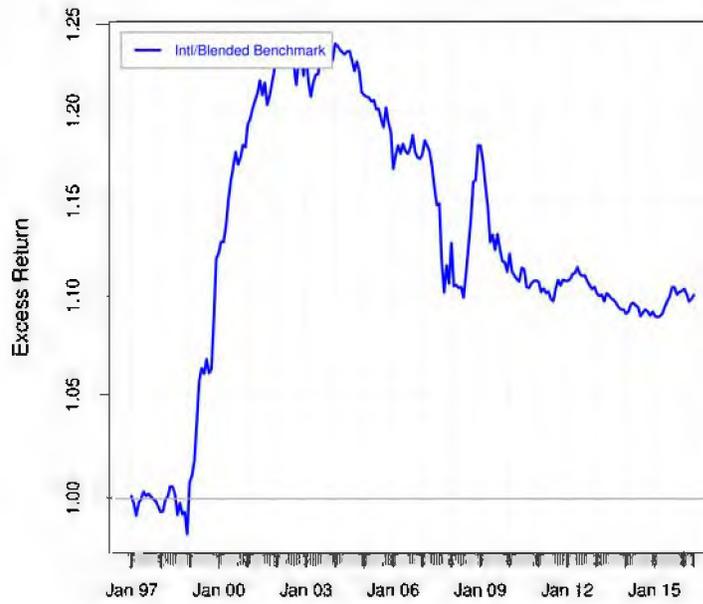
TimesSquare Rolling 36 Month Information Ratio



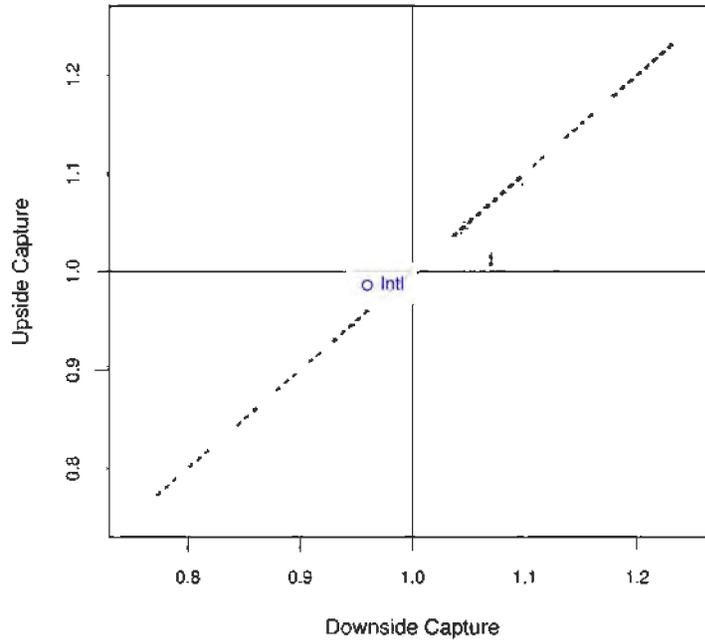
International Equity Performance Summary



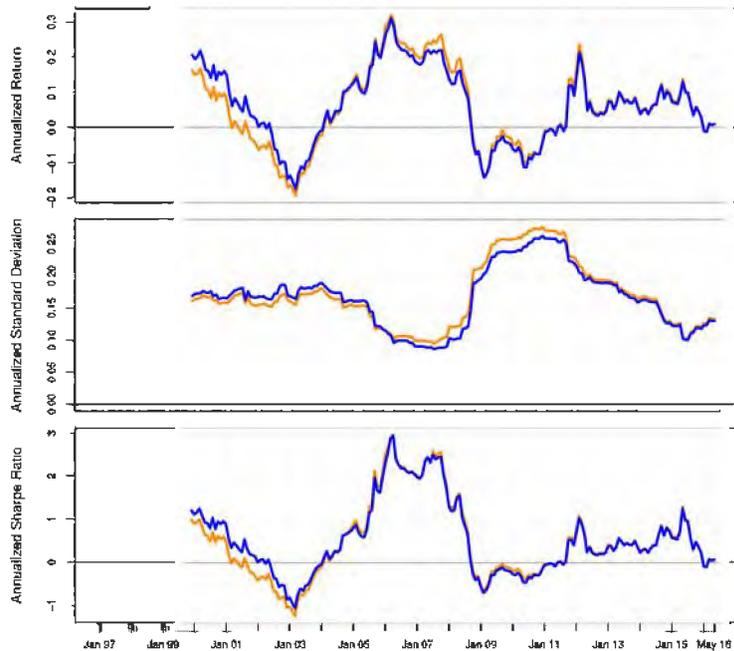
International Equity Cumulative Relative Performance



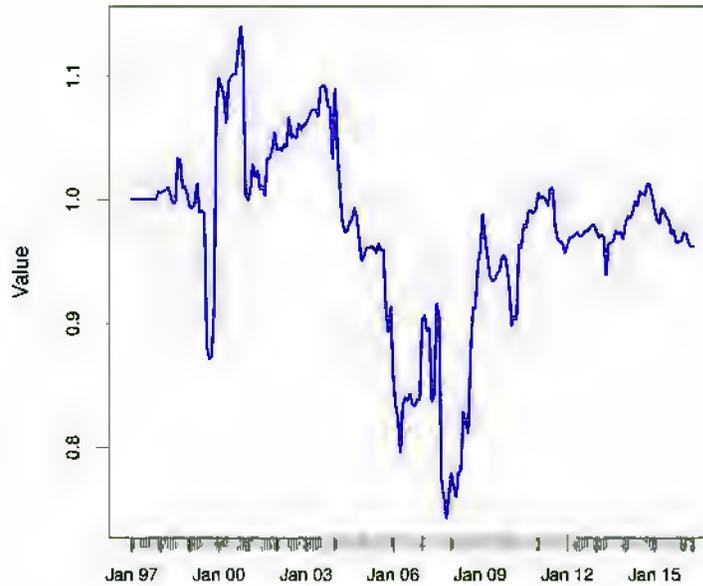
International Equity Capture Ratios



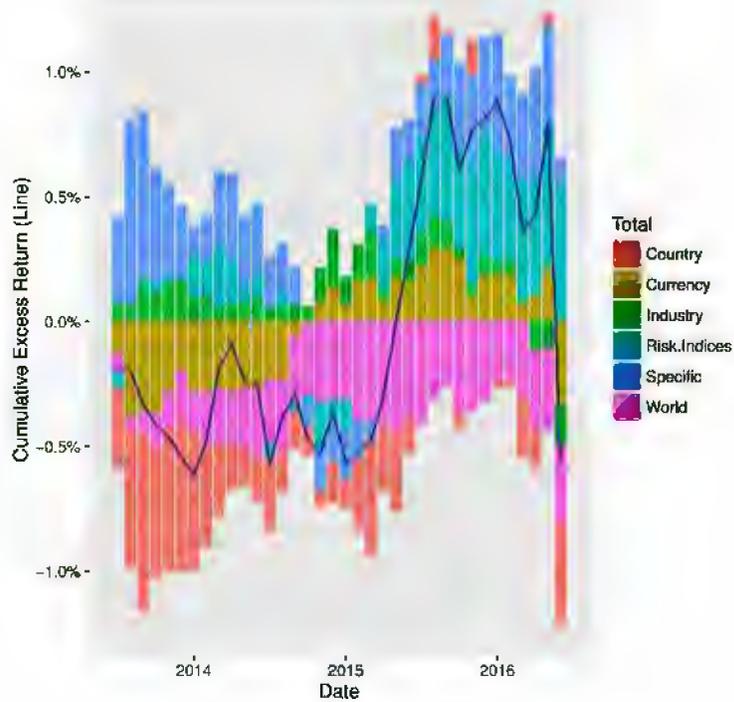
International Equity Rolling 3 Year Performance



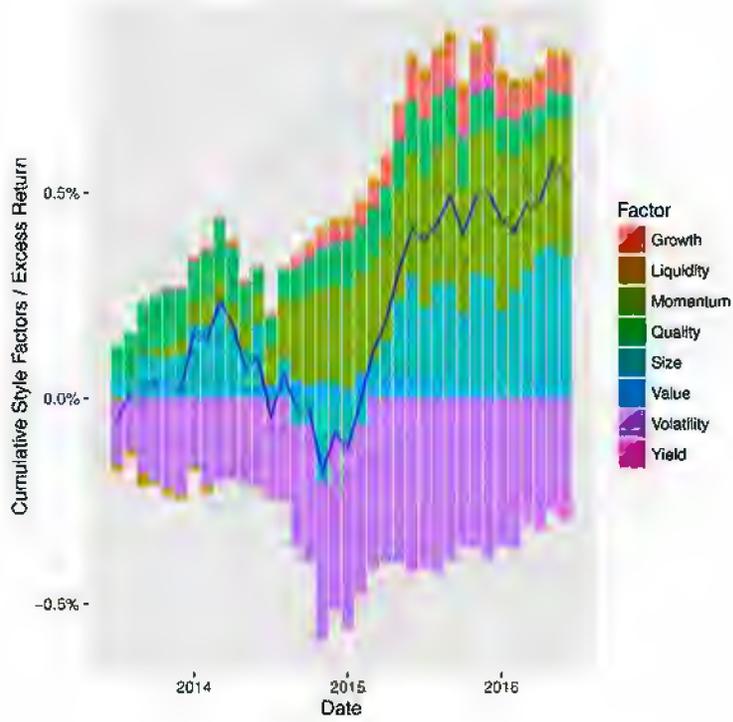
International Equity Rolling 12 Month Beta



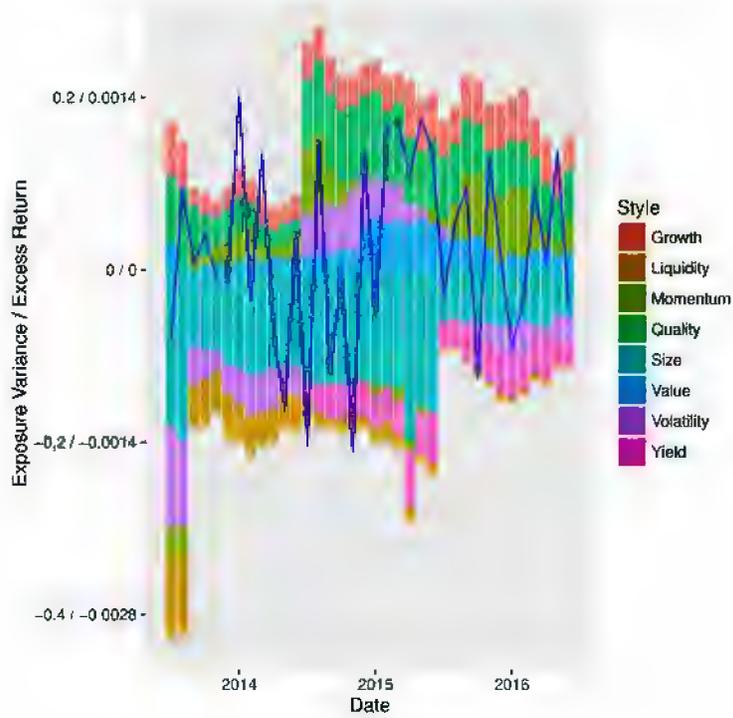
Barra Holdings Based Factor Attribution: International Equity



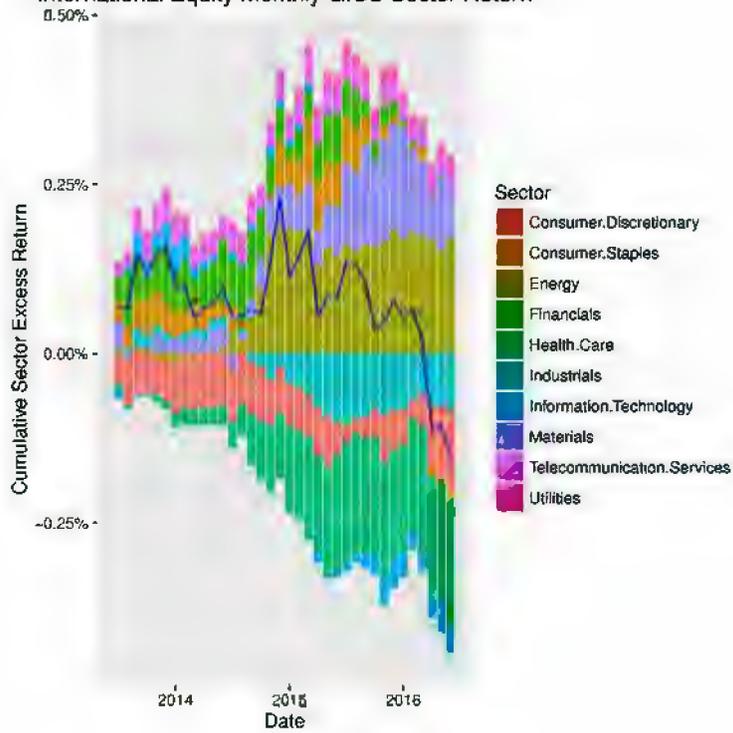
International Equity Barra Style Factor



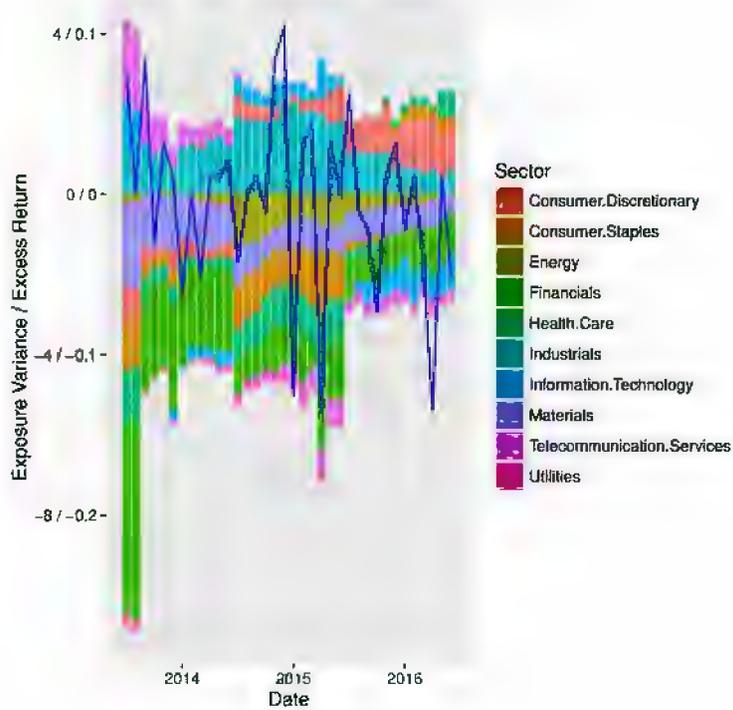
International Equity Monthly Style Factors Active Exposure



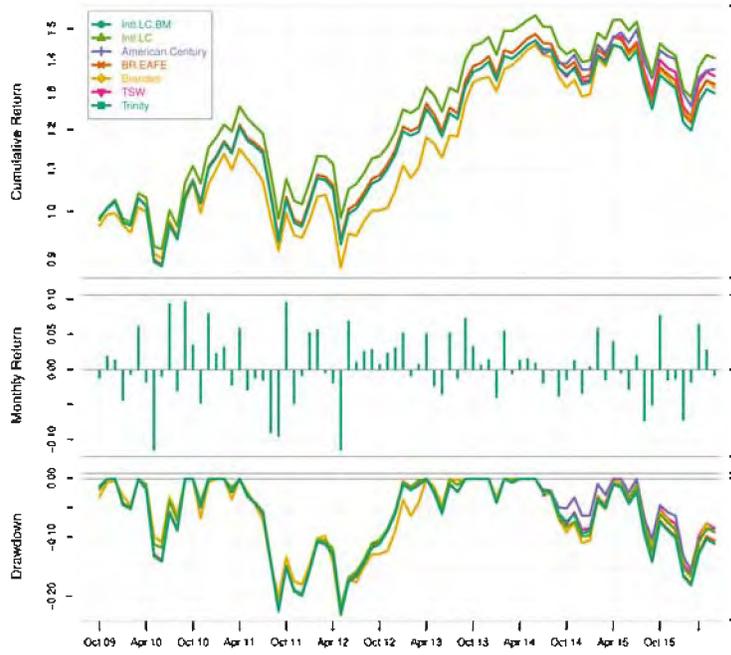
International Equity Monthly GICS Sector Return



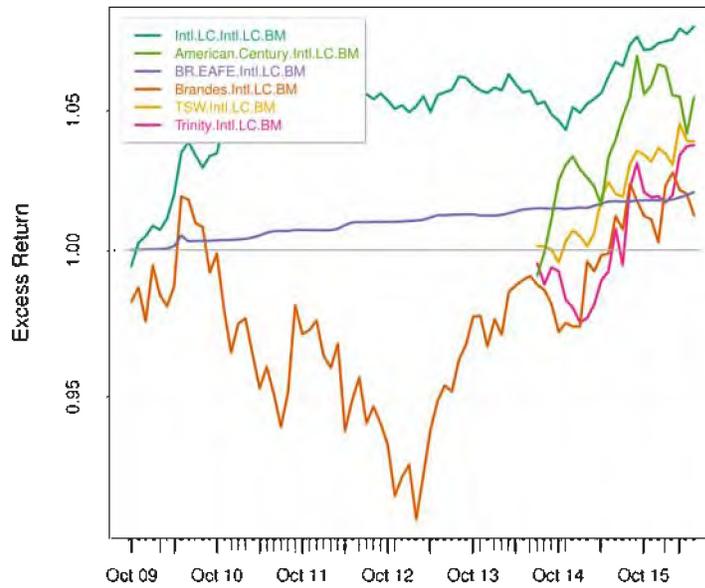
International Equity GICS Sector Active Exposure



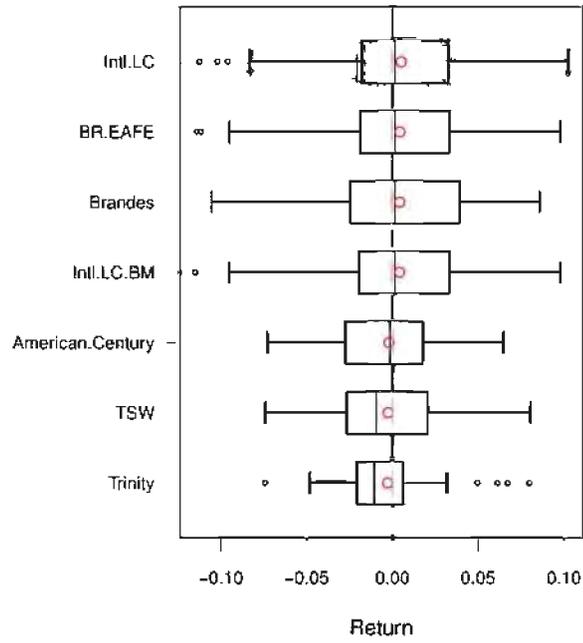
Intl Developed Large Cap Performance Summary



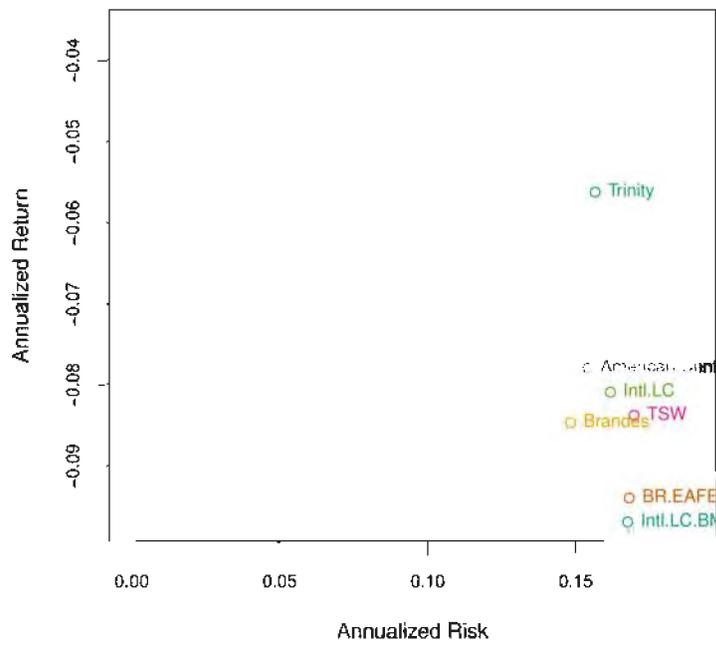
Intl Developed Large Cap Cumulative Relative Performance



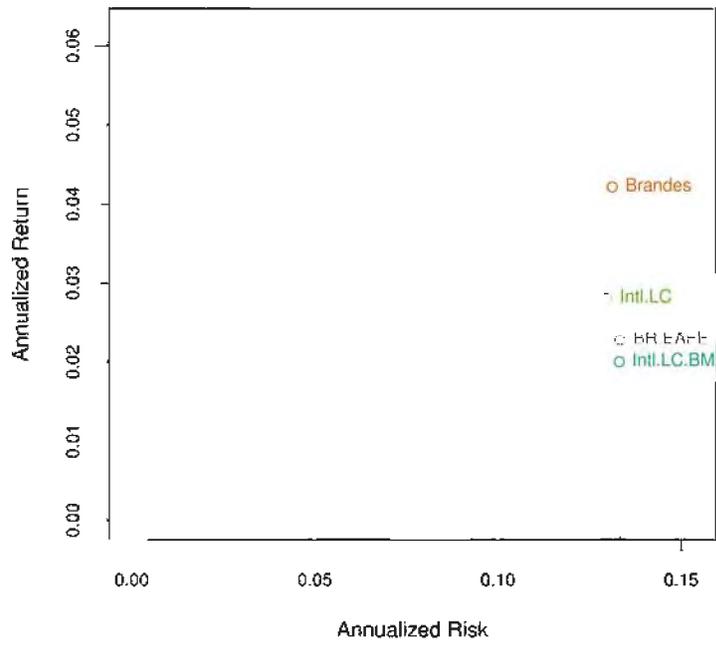
Return Distribution Comparison



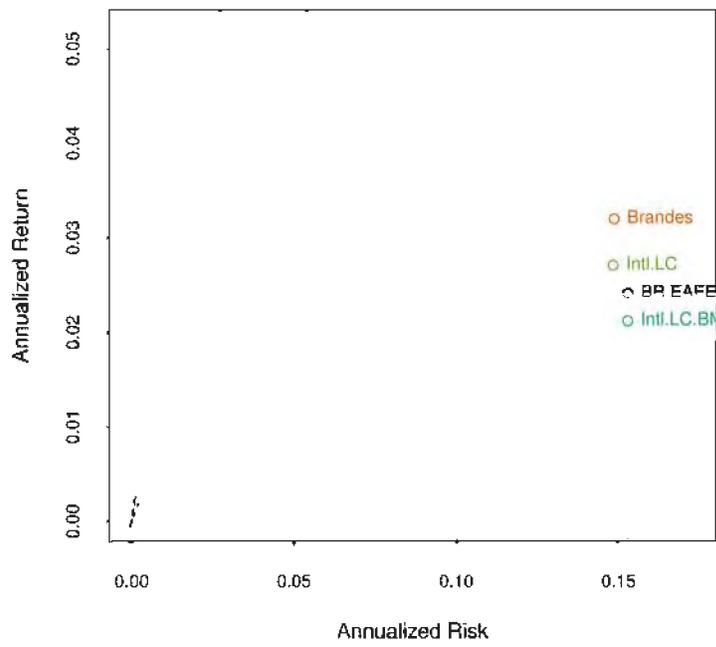
Intl Developed Large Cap Trailing 1 Year Performance vs Sharpe Ratios (1)



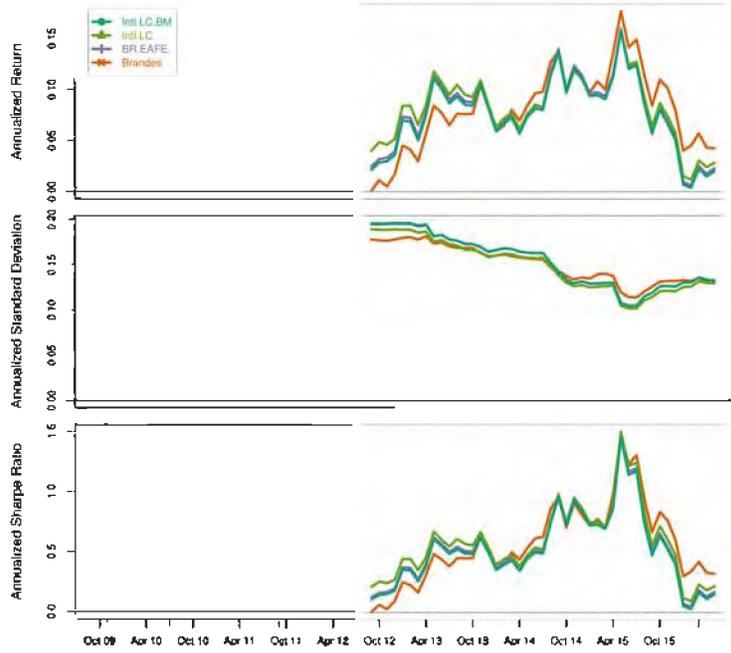
Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)



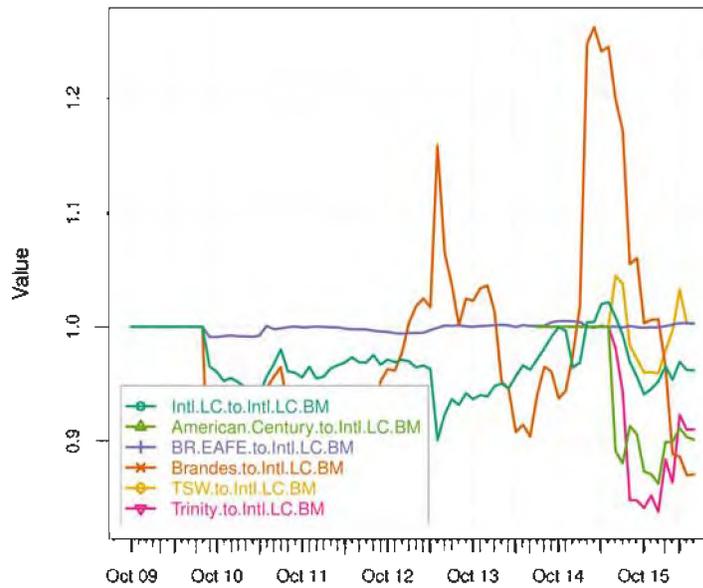
Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)



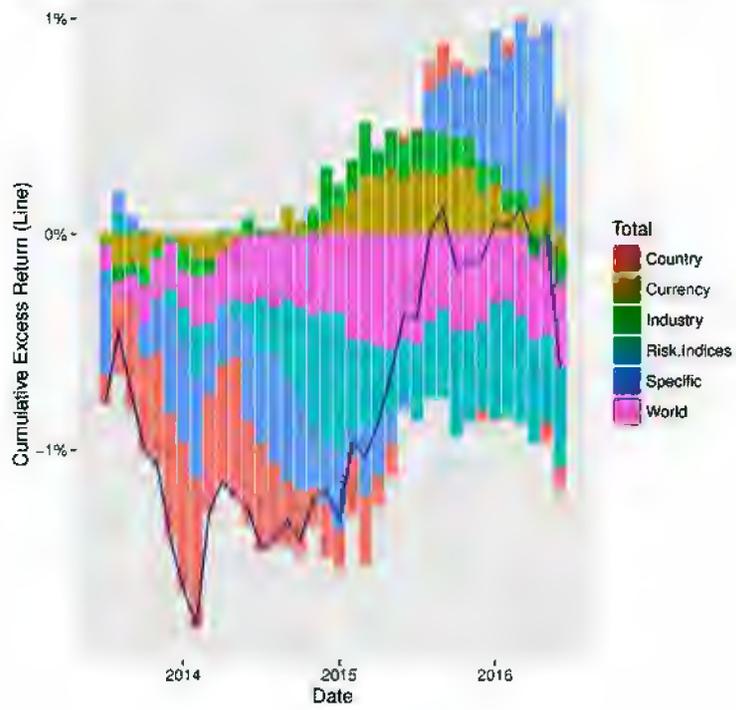
Intl Developed Large Cap Rolling 3 Year Performance



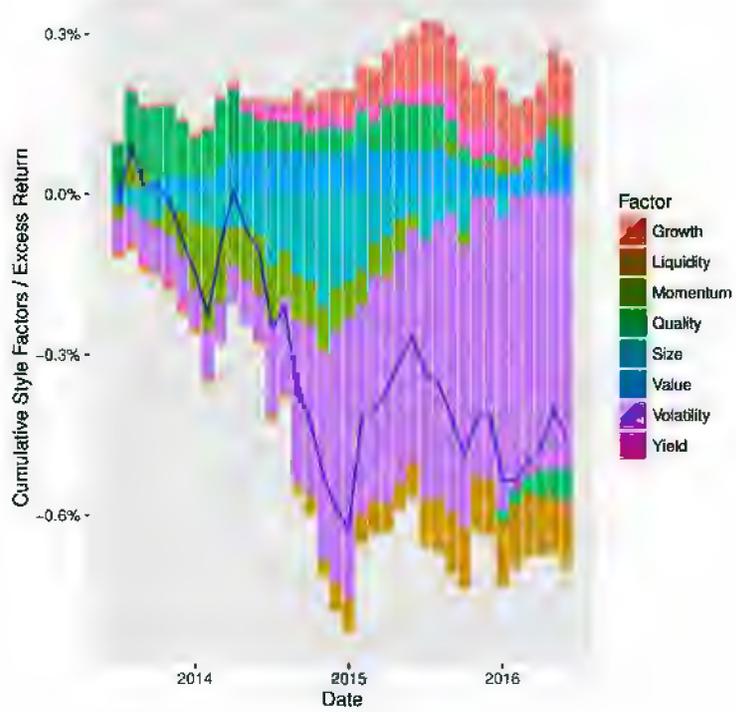
Intl Developed Large Cap Rolling 12 Month Beta



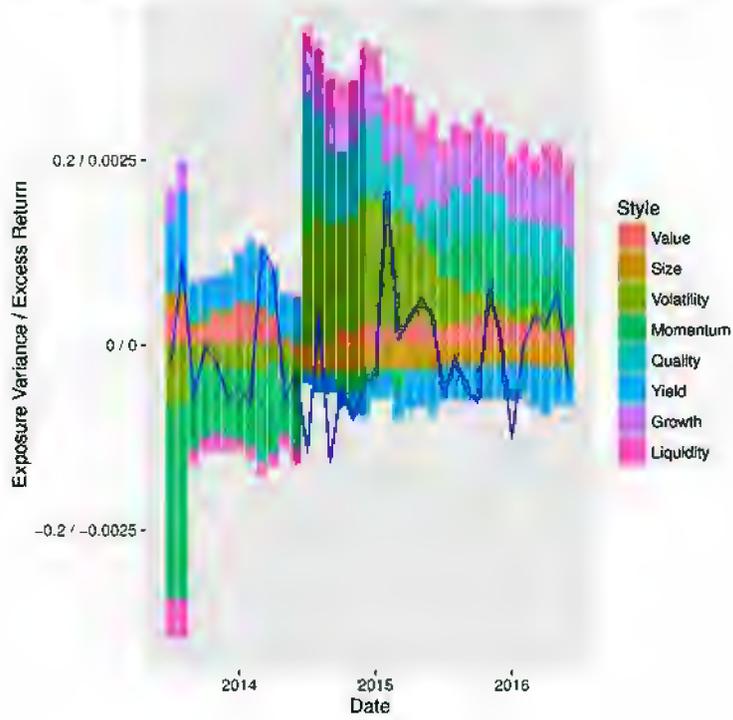
Barra Holdings Based Factor Attribution: Intl Developed Large Cap



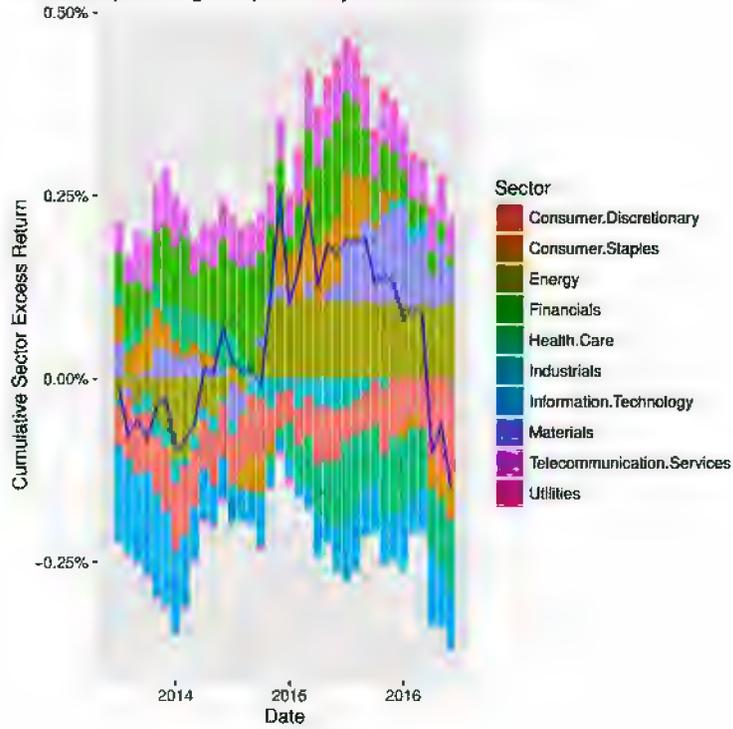
Intl Developed Large Cap Barra Style Factor



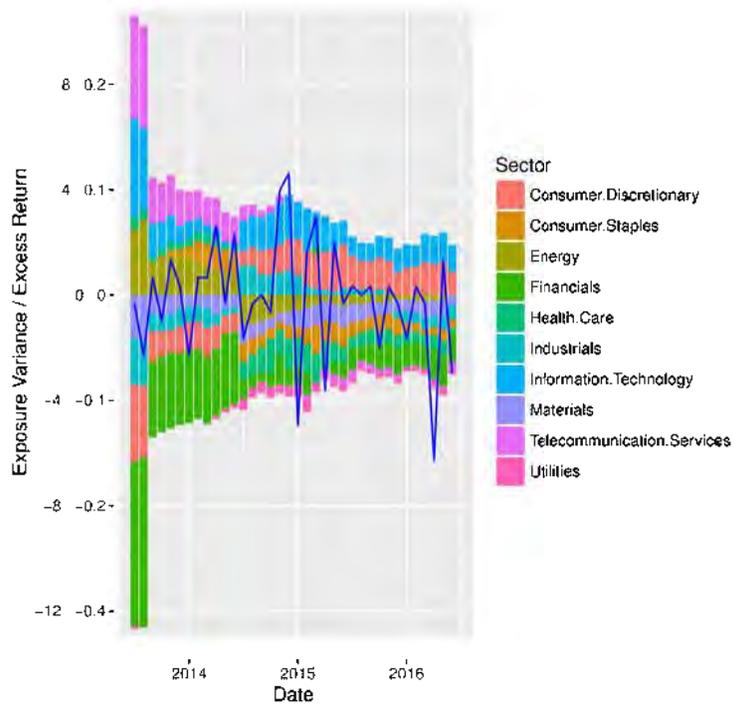
Intl Developed Large Cap Monthly Style Factors Active Exposure



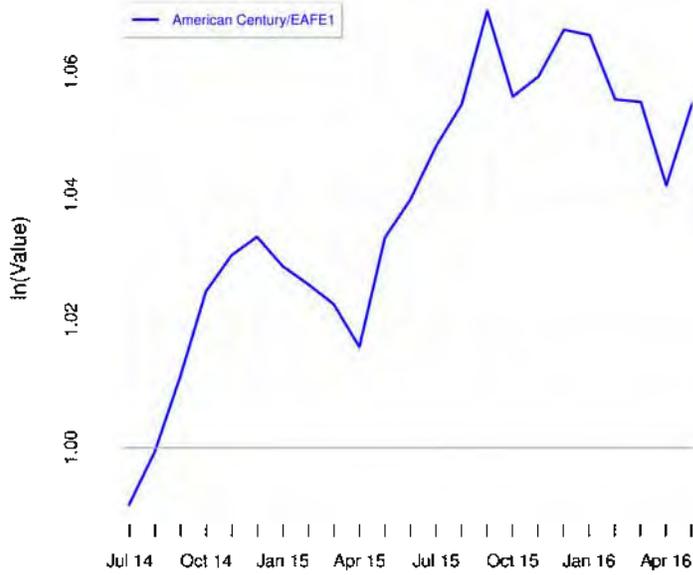
Intl Developed Large Cap Monthly GICS Sector Return



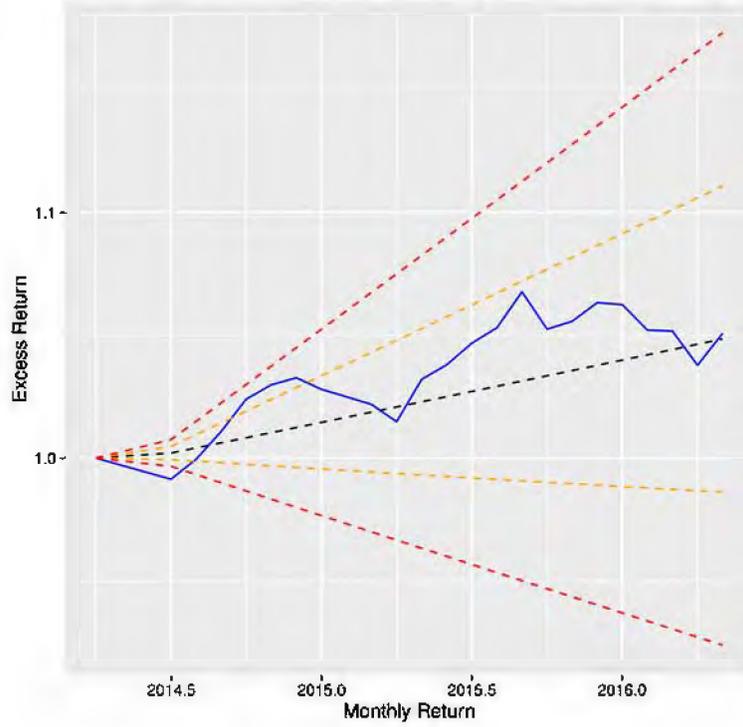
Intl Developed Large Cap GICS Sector Active Exposure



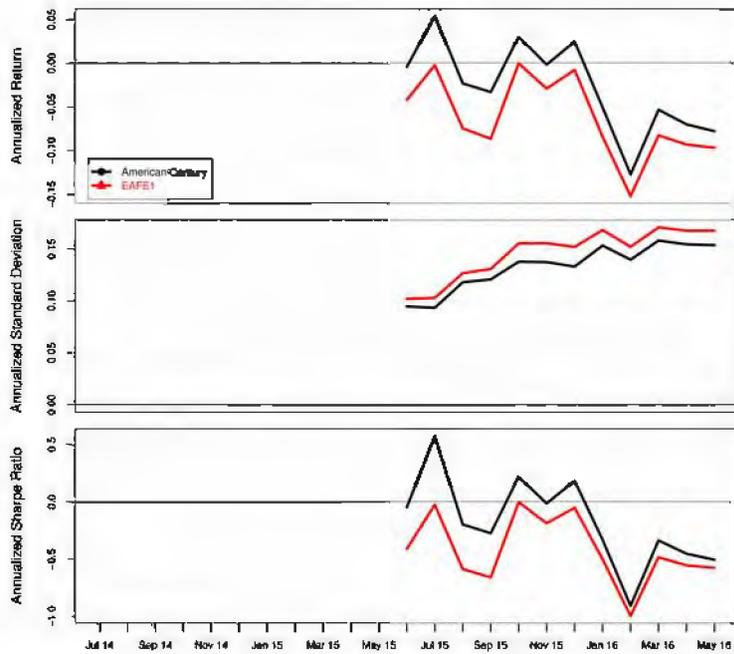
American Century Cumulative Relative Performance



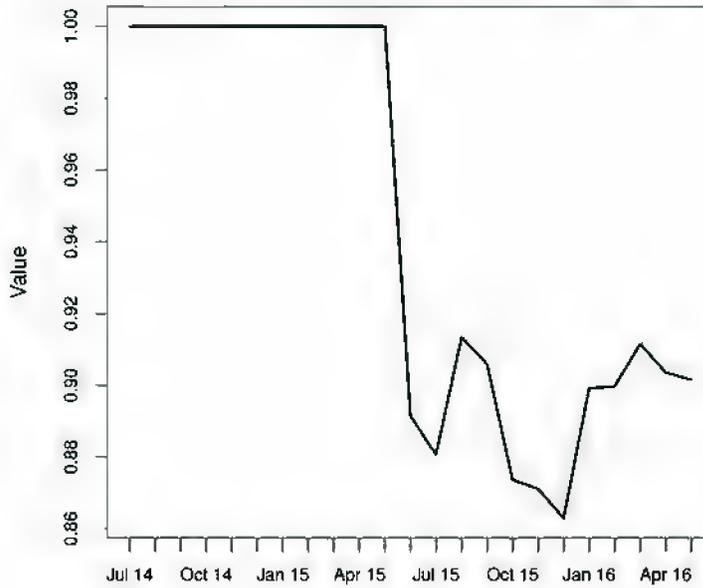
American Century Actual Excess vs Expected Excess +/-1 & 2 Std De



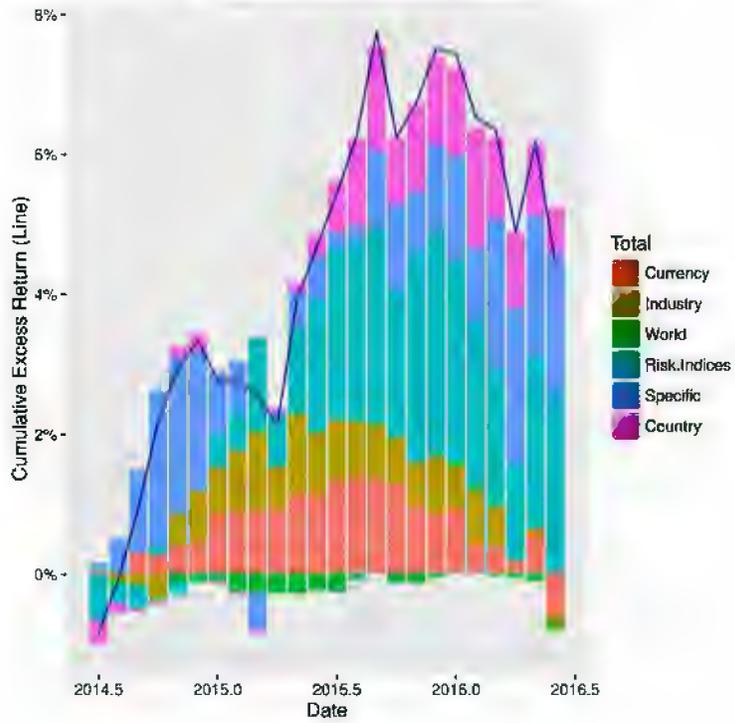
American Century Rolling 1 year Performance

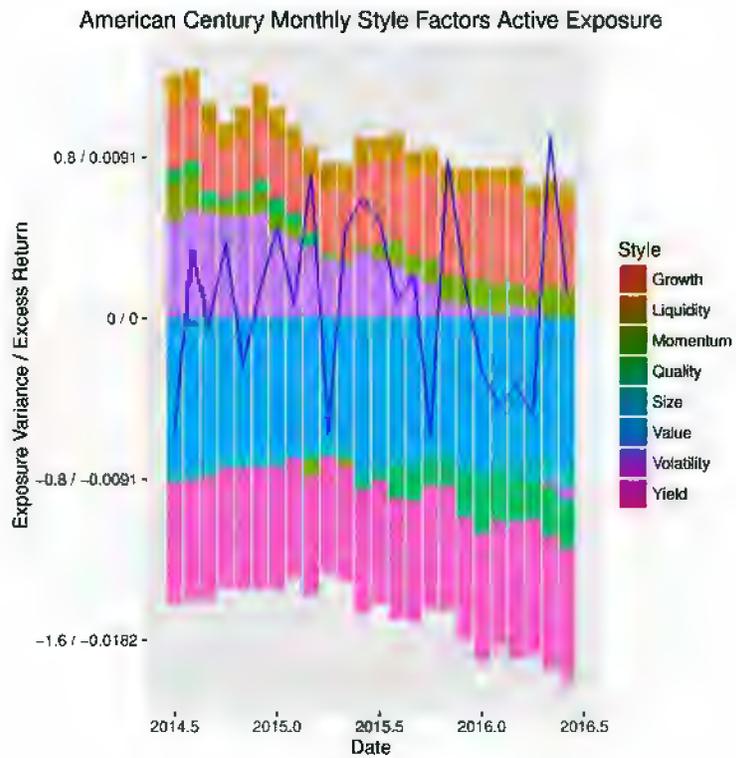
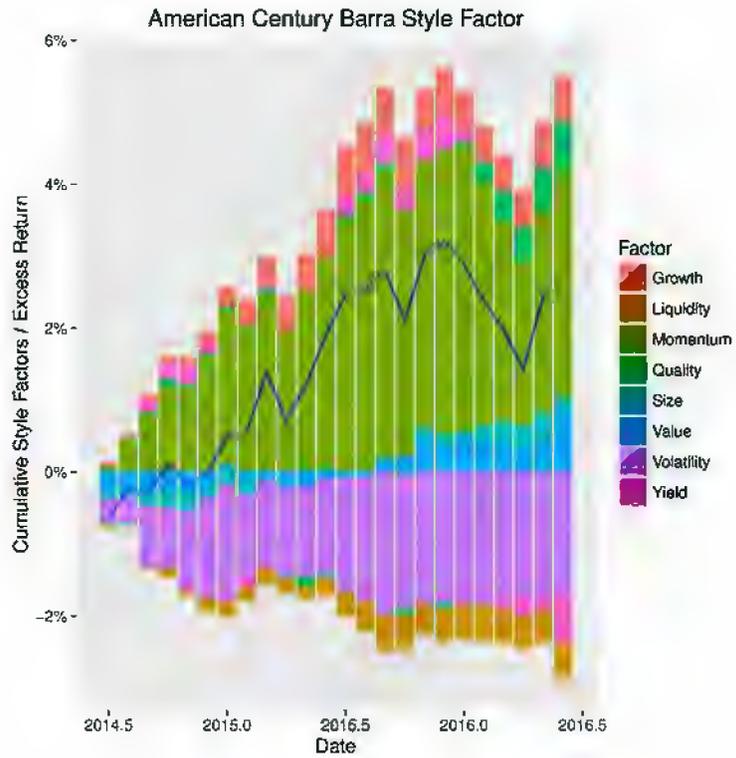


American Century Rolling 12 Month Beta

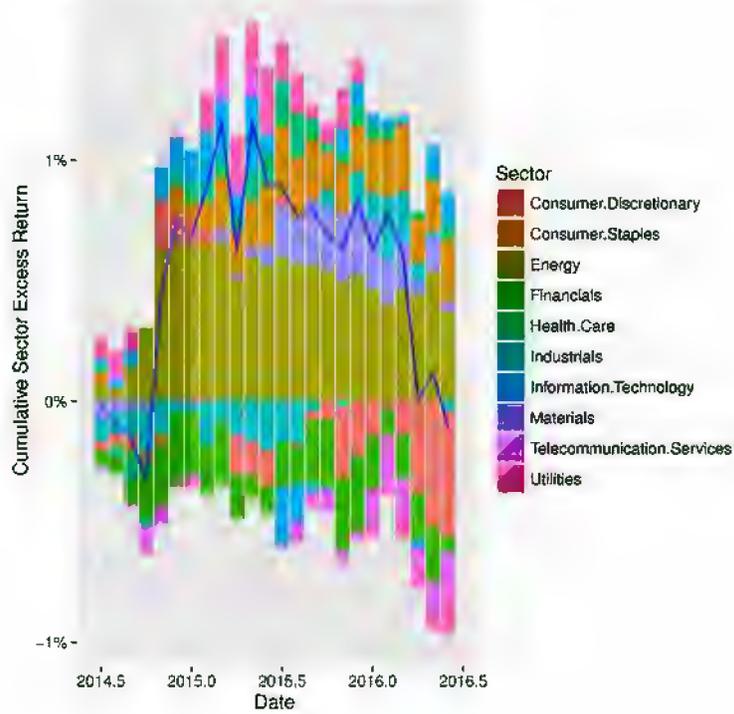


Barra Holdings Based Factor Attribution: American Century

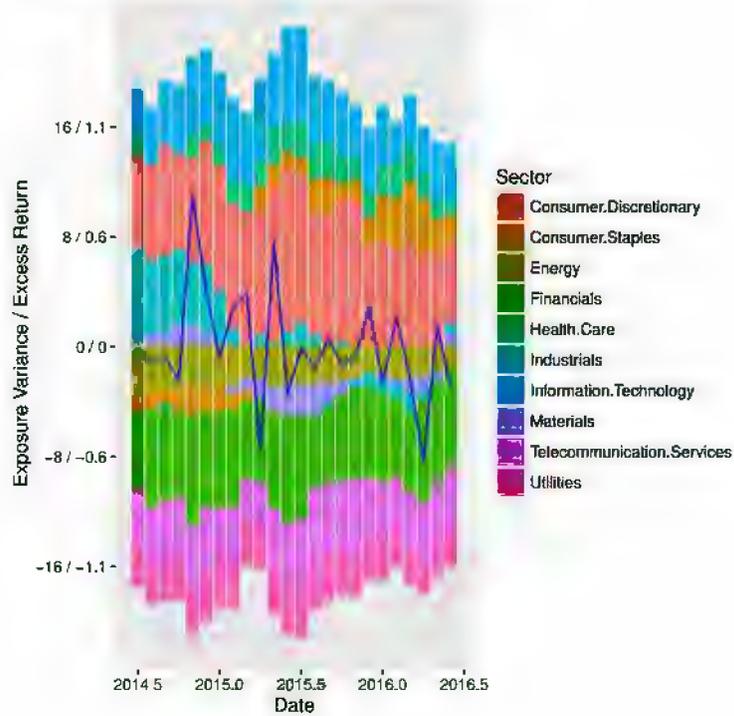




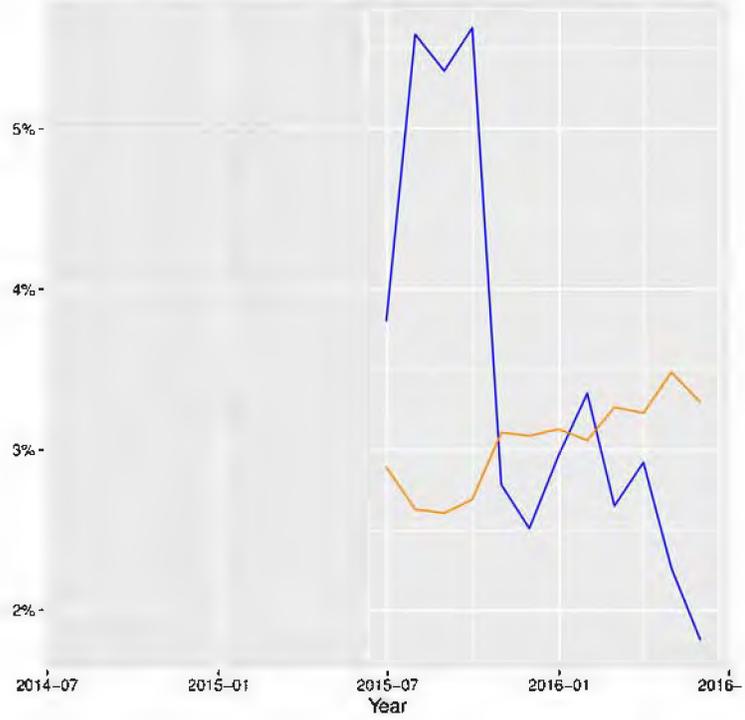
American Century Monthly GICS Sector Return



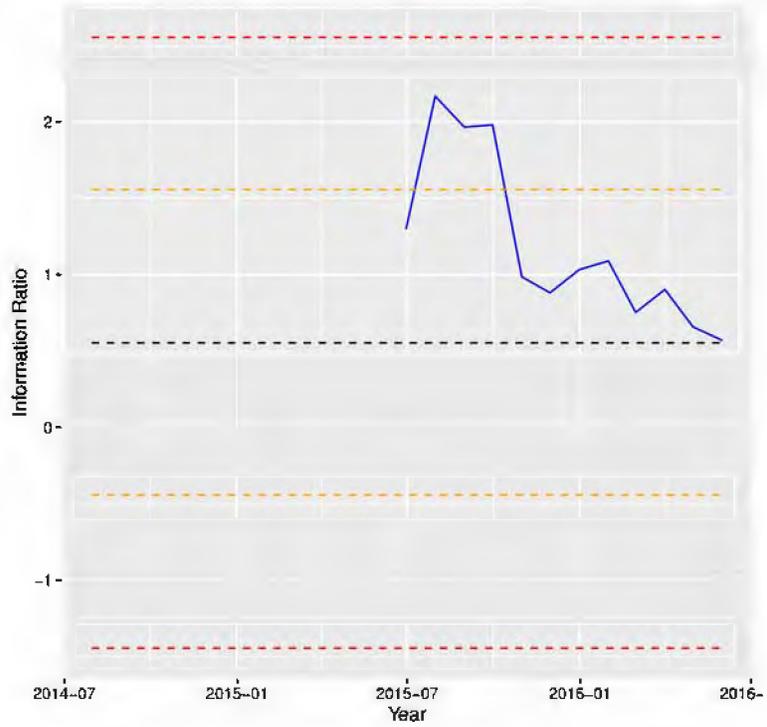
American Century GICS Sector Active Exposure



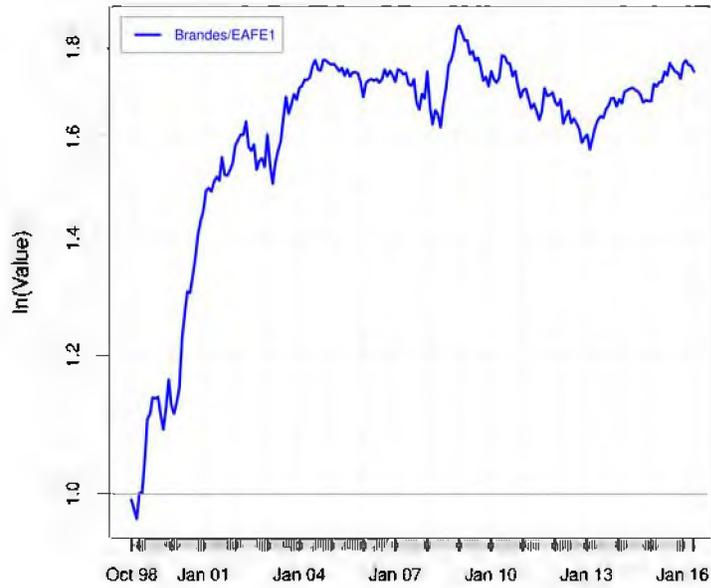
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



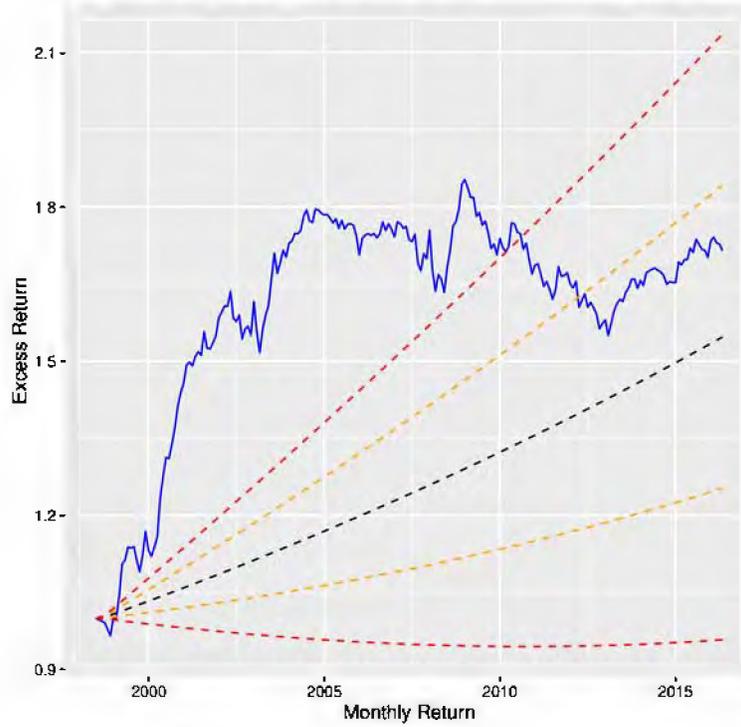
American Century Rolling 12 Month Information Ratio



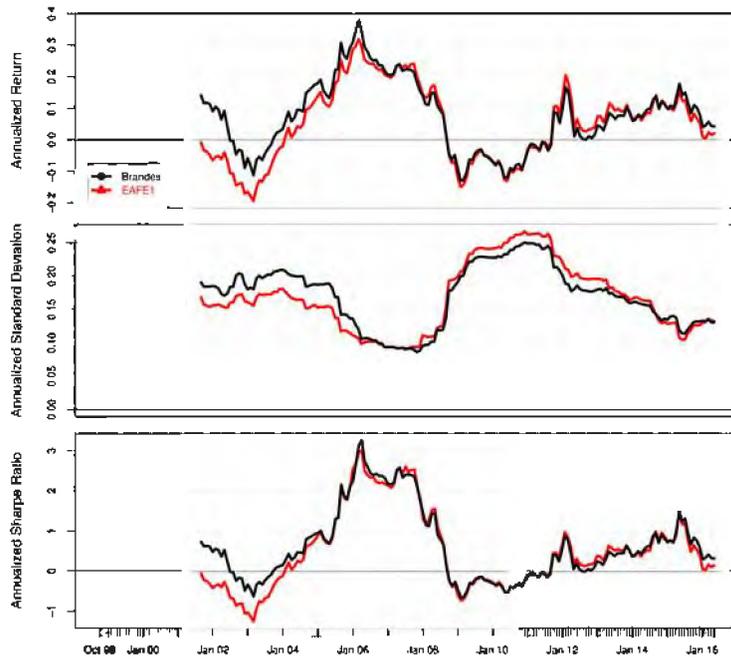
Brades Cumulative Relative Performance



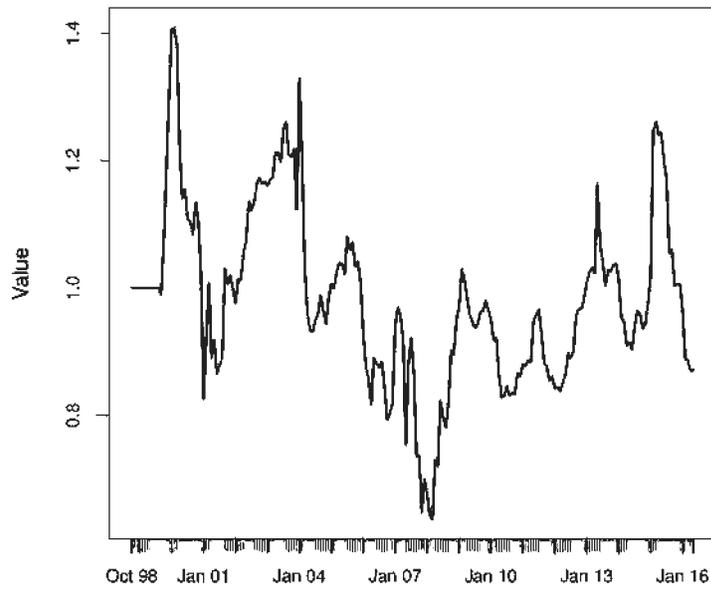
Brades Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



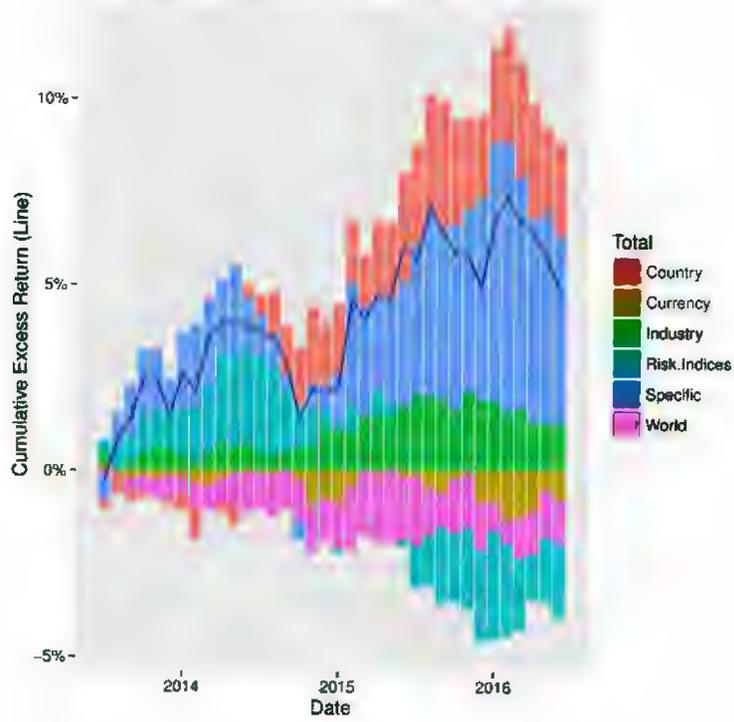
Brandes Rolling 3 year Performance



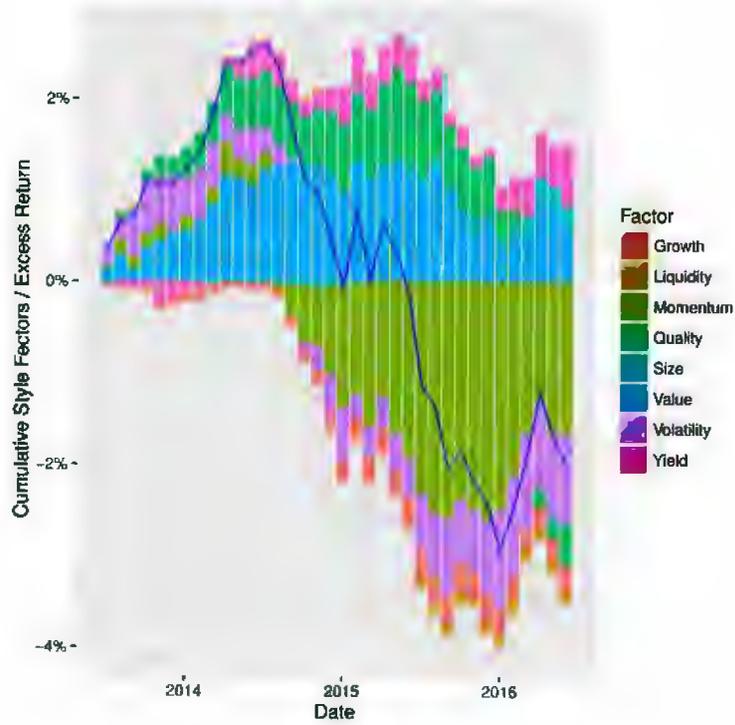
Brandes Rolling 12 Month Beta



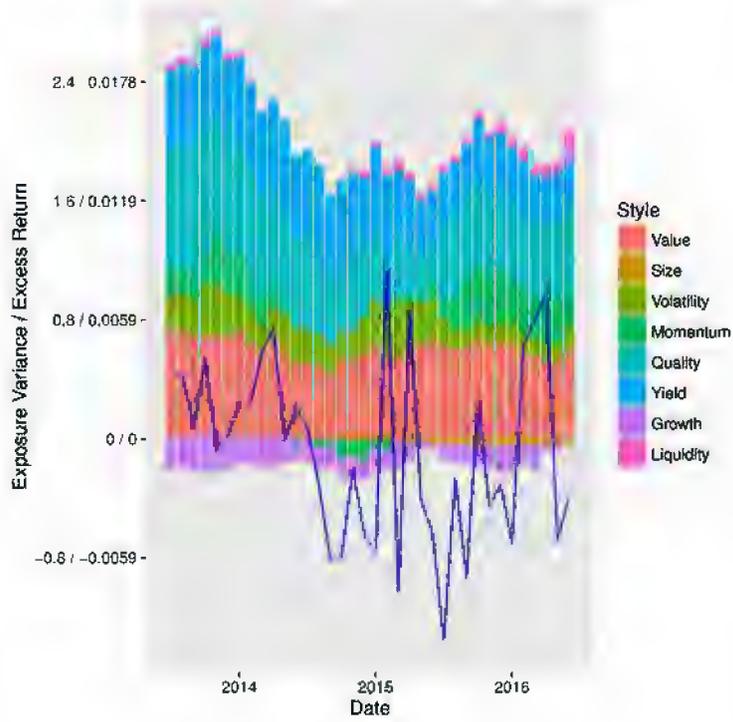
Barra Holdings Based Factor Attribution: Brandes



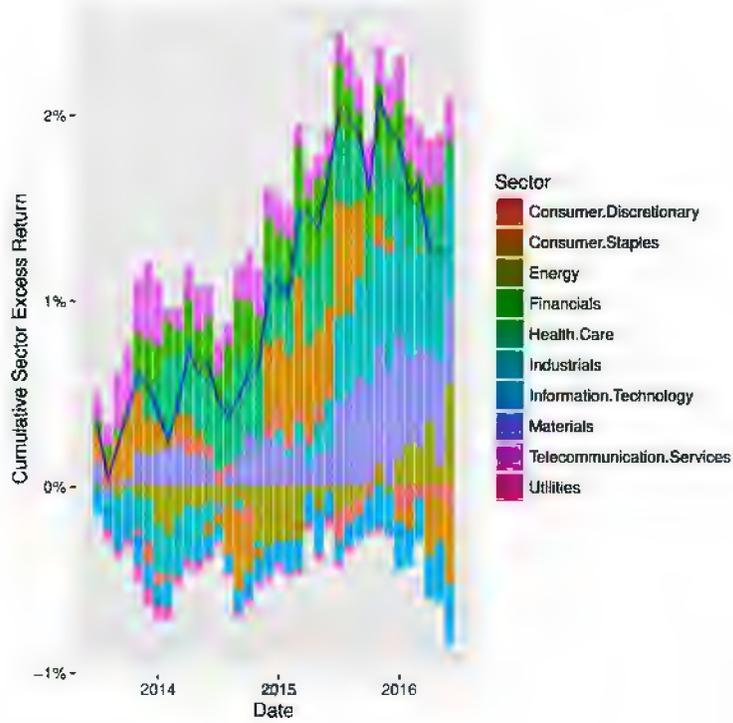
Brandes Barra Style Factor



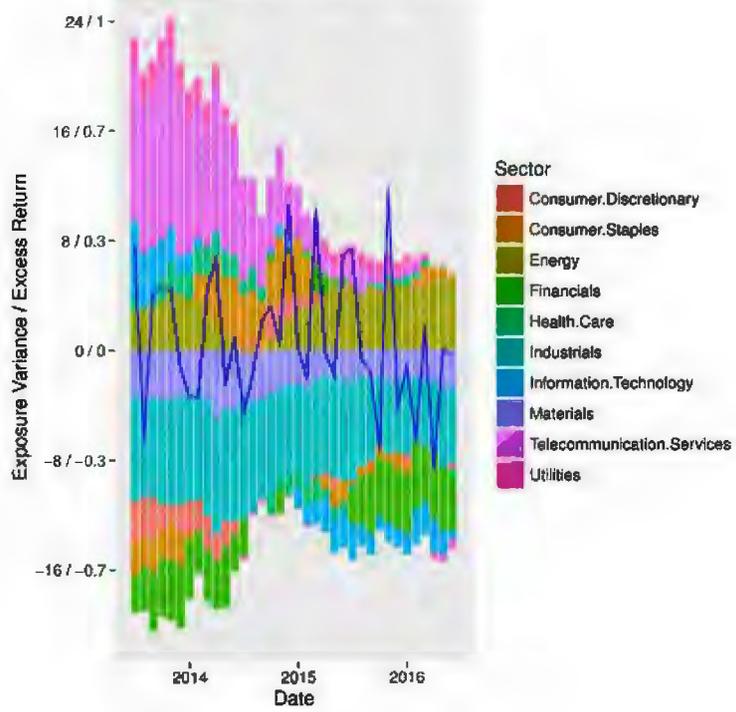
Brandes Monthly Style Factors Active Exposure



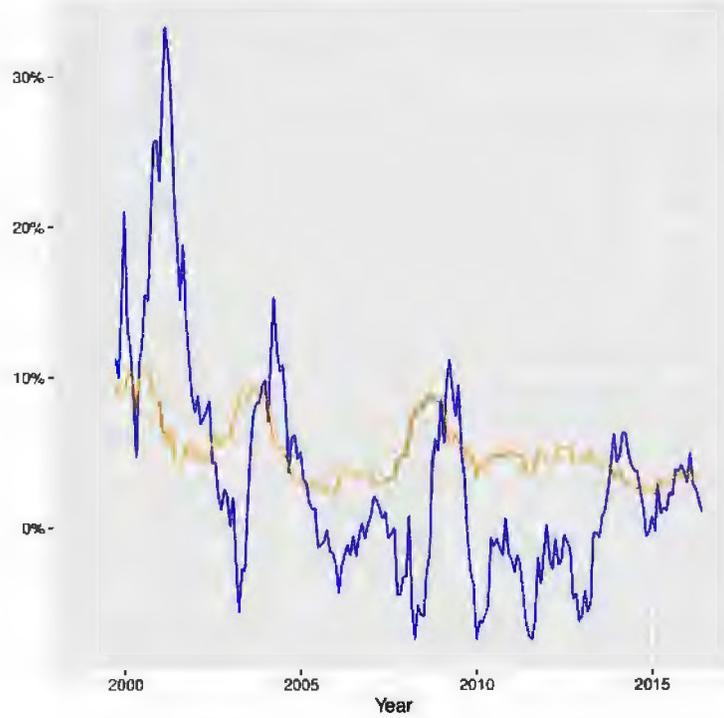
Brandes Monthly GICS Sector Return



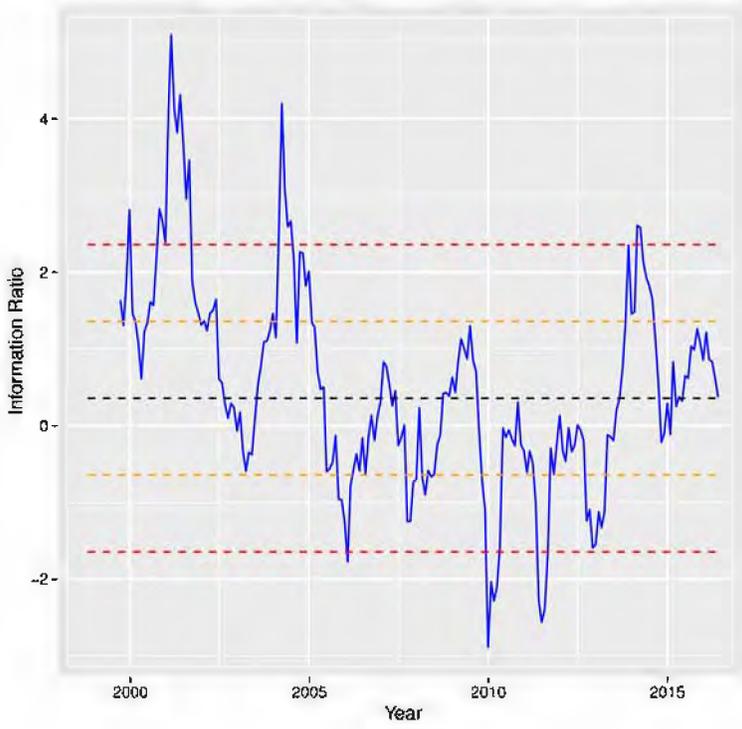
Brandes GICS Sector Active Exposure



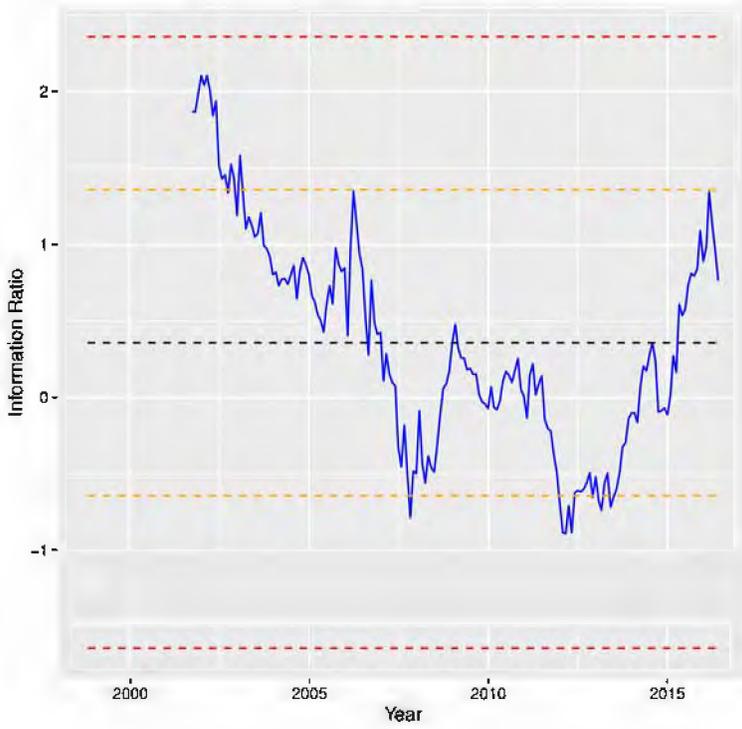
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



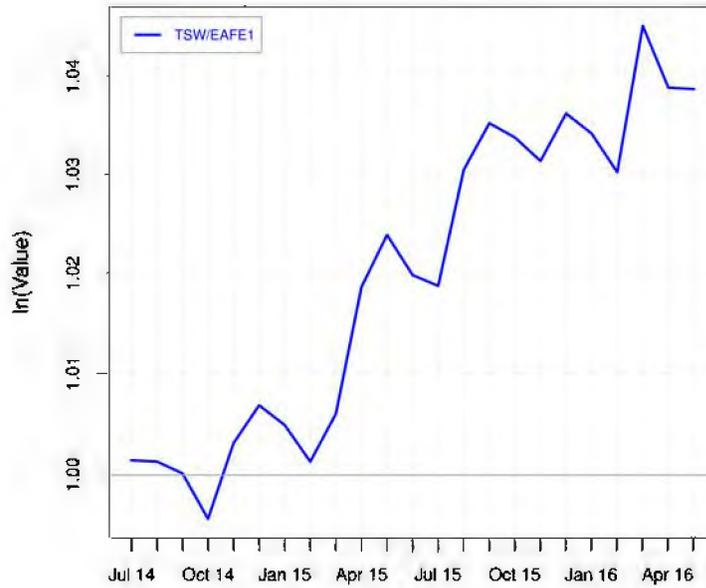
Brandes Rolling 12 Month Information Ratio



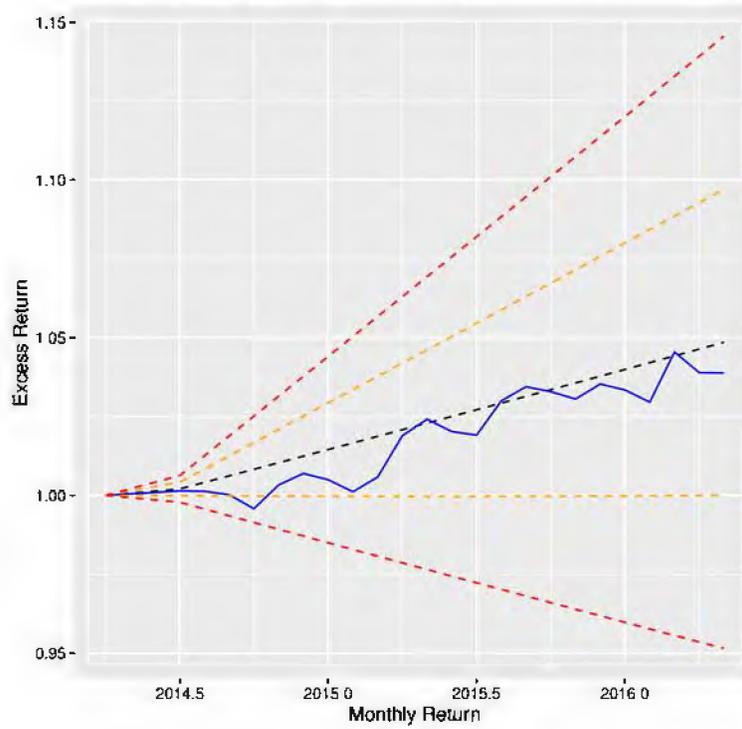
Brandes Rolling 36 Month Information Ratio



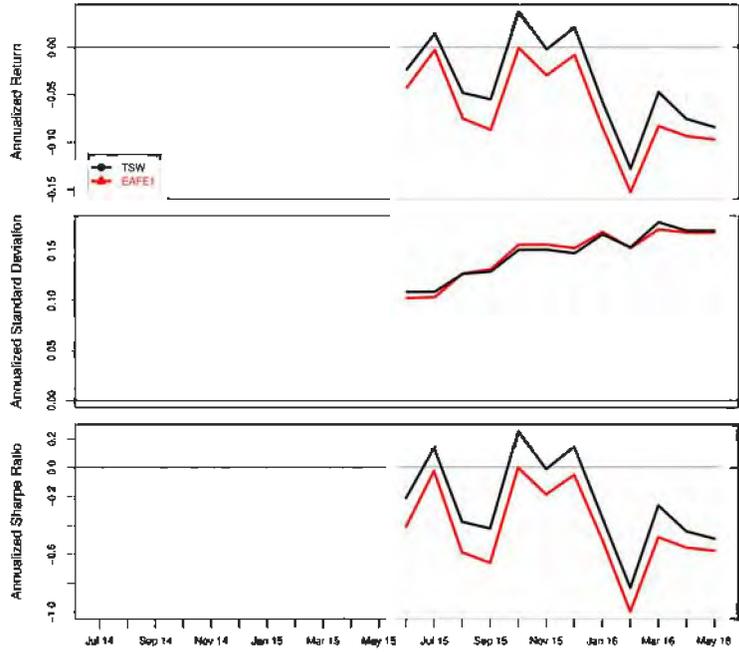
TSW Cumulative Relative Performance



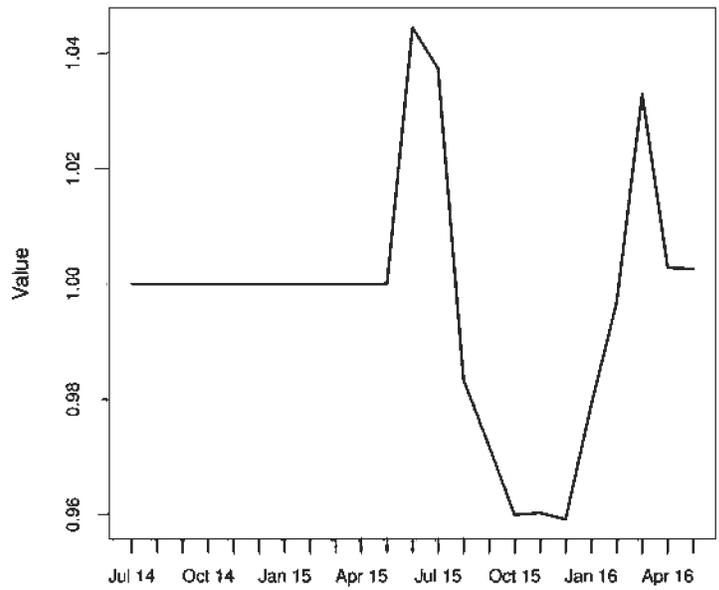
TSW Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



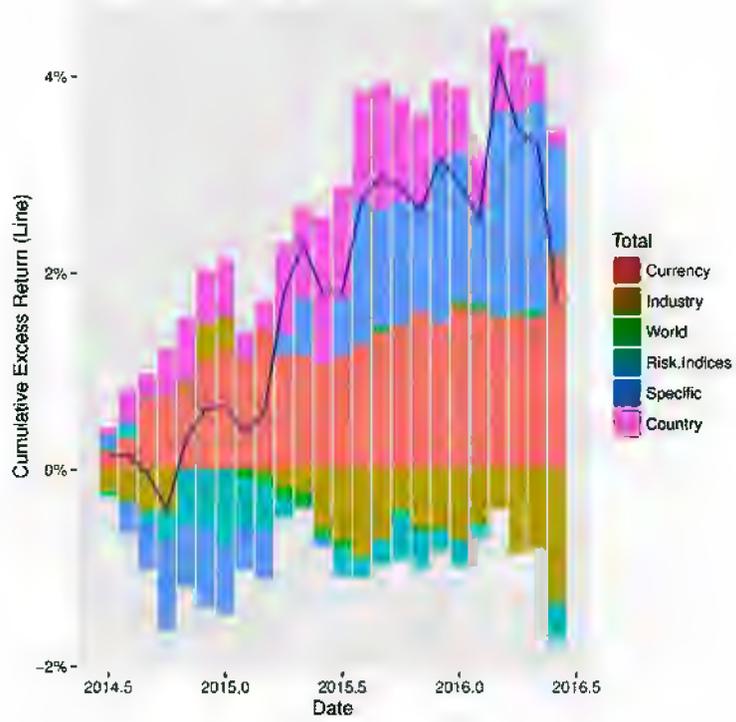
TSW Rolling 1 year Performance



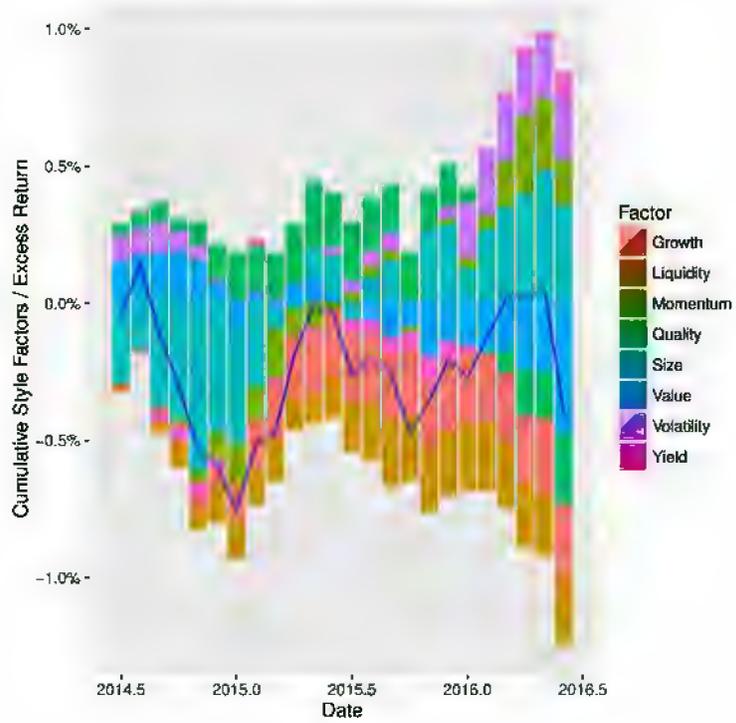
TSW Rolling 12 Month Beta



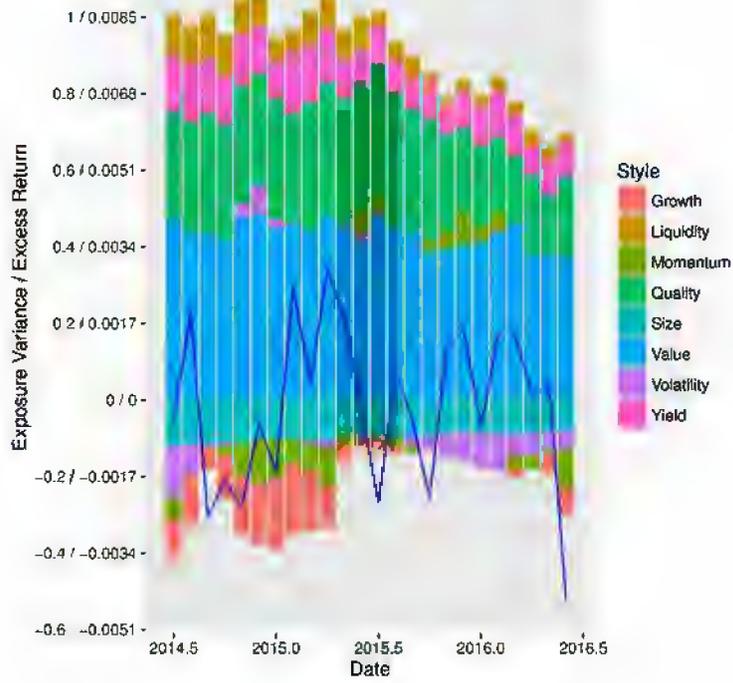
Barra Holdings Based Factor Attribution: TSW



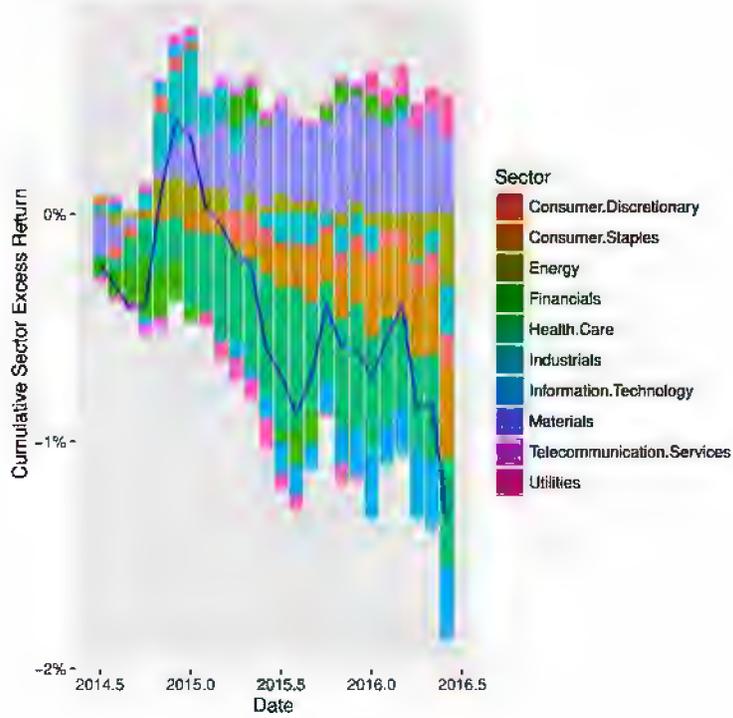
TSW Barra Style Factor



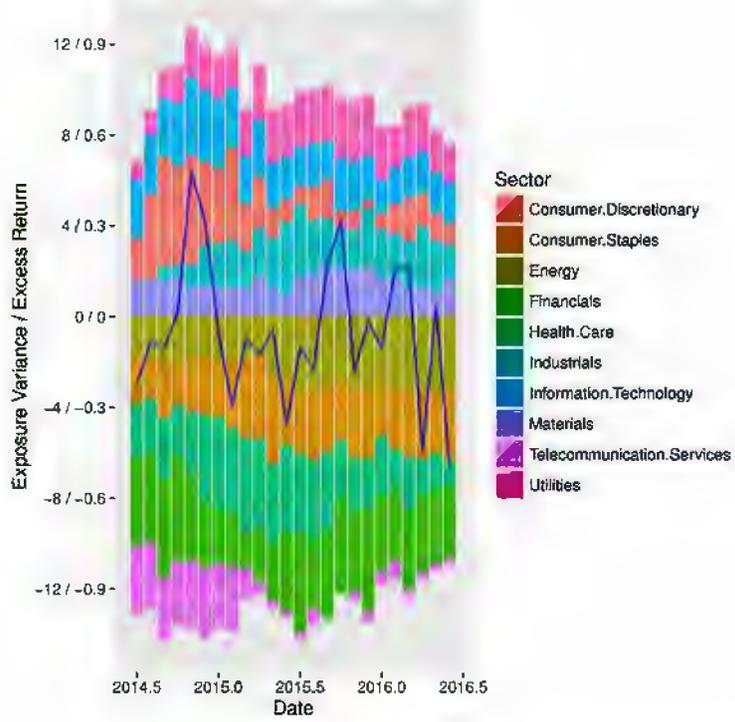
TSW Monthly Style Factors Active Exposure



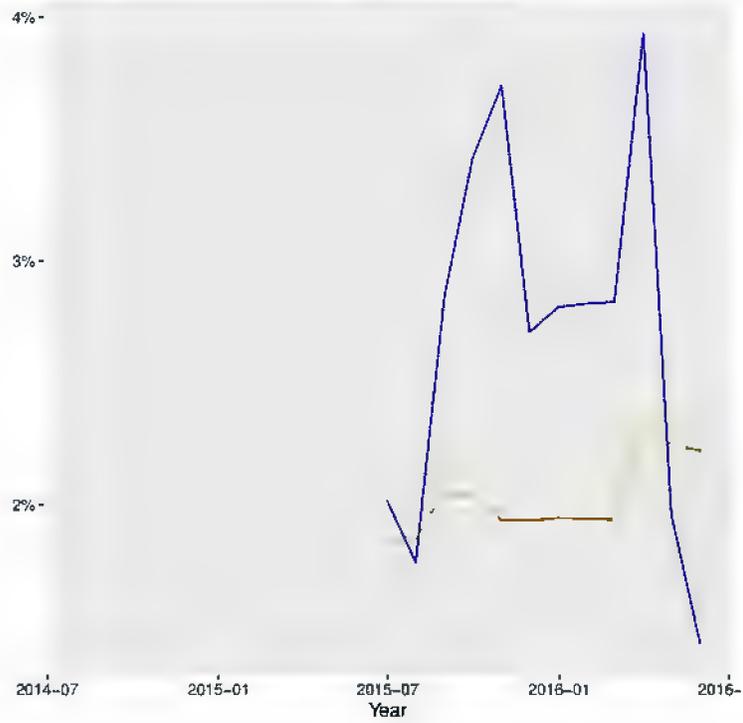
TSW Monthly GICS Sector Return



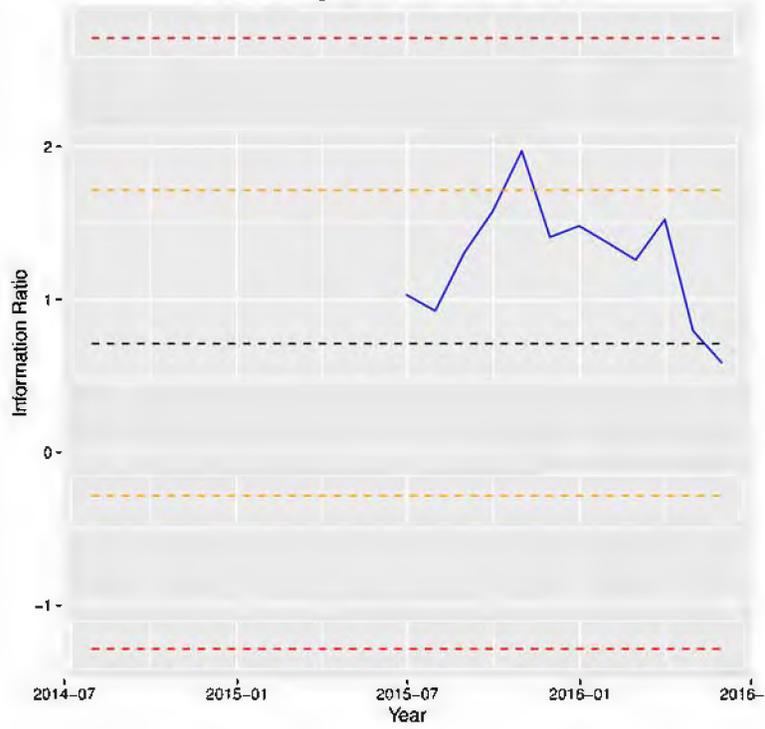
TSW GICS Sector Active Exposure



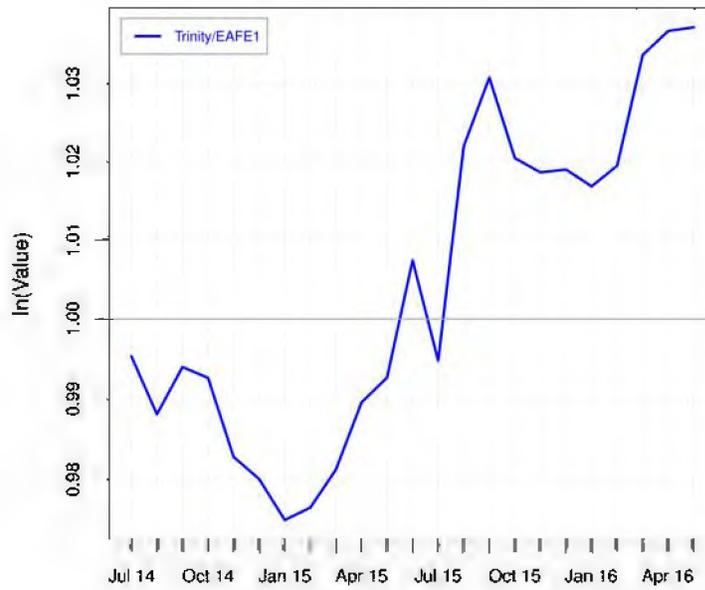
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



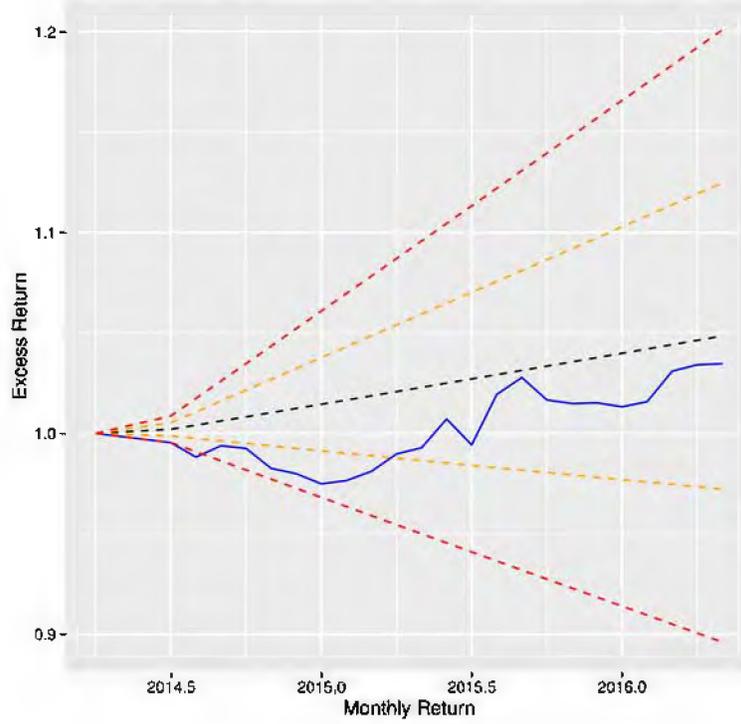
TSW Rolling 12 Month Information Ratio



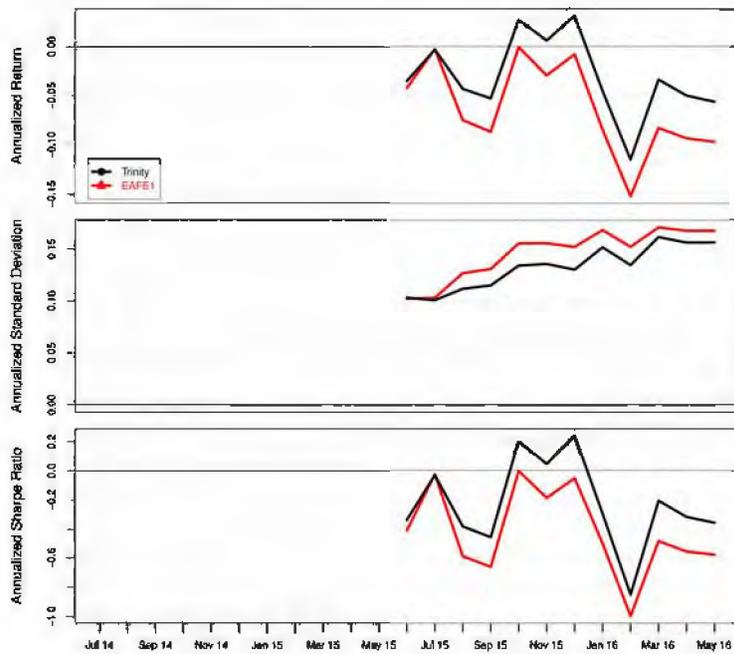
Trinity Cumulative Relative Performance



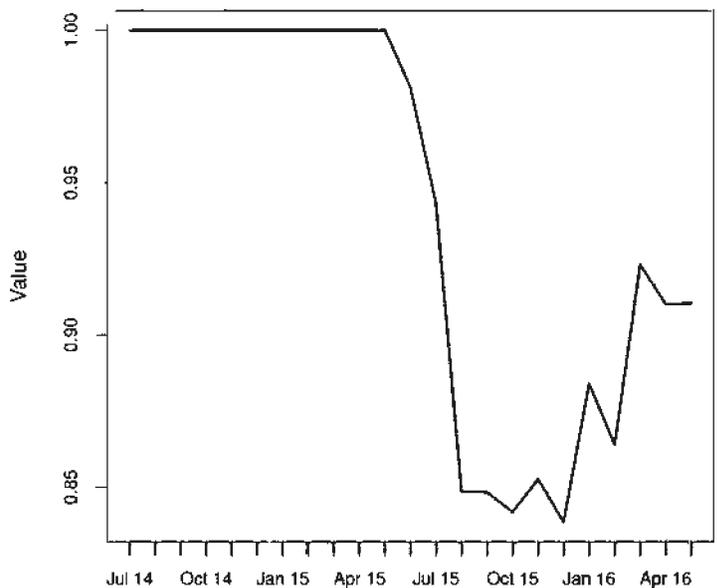
Trinity Actual Excess vs Expected Excess +/-1 & 2 Std Dev



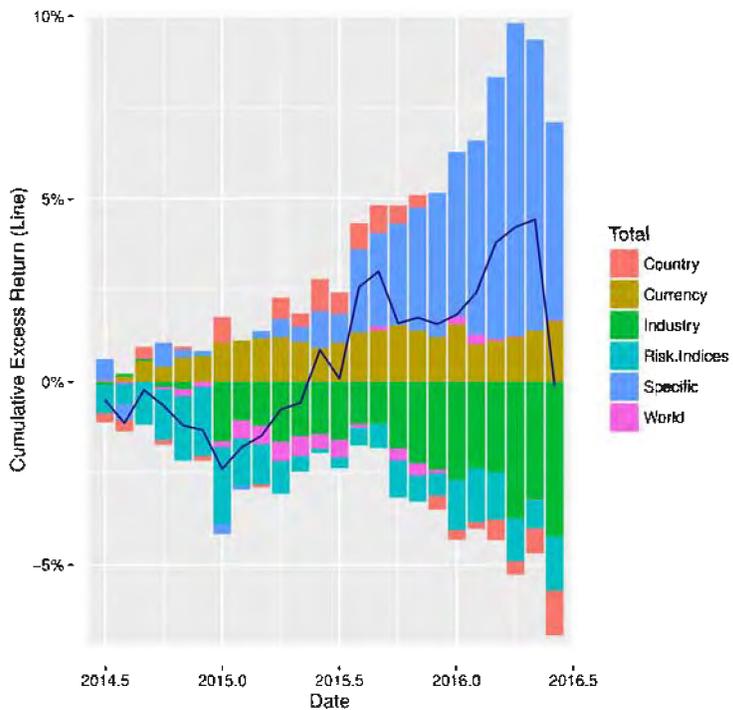
Trinity Rolling 1 year Performance



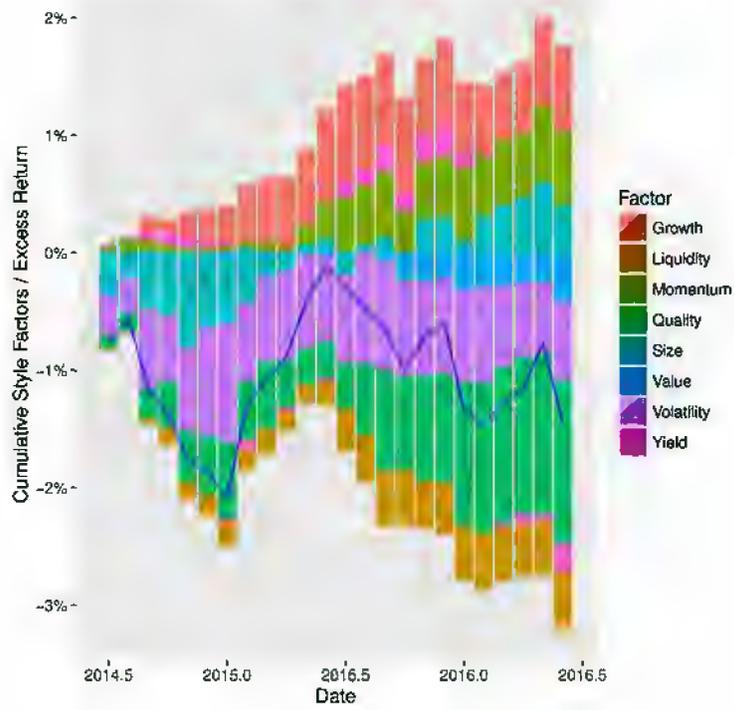
Trinity Rolling 12 Month Beta



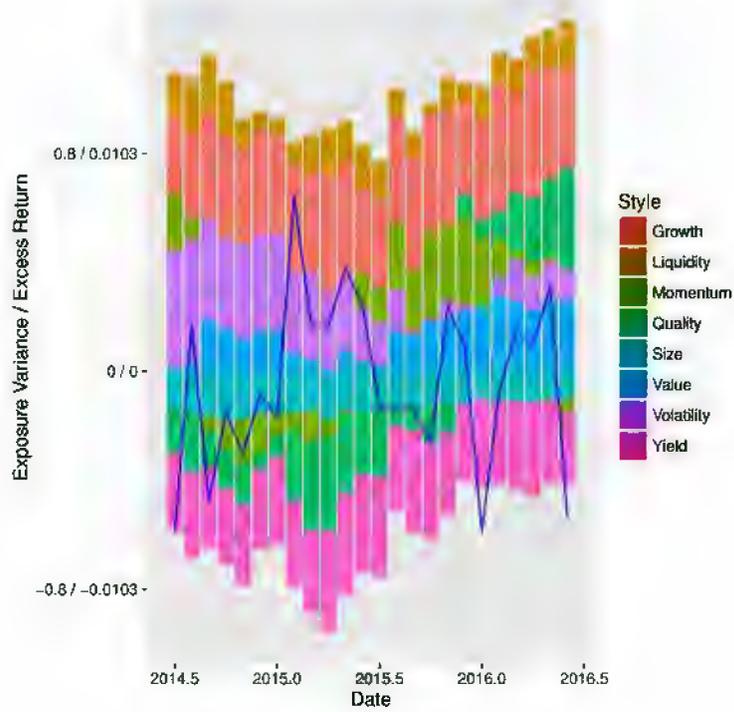
Barra Holdings Based Factor Attribution: Trinity



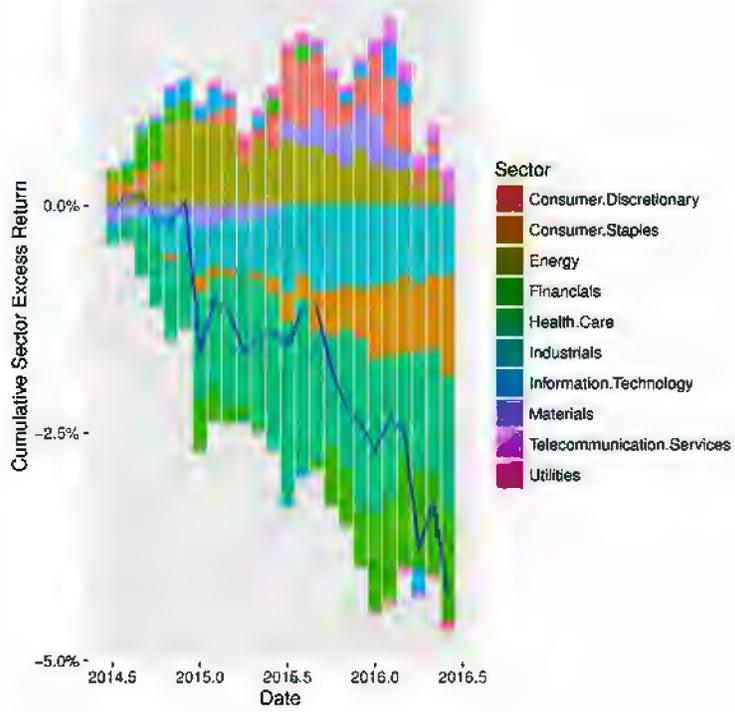
Trinity Barra Style Factor



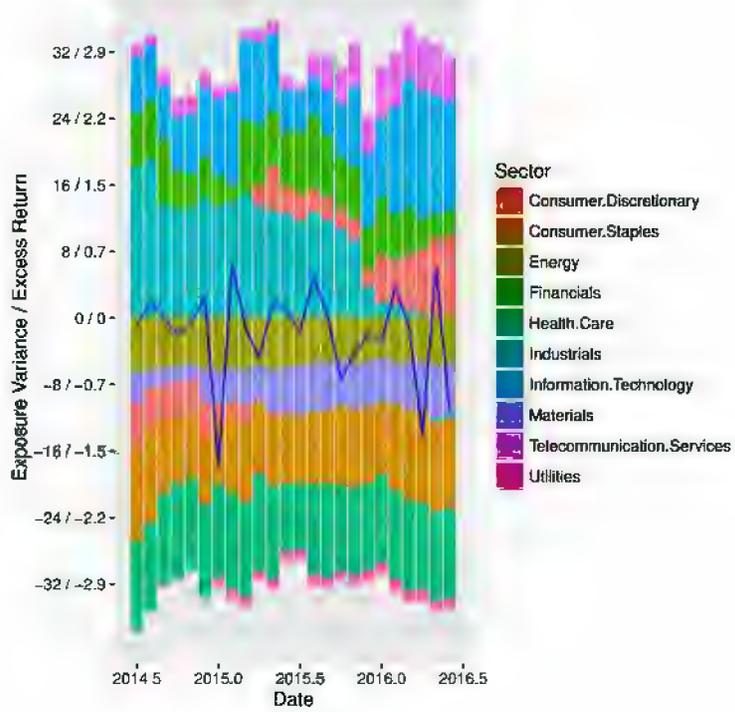
Trinity Monthly Style Factors Active Exposure



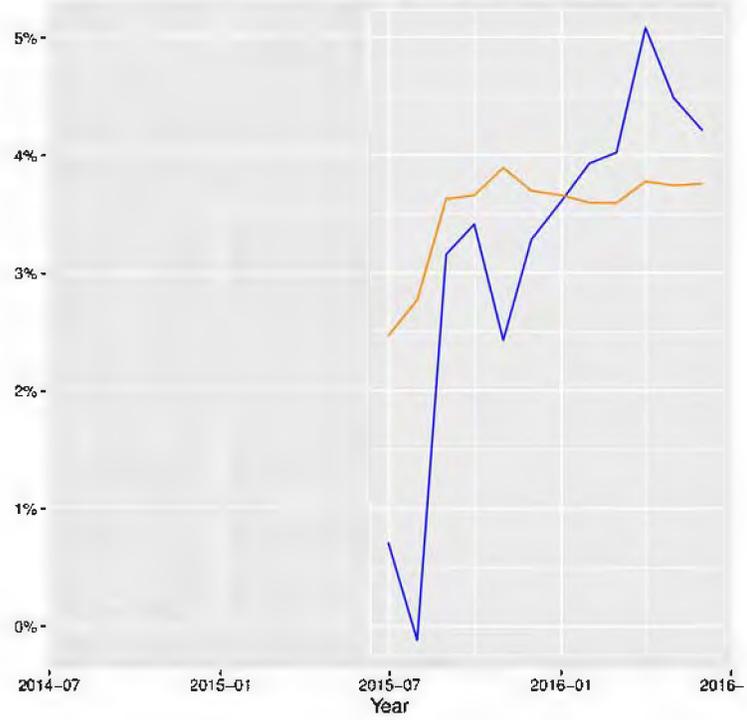
Trinity Monthly GICS Sector Return



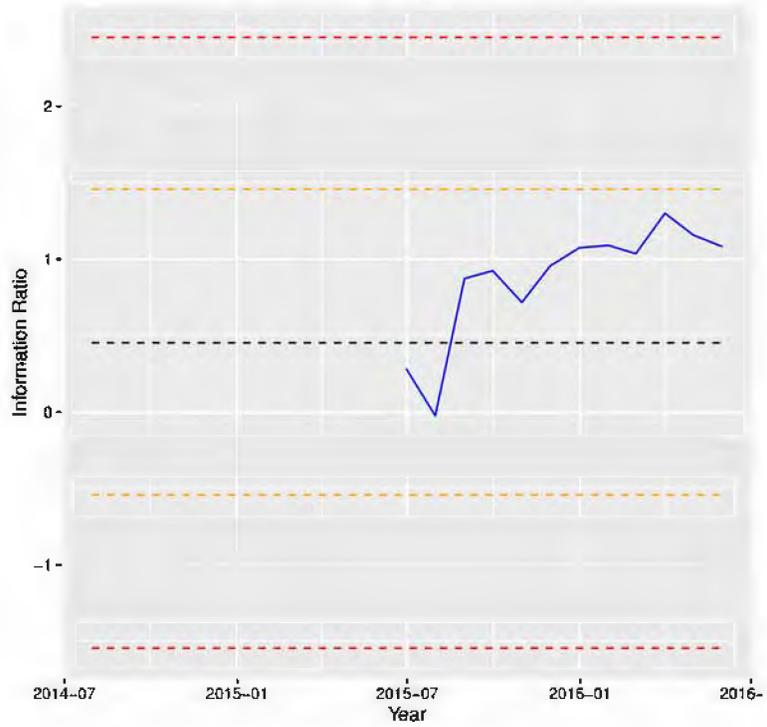
Trinity GICS Sector Active Exposure



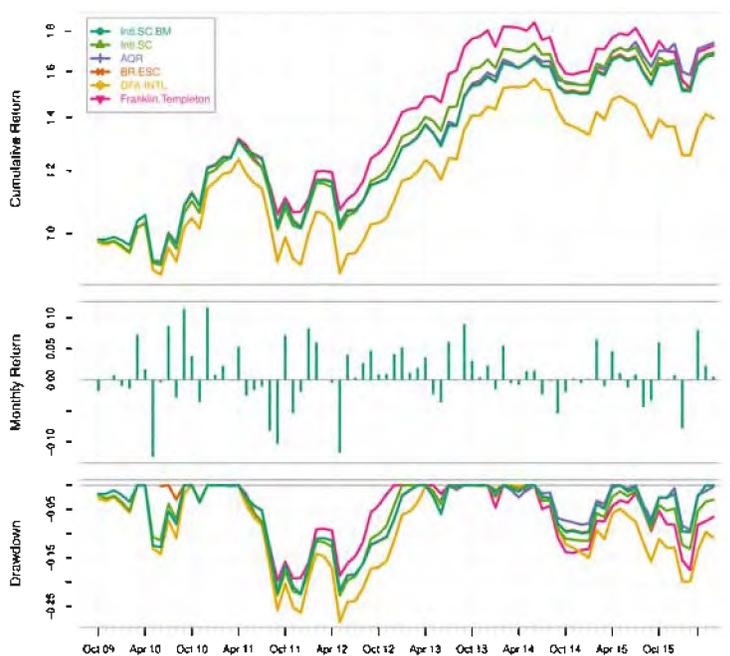
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



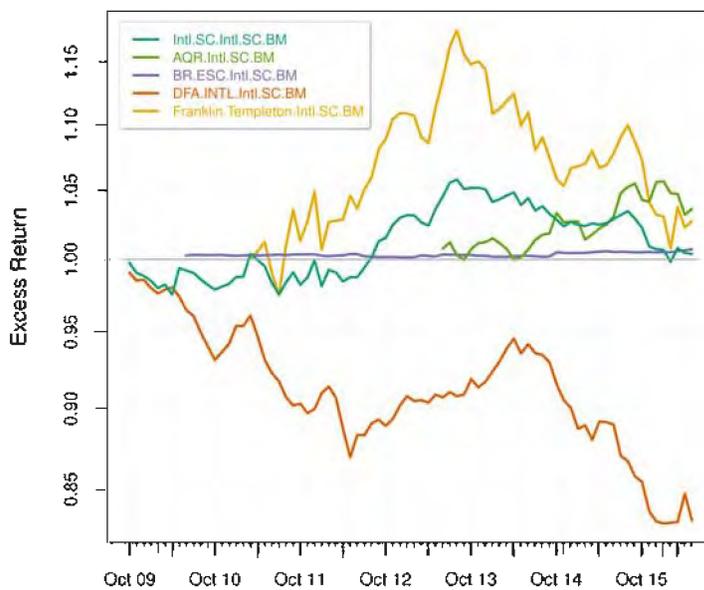
Trinity Rolling 12 Month Information Ratio



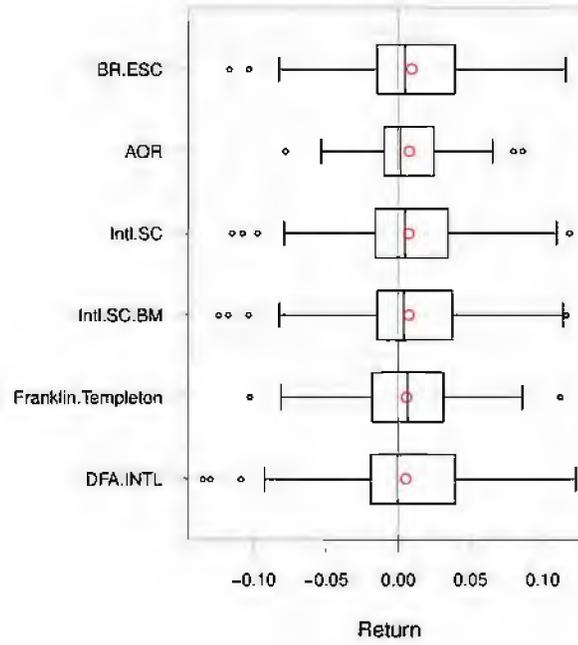
Intl Developed Small Cap Performance Summary



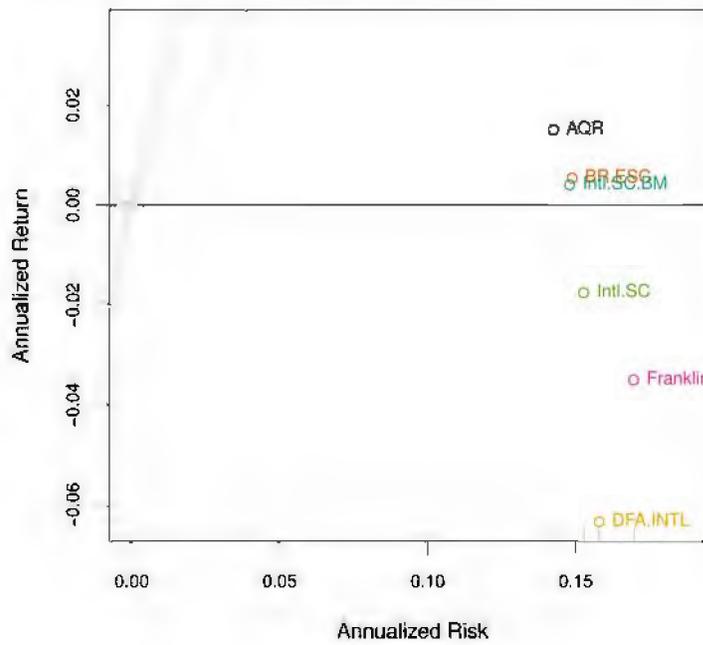
Intl Developed Small Cap Cumulative Relative Performance



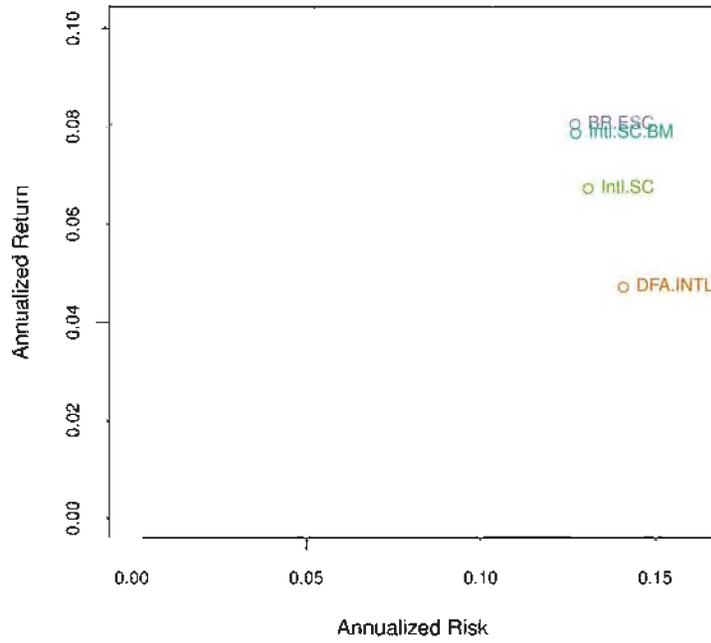
Return Distribution Comparison



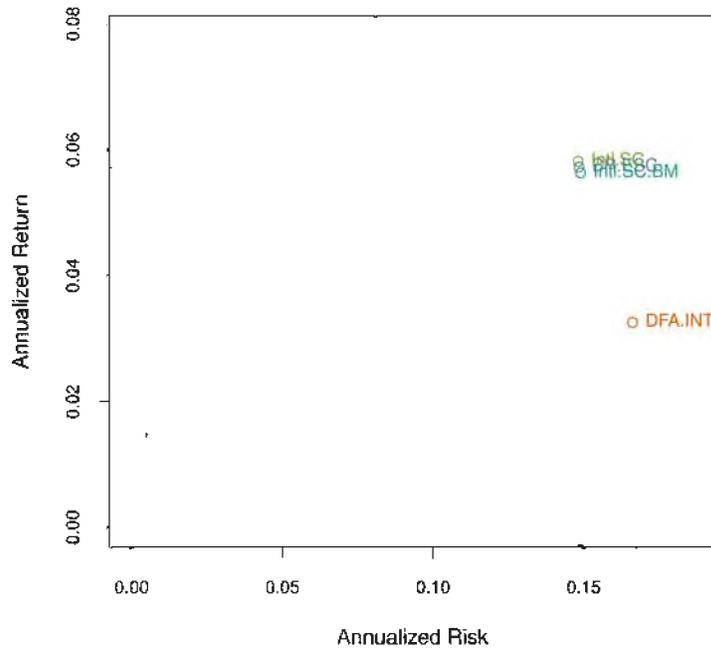
Intl Developed Small Cap Trailing 1 Year Performance vs Sharpe Ratios (1;



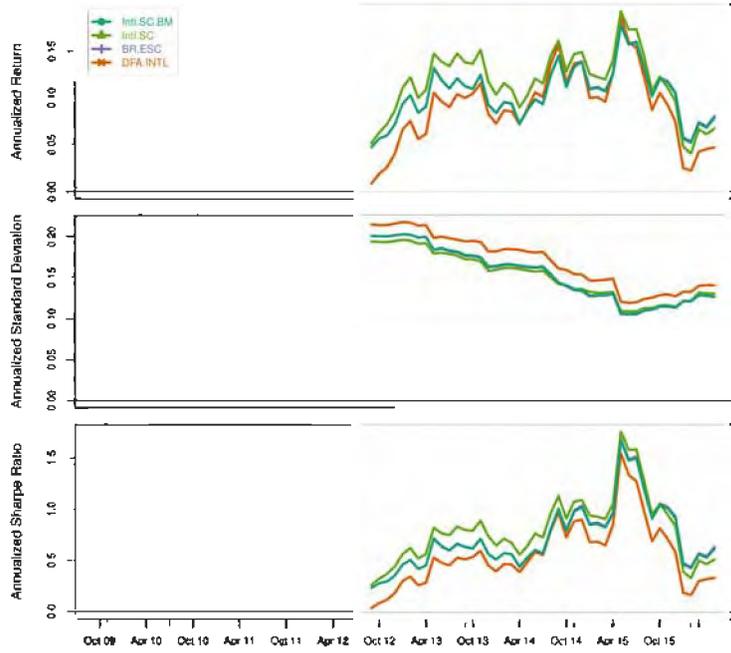
Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)



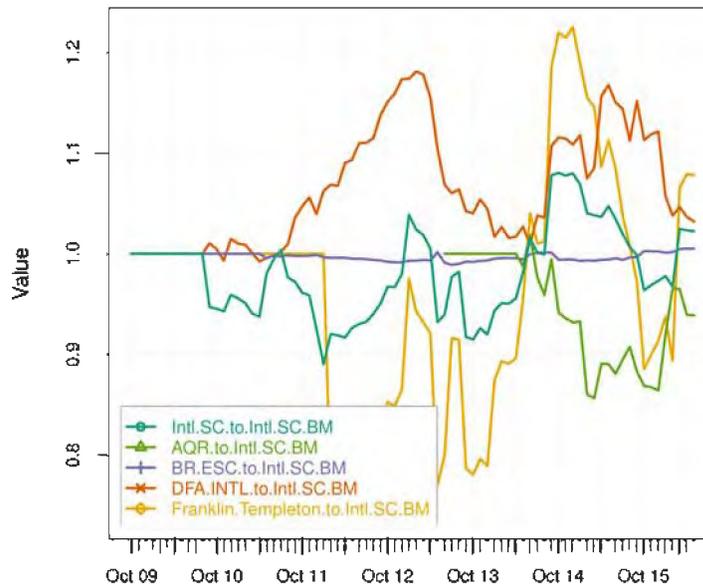
Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)



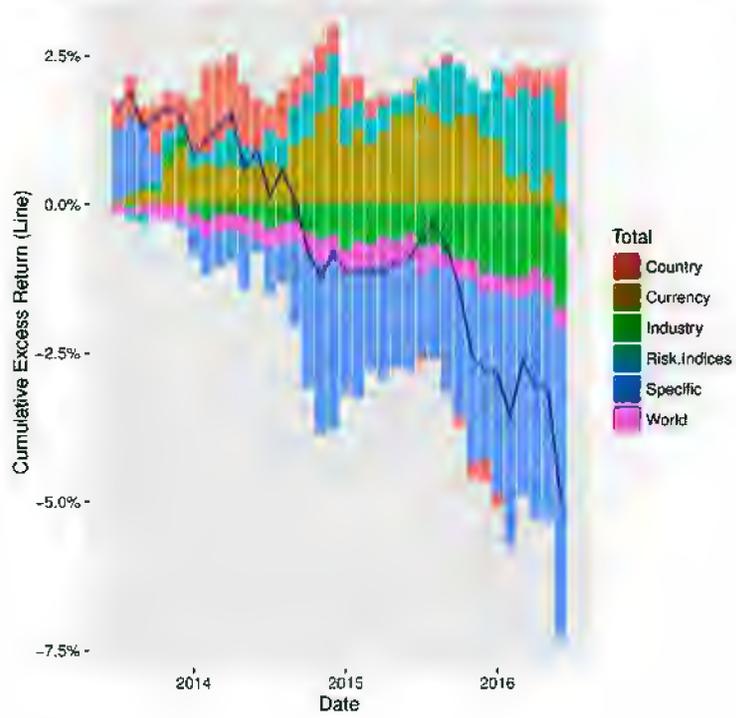
Intl Developed Small Cap Rolling 3 Year Performance



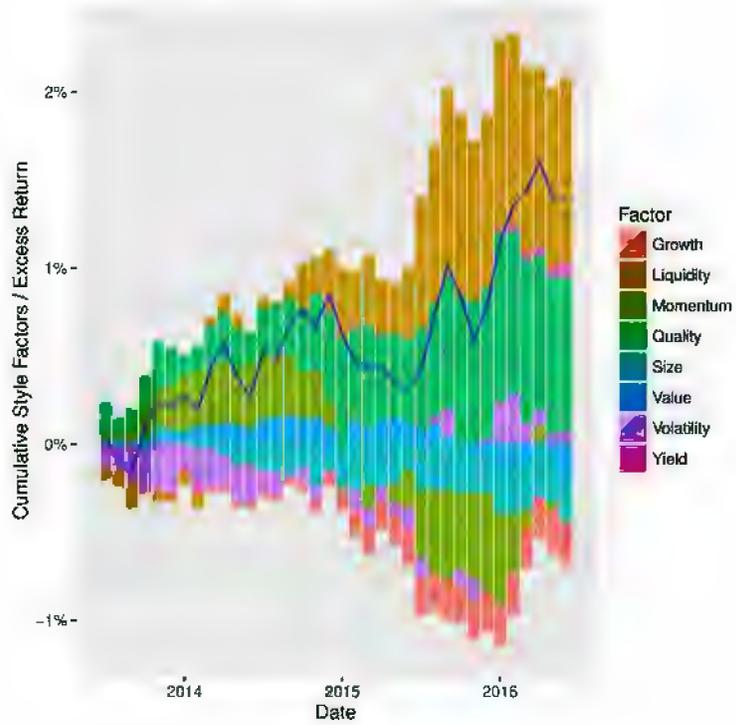
Intl Developed Small Cap Rolling 12 Month Beta



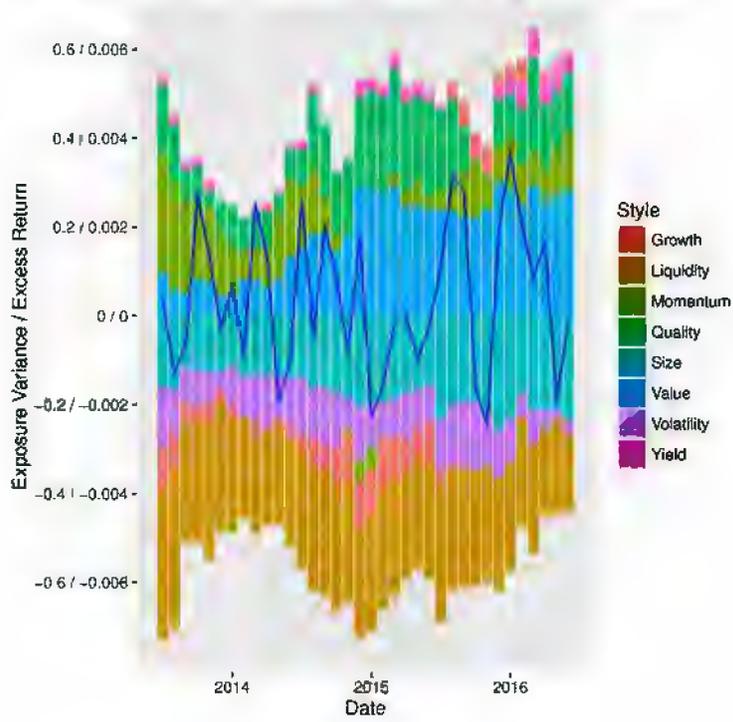
Barra Holdings Based Factor Attribution: Intl Developed Small Cap



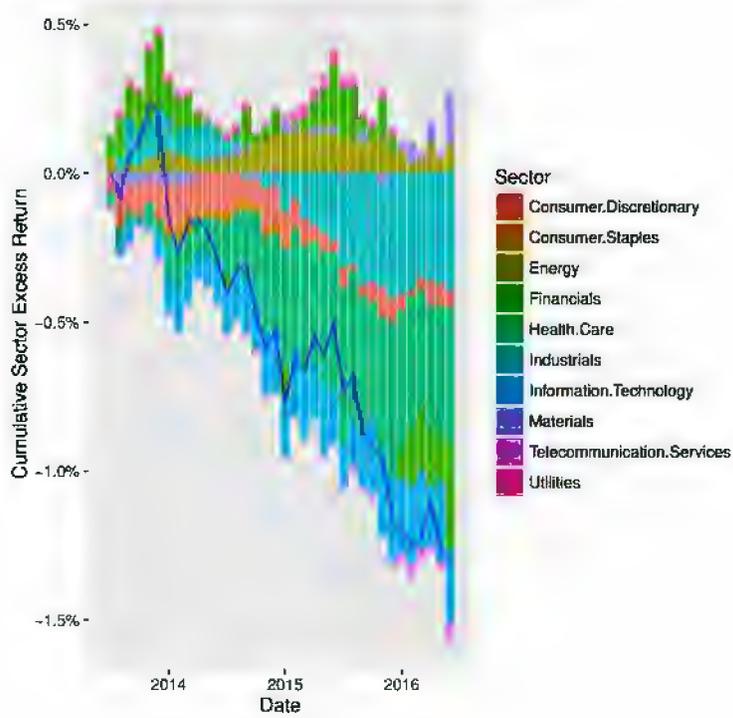
Intl Developed Small Cap Barra Style Factor



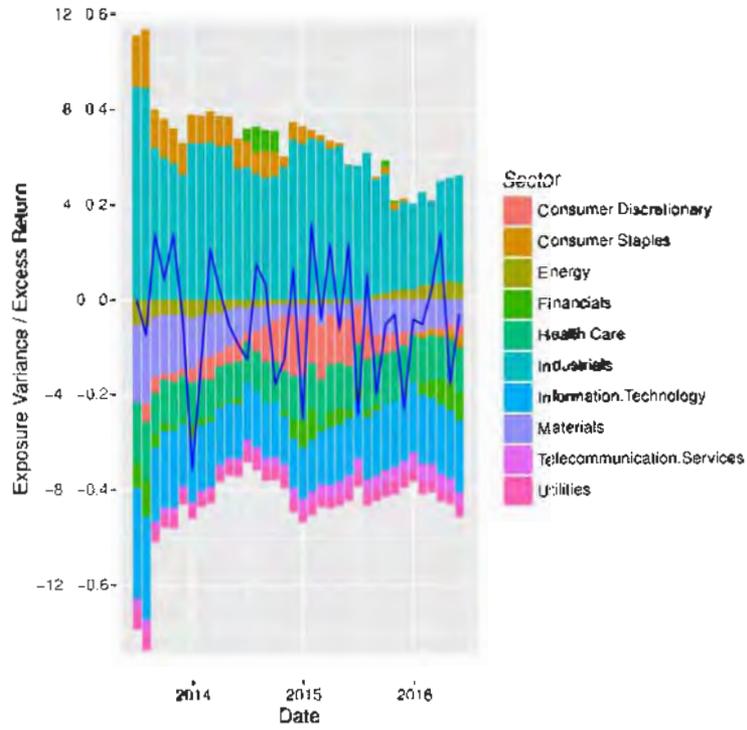
Intl Developed Small Cap Monthly Style Factors Active Exposure



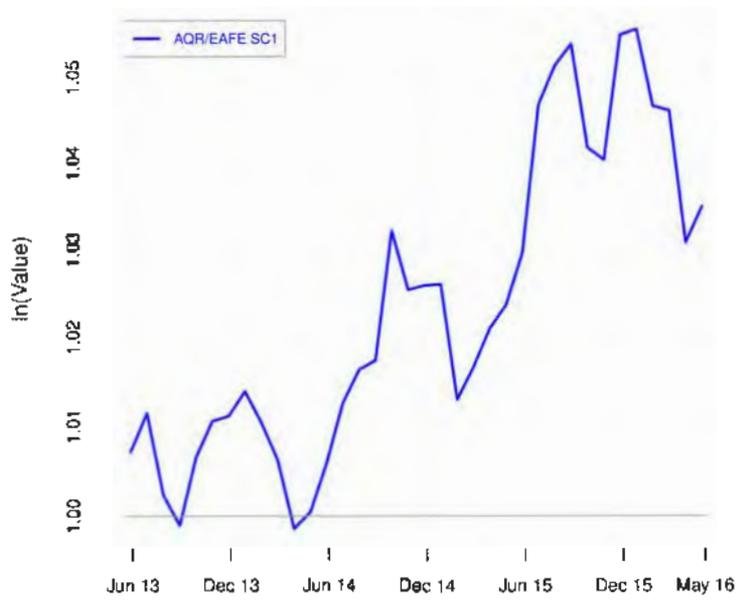
Intl Developed Small Cap Monthly GICS Sector Return



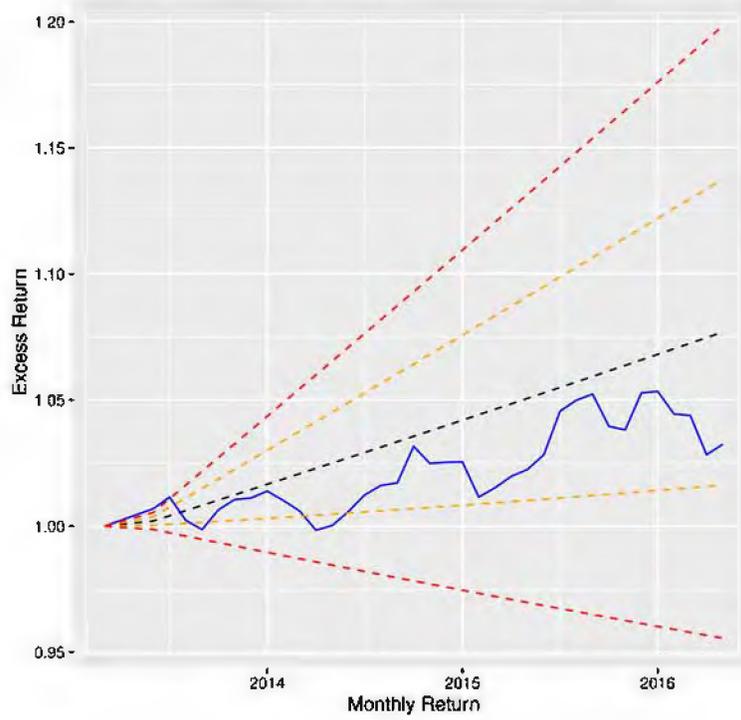
Intl Developed Small Cap GICS Sector Active Exposure



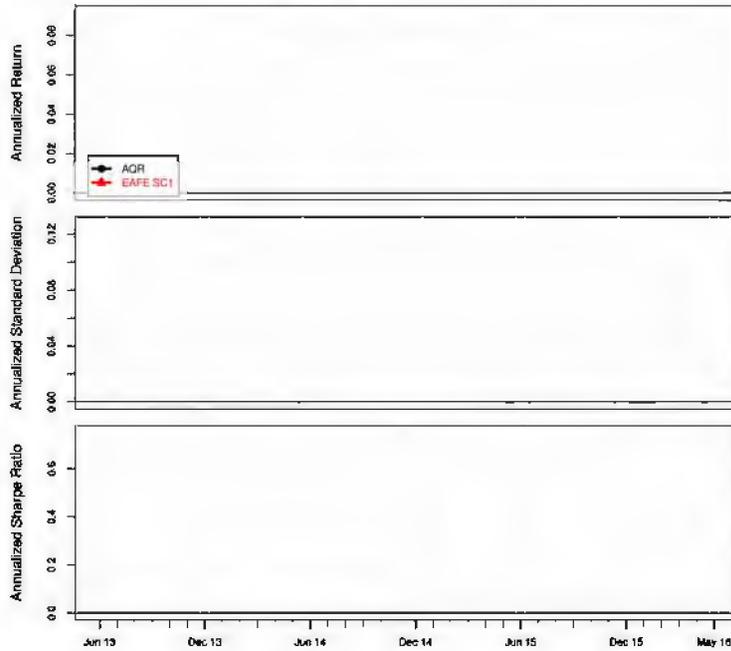
AQR Cumulative Relative Performance



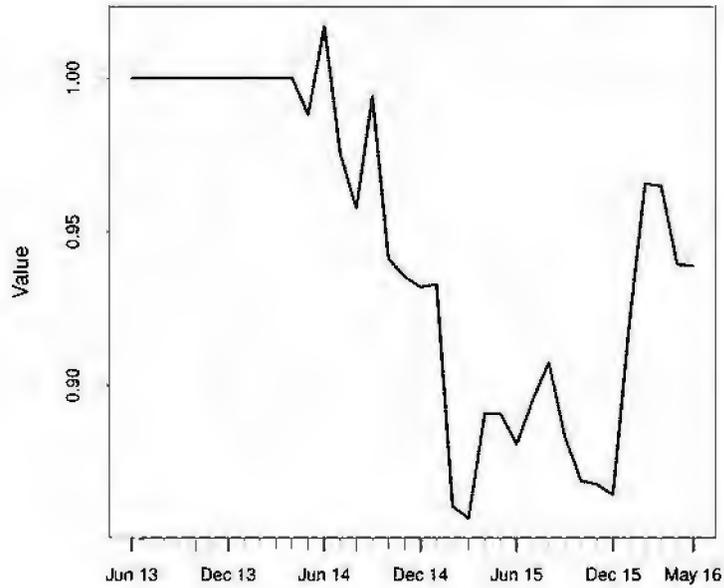
AQR Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



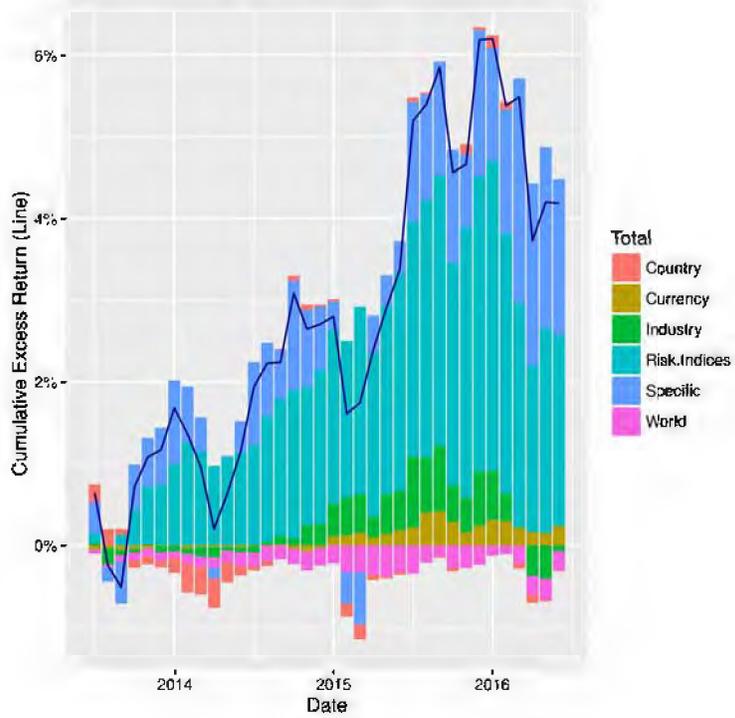
AQR Rolling 3 year Performance



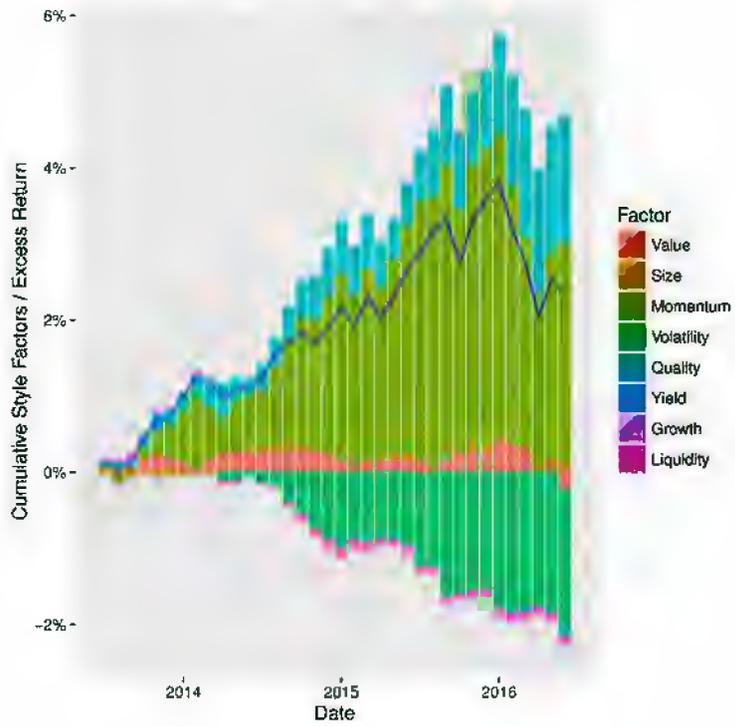
AQR Rolling 12 Month Beta



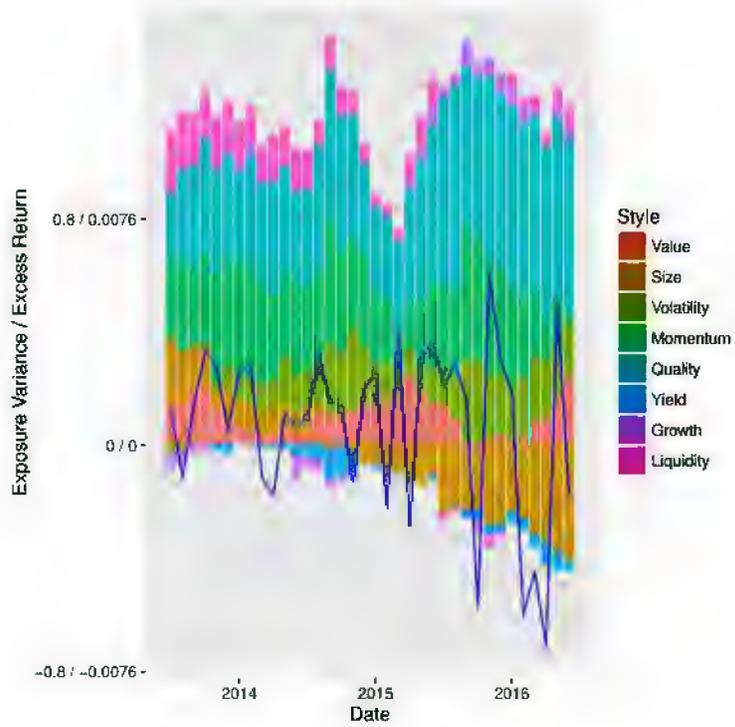
Barra Holdings Based Factor Attribution: AQR

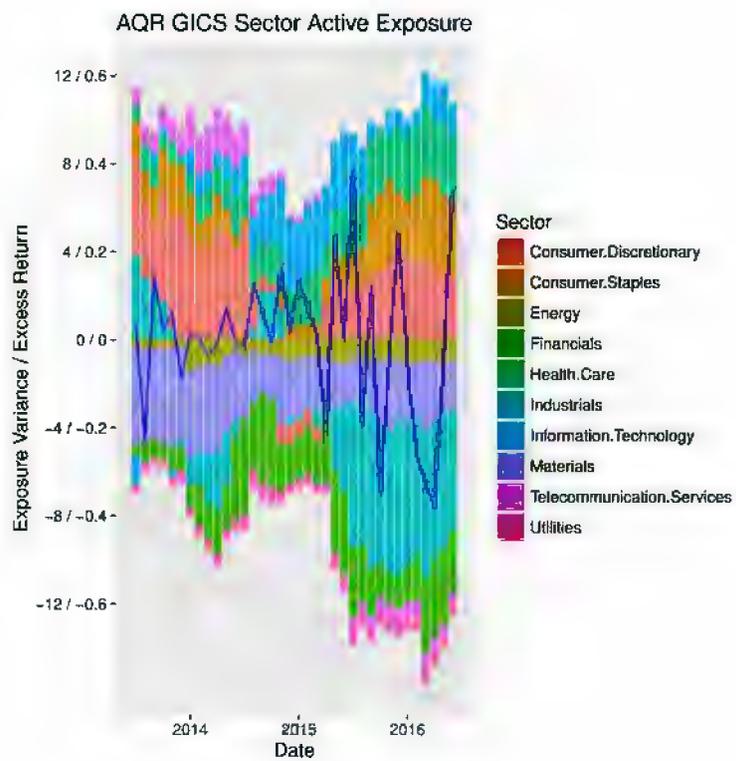
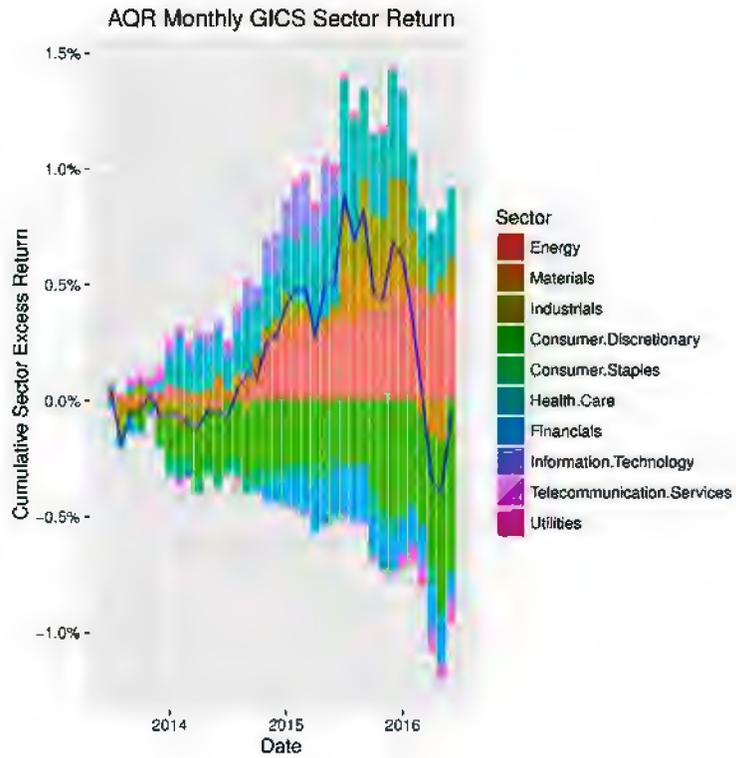


AQR Barra Style Factor

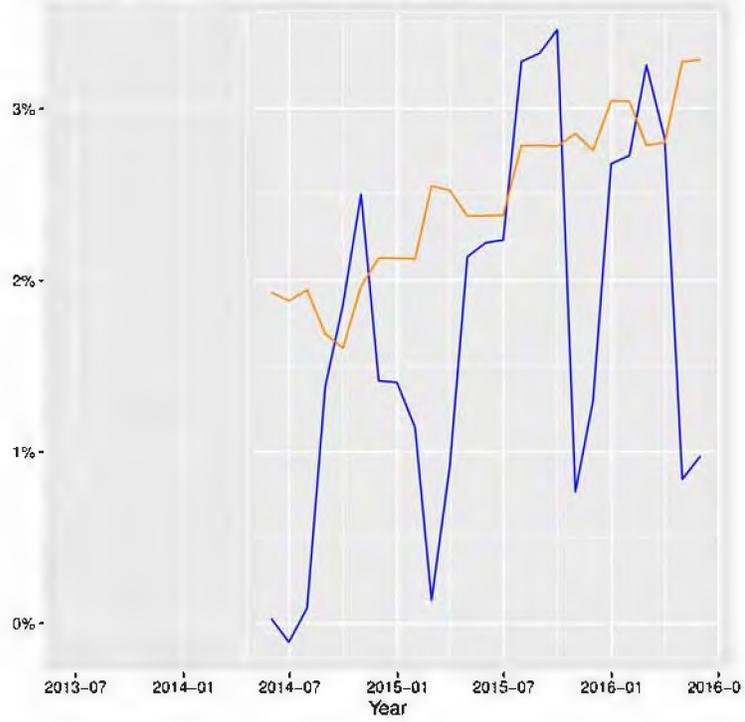


AQR Monthly Style Factors Active Exposure

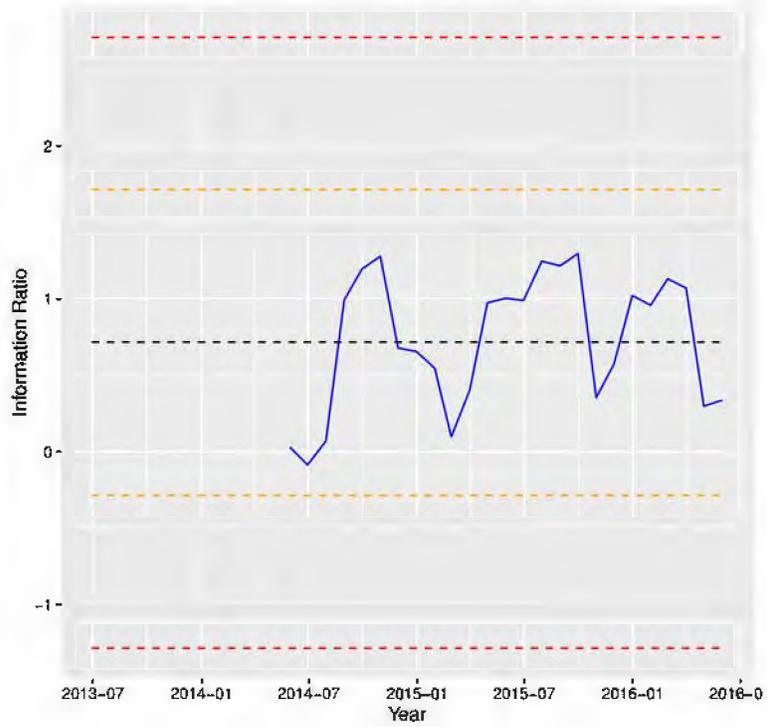




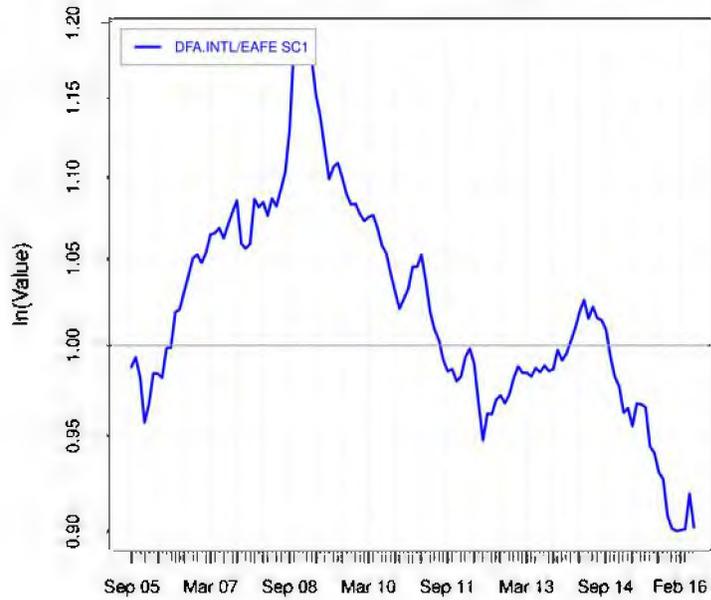
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



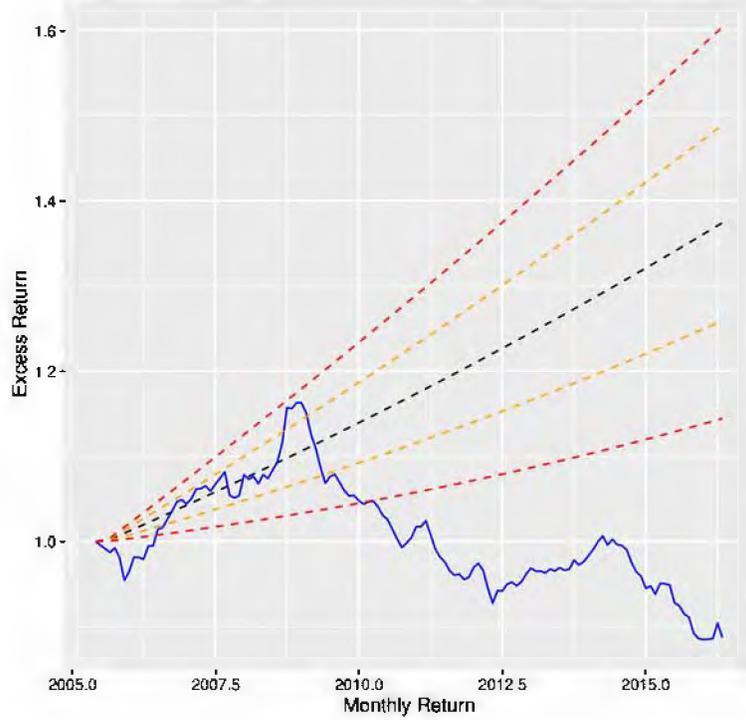
AQR Rolling 12 Month Information Ratio



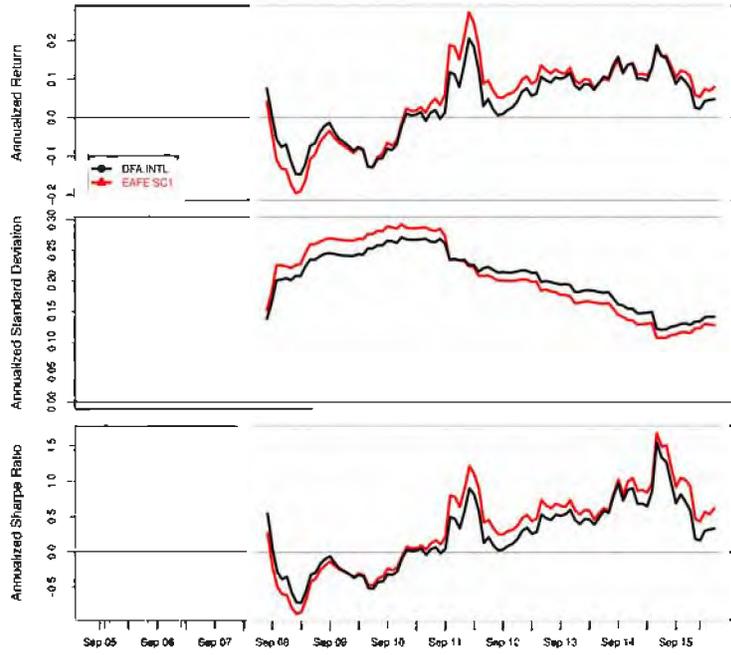
DFA.INTL Cumulative Relative Performance



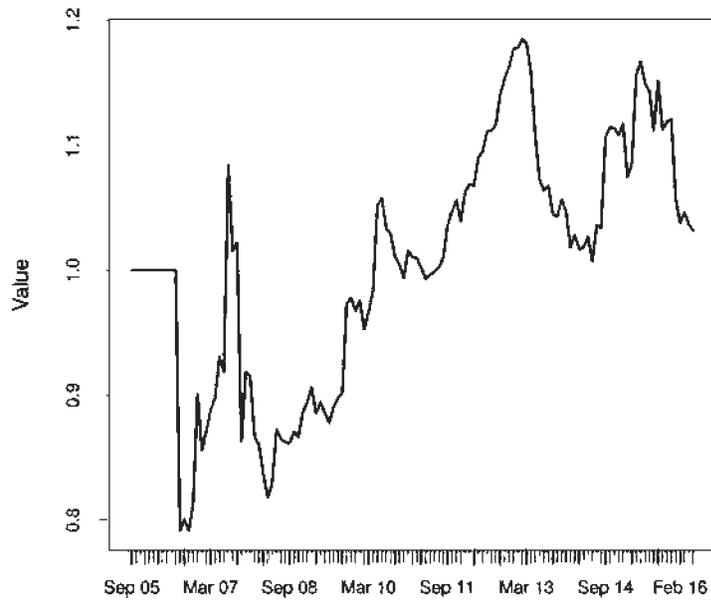
DFA.INTL Actual Excess vs Expected Excess +/- 1 & 2 Std Dev



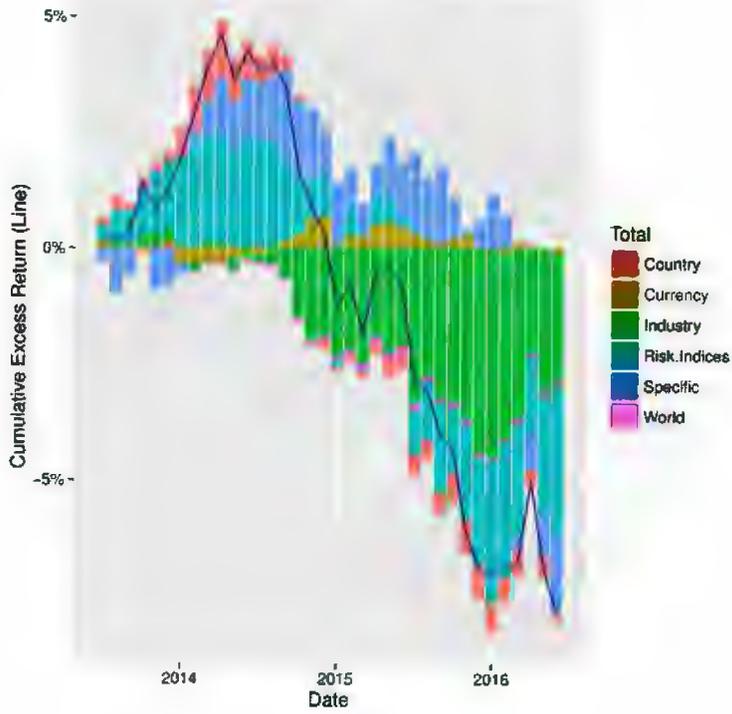
DFA.INTL Rolling 3 year Performance



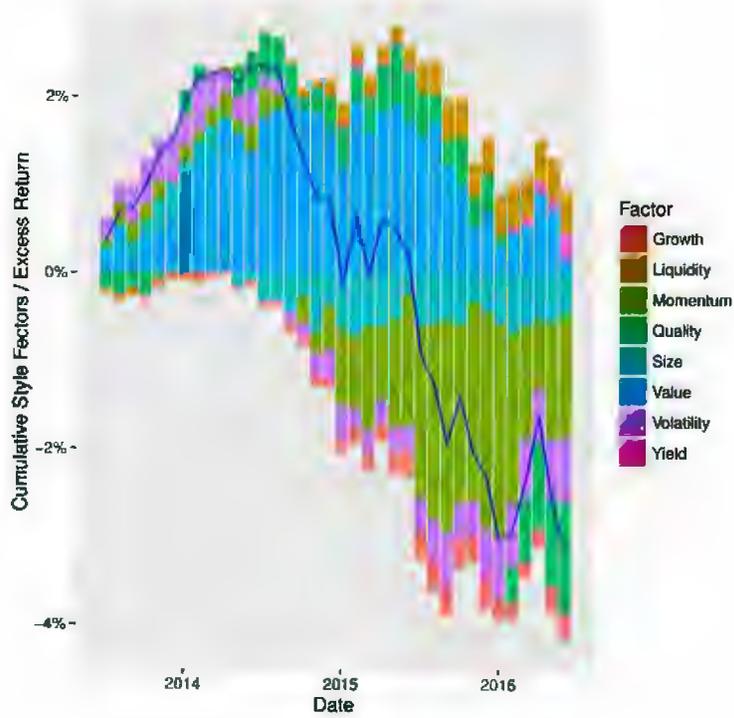
DFA.INTL Rolling 12 Month Beta



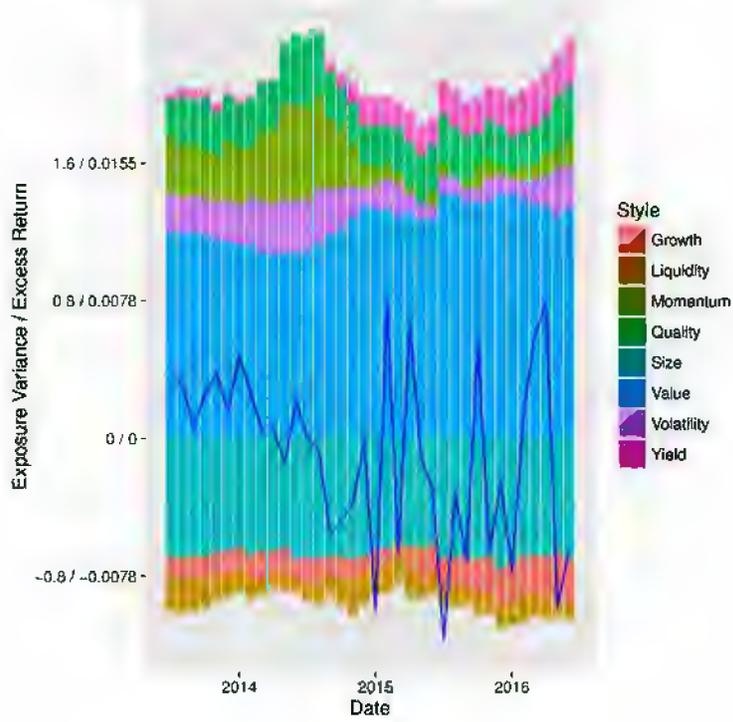
Barra Holdings Based Factor Attribution: DFA.INTL



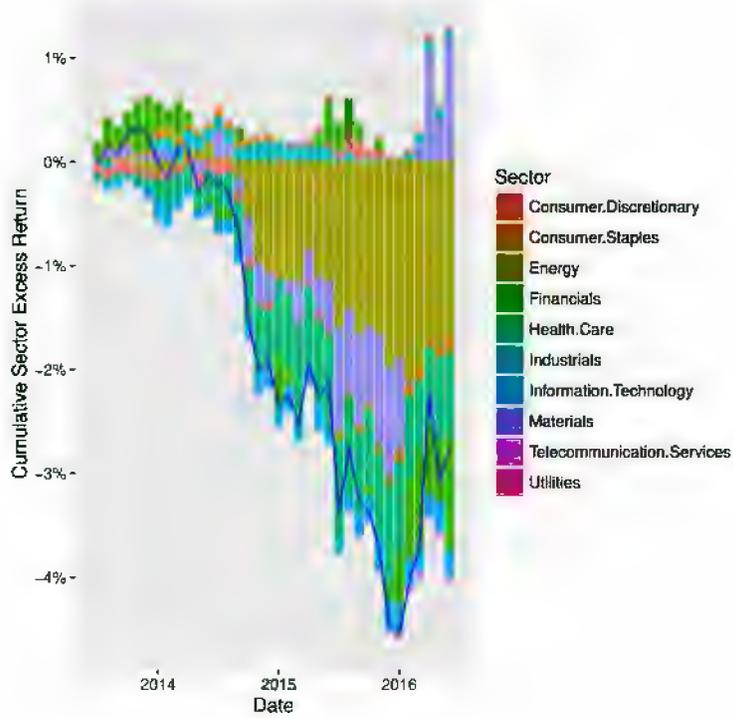
DFA.INTL Barra Style Factor



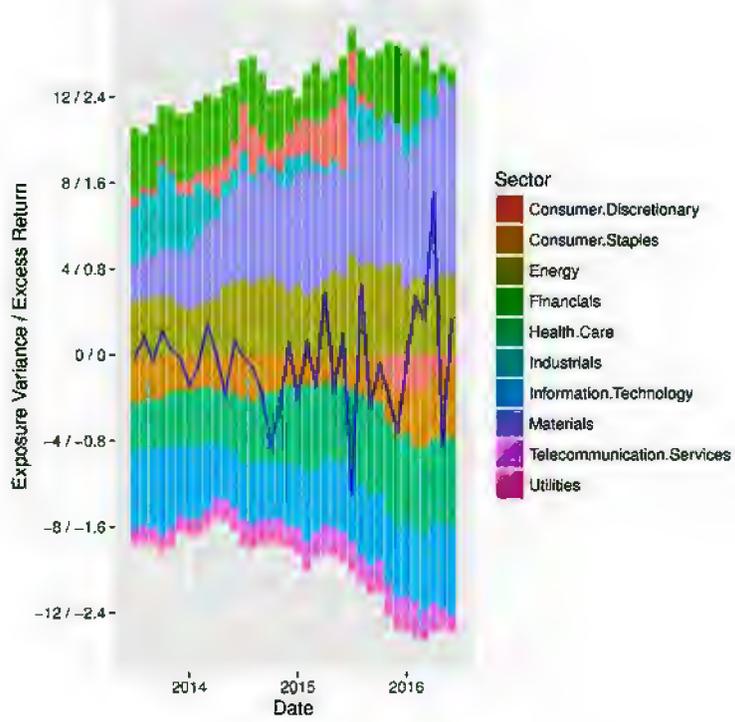
DFA.INTL Monthly Style Factors Active Exposure



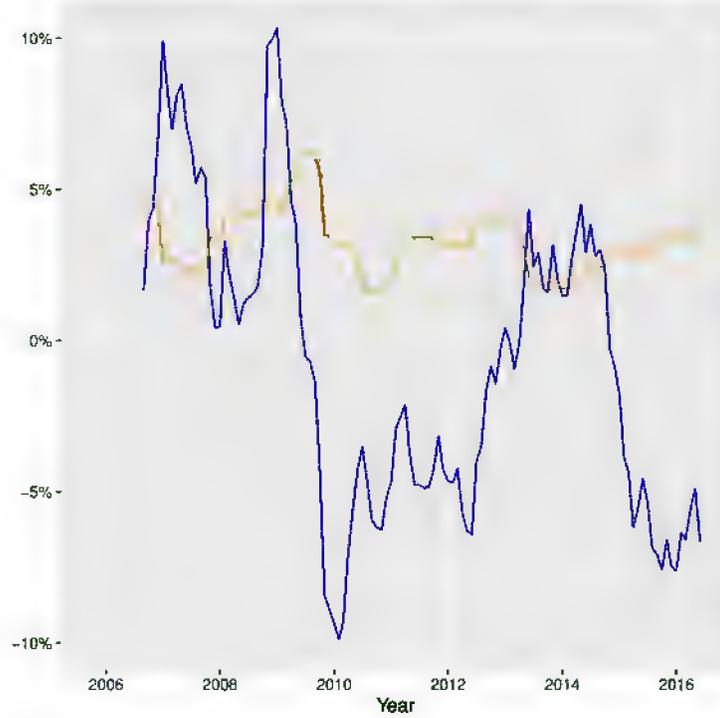
DFA.INTL Monthly GICS Sector Return

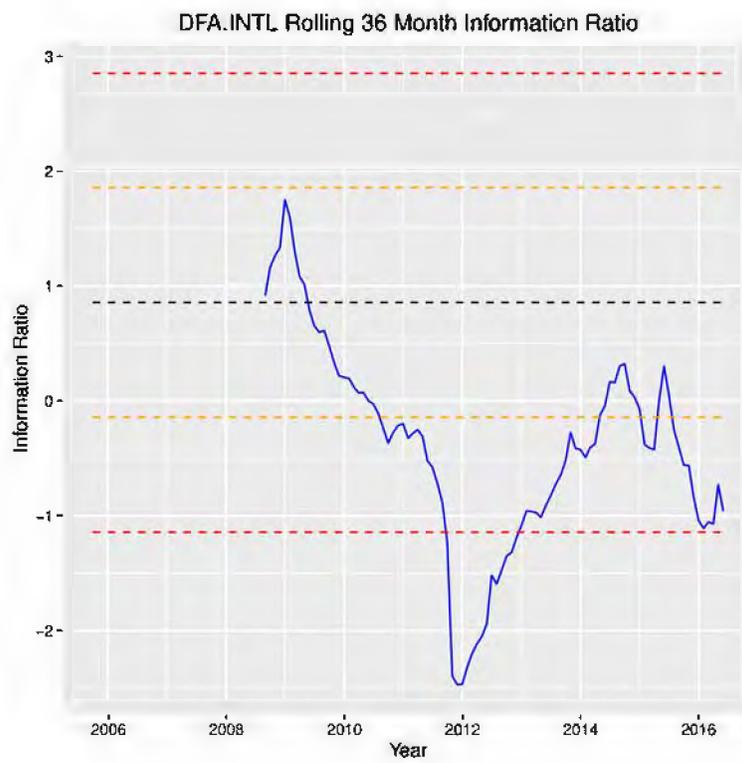
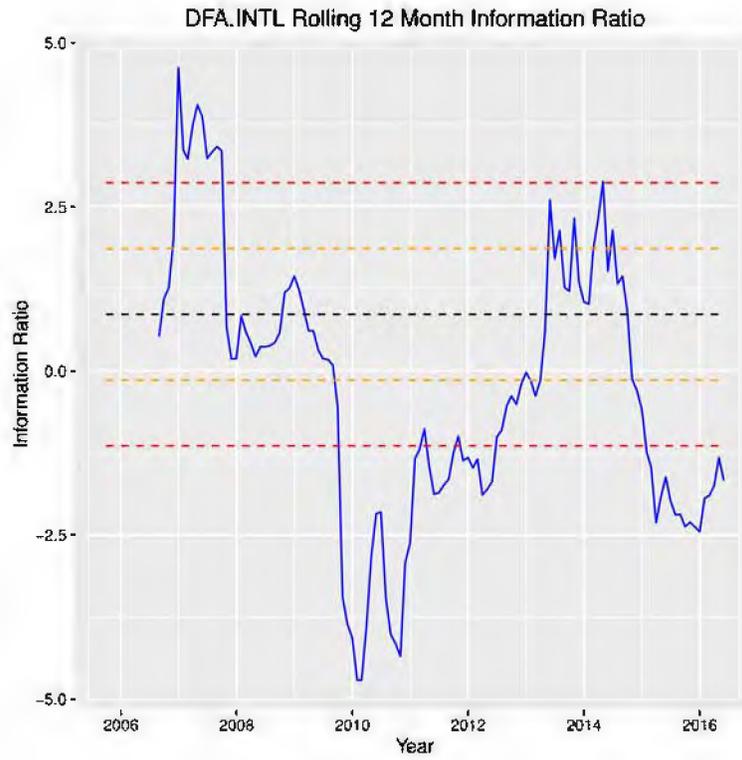


DFA.INTL GICS Sector Active Exposure

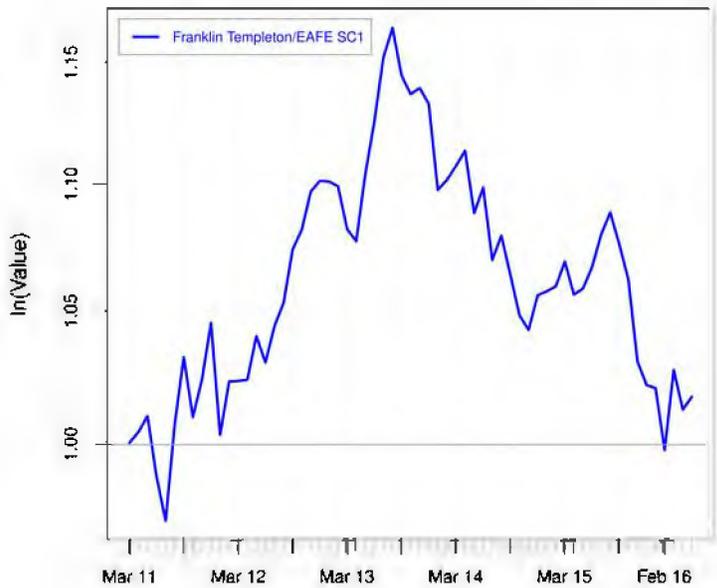


Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)

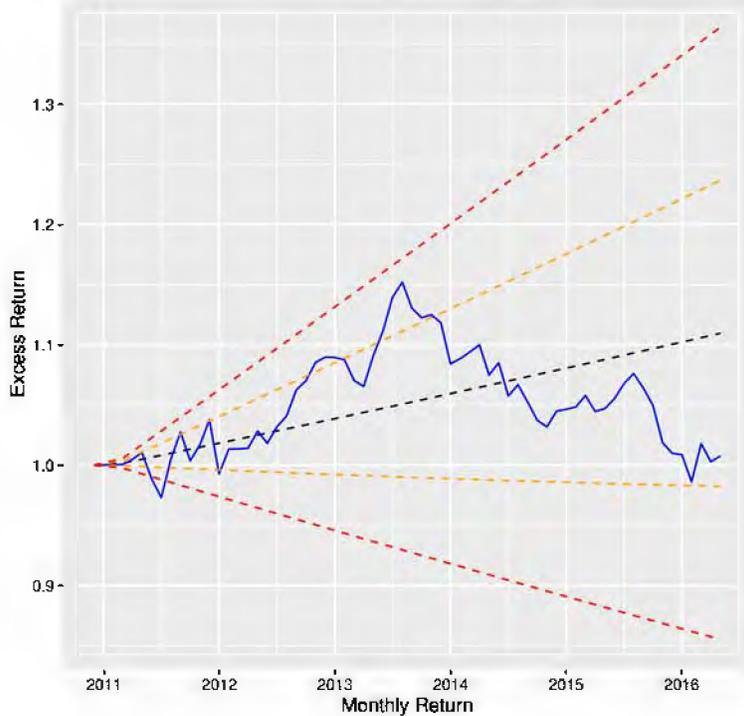




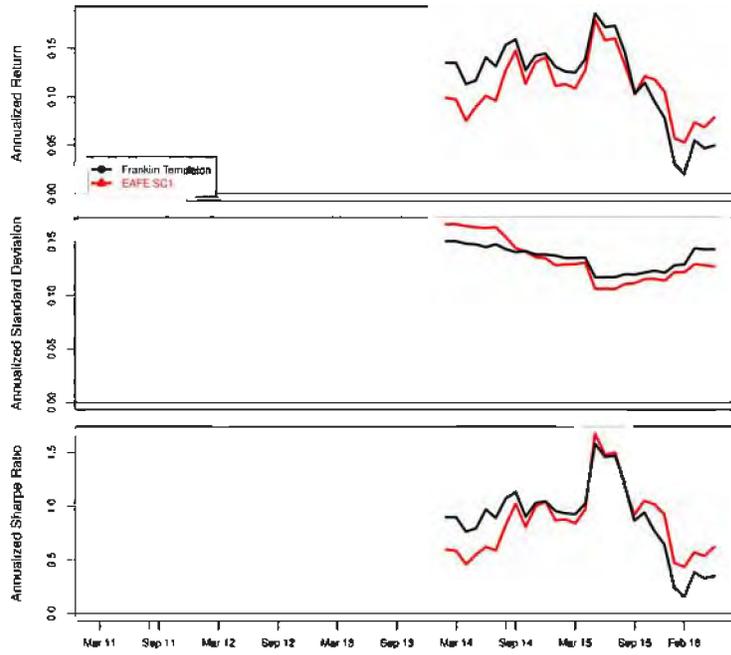
Franklin Templeton Cumulative Relative Performance



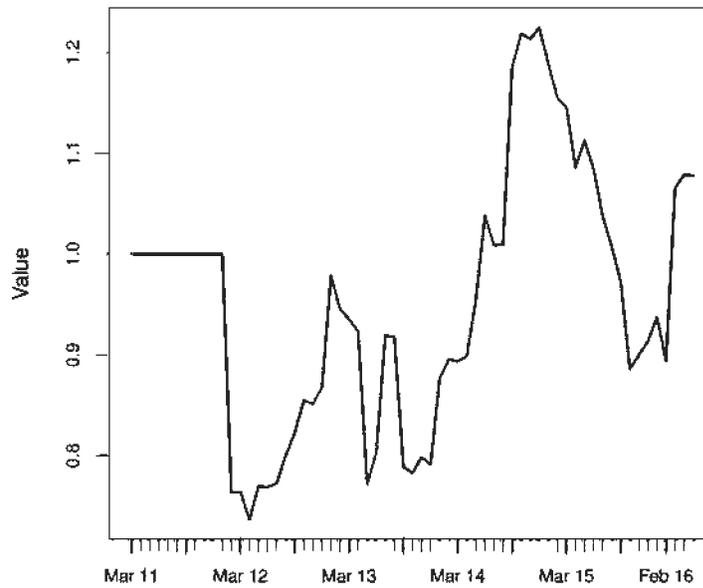
Franklin Templeton Actual Excess vs Expected Excess +/- 1 & 2 Std De



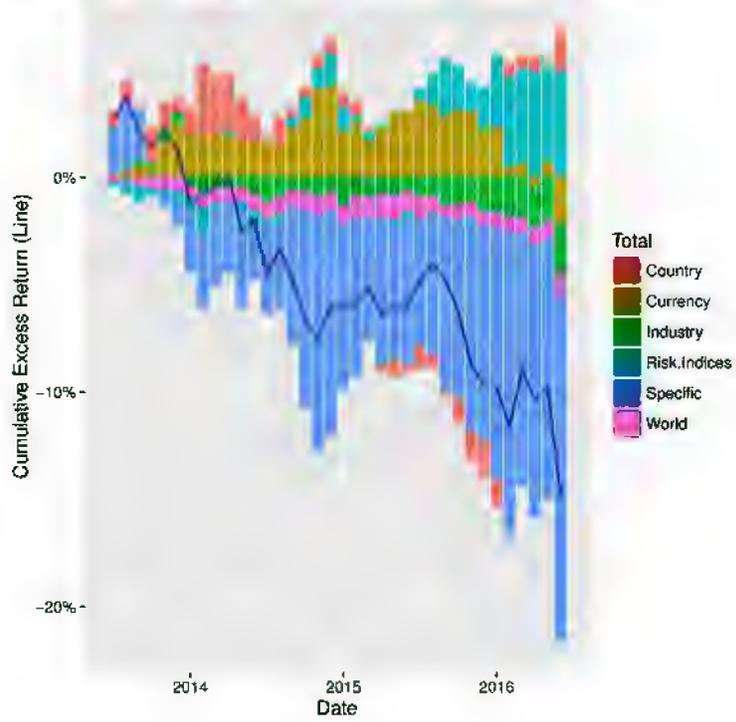
Franklin Templeton Rolling 3 year Performance



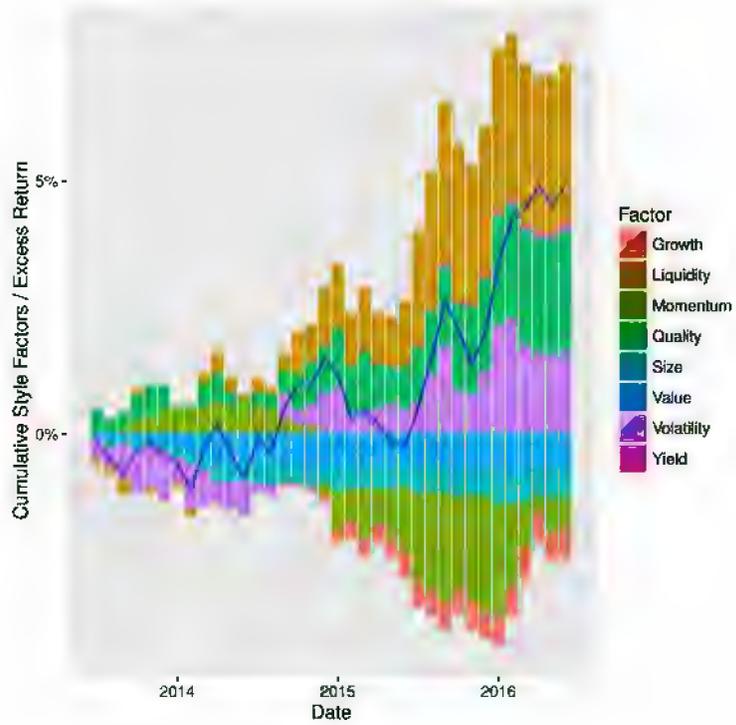
Franklin Templeton Rolling 12 Month Beta



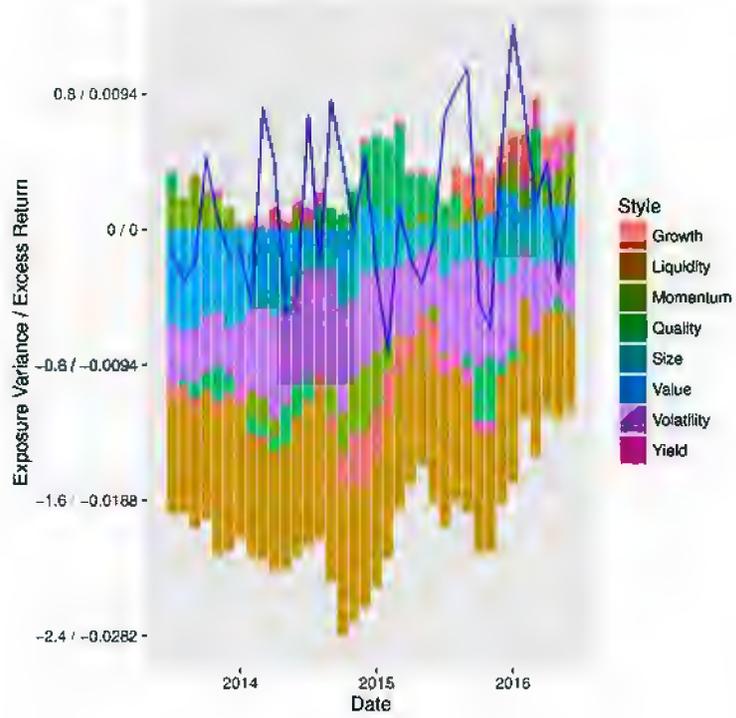
Barra Holdings Based Factor Attribution: Franklin Templeton



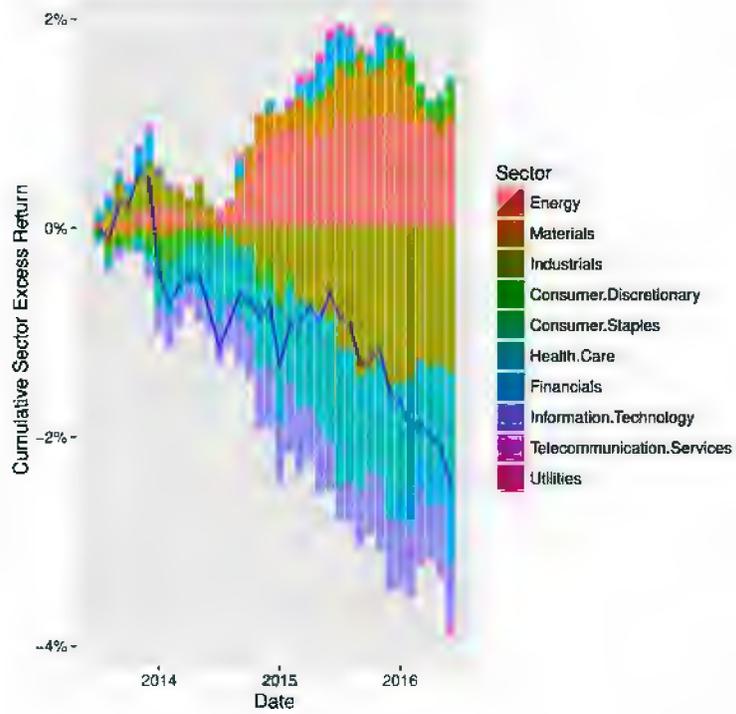
Franklin Templeton Barra Style Factor



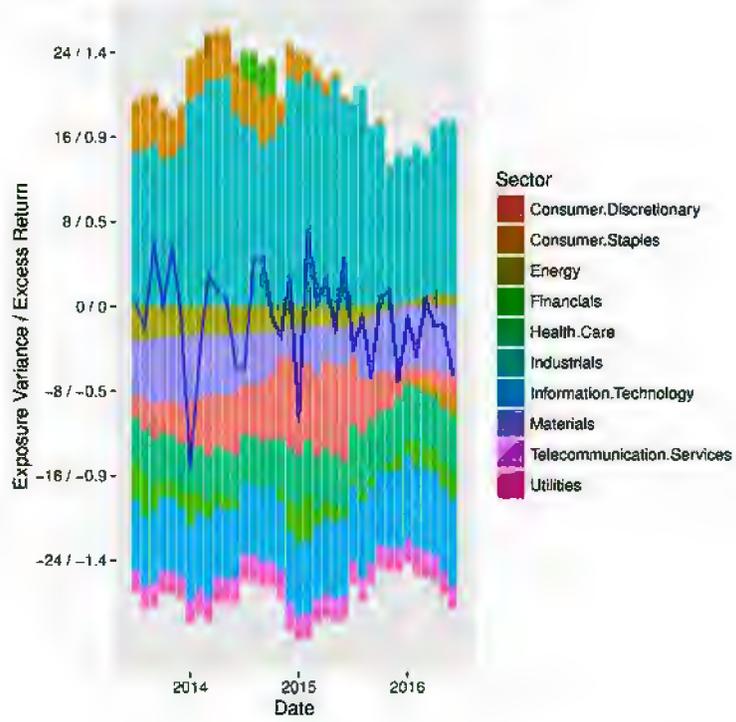
Franklin Templeton Monthly Style Factors Active Exposure



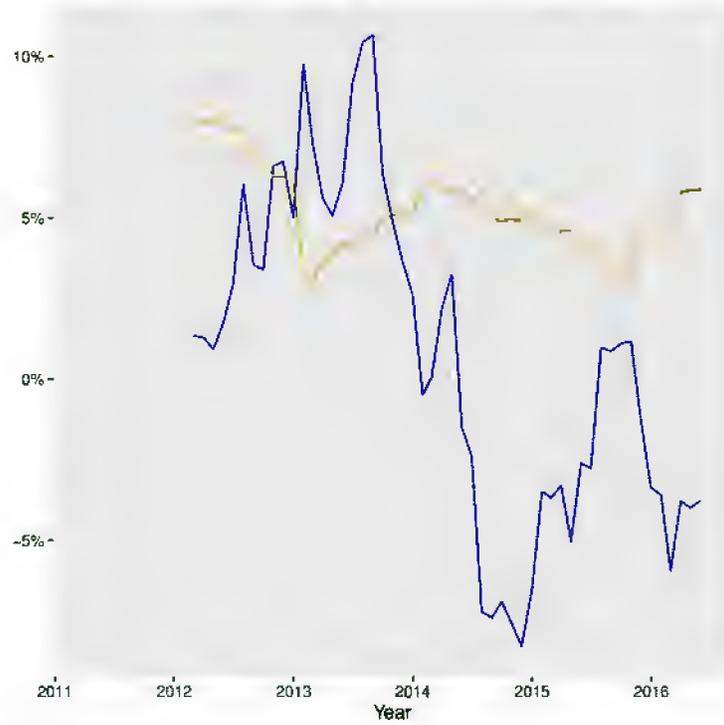
Franklin Templeton Monthly GICS Sector Return



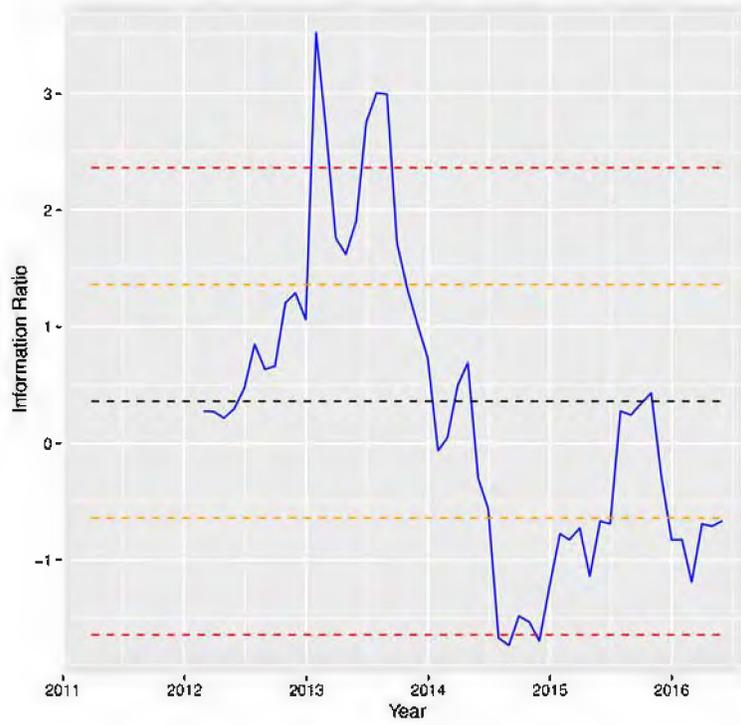
Franklin Templeton GICS Sector Active Exposure



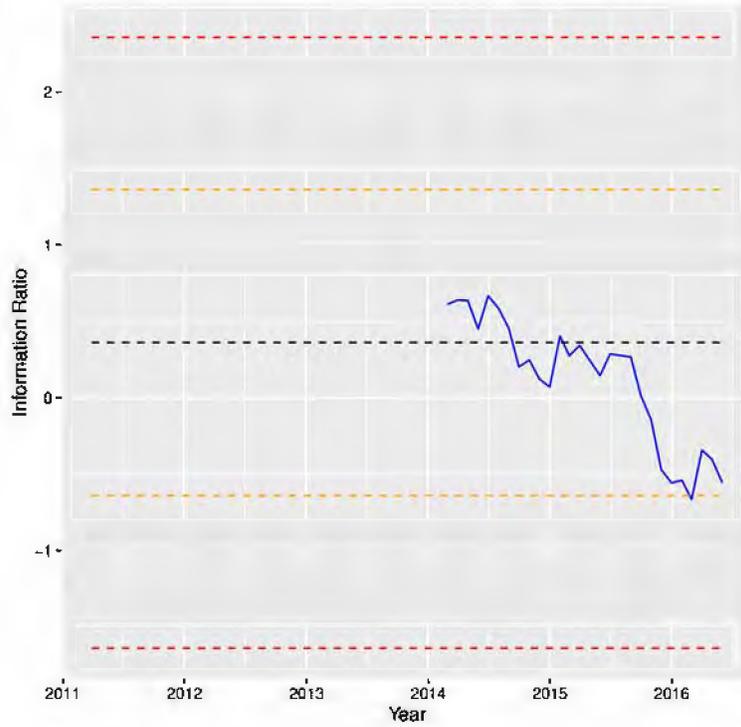
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



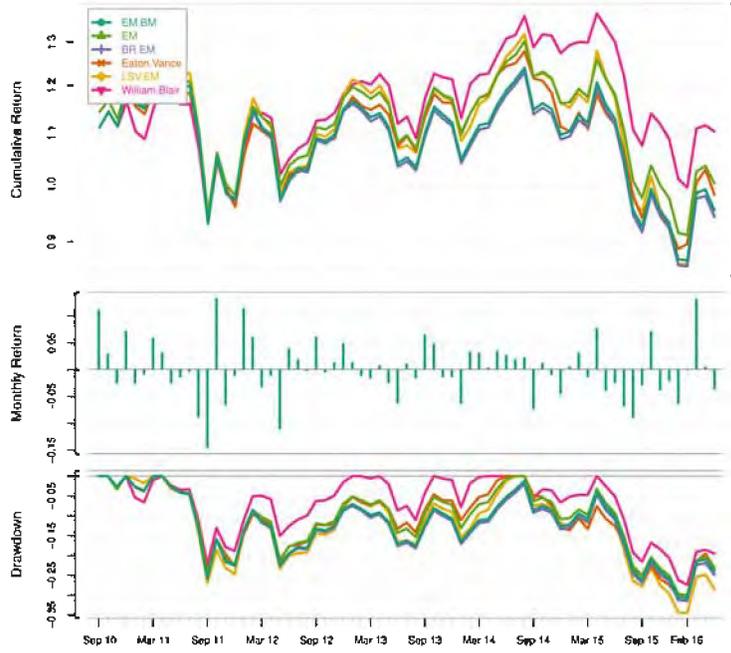
Franklin Templeton Rolling 12 Month Information Ratio



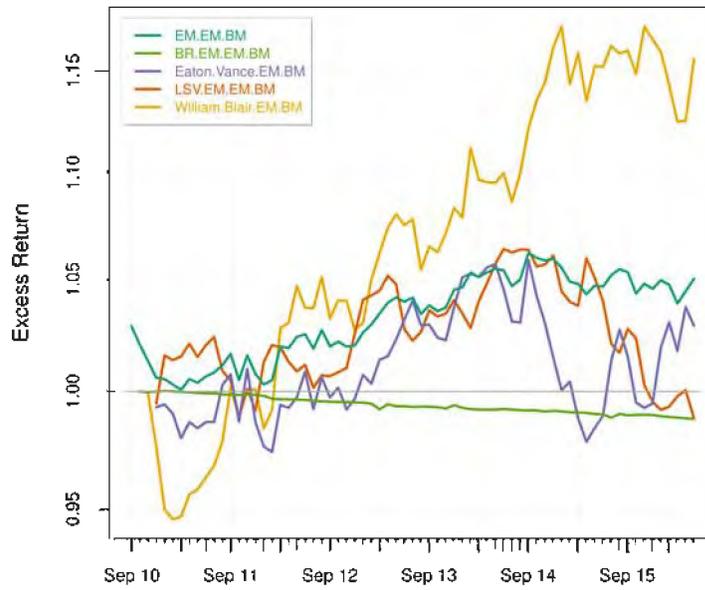
Franklin Templeton Rolling 36 Month Information Ratio



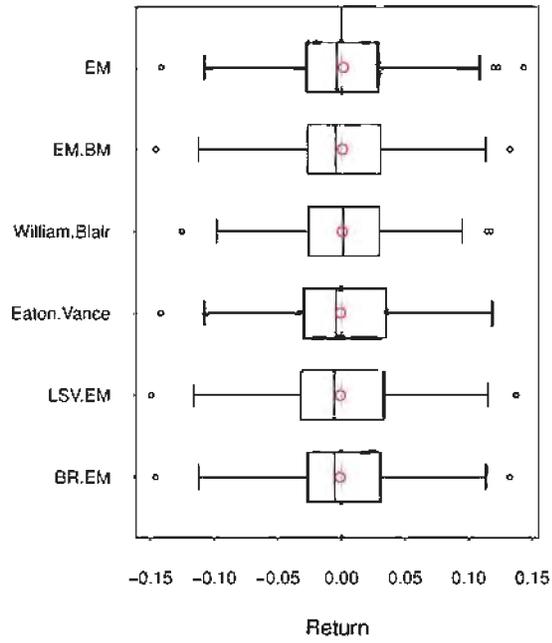
Emerging Markets Performance Summary



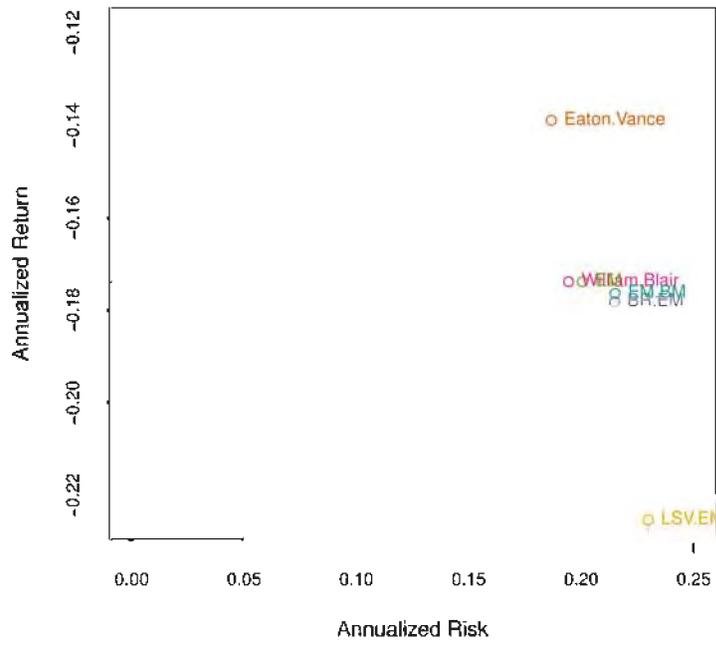
Emerging Markets Cumulative Relative Performance



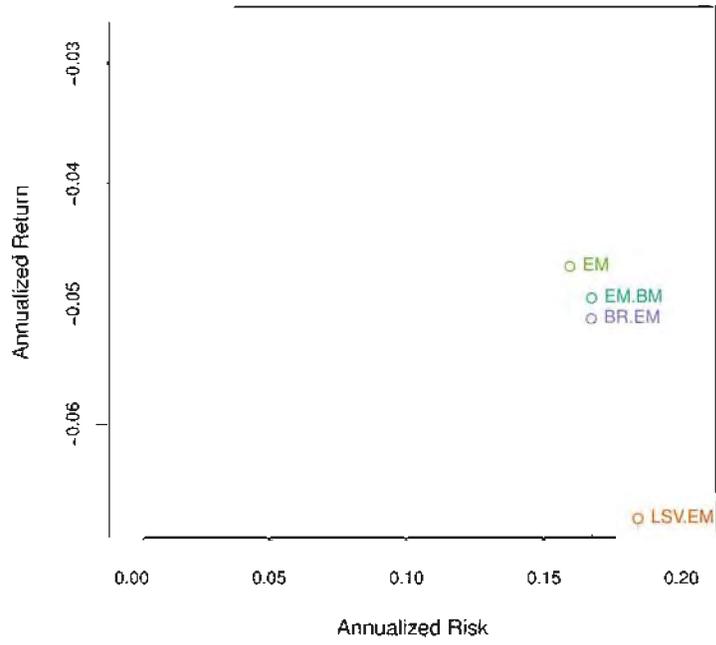
Return Distribution Comparison



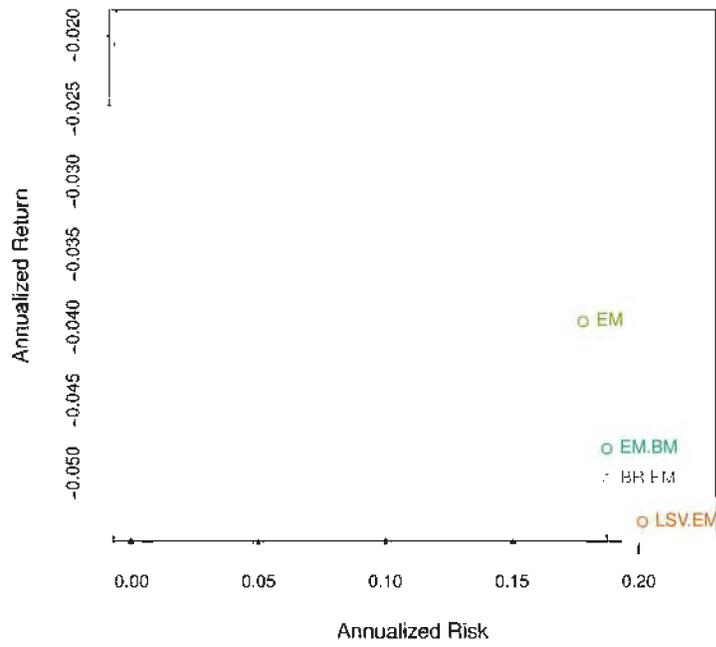
Emerging Markets Trailing 1 Year Performance vs Sharpe Ratios (1,2,3)

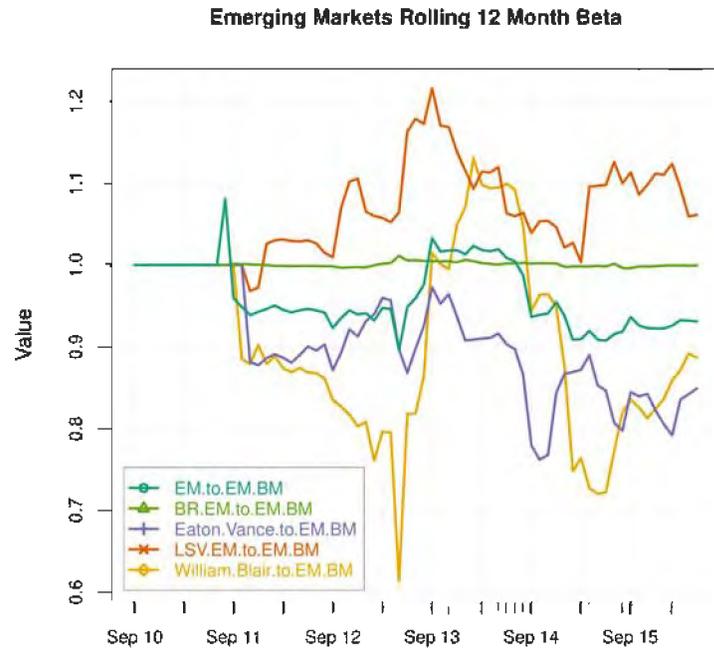
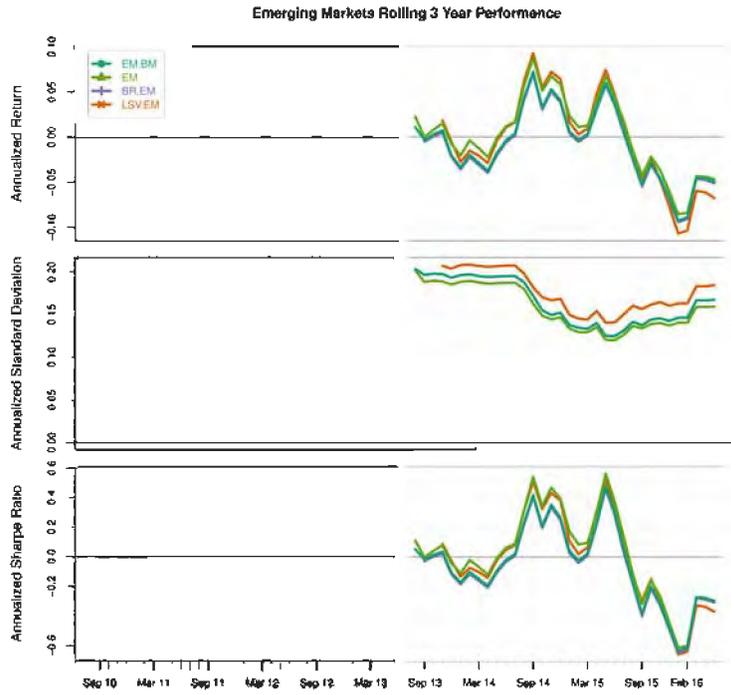


Trailing 3 Year Performance vs Sharpe Ratios (1,2,3)

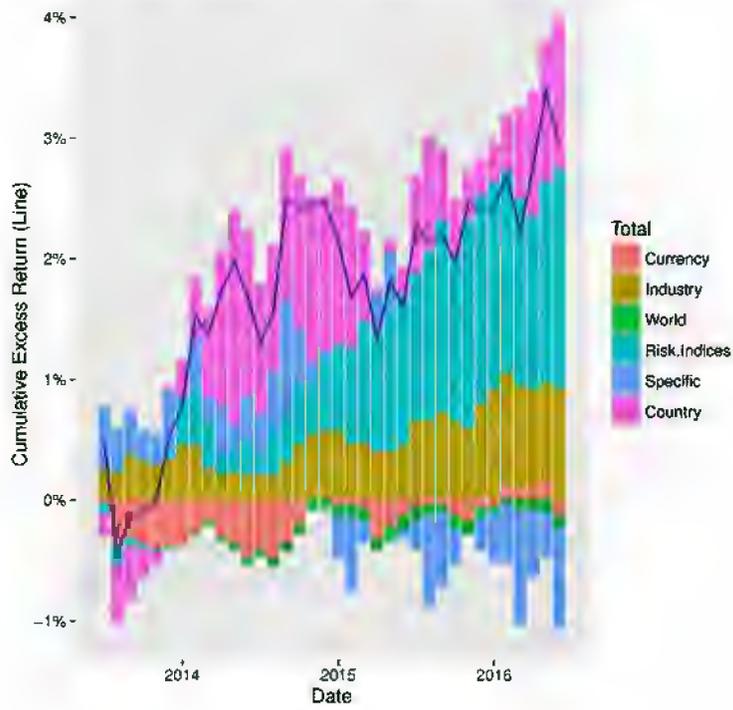


Trailing 5 Year Performance vs Sharpe Ratios (1,2,3)

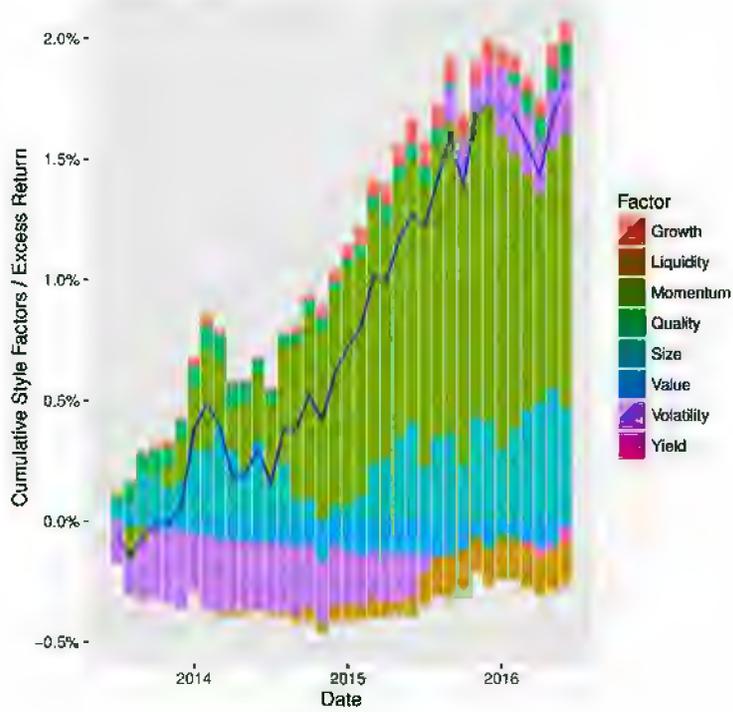




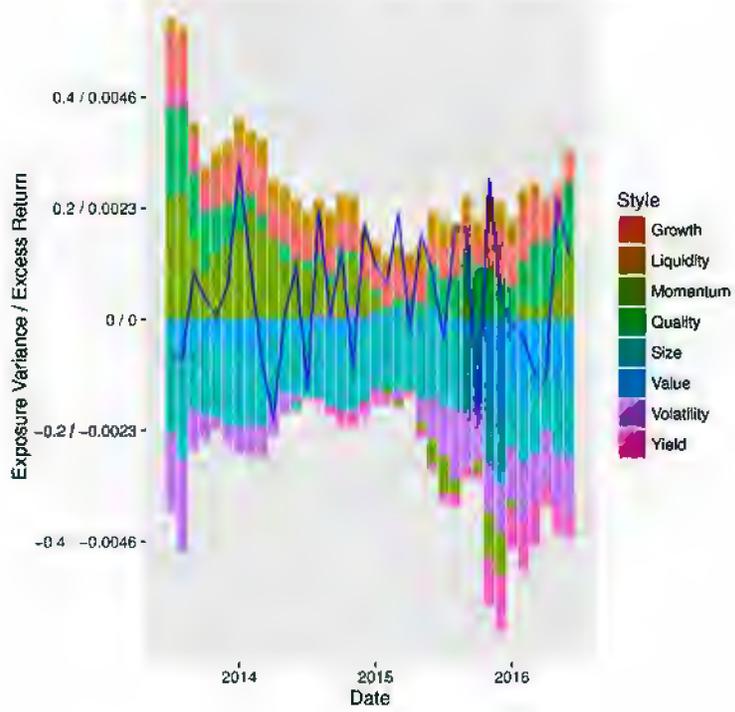
Barra Holdings Based Factor Attribution: Emerging Markets



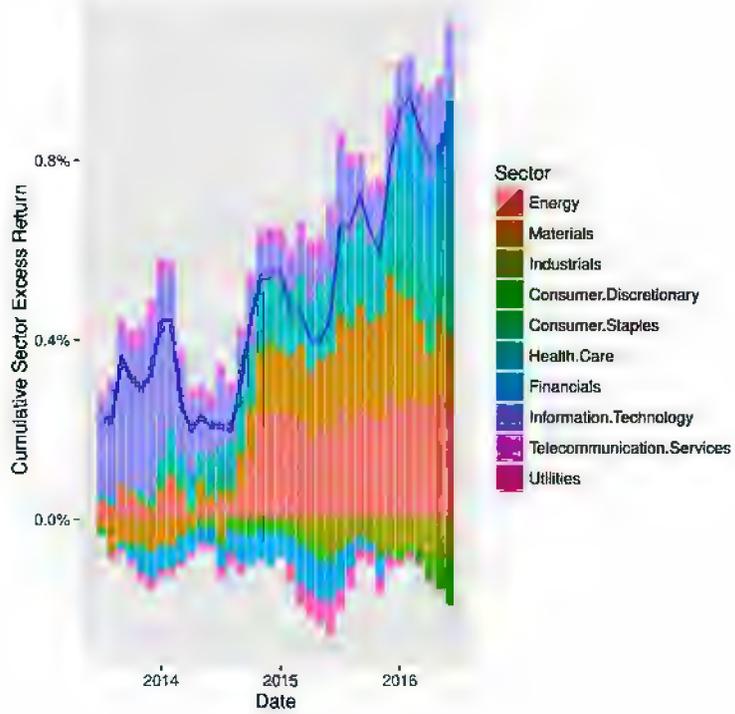
Emerging Markets Barra Style Factor



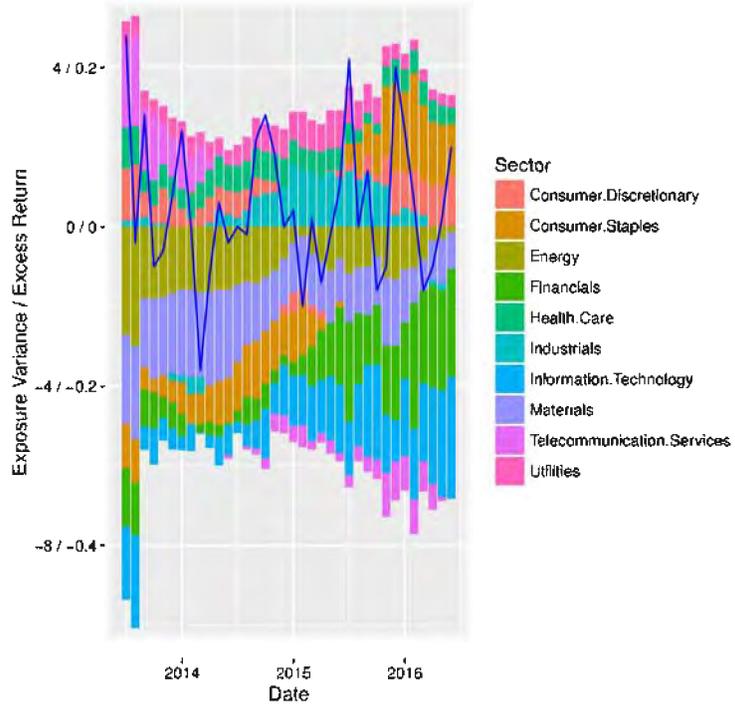
Emerging Markets Monthly Style Factors Active Exposure



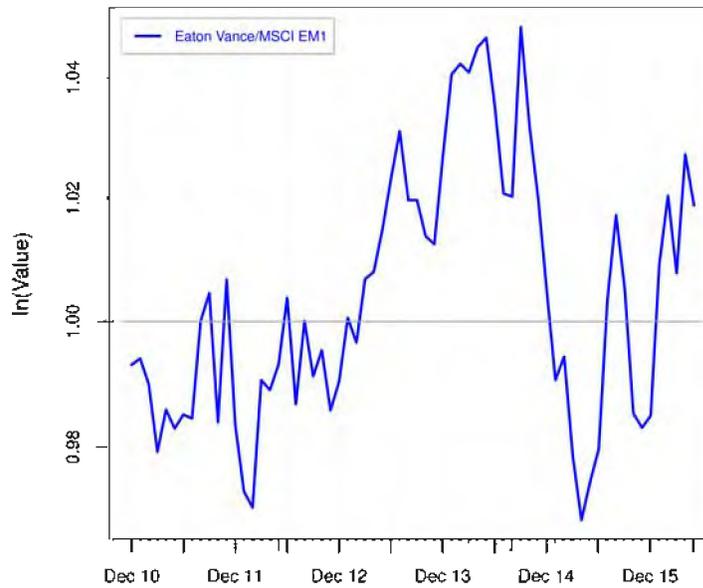
Emerging Markets Monthly GICS Sector Return



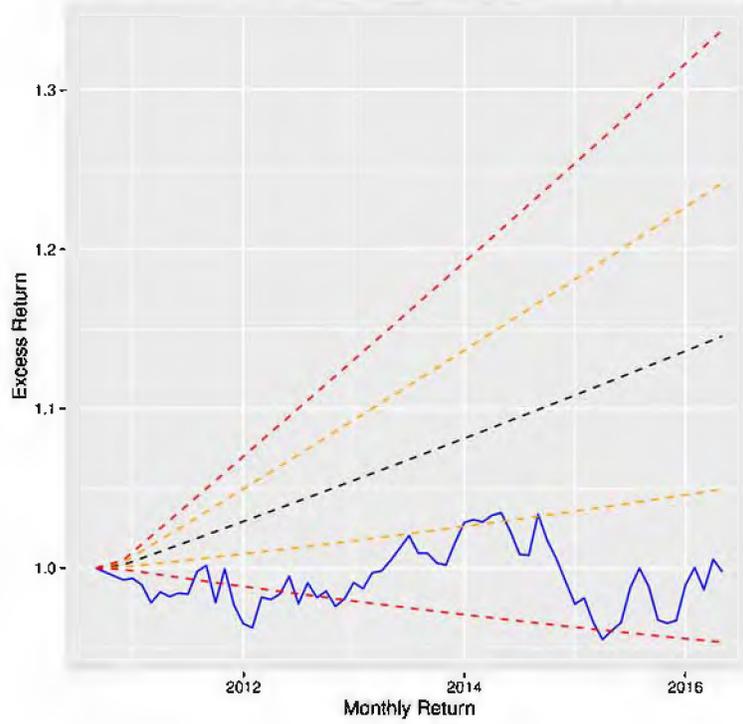
Emerging Markets GICS Sector Active Exposure



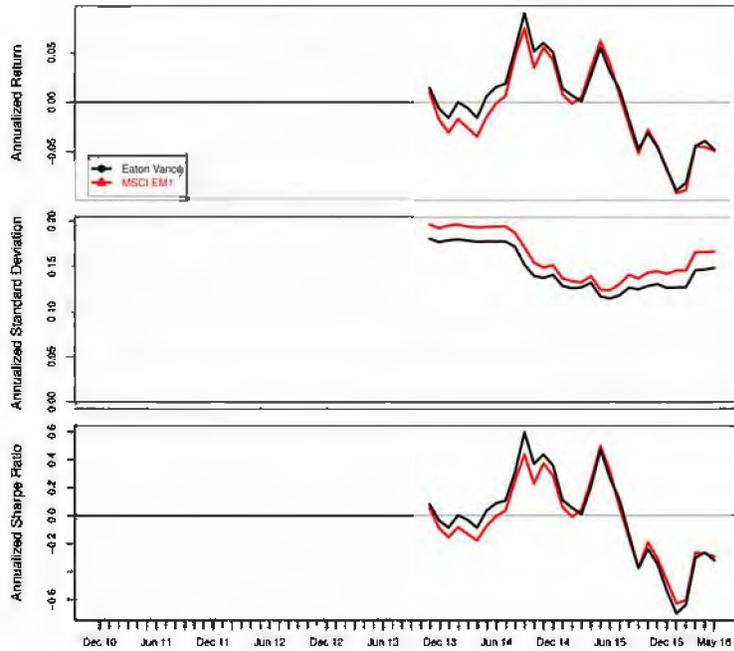
Eaton Vance Cumulative Relative Performance



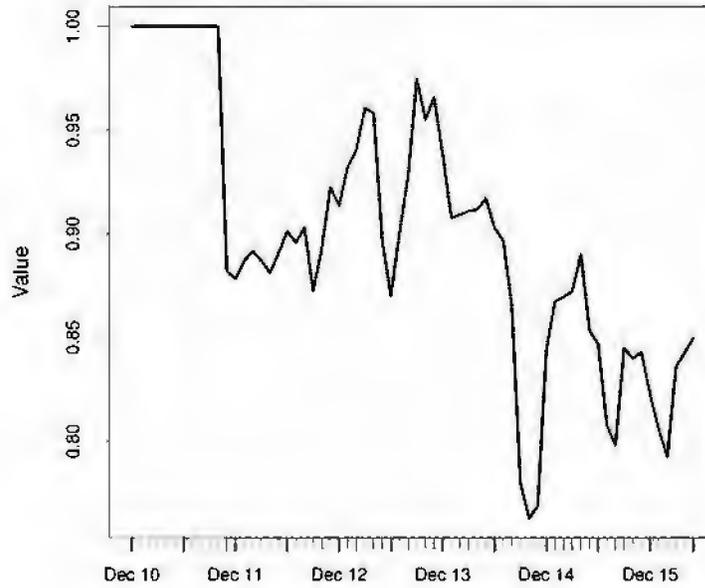
Eaton Vance Actual Excess vs Expected Excess +/-1 & 2 Std Dev



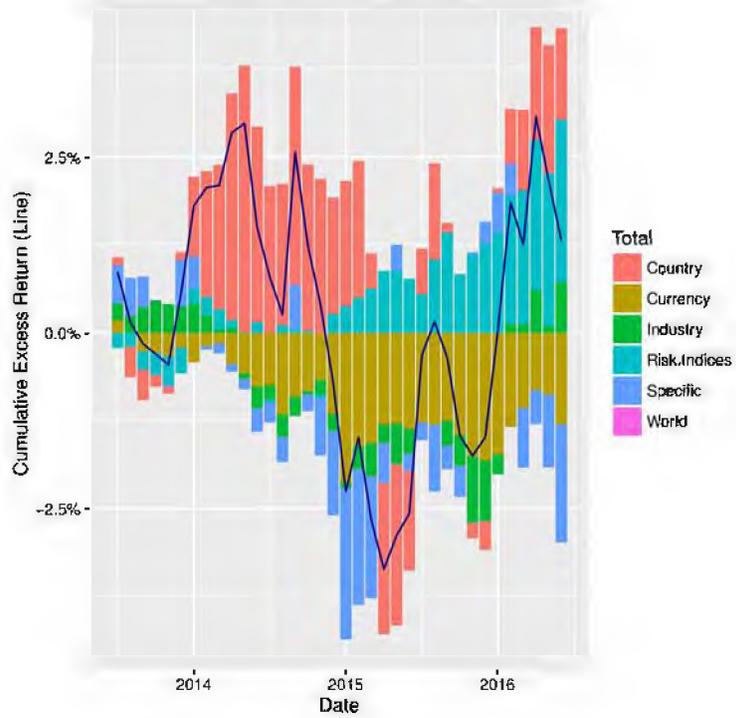
Eaton Vance Rolling 3 year Performance



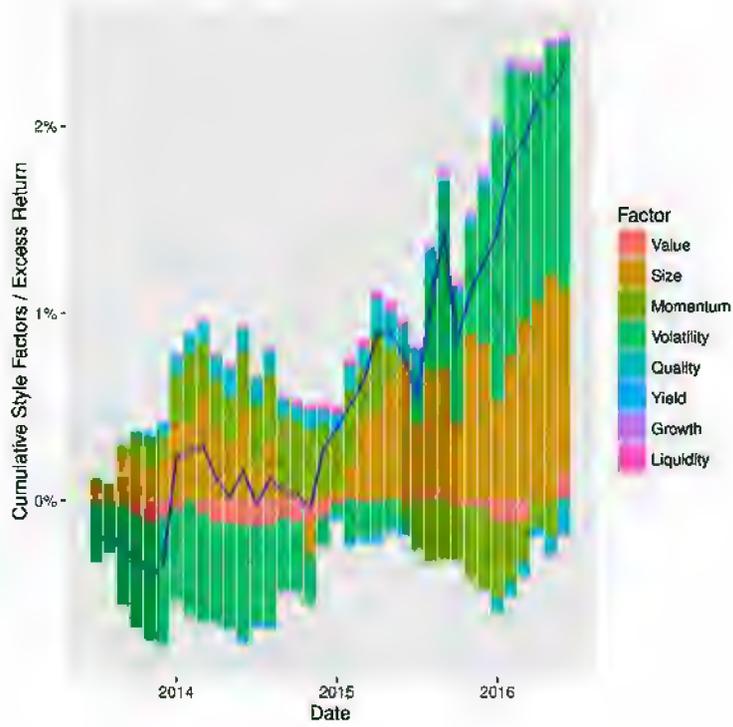
Eaton Vance Rolling 12 Month Beta



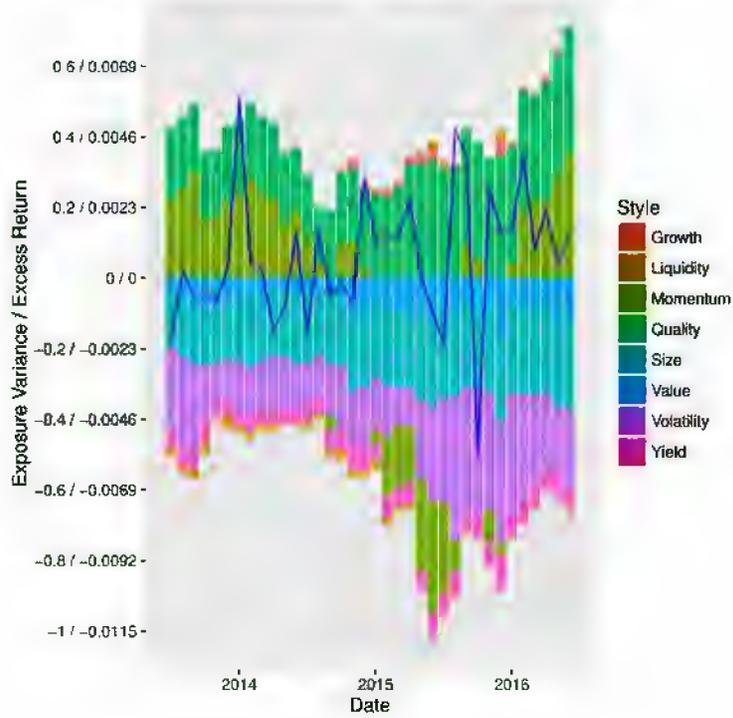
Barra Holdings Based Factor Attribution: Eaton Vance

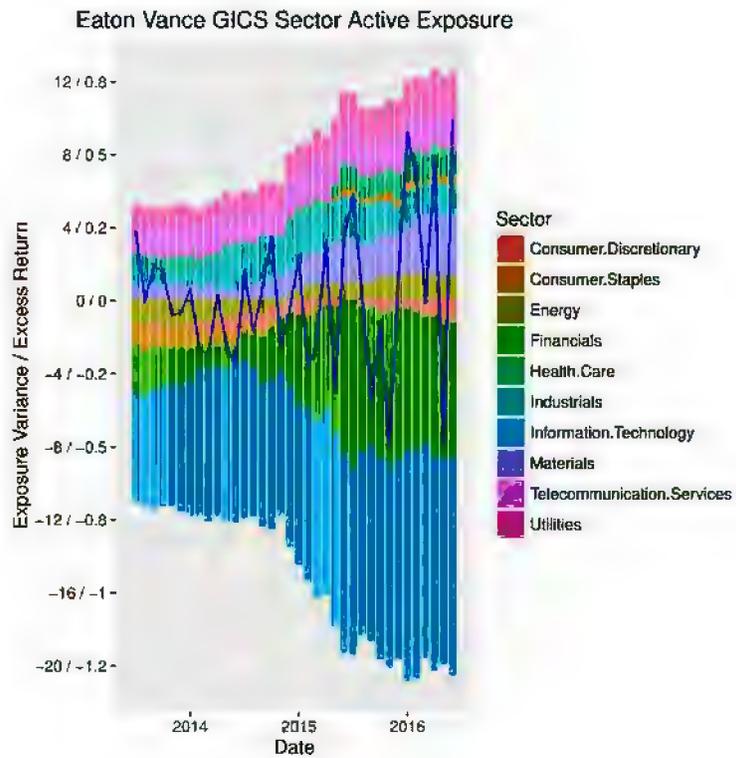
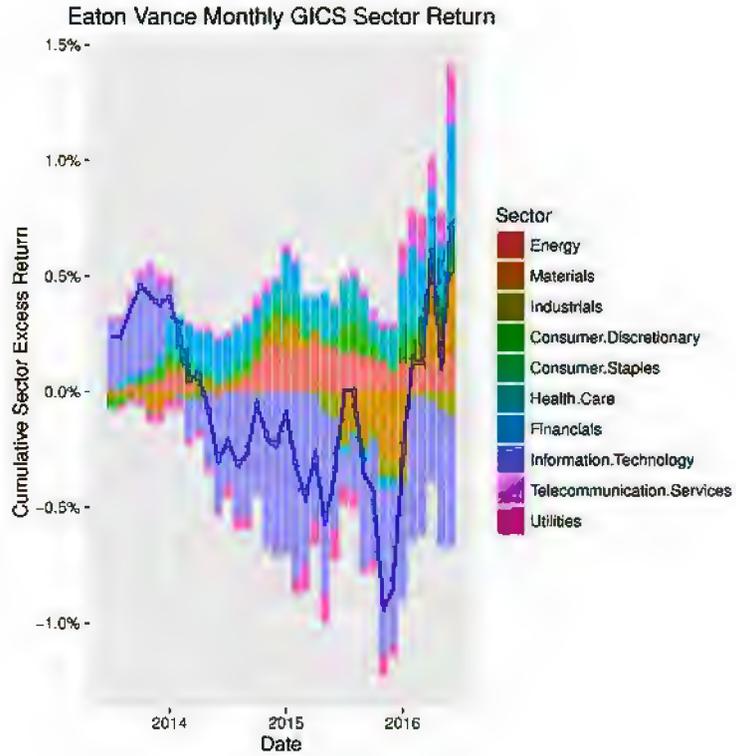


Eaton Vance Barra Style Factor

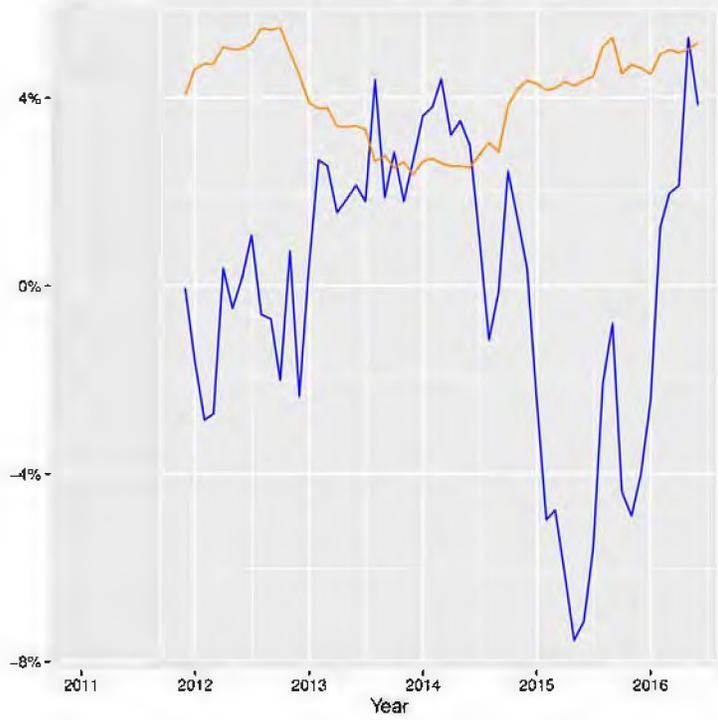


Eaton Vance Monthly Style Factors Active Exposure

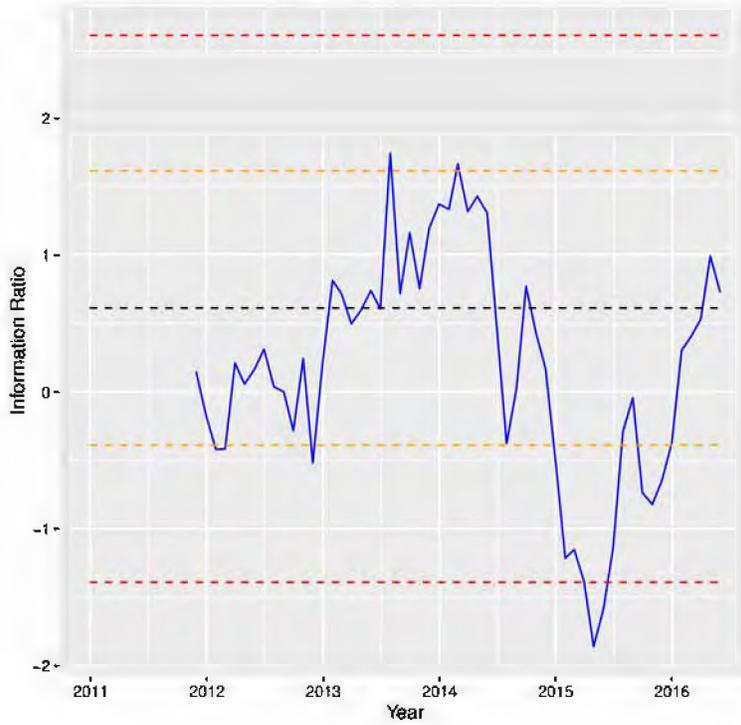




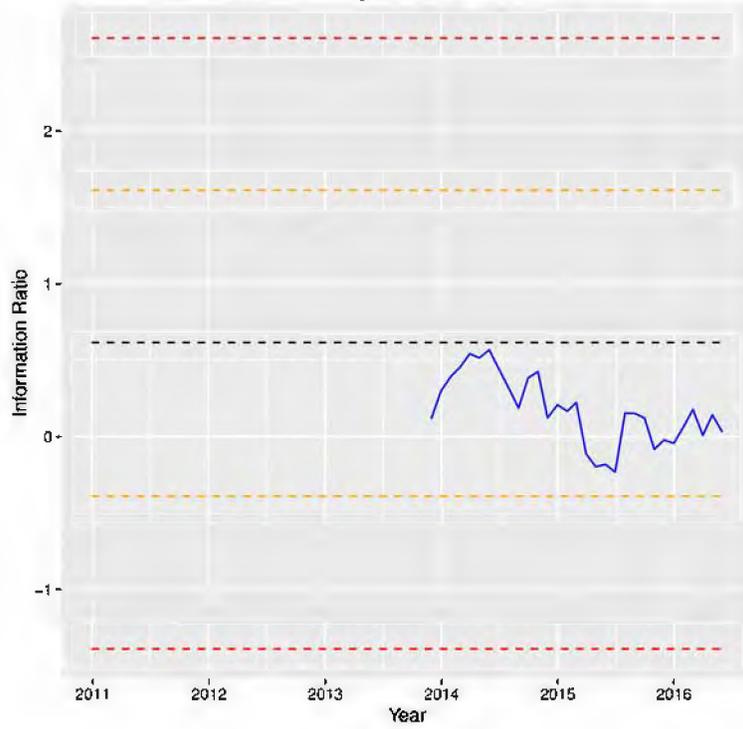
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



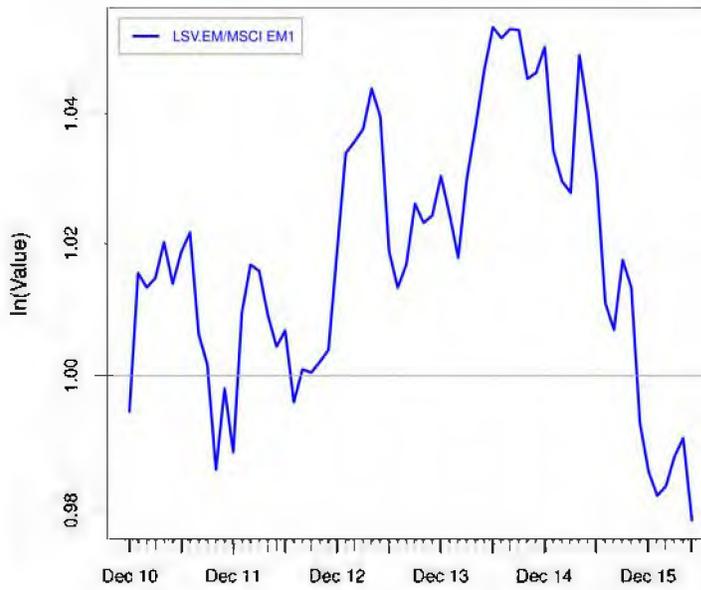
Eaton Vance Rolling 12 Month Information Ratio



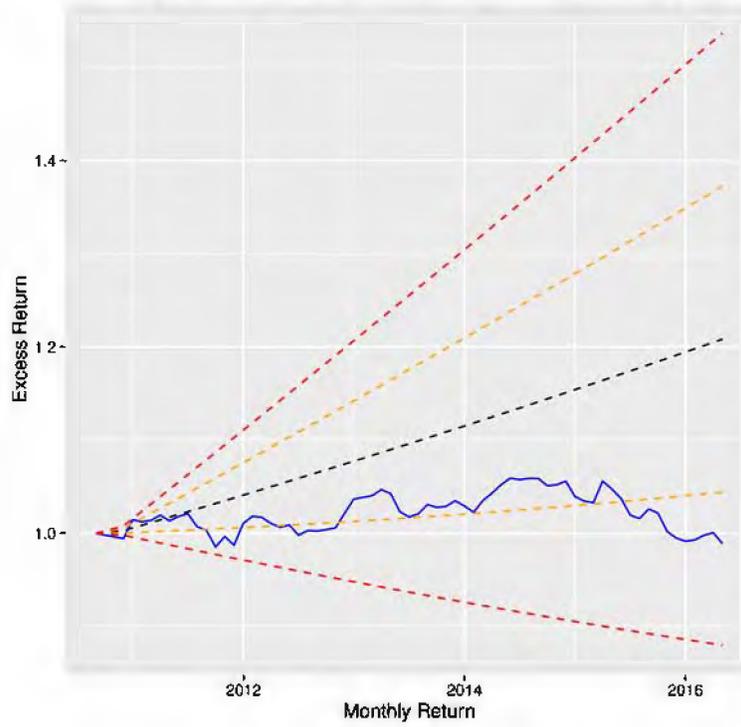
Eaton Vance Rolling 36 Month Information Ratio



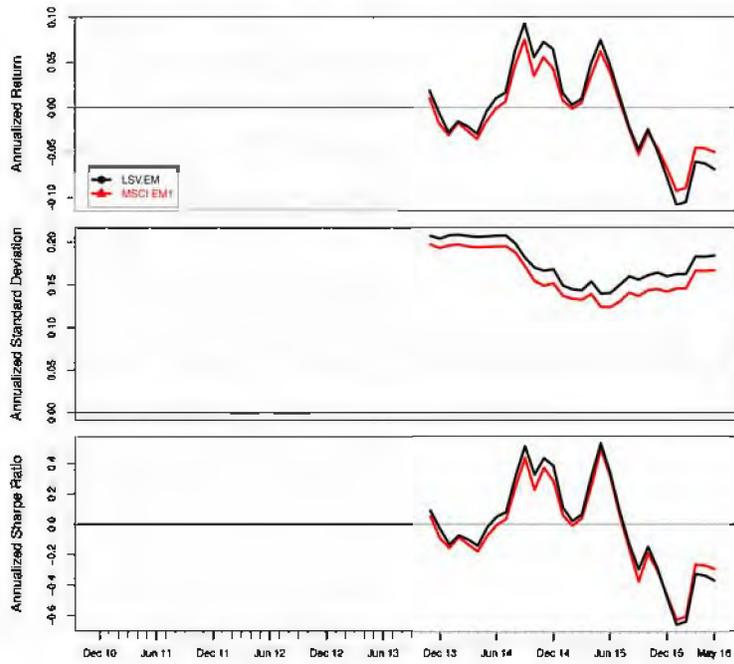
LSVEM Cumulative Relative Performance



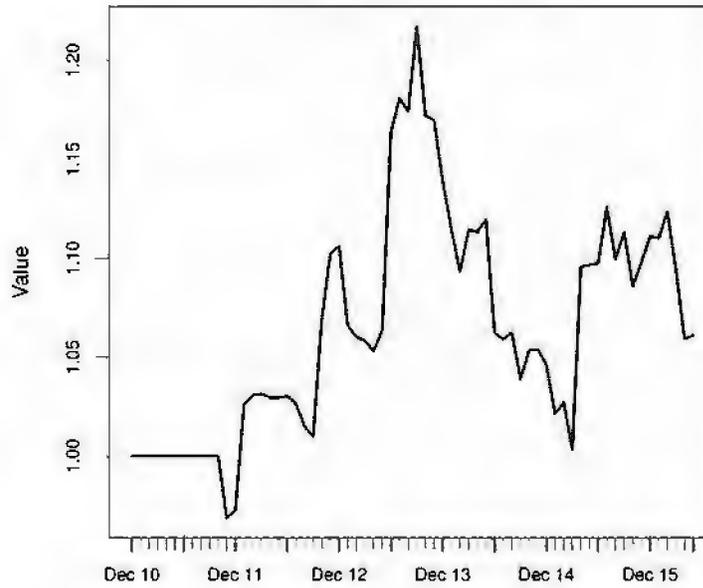
LSV.EM Actual Excess vs Expected Excess +/-1 & 2 Std Dev



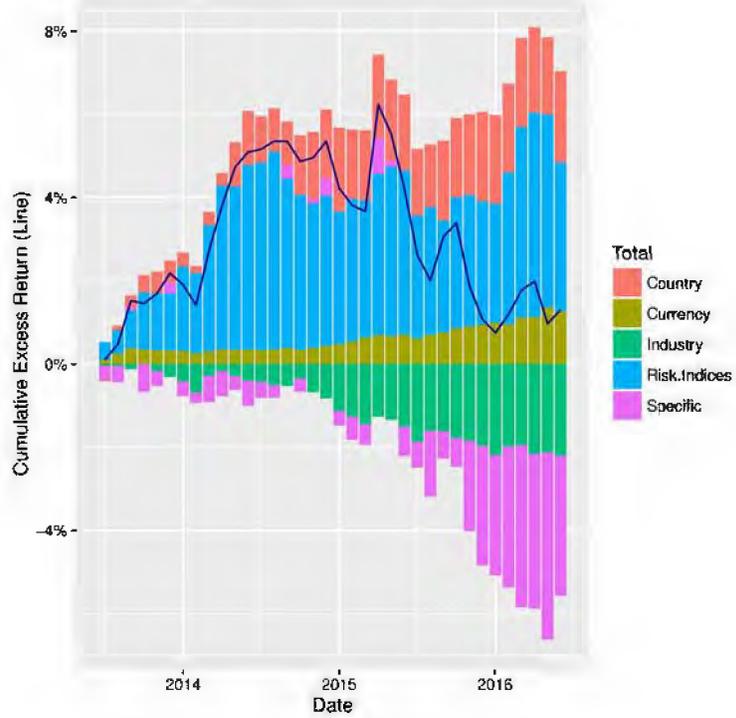
LSV.EM Rolling 3 year Performance



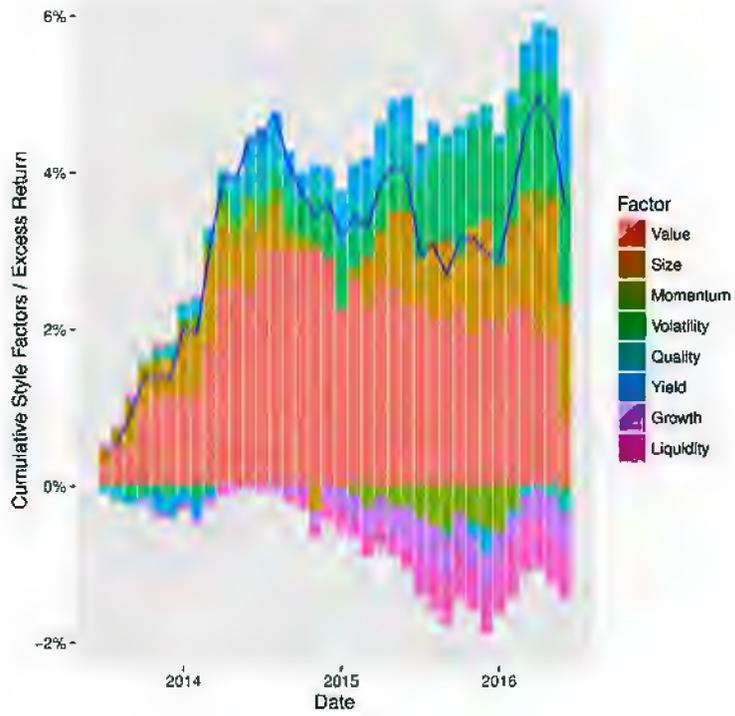
LSV.EM Rolling 12 Month Beta



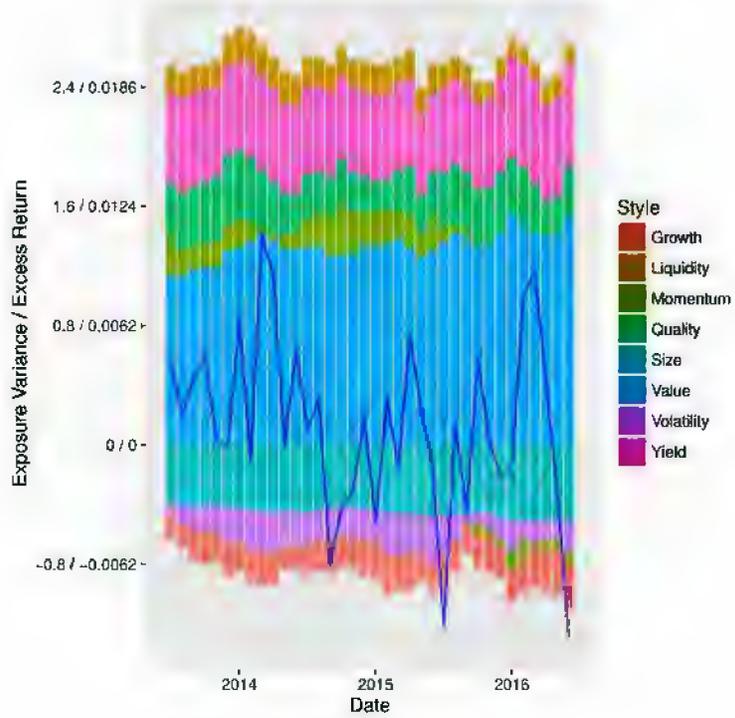
Barra Holdings Based Factor Attribution: LSV.EM



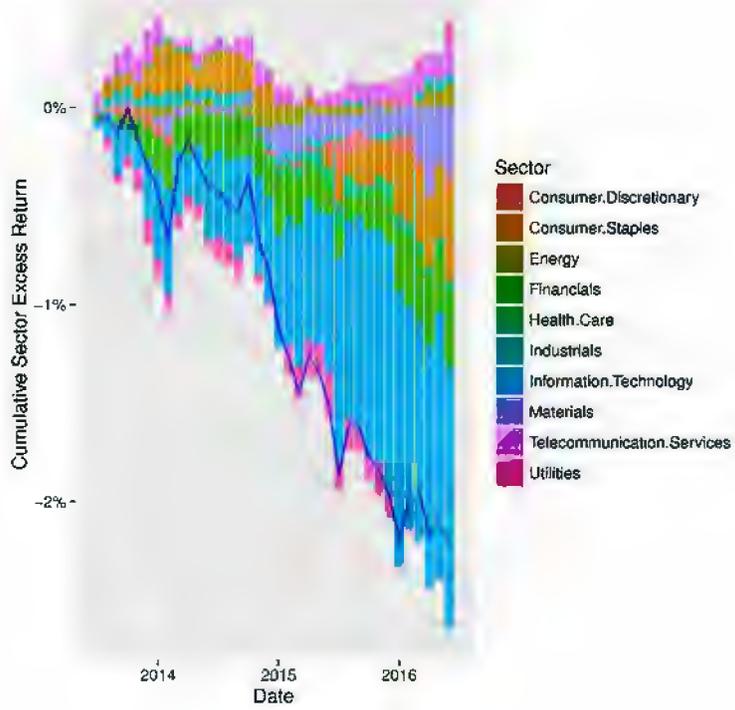
LSV.EM Barra Style Factor



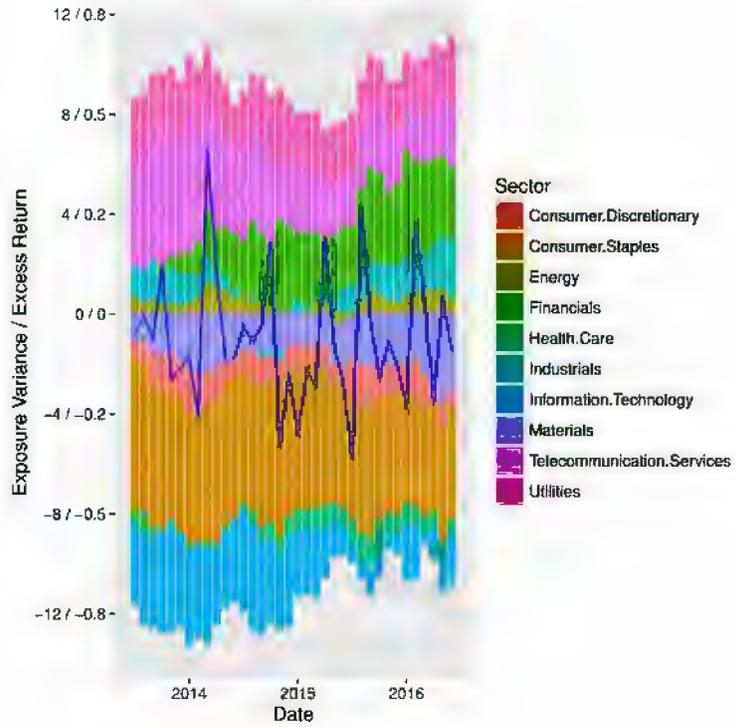
LSV.EM Monthly Style Factors Active Exposure



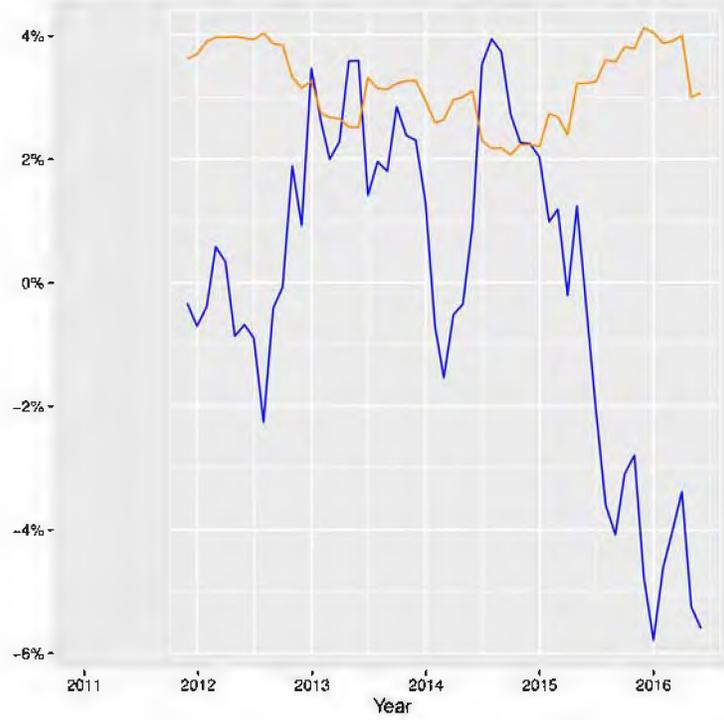
LSV.EM Monthly GICS Sector Return



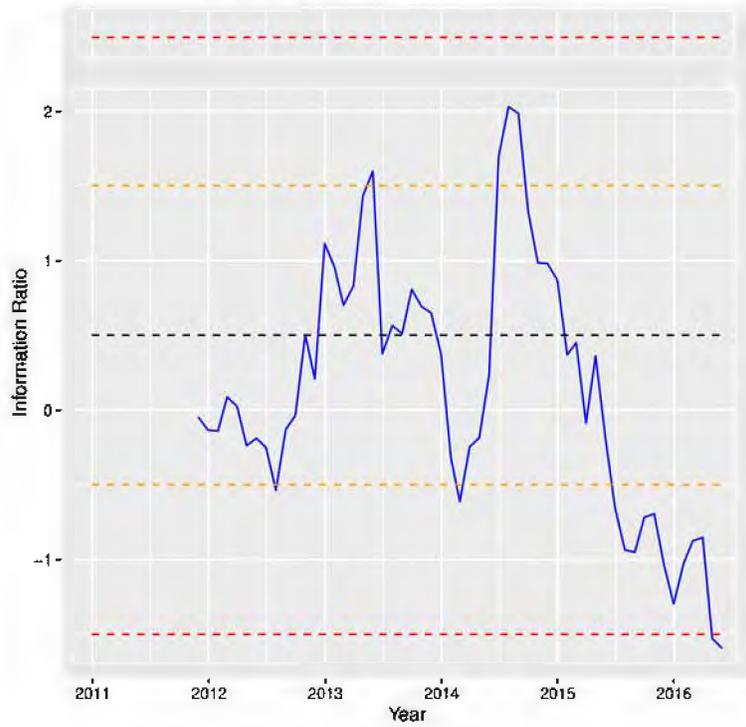
LSV.EM GICS Sector Active Exposure



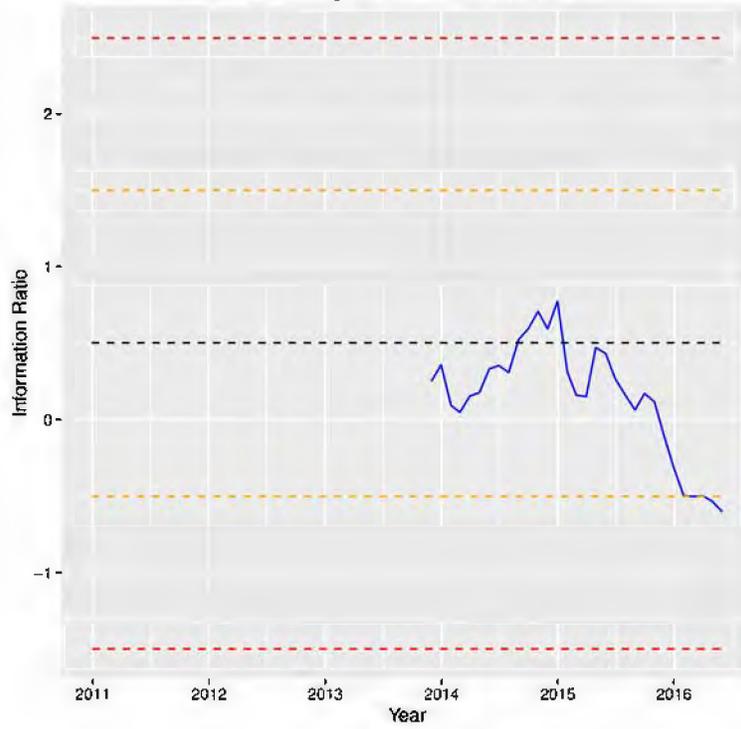
Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



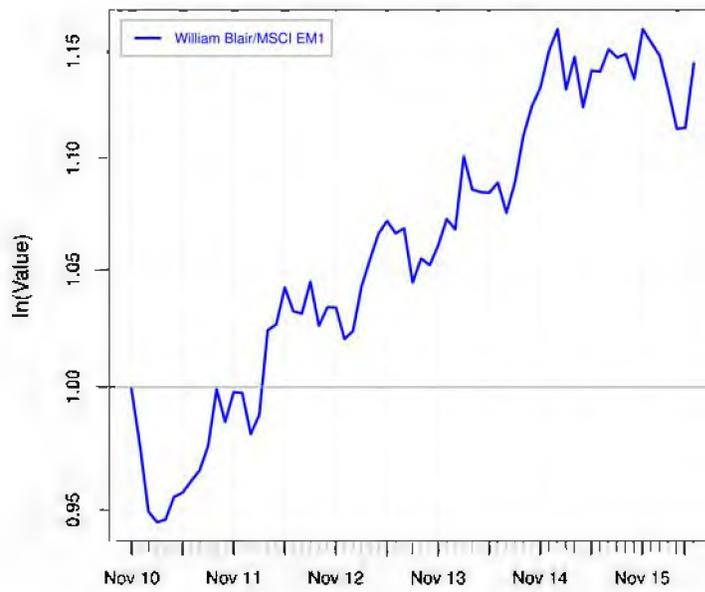
LSVEM Rolling 12 Month Information Ratio



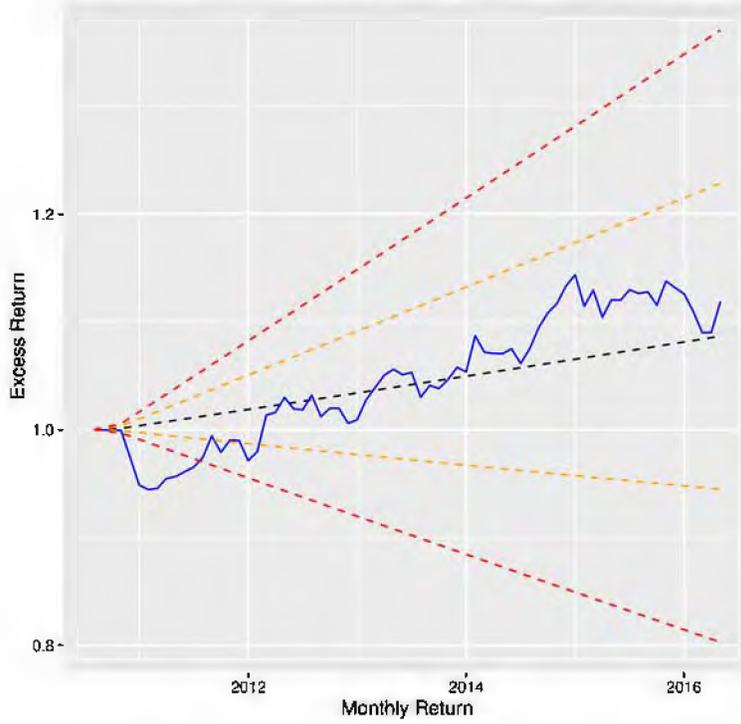
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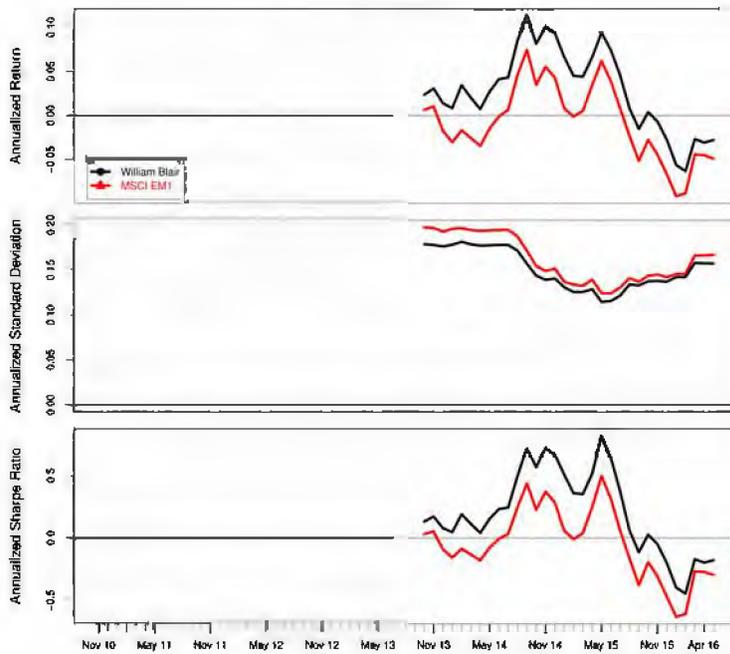
William Blair Cumulative Relative Performance



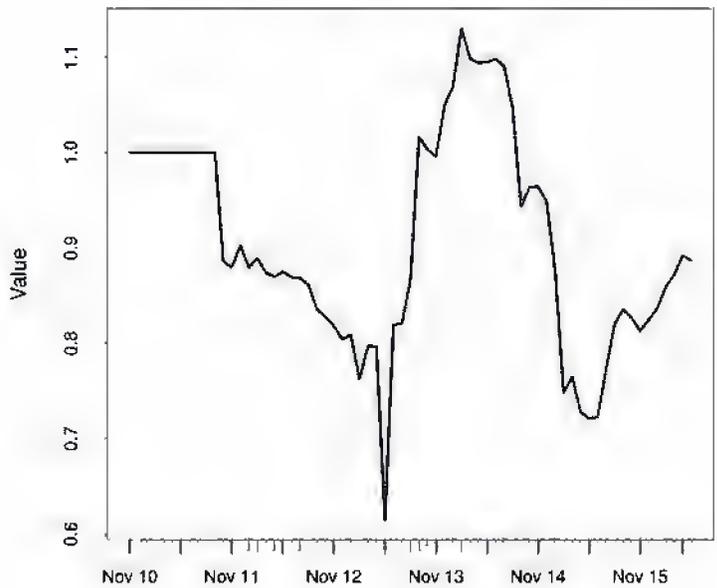
William Blair Actual Excess vs Expected Excess +/-1 & 2 Std Dev



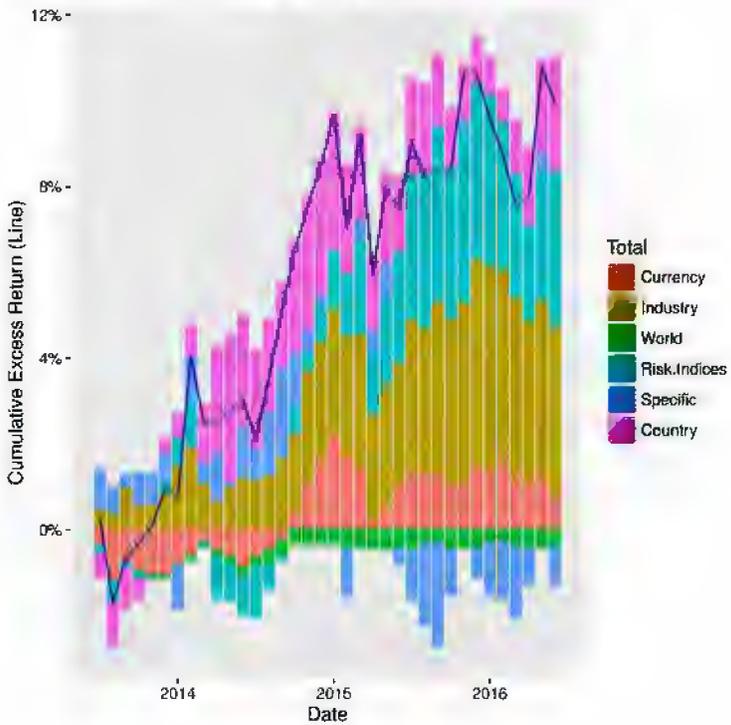
William Blair Rolling 3 year Performance



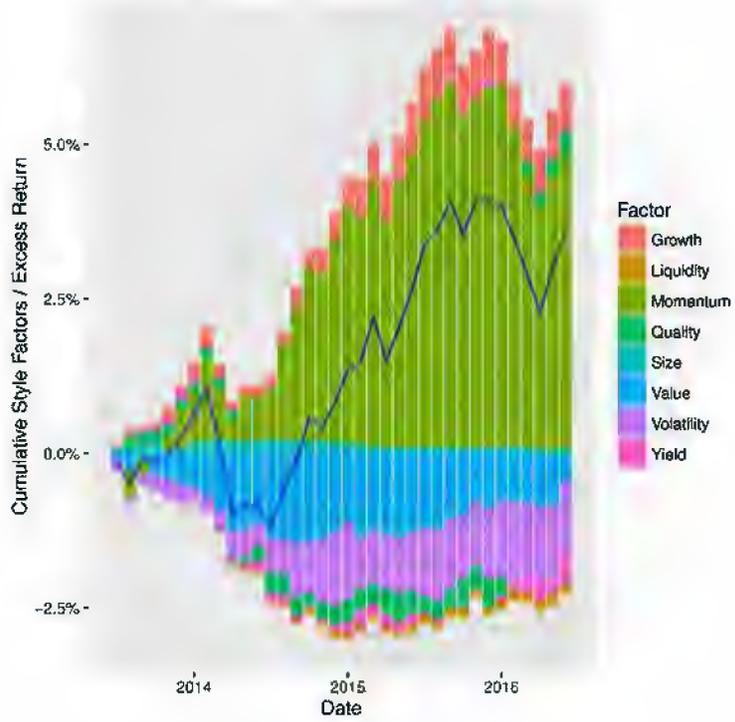
William Blair Rolling 12 Month Beta



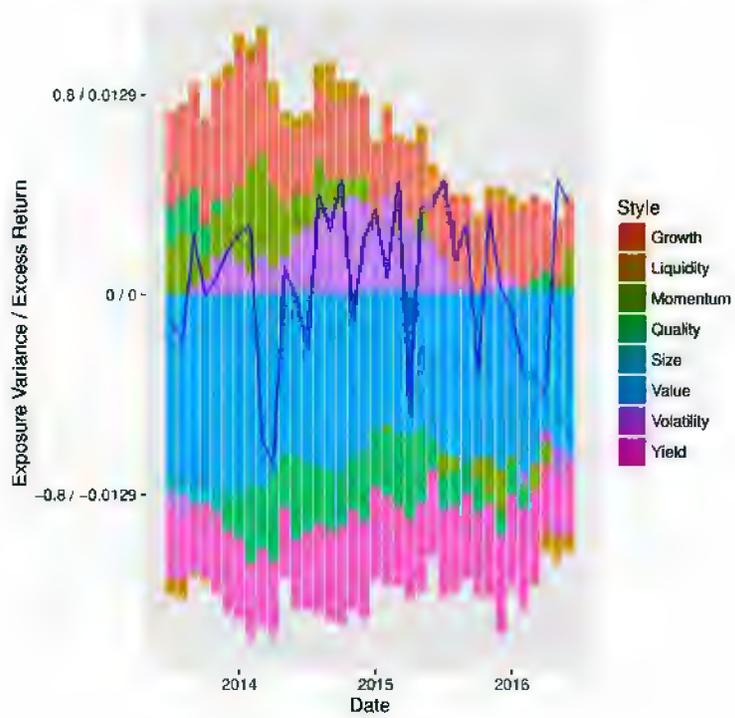
Barra Holdings Based Factor Attribution: William Blair



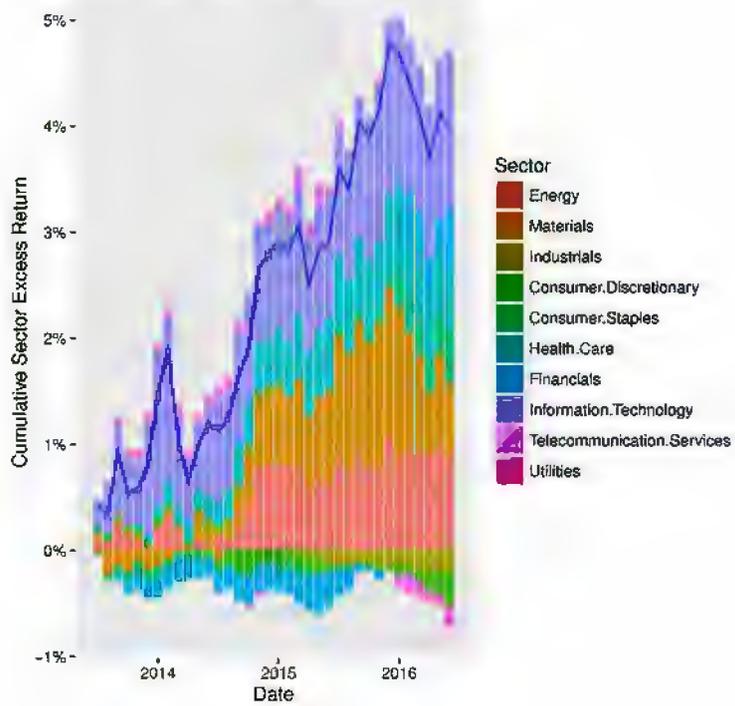
William Blair Barra Style Factor



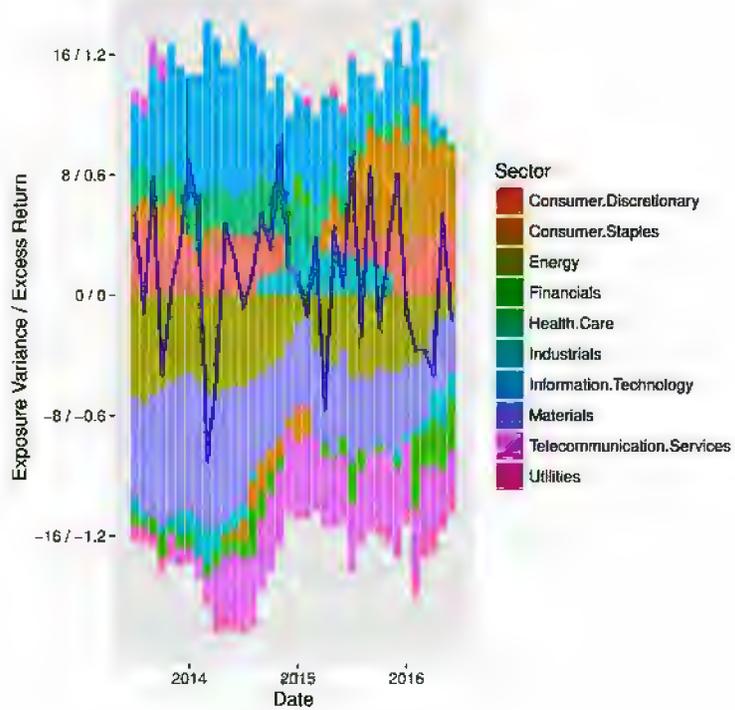
William Blair Monthly Style Factors Active Exposure



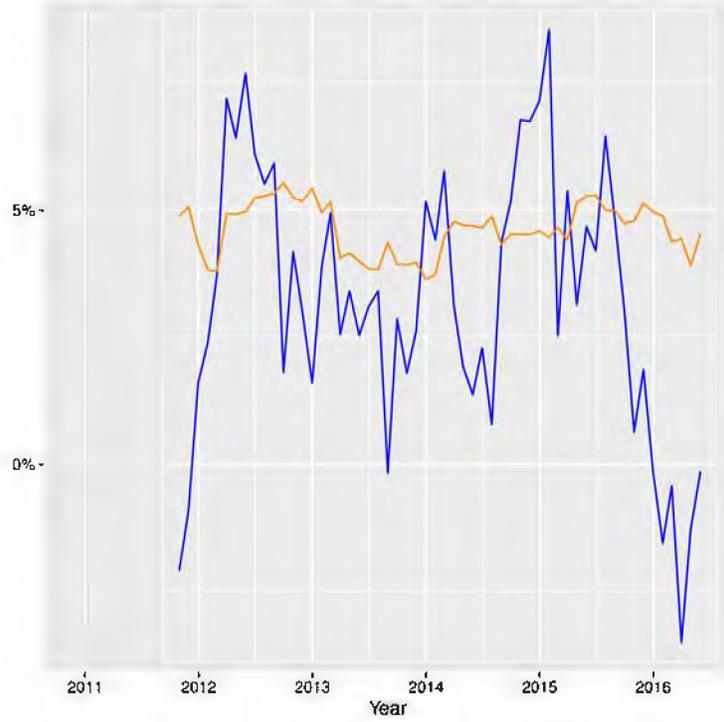
William Blair Monthly GICS Sector Return



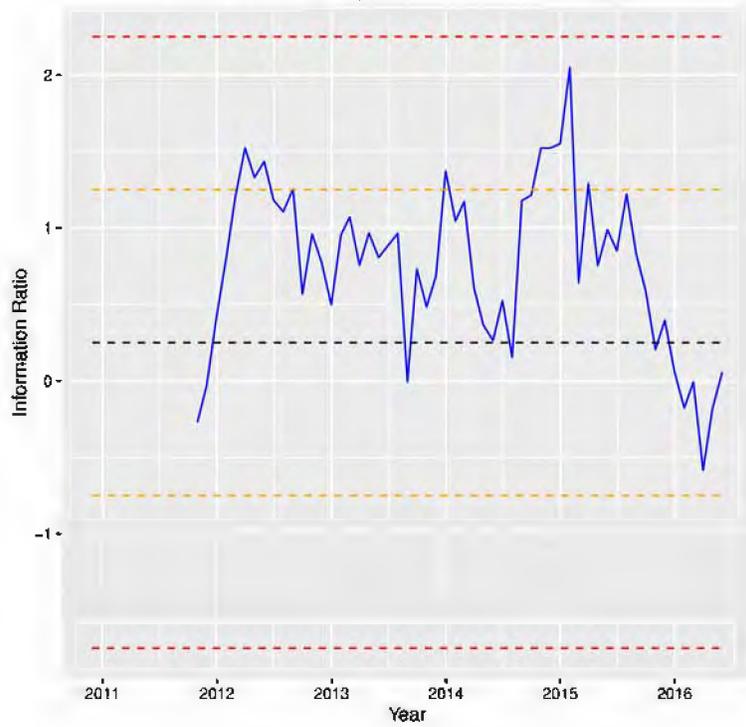
William Blair GICS Sector Active Exposure

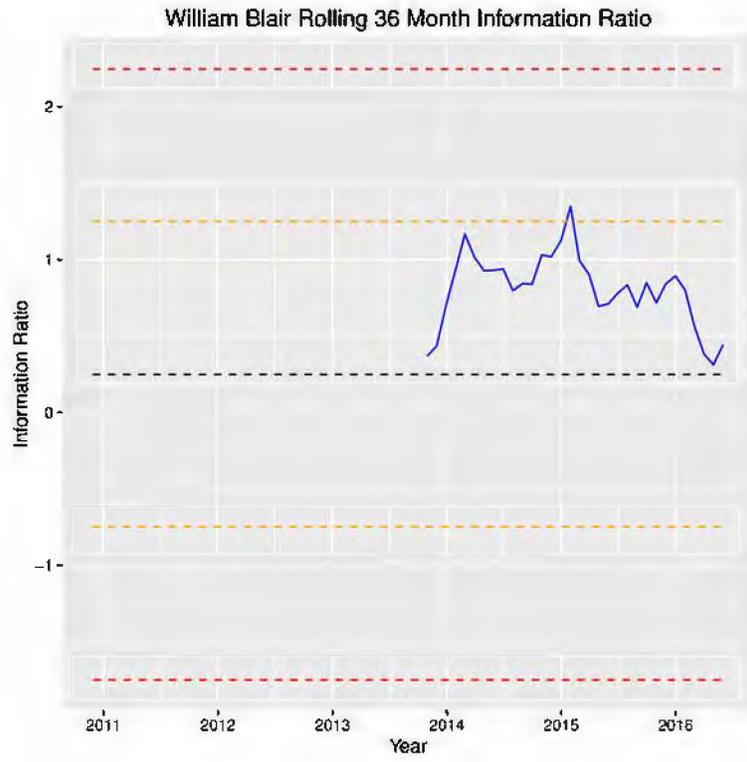


Rolling 12 Month Excess Return (Blue) & Tracking Error (Orange)



William Blair Rolling 12 Month Information Ratio





Confidential Materials

Agenda Item #10

**Confidential
Meeting
Materials
Removed**



Arizona State Retirement System

Investment Beliefs

FRAME OF REFERENCE

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

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

INVESTMENT BELIEFS

1. Asset Class Decisions are Key

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

2. Theories and Concepts Must be Sound

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

3. House Capital Market Views Are Imperative

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

4. Investment Strategies Must be Forward Looking

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

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

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

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

5. Public Markets are Generally Informationally Efficient

Asset Class Valuations

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

Security Valuations

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

The extent of informational efficiency varies across asset classes.

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

6. Market Frictions are Highly Relevant

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

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

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

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

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

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

8. External Investment Management is Beneficial

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

9. Investment Consultants

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

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

10. Trustee Expertise

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