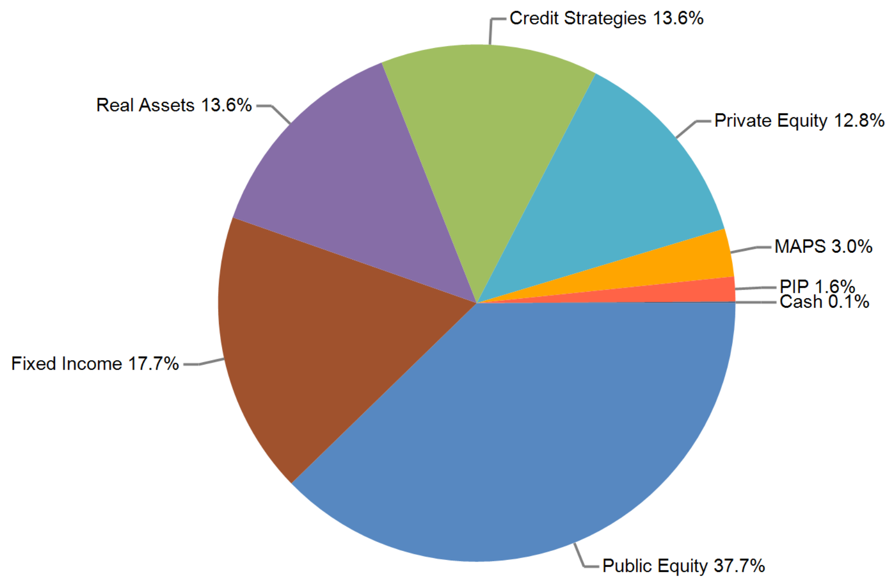
Investment Advisory Committee (IAC) Meeting

Via GoToWebinar

Wednesday, 4/15/2020
10:00 - 11:00 AM ET

Virginia Retirement System

Asset Allocation Report
February 29, 2020
For Internal Investment Purposes Only



	Current $Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
TOTAL FUND	**82.3**						**32.8%**
Public Equity	**31.0**	**37.7%**	**40.0%**	**-2.3%**	**-5%**	**+5%**	**40.9%**
Fixed Income	**14.5**	**17.7%**	**16.0%**	**1.7%**	**-1%**	**+5%**	**93.8%**
Credit Strategies	**11.2**	**13.6%**	**14.0%**	**-0.4%**	**-5%**	**+5%**	
RS Credit	4.8	5.8%	5.6%	0.2%			
NRS Credit	6.2	7.6%	8.4%	-0.8%			
Real Assets	**11.2**	**13.6%**	**14.0%**	**-0.4%**	**-5%**	**+5%**	**5.4%**
Public RE	1.1	1.3%					54.8%
Private RE	6.6	8.0%					
Other RA	3.5	4.3%					
Private Equity	**10.5**	**12.8%**	**11.0%**	**1.8%**	**-5%**	**+5%**	
MAPS	**2.5**	**3.0%**	**3.0%**	**0.0%**	**-1%**	**+1%**	
DSTRAT	1.1	1.4%					
RBI	1.3	1.6%					3.8%
PIP	**1.3**	**1.6%**	**2.0%**	**-0.4%**	**-1%**	**+1%**	
Cash	**0.1**	**0.1%**	**0.0%**	**0.1%**	**0%**	**+5%**	

	Current $Bil	Current Weight	Policy Limit
Hedge Funds	**8.5**	**10.4%**	**15.0%**

3 Year Tracking Error
Total Fund: **1.42%**
Total Public: **0.49%**

*Total Fund includes the following amt held by the Treasurer of VA: $ 0 million

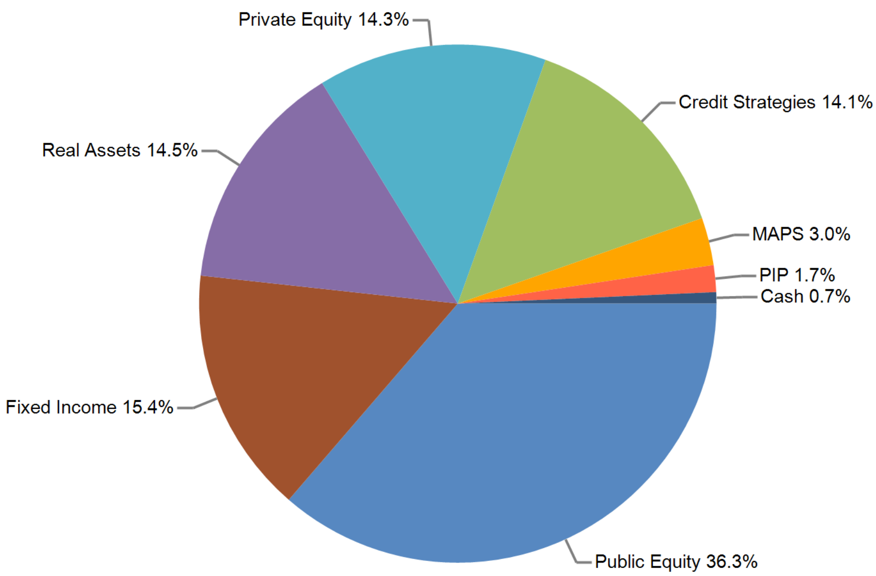
• The values shown for each asset class on this report may differ from the VRS Monthly Performance Report due to adjustments related to derivative positions in the Rebalance Account, pending transactions, and certain accruals. The values on this report are a more descriptive representation of th Virginia Retirement System's true economic exposure to each asset class.(-1 adjustments applied)
*Total Fund and Total Public tracking error are calculated using monthly returns, then annualized
* Differences in Totals are due to Rounding

Virginia Retirement System

Daily Asset Allocation Report

April 08, 2020

For Internal Investment Purposes Only



	Current $Bil	Current Weight	Policy Weight	Variance	Allowable Range		Internal %
TOTAL FUND	**77.8**						**30.9%**
Public Equity	**28.3**	**36.3%**	**40.0%**	**-3.7%**	**-5%**	**+5%**	**43.2%**
Fixed Income	**12.0**	**15.4%**	**16.0%**	**-0.6%**	**-1%**	**+5%**	**93.6%**
Credit Strategies	**11.0**	**14.1%**	**14.0%**	**0.1%**	**-5%**	**+5%**	
RS Credit	4.5	5.8%	5.6%	0.2%			
NRS Credit	6.5	8.3%	8.4%	-0.1%			
Real Assets	**11.3**	**14.5%**	**14.0%**	**0.5%**	**-5%**	**+5%**	**5.1%**
Public RE	1.1	1.4%					52.7%
Private RE	6.7	8.6%					
Other RA	3.5	4.5%					
Private Equity	**11.1**	**14.3%**	**11.0%**	**3.3%**	**-5%**	**+5%**	
MAPS	**2.3**	**3.0%**	**3.0%**	**0.0%**	**-1%**	**+1%**	
DSTRAT	1.0	1.3%					
RBI	1.3	1.7%					4.3%
PIP	**1.3**	**1.7%**	**2.0%**	**-0.3%**	**-1%**	**+1%**	
Cash	**0.6**	**0.7%**	**0.0%**	**0.7%**	**0%**	**+5%**	

	Current $Bil	Current Weight	Policy Limit
Hedge Funds	**7.6**	**9.8%**	**15.0%**

3 Year Tracking Error
Total Fund: **1.42%**
Total Public: **0.64%**

*Total Fund includes the following amt held by the Treasurer of VA: $ 0 million

• The values shown for each asset class on this report may reflect adjustments related to derivative positions in the Rebalance Account, pending transactions and certain accruals, in order to provide a more descriptive representation of the true economic exposure to each asset class (-1 adjustments applied)

*Total Fund and Total Public tracking error are calculated using monthly returns, then annualized

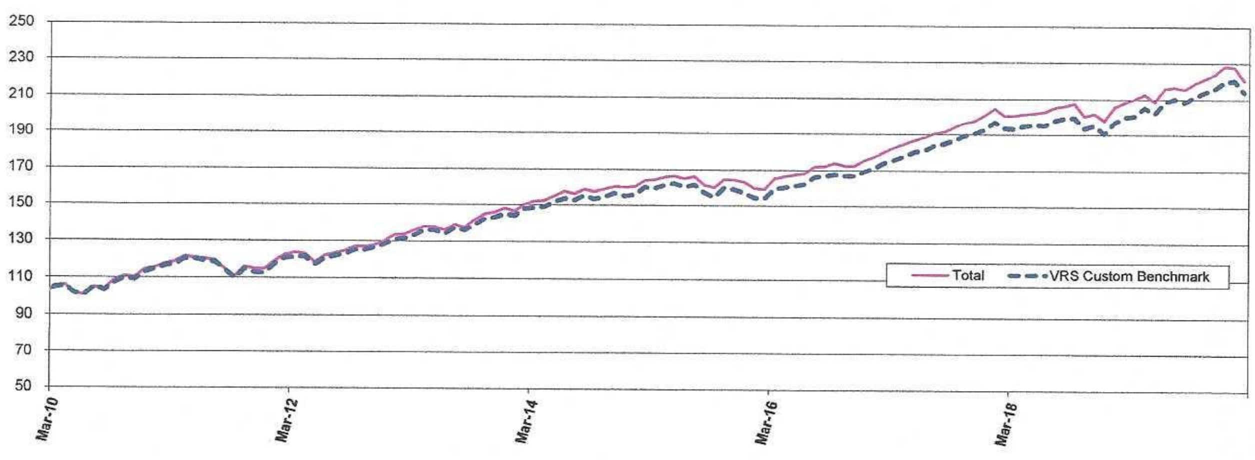
* Differences in Totals are due to Rounding

PERFORMANCE SUMMARY
Rolling Periods Ending
February 29, 2020

TOTAL FUND PERFORMANCE

	10 Yr	5 Yr	3 Yr	1 Yr	Qtr	Month	Fiscal YTD	Cal YTD	Market Value ($MM)
Total Public Equity Strategies	**8.5**	**5.0**	**5.6**	**1.7**	**-6.5**	**-7.7**	**-1.6**	**-9.0**	**30,760**
Benchmark	8.2	5.3	6.3	2.6	-6.3	-8.1	-1.5	-9.1	
Total Fixed Income	**4.6**	**4.0**	**5.3**	**11.7**	**3.4**	**1.4**	**6.2**	**3.3**	**13,891**
Benchmark	3.9	3.5	4.9	11.2	3.3	1.5	5.9	3.3	
Total Credit Strategies	**6.8**	**5.4**	**5.9**	**7.0**	**1.6**	**-0.6**	**3.3**	**0.0**	**10,993**
Benchmark	6.2	5.2	5.8	7.5	1.4	-1.0	3.7	-0.4	
Total Real Assets	**11.4**	**9.4**	**8.7**	**5.9**	**0.3**	**-1.1**	**2.5**	**-1.1**	**11,215**
Benchmark	9.9	7.5	6.6	4.8	0.3	-0.5	2.6	0.0	
Total Private Equity	**14.4**	**13.7**	**16.6**	**12.7**	**3.0**	**-0.1**	**7.5**	**-0.1**	**10,490**
Benchmark	14.1	11.4	15.6	17.7	8.2	2.6	11.1	5.2	
Total Private Investment Partnerships	**n/a**	**7.4**	**8.4**	**5.1**	**0.8**	**0.0**	**3.6**	**0.0**	**1,279**
Benchmark	n/a	7.9	9.3	10.0	3.7	1.1	6.1	2.5	
Total Multi-Asset Public Strategies	**n/a**	**n/a**	**n/a**	**1.9**	**-3.0**	**-3.7**	**-0.7**	**-4.3**	**2,470**
Benchmark	n/a	n/a	n/a	7.6	-0.8	-2.4	1.9	-2.4	
Total Fund	**8.1**	**6.2**	**7.0**	**6.0**	**-1.5**	**-3.1**	**2.1**	**-3.4**	**82,276**
VRS Custom Benchmark	7.8	6.0	7.1	7.1	-0.8	-3.0	2.7	-2.7	

10-Year Performance
Indexed to 100



Effective July 2013, the VRS Custom Benchmark is a blend of the Asset Class Benchmarks at policy weights.

The VRS Cash Account, the Treasurer Short-Term Investment Account, the VRS Rebalancing Account, transition activity and accounts with market values of less than $1 million are included in the Total Fund's market value. Differences in market value totals are due to rounding.

4/3/2020 4:24 PM

Total Fund Tracking Error

Figure 1: Policy Tracking Error Rolling Three Year - Plan (as of 12/31/2019)

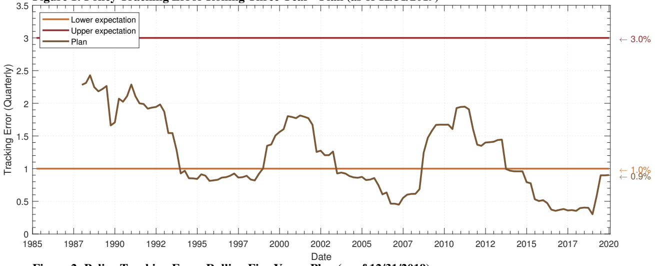
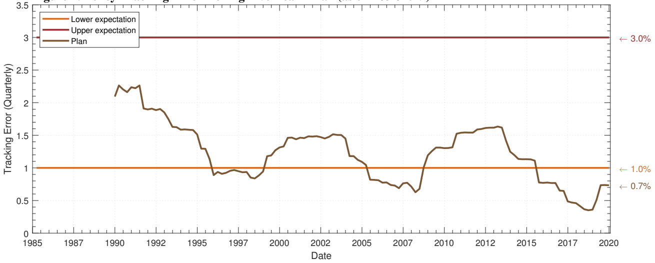


Figure 2: Policy Tracking Error Rolling Five Year - Plan (as of 12/31/2019)



1 The VRS Defined Benefit Plan Investment Policy Statement established the total fund tracking error range as the allowable observed tracking error calculated quarterly using 5 years of history.

VRS Investment Department
Recap of New Investments/Terminations
Time Period: 11/13/2019 – 04/15/2020

Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Fixed Income	Hired	02/03/2020	$300 Million	Immediate	**AQR Systematic High Yield –** A separately managed account allocation to a systematic high yield credit strategy.
Credit Strategies	Hired	11/15/2019	$200 Million	4 Years	**Ares Special Opportunities Fund** – A closed-end fund investing in stressed and distressed credit and reorganized equity.
Credit Strategies	Hired	11/18/2019	$150 Million	2 Years	**Värde Mortgage Fund III –** A closed-end fund investing in commercial and residential mortgages.
Credit Strategies	Terminated	01/01/2020	$502 Million	6 Months	**Zazove Convertible** – A separate account investing in convertible securities.
Credit Strategies	Hired	02/25/2020	$300 Million	3 Years	**H.I.G. WhiteHorse Direct Lending SMA –** An open-end separate account focused on loan origination to lower-middle market companies.
Credit Strategies	Hired	03/13/2020	$250 Million	3-4 Years	**Ares Pathfinder** – An alternative credit fund investing in performing assets that have predictable cash flows and are directly originated by the manager.
Real Assets	Hired	03/26/2020	$120 Million	6 Years	**iCon Infrastructure Partners V –** A closed-end fund investing in middle market infrastructure investments in Europe and North America.
Real Assets	Hired	03/27/2020	$75 Million	6 Months	**Harrison Street Core Property Fund** – An open-end fund focused on core investments in alternative real estate property types in the U.S.
Private Equity	Hired	11/12/2019	$75 Million	6 Years	**TA Select Opportunities –** A private equity fund focused on minority recapitalizations of existing TA flagship fund investments.
Private Equity	Hired	11/18/2019	$150 Million	5 Years	*** MBK Partners Fund V –** A large market buyout fund focused exclusively on North Asia: Korea, Japan and Greater China.
Private Equity	Hired	12/17/2019	$100 Million	6 Years	**Madison Dearborn VIII –** A mid-market private equity fund focusing on buyout and growth investments in five industry verticals.

* Qualifies as a WaM manager

VRS Investment Department
Recap of New Investments/Terminations
Time Period: 11/13/2019 – 04/15/2020

Virginia Retirement System

Program	Action	Effective Date	Commitment/ Current Value	Funding/ Defunding Period	Description
Private Equity	Hired	01/21/2020	$150 Million	5 Years	**Insight XI –** A large private equity fund targeting growth software investments with an emphasis on software as a service companies.
Private Equity	Hired	01/31/2020	$100 Million	6 Years	**Odyssey VI –** A U.S. focused mid-market buyout fund following a business transformation and buy and build strategy.
Risk-Based Investments	Terminated	12/31/2019	$150 Million	Immediate	**Bridgewater Optimal Portfolio –** A global risk parity fund.

* Qualifies as a WaM manager

Virginia Retirement System

Investment Advisory Committee

Public Investment Program Reviews

- Fixed Income – Parham Behrooz & Greg Oliff, Co-Directors
- Public Equity – Dan Whitlock, Program Director
- Internal Equity Management – Dan Schlussler, Program Director

April 15, 2020

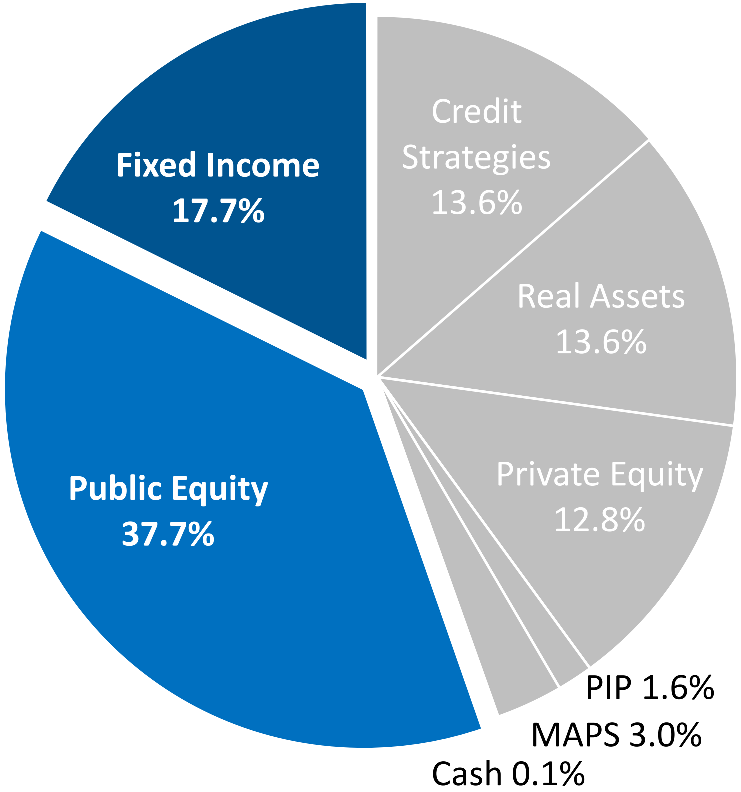
Virginia Retirement System

Public Investment Program Overview

J.T. Grier

Managing Director, Public Investment Program

Overview:
Public Market Assets



Public Equity
(23 Developed Mkts, 26 Emerging Mkts)

Internal Equity Management
(≈40% of Public Equity, Invested in 49 Global Mkts)

Fixed Income
(U.S. Core Focus, USD EMD, High Yield)

Market values as of 2/29/20; source: BNY Mellon data

Overview:
Preview of Agenda Items

- Overview
- Markets
- Exposures
- Results
- Mandates
- Looking Forward

Virginia Retirement System

Fixed Income

Parham Behrooz & Greg Oliff, Co-Directors

Agenda:
Fixed Income Annual Review Topics

- Overview
  - Markets
    - Exposures
      - Results
        - Mandates
          - Looking Forward

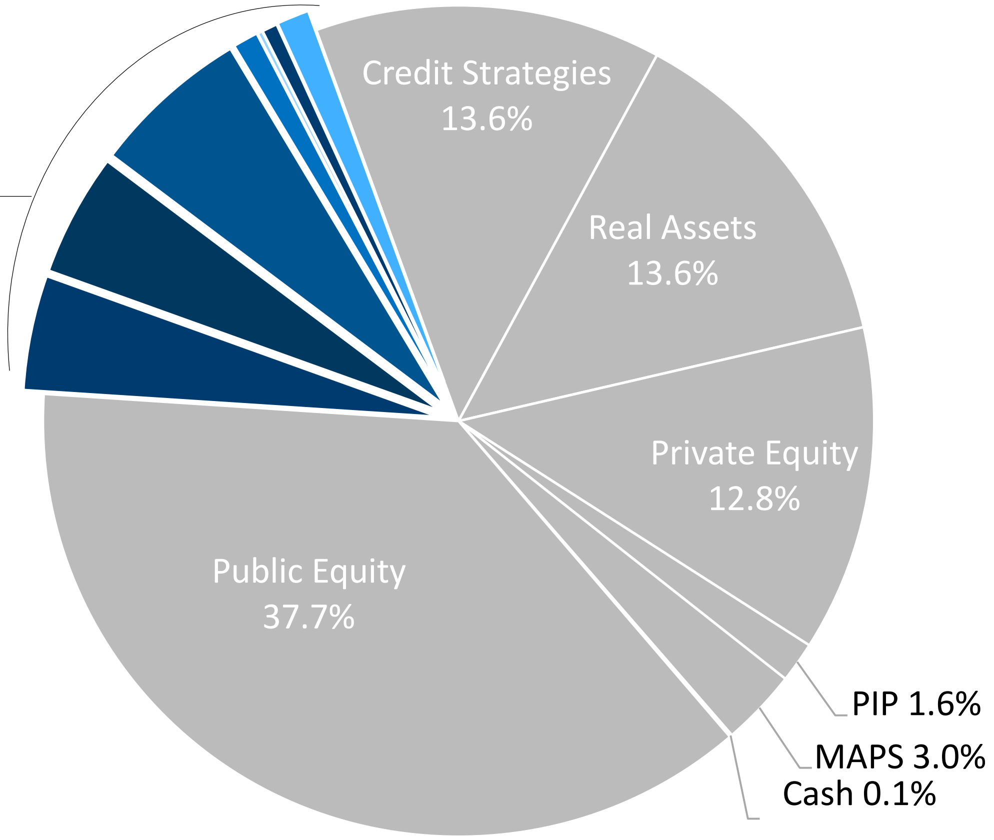
Overview:
Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Parham Behrooz	**Co-Director**	**BS**	**CFA**	**23**	**7**
Greg Oliff	**Co-Director**	**MBA Cand.**	**CFA**	**12**	**9**
Edward Norfleet	Senior Investment Officer	MBA	CFA	9	6
Teresa Nguyen	Senior Investment Officer	BA	CFA	18	3
Nick Toporkov	Investment Officer	PhD		1	1
Delaney Brown	Senior Investment Analyst	BA	CFA	3	<1
Additional Resources	Investment Operations Department & Portfolio Intelligence Team				

Overview:
Asset Allocation as of 2/29/20

Collateralized	6.2%
Government	4.8%
IG Credit	4.5%
Emerging Market Debt	1.3%
High Yield	0.6%
Opportunistic	0.2%
Core Overlay	0.1%
Total FI Overlay	0.0%

Total Fixed Income 17.7%



Market values as of 2/29/20; source: BNY Mellon data

Fixed Income

Overview: Philosophy

Risk Controlled Relative Value

- Market factors provide opportunities to add value through optimal sector allocation and security selection, while managing risk exposures to the benchmark within controlled parameters

Risk Control

How different are we from the benchmark and are these differences acceptable?

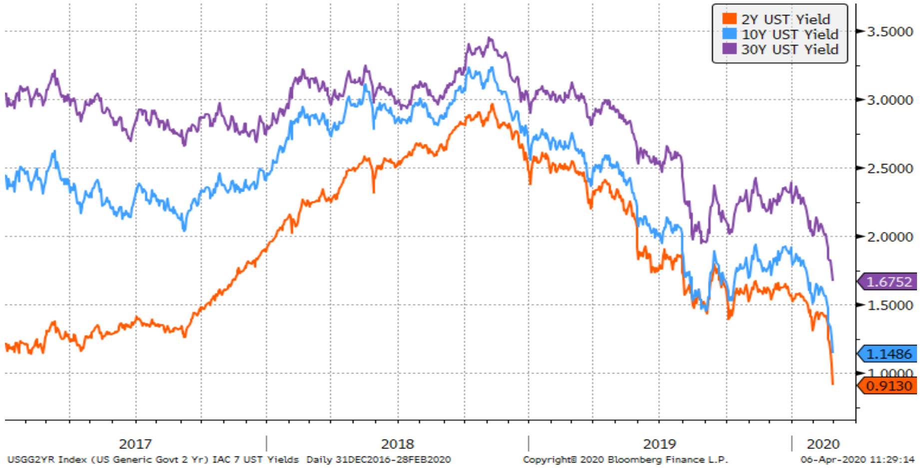
Relative Value

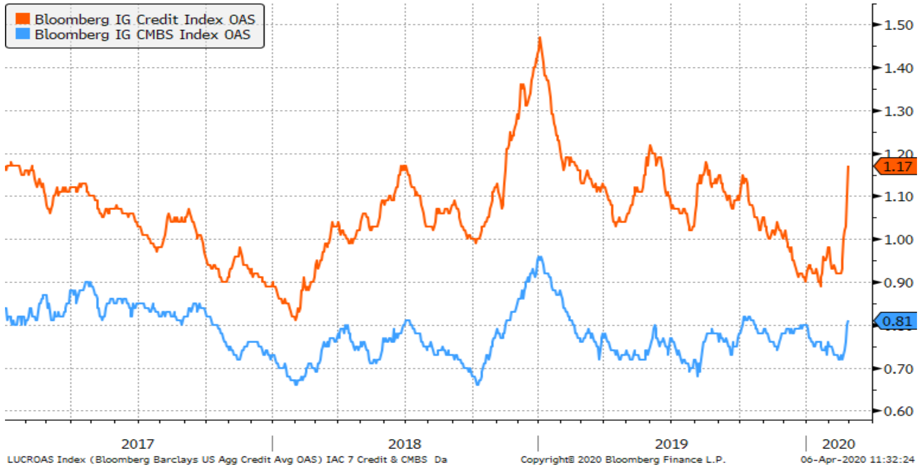
What should these differences be so that we can maximize excess return?

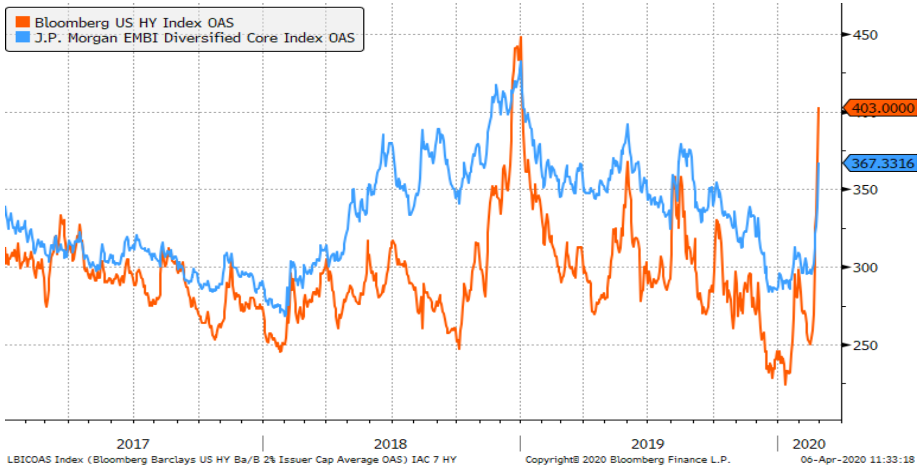
The Internal Fixed Income Program serves as a diversifying asset class, providing a hedge against a deflationary economic environment.

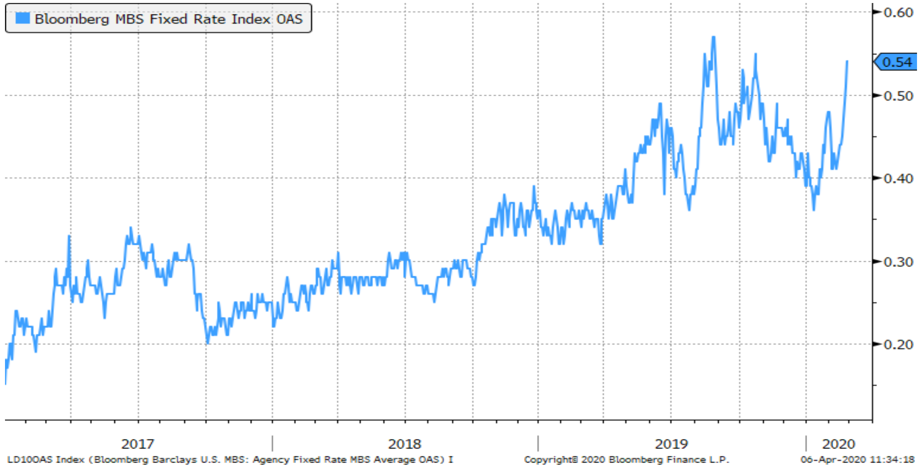
Markets:
Data: Jan 2017- Feb 2020

Virginia Retirement System



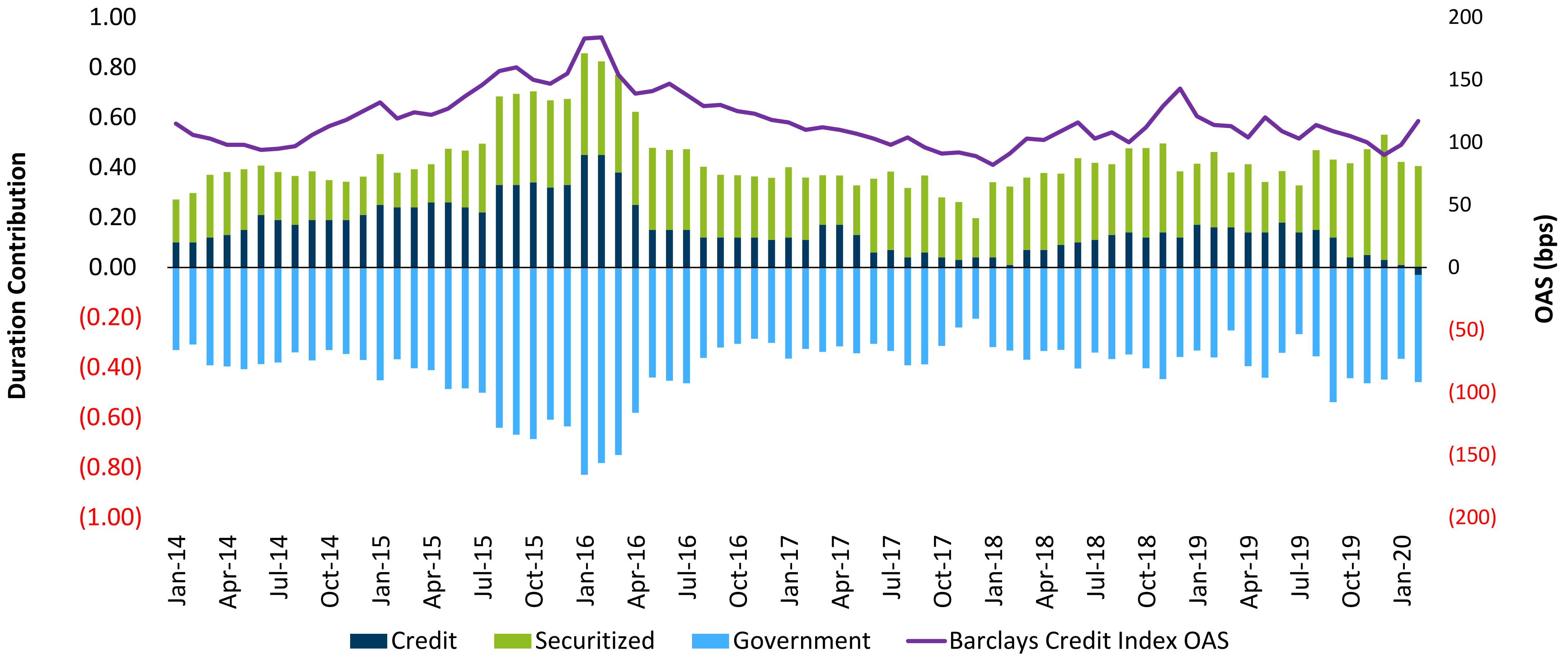






Fixed Income

Markets:
History of Sector Tilts

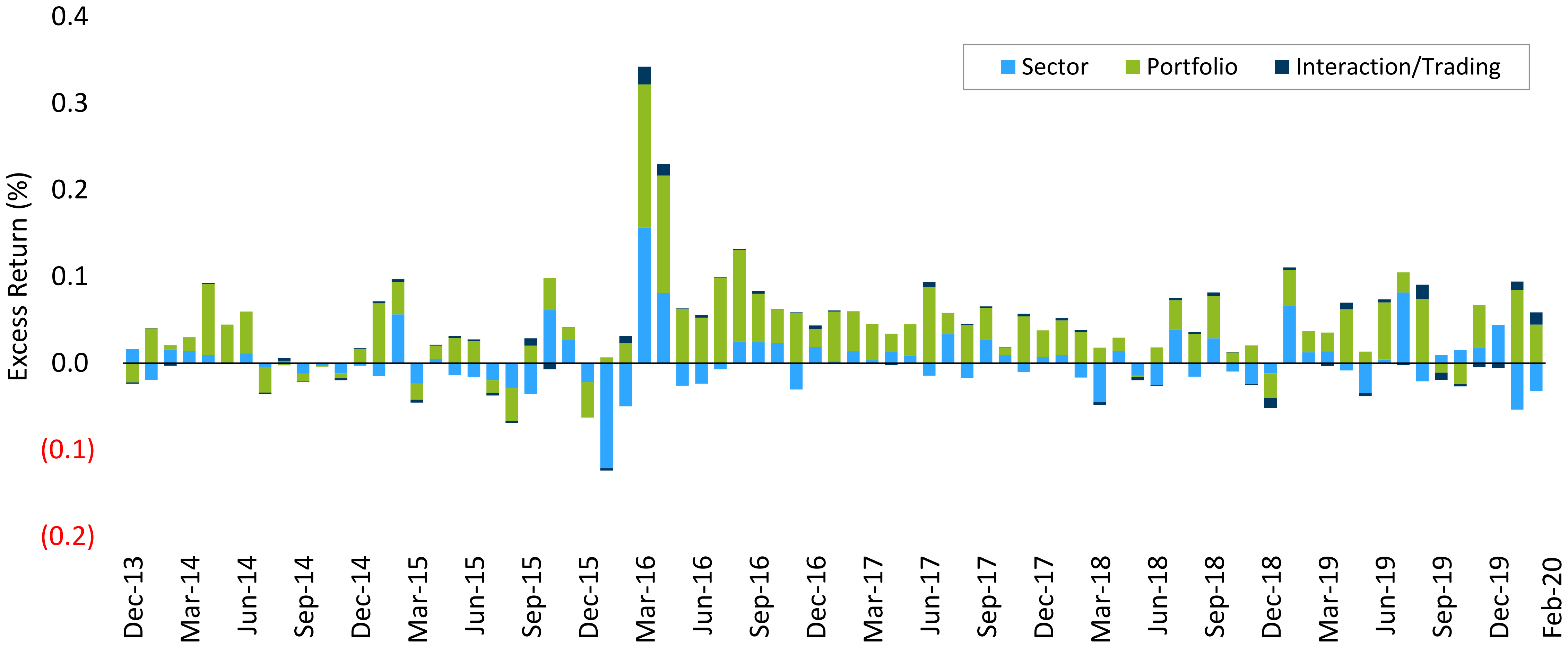


Source: Aladdin, Bloomberg

Fixed Income

Markets:
Excess Return Attribution Since July 2012

Virginia Retirement System



Source: BNY Mellon, VRS

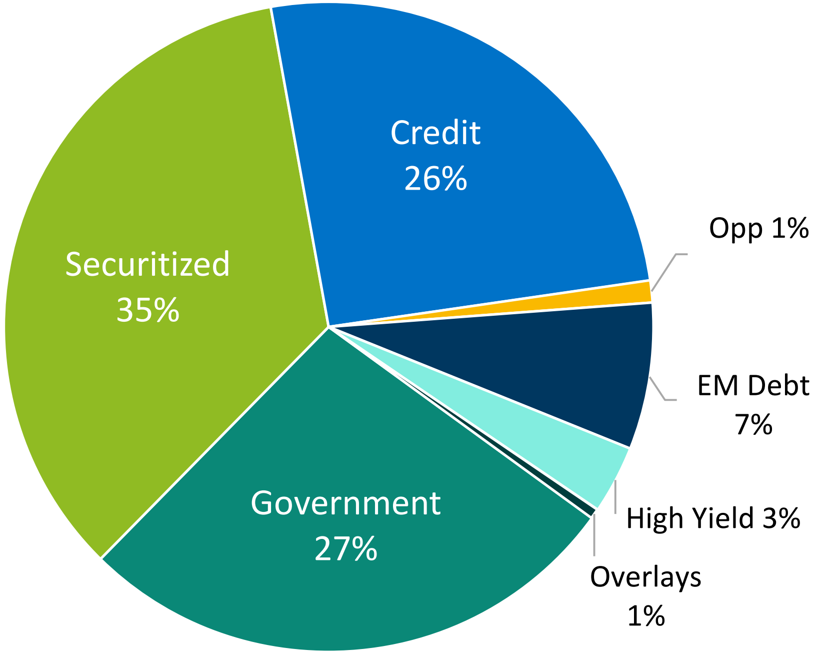
Fixed Income

Exposures:
Fixed Income Snapshot

Virginia Retirement System

VRS Internal Fixed Income Portfolios (as of 2/29/20)

	Market Value ($MM)	Market Value (%)
Government	3,955	27.2
Securitized	5,063	34.9
Credit	3,723	25.6
Opportunistic	160	1.1
EM Debt	1,056	7.3
High Yield	495	3.4
Core Overlay	64	0.4
FI Overlay	7	0.0
Total	14,523	



Highlights From Past Year

- Good year of performance in a relatively stable environment
- Formally launched HY and EMD strategies versus new 90/5/5 benchmark
- Focused resources on new initiatives and enhancements to existing portfolios

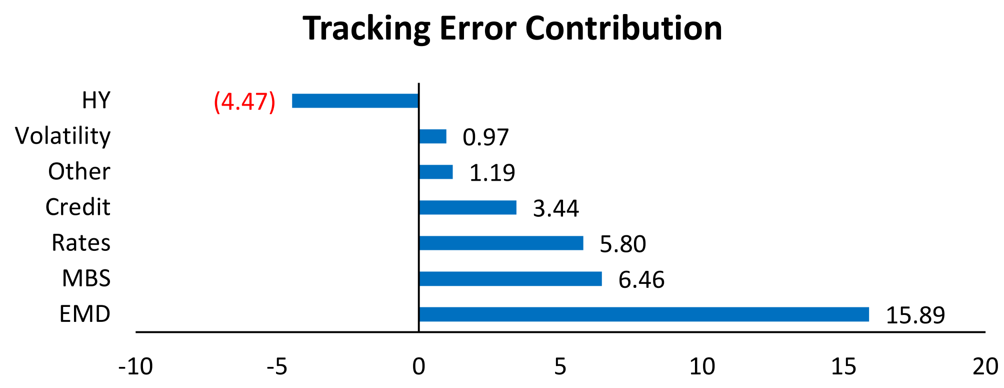
Fixed Income

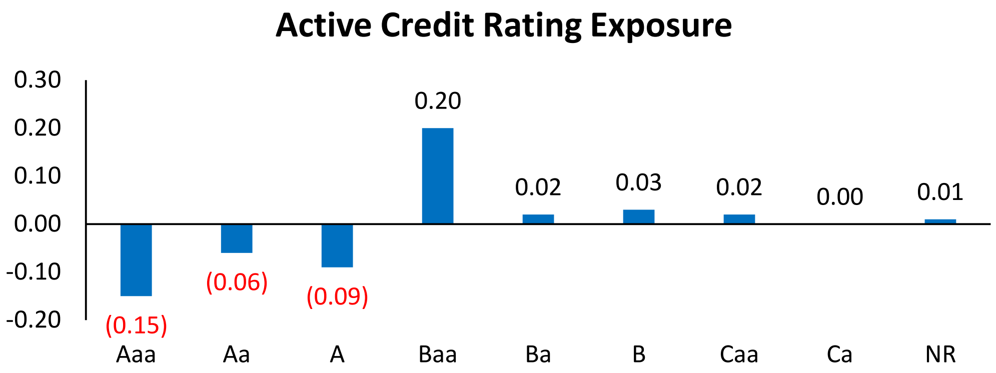
Exposures:
Portfolio Characteristics

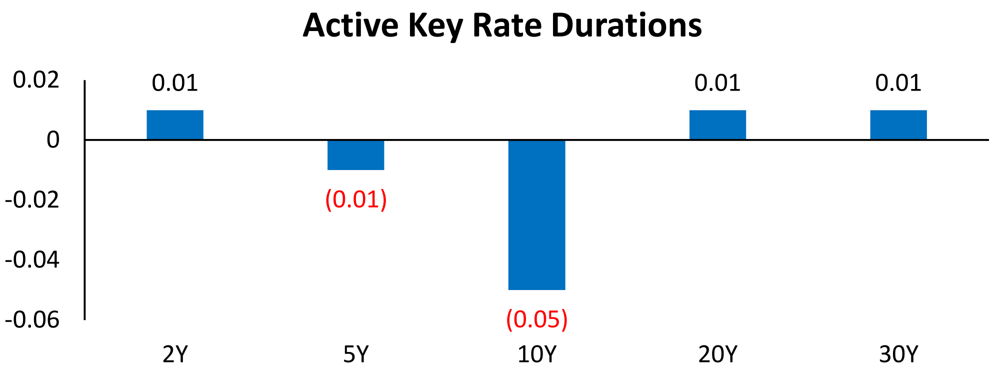
Virginia Retirement System

Internal Fixed Income — Total Program MV: $13,891,110,537

Portfolio Characteristics	Port	Bench	Diff
Effective Duration	5.85	5.90	(0.04)
Yield to Maturity	2.32	2.04	0.28
Option Adj. Spread	108	83	25







Fixed Income

Results:
Attribution Factors For CY'19

Program Level

- We saw the Fed reverse course in response to an inverted curve mid-year
- Questions remained about global weakness and domestic growth
- Sector allocation decisions added 19 basis points to excess return

Portfolio Level

- Fixed income portfolio had another positive year with sub-portfolios performing well
- Enhancements in relative value models and portfolio tools improved overall security selection in a relatively tight spread environment
- Security selection added 33 basis points to the Program's excess return

Results:
Risk/Return Characteristics as of 2/29/20

Program Excess Return and Statistics				
	Since July 2012*	**5 Year**	**3 Year**	**1 Year**
Core IFI Program	**0.48**	**0.48**	**0.44**	**0.55**
Tracking Error	0.25	0.23	0.13	0.13
Information Ratio	1.96	2.05	3.40	4.11
Total FI Program	**0.50**	**0.52**	**0.43**	**0.48**
Tracking Error	0.25	0.27	0.16	0.19
Information Ratio	2.02	1.95	2.74	2.48

Batting Average

	Monthly Excess Returns*	
Core IFI Program	68/92	74%

**Beginning July 2012, FI transitioned all assets internally and implemented our enhanced investment approach.*

Results:
Portfolio as of 2/29/20

Virginia Retirement System

Portfolio Excess Return and Statistics				
	Since July 2012*	**5 Year**	**3 Year**	**1 Year**
Government	**0.28**	**0.27**	**0.26**	**0.22**
Tracking Error	0.10	0.09	0.06	0.09
Information Ratio	2.76	2.99	4.16	2.44
Securitized	**0.41**	**0.28**	**0.29**	**0.30**
Tracking Error	0.29	0.20	0.22	0.30
Information Ratio	1.41	1.40	1.31	1.03
Credit	**0.60**	**0.77**	**0.65**	**0.93**
Tracking Error	0.34	0.28	0.20	0.25
Information Ratio	1.78	2.75	3.35	3.65
Opportunistic*	**–**	**–**	**0.45**	**0.25**
Tracking Error	–	–	0.73	0.84
Information Ratio	–	–	0.62	0.29

**Beginning July 2012, FI transitioned all assets internally and implemented our enhanced investment approach.*

Fixed Income

Results:
Portfolio as of 2/29/20

Virginia Retirement System

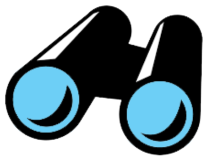
Portfolio Excess Return and Statistics				
	Since Inception*	**1 Year**	**Fiscal YTD**	**3 Months**
Internal EMD	**0.24**	**0.55**	**0.39**	**0.39**
Tracking Error	0.75	0.61	–	–
Information Ratio	0.32	0.90	–	–
Payden & Rygel EMD	**(0.39)**	–	–	–
PIMCO EMD	**0.20**	–	–	–
Internal High Yield	**0.87**	–	**0.87**	**(0.21)**
AQR High Yield	**(1.50)**	–	–	–

**Inception dates*: Internal EMD Portfolio 11/2018, Internal HY Portfolio 7/2019, External EMD & HY Portfolios 1/2020*

Fixed Income

Looking Forward:
Where Are We focusing?

Virginia Retirement System



Continue To Implement Long Term Vision For The Program

Continue to Find Ways To Collaborate in Efforts To Add Value To VRS

On The Radar

- Enhancements to the High Yield and EMD Portfolios
- Explore quantitative closed-end fund strategy
- Expand into more value-adding ideas in the Opportunistic Portfolio
- Cross-asset class working groups to enhance expertise

People: Collaboration Across Programs

Virginia Retirement System

Portfolios

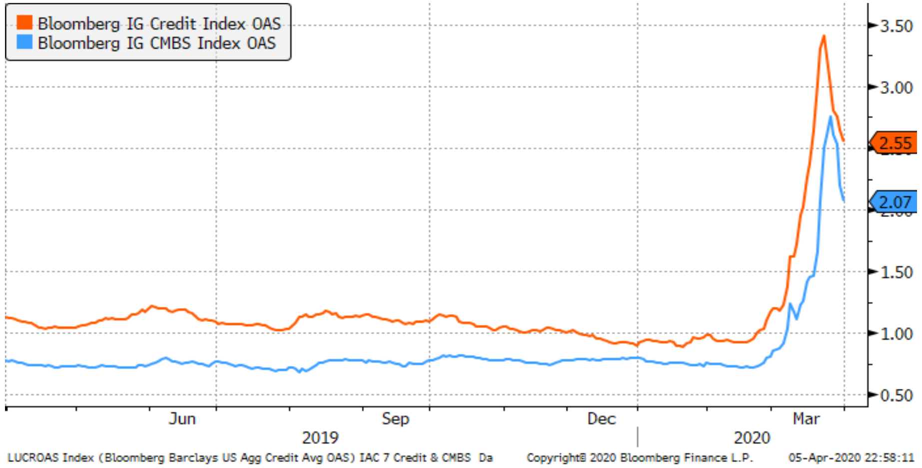
- IEM: Total Fund Rebalance Portfolio
- CS: CS Overlay Portfolio
- RBI: RBI Risk Hedging Portfolio

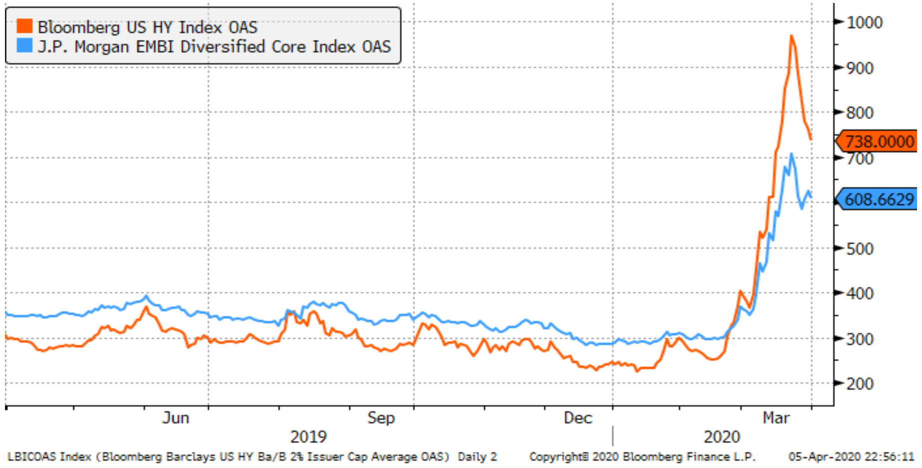
People

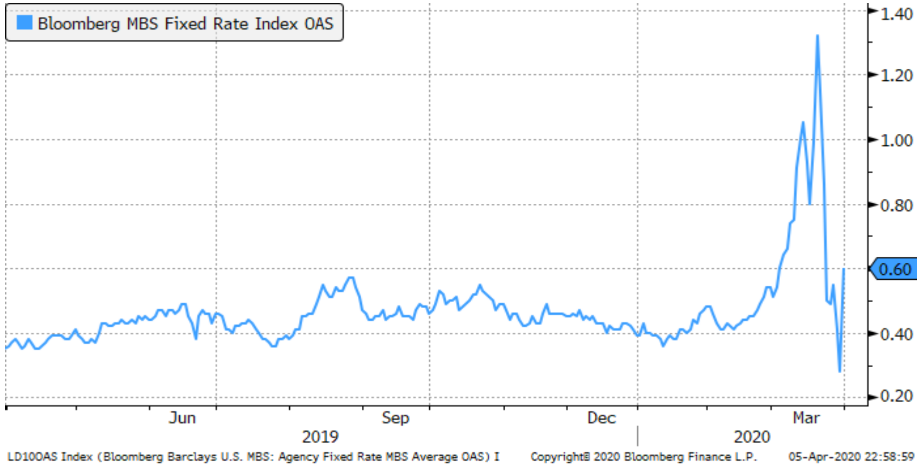
- Cross Team Lunches
- Small Group Roundtables
- Factor Based Investing Work
- Individual Team Member Collaboration

Markets – March 2020:
Data: TTM as of 3/31/20

Virginia Retirement System







Fixed Income

Virginia Retirement System

Public Equity

Dan Whitlock, Program Director

Agenda:
Global Equity Annual Review Topics

Virginia Retirement System

- Overview
- Markets
- Exposures
- Results
- Mandates
- Looking Forward

Public Equity

Overview: Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Dan Whitlock	**Director**	**MBA**	**CFA, CAIA**	**18**	**18**
Stephen Adelaar	Portfolio Manager	MS	CFA	20	13
Holly Glass	Portfolio Manager	MA	CFA	19	19
Olga Zozulya	Investment Officer	BS	CFA	7	7
Korey Turner	Intern				
Kelly Baker	Portfolio Assistant	AAS		10	5
Additional Resources	The entire Internal Equity Team, Portfolio Solutions Group, Management Committee, Operations Team, Compliance Team, and Legal/Regulatory Team.				

Public Equity

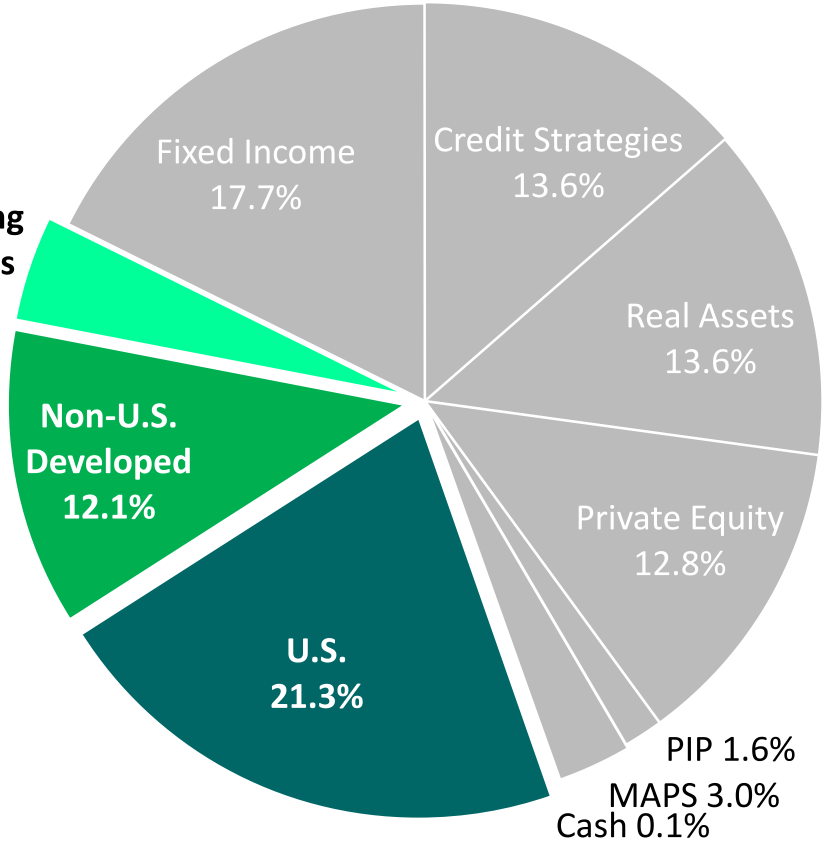
Overview:
Team & Process

Virginia Retirement System

	Stephen Adelaar	Holly Glass	Olga Zozulya	Daniel Whitlock
Strategy Lead	Defined Contribution	*IEM Group (Italics)*	Global Equity	Total Public Equity
	Emerging Markets	Risk Management	International Developed	
	Hedge Funds	Transition Management	Tilt Monitoring	
		United States		
Analyst	*Afton (IEM)*	Acadian EM	Ariel Global	Advent Convertibles
	Baillie Gifford Global	Acadian Small Cap	*Internal EM (IEM)*	Arisaig Global EM Cons
	Baillie Gifford EM	Arrowstreet Global	J.P. Morgan LS	Farallon
	Kylin	Cevian	Jackson Square	Highline
	LSV Global	Eminence	Lansdowne Dev	Nordea EM
	LSV Non-U.S. Small Cap	*Hedge Fund Overlay*	Maverick	Nordea Global
	LSV U.S. SC	*Mobjack (IEM)*	New Mountain	*Potomac (IEM)*
	Matoaka (IEM)	*Piedmont (IEM)*	Nitorum	
	Select - SEG	Taiyo	Theleme	
	Select – Cooper Square			
	ValueAct Capital			

Public Equity

Overview:
Asset Allocation as of 2/29/20



U.S. Equity	21.3%
Non-U.S. Developed	12.1%
Emerging Market	4.3%

Total Public Equity 37.7%

Public Equity

Overview: Philosophy

Primary Objective: Gain exposure to global economic growth & the global equity risk premium

Specific Return Objective: Outperform the strategic benchmark over three to five years

Approach: Risk-adjusted, using both equity hedge funds & low-volatility equity mandates

Strategic Benchmark*: MSCI All-Country World Index Investible Markets Index (MSCI ACWI IMI)

*Effective February 2020, customized for the VRS dividend withholding tax rates

Public Equity

Overview:
Manager Evaluation Framework

Virginia Retirement System

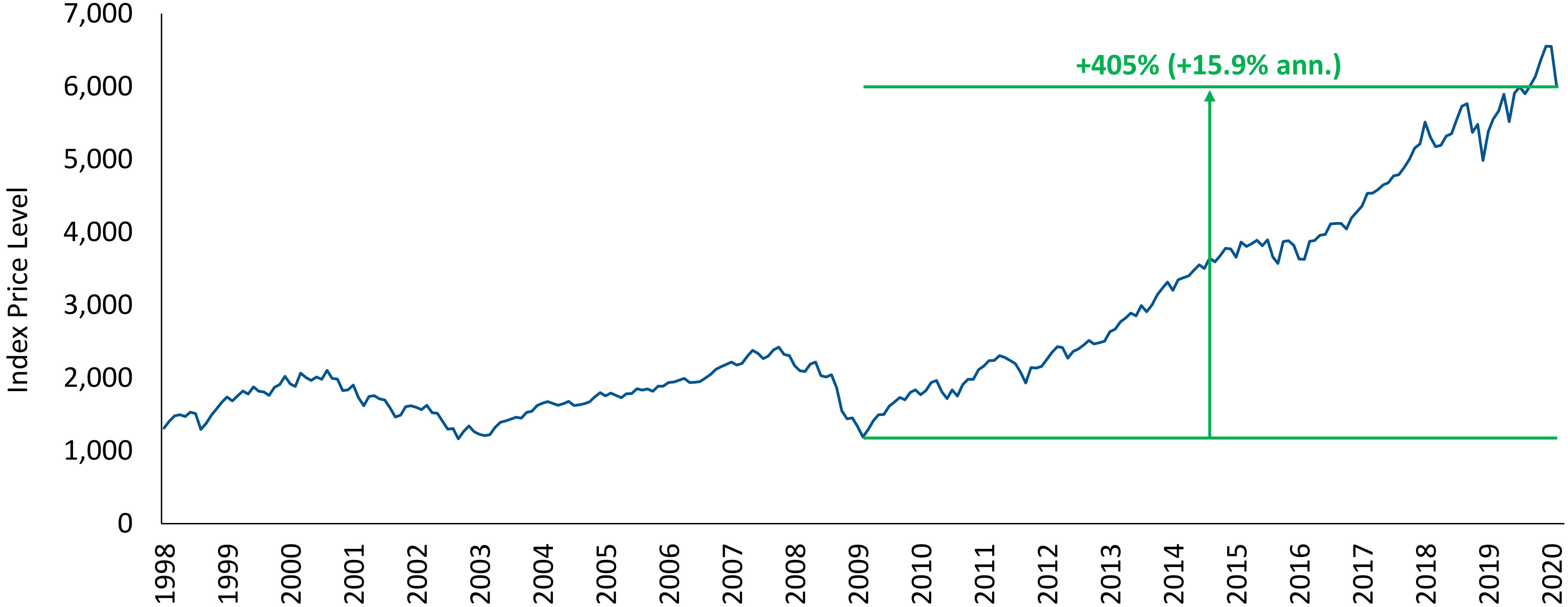
Sustainable Risk-Adjusted Returns	• Long history, repeatable process, consistent philosophy • Sustainable team and firm • Outperformed in a consistently diversified manner • Outperformed when considering risk profile • Sizeable allocations will not impact performance
Doing Things Differently	• Low correlations to existing book (quantitative & qualitative) • Something VRS cannot produce internally • Something one of VRS' existing external managers cannot provide • Employ a different way of thinking or different strategies
Terms & Back Office	• Favorable fees, liquidity, etc. • Robust back office • Partnership mentality • Resources to manage sizeable allocations

Public Equity

Markets: 2/29/20

Virginia Retirement System

S&P 500 Index Total Return



Source: Bloomberg & JP Morgan

Public Equity

Markets:
1 Year Ending 2/29/20

	Global	Developed	Dev ex US	US	EMEA	Pacific	Emerging	EM ASIA	EM LatAm	EM EMEA
All Sectors	3.9%	4.6%	0.2%	7.7%	-0.7%	-0.4%	-1.9%	1.4%	-11.9%	-9.0%
Information Technology	22.8%	23.2%	15.0%	24.7%	10.7%	19.6%	19.7%	20.1%	-33.9%	n/a
Utilities	8.7%	10.9%	13.0%	10.4%	22.0%	-13.1%	-11.0%	-12.5%	-3.5%	-17.7%
Communication Services	7.9%	9.0%	-0.7%	12.2%	-8.8%	4.8%	1.6%	2.5%	1.4%	-4.4%
Health Care	5.3%	5.6%	11.6%	3.2%	10.3%	13.1%	-3.4%	-2.7%	29.0%	-22.5%
Consumer Discretionary	5.1%	4.7%	-0.5%	8.4%	-2.0%	4.9%	6.2%	7.6%	0.2%	-3.8%
Real Estate	3.7%	3.9%	-3.6%	9.2%	1.2%	-2.5%	1.6%	7.2%	10.7%	-29.3%
Consumer Staples	3.4%	4.3%	0.3%	8.5%	1.5%	-5.9%	-4.6%	-2.4%	-6.5%	-12.5%
Industrials	-0.7%	0.0%	1.8%	-1.1%	4.2%	-5.3%	-11.2%	-12.8%	4.3%	-20.7%
Financials	-2.4%	-1.1%	-3.3%	1.9%	-6.1%	-5.3%	-8.5%	-5.2%	-15.8%	-11.7%
Materials	-7.1%	-5.4%	-6.3%	-3.1%	-8.3%	-9.4%	-15.0%	-12.1%	-22.6%	-12.6%
Energy	-21.6%	-23.1%	-18.4%	-26.3%	-24.8%	-23.3%	-13.4%	-17.8%	-23.7%	0.2%

Unhedged Total Returns

Sources: MSCI and Bloomberg

Public Equity

Markets:
5 Years Ending 2/29/20

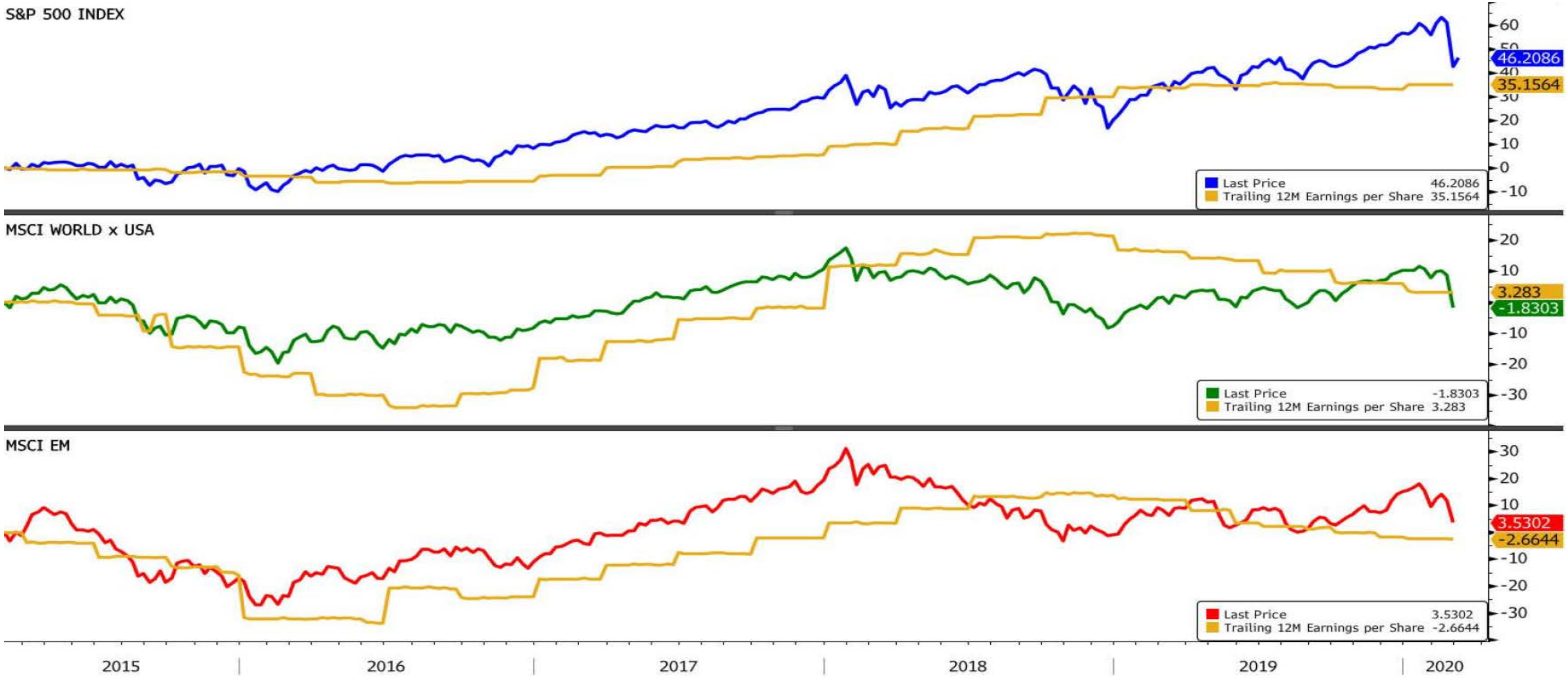
Virginia Retirement System

Percentage Appreciation of Price and Earnings

18x P/E | 20x P/E

17x P/E | 17x P/E

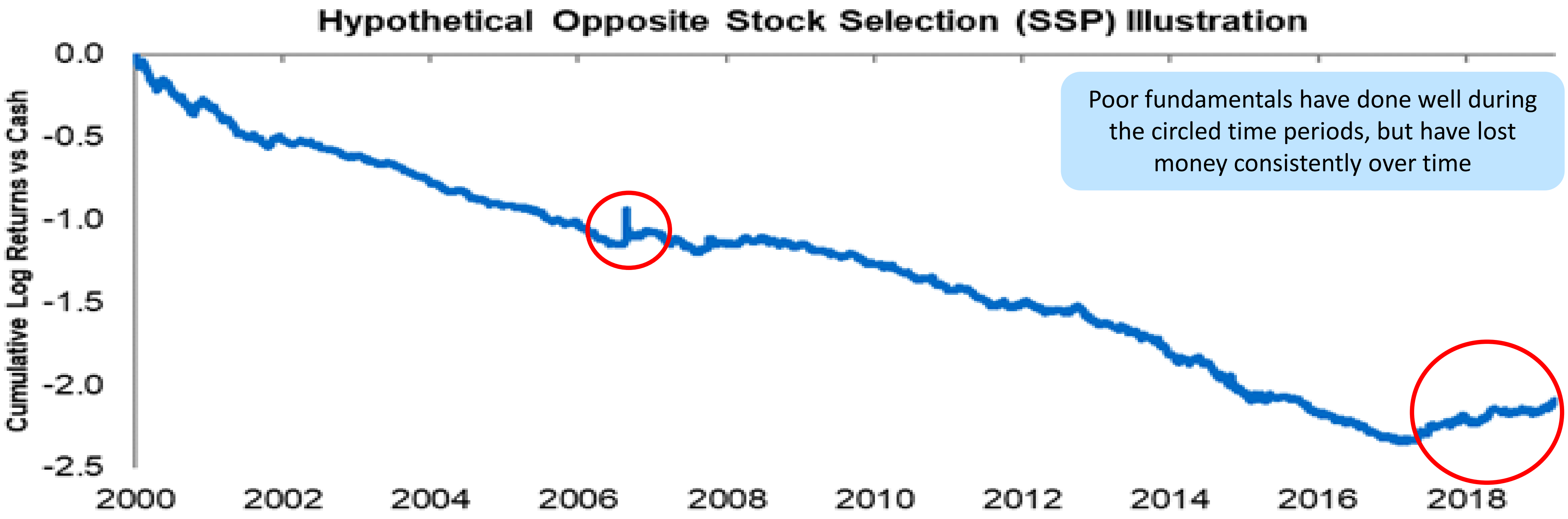
13x P/E | 14x P/E



Source: Bloomberg

Public Equity

Markets:
A Difficult Active Environment

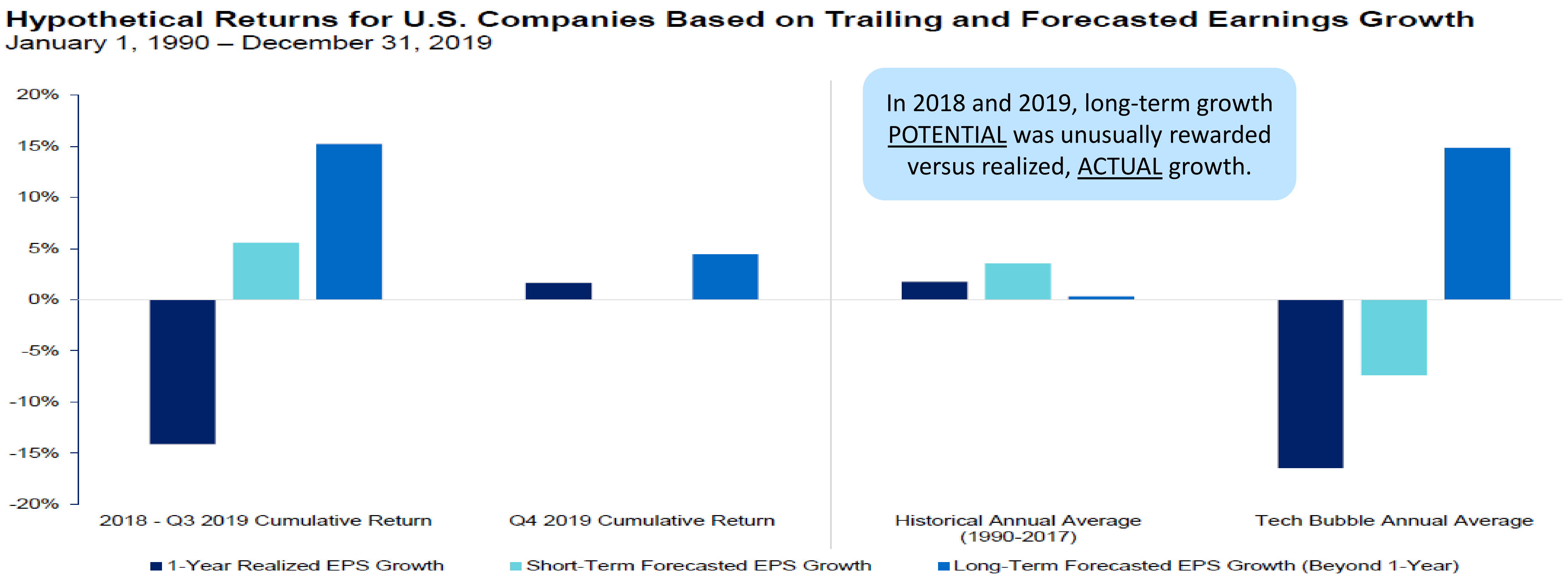


Source: AQR's "The George Costanza Portfolio," October 22nd, 2018, Cliff Asness, Updated as of March 2020. For illustrative purposes only. Hypothetical data has inherent limitations, some of which are described in the disclosures. See detailed explanation in the body of this article, and additional disclosures at the end of this article. This hypothetical performance does not reflect the deduction of any management fees, which as mentioned, would further reduce the actual return. It should not be assumed that the inversion of these charts is illustrative of actual portfolio performance.

Public Equity

Markets:
A Difficult Active Environment

Virginia Retirement System



AQR

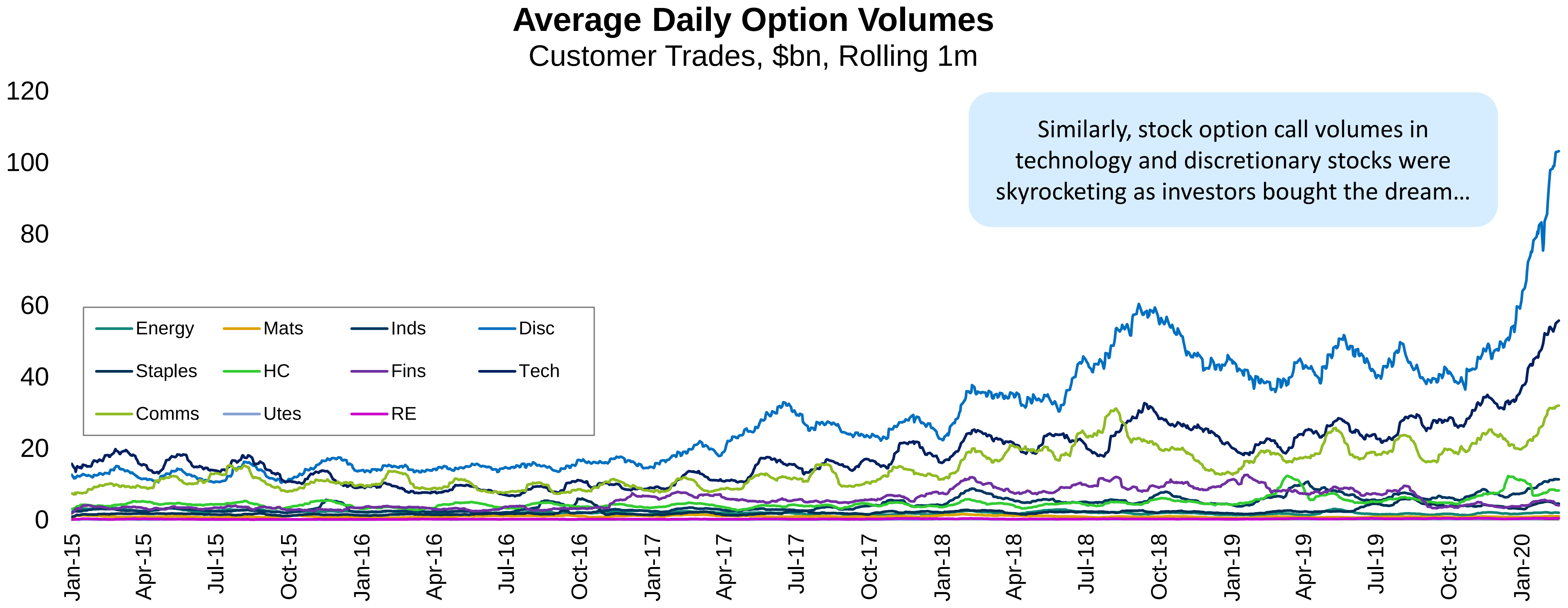
Tech Bubble period is defined Jan 1999-Feb 2000.

Source: AQR, IBES. 1-Year realized growth is based on EPS growth over past 12-months. Short-Term Forecasted EPS Growth is defined as analyst forecasts 1-year ahead. Long-Term Forecasted EPS Growth is defined as forecast EPS growth beyond one year. The underlying basket of stocks in the universe is described in the AQR U.S. Large Cap Short Term and Long Term Forecasted Growth Backtest in the Appendix. All estimates come from IBES and measures are defined on a within-industry basis. Hypothetical returns are targeting an ex-ante 7% volatility. Forecasts are not a guarantee of performance and are subject to change. For illustrative purposes only and not representative of an actual portfolio AQR currently manages. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix. Please see Appendix for additional disclosures.

Public Equity

Markets:
A Difficult Active Environment

Virginia Retirement System



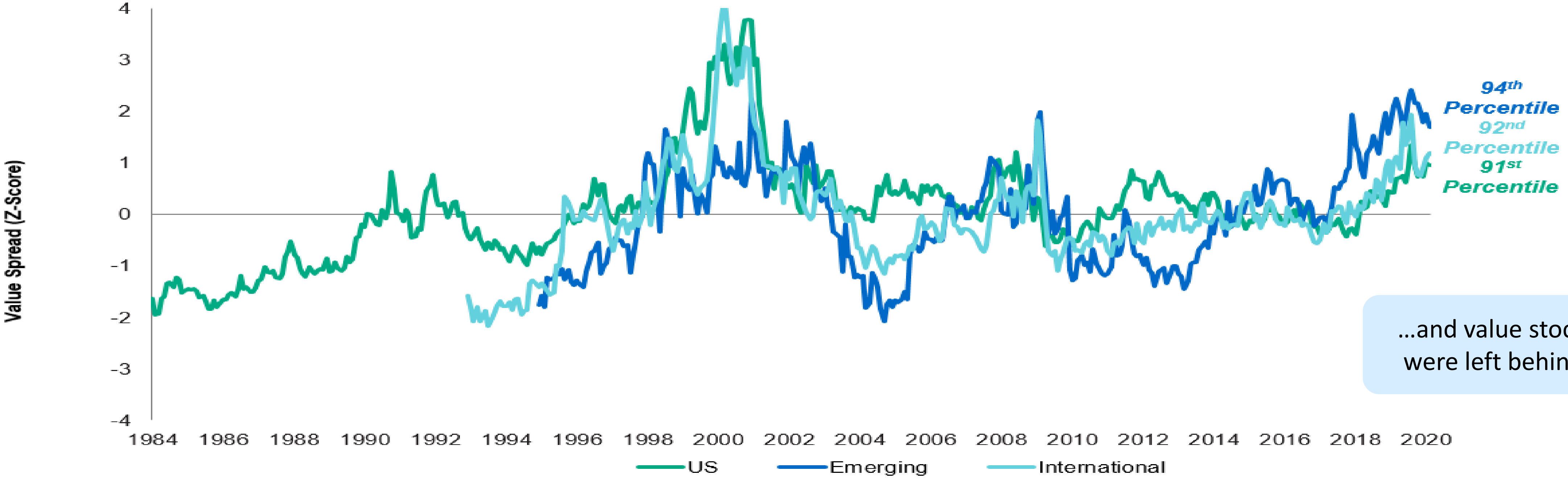
Source: Options Clearing Corporation, data through 2/18/2020

Public Equity

Markets:
A Difficult Active Environment

Virginia Retirement System

Value Spreads for Hypothetical Industry-Neutral Value Portfolios
January 1, 1984 – February 29, 2020



...and value stocks were left behind.

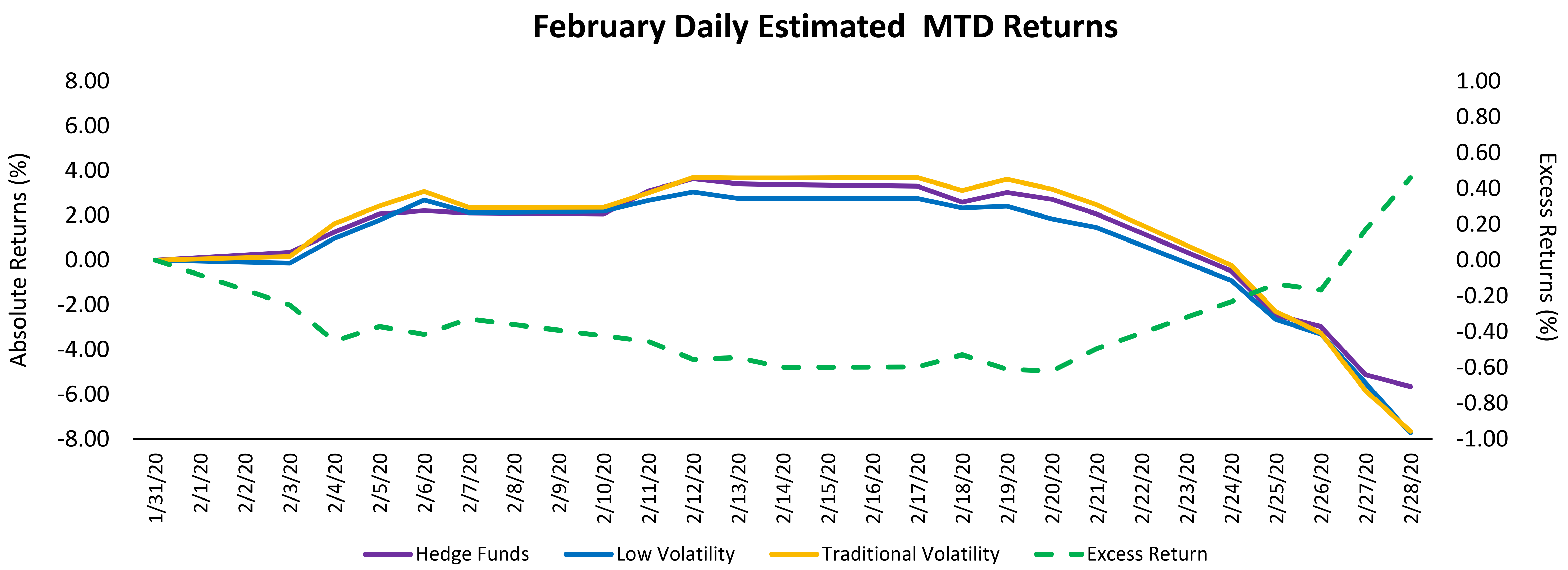
AQR

Source: AQR. Hypothetical value composite includes four value measures: book-to-price, earnings-to-price, forecast earnings-to-price, and sales-to-enterprise value; spreads are measured based on ratios. To construct industry-neutrality, the value spreads are constructed by comparing the aforementioned value measures within each industry, which are then aggregated up to represent an entire portfolio. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix. Please see the Hypothetical AQR Value Backtest Description in the Appendix. For illustrative purposes only and not representative of an actual portfolio AQR currently manages. Please read the Appendix for important disclosures. 1

Public Equity

Markets:
An Extreme Change In Risk Tolerance

Virginia Retirement System



Public Equity

Markets:
March Update

Markets were down ~-26% at their low during March, had a ~+17% rebound in 3 days, and ultimately ended the month ~-14%

Large negative factor moves in value and size stood out and large capitalization technology/momentum leadership continued

Indiscriminate selling most likely created opportunities for active management in stock selection

- Deleveraging in the hedge fund industry temporarily created selling of attractive stocks and buying of unattractive stocks
- Low Volatility stocks historically do better after investors sort out fundamentals
- Managers are encouraged about compelling forward-looking, stock specific opportunities

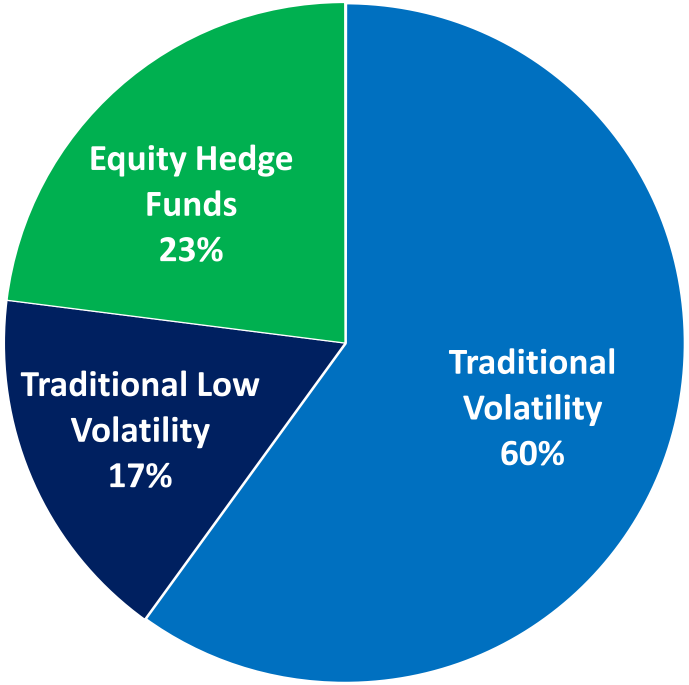
Forward return estimates for general market beta can vary widely depending on different earnings scenarios

Exposures: Portfolio Positioning

Virginia Retirement System

Effective Date : 2/29/20

$30.8	Billion
37.7%	of Plan Assets
52%	Traditional Domestic (-3.7% vs. bmk)
35%	Traditional Non-US Developed (+2.9% vs. bmk)
13%	Traditional Emerging Markets (+0.9% vs. bmk)
100%	Active
0%	Passive
40%	Internal
60%	External
60%	Traditional Volatility
17%	Traditional Low Volatility
23%	Equity Hedge Funds
10.85%	Forecasted Portfolio Risk (Barra)
11.40%	Forecasted Benchmark Risk (Barra)
0.93%	Forecasted Active Risk (Barra)



29 External Mandates (14 Traditional & 15 HFs)
22 External Managers (8 Traditional & 14 HFs)

Public Equity

Exposures:
Portfolio Positioning

Virginia Retirement System

Traditional Portfolio Characteristics 2/29/20

Portfolio Characteristics	Program	Benchmark
Dividend Yield	2.9%	2.6%
Price to Book	1.8	2.1
Price to Earnings (F12)	13.0	14.9
Price to Earnings (T12)	15.4	18.5
Return on Equity	11.9%	10.9%
Debt to Assets	21.3%	23.0%
Sales Growth	3.2%	2.8%
Profit Margin	7.5%	7.6%

Great Value, Better Quality, and Attractive Growth Profiles

Results:
As of 2/29/20

	10 Year	5 Year	3 Year	1 Year
Total Public Equity	8.46	5.04	5.58	1.66
Strategic Benchmark[1]	8.17	5.29	6.32	2.61
Excess Return	0.29	-0.24	-0.73	-0.95

	10 Year	5 Year	3 Year
Beta vs. Strategic Benchmark*	0.99	0.99	0.99
Beta vs. Respective Beta 1 Market Cap Benchmarks*	0.91	0.88	0.91
Active Risk vs. Strategic Benchmark**	0.83	0.84	0.80
Information Ratio vs. Strategic Benchmark***	0.35	-0.29	-0.91

VRS Public Equity has outperformed in eight of the last ten calendar years, underperforming in only 2018 and 2019

**Measure of volatility, or systematic risk, of a portfolio in comparison to a benchmark*
***Otherwise known as tracking error, this is the standard deviation of returns relative to a benchmark*
****(Portfolio Returns - Benchmark Returns) / Active Risk*

Please see endnotes on page 49

Results:
As of 2/29/20

	1 Year
Total Public Equity	1.66
Strategic Benchmark[1]	2.61
Excess Return	**-0.95**

Largest One Year Absolute Return Contributors:

Positive: U.S. program was up 5.3% with a 30% weight

Negative: Non-U.S. program down -2.7% at 24% weight

Largest One Year Relative Return Contributors:

Positive: Hedge Fund strategies outperformed by 5.8%

Negative: Traditional strategies including Low Vol Strategies

Negative: Value exposure

Please see endnotes on page 49

Results:
As of 2/29/20

Virginia Retirement System

	10 Year	5 Year	3 Year	1 Year	MV ($MM)
Total Public Equity	8.46	5.04	5.58	1.66	30,761
Strategic Benchmark[1]	8.17	5.29	6.32	2.61	
Excess Return	0.29	-0.25	-0.74	-0.95	

	10 Year	5 Year	3 Year	1 Year	
U.S. Program	12.56	8.14	8.89	5.27	9,165
U.S. Benchmark[2]	12.39	8.65	9.11	6.34	
Excess Return	0.17	-0.51	-0.22	-1.07	
Non-U.S. Developed Program	7.10	3.79	3.62	-1.64	5,385
Non-U.S. Developed Benchmark[3]	6.53	3.71	4.98	1.37	
Excess Return	0.57	0.08	-1.36	-3.01	
Emerging Market Program	2.96	1.90	1.78	-5.66	2,013
Emerging Market Benchmark[4]	3.10	2.47	4.33	-2.36	
Excess Return	-0.14	-0.57	-2.55	-3.30	
Global Program	9.17	6.06	6.41	1.05	7,238
Global Benchmark[5]	8.95	6.43	7.69	4.86	
Excess Return	0.22	-0.37	-1.28	-3.81	
Equity Hedge Fund Program	6.08	1.59	2.96	2.47	6,958
Equity Hedge Fund Benchmark[6]	4.31	1.18	2.50	-2.84	
Excess Return	1.77	0.41	0.46	5.31	

Please see endnotes on page 49

Managers: Top 5

Name	Mandates	# of Mandates	% of Program
VRS Internal Equity	U.S., Non-U.S., Emerging	6	40%
LSV	Global, Non-U.S. Small, U.S. Small	3	9%
Arrowstreet	Global	1	6%
Nordea	Global, Emerging	2	6%
Baillie Gifford	Global, Emerging	2	5%
Total			**66%**

Public Equity

Managers:
Hires & Terminations – 1 Year

Virginia Retirement System

Action	Effective Date	Commitment/ Current Value	Funding/Defunding Period	Description
Terminated	2/28/2019	$413 Million	Immediate	TimesSquare Capital Management U.S. small cap growth manager
Hired	4/1/2019	$350 Million	Immediate	Jackson Square Partners, LLC U.S. small cap growth manager
Terminated	7/19/2019	$275 Million	Immediate	GMO Emerging Domestic Opportunities Emerging market equity manager
Hired	8/1/2019	$275 Million	Immediate	Baillie Gifford Emerging Markets All Cap Emerging market equity manager

Public Equity

Managers:
Women & Minority (WAM)

Women & Minority Owned Management Firms Currently In The Lineup

- Ariel managing VRS assets since 2014
  African-American, Asian-American & women-owned global equity manager
- Kylin managing VRS assets since 2014
  Asian-American owned hedge fund
- Advent managing VRS assets since 2011, Public Equity assets since 2020
  African-American owned convertible manager

Continue To Meet With New Prospects & Consider New Investments

- 85 meetings with minority managers or consultants in last 5 years
- 173 meetings since we started tracking this in late 2009

Looking Forward: Remain Opportunistic

Virginia Retirement System

- Opportunistic Manager Selection
- Monitor Tilt Opportunities
- Continue To Work Closely With Internal Equity & Portfolio Solutions Group
- Continue Women & Minority Manager Outreach

Appendix

Due Diligence

Existing Portfolio
- Qualitative: long-term relationships, frequent communication, monitor organizations & personnel
- Quantitative: monitor exposures & performance & risk, risk budget drives allocation, identify new strategic & tactical tilts

Assess Opportunity
- Qualitative: identify attractive investments, identify talented managers, utilize network of contacts
- Quantitative: multiple data sources/screen universe, identify potential manager, evaluate performance & risk of prospects

Manager Due Diligence
- Qualitative: face to face manager meetings, review firm strategy & process, detailed portfolio reviews, reference checks
- Quantitative: due diligence of existing managers, attribution, verify performance, assess risk

Portfolio Construction & Risk Management
- Qualitative: bottom-up portfolio construction, look for organizational “cracks” & process changes
- Quantitative: review targeted policy allocation & portfolio tilts, determine benchmark & manager allocations, perform risk analysis, monitor exposures

Public Equity

End Notes

[1]Effective February 2020, this is the MSCI ACWI IMI (net VRS tax rates) index; prior periods included several other representative benchmarks.

[2]Effective March 2017, this is a weighted average of MSCI U.S. Standard and MSCI U.S. Small Cap indices; prior periods are other representative benchmarks

[3]Effective February 2020, this is a weighted average of MSCI World ex U.S. Standard (net VRS tax rates) and MSCI World ex U.S. Small Cap (net of VRS tax rates) indices; prior periods are other representative benchmarks

[4]Effective April 2009, this is the MSCI Emerging IMI (net of VRS tax rates); prior periods are other representative benchmarks

[5]Effective February 2020, this is the MSCI ACWI Standard (net of VRS tax rates) index; prior periods are other representative benchmarks

[6]Effective February 2020, this is the MSCI ACWI IMI (net of VRS tax rates) index; prior periods are other representative benchmarks

Virginia Retirement System

Internal Equity Management
Dan Schlussler, Program Director

Agenda:
Internal Equity Management Annual Review Topics

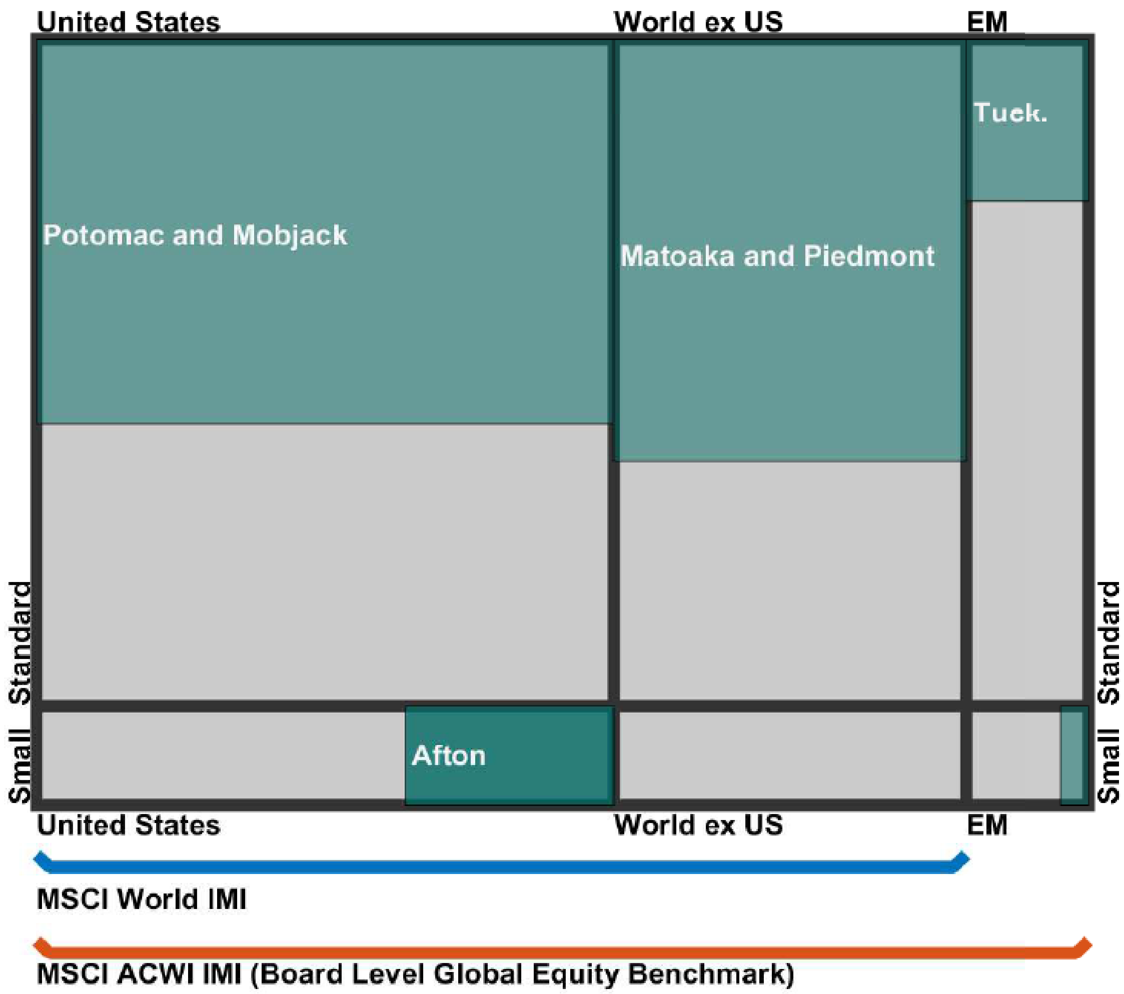
- Overview
- Markets
- Exposures
- Results
- Mandates
- Looking Forward

Overview:
Team Members

Professional	Position	Highest Degree	Professional Certifications	Investment Experience	VRS Tenure
Dan Schlussler	**Program Director, Non-U.S. Dev Low Vol**	**MBA**	**CFA**	**24**	**7**
Joe Kennebeck	Head Trader	BA		27	13
Aaron Lazar	Rebalance, Currency Hedge	MA	Passed CFA Level 1	6	6
Vu Le	U.S. Small Cap	PhD	CFA	9	8
Alex Muniz	U.S. Low Volatility	MA	CFA	19	19
Garret Rhodes	Rebalance, Currency Hedge	MS	Passed CFA Level 3	1	1
Larry Tentor	Non-U.S. Large Cap, Passive	PhD	FRM	18	12
Weldon Wirick	REITs, Currency Hedge	MA	CFA	18	14
Matthew Lacy	U.S. Large Cap	MA	CFA	21	21
Chung Ma	Emerging Markets	MA	CFA	24	6
Additional Resources	Investment Operations Department, Portfolio Solutions Group & Investment Decision Support				

Overview: Strategy Allocation as of 2/28/20

Virginia Retirement System



- Size of outer rectangle represents Traditional Equity program benchmark.
- Six bold rectangles represent market segments, by county groupings & market capitalization.
- Green rectangles represent asset sized pieces managed by Internal Equity.
- White text are internal portfolio names.

Internal Equity Mgmt.

Overview: Philosophy

- Provide Cost Effective Access To The Equity Risk Premium
- Provide Risk-controlled Value Added
- Provide Insights Into The Capital Markets
- Complement The Total Public Equity Program

Overview: Philosophy

Philosophy – Risk Controlled Relative Value

- Markets are relatively efficient
- Behavioral biases create exploitable opportunities
- Systematic strategies are effective at capitalizing on these opportunities

Stock Selection	Risk Management	Portfolio Management
• Valuation • Quality • Market Sentiment	• Statistical Risk • Fundamental Risk • Expert Assessment	• Information Management • Rebalancing • Trading & Operations

Internal Equity Mgmt.

Overview: Research Process

Investment Ideas

Existing Strategies
Academic Pubs
Professional Assoc's
Street Research
Networking

Data Collection

MarketQA
MSCI/Barra
Axioma
Custom

Proprietary Research

Factor Selection
Alpha Score
Risk Model
Simulation
Attribution

Overview:
Factor Selection & Alpha Score

Virginia Retirement System

Valuation
Discounted Cash Flow
Relative Valuations

- DCF models provide robust estimates of intrinsic value
- RV models compare stocks within cohorts using accounting metrics
- Valuation models identify stocks trading at a discount or premium

+

Quality
Prudent Accounting
Return on Equity

- Cash based earnings are preferred to accrual based earnings
- High & stable ROEs help to avoid value traps
- Quality captures accounting strength & management efficiency

+

Market Sentiment
Momentum
Analysts' Revisions

- Stock price movements show persistence in the intermediate term
- Analysts revisions have a predictable impact on stock prices
- Market sentiment indicates potential investment opportunities

=

Composite Score

Composite score identifies stocks that are trading at a discount, have superior management, & positive market recognition

Overview:
Portfolio & Risk Management

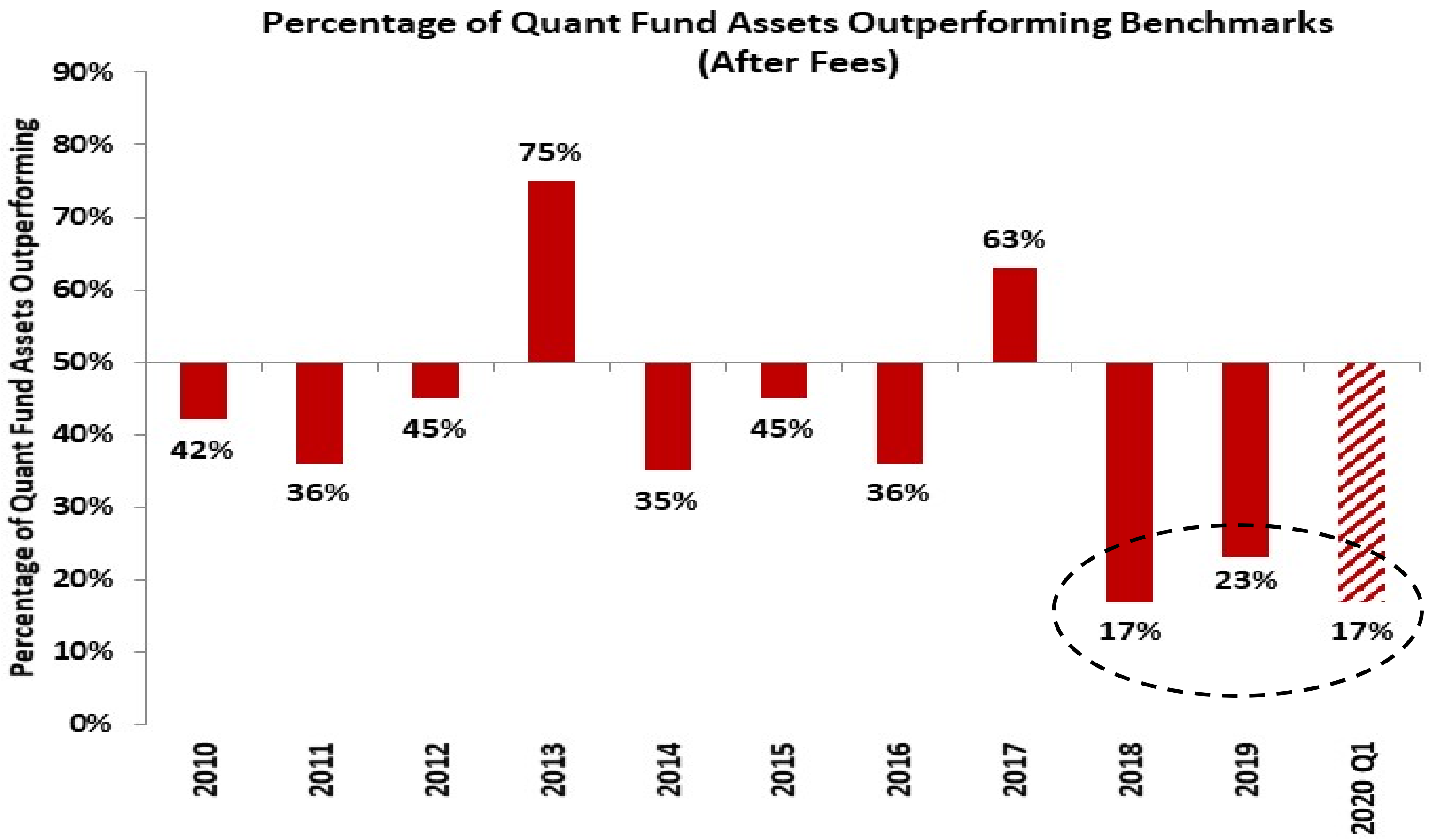
Quantitative	
Statistical Risk	• Fundamental Multifactor Risk Models • PCA Risk Models
Factor Constraints	• Relative or Total Risk • Return & Risk Factors • Industries, Sectors, Countries, Regions, etc.
Qualitative	
Fundamental & Non-Modeled Risks	• Forensic Accounting, Refinancing Risk, etc. • Individual Stock Modeling Tools
Expert Assessment	• Continuous Monitoring • Thematic Trend Analysis • Proprietary Research

Markets: Headwinds We've Faced

- Trade War
- Brexit
- COVID-19
- Quant Winter

Markets: Quant Strategies Have Under-Performed Recently

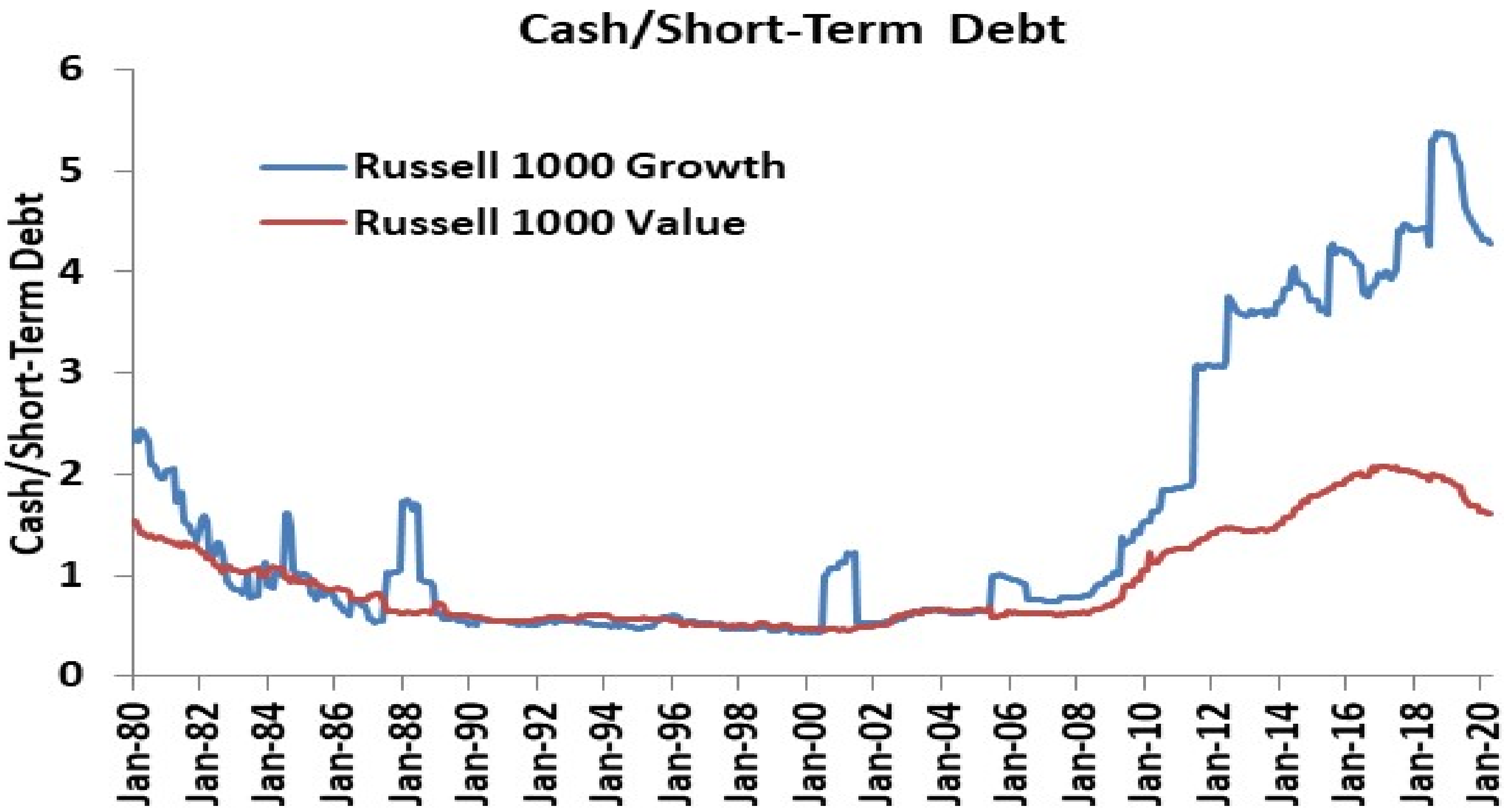
Virginia Retirement System



Source: Nomura-Instinet, Joseph Mezrich

Internal Equity Mgmt.

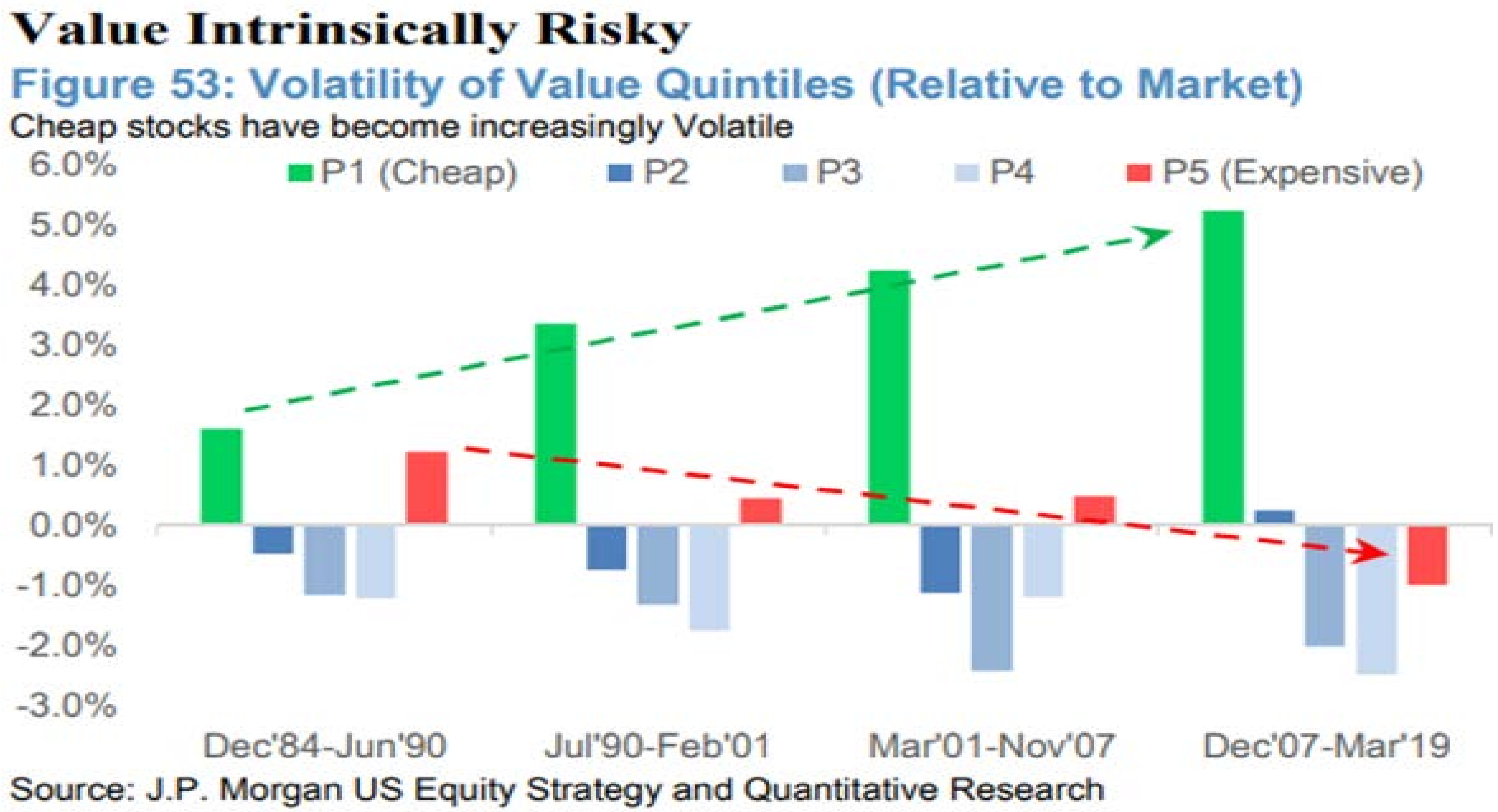
Markets:
Value Companies Have Taken On More Short-Term Debt…



Source: Nomura-Instinet, Joseph Mezrich

Internal Equity Mgmt.

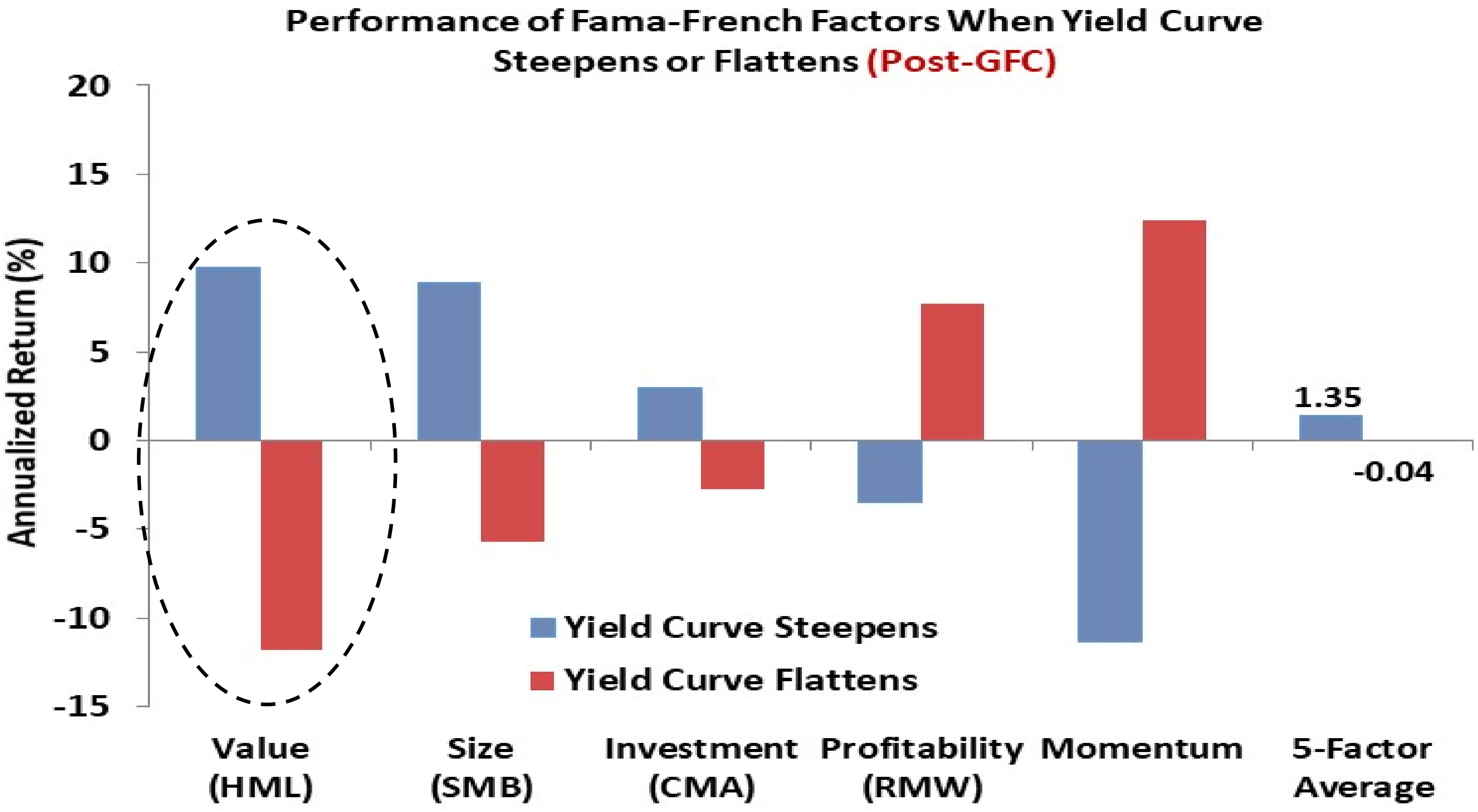
Markets:
…and Have Become More Risky…



Internal Equity Mgmt.

Markets:
…Leading to Heightened Sensitivity to Yield Curve

Virginia Retirement System



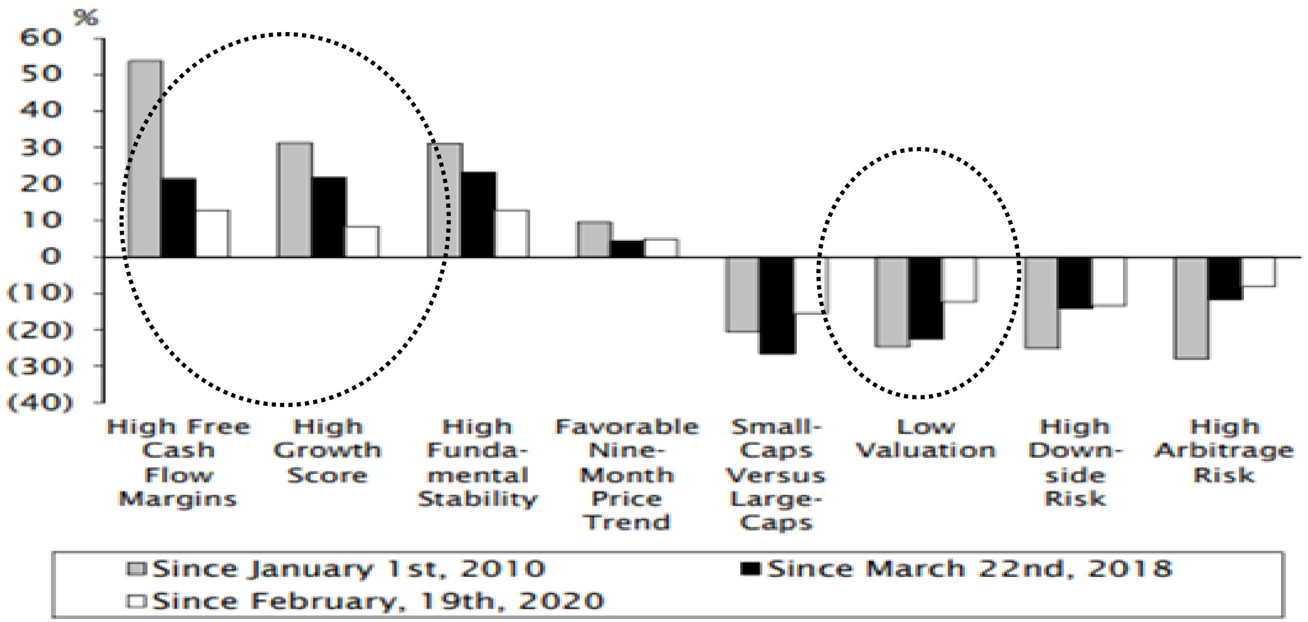
Source: Nomura-Instinet, Joseph Mezrich

Internal Equity Mgmt.

Markets:
High Demand for Growth in Low Growth Environment

Virginia Retirement System

Exhibit 8: Large-Capitalization Stocks
Relative Returns to Select Factors[1]
Daily Data Compounded to Various Periods
2010 Through March 20, 2020



Source: Empirical Research Partners Analysis.

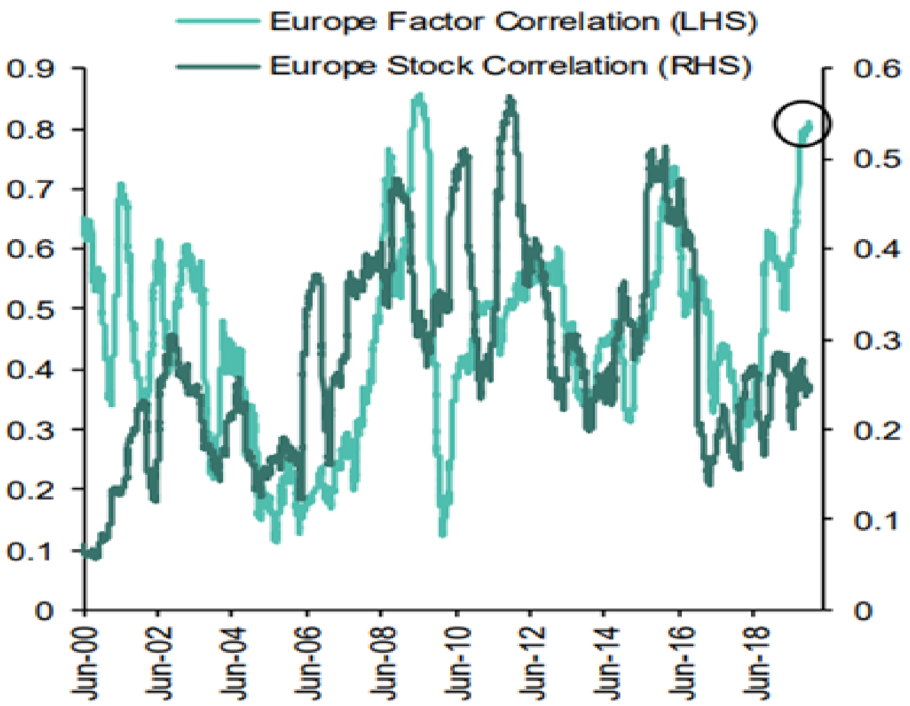
[1] Equally-weighted data, unannualized. High and low is based on the highest and lowest quintiles, respectively.

Internal Equity Mgmt.

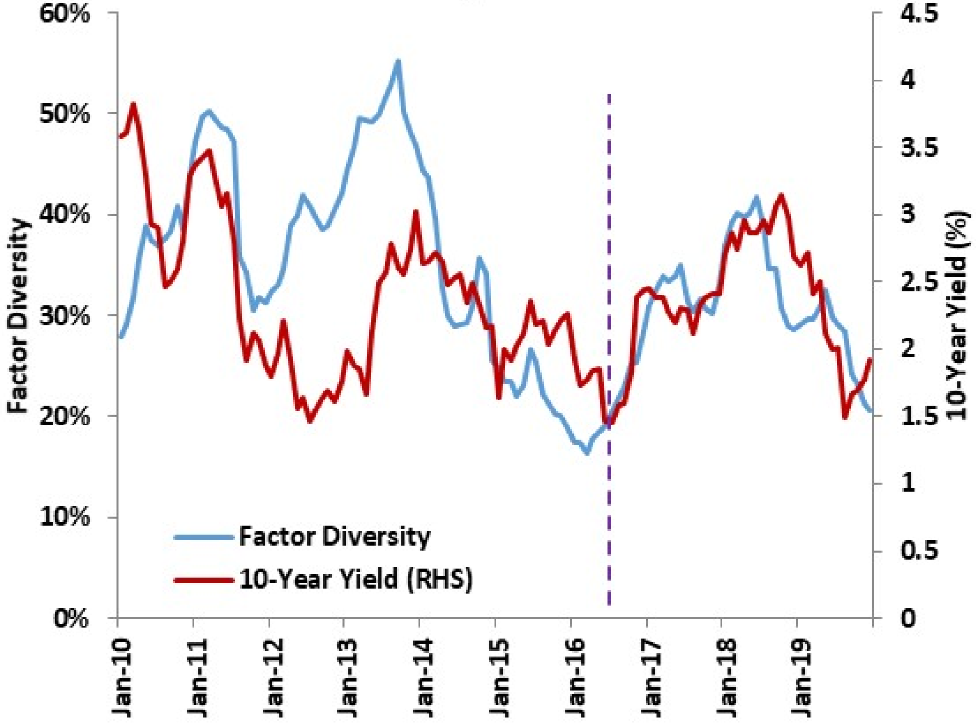
Markets:
Low Interest Rates Driving High Factor Correlations…

Virginia Retirement System

EXHIBIT 6: **Europe - Factor and Stock Correlation**



Source: MSCI, Factset, Bernstein Analysis
The factor correlations are based on the average absolute pairwise correlations of daily signed long-short factor returns for Europe composite value, Europe composite quality, Europe long term growth and Europe price momentum. The correlations are calculated over a rolling 6-month window.

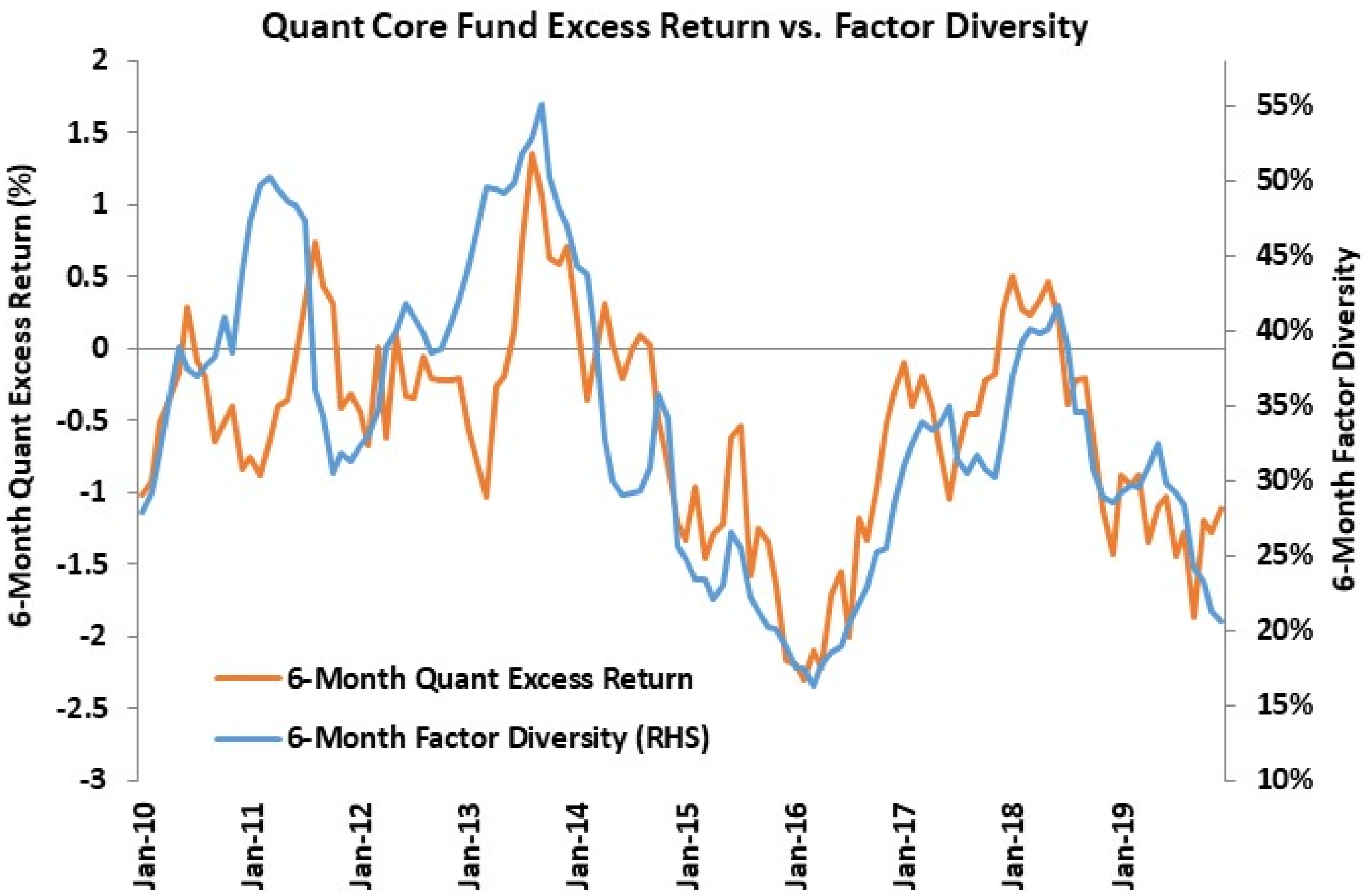


Source: Nomura-Instinet, Joseph Mezrich

Internal Equity Mgmt.

Markets:
…Leading to a Challenging Environment

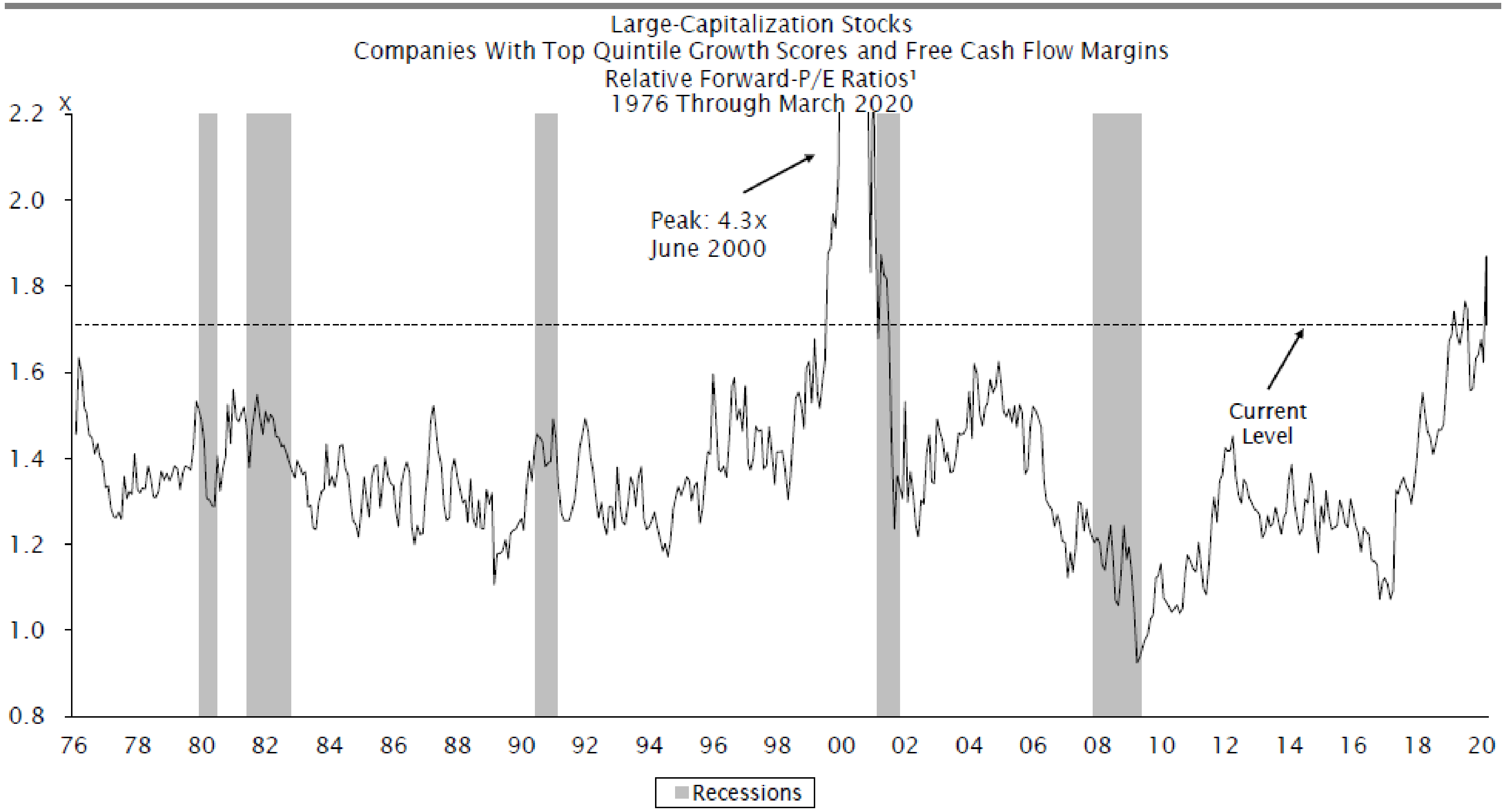
Virginia Retirement System



Source: Nomura-Instinet, Joseph Mezrich

Internal Equity Mgmt.

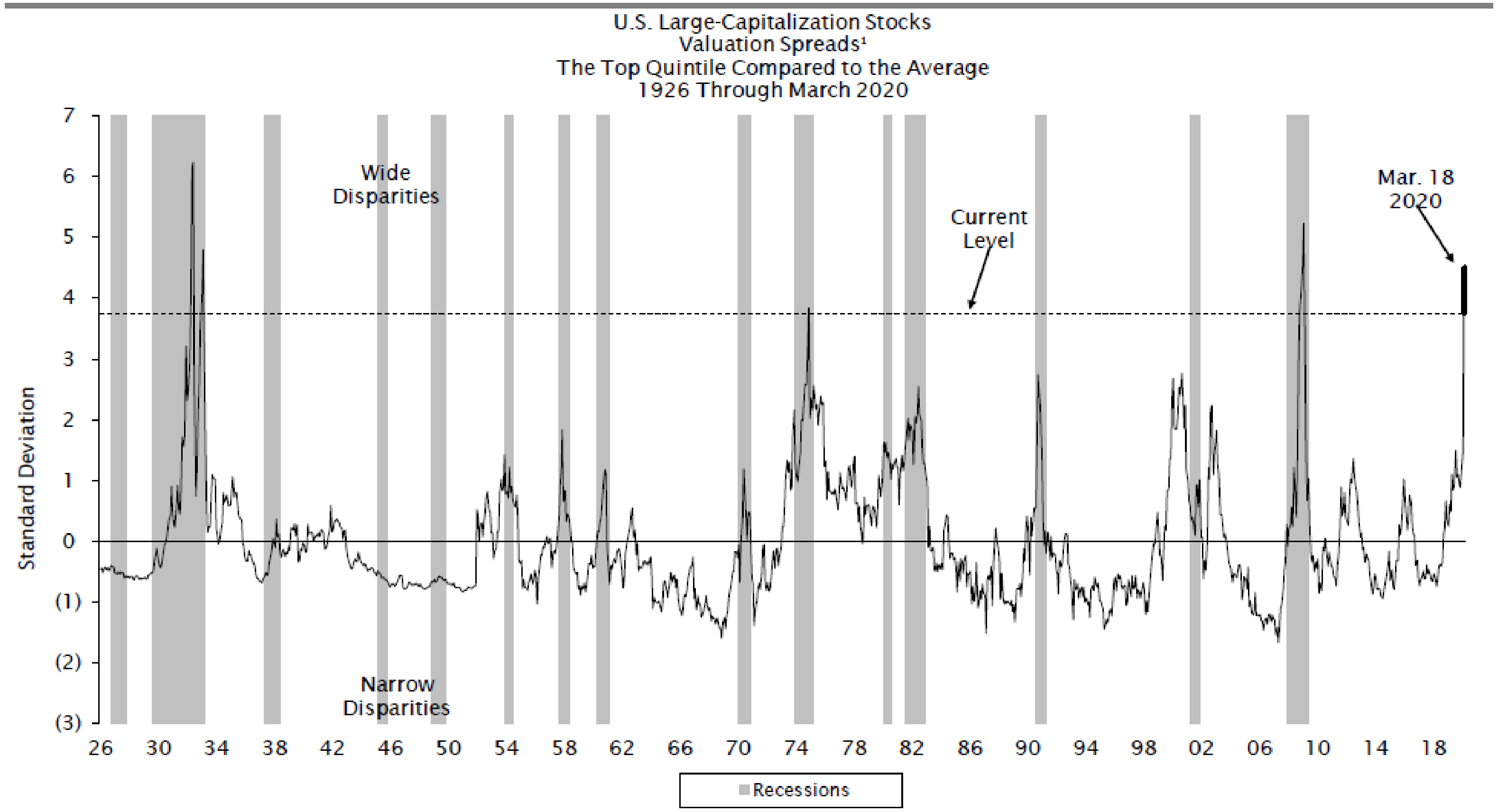
Markets:
Growth Stocks Are Expensive…



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1] Equally-weighted data.

Internal Equity Mgmt.

Markets:
…and Value Spreads Are Wide…

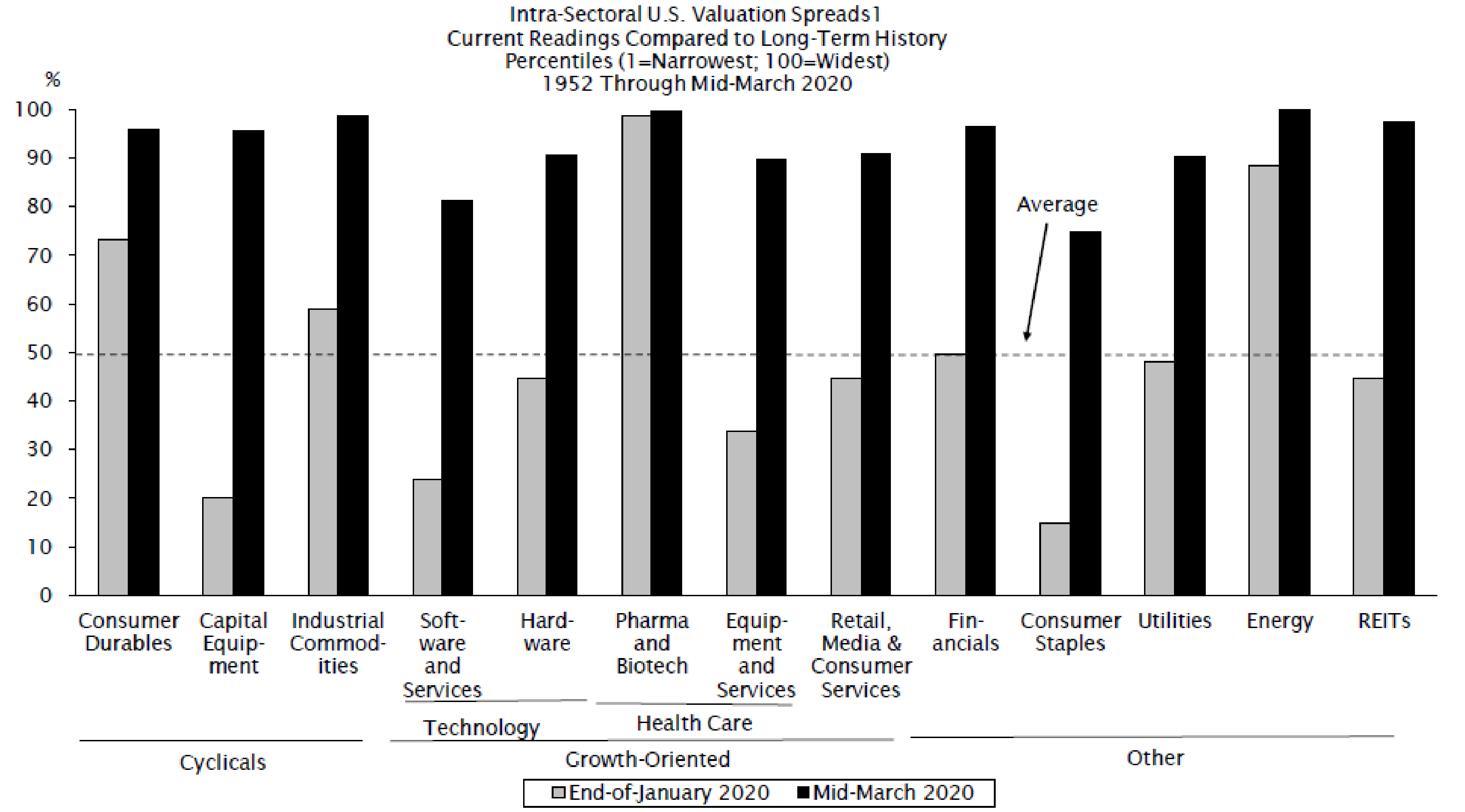


Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1]Prior to 1952, the spread is measured using the price-to-book data of the largest 1,500 stocks.

Internal Equity Mgmt.

Markets:
…with Broad-Based Opportunity

Virginia Retirement System



Source: Empirical Research Partners Analysis.
[1]Based on an analysis of a 1,500 stock universe. Framework varies across sectors depending on what's efficacious.

Internal Equity Mgmt.

Exposures:
Risk & Positions

Virginia Retirement System

Risk Summary*	Strategy	Mkt Val ($MM)**	Weight	Tracking	CF Risk	Specific	Risk Attrib	% of TE
Program	Composite	12,962	100.0	0.59	0.45	0.55	0.59	100.0
Potomac	US Large Cap	4,693	36.2	0.62	0.26	0.74	0.11	19.0
Afton	US Small Cap	603	4.7	0.89	0.24	0.76	0.01	1.1
Monroe	US REIT	608	4.7	0.62	0.10	0.90	0.00	0.1
Mobjack	US Low Vol	2,226	17.2	1.67	0.23	0.77	0.14	23.5
Matoaka	Non-US Dev. Large Cap	2,382	18.4	1.14	0.64	0.36	0.13	22.8
Tuckahoe	Emerging Markets	602	4.6	1.19	0.45	0.55	0.02	2.6
Piedmont	Non-US Dev. Low Vol	1,847	14.2	1.94	0.66	0.34	0.18	30.8

Top 10 Industry**	Act Wgt
Utilities	1.62
Pharmaceuticals, Biotechnology	1.42
Software & Services	0.92
Telecommunication Services	0.73
Real Estate	0.39
Consumer Services	-0.63
Materials	-0.68
Insurance	-0.69
Commercial & Professional Serv	-0.72
Health Care Equipment/Services	-0.75

Top 10 Country**	Act Wgt
AUSTRALIA	0.73
CANADA	0.33
SINGAPORE	0.31
SPAIN	0.29
ISRAEL	0.20
BRITAIN	-0.34
GERMANY	-0.40
FRANCE	-0.43
HONG KONG	-0.49
SWITZERLAND	-0.78

Sectors**	Act Wgt
Utilities	1.62
Health Care	0.67
Information Technology	0.52
Real Estate	0.39
Communication Services	0.11
Energy	0.10
Consumer Staples	-0.45
Consumer Discretionary	-0.65
Materials	-0.68
Financials	-0.75
Industrials	-0.87

Factor*	Act Wgt
EARNYILD	0.18
DIVYILD	0.12
BTOP	0.07
SIZENL	0.00
MOMENTUM	0.03
LIQUIDTY	0.04
RESVOL	0.00
BETA	0.04
LEVERAGE	-0.05
GROWTH	-0.02
SIZE	-0.02

*Data as of 02/07/2020; **Data as of 02/29/2020*

Internal Equity Mgmt.

Results:
As of 2/29/20

Virginia Retirement System

	IEM Active				IEM Low Volatility				IEM Enhanced Index			
	1 Yr	**3 Yr**	**5 Yr**	**Incep**	**1 Yr**	**3 Yr**	**5 Yr**	**Incep**	**1 Yr**	**3 Yr**	**5 Yr**	**Incep**
Total Active Internal Equity	2.67	6.65	6.35	6.56	3.41	6.12	6.46	12.06	2.32	6.71	6.21	6.34
IEM Benchmark	4.92	7.75	6.91	5.96	5.82	8.47	7.27	9.64	4.52	7.42	6.69	6.11
Excess Returns	*-2.25*	*-1.10*	*-0.56*	*0.60*	*-2.42*	*-2.35*	*-0.81*	*2.42*	*-2.20*	*-0.70*	*-0.48*	*0.23*
Realized Tracking Error	*0.80*	*0.75*	*0.85*	*1.00*	*1.66*	*1.50*	*1.74*	*2.84*	*0.61*	*0.67*	*0.67*	*0.75*
Realized Information Ratio	*-2.81*	*-1.47*	*-0.65*	*0.59*	*-1.45*	*-1.57*	*-0.47*	*0.85*	*-3.59*	*-1.05*	*-0.71*	*0.31*

Internal Equity Mgmt.

Results:
As of 2/29/20

Strategy	Performance Factor(s)
Potomac	**U.S. Enhanced Index: Largest Strategy By Assets** • Lost 2.4% vs the benchmark • Value exposure drove over half of the under-performance, with stock specific losses in the technology sector
Matoaka	**Non U.S. Developed Enhanced Index** • Underperformed by 3.2% • Similar to Potomac, value exposure was the main driver of under-performance. Stock selection within the industrial sector was also a meaningful detractor.
Low Volatility	**U.S. and Non-US Low Volatility Strategies** • Low Vol indexes out-performed the broad market benchmarks slightly for the trailing 1-year period • Both IEM Low Volatility strategies underperformed their blended benchmarks • As with other strategies our exposure to value was the major driver of under-performance, detracting over 140 bps for our non-US portfolio • Stock selection within industrials and consumer staples was also weak
Monroe	**U.S. REITs Enhanced Index Strategy** • Monroe had a good year, out-performing its benchmark by 64 bps • Good stock selection drove performance, with investments in less leveraged positions doing well

Internal Equity Mgmt.

Results:
As of 2/29/20

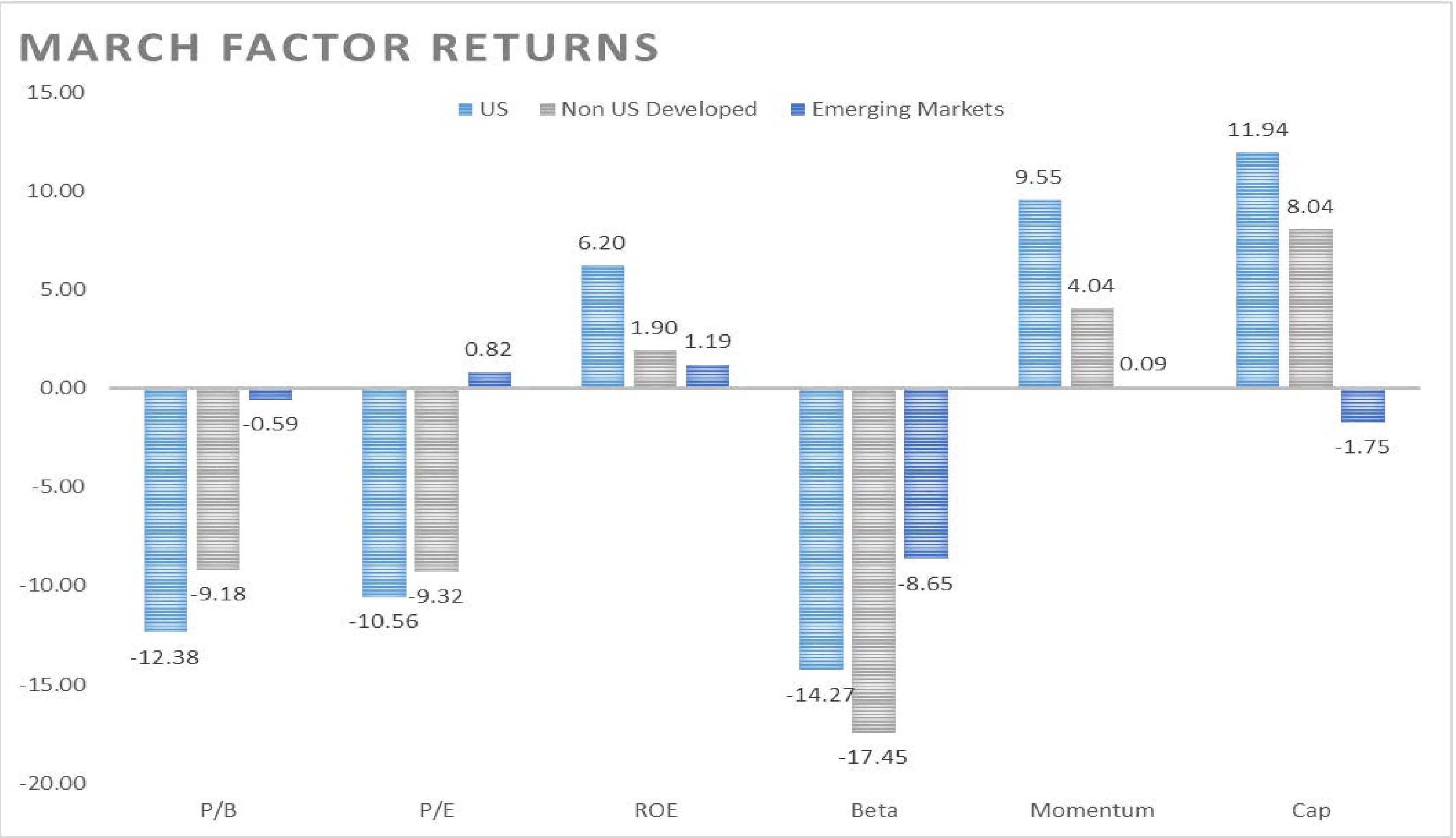
Virginia Retirement System

	Inception Date	Market Value ($MM)	1-Year Return	1-Year Excess	Since Inc. Excess	Since Inc. Tracking
Risk Controlled Strategies		8,888	2.32	-2.20	0.23	0.75
U.S. Large Cap (Potomac)	Apr-01	4,693	5.88	-2.44	0.25	0.91
Non-U.S. Large (Matoaka)	Sep-10	2,382	-1.72	-3.19	0.17	0.99
EM Large Cap (Tuckahoe)	Sep-15	602	-2.46	-0.64	-0.45	1.4
U.S. Small Cap (Afton)	Jun-05	603	-4.11	-0.74	0.22	1.8
U.S. REIT (Monroe)	Dec-05	608	3.53	0.64	1.14	1.14
Less Constrained (Low Vol) Strategies		4,073	3.41	-2.42	2.42	2.84
U.S. Large Cap (Mobjack)	Jun-10	2,226	7.57	-1.60	2.38	3.29
Non-U.S. Large (Piedmont)	Dec-12	1,847	-1.2	-3.33	1.32	2.44
Passive Strategies		74	-6.73	0.01	0.10	0.15
EM Small Cap (Cardinal)	Sep-15	73	-6.76	0.00	0.36	0.28
Other Mandates						
Rebalancing & Liquidity Mgmt	Jul-07	187	n.a.	n.a.	n.a.	n.a.
Currency Hedging	Apr-09	4,207	n.a.	n.a.	n.a.	n.a.

Internal Equity Mgmt.

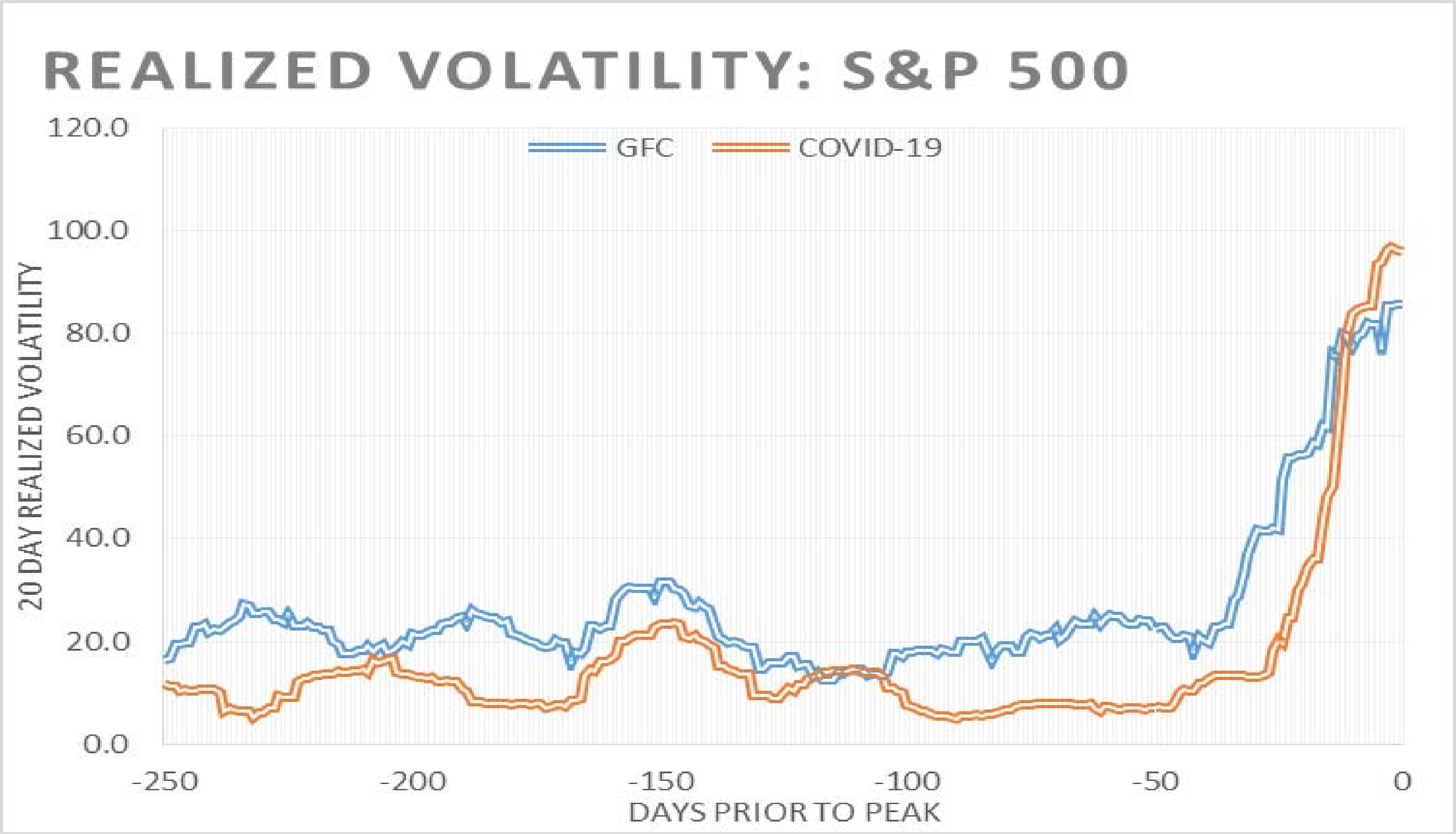
March Update:
Value Under-Performs, Flight to Quality

Virginia Retirement System



Internal Equity Mgmt.

March Update:
Value Under-Performs, Flight to Quality



Internal Equity Mgmt.

Looking Forward:
Focus On Today's & Long-Term Opportunities

Virginia Retirement System

- Difficult Year Of Performance
- We Maintain Conviction In Our Strategies
- Continue To Enhance The Overall Investment Process
- Continue Research On Global Long and Long/Short Strategies
- Major Project to Enhance our Research Infrastructure

Investment Advisory Committee

April 15, 2020

Virginia Retirement System

Asset Allocation Phase-In

IAC Meeting - April 15, 2020

Asset Liability Study Implementation: Asset Class Phase-in Dates (Per 11/19 BoT)

	Allocation			
	Current Policy	7/1/20	7/1/21	New LT Policy
Public Equity	40%	39%	36%	34%
Fixed Income	16%	15%	15%	15%
Credit Strategies	14%	14%	14%	14%
Real Assets	14%	14%	14%	14%
Private Equity	11%	12%	13%	14%
PIP	2%	2%	3%	3%
MAPS	3%	4%	5%	6%

Policy Ranges

- Equity, Credit, Real Assets & Private Equity have a +/- 5% range (unchanged).
- Fixed Income has a 15% floor and +5% upper range (unchanged).
- PIP & MAPS have a **+/- 3% range (suggested increase from +/- 1%)** as we get closer to the target allocation.

Proposed April 2020 Phase-in

Total Fund	Policy Weight	Current Weight	Proposed 4/1/20	Change From Current Policy
Public Equity	40.0%	36.2%	37.0%	-3%
Fixed Income	16.0%	15.7%	16.0%	
Credit Strategies	14.0%	14.4%	14.0%	
Real Assets	14.0%	14.3%	14.0%	
Private Equity	11.0%	13.7%	13.0%	+2%
MAPS	3.0%	3.0%	3.0%	
PIP	2.0%	1.6%	2.0%	
Cash	0.0%	1.0%	1.0%	+1%
	100.0%	**99.9%***	**100.0%**	**0.0%**

*Does not sum to 100% due to rounding

Note:

The market has more or less brought us to the July 2021 phase-in step.

- Equity -3% from current, +1% from **7/21 target**
- Fixed Income unchanged from current, +1% from **7/21 target**
- MAPS/PIP unchanged from current, down 2% and 1%, respectively, from **7/21 target**
- Cash target new

Proposed Allowable Ranges

Total Fund	Proposed Target Weight	Allowable Range	
Public Equity	37%	-5%	+5%
Fixed Income	16%	-3%	+5%
Credit Strategies	14%	-5%	+5%
Real Assets	14%	-5%	+5%
Private Equity	13%	-5%	+5%
MAPS	3%	-1%	+1%
PIP	2%	-1%	+2%
Cash	1%	-1%	+4%
	100%		

Key Changes In Allowable Ranges Include:

- Fixed Income: -3%; including the cash target, this is effectively a 1% drop from the current 15% floor.
- PIP is reinvesting proceeds, rather than harvesting distributions. As a 'lumpy' asset class, it is prone to unanticipated increases because of the denominator effect; therefore, we propose, a +2% upper range, vs. the old +1% range.
- Frictional cash needs, especially in time of turmoil, necessitates a small constant cash exposure. The +4% range allows us to be defensive, if needed.