Advanced Beta Equities Multi-Factor Strategy

Prepared for the Employees' Retirement System of Rhode Island

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Global Equity Beta Solutions

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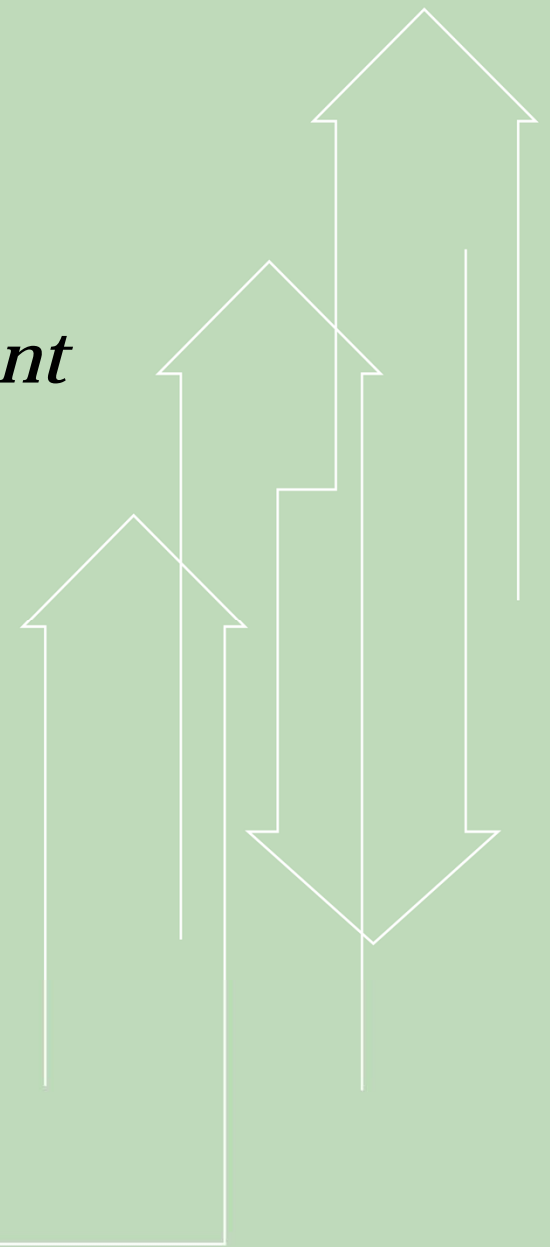
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All the information contained in this presentation is as of date Indicated unless otherwise noted.

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Account Summary

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Employees' Retirement System of Rhode Island

Investment Summary

As of October 31, 2016:

	Market Value
ERSRI QVM Strategy	$1,040,180,642
State Street Russell 3000 Index NL Fund	1,191,221,174
State Street MSCI EAFE Index NL Fund	714,583,227
State Street MSCI Canada Index NL Fund	98,490,281
State Street MSCI Emerging Markets Index NL Strategy	347,031,913
Total	**$3,391,507,237**

Statement of Asset Changes

The following changes took place in the Rhode Island Employees Retirement System account for the period of September 01, 2015 to October 31, 2016:

	Market Value 09/01/2015	Contributions	Withdrawals	Change in Market Value*	Market Value 10/31/2016
ERSRI QVM Strategy	—	$1,004,253,305	$(1,368,849)	$37,296,186	$1,040,180,642
State Street Russell 3000 Index NL Fund	1,778,321,993	—	(714,049,775)	126,948,956	1,191,221,174
State Street MSCI EAFE Index NL Fund	1,197,109,094	—	(464,353,184)	(18,172,683)	714,583,227
State Street MSCI Canada Index NL Fund	122,017,124	—	(31,757,320)	8,230,477	98,490,281
State Street MSCI Emerging Markets Index NL Strategy	366,207,793	—	(60,000,000)	40,824,120	347,031,913
Total	**3,463,656,004**	**$1,004,253,305**	**$(1,271,529,128)**	**$195,127,056**	**$3,391,507,237**

Source: SSGA. * Includes dividends, interest, and realized/unrealized gains and losses. Past performance is not a guarantee of future results.

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Employees' Retirement System of Rhode Island

Summary of Performance

Following are the gross and net returns for the Employees Retirement System of the State of Rhode Island Portfolios versus the corresponding benchmarks as of October 31, 2016:

	One Month	Three Months	Year to Date	Last 12 Months	Three Years	Five Years	Since Inception
Employees' Retirement System of Rhode Island Advanced Beta QVM Strategy							**Oct/2015**
Total Returns [Net]	-1.74%	-1.34%	3.30%	1.48%	N/A	N/A	8.63%
MSCI World Index	-1.94	-1.33	3.51	1.18	N/A	N/A	8.44
Difference†	0.20	-0.01	-0.21	0.30	N/A	N/A	0.19
Total Returns [Gross]	-1.74	-1.33	3.34	1.53	N/A	N/A	8.67
MSCI World Index	-1.94	-1.33	3.51	1.18	N/A	N/A	8.44
Difference†	0.20	0.00	-0.17	0.35	N/A	N/A	0.23
State Street MSCI Canada Index NL Fund							**Sep/2012**
Total Returns [Net]	-0.83	0.67	20.22	9.63	-1.86%	N/A	N/A
MSCI Canada Index	-0.89	0.52	19.56	8.90	-2.50	N/A	N/A
Difference†	0.06	0.15	0.66	0.73	0.64	N/A	N/A
Total Returns [Gross]	-0.83	0.68	20.25	9.66	-1.83	N/A	1.05
MSCI Canada Index	-0.89	0.52	19.56	8.90	-2.50	N/A	0.35
Difference†	0.06	0.16	0.69	0.76	0.67	N/A	0.70
State Street MSCI EAFE Index NL Fund							**Sep/2012**
Total Returns [Net]	-2.03	-0.72	-0.03	-2.91	-1.02	N/A	N/A
MSCI EAFE® Index	-2.05	-0.77	-0.35	-3.23	-1.31	N/A	N/A
Difference†	0.02	0.05	0.32	0.32	0.29	N/A	N/A
Total Returns [Gross]	-2.03	-0.71	-0.01	-2.88	-0.99	N/A	6.15
MSCI EAFE® Index	-2.05	-0.77	-0.35	-3.23	-1.31	N/A	5.83
Difference†	0.02	0.06	0.34	0.35	0.32	N/A	0.32

Source: SSGA.

† The calculation method for value added returns may show rounding differences. Past performance is not a guarantee of future results.

Return periods of less than one year are not annualized. The performance for Employees' Retirement System of Rhode Island Portfolios shown above on 5 is reflected on a gross basis as of September 30, 2016. Due to SSGA FM's CTA status, beginning with the September 2012 month-end period going forward, net returns will be reflected in addition to gross returns. Net returns will be expressed net of actual management fees, actual brokerage fees and trading commissions. Net returns will not be expressed net of administration, custody and/or other fees that may be externally negotiated. If so, net returns would be lower than what will be reflected. Investing involves risk including the risk of loss of principal.

The performance includes the reinvestment of dividends and other corporate earnings and is calculated in US dollars.

Index returns reflect capital gains and losses, income, and the reinvestment of dividends.

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Employees' Retirement System of Rhode Island

Summary of Performance

Following are the gross and net returns for the Employees Retirement System of the State of Rhode Island Portfolios versus the corresponding benchmarks as of October 31, 2016:

	One Month	Three Months	Year to Date	Last 12 Months	Three Years	Five Years	Since Inception
State Street MSCI Emerging Markets Index NL Strategy							**Sep/2012**
Total Returns [Net]	0.22%	4.02%	15.98%	9.00%	-2.23%	N/A	N/A
MSCI Emerging Markets Index	0.24	4.05	16.30	9.27	-2.05	N/A	N/A
Difference†	0.02	-0.03	-0.32	-0.27	-0.18	N/A	N/A
Total Returns [Gross]	0.23	4.05	16.07	9.11	-2.13	N/A	1.18%
MSCI Emerging Markets Index	0.24	4.05	16.30	9.27	-2.05	N/A	1.30
Difference†	0.01	0.00	-0.23	-0.16	-0.08	N/A	-0.12
State Street Russell 3000 Index NL Fund							**Sep/2012**
Total Returns [Net]	-2.14	-1.75	5.93	4.31	8.16	N/A	N/A
Russell 3000® Index	-2.16	-1.76	5.84	4.24	8.13	N/A	N/A
Difference†	0.02	0.01	0.09	0.07	0.03	N/A	N/A
Total Returns [Gross]	-2.14	-1.75	5.94	4.32	8.18	N/A	11.78
Russell 3000® Index	-2.16	-1.76	5.84	4.24	8.13	N/A	11.74
Difference†	0.02	0.01	0.10	0.08	0.05	N/A	0.04

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Advanced Beta

Smart Beta: A Third Approach

Smart Beta: Any objective, transparent, consistent process for capturing investment exposures
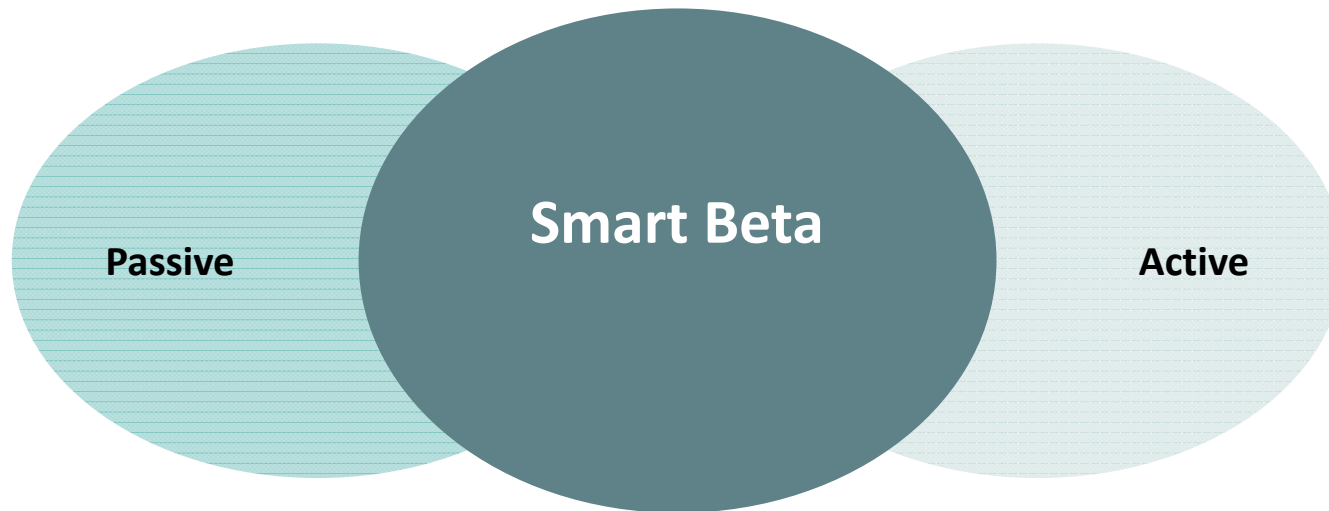
A third approach — Blurs the boundaries between active and passive investing.

Active performance potential — Expectations of improvement in absolute or risk-adjusted returns.

- Returns driven by well-known factors often targeted by active managers (valuation, volatility, quality, size, momentum, etc.)
- While long-term historical performance is attractive, interim risks are significant

Passive implementation — Retains the benefits of traditional passive investing.

- Transparency, objectivity, consistency, low cost, diversification and liquidity

# SSGA Smart Beta Equity: Core Beliefs

We believe that:

- Smart beta factor premia exist, creating opportunities to outperform traditional benchmarks
  - These premia reflect sources of risk, or in some cases, may result from security mispricings caused by investor behavioral biases or market frictions

- Smart beta factor premia can be captured via transparent, rules-based investment processes
  - Consistent, systematic methodologies; not dissimilar to characteristics of traditional passive index methodologies

- Portfolios can be constructed in a manner that is consistent with investors' beliefs and objectives
  - An outcome-oriented mindset to strategy implementation is crucial, as performance expectations vary across factors

- Successful factor investing must account for cyclicality of factor performance
  - Multi-factor approaches provide diversification benefits, offer potential for improved consistency in performance
  - Longer term investment horizon is most appropriate

- Experienced, innovative investment team is essential in delivering best in class smart beta solutions
  - Our Global Equity Beta Solutions team combines robust research capabilities with relevant global experience and trading experience

Diversification does not ensure a profit or guarantee against loss.

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Single or Multi-factor Approaches
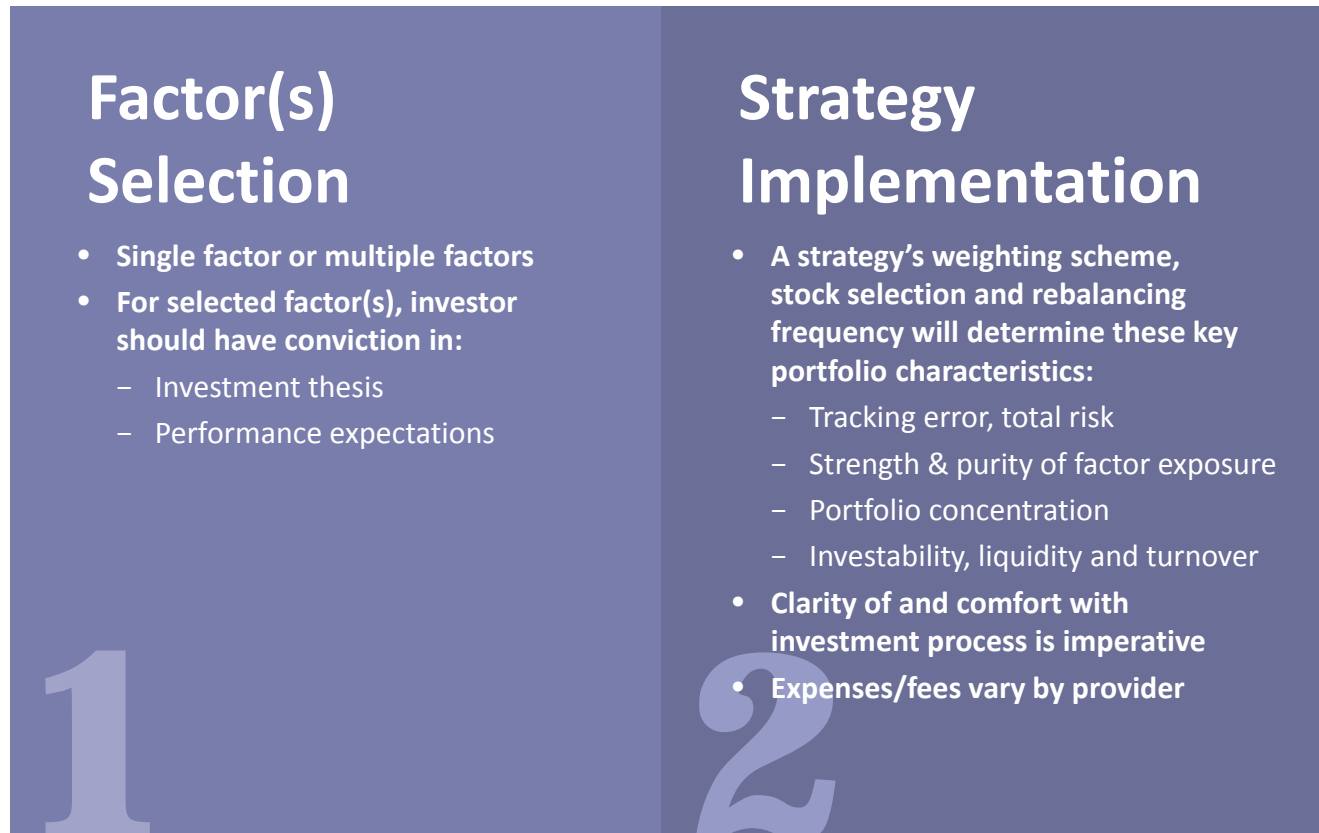
Single Factor
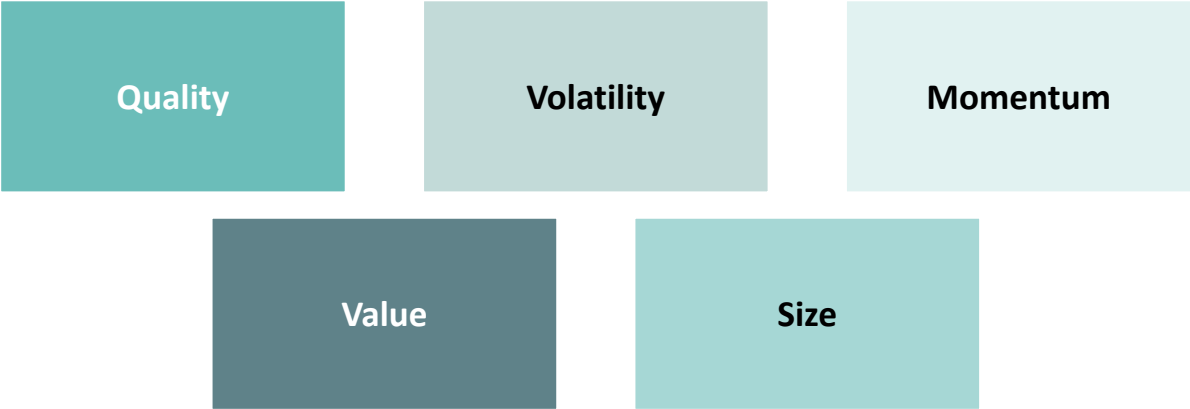
Multi-Factor

Source: SSGA.
The information contained above is for illustrative purposes only.

Smart Beta Investing: Decision Making Process

Two key decisions for Smart Beta investors influenced by investor goals and beliefs

Factor(s) Selection

- **Single factor or multiple factors**
- **For selected factor(s), investor should have conviction in:**
  - Investment thesis
  - Performance expectations

1

Strategy Implementation

- **A strategy's weighting scheme, stock selection and rebalancing frequency will determine these key portfolio characteristics:**
  - Tracking error, total risk
  - Strength & purity of factor exposure
  - Portfolio concentration
  - Investability, liquidity and turnover
- **Clarity of and comfort with investment process is imperative**
- **Expenses/fees vary by provider**

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Concluding Remarks

Smart Beta (SB): Empirical evidence is compelling

- Many different SB indexes and strategies, but returns are driven by a few well-known factors
- Since SB strategies are constructed with benefit of hindsight, they should be viewed with skepticism
- While long term historical performance is attractive, interim risks are significant

Considerations for implementing a Smart Beta portfolio

- Ownership of Smart Beta decisions can pose unique challenges for investors
- We believe, to be successful with Smart Beta strategies, investors should have:
  - (1) conviction about the source of returns
  - (2) patience to endure periods of underperformance
- Empirical evidence, low costs and intuitive arguments suggest opportunities for long-term investors

SSGA: Partnering with clients to deliver Smart Beta solutions

- Extensive research and development, successful implementation of Smart Beta strategies
- Solutions-oriented approach with flexibility to customize portfolio construction

Past performance is not a guarantee of future results.

Summary of Research

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Research Summary

Research Performed for ERS of Rhode Island

Begun in September 2014

Includes:

- Investigation of alternative definitions of quality including ROA, Change in ROA, ROE, Asset Turnover, Earnings Variability over different horizons
- Investigation of single factor portfolio construction methods to account for differentiation in weight of factor metrics
- Investigation of the impact of sector/country neutralization in portfolio construction
- Investigation of multiple factor portfolio construction methods to account for differentiation in weight of factor metrics

Research Summary

Key Findings

Includes:

- Employing Percent Change in ROA versus level of ROA does not materially change outcome

- Employing ROE produces slight improvements over ROA

- Earnings Variability and Debt to Equity are weaker signals than ROA and ROE but can be useful as diversifying measures of Quality because of their lower correlation with the former

- Employing 10-year Earnings Variability over 5-year Earnings Variability does not materially change outcome

- Adding Asset Turnover does not materially change outcome

- Down weighting Debt to Equity and treating the top four quintiles equally impacts performance positively

- Sector neutralizing and country neutralizing the portfolios reduces excess returns; country neutralizing has a greater negative impact than sector neutralizing

- Bottom-up multi-factor portfolio construction impacts performance positively over top-down construction due to non-linear interaction effects between the factors

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Multi-Factor Portfolio for Value, Quality, and Momentum

Portfolio Summary

Multi-factor Portfolio

Objective

- Transparent framework to tilt portfolio to capture specific investment themes: Low valuation, high quality, and high momentum
- The portfolio reflects high quality stocks that are relatively inexpensive and have experienced recent price momentum

How we define Valuation, Momentum, and Quality

- Supported by strong academic research and historical empirical results

How we build the portfolio

- How the factors are defined and how the portfolio is constructed is fully transparent, rules-based, and intuitively links security characteristics directly to the security weights in the portfolio

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SSGA Multi-factor Strategy

Objective

- Transparent framework to tilt portfolio to capture specific investment themes
  - Low valuation, high momentum, and high quality

How we define Valuation, Momentum and Quality

- Supported by strong academic research and historical empirical results

	Valuation	**Price/Fundamental** Fundamentals: Earnings, Cash flow, Sales, Dividend, and Book Value
	Momentum	**Total Return** Trailing 12-month, excluding recent 1-month
	Quality	**(1) Profitability (2) Earnings Consistency and (3) Low Leverage** ROA, EPS variability, LT Debt/Equity

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SSGA Multi-Factor Strategy

Key Features

- Rules-based, transparent investment process
- Broadly diversified
- Security weights directly tied to cap weights

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1   **Independently sort universe by each factor, create quartiles containing approximately 25% of market cap**

- Q1 = 25% of index weight with lowest valuation (or highest momentum, or highest quality)
- Q2 = …
- Q3 = …
- Q4 = 25% of index weight with highest valuation (or lowest momentum, or lowest quality)

---

2   **Attach a score to each stock (one score for each factor) based on its quartile rank**

- Q1 = 3
- Q2 = 2
- Q3 = 1
- Q4 = 0
- Valuation score + Momentum Score + Quality Score = Total Score
- 64 possible combinations of scores from 0 to 9
- (Min score: 0+0+0=0, Max score: 3+3+3=9)
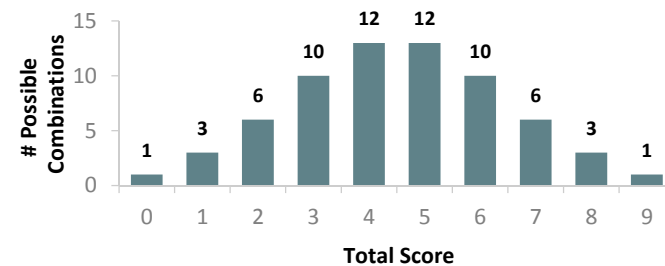
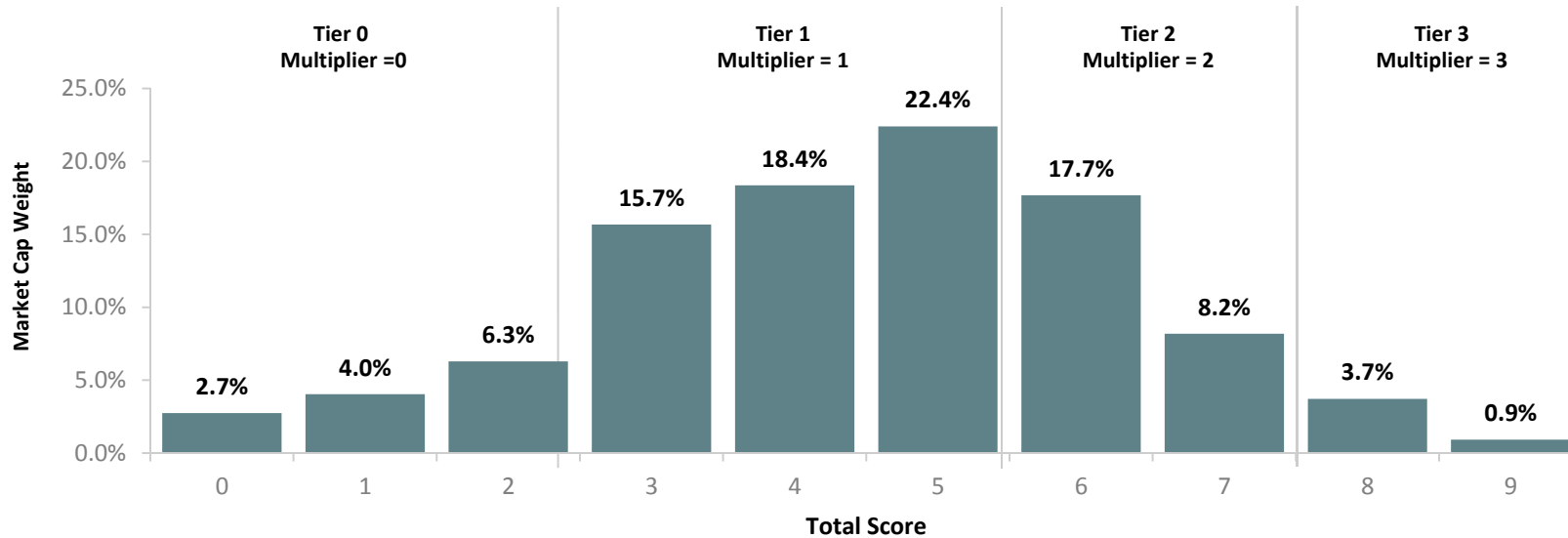**3**   **Apply methodology to tilt security weights**

- Each stock grouped into a Tier based on its Total Score
- Apply a multiplier to cap weight of each Tier

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SSGA Multi-Factor Strategy

Tilting Methodology

Re-allocates capital from unattractive to attractive

- (9) Total Score groups assigned to Tiers
- Multiplier applied to cap weight of each Tier
  - Tier 0: Multiplier = 0, thus these stocks are excluded
- Adjusted market cap determines tilted weights
  - Tilted weights sum to 100%
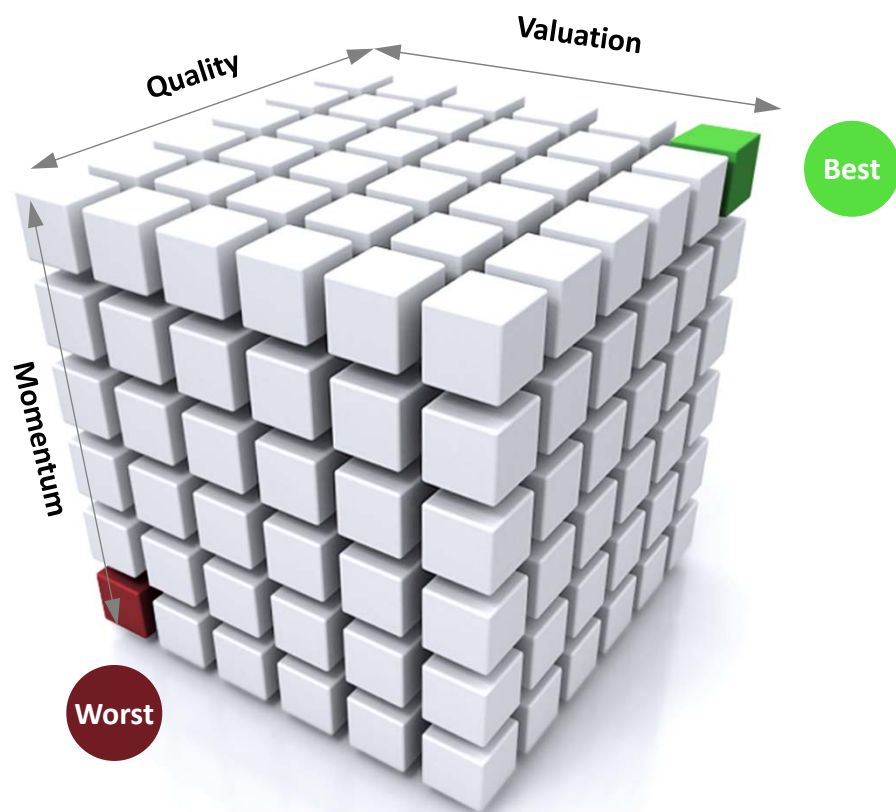- Reconstitute methodology annually

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Portfolio Methodology: A Visualization

The information contained above is for illustrative purposes only.

ERSRI QVM Strategy — Performance

ERSRI QVM Strategy Performance

October 2015–September 2016

	MSCI World (Net)	ERSRI QVM Portfolio
Annualized Return (Gross)	11.36%	11.40%
Annualized Return (Net)	11.36%	11.35%
Annualized Volatility	12.65%	12.23%
Sharpe Ratio	0.88	0.92
Excess Return	N/A	0.04%
Tracking Error	N/A	0.79%
IR	N/A	0.05
Max Drawdown	-8.78%	-8.17%
Turnover	N/A	51.89%

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ERSRI QVM Strategy — Performance

Historical Drawdown

October 2015 – September 2016

- Strategy exhibited downside protection versus MSCI World Index over period
  - Up Capture: 0.95
  - Down Capture: 0.91

Cumulative Growth of $1

October 2015 – September 2016

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ERSRI QVM Strategy — Characteristics

Portfolio Characteristics

As of September 30, 2016

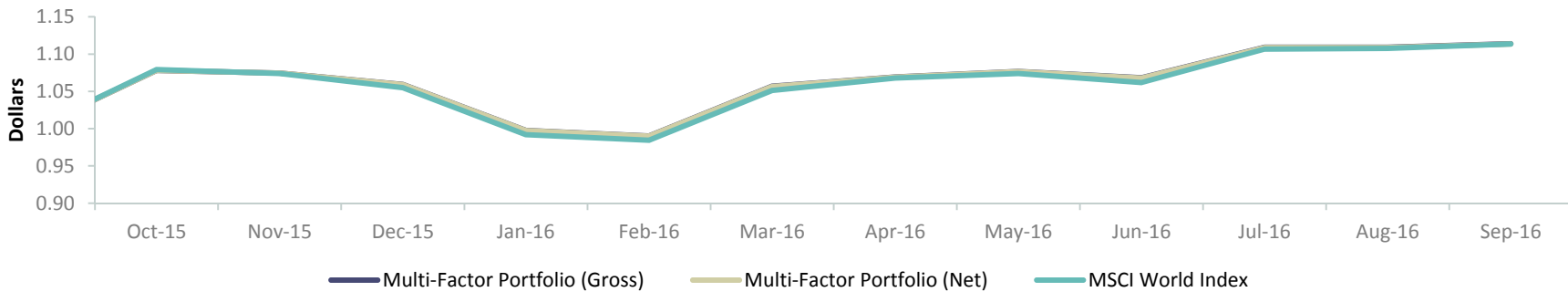|		Multi-Factor Portfolio	MSCI World Index
Value	Price/Earnings	17.01	16.50
	Price/Book	2.16	2.16
	Dividend Yield (%)	2.71	2.53
	Price/Cash Flow	9.62	9.87
	Price/Sales	1.40	1.46
Quality	ROE (%)	18.0	16.2
	Earnings Variability (exposure)	1.02	1.41
	LT Debt to Capital	39.0	40.8
Momentum	Ret12M (%)	18.27	15.33
Risk	% Specific Risk	26.43	
	% Factor Risk	73.57	
	Axioma — Total Risk (%)	13.86	14.17
	Axioma — Predicted Beta	0.98	1.00
# of Securities		1,466	1,637
Market Capitalization		106,765	104,061

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ERSRI QVM Strategy — Characteristics

Sector Weight (%) of MSCI World (As of September 30, 2016)

Sector	MSCI World Index	Multi-Factor Portfolio
Utilities	3.36	3.83
Telecommunication Services	3.46	4.59
Real Estate	3.43	3.17
Materials	4.98	4.84
Information Technology	14.88	15.44
Industrials	10.98	12.83
Health Care	12.85	10.22
Financials	16.05	17.13
Energy	6.79	4.96
Consumer Staples	10.71	11.35
Consumer Discretionary	12.50	11.66

■ MSCI World Index   ■ Multi-Factor Portfolio
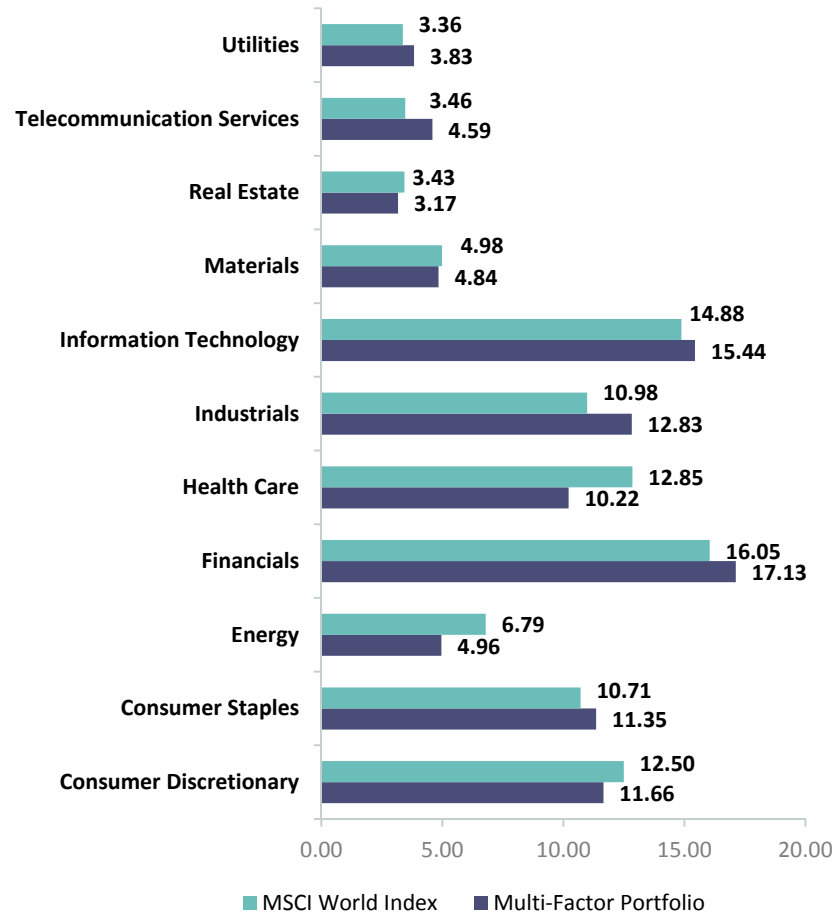
Active Sector Weight (%) (As of September 30, 2016)

Sector	Multi-Factor Portfolio
Utilities	0.47
Telecommunication Services	1.12
Real Estate	-0.26
Materials	-0.14
Information Technology	0.56
Industrials	1.85
Health Care	-2.64
Financials	1.08
Energy	-1.83
Consumer Staples	0.64
Consumer Discretionary	-0.84

■ Multi-Factor Portfolio

Source: SSGA, Factset.
This information should not be considered a recommendation to invest in any particular sector or to buy or sell any security shown.
It is not known whether the sectors or securities shown will be profitable in the future.
Sector weights are as of the date indicated, are subject to change, and should not be relied upon as current thereafter.

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ERSRI QVM Strategy — Characteristics

Country Weight (%) of MSCI World Index (As of September 30, 2016)

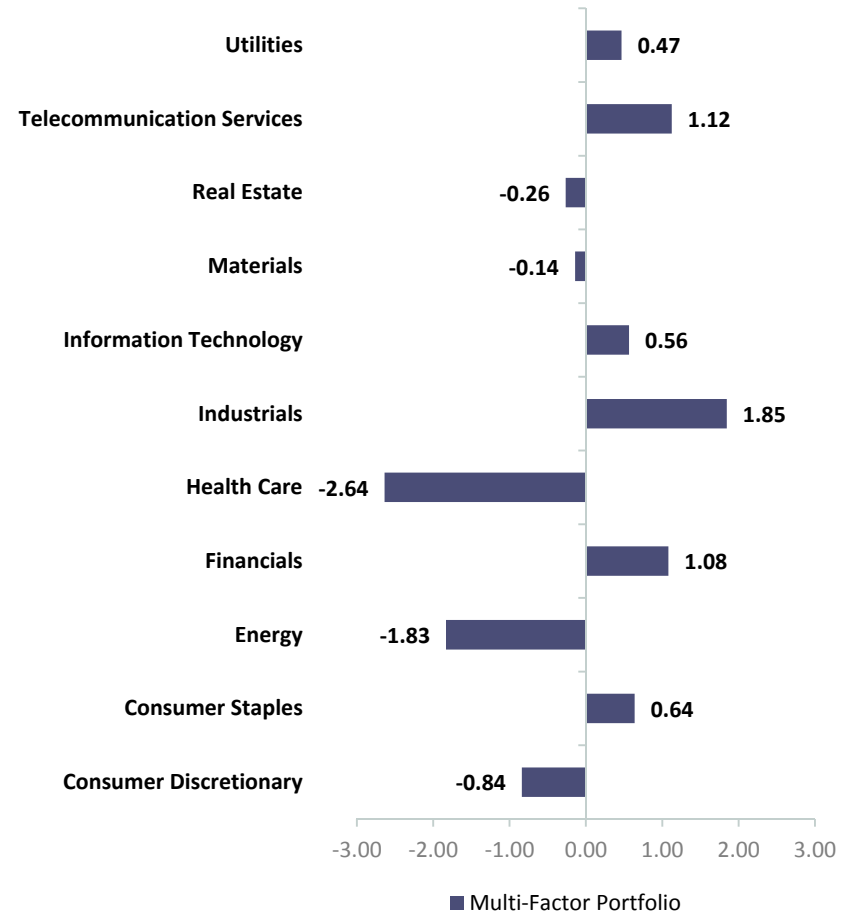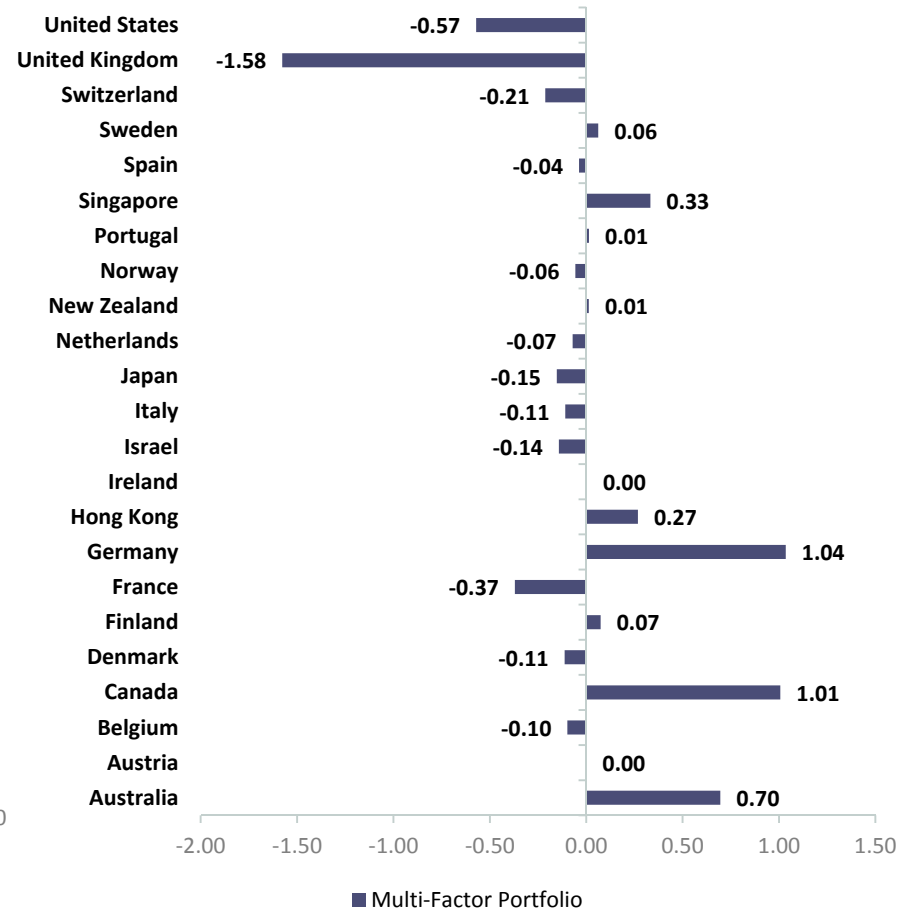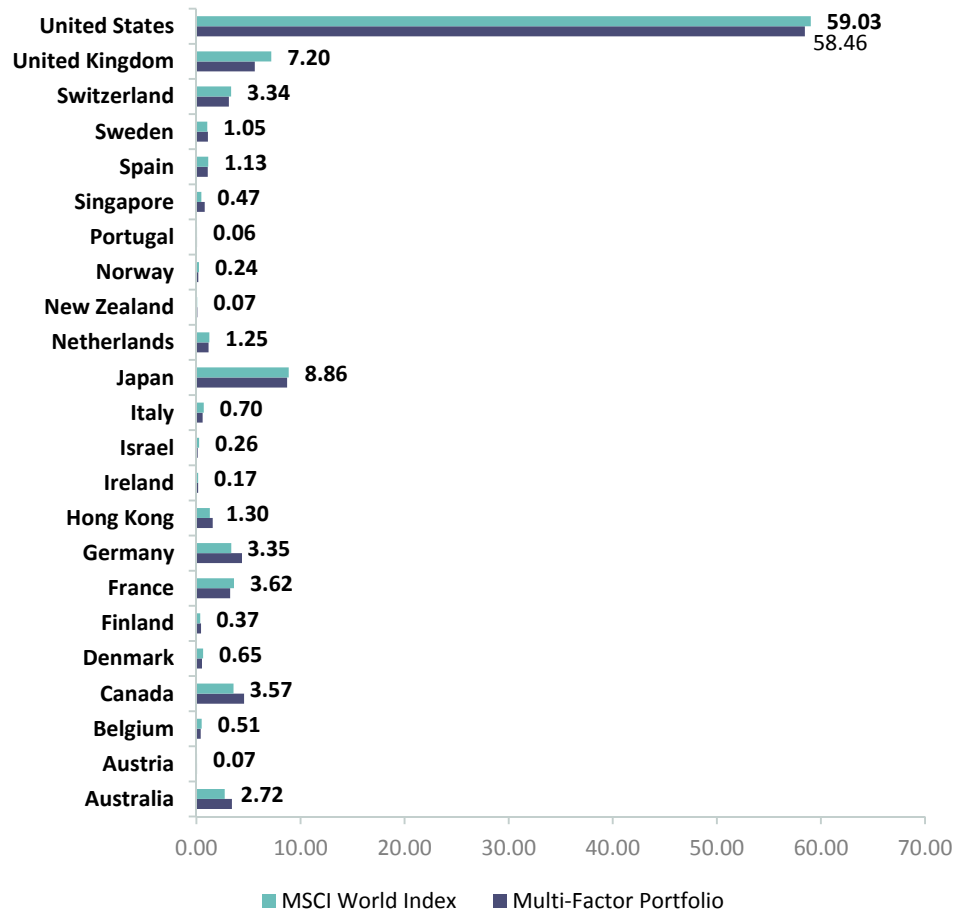| Country	MSCI World Index	Multi-Factor Portfolio
United States	**59.03**	58.46
United Kingdom	**7.20**	
Switzerland	**3.34**	
Sweden	**1.05**	
Spain	**1.13**	
Singapore	**0.47**	
Portugal	**0.06**	
Norway	**0.24**	
New Zealand	**0.07**	
Netherlands	**1.25**	
Japan	**8.86**	
Italy	**0.70**	
Israel	**0.26**	
Ireland	**0.17**	
Hong Kong	**1.30**	
Germany	**3.35**	
France	**3.62**	
Finland	**0.37**	
Denmark	**0.65**	
Canada	**3.57**	
Belgium	**0.51**	
Austria	**0.07**	
Australia	**2.72**	

■ MSCI World Index   ■ Multi-Factor Portfolio

Active Country Weight (%) (As of September 30, 2016)

Country	Multi-Factor Portfolio
United States	-0.57
United Kingdom	-1.58
Switzerland	-0.21
Sweden	0.06
Spain	-0.04
Singapore	0.33
Portugal	0.01
Norway	-0.06
New Zealand	0.01
Netherlands	-0.07
Japan	-0.15
Italy	-0.11
Israel	-0.14
Ireland	0.00
Hong Kong	0.27
Germany	1.04
France	-0.37
Finland	0.07
Denmark	-0.11
Canada	1.01
Belgium	-0.10
Austria	0.00
Australia	0.70

■ Multi-Factor Portfolio

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Conclusion

Multi-Factor Portfolio for Value, Quality, and Momentum

- Captures investment factors in intuitive, transparent, rules-based way
- Factors are supported by robust academic evidence
- The portfolio reflects high quality stocks that are relatively inexpensive and have experienced recent price momentum
- Delivers excess returns with lower volatility relative to the market cap-weighted benchmark over the long run
- However, while long term historical performance is attractive, there are still interim risks
- Empirical evidence, low costs and intuitive arguments suggest opportunities for long-term investors

Past performance is not a guarantee of future results.

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Appendix A: Additional Information

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Portfolio Methodology

How the Quality Score Is Defined

a	**Z-Score for Leverage**

Z-score of leverage =

> normalized leverage score, if the stocks is in the highest Debt-to-Equity quintile
>
> 0, if the stocks is in the other four quintiles ranked by Debt-to-Equity

Histogram of leverage z-score
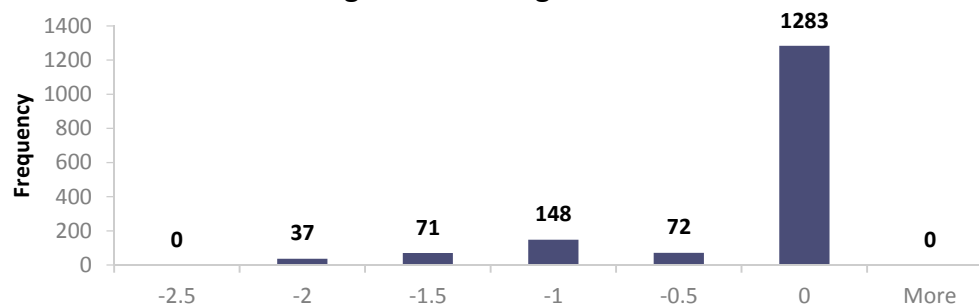
b	**Combine leverage z-score with ROE z-score and earnings variability z-score to form the quality factor score**

Quality score =

> 0.4* ROE z-score + 0.2*Earnings Variability z-score + 0.4*customized leverage z-score, if the stock is in the highest leverage quintile
>
> (2/3)* ROE z-score + (1/3)*Earnings Variability z-score, if the stock is in the other 4 quintiles ranked by leverage

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Appendix B: Important Disclosures

CTA Disclosures

SSGA generally delegates commodities management for separately managed accounts to SSGA FM, a wholly owned subsidiary of State Street and an affiliate of SSGA. SSGA FM is registered as a commodity trading advisor ("CTA") with the Commodity Futures Trading Commission and National Futures Association.

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Derivative investments may involve risks such as potential illiquidity of the markets and additional risk of loss of principal.

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A "quality" style of investing emphasizes companies with high returns, stable earnings, and low financial leverage. This style of investing is subject to the risk that the past performance of these companies does not continue or that the returns on "quality" equity securities are less than returns on other styles of investing or the overall stock market.

The Fund employs a momentum style of investing that emphasizes investing in securities that have had higher recent price performance compared to other securities, which is subject to the risk that these securities may be more volatile and can turn quickly and cause significant variation from other types of investments.

A Smart Beta strategy does not seek to replicate the performance of a specified cap-weighted index and as such may underperform such an index. The factors to which a Smart Beta strategy seeks to deliver exposure may themselves undergo cyclical performance. As such, a Smart Beta strategy may underperform the market or other Smart Beta strategies exposed to similar or other targeted factors. In fact, we believe that factor premia accrue over the long term (5–10 years), and investors must keep that long time horizon in mind when investing.

While diversification does not ensure a profit or guarantee against loss, investors in Smart Beta may diversify across a mix of factors to address cyclical changes in factor performance. However, factors may have high or increasing correlation to each other.

This information is unaudited.

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Appendix C: Biographies

Biographies

Gregory Balewicz

Greg is a Vice President and Senior Relationship Manager for State Street Global Advisors. He is responsible for managing Institutional client relationships located in the Northeastern United States.

Prior to his current role, Greg was a Relationship Manager in SSGA's Private Wealth Management Group where he was responsible for managing relationships for SSGA's RIA and Family Office customers and the consultant community that services them. Before that, Greg held positions in our Client Reporting group and in our New Business Installation Unit. He has been involved in the investment services field since 1996.

Greg holds a Bachelor of Arts degree from Framingham State University and holds the FINRA series 7 and 63 licenses. Greg also holds the NFA Series 3 and is an Associated Person of SSGA Funds Management, Inc. ('SSGA FM') SSGA FM is a Commodity Trading Advisor registered with the Commodity Futures Trading Commission.

Jennifer Bender, PhD

Jennifer Bender, PhD, is a Managing Director at State Street Global Advisors and Director of Research for the Global Equity Beta Solutions team. In this role, she is responsible for promoting the thought leadership of SSGA across key areas of passive investing including smart beta, thematic investing, and global equity investing. Previously, Jenn was a Vice President in the Index and Analytics Research teams at MSCI. In that role, she was responsible for research on equity index-related topics including asset allocation and indexing.

Prior to joining the Index Research team, Ms. Bender worked in the Barra Research group, focusing on portfolio construction and risk modeling. She began her career as an economist at DRI in 1996 and has held research roles at State Street Associates and Harvard University. Jenn holds MS and PhD degrees in Economics from Brandeis University. Her work has been published extensively in industry-leading journals and books such as the Institutional Investor Journals and Wiley Finance Series. She is on the Editorial Board of the Journal of Portfolio Management and a member of the Chicago Quantitative Alliance.