Avantis Investors®
By American Century Investments®

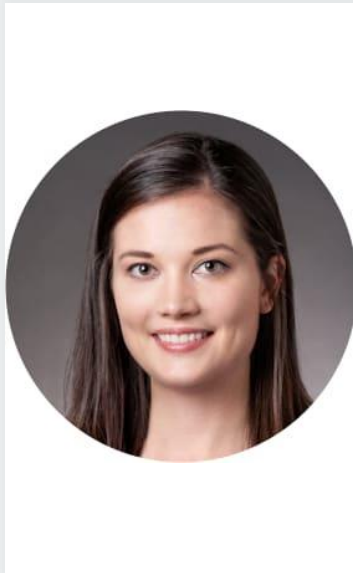# Where Can Indexes and Factors Fall Short?

May 23, 2024

Ted Randall

Senior Portfolio Manager

Your DFW Avantis Team

Spenser Sydow

Relationship Director

213-992-9006

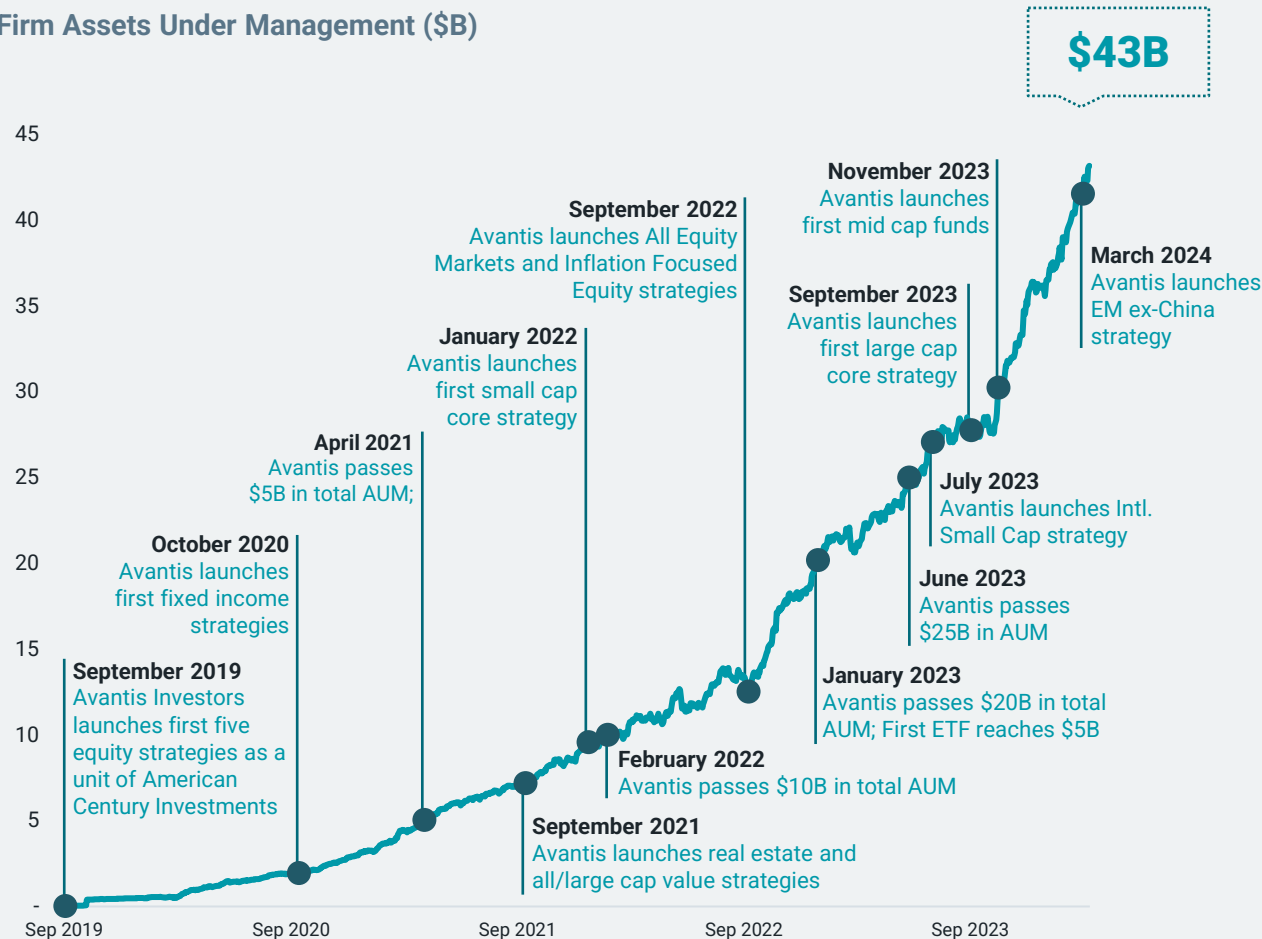Spenser.Sydow@avantisinvestors.com

Daniel Sharplin, CFP®

Relationship Director

213-992-9033

Daniel.Sharplin@avantisinvestors.com

Avantis Investors®
By American Century Investments®

Avantis Investors From Launch to Today

Firm Assets Under Management ($B)

$43B

November 2023
Avantis launches first mid cap funds

September 2022
Avantis launches All Equity Markets and Inflation Focused Equity strategies

September 2023
Avantis launches first large cap core strategy

March 2024
Avantis launches EM ex-China strategy

January 2022
Avantis launches first small cap core strategy

April 2021
Avantis passes $5B in total AUM;

July 2023
Avantis launches Intl. Small Cap strategy

October 2020
Avantis launches first fixed income strategies

June 2023
Avantis passes $25B in AUM

September 2019
Avantis Investors launches first five equity strategies as a unit of American Century Investments

January 2023
Avantis passes $20B in total AUM; First ETF reaches $5B

February 2022
Avantis passes $10B in total AUM

September 2021
Avantis launches real estate and all/large cap value strategies

Chart Y-axis: 45, 40, 35, 30, 25, 20, 15, 10, 5, -

Chart X-axis: Sep 2019, Sep 2020, Sep 2021, Sep 2022, Sep 2023

Data as of 3/31/2024.

March 31, 2024
Avantis Investors

- $43.2 B total AUM
- $4.4B net flows YTD 2024
- 28 strategies
  - 22 equity
  - 3 fixed income
  - 2 real assets
  - 1 global balanced
- 17 strategies over $100M
- 3,500+ institutional and advisory clients

Agenda

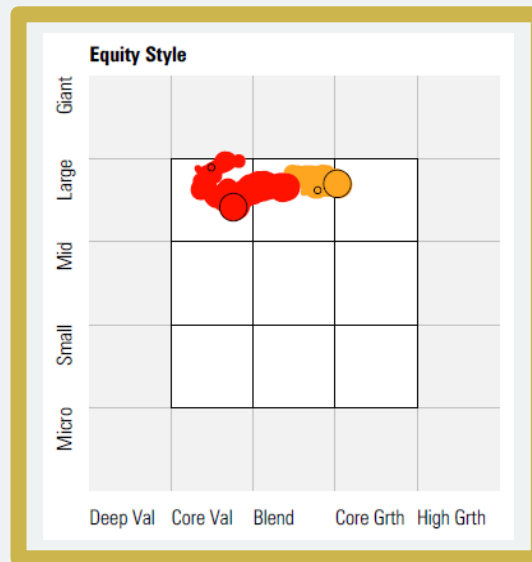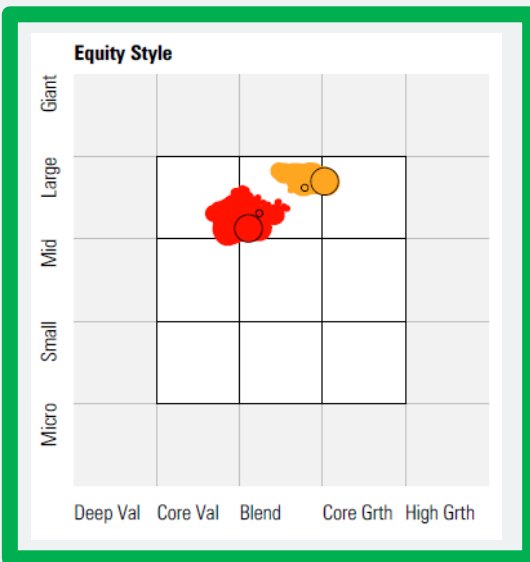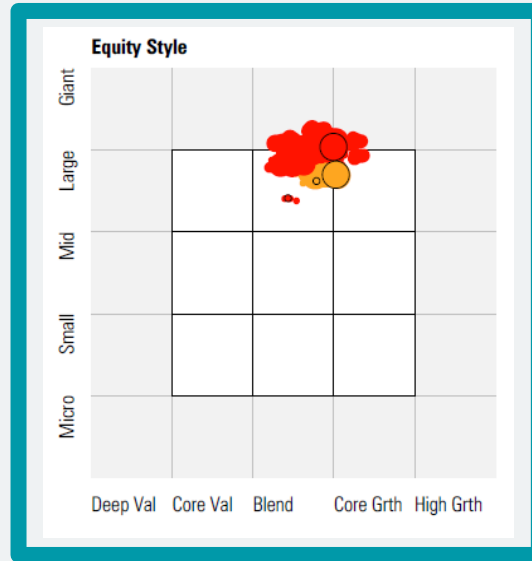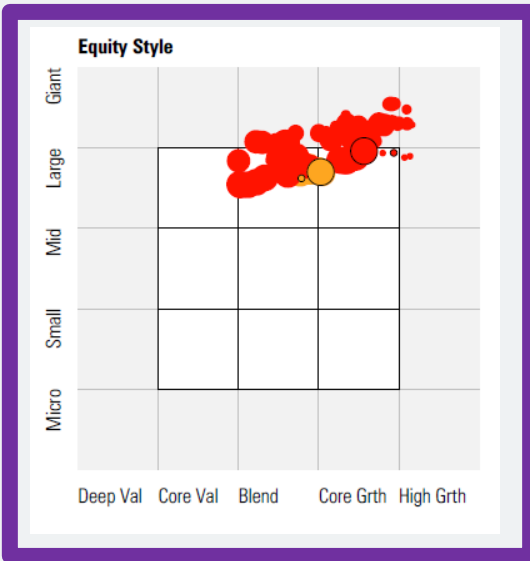**1** Some Factor Trivia

2 Design and Implementation Issues

3 Factors vs. Fundamentals

4 Thinking About Factors as an Allocator

Avantis Investors®
By American Century Investments®

Some Factor Trivia

Guess the Factors Being Displayed in Red

Momentum

Low Volatility

Value

Quality

Equal Weight

Multi-factor

🟡 Russell 3000 Index

Avantis Investors®
By American Century Investments®

Guess the Factors Being Displayed in Red

Momentum

Low Volatility

Value

Quality

Equal Weight

Multi-factor

🟡 Russell 3000 Index

Avantis Investors®
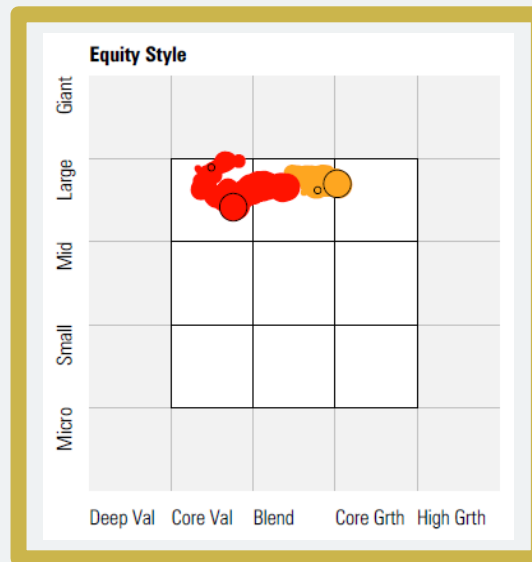By American Century Investments®

Guess the Factors Being Displayed in Red

Momentum

Low Volatility

Value

Quality

Equal Weight

Multi-factor

🟡 Russell 3000 Index

Avantis Investors®
By American Century Investments®

Guess the Factors Being Displayed in Red

Momentum

Low Volatility

Value

Quality

Equal Weight

Multi-factor

🟡 Russell 3000 Index

Avantis Investors®
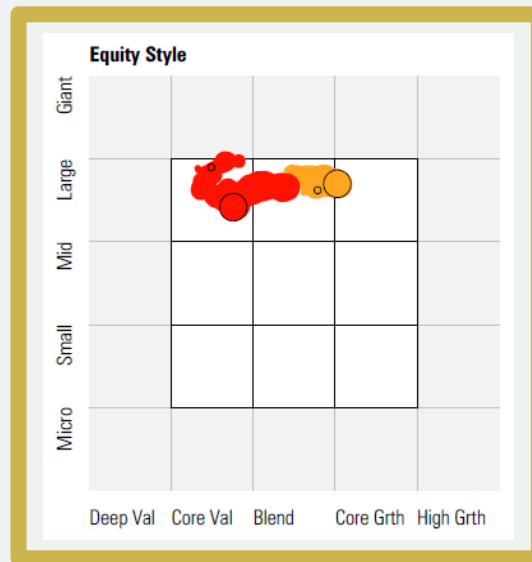By American Century Investments®

Guess the Factors Being Displayed in Red

Momentum

Low Volatility

Value

Quality

Equal Weight

Multi-factor

🟡 Russell 3000 Index

Avantis Investors®
By American Century Investments®

Choosing Factors

Which of these indexes has the highest active share with the S&P 500 Index?

a. S&P 500 Value Index
b. S&P 500 Momentum Index
c. S&P 500 Quality Index
d. S&P 500 Equal Weighted Index
e. S&P 500 Low Volatility Index
f. S&P 500 Quality Value Momentum Index

Avantis Investors®
By American Century Investments®

Choosing Factors

Which of these indexes has the highest active share with the S&P 500 Index?

a. S&P 500 Value Index
b. S&P 500 Momentum Index
c. S&P 500 Quality Index
d. S&P 500 Equal Weighted Index
e. S&P 500 Low Volatility Index (78%)
f. S&P 500 Quality Value Momentum Index

Avantis Investors®
By American Century Investments®

Choosing Factors

Which of these indexes has the lowest active share with the S&P 500 Index?

a. S&P 500 Value Index
b. S&P 500 Momentum Index
c. S&P 500 Quality Index
d. S&P 500 Equal Weighted Index
e. S&P 500 Low Volatility Index
f. S&P 500 Quality Value Momentum Index

Choosing Factors

Which of these indexes has the lowest active share with the S&P 500 Index?

a. S&P 500 Value Index (43%)
b. S&P 500 Momentum Index (75%)
c. S&P 500 Quality Index (62%)
d. S&P 500 Equal Weighted Index (51%)
e. S&P 500 Low Volatility Index (78%)
f. S&P 500 Quality Value Momentum Index (7%)

Issues in Design and Implementation

Avantis Investors®
By American Century Investments®

What's Driven the Growth in Indexing?

Non-total market index funds capture the majority of index fund assets
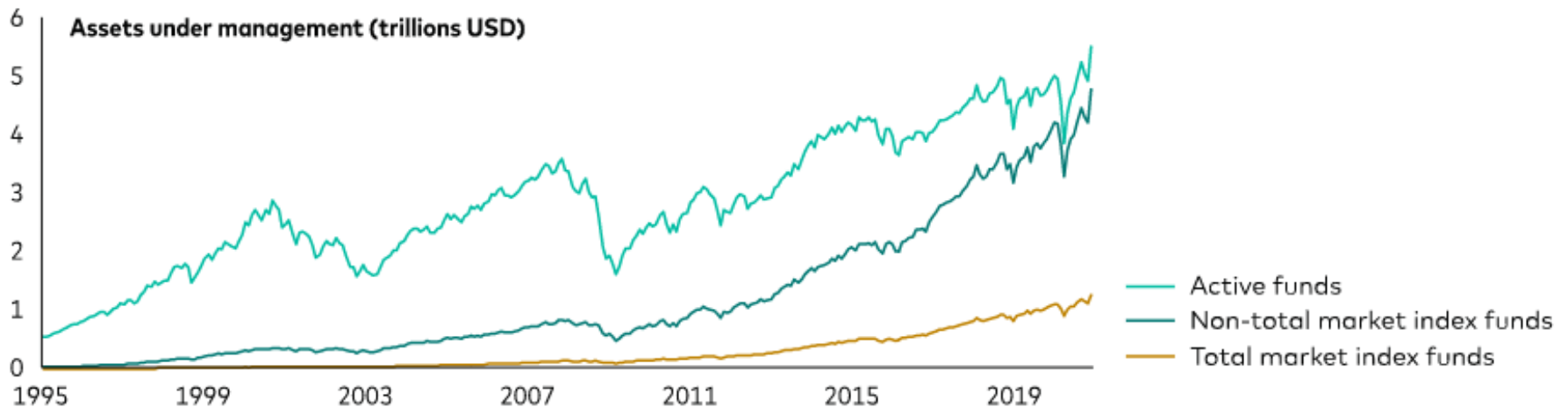
Notes: The chart shows the development of assets under management in the categories of non-total market index funds, total market index funds, and active funds. Time period observed: January 1995 to December 2020.

Sources: Vanguard calculations, based on data from Morningstar, Inc.

Source: https://corporate.vanguard.com/content/corporatesite/us/en/corp/articles/new-form-of-active-investing.html

Avantis Investors®
By American Century Investments®

What is Truly "Passive"?

In "Truly Passive" there is no security selection

**Market Portfolio =
Only Truly Passive**

Once we deviate from the market, "someone" is selecting securities

Market Capitalization Asset Class Indexing	Strategic Beta	Active
=	=	=
Security Selection by Index House	Rules-Based Active Screening/Weighting	Rules-Based and/or Discretionary Active Screening Weighting
+	+	+
Passive Implementation	Passive Implementation	Active Implementation

Active/Strategic Beta/Passive Framework is credited to Ben Johnson at Morningstar.

Avantis Investors®
By American Century Investments®

What's in a Name?

U.S. Large Cap Value Index Returns (%) Ranked from Highest to Lowest (2009-2023)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	FULL PERIOD
	S&P	Wilshire	Wilshire	S&P	CRSP	Russell	Wilshire	Morningstar	CRSP	CRSP	S&P	Wilshire	CRSP	Morningstar	S&P	S&P 500 Value **12.17**
	Russell	CRSP	CRSP	Russell	Russell	CRSP	CRSP	S&P	Wilshire	Wilshire	Wilshire	Russell	MSCI	CRSP	Morningstar	CRSP US Large Cap Value **12.04**
	CRSP	Russell	Morningstar	CRSP	S&P	Wilshire	Morningstar	Russell	S&P	Morningstar	Russell	CRSP	Russell	S&P	Russell	Wilshire US Large Value **11.71**
	Wilshire	Morningstar	MSCI	Wilshire	Morningstar	S&P	MSCI	CRSP	MSCI	MSCI	CRSP	S&P	S&P	Wilshire	CRSP	Russell 1000 Value **11.09**
	MSCI	S&P	Russell	Morningstar	MSCI	MSCI	S&P	MSCI	Morningstar	Russell	Morningstar	MSCI	Wilshire	MSCI	Wilshire	Morningstar US LM Value **10.91**
	Morningstar	MSCI	S&P	MSCI	Wilshire	Morningstar	Russell	Wilshire	Russell	S&P	MSCI	Morningstar	Morningstar	Russell	MSCI	MSCI USA Value **10.01**
MAX - MIN RETURN																

U.S. Small Cap Value Index Returns (%) Ranked from Highest to Lowest (2009-2023)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	FULL PERIOD
	Morningstar	CRSP	CRSP	Wilshire	S&P	CRSP	Wilshire	Russell	CRSP	Wilshire	S&P	Wilshire	Morningstar	Morningstar	CRSP	CRSP US Small Cap Value **13.42**
	CRSP	Wilshire	S&P	CRSP	CRSP	Morningstar	CRSP	S&P	S&P	CRSP	Wilshire	CRSP	S&P	CRSP	Wilshire	Wilshire US Small Value **12.22**
	Wilshire	Morningstar	Morningstar	Morningstar	Morningstar	Wilshire	MSCI	Morningstar	MSCI	S&P	CRSP	Russell	MSCI	MSCI	S&P	Morningstar US Small Value **12.08**
	MSCI	S&P	MSCI	S&P	Russell	S&P	S&P	Wilshire	Morningstar	Russell	Russell	S&P	Wilshire	S&P	MSCI	S&P SmallCap 600 Value **12.02**
	S&P	Russell	Wilshire	Russell	Wilshire	MSCI	Russell	MSCI	Russell	MSCI	MSCI	MSCI	Russell	Wilshire	Russell	MSCI US Small Cap Value **10.81**
	Russell	MSCI	Russell	MSCI	MSCI	Russell	Morningstar	CRSP	Wilshire	Morningstar	Morningstar	Morningstar	CRSP	Russell	Morningstar	Russell 2000 Value **10.27**
MAX - MIN RETURN																

Avantis Investors®
By American Century Investments®

18

What's in a Name? Answer: Not Enough

U.S. Large Cap Value Index Returns (%) Ranked from Highest to Lowest (2009-2023)

Rank	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	S&P 21.18	Wilshire 16.56	Wilshire 3.74	S&P 17.68	CRSP 33.34	Russell 13.45	Wilshire -0.79	Morningstar 20.01	CRSP 17.16	CRSP -5.40	S&P 31.93	Wilshire 7.37	CRSP 26.51	Morningstar -0.35	S&P 22.23
2	Russell 19.69	CRSP 16.06	CRSP 1.43	Russell 17.51	Russell 32.53	CRSP 13.29	CRSP -0.86	S&P 17.40	Wilshire 16.31	Wilshire -5.94	Wilshire 27.72	Russell 2.80	MSCI 26.29	CRSP -2.01	Morningstar 11.76
3	CRSP 18.42	Russell 15.51	Morningstar 1.35	CRSP 16.71	S&P 31.99	Wilshire 13.00	Morningstar -2.13	Russell 17.34	S&P 15.36	Morningstar -6.90	Russell 26.54	CRSP 2.26	Russell 25.16	S&P -5.22	Russell 11.46
4	Wilshire 16.98	Morningstar 15.17	MSCI 0.64	Wilshire 14.56	Morningstar 31.78	S&P 12.36	MSCI -2.82	CRSP 16.93	MSCI 14.42	MSCI -7.96	CRSP 25.85	S&P 1.36	S&P 24.90	Wilshire -5.51	CRSP 9.17
5	MSCI 16.91	S&P 15.10	Russell 0.39	Morningstar 14.06	MSCI 31.22	MSCI 11.36	S&P -3.13	MSCI 15.83	Morningstar 14.25	Russell -8.27	Morningstar 25.53	Morningstar 0.05	Wilshire 24.53	MSCI -6.96	Wilshire 9.17
6	Morningstar 16.39	MSCI 13.46	S&P -0.48	MSCI 13.96	Wilshire 30.24	Morningstar 9.37	Russell -3.83	Wilshire 15.44	Russell 13.66	S&P -8.95	MSCI 24.61	MSCI -1.65	Morningstar 23.28	Russell -7.54	MSCI 8.35
MAX - MIN RETURN	4.78	3.10	4.22	3.72	3.10	4.08	3.04	4.57	3.49	3.55	7.31	9.01	3.24	7.18	**13.88**

FULL PERIOD

Index	Return
S&P 500 Value	12.17
CRSP US Large Cap Value	12.04
Wilshire US Large Value	11.71
Russell 1000 Value	11.09
Morningstar US LM Value	10.91
MSCI USA Value	10.01
MAX - MIN RETURN	2.16

U.S. Small Cap Value Index Returns (%) Ranked from Highest to Lowest (2009-2023)

Rank	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	Morningstar 40.28	CRSP 27.18	CRSP 0.01	Wilshire 21.52	S&P 39.98	CRSP 10.63	Wilshire -4.36	Russell 31.74	CRSP 11.83	Wilshire -12.04	S&P 24.54	Wilshire 6.16	Morningstar 31.79	Morningstar -6.60	CRSP 15.91
2	CRSP 37.81	Wilshire 26.76	S&P -1.38	CRSP 20.50	CRSP 38.47	Morningstar 10.03	CRSP -4.64	S&P 31.32	S&P 11.51	CRSP -12.27	Wilshire 23.08	CRSP 5.75	S&P 30.95	CRSP -9.27	Wilshire 15.35
3	Wilshire 37.45	Morningstar 25.96	Morningstar -1.84	Morningstar 18.30	Morningstar 35.71	Wilshire 9.09	MSCI -5.89	Morningstar 27.96	MSCI 8.44	S&P -12.64	CRSP 22.76	Russell 4.63	MSCI 29.77	MSCI -10.33	S&P 14.89
4	MSCI 29.21	S&P 24.72	MSCI -4.72	S&P 18.21	Russell 34.52	S&P 7.54	S&P -6.67	Wilshire 27.68	Morningstar 8.40	Russell -12.86	Russell 22.39	S&P 2.53	Wilshire 29.24	S&P -11.04	MSCI 14.77
5	S&P 22.85	Russell 24.50	Wilshire -5.34	Russell 18.05	Wilshire 33.80	MSCI 6.64	Russell -7.47	MSCI 26.62	Russell 7.84	MSCI -13.60	MSCI 21.27	MSCI 1.20	Russell 28.27	Wilshire -14.22	Russell 14.65
6	Russell 20.58	MSCI 24.21	Russell -5.50	MSCI 17.69	MSCI 32.73	Russell 4.22	Morningstar -8.65	CRSP 24.82	Wilshire 7.42	Morningstar -16.61	Morningstar 19.96	Morningstar 1.01	CRSP 28.15	Russell -14.48	Morningstar 14.58
MAX - MIN RETURN	**19.70**	2.97	5.51	3.82	7.25	6.41	4.28	6.92	4.41	4.57	4.57	5.16	3.64	7.88	1.33

FULL PERIOD

Index	Return
CRSP US Small Cap Value	13.42
Wilshire US Small Value	12.22
Morningstar US Small Value	12.08
S&P SmallCap 600 Value	12.02
MSCI US Small Cap Value	10.81
Russell 2000 Value	10.27
MAX - MIN RETURN	3.15

Avantis Investors®
By American Century Investments®

Multi-Factor Faces Similar Labeling Issues

Russell 1000 Dynamic Multifactor Index
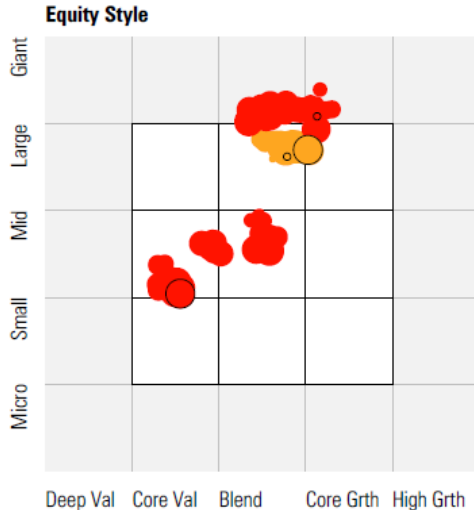
STOXX U.S. Equity Factor Index
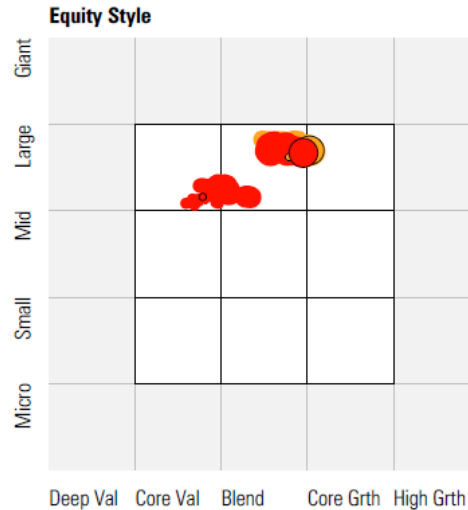
JPMorgan Diversified Factor US Equity Index
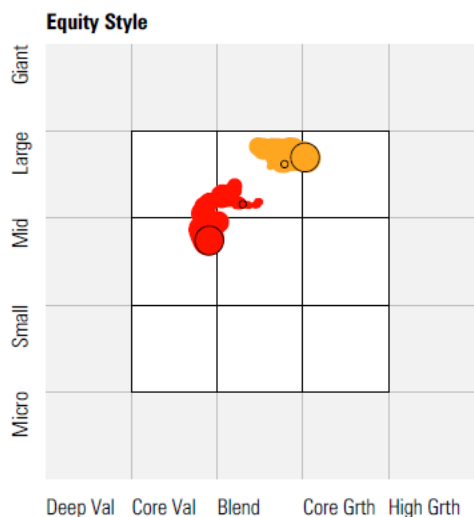
S&P 500 QVM Top 90% MF Index
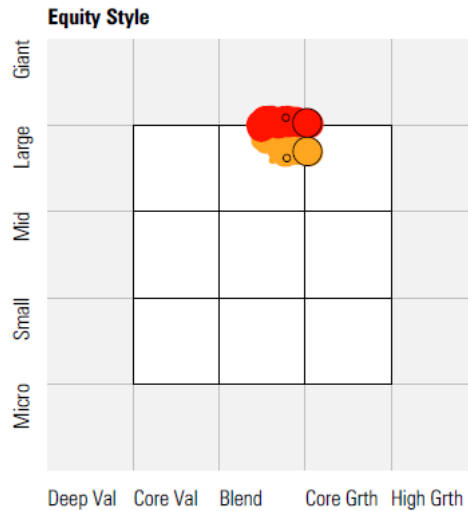
These are all holdings-based style trails of multi-factor index-based strategies with large cap core benchmarks.

- Active share versus the Russell 1000 Index ranges from **7%** to **94%**

- Number of holdings ranged from **<200** to **>700**

- 2023 turnover ranged from **20%** to **350%**

- Realized annualized tracking error versus the Russell 1000 Index over the last 5 years ranged from **<2%** to **>7%**

Avantis Investors®
By American Century Investments®

Pre-Launch vs. Post-Launch

Index Excess Total Return Prior to Fund Launch

Number of Indexes

Annualized Excess Total Return (%)
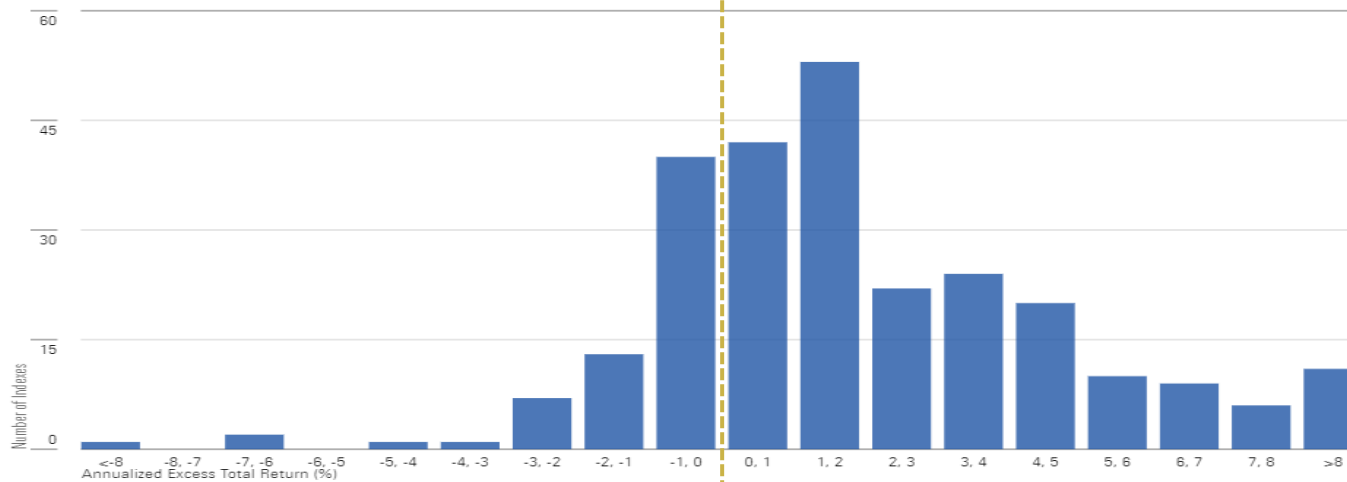
Index Excess Total Return After Fund Launch

Number of Indexes

Annualized Excess Total Return (%)
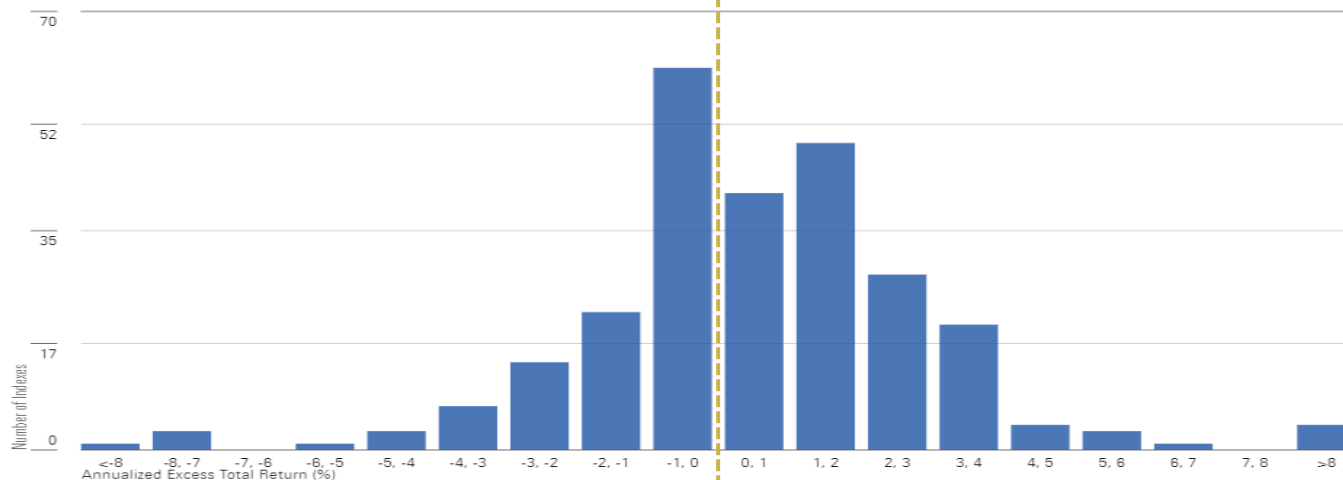
Research from Morningstar shows how indexes that index funds are tracking have performed pre- fund launch and post- fund launch.

- **75% of indexes** beat their Morningstar Category Index over the five years prior to the fund launch, with a median outperformance of **140 bps per year**.

- In the five years following launch, those numbers shrank to **57% and 39 bps per year**.

Source: *Mining for Alpha With Index Funds, Dan Sotiroff (Morningstar), July 2023*

Avantis Investors®
By American Century Investments®

What is Truly "Passive"?

How should we distinguish between active and passive?

Market Capitalization Asset Class Indexing	Strategic Beta	Active	
=	=	=	
Security Selection by Index House	Rules-Based Active Screening/Weighting	Rules-Based and/or Discretionary Active Screening Weighting	The Market is the only truly "passive" portfolio
+	+	+	
Passive Implementation	Passive Implementation	Active Implementation	
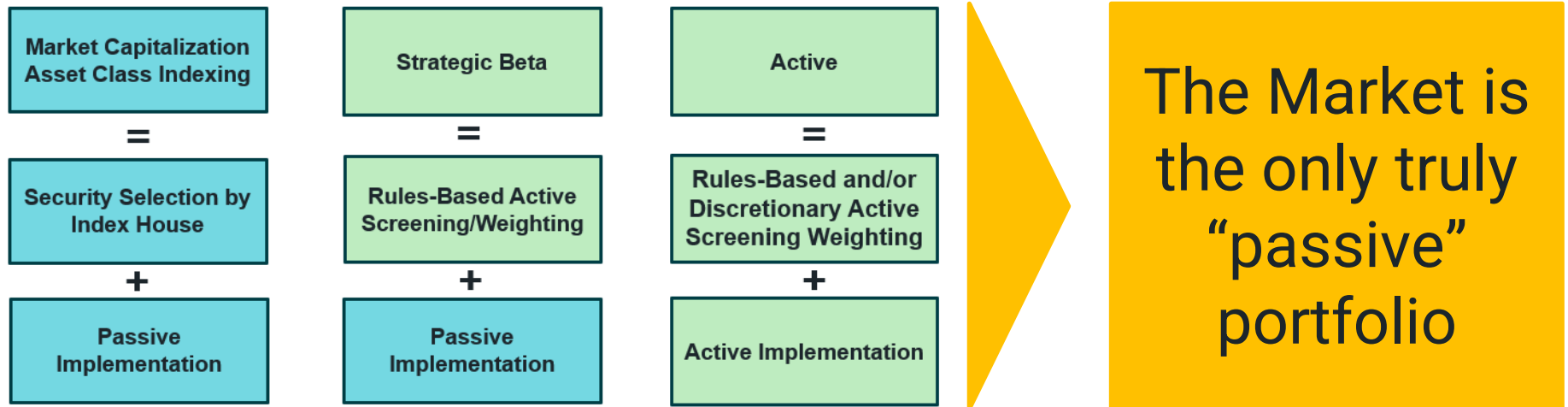
Once we move away from the market, "someone" is selecting securities.

Stock selection and implementation matter!!!

Active/Strategic Beta/Passive Framework is credited to Ben Johnson at Morningstar.

Avantis Investors®
By American Century Investments®

Factors vs. Fundamentals

The Factor Craze – Evolution

In what year was the first single-factor model developed?

a. 1949
b. 1964
c. 1981
d. 1993

The Factor Craze – Evolution

In what year was the first single-factor model developed?

a. 1949

b. 1964 – CAPM (Sharpe)

c. 1981

d. 1993

Avantis Investors®
By American Century Investments®

The Factor Craze – Evolution

How many factors have been documented today?

a. 100
b. 200
c. 400
d. 1,000

Avantis Investors®
By American Century Investments®

The Factor Craze – Evolution

How many factors have been documented today?

a. 100
b. 200
c. **400 – *A Census of the Factor Zoo* (Harvey/Liu, 2019)**
d. 1,000

Avantis Investors®
By American Century Investments®

400 Factors...and Counting

Data availability has allowed researchers and practitioners to "search" for patterns using historical data

- most of these patterns have no reason to exist – they happened randomly in the past

- Some factors provide benefits (but not increased expected returns), e.g. Low volatility

- Some factors may not be directly implementable but can enhance expected returns, e.g. momentum

What should investors do to cut through the factor noise?

See A Census of the Factor Zoo, Harvey/Liu (2019)

Avantis Investors®
By American Century Investments®

We Should Consider Valuation

Use the learnings from asset pricing and factor research but within a valuation framework.

Price = Equity + $\dfrac{\text{Profits}}{\text{Discount Rate}}$	$\dfrac{\text{Equity}}{\text{Price}}$ AND $\dfrac{\text{Profits}}{\text{Equity}}$
Expected returns (discount rates) are a function of:	**Differences in expected returns across securities are captured in valuation ratios**
Prices	**Need to define**
Current equity	**Equity (modified B/M)**
Expected profits	**Profits (cash-based operating profitability)**

Goal is to find reliable proxies for equity and profits that incorporate enhancements to have a more robust approach.

Avantis Investors®
By American Century Investments®

Implications for Expected Returns

Book-to-Market (left grid)

	Low			High
High Profitability			green	High E(R) (green)
				green
	red			
Low	Low E(R) (red)	red		

Book-to-Market (right grid)

	Low			High
High Profitability	orange	orange		
	orange			
				High-Low (tan)
Low			tan	tan

	All Companies	Low-Low	High-High	Low-High	High-Low
Large Caps	12.12	10.63	16.27	12.15	11.92
Mid Caps	13.47	11.18	17.13	13.13	13.07
Small Caps	14.32	8.53	19.44	14.66	15.02
Premium vs. Market		▬	✚	═	═

Source: Avantis Investors and Sunil Wahal, CRSP/Compustat, US Securities, 1973-2023.

What Exposure do Indexes and Factors Offer Through The Lens of Fundamentals?

What Exposure Do Factor Indexes Offer?

Russell 1000 Index
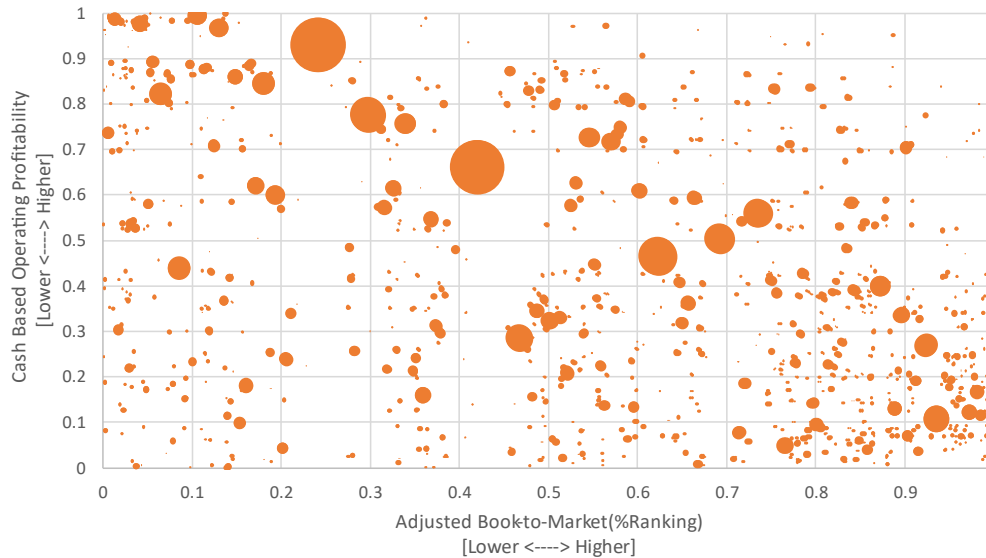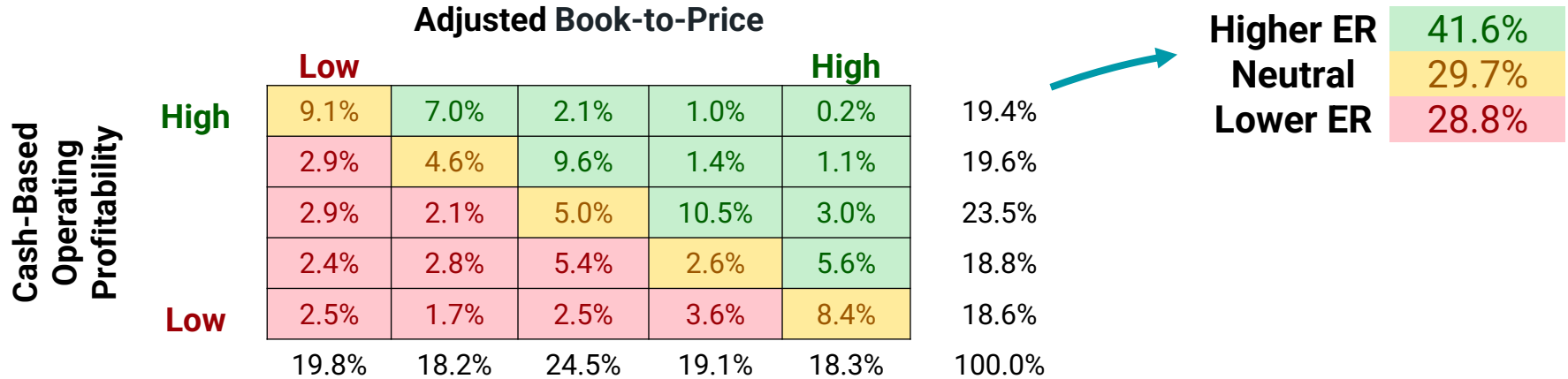
Adjusted Book-to-Price

	Low				High	
High	9.1%	7.0%	2.1%	1.0%	0.2%	19.4%
	2.9%	4.6%	9.6%	1.4%	1.1%	19.6%
	2.9%	2.1%	5.0%	10.5%	3.0%	23.5%
	2.4%	2.8%	5.4%	2.6%	5.6%	18.8%
Low	2.5%	1.7%	2.5%	3.6%	8.4%	18.6%
	19.8%	18.2%	24.5%	19.1%	18.3%	100.0%

Cash-Based Operating Profitability (vertical axis label)

Higher ER	41.6%
Neutral	29.7%
Lower ER	28.8%

Cash Based Operating Profitability [Lower <----> Higher]

Adjusted Book-to-Market(%Ranking) [Lower <----> Higher]

Avantis Investors®
By American Century Investments®

What Exposure Do Factor Indexes Offer?

S&P 500 Value Index

	Low				High	
Adjusted BtM						
7.7%	0.3%	2.8%	1.2%	0.4%	12.4%
3.8%	1.9%	3.8%	1.9%	2.1%	13.5%
4.1%	3.0%	5.6%	3.8%	4.8%	21.3%
4.0%	2.6%	5.1%	2.9%	10.4%	25.0%
3.3%	0.2%	2.9%	5.3%	16.2%	27.8%
22.8%	8.1%	20.2%	15.1%	33.8%	100.0%

Cash Based Operating Profitability (High / Low)
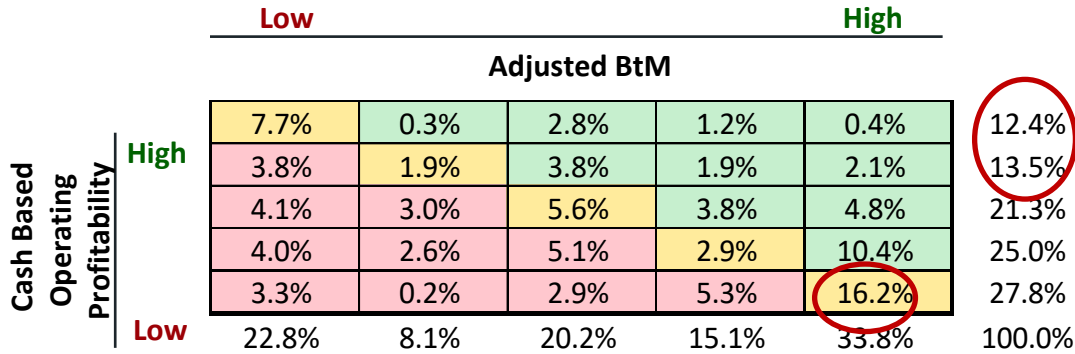
Higher ER	31.5%
Neutral	34.2%
Lower ER	34.2%

Russell 1000 Index
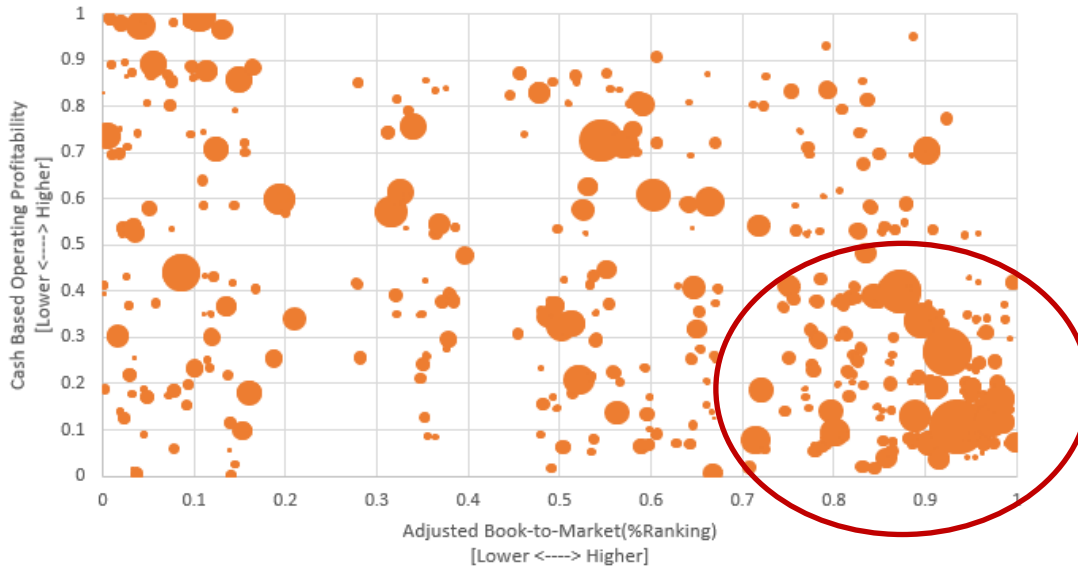
Higher ER	41.6%
Neutral	29.7%
Lower ER	28.8%

Source: Avantis Investors, data from Bloomberg as of December 31, 2023

Avantis Investors®
By American Century Investments®

What Exposure Do Factor Indexes Offer?

Russell 1000 Value Index
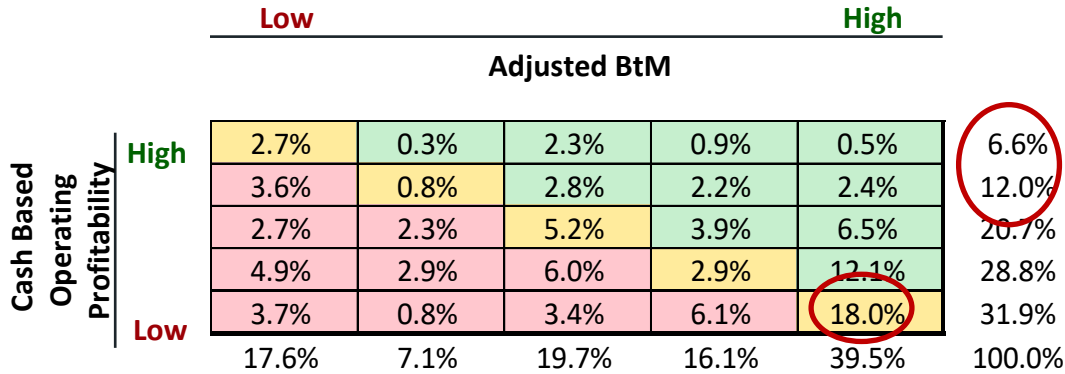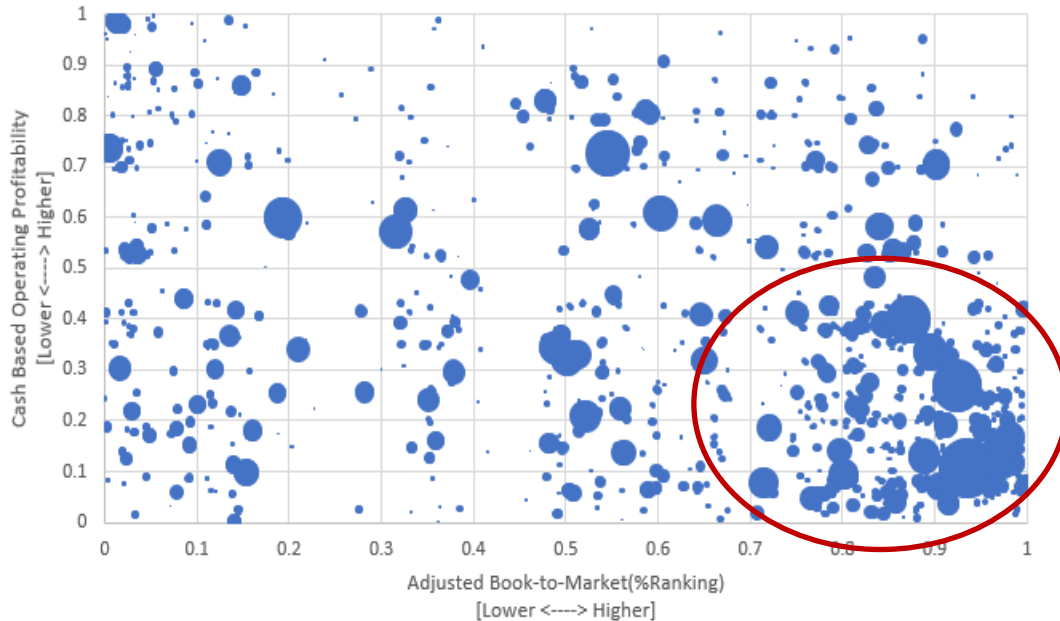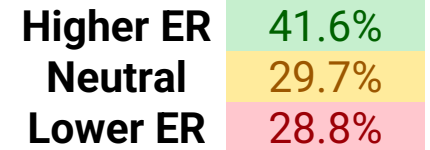
Adjusted BtM

	Low				High	
High	2.7%	0.3%	2.3%	0.9%	0.5%	6.6%
	3.6%	0.8%	2.8%	2.2%	2.4%	12.0%
	2.7%	2.3%	5.2%	3.9%	6.5%	20.7%
	4.9%	2.9%	6.0%	2.9%	12.1%	28.8%
Low	3.7%	0.8%	3.4%	6.1%	18.0%	31.9%
	17.6%	7.1%	19.7%	16.1%	39.5%	100.0%

Cash Based Operating Profitability

Higher ER	34.0%
Neutral	29.7%
Lower ER	36.3%

Russell 1000 Index

Higher ER	41.6%
Neutral	29.7%
Lower ER	28.8%

Cash Based Operating Profitability [Lower <----> Higher]

Adjusted Book-to-Market(%Ranking) [Lower <----> Higher]

Source: Avantis Investors, data from Bloomberg as of December 31, 2023

Avantis Investors®
By American Century Investments®

What Exposure Do Factor Indexes Offer?

Value Factor Index

Adjusted BtM

Low ————————————————— High

High	1.0%	0.2%	3.8%	0.2%	-	5.2%
	5.0%	0.1%	3.1%	0.1%	4.4%	12.7%
	-	5.2%	1.8%	3.4%	10.5%	20.8%
	5.0%	0.6%	0.6%	4.3%	18.8%	29.4%
Low	3.0%	-	1.0%	5.6%	22.4%	31.9%
	14.0%	6.1%	10.3%	13.6%	56.0%	100.0%

Cash Based Operating Profitability

Higher ER	44.5%
Neutral	29.6%
Lower ER	25.9%

Russell 1000 Index
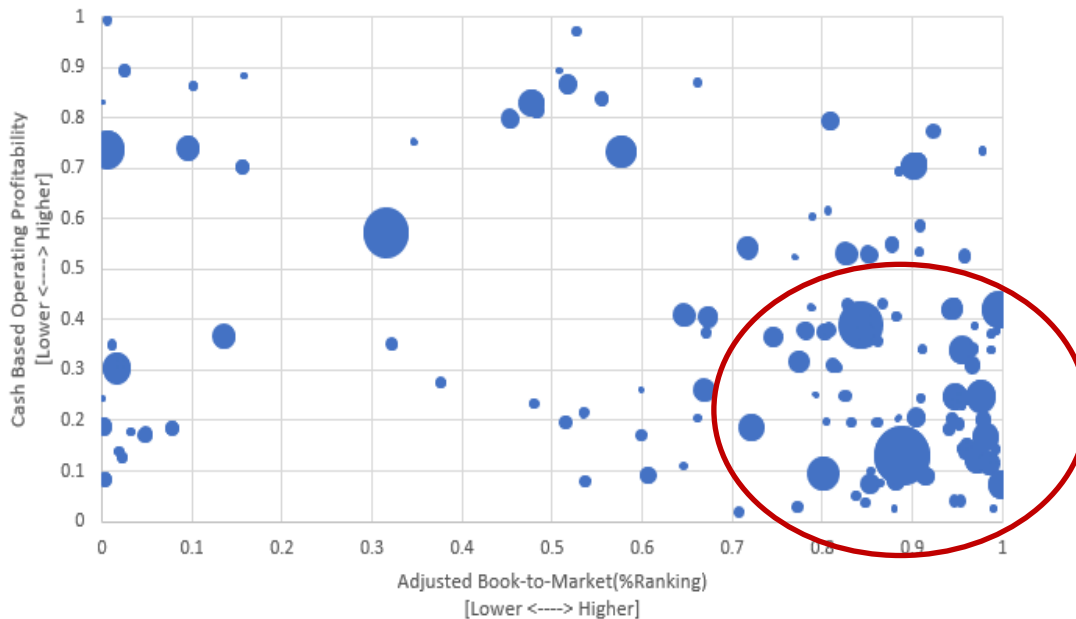
Higher ER	41.6%
Neutral	29.7%
Lower ER	28.8%

Cash Based Operating Profitability [Lower <----> Higher]

Adjusted Book-to-Market(%Ranking) [Lower <----> Higher]

Source: Avantis Investors, data from Bloomberg as of December 31, 2023

Avantis Investors®
By American Century Investments®

What Exposure Do Factor Indexes Offer?

Quality Factor Index

Adjusted BtM

Low — High

High	21.4%	6.5%	4.6%	0.9%	-	33.4%
	2.5%	11.6%	12.4%	1.8%	0.6%	29.0%
	3.2%	4.4%	4.7%	7.4%	3.5%	23.2%
	-	0.2%	2.8%	3.8%	3.7%	10.5%
Low	-	-	0.3%	2.3%	1.4%	4.0%
	27.2%	22.6%	24.7%	16.3%	9.1%	100.0%

Cash Based Operating Profitability (left axis)
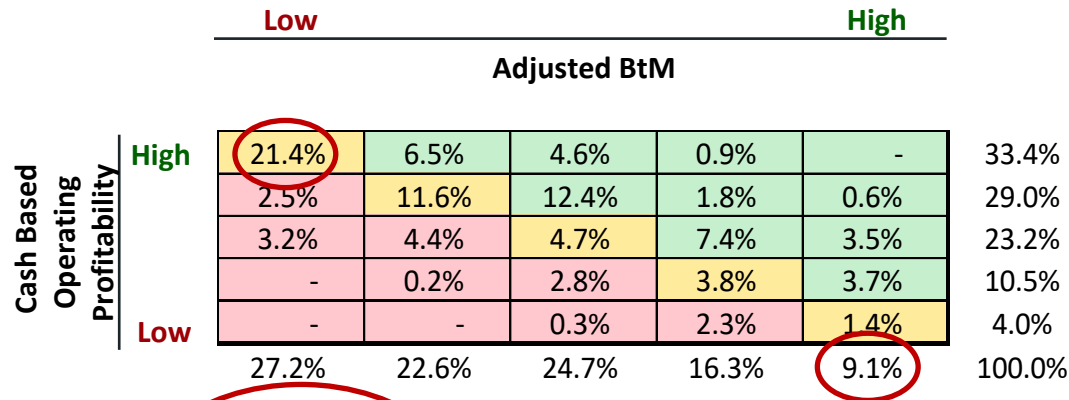
Higher ER	**41.4%**
Neutral	**42.8%**
Lower ER	**15.8%**

Russell 1000 Index
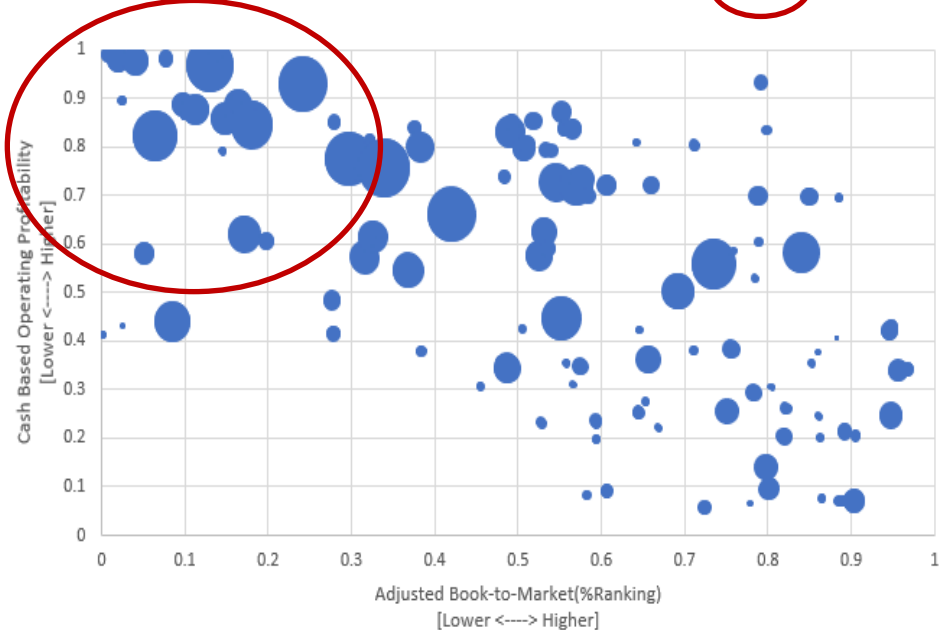
Higher ER	**41.6%**
Neutral	**29.7%**
Lower ER	**28.8%**

Cash Based Operating Profitability [Lower <---> Higher]

Adjusted Book-to-Market(%Ranking)
[Lower <----> Higher]

Avantis Investors®
By American Century Investments®

What Issues Do Factor Indexes Face?

Let's see the effects of deviating from the market

U.S. Companies Sorted by Profitability and Book-to-Price

		Adjusted Book-to-Price					
		Low				**High**	
	High	8.9%	6.8%	2.2%	1.1%	0.3%	19.2%
		3.0%	4.6%	9.2%	1.5%	1.2%	19.4%
Cash-Based Operating Profitability		2.8%	2.1%	5.1%	10.2%	3.3%	23.5%
		2.5%	2.9%	5.3%	2.7%	5.8%	19.1%
	Low	2.5%	1.8%	2.6%	3.6%	8.1%	18.7%
		19.6%	18.1%	24.5%	19.1%	18.7%	100.0%

Source: Avantis, Bloomberg, U.S. companies represented by the Russell 3000 Index, December 31, 2023

Avantis Investors®
By American Century Investments®

What Issues Do Factor Indexes Face?

Shifting an allocation towards high B/P produces a shift to companies with low profitability.

Companies with High B/P tend to have Low Profitability

U.S. Companies Sorted by Profitability and Book-to-Price

	Adjusted Book-to-Price				
	Low				**High**
High	8.9%	6.8%	2.2%	1.1%	0.3%
	3.0%	4.6%	9.2%	1.5%	1.2%
	2.8%	2.1%	5.1%	10.2%	3.3%
	2.5%	2.9%	5.3%	2.7%	5.8%
Low	2.5%	1.8%	2.6%	3.6%	8.1%

(Cash-Based Operating Profitability — row axis label)

High Prof	1.6%
	6.3%
	17.5%
	31.2%
Low Prof	**43.5%**

Searching for a B/P premium, as suggested by the factor, produces a negative profitability premium.

Source: Avantis, Bloomberg, U.S. companies represented by the Russell 3000 Index, December 31, 2023

Avantis Investors®
By American Century Investments®

What Issues Do Factor Indexes Face?

Shifting an allocation towards high profitability produces a shift to companies with low B/P.

Companies with High Prof tend to have Low B/P

Low B/P				High B/P
46.2%	**35.2%**	11.6%	5.6%	1.5%

U.S. Companies Sorted by Profitability and Book-to-Price

Adjusted Book-to-Price

		Low				High
Cash-Based Operating Profitability	**High**	8.9%	6.8%	2.2%	1.1%	0.3%
		3.0%	4.6%	9.2%	1.5%	1.2%
		2.8%	2.1%	5.1%	10.2%	3.3%
		2.5%	2.9%	5.3%	2.7%	5.8%
	Low	2.5%	1.8%	2.6%	3.6%	8.1%

Searching for a profitability premium, as suggested by the factor, produces a negative B/P premium.

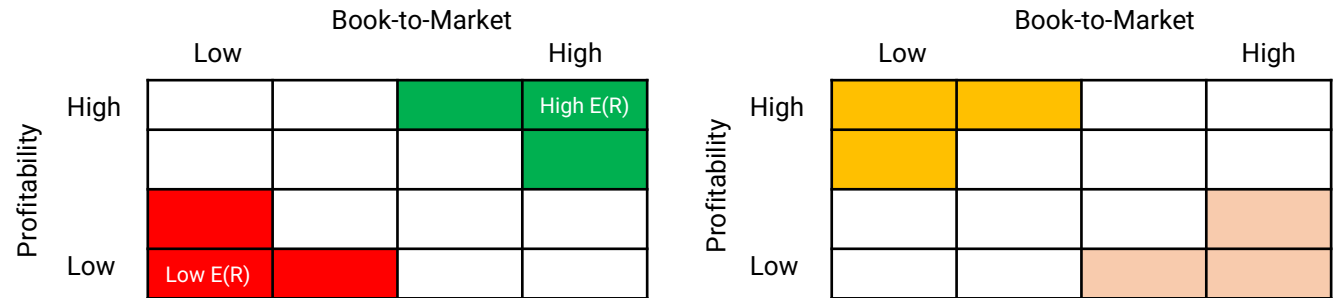Source: Avantis, Bloomberg, U.S. companies represented by the Russell 3000 Index, December 31, 2023

Avantis Investors®
By American Century Investments®

Choosing Factors

- The creation of factor indexes and smart/strategic beta strategies tracking factor indexes increased the number of tools available to implement systematic factor tilts into asset allocations

- Many single factor indexes can run into similar challenges of style-based indexes

- Single and multi-factor strategies can become too "factor focused", ignoring interaction effects and sacrificing diversification and other risk management principles unnecessarily

Avantis Investors®
By American Century Investments®

Implications for Asset Allocators

Implications for Expected Returns

Book-to-Market

	Low			High
High				High E(R)
	Low E(R)			
Low				

Profitability (vertical axis, High to Low)

Book-to-Market

	Low			High
High				
Low				

Profitability (vertical axis, High to Low)

	All Companies	Low-Low	High-High	Low-High	High-Low
Large Caps	12.12	10.63	16.27	12.15	11.92
Mid Caps	13.47	11.18	17.13	13.13	13.07
Small Caps	14.32	8.53	19.44	14.66	15.02
Premium vs. Market		—	➕	＝	＝

Avantis Investors®
By American Century Investments®

Implications for Asset Allocation

Expectations from empirical evidence based on the valuation framework.

Select/Overweight to Increase Expected Returns (green)

Low price (high BtM) despite high profitability implies a high discount rate.

Exclude/Underweight to Increase Expected Returns (red)

High price (low BtM) despite low profitability implies a low discount rate.

High price (low BtM) due to high profitability. No expectations of high discount rate or high expected returns.

Low price (high BtM) due to low profitability, not a high discount rate. No expectations of high expected returns.

Book-to-Market — Low / High

Profitability — High / Low

High E(R)

Low E(R)

Avantis Investors®
By American Century Investments®

Thinking Beyond Factors and Indexes

Financial Science and Research on Asset Pricing and Factors taught us:

Certain stock characteristics are associated with premiums

Premiums can be linked to valuations

To create better portfolios:

We do not need the factors
factors are just <u>one possible</u> implementation of a concept

We need the underlying concepts we learned from research and their interactions

Bassu (1977), Stattman (1980), Banz (1981), Rosenberg (1985), Bhandari (1988)

Avantis Investors®
By American Century Investments®

Questions?

Appendix

Avantis Investors®
By American Century Investments®

Disclosures

Expected Returns: Valuation theory shows that the expected return of a stock is a function of its current price, its book equity (assets minus liabilities) and expected future profits, and that the expected return of a bond is a function of its current yield and its expected capital appreciation (depreciation). We use information in current market prices and company financials to identify differences in expected returns among securities, seeking to overweight securities with higher expected returns based on this current market information. Actual returns may be different than expected returns, and there is no guarantee that the strategy will be successful.

The opinions expressed are those of American Century Investments (or the fund manager) and are no guarantee of the future performance of any American Century Investments fund. This information is for educational purposes only and is not intended as investment advice.

This material has been prepared for educational purposes only. It is not intended to provide, and should not be relied upon for, investment, accounting, legal or tax advice.