WisdomTree RESEARCH

GENERATING PASSIVE ALPHA IN THE CORE OF A PORTFOLIO

Authored by: Jeremy Schwartz, (CFA®, Global Head of Research)
Christopher Gannatti, (CFA®, Head of Research, Europe)

WISDOMTREE®

In February 2017, the WisdomTree Core Equity Index family reached a critical milestone—10 years of live performance history. With more than a decade of live performance data to analyze, we will use this paper to:

+ Examine the philosophical and fundamental underpinnings for the creation of the WisdomTree fundamentally weighted[1] Indexes
+ Showcase the impressive performance track record they have generated
+ Indicate the factors[2] that we believe drove this performance
+ Conclude with how we think these strategies fit into the U.S. equity market context today

While many factor, or "smart beta,"[3] indexes exist today, we emphasize that few have over 10 years of live performance with which to judge the effectiveness of their approaches. The results of the WisdomTree Core Equity Indexes thus far indicate a capability to generate low-cost and passive alpha[4] in the core building blocks of a portfolio.

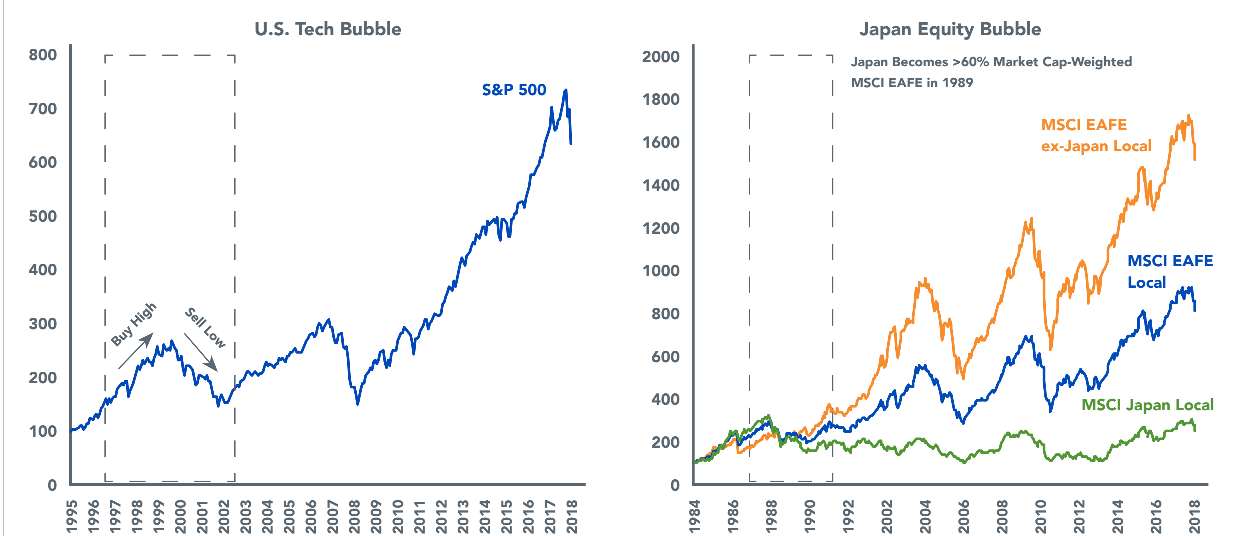
THE "NOISY MARKET HYPOTHESIS" AND BUBBLE AVOIDANCE

Wharton finance Professor Jeremy Siegel developed a theory—the Noisy Market Hypothesis—that explains why it is possible to develop indexes that can deliver added value over a market capitalization-weighted[5] index. Most of the time, markets are micro-efficient[6] when it comes to digesting new information. However, widespread evidence exists to indicate that markets can become overextended, allowing bubbles[7] to occur. In figure 1, we show two of the greatest bubbles in recent history—U.S. technology in the late 1990s and Japan in the late 1980s. At the top of bubbles, market cap-weighted indexes become momentum[8]-chasing vehicles; they assume that the latest stock price, no matter how high, is the best estimate of a company's fundamental value. As a result, they lack any corrective mechanism for reducing exposure to areas of the market where fundamentals cannot justify prices.

Professor Siegel first became dissatisfied with market cap-weighting during the U.S. Tech Bubble. He penned the Wall Street Journal article, "Big-Cap Tech Stocks Are a Sucker Bet,"[9] because he realized the 30% exposure the indexes had to technology could not be justified by a rational set of expectations. His research on value-oriented[10] investment strategies, like sorting the market for low price-to-earnings (P/E) ratios,[11] was one of the prescriptions in his book, *The Future for Investors*, for how to protect your portfolio from the drawdowns[12] that can occur after bubbles.

[1] Fundamentally weighted: A type of equity index in which components are chosen based on fundamental criteria as opposed to market capitalization. Fundamentally weighted indexes may be based on fundamental metrics such as revenue, dividend rates, earnings or book value.
[2] Factors: Attributes that, based on fundamentals or share price behavior, are associated with higher returns.
[3] Smart beta: A term for rules-based investment strategies that don't use conventional market cap weightings.
[4] Passive alpha: Passive indexes take a rules-based approach with regular rebalancing schedules that are not changed due to market conditions, while alpha is a measure of risk-adjusted performance that compares how the constituents move relative to a benchmark.
[5] Market capitalization-weighted: Market capitalization = share price x number of shares outstanding. Firms with the highest values receive the highest weights.
[6] Efficient: Current share prices correctly reflect all available information about publicly traded firms and continually incorporate the emergence of new information on a nearly instantaneous basis; there are no bubbles, and firms are neither expensive nor inexpensive.
[7] Bubble: When market participants drive stock prices above their "fair value" in relation to some system of stock valuation.
[8] Momentum: Stocks characterized by high sensitivity to sentiment and perception of potential, with lower sensitivity to actual business operations.
[9] Jeremy J. Siegel, "Big-Cap Tech Stocks Are a Sucker Bet," The Wall Street Journal, 3/14/00.
[10] Value oriented: Characterized by lower price levels relative to fundamentals, such as earnings or dividends. Prices are lower because investors are less certain of the performance of these fundamentals in the future.
[11] Price-to-earnings (P/E) ratio: Share price divided by earnings per share. Lower numbers indicate an ability to access greater amounts of earnings per dollar invested.
[12] Drawdowns: Periods of sustained negative trends of returns.

Figure 1: Bubbles Have Occurred Before



Sources: WisdomTree, Bloomberg, MSCI. U.S. Tech Bubble, 12/31/1995–12/31/2018. Japan Equity Bubble, 12/31/1984–12/31/2018. You cannot invest directly in an index. Past performance is not indicative of future results.

DEVELOPING A VALUATION-SENSITIVE INDEXING APPROACH

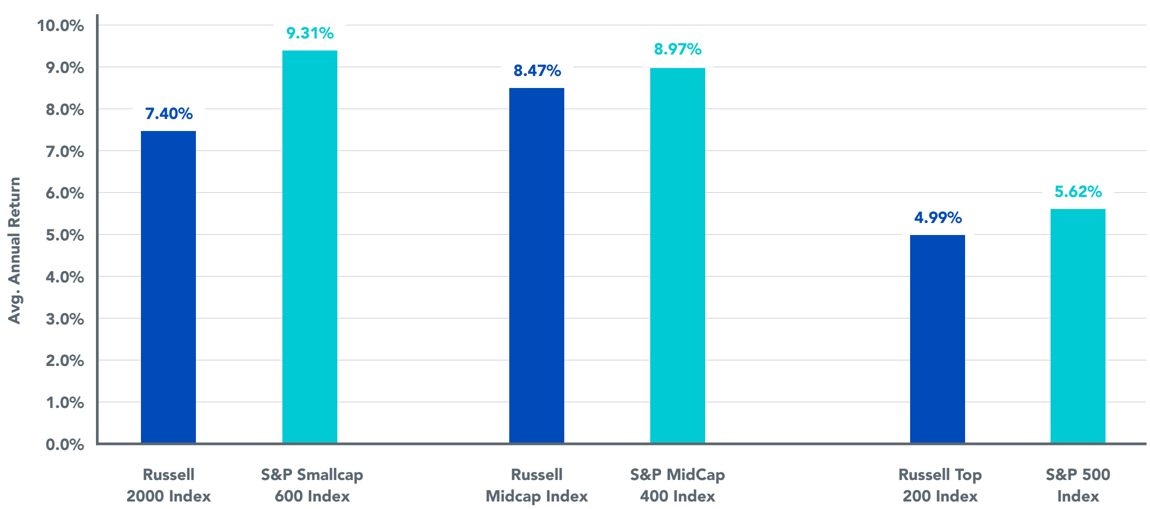
Independently, WisdomTree's Jonathan Steinberg and Luciano Siracusano, in the early 2000s, were developing indexes during the aftershocks of the U.S. Tech Bubble. The two co-creators of WisdomTree's original Indexes found in their research that rebalancing indexes with valuation sensitivity in mind could create a value-added experience by helping mitigate the impact of deflating market bubbles. Let's look more closely at the background to varying index-based approaches before reviewing the real-time results of WisdomTree's Indexes.

NOT ALL INDEXES ARE CREATED EQUAL

One of the first notable observations in evaluating indexes is how, even from a market cap-weighted, beta[13] perspective, large differences in the returns for the U.S. market can arise depending on how you define "beta."

Across time, S&P indexes have tended to exhibit persistent outperformance compared to comparable Russell indexes. We show the 20-year average annual returns for both in figure 2. It is unlikely that S&P will always outperform Russell. However, the consistent, long-term outperformance of S&P, across large-, mid- and small-cap market segments, as well as the magnitude of those outperformances, is enough to motivate research into why there are differences in returns even between traditional beta approaches.

Figure 2: Outperformance of S&P over Russell across Large-Cap, Mid-Cap and Small-Cap Indexes



Sources: WisdomTree, Bloomberg, 12/31/1998–12/31/2018 (20-year period). You cannot invest directly in an index. Past performance is not indicative of future results.

+ **Russell methodology:** The process begins with a very broadly inclusive approach defined by the Russell 3000 Index, which included 3,547 stocks as of December 2018.[14] The Russell Top 200 Index is created by selecting the largest 200 companies from this index. Ranked by market capitalization, the Russell Midcap Index contains the 201st to 1,000th companies (i.e., 800 stocks). The Russell 2000 Index encompasses the 1,001st to 3,000th largest companies. Combined, the Russell Top 200 Index plus the Russell Midcap Index plus the Russell 2000 Index have the same constituents as the Russell 3000 Index.

[13] Beta: Measure of the volatility of an index or investment relative to a benchmark. A reading of 1.00 indicates that the investment has moved in lockstep with the benchmark; a reading of -1.00 indicates that the investment has moved in the exact opposite direction of the benchmark.

[14] "Russell U.S. Index Series Monthly Review," FTSE Russell, 12/18.

- **S&P methodology:** An important difference in methodology for determining stocks eligible for the S&P 500, S&P MidCap 400 and S&P SmallCap 600 Indexes is that "the sum of the most recent four consecutive quarters' Generally Accepted Accounting Principles (GAAP)[15] earnings (net income excluding discontinued operations) should be positive as should the most recent quarter."[16] Given that initial inclusion is, in part determined by passing this "profitability test," the S&P indexes avoid more speculative companies right out of the gate.

We believe that this difference in selection explains the majority of the difference in long-term performance between the Russell indexes and the S&P indexes covering the same market cap size segments. It also makes sense that the difference in annualized returns between the S&P SmallCap 600 Index and the Russell 2000 Index is larger than it is between the Russell Top 200 Index and the S&P 500 Index, as the proportion of speculative, unprofitable firms at any time tends to be higher among small-cap stocks than among large-cap stocks.

- **CRSP methodology:** The CRSP index series does not have a 20-year live track record for us to audit, but CRSP has gained wide recognition, largely due to Vanguard's adoption of the indexes as the basis for its passive approach. The eligible universe for the CRSP indexes is similar in breadth to that of the Russell 3000 Index, having 3,580 companies as of December 31, 2018.[17] From this universe, the CRSP U.S. Large Cap Index includes U.S. companies that make up the top 85% of the market cap, the CRSP U.S. Mid Cap Index comprises companies that fall between 70% and 85% of the market cap and the CRSP U.S. Small Cap Index comprises companies that fall between the bottom 2% and 15% of the market cap. As the CRSP indexes discussed here have an inception date of March 31, 2011, a long-term study of live performance results is not possible. For this reason, we have omitted them from the 20-year average annual returns we display in figure 2.[18]
- **Critical point:** While CRSP and Russell represent the more broadly inclusive approaches, and all three families weight constituents based on their market value, S&P's indexes are different. They tend to exclude the more speculative, unprofitable segment of the market. We found this interesting as a potential risk[19]-control measure in a passive core index, and it is an element that we also built into our construction process for the WisdomTree Core Equity Indexes.

WISDOMTREE'S CORE EQUITY INDEX FAMILY

More than a decade ago, on February 1, 2007, WisdomTree launched its Core Equity Index family—an earnings-weighted[20] family of Indexes. We will show how this methodology incorporates the following attributes:

1. **Valuation-sensitive rebalancing:** The rebalancing itself has the potential to provide a "bubble-avoidance vehicle" by implementing a disciplined mechanism of stock and sector selection on the basis of relative value.
2. **Quality[21] improvement:** The rebalancing itself has the potential to provide a "bubble-avoidance vehicle" by implementing a disciplined mechanism of stock and sector selection on the basis of relative value.

15 Generally Accepted Accounting Principles (GAAP): Principles of accounting used in the U.S. that deal with different aspects and assumptions that are deemed acceptable in calculating the earnings of a firm.
16 "S&P U.S. Indices Methodology," S&P Dow Jones Indices, 01/19.
17 CRSP U.S. Total Market Index factsheet, 12/31/18.
18 CRSP U.S. Large Cap, Mid Cap and Small Cap Index factsheets, 12/31/18.
19 Risk: Also "standard deviation," which measures the spread of actual returns around an average return during a specific period. Higher risk indicates greater potential for returns to be farther away from this average.
20 Earnings weighted: Earnings for all constituents in an index are added together, and individual constituents are subsequently weighted by their proportional contribution to that total.
21 Quality: Related to lower levels of debt, higher return on equity or greater stability of earnings.

WHAT IS THE *"EARNINGS STREAM"*?

WisdomTree's Earnings Stream utilizes the concept of "core earnings," which comes from a calculation done by Standard & Poor's. Specifically, the core earnings concept starts with income before extraordinary items and then makes adjustments in order to get closer to a measure of earnings from continuing, regular operations and avoids one-time distortions brought on by extraordinary events.

Figure 3: Largest "Core Earners" of 2018

Company Name	2017 Earnings ($ B)	2018 Earnings ($ B)	Percentage of 2018 Earnings Stream	Price-to-Earnings Ratio
Apple Inc.	$48.35	$60.88	4.36%	14.2x
Berkshire Hathaway B	$18.68	$33.76	2.42%	15.9x
Microsoft Corp	$23.09	$32.52	2.33%	26.2x
JP Morgan Chase & Co	$24.33	$29.74	2.13%	12.6x
Alphabet Inc A	$21.02	$28.63	2.05%	26.8x
Bank of America Corp	$19.27	$24.11	1.73%	11.8x
Facebook Inc A	$15.21	$21.77	1.56%	18.6x
Intel Corp	$13.85	$20.32	1.45%	11.2x
Wells Fargo & Co	$19.52	$17.37	1.24%	15.1x
Exxon Mobil Corp	$13.01	$17.28	1.24%	19.5x
Sum/Average	$216.32	$286.37	20.49%	17.2x

Sources: WisdomTree, Standard & Poor's, 11/30/18 (Index screening date). Universe includes the top 10 generators of core earnings from the WisdomTree U.S. Total Market Index in 2018. Differences in totals due to rounding. The total *Earnings Stream* for the WisdomTree U.S. Total Market Index as of the 11/30/18 screening date was $1,397.66 billion. You cannot invest directly in an index. Holdings subject to change.

+ **Selection:** The most critical selection criterion for any of WisdomTree's Core Equity Indexes is that a company must have positive core earnings, as defined by the sum of the quarterly core earnings for the four quarters prior to the November 30 annual screening date.
+ **Weighting:** For each WisdomTree Core Equity Index, a sum of the core earnings for all constituents in that Index is calculated. Each company is then weighted in accordance with its proportionate contribution to that total.
    - Example: In 2018, Apple had core earnings of slightly more than $60.8 billion. Adding up the core earnings of the WisdomTree U.S. Total Market Index—WisdomTree's most broadly inclusive core equity Index—we get approximately $1.40 trillion. So, $60.8 billion divided by $1.40 trillion equals approximately 4.4%, meaning that Apple contributed 4.4% of the total and would therefore get a 4.4% weight.
    - One of the benefits of weighting by earnings is that doing so typically lowers the P/E ratio of the entire portfolio, by removing the role that stock multiples play in determining a company's market value. WisdomTree believes that investors, en masse, traditionally pay too much for future earnings, and that a systematic, rules-based way of rebalancing, apart from market sentiment, can add value over time.

[22] Specific adjustments include 1) implied option expenses, 2) gains or losses on sales of assets after taxes, 3) impairments of goodwill after taxes, 4) settlement after taxes, 5) reversal restructuring/acquisition after taxes, 6) core pension adjustments and 7) core post-retirement adjustments.

HOW RELATIVE VALUE REBALANCING WORKS

To understand how earnings-weighted indexes work, it's critical to think about the relationship between a firm's share price performance and the change in core earnings.

+ **Rising P/E multiples = reduced weight:** Companies whose stock prices increased compared to their peers, but that saw their earnings growth rates trail their peers, would typically see reduced weight in WisdomTree Indexes at the annual rebalance. In a market cap-weighted index, however, the primary driver of weight is the relative price change due to a change in market capitalization.
+ **Falling P/E multiples = increased weight:** Companies whose stock prices fell while their earnings were flat or grew, would typically see increased weight in WisdomTree earnings-weighted Indexes. In a market cap-weighted index, however, the lower price would result in a lower weight, again due to the change in market capitalization.

HOW BUBBLE AVOIDANCE BECOMES A NATURAL CONSEQUENCE

A consequence of weighting firms by earnings—thereby placing the highest weights in firms that delivered the greatest cumulative profits—is a lowering of the P/E ratio (or a raising of the earnings yield[23]) of the index compared to a similar market cap-weighted index. We indicate how this works in figure 4, which is a simplified hypothetical illustration.

Figure 4: An Illustration of How Weighting by Earnings Lowers the P/E Ratio

				Market Cap-Weighted Approach			Earnings-Weighted Approach		
Company	Market Cap (Millions)	*Earnings Stream* (Millions)	P/E Ratio	Weight	Investment	P/E Ratio	Weight	Investment	P/E Ratio
A	200	40	5	17.39%	$17,391		40.00%	$40,000	
B	250	25	10	21.74%	$21,739		25.00%	$25,000	
C	700	35	20	60.87%	$60,870		35.00%	$35,000	
Totals	1150	100			$100,000	11.50x		$100,000	8.16x

Source: WisdomTree, hypothetical illustration.

[23] Earnings yield: Earnings per share for the most recent 12-month period divided by the current market price per share. The earnings yield (which is the inverse of the P/E ratio) shows the percentage of each dollar invested in the stock that was earned by the company.

In the series of charts in figures 5a-c, we show the historical consistency of this lower P/E ratio approach across large-, mid- and small-cap indexes.

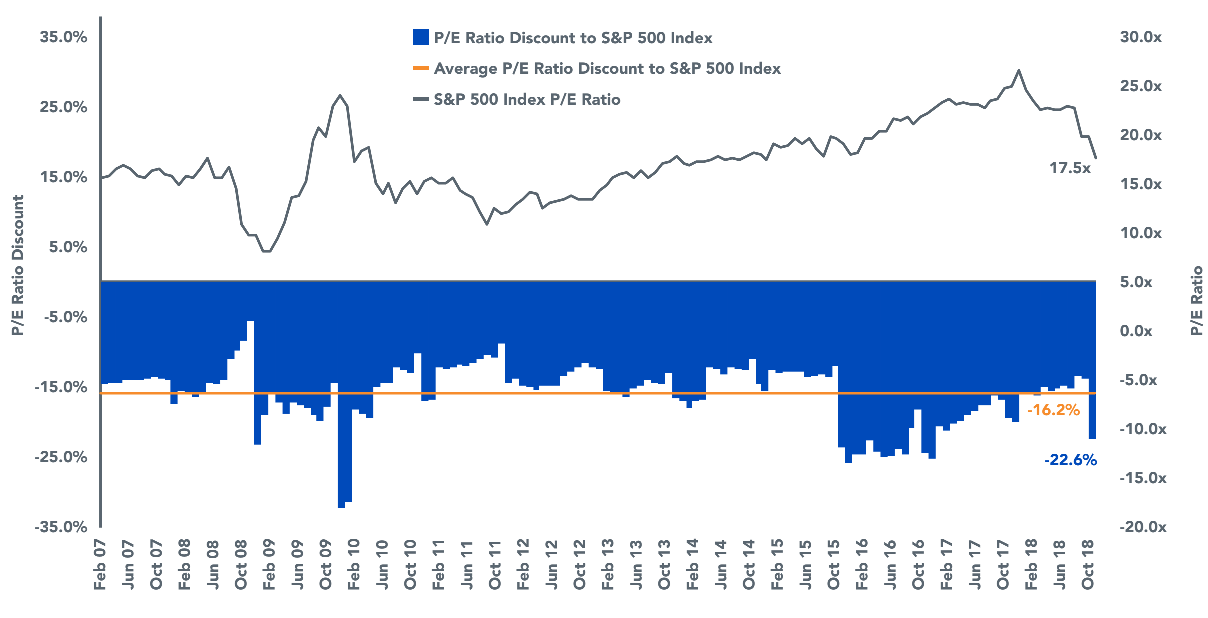
As we mentioned, we launched these Indexes a decade ago. In figures 5a, 5b and 5c, we indicate the P/E discount compared to a comparable U.S. market cap-weighted universe.

One of the important elements with this lower P/E approach is that the higher the market valuation multiples in a cap-weighted index, the greater the potential to lower the aggregate P/E ratio by earnings-weighting the index. WisdomTree believes that starting with a valuation advantage—what we call owning the market at a more reasonable price—has contributed to the outperformance the WisdomTree earnings-weighted Indexes have delivered over the past decade.

We note that current valuations of the WisdomTree Core Equity Index family, particularly in the small-cap space, are close to the widest levels they've been at since the Indexes were launched—indicating even greater potential for added value today than during their near 12-year history.

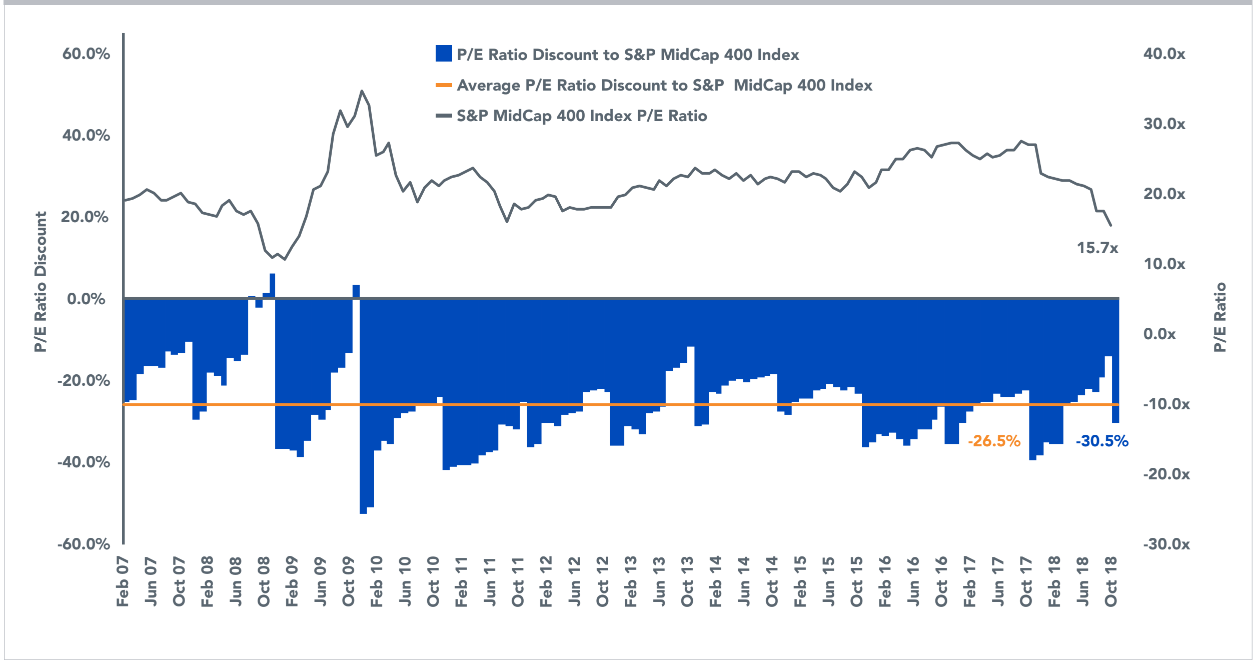
Small Caps Offered the Greatest Discount: Why is this? We noted earlier that in the small-cap space there would be the greatest proportion of firms with negative earnings over the prior 12 months. When firms in an index have negative earnings, the aggregate earnings per share for the index is lowered, and, absent any change in the index price level, the P/E ratio is pushed up. WisdomTree's approach of eliminating firms with negative earnings tends to regularly introduce a lower P/E ratio.

Figure 5a: WisdomTree U.S. LargeCap Index P/E Discount



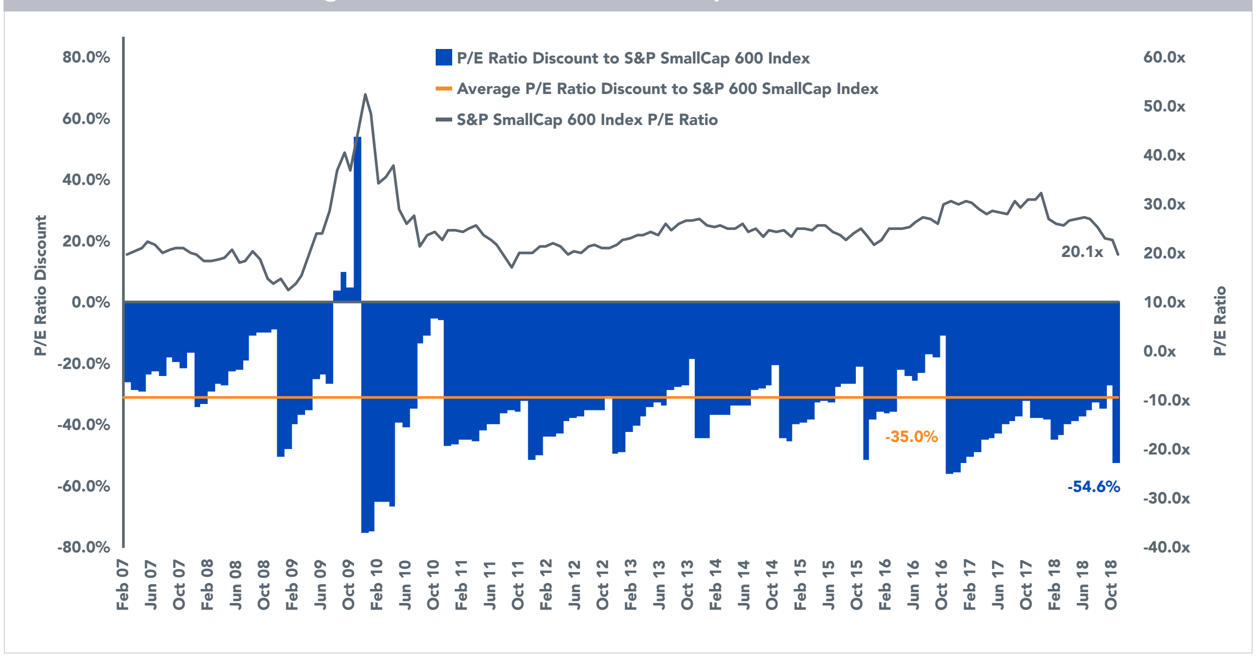
Sources: WisdomTree, MSCI, 2/1/07–12/31/18. Past performance is not indicative of future results. You cannot invest directly in an index.

Figure 5b: WisdomTree U.S. MidCap Index P/E Discount



Sources: WisdomTree, MSCI, 2/1/07–12/31/18. Past performance is not indicative of future results. You cannot invest directly in an index.

Figure 5c: WisdomTree U.S. SmallCap Index P/E Discount

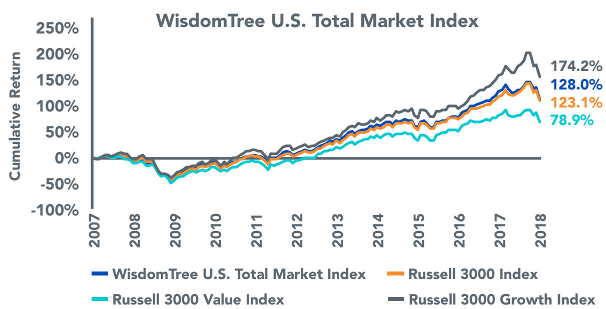


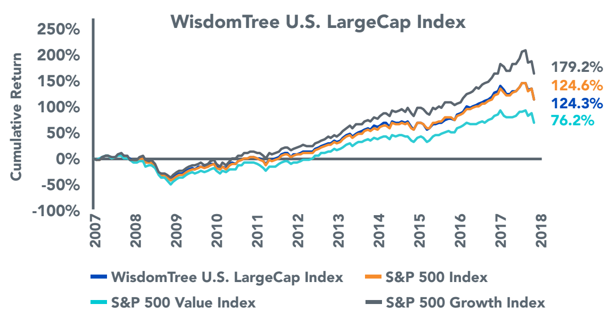
Sources: WisdomTree, MSCI, 2/1/07–12/31/18. Past performance is not indicative of future results. You cannot invest directly in an index.

THE PROOF MUST BE IN THE PERFORMANCE

What we've seen in terms of performance for WisdomTree's Core Equity Indexes has been nothing short of astonishing. For more than a decade, risk-adjusted returns for each and every WisdomTree core earnings-weighted Index beat those of the comparable market cap-weighted benchmark.

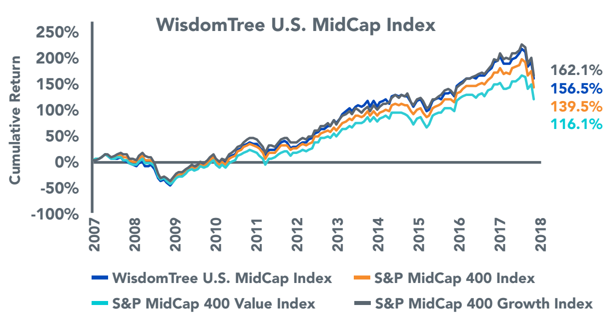
Figure 6: Risk-Adjusted Returns Beat Value & Core Benchmarks for More than a Decade

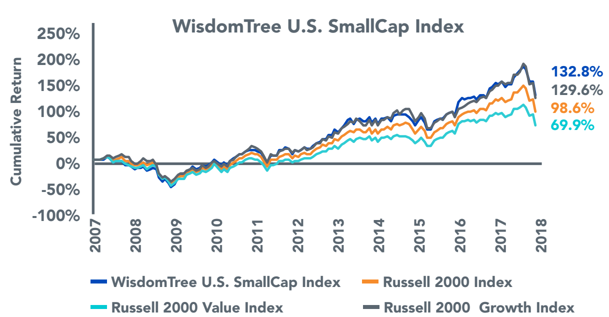




Index Name	Avg. Ann. Return	Avg. Ann. Risk	Sharpe Ratio	Correlation to Russell 3000 Index
WisdomTree U.S. Total Market Index	7.16%	14.92%	0.43	0.99
Russell 3000 Index	6.97%	15.21%	0.41	1.00
Russell 3000 Value Index	5.00%	15.63%	0.27	0.98
Russell 3000 Growth Index	8.83%	15.40%	0.52	0.98

Index Name	Avg. Ann. Return	Avg. Ann. Risk	Sharpe Ratio	Correlation to S&P 500 Index
WisdomTree U.S. LargeCap Index	7.01%	14.53%	0.43	0.99
S&P 500 Index	7.03%	14.73%	0.42	1.00
S&P 500 Value Index	4.87%	15.79%	0.26	0.98
S&P 500 Growth Index	9.00%	14.45%	0.57	0.98





Index Name	Avg. Ann. Return	Avg. Ann. Risk	Sharpe Ratio	Correlation to S&P MidCap 400 Index
WisdomTree U.S. MidCap Index	8.23%	18.34%	0.40	0.93
S&P MidCap 400 Index	7.61%	17.39%	0.39	0.94
S&P MidCap 400 Value Index	6.68%	17.83%	0.33	0.93
S&P MidCap 400 Growth Index	8.42%	17.35%	0.44	0.93

Index Name	Avg. Ann. Return	Avg. Ann. Risk	Sharpe Ratio	Correlation to Russell 2000 Index
WisdomTree U.S. SmallCap Index	7.35%	21.07%	0.31	0.87
Russell 2000 Index	5.93%	19.39%	0.26	0.91
Russell 2000 Value Index	4.55%	19.48%	0.19	0.89
Russell 2000 Growth Index	7.22%	19.85%	0.32	0.90

Sources: WisdomTree, Bloomberg, with data from 2/1/07 (the first day of live calculation for the WisdomTree Core Equity Indexes) to 12/31/18. You cannot invest directly in an index.

Sharpe ratio: Measure of risk-adjusted return. Higher values indicate greater return per unit of risk, specifically standard deviation, which is viewed as being desirable.

Correlation: Statistical measure of how two sets of returns move in relation to each other. Correlation coefficients range from 1 to 1. A correlation of 1 means the two subjects of analysis move in lockstep with each other. A correlation of -1 means the two subjects of analysis have moved in exactly opposite directions.

+ **Growth beat value:** Over this period, something that is immediately apparent when looking at the total market, large caps, mid-caps or small caps is that in each case, the growth[24] index in that size segment outperformed the value index. Of course, the "core" index existed somewhere in between, as it included the full universe of both value and growth stocks
    - We have outlined how WisdomTree's Core Equity strategies have a history of providing a P/E discount to comparable market cap-weighted benchmarks. Are these therefore in the "value" bucket? It's an interesting question, and the performance results suggest that—even if there is a sensitivity to the value style—there is clearly something more going on that we will need to discuss later in this paper.
+ **Small caps:** What is particularly interesting here is that the return for the WisdomTree U.S. SmallCap Index not only exceeded the returns for its value and core benchmarks, but also surpassed the return for the growth benchmark! What we know about this period is that growth was—by a significant margin—one of the strongest overall styles, and was therefore very tough to beat. The this transpired while WisdomTree maintained a disciplined approach to valuation is remarkable, given that growth strategies typically do not apply such a valuation-sensitive discipline.

HOW DID WISDOMTREE'S EARNINGS STRATEGIES GENERATE THIS IMPRESSIVE TRACK RECORD?

To answer this question, it is important to examine factor or risk premiums. Investors searching for sustainable outperformance need to consider novel investment strategies in terms of the exposures they create to the premiums that have traditionally been associated with explaining excess returns. For more than a decade, WisdomTree's earnings-weighted strategies have generally tapped into:

1. The value premium, which is intuitive, given our earlier discussion about valuation discounts relative to market cap-weighted benchmarks.
2. The quality premium, which might seem less intuitive on its face, but has been no less important.

Then, when considering the WisdomTree U.S. MidCap and SmallCap Indexes, it's also notable that the so-called "small-cap" or "size" premium was accessed, at least in relation to the comparable market cap-weighted benchmarks that focus on the mid-cap and small-cap size segments of the market.

WisdomTree's core equity family tends to be considered part of the core or blend category[25] when evaluated in various peer groups by firms such as Morningstar. That is because these Indexes include a broad cross-section of the market. But within that core part of the market are a few factor tendencies that show up.

[24] Growth: Characterized by higher price levels relative to fundamentals, such as dividends or earnings. Price levels are higher because investors are willing to pay more due to their expectations of future improvements in these fundamentals.
[25] Core/blend: Characterized by exposure spanning stocks exhibiting both value and growth attributes.

Figure 7: Factor Loadings of the WisdomTree Core Equity Indexes Relative to Market Cap-Weighted Universes

Market Capitalization Size Focus	Index	Market	Size	Value	Quality	Momentum
Total Market	WisdomTree U.S. Total Market Index	0.98	-0.06	0.07	0.09	-0.06
	Russell 3000	1.01	0.00	0.00	0.02	0.00
	Russell 3000 Value	0.97	-0.03	0.28	0.00	-0.02
	Russell 3000 Growth	1.05	0.01	-0.27	0.03	0.01
Large Cap	WisdomTree U.S. LargeCap Index	0.97	-0.16	0.07	0.08	-0.04
	S&P 500	1.00	-0.13	0.03	0.04	0.00
	S&P 500 Value	0.97	-0.14	0.30	-0.06	-0.05
	S&P 500 Growth	1.03	-0.12	-0.22	0.13	0.04
Mid Cap	WisdomTree U.S. MidCap Index	1.02	0.51	-0.01	0.20	-0.16
	S&P MidCap 400	1.03	0.44	-0.04	0.09	-0.01
	S&P MidCap 400 Value	1.00	0.47	0.12	0.07	-0.05
	S&P MidCap 400 Growth	1.06	0.41	-0.19	0.10	0.02
Small Cap	WisdomTree U.S. SmallCap Index	0.97	0.93	0.21	0.24	-0.23
	Russell 2000	1.01	0.84	0.06	-0.05	0.03
	Russell 2000 Value	0.96	0.81	0.39	0.09	0.02
	Russell 2000 Growth	1.07	0.87	-0.26	-0.19	0.04

Sources: WisdomTree, Kenneth French Data Library, Bloomberg, 2/1/07–12/31/18. You cannot invest directly in an index. "Market" refers to the Mkt-Rf factor, with larger numbers indicating greater sensitivity to movements of the market. "Size" refers to the Small-minus-Big (SMB) factor, with larger positive numbers indicating greater loading to small-cap stocks. "Value" refers to High-minus-Low (HML) in the context of book value to market value, with larger positive numbers indicating greater loading to value stocks. "Quality" refers to Robust-minus-Weak (RMW) in the context of operating profitability, with larger positive numbers indicating greater loading to stocks with higher operating profitability. "Momentum" refers to MOM, with larger positive numbers indicating greater exposure to stocks with recent positive performance trends.

+ **Value:** First, the value loading of the WisdomTree Core Equity Indexes doesn't quite match the value loadings of the value variants of the market cap-weighted indexes; second, the value loading of the WisdomTree U.S. MidCap Index actually tilts slightly toward the growth side of the spectrum.
+ **Quality:** It is of particular interest to focus on the mid-cap and small-cap universes, as these are where a wider spectrum of profitable and unprofitable companies reside. In both the mid-cap and small-cap cases, the highest loading to quality came from the WisdomTree U.S. MidCap and SmallCap Indexes, within each specified grouping. This quality tilt is related to what we mentioned earlier—WisdomTree Indexes require constituents to have initial and ongoing profitability, and constituents are weighted based on earnings generated, rather than market value.
+ **Size:** Where we believe it counts—specifically in the mid-cap and small-cap size segments—the WisdomTree U.S. Total Market Index exhibited a higher loading to the size premium than the other market cap-weighted indexes.
+ **Momentum:** We mentioned earlier in this paper that companies whose share prices outperform the growth of their earnings typically see reductions in weight at the annual rebalance, while companies whose earnings outperform their share prices typically see increased weight. This is the opposite of momentum, and we found it interesting to see negative loadings to momentum across the WisdomTree Core Equity Indexes.

WHAT PREMIUM EXPOSURES WERE REWARDED OVER THIS PERIOD?

Taking a step back, it's important to indicate which premiums garnered the greatest rewards over this period.[26]

+ Market exposure: With the exception of the global financial crisis of 2008–09, there was a general upward trend to equities in the U.S. over this period. Exposure to the market was the strongest of the forces in figure 7.
+ Size exposure: Small did outperform large, but the effect was not very significant. This partly explains the advantage in the WisdomTree U.S. MidCap and SmallCap Indexes.
+ Value exposure: Value underperformed and was the largest drag on returns. This is not a surprising point, given what we have seen in figure 6.
+ Quality exposure: This was the second-largest positive impact over this period—again, clearly a help to WisdomTree's U.S. MidCap and SmallCap Indexes relative to the market cap-weighted indexes shown in the same size segments.
+ Momentum exposure: Over this period, momentum was a slight drag on returns, albeit a strong-performing factor lately. This made WisdomTree's negative loading to this effect actually beneficial to returns.

Of course, these exposures and effects may change over time, but this was a very informative period.

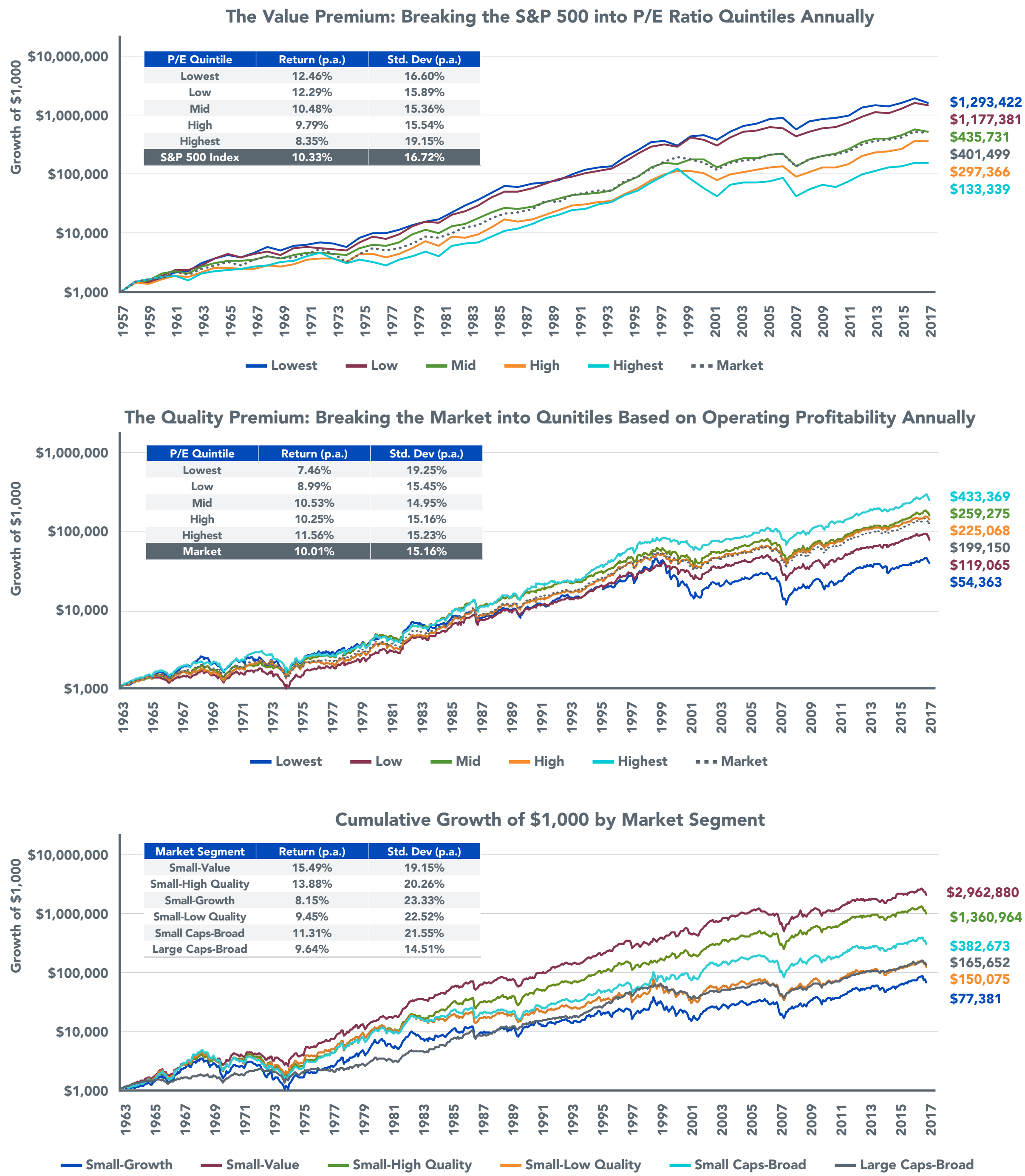
THE LONG-TERM EFFICACY OF THESE PREMIUMS

The value, quality and size effects are well-known, and WisdomTree is not the first to access or study them. In figure 8, we show:

+ **Value effect:** Specifically, the impact of breaking the S&P 500 Index into quintiles of 100 stocks based on P/E ratios. The lowest and low P/E ratio quintiles outperformed the market and the high and highest P/E ratio quintiles over the long run.
+ **Quality effect:** Here, we looked at the market broken into quintiles based on operating profitability. Higher operating profitability quintiles outperformed lower groupings.
+ **Size effect:** A unique aspect of the size effect is that it can become very pronounced if you combine a focus on size with something else, such as value or quality. Size by itself hasn't been nearly as powerful over the long term.

[26] Source for all bullets in this segment: Kenneth French Data Library, 2/1/07–12/31/18.

Figure 8: Value, Quality and Size Effects over the Long Run



P/E Quintile	Return (p.a.)	Std. Dev (p.a.)
Lowest	12.46%	16.60%
Low	12.29%	15.89%
Mid	10.48%	15.36%
High	9.79%	15.54%
Highest	8.35%	19.15%
S&P 500 Index	10.33%	16.72%

P/E Quintile	Return (p.a.)	Std. Dev (p.a.)
Lowest	7.46%	19.25%
Low	8.99%	15.45%
Mid	10.53%	14.95%
High	10.25%	15.16%
Highest	11.56%	15.23%
Market	10.01%	15.16%

Market Segment	Return (p.a.)	Std. Dev (p.a.)
Small-Value	15.49%	19.15%
Small-High Quality	13.88%	20.26%
Small-Growth	8.15%	23.33%
Small-Low Quality	9.45%	22.52%
Small Caps-Broad	11.31%	21.55%
Large Caps-Broad	9.64%	14.51%

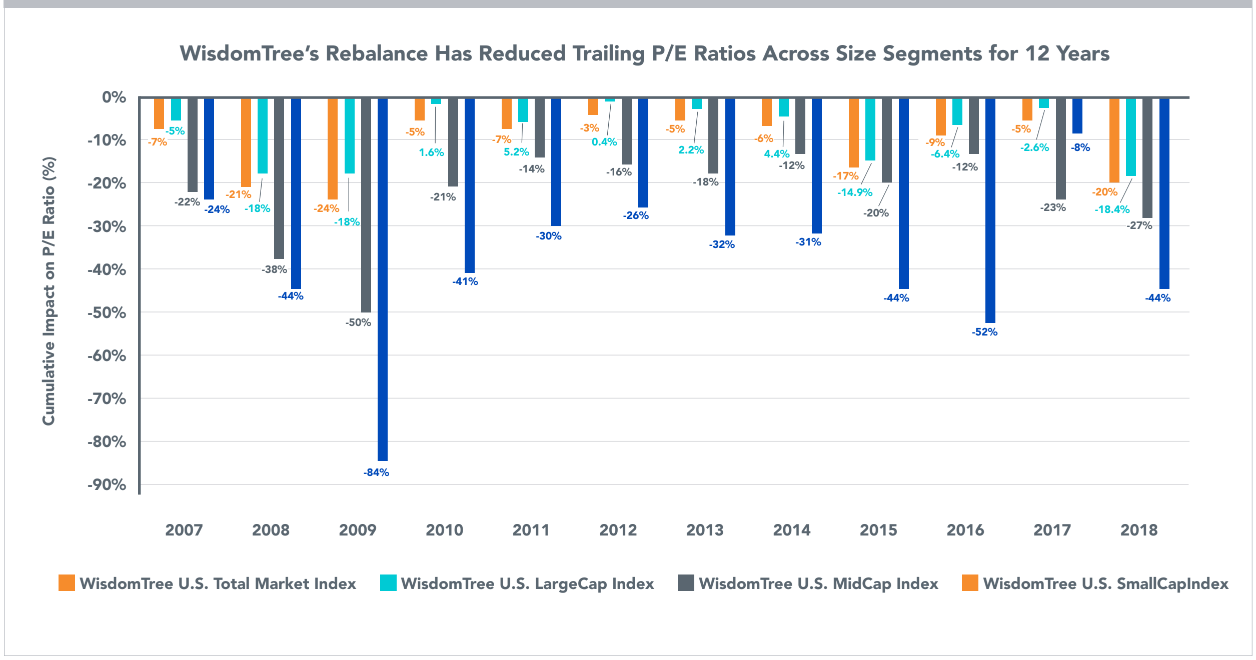
Sources: WisdomTree; The Future for Investors, Jeremy J. Siegel, 2005. Updates to 12/31/18 for P/E ratio quintile chart, and start of 12/31/1957 for value effect. Kenneth French Data Library, 6/30/1963–12/31/2018, for quality effect, with period based on data availability. Kenneth French Data Library, 6/30/1963–12/31/2018, for size effect. Past performance is not indicative of future results. You cannot invest directly in an index.

HOW THE WISDOMTREE CORE EQUITY INDEXES REFRESH EXPOSURES TO THESE PREMIUMS

What 12 Live Rebalances Have Shown

In order to effectively generate passive alpha in the core of a portfolio, the most critical element is connecting the ongoing annual rebalancing process to accessing the premiums that have been shown to outperform over long-term, historical periods.

Figure 9: Accessing the Value Effect: P/E Ratio Was Reduced in All Instances at the Annual Rebalance for 12 Years



Sources: WisdomTree, Standard & Poor's, data as of the annual rebalancing process, specifically the change from 11/30 of each year to 12/31 of each year. While the rebalancing actually occurs on the Monday following the third Friday in December after 11/30 of each year, looking at these two monthly data points captures the appropriate impact on the P/E ratio. You cannot invest directly in an index.

+ **48 Instances of P/E ratio reduction:** Four Indexes, 12 rebalances, 48 total instances of P/E reduction. While this may not always be the case, the historical record does show an ongoing, consistent focus back toward managing valuation risk.
+ **Interesting organization by size cut:** In all but one year, the large caps (WisdomTree U.S. LargeCap Index) experience a drop in P/E ratio, the mid-caps (WisdomTree U.S. MidCap Index) see the P/E ratio drop by more than the large caps and the small caps (WisdomTree U.S. SmallCap Index) see the P/E ratio drop by more than the mid-caps.
    - Why have small caps tended to see the greatest P/E reduction? The answer, as we've mentioned before, lies in the fact that negative earnings are most prevalent in this size segment. Simply eliminating these firms at regular intervals lowers the P/E ratio of the Index. Large caps represent the opposite case because this is where, on a size basis, negative earnings are least prevalent.

REFRESHING THE QUALITY AND SIZE EFFECTS

We believe that the relative value aspect of the rebalance, shown in figure 9, is the most intuitive—leading to added exposure to stocks whose share prices have underperformed their earnings and reduced exposure to stocks whose share prices have outperformed their earnings. Additionally:

+ **Quality:** The removal of firms with negative earnings does show up in a lowering of the P/E ratio in figure 9—particularly in the small-cap segment. If one were to look at other metrics such as return on equity or return on assets, this would show up in a regular raising of these more quality-oriented metrics at a regular frequency. It's all tied into the same profitability requirement built into the ongoing Index methodology.
+ **Size:** Again, this is more important in the mid-cap and small-cap segments. In nearly every rebalance in the WisdomTree U.S. MidCap Index and SmallCap Index, we saw that the weighted average market capitalization size exposure was reduced. While this presents an interesting data point, it's more notable conceptually in that there is a discipline built into the methodology that directly combats any drift upward on the market capitalization spectrum, such as would come from holding a small-cap stock in a small-cap strategy as it grew and became a mid-cap stock, for example.

CONCLUSION

We conclude with the same theme with which we started nearly 12 years ago—that WisdomTree's core equity strategies have the potential to provide passive alpha in the core of a portfolio. The greatest benefit of these approaches has been the consistency of the methodology. This has been the driver of a fairly impressive track record—inclusive of the 2008–09 global financial crisis—and over time we believe that it has the potential to continue accessing the factors that drove the results over this first live decade.

WisdomTree U.S. Total Market Index: A fundamentally weighted index that measures the performance of earnings-generating companies within the broad U.S. stock market. WisdomTree U.S. LargeCap Index: A fundamentally weighted index that measures the performance of earnings-generating companies in the large-capitalization segment of the U.S. stock market. Companies in the Index are incorporated and listed in the U.S. and have generated positive cumulative earnings over their most recent four fiscal quarters prior to the Index measurement date. The Index comprises the 500 largest companies ranked by market capitalization in the WisdomTree U.S. Total Market Index. WisdomTree U.S. MidCap Index: A fundamentally weighted index that measures the performance of the top 75% of the market capitalization of the WisdomTree U.S. Total Market Index after the 500 largest companies have been removed. WisdomTree U.S. SmallCap Index: A fundamentally weighted index that measures the performance of earnings-generating companies in the small-capitalization segment of the U.S. stock market. The Index comprises the companies in the bottom 25% of the market capitalization of the WisdomTree U.S. Total Market Index after the 500 largest companies have been removed. S&P 1500 Composite Index: The index is designed to represent the performance of the U.S. equity market, which combines three indexes, the S&P 500, S&P MidCap 400 and S&P SmallCap 600. S&P 1500 Composite Value Index: Very broadly inclusive market capitalization-weighted index of large-cap, mid-cap and small-cap stocks, tilting toward the value style. S&P 1500 Composite Growth Index: Very broadly inclusive market capitalization-weighted index of large-cap, mid-cap and small-cap stocks, tilting toward the growth style. S&P 500 Index: A market capitalization-weighted benchmark of 500 stocks selected by the Standard & Poor's Index Committee, designed to represent the performance of the leading industries in the U.S. economy. S&P 500 Value Index: A market capitalization-weighted benchmark designed to measure the value segment of the S&P 500 Index. S&P 500 Growth Index: A market capitalization-weighted benchmark designed to measure the growth segment of the S&P 500 Index. S&P MidCap 400 Index: Provides investors with a benchmark for mid-sized companies. The index covers over 7% of the U.S. equity market, and seeks to remain an accurate measure of mid-sized companies, reflecting the risk and return characteristics of the broader mid-cap universe on an ongoing basis. S&P MidCap 400 Value Index: Provides investors with a measure of the performance of the value segment of the S&P MidCap 400 Index. S&P MidCap 400 Growth Index: Provides investors with a measure of the performance of the growth segment of the S&P MidCap 400 Index. S&P SmallCap 600 Index: A market capitalization-weighted measure of the performance of small-cap equities within the U.S., with constituents required to demonstrate profitability prior to gaining initial inclusion. S&P SmallCap 600 Value Index: A market capitalization-weighted measure of the performance of small-cap value equities within the U.S., with constituents required to demonstrate profitability prior to gaining initial inclusion. S&P SmallCap 600 Growth Index: A market capitalization-weighted measure of the performance of small-cap growth equities within the U.S., with constituents required to demonstrate profitability prior to gaining initial inclusion. Russell 3000E Index: Measures the full investable universe of equities in the U.S. market, including large caps, mid-caps, small caps and micro caps. Russell 3000 Index: Measures the performance of the 3,000 largest U.S. companies based on total market capitalization. Russell 3000 Value Index: Measures the performance of the broad value segment of the U.S. equity value universe. It includes those Russell 3000 Index companies with lower price-to-book ratios and lower forecasted growth values. Russell 3000 Growth Index: Measures the performance of the Russell 3000 Index constituents with growth characteristics. Russell 2000 Index: Measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 is a subset of the Russell 3000 Index, representing approximately 10% of the total market capitalization of that index. It includes approximately 2,000 of the smallest securities based on a combination of their market cap and current index membership. Russell 2000 Value Index: Measures the performance of the small-cap value segment of the U.S. equity universe. It includes those Russell 2000 Index companies with lower price-to-book ratios and lower forecasted growth values. Russell 2000 Growth Index: Measures the performance of the small-cap growth segment of the U.S. equity universe. It includes those Russell 2000 Index companies with higher price-to-book ratios and higher forecasted growth values. Russell Midcap Index: Measures the performance of the mid-cap segment of the U.S. equity universe. The Russell Midcap is a subset of the Russell 1000 Index. It includes approximately 800 of the smallest securities based on a combination of their market cap and current index membership. Russell Midcap Value Index: Measures the performance of the mid-cap value segment of the U.S. equity universe. It includes those Russell Midcap Index companies with lower price-to-book ratios and lower forecasted growth values. Russell Midcap Growth Index: Measures the performance of the mid-cap growth segment of the U.S. equity universe. It includes those Russell Midcap Index companies with higher price-to-book ratios and higher forecasted growth values. Russell Top 200 Index: A market capitalization-weighted measure of the performance of the 200 largest companies in the Russell 1000 Index. Russell Top 200 Value Index: Market capitalization-weighted index of the 200 largest stocks, tilted toward the value style. Russell Top 200 Growth Index: Market capitalization-weighted index of the 200 largest stocks, tilted toward the growth style. MSCI USA Index: Designed to measure the performance of the large- and mid-cap segments of the U.S. market. MSCI USA Mid Cap Index: Designed to measure the performance of mid-cap stocks in the U.S. market. MSCI USA Small Cap Index: Designed to measure the performance of small-cap stocks in the U.S. market. CRSP U.S. Total Market Index: A market capitalization-weighted measure of all-cap companies representing nearly 100% of the investable equity market in the U.S. CRSP U.S. Large Cap Index: Measures the large-cap size segment of the CRSP investable universe. CRSP U.S. Mid Cap Index: A market capitalization-weighted measure of the performance of mid-cap equities in the U.S. CRSP U.S. Small Cap Index: A market capitalization-weighted measure of the performance of small-cap equities in the U.S.

Investors should carefully consider the investment objectives, risks, charges and expenses of the Funds before investing. To obtain a prospectus containing this and other important information, please call 866.909.9473 or visit WisdomTree.com. Investors should read the prospectus carefully before investing.

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