Wilshire

Wilshire US Style Indexes

A Methodology Overview

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Two common stock qualities consistently explain a significant portion of manager return. In fact, most managers use these qualities to describe the section of the market where they have skill. These qualities are size (capitalization) and style (growth/value). Long before Fama and French confirmed the existence of style factors, managers displayed skill primarily through tactical asset allocation or stock selection specializing within a specific style. The existence of these style managers requires appropriate style benchmarks.

Background

Beginning in 1974, Wilshire Associates (Wilshire®), an industry leader in the development of index technology, introduced the Wilshire 5000 Total Market Index℠, an index containing all publicly traded U.S. stocks. As appropriate, Wilshire has divided the Wilshire 5000 equity universe into useful components to help money managers and fund sponsors better benchmark portfolio performance and to more fully understand manager style. In 1983, for example, the Wilshire 5000 Index was divided into two parts (1) all 500 stocks in the S&P 500® Index and (2) a new index called the Wilshire 4500 Completion Index℠, which contains the remaining smaller non-S&P 500 stocks. In 1986, Wilshire introduced style indexes, called the Wilshire Target Indexes℠, comprised of stocks with concentrated growth or value characteristics. In 1996, separate style indexes, called the Wilshire Style Indexes℠, were created for a different purpose: to measure the performance of a broader variety of investment styles and to act as benchmarks to evaluate the performance of active managers. In 2005, Wilshire Associates enhanced its Wilshire US Style Index methodology, which in turn led to the June 2006 retirement of Wilshire's earlier style indexes.

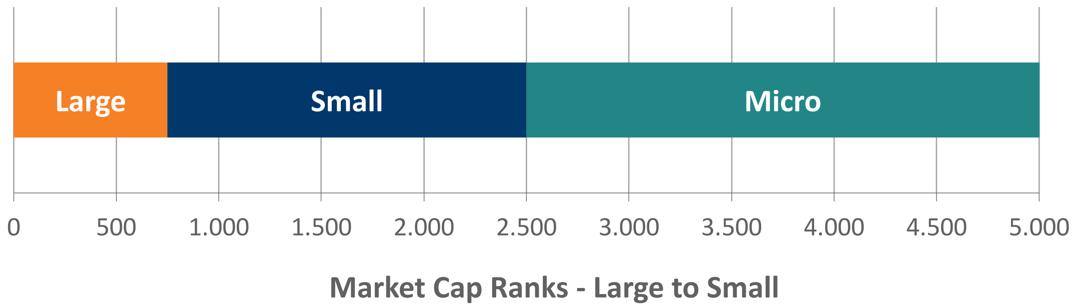
The Wilshire US Style Indexes

Today, the Wilshire US Style Indexes are constructed by separating the Wilshire 5000 universe of stocks into four capitalization groups using full market capitalization and then splitting the capitalization groups into growth and value stocks. The resulting ten indexes are float-adjusted, market-capitalization weighted. Instead of twelve sub-indexes, there are ten style benchmarks because the smallest capitalization group, micro-cap stocks, does not split readily into growth and value. Wilshire research shows that unlike larger stocks (market cap rank over 2,500), the fundamentals of micro-cap stocks do not explain performance as much as size and industry do.

The four capitalization groups and their definitions are:

- **Wilshire US Large-Cap** – the 750 largest stocks by market capitalization;
- **Wilshire US Small-Cap** – the next 1,750 largest stocks, i.e., from 751 to 2,500 in terms of market capitalization;
- **Wilshire US Mid-Cap** – a combination of 500 large and small stocks from the 501st largest to the 1,000th largest by market capitalization;
- **Wilshire US Micro-Cap** – all stocks in the Wilshire 5000 Index that are not in the top 2,500 by market capitalization (below the 2,501st largest).

Figure 1 shows how these definitions divided the Wilshire 5000 into the size indexes.



The large and small capitalization indexes each have been equally divided by float weight—not the number of stocks—into growth and value indexes. For example, an equal weighting of the Wilshire US Large-Cap Growth Index return and the Wilshire US Large-Cap Value Index return gives approximately[1] the same return as the Wilshire US Large-Cap Index. With these new indexes, stocks are classified as either growth or value so that adding component growth, value, and/or capitalization indexes together will give the desirable result of reproducing the Wilshire 5000 Index[2]. This building block approach means that the sum of the parts (Wilshire US Large-Cap Growth, Wilshire US Large-Cap Value, Wilshire US Small-Cap Growth, Wilshire US Small-Cap Value and Wilshire US Micro-Cap) equals the whole (Wilshire 5000 Total Market Index) without any gaps or overlaps.

Separating Growth from Value Stocks

The Wilshire style methodology uses six intuitive fundamental factors backed by statistical analysis to define a company as growth or value. The six factors are:

- Price-to-earnings ratio, where earnings are the projected analysts' earnings for the next year;
- Forecast long-term earnings growth;
- Price-to-book ratio;
- Dividend yield;
- Trailing revenue growth for the previous five (5) years;
- Trailing earnings growth for the previous 21 quarters.

Other factors were evaluated but none were able to contribute to the net explanatory power of these six factors.

Wilshire equal-weights the six style factors; which reduces data mining because different factors have different discriminating power over different time periods. Each stock's exposures to the six factors are normalized against their base capitalization segment (the Wilshire US Large-Cap and Wilshire US Small-Cap) via a z-score statistic. A z-score measures where a data point falls with respect to the distribution of all data points in the population. Z-scores are computed by standardizing each stock's fundamental factor exposure by computing the number of standard deviations its value is away from the mean fundamental value. This standardization technique is commonly utilized to protect against problems inherent in the combination of factors with varying distribution. To limit the impact from data outliers, Wilshire applies z-scores of –2 and 2 to raw z-scores below –2 and above 2, respectively. Stocks with missing factor(s) are assigned the segment industry average for the missing factor(s).

Once a stock's z-scores are calculated for each of the six fundamental factors, a composite style score is computed. Wilshire arrives at a stock's aggregate style score by measuring each stock's "Euclidian distance" from the growth and value seeds. Since the z-scores are designed so that negative scores represent relative value and positive scores indicate relative growth, the value seed is assumed to have exposure of –2 to all six fundamentals, while the growth seed is assumed to have exposures of 2. The calculation is as follows

$$\text{Distance from Seed} = \sqrt{\sum_{f=1}^{n}\left(E_f - S_f\right)^2}$$

where: E is the stock's exposure to factor f and S is the seed's exposure to factor f (S =2 for the growth seed and S =–2 for the value seed).

A stock's final value score is found by comparing its distance from both the growth and value seed as follows:

[1] A number of items prevent this from being exact including additions and deletions.

[2] Since the style indexes are float adjusted, their combination reproduces the float adjusted Wilshire 5000 Index.

$$\text{Value Score} = G/(G+V)$$

where: G is the stock’s distance from the growth seed and V is the stock’s distance from the value seed (Note: a stock’s Growth Score = 1 – Stock’s Value Score).

Stocks with a value score above 0.5 (and growth score below 0.5) are placed in the value index, while stocks with a growth score above 0.5 (and value score below 0.5) are placed in the growth index. While the style methodology does not lead to an equal number of stocks across style categories, it targets a 50/50 float-adjusted capitalization split between growth and value within the large and small cap segments.

Wilshire US Mid-Cap Index stocks use the same style assignment as the corresponding Wilshire US Large-Cap or Wilshire US Small-Cap style-assignments.

Buffer Reduce Turnover

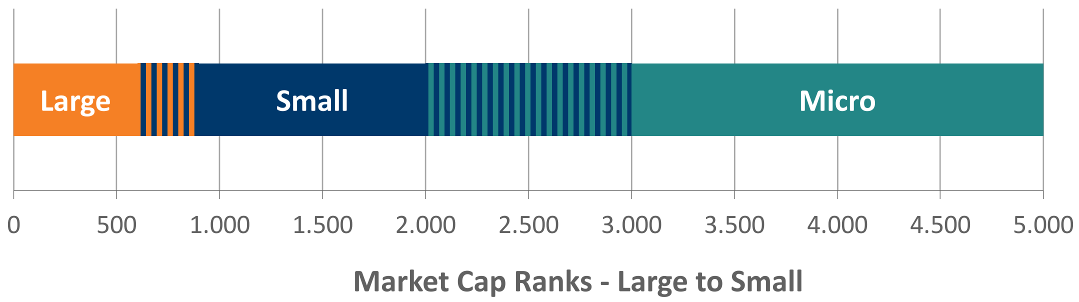
As important as style purity is, Wilshire recognizes that total style purity would result in unnecessary and undesirable turnover. A membership change should reflect changes in risk exposures to the “new” category large enough to justify the change. Buffers strike an appropriate balance between style purity and justified turnover. Applied during the indexes’ reconstitution, buffers ensure that only pronounced or prolonged changes in a security’s size or style score results in its reclassification.

The cutoff values that define the size segments are subject to the following buffers:

- Wilshire US Large-Cap/Small-Cap = 601/900;
- Wilshire US Small-Cap/Micro-Cap = 2001/3000;
- Wilshire US Large-Cap/Mid-Cap = 401/600;
- Wilshire US Mid-Cap/Small-Cap = 901/1100.

For example, the Wilshire US Large-Cap/Small-Cap buffers of 601/900 indicate that at the semiannual review, any component stock of the Wilshire US Large-Cap Index ranked 901 or lower is replaced by the highest ranked component in the Wilshire US Small-Cap Index, and any component stock for the Wilshire US Small-Cap Index ranked 600 or higher replaces the lowest ranked component of the Wilshire US Large-Cap Index. Figure 2 shows how the size buffers are applied to Figure 1.

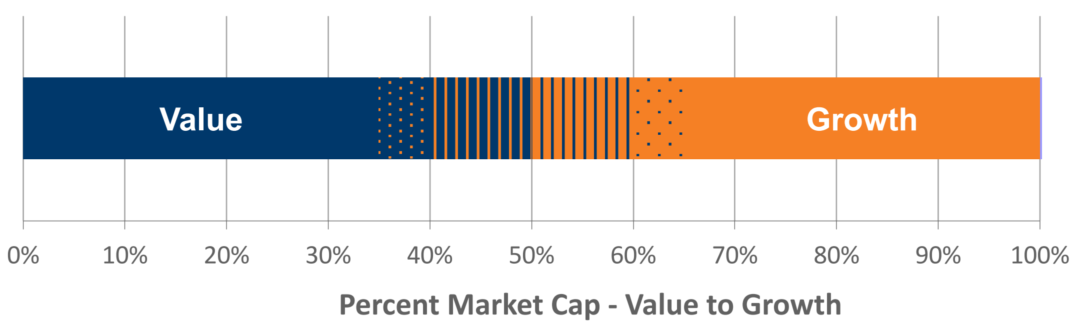
Figure 2: Wilshire Size Indexes with Buffers



Style assignments are finalized based on buffers that are determined by ranking each index's components by composite style score and determining a mid-point based on cumulative market capitalization:

- Any company that remains within 10% of the midpoint retains its previous style classification;
- Any company whose rank is more than 15% beyond the midpoint into the opposite style is reclassified into the new style;
- Any company whose rank is between 10% and 15% beyond the midpoint into the opposite style retains its current classification, but is placed on a watch list. A component that remains on the watch list for one year is assigned the "new" style classification.

Figure 3 shows the style buffers applied a to a style market cap continuum of style scores.



Index Maintenance

Semi-annual rebalances with buffers provide timely changes to style and reduce portfolio disruptions compared to annual rebalancing. March and September rebalance dates align membership changes with the expiration dates of related futures contracts and the release of corporate financial statements. Any changes to the Wilshire 5000 are immediately reflected in the style indexes. This means that additions and deletions are made after the close of the third Friday of each month. Shares outstanding and float factors are updated quarterly after the third Friday of March, June, September and December. If the cumulative impact of a company's corporate actions exceeds 10%, then the shares outstanding and/or the float factor are adjusted as soon as prudently possible. Spin-off stocks that meet Wilshire 5000 inclusion requirements are added to the spinning-off company's index until the next rebalance date.

Conclusion

The purpose of the Wilshire Style Indexes is to improve understanding of the performance of different sections of the stock market and to better evaluate the performance of money managers relative to their respective investment management style. Wilshire Associates has created U.S. style indexes that combine the innovation and quality of prior Wilshire style indexes, manager research knowledge and attribution expertise. Their purpose is to continue to give the investment community better information on important return and risk segments of the market, as well as ways to better understand the actions and performance of domestic equities managers. With histories going back to June 1978, these indexes continue to accomplish this task.

For more information go to: www.wilshire.com

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