

Keeping Up with Styles

The Case for Periodic Recalibration of Style Benchmark Factors

- While there is no universally accepted definition of “growth” or “value,” and there is much debate about the merit of adhering to style boxes, style benchmarks serve important benchmarking, risk management, and asset allocation needs by measuring style box movements in a manner congruent with broadly accepted definitions of style factors.
- Developments in financial theory and accounting standards, as well as data availability, affect relevance of growth and value factors across time.
- Therefore, a cornerstone of robust style benchmarks should be periodic reviews of underlying style factor definitions.
- Periodic reviews and incremental adjustments at intervals of 5 to 10 years provide a basis for style benchmarks to stay relevant through time.
- Beginning in 2009, Standard & Poor’s will introduce a new procedure for maintaining the ongoing relevance of its U.S. style benchmarks by instituting a process for periodic review of style factors. This document describes the process and results of the 2009 review.
- The S&P U.S. Style Indices will use three growth and three value factors. Sales growth, momentum, and earnings change to price ratio (closely related to the PEG ratio) will be used as growth factors, while earnings to price ratio, sales to price ratio, and book to price ratio will be used as value factors. Overall, four out of the seven existing factors will change. The structure, methodology, and rebalancing schedule for the indices will remain unchanged.

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Introduction

Various criticisms have recently been made with respect to ubiquitous style boxes, including the contention that they cost investors absolute and risk-adjusted performance during bear markets. While some of this criticism is thought provoking, blaming the size/style framework for unsatisfactory performance is misplaced. Size and style explain a large part of the cross section of equity returns and the framework has been an invaluable resource for facilitating performance measurement and passive investment. However, style boxes should not be interpreted as a cage. It may very well pay to invest with managers who fall “outside the box,” but surely it also pays to know that fact. Conversely, it is surely beneficial not to overpay for exposure within style boxes. While there are no universally accepted definitions of growth and value, there is a body of topical literature in which factors consistently appear as helping to define growth or value, or both. Ideally, style benchmarks would reflect theory as it evolves through time.

First generation style benchmarks were built around single factors such as book to price. Since growth and value were defined by a single variable, value consisted of stocks with high book to price values and growth consisted of those with low book to price values. However, relying on one measure to differentiate growth from value was justifiably criticized. Pope, Rakvin, and Platt (2003)¹ point out some of the limitations of book to price and state that while it does seem to have explanatory power, “there logically must be ... additional information in other factors.” As a solution, next generation style benchmarks assessed growth and value along separate dimensions by identifying distinct growth and value factors.

While multi-factor style indices were an important innovation in style benchmarking, they also suffer shortcomings. Over time, developments in financial research, changes in accounting standards, and shifts in investment sentiment jointly contribute to variations in growth and value factor sensitivities. Given the inherently factor-based nature of style indices, good benchmarks would ideally incorporate some level of dynamism. On the other hand, it is important to avoid too much change because benchmarks provide a standard for performance measurement. By periodically updating factors every 5 to 10 years, style benchmarks can capture an aspect of market representation that may be ignored in static formulations. For example, much work has been done in recent years on styles factors, so the universe of potential factors is of a considerably different makeup than it was 10 or 15 years ago. Style benchmarks should take these developments into account. Less directly but perhaps just as significantly, changes in accounting standards may affect factor efficacy in growth and value differentiation. Periodic factor updates would capture changing dynamics on both fronts without over-fitting to recent history.

The Need for Factor Revision

With the 2009 rebalance of its U.S. style benchmarks, S&P Indices will revise the factors it uses to categorize growth and value stocks and create its style indices. S&P has embarked on this update with the goal of addressing the need for increased dynamism in style benchmarking. Measures of the need to review and potentially revise style factors include the frequency, breadth, and depth of changes in accounting standards over time. Since the original deployment of S&P's current factors, many changes have occurred in accounting standards and also, perhaps, in the factors that best reflect the investment decisions of growth and value managers. Table 1 shows the number of new standards issued for the last 5 years by the Financial Accounting Standards Board (FASB).

Table 1 – Recent Years Have Seen Numerous Changes to Accounting Standards

Number of FASB Standards Issued	
2005	22
2006	14
2007	9
2008	20
2009 YTD	15

Source: www.fasb.org, Standard & Poor's

Some of these changes in standards have had far-reaching consequences. One example is the statement of financial accounting standards (SFAS) No. 158, released in September 2006, which changed the rules under which public companies report pension-related assets and liabilities on the balance sheet. Mulford, Quinn, and Swanson (2008)² show the effects of SFAS No. 158 on total assets, total liabilities, and shareholder equity, as well as on related profitability measures such as return on assets (ROA) and return on equity (ROE). Of the 24 companies studied (Dow Jones Industrial Average components with defined benefit plans affected by SFAS No. 158 in 2006), the change in ROE after adjusting for the new standard ranged from 0.5% to 173.9%. To analyze ROE through time as a determinant of returns, we ranked the S&P 500 universe and measured ROE quartile portfolio returns for 7 non-overlapping periods covering January 1988 through August 2009. Table 2 shows the results; it seems clear that ROE performance is highly time-varying.

Table 2 – Performance of ROE Quartile Portfolios is Time-Varying

Average Monthly Active Return	Equally Weighted Quartile Portfolio			
	1	2	3	4
Jan-88 thru Dec-91	4.98%	1.37%	0.73%	0.13%
Jan-92 thru Dec-94	1.22%	5.03%	8.41%	10.71%
Jan-95 thru Dec-97	2.56%	-0.46%	-3.24%	-5.58%
Jan-98 thru Dec-00	5.52%	1.76%	-0.39%	0.29%
Jan-01 thru Dec-03	7.41%	11.38%	13.68%	16.03%
Jan-04 thru Dec-06	3.63%	5.63%	5.79%	6.05%
Jan-07 thru Aug-09	5.26%	11.60%	9.27%	14.50%

Source: Standard & Poor's

In addition to variations in accounting standards and factor sensitivities, the style literature evolves through time. For example, momentum has appeared frequently in the past 10 years while some factors that are commonly thought of as style determinants, such as dividend yield, appeared less frequently.

Our factor revision should result in style benchmarks that reflect current thinking and practice with respect to the measures that best determine style constituency.

Style Factor Identification

Overview

There are many potential factors that have been investigated as style determinants. Ideally, style indices would be constructed in such a way as to maximize the differentiation and, therefore, the utility of the growth and value categories. Practically speaking, however, searching for factors that have historically enabled such a result amounts to an exercise in data mining. There is no assurance that such divergence would continue during out-of-sample periods. On the other hand, it is sensible to select factors that are likely to hold the promise of growth and value differentiation as indicated by their past history as long as their application is not designed to optimize historical growth and value differentiation. The approach we have taken to determine which factors to use going forward began with a survey of academic and practitioner literature. Referring to a current body of research, we will update our indices with factors cited in the latest work on the topic. The steps involved in our overall process are summarized below.

1. Review of relevant literature:
 - a. We searched for peer-reviewed papers that have been published in academic and practitioner journals on the subject of style investing in the 10 years through January 2009. To avoid biasing our search results, we did not use specific factor names, such as “price to book.” We searched paper abstracts for keywords “growth” *or* “value” *or* “style,” *and* “stocks” *or* “equity” *or* “portfolio.”
 - b. We created a catalogue of factors referenced in the literature, each of which became a candidate for inclusion in the set of new style factors.
2. Definition of analytical universe:
 - a. For the purpose of performing the analyses described below, our universe is comprised of all U.S. domiciled and listed stocks trading over US\$ 5 per share.
3. Time series analysis:
 - a. For each potential factor, rank all stocks in the universe. Create factor quartiles and form equally-weighted portfolios of stocks in the top and bottom quartiles.
 - b. Calculate monthly returns of each portfolio for the past 20 years, and measure the monthly difference in total return between top and bottom portfolios (the inter-quartile spread).
 - c. Calculate a t-statistic from the inter-quartile spread time series of each factor and rank all factors by t-statistic.
4. Cross-sectional analysis - for each potential factor, perform a *k*-means cluster analysis. Insightful Corporation (2001), producer of the statistical software S-Plus, describes the *k*-means clustering as an algorithm wherein “the observations are classified as belonging to one of *k* groups. Group membership is determined by calculating the centroid (the multi-

dimensional version of the mean) for each group and assigning each observation to the group with the closest centroid.”

- a. For sample years under consideration in our data set, we perform *k*-means clustering for every potential factor. We set *k* equal to 2 because we want to divide the universe into 2 parts. Factors are standardized and outliers removed before clustering.
- b. For each factor we record two terms, intra-cluster distance and inter-cluster distance. The former refers to the distance of each cluster member from the cluster centroid, while the latter refers to the distance between the centroids of each cluster.
- c. We characterize the clustering ability of each potential factor in terms of a clustering power variable, defined as:

$$\text{Clustering Power} = \frac{\sum_{y=1}^5 \text{Inter-ClusterDistance}_y}{\text{Intra-ClusterDistance}_y}$$

Where for each year,

$$\text{Inter-Cluster Distance} = |Centroid(A) - Centroid(B)|^2$$

$$\text{Intra-Cluster Distance} = \frac{\text{SumSquare}(A)}{\text{Count}(A)} + \frac{\text{SumSquare}(B)}{\text{Count}(B)}$$

Centroid(A) and Centroid(B) refer to the centroids of each of two clusters for each potential factor. SumSquare(A) and SumSquare(B) refer to the sum of squares of the distances among members within each cluster. Count(A) and Count(B) refer to counts within each cluster. All these variables are available as output of S-Plus’ *k*-means clustering module. We rank all factors by their clustering power variable.

- 5. Review of data coverage:
 - a. For all potential factors, we performed an assessment of data coverage. We prefer factors with relatively high data coverage.

Candidate List

Our literature review resulted in a list of 39 papers, which cited 13 style-related factors plus several variations focusing on altering time periods over which variables are calculated. Variations are more prevalent within the group of potential growth factors because there is less of a consensus regarding their identification and formulation. It was not until the introduction of multi-factor indices that growth began to be measured by a different set of factors than value. The most common formulation of single-factor benchmarks relies on book to price in order to differentiate styles. The literature reflects this, as book-to-price is the most cited factor and the average frequency of citations per growth factor is

significantly lower than the average frequency of citations per value factor. Table 3 summarizes the findings of our literature review, sorted by frequency of citation.

Table 3 – Literature Review Findings

Growth		Value	
Factor	# of Citations	Factor	# of Citations
<i>Momentum</i>	10	<i>Book to Price</i>	30
<i>Book Equity Growth</i>	3	<i>Earnings to Price</i>	13
<i>Return on Equity</i>	2	<i>Dividend Yield</i>	9
<i>Earnings Change to Price</i>	1	<i>Cash Flow to Price</i>	6
<i>Earnings Surprise</i>	1	<i>Sales to Price</i>	4
<i>Estimate Revisions</i>	1	<i>Forecast Earnings to Price</i>	1
<i>Sales Growth</i>	1		

Source: EBSCO Online Database, Standard & Poor's

Generally speaking, as noted by Brush (2007),³ growth factors capture some change and thus may be thought of as dynamic, while value factors capture some level and thus may be thought of as static. One possible exception to this line of thinking is return on equity (ROE), which seems to capture a level at a point in time but has been considered as a growth factor in the literature.

Factor Selection

The approach we use in factor selection encompasses three considerations. First, we give preference to factors with more frequent citations in the literature selected in order to reflect the dynamism of current thinking and practice in the field of style investing. Second, we prefer factors that are constructed from measures with high levels of coverage within the S&P Total Market Index (TMI) universe, which facilitates style categorization across the entire spectrum of U.S. market capitalization. Third, all else equal, we prefer factors with relatively high analytical ranks, as indicated by our time series and cross sectional analyses.

Growth

Table 4 ranks all growth factors under consideration in order of literature citation frequency for data coverage, time series, and cross sectional analyses. In making factor selections, S&P tried to balance the sometimes conflicting considerations of presence in the literature, data coverage, and analytical results. We weighed the first two considerations somewhat more heavily than the last. Momentum had the highest citation count (see Table 4) and highest level of coverage. The relative importance of these considerations overcame its middling analytical performance because we wanted to avoid data mining and include representative factors. Book equity growth was not accepted because of its relatively low level of data coverage. Return on equity was not accepted due to its extremely poor analytical results. Earnings change to price, despite its low citation count, had reasonably good coverage and analytical results, and was accepted. Earnings surprise and estimate revisions were both rejected because of coverage levels. Finally, sales growth, also despite a low citation count, had good coverage and analytical results, and was accepted.

Table 4 – Ranking of all growth factor candidates, in order of literature citations

	Data Coverage as of Dec 2008	Time Series	Cross Sectional
Momentum	1	6	4
Book Equity Growth	5	3	5
Return on Equity	3	7	7
Earnings Change to Price	3	4	2
Earnings Surprise	7	2	6
Estimate Revisions	6	1	3
Sales Growth	2	5	1

Source: Standard & Poor's

Value

Table 5 ranks all value factors under consideration in order of literature citation frequency for data coverage, time series, and cross sectional analyses. Book to price had the highest overall number of literature citations and the highest level of data coverage, as well as fairly good analytical results; it was accepted. Earnings to price also had high levels of literature mentions and data coverage along with reasonably good analytics; it was also accepted. We were skeptical of our cross sectional rank of dividend yield because the universe is naturally clustered into stocks that pay dividends and those that do not; therefore, we reasoned that the cross sectional results were biased upward and discounted it somewhat. Since none of the other results were particularly impressive, dividend yield was rejected. While cash flow to price had a somewhat better citation frequency and equivalent data coverage compared to sales to price, the latter had superior time series and cross sectional results. Therefore, cash flow to price was rejected and sales to price was accepted. Forecast earnings to price ranked poorly in all measures and was therefore rejected.

Table 5 – Ranking of all value factor candidates, in order of literature citations

	Data Coverage as of Dec 2008	Time Series	Cross Sectional
Book to Price	1	4	3
Earnings to Price	2	3	4
Dividend Yield	5	5	1
Cash Flow to Price	2	2	6
Sales to Price	2	1	2
Forecast Earnings to Price	6	6	5

Source: Standard & Poor's

Summary of Changes

Table 6 shows the upcoming factor changes.

Table 6 – 2009 Revision to S&P U.S. Style Factors

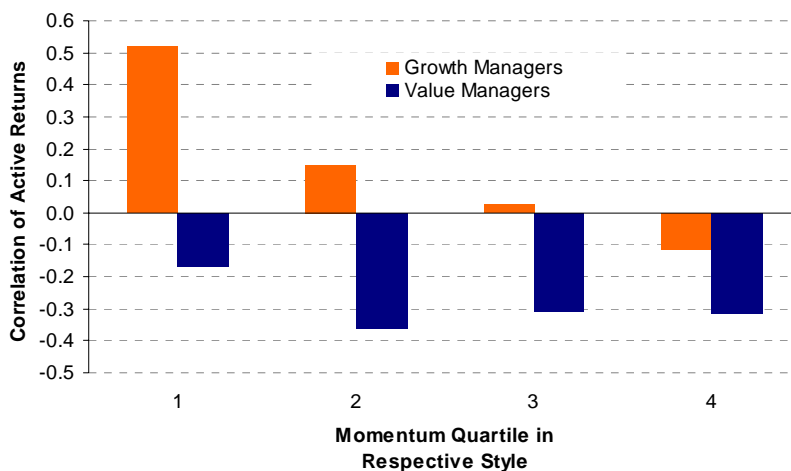
	Current Factors	Revised Factors
Growth	Sales Growth	Sales Growth
	Earnings Growth	Earnings Change to Price
	Internal Growth Rate	Momentum
Value	Book to Price	Book to Price
	Sales to Price	Sales to Price
	Cash Flow to Price	Earnings to Price
	Dividend Yield	

Source: Standard & Poor's

Momentum as a Growth Factor

Of all the factors under consideration, momentum is perhaps the most controversial. Much work has been done demonstrating its efficacy as an investment strategy. Some theorists and practitioners consider it to be an additional dimension of investment style, independent of growth or value. Logically, there is reason to see it as such because momentum may develop in either growth or value as market leadership shifts. Bird and Casavecchia (2007) follow this line of thinking as they consider momentum effects across growth and value styles. Others view momentum in lieu of the growth style. For example, Arshanapalli, d’Ouille, and Nelson (2004) and Bansal, Dittmar, and Lundblad (2005) both examine various effects of momentum along with size and value. However, Brush (2007) considers momentum explicitly as a growth factor. Its efficacy as such becomes clearer when one considers the high level of excess return it explains among growth managers. Exhibit 1 shows the correlation of growth and value managers’ excess return versus momentum’s excess return within each style. The analysis covers 10 years through August 2009. Momentum quartile portfolios are drawn from growth and value benchmark universes, respectively.

Exhibit 1 – Growth manager active return is linearly related to momentum, while value manager returns are negatively correlated to momentum across quartiles.



Source: Lipper, Standard & Poor's

It appears that momentum goes a long way toward explaining active returns of growth managers, whereas this factor is negatively correlated to the active returns of value managers. This makes intuitive sense since price momentum is a reaction to fundamental momentum in measures such as earnings and cash flow.

Summary

Consistency in style benchmarking need not imply artificially confining factor exposures to a static set. The world changes and style benchmarks should be representative of recent research and results in the field without being over-reactive or over-fitted. We feel that periodic reviews of the style literature and factor efficacy are reasonable steps toward instituting dynamism in the benchmarking process.

For its 2009 U.S. style index rebalance, S&P will use several revised factors for its growth and value benchmarks. The changes directly affect the calculation of our growth and value scores, which are then used to construct our style benchmarks. Our overall style index construction framework, downstream of the calculation of style scores, remains intact as originally introduced in 2005. For details of S&P style index construction, see “S&P U.S. Style Indices Methodology” at www.styleindices.standardandpoors.com.

References

- 1) Brad Pope, Chad Rakvin, and Gardner Platt. “Style Indexes of The U.S. Equity Market”, *Investment Insights*, Barclays Global Investors, July 2003.
- 2) Charles W. Mulford, Eric Quinn, and Ryan Swanson. “The Effects of Enacted and Proposed Pension Accounting Changes On Leverage, Profitability, and Earnings Volatility”, Georgia Tech Financial Analysis Lab, January 2008.
- 3) John S. Brush. “Value and Growth, Theory and Practice”, *The Journal of Portfolio Management*, Spring 2007.

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