Re-evaluating the Equity Style Paradigm

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Among institutional investors, the past decade has seen equity style evolve from a subjective generalization of investment philosophy to a crowded bazaar of rigid quantitative classification systems for stocks and portfolios. These modern style methodologies have enjoyed wide acceptance from the institutional investment community under a presumption that their application benefits both portfolio construction and performance measurement. Are these ostensibly scientific systems for parsing stocks and measuring their performance actually helpful to the investment process, or do they handicap effective portfolio management?

COMPASS ANALYTICS

Introduction

The recognition that the stock picking philosophies and processes of individual investment managers often differ significantly is nothing new to investing. Investors have been using the presence of competing philosophies to diversify their multi-manager portfolios since the 1960's. What *is* relatively new, however, is the christening of manager philosophy as "style"[1] and the massive amount of effort that has subsequently been devoted to its definition, quantification, and measurement.

Style Based Indices

No specific research can be pointed to as the origin of the current style classification regimes. The parsing of manager stock selection processes, and thereby the stocks themselves, into either "growth" or "value" seems to have evolved gradually in the 60's and 70's. Perhaps investment consultants can claim the majority of the responsibility for pushing the current style dichotomy into the collective investment consciousness. Regardless of how or when style classification arrived on the scene, the introduction of cheap computing power in the late 1980's made the creation of style based indices feasible, and consultants quickly added them to their repertoire of services (see Table 1 [Acito, 2001]). Suddenly, style was no longer merely a classification scheme, it had now crossed over into performance measurement. Most managers applauded the new style-based benchmarking approach, realizing that they now had an added opportunity to claim superiority by beating the slower of two horses: their specific style index or the broad market index.

Table 1—Events in the Evolution of Style

1987	Frank Russell creates large capitalization style indices
1987	Wilshire creates large and small capitalization style indices
1992	S&P and BARRA create large capitalization style indices
1992	Morningstar introduces style boxes, categorizes funds according to prospectus
1995	Morningstar begins categorizing managers according to style boxes
1996	S&P/BARRA create small capitalization style indices

The popularity of style-based indices for performance measurement brought new urgency to the problem of classifying managers according to their investment style. Consultants and their clients needed ways to understand which index, or combination of indices, to use to measure a manager's performance appropriately. With new and complex ways of calculating style benchmarks, classifying a manager simply by assessing their advertised investment process suddenly seemed terribly old fashioned and unscientific.

Classification Science

In addition to reviewing a manager's stated investment process to determine their appropriate style category, the increase in computing power made possible two new techniques for determining a portfolio's style: Returns Based Analysis and Holdings Based Analysis.

Returns Based Analysis became viable shortly after the introduction of style based indices. Sharpe [1988, 1992] advocated the use of common linear regression techniques to determine what linear combination of style based indices best represented a manager's return history. The procedure quickly grew into an industry with firms like Zephyr Associates touting its benefits. Although theoretically appealing, this technique has significant, and intractable shortcomings as noted by Buetow, Johnson, and Runkle [2000] and Buetow and Ratner [2000]. In addition the method requires a substantial set of historical returns and therefore is relatively insensitive to a manager's changes in style or "style drift" as it has become known.

[1] While some practitioners use the term "style" to refer to a combination of both stock selection process (i.e., growth, value, core, etc.) and market capitalization, here we will use the word to refer to process exclusive of a manager's target market capitalization.

Table 2—Style Determination Methodology of Various Index Providers

Provider	Methodology
S&P/BARRA	Price-to-book. Top half of market cap is growth, bottom half value reconstituted 1/1 and 7/1.
Russell U.S.	Price-to-book and IBES 5-year estimated growth used for composite score. 70% of stocks are pure growth or value. 30% of stocks partly in both indexes. Reconstituted 6/30.
Russell Non-	P/B, P/Cash Flow, P/E, IBES 5-year estimated growth equally weighted within country. Stocks are either growth or value.
MSCI	Price-to-book.
Wilshire	Price-to-book and price-to-earnings (IBES 1-year estimated). Score = 75% B/P + 25% E/P. Half market cap in each index. Re-constituted in June.
Salomon	Growth stocks have high: 5-year EPS, sales growth, retained ROE.
	Value stocks have high: P/B, cash flow/P, sales/P, yield. Roughly 25% of names and 50% of cap are all growth or all value. The remainder are probability-weighted in both indexes.
Prudential	Growth stocks have: Sales growth > 10%. IBES estimated 5-year growth > median. Low dividend payout. Low debt/capital.
	Value stocks have: Earnings/price > median.

Holdings Based Analysis utilizes the same methods used to create style based indices. Index providers classify each stock in their broad-market index as either growth or value. By identifying which stocks a manager holds in its portfolio, practitioners arrive at a manager's style. But Holding Based Analysis relies on a single "snapshot" of a manager's portfolio, ignoring the timing of purchases and sales of stocks. A "growth" stock may have been a "value" stock when it was purchased and vice versa. In addition, there is no universally accepted definition of what constitutes a "value" or "growth" stock. As Table 2 shows, there is significant variation among providers regarding style criteria.

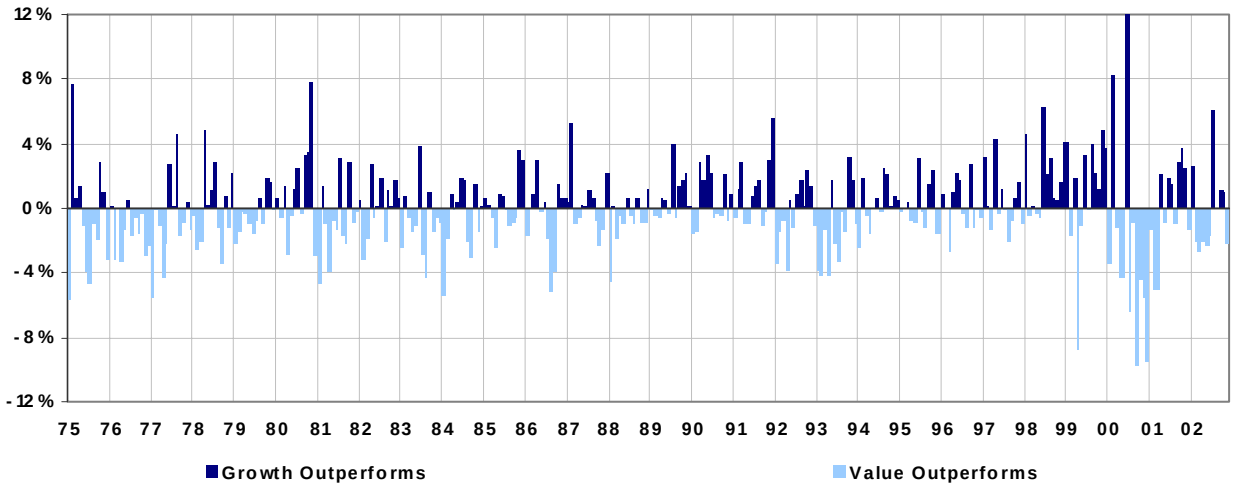
The illusion of scientific precision fostered by these complex and technical formulas tempts investors to believe that multi-dimensional investment philosophies can easily be quantified and categorized by a few simple statistics. The vagaries involved with style classification of both individual stocks and manager portfolios introduce ambiguities that considerably impair the clarity of the benchmarking process. Does using a benchmark produced by carving out a portion of stocks from the overall market with what is essentially a generalized stock screening process improve manager performance measurement? Or does it simply relieve managers of accountability for what is arguably a significant component of their stock selection decisions? These and other questions have been essentially brushed aside by the manager communitie's enthusiasm for an additional benchmark, and a consultant community eager to provide its investors with the latest and greatest techniques.

Style Wars

Of course, all the attention to the definition and measurement of style quickly elevated equity style to the status of asset class. A natural outgrowth of this event was the question whether growth or value was the better investment. An excerpt from Speidell and Graves [2001] summarizes the debate:

Academic researchers have explored the characteristics of the value and growth styles and have often defined value stocks as those with a low ratio of price-to-book value, while growth stocks have a high ratio. They have further suggested that value stocks (so defined) tend to outperform the so-called growth or glamour stocks. Numerous researchers discuss this topic, including Biggs [1995], Fama and French [1993], Lakonishok [1994], Sharpe [1993], and Umstead and Davis [1995].

Chart 1- S&P 500 Growth Minus S&P 500 Value Monthly 1975-2001

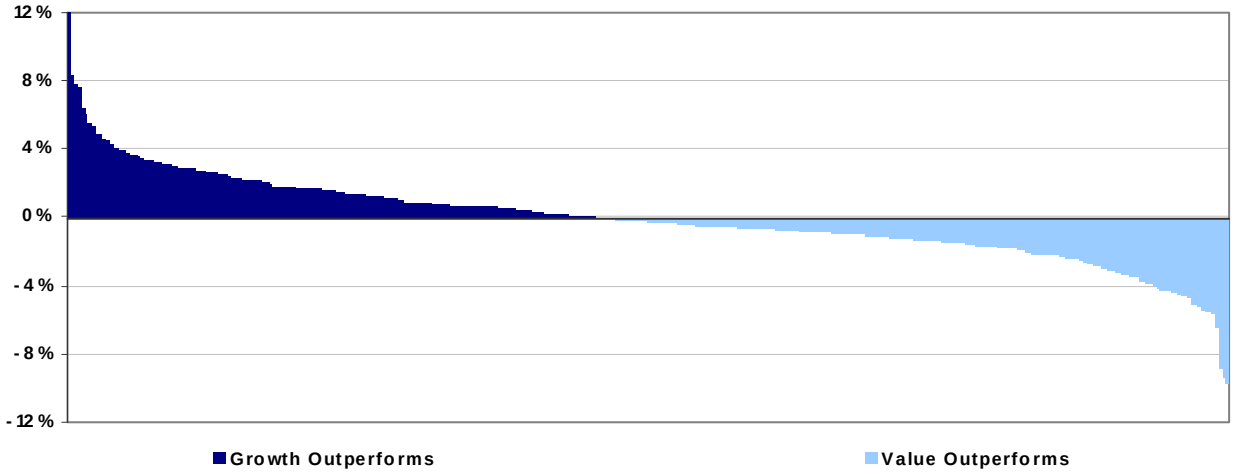


A chapter in Stocks, Bonds, Bills, and Inflation [2000] concludes that from 1927 to 1999, value stocks had returned 13.4% per year while growth stocks had returned only 10.2%. By the mid-1990s, many academicians stated flatly that "value outperforms growth," and some institutional investors responded by terminating their growth managers or at least tilting their asset allocation in favor of value.

Unfortunately, many of these moves came at precisely the wrong time... Over 1975–1993, the S&P value index outperformed the growth index in 11 of 19 years. From 1993 to 1999, however, value underperformed six years in a row. At the end of 1999, the firm of AXA Rosenberg reported that its measure of growth stocks had outperformed value stocks by 125% over the prior 18 months, representing a 6.8 standard deviation event, which "should occur only once every 285 billion years" (The Leuthold Group, March 2000)

The pendulum swung back in favor of value in 2000 through 2002. Chart 1 shows the difference between the monthly returns on the S&P/Barra 500 Growth Index and the S&P/Barra 500 Value Index. The dark blue bars represent months when growth (Barra's definition) outperformed value and the light blue bar months when the opposite was true. Chart 2 shows the same data sorted by magnitude of monthly style

Chart 2- S&P 500 Growth Minus S&P 500 Value Monthly 1975-2001 Sorted



premium. There is no clear style winner here. What is clear, is that styles shift in and out of favor quite rapidly and unpredictably. Chart 3 shows that only four times since 1975 has either style index outperformed for longer than 5 consecutive months. Historically, the average length of an uninterrupted style run is only 2.0 months. This seems contradictory to recent experience and reinforces the idea that the growth run of the late 90's was an extraordinarily anomalous event. Examining the historical data further, we find that the average style run on a calendar quarter basis is approximately 2.0 quarters and, on an annual basis, 1.9 calendar years (even with the recent 6 year growth run). This is a curious result. No matter what discrete time periods one segments the record into, the average style run length is approximately 2 periods. To validate this, we modeled style premiums using monte-carlo simulation techniques.

The first step involved determining an appropriate probability distribution. Using monthly return data from 1975 through 2002 we observed the statistics in Table 5 (see Appendix) for the S&P 500/Barra Style Indices. Focusing on the Growth Over Value

Chart 3 - Length of Style Runs in Months 1975-2001

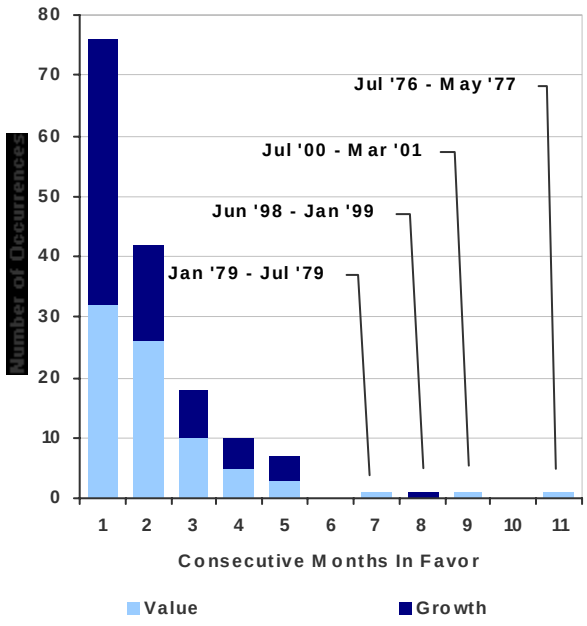


Table 3 - Monte-Carlo Simulation Style Run Statistics

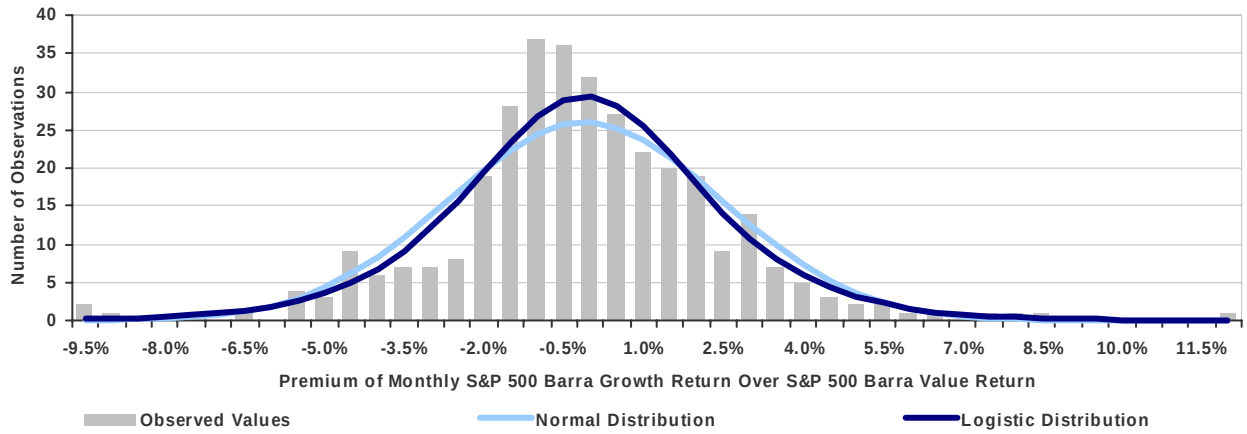
	Run Length		Run Return Difference	
	Monthly	Annual	Level Monthly	Annual-ized
Standard Deviation	1.42	1.21	1.39%	5.35%
Mean	2.00	1.93	1.98%	8.39%
Median	1.00	1.00	1.74%	7.42%

column, we noticed that the Kurtosis is significantly higher than a typical Normal Distribution. This indicated that the Logistic Distribution was a better candidate for modeling style premiums . Examining a histogram of monthly style premiums overlaid with the Normal and Logistic distribution curves reinforces this conclusion (see Chart 4).

We then made the observation that the S&P 500/ Barra Value monthly returns have almost no correlation with style premiums, whereas growth monthly returns have a correlation of approximately 0.5 (see Table A1, Appendix)[2]. We used this result to simulate the growth return by modeling first the value return and then the style premium (i.e., growth less value returns) and then adding to derive the growth style return. Using this approach we simulated 1,000 sets of 252 month streams of style index returns. We then compounded these monthly returns into 21 annual returns. Table 3 displays the results of this monte-carlo simulation. Both the monthly and annual results are consistent with the observed results for both style run length and annualized style run premium shown in Table A4 in

[2] This seems somewhat counter-intuitive, however it is merely an outgrowth of the style classification process. When a stock is categorized as value style, it has basically been identified as "cheap" relative to it's current fundamentals (i.e., price vs. book-value, cash-flow and earnings data). The remaining stocks are labeled as "growth". Whether or not these stocks represent good "values" is not as apparent from current fundamentals, but obviously their prices are relatively high due to some investor rationale. This rationale is generally a consensus prediction regarding the *future* prospects of the underlying company. The subjectivity of these investor predictions represents a variable set containing much more uncertainty than the objective fundamental data. Thus, it seems reasonable that growth indices possess larger historical standard deviation, and style premiums are much more a product of their performance than the performance of their value counterparts.

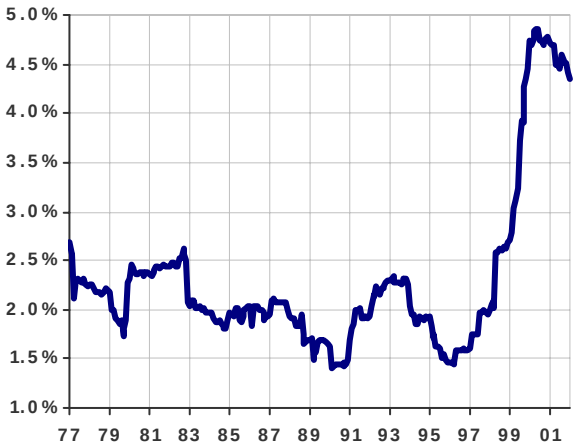
Chart 4-Histogram of Monthly Style Premiums from 1975 thru 2002 with Normal and Logistic Distribution Overlays



the Appendix.

A reassuring observation that can be drawn from these results is that the growth style run that occurred between 1994 and 1999 was far from the anomalous event that some have portrayed it to be. Based on simulation results, similar style runs should occur approximately once every 100 years, making it unlikely, but certainly not bizarre. But while the length and depth of recent runs is short of remarkable, the volatility of monthly style premiums has jumped dramatically. Chart 5 shows that the standard deviation of style premiums has basically doubled from historic norms over the past three years. One has to wonder, whether the increasing emphasis on equity style has not somehow played a part here. By demanding that managers possess a singular devotion to a few specific portfolio fundamentals which we have labeled style indicators perhaps we have reduced their capacity to collectively arbitrage away style mispricings. Certainly, we have reduced their discretion to manage their portfolios on our behalf in the name of risk-control and benchmarking. But have we surrendered performance potential in the process? This question deserves further investigation.

Chart 5 - Rolling 36 Mo. Standard Deviation of Style Premium

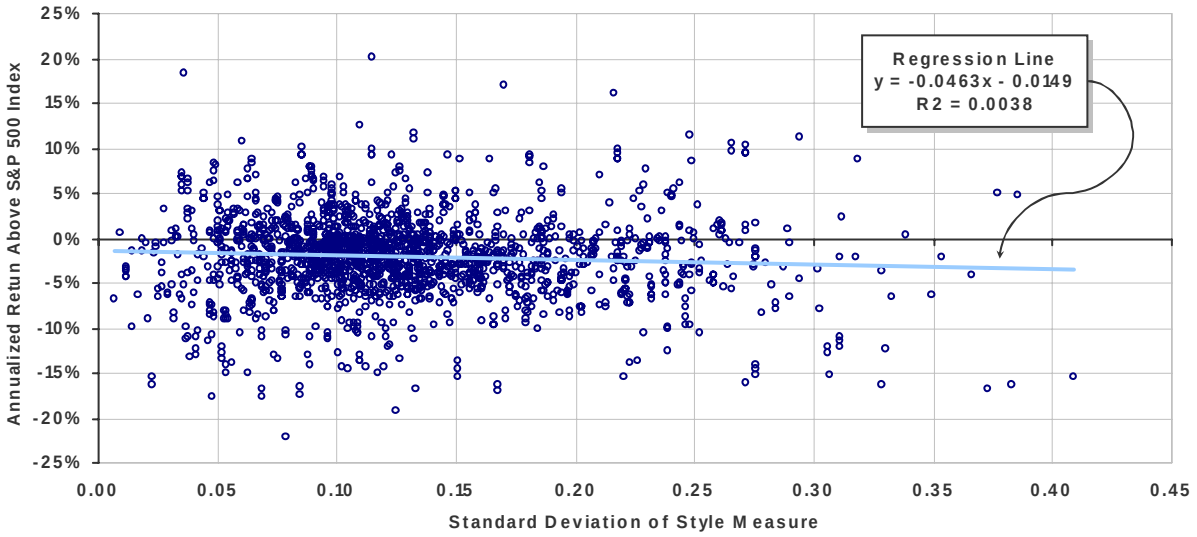


Style Drift

As the use of style based indices for performance benchmarks has become commonplace among consultants and portfolio managers, the desire for managers to fit neatly into pre-defined style boxes has taken on a religious fervor. The degree of movement in some style measure applied to a manager's portfolio has become known as "style drift" and many consultants have taken on the role of style police, including "style drift" analytics as a standard part of their performance reporting. But such analyses imply an air of accuracy that is far from reality. As we saw earlier, both the definition of style and the calculation of style measures are prone to significant ambiguities. Important questions are brushed aside in the process:

- Is it the manager's portfolio that is moving or the style measure?

Chart 6 - Excess Performance of Large Capitalization Mutual Funds vs. Style Drift 1992 Through September 2002



- Is the style measure contradictory to the manager's stock selection process?

- Is style drift actually related to bad performance?

This last question is of particular interest, however few data sources exist with the detailed, historical information necessary to provide an adequate answer. We found only on provider, Morningstar, who had the data to attempt such an analysis. Since 1992 Morningstar has maintained annual ratios of price to book, earnings, and cash-flow on the mutual fund portfolios in its database. Using this data we were able to obtain historical portfolio fundamentals for 1,927 large-cap equity mutual funds. This was combined with historical fundamentals of the S&P 500 to calculate the following style measure for each calendar year, x,

$$S_x = \frac{\left(\frac{PB_x^{\text{Manager}}}{PB_x^{\text{S\&P500}}} + \frac{PE_x^{\text{Manager}}}{PE_x^{\text{S\&P500}}} + \frac{PC_x^{\text{Manager}}}{PC_x^{\text{S\&P500}}} \right)}{\left(IB_x^{\text{Manager}} + IE_x^{\text{Manager}} + IC_x^{\text{Manager}} \right)},$$

where PB, PE, and PC represent price-to-book, price-to-earnings, and price-to-cash-flow ratios respectively. Since some manager ratios for some years were missing, indicator variables IB, IE, and IC were necessary to calculate an accurate average. These variables are either 1, when the corresponding manager ratio is present in the data, or 0 when it is absent.

Using this measure of style we can begin to examine the relationship between performance and style drift. Chart 6 shows a scatter plot of mutual fund annualized excess return to the S&P 500 vs. standard deviation of mutual fund style for the 1,927 mutual funds in our dataset. The chart indicates that high levels of style drift are not indicative of poor fund performance over long periods. But is significant style drift related to poor performance over shorter periods? Even better, is style drift predictive of poor performance? An affirmative answer would certainly reinforce the popular practice of including style drift analytics in quarterly performance reports.

To address this question, we examined the data for excess performance in the year following a significant change in our style measure. We calculated the percentage of manager style drift during calendar year x as,

Table 4—Impact of Style Drift on Subsequent Year's Excess Returns

	2002*	2001	2000	1999	1998	1997	1996	1995	1994	All Years
No-Drift Excess Returns										
Count	1,749	1,272	1,658	1,397	1,213	947	749	586	388	9,959
Average	3.74%	2.12%	8.02%	-7.58%	-9.74%	-7.13%	-4.20%	-6.31%	-2.24%	-1.44%
Std Deviation	8.42%	8.96%	11.55%	12.68%	10.74%	7.32%	5.55%	6.71%	4.10%	11.50%
Post-Drift Excess Returns										
Count	178	600	142	81	31	32	26	22	31	1,143
Average	6.31%	3.98%	12.90%	-4.95%	1.37%	-10.26%	-5.58%	-9.61%	-4.90%	3.63%
Std Deviation	12.68%	8.87%	13.96%	14.45%	23.03%	15.32%	8.24%	11.32%	4.48%	12.63%
Post-Drift Excess Returns Less No-Drift Excess Returns and Significance										
Difference	2.57%	1.86%	4.88%	2.63%	11.12%	-3.14%	-1.38%	-3.30%	-2.66%	5.07%
Significance	1.04%	0.00%	0.01%	11.60%	1.03%	27.05%	42.00%	20.05%	0.22%	0.00%

* 2002 excess returns are year-to-date through September 30.

$$SD_x = \frac{\left(S_{x+1} - S_x\right)}{S_x}.$$

We then used this drift measure to divide the dataset of calendar year fund excess performance (vs. the S&P 500) into "no-drift" and "post-drift" calendar year fund premiums. Using a prior year ***SD*** cutoff of 25% produced the results shown in Table 9. Significance was calculated using a t-statistic. The startling result is that, over all years, average post-drift excess returns exceeded no-drift returns by over 500 basis points, at a significance level 0.00%. Examining each calendar year separately, we see that post-drift premiums averaged less than no-drift premiums in 94, 95, 96, and 97, however only one of these years, 1994, had a significance level below 20%. It is also interesting to note that only the most recent years exhibit the existence of post-drift premiums and these span both growth and value periods.

One final observation that can be drawn from the Morningstar data is that, of the 1,927 funds in the dataset, 853, or 44%, had at least one year where ***SD*** exceeded 25%. This by itself is not an insignificant result since the average standard deviation of S_x for the funds is 11% of the mean. Thus almost half of the funds in the study had at least one single year style drift of over 2 standard deviations.

Conclusion

These results call into question the practice of using style based indexes for performance measurement. Although proper diversification necessitates the inclusion of managers with disparate stock selection paradigms in a portfolio, the attempts of the past decade to quantify these complex schemes with style indices has resulted in the deterioration of the benchmarking process. By their nature, style indices encourage a focus on short-term investment results rather than the long-term horizons that are crucial to successful equity investing. Individually, the ambiguities introduced in each phase of the style indexing process: index construction, initial manager classification, and manager style drift, are enough to call into question the wisdom of their use. Taken together, these vagaries should remove style indexes from serious consideration as candidates for long-term performance measurement. In addition, the data suggest that style drift has no impact on manager performance, on the contrary, it appears that some managers may have become adept at capturing style premiums through significant shifts in the style positions of their portfolios.

Notes

The Logistic Distribution has a density function expressed as,

$$f(x) = \frac{\frac{1}{\beta}\exp\left(\frac{x-\alpha}{\beta}\right)}{\left[1+\exp\left(\frac{x-\alpha}{\beta}\right)\right]^2},$$

and a distribution function of,

$$F(x) = \frac{\exp\left(\frac{x-\alpha}{\beta}\right)}{\left[1+\exp\left(\frac{x-\alpha}{\beta}\right)\right]},$$

resulting in,

$$E(X) = \alpha,$$
$$Var(X) = \frac{\beta^2\pi^2}{3}.$$

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Appendix

Expanded results for the Monte-Carlo simulation of monthly and annual style premiums.

Table A1—S&P 500 Style Index Monthly Returns 1975-2002

Statistics	S&P 500	S&P 500/ Barra Growth	S&P 500/ Barra Value	Growth Over Value
Kurtosis	1.950	1.316	2.549	2.622
Skew	-0.475	-0.380	-0.513	0.142
Standard Deviation	4.48%	4.94%	4.33%	2.58%
Mean	1.15%	1.09%	1.20%	-0.11%
Correlations				
S&P 500		0.969	0.955	0.253
S&P 500/Barra Growth			0.854	0.483
S&P 500/Barra Value				-0.044

Table A2 - Monte-Carlo Simulation Distribution of Style Runs

	Monthly		Annual	
Consecutive Periods	Specific	Cumulative	Specific	Cumulative
1	50.2%	50.2%	51.7%	51.7%
2	24.7%	74.9%	24.8%	76.5%
3	12.6%	87.5%	11.8%	88.3%
4	6.3%	93.8%	6.0%	94.4%
5	3.1%	96.9%	2.8%	97.2%
6	1.5%	98.4%	1.5%	98.6%
7	0.8%	99.2%	0.7%	99.3%
8	0.4%	99.6%	0.4%	99.7%
9	0.2%	99.8%	0.2%	99.8%
10	0.1%	99.9%	0.1%	99.9%

Table A3—Annual Style Run Monte-Carlo Simulation Occurrences by Run Length and Annualized Premium

Annualized Premium	Length of Style Run in Years														Grand Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	15	
<3%	1,206	270	65	16	2										1,559
3 - 6%	1,039	609	276	145	56	20	13	4	1	2	1				2,166
6 - 9%	889	642	381	223	100	75	26	22	12	2		1	2		2,375
9 - 12%	654	462	273	145	89	40	18	11	3	3	1	1		1	1,701
12 - 15%	503	268	115	41	23	8	7						1		966
15 - 18%	326	104	38	16	4	1	1								490
18 - 21%	198	49	7	1											255
21 - 24%	101	11													112
24 - 27%	59	4													63
27 - 30%	32	2													34
30 - 33%	18	1													19
33 - 36%	12														12
36 - 39%	5														5
42 - 57%	4														4
Total	5,046	2,422	1,155	587	274	144	65	37	16	7	2	2	3	1	9,761
Std Dev	6.5%	3.9%	3.2%	2.8%	2.6%	2.4%	2.3%	1.7%	1.8%	2.2%	2.2%	2.0%	2.0%	N/A	5.35%
Mean	8.3%	8.1%	8.2%	8.2%	8.4%	8.3%	8.3%	8.0%	8.0%	8.3%	8.6%	9.1%	9.8%	N/A	8.39%

Table A4—Calendar Year Style Premiums

Year	S&P 500/ Barra Growth	S&P 500/ Barra Value	Growth Over Value	Annualized Absolute Difference
2002	-23.59%	-20.85%	-2.73%	
2001	-12.73%	-11.71%	-1.02%	10.11%
2000	-22.08%	6.08%	-28.16%	
1999	28.25%	12.72%	15.52%	
1998	42.16%	14.67%	27.48%	
1997	36.52%	29.98%	6.54%	9.34%
1996	23.97%	22.00%	1.97%	
1995	38.13%	36.99%	1.14%	
1994	3.13%	-0.64%	3.77%	
1993	1.68%	18.61%	-16.93%	11.14%
1992	5.06%	10.52%	-5.46%	
1991	38.37%	22.56%	15.81%	
1990	0.20%	-6.85%	7.05%	10.74%
1989	36.40%	26.13%	10.27%	
1988	11.95%	21.67%	-9.73%	9.73%
1987	6.50%	3.68%	2.82%	2.82%
1986	14.50%	21.67%	-7.17%	7.17%
1985	33.31%	29.68%	3.64%	3.64%
1984	2.33%	10.52%	-8.18%	10.28%
1983	16.24%	28.89%	-12.65%	
1982	22.03%	21.04%	0.99%	0.99%
1981	-9.81%	0.02%	-9.83%	9.83%
1980	39.40%	23.59%	15.82%	15.82%
1979	15.72%	21.16%	-5.45%	5.45%
1978	6.78%	6.16%	0.63%	0.63%
1977	-11.82%	-2.57%	-9.25%	
1976	13.84%	34.93%	-21.09%	13.77%
1975	31.72%	43.38%	-11.66%	
Annualized	12.19%	14.10%	N/A	N/A
Average	13.86%	15.14%	-1.28%	8.10%
Std Dev	19.03%	15.10%	11.91%	4.37%

Table A5—Monte-Carlo Distribution of Style Run Returns

	Level Monthly Run Return		Annualized Run Return	
Premium	Specific	Cumulative	Specific	Cumulative
1%	24.8%	24.8%	4.6%	4.6%
2%	33.7%	58.5%	5.4%	10.0%
3%	23.1%	81.6%	6.0%	16.0%
4%	10.4%	92.0%	6.6%	22.5%
5%	4.4%	96.5%	7.3%	29.8%
6%	1.9%	98.4%	8.3%	38.2%
7%	0.9%	99.2%	8.4%	46.6%
8%	0.4%	99.7%	8.2%	54.7%
9%	0.2%	99.8%	7.8%	62.5%
10%	0.1%	99.9%	6.9%	69.4%
11%	0.0%	100.0%	5.6%	75.0%
12%			4.9%	79.9%
13%			4.1%	84.0%
14%			3.1%	87.1%
15%			2.7%	89.8%
16%			1.9%	91.8%
17%			1.7%	93.4%
18%			1.4%	94.8%
19%			1.1%	96.0%
20%			0.9%	96.9%
21%			0.6%	97.4%
22%			0.5%	98.0%
23%			0.3%	98.3%
24%			0.3%	98.6%
25%			0.2%	98.8%
26%			0.2%	99.1%
27%			0.2%	99.2%
28%			0.2%	99.4%
29%			0.1%	99.5%
30%			0.1%	99.6%
31%			0.1%	99.7%
32%			0.0%	99.7%
33%			0.1%	99.8%
34%			0.1%	99.9%
35%			0.0%	99.9%
36%			0.0%	99.9%
37%			0.0%	99.9%
38%			0.0%	99.9%
39%			0.0%	100.0%

About the Author

Randall Doser joined Compass Advisors as Vice President in March of 2001. A Fellow of the Society of Actuaries, an Enrolled Actuary (inactive) and a Member of the American Academy of Actuaries, he has a strong background in the mathematics of finance and extensive experience in the legal and accounting aspects of benefit plan liabilities and assets. Most recently, he was the Manager of Benefit Investments for Freightliner LLC, overseeing the company's $900 million portfolio of pension, 401 (k) and retiree medical assets since 1998. Before that he spent three years with the consulting firm Watson Wyatt Worldwide in their Portland and Minneapolis offices doing retiree medical and defined benefit retirement plan valuation and design for employers ranging in size from 12 to 60,000+ employees. Prior to 1995 he was an associate consultant with Howard Johnson & Company in Portland, Oregon doing defined contribution and defined benefit retirement plan design, administration and valuation for small to mid size companies. Randall graduated in 1990 Magna Cum Laude from Oregon State University with a B.S. in Mathematical Sciences.

About Compass Analytics

Compass Analytics, LLC is a provider of investment analytics and performance measurement services. A member of the Compass group of companies, Compass Analytics offers fully customizable reporting platforms that allow clients to better evaluate the performance of investment managers, asset allocations and risk management strategies employed in their portfolios, whether they manage their own assets or hire an outside adviser or consultant to do so. Compass Analytics also offers clients investor education and research services, whether in the form of white papers on timely investment topics or profiles on investment managers. To find out more about the services offered by Compass Analytics, LLC, call 503-241-7058 or visit the website at www.compassanalytics.net.

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