THE PROBLEMATIC "STYLE" GRID

By Charles T. Howard, Ph.D., and Craig T. Callahan, D.B.A.

Abstract

Current practice has equity managers being hired to represent a particular "style" box limiting them to stocks with characteristics fitting that box, for example, small-cap value or large-cap growth. An extensive literature search reveals that this system has no empirical basis but simply evolved out of convenience. Along the way, assumptions essential to its validity were made and believed to be true without empirical support. In using the multispecialist system, the words "style" and "characteristics" are currently used synonymously. We distinguish between the two and argue that small-cap value, for example, is neither a style of investing nor an asset class but simply a box in the characteristic grid. We conclude that to produce superior returns, managers must be allowed to pursue unique styles and have access to the entire stock universe, which means that resulting portfolios experience characteristic drift. Furthermore, our empirical results, based on style constancy, show that characteristic-constrained investing sets the stage for underperformance.

The Problematic "Style" Grid

A system of portfolio management evolved in the 1990s that segmented the stock universe into "style"[1] boxes defined by value-growth and market capitalization (small, mid, large) characteristics. Within this framework, investors, both individuals as well as pension plan sponsors, allocate their portfolios among these boxes in what they (incorrectly, we believe) call asset allocation. Equity managers are hired to represent a particular "style" box and then asked to limit themselves, by and large, to those stocks with characteristics fitting that box, for example, small-cap value or large-cap growth. Consultants and plan sponsors use this system for institutional investing, and advisers and individual investors use it when they select mutual funds using Morningstar, for example.

One of the primary foundations of the resulting multispecialist, characteristic-constrained system is the use of holdings or returns-based analysis to detect "style" drift, which can be grounds for firing a manager. In performing this analysis, it is assumed that style and portfolio characteristics are synonymous. Style, however, is a method of investing, such as bottom-up, top-down, contrarian, growth, momentum, and so forth. There may be as many styles as there are managers. Characteristics, on the other hand, are measurable dimensions of the portfolio, usually defined by a value-growth scale, such as price-earnings ratio (P/E) or price-to-book ratio (P/B), and market capitalization. For example, small-cap value refers to stocks with a low P/E ratio and small market capitalization. We contend that investment style and portfolio characteristics are two very distinct aspects of equity portfolio management, and thus it is important that these two be kept separate.[2] The current practice in which they are treated as one and the same has led, we believe, to significant underperformance. Later in the paper we present empirical results that provide a first estimate of the magnitude of this underperformance.

Three conditions, which we will present shortly, must be met for the multispecialist, characteristic-constrained system to make sense. To date these conditions have been assumed to be true without supporting empirical results. If these conditions are met, characteristic-constrained investing makes sense and leads to superior investment performance. If these conditions are not met, then constrained investing hampers investment performance. We present evidence that these conditions are not met in the face of style constancy and that, indeed, characteristic drift is part and parcel of superior performance.

The remainder of this paper is organized as follows: In the next section we discuss the investment "style" literature and how it has led to the current focus on characteristic-constrained investing. Then we present results from several recent studies that have explored the impact of characteristic drift on investment performance. The overall conclusion of these studies is that characteristic drift and superior performance go hand in hand. The three conditions under which characteristic-constrained investing makes sense and the constant style test methodology are described in the next section. The results presented reveal that these conditions are not met in our sample and that constrained investing hurts performance. We then present the principles for operating in a world in which unconstrained investing is the rule. Finally, we state our conclusions and recommendations.

The Investment "Style" Literature

The idea of "style"-constrained investing (which herein we will call by its correct name, characteristic-constrained investing) grew out of research about small-firm and low-P/E anomalies. A series of articles by Fama and French (1992, 1993, 1998) and Davis *et al*. (2000) proposed and tested a three-factor returns model involving beta, size, and price-to-book. Momentum is another factor that sometimes is included in such models. There is still no consensus, however, about whether factors other than beta represent risk being priced by the market or abnormal return opportunities. Regardless of whether size and value-growth represent risk factors or abnormal return opportunities, there is little doubt that they have a significant impact on stock portfolio performance.

As a consequence, a number of authors propose ways to measure a portfolio's exposure to both size and value-growth. One approach, known as holdings-based analysis (which is the one we use), is to measure size and value-growth tilts using portfolio holdings. Another approach first introduced by Sharpe (1988, 1992), known as returns-based style analysis (RBSA), involves matching actual returns with various indexes to determine the extent to which these indexes explain historical returns. Articles by Trzinka (1995), Christopherson (1995), Brown (1997), Daniel *et al*. (1997), and Coggin (1998) have explored this approach further.

Proponents of characteristic-constrained investing believe that it is an easy-to-understand tool for selecting and monitoring investment managers and helps investors control risk at the portfolio level. They also believe that significant characteristic drift is grounds for replacing a manager. Characteristic-constrained investing is the focus of articles by Ahmed and Nanda (2001), Ahmed *et al*. (2001, 2002), Arrington (2000), Case and Cusimano (1995), Fabbozi (1998), and Gallo and Lockwood (1997). Books by Bernstein (1995) and Coggin *et al*. (2003) provide more comprehensive tracts. Characteristic-constrained investing has become an industry standard through the efforts of investment advisers, consultants, and organizations such as Morningstar and Lipper, among others.

Ennis (2001) presents a criticism of characteristic-constrained investing, arguing that the resulting multi-specialist architecture (that is, hiring a manager to fill each characteristic box) is highly inefficient. He argues that measures of value-versus-growth and capitalization have proven to be useful but imperfect descriptors of manager style. Consequently, managers often exhibit so-called style drift even when pursuing, in their eyes, a consistent investment philosophy and strategy. Ennis goes on to advocate a return to whole-stock investing, in which an equity manager is free to roam the entire stock inverse in search of opportunities. He posits that this will lead to a less complex and thus less expensive overall portfolio and frees up equity managers to apply their styles to the full range of stocks.

Our study builds upon this argument and provides evidence that not only does constrained investing lead

to inefficiencies in managing a large portfolio, but it also hurts investment performance.

The Role of Characteristic Drift

Several recent articles examine the performance of equity managers in general and unconstrained investing in particular. In a comprehensive study of mutual fund performance, Wermers (2000) found that manager stock picking on average outperformed the benchmark by 130 bp (before transaction costs) and that more-active managers performed better at stock picking than less-active managers. Wermers argues that his holdings-based adjustment provides a more accurate performance measure than RBSA, and this is why he finds superior performance where others have not.[3] In a recent working paper, Baker *et al*. (2004) found that mutual fund managers tend to purchase stocks that earn higher returns at subsequent earnings announcements and sell stocks that earn lower returns. Thus it appears that mutual fund managers exhibit superior stock-picking ability, further supporting Wermers' results.[4]

In another working paper, Wermers (2002) focuses specifically on the causes and consequences of characteristic drift. Using the same methodology as in his earlier work and data for the period 1985–2000, Wermers concludes that characteristic drift plays a central role in generating superior performance among mutual fund managers.[5] His most important conclusions are the following:

1. Mutual fund managers do not attempt to counteract passive characteristic drift with active rebalancing. That is, when a portfolio drifts due to changes in the characteristics of the stocks being held, managers do not counteract this drift with active rebalancing.
2. Managers who have the best before-the-fact stock-picking performance also experience the greatest amount of drift.
3. These same managers produce the best future investment performance.
4. Managers who did not drift produce little or no tilt-adjusted superior performance.
5. The difference between the adjusted return α for the zero drifters and the greatest drifters is roughly 290 bp.

In summary, Wermers (2002) finds that characteristic drift is part and parcel of superior performance among mutual fund managers.[6] In other words, without drift a manager cannot produce superior investment performance. This of course does not mean that drift, in and of itself, produces superior performance. It is more likely that a successful equity style produces both drift and superior performance. They cannot be separated, according to Wermers (2002).

Barberis and Shleifer (2003) recently proposed the following possible explanation for why unconstrained managers outperform constrained managers:

> We study asset prices in an economy where some investors categorize risky assets into different styles and move funds among these styles depending on their relative performance. In our economy, assets in the same style comove too much, assets in different styles comove too little, and reclassifying an asset into a new style raises its correlation with that style. We also predict that style returns exhibit a rich pattern of own- and cross-autocorrelations and that while asset-level momentum and value strategies are profitable, their style-level counterparts are even more so.[7]

They postulated that as a consequence of trading on perceived relative "style" performance, stock returns are infused with a "style" dimension. To test this proposition, Teo and Woo (2004) used mutual fund and individual stock data for the period 1984–1999 and indeed discovered that there is a "style" effect in stock returns. In particular, using the nine Morningstar "style" boxes, they uncovered a strong annual "style" return reversion because investing in the previous two years worst-performing "style" garners an annual return that is 12.6 percent higher than investing in the previous two years best performing "style."[8] These results suggest that beating a broad U.S. market benchmark over multiple time periods requires moving around the characteristic grid.[9] This may help explain why unconstrained managers are able to capture "style" return reversion and outperform their constrained counterparts.[10]

These studies collectively provide intriguing results about characteristic drift and performance. Their general conclusion is that managers must exhibit characteris-

tic drift to produce superior returns. Our study builds upon these results by specifically controlling for equity style. In the next section we present a methodology for capturing the key aspects of an equity style that allows for rigorous application over time. We do this by identifying the characteristic-based screening criteria used by four well-known investors and applying these screens in a constant way through time. The four investors were selected to capture a wide range of styles currently used in the market. By objectively locking in style, we can measure the resulting characteristic drift and the resulting investment performance.

Constant Style Test Methodology

As we mentioned above, the blurring of style and characteristics has happened as a matter of convenience rather than as the result of thoughtful research regarding investment performance. If we were to turn the clock back to the 1980s, when style and characteristics began to merge, what questions should have been raised to determine whether using characteristics to define equity style made sense? After some reflection, we determined that the following three conditions must hold for characteristic-constrained investing to make sense:

1. The set of stocks resulting from the application of a particular style screen should, by and large, fall into a single characteristic box, for example, small-cap growth.
2. The application of the style screen over time must lead to the resulting stocks falling, by and large, into this same characteristic box.
3. Characteristic drift produces inferior investment performance.

If these three conditions are met, characteristic-constrained investing makes sense and produces superior investment returns. If these conditions are not met, then constrained investing hampers investment performance.

To test these three conditions, we identified four well-known equity styles and tested them over the period 1995–2003. The four styles are those espoused by Benjamin Graham, John Neff, William O'Neil, and T. Rowe Price. We chose these because they represent a wide range of equity styles practiced in the market and objective information regarding each style was available from publicly available sources. We did not test a large number of styles and then cherry-pick these four. These were the only four we looked at. Furthermore, we did not know the performance of these styles before running the tests described in the next section.

The four resulting characteristic-based style screens are:[11]

Graham: EPS>0
- EPS five-year growth > 0%, capped at 20%
- Price per share < $1,000
- Score: Price / (EPS * (8.5 + 2*EPS G5yr) * (4.4/ AAA Bond rate))
- Lower the better

Neff: P/E > 0
- EPS five-year growth > 0%, capped at 20%
- Sales five-year growth > 0%, capped at 20%
- Operating margin > 0
- Score: EPS G5yr/(P/E) * Sales G5yr * FCF/sh * OM
- Higher the better

O'Neil: EPS two-year-ago growth > 0%
- EPS year-ago growth > 0%
- EPS three-year growth > 0%, capped at 20%
- Sales growth last year > 0%, capped at 20%
- Score: Sales G1yr * EPS G3yr * Price/52-wk High
- Higher the better

T. Rowe Price: P/E > 0
- ROA > 0%
- Net Margin > 0%
- OM > 0%
- EPS G3yr > 0%, capped at 20%
- Cash flow > 0
- Score: EY * ROA * NM * OM * EPS G3yr
- Higher the better

The characteristic screens for each style were obtained from the sources listed in note 11. The scoring equation was developed as a way to combine individual characteristic screens into a single measure, resulting in rigid, style-constant stock selection.

Using data from S&P's comprehensive financial and market database Research Insight, we applied each style scoring equation to the S&P 1500 stocks at the beginning

TABLE 1

Stock Universe Return Summary Statistics*
(12-month total return: March to February following year)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	AVERAGE
Count	1472	1470	1476	1477	1478	1476	1482	1493	1496	**1480**
Min	–93.70	–79.00	–99.20	–98.70	–99.20	–99.8	–99.90	–99.90	–99.7	**–96.60**
1st Qtr	3.60	–2.60	8.40	–33.50	–27.90	–14.4	–15.40	–39.20	29.2	**–10.20**
Average	27.10	18.20	31.80	–6.00	12.9	20.8	6.60	–20.80	59.0	**16.60**
3rd Qtr	44.70	36.80	52.10	14.00	28.1	51.1	25.00	–1.70	78.7	**36.60**
Max	200.00	200.00	200.00	200.00	200.0	200.0	200.00	182.20	200.0	**198.00**
# of 200%	8	2	8	4	85	13	6	0	44	**19**
SD	41.80	34.40	39.90	41.90	65.60	55.90	41.20	29.70	47.60	**44.20**
Skewness	0.91	0.73	0.63	1.27	1.57	0.48	0.80	0.15	1.02	**0.80**
Kurtosis	2.59	2.73	2.31	3.33	2.05	0.56	3.24	1.59	1.53	**2.20**

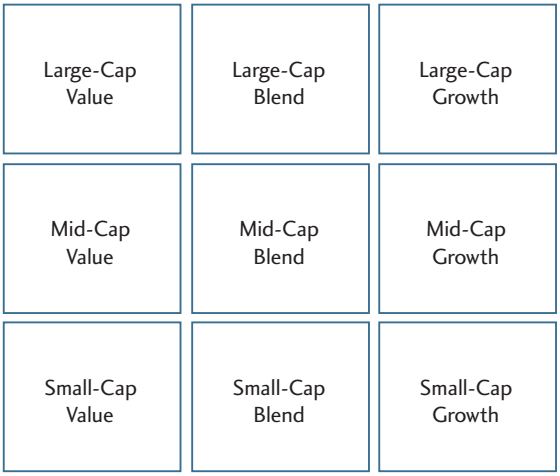
** Based on the S&P 1500 at the beginning of each year. Where a stock did not trade through the entire year, the return used was the previous 12-month return for the past trading month multiplied by the fraction of the year for which the stock traded. Returns are capped at 200 percent.*

*** For example, the 1995 return is the total return on the stock for the period March 1995–February 1996.*

of each year from 1995 through 2003. Descriptive statistics for the S&P 1500 universe are reported in table 1. For each style, the twenty highest-ranked stocks, based on the scoring equation, were selected from the stock universe at the beginning of 1995, and the resulting four style portfolios were held from March 1995 until February 1996. This was repeated each year through 2003, resulting in nine years of performance results for each of the four styles. Each style was applied the same way every year with the only difference being the use of information available at the beginning of each year. The holding period was delayed two months after the selection decision to avoid possible look-ahead bias. Consequently our methodology is style constant and allowed us to examine the resulting characteristic drift and investment performance. The only drift in our study is characteristic drift; there is no style drift.[12]

FIGURE 1

Boxes in the Characteristic Grid



Constant Style, Characteristic Drift, and Investment Performance

To explore the impact of equity style on characteristic drift and investment performance, the stocks in the S&P 1500 universe were sorted into one of the nine characteristic boxes (CBs) shown in figure 1. The stocks that ended up in the large-cap value box, for example, ranked in the upper third by market value *and* ranked in the lower third based on the price to sales ratio. As a result, the nine CBs had varying numbers of stocks on average and over time. With the four defined styles and the nine CBs we are able to test the following three conditions under which CB-constrained investing makes sense:

1. style-selected stocks fall, by and large, into a single CB;
2. style-selected stocks stay, by and large, in the same CB over time; and
3. characteristic drift hurts performance.

TABLE 2

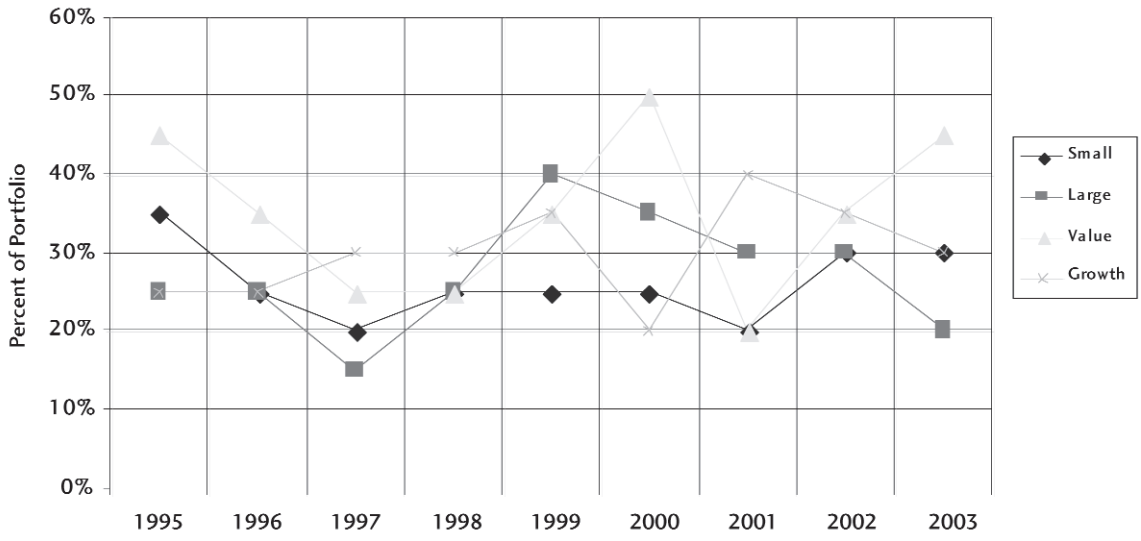
Percent of Selected Stocks in Each Characteristic Box by Style
(20 highest-ranked stocks each year, average over 1995–2003)

CHARACTERISTIC BOX *	GRAHAM	NEFF	O'NEIL	ROWE PRICE	AVERAGE
SV	53	14	25	14	**27**
SB	9	6	14	14	**11**
SG	3	6	8	14	**8**
MV	21	14	9	11	**14**
MB	4	16	11	10	**10**
MG	1	17	12	17	**12**
LV	6	7	3	1	**4**
LB	3	14	8	7	**8**
LG	1	7	9	12	**7**

** S = Small-Cap, M = Mid-Cap, L = Large-Cap, V = Value, B = Blend, and G = Growth*
May not add to 100 due to rounding.

FIGURE 2

Characteristic Drift Using Neff Model



Characteristics of Selected Stocks

Table 2 reports the percent of the annual twenty highest-ranked stocks that fell into each CB for each of the four styles. It is immediately obvious that the selected stocks do not fall, by and large, into a single CB and, indeed, are fairly evenly spread among the CBs. The largest concentration is in the Graham small-cap value box with an average of 53 percent over the nine years. The next largest is 25 percent, and the percentages fall off from there. There is no CB in table 2 that is empty. That is, each style selected a stock in every CB at some point during the sample period. Thus the first condition for constrained investing to make sense, that style-selected stocks fall, by and large, into a single CB, is not met.

Characteristic Drift

Figure 2 shows the small-cap, large-cap, value, and growth drifts over time for the Neff style portfolios.

While the Neff style is constant, portfolio characteristics experience significant drift through time. In 1995 Neff invested 35 percent in small-cap stocks, and by 1997 that investment dropped to 20 percent. Neff's commitment to value stocks is much more volatile, starting at 45 percent in 1995, dropping to 25 percent by 1997, increasing to 50 percent by 1999, and then dropping to 20 percent the next year. There is considerable characteristic drift among the other styles as well (graphs not shown), and thus we conclude that following a constant style leads to considerable characteristic drift over time. This result refutes the second condition for CB-constrained investing to make sense.

Investment Performance

In table 2 we showed that each style's twenty highest-ranked stocks fell, at one time or another, into each one of the nine CBs. This means that under CB-constrained investing, a constant style manager is forced to purchase stocks that are not among the highest ranked picks to populate a mandated twenty-stock portfolio. The results reported in figure 3 for Neff show the impact of strict CB-constrained investing on the average rank of stocks selected in each CB and reveals that the average selection ranges from the 68th to the 183rd highest ranked stock depending upon the CB. For example, a mid-cap value Neff manager would be forced to purchase, on average, his or her 109th highest-ranked stock. This compares with the 10th highest-ranked selection, on average, for an unconstrained Neff portfolio of twenty stocks that does not face a CB constraint. Thus CB-constrained investing results in managers being unable to give investors their highest-ranked selections and, as a consequence, performance suffers, as we show next.

The first two columns in table 3 report unconstrained performance alphas for each of the four styles averaged over the nine years 1995 through 2003. The universe of alpha in the first column is the average return for the twenty highest-ranked stocks each year net of the equal weighted return for stocks in the S&P 1500. The market size value momentum (MSVM) alpha is reported in the second column and, in addition to the S&P 1500 return, is adjusted for portfolio tilts with respect to market, size, value, and momentum.[13] Examination of these two columns reveals that each of the four styles (with the exception of the T. Rowe Price universe alpha) produces superior returns, with an overall average 373 bp universe alpha and 413 bp MSVM alpha. These are impressive results indeed, particularly in light of the mechanical way in which the portfolios are constructed over time.

FIGURE 3

Average Rank of Neff Selected Stocks *
(20 highest-ranked picks in each CB each year 1995–2003 using S&P 1500 stock universe)

183 Large-Cap Value	**79** Large-Cap Blend	**98** Large-Cap Growth
109 Mid-Cap Value	**68** Mid-Cap Blend	**84** Mid-Cap Growth
81 Small-Cap Value	**86** Small-Cap Blend	**132** Small-Cap Growth

** Rank of 1 is best, 2 next best, and so forth.*

The third column in table 3 reports the CB-constrained MSVM alphas for each of the four styles. These were calculated by applying the same style as before but now strictly limiting the universe to those stocks in one of the nine CBs. This process was repeated in each of the nine years. The CB-constrained MSVM alphas reported in column three represent an average over all years and all CBs for each of the resulting twenty-stock portfolios. For example, the Graham style produced an average CB-constrained MSVM alpha of –7 bp over all CBs over all years. Indeed, the CB-constrained performance is much worse, to the tune of –339 bp, when compared with the unconstrained results in column two. That is, by forcing our four hypothetical style managers to select only those stocks in a particular CB, virtually all of the superior performance disappears. Thus our results support the contention that unconstrained investing pro-

TABLE 3

Constant Style Investment Performance (Based on S&P 1500 stocks 1995–2003, in basis points)

	UNIVERSE α [1]	MSVM α [2]	CB CONSTRAINED [3]	RANK SLOPE [4]
Graham	548	443	-7	-1.6
Neff	249	313	146	-1.2
O'Neil	709	783	-23	-4.8
T. Rowe Price	-15	112	180	-3.3
Average	373	413	74	-2.7

1. Return on the 20 highest-ranked stocks each year as determined by each style minus the average return of stocks in the S&P 1500.
2. Return on the 20 highest-ranked stocks each year as determined by each style minus the average return of the stocks in the S&P 1500. Then minus the portfolio (M)arket (as measured by CAPM beta) tilt times the market factor price, the (S)ize tilt (as measured by market value) times the size factor price, the (V)alue tilt (as measured by price-to-sales ratio) multiplied by the value factor price, and the (M)omentum tilt multiplied by the momentum factor price. Tilts are annual standard normal deviates for each of the MSVM factors averaged over the stocks in the portfolio. The factor price is the average over the nine-year period of the slope coefficient from a simple regression of stock returns on the individual stock's factor tilt. The resulting factor prices are: MK_{fp} = –1.961%, S_{fp} = –0.389%, V_{fp} = –1.521%, and MO_{fp} = –0.438%. That is, during our sample period, lower beta, smaller companies, value stocks, and lower historical returns each led to higher returns on average. Stock betas were only available from 2000–2003 and so 1995–1999 beta adjustments were not possible. The 36 (4 managers * 9 CBs) MSVM α's ranged from a low of –562bp to a high of 925bp with 8 of the 36 (22%) exceeding the 413bp average unconstrained α.
3. The CB constrained result is the average MSVM alpha earned over the nine characteristic boxes (small, mid, and large size across value, blend, and growth) over the 9 years when a particular style was used to select the highest ranked 20 stocks within a particular CB. This is referred to as characteristic box (CB) constrained investing.
4. The rank slope is the change in average return when moving down a rank. For example, the rank slope of –4.8 bp for the O'Neil style means that choosing the 21st-ranked stock as compared with the 20th-ranked stock reduces average return by 4.8 bp.

duces superior performance relative to CB-constrained investing. This refutes the third and final condition for CB-constrained investing to make sense.

Note that our 339-bp underperformance is very similar to the 290-bp underperformance obtained by Wermers (2002) in his comparison of the no-drift managers with the highest drift managers. Recall that Wermers' study focused on mutual funds that were facing increasing CB constraints over the 1985–2000 sample period. It is striking that our two studies come to similar conclusions: CB-constrained investing leads to significant underperformance. That is, both studies provide support for the contention that characteristic drift is part and parcel of superior performance and that CB constraints set the stage for underperformance.

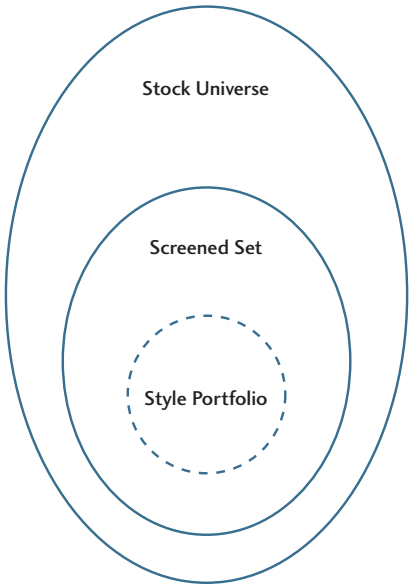
The final column in table 3 provides evidence about the impact of selecting lower-ranked stocks. The rank slope is the change in the average return when moving down one rank. For example, O'Neil moving from, say, the twentieth-ranked stock to the twenty-first-ranked stock reduces average return by 4.8 bp. The overall rank slope is –2.7 bp. This means that for every twenty-rank drop, average investment performance declines by 54 bp. This reinforces our earlier statement that being forced to choose lower-ranked stocks hurts performance.

We began this section stating that for characteristic-constrained investing to make sense, three conditions must hold. The evidence presented so far refutes each of these conditions: 1) style-selected stocks do *not*, by and large, fall into a single characteristic box, 2) style-selected stocks *drift* from box to box over time when the style is rigidly applied each year, and 3) characteristic drift *helps* investment performance. Thus CB-constrained investing hurts performance.

Our results cast doubt on the wisdom of constraining managers to a specific characteristic box. There are several ways around this problem. The most obvious is to allow managers to stray from their boxes as they pursue their unique equity styles. This is the topic of the next section. But in today's investment management world, investors, advisers, consultants, and plan sponsors frequently frown upon such drifting. Many require a strict adherence to "style" purity and will dismiss managers for drifting too much. Our results, while tentative in nature, suggest that a relaxed attitude toward characteristic drift

FIGURE 4

Equity manager style portfolio



increases the chance of superior performance. On the other hand, our results and Wermers' (2002) seem to say that strict adherence to "style" purity makes it difficult for managers to generate superior returns.

Some suggest that the use of RBSA alleviates this problem because, rather than restricting managers to a specific box, a manager is categorized by the observed relationship between historical returns and various indexes.[14] This is the case if the manager truly is allowed to drift freely and RBSA is used simply to keep track of the changing characteristics of the resulting portfolio. But if RBSA is a tool used to track drift and then discipline managers when too much drift is observed, it is no better than CB constraints. And if the indexes are intended to capture "style," as they often are, then it is no better than CBs because once again characteristics and style are being lumped together. We think it is important to be diligent in separating style and characteristics.

Operating in an Unconstrained World

The unconstrained world of equity investing is represented by figure 4. As a first step, the manager screens the stock universe to obtain a smaller set of stocks that meet a predetermined set of style criteria. These criteria can be anything that is measurable for the company and allows the manager to identify stocks with high-return potential based on their particular styles. From this style screen the manager makes the final portfolio selections. Thus the equity manager goes through a two-step investment process: 1) use a style screen to identify desirable stocks, and 2) select the final portfolio from among those in the style screen. The manager also will have a corresponding sell discipline.

The problem with CB-constrained investing can be visualized best by comparing figure 1 with figure 4. In figure 1 the stock universe is divided into CBs and the equity manager is expected to stay within a particular box. In figure 4, the equity manager views the stock universe as a whole and then applies a particular style in constructing a portfolio. With these figures side by side, the fundamental conflict is apparent. If the screened set in figure 4 happens to fall mostly within one of the CBs in figure 1, investment performance will

TABLE 4

Differences Between Constrained and Unconstrained Investing

	CONSTRAINED INVESTING	UNCONSTRAINED INVESTING
Who is hired:	CB* managers	Unconstrained managers
Comparison group:	CB	Style peer circle
Performance measure:	CB α	Peer circle α
Diversification:	Among CBs	Among styles
Manager drift:	Monitor	Ignore
Overall portfolio drift:	Monitored at manager level	Monitored at portfolio level

** CB = Characteristic Box*

be little effected by CB-constrained investing, although, *a priori*, one would need to know the match-up between styles and CBs. If stocks in the style portfolio fall into different CBs, however, performance will be reduced significantly by using CB-constrained investing.

How do things change when one moves from a CB-constrained world to an unconstrained world, that is, from the world represented by figure 1 to the one represented by figure 4? Table 4 summarizes the differences between constrained and unconstrained investing. With unconstrained investing, several managers who are free to move about the entire stock universe are hired rather than CB-constrained managers.

In an unconstrained world, managers still are expected to produce superior results (that is, positive alpha), but alpha is calculated by benchmarking results to a style peer circle rather than to a CB as in constrained investing. For example, if a manager is tilted toward small-cap growth stocks, the manager's returns are tilt-adjusted and then compared with others pursuing the same style. Again, in both constrained and unconstrained investing, the manager is expected to produce positive tilt-adjusted alpha.[15]

In an unconstrained world, diversification is accomplished among styles rather than CBs. In this regard, the number of managers selected may be the same in both situations. Even though the individual unconstrained managers may experience considerable drift, combining several managers, particularly those with low drift correlation over time, leads to much more stable tilts at the portfolio level. This is demonstrated in figures 5 and 6, which show the unmanaged size and value tilts of our four styles. Notice that the tilt of each style varies considerably from year to year, sometimes changing by as much as 0.5 standard normal deviates in a year. However, if an equally weighted portfolio of all four styles is constructed, the overall portfolio tilt is much more stable: in particular, the portfolio size tilt is around zero for most of the sample period. Thus it is possible to allow individual manager characteristic drift while maintaining a fairly stable overall portfolio tilt.[16]

As mentioned earlier, the four styles we tested were the only four we looked at and, at some level, it is surprising that the overall portfolio tilts turned out to be so stable. In reality, an investor may not be so lucky. As long as the managers are not changing tilts in unison, however, the lack of correlation among managers will help produce stable portfolio level tilts. The more correlated the managers, the more managers need be hired to achieve the desired level of tilt stability.

FIGURE 5

Unmanaged Size Tilts

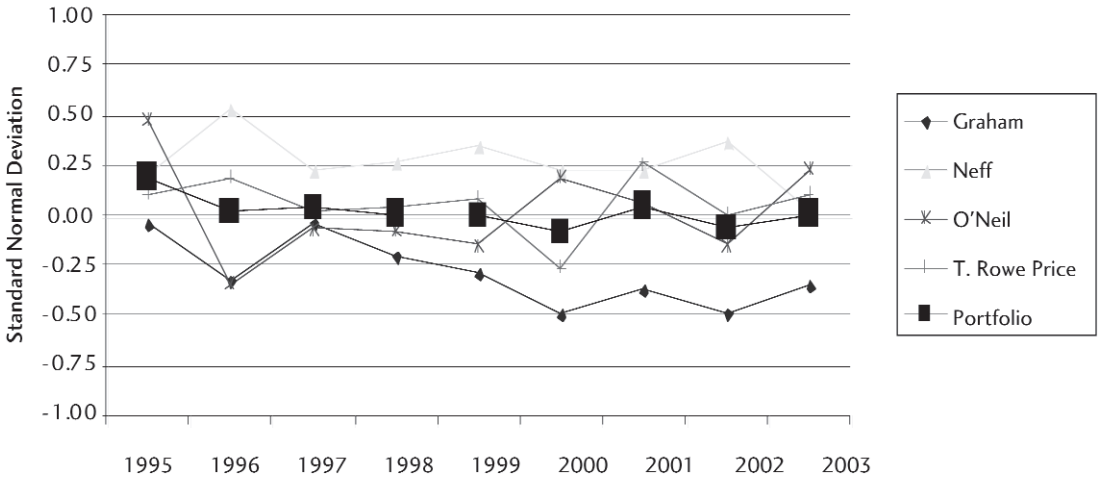
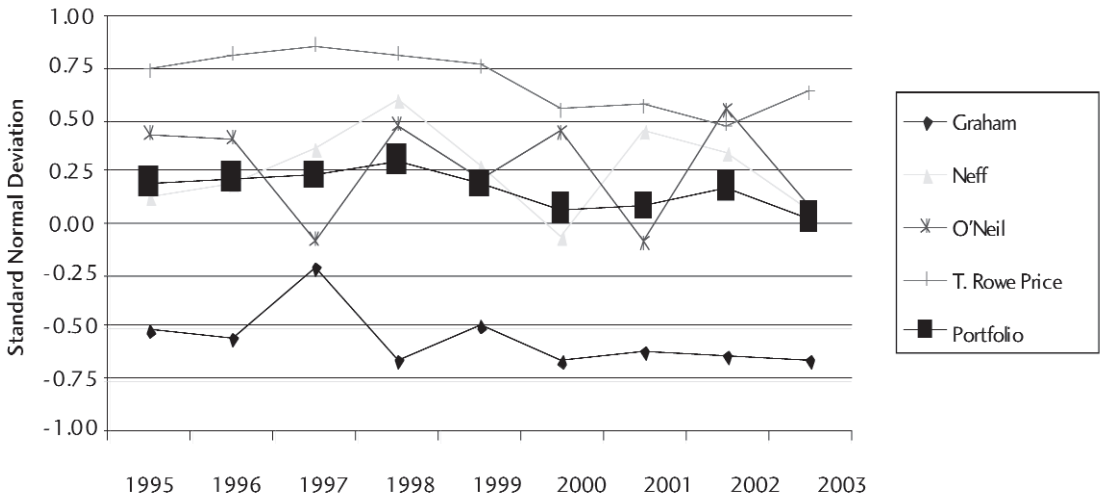


FIGURE 6

Unmanaged Value Tilts



Conclusions and Recommendations

For many, equity style is synonymous with portfolio characteristics. It is our contention that this is a mistake and it is important to separate equity style from portfolio characteristics. Equity style is the unique way in which a manager goes about analyzing, buying, and selling stocks over time, while portfolio characteristics, such as market capitalization and value-growth, describe the equity holdings that result. There is no reason to believe that characteristics remain constant over time as a particular style is executed. In fact, we report evidence from other studies as well as from this study that characteristic drift is part and parcel of superior performance. We discuss the differences between characteristic-constrained investing, which is the current environment, and unconstrained investing, which is more likely to produce superior investment returns.

We present evidence that none of the three conditions necessary to make constrained investing make sense hold. That is, our four constant styles lead to selecting stocks in all nine characteristic boxes, to considerable characteristic drift over time, and to a 359-bp performance improvement. Thus our results imply that unconstrained, style-constant investing is superior to constrained investing. We also provide guidelines about how investors (individuals as well as plan sponsors) can operate in an unconstrained world compared with the current constrained world.

It appears that the move to constrained investing, in which the differences between style and characteristics have been blurred to the point of being considered one and the same, was undertaken as a matter of convenience and not on the basis of careful analysis and research. This would not be a major concern if it were not for the fact that such blurring has led, we believe, to inferior performance. At the very least, we hope this paper spawns a much needed, thoughtful debate about the merits of the current reliance on the "style" grid and returns based style analysis for categorizing, selecting, and evaluating equity managers.

We have benefited from discussions with Andrew Cox, Maclyn Clouse, Ph.D., Gary Black, Paul Kaplan, Ph.D., Art Lutschaunig, and Don Cassidy as well as with participants at the 2004 IMCA conferences in Boca Raton, Fla., and Chicago, Ill., the 2004 IMN Plan Sponsor and Pension Consultants Circle, and the Daniels College of Business at the University of Denver. Dr. Howard acknowledges financial support from the Daniels Scholarship Committee. We especially thank Russ Wermers, Ph.D., for lengthy and helpful discussions on this topic.

Endnotes

1. We place "style" in quotes because we believe that it is a misuse of the word and in fact does not capture the true investment style but instead describes the characteristics of the resulting constrained portfolio.

2. Sharpe (1988, 1992) often is credited with launching the movement toward inferring a manager's style by examining the relationship between historical returns and various "style" indexes, now referred to as returns-based style analysis (RBSA). We contend that what Sharpe identifies is not style but characteristic tilts. Our definition of style includes both tilts and manager-specific skills, but in measuring alpha we net out the impact of characteristic tilts to determine what value the manager has added above and beyond tilt exposures.

3. Wermers combines two databases, one with mutual fund holdings information and another with return and other mutual fund information. The resulting sample covers the period 1975–1994, includes nearly every equity mutual fund that existed during this period, and is largely free of survivor bias. The holdings information allows Wermers to adjust precisely for portfolio characteristics, and his results are adjusted for beta, market cap, value/size, and momentum.

4. Baker *et al*. (2004) use the Wermers' database described above. They are unable to estimate annual excess returns because their focus is on excess returns around earnings announcements.

5. Wermers refines his earlier methodology to capture the nature and impact of characteristic drift. He categorizes every stock in each mutual fund into one of 125 market cap, value-growth, momentum boxes and is able to measure both passive and active drift as well as numerous fund manager attributes and performance in relation to the extent of characteristic drift.

6. A working paper by Brown and Harlow (2004) comes to the opposite conclusion: that characteristic-consistent managers do outperform other mutual fund managers. Wermers (2002) argues that their results are the consequence of using the less precise RBSA.

7. See Barberis and Schleifer (2003), p. 161.

8. Teo and Woo (2004) conduct extensive robustness tests to show that their results hold regardless of the risk model assumed. They contend that their results are consistent with the "style" level positive feedback trading model of Barberis and Shleifer (2003) and cannot be explained by stock level momentum and reversals, fundamental risk, or psychological models.

9. Teo and Woo (2004) find a strong inflow of money into the best-performing "styles," which is consistent with the positive feedback trading model proposed by Barberis and Shleifer (2003). The profitable strategy, then, is to move opposite these positive feedback flows.

10. The Teo and Woo (2004) findings have interesting timing implications in today's mutual fund regulatory climate. It would seem that a manager who agrees to have holdings constrained to one characteristic box is complicit with "timing" by fund investors. A characteristic-constrained manager is vulnerable to "style"-return timing as well. This could be damaging to long-term fund investors as short-term investors move in and out of the mutual fund to exploit "style" return timing opportunities.

11. The Graham screen is from Arbel *et al.* (1988), the Neff screen is from chapter 7 in Neff and Mintz (1999), the O'Neil screen is from section 1 in O'Neil (2002), and the Price screen is from chapter 1 in Train (2000). Term definitions: FCF = free cash flow, OM = operating margin, EY = earnings yield, NM = net margin, and ROA = return on assets.

12. Of course, we have not captured the complete style of each of these four well-known investors. After running the screens listed above, each would apply his own judgment on which stocks to pick from the resulting screen. Each would have his own unique sell discipline as well. Unless we are able to sit with each and observe the specific decisions made, the best we can do is capture only a portion of the style. The advantage for our study is that the screens, which represent the first step in the investment process, can be applied rigorously over time and thus ensure style constancy.

13. See note 2 at the bottom of table 2 for more details on how MSVM alpha is calculated. Again, there is not agreement about whether these tilts represent risk exposure or excess returns.

14. There is considerable controversy regarding RBSA. Many contend it is an inferior manager-categorizing methodology when compared with holdings-based techniques.

15. In this study we used MSVM alpha as our tilt-adjusted alpha. Again there is no agreement about which, if any, of these tilts represent risk, and so investors are able to choose whichever tilt adjustment they wish, or no adjustment at all.

16. There may be times when the actual portfolio tilt deviates to an unacceptable degree from the desired tilt. In this situation, proactive intervention may be necessary in the form of reallocating funds among existing managers or offsetting undesired tilts by temporarily investing in a pure tilt fund. Some have suggested that this problem can be dealt with best by hiring a master manager who is responsible for monitoring and counteracting undesirable tilts as needed.

References

Ahmed, Parvez, Larry J. Lockwood and Sudhir Nanda. 2002. "Multistyle Rotation Strategies." *The Journal of Portfolio Management* 28 (spring):17–29.

Ahmed, Parvez, and Sudhir Nanda. 2001. "Style Investing: Incorporating Growth Characteristics in Value Stocks." *The Journal of Portfolio Management* 27 (spring): 47–59.

Arbel, Avner, Steven Carvell, and Erik Postnieks. 1988. "The Smart Crash of October 19th." *Harvard Business Review* (May-June): 124–136.

Arrington, George S. 2000. "Chasing Performance Through Style Drift." *Journal of Investing* 9 (summer): 13–17.

Baker, Malcolm, Lubomir Litov, Jessica A. Wachter, and Jeffrey Wurgler. 2004. "Can Mutual Fund Managers Pick Stocks? Evidence from Their Trades prior to Earnings Announcements." NBER Working Paper w10685 (July 28).

Barberis, Nicolas, and Andrei Shleifer. 2003. "Style Investing." *Journal of Financial Economics* 68 (May): 161–199.

Bernstein, Richard. 1995. *Style Investing*. New York: John Wiley & Sons, Inc.

Brown, Keith, and W. V. Harlow. 2004. "Staying the Course: Performance Persistence and the Role of Investment Style Consistency in Professional Asset Management." University of Texas at Austin working paper (May).

Brown, Stephen J., and William N. Goetzmann. 1997. "Mutual Fund Styles." *Journal of Financial Economics* 43 (March): 373–399.

Case, Douglas W., and Steven Cusimano. 1995. "Historical Tendencies of Equity Style Returns and the Prospects for Tactical Style Allocation." In R. Klein and J. Lederman, eds., *Equity Style Management*, Burr Ridge, Ill.: Irwin.

Christopherson, Jon A. 1995. "Equity Style Classifications." *The Journal of Portfolio Management* 21, no. 3 (spring): 32–43.

Coggin, T. Daniel. 1998. "Long-Term Memory in Equity Style Indexes." *The Journal of Portfolio Management* (winter): 37–46.

Coggin, T. Daniel, Frank J. Fabozzi, and Robert D. Arnott. 2003. *The Handbook of Equity Style Management* 4th ed. New Hope, Penn.: Frank J. Fabozzi Associates.

Daniel, Kent, Mark Grinblatt, Sheridan Titman, and Russ Wermers. 1997. "Measuring Mutual Fund Performance with Characteristic-Based Benchmarks." *Journal of Finance* 52: 1035–1058.

Davis, James L., Eugene F. Fama., and Kenneth R. French. 2000. "Characteristics, Covariances, and Average Returns: 1929 to 1997." *Journal of Finance* 55: 389–406.

Ennis, Richard M. 2001. "The Case for Whole-Stock Portfolios." *The Journal of Portfolio Management* 27 (spring):17–26.

Fabozzi, Frank, J. 1998. "Factor-Based Approach to Equity Portfolio Management." In Frank J. Fabozzi, ed., *Active Equity Portfolio Management*. New Hope, Penn.: Frank J. Fabozzi Associates.

Fama, Eugene F., and Kenneth R. French. 1992. "The Cross-Section of Expected Stock Returns." *Journal of Finance* 47: 427–466.

———-. 1993. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics* 33: 3–56.

———-. 1998. "Value versus Growth: The International Evidence." *Journal of Finance* 53: 1975–1999.

Gallo, John G., and Larry J. Lockwood. 1997. "Benefits of Proper Style Classification of Equity Portfolio Managers." *The Journal of Portfolio Management* 23, no. 3: 47–55.

Neff, John, and Steven L. Mintz. 1999. *John Neff on Investing*. New York: John Wiley & Sons, Inc.

O'Neil, William. 2002. "How to Make Money in Stocks." McGraw-Hill.

Sharpe, William F. 1988. "Determining a Fund's Effective Asset Mix." *Investment Management Review* (November-December): 5–10.

———. 1992. "Asset Allocation: Management Style and Performance Measurement." *The Journal of Portfolio Management* (winter): 7–19.

Teo, Melvyn, and Sung-Jun Woo. 2004. "Style Effects in the Cross-section of Stock Returns." *Journal of Financial Economics* 74 (November): 367–398.

Train, John. 2000. *Money Masters of Our Time*. New York: Harper Collins Publishers.

Trzcinka, Charles A. 1995. "Equity Style Classifications: A Comment." *The Journal of Portfolio Management* 21, no. 3: 44–46.

Waring, M. Barton, and Laurence B. Siegel. 2003. "The Dimensions of Active Management." *The Journal of Portfolio Management* 29 (spring): 35–41.

Wermers, Russ. 2000. "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses." *Journal of Finance* 55 (August):1655–1695.

———. 2002. "A Matter of Style: The Causes and Consequences of Style Drift in Institutional Portfolios." University of Maryland working paper (July).