The Problematic "Style" Grid*

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The Problematic "Style" Grid

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 multi-specialist 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 is simply a box in the characteristic grid. We conclude that in order to produce superior returns, managers must be allowed to pursue their unique style and have access to the entire stock universe, which means that the resulting portfolio experiences characteristic drift. Furthermore, our empirical results, based on style constancy, show that characteristic constrained investing sets the stage for under performance.

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 individual as well as pension plan sponsors, allocate their portfolio 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. This system is used by consultants and plan sponsors for institutional investing and also by advisors and individual investors for selecting mutual funds using Morningstar, for example.

One of the primary foundations of the resulting multi-specialist, 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 P/E or 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

[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.

and portfolio characteristics are two very distinct aspects of equity portfolio management and thus it is important that these two be kept separate from one another.[2] The current practice in which they are treated as one in the same has lead, we believe, to significant under performance. Later in the paper we present empirical results that provide a first estimate of the magnitude of this under performance.

There are three necessary conditions, which we will present shortly, that must be met for the multi-specialist, 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. In section II 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

[2] Sharpe (1988, 1992) is often credited with launching the movement towards inferring a manager's style by examining the relationship between historical returns and various "style" indices, 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 α we net out the impact of characteristic tilts in order to determine what value the manager has added above and beyond tilt exposures.

hand. The three conditions under which characteristic constrained investing makes sense and the constant style test methodology are described in section III. The results presented in section IV reveal that these conditions are not met in our sample and that constrained investing hurts performance. In Section V we present the principles for operating in a world in which unconstrained investing is the rule. Section VI presents our conclusions and recommendations.

I. The Investment "Style" Literature

The idea of "style" constrained investing (which going forward we will call by its correct name of characteristic constrained investing) grew out of research on the small firm and low P/E anomalies. A recent series of articles by Fama et. al. (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 is sometimes included in such models. However, there is still no consensus on 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 and 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 to various indexes to determine the extent to

which these indices explain historical returns. Articles by Trzinka (1995), Christopherson (1995), Brown (1997), Daniel et. al. (1997), and Coggin (1998) have further explored this approach.

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 overall 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 et. al. (2001 & 2002), Arrington (2000), Case and Cusimano (1995), Fabbozi (1998) and Gallo and Lockwood (1997). More comprehensive tracks are provided in books by Bernstein (1995) and Coggin et. al. (2003). Characteristic constrained investing has become an industry standard through the efforts of investment advisors, consultants and organizations such as Morningstar and Lipper, among others.

A criticism of characteristic constrained investing is presented by Ennis (2001) who argues that the resulting multispecialist architecture (i.e. hiring a manager to fill each characteristic box) is highly inefficient.

> 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 (2001))

Ennis goes beyond the criticism of characteristic constrained investing to advocate a return to whole stock investing in which an equity manager is free to roam the entire stock universe in search of opportunities. He argues that this will lead to a less complex and thus less expensive overall portfolio and frees up equity managers to apply their style

to the full range of stocks. The current 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.

II. The Role of Characteristic Drift

There are several recent articles that examine the performance of equity managers in general and unconstrained investing in particular. In a comprehensive study on mutual fund performance, Wermers (2000) found that managers' stock picking on average outperformed their characteristics adjusted benchmarks by 130bp (before transactions costs) and that more active managers perform better at stock picking than did less active managers. Wermers argues that his holdings based adjustment provides a more accurate performance measure than does 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 mutual fund managers exhibit superior stock picking ability, further supporting Wermers' results.[4]

In a 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 to 2000, Wermers concludes that characteristic drift plays a central role in

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

[4] Baker et. al. (2004) uses the Wermers data base described above. They are unable to estimate annual excess returns since their focus is on excess returns around earnings announcements.

generating superior performance among mutual fund managers.[5] His most important conclusions are:

1. Mutual fund managers do not attempt to counteract passive characteristic drift by means of 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 by means of active rebalancing.
2. Those managers who have the best before the fact stock picking performance also experience the greatest amount of drift.
3. Furthermore, these same managers produce the best future investment performance.
4. Those managers who do 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 290bp.

In summary, Wermers finds that among mutual fund managers, characteristic drift is part and parcel of superior performance.[6] Without drift, a manager cannot produce superior investment performance. This of course does not mean drift, in and of itself, produces superior performance. More likely is that a successful equity style produces both drift and superior performance. They cannot be separated one from the other according to Wermers.

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[5] Wermers refines his earlier methodology in order 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 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.

A possible explanation for why unconstrained managers out perform constrained managers was recently proposed by Barberis and Shleifer (2003).

> 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.

They postulate 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) use mutual fund and individual stock data for the period 1984 through 1999 and indeed discover that there is a "style" effect in stock returns. In particular, using the nine Morningstar "style" boxes, they uncover a strong annual "style" return reversion in that investing in the previous two years worst performing "style" garners an annual return that is 12.6% higher than investing in the previous two years best performing "style".[7] These results suggest that beating a broad U.S. market benchmark over multiple time periods requires moving around the characteristic grid.[8] This may help explain why unconstrained managers, who are free to characteristic drift and thus able to capture "style' return reversion, out perform their constrained counterparts.[9]

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[7] 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.

[8] They find that there is 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.

[9] 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 of "timing" by fund investors. A characteristic constrained manager is vulnerable to "style"

These studies collectively provide intriguing results with respect to characteristic drift and performance. Their general conclusion is that managers must exhibit characteristic drift in order to produce superior returns. Our study builds upon these studies by specifically controlling for equity style. In the next section we present a methodology for capturing the key aspects of an equity style which 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.

III. 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 80's, 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 identified three conditions that must hold in order for characteristic constrained investing to make sense:

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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 in order to exploit "style" return timing opportunities.

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.

In order to test these three conditions, we identify four well known equity styles and test them over the period 1995 through 2003. The four styles are those espoused by Benjamin Graham, John Neff, William O'Neil and T. Rowe Price. These were chosen because they represent a wide range of equity styles currently 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 prior to running the tests described in the next section.

The four resulting characteristic based style screens are:[10, 11]

[10] The Graham screen is from Arbel (1988), the Neff screen is from chapter 7 in Neff(1999), the O'Neill screen is from Section 1 in O'Neil (2003), and the Price screen is from chapter 1 in Train (2000).
[11] Terms definitions: FCF = free cash flow, OM = operating margin, EY = earnings yield, NM = net margin, and ROA = return on assets.

Graham: EPS>0
EPS five year growth > 0%, capped at 20%
Price per share < $1000
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/52wk 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 footnote 10. 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 the Research Insight data base[12], each style scoring equation was applied to the S&P1500 stocks at the beginning of each year from 1995 through 2003. The

[12] The Research Insight data base is a source of comprehensive financial and market data provided by S&P which covers thousands of companies over extended time periods.

descriptive statistics for the S&P1500 universe are reported in Table 1. For each style, the 20 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 in order to avoid possible look ahead bias. Consequently our methodology is style constant and allows us to examine the resulting characteristic drift and investment performance. The only drift in our study is characteristic drift; there is no style drift.[13]

IV. Constant style, Characteristic Drift, and Investment Performance

In order to explore the impact of equity style on characteristic drift and investment performance, the stocks in the S&P1500 universe are sorted into one of the nine characteristic boxes (CB's) 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 P/S. As a result, the nine CB's had varying numbers of stocks both on average and over time. With the four defined styles and the nine CB's we are able to test the three conditions under which CB constrained investing makes sense:

[13] 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 their own judgment on which stocks to pick from the resulting screen. Each would have their 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.

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	-93.7	-79.0	-99.2	-98.7	-99.2	-99.8	-99.9	-99.9	-99.7	**-96.6**
1st Q	3.6	-2.6	8.4	-33.5	-27.9	-14.4	-15.4	-39.2	29.2	**-10.2**
Average	27.1	18.2	31.8	-6.0	12.9	20.8	6.6	-20.8	59.0	**16.6**
3rd Q	44.7	36.8	52.1	14.0	28.1	51.1	25.0	-1.7	78.7	**36.6**
Max	200.0	200.0	200.0	200.0	200.0	200.0	200.0	182.2	200.0	**198.0**
# of 200%	8	2	8	4	85	13	6	0	44	**19**
SD	41.8	34.4	39.9	41.9	65.6	55.9	41.2	29.7	47.6	**44.2**
Skewness	0.91	0.73	0.63	1.27	1.57	0.48	0.80	0.15	1.02	**0.8**
Kurtosis	2.59	2.73	2.31	3.33	2.05	0.56	3.24	1.59	1.53	**2.2**

*** Based on the S&P1500 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 last trading month multiplied by the fraction of the year for which the stock traded. Returns are capped at 200%.**

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

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 .

Figure 1: Boxes in the Characteristic Grid

Large Cap Value	Large Cap Blend	Large Cap Growth
Mid Cap Value	Mid Cap Blend	Mid Cap Growth
Small Cap Value	Small Cap Blend	Small Cap Growth

Characteristics of Selected Stocks

Table 2 reports the percent of the annual 20 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 CB's. The largest concentration is in the Graham small cap value box with an average of 53% over the nine years. The next largest is 25% 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.

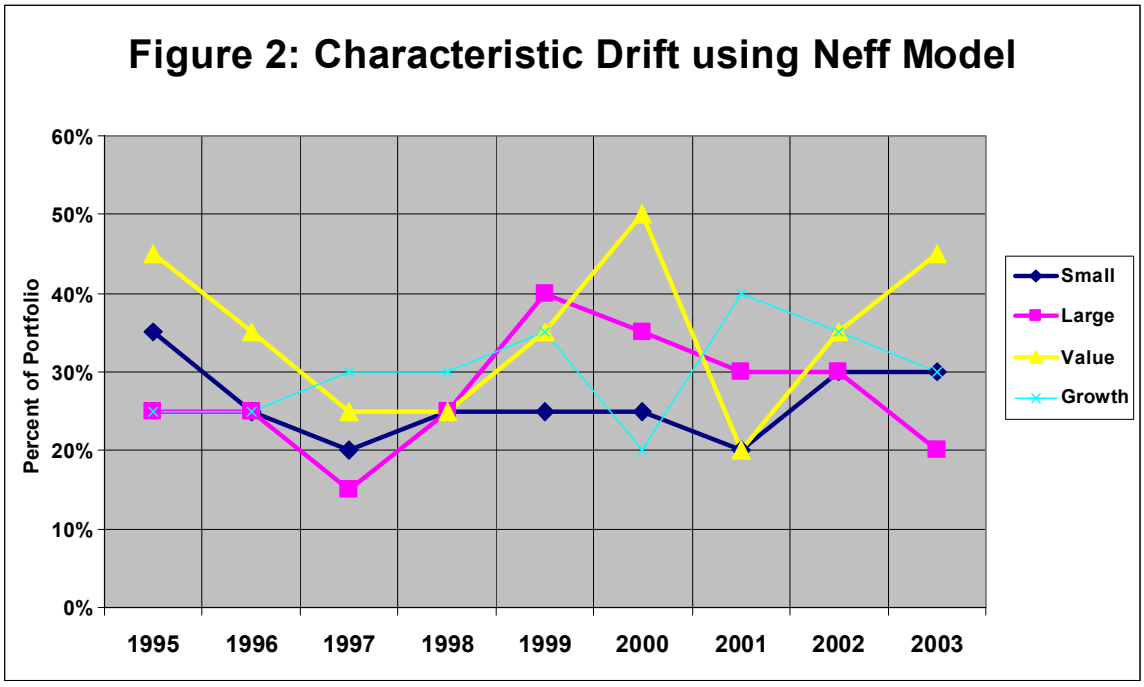
Table 2: Percent of Selected stocks in each CB by Style
(20 highest ranked stocks each year, average over 1995-2003)

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.

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 invests 35% in small cap stocks and by 1997 that has dropped to 20%. Neff's commitment to value stocks is much more volatile, starting at 45% in 1995, dropping to 25% by 1997, increasing to 50% by 1999, and then dropping to 20% 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 20 highest ranked stocks fell, at one time or another, into each one of the nine CB's. This means that under CB constrained investing, a constant style manager is forced to purchase stocks that are not among their highest ranked picks to populate a 20 stock mandated portfolio. The results reported in Table 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 to the 10th highest ranked selection, on average, for an unconstrained Neff portfolio of 20 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.

Table 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 first two columns in Table 4 report unconstrained performance α's for each of the four styles averaged over the nine years 1995 through 2003. The universe α in the first column is the average return for the 20 highest ranked stocks each year net of the equal weighted return for stocks in the S&P1500. The MSVM α[14] is reported in the second column and, in addition to the S&P1500 return, is adjusted for portfolio tilts with respect

[14] MSVM is short for market, size, value/growth, and momentum tilt adjusted returns. See footnote 2 at the bottom in Table 4 for details on how these were calculated.

to market, size, value, and momentum.[15] Examination of these two columns reveals that each of the four styles (with the exception of the T. Rowe Price universe α) produces superior returns, with an overall average 373bp universe α and 413bp MSVM α. These are impressive results indeed, particularly in light of the mechanical way in which the portfolios are constructed over time.

The third column in Table 4 reports the CB constrained MSVM α's for each of the four styles. These are calculated by applying the same style as before, but now strictly limiting the universe to those stocks in one of the nine CB's. This process is repeated in each of the nine years. The CB constrained MSVM α's reported in column 3 represent an average over all years and all CB's for each of the resulting 20 stock portfolios. For example, the Graham style produced an average CB constrained MSVM α of -7bp over all CB's over all years. Indeed, the CB constrained performance is much worse, to the tune of -339bp, when compared to the unconstrained results in column 2. 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 produces superior performance relative to CB constrained investing. This refutes the third and final condition for CB constrained investing to make sense.

Note that our 339bp under performance is very similar to the 290bp under performance obtained by Wermers (2002) in his comparison of the no drift managers to the highest

[15] See note 2 at the bottom of Table 4 for more details on how MSVM α is calculated. Again, there is no agreement on whether these tilts represent risk exposure or excess returns.

Table 4: Constant Style Investment Performance (Based on S&P1500 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&P1500.

[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&P1500. Then minus the portfolio (M)arket (as measured by CAPM β) tilt times the MK factor price, the (S)ize tilt (as measured by market value) times the S factor price, the (V)alue tilt (as measured by price to sales ratio) multiplied by the V factor price, and the (M)omentum tilt multiplied by the MO 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 β, smaller companies, value stocks, and lower historical returns each led to higher returns on average. Stock β's were only available from 2000 through 2003 and so 1995 through 1999 β adjustments were not possible.

[3] The CB constrained result is the average MSVM α earned over the nine characteristic boxes (small, mid, and large size across value, blend and growth) over the nine 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. The 36 (4 managers x nine CB's) 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.

[4] The rank slope is the change in average return when moving down a rank. For example, the rank slope of -4.8bp for the O'Neil style means that choosing the 21st ranked stock as compared to the 20th ranked stock reduces average return by 4.8bp.

drift managers. Recall that Wermer's study focused on mutual funds that were facing increasing CB constraints over the 1985 to 2000 sample period. It is striking that our two studies come to similar conclusions: CB constrained investing leads to significant under performance. 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 under performance.

The final column in Table 4 provides evidence on 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 20th ranked stock to the 21st ranked stock reduces average return by 4.8bp. The overall rank slope is -2.7bp. This means that for every 20 rank drop, average investment performance declines by 54bp. This reinforces our earlier statement that being forced to choose lower ranked stocks hurts performance.

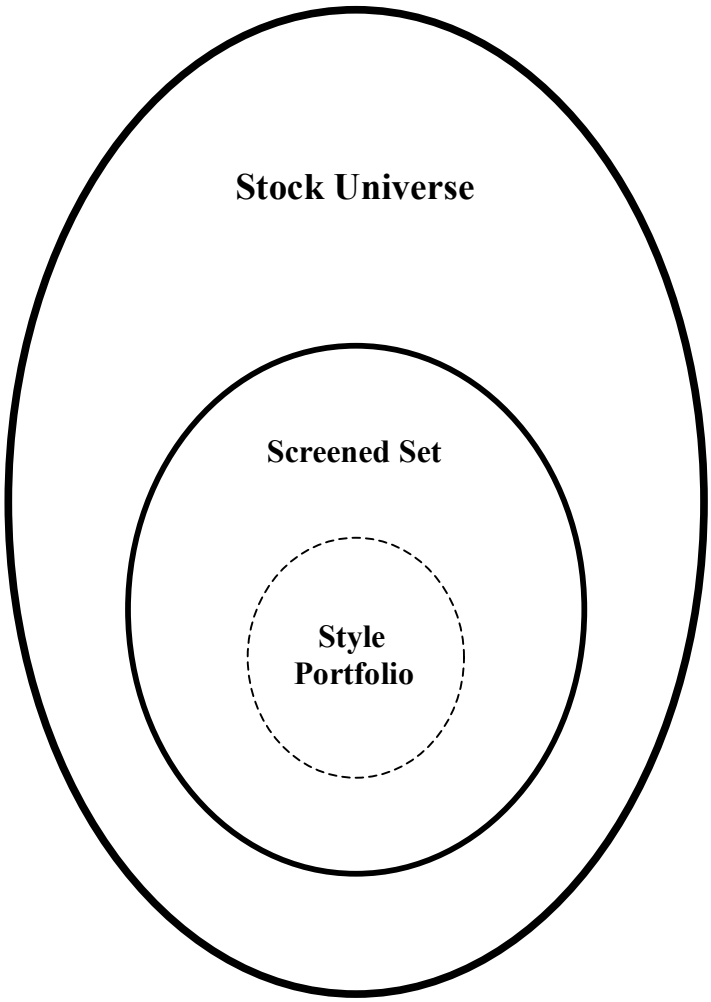
We began this section stating that for characteristic constrained investing to make sense, three conditions must hold. The evidence presented so far refutes each of these conditions: 1) style selected stocks do <u>not</u>, by and large, fall into a single characteristic box, 2) style selected stocks <u>drift</u> from box to box over time when the style is rigidly applied each year, and 3) characteristic drift <u>helps</u> 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 box as they pursue their unique equity style. This is the topic of the next section. But in today's investment management world, such drifting is frequently frowned upon by investors, advisors, consultants, and plan sponsors. 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 towards characteristic drift increases the chance of superior performance. On the other hand, our results and Wermers 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 since, rather than restricting managers to a specific box, a manager is categorized by means of the observed relationship between historical returns and various indices.[16] This is the case if the manager is truly 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 constraining. And if the indices are intended to capture "style", as they often are, then it is no better than CB's because once again characteristics and style are being lumped together. We think it is important is to be diligent in separating style and characteristics.

[16] There is considerable controversy regarding RBSA as many contend it is an inferior manager categorizing methodology when compared to holdings based techniques.

Figure 3: Equity manager style portfolio



V. Operating in an Unconstrained World

The unconstrained world of equity investing is represented by Figure 3. As a first step, the manager screens the stock universe to obtain a smaller set of stocks meeting 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 style. 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 will also have a corresponding sell discipline.

The problem with CB constrained investing can best be visualized by comparing our earlier Figure 1 to Figure 3. In Figure 1 the stock universe is divided into CB's and the equity manager is expected to stay within a particular box. In Figure 3, on the other hand, the equity manager views the stock universe as a whole and then applies a particular style in constructing a portfolio. By placing these figures side by side, the fundamental conflict is apparent. If the screened set in Figure 3 happens to fall mostly within one of the CB's in Figure 1, investment performance will be little effected by CB constrained investing, although, a priori, one would need to know the match up between styles and CB's. If however, stocks in the style portfolio fall into different CB's, performance will be significantly reduced by using CB constrained investing, as we have just demonstrated.

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 3?

Table 5 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.

Table 5: 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 CB's	Among styles
Manager drift:	Monitor	Ignore
Overall portfolio drift:	Monitored at manager level	Monitored at portfolio level

* CB =Characteristic Box

In an unconstrained world, managers are still expected to produce superior results (i.e. positive α) but α 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 towards small cap growth stocks, the manager's returns are tilt adjusted and then compared to others pursuing the same style. Again, in both constrained and unconstrained investing, the manager is expected to produce positive tilt adjusted α.[17]

In an unconstrained world, diversification is done among styles rather than CB's. 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

[17] In this study we used MSVM α as our tilt adjusted α. Again there is no agreement on which if any of these tilts represent risk and so the investor is able to choose whichever tilt adjustment they wish or no adjustment at all.

several managers, particularly those with low drift correlation over time, leads to much more stable tilts at the overall portfolio level. This is demonstrated in Figures 4 and 5 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 .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 0 for most of the sample period. Thus it is possible to allow individual manager characteristic drift while at the same time maintaining a fairly stable overall portfolio tilt.[18]

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 an actual situation, an investor may not be quite so lucky. However, as long as the managers are not changing tilts in unison, the lack of correlation among managers will help produce stable portfolio level tilts. The more correlated the managers, the more managers need be hired in order to achieve the desired level of tilt stability.

[18] 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 best be dealt with by hiring a master manager who is responsible for monitoring and counteracting undesirable tilts as needed.

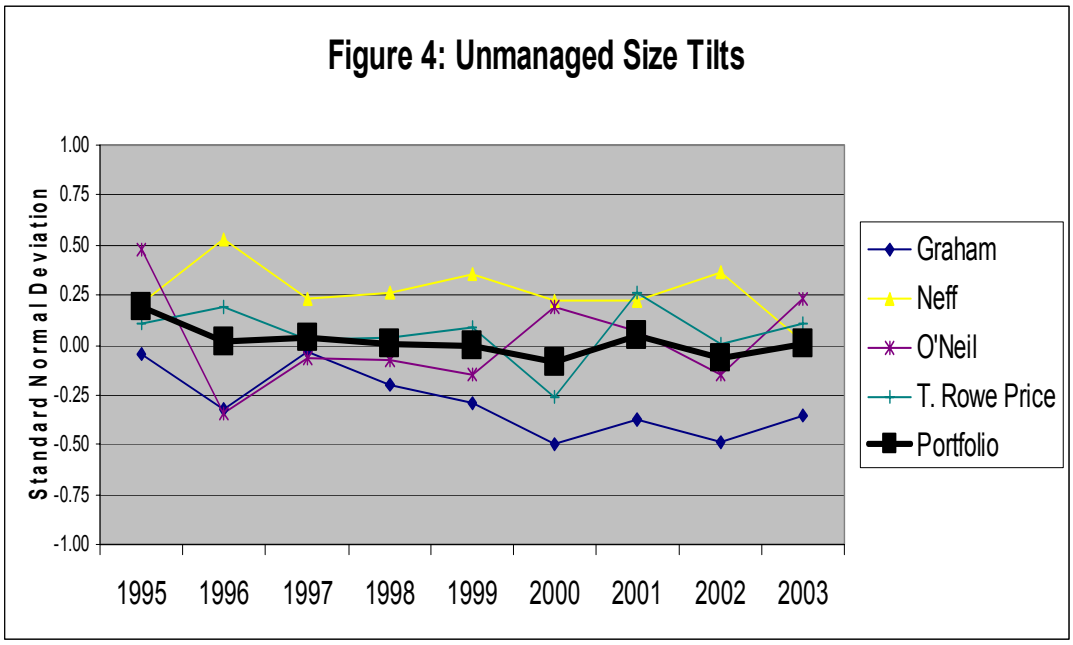


Figure 4: Unmanaged Size Tilts
Standard Normal Deviation
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
Graham
Neff
O'Neil
T. Rowe Price
Portfolio

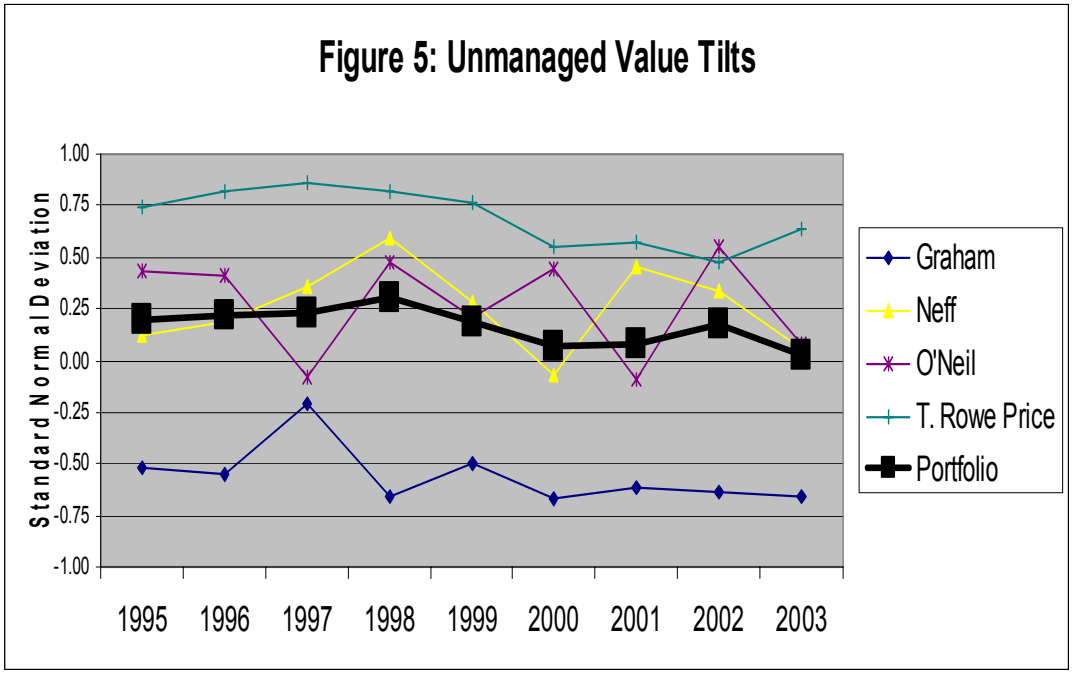


Figure 5: Unmanaged Value Tilts
Standard Normal Deviation
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
Graham
Neff
O'Neil
T. Rowe Price
Portfolio

VI. 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 339bp performance improvement. Thus our results imply that unconstrained, style constant investing is superior to constrained investing. We also provide guidelines on how investors (individual as well as plan sponsors) can operate in an unconstrained world as compared to 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 on the merits of the current reliance on the "style" grid and returns based style analysis for categorizing, selecting and evaluating equity managers.

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