Style Trends in Institutional Investment

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Abstract

It is intuitively clear that certain fashions exist in the investment industry: at times we witness "technology fashion" or "emerging markets fashion". In this paper we describe a methodology that allows us to diagnose and measure these style trends or fashions in institutional investment management. Using readily available manager performance databases and a return-based style analysis technique introduced by William F. Sharpe, we were able to identify style cycles for U.S. domestic equity money managers.

Our approach can be used to measure deficiencies and biases in the managers' performance databases. It can be used by money managers to design their marketing strategies. It can be applied to fixed income and international markets, and used as a basis for arbitrage and style rotation strategies.

Introduction

The goal of this study is to identify certain trends or cycles which exist in the institutional investment industry. If we consider the US equity market, it is reasonable to assume that in some periods growth stocks are fashionable, while during other periods value stocks. Very often this fashion is driven by the past performance, while sometimes it is just marketing hype. Securities fashion drives the demand for new investment products and we witness an increased money flow into the fashionable products -- either mutual funds or institutional accounts.

One way to identify this fashion would seem to be measure account *cash flows*. Unfortunately, these data are not available for most accounts, some accounts represent a mixture of styles, and some money managers tend to misrepresent their style in order to move to a favorable style category. The best way to overcome these problems would be to analyze the *actual portfolios* historically for all accounts. This would be a large-scale project and, again, the portfolios will not be available for the majority of small accounts.

We will use a different approach, comparing the dynamic of *style allocations* of managed portfolios to the market. The increased demand for, say, value management would increase the supply of value money managers and/or assets in value portfolios. In this

case the portion of value stocks in institutional portfolios will be higher than in the market as a whole. In this case we say that there is a value trend. In the same way we can describe growth and size trends.

We will derive these style allocations by using only portfolio performance data (total returns) and historical assets under management, figures which are available from numerous manager databases' providers.

One would expect that the fashion trends are driven by style performance -- that some of the managers are "trend followers" that would sell the worst performing assets and buy the best performing, other managers would overreact to the bad or good performance of the style, and so on. In our study we will link this behavior with the investment style performance.

All data manipulation procedures were performed in Microsoft Access Database using Access Basic language. For data analysis we used Zephyr Associates' Style Advisor performance analysis and visualization software.

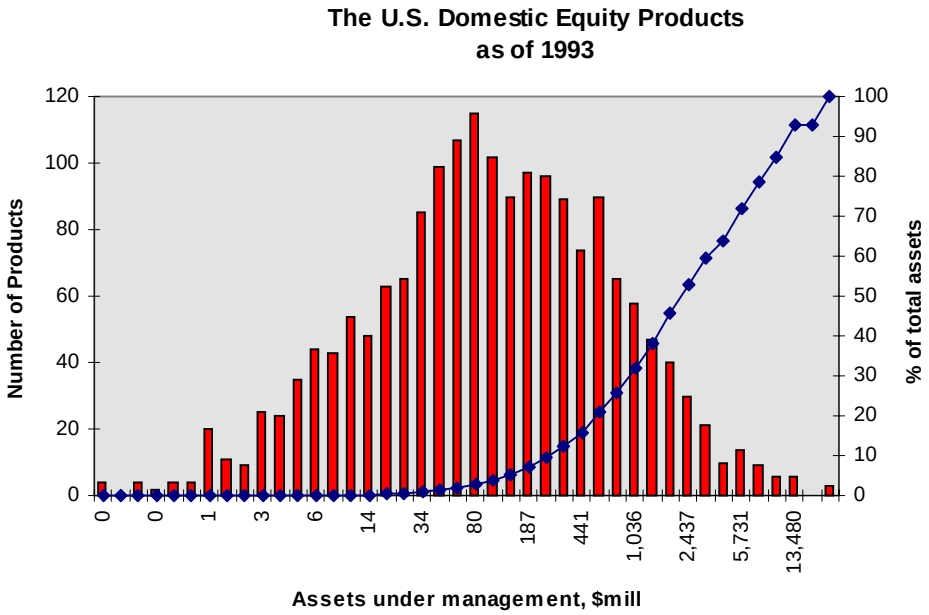
Data Selection

The selection of managers' historical performance and asset data was crucial for our research.

We examined several manager performance databases that are available on the market: PSN from Effron Enterprises, M-Search from Mobius Group, NELSON from Nelson Publications, PIPER from Rogers, Casey & Associates. All of them, except PIPER, have survivorship bias -- they don't keep managers/products that went out of business in the database. This gap is quite understandable because the vendors provide data to the consultants who perform manager searches and who are concerned with the products that are available at the time of search.

We have selected Nelson Publications' Manager Performance Database as a comprehensive and apparently reliable source of both asset and return data.

The following graph shows the distribution of assets under management of US equity products at the end of 1993. Note that the X-axis is intentionally made logarithmic because of the "log-normal" nature of capitalization figures. The line graph represents cumulative assets under management.



Evidently, about 50% of all assets are concentrated in less than 4% of all products, offered by those money managers with the assets greater than $2.5bill.

In this study we will examine the "distribution of style" between these large and small products.

Building A Composite Index.

Our first step was to test the reliability of performance and asset data. About 80% of all managers, in compliance with AIMR reporting standards, report the performance of all their assets, while the rest of the managers would report, on average, about 60% of their accounts' performance -- apparently the best performing portfolios. One would expect that the composite index of all managers would significantly outperform a broad US market index.

In order to test that hypothesis, we created a composite index for the US domestic equity managers. We started the index at the end of 1983 with the assets given at the year end. We continued this index in 1984 compounding quarterly returns (buy-and-hold). At the

end of 1984 we rebalanced to the assets given in the database. Note that the number of managers can increase (it cannot decrease because this database has only survivors). This process is very similar to the creation of any capitalization weighted index. We continued this process up to the June 1994 rebalancing to the provided asset weights at the every year end. We will call the resulting index the *institutional* index.

In addition to the total composite index we have created in like manner two indices that represent the top 50% and the bottom 50% of the cumulative product capitalization. We constructed these indices to have exactly one-half of the total assets at the end of each year.

We compared performance of the institutional indices thus created to the market benchmark selected for this study, the Russell 3000 Index. The choice of a market benchmark is very important. In their study, Lakonishok, Shleifer, and Vishny [1992] compared equal-weighted and value-weighted composite returns of 769 managed portfolios to the S&P 500 Index. They observed the managers'annual average return for the 1983-1989 period to be 17.7%, compared to 19% for the S&P 500 Index ; based on 1.3% difference, they concluded that "active money management subtracted rather than added value". The S&P 500 Index was selected as a benchmark in their study because they assumed that plan sponsors were hiring money managers primarily to beat the S&P500 Index. We think that this approach to the manager selection process is oversimplified. There are plenty of small-cap, value, and growth money managers that are valued for the consistency of their style and their ability to beat style-specific benchmarks, not just the S&P 500 Index. Therefore, a broad market index would be more appropriate for this and similar studies. Interestingly, the average annual return of the Russell 3000 Index for 1983-1989 was 17.7%, which matches the performance of the managers in the Lakonishok study! The only conclusion one can make is that managers in the study had pretty good coverage of the US equity market.

The performance of our reconstituted indices compared to the Russell 3000 is given in Table 2 below. During the whole 10 year period, the tracking numbers look very good.

Table 1 Institutional Indices compared to Russell 3000
January 1984 - June 1994

	Annualized Excess Return, %	*Cumulative Excess Return, %*	*Tracking Error, %*	*Correlation*	*Beta vs. R3000*	*Annualized Alpha,%*
Institutional Index	*0.05*	*1.60*	*1.82*	*0.9963*	*0.92*	*0.46*
Institutional 50% top Cap	*0.67*	*23.00*	*1.77*	*0.9964*	*0.93*	*0.84*
Institutional 50% bottom Cap	*-0.29*	*-9.61*	*2.09*	*0.9948*	*0.91*	*0.04*

Table 2 Annualized Performance
January 1984 - June 1994

	Annualized Return, %	*Cumulative Return, %*	*Standard Deviation, %*	*Sharpe Ratio*
Russell 3000 Index	*13.14*	*265.58*	*15.93*	*0.42*
Russell 1000 Index	*13.48*	*277.29*	*15.66*	*0.45*
Russell 2000 Index	*9.66*	*163.32*	*21.47*	*0.15*
Institutional Index	*13.19*	*267.18*	*14.67*	*0.46*
Institutional 50% top Cap	*13.65*	*283.37*	*14.81*	*0.49*
Institutional 50% bottom Cap	*12.70*	*250.76*	*14.62*	*0.43*

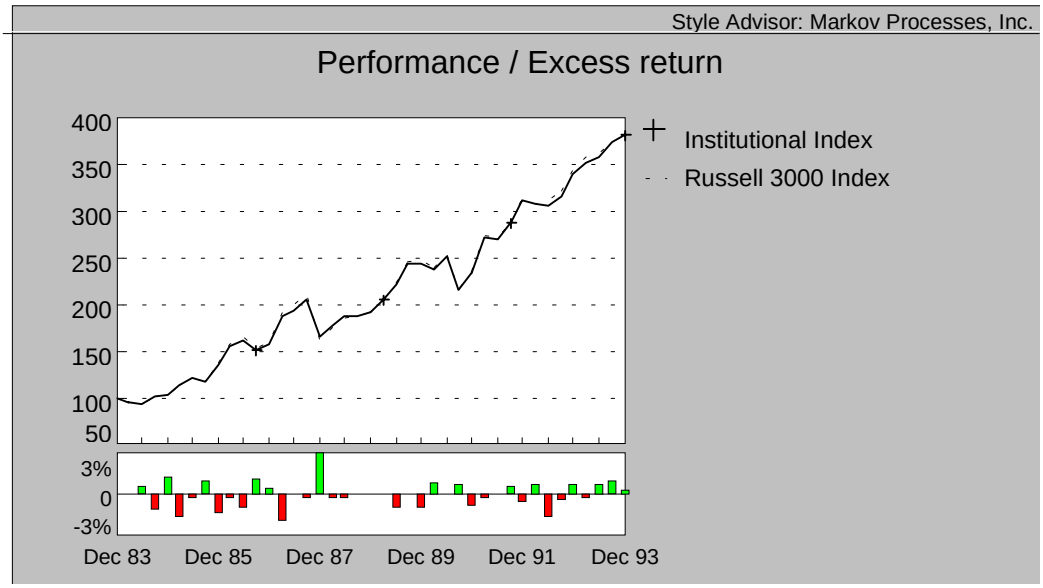
The performance numbers in the Tables 1 and 2 show the average superiority of the 4% of equity portfolios with the largest assets under management. One would expect quite the opposite: managers with less money under management should have higher volatility of their performance numbers which should be rewarded (on average) by higher returns. Here we observe that these managers have lower returns and lower standard deviations. Note that the composite institutional index has a superior Sharpe Ratio (.46) than the broad market index (.42), but all superiority comes from the managers with the largest assets (.49). As it follows from the Table 1, smaller accounts have lower historical beta and lower Jensen's alpha. While the total composite index has superior risk-adjusted performance (α=0.46%), all outperformance comes from the top 4% of equity products.

It is intuitevly clear that small account managers should have greater exposure to small capitalization stocks, which significantly underperformed "large cap" in the past decade (compare the Russell 1000 and Russell 2000 in the Table 2). This could clearly degrade the performance of these managers. It is also possible that smaller accounts have proportionally more cash than larger accounts -- this can also make their performance and volatility lower.

We will show in the following sections that both assumptions hold: smaller accounts have proportionally more cash and more smallcapitalization stocks.

The line graph below shows how the institutional index compares to the Russell 3000 index. The bar graph shows quarterly excess return of thenstitutional vs. the Russell 3000. Note the unusually stable outperformance for the last several quarters. It could be due to managers, on average, reporting results for the best *recently* performing portfolios.

Graph 2. Institutional Index vs. Russell 3000 (broad-market Index)



The 3% spike in the last quarter of 1987 is apparently due to the cash position in managers' portfolios during the market crash in October 1987. The Russell 3000 Index contains equity returns only. Most of the managers' return data in the performance databases includes cash position, which means that we had to extract the equity-only portion from the manager's data before reasonably comparing it to market data.

The above results suggest that the quality of the data is high and also show that active managers, on average, do not add much value (about .05% per year) when compared to a broad market index or, to put it differently, do not misrepresent their performance by much. It appears that all excess performance generated in the past decade came from the top 4% of the managers with the most assets under management.

Style Analysis

For each year in 1984-1994 period we identified four style components: large-growth, small-growth, large-value, and small-value, in the US equity market (Russell 3000 universe) and in the institutional portfolio (Nelson Manager Database).

In each year we found a combination of generic style-portfolios that minimizes tracking error to each of the two. We decided to use Russell's style indices, the 1000 Value, 1000 Growth, 2000 Value, and 2000 Growth, because they are exhaustive and add up to Russell 3000 Index. The portfolio weights to be found have to be non-negative and have to add up to 100%.

This process is usually called "style analysis" and requires quadratic optimization where the objective function is formed by adding the squared differences between the portfolio return and the style combination return for a certain period, which we call the *estimation window*. In this study the estimation window was two years or eight quarters. Because managers' return data in databases is quarterly, we had eight data points for each estimation. We used the Salomon Brothers three-month T-bill total return index as our fifth index to account for cash in managers' portfolios.

Style Analysis can be considered as an extension of the *single index* CAPM and has much higher explanatory power when applied to the managed portfolios. The standard *beta regression* model can be written in the following form:

$$R_p - R_f = \alpha + \beta(R_m - R_f) + \varepsilon$$

or

$$R_p = \alpha + \beta R_m + (1-\beta)R_f + \varepsilon,$$

where R_p is the rate of return of a managed portfolio, R_f *the* risk-free rate, and R_m the return of the market.

Or in the matrix form:

$$R_p = \alpha + R'\beta + \varepsilon$$

where

$$\beta' = (\beta, (1-\beta)),$$
$$R' = (R_m, R_f).$$

In some sense we are looking for a portfolio with two assets, Treasury bills and the market portfolio, which has the best tracking of a manager. One of the major deficiencies of this model when applied to managed portfolios, is that we are not using some of the *a-priori* available information, say, that managers on average don't have short positions. In the above model we can short either T-bills ($\beta > 1$) or the market portfolio ($\beta < 0$). Unfortunately, if we introduce "non-negativity" constraints in this single-index model we will have, on average, a lot lower explanation of the manager's returns than with an unconstrained model.

Usually the generic dimensions of investment for a manager are known in advance: for a domestic U.S. equity manager these could be value, growth, size, cash; for an international equity manager, country indices and cash; and for a domestic fixed income manager, quality, duration, cash. Including generic style indices in the model and imposing non-negativity constraints will greatly improve the explanation of the manager's performance and will give the insight in his or her management style. This method was introduced by William Sharpe and described in detail in Sharpe[1992].

The modified model will now have the following form:

$$R_p = \alpha + R'\beta + \varepsilon \qquad (1)$$

subject to

$\beta \geq 0$,

$\beta' 1 = 1$

where

$\beta' = (\beta_1, \ldots, \beta_n)$ *are style "weights",*

$R' = (R_1, \ldots, R_n)$ *are style indices returns.*

Note that the higher explanatory power of the model can be attributed to the Bayesian nature of the estimation (we are using "prior knowledge" of the manager's return distribution in constraints).

Modified Style Analysis

To estimate the parameters of the model (1) one would need to solve the following linearly constrained quadratic problem:

$$\min_{\alpha,\ \boldsymbol{\beta}} (R_p - \alpha - \boldsymbol{R'\beta})' (R_p - \alpha - \boldsymbol{R'\beta}) \qquad (2)$$

$$\text{s.t. } \boldsymbol{\beta \geq 0},$$

$$\boldsymbol{\beta' 1} = 1,$$

where R is the matrix of historical returns on the generic style indices included in the model, and R_p is the vector of historical returns of the portfolio for the same period of time, which we called the "estimation window" above.

Style betas obtained in this manner give us an estimation of the style allocation of the manager during the estimation period. If we are interested in the style allocation at the end of the period (or *current* style) we would have to take the shortest possible period -- but long enough to have the covariance matrix of the problem (2) to be of full rank and have a unique solution, i.e., we would need the number of observations to be greater than the number of style indices.

Instead of analyzing the style of individual managers, in this study we analyzed the composite index of all US equity managers. If our goal was to identify the style allocation of this composite index and catch the dynamic of style allocations, we would be always behind in identifying these changes. Consider the following example.

Let's assume there are only two money managers in the US, a value manager and a growth manager. For the previous year growth fashion prevailed and most, say 90%, of the funds were managed by the growth manager. This year things have changed, and during the first quarter the value manager captured 90% of the market. If we analyze the composite index of two managers using their historical asset numbers in order to identify

current style allocation of the institutional portfolios, we would be getting wrong answers because the composite index is dominated by the growth returns except for the last quarter.

One solution to this problem is (a) to assume that the managers' style has not changed by much during the estimation period and (b) to use *constant current assets* in calculating composite instead of the real, time-varying asset figures. In our case the style regression (2) would produce correct style allocation of 10% growth, 90% value with this approach.

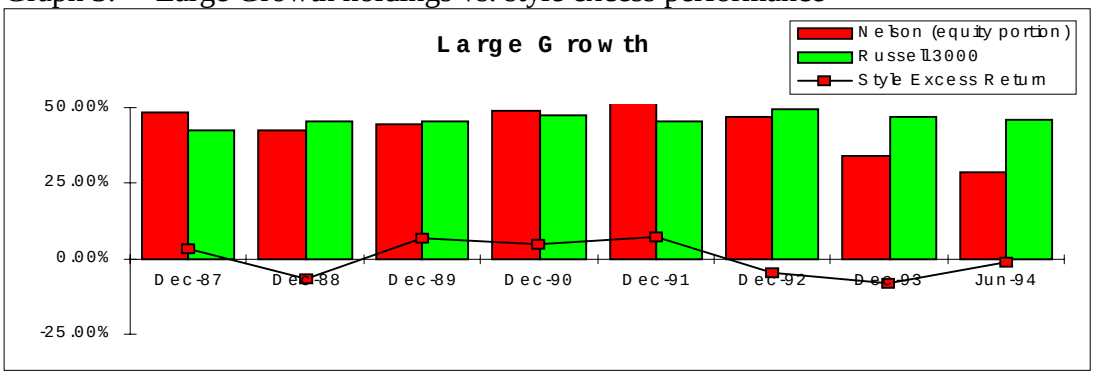
For the U.S. equity market the assumption a) seems reasonable on average, because money managers are valued by plan sponsors and individual investors for the consistency of their style. In the international equity market this is not true; managers shift their country loadings frequently. In this case, it's worth getting monthly performance numbers to make the estimation time window shorter and working with the composite index.

Another solution is to use an *equal-weighted* composite instead of capitalization (asset) weighted, i.e., to use average return among all money managers for each time period. These indices for mutual funds are readily available from Morningstar, Inc. and are called *investment objectives*. The asset allocation derived from the equal-weighted index is actually a "number of products" allocation, and shows the dynamic of the number of available products in each style rather than the actual style assets allocated. While this could be considered a very useful number, the detailed analysis of this dynamic is beyond the scope of this paper and can be a subject of further research (see the section on *Further Research*). In the above example with two managers, the analysis of the equal-weighted index would produce a fifty-fifty allocation at any time and with any estimation window. These numbers should be interpreted in the following way: half of all managers are value managers, the other half are growth managers.

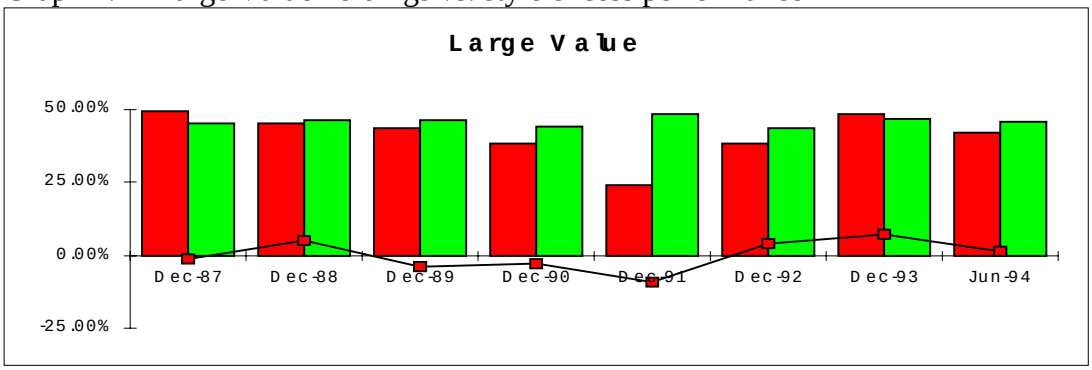
We used the first approach to derive the style allocations among the US institutional portfolios. For each year we calculated a separate composite using asset weights at the end of the year. The results of the analysis are shown in the graphs below. Each graph reflects the history of loadings on each of the style components. Note that we rescaled the non-cash portion of the institutional index, so that it would add to 100% without cash. We observed about 7% cash loading on average in the institutional index and the above rescaling allowed us to compare equity-only positions in both indices (Russell 3000 didn't load cash, as expected). The R-squareds for the regressions were in the range 99.8 - 99.9%%.

The line on each graph shows the return of the corresponding style portfolio in excess of the market (Russell 3000).

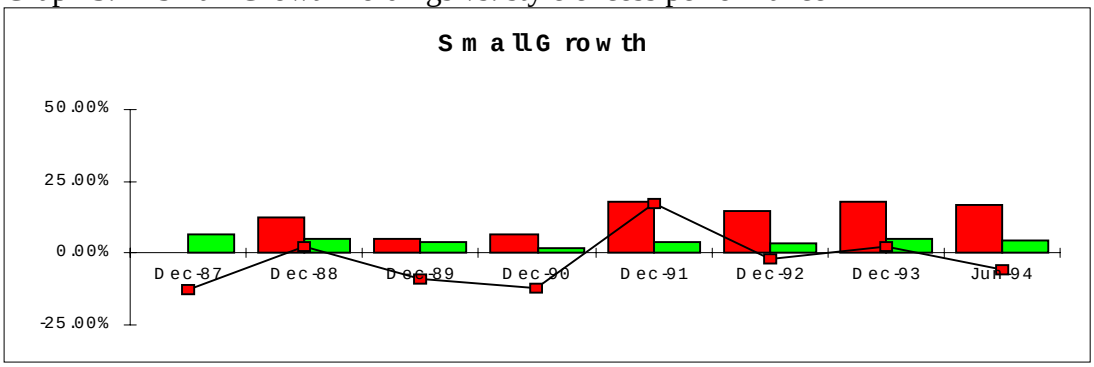
Graph 3. Large Growth holdings vs. style excess performance



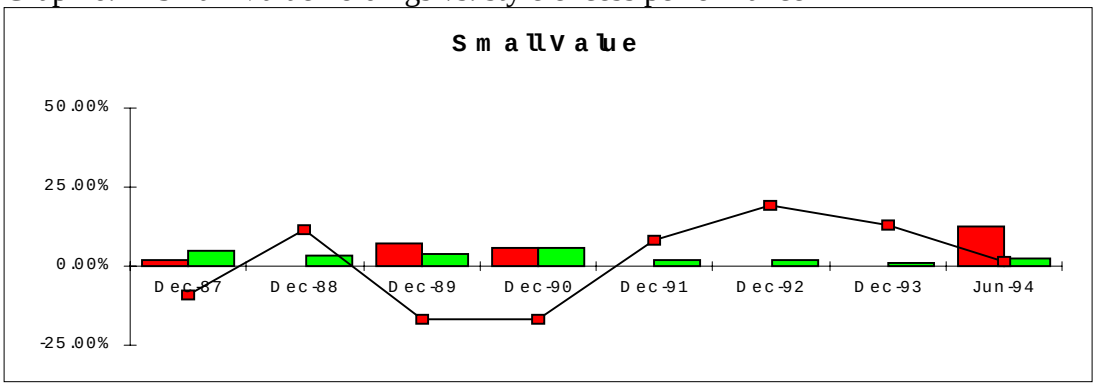
Graph 4. Large Value holdings vs. style excess performance



Graph 5. Small Growth holdings vs. style excess performance



Graph 6. Small Value holdings vs. style excess performance



It is noteworthy that small growth stocks are overrepresented in the institutional portfolios, compared to the market.

Several observations can be made from the Graphs 3-6 without any further exploratory analysis:

- Large-cap managers, whether growth or value, are "trend-followers."

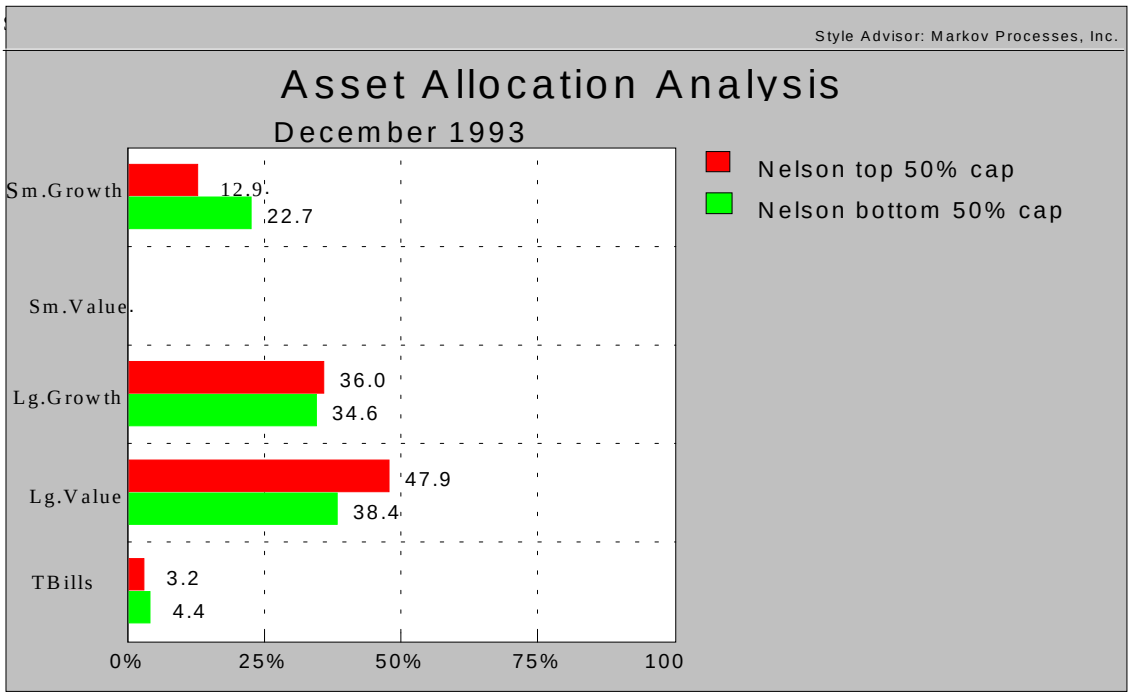
- Small-cap growth managers "over-react" to the performance of the managed portfolios -- two small boosts in performance in 1988 and 1991 were sufficient to keep money in this sector despite its poor performance in the following years.

- Small-cap value managers are very cautious and slow -- it takes years of good style performance for them to jump in the style, and years of bad performance to jump out. It is interesting that the highest loadings in small-value portfolios coincide with the worst performance of the sector.

So far we haven't discussed *causality*, i.e., whether the past performance drives the fashion or the fashion drives style performance. Implicitly we assumed the former while it is possible that the latter is true. The dynamic of the small growth loadings/performance graph indicates that dramatic increase in small growth holdings could have caused their superior performance during this drive and, as a result, overpricing and the degrading of performance in the two to three following years.

The following graph shows style allocation for the two Institutional sub-indices at the end of 1993. In one of the previous section we suggested that the performance of smaller accounts had been degraded by a larger-than-average cash and small-cap holdings. Note that the difference in style allocation is not as dramatic as one would expect. Smaller stocks have higher representation in smaller accounts, which at the same time hold 50% more cash than bigger accounts.

Graph 7. Allocation of Style between Large and Small accounts.



Further Research

In this section we will outline several directions for further research based on the methodology described in the previous chapters.

Style Allocation Strategies

Once the causality issue in style performance vs. style allocation is tested, it could lead to an obvious style rotation strategy. If, for example, for a certain style higher than the market average, style loading degrades the style performance in the next few years, then a good strategy would be buying a generic compliment to this style in the market portfolio.

We believe that using monthly returns instead of quarterly will make the asset allocation figures more reliable and suitable for creating a sensible style allocation strategy.

Small Accounts vs. Large Accounts

We have briefly compared the performance of the two composites: small and large accounts. We used style analysis technique here just to estimate the parameters of return-generating process (we call it style allocation) for both composites. If we could

demonstrate that larger accounts are better managed and produce superior performance, this could have serious implications for the money manager selection process for a plan sponsor, because when hiring smaller money managers the plan sponsor is taking higher risks.

In the Table 3 we show sample cross-sectional statistics of the 1993 annual return distribution of the domestic equity products sorted and grouped by the end of 1992 assets under management figure. We used 1992 year-end assets figures in order not to introduce a performance bias in the groups that we have created.

Table 3 Cross-sectional Sample Statistics of Managers Performance; (1993 annual returns)

	Standard deviation of Return	*Mean (equal weighted) Return*	*Asset Weighted Mean Return*	*Median Return*	*Number of Accounts in the group*
Large: 50% of total Assets	*6.12%*	*12.90%*	*13.06%*	*12.67%*	*60*
Core: next 40% of total Assets	*6.84%*	*13.07%*	*13.13%*	*13.36%*	*460*
Small: 10% of total Assets	*9.96%*	*13.79%*	*13.80%*	*12.86%*	*1000*

While the confidence interval for the mean return of small accounts is obviously narrower than for the large accounts, the standard deviation is still 50% higher, and in hiring a smaller manager, the plan sponsor is taking 50% higher risk.

We think that eliminating survivorship bias, taking historical data for 15-20 years, and using the simulated style adjusted benchmark (Sharpe[1992]) could be the right framework for this study.

International/Global Accounts

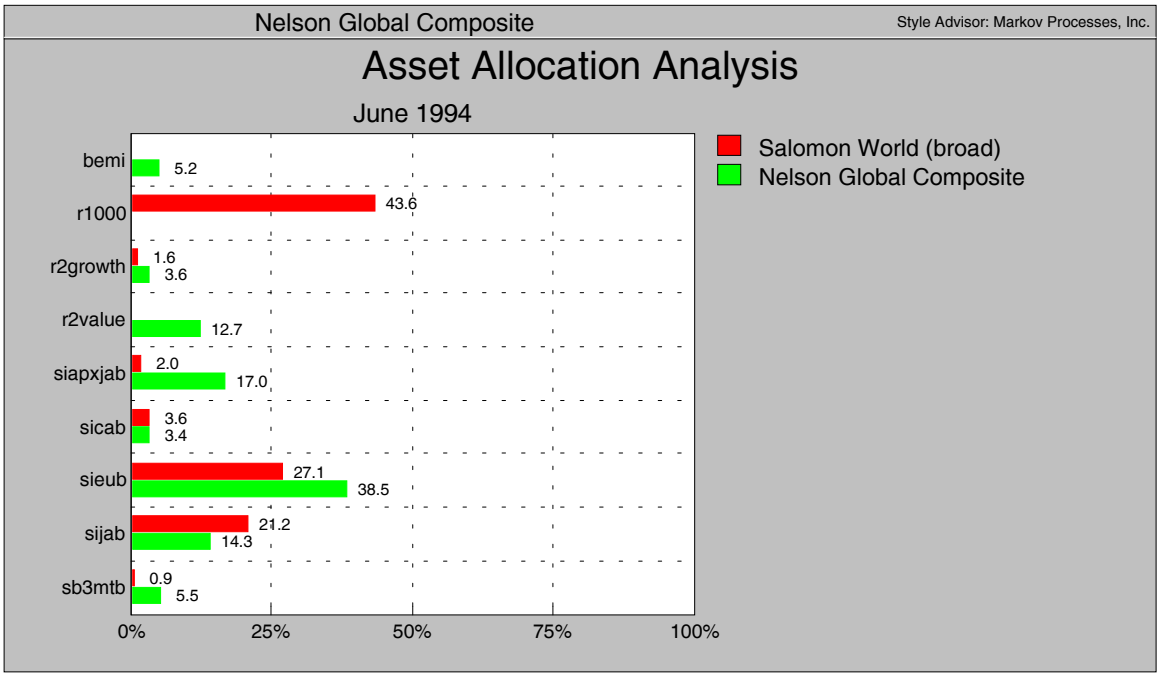
We applied the same technique to the composite performance index of the international/global equity money managers in the Nelson database. We used the asset-weighted composite index instead of year-end composites with the year-end weights for the reasons we mentioned in the previous section. For the palette of indices we selected the following Salomon Brothers Global Equity indices:

Canada Broad Index (SICAB)
Japan Broad Index (SIJAB)
Asia-Pacific excluding Japan Broad Index (SIAPXJAB)
European Broad Index (SIEUB)

We added Baring Securities Emerging Market Index (BEMI), three Russell US style indices (R1000, R2VALUE, R2GROWTH), and Salomon Brothers three month T-bill

index to account for other areas of international equity investment[1]. Each index represents total returns in US dollars. The results of the analysis are shown in the graph below. In order to compare the asset allocation in managed portfolios to the one of the market, we have run the same analysis on the Salomon Global Broad Index.

Graph 8. Style Allocation of global money managers



Interestingly, when it comes to the US equity portion of their portfolios, global money managers prefer to invest in smaller equities (12.7% in R2VALUE, the Russell small value index). The reason is quite obvious -- international managers can attain higher degree of diversification than domestic managers by investing in the assets with low correlation. That's why they can "afford" to take assets with higher risk (and higher return) -- small-cap domestic equities. Note that U.S. small-cap value stocks dominate the U.S. small-cap growth stocks in portfolios of global money managers -- quite the opposite to what we observed for the domestic managers!

One of the possible applications of this analysis is that the asset weights obtained during style analysis of the International Institutional Index can be used to create an overall benchmark for a global money manager. For example, instead of looking at his peers (which are hard to find sometimes) or some capitalization-weighted benchmark like MSCI EAFE index, a plan sponsor should compare the manager's results to a combination of indices weighted according to the style allocation of the institutional

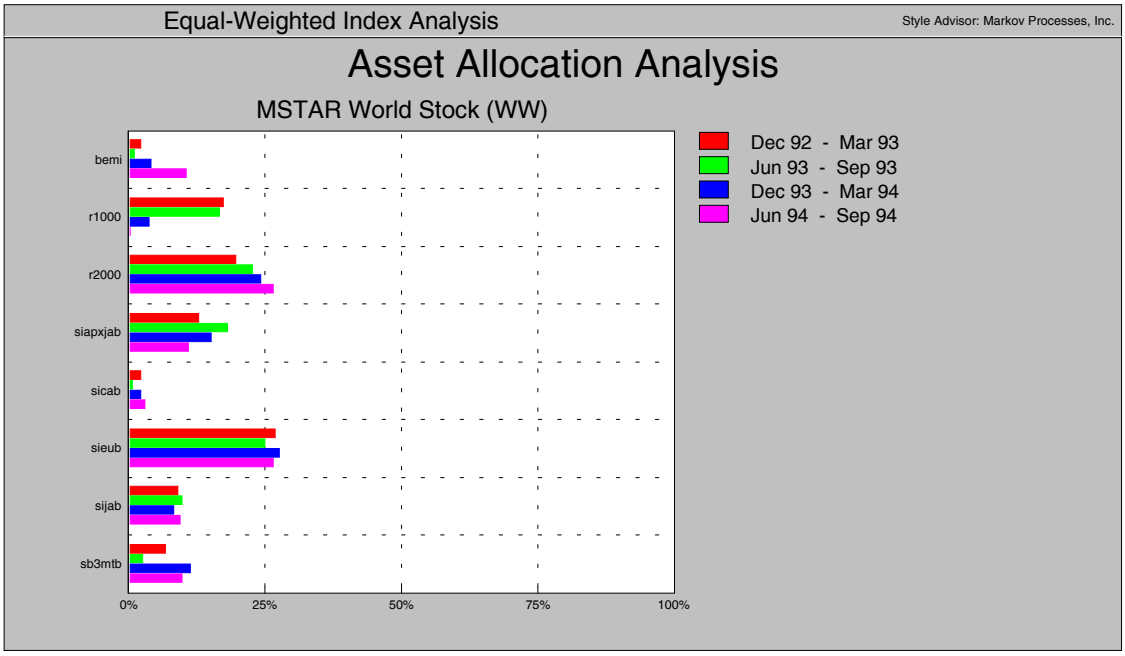
[1] Unfortunately, there exist a small "overlap" between Baring Emerging Market Index and Salomon Brothers Asia-Pacific Broad Index. We were not able to obtain Salomon Brothers emerging markets index for our study.

composite index and not to the capitalization-weighted global index. The logic behind this is that this combination of assets represents the plan sponsor's "opportunity mix".

A similar analysis can be done by using country indices instead of region indices. A MSCI EAFE country index subset with countries weighted proportionaly to their weights obtained by the Style Analysis of an International Institutional Index can be a viable alternative to the market capitalization-weighted or GDP-weighted indices. By definition, this benchmark would take into consideration all investment restrictions, pricing inefficiencies, and the illiquidity of international markets.

As we have mentioned in one of the previous chapters, the same analysis can be done with the *equal-weighted* indices. The asset allocation will show the dynamic of the number of products rather than the assets under management. In the Graph 9 below we show the results of the analysis of the Morningstar World Stock Index which is just an equal-weighted average of the mutual funds in this style category.

Graph 9. Style Allocation of the MorningStar World Stock Equal-Weighted Index.



Note an increased representation of Emerging Markets products during the last four years. The same is true, while not to the same extent, for the US small-cap equities. On the other hand the portion of large-cap US stocks in global products (on average) decreased.

An obvious application for analysis of equal-weighted composite indices would be measurement of deficiencies of performance databases.

Conclusions

Return-based style analysis is a valuable tool. Iit gives you insight into a manager's strategy when no exact holdings information is available. When applied to the composite indices -- either equal-weighted or asset-weighted -- derived from the manager performance database, style analysis permits the identification of trends in allocation of institutional assets and products. Linking the dynamics of style allocation with style performance can explain changes in both.

Just using a generic personal computer and one of the widely available manager performance databases and data analysis tools we were able to follow style trends in institutional investment and identify the reaction of money managers to style performance.

Our approach can be used to measure the deficiencies and biases in the managers' performance databases. It can be used by money managers to design their marketing strategies. When applied to international markets it allows to create a valuable international benchmark that takes in consideration all pricing inefficiencies of international markets.

References

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2. Josef Lakonishok, Andrei Shleifer, Robert W. Vishny, "The Structure and Performance of the Money Management Industry", Brookings Papers on Economic Activity: Microeconomics, 1992, pp. 339-391.