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ENHANCED EQUITY INDEXERS: COMMON TRAITS AND SURPRISING DIFFERENCES*

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This paper investigates the type of returns-based data a consultant or institutional investor would confront when analyzing an existing enhanced index manager or searching for a new one. The paper presents findings about different types of enhanced managers. Among them, and not surprisingly, the data suggests that all enhanced managers control tracking error by diversifying and by controlling factor exposures, in particular those relating to style (growth versus value) and company size. However, once those variables are controlled, the excess returns of these managers have remarkably low correlations, even among those following seemingly similar strategies.

The term "enhanced index" loosely describes an investment technique that attempts to outperform a benchmark index while, simultaneously, exhibiting a relatively low tracking error. Enhanced indexing occupies a middle ground, falling between index funds and conventional active strategies in the risk spectrum. Lately, institutional investors have increasingly utilized enhanced indexing. Some have become more conservative—stepping down from the high volatility associated with conventional active strategies. Alternatively, a combination of low interest rates and a declining stock market has forced some normally conservative investors to move away from conventional index funds to increase returns.

This paper describes many, if not all, of the enhanced equity managers that an institutional investor would see were he or she to use a commercial database to engage in a search. It discusses manager performance, the ways managers seek to enhance returns, tracking error, excess returns, factor exposures, and even how the managers name their funds.

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The paper analyzes manager characteristics using returns-based style analysis (Sharpe, 1992). Many consultants and institutional investors use this approach to begin the analysis of an existing manager or search for a new one, and it has been extensively discussed in the literature (e.g. Dor *et al.*, 2003; Brown and Goetzmann, 1997; Trzcinka, 1995; Christopherson, 1995; Tierney and Winston, 1991).[1]

The paper ends with a series of conclusions. One is that, as a group, these managers appear to have met their objective of outperforming their benchmark with low tracking error. They also appear to have controlled their portfolio exposure to different factors effectively. In this respect, style analysis appears useful in understanding these managers. It is likely that the managers themselves find this type of analysis, or the ideas underlying it, useful as they design and monitor their investment processes.

We also find that the average correlation of one enhanced manager's value added with another is surprisingly low. In other words, their performance deviations from benchmark appear to reflect primarily active or idiosyncratic risk. This suggests that combining several of these managers may reduce tracking error and increase the information ratio of an institutional investor's overall equity portfolio.

1 The recent attractiveness of enhanced indexers

According to the January 20, 2003 *Pensions & Investments*, in 2002 the top 200 Defined Benefit plans increased their allocation to enhanced equity products by over $30 billion, while their allocation to pure index funds fell. As of the end of September, these plans allocated approximately 29% of their public equity assets to pure indexes and 5% to enhanced equity index strategies.

Among the reasons for growing interest are the following:

- As absolute returns have fallen, institutional investors have searched for ways to increase the returns on their passive holdings. As one investment officer noted, "A 1% enhancement over a passive portfolio can make the difference in meeting or beating your actuarial assumptions."[2]
- A manager does not need to beat the market by very much to earn above average returns. Over the last 10 years, beating the S&P 500 by 1% put a manager in the second quartile of active equity managers, while beating it by 2% put a manager in the first quartile.
- Pure index funds have underperformed the average active manager recently and many investors feel that stock-picking skill is likely to be rewarded over the next several years.
- The tech collapse reminded everyone of the difficulties of forecasting whether growth will outperform value and by how much. As a result, risk-controlled core strategies look attractive.
- During the tech buildup, some traditional managers strayed from their stated styles—growth managers turned into aggressive growth managers and value managers drifted toward growth. The collapse hurt both more than would have been expected.
- Because enhanced strategies are tightly controlled, past returns are more useful in determining skill levels among enhanced indexers than they are for more active managers. Thus, it should be easier to distinguish skill from good fortune.

2 Data

Tracking error[3] is the variable that defines enhanced indexers. In terms of tracking error, some consider managers with less than 1% tracking error to be enhanced indexers. Others put the dividing line at 2% or even 3%. Some refine the delineation by

characterizing funds with very low tracking error as enhanced indexers and those with modest tracking error as "structured equity." In what follows, we examine the characteristics of managers with tracking error over 0.25% and less than 3% and refer to all of them as enhanced indexers.

Typically, institutional investors require that managers meet a variety of conditions to be included in a search. They require that managers be large enough and have a track record of reasonable length. They want size because it is easier to outperform with small portfolios than with large ones. Also, they want the manager to be financially stable and are often hesitant to be a very large portion of the manager's business. For our sample, we omitted managers with less than $250 million in their enhanced index strategy.

Length of track record is a concern as well. Investors want a record that is long enough to have provided the manager with sufficient experience and to be indicative of potential returns. On the other hand, a very long track record may not reflect the management process currently in place, either because of manager turnover or a change in the process itself. Although there is no magic length, in practice, five years tends to be an important milestone. Our sample requires a track record of at least 5 years.

In sum, we used the Mobius[4] database to isolate all strategies with at least $250 million and whose most recent 5 year tracking error relative to the S&P 500, was between 0.25% and 3%. Finally, we sought to eliminate all pure index managers, managers using leverage and managers whose stated benchmark was not the S&P 500. This resulted in 5 years of data ending December 31, 2002, for 44 funds operated by 41 managers.

In an actual search, quantitative data are used to determine likely candidates. Thereafter, the process may be long or short and may involve a small or large number of decision makers. In addition to quantitative characteristics, the due diligence process often involves the "five p's": people (How good and stable is the management team?), philosophy (What underlying assumptions do they bring to the management process and do the assumptions make sense?), process (Does it reflect the philosophy and the opportunities, and is it well-controlled?), performance (Does it reflect the successful application of the philosophy?), and price (Is the compensation reasonable?).

3 Tracking error

Figure 1 arrays the enhanced indexers according to realized tracking error. Surprisingly, no range of tracking error stands out as the natural domain of enhanced indexers. Instead, the 44 funds are arrayed fairly evenly across the spectrum. Nonetheless, three clusters contain relatively more funds. There are 11 funds with tracking error between 1% and 1.5%, 10 between 2% and 2.5%, and 12 between 2.5% and 3%.

Because tracking error across managers varies more or less continuously, investors should not restrict their search to a narrow range of tracking error for the following reasons.

- Doing so might unnecessarily restrict the search to a few managers.

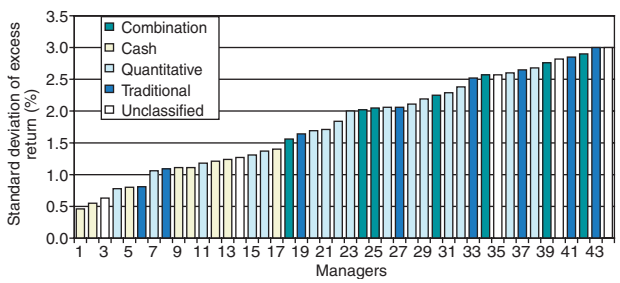

Figure 1 Core managers arrayed by tracking error: five years ended December 2002.

- Tracking error measured over any short interval is a noisy estimate of the "true" risk of any strategy and a strategy with low tracking error could harbor a significant risk that has yet to manifest itself.
- It is usually better to diversify across several enhanced indexers rather than to choose only one. Diversification is likely to increase the certainty of achieving a positive alpha at little cost in expected net return.
- In a diversified portfolio, how a manager correlates with other managers is at least as important as the absolute level of a manager's tracking error.

4 Performance and batting average

On average these managers lost 0.04% per year over the 5 year period ending December 31, 2002. The S&P 500 lost 0.59% per year, so the average enhanced manager provided 0.55% in excess return. Their average tracking error was 1.82% and the average information ratio, a respectable 0.34.

A manager's batting average is the number of quarters he or she outperforms the benchmark divided by the total number of quarters. The average batting average for these managers was 0.578, which if these managers were baseball players, would be very good. However, long-term success in money management would seem to require an average above 0.500, particularly for managers with low tracking error.

Figure 2 shows the distribution of batting average across enhanced managers. Not only is the average fairly high, but also the range and right skewness of the distribution are interesting. No manager had a batting average below 0.400 and the mode of the distribution was 0.600.

Also shown in Figure 2 is equivalent data for a group of active large and mid-cap US equity managers.

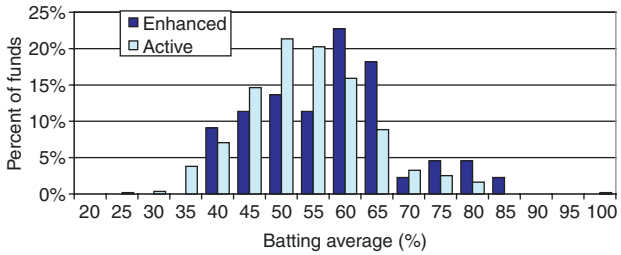

Figure 2 Batting averages, enhanced index versus active managers: 20 quarters ended December 2002.

These, more active, managers exhibited an average batting of 0.528, exactly 0.050 less than the enhanced indexers. The enhanced indexers have a distribution with fewer low batting averages and more high ones than their more aggressive counterparts. Also, the mode for active managers is 0.500, while the mode for enhanced indexers is 0.600.

The absence of enhanced managers with batting averages below 0.400 (or an active manager below 0.250) suggests several possibilities. One is the obvious: every enhanced index manager did 0.400 or better over the past 5 years. The second possibility is that those who were under 0.400 are no longer enhanced indexers and thus not in the database. Three, those whose performance is under 0.400 may not have reported their returns, or may have reported better returns. To the extent that possibilities two and three are correct, the database is biased and contains survivorship bias.

Nonetheless, even if there is some bias, this is the type of data that institutional investors use in their initial screening of managers. As a result, it is interesting to see what one can learn from it. Furthermore, as will become clear later in the paper, a number of managers who underperformed the benchmark over the interval did report their returns and are in the data. So, there is a limit to survivorship bias. Finally, the legal, regulatory, and reputational penalties for misreporting are significant.

5 Types of management processes

Enhanced index funds require active management. Active managers use a variety of strategies. Nevertheless, it is possible to group enhanced index managers into several broad categories. As will become apparent, the fact that two managers are within the same category does not mean that their portfolios are similar or that their performance is highly correlated.

Here are the major ways managers try to beat their benchmark.

I. *Stock-based strategies* invest virtually 100% of assets in stocks and seek to outperform by holding favored stocks slightly above their benchmark weights and disfavored ones, slightly below.
   A. *Quantitative stock-based strategies* seek to build as much investment skill as possible into algorithms determining portfolio weights. However, these algorithms are seldom static as managers seek to continually build higher levels of skill into the process and/or to change the algorithms as they believe the market is changing.
      - *Pros*—Quantitative processes are dispassionate and likely to be repeatable. They can also cover large universes of securities and are more amenable to structured, risk-controlled products.
      - *Cons*—like any active process, their success depends on the quality and depth of insight of the managers who create and evolve them, as well as on the skill with which they are implemented.

   Among quantitative strategies, there are two major types:
      1. *Single equation models*—these models evaluate every stock the same way. If they focus on price-related variables they tend to have a value bias, while if they focus on momentum, a growth bias. Some use technical indicators, either exclusively or in conjunction with fundamental variables.
         - *Pros*—this was the first type of quantitative model, and is still widely and successfully used.
         - *Cons*—evaluating every security in exactly the same fashion may miss important characteristics. Many of these models have a bias toward value stocks, which may or may not be desirable.
      2. *Different models for different stocks*—these approaches assume that different types of stocks need to be evaluated in different ways.
         (a) *Industry or Economic Sector models*—these managers evaluate stocks differently depending on the sector a stock is in. This approach lends itself more readily to a fundamental rather than a technical approach.
            - *Pros*—may better reflect economic reality than a single equation model. Also, some accounting ratios and data are more comparable within industries and sectors.
            - *Cons*—still a relatively new approach used by a limited number of managers.
         (b) *Fundamental Characteristics*—this approach segments stocks using fundamental variables rather than industries or sectors. Once categorized, stocks are then analyzed using cohort-specific models. For example, a strategy that segments stocks by earnings growth (in accordance with valuation theory) might treat slowly growing stocks differently than rapidly growing ones—much like active value managers differ from active growth managers.

- *Pros*—may better reflect the implications of valuation theory. This approach may also be more consistent with the different ways in which traditional growth and value managers judge investment attractiveness.
- *Cons*—still a relatively new approach.

B. *Traditional management*—this approach uses traditional stock analysts who use a combination of analysis and judgment to rate the stocks and/or estimate alphas. Then, portfolio managers, often with a strong quantitative bent, constrain the investment process so that portfolio characteristics mimic, to some degree, the benchmark index. Often they will constrain the percentage of total assets in each industry or sector to match the corresponding weight in the portfolio's benchmark.
   - *Pros*—an intuitively appealing mixture of hands-on analysis and quantitative discipline. Can reflect the idiosyncratic characteristic of each stock.
   - *Cons*—exceptional analysts may leave if there is no obvious route to portfolio management. Significant cultural differences between traditional and quantitative managers require strong, knowledgeable, and committed senior management.

C. *Combination of quantitative and conventional management*. This approach uses a quantitative overlay to modify the selections and/or alphas estimated by fundamentally oriented analysts. The portfolio is then constructed to approximate the benchmark portfolio.
   - *Pros*—an intuitively appealing balance between traditional analysis and a quantitative estimation of alphas.
   - *Cons*—In addition to the drawbacks of the traditional approach mentioned above, the overall portfolio manager must judge how much influence to give to the traditional as opposed to the quantitative estimates of alpha. Also, it may be difficult to ensure a consistent alpha estimation process across a group of fundamental analysts. This may preclude, for example, making active sector bets if individual analysts specialize by economic sector.

II. *Derivatives-based or portable-alpha approaches* invest in another asset class, most often fixed income. Usually, these strategies invest in fixed income portfolios that seek to earn a higher return than the interest rate implicit in futures contracts by taking duration or credit bets. They then hold S&P 500 futures equal to the total assets in the fixed income fund to provide an equity-like return.
   - *Pros*—has the potential of a lower risk portfolio. Can utilize a strong bond manager to add an equity alpha.
   - *Cons*—alpha may be highly correlated to bond market alphas. This approach is subject to normal bond alpha problems such as a poor duration, sector, or credit call. Because some managers have misused derivative exposure, this type of strategy may require closer monitoring. Additionally, these strategies tend to cluster at relatively low alpha levels—possibly indicative of bounds on the magnitude of potential alpha.

6 Classifying the managers

The 44 funds we identified were classified into the following categories: Traditional, Quantitative, Combination (i.e. employing both Traditional and Quantitative alpha estimates) and Cash. Cash stands for derivatives-based managers using an

underlying fixed income or money market portfolio to produce alpha.

We used each manager's own description of his or her investment process to classify the funds. We were able to classify 40 of the 44 funds using manager web sites and consultant reports. Our classification is subjective, but, given the clarity of many of the descriptions, we feel it is reasonably accurate.

Table 1 shows average performance statistics for each category of fund as well as for the group as a whole. Two funds were omitted, because two managers each managed two different funds in the same style with slightly different tracking errors. In each case, we retained the fund with the higher tracking error, which was slightly above 2% in both cases. That left 42 funds.

Numbers: Table 1 shows that most enhanced indexers use Quantitative disciplines, either straight Quantitative (15) or Quantitative combined with Traditional (7). Close behind are the Traditional managers (9 plus the same seven Combination managers they share with Quantitative). There are seven Cash managers, and we were unable to classify four.

Tracking Error: The Cash managers, who overlay a fixed income portfolio with equity futures, had an average tracking error of roughly 1%, which is by far the lowest among the groups studied. The stock-only managers averaged around 2%.

Performance: Over this interval, Quantitative managers, on average, had the highest excess returns (0.95% per year) and information ratios (0.57) and Traditional managers, the lowest.

Performance versus tracking error: Figure 3 shows the distribution of excess returns[5] and the tracking error. Most of these managers earned returns in

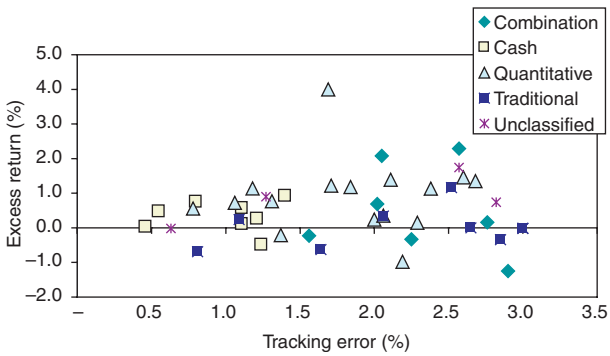

Figure 3 Excess return versus tracking error.

Table 1 Average statistics for manager types.

Enhancement type	Numbers of managers	Tracking error	Excess returns	Information ratios	Average correlation of excess return within type
Quantitative	15	1.82	0.95	0.57	0.13
Traditional	9	2.18	0.04	0.00	0.10
Combination	7	2.25	0.56	0.28	0.19
Cash	7	0.95	0.34	0.39	0.17
Unclassified	4	1.82	0.84	0.40	0.04
All 42 Funds	42	1.82	0.55	0.34	—
Average of within-type correlations					0.13
Average correlation of all 44 funds					0.11

excess of their benchmark over this interval. As one would expect, returns were low and tightly clustered at low tracking errors, but were more dispersed for high tracking error funds. The proportion with negative value added was fairly constant along the risk spectrum.

Correlations: These are surprisingly low and will be discussed in a later section.

7 Factor exposures as sources of tracking error and return

Managers can add value either by picking good stocks, or by tilting the portfolio toward a factor (such as smaller size) that they believe is likely to do well. Both stock bets and factor bets add to the expected tracking error. Whether they add to the historical tracking error depends on the particular interval studied. For example, suppose that, over the most recent 5 year period a manager had a tracking error of 1.5% but had a relatively large exposure to small stocks, or to value stocks. It may be that over this period, those exposures did not contribute much to tracking error, but they may in the future.

We conducted a "style analysis"[6] to further understand the characteristics of these managers. This technique seeks to explain a manager's historical returns in terms of hypothetical index funds (we used four: Russell Large Growth, Large Value, Small Growth, and Small Value) and a money market fund (represented by the Citigroup 3-month Treasury Bill index).

Each manager's factor exposures are estimated from a constrained regression. The dependent variable in each of the regressions is a time series of an individual fund's quarterly historical returns. The independent variables are comparable time series for the five indexes, where the coefficients on the independent variables are constrained to sum to 1. The estimated coefficients represent the fund's historical exposure to the different factors represented by the indexes. This is the "standard approach" in the Zephyr program and is discussed in greater detail in Dor *et al.* (2003).

Table 2 shows the average exposures of the different manager types and of the S&P 500. Note that even though the S&P 500 contains no Treasury Bills, over the last 5 years the best fit that one can obtain in a constrained regression against Russell indexes includes an exposure to Treasury Bills.

On average, all manager types have exposures close to their S&P 500 benchmark. The constraints in the regression cause the exposures in

Table 2 Average factor exposures relative to benchmark.

Enhancement type	Citigroup 3-month T-bill	Russell 1000 value	Russell 1000 growth	Russell 2000 value	Russell 2000 growth
Cash	0.04	0.49	0.48	0.000	0.000
Combination	0.03	0.47	0.49	0.009	0.000
Quantitative	0.03	0.47	0.48	0.011	0.004
Traditional	0.05	0.47	0.48	0.007	0.001
Unclassified	0.03	0.47	0.50	0.000	0.000
S&P 500 Index	0.03	0.48	0.49	—	—

each row to sum to 1, except for the rounding error.

Although the strategies are similar on average, there is a wide dispersion among them and some funds exhibited evidence of significant factor exposures over the interval studied. Do these small exposures help explain the tracking error and returns of the individual managers? First, consider the tracking error.

8 Tracking error: the importance of individual factor exposures

Figure 4 plots the tracking error on the horizontal axis and the difference between a fund's exposure to growth and value on the vertical axis. The zero axis is approximately the relative exposure of the S&P 500. Those above the axis have a relatively higher exposure to growth than the S&P 500. Those below have a higher exposure to value.

The managers closely controlled their style exposures to Growth and Value. A pure growth manager would plot at +1.0 on the vertical axis. A pure value manager would lie at −1.0 on the vertical axis. The enhanced managers all fall within style exposures of ±0.15.

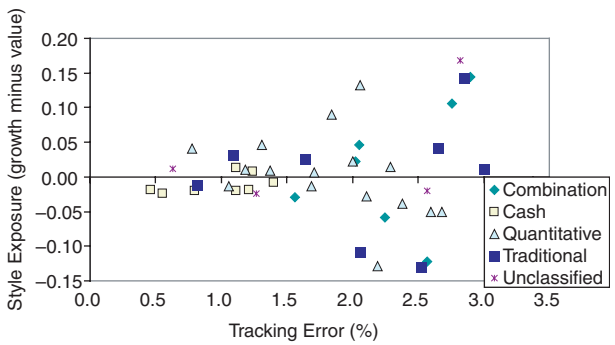

Figure 4 Style exposure versus tracking error.

Figure 4 suggests that

- over this interval, controlling style mattered. Tracking error below 1.5% to 2% required style exposures fairly close to benchmark;
- however, maintaining an exposure close to that of the S&P 500 did not guarantee low tracking error;
- at higher tracking errors, some enhanced managers tend to have a value bias, while others tilt toward growth.

Other factors have similar effects. Table 3 shows how factor exposures affected the tracking error. Since style exposure can range from −1 to +1 while size goes only from 0 to +1, in this table we divided the style exposures by 2 to make them comparable to the size exposures. Also included is the effect of a fund's exposure to the market as a whole as measured by the fund's beta, which was estimated separately from the other factor exposures. The implication of these results is that individual factor exposures need to be controlled successfully to maintain low tracking error.

9 Excess returns and individual factor exposures

An important question about enhanced indexers is how much of their value added is due to (small) factor bets and how much to stock picking. Figure 5 presents excess returns and exposure to size. The exposure of the S&P 500 was about 0.96. The chart suggests that an increase in the exposure to small stocks increased the dispersion of excess returns. Over this interval, small and mid-cap stocks outperformed large caps, but as will be seen below, exposure to size had little effect on the tracking error, perhaps because large, mid- and small cap stocks were more highly correlated than in previous periods.

Further analysis showed that no individual factor seemed to be a particularly important contributor to excess return over this interval. Rather than examine

Table 3 Differences between fund and benchmark exposures at increasing levels of tracking error.

Tracking error %	Minimum and maximum exposure differences for different factors								
	Size (Russell 1000 − Russell 2000)			Style (Russell growth − Russell value)			Beta		
	Min	Max	Range	Min	Max	Range	Min	Max	Range
0 to 1	−0.01	0.01	0.02	−0.06	0.00	0.07	−0.01	0.01	0.02
1 to 2	−0.12	0.02	0.14	−0.07	0.05	0.12	−0.04	0.02	0.06
2 to 3	−0.10	0.03	0.13	−0.17	0.13	0.30	−0.05	0.04	0.09

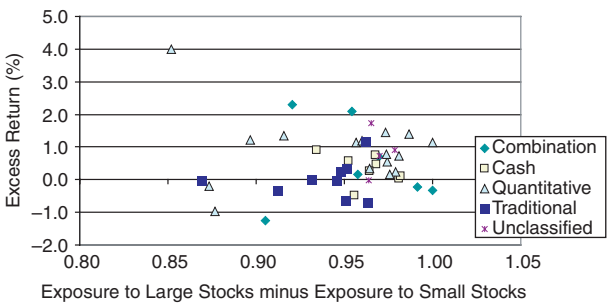

Figure 5 Excess return versus size exposure.

each individually, we consider them together with tracking error in the next section.

10 Performance and multiple factor exposures

Previous sections suggested that to control tracking error a manager needed to control each individual factor. Excess returns did not seem to be closely related to any individual factor. This section further investigates the effect of factor exposures on performance.

We begin with simple correlations. Table 4 presents correlations between manager excess returns and manager exposures, as well as correlations involving the tracking error.

The correlations are low, but they suggest that performance was helped by exposure to value and smaller stocks and hurt by exposure to growth. Not only did exposure to large value improve returns, it also reduced the tracking error.

A more important question is how these factor exposures interact with each other in their effect on performance. We can gain some insight into this by performing two sets of regression analyses. The first set considers the tracking error.

11 Explaining tracking error

Factor exposures are a major source of tracking error. Table 5 shows the results of five different regressions

Table 4 Correlations between manager performance and factor exposure.

	Russell 1000 value	Russell 1000 growth	Russell 2000 value	Russell 2000 growth	Citigroup 3-month T-bill	Beta
Tracking Error	(0.22)	0.07	0.19	0.04	0.14	(0.04)
Excess Return	0.16	(0.16)	0.24	0.15	(0.32)	0.10

Table 5 Explaining tracking error with ordinary least squares regressions.

Independent variables*	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	1.47	1.38	1.34	1.01	0.98
	(8.64)	(8.02)	(10.04)	(6.46)	(5.97)
T-bill	24.80			23.53	20.43
	(2.63)			(3.23)	(2.48)
Beta		27.9			6.89
		(3.17)			(0.81)
Russell 1000 Growth/			4.42	4.34	4.08
Russell 1000 Value			(4.97)	(5.39)	(4.69)
Adjusted R^2	0.12	0.17	0.36	0.47	0.47
F Test for significance of regression	0.01	0.00	0.00	0.00	0.00

*Each independent variable equals the absolute difference of a fund's exposure minus the exposure of the S&P 500 index.

that seek to explain tracking error in terms of the absolute value of the deviation of a fund's factor exposures from those of the S&P 500 index. In each, tracking error is the dependent variable. The independent variables vary from model to model. In each case they represent a fund's deviation from the benchmark. The beta was estimated in a separate regression from the exposures to the Russell indexes. We tried several other regressions, but since they added no additional insights, we have omitted them.

Model 1 suggests that a fund's exposure to Treasury Bills, or cash, contributed to the tracking error over this period. However, Model 2 shows that the difference of a fund's beta from 1.0 was more important. Model 3 shows that the relative exposure to large growth and value mattered even more. More precisely, Model 3's independent variable is the absolute value of the difference between a fund's exposure to large growth divided by its exposure to large value minus the comparable ratio for the S&P 500.

Model 4 is the strongest regression we ran. It suggests that almost half of the variance in fund tracking error is attributable to an S&P 500 enhanced fund's exposure to cash and to style exposure. The remaining tracking error is due to exposure to individual securities and, perhaps, to exposure to factors we have not included.

These results, as well as the other tests we ran, suggest that controlling a fund's exposure to three factors is critically important in controlling the tracking error. This result is well known among practitioners—to run an enhanced index one must keep cash low and one's exposure to size and style close to benchmark.

Finally, the low tracking errors of these managers and the strong results of Models 4 and 5 suggest that idiosyncratic risk is low, undoubtedly due to a significant amount of diversification. Anecdotally, portfolios of 200 to 300 securities, or more, are common.

The fewer factors a manager needs to control, the better, because every factor that must be controlled limits a manager's freedom. In practice, there is almost always a tradeoff between expected return and the control of risk. In this respect, Table 5

Table 6 Explaining excess return with ordinary least squares regressions.

Independent variables*	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.58	0.56	0.57	0.43	0.48	0.51
	(4.27)	(3.39)	(4.07)	(2.85)	(3.22)	(3.19)
T-bill	−16.66				−14.21	4.10
	(−2.22)				(−1.87)	(0.12)
Beta		4.89				−3.17
		(0.67)				(−0.08)
Russell 3000 Growth/ Russell 3000 Value			−1.39			−2.33
			(−1.45)			(−0.58)
Russell 2000/ Russell 1000				13.9	10.89	12.17
				(1.88)	(1.48)	(1.4)
Adjusted R^2	0.08	−0.01	0.02	0.06	0.11	0.07
F test for significance of regression	0.03	0.51	0.16	0.07	0.04	0.14

*Each independent variable equals the difference of a fund's exposure minus the exposure of the S&P 500 index.

suggests that not only is controlling beta inadequate to control tracking error, but also more importantly, if one controls cash, size, and style, it may be unnecessary. If it is unnecessary, then a manager should not control beta, or should do it loosely. The fewer factors to control, the more latitude to add expected return.

12 Explaining excess return

We had a harder time using factor exposures to explain excess return. Table 6 presents the best six of the regressions we estimated. None works very well, but perhaps Model 5 is the best. It suggests that over this period, 11% of the variance in excess returns could be explained in terms of the raw difference (not the absolute difference) in a fund's exposure relative to benchmark to cash and size.

Model 5 suggests that the greater a fund's relative exposure to cash and to large stocks, the lower a fund's excess return. These results are undoubtedly period specific. In contrast, we suspect that the implications about the tracking error in Table 5 hold in many, if not most, market environments.

More generally, the difficulty in explaining excess returns in terms of factor bets suggests that something else is at work. The two most likely candidates are other unspecified factors, or more likely security selection, i.e. most of these managers appear to be stock pickers.

13 The low correlations of enhanced index managers

The above analysis suggests that, over this 5 year interval, factor exposures did not contribute much to the excess returns of enhanced managers. Nevertheless, their excess returns may still be correlated. Other factors to which they are exposed may cause returns to be correlated. Or, some of the managers may follow management styles that are similar

enough to give them similar portfolios and, thus, positively correlated excess returns or alphas.

We calculated the correlations of manager returns. As one would expect, raw returns were highly correlated, averaging 0.996. However, the average correlation of their excess returns was surprisingly low, averaging 0.107. Of these 861 excess return correlations, 609 were positive and 294, negative.

In terms of high correlations, 24 or 2.8% were over 0.60 in absolute value. Of these, six involved managers of the same type and 18 were between different types of managers. In terms of numbers, most of the high correlations involved Quantitative managers (8). However, this is not surprising since there are more Quantitative managers. In terms of percentages, the highest were among Cash (2.4%) and Traditional managers (1.6%). The number and pattern of these correlations suggests randomness. In short, as a group, these managers are not highly correlated.

Many observers expect that the performance of managers of the same type should have higher correlations with each other than with other managers. Table 1 suggests this is true, but only to a limited extent (0.132 versus 0.107). Consequently, once an investor has targeted a specific level of tracking error, or alpha, it probably makes more sense to choose good managers than to diversify across manager types.

The low correlations are perhaps surprising. Many of these managers seem to use similar variables and approaches in evaluating stocks and building their portfolios. However, most active managers rely on similar information. Active management requires many minor decisions. There are a number of reasons why seemingly similar processes, using similar variables in similar ways, might exhibit disparate returns. Most of these differences are subtle and attributable to the selection of individual stocks:

- *Variable construction*. Algorithms used to construct and evaluate variables vary considerably among managers. For example, although many strategies use P/E multiples to evaluate stocks, some use measures of trailing earnings, others average the measure over time, still others rely upon forward-looking earnings estimates. Some managers may ignore negative earnings, while others consider them.
  There are many possible variations on any simple indicator. Moreover, even if many firms utilize the same indicators, it is unlikely that managers use all of them in identical ways. The ensuing portfolios can be quite dissimilar, as long as a single ranking variable differs across strategies.
- *Optimization*. Even if different strategies favor the same stock, the methods used to construct and rebalance portfolios differ across managers. Some use explicit optimization models, others do not. Some use risk models to construct variance–covariance matrices, while others place more emphasis on constraints or on simple heuristics. These differences can have significant effects on the resulting portfolio.
- *Trading and rebalancing*. Subtle differences in trading techniques can have a profound consequence. Although two firms may find the same stock equally attractive, their holdings can differ depending upon when the portfolios are rebalanced.
- *Residual risk*. Despite the use of sophisticated controls, some risk is inevitable. After controlling for style and size exposure—two of the more significant common risk factors—individual stock risk still accounts for a major proportion of the variability in value-added. For example, a tiny 10 basis point exposure to Qualcomm in 1999 would have added approximately 260 basis points to annual return. Even a small exposure to an individual stock can be enough to propel a portfolio to the top or bottom of competitive rankings.

These weak correlations suggest that, even if the management process is constrained, as it is for enhanced index managers, the resulting portfolio performance is idiosyncratic. This is an intriguing finding that would benefit from further analysis with different datasets.

From a practical point of view, the low correlations have several potential implications. As mentioned above, one might take the view that once an investor targets a specific level of tracking error or excess return, it may make sense simply to look for good managers.

This is counter to current conventional wisdom, which suggests that combining several manager styles is a good way to insure a diversified portfolio. However, if these managers display low correlations, style diversification is unnecessary.

In fact, one might draw a radically different conclusion. Instead of diversifying across styles, perhaps one should diversify within a style. The argument goes like this. Most enhanced styles are really stock picking processes. However, because of minor differences in implementation, or randomness, even very similar processes will yield different sets of securities. One or two of these securities can have significant effects on returns. Therefore, to more reliably capture the power of a particular stock picking approach one should diversify within a set of managers who use that approach.

14 Low correlations and the degree of active management

As Dor *et al.* (2003) note, $1 - R^2$ is a common measure of active management. Here, R^2 is based on a regression of the manager's returns against his or her benchmark. The notion is that if R^2 is high, then the independent variables in the regression have explained most of the variation in return. Typically, as in this paper, these independent variables are a short-term cash index and the market (for estimating beta) or the four Russell indexes (for estimating factor exposure to size and style). Since the independent variables are index funds, so the argument goes, a high R^2 must imply passive management. Therefore, the lower $1 - R^2$, the more passive the manager.

For the funds in this paper, the R^2 using the S&P 500 as an independent variable was 0.992. Using the Russell indexes, the R^2 was lower, 0.989. These are very high R^2s. Compared to those of Dor *et al.* (2003), these funds would seem passive. Our analysis suggests otherwise. These funds reflect either active fixed income management or, we would argue, active security selection. The funds have high R^2 because they control factor bets.

True index funds have even higher R^2. We restricted the sample to S&P 500 index funds with tracking error below 25 basis points (0.25%), which is high for an institutional index fund. The average R^2 for this group was 0.99998 using the S&P 500 as an independent variable and, like the enhanced indexers, lower for the Russell indexes, at 0.993. What this suggests is that a manager transitions from passive to active at extremely low levels of $1 - R^2$.

In other words, we conclude that a "low" reading of $1 - R^2$ does not imply a lack of active management. As such, it is a poor measure for determining whether a fund is active or passive. What a low reading suggests is either (1) the model is misspecified, e.g., the wrong benchmark was used, or (2) the manager is making active factor bets.

15 Branding of the funds

Managers name their funds in different ways. It is common to choose a name that helps a potential client understand the fund type.

Table 7 Words used in branding of funds.

Tracking error	Total number of funds	Words Used					
		Funds using "index" (%)		Funds using "enhanced" (%)		Funds using "core" (%)	
0.25–0.5	1	0	0	0	0	0	0
0.5–1	5	2	40	4	80	0	0
1–1.5	11	6	55	7	64	2	18
1.5–2	5	1	20	2	40	3	60
2–2.5	10	4	40	4	40	3	30
2.5–3	12	1	8	0	0	6	50
Totals	44	14	32	17	39	14	32

As Table 7 shows, the word "index" appears in the names of about one-third of the funds. Although "index" is used throughout the range of tracking error, a slightly higher proportion of the funds with lower tracking error use "index."

The word "enhanced" is used by almost 40% of the funds. The lower the tracking error, the more likely the usage. Finally, the word "core" is used in the names of one-third of the funds, particularly those with relatively higher tracking errors.

16 Conclusions

The analysis leads to several conclusions.

- There is a sizable group of managers with low tracking error who can be classified as enhanced indexers. Without much trouble, we found 44 funds that met our rather stringent requirements.
- Over the period of our study, enhanced indexers, on average, met their objective of beating their benchmark index and controlling tracking error. They also had relatively high batting averages.
- Most enhanced indexers appear to be quantitative stock pickers; however, the group includes traditional active managers and fixed income managers who use a futures overlay.
- The major attribute these managers share is their tight control of deviations from their benchmark. Beta, size, and style exposures are, for most, close to benchmark exposures.
- On the other hand, and perhaps surprisingly, correlations of excess returns were low and did not measurably increase within management style groups. For example, the correlation of two traditional managers was the same as that of two randomly chosen managers. This suggests that, having controlled for style, the remaining excess returns largely reflect alpha and idiosyncratic risk.

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Notes

[1] Dor *et al.* (2003) discuss this issue. To "specify" the analysis correctly one must include the correct factors or indexes as independent variables in the style analysis. In our analysis, we would argue that the higher R^2 using the S&P 500 does not imply a better specification than the Russell indexes. As our data shows, an enhanced manager better tracks the

index by controlling style and size than by controlling only a fund's market exposure as measured by beta.

[2] Williams, Fred. "One asset class rises above the carnage." *Pensions & Investments*, January 20, 2003, pp. 17, 64.

[3] Tracking error is the annualized standard deviation of excess return and is usually calculated with monthly or quarterly data. The tracking error in this paper is annualized but calculated using quarterly data.

[4] Mobius is an outside vendor whose software has been used to create this analysis. The software provides data on investment managers and products. Prudential Financial pays a fee for this software. Prudential Financial has made efforts to confirm accuracy/reliability of the data provided by such vendors but we disclaim responsibility for its accuracy or completeness.

[5] Excess return is the difference between portfolio return and benchmark return in the month or quarter.

[6] This was accomplished by using software provided by Zephyr Associates. The original article discussing returns-based style analysis is Sharpe (1992). Zephyr Associates is an outside vendor whose software has been used to create this analysis. Prudential pays a fee for this software. Prudential Financial has made efforts to confirm accuracy/reliability of the data provided by such vendors but we disclaim responsibility for its accuracy or completeness.

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