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U.S. STOCK MANAGER SELECTION

1998

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## PREFATORY NOTES

### Content and Structure

Throughout this paper we have assumed that readers already possess some basic knowledge of the subject. For example, we have not digressed to explain terms like "style" or "benchmark," nor provided detailed lists of basic criteria for screening prospective managers (e.g., a clean record with the SEC, focused solely on investment management, coherent investment approach). Several basic primers covering such information are in print; see, for example, *Selecting and Evaluating an Investment Manager* by William T. Spitz, published by the National Association of College and University Business Officers (NACUBO) in their Financial Management Guidebook Series.

The paper has a modular structure in which the Appendixes that support the argument of the main text can be read independently, since each deals with a separate subtopic. For this reason there is some duplication of material, with the idea that different sections might be of greater or lesser interest to different readers.

### Manager Performance Data

All analyses of manager performance are fraught with data integrity problems and their results should therefore be regarded as providing useful general indicators rather than sacred truths.

- Very few firms possess a record long enough to "prove" that value added is the result of skill rather than luck. Such statistical proof requires *at least* 20 years of monthly data.
- Even our own database of U.S. stock managers, with a breadth, depth, and history second to none, thins out dramatically when we look for managers with an unbroken record (i.e., the same product managed by the same individuals) going back 20 years or more. For the purposes of statistical analysis, we do have sufficient breadth and depth of manager data covering the past 15 years—but that period coincides with the great secular bull market that began in 1982. Consequently, one needs to be cautious about extrapolating results from this period (e.g., on average active managers consistently underperform the S&P 500) into an uncertain future.
- Even among U.S. common stock managers, distinctions of style, cap size, and objectives vitiate the statistical heterogeneity of the universe. In other words, too often we are comparing apples with oranges.
- Performance is cyclical. No manager or group of managers is likely to show up in the top quartile in *every* period over a long time horizon. Whether a manager shows up in the first or third quartile of an appropriate peer group universe too often depends primarily on which period one happens to be measuring.

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## ABSTRACT

1. Investors typically hire and fire their U.S. stock portfolio managers primarily on the basis of recent performance. However, there is no compelling evidence of *persistence* in U.S. stock manager performance over periods even as long as five years—in other words, there is nothing inherent in performance data that enables one to assume that a manager successful in one five-year period will be equally successful in subsequent periods. This means that random selection is likely to prove just as successful as the selection of managers *solely* on the basis of their performance over the past three or five years.
2. It also means that investors should not *fire* managers solely on the basis of poor performance over a similar period. In most fields of human endeavor, success is predictive of subsequent success. It does not pay to bet that the winner of this year's PGA tournament will prove a duffer next year, nor that a good surgeon will butcher next year's patients. This is far less true in the investment world, however, because over short time periods the principal determinants of most managers' performance are both unpredictable and beyond their control. A small-cap manager will not shine when large-cap stocks dominate the market, nor a value manager outperform when growth stocks lead the pack. Although the judicious selection of appropriate benchmarks can alleviate mis-measurement problems, even within style and capitalization sectors some approaches are effective in some periods but not in others, and these are inherently unpredictable.
3. We need not therefore conclude that active U.S. stock portfolio managers can never add value. Even if the market were totally efficient (which few now believe it to be), active managers could add value by assuming greater risk (e.g., through leverage or beta), by adopting a longer time horizon than that of most investors (e.g., Warren Buffett), or by exploiting valuation discrepancies created by market psychology (which is the basis on which "value" investing has outperformed over time). These are sensible criteria on which to predicate manager selections; however, their success depends on the adoption of far longer performance measurement time horizons than most investors can tolerate. Even the most skillful manager pursuing such a discipline will underperform "the market" during many three- or five-year periods—which define the typical limit of most investors' tolerance for underperforming managers. Precisely because there is no sound basis for hiring or firing managers *solely* on the basis of recent performance, investors should make far more rigorous efforts to understand why and to what extent a given manager might be expected to add value, and of just how much that manager is likely to deviate from an appropriate benchmark index (both for better and for worse), when, and for how long. Only then will investors develop sufficient confidence to stick with successful managers during those periods when they lag the market, and avoid the expense and inevitable disappointment that comes from firing recent "losers" and replacing them with recent "winners."

4. Since investors cannot predict what investment approach will work best tomorrow, it makes sense to diversify by hiring several managers adept at different disciplines, and to rebalance among them periodically. This requires patience—again, a five-year time horizon is too short—and a commitment to *adding* funds to managers that have recently underperformed. Nothing better underlines why investors should devote far more resources to their manager selection process than is now customary—unless they have a thorough understanding of their managers, investors cannot possibly develop sufficient confidence not only to stay the course but to add funds when managers underperform (as *all* managers do at one time or another). In other words, investors intent on hiring active managers should develop a coherent, disciplined, explicit, long-term strategy for success that serves both as a blueprint for the future and also as a mechanism for combating behavioral risk (i.e., the risk of ill-judged hiring and firing on the basis of short-term performance). For those who cannot overcome this behavioral risk, some form of passive investing is probably a better option than active management.
5. When investors have more than one manager, however, they must also wrestle with issues of manager structure: How much of the portfolio is allocated to each manager, and why? Is this a structure that provides the best possible trade-off between value added (or "alpha") and deviation from the benchmark? Given the investment characteristics and performance history of the managers, how likely are they to outperform or underperform over different periods, and in different market environments? These and similar questions need to be reviewed each time a manager is added or replaced, since this action changes the structure of the portfolio and therefore how it might be expected to perform.
6. Having developed a coherent portfolio structure, an investor is better able to recognize what kind of manager is best suited to play a specific role. Having identified managers that seem well equipped to fulfill that role, the investor should then focus on largely qualitative characteristics: What drives returns? When is this investment approach most likely to succeed or fail? How important are *individuals* to this success or failure? Who are these key individuals and what are their backgrounds, experience, and incentives? How long and how well have they worked together? How intelligent and creative do they appear to be? How sound is their business judgment? Are they effective communicators (because good communication skills are necessary when performance lags). What is the firm's ownership structure and how likely is that to change? These (and many similar) broad questions should form the basis for an attempt to know and understand a manager well before the investor must change horses. Ideally, investors should maintain a stable (or farm team) composed of four or five promising managers to which they have made nominal allocations in order to study, meet, measure, and observe them over a period of years. Replacements or additions to the current line-up can then be drawn from this well-known stable—*not* on the basis of a few years good performance, but on the basis of a thorough knowledge which gives the investor sufficient confidence to hire a manager whose recent performance has been relatively weak. In practice, too many manager searches are conducted in haste and the results repented at leisure.



7. The structure of the investment management industry militates against the construction of an optimum portfolio of active U.S. stock managers. For example, an ideal structure for some investors might consist of four distinctive, highly skilled and experienced satellite managers each managing a concentrated portfolio composed of 15 or 20 "best ideas." Even with only four such managers, each fishing in a different part of the U.S. stock-market pond, the aggregate portfolio of 60-80 stocks would be sufficiently diversified to minimize stock-specific risk. This portfolio structure could not be implemented in practice, however, because so few managers run concentrated portfolios. Most want to qualify for more general mandates, and so they diversify their own *business* risk by holding highly diversified portfolios, thereby reducing their probability of underperforming the relevant benchmark and of outperforming. But why should investors pay active manager fees for portfolio diversification, when they can buy this for substantially less through an index fund? Concentrated portfolios are less appropriate for managers fishing in sectors where stock-specific risk is already high (e.g., low-quality or small-cap sectors), but in the case of some mid- and large-cap U.S. stock portfolios, skillful managers should be actively encouraged to hold far more concentrated portfolios, and investors should be prepared to tolerate the manager-specific volatility this entails.
8. There are two generic reasons why investors might consider indexing some or all of their U.S. stock portfolios rather than employing active managers, and these reasons should not be confused. The first is to eliminate benchmark tracking variability; that is, the degree to which the portfolio's returns deviate from those of the benchmark index selected as a reasonable proxy for the asset class. Whether active managers in general subsequently perform better or worse than the index should be irrelevant to such investors. The second reason to index is because the investor believes that most active managers do not add value, net of fees, and that one cannot predict which particular managers might do so in any future period. This will prove correct in some periods and incorrect in others; however, the fact that it *has* proved correct in the past five years is no reason to presume that it will do so in the next five years. Historically, institutional U.S. stock managers have outperformed by a wide margin during bear markets, and by a narrower margin when mid- and small-cap stocks perform better than large-cap issues. Relative to the market, the worst periods for active managers are always bull markets dominated by large-cap stocks—of which the past three years is a preeminent example. Whether indexed portfolios will outperform most actively managed portfolios over an extended period (e.g., 15 or 20 years) no one knows—although we do know that the longer the time horizon, the narrower the dispersion of returns among active managers and the closer their convergence towards those of the market, which means that manager fees inevitably eat up an ever-increasing percentage of any value added.

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## **SUMMARY**

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## Manager Selection and Evaluation

### The Problem

Institution X is unhappy with Value Manager Y, whose performance over the past three years has not only lagged that of the S&P 500, but also ranks in the third quartile of all value managers. So the decision is made to fire Y and search for a suitable replacement. What happens next?

In too many instances, what happens next is a process better designed to satisfy certain psychological needs of the investment staff and committee than to increase the probability of a more successful result than achieved with Manager Y.

Assuming no shifts are made in the portfolio's allocations among investment styles, the typical first step is the compilation of a list consisting of value managers recommended by the institution's consultant and of those known to investment staff and committee members from other sources. Although—as consultants—our list is a hard sell since we often recommend firms that have *not* recently performed above average. More commonly, selection committees tend to focus on those firms with good recent results—otherwise, why fire Manager Y? In addition to performance, such details will be provided on each firm as assets under management, representative clients, fees and expenses, portfolio manager bios, the investment characteristics of a standard portfolio, and the specific discipline to which the firm adheres in its approach to value investing.

Names will then be winnowed from the list on the basis of such criteria as size (e.g., rapid growth in assets under management in recent years), investment-sector bias (e.g., focused more on mid- to small-cap than on mid- to large-cap), relative risk, and historical performance. Having shrunk the list from ten or so names to three or four, the committee is now ready for a "beauty contest" in which short-listed managers are invited to give brief presentations, and the winner is the firm with the most compelling marketing pitch. Each contestant will be expected to explain how it goes about managing money and what are the sources of its success. The aggressive will seek to impress the committee with the intensity of their dedication, asserting their recent results as proof positive of an ability to add significant value. Others will seek to impress the committee with their low-key, level-headed, common-sense attitude, modestly allowing their performance record to speak for itself and relying on their *gravitas* to carry the day.

As consultants, we are often asked by also-ran managers what tipped the balance against them. Occasionally, we can provide a logical and reasonable answer. More often than not, however, the honest response is "who knows?" All the finalists in a beauty contest are pretty or handsome characters, and the subjective impressions that determine the selection of a winner frequently lie outside the realm of reason and logic.

At the end of the day, the new manager is selected (subject to some routine reference checking), the selection committee feels satisfied it has acted in a capable and responsible manner, the process of transferring assets is set in motion, and the relationship with Manager Z begins in a spirit of confident optimism—despite the selection committee's rather superficial knowledge of the manager and substantial ignorance as to what it should and should not reasonably expect over the *next* three years.

If Manager Z subsequently performs well, the committee may regard this as evidence of its superior manager-selection capabilities. If Manager Z performs poorly, the committee may feel somewhat baffled that the cream has soured, blame the manager (or the consultant) for letting it down, and repeat the manager search process as before. In truth, however, in a market as efficient as the U.S. stock market, there is little reason to believe that this approach to manager selection should result in the engagement of a manager whose subsequent performance is likely to be much better or worse than average. On the basis of historical data alone, the odds of Manager Z performing above or below average over the next three to five years are about 50/50—in many cases, probably no better or worse than those for Manager Y.

In other words, the committee *feels* that it has acted in an efficient, effective, business-like manner, and the feedback it receives from the results are both too distant from the time the decision was made and too indeterminate to demonstrate causality—*this* selection process caused *that* result. In addition, individual committee members are probably involved in few manager searches during their tenure and so lack sufficient evidence that *on average* this approach to manager selection produces only average results. Consequently, the efficacy of the process goes unchallenged.

### **Improving the Process**

A selection process such as this may shield investors from egregious mistakes, since it will tend to screen out candidates equipped with little more than connections, ego, and a smooth sales pitch. However, several critical components are missing, and their absence greatly increases the probability of the institution earning sub-par returns on its U.S. stock portfolio over time.

**Time Horizon.** Of these missing components, the definition of an appropriate time horizon for performance measurement is perhaps the most essential. No investment management approach can be expected to outperform over all three-year periods; indeed, the most successful over the long run are precisely those with the greatest probability of *underperforming* during any short-term period. Consequently, investors that hire and fire managers on the basis of their performance over the most recent three years are the most likely to suffer underperformance over the long term. Even five years of performance data provide inadequate information on which to base hiring and firing decisions (see Appendix D "Manager Performance—What's in the Numbers?" for details).

**A Disciplined Strategy for Success.** However, the practical reality is that most investors' tolerance for manager underperformance withers rapidly after two years or so, approaching zero over a five-year time horizon. An important reason for this is that most investors lack explicit, coherent, disciplined, and reasoned strategies for long-term success. That is, they have not laid out the fundamental basis on which they expect their active managers to outperform the market, by how much, and why, but have simply hired managers in the vague hope of success. In the absence of any fundamental basis for believing that a manager who has underperformed for three years might nevertheless outperform over the long term, firing the manager seems like a rational decision.

A disciplined strategy for success might include the recognition that even in efficient markets managers can add value by assuming greater risk (e.g., by leverage or increased beta), or by adopting a different time horizon than that of other investors (e.g., Warren Buffett), or by exploiting valuation discrepancies created by market psychology (this is, in fact, the basis for "value" investing), or by holding only a few, carefully researched securities (e.g., Warren Buffett again). Just the articulation of any such discipline immediately suggests the improbability of it outperforming market indexes in all periods, and the need to persevere over the long term in order to reap the rewards. Conversely, investors that lack such a blueprint for realizing success over the long term are more likely to be swayed by short-term market conditions, and to suffer the inevitable consequences.

**Proper Benchmarking.** The probability that an investor will make a hasty and ill-advised decision about a manager is greatly increased if the investor does not thoroughly understand the manager's investment approach, and recognize which performance measurement benchmarks are most appropriate. Note, for example, how little information was provided about our hypothetical Value Manager Y which our hypothetical investment committee has fired. Is this a mid-cap, highly focused value manager that allows cash levels to rise when he is unable to identify enough issues that meet his strict value criteria? If so, performance should not be measured against that of the S&P 500 at all, but against a mid-cap value index, preferably adjusted for risk (since this manager is highly risk-averse). Proper benchmarking enables the investor to recognize whether superior or inferior performance is attributable to the manager, or simply reflects the performance of that sector of the market in which the manager invests. Eminently capable managers are fired every day for failing to achieve results which they should never have been expected to achieve, given their style of investing. Proper benchmarking also helps remind investors that different investment styles work better and worse at different times, and therefore reinforces the message that managers should not be fired just because their style of investing has been out of favor for several years.

### **Putting It All Together: Hiring and Firing**

A blueprint for successful decision making includes a disciplined framework for the selection and evaluation of investment managers, including the explicit recognition that a short-term performance shortfall should never in itself be regarded as sufficient reason for termination, and the identification of

appropriate performance benchmarks for measuring a manager's relative risk and return. In addition, investors should not rely on vague hopes that active managers will add value, but should develop a realistic game plan that includes specific expectations for value added from active management over the long term, the concrete basis for those expectations, and the level of shorter-term shortfall this might entail. Thus equipped, an investment committee should be able to build that degree of confidence necessary to stay the course with—and even add funds to—underperforming managers, which is the discipline required for the success of an actively managed portfolio diversified among multiple managers. It is precisely because investors exhibit little or no patience with managers which they have hired as a result of a cursory search process that we advocate a much greater attention to process. Before hiring an active manager, an investor should have developed sufficient confidence in the wisdom of this selection as to have no hesitation about adding additional assets when that manager underperforms, as long as the same portfolio managers are implementing the same investment process with the same rigor and discipline that led to their being hired in the first place.

Hiring and firing are usually perceived as unrelated. When an institution hires an investment manager, it rarely does so with a specific holding period in mind—the implicit intent is to retain the manager indefinitely. However, the holding period typically lasts only as long as the manager produces satisfactory performance. As a consequence, an institution usually lets its winners run and fires only the losers—thereby locking in losses which it must recover through the continued outperformance of the remaining managers, whose aggregate value added is more likely to converge towards the median than to expand with the passage of time.

From the moment it selects a new manager, an institution should know when and why the old manager will be dismissed. As noted above, most investment committees regard this as a no-brainer—fire "losers" and keep "winners." In fact, the relatively easy decisions should be those *unrelated* to past performance (e.g., reporting irregularities, indictment by the SEC, the resignation of the individual managing the portfolio, a change in the investment approach) which committees often ignore if performance has been satisfactory. Poor performance over a few years may well be a critical symptom of any number of possible problems that suggest the wisdom of firing the manager, but should not *in itself* be the reason a manager is terminated.

For investment committee members that are not themselves involved in investment management, this is the hardest concept to grasp—because their experience tells them that capable professionals produce consistent results. In other words, the capabilities of the lawyer, doctor, or accountant are consistently reflected in that individual's job performance, year after year. For this reason, it is difficult for most investors to accept the accumulated evidence that in the investment world performance data do not enable one to predict future winners and losers. That is: **THERE IS NO COMPELLING EVIDENCE THAT WINNING MANAGERS (FOR U.S. STOCK PORTFOLIOS) CAN BE SELECTED SOLELY ON THE BASIS OF PAST PERFORMANCE.**



It seems necessary to shout this as loudly as possible because investors persist in acting otherwise, despite all the evidence to the contrary. Appendix D discusses the matter in detail.

Note, however, the modifier, "solely"—although past performance should never be regarded as predictive of future performance, that does not render it irrelevant. Rather, it should be treated simply as one among many considerations in the manager evaluation process.

Before hiring a new manager, an institution should have a clear understanding of what to expect.

On the basis of past performance:

- How much has performance tended to deviate from the appropriate benchmark index over one-, three-, and five-year periods in the past?
- Are these typical periods, or is there reason to think that the pattern of relative performance would be quite different in a flat or down market?
- Where have returns come from? Primarily from exposure to the market (i.e., what is the  $R^2$ )? From persistent and predictable capitalization, style, and economic sector biases? Are these truly persistent or simply responses to the recent market environment?
- Why should this approach to investing generate returns above those of the benchmark over time?
- How often, under what conditions, how much, and for how long might those returns fall short of those of the benchmark?
- What evidence is there to suggest that the probability of outperforming outweighs the probability of underperforming?

On questions not directly related to performance:

- Does the portfolio remain fully invested at all times, or can the investment discipline result in cash holdings in lieu of stocks?
- Is the investment discipline cogent and reliable? Are there reasons to fear a catastrophic collapse in the event of a bear market (e.g., from momentum investing)?
- Who researches and selects stocks? Has this changed at all in recent years?
- Is the person responsible for the results of the past ten years likely to continue in the same position, with the same responsibilities?
- How is he or she compensated?
- What reasons are there for believing the results are a consequence of skill rather than luck (almost impossible to prove statistically)?
- Who owns the firm and is this likely to change? Is there a push to add assets under management or to diversify into other products? Are there capacity constraints (dollars under management, or number of clients) and plans to close to new investors when those limits are reached?

- Is the back office efficient and reliable?
- Does the firm communicate effectively with its clients?

Hiring and firing are closely related. The less disciplined the hiring process, the more likely the manager will be fired after a few years of unexpected disappointing performance. Rather than lay all the blame for underperformance on their managers, investment committees might do well to consider to what extent their own decision making has contributed to this unhappy result, and seek to implement a manager selection process likely to lead to greater success.

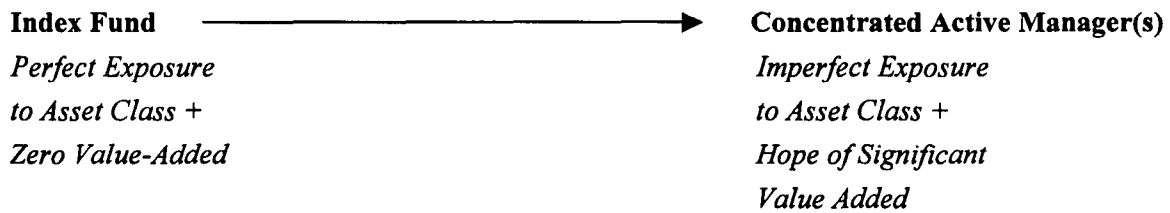
### **Manager Structure**

Presumably Manager Z, which the investment committee proposes to hire, must differ in some important respects from Manager Y, which the committee has fired, otherwise there would be little reason to choose between them. If Manager Z differs from Manager Y, however, this will affect the portfolio's structure. Just as the risk-return profile of a total portfolio is changed by any significant reallocation among asset classes, so significant reallocations among subportfolio managers, or the addition of a new manager, must in some way change the risk-return profile of that subportfolio. In those instances where one manager with a small allocation is being replaced by another with the same investment style and discipline, the structural shift may be insignificant and safely ignored. When sizeable allocations are involved, however, their structural implications should not be overlooked, since the resulting portfolio might have characteristics the investor did not intend, and a far greater probability of extensive deviation from the benchmark index than is tolerable. Presumably the objective of hiring several different managers to manage different sectors of the U.S. stock portfolio is to invest as efficiently and effectively as possible in that asset class—investors that disregard how their managers overlap or complement each other, and remain ignorant of their portfolio's aggregate characteristics, incur the risk of a portfolio manager structure that is both expensive and ineffective, whatever the capabilities of the individual managers. Whenever an investor considers extensive changes to an existing manager structure, the first step should therefore be a review of the structure, not the compilation of a list of manager names.

### **What is "Portfolio Manager Structure?"**

Portfolio manager structure is simply the design and composition of the portfolio *in the aggregate*. As noted above, investors should obviously attempt to create structures that enable them to invest in the asset class in the most effective way possible; that is, structures that are likely to provide the best possible trade-off between risk and return, where risk is defined as failing to realize the return of the asset class, and return is performance in excess of the benchmark.

Potential structures are infinite, but all lie somewhere along this spectrum:



In reality, the aggregate composition of many institutions' U.S. stock portfolio lacks any coherent design because it is the accidental result of a series of bottom-up manager selection decisions. In fact, the construction of the portfolio should normally be managed exactly in reverse, with structural imperatives dictating which managers the committee should consider (except perhaps in the unusual case of funds employing "completeness" managers, as discussed in Appendix A). Just as a builder would never dream of constructing a home room-by-room, without regard to the architecture of the house as a whole, so a portfolio of managers needs to be designed as a coherent unity rather than cobbled together from a jumble of parts—not only because the latter is costly and inefficient, but also because unintended and incoherent manager structures can easily subvert larger asset allocation decisions.

For example, most institutional investors whose U.S. stock portfolios have failed to match the performance of the S&P 500 in recent years blame their managers. In fact, in many cases they should acknowledge this result as a consequence of their implementing a portfolio structure that includes a significant bet against very large-cap stocks. If their managers are diligently pursuing the disciplines they were hired to implement, which might well include a bias against cap-weighting their portfolio holdings, then they can hardly be damned for failing to deliver something never promised. If the investors only now realize, after the fact, that their U.S. stock portfolios have an implicit bet against the very large-cap stocks that dominate the U.S. economy—and have led the market over the past three years—they have only themselves to blame.

Similarly, an institution that has set its allocation to U.S. stocks at 40% may find that although it has 40% of its assets allocated to four U.S. stock investment managers, its actual exposure to the asset class rarely exceeds 36% because in the aggregate the managers habitually carry about 10% cash.

In any given period, the portfolio's deviation from the benchmark index that serves as a proxy for the asset class may prove beneficial or detrimental, but the point is that these deviations may undermine the fund's intended risk-return profile without the investor's knowledge or approval.

## **Reviewing the Portfolio Manager Structure**

In its review of portfolio manager structure, the committee's first objective should be to ensure that it has a reasonable grasp of how much the portfolio's returns are likely to vary from those of the benchmark index (e.g., S&P 500, Wilshire 5000, Russell 1000) over different periods of time, that it is comfortable with these deviations, and understands their source. Indexing the total portfolio obviously ensures zero deviation, but if the portfolio is managed in whole or in part by active managers, the amount by which it can be expected to deviate from the index may vary considerably, over different periods, depending on how the individual manager portfolios combine to form the aggregate portfolio. This deviation (which is variously called "benchmark tracking" or "tracking variability" or "tracking error") cannot be precisely predicted, but one can at least compute historical benchmark tracking in an attempt to understand the probable range. Since deviation from the index constitutes a form of risk which can easily be avoided simply by indexing, investors should not assume this risk unless they have valid reasons to believe they will be adequately compensated for doing so. In other words, the more the portfolio is likely to deviate from the benchmark index that serves as a proxy for the asset class, the more the investor should expect to outperform the index. The worst of both worlds is a portfolio that both deviates significantly from the index and also underperforms.

## **Portfolio Manager Structure and Manager Selection**

Just as the trade-off between risk and return can be improved at the level of the total fund by diversifying among asset classes whose returns are not highly correlated, but are driven by different underlying economic fundamentals, so the trade-off between risk and return in the U.S. stock portfolio can be improved by diversifying among investment managers whose returns (defined as performance in excess of the benchmark) are not highly correlated, and are driven by different investment styles. Poorly constructed portfolios are typically characterized by large areas of overlap among managers whose returns are highly correlated, for which the investor pays substantial fees and receives no benefit, or by huge structural gaps, which result in the investor's incurring substantial risk of underperformance with insufficient potential payoff for doing so. In contrast, a well-constructed portfolio is intelligently diversified among individual managers, each of which plays a distinctive role in the portfolio. Some may have considerable tracking variability vis-à-vis the benchmark index, others less, but at the level of the aggregate portfolio, deviation from the benchmark should be more than fully justified by the expected value added.

We recognize that this is much easier said than done because the structure of the investment management industry dramatically impedes the implementation of such an "optimum" portfolio structure. For the most part, investment managers do not see themselves as specialists working together in a team effort—they are not paid as a team and tend to think of themselves as being in competition with other managers, rather than engaged in a cooperative effort to generate good results for the portfolio as a

whole. As a result, very few U.S. stock managers run concentrated portfolios consisting of their 15 or 20 "best ideas"—because such portfolios have large tracking variability from their benchmarks, raising the "business risk" (i.e., possibility of termination) for the managers.

On the other hand, investors who hire active managers presumably do so because they believe those managers possess sufficient knowledge, experience, and skill to add value over and above a diversified index. From the investor's perspective therefore, it would be preferable for at least some managers—particularly those focused on larger-cap stocks—to run more concentrated portfolios of "best ideas." At the level of the individual manager, this would result in far greater tracking variability vis-à-vis any relevant benchmark index, but at the level of the investor's total U.S. stock portfolio, this need not be the case. Assume, for example, that an institution employed six managers for its U.S. stock portfolio, one value specialist and one growth specialist for each of the three capitalization sectors—large-, mid-, and small-cap—and instructed the large-cap managers to hold no more than 15 stocks, the mid-cap managers to hold no more than 25 stocks, and the small-cap managers to hold no more than 30 stocks. The result would be a portfolio of 140 stocks, which is far more than the minimum number (about 30) required to diversify stock-specific risk. If these managers were indeed possessed of stock selection skill, *and if the investor rebalanced among them religiously*, the result would be a portfolio with a far greater probability than most of outperforming the broad market.

As already noted, however, this recommendation is largely impractical because the number of U.S. stock managers now running even modestly concentrated portfolios can be counted on one's fingers. In addition, successful managers tend to attract additional assets, and in the mid- and small-cap sectors of the market there would be severe limits to the size of assets manageable by managers that elected to hold fewer stocks. Nevertheless, despite its relative impracticality, the *idea* of such a manager structure should encourage institutional investors to think more closely about the basis for any expectation of value added in their current portfolios. In addition, more institutions *should* consider whether they can persuade appropriate managers to offer such products—not all managers, not even a majority of managers, just those with a demonstrable record of success in bottom-up stock selection, the benefits of which they have tended to dilute (for sound business reasons) by running excessively diversified portfolios.<sup>1</sup>

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<sup>1</sup> For example, see the article on page C1 of the *Wall Street Journal* of November 20, 1997, on the *Masters Select* mutual fund, whose assets are managed by six experienced and respected mutual fund managers whose subportfolios are restricted to a maximum of 15 stocks each.

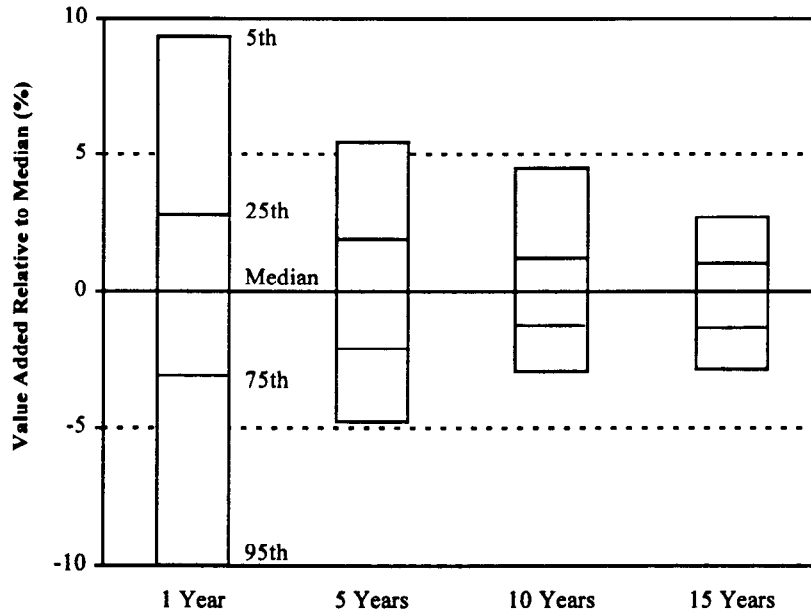
There is nothing impractical, however, about the process of evaluating an existing manager structure in order to determine whether or not that structure is likely to realize the investor's objectives, and whether it can be improved. For example, let us assume that Value Manager Y, at our hypothetical institution, has been managing 30% of the U.S. stock portfolio, with another 30% managed by a large-cap growth stock manager, and 40% in a diversified core portfolio. An analysis of this structure might show that part of the problem has been that Manager Y's diversified, relative value portfolio has simply overlapped too much with the core portfolio, and was never very likely to win (or lose) significantly because the manager made only modest bets relative to the benchmark index, and underperformed by about the same amount as the fees charged.

Since the core portfolio is specifically designed to track the benchmark index closely, would it be better to increase the allocation to the core, while allocating a smaller amount—perhaps 20%—to a mid- to small-cap value manager running a more concentrated portfolio? How much would that shift the tracking variability of the portfolio as a whole—and therefore increase the risk of underperforming the benchmark? Or would it be better to reduce the allocation to the core and allocate a greater amount to a large-cap, diversified value manager, reflecting the committee's belief that large-cap stocks will continue to outperform and that value strategies generate superior returns over time?

In other words, only when it has adequately defined what *kind* of value manager would be appropriate for the structure it wants to implement in order to realize its investment goals should the selection committee set about identifying prospective value managers that meet the requisite criteria. Just as the performance of an institution's fund is determined primarily by asset allocation decisions, similarly, within an asset class (e.g., U.S. stock) performance will typically be determined more by the *structure* of the portfolio than by which individual managers are employed. This is not to derogate the importance of selecting capable managers, only to stress the comparable importance of portfolio structure. In the short term (one to three years) the dispersion of returns among managers is very considerable, creating the illusion that everything depends on whether one selected Manager A or Manager B. As the graph below shows, however, the longer the holding period, the greater the convergence of all managers' returns towards the median (because the market itself is increasingly the dominant influence on all managers' returns as the time horizon lengthens).

**Dispersion of Returns Among U.S. Stock Managers**  
**Periods Ended December 31, 1996**

The dispersion of returns shrinks with time.



Source: Cambridge Associates, Inc. Investment Manager Database.

In summary, if the objective is to replace Value Manager Y, the selection committee might start by defining quantitative and qualitative characteristics required of any candidate (sample lists of such characteristics comprise Appendix B). In contrast, too many manager searches begin with everyone tossing names into the ring, regardless of whether these firms possess the characteristics required to play the specific role intended for this manager in the total portfolio.

### **Indexing**

For any institution, indexing provides both the cheapest way to gain exposure to the asset class, and the only way to ensure zero tracking variability (and therefore zero risk of underperforming the asset class). Of course, an indexed portfolio also bears the full brunt of any decline in the asset class—which is a point investors tend to overlook during a bull market. In structuring a U.S. stock portfolio, therefore, investors should regard indexing as the default option, and should only engage active managers (and thereby incur relative performance risk) when they have sound reasons either for believing that active managers in general are likely to outperform the index going forward, or that they possess the knowledge, information, and insight required to select active managers that can add value, net of fees, over a given time horizon. (Indexing is discussed in detail in Appendix C and different portfolio structures [competitive, complementary, core/satellite, and completeness fund] are reviewed in Appendix A).

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## **APPENDIX A**

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## DEVELOPING A U.S. STOCK MANAGER STRUCTURE

### Managing Expectations

Questioned as to how much they expect their actively managed portfolios to outperform the benchmark index, net of fees, over an indefinite time horizon, investors typically respond that they expect to outperform by 100 or 150 basis points. Questioned as to how they arrived at this number, they are mute. Questioned as to how much relative risk (i.e., risk of underperforming the benchmark) is implicit in this target, they are at a loss.

Here, as always, however, risk and return are inextricably related—and risk should only be incurred when there is good reason to believe one will be adequately compensated.

### Concentration, Diversification and Benchmark Tracking

The more diversified an actively managed portfolio, the more closely its results will track those of an appropriate benchmark index, and the less likely it will generate significant value added, net of fees. Conversely, the more concentrated an actively managed portfolio, the less closely its results will track those of the index.

This relationship is illustrated by the following table, which shows the approximate relationship between a fund's  $R^2$  (which measures how much a portfolio's return is attributable simply to market action) and how widely its results deviate from those of the index.

<u><math>R^2</math> (%)</u>	<u>Quarterly Tracking Variability (%)</u>	<u>Annual Tracking Variability (%)</u>
100	0.0	0.0
95	1.7	3.4
90	2.4	4.8
80	3.4	6.8
70	4.1	8.2
60	4.8	9.6
50	5.3	10.6

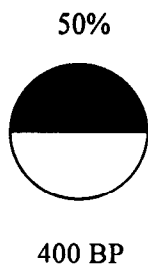
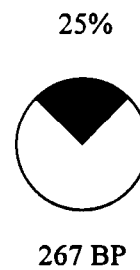
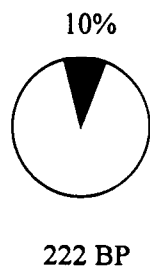
Note: "Tracking variability" is measured by the standard deviation of the portfolio's returns after removing the impact of market fluctuations, here assumed to have a quarterly standard deviation of 7.5%.

Note that as a portfolio becomes increasingly different from its benchmark (lower  $R^2$ ), the dispersion of relative returns increases.

## Benchmark Overlap and Value Added from Active Management

Another way to illustrate the same issue is to think about how an active manager can actually add value. To the extent that an active manager's portfolio reflects that of the benchmark index, there can be no expectation of value added; consequently, 100% of the value added must be generated by that portion of the manager's portfolio that is different from the index, which must consist of stocks not included in the index, or of different weightings of stocks that are included in the index, or some combination of both. This is illustrated (in simplified form) by the following diagram:

### By How Much Must Actively Managed Stocks Beat the Rest of the Index for the Portfolio to Outperform by 100 Basis Points?



Notes: Shading indicates the percentage of the index held by the actively managed portfolio. The portfolio only invests in stock also included in the index. Fees and expenses equal 100 basis points.

## Key Issues

Key issues to be addressed in the process of developing a coherent manager structure include: expected value added and time horizon, risk focus, portfolio diversification, correlations of manager alpha, benchmark overlap, selection skill, the asymmetric payoff from manager selection, and fees.

### Expected Value Added ("Alpha"<sup>1</sup>) and Time Horizon

Investors expectations for excess returns (i.e., returns in excess of those of the benchmark index) should be derived from their level of tolerance for *underperformance* over interim time periods—it is simply unrealistic to assume that an actively managed U.S. stock portfolio will outperform the market in all periods and under any and all circumstances. In fact, an ability to tolerate lost battles is a precondition for winning the war. However, as the time horizon lengthens, the dispersion of all U.S. stock managers' returns tends to compress around the median. In other words, the longer the time horizon, the smaller the percentage of managers that will exceed the return of a fixed target (e.g., outperform the median manager by 100 or 200 basis points annually). Failing to recognize this, many investors with long time horizons adopt unrealistic performance targets for their active management programs, given the level of risk that they are willing to assume. The first step in developing a coherent manager structure is therefore to decide the primary time period over which the program should be measured, and to understand how much relative risk (i.e., risk of underperforming) is implicit in the target level of relative return the institution aims to realize over that period.

### Risk Focus

In any manager structure, the two principal risks are the **absolute** variability of the returns (measured by the standard deviation of the returns) and the variability of the returns **relative** to those of the appropriate benchmark index, which represents a passive investment alternative. The greater the absolute variability of the returns, the higher should be the expected return—investors should not assume risk for which they are not adequately compensated. Similarly, investors intent on achieving above-market risk-adjusted returns (the northwest quadrant of the familiar scatter plot diagram) should recognize that this cannot be achieved without the assumption of significant relative risk (i.e., significant deviation of returns from those of the benchmark index), and the danger of finding that their results sometimes fall in the southeast quadrant. Over long periods of time, even a relatively modest shortfall in the managers' returns, net of fees, relative to those of the benchmark, can have significant impact on terminal wealth. Consequently, relative risk should be explicitly addressed and managed.

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<sup>1</sup> "Alpha" is the difference between a manager's returns and those of the benchmark index. A manager that outperforms the benchmark index has positive alpha; one that underperforms the index has negative alpha.

### **Portfolio Diversification**

The level of diversification of the portfolio directly affects both its potential shortfall and its potential relative return. For portfolios that are perfectly diversified ( $R^2$  of 100%), investors sacrifice any hope of value added in order to minimize the possibility of underperforming the benchmark. Portfolios with lower  $R^2$  have the potential both for greater value added *and* for greater shortfall. This is the trade-off each investor must weigh. In this context, it should be noted that even well-diversified portfolios may generate significantly different relative returns—both above and below those of the market. On the other hand, many investors may find that they are uncomfortable with a portfolio that has a low  $R^2$  and is theoretically sub-optimal because they certainly have no assurance that a more concentrated portfolio will necessarily produce higher returns—that depends entirely on the level of skill (or luck) exhibited by the managers.

### **Correlations of Manager Alpha**

The relative risk of the manager structure (tracking variability) can be reduced by allocating assets to managers that tend to add value at different times because they pursue entirely different disciplines. By employing both a growth and a value manager, for example, the investor expects to capture the weighted average alpha of both managers, but to have an *aggregate* tracking variability that is less than that of a simple weighted average of the individual managers. This is the theoretical benefit to be captured from style diversification and it follows that overweighting one style, or sector, relative to the market introduces shortfall risk, for which investors must believe they will be compensated over the designated time horizon.

### **Benchmark Overlap**

In the construction of active management structures, investors should be aware of the extent to which the holdings in their own portfolio overlap with those of the portfolio's benchmark. The drawbacks of high levels of benchmark overlap become apparent when portfolio weightings are considered. In the case of an overweighted security, the manager is paid a fee to hold the stock up to the benchmark's weighting, which in broadly diversified portfolios can be purchased cheaply by investing in index funds. In the case of underweighted issues, the investor is charged for holding a stock that the manager believes will underperform the market, which is clearly unattractive from the investor's standpoint. Although the holdings of individual managers may overlap only modestly with those in the benchmark index, there may be considerable overlap at the aggregate portfolio level. For investors seeking reasonably diversified portfolios, the net effect is that they may pay management fees on portfolios that in aggregate make only modest, marginal bets away from the benchmark. Whether or not these decisions turn out to be profitable, this has the result of raising the effective fee that the investor pays for active management decisions at the total portfolio level. An alternative for investors that want to hold well-diversified portfolios is to invest the core in low-cost index funds and to ask active managers, whom they believe can add value, to manage much more concentrated portfolios of "best ideas" in a more serious attempt to add value at the margins.

## **Selection Skill**

Can investors select managers that will outperform the market? Investors confident in their manager selection skill will tend to opt for structures composed entirely of active managers, while those who feel they have more limited manager selection capabilities may decide to combine active and passive portfolios in the same structure. The default, or starting, position should be an index fund, and investors should only engage active managers (and thereby incur shortfall risk) in areas they feel offer adequate upside to compensate them for the risk of underperformance.

## **The Asymmetric Payoff From Manager Selection**

Even investors possessed of sufficient skill in manager selection must actively manage their portfolio structure in order to ensure that gains generated by outperforming managers are not offset (or worse) by losses locked in when underperforming managers are fired. Consider, for example, an investor able to select 6 out of 10 managers capable of meeting or exceeding a designated value-added target. The 4 losers will be terminated after they have trailed the market and imposed an opportunity cost on the fund. The real danger, however, is that the investor terminates one or more of the long-term winners during a period of temporary underperformance. There is, after all, no assurance that a given manager's alpha will revert to a positive mean; the investor cannot be sure which firms will and will not recover lost ground; and poor long-term decisions are most likely made during short-term periods when the portfolio is failing to realize its objectives. The reverse situation—firing a long-term underperformer when it is temporarily ahead of the benchmark—almost never happens. Most investors' expectations for value added from active management implicitly assume that all managers selected will prove long-term winners, which may be unrealistic even when the selection process is rigorous, and is certainly unrealistic for investors whose manager selection process is cursory.

## **Fees**

In the aggregate, active manager fees are far too high, since they should be considered in relation to value added versus appropriate index funds rather than in relation to absolute performance. Despite the failure of most active managers to outperform their benchmark indexes in recent years, fees remain high because investors continue to regard the fees as reasonable in relation to what they expect winning managers to deliver—and, of course, they would not be hiring active managers in the first place if they thought themselves likely to pick losers. Investors would do well to note, however, that the impact of fees increases with time because fees constitute a fixed amount in a universe of returns which (on an annualized basis) converges towards its median. This means that fees become an increasingly high percentage of the gross value added even by managers performing in the top quartiles. Investors should therefore be satisfied that a given ratio of value added to fees is adequate given that conventional fee structures ensure that the investor bears all the risk of manager shortfall. The alternative (which we have advocated for years—so far with remarkably little effect!) is to compensate managers on the basis of performance.

## U.S. Stock Portfolio Structures

### Competitive

Extrapolating from their own business practices, some selection committee members advocate hiring broadly similar managers in order to set them in competition, winner-take-all after some predetermined period of years. The premise implicit in this strategy is that a manager that has performed best over one period (e.g., three years) will almost certainly continue to provide superior results in the future. This may be true in the case of insurance salesmen, lawyers, neurosurgeons, or golfers—professions in which superior abilities may reasonably be relied upon to produce consistently superior performance—but it does *not* apply to the business of managing U.S. stock portfolios (at least over a measurement period relevant to most committee members) simply because an investment approach that has failed dismally in one three-year period may well produce top quintile results over the next three years. Because it requires literally decades to determine whether a manager's value added is the result of luck or skill, the results of a three- or five-year competition among managers contain no predictive information, while the institution has paid multiple fees for broadly overlapping portfolios without any promise of reaping superior performance.

### Complementary

A complementary structure consists of managers specializing in specific style or capitalization sectors of the market (e.g., value or growth, small- or mid-cap) in the theory that each should be able to add value within that sector. Their combination ensures that the portfolio as a whole is not dramatically over- or underexposed to one sector or another, and therefore does not incur excessive tracking risk.

This structure can prove effective if three conditions are met:

- The managers are indeed capable of producing above-average performance in their respective sectors.
- The portfolio is consistently rebalanced among them.
- The portfolio is not over- or underrepresented in some sector of the market that generates markedly superior or inferior performance.

However, most complementary manager structures are relatively incoherent and may fail to produce added value for the following reasons:

- The value and growth managers (for example) both manage broadly diversified and often overlapping portfolios because they know that whatever their clients *say*, they will in fact be punished if they underperform the broad market. As a result, they tend to outperform a little in some periods, underperform a little in others, and *at best* may add value over time enough to cover their fees, with a small increment for the client.



- Alternatively, the managers run more concentrated portfolios, giving them greater potential to add value, and a higher probability of underperforming over two- and three-year periods, during one of which there is a good chance the client will fire them, thus locking in losses before the cycle swings back in the manager's favor.
- This is an extreme example of a failure to rebalance. The basis for the superior potential of a complementary manager structure is the low correlation among the returns of the various managers: when value is doing well, growth is doing badly, and vice versa. Investors who fail to rebalance among complementary managers undermine the basis for superior performance of the total portfolio over time.
- Finally, active managers of all sorts tend to hold portfolios biased towards smaller-cap stocks—even when they advertise themselves as large-cap managers. There are two reasons for this: first, they tend to weight their portfolio holdings either on the basis of conviction, or more or less equally, but not on the basis of capitalization, which is how the broad indexes are weighted; second, they believe there are greater opportunities to add value through stock selection among mid- and small-cap than among large-cap stocks. Consequently, most actively managed portfolios have an implicit bet against very large-cap stocks—and therefore underperform badly during periods like the past few years when the largest-cap stocks have significantly outperformed all others.

### **Core/Satellite**

In a core/satellite structure, the lion's share of the portfolio is either indexed or given to a diversified active manager that is expected to add modest value, net of fees, with relatively little tracking variability, while smaller portions are assigned to satellite managers, whose portfolios will deviate considerably from the index, but who are expected to deliver the lion's share of value added over time.

However, this promise of substantial outperformance carries with it the potential for substantial underperformance, and the risk that investment committees will hire and fire satellite managers at exactly the wrong times. Selection committees should want and expect satellite managers to display significant tracking variability, and the ideal time to hire good satellite managers is when they have *underperformed* for several years. The ideal satellite manager construct consists of several such managers whose returns display low correlations both to each other and to that of the core index, but whose tracking variability in the aggregate is relatively modest.

As in the case of a complementary portfolio structure, a core/satellite structure can easily be undermined by a loss of faith that manifests itself in a failure to rebalance. If the satellite managers have truly distinctive styles resulting in low correlations of returns with each other and with those of the index, then by definition at least one or more must be performing relatively poorly when others are performing relatively well—otherwise they are not in fact a well-diversified group. The benefits of this diversification among satellite managers can only be realized, however, if the allocations among them are

periodically rebalanced, which in blunt terms means that money must be taken from the winners and given to the losers. This is so antithetical to the instincts of most investment committee members—in whose own business dealings the prudent and profitable course of action is most often to cut losses short and let winning strategies thrive—that no institution should implement a core/satellite strategy unless convinced that its committee understands and accepts that a commitment to counter-intuitive rebalancing is a prerequisite of success.

### **"Completeness" Fund**

Logically, a completeness fund should provide the most efficient portfolio structure, but the devil is in the details of implementation.

The idea of a completeness fund is that *in the aggregate*, the characteristics of an institution's total U.S. stock portfolio should not deviate too much from those of the benchmark index that serves as a reasonable proxy for the asset class, otherwise the investor may find that asset allocation decisions—and expectations based upon them—are subverted by its ownership of a portfolio whose characteristics do not in fact correspond to those of the benchmark. In order to ensure that the portfolio does effectively reflect the composition of the index, the completeness fund manager creates a sub-portfolio specifically designed to fill in the gaps left by other managers.

This liberates the investor to hire active managers solely on the basis of their perceived ability to add value, without regard to whether they do or do not complement each other stylistically. For example, if the investor decides there are no large-cap value managers worth hiring, that sector of the portfolio can safely be left to the completeness manager to fill in. The difficulty is in deciding just how thoroughly each gap must be filled, and how to avoid simply nullifying the decisions made by the active managers.

Exhibit A-1

COMPLEMENTARY STRUCTURES

THE MARKET

Large-Cap Growth	Large-Cap Value
Mid-Cap Growth	Mid-Cap Value
Small-Cap Growth	Small-Cap Value

2 MANAGERS

One Core Growth	One Core Value
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4 MANAGERS

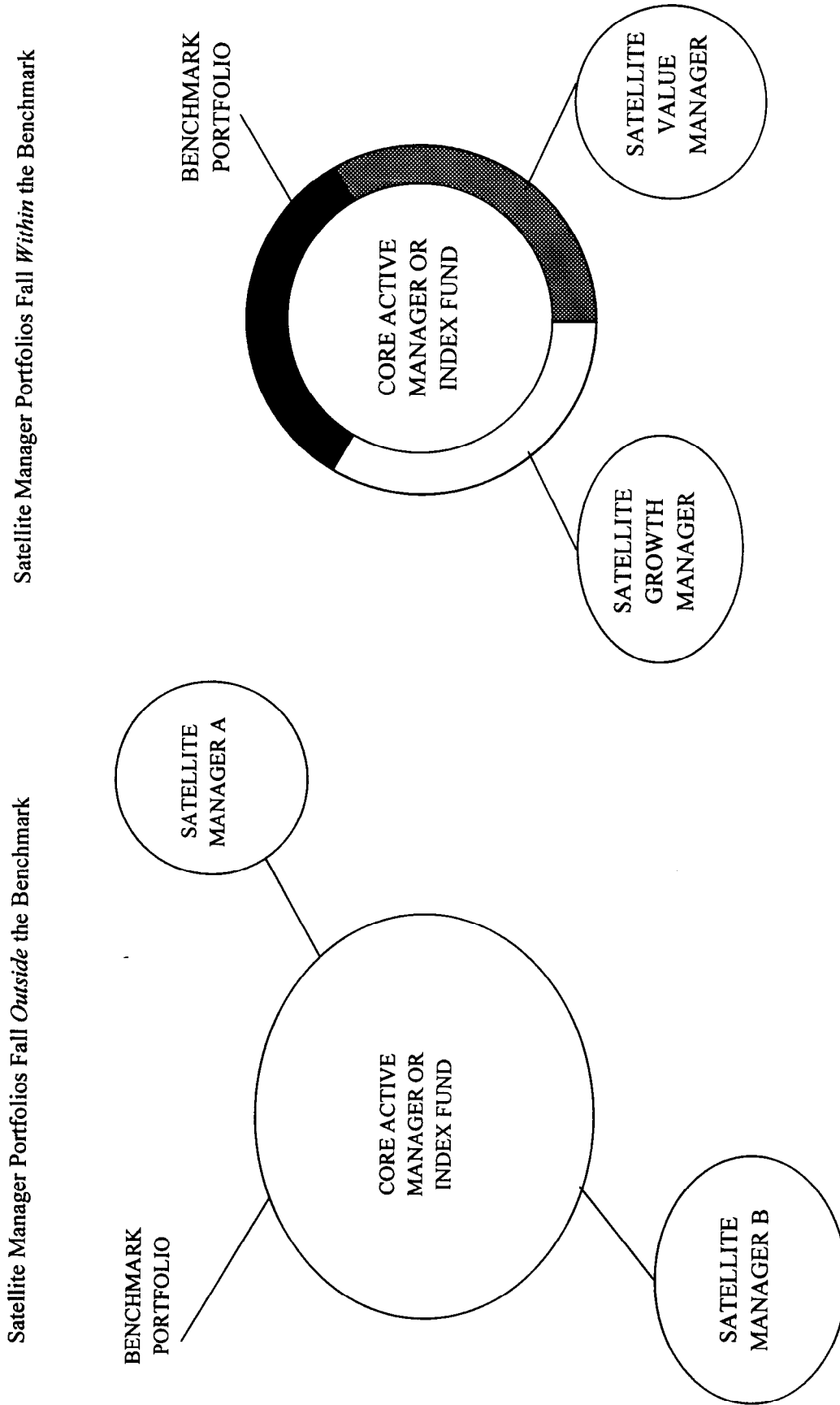
One Large-Cap Growth	One Large-Cap Value
One Small-Cap Growth	One Small-Cap Value

6 MANAGERS

One Large-Cap Growth	One Large-Cap Value
One Mid-Cap Growth	One Mid-Cap Value
One Small-Cap Growth	One Small-Cap Value

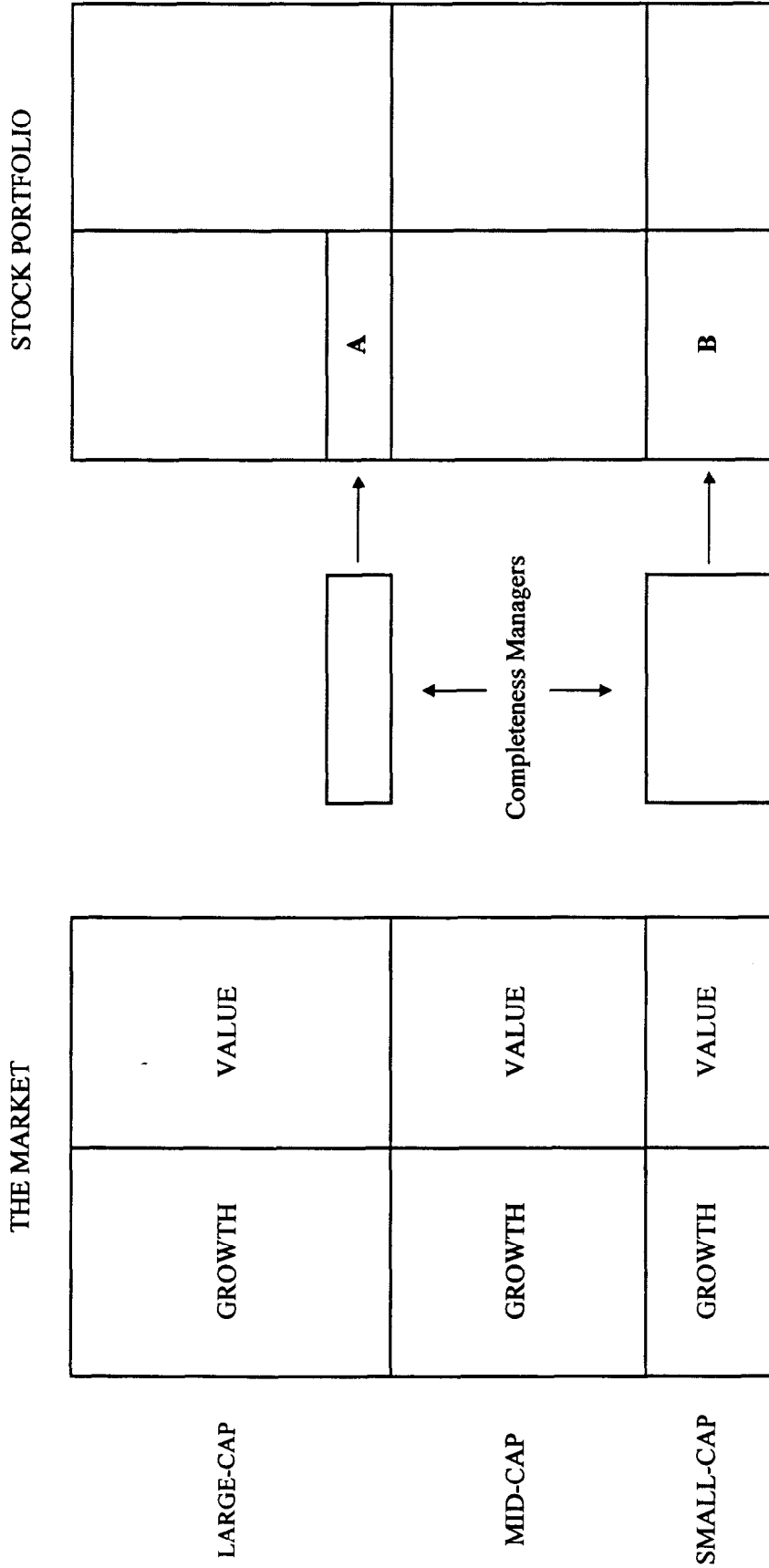
**Exhibit A-2**

**CORE/SATELLITE STRUCTURE**



**Exhibit A-3**

**COMPLETENESS FUND**



**A:** Growth sector underweighted by large-cap growth manager

**B:** No small-cap growth manager

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## **APPENDIX B**

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## **THE PROCESS OF U.S. STOCK MANAGER SELECTION AND EVALUATION**

### **A Checklist of Questions, Actions and Decision Points**

#### **It's a Tough Game: Don't Expect to Win if You're Not Equipped to Play**

There is no point in hiring an active equity manager until and unless you have a thorough knowledge of what that manager does, what you can reasonably expect in the future, and whether and how this fits your needs and expectations. Unless you are prepared to invest considerable time, money, and effort in the selection process, you should not expect the results to prove better than average, and should consider passive investing instead.

#### **Select a Benchmark**

Investors are often disappointed in managers that fail to outperform a standard market benchmark (e.g., the S&P 500) over relatively short time periods, despite the fact that the manager's investment style and process is such that there is no logical reason to expect returns to correlate with those of that index. In addition to eliminating much random "noise" from performance measurement, the thoughtful selection of appropriate benchmarks sharpens investors' awareness of what they are trying to achieve, when and why their managers are likely to do better or worse than broad market indexes, and where they are making active bets in the hope of adding value.

#### **Build a Team**

- The definition of your needs and expectations requires the development of a coherent manager structure; that is, a plan for what kind of managers you intend to hire for what purposes, how these separate agents fit together as a team, and what are likely to be the risk-reward trade-offs incurred both with individual managers and with the portfolio as a whole. American football, with its high degree of specialization among players, provides a useful analogy: winning teams have strong players at each offensive and defensive position, and seek to ensure that their skills are complementary rather than duplicative, in order to improve the odds of overcoming the different opponents they have to face during the season.
- Once developed (which is a considerable task), the team structure needs to be reviewed each time a manager is added or replaced, since this will affect the composition of the whole. For example, would the addition of Growth Manager A result in a large bias towards technology stocks in the whole portfolio? Or an overweighting in mid-cap aggressive growth issues? Or a significant

increase in tracking variability versus the benchmark index? Or in a higher beta for the whole portfolio? Or greater vulnerability to underlying economic events, like rising interest rates?

- Assessing the players' strengths and weaknesses should also enable you to develop *realistic* expectations of their individual performances and that of the portfolio as a whole. Investment managers tend to make unrealistic promises to prospective clients—because they know what clients want to hear. This is a prescription for disappointment. *Before* meeting a manager try to understand as clearly as possible what has driven performance, to what extent performance is dependent on investment cycles and rotating styles, when the manager has tended to perform well and badly, what are the buy and sell disciplines, to what extent performance may be affected by changes in personnel or firm ownership, growth in assets under management, a different market environment, and other such factors. As far as possible, do *not* depend on the manager as sole source for answers to these questions, but test whether the manager's responses correspond with what you have already discovered. In other words, do your homework! Only then can you evaluate which player will prove the most productive addition to your team.

### Study History

- What has been the history of the firm's performance over time, both in terms of absolute return and variability of return, and of return and variability relative to the appropriate benchmark and to your equity portfolio benchmark? Have periods of relative outperformance and underperformance been more or less symmetrical? How has relative performance varied in different market environments? Are there sufficient data to allow you to extrapolate these results into the future? Are there reasons to regard this manager as a bull-market winner who will be a major loser in a flat or bear market? Based on historical data, is the probability of outperforming the relevant index very much greater than the probability of underperforming? What does attribution analysis show to have been the main sources of return? Of the variance of the manager's return from that of relevant indexes? Are there disparities between what these analyses indicate and what the manager claims to be the sources of value added?
- **In general, learn everything possible about performance, but give relatively little weight to recent results. Indeed, the best time to hire a manager with an excellent long-term record may be after a few weak years, especially if these can be explained by style or sector biases.**
- Are the same people responsible for the firm's long-term record still there, dedicated to the same work? How much time and energy do key investment personnel expend on marketing and client servicing? How have they been compensated, and how have incentives been aligned with performance? Has this changed recently? Has the firm's ownership been stable over time? Is a change in ownership likely in the foreseeable future?

- Talk to current and past clients. What were their expectations when they hired the manager, and have these been fulfilled? Why did they hire or fire this manager? Has their account performed in line with the manager's composite, or is there significant dispersion among accounts? Has the firm proved responsive—does it communicate effectively with clients?

### **Attend to Non-Investment Issues**

- Does the firm have capable and effective people in non-investment positions; for example, in operations and accounting, and in client servicing? Are back office functions smooth and transparent? You should visit prospective managers' offices not only to check this out, but also to gauge whether they seem pleasant places to work, with employees who seem reasonably relaxed and happy. Even superficial impressions of this sort can prove important, especially if they are negative.
- Write clear, simple, precise guidelines for each manager. Better yet, ask the managers to write their own guidelines, in the format you prescribe, documenting what they have told you they do. Edit these as necessary and return. Above all, however, avoid constraining a manager from investing in sectors or securities which the manager would otherwise buy—if you don't like the way this manager invests, hire another firm, do *not* try to customize this manager's style to suit you. An exception to this general rule is that you might well want to ask some capable managers to run highly concentrated portfolios composed only of "best ideas"—but you must assure the managers that you realize that this will result in far greater absolute and relative variability of returns.

### **Don't Relax—You've Only Just Begun**

- Recognize that your work does not end when the manager has been hired. You must continue to evaluate what the manager is doing, and why, what is determining the results (i.e., performance attribution), what changes are occurring at the firm in terms of turnover in personnel, growth in assets, and so on.
- The relationship should be managed by *you*, not by the manager. For example, tell the manager *your* agenda in advance of meetings and send a list of questions and issues *you* want discussed.
- Continue to evaluate and meet other managers. If possible, establish a small subportfolio (5% or less of total equities), composed of several managers, each managing a small account, so that you can get to know these managers extremely well over the years and can draw on this stable (or farm team) when you need to add or replace a manager. Do *not*, however, make the common

mistake of promoting a farm team manager *solely* on the basis of superior results over the past three years—the whole point of establishing a farm team is to develop the knowledge and confidence required to promote a manager whose recent results have been relatively poor.

### **The Bottom Line**

- The more work you do before hiring a manager, the less likely you will subsequently regret the decision. Hire in haste, repent at leisure.
- Think of each hire as a *long-term* commitment, by which we mean ten years or more. (The only exception is when you are explicitly attempting to exploit some short-term opportunity in the markets.)
- As far as possible, anticipate from day one the circumstances that would result in your firing the manager. Write down your termination criteria. Predictable, short-term underperformance should not be on that list. On the other hand, unpredictable, unexpected, significant outperformance might constitute reasonable cause.
- Rebalance religiously by adding funds to managers that have underperformed.

**Exhibit B-1**

**SAMPLE WORKSHEET**

**STATISTICAL PROFILE OF  
U.S. STOCK PORTFOLIO AND MANAGERS FOR INSTITUTION XYZ**

	<b>Portfolio (B'mark = )</b>	<b>Manager A (B'mark = )</b>	<b>Manager B (B'mark = )</b>	<b>Manager C (B'mark = )</b>
<b>Market-Cap Median (\$ billions)</b>				
Market-Cap Range (\$ billions)				
<b>% Portfolio in Large- Mid-, and Small-Cap</b>				
Number of Stocks				
<b>% of Portfolio in Top 10</b>				
Persistent Sector Biases				
<b>Other Persistent Region Biases</b>				
R <sup>2</sup>				
<b>Beta</b>				
Standard Deviation				
<b>Average Outly - Alpha</b>				
Tracking Variability				
<b>Information Ratio (alpha ÷ tracking variability)</b>				

**Correlations of Manager Alphas Relative to Portfolio Benchmark**

	<b>Manager A</b>	<b>Manager B</b>	<b>Manager C</b>
Manager A	_____	_____	_____
Manager B	_____	_____	_____
Manager C	_____	_____	_____

**Exhibit B-2****QUALITATIVE MANAGER PROFILE****Personnel**

Number of employees: portfolio managers, analysts, traders, client service

Education/background

Years together/years in investment business

Team turnover

Succession plans

**Firm**

Years in business

Ownership

Financial stability

Number of products; growth in number of products

Assets under management; growth in assets under management; plans to close vehicle?

Number of accounts

Size of average account; largest account

Client profile

Manage own money?

Compensation structure

**Administration**

Administrative capacity for number of clients/products adequate?

Client servicing capacity (portfolio manager visits, backup PM for each account; marketing staff)

Systems

Trading

**Philosophy**

Style

Top-down/bottom-up; for global ex U.S.: country/security selection

Quant

Cash holdings

Competitive advantage

**Exhibit B-2 (continued)****QUALITATIVE MANAGER PROFILE****Process**

Decision making

Research/due diligence: Street sources, in-house, company visits?

Monitoring/controls

Portfolio composition

Sell discipline

Ability to screen according to socially responsible criteria

**Performance**

Each product against its benchmark

Against similar managers

Risk/return

Fit within various manager structures: core, satellite, other?

How much does manager expect to outperform benchmark over 5 years, 15 years?

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## **APPENDIX C**

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## A NOTE ON U.S. STOCK PORTFOLIO INDEXING

Investors may choose to index their stock portfolios for two entirely different and equally valid reasons, which unfortunately tend to be confused.

The more compelling reason to index a stock portfolio is to ensure that one captures the returns of the asset class, without any possibility of deviation (particularly downside deviation). As long as one thinks that a given index (e.g., the S&P 500 or the Wilshire 5000) constitutes an accurate proxy for the asset class, indexing the portfolio to that benchmark ensures that one will earn the return of the asset class, for better or for worse, at the lowest possible cost.

There are four principal reasons why investors might find this appealing:

- Because their U.S. stock portfolios are so large (\$ billions) they cannot avoid "owning the market" anyway, and so seek to do so at the least possible cost.
- Because their asset allocation is predicated on the presumption that they will earn the assumed return of the asset class, and their circumstances are such that the possibility of earning higher returns from active management are insufficient to compensate for the risk of shortfall as a result of active managers underperforming.
- Because they want to devote more of their limited staff resources to less efficient asset classes in which active managers have more opportunities to add considerable value (e.g., venture capital).
- Because they want to construct a portfolio whose aggregate risk-return characteristics and relative variability (i.e., variability vis-à-vis the benchmark index) fall within a tolerable range despite the inclusion of specialized, active managers. This can be fine-tuned by indexing more or less of the diversified core (which has zero variability), depending on the characteristics of the portfolio's active managers.

An investor who indexes some or all of a portfolio for one or several of these reasons should be completely indifferent to the success or failure of active managers (on average) to outperform the index over a given period.

The second reason to index is because the investor believes that most active managers are unlikely to outperform the index, net of fees, over a given time period and that one cannot determine which managers will outperform over time—or, if this can be done, that the investor and/or his advisors lack such manager selection skill.

If we assume that the index in question is a standard, cap-weighted index, historical precedent suggests that this view constitutes a bet on the superior performance of large-cap stocks versus mid- and

small-cap stocks—since most managers hold portfolios relatively overweighted in the latter—and also a bet on a rising market, since active managers have historically added greatest value during flat and down markets (although whether this will prove true in future is unknown).

Just as it was wrong 15 years ago to extrapolate from recent history the presumption that active managers could obviously outperform index funds, so it may be equally misguided today to presume that they cannot do so over the next five or ten years. *We don't know*. We do know, however, that active managers who attribute their relatively disappointing results to the "fact" that a few mega-cap stocks have come to dominate the index are simply wrong: the percentage of the S&P 500 taken up by the largest stocks is no greater today than in 1982 or 1992 (see below).

#### **Historical Dispersion of S&P 500 Stock Weightings**

	<u>6/30/82</u>	<u>6/30/87</u>	<u>6/30/92</u>	<u>6/30/97</u>
Total Portfolio Size (\$ bil)	\$783	\$2,151	\$2,813	\$6,802
% Represented by Top 10 Holdings	23.9	18.9	20.4	19.6
% Represented by Top 20 Holdings	33.8	28.0	30.3	29.8
% Represented by Top 50 Holdings	49.9	45.6	48.9	49.5

Unlike the investor who has indexed for structural reasons that have nothing to do with the possible direction of the market or which cap sector might or might not perform best, the investor who indexes in the belief that this will result in superior performance, net of fees, may be regarded as having made a right or a wrong call, depending on whether the average (or median) manager does better or worse than the index over a relevant time period. It is illogical for such investors to index today just because the index has outperformed active managers in recent years; the question is, will the index continue to outperform in the future, over the time horizon relevant to the investor.

## Exhibit C-1

### DECISION: INDEX OR EMPLOY ACTIVE MANAGERS?

#### What implicit assumptions underlie the decision to employ active managers?

- Active has positive mean alpha. Passive has zero mean alpha.
- Even if active has zero mean alpha in the aggregate, by skillful selection one can narrow the universe to those managers with high probability of positive mean alpha.
- We, or our advisor, possess such selection skill.
- Active managers have historically added most value in down or flat markets, therefore they reduce our downside risk.
- Indexing is an admission of failure or incompetence on our part.

**Start at Active**            **Go to Passive only when disillusioned**

#### What implicit assumptions underlie the decision to index some or all of a portfolio?

- Active managers generate zero positive alpha in aggregate.
- The risk of underperforming the asset class outweighs the potential rewards of active management, net of fees.
- These odds probably cannot be sufficiently improved by selection skill.
- Even if they could, we doubt we, or our advisor, possess such selection skill.
- The superior performance of active managers in down or flat markets is a spurious reason for employing them—even if we assume the persistence of this phenomenon—because we can reduce downside risk simply by reducing our allocation to this asset class.
- If we index, and it turns out that the average active manager does outperform over the next decade, we shall have incurred some opportunity cost, but will have achieved our aim of realizing

**Exhibit C-1 (continued)****DECISION: INDEX OR EMPLOY ACTIVE MANAGERS?**

the return of the asset class—whatever that is. Not a bad outcome. If we employ active managers who *underperform* the index, we shall have incurred higher costs *and* failed in our primary aim of realizing at least the return of the asset class. In other words, if we index and are wrong, we don't lose much. If we select active managers and are wrong, we may lose a lot. This asymmetrical risk-reward ratio favors indexing.

- The logical position, therefore, is to start with the assumption that one should index, and should give money to an active manager only when a compelling case can be made that the manager's future returns will have sufficient positive skew, net of fees, to compensate for the inevitable tracking variability and the risk of underperformance.

**Start at Passive**  **Go to Active only when convinced of the probability of value added**

**APPENDIX D**

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## MANAGER PERFORMANCE—WHAT'S IN THE NUMBERS?

### Introduction

Numerous studies have attempted to determine whether there is evidence of persistence in the performance of active managers of U.S. stock portfolios. In other words, do the winners keep winning and the losers keep losing? As the most systematic of recent analyses<sup>1</sup> says, "the idea that winners repeat is so obvious and popular, it has spawned an entire mini-industry devoted to documenting past winners" despite a singular lack of evidence that such information has any predictive value. Indeed, this study finds no evidence of such persistence and concludes, "only with information beyond historical performance statistics should investors choose active managers." Earlier studies that purported to find evidence of persistence in manager performance tended to ignore the effects of manager style and capitalization biases, and typically extrapolated results from relatively short periods (e.g., five or ten years only), ignoring the overwhelming influence of prevailing market conditions. More conclusive results could perhaps be obtained by studying longer periods, but this is impossible because the universe of managers with continuous track records of 20 or more years is too small to provide statistically significant data.

Consequently, we are not surprised that our own study of performance persistence is not entirely conclusive—but strongly suggests that **selecting managers on the basis of recent performance is perhaps the *worst* approach one could take.**

### The Analyses

The exhibits that follow document the relative performance of all mid- to large-cap U.S. stock managers in our database (institutional account managers) with a 15-year record (205 managers) in order to determine the persistence of their performance in the three sub-periods, 1982-86, 1987-91, and 1992-96. The fundamental questions we set out to answer are:

- Is there any evidence that managers performing in the top two quintiles in one five-year period are likely to repeat as winners in the subsequent five-year period?
- Is the number of managers that succeed in performing above average in all three five-year periods more or less than one would expect from a random draw?

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<sup>1</sup> "Does Historical Performance Predict Future Performance?" by Ronald N. Kahn and Andrew Rudd (Financial Analysts Journal, November-December, 1995). This article also provides a brief review of previous literature on the topic.

In order to increase the sample size, we then repeated the same analysis for all managers for which we had ten years of performance data (424 managers).

Finally, in order to correct for manager style biases, we divided the universe into growth and value managers and repeated the analysis for those sub-groups. Since managers dedicated to managing small-cap portfolios are not included in any of these data, we did not attempt to stratify managers by capitalization bias.

## **Results**

In the periods 1982-86 and 1992-96, value outperformed growth, whereas growth beat value in the period 1987-91. In our analysis of all managers, the tendency of many first quintile managers in one five-year period to show up in the fifth quintile in the subsequent five-year period, and of fifth quintile managers to shoot up to the first quintile (see, for example, Exhibits 1 and 6) may reasonably be attributed to these periodic shifts between value and growth.

Of the 102 managers that outperformed the median manager in 1982-86 and in 1987-91, the number that did so in the subsequent five-year period was a few less than would be expected in a random draw, and proved of no statistical significance (Exhibits 2 and 4).

However, when we measured how many managers in the top two quintiles in the period 1982-86 had remained in the top two quintiles during both subsequent five-year periods, 1987-91 and 1992-96, the results did prove statistically significant. In a random draw, one would expect 13 managers to outperform their peers in this way; the fact that only eight succeeded in doing so suggests that our tendency to bet on winners should be confined to Churchill Downs and suppressed when it comes to manager selection.

Nor is this simply a result of style rotation—of growth managers outperforming value in some periods but not in others. The analyses of growth and value manager performance shown in Exhibits 8-17 yield the same results.

## **Conclusions**

These data are strongly suggestive, but are not definitively conclusive. Nor do we believe that definitive results can be obtained simply by increasing the number of observations. Our analyses are based on quarterly data, and the tendency of many such studies to focus on monthly data (typically from retail mutual funds) does not address the fundamental problem that even 15 years is far too short a period from which to extrapolate universal truths. Unfortunately, a list of managers with continuous track records of 20 years or more could fit on a small postcard.

In addition, manager performance, both in the aggregate and at individual firms, is bound to be significantly influenced by the market environment, and the 15 years covered by our study coincides with the greatest bull market of the century. Might some managers prove more persistently successful relative to their competitors in a prolonged period of adverse conditions? We don't know.

We do know, however, that a typical manager selection process begins and ends with historical performance, that all available evidence suggests this is a serious mistake, and that investors' intuitive belief that past results are a reliable guide to future performance seems entirely unwarranted. Although we should by no means ignore performance history as one factor in the decision process, qualitative considerations should be given at least as much weight in any manager search.

## Exhibit D-1

**ANALYSIS OF U.S. STOCK MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Managers With 15 Years of Consecutive Returns**  
(Number of Observations: 205)

Initial Five-Year Period Quintile (1982-86)	Subsequent Five-Year Period Quintile (1987-91)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	14.6	-0.960	6	41
	2	12.2	-1.508	5	
	3	22.0	0.298	9	
	4	22.0	0.298	9	
	5	29.3	1.288	12	
2	1	17.1	-0.492	7	41
	2	24.4	0.627	10	
	3	22.0	0.298	9	
	4	17.1	-0.492	7	
	5	19.5	-0.078	8	
3	1	17.1	-0.492	7	41
	2	17.1	-0.492	7	
	3	17.1	-0.492	7	
	4	26.8	0.975	11	
	5	22.0	0.298	9	
4	1	17.07	-0.492	7	41
	2	26.83	0.975	11	
	3	19.51	-0.078	8	
	4	26.83	0.975	11	
	5	9.76	-2.183	4	
5	1	34.15	1.887	14	41
	2	19.51	-0.078	8	
	3	19.51	-0.078	8	
	4	7.32	-3.080	3	
	5	19.51	-0.078	8	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.02 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

**Exhibit D-2**

**"PAST PERFORMANCE IS NO GUARANTEE..."**

**U.S. Stock Managers With 15 Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1982-86 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1982-86)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing Above the Median in Subsequent Five-Year Period (1987-91)</u>	<u>Managers Performing Above the Median (%)</u>
1	41	16	39.02
2	41	23	56.10
3	41	16	39.02
4	41	23	56.10
5	<u>41</u>	<u>24</u>	58.54
	205	102	

Of the 102 managers above the median in the first period,  
how many were above the median in the subsequent period? **48**

Random Prediction? **51**

t-stat = -0.592

**Results: Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 1.98 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

## Exhibit D-3

**ANALYSIS OF U.S. STOCK MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Managers With 15 Years of Consecutive Returns**  
(Number of Observations: 205)

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	17.1	-0.492	7	41
	2	12.2	-1.508	5	
	3	19.5	-0.078	8	
	4	26.8	0.975	11	
	5	24.4	0.627	10	
2	1	9.8	-2.183	4	41
	2	24.4	0.627	10	
	3	14.6	-0.960	6	
	4	24.4	0.627	10	
	5	26.8	0.975	11	
3	1	17.1	-0.492	7	41
	2	19.5	-0.078	8	
	3	36.6	2.178	15	
	4	12.2	-1.508	5	
	5	14.6	-0.960	6	
4	1	29.3	1.288	12	41
	2	19.5	-0.078	8	
	3	19.5	-0.078	8	
	4	24.4	0.627	10	
	5	7.3	-3.080	3	
5	1	26.8	0.975	11	41
	2	24.4	0.627	10	
	3	9.8	-2.183	4	
	4	12.2	-1.508	5	
	5	26.8	0.975	11	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.02 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

**Exhibit D-4**

**"PAST PERFORMANCE IS NO GUARANTEE..."**

**U.S. Stock Managers With 15 Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1987-91 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1987-91)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing Above the Median in Subsequent Five-Year Period (1992-96)</u>	<u>Managers Performing Above the Median (%)</u>
1	41	17	41.46
2	41	16	39.02
3	41	22	53.66
4	41	25	60.98
5	41	22	53.66
	<u>205</u>	<u>102</u>	

Of the 102 managers above the median in the first period,  
how many were above the median in the subsequent period? **45**

Random Prediction? **51**

t-stat = -1.191

**Results: Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 1.98 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

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**Exhibit D-5****ANALYSIS OF U.S. STOCK MANAGER RETURNS  
BY QUINTILE OVER THREE FIVE-YEAR PERIODS****U.S. Stock Managers With 15 Years of Consecutive Returns**

Number of managers	205
Number of managers in top two quintiles in first five-year period	82
Number of managers in top two quintiles for all three five-year periods 1982-86, 1987-91, 1992-96	8
Percentage of managers in top two quintiles in first five-year period that are in the top two quintiles in subsequent two five-year periods	9.76%
Random Prediction (#)?	13
Random Prediction (%)?	16.00
t-stat =	-1.894
Results:	<b>Not significant</b>

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 1.99 for the number of managers above the median in the subsequent periods to be significantly non-random at the 95% confidence level.

## Exhibit D-6

**ANALYSIS OF U.S. STOCK MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Managers With Ten Years of Consecutive Returns  
(Number of Observations: 424)**

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	21.2	0.264	18	85
	2	8.2	-3.922	7	
	3	17.6	-0.566	15	
	4	20.0	0.000	17	
	5	32.9	2.524	28	
2	1	8.2	-3.922	7	85
	2	21.2	0.264	18	
	3	16.5	-0.872	14	
	4	25.9	1.231	22	
	5	28.2	1.677	24	
3	1	12.9	-1.927	11	85
	2	21.2	0.264	18	
	3	29.4	1.893	25	
	4	23.5	0.763	20	
	5	12.9	-1.927	11	
4	1	32.9	2.524	28	85
	2	18.8	-0.276	16	
	3	22.4	0.518	19	
	4	14.1	-1.548	12	
	5	11.8	-2.343	10	
5	1	24.7	1.052	21	84
	2	30.6	2.158	26	
	3	14.1	-1.488	12	
	4	16.5	-0.815	14	
	5	12.9	-1.865	11	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 1.99 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

**Exhibit D-7**

**"PAST PERFORMANCE IS NO GUARANTEE..."**

**U.S. Stock Managers With Ten Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1987-91 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1987-91)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing Above the Median in Subsequent Five-Year Period (1992-96)</u>	<u>Managers Performing Above the Median (%)</u>
1	85	41	48.24
2	85	36	42.35
3	84	39	46.43
4	85	48	56.47
5	85	48	56.47
	<hr/> 424	<hr/> 212	

Of the 212 managers above the median in the first period,  
how many were above the median in the subsequent period? **95**

Random Prediction? **106**

t-stat = -1.516

Results: **Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 1.97 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

## Exhibit D-8

**ANALYSIS OF U.S. STOCK VALUE MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Value Managers with 15 Years of Consecutive Returns**

(Number of Observations: 93)

Initial Five-Year Period Quintile (1982-86)	Subsequent Five-Year Period Quintile (1987-91)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	22.2	0.220	4	18
	2	27.8	0.716	5	
	3	0.0	NA	0	
	4	16.7	-0.369	3	
	5	33.3	1.166	6	
2	1	11.1	-1.166	2	18
	2	27.8	0.716	5	
	3	27.8	0.716	5	
	4	27.8	0.716	5	
	5	5.6	-2.600	1	
3	1	16.7	-0.377	3	19
	2	16.7	-0.377	3	
	3	22.2	0.225	4	
	4	16.7	-0.377	3	
	5	33.3	1.185	6	
4	1	16.7	-0.377	3	19
	2	11.1	-1.196	2	
	3	38.9	1.617	7	
	4	22.2	0.225	4	
	5	16.7	-0.377	3	
5	1	33.3	1.185	6	19
	2	16.7	-0.377	3	
	3	16.7	-0.377	3	
	4	22.2	0.225	4	
	5	16.7	-0.377	3	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.10 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

**Exhibit D-9**

**"PAST PERFORMANCE IS NO GUARANTEE..."**

**U.S. Stock Value Managers With 15 Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1982-86 performed better than the median manager over the subsequent five years?**

Initial Five-Year Period Quintile (1982-86)	Number of Managers	Number of Managers Performing Above the Median in Subsequent Five-Year Period (1987-91)	Managers Performing Above the Median (%)
1	18	9	50.00
2	18	10	55.56
3	19	9	47.37
4	19	7	36.84
5	19	11	57.89
	<u>93</u>	<u>46</u>	

Of the 46 managers above the median in the first period,  
how many were above the median in the subsequent period **25**

Random Prediction? **23**

t-stat = 0.414

Results: **Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 2.01 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

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## Exhibit D-10

**ANALYSIS OF U.S. STOCK VALUE MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Value Managers with 15 Years of Consecutive Returns  
(Number of Observations: 93)**

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	22.2%	0.220	4	18
	2	5.6%	-1.330	1	
	3	22.2%	0.205	4	
	4	22.2%	0.246	4	
	5	27.8%	0.680	5	
2	1	11.1%	-1.166	2	18
	2	11.1%	-0.818	2	
	3	22.2%	0.205	4	
	4	33.3%	1.227	6	
	5	22.2%	0.400	4	
3	1	22.2%	0.252	4	19
	2	33.3%	1.510	6	
	3	16.7%	-0.338	3	
	4	16.7%	-0.377	3	
	5	16.7%	-0.296	3	
4	1	16.7%	-0.377	3	19
	2	16.7%	-0.449	3	
	3	33.3%	1.141	6	
	4	27.8%	0.788	5	
	5	11.1%	-1.007	2	
5	1	27.8%	0.691	5	19
	2	33.3%	1.510	6	
	3	11.1%	-1.007	2	
	4	5.6%	-1.463	1	
	5	27.8%	0.881	5	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.10 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

## Exhibit D-11

**ANALYSIS OF U.S. STOCK GROWTH MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Growth Managers with 15 Years of Consecutive Returns  
(Number of Observations: 66)**

Initial Five-Year Period Quintile (1982-86)	Subsequent Five-Year Period Quintile (1987-91)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	30.8	0.808	4	13
	2	0.0	NA	0	
	3	15.4	-0.443	2	
	4	23.1	0.253	3	
	5	30.8	0.808	4	
2	1	7.7	-1.600	1	13
	2	30.8	0.808	4	
	3	7.7	-1.600	1	
	4	30.8	0.808	4	
	5	23.1	0.253	3	
3	1	15.4	-0.443	2	13
	2	23.1	0.253	3	
	3	23.1	0.253	3	
	4	23.1	0.253	3	
	5	15.4	-0.443	2	
4	1	23.1	0.253	3	13
	2	23.1	0.253	3	
	3	30.8	0.808	4	
	4	7.7	-1.600	1	
	5	15.4	-0.443	2	
5	1	23.1	0.126	3	14
	2	23.1	0.126	3	
	3	23.1	0.126	3	
	4	15.4	-0.589	2	
	5	23.1	0.126	3	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.15 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.



**Exhibit D-12**

**"PAST PERFORMANCE IS NO GUARANTEE..."**

**U.S. Stock Growth Managers With 15 Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1982-86 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1982-86)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing in Subsequent Five-Year Period (1987-91)</u>	<u>Managers Performing Above the Median (%)</u>
1	13	7	53.85
2	13	5	38.46
3	13	6	46.15
4	13	6	46.15
5	14	9	64.29
	<u>66</u>	<u>33</u>	

Of the 33 managers above the median in the first period,  
how many were above the median in the subsequent period      **16**

Random Prediction?      **16**

t-stat = -0.171

Results: **Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 2.03 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

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**Exhibit D-13**

**ANALYSIS OF U.S. STOCK GROWTH MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Growth Managers with 15 Years of Consecutive Returns  
(Number of Observations: 66)**

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	53.8	2.352	7	13
	2	23.1	0.253	3	
	3	7.7	-1.600	1	
	4	7.7	-1.600	1	
	5	7.7	-1.600	1	
2	1	7.7	-1.600	1	13
	2	23.1	0.253	3	
	3	15.4	-0.443	2	
	4	23.1	0.253	3	
	5	30.8	0.808	4	
3	1	23.1	0.253	3	13
	2	15.4	-0.443	2	
	3	23.1	0.253	3	
	4	15.4	-0.443	2	
	5	23.1	0.253	3	
4	1	7.7	-1.600	1	13
	2	23.1	0.253	3	
	3	23.1	0.253	3	
	4	23.1	0.253	3	
	5	23.1	0.253	3	
5	1	7.7	-1.800	1	14
	2	15.4	-0.589	2	
	3	30.8	0.684	4	
	4	30.8	0.684	4	
	5	23.1	0.126	3	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.15 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

## Exhibit D-14

**ANALYSIS OF U.S. STOCK VALUE MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Value Managers With Ten Years of Consecutive Returns**  
(Number of Observations: 189)

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	34.2	1.822	13	38
	2	10.5	-1.878	4	
	3	15.8	-0.702	6	
	4	13.2	-1.231	5	
	5	26.3	0.872	10	
2	1	10.5	-1.878	4	38
	2	15.8	-0.702	6	
	3	31.6	1.515	12	
	4	28.9	1.200	11	
	5	13.2	-1.231	5	
3	1	21.1	0.157	8	38
	2	28.9	1.200	11	
	3	10.5	-1.878	4	
	4	21.1	0.157	8	
	5	18.4	-0.248	7	
4	1	13.2	-1.231	5	38
	2	26.3	0.872	10	
	3	26.3	0.872	10	
	4	23.7	0.527	9	
	5	10.5	-1.878	4	
5	1	21.1	0.239	8	37
	2	18.4	-0.167	7	
	3	15.8	-0.623	6	
	4	13.2	-1.152	5	
	5	28.9	1.256	11	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.03 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

## Exhibit D-15

**"PAST PERFORMANCE IS NO GUARANTEE..."****U.S. Stock Value Managers With Ten Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1987-91 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1987-91)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing in Subsequent Five-Year Period (1992-96)</u>	<u>Managers Performing Above the Median (%)</u>
1	38	17	44.74
2	38	17	44.74
3	38	20	52.63
4	38	21	55.26
5	<u>37</u>	<u>19</u>	51.35
	189	94	

Of the 94 managers above the median in the first period,  
how many were above the median in the subsequent period **43**

Random Prediction? **47**

t-stat = -0.824

**Results: Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 1.99 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

## Exhibit D-16

**ANALYSIS OF U.S. STOCK GROWTH MANAGER RETURNS  
BY QUINTILE OVER FIVE-YEAR PERIODS**

**U.S. Stock Growth Managers With Ten Years of Consecutive Returns**  
(Number of Observations: 135)

Initial Five-Year Period Quintile (1987-91)	Subsequent Five-Year Period Quintile (1992-96)	Managers from Initial Quintile (%)	t-statistic	Number of Observations	Number of Managers in Quintile
1	1	39.3	2.052	11	28
	2	21.4	0.181	6	
	3	7.1	-2.594	2	
	4	10.7	-1.560	3	
	5	21.4	0.181	6	
2	1	17.9	-0.286	5	27
	2	14.3	-0.835	4	
	3	17.9	-0.286	5	
	4	25.0	0.592	7	
	5	21.4	0.178	6	
3	1	17.9	-0.286	5	27
	2	17.9	-0.286	5	
	3	28.6	0.975	8	
	4	14.3	-0.835	4	
	5	17.9	-0.286	5	
4	1	7.1	-2.549	2	26
	2	21.4	0.178	6	
	3	17.9	-0.268	5	
	4	28.6	0.975	8	
	5	17.9	-0.286	5	
5	1	17.9	-0.194	5	27
	2	21.4	0.273	6	
	3	21.4	0.273	6	
	4	17.9	-0.194	5	
	5	17.9	-0.194	5	

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 20% of managers to appear in each quintile - a t-statistic of zero. The t-statistic must be greater than 2.05 for the number of managers in the subsequent period quintile to be significantly non-random at the 95% confidence level.

## Exhibit D-17

**"PAST PERFORMANCE IS NO GUARANTEE..."****U.S. Stock Growth Managers With Ten Years of Consecutive Returns**

**What percentage of those in each quintile of performance for the period 1987-91 performed better than the median manager over the subsequent five years?**

<u>Initial Five-Year Period Quintile (1987-91)</u>	<u>Number of Managers</u>	<u>Number of Managers Performing in Subsequent Five-Year Period (1992-96)</u>	<u>Managers Performing Above the Median (%)</u>
1	28	17	60.71
2	27	12	44.44
3	27	15	55.56
4	26	11	42.31
5	<u>27</u>	<u>13</u>	48.15
	135	68	

Of the 68 managers above the median in the first period,  
how many were above the median in the subsequent period? **37**

Random Prediction? **34**

t-stat = 0.725

Results: **Not significant**

Notes: The t-statistic tests the hypothesis that subsequent period performance is independent of initial period performance. If returns are random, one would expect 50% of managers to appear above the median - a t-statistic of zero. The t-statistic must be greater than 2.00 for the number of managers above the median in the subsequent period to be significantly non-random at the 95% confidence level.

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## **GLOSSARY**

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- Alpha:** Alpha measures the difference between a manager's returns and those of an appropriate benchmark. However, because this measurement does not reflect differences in risk between the two portfolios, risk-adjusted alpha is more commonly used to evaluate manager performance. A firm that consistently achieves excess risk-adjusted returns is said to have a positive alpha, which is generally interpreted as showing the value added by stock selection, the timing of sales and purchases, and industry group weighting. When risk-adjusted alpha is computed, the assumption is made that funds can be invested in Treasury bills with zero risk and that the Treasury bill rate must therefore be subtracted from those of the manager before valid comparisons can be made.
- Beta (Volatility):** A measure of the sensitivity of the portfolio's rate of return to changes in the market rate of return. A beta of 1.0 implies that a 1% increase in the market return will result, on average, in a 1% increase in the portfolio return; in other words, that both are equally volatile, equally risky. If a portfolio has a beta of 2, a 10% increase in the market return will result, on average, in a 20% increase in the portfolio return. A beta greater than 1 therefore signifies that a portfolio is more risky (volatile) than the market, while a beta of less than 1 signifies the opposite.
- Investment Style:** The investment approach applied by a manager in its stock selection may be broadly categorized as follows:
- Growth:** Emphasis on stocks of companies with rapid earnings growth. Willing to pay high multiples of earnings, dividends, and book values.
  - Value:** Focus on low price-earnings multiples (usually in relation to the overall market, but at least in relation to corporate rates or return on equity), low price-to-book multiples, high yields, and depressed prices relative to previous highs. It is the reverse image of growth stock investing.
  - Opportunistic:** Primary emphasis on shifts within the stock market. No strong identification with particular market sectors, however defined.
  - Diverse:** Securities are selected from all or most market sectors, but without attempting to replicate an index fund.

- Regression Analysis:** A statistical technique used to evaluate the risk-return characteristics of a portfolio. By using regression analysis to look at the relationship between the portfolio returns and returns of the market (using the S&P 500 as the proxy), one can arrive at quantitative measures of the stock portfolio's risk level, its sensitivity to the market, the diversification of the portfolio, and the manager's contribution through stock selection and timing.
- R-Squared:**  $R^2$  is a measure of portfolio diversification. Every portfolio is subject to market and nonmarket risk. As stocks are added to a portfolio, the stock-specific effects (nonmarket risks) tend to cancel each other as diversification increases.  $R^2$  measures the degree to which a portfolio's returns are correlated with those of the market and in doing so it measures the relative significance in the portfolio of market and nonmarket risk. An  $R^2$  of 1.0 implies that 100% of the variability of the portfolio's return is explained by fluctuations in the market. An  $R^2$  of 0.0 indicates there is no correlation between the two.
- S&P 500:** A capitalization-weighted index composed of 500 stocks primarily traded on the New York Stock Exchange. The S&P 500 represents approximately 70% of the aggregate market value traded on the NYSE, but because it is capitalization-weighted, fewer than 60 stocks constitute half the index's total weight. The 500 issues included in the index are selected to maintain an emphasis on large and successful companies and to achieve an appropriate representation across industry groups. It is the most widely used proxy for the market return.
- Sharpe Ratio:** The Sharpe ratio is a measure of risk-adjusted performance. The ratio is computed by dividing a portfolio's excess return for the sample period (average portfolio return less the average risk-free rate) by the standard deviation of the portfolio's returns over that period. The higher the Sharpe ratio, the better the risk-adjusted returns. The Sharpe ratio is often used to compare excess return per unit of absolute risk for different investment vehicles.
- Standard Deviation:** A measure of variability or volatility. The standard deviation measures the degree of dispersion of returns, estimating the extent to which actual returns over a period are likely to differ from the average historical return. The larger the standard deviation, the wider the range of likely returns and the greater the risk implicit in the portfolio.

<b>Standard Error:</b>	A statistical measure of the error in a given regression analysis caused by deviations in the data. The smaller the value, the lower the error.
<b>Total Return:</b>	A measure of an investment's return that takes into account both capital appreciation (realized and unrealized) and earned income.
<b>Tracking Error:</b>	Tracking error is defined as the standard error of the alpha estimate. The smaller the value, the lower the error. When residual risk is low, there is a greater confidence that the alpha is sustainable, whereas high residual risk creates uncertainty about the significance of the value added to the portfolio. (See also Tracking Variability)
<b>T-Statistic:</b>	A test statistic used to gauge the statistical significance of estimated parameters.
<b>Tracking Variability:</b>	Tracking variability is the extent to which a manager's returns deviate from those of the benchmark index and is related both to $R^2$ and to the <i>potential</i> for value added—a manager with a high $R^2$ and little deviation from the index cannot be expected to outperform by a large margin.
<b>U.S. Stock Manager Mean:</b>	The simple arithmetic average of all the returns achieved by the stock managers tracked by Cambridge Associates, Inc.
<b>U.S. Stock Manager Median:</b>	The middle return in the Cambridge Associates, Inc. universe of manager returns when these are ranked from highest to lowest. One-half of the returns will exceed the median return and one-half will be lower. The universe includes more than 700 stock managers that Cambridge Associates, Inc. tracks on a quarterly basis.