The Case for **Indexing**

MARCH 2004

The Indexing Strategy and Its Advantages

An index is a group of securities chosen to represent an entire market or a portion of the market. An index investment strategy tracks the performance of an index by assembling a portfolio that invests in the same group of securities, or a sampling of the securities, that compose the index.

Figure 1 illustrates the difference among the various approaches to equity investment management. Investment strategies are plotted according to both the expected volatility of tracking error relative to a benchmark and the expected excess return versus the benchmark (alpha).

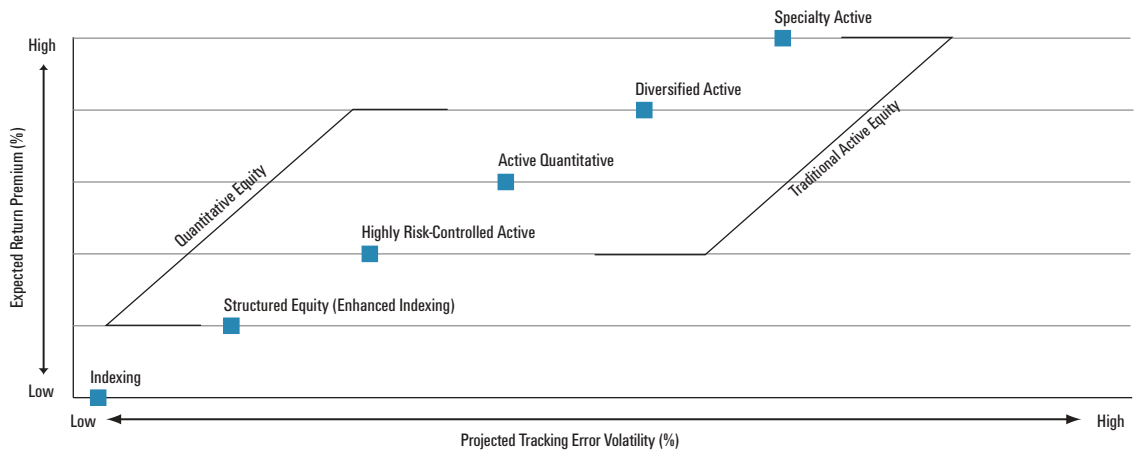
Indexing is at the base of the equity-management slope, simply seeking to track the returns of an unmanaged benchmark. Indexing uses quantitative risk-control techniques to replicate the benchmark's return with minimal expected tracking error (and, by extension, with no expected alpha).

Quantitative management strategies accept some degree of tracking error in exchange for a modest amount of expected alpha by using quantitative criteria to select a sample of stocks that are expected to outperform a benchmark. At the riskiest end of the equity-management slope are traditional active strategies, which typically emphasize individual stock selection and have less regard for formal risk control versus the benchmark.

This paper presents both the theory that underlies index investing and evidence to support its compelling and enduring advantages. The advantages of indexing are:

- Superior long-term performance.
- Relative predictability versus the benchmark.
- Tax efficiency.
- Applicability to any market or asset class.

Figure 1 The Spectrum of Equity Management Strategies



Source: The Vanguard Group, Inc.

Table 1 General Equity Fund Returns by Expense Ratios

Expense Ratio	Average Annual Total Return
0.50% and below	10.90%
0.51%–1.00%	10.18
1.01%–1.50%	9.76
1.51% and above	7.40

Source: Lipper Inc.
Ten Years Ended December 31, 2003.

Indexing Can Lead to Superior Long-Term Performance: Theory and Evidence

Average mutual fund performance is inversely related to fund expenses (Table 1). Index funds achieve a performance advantage by employing a low-cost structure. This structure derives from having low, if any, management fees and low turnover. Turnover, or the buying and selling of securities within the fund, results in transaction costs such as commissions, bid-ask spreads, market impact, and opportunity cost. These costs, although incurred by every fund, are generally opaque. A mutual fund's expense ratio or a separate account's management fee, however, is visible and represents actual costs to manage the assets, regardless of how that fee is paid.

Table 2 Components of Cost Advantage for Index Funds Versus Active Funds, by Market Segment (in basis points)

	Large-Cap		Small-Cap		International	
	Index	Active	Index	Active	Index	Active
Expense ratio	112	151	90	180	86	191
Transaction costs	2	60	50	224	6	41
Total	114	211	140	404	92	232
Indexing Advantage	**97**		**264**		**140**	

Notes: Costs are based on a $10 million investment. Expense ratios are for period ended December 31, 2003.
Sources: Lipper Inc. and The Vanguard Group, Inc.

Compared with index funds and separate accounts, actively managed mutual funds have higher management fees coupled with higher transaction costs. The higher fees result from a portion of the management fee that must cover the research process. Higher transaction costs result from generally higher turnover associated with active management's attempt to outperform the market. Table 2 depicts the components of this cost advantage for domestic and international equity markets.

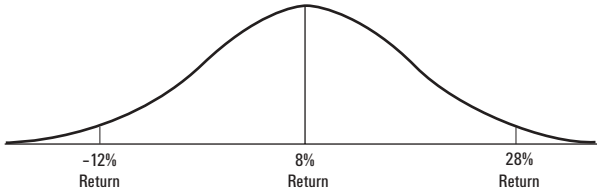
Thinking of the market as a zero-sum game, in which one person's gain always equals another person's loss, helps illustrate the impact of cost on performance. No matter how one looks at it, logic shows that investors *in aggregate* earn the market return, before costs (Figure 2 illustrates this point). Figure 3 shows how the hypothetical distribution of returns would change when costs are subtracted. Although the market performance appears to have shifted to the right, the market has actually remained stationary while the distribution of returns has shifted to the left, toward underperformance. Given their low costs, index funds earn only slightly less than the market return. In contrast, the substantially higher costs of active funds cause a high proportion of them—often, in fact, a majority—to perform significantly worse than the market.

Evidence

Actual results from the mutual fund universe, depicted in Figure 4, bear out the theoretical underpinnings of indexing.

Figure 2 Hypothetical Annual Return Distribution

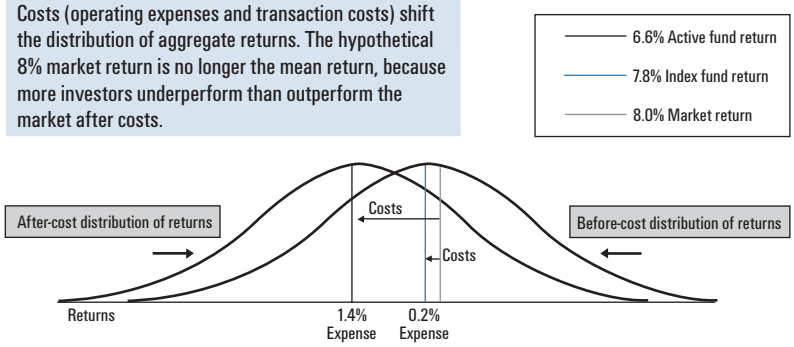
Before costs, the mean returns of all active and passive managers are equivalent to the hypothetical market return of 8%. The few managers who significantly outperform or underperform an index are at the far ends of the distribution curve.



Hypothetical Distribution of Annual Returns

Figure 3 Hypothetical Annual Return Distribution After Costs

Costs (operating expenses and transaction costs) shift the distribution of aggregate returns. The hypothetical 8% market return is no longer the mean return, because more investors underperform than outperform the market after costs.



Hypothetical Distribution of Annual Returns

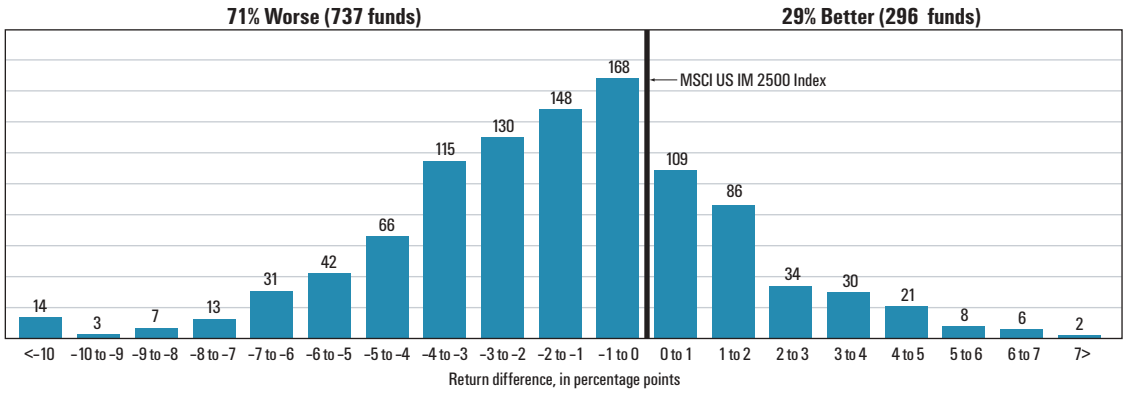
The Equity Performance Advantage

Indexing's low-cost structure produces performance advantages in both equity and fixed income markets. In the U.S. equity market, index funds do well against their actively managed counterparts when compared against a broad measure of the market, the Morgan Stanley Capital International Investable Market 2500 Index (Figure 5 on page 4). This conclusion also holds true when the market is subdivided into its style components.

The superior long-term performance of indexing in equity investing is evident in ten-year returns. Figure 6a (on page 5) shows the percentage of actively managed stock funds in each style category that were outperformed by the benchmark for that category. In all instances, the index outperformed a majority of actively managed funds.

Index outperformance is especially prominent in the large-cap stock arena, where markets are generally considered to be more efficient. However, for small- and mid-cap funds, where the outperformance advantage is less pronounced, survivorship bias distorts the comparison in favor of active managers. Survivorship bias exists because the Lipper data[1]

Figure 4 Performance Distribution of U.S. Diversified Equity Funds Versus MSCI US Investable Markets 2500 Index



Sources: Lipper Inc., Morgan Stanley Capital International, and The Vanguard Group, Inc.
Ten Years Ended December 31, 2003.

[1] Survivorship bias exists in most commercially available databases of mutual funds.

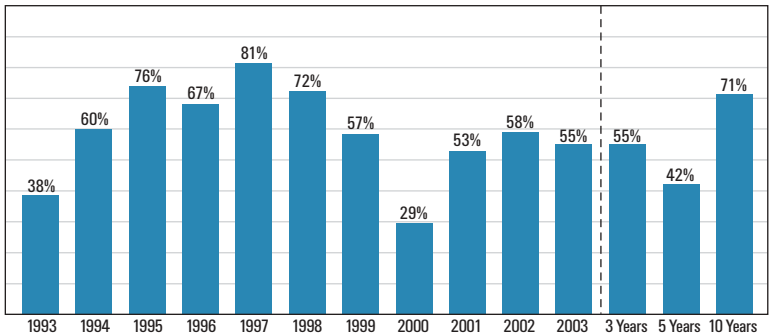
exclude all results for funds that ceased to exist during the ten-year period. Funds typically close or merge as the result of poor performance; therefore, excluding their performance records inflates average returns and reduces the percentage of funds that are outperformed by the benchmark. If the returns of these extinct funds were included in Figure 6a, the performance advantage of equity indexing probably would be even more compelling. In fact, a study by Ennis and Sebastian (2002) that accounts for survivorship bias, fees, and benchmark mismatching[2] demonstrates that active managers, particularly those running small-cap funds, tend to underperform a given benchmark.

After accounting for these data considerations, the empirical evidence supports the theoretical zero-sum framework regardless of the market segment. Over time, low costs enable the index fund to outperform a majority of actively managed funds.

The Fixed Income Performance Advantage

Indexing is particularly effective in fixed income investing. This is because the relatively narrow range of returns between the best and worst performers in this asset class magnifies the benefits of the indexing cost advantage.

Figure 5 Percentage of U.S. Diversified Equity Funds Outperformed by MSCI US Investable Markets 2500 Index



Note: Data for 3-, 5-, and 10-year periods ended December 31, 2003.
Sources: Lipper Inc., Morgan Stanley Capital International, and The Vanguard Group, Inc.

Figure 7 shows the distribution of ten-year returns for the 102 intermediate-term, investment-grade bond funds in existence for the decade ended December 31, 2003. As is typical, performance is concentrated in the middle bars. This narrow distribution occurs because a large portion of bond returns is determined by interest rate fluctuations and credit quality. Since these factors are common to all bond portfolios in a given market, the portfolios will react similarly to new information—which makes it difficult to outperform the market index. Fund expenses on their own can suffice to cause significant underperformance relative to the index. By minimizing costs, index funds closely track the market return after costs, and thus outperform a majority of active funds.

As with the equity fund universe, the performance advantage holds when applied to the bond market's subcomponents, as indicated by Figure 6b.

Advantages of Indexing in Other Markets

Although many investors consider only the domestic equity and fixed income markets when contemplating investing in index funds, the indexing strategy has demonstrated advantages in many other areas. Two examples are international equity and real estate investing. Both of these markets were long considered too inefficient for indexing to be practical. However, because fund performance is a zero-sum game in all markets, it has turned out that the high cost of active management in less-efficient markets makes indexing an attractive alternative.

The International Equity Performance Advantage

The low operating and transaction costs of indexing give international index fund investors an enormous head start relative to actively managed funds (recall Table 2). However, a comparison of actively managed funds with the broad-

[2] A benchmark mismatch occurs when the composition of the benchmark does not reflect the holdings of active managers. Benchmark mismatching is most problematic in the small- and mid-cap growth categories, where managers tend to hold significant portions of stocks with larger capitalizations than are represented by the benchmark composition. To mitigate this problem, Figure 6a uses Morgan Stanley Capital International indexes. The MSCI indexes more effectively replicate the holdings of active managers by considering many variables when determining the style characterization of a stock.

Figure 6a Percentage of Managers Outperformed by MSCI Indexes

	Value	Blend	Growth
Large-cap*	90%	84%	85%
Mid-cap**	80	68	59
Small-cap†	64	68	62

*Versus MSCI US Prime Market Value, US Prime Market 750, and US Prime Market Growth Indexes.
**Versus MSCI US Mid Cap Value, US Mid Cap 450, and US Mid Cap Growth Indexes.
†Versus MSCI US Small Cap Value, US Small Cap 1750, and US Small Cap Growth Indexes.
Sources: Lipper Inc. and Morningstar, Inc.
Ten Years Ended December 31, 2003.

Figure 6b Percentage of Actively Managed Bond Funds Outperformed by Benchmark

	Government	Corporate	GNMA	High-Yield
Short-term	95%	99%	96%	90%
Intermediate-term	82	92	–	–
Long-term	99	98	–	–

Note: Benchmark return data adjusted 20 basis points for estimated expense ratio.
Sources: Lipper Inc. and Morningstar, Inc.
Ten Years Ended December 31, 2003.

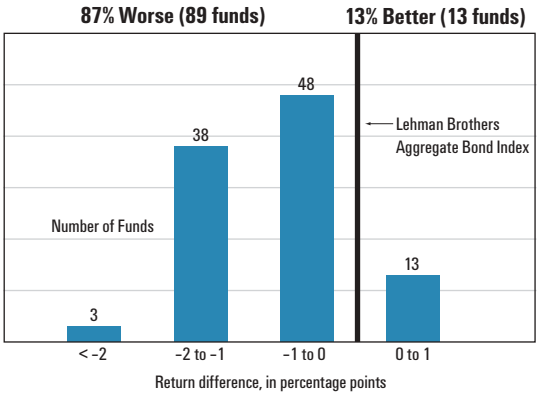
market MSCI EAFE international index, as shown in Figure 8 (on page 6), gives the impression that indexing has underperformed about half of actively managed international funds in recent periods. In fact, this characterization is incomplete. To get a more accurate sense of the performance advantage that indexing provides, it is necessary to isolate the EAFE Index's component parts and analyze performance in each segment individually.

One component of the EAFE Index is the European market. Figure 9 (on page 6) shows the indexing advantage against European funds alone. During most years indexing outperformed a majority of actively managed funds.

Pacific markets are the other major EAFE component. Figure 10 (on page 7) separates the funds according to whether they invest in the Japanese market, which has a heavy weighting in the EAFE Pacific Index. As is well known, the Japanese market has been in a secular decline for more than a decade. Isolating the "Japan funds" reveals a different picture of indexing performance. The index underperformed a majority of funds because of its bigger weighting in the troubled Japanese market. With Japan excluded, the index outperformed a majority of funds in most periods shown. In the last few years, virtually all diversified international active managers have bet heavily against the Japanese market by underweighting their exposure to it in comparison to the index.

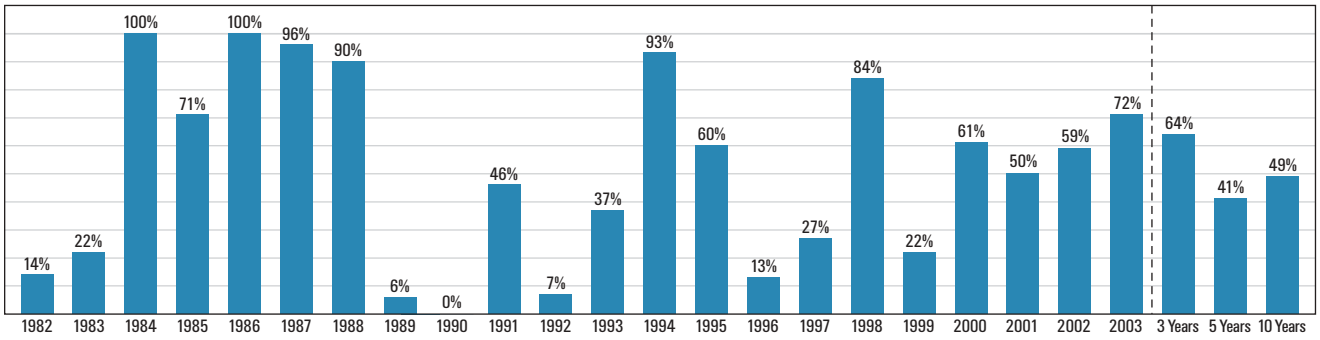
Two factors are involved, one of which is secular and the other structural. First, the decision to over- or underweight Japan dominated international managers' returns versus EAFE in the late 1980s and early 1990s. Second, the index itself has had flaws. The MSCI Pacific benchmark has been subject to criticism for years because it was so easily outperformed by active managers who underweighted Japan. The index weightings for each company were based on the total value of stock issued, whereas the actual amount of available stock was much less because of large, static holdings by banks and other companies. This differential forced managers to underweight Japan, which was to their advantage in a falling market. Obviously, the index was failing to serve as a realistic standard for the actual investing behavior of fund managers—creating a performance-comparison illusion.

Figure 7 Performance Distribution of Intermediate-Term Investment-Grade Bond Funds Versus Lehman Aggregate Bond Index



Sources: Lipper Inc. and The Vanguard Group, Inc.
Ten Years Ended December 31, 2003.

Figure 8 Percentage of Diversified International Equity Funds Outperformed by MSCI EAFE Index



Notes: International small-cap funds included. Data for 3-, 5-, and 10-year periods ended December 31, 2003.
Sources: Lipper Inc., Morgan Stanley Capital International, and The Vanguard Group, Inc.

To construct a better benchmark, Morgan Stanley accounts for "free float" in its international and domestic indexes. Free float refers to the shares available to the public to hold. The index weightings thus will exclude shares held by company insiders or cross-held by other companies. This change effectively reduces Japan's proportion in the index by ensuring that every country's weighting more correctly reflects the market capitalization available to investors to hold. The change should make outperforming the EAFE Pacific Index by betting on a single risk factor, the market weighting of Japan, much less likely over the long term.

The Performance Advantage in Other Markets

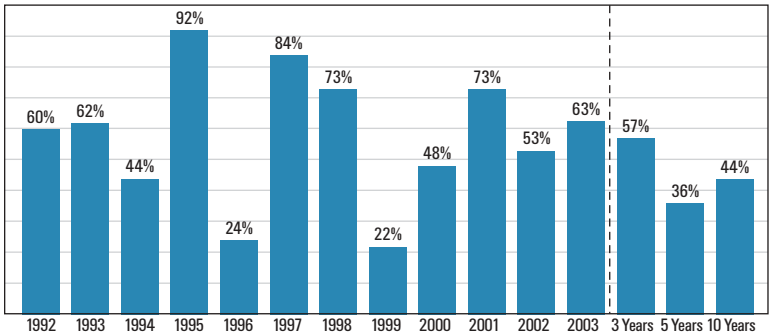
Indexing also works in smaller segments of the market, such as industry sectors. Real estate investment trusts are a good example. Figure 11 demonstrates the performance advantage achieved by indexing real estate investment trusts (REITs). The Wilshire REIT Index outperformed a majority of actively managed real estate investment funds over three- and five-year periods. The longer-term results are less meaningful because of the small number of REIT funds previously available for comparison. As the number of REIT funds and underlying REITs has grown in recent years, indexing's benefits have become clearer.

The Tax Advantage

From an after-tax perspective, indexing provides an additional advantage. As noted earlier, index funds' turnover is substantially lower than that of active funds; in addition, index funds rarely distribute capital gains to shareholders.

According to Daniel Bergstresser and James Poterba, writing in the *Journal of Financial Economics*, the typical actively managed mutual fund distributed, on average, 50% of its annual price appreciation in the form of capital gains.[3] Historically, approximately one-third of the distributions have been in the form of short-term gains and two-thirds as long-term gains. Index funds, on the other hand, distribute far less (an estimated 0.50%) as long-term gains, primarily because selling occurs only when the composition of the market

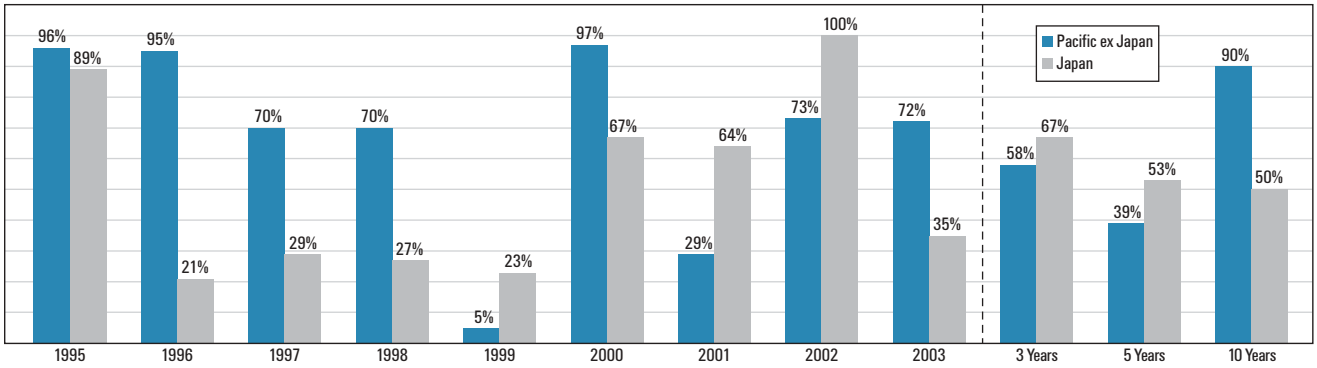
Figure 9 Percentage of European Funds Outperformed by MSCI Europe Index



Note: Data for 3-, 5-, and 10-year periods ended December 31, 2003.
Sources: Morningstar, Inc., Morgan Stanley Capital International, and The Vanguard Group, Inc.

[3] Bergstresser, Daniel, and James Poterba, 2002. Do After-Tax Returns Affect Mutual Fund Inflows? *Journal of Financial Economics* 63:381–414.

Figure 10 Percentage of Pacific ex Japan and Japan Funds Outperformed by MSCI Pacific ex Japan and MSCI Japan Indexes

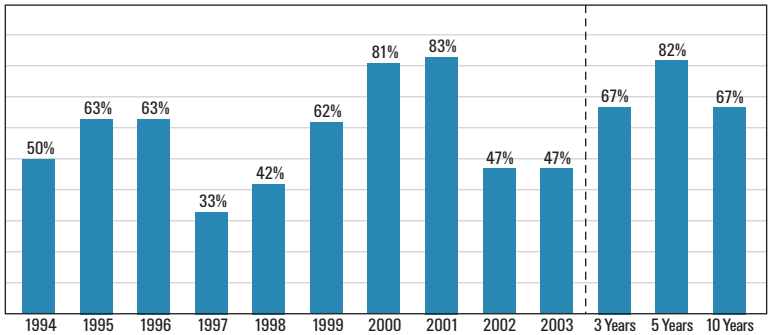


Note: Data for 3-, 5-, and 10-year periods ended December 31, 2003.
Sources: Lipper Inc., Morgan Stanley Capital International, and The Vanguard Group, Inc.

index changes. This can result in return advantages over the long term.

Figure 12 (on page 8) uses hypothetical funds that return 8% to demonstrate the long-term tax consequences resulting from typical distributions by active funds and index funds. Every year, the index fund distributes less capital gains, and the retained capital gains compound over time. The result is a difference in the ultimate rates of return after liquidation: 7.16% for the index fund versus 6.79% for the active fund.

Figure 11 Percentage of Real Estate Mutual Funds Outperformed by Wilshire REIT Index



Note: Data for 3-, 5-, and 10-year periods ended December 31, 2003.
Sources: Lipper Inc., Wilshire Associates, and The Vanguard Group, Inc.

Minimized Risks

Indexing offers additional benefits, each of which reduces portfolio risk as measured by the volatility of returns relative to market benchmarks. Historically, broad diversification, style consistency, and the virtual absence of manager risk have provided predictable relative returns.

Diversification

Index funds typically are more diversified than actively managed funds, a by-product of the way indexes are constructed. Except for funds tracking narrow market segments, an index fund must hold a broad range of securities in order to accurately track its target benchmark, whether by replicating it outright or by a sampling method. The broad range of securities dampens the risk associated with specific securities and removes a component of return volatility. Actively managed funds, on the other hand, tend to hold fewer securities with varying degrees of return correlation.

Style Consistency and Relative Predictability

An index fund maintains its style consistency by closely tracking the characteristics of the index. If an investor desires exposure to a particular market, selecting an index fund that tracks that market assures him or her of a consistent allocation.

An active manager may have a broader mandate, causing the fund to be a moving target from a style point of view. Many active managers can choose to vary their investments among small-, medium-, or large-capitalization stocks, betting on whichever segment is expected to perform best. Even if a manager has a well-defined mandate, the decision to hold more or less of a security than the index will lead to performance differences.

Indexing: A History of Superior Performance

Today, more than $1 trillion is invested in U.S. index funds tracking equity and fixed income markets domestically and abroad. Indexing has grown rapidly because it provides a simplified, efficient investment vehicle with the potential to increase shareholder wealth. Primarily because of their low-cost structure, index investments have generally offered long-term outperformance relative to a majority of actively managed funds. The performance advantage was compounded at the taxable shareholder level by the tax advantages realized from low turnover. Other benefits of indexing include the inherent characteristics of consistent investment focus, low manager risk, and broad diversification. ■

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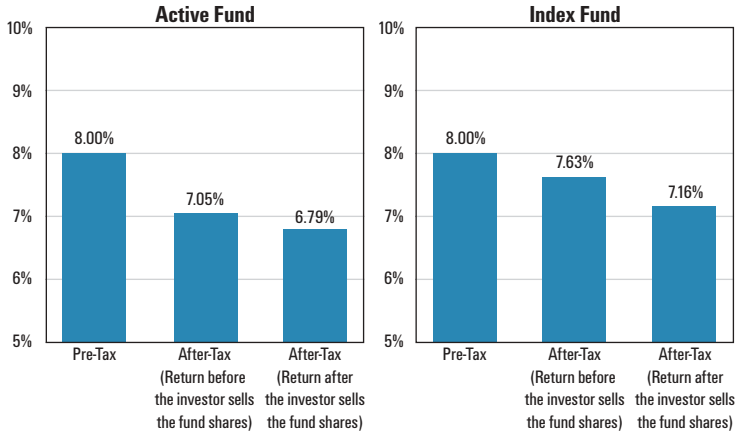
Figure 12 Equity Index Funds Minimize Realization of Capital Gains
(Pre- and After-Tax Total Returns of Similar Funds with Different Turnover Rates)



Assumptions:
- Two hypothetical funds.
- 20-year holding period.
- 8% total return (6% capital appreciation, 2% dividend yield).
- 35% short-term capital gains tax rate.
- 15% long-term capital gains tax rate.
- 15% dividend tax rate.
- Active fund:
  - One-half of capital appreciation is distributed annually.
  - One-third of each distribution consists of short-term gains; the rest is long-term gains.
- Index fund:
  - 0.50% of assets are distributed annually as long-term gains.

Source: The Vanguard Group, Inc.

Past performance cannot be used to predict future returns. The investment return and principal value of an investment will fluctuate, so an investor's shares, when redeemed, may be worth more or less than their original cost.

The hypothetical illustrations included are not representative of the returns of any particular investment.

For more information about Vanguard funds, visit www.vanguard.com, or call 800-662-7447, to obtain a prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read it carefully before investing.

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