# Index and Enhanced Index Funds

By David G. Booth
Co-Chairman, Chief Executive Officer and Chief Investment Officer
Dimensional Fund Advisors Inc.
April 2001

Dimensional Fund Advisors' investment strategies provide access to a wide range of fixed income and equity risk dimensions. The funds under management are either "index funds," designed to closely track the returns of an index, or "enhanced index funds." Of the assets under management, approximately 90% are invested in enhanced index funds and 10% are invested in straight index funds. The goal of our enhanced index funds is to add 100-200 basis points a year over conventional benchmarks while tracking their benchmarks almost as well as index funds.

The purpose of this paper is to develop a case for the use of index funds and, by extension, our type of enhanced index funds.

## The Research into Fund Management

Index funds were first launched in the early 1970s. The motivation for indexing was the poor performance of what might be called "conventional" active management, the attempt at improving returns through stock selection and market timing.

Today, we take for granted the calculation of time-weighted rates of return and the availability of comparative universes for professionally managed funds. Before the mid-1960s, there was neither a generally accepted way to calculate a total return nor a way to compare the returns of different funds. This all changed with the advent of computers and the collection of data for mutual funds as well as for individual stocks and bonds. For the first time, investors could calculate returns on a consistent basis and compare their returns with the returns achieved elsewhere. And, for the first time, they became aware of the poor performance of professional money managers.

An article from *The Wall Street Journal* typifies the findings. It reports that, based on the newest methods of analyzing investment returns, the average mutual fund underperformed its risk-adjusted benchmark by 140 basis points (1.4%) a year (Jonathan Clements, "Stock Funds Just Don't Measure Up," *The Wall Street Journal*, October 5, 1999). The findings are consistent with previous research. There is now more than 30 years of research into fund performance, covering a span of over 50 years. The research is clear: In every time period examined, active management has lower returns than would be expected from index funds. And the results are the same for all equity styles. In his article "Mutual Fund Performance and Manager Style," Davis finds that both small cap and large cap stock funds, both growth and value funds, all underperform risk-adjusted benchmarks.

Upon hearing about the research findings, investors sometimes respond that they are not concerned about the results of the average manager. They plan on hiring only the above-average managers. A follow-up *Wall Street Journal* article addresses that bit of wishful thinking (Jonathan Clements, "Not Everyone Can Pick Funds. Really," *The Wall Street Journal*, Novermber 9, 1999). Once again, the conclusions are revealing. Managers with good track records are no more likely to have good records in the future than are managers with poor returns. The one bit of consistency concerns the funds with poor track records—they are more likely to have poor future returns than are other funds. With high fees and high turnover rates it is easy to be a consistent loser.

The performance of pension funds and outside investment consultants mirrors that of mutual funds. Some argue that pension funds and other investment professionals should have better returns than mutual funds because professional investors should be able to select the best managers. The results indicate they do not. The only difference in performance can be explained by their ability to negotiate lower management fees than those charged by mutual funds.

The negative view of professionally managed funds is not restricted to the US Quigley and Sinquefield, in their article "Performance of UK Equity Unit Trusts," report the performance of actively managed UK funds is even worse than the performance of US funds.

Thus, part of the case for indexing is based on extensive empirical research. Before fees, the track records of traditional managers are similar to what would be expected from a room full of orangutans throwing darts at stock and bond listings. After fees, the expected distribution of results is better for the orangutans because they are assumed to work for bananas.

Index funds, with low management fees and low turnover costs, always rank high in long-term performance studies. They have ranked in the top of the comparative universes since their inception in the 1970s, the 1980s, and the 1990s.

## What Seems to Matter

Investors should be happy with the research findings. Ignoring fee differentials, systematic differences in average portfolio returns can be explained by differences in average risk. Portfolio management becomes an issue of asset allocation across the dimensions of risk rather than an issue of which money manager is best.

Over the last 35 years, academics have led the way in improving our understanding of risk and return in public securities markets. Currently, the generally accepted view of leading academics is that risk can be thought of as having the following dimensions:

1. Fixed income. The two dimensions of fixed income risk appear to be maturity and quality. Low quality obligations have higher returns than high quality obligations. To some, the difference is so great that they invest in high-yield strategies. The maturity dimension is somewhat more complicated. Longer-term obligations do not have reliably higher average returns than shorter-term obligations, even though their prices fluctuate more. Investors concerned about return volatility should shrink away from long-term obligations.

2. Stocks. The two dimensions explaining differences in average equity returns appear to be related to company size and financial health. Exhibit 1 displays the differences in average returns calculated by Fama and French for large cap vs. small cap stocks and for value stocks vs. growth stocks. Value stocks are low-priced stocks, which are biased toward financially unhealthy companies. Growth stocks represent high-priced, financially healthy companies.

**Exhibit 1**

**Historical Simulation Results**

| | | Annual Compound Return (%) | Annual Standard Deviation (%) |
|---|---|---|---|
| 1964-2000 | Fama/French US Large Value Index | 14.28 | 17.83 |
| | S&P 500 Index | 11.90 | 15.92 |
| | Fama/French US Large Growth Index | 11.49 | 18.65 |
| 1964-2000 | Fama/French US Small Value Index | 15.66 | 25.89 |
| | CRSP 6-10 Index | 13.35 | 25.52 |
| | Fama/French US Small Growth Index | 10.15 | 30.40 |
| 1975-2000 | Fama/French International Value Index | 18.26 | 20.61 |
| | International Small Company Index | 18.07 | 27.44 |
| | MSCI EAFE Index | 13.69 | 20.58 |
| 1989-2000 | Fama/French Emerging Markets Value Index | 13.13 | 41.56 |
| | Fama/French Emerging Markets Index | 10.44 | 37.21 |
| | Fama/French Emerging Markets Growth Index | 8.74 | 36.04 |

In US dollars.

Fama/French indices courtesy of Fama/French.
S&P data courtesy of © Stocks, Bonds, Bills and Inflation Yearbook™, Ibbotson Associates, Chicago (annually updated works by Roger G. Ibbotson and Rex A. Sinquefield).
CRSP data courtesy of the Center for Research in Security Prices, University of Chicago.
MSCI data courtesy of Morgan Stanley Capital International.
International Small Company Index: Simulated by Dimensional from StyleResearch data; prior to July 1981, 50% UK Small Company Index courtesy of the London Business School and 50% Japan Small Company Index courtesy of Nomura Securities Investment Trust, Tokyo. The International Small Company Index is not available for direct investment and its performance does not reflect the expenses associated with the management of an actual portfolio.

In essence, risk is related to distress in an intuitively appealing way. Financially distressed companies have higher costs of capital than financially healthy companies. When they borrow from a bank, they pay higher interest rates. When they issue stock, they receive lower prices.

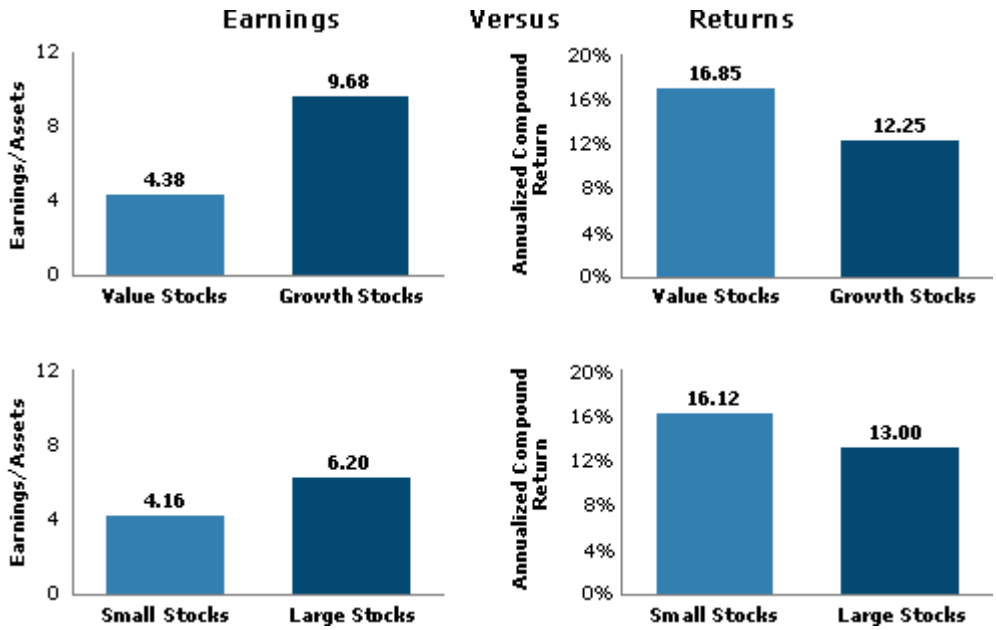
Cost of capital is the flip side of the coin from investment return. A firm's cost of capital is an investor's **expected return**. If a company sells off 20% of its stock, the investor gets a claim of 20% of the earnings forever. The return received by the investor is a return forgone by the company.

Exhibit 2 displays the negative relation between profitability and average stock returns. Value stocks and small cap stocks are less profitable than are growth and large cap stocks, but their returns are higher. It is hard to believe a stock market could behave any differently. What would the world be like if the largest, safest companies offered the highest average returns? The two dimensions of stock returns rightfully appear in all of the stock markets around the world.

**Exhibit 2**

## Company Size and Financial Strength

**Annual Data: 1964-2000**




Earnings/Assets through 1999 due to availability.

Data courtesy of Fama/French.

## The Fatal Flaw of Active Management

The positive relation between distress and returns drives a spike through the heart of active management. Not many active managers invest in companies with poor earnings prospects and poor management. But, these are the companies with high costs of capital and high expected returns. Much of the 140 basis point shortfall from active management could be due to their selling companies whose costs of capital have increased recently and buying companies whose costs of capital have declined recently.

Shifting risk levels to avoid distress also explains why the return for the average investor is less than the return for the average fund in which they invest, according to a Dalbar study. The average investor equity return is about 1,000 basis points (10%) per year lower than the S&P 500 Index.

Similarly, the relation between distress and returns causes problems for fund trustees. Expected stock returns tend to be highest when economic prospects look bleak, and lowest when economic prospects look bright. Trustees move in the opposite direction. When economic prospects worsen, stock prices drop and trustees want to reduce their equity commitments. They want to increase equity commitments when economic prospects look bright. The market has already discounted those prospects, so the timing of the equity commitment lowers average returns.

## Tax Considerations

For taxable investors, the case against conventional stock management is even stronger than it is for tax-exempt investors. With its high portfolio turnover rates, conventional active management generates a much larger portion of its returns in the form of taxable capital gains.

Index funds can be engineered to eliminate most capital gains distributions. An index fund holds all of the winners and losers. To the extent that it is forced to recognize a capital gain, there are usually ample

numbers of losers in a portfolio that can be sold to eliminate the capital gain. Sampling techniques can be used to eliminate much of the dividend income as well, without sacrificing total return.

Exhibit 3 displays the greater tax liability of active managers. Two of the best-performing funds have been Janus and Magellan. Once taxes are deducted, Morningstar reports that the after-tax return for the two funds is less than the after-tax return of Vanguard's S&P 500 Index Fund. If an index fund could eliminate the dividend income without reducing the total return, it would rank in the top 4% of funds over the last 15 years.

**Exhibit 3**

**Tax Effects on US Equity Mutual Funds**
**15 Years of Annualized Returns: 1986-2000**

| Fund Name | Pre-Tax Return | After-Tax Return | Difference |
|---|---|---|---|
| Janus | 17.23% | 13.79% | 3.14% |
| Magellan | 17.04% | 13.96% | 3.08% |
| Vanguard S&P 500 Index | 15.81% | 14.44% | 1.37% |
| Percentile Rank | 21 | 9 | |
| Vanguard S&P 500 Index assuming zero tax liability | 15.81% | 15.81% | 0.00% |
| Percentile Rank | 21 | 4 | |

Morningstar, January 2001; all 355 domestic equity funds with 15 years of return history.

## Random Drift

The research into investment return is concerned with whether conventional active management is a "fair game." Active management would be a fair game if the average actively managed fund return equaled the average benchmark index return.

Suppose active management were a fair game instead of a game that loses 140 basis points a year. Based on the agony of random drift, it would still not be a game worth playing.

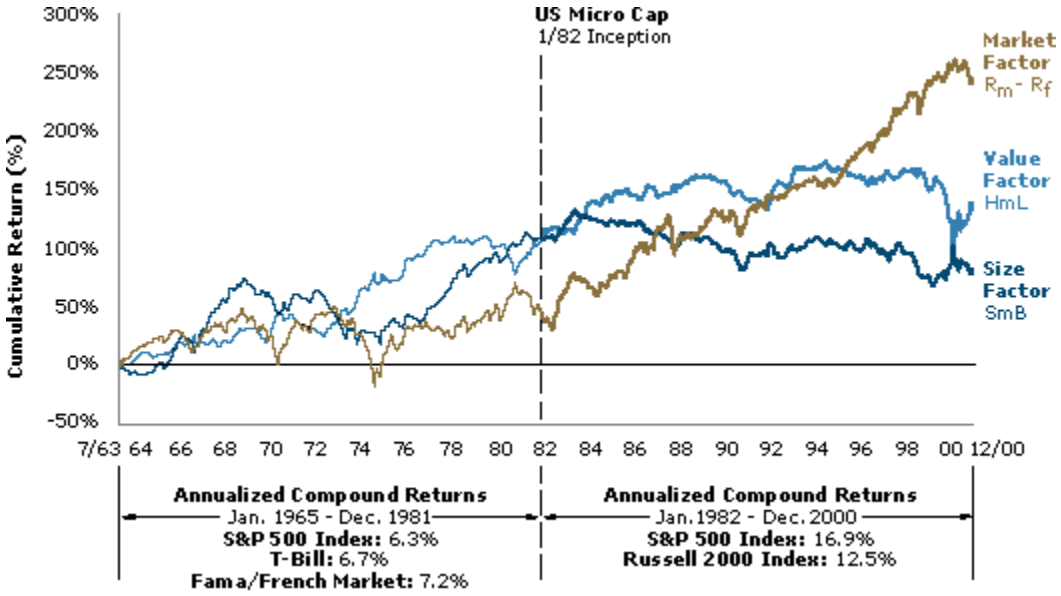
One example of a fair game is a coin-tossing gamble. Almost no one would wager millions of dollars on the flip of a coin, no matter how fair the flip. Similarly, it does not make sense to wager large sums of money on an active manager, whose performance is erratic at best, when an index fund closely tracks the performance target. For any year, the return for an equity fund can only be predicted to be within the S&P 500 return ± 7.5%, approximately equal to the standard deviation of S&P 500 returns. Even though drift is random, the volatility of active manager drift is almost half as large as the volatility of the stock market.

Exhibit 4 displays the performance of three equity risk factors developed by Fama and French: the market factor (Rm-Rf), the size factor (SmB), and the book-to-market factor (HmL). The random drift in returns for these factors is readily apparent. Note that the risk premium in stocks is negative for the 17-year period 1965-81. Investors often want to make decisions based on the most recent 5-year or 10-year period. Unfortunately for such investors, the magnitude of stock returns makes it difficult to make informed decisions over such short intervals.

**Exhibit 4**

## Three-Factor Cumulative Returns

**Monthly Data: July 1963-December 2000**




SmB is Small stock minus Big stocks.
HmL is High BtM (value) stocks minus Low BtM (growth) stocks.
Low BtM (growth) stocks.

Three-factor and Market data courtesy Fama/French.
S&P and T-Bill data courtesy of © Stocks, Bonds, Bills and Inflation Yearbook™, Ibbotson Associates, Chicago (annually updated works by Roger G. Ibbotson and Rex A. Sinquefield).
Russell data courtesy of Russell Analytic Services.

## Types of Index Funds

There has been a rapid increase in the development of index funds. The most popular type of index fund is the S&P 500 Index fund, which tracks the performance of the largest 500 US stocks. It is a large cap growth index. The international equivalent is the MSCI EAFE (Europe, Australia, and Far East) Index fund.

Based on the research into the dimensions of equity returns, we pioneered the development of small cap index funds as well as large cap, value, and the S&P 500 Index funds. These types of funds are also available in international markets, both developed and emerging.

Real estate appears to be a separate asset class, sufficiently different from the two dimensions of equity returns to justify a separate commitment. We offer an REIT index fund for investors wanting real estate exposure through marketable securities.

Fixed income can also be accessed through index funds. There are long-term, intermediate, and short-term funds. Almost all are high quality, because high-yield investing requires significantly more subjective decision-making.

## Asset Allocation: The Essence of Portfolio Management

In a nutshell, academic research points to asset allocation as the main emphasis of portfolio management. Expected portfolio returns are shaped by how much is invested in stocks vs. fixed income. The fixed income expected return is largely a function of the maturity and quality decisions. The stock portfolio expected return depends on the proportions invested in international vs. domestic stocks, in value vs. growth stocks, and in small cap vs. large cap stocks.

Exhibit 5 displays the asset allocation examples for clients willing to invest in all of the equity dimensions. The commitments to the index funds are constant, which solves the problem of adverse timing. With constant commitments, the portfolio adjustments force the discipline of investing more in an asset class after it has done poorly, when its expected return may have gone up.

**Exhibit 5**

## Balanced Strategies

**Portfolio Mixes**

| | Fixed | Conservative | Moderate | Normal | Aggressive | Equity |
|---|---|---|---|---|---|---|
| **Equity** | **0.0%** | **20.0%** | **40.0%** | **60.0%** | **80.0%** | **100.0%** |
| **US Stocks** | **0.0%** | **14.0%** | **28.0%** | **42.0%** | **56.0%** | **70.0%** |
| **Large Cap Market**<br>Enhanced US Large Company | 0.0% | 4.0% | 8.0% | 12.0% | 16.0% | 20.0% |
| **Large Cap Value**<br>US Large Cap Value | 0.0% | 4.0% | 8.0% | 12.0% | 16.0% | 20.0% |
| **Small Cap Market**<br>US Micro Cap | 0.0% | 2.0% | 4.0% | 6.0% | 8.0% | 10.0% |
| **Small Cap Value**<br>US Small Cap Value | 0.0% | 2.0% | 4.0% | 6.0% | 8.0% | 10.0% |
| **Real Estate Stocks**<br>Real Estate Securities | 0.0% | 2.0% | 4.0% | 6.0% | 8.0% | 10.0% |
| **International Stocks** | **0.0%** | **6.0%** | **12.0%** | **18.0%** | **24.0%** | **30.0%** |
| **Large Cap Value**<br>International Value | 0.0% | 2.0% | 4.0% | 6.0% | 8.0% | 10.0% |
| **Small Cap Market**<br>International Small Company | 0.0% | 1.0% | 2.0% | 3.0% | 4.0% | 5.0% |
| **Small Cap Value**<br>International Small Cap Value | 0.0% | 1.0% | 2.0% | 3.0% | 4.0% | 5.0% |
| **Emerging Markets Large**<br>Emerging Markets | 0.0% | 0.6% | 1.2% | 1.8% | 2.4% | 3.0% |
| **Emerging Markets Value**<br>Emerging Markets Value | 0.0% | 0.6% | 1.2% | 1.8% | 2.4% | 3.0% |
| **Emerging Markets Small**<br>Emerging Markets Small | 0.0% | 0.8% | 1.6% | 2.4% | 3.2% | 4.0% |
| **Fixed Income** | **100.0%** | **80.0%** | **60.0%** | **40.0%** | **20.0%** | **0.0%** |
| **One-Year Fixed Income** | 25.0% | 20.0% | 15.0% | 10.0% | 5.0% | 0.0% |
| **Two-Year Global Fixed Income** | 25.0% | 20.0% | 15.0% | 10.0% | 5.0% | 0.0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Five-Year Government** | 25.0% | 20.0% | 15.0% | 10.0% | 5.0% | 0.0% |
| **Five-Year Global Fixed Income** | 25.0% | 20.0% | 15.0% | 10.0% | 5.0% | 0.0% |

The purpose of including Exhibit 5 is to demonstrate that portfolio management is a sufficiently complicated task even when index funds are used. In some ways, the role of an investment committee is made more difficult, because it has to decide which asset classes should be indexed and how much to invest in each.

Once the asset mix is established, investing is less stressful. There is no second-guessing of the manager, because an index fund always provides the return of an asset class to within tight tolerances. There is no anxiety about market forecasting, because the proportion of the portfolio invested in each fund remains fixed.

In summary, logic and empirical evidence overwhelmingly favor an investment approach based on index funds. The returns are higher and the fees are lower. The returns of an asset class are assured. The discipline keeps the portfolio fully invested, thereby avoiding the adverse timing pitfall inherent in investment committees and active managers.

---

Carhart, Mark M. "On Persistence in Mutual Fund Performance." *Journal of Finance 52*, No. 1 (1997), 57-82.

Dalbar study. "Quantitative Analysis of Investor Behavior." *Fourth Quarter Update* (1996).

Davis, James L. "Mutual Fund Performance and Manager Style." *Financial Analyst Journal 57*, No. 1 (2001), 19-27.

Fama, Eugene F. and Kenneth R. French. "The Cross-Section of Expected Stock Returns." *Journal of Finance 47* (1992), 427-65.

Fama, Eugene F. and Kenneth R. French. "Size and Book-to-Market Factors in Earnings and Returns." *Journal of Finance 50* (1995), 131-55.

Quigley, Garrett and Sinquefield, Rex A. "Performance of UK Equity Unit Trusts." Journal of *Asset Management 1*, No. 1 (2000), 72-92.