

Broad-Capitalization Indexes of the U.S. Equity Market

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The effort to measure the performance of stock markets, as opposed to individual securities, is at least as old as Charles Henry Dow's pioneering average, first calculated in 1884. The first Dow Jones average was simply the average of the prices of 11 railroad stocks. This number was published daily, providing investors with a constantly updated barometer of the market.

Maybe the modern mind reads too much into the historical record, but it is tempting to conclude that the construction and popularity of this early market index reflected an awareness that trends in the market had a bearing on the prices of individual issues, and not just the other way around.¹

Between 1885 and today, by far the most important innovation in index construction has been that of the Standard Securities Corporation (later Standard & Poor's), which in 1923 constructed the first market capitalization-weighted index. This index, a composite of 223 securities, later evolved into the S&P 500.²

Such an index gives each company a weight in proportion to the total market value of its outstanding shares. Most of the market indexes in use today, and all those covered in this study, are market capitalization-weighted in one form or another. (The Dow Jones instead implicitly weights each company by its per share stock price; other weighting schemes, such as equal weighting, are found in a few other indexes. The principle of market capitalization weighting is so central to modern

index construction that we treat it in a separate section.)

Today, there are thousands of market indexes, representing every conceivable country, asset class, and investment style. While this abundance reflects the explosive growth of the investment industry and suggests a healthy emphasis on quantifying investment results and processes, it also makes differentiation among indexes more difficult.

This study is a guide to the uses and characteristics of the leading broad-capitalization indexes of equities in the United States. Indexes of non-U.S. equity markets are covered in Schoenfeld, Handley, and George [2000]. By broad-capitalization we mean that an index comprises stocks of all market capitalizations, or sizes—large, medium, and small—compared to a specialized index that measures stocks in only one size category.

The leading indexes in this category are (in descending order of number of stocks included): the Wilshire 5000, the Dow Jones U.S. Total Market Index, the Russell 3000, and the S&P 1500. Because the large-capitalization Russell 1000 and S&P 500 indexes are taken by many investors and investment managers to represent the market, we also discuss them, although they are not truly broad-capitalization.

USES OF INDEXES

Indexes may be used to, among other things, gauge market sentiment, measure per-

formance, develop index funds, and carry out asset allocation. All the principal broad-capitalization U.S. equity indexes give approximately the same indication of general market trends. Thus, the principal uses of indexes that motivate us to distinguish one index from another are:

- As benchmarks for actively managed funds.
- As portfolios (index funds).
- As proxies for asset classes in asset allocation.

Gauge of Sentiment

From the beginning, market indexes have been widely used to answer the question: “What is happening in the world at this minute?” As early users of the Dow Jones could appreciate, reducing the prices of diverse securities in a market to a single statistic is useful because it reveals the net effect of all factors at work in a market. These include not only hopes and fears specific to companies in the index, but also broader factors—war, peace, economic expansion and recession, and so forth—that can potentially impact share values.

Thus a frequently updated stock market index gives an indication of how well one’s home country is doing at a given time. This use is particularly notable in times of stress, such as when the Allies were faring poorly in World War II (stock indexes were extremely depressed), and when John F. Kennedy was assassinated (the strong rebound after the large one-day decline was taken as a sign that national confidence had not been destroyed).

Performance Measurement

One of the pleasing—and possibly unintended—uses of a market index is that it answers the question: “Did I beat the market?” Early on, the natural human desire to best one’s competitors surely must have motivated investors to compare their portfolio returns to index returns; the founding of an organized investment management profession in the 1920s prompted development of methods to make this comparison more accurate.

The modern science of performance measurement, evaluation, and attribution draws on the academic achievements of the 1960s—the capital asset pricing model and related work—in determining to what extent and why a particular portfolio beat or was beaten by a market index.

Index Funds

With the advent of the capital asset pricing model, and other theories suggesting it is difficult to beat the market on a risk-adjusted basis, market capitalization-weighted indexes turned out to be preadapted to an important and revolutionary new use: index funds.

By simply matching the holdings of a well-constructed index, a portfolio manager can provide the return on the index, net of expenses. In the long run, this asset class return, rather than value added through stock selection skill, forms the great majority of the gain from investing.³

Index fund management has become a big business. Many active investors—particularly the new breed of quantitative active, risk-controlled, and enhanced-index managers—use an index as their starting point, deviating from index weights according to the degree of conviction they have that a particular stock is more or less attractive than the market as a whole.

Asset Allocation

Finally, as asset allocation has come to the forefront of the practice of investing, analysts have studied the historical returns and other characteristics of indexes in an attempt to understand the behavior of the asset classes they represent. An index constructed on a consistent basis across time allows one to calculate long-run rates of return and to compare market levels at widely separated times.

In addition, investors use indexes to compare the risks of different asset classes, and to measure the changes in risk of a given asset class over time; to calculate correlations and gains from diversification among asset classes; and to perform other analysis relevant to determining investment policy.

MARKET CAPITALIZATION WEIGHTING

For several vitally important reasons, market capitalization weighting (cap weighting) is the central organizing principle of good index construction. The first and simplest reason is macroconsistency; if everyone held a market cap-weighted index fund, and there were no active investors, all stocks would be held with none left over. With other weighting schemes, it is mathematically impossible for all investors to hold the index. (Cap-weighted indexes include both float-adjusted and unadjusted variants, a distinction we develop in detail below.)

Second, market cap weighting is the only weighting scheme consistent with a buy-and-hold strategy. The manager of a full-replication fund needs to trade only to reinvest dividends, to keep pace with changes in the index constituents, and to reflect modifications in index weights caused by changes in the constituent companies' number of shares outstanding. (A full-replication fund holds every security in the index in proportion to its index weight; an optimized or sampled fund, which attempts to track an index using a subset of the securities in the index, may require more frequent rebalancing even if the fund is based on a cap-weighted index.) Indexes that are not cap-weighted require constant rebalancing due to ordinary changes in the prices of stocks.

Third, according to the capital asset pricing model (CAPM) of Sharpe [1964] and others, the cap-weighted market index is the only portfolio of risky assets that is mean-variance efficient. That is, no portfolio can be constructed with the same risk and a higher expected return, or with the same expected return and lower risk. If the CAPM conditions hold, all investors should hold only this portfolio, plus or minus positions in the riskless asset (because each investor must be able to choose his or her desired risk level).

The CAPM observation that the market portfolio is appropriate in greater or lesser amounts for everybody is one of the reasons that it is important that indexes be macroconsistent. Of course, the stringent conditions under which the CAPM was derived do not actually hold, and investors deviate from the index for many valid reasons, including a desire to boost returns through active management. Because of the special place that a cap-weighted index holds in capital market theory, though, such an index is a good baseline.

To better represent the shares available for purchase by the public, some index constructors remove closely held and illiquid shares in order to calculate a company's number of shares outstanding. In general, such a *float adjustment* makes an index more useful as a benchmark and as the basis for an index fund, since portfolio managers cannot typically buy shares held by founders, directors, employees, other corporations, and government bodies. (Government holding of corporate equities is a major consideration in many non-U.S. markets, although not in the U.S.)

While float adjustment conveys substantial advantages to an index, as we discuss later, it should not be considered a prerequisite of a well-constructed index.

OTHER CHARACTERISTICS OF A GOOD INDEX

We noted earlier that indexes are useful as benchmarks for active management, as the basis for index funds, and as proxies for asset classes in asset allocation. Ideally, one should choose an index that can be used for all three purposes simultaneously.

In selecting an index to use for one or more of these purposes, one must consider all the characteristics of the index and determine the fit with one's needs. No broad-cap U.S. equity index is perfect, so trade-offs are involved.

How should one choose among the competing alternatives? In addition to market capitalization weighting, which is a literal prerequisite of a good index, and which is common to all indexes covered here, there are at least seven criteria that are useful in identifying a good broad-capitalization benchmark for U. S. equities:

- Completeness.
- Investability.
- Objective, published rules.
- Accurate and complete data.
- Acceptance by investors.
- Availability of crossing opportunities, derivatives, and other tradable products.
- Low turnover and related transaction costs

Exhibit 1 rates each index by each criterion and defines some of the criteria in more detail. Some of the criteria have several components, so each index has more than seven ratings. All ratings are assessed on a scale from 1 to 5, where 5 is the highest rating.

Ratings are intended to be from the client's perspective, and clients include individual investors, sponsors of defined-contribution retirement plans, and traditional institutional investors (defined-benefit pension plans, endowments, and foundations).

Exhibit 2 compares the statistical characteristics of the indexes.

TRADE-OFFS INVOLVED IN INDEX CONSTRUCTION AND SELECTION

The trade-offs investors face relate to completeness versus investability, reconstitution and rebalancing frequency versus turnover, and objectivity versus judgment.

EXHIBIT 1

Ratings of Broad-Cap Indexes (5 = best)

	Wilshire 5000	Russell 3000	Dow Jones US TMI	S&P 1500	Russell 1000	S&P 500
Completeness of Index Coverage	5 (comprehensive)	4 (very broad)	4 (very broad)	3 (broad)	2 (mostly large-cap)	1 (only large-cap)
Investability of Stocks in Index	2 (many illiquid issues, no full-replication fund)	3 (full-replication funds exist)	3 (investable but no full-replication funds known)	3 (investable)	4 (readily investable)	5 (very readily investable)
Float Adjustment of Market Capitalization Weights	3 (not float-adjusted, except for some IPOs)	5 (yes)	5 (yes)	3 (no)	5 (yes)	3 (no)
Objective, Published Rules	4	5	5	1	5	1
Acceptance by Investors	4	4	1	1	4	5
Turnover and Related Costs	3	4	3	3	4	5
Investor Access to Index Funds, ETFs, and Derivatives	3 (Vanguard partial replication index fund)	3 (Institutional but not retail index fund; iShare ETF. Futures position can be created out of two component contracts)	2 (iShare ETF)	1 (None. Position can be created out of three component iShares)	4 (Index funds, ETFs, futures contract with limited liquidity)	5 (Index funds, ETFs, liquid futures contract)
Accuracy and Completeness of Data						
Public Web Availability of Daily Price Returns and Total Returns	4	5	3	3	5	3
Availability and Quality of Size and Style Subindexes	3 (style indexes do not sum to market)	5	3	2	5	2 (no size subindexes)
Constituent Lists, Stock Weights, and Stock Prices	4	4	5	4	4	4
Length and Quality of Historical Returns	3 (to 1971)	3 (to 1979)	2	1	3 (to 1979)	5 (to 1957 with predecessor index to 1920s)

EXHIBIT 2

Statistical Characteristics of Broad-Cap Indexes

	Wilshire 5000	Russell 3000	Dow Jones TMI	S&P 1500	Russell 1000	S&P 500
Number of Stocks	5,637	2,955	1,579	1,500	991	500
Total Market Cap of Index	10,160,084,865,615	8,989,393,568,283	8,865,970,840,083	9,135,504,639,742	8,389,336,332,140	8,107,401,639,445
Cap of Largest Company	276,411,465,000	241,984,723,850	242,269,618,850	276,411,465,000	241,984,723,850	276,411,465,000
Cap of Smallest Company	47,655	3,789,600	61,245,402	39,165,450	120,150,300	279,286,320
Average Market Capitalization	1,802,392,206	3,042,095,962	5,614,927,701	6,090,336,426	8,465,526,067	16,214,803,279
Median Market Capitalization	119,125,440	401,358,550	1,330,981,650	1,240,030,760	2,449,826,180	7,706,180,340
Weighted Average Market Cap	62,747,682,163	61,148,735,317	61,699,861,133	68,299,843,182	65,485,068,488	76,709,263,455
*Russell and Dow Jones numbers reflect float adjusted market capitalization.						
Fundamental Characteristics						
Dividend Yield	1.71	1.82	1.8	1.73	1.84	1.81
Beta	1.00	1.00	1.02	0.99	1.01	0.99
Price/Book Ratio	2.286	2.361	2.38	2.465	2.467	2.559
Price/Earnings Ratio	23.6	22.7	23	22.6	21.9	22.4
* Beta calculated relative to the S&P 500 over the 60 month period ending 12/31/2002.						
Consumer Discretionary	14.67	13.29	13.19	13.93	13.27	13.45
Consumer Staples	8.41	8.76	8.84	8.97	9.13	9.48
Energy	5.88	5.75	6.26	6.12	5.86	6
Financials	22.19	21.67	21.04	20.1	21.59	20.45
Health Care	14.28	15.24	15.09	14.64	15.42	14.93
Industrials	11.11	11.01	11.26	11.96	10.7	11.53
Information Technology	13.9	14.12	14.2	14.17	13.88	14.29
Materials	3.02	3.09	3.04	3.06	2.95	2.83
Telecomm Services	3.53	3.82	3.85	3.77	4.01	4.19
Utilities	3.01	3.25	3.23	3.28	3.2	2.85

Completeness versus Investability

From a purely theoretical standpoint, the ideal index includes every security in its asset class. No one knows exactly how many stocks there are in the United States, but the Wilshire 5000, so named because it was originally composed of 5,000 stocks, included 5,637 stocks as of December 31, 2002, and thus includes more issues than any other widely distributed U.S. equity index.⁴

Many of the smaller stocks in the Wilshire 5000 are illiquid, so investors have a difficult time trading them. No full-replication index fund has ever been constructed for the Wilshire 5000.

For these reasons, a somewhat less broad index is more investable and accessible. By an “investable index,” we mean that the stocks in the index can be bought and sold by the fund manager in a volume sufficient to construct a full-replication index fund, or one that is nearly full replication, without incurring high transaction costs or unusual delays due to illiquidity of index constituents.

We consider a particular index to be accessible to investors to the extent that the index is the basis for current index funds and exchange-traded funds (ETFs). We also regard access to an index through derivatives (futures and options) as desirable, but less important than access through index funds and ETFs.

The Russell 3000 index, with 3,000 stocks, specifically excludes the smallest and most illiquid issues, so that all or nearly all of its capitalization can be held efficiently through full replication. This index is the broadest of the well-known, widely distributed indexes that exclude illiquid, hard-to-trade stocks.

Narrower U.S. equity indexes that are still considered broad-cap, such as the Dow Jones U.S. Total Market Index and the S&P 1500, are also investable.

Reconstitution Frequency versus Turnover

Reconstitution, which is the process of periodically deciding which stocks meet the criteria for inclusion in an index, is a source of turnover (which is costly to investors) because the manager must trade to keep pace with changes in index content. Because timely reconstitution is what enables an index to accurately track the asset class it is designed to represent, there is a trade-off between such accuracy and trading cost.

Turnover due to reconstitution is a major concern for managers of small-cap and style indexes, where companies with a large weight in the index are constantly

crossing the size or style boundary that qualifies them for inclusion. For this reason, the constructors of size and style indexes tend to reconstitute them at regular and rather infrequent intervals, such as quarterly or annually. The holdings lists of broad-cap indexes are much more stable, so that continuous reconstitution (as with the Wilshire 5000, the S&P 1500, and the S&P 500), while not necessarily ideal, is not a terrible burden on investors or managers.

Reconstitution-related transaction costs are primarily a burden for small- and mid-cap indexes, and for style-specific indexes, which are outside the scope of this study. In these indexes, companies with large weights in the index frequently cross the boundary that qualifies them for inclusion. Broad-cap indexes, in contrast, experience turnover mostly in their smallest-cap stocks, making turnover less of a problem when measured by the weight in the index of the stocks being traded. Nonetheless, turnover is costly, whatever its source or volume, and a cost advantage accrues to indexes that have less of it.

Indexes that have no fixed limit on the number of stocks, and that are all-inclusive in terms of their capitalization range, have a small but non-trivial advantage over indexes with a fixed number of stocks. This is because an all-inclusive index gains or loses stocks only because of new listings, delistings, and other changes in the identity of the stocks in the market.⁵ The holdings of a fixed-count index, in contrast, typically also change to reflect shifts in the capitalization rankings of stocks that occur as their prices fluctuate.

Of the indexes we cover, the only all-inclusive one is the Wilshire 5000; those with a fixed number of stocks are the Russell 3000 and S&P 1500. These latter indexes tend to experience higher turnover and consequently higher transaction costs. The Dow Jones U.S. Total Market Index is nearly all-inclusive, and behaves more like an all-inclusive index than a fixed-count one.

Rebalancing Frequency versus Turnover

Rebalancing, which is different from reconstitution, is the process of adjusting the weights of stocks in an index for changes in the number of shares outstanding. Taking account of changes in the number of shares outstanding maintains the macroconsistency and mean-variance efficiency of an index. A theoretically ideal index continually updates the number of shares that a company has issued, but there is a trade-off involved: The index fund manager must rebalance to reflect these changes, imposing

transaction costs on the investor.

Thus index constructors typically decide on a pre-arranged schedule for updating shares outstanding data, so that changes in the index are somewhat predictable and index fund managers can decide how to rebalance. Active managers benchmarked to the index likewise find it useful to be able to predict changes in index contents.

Objective Rules versus Judgment

Some broad-cap indexes of the U.S. equity market are constructed using rules that are reasonably objective, while others are constructed using judgment. The advantage of objective rules is that any investor with access to the relevant data can predict, more or less accurately, what stocks will be added to and deleted from the index. This enables investors to trade in anticipation of (rather than in reaction to) additions and deletions, and in general to manage the index replication process in an orderly and efficient manner. Active managers also find it useful to be able to predict what will be in the index to which they are benchmarked.

The use of judgment in selecting stocks for an index, however, enables the index constructor to achieve certain traits that cannot be achieved with objective rules, and that constructors of judgment-based indexes claim are desirable. Standard & Poor's, which uses judgment in selecting stocks for its S&P 500 and S&P 1500 indexes, asserts that its indexes are superior in terms of stability, accurate representation of the industry distribution of the economy, and other attributes. The S&P indexes can achieve these traits specifically because the index construction staff need not act mechanically in selecting and removing stocks, and can take conscious steps to construct an index with the desired characteristics.

Thus there is a trade-off between the clarity and predictability of a rule-based index and the flexibility of a judgment-based index.

HISTORY OF BROAD-CAP INDEXES AND THE CAPITALIZATION WARS

Broad-capitalization indexes, in the sense of indexes consciously designed to capture all capitalization strata of the stock market, are a relative newcomer to the investment scene. The original Dow Jones averages (that is, the Dow Jones Industrial, Transportation, and Utilities Averages) tend to include only the largest-cap stocks. The S&P indexes, which date from 1923, are concentrated in larger

issues, although they are obviously broader (simply because the constituents are more numerous) than the original Dow averages.

Alfred Cowles

The first broad-cap index was a historical reconstruction, not a current-time indicator of the market. In the late 1930s, Alfred Cowles, a Yale professor, collected monthly price, shares outstanding, and dividend data on all New York Stock Exchange-listed stocks over the period from 1871 to 1937, and from this information he constructed cap-weighted price return and total return indexes (see Cowles et al. [1938]). The index was broad-cap because the New York Stock Exchange lists stocks having a wide range of capitalizations. While American Stock Exchange and over-the-counter stocks (not represented here) are much smaller on average, the NYSE has plenty of small-cap issues.

Unfortunately Cowles's individual-stock data were not kept, so that the differential performance of specific groups of stocks (including size groups) could not be measured. Cowles's surviving work is useful mainly for the information it provides on the rates of return, and variability of the returns, provided by stocks over this long historical period.

Fisher and Lorie, CRSP, and Discovery of the Small-Stock Effect

The second major attempt at constructing a broad-cap stock index was also a historical reconstruction. This time it is more fruitful for us, because the individual-stock data have been retained, enabling subsequent generations of researchers to mine the information. Like Cowles, the University of Chicago professors Lawrence Fisher and James Lorie [1964, 1977] constructed cap-weighted, price return, and total return indexes of all NYSE stocks.

While their starting date of 1926 has achieved almost iconic meaning in the investment community, they chose their date simply because they wanted to capture a full bull market cycle before the crash of 1929. American Stock Exchange (ASE) and over-the-counter (by then called Nasdaq) stocks were eventually added, expanding the small-cap coverage.

Fisher and Lorie founded the Center for Research in Security Prices (CRSP) at the University of Chicago to continue the collection of data and to distribute computer tapes including all the individual stock information

as well as the broad indexes. In the late 1970s, Rolf Banz [1981] and Marc Reinganum [1981] independently found from their analysis of the CRSP tapes that the quintile of stocks on the NYSE of the smallest capitalization had a long-run return some 5 percentage points per year higher than the stocks of the largest capitalization. Astonishingly, the higher return was attributable not to the higher beta, or systematic risk, of the smaller stocks, but rather appeared to represent a true anomaly controverting market efficiency and the capital asset pricing model.

One could beat the broad market, it seemed, by buying small-cap stocks.⁶

Ibbotson and Sinquefeld

Drawing on the work of Banz and Reinganum, Ibbotson and Sinquefeld [1982] highlighted for the first time in a widely published work the wide difference between the returns of large and small stocks. As their proxy for large stocks, they chose the S&P 500; for small stocks, they used the bottom quintile of NYSE stocks as ranked by capitalization.⁷

Ibbotson and Sinquefeld chose these extreme portfolios because they were trying to measure the small-stock premium, a task made easier by constructing portfolios of stocks as different as possible from each other in terms of capitalization. The stocks in the bottom quintile of the NYSE are small indeed; the largest stock in that quintile had a capitalization of \$193 million as of September 30, 2000.

The wide dissemination of the Ibbotson and Sinquefeld studies has caused many investors to regard “small stocks” as defined by the fifth (smallest) quintile of NYSE stocks, as well as similar-sized non-NYSE issues—even though stocks this small are rarely a significant portion of any investor’s portfolio.

Capitalization Wars: Barbell versus Broad-Cap

The popularity of the Ibbotson and Sinquefeld studies, and the identification of small-cap stocks with the fifth NYSE quintile (and similar-sized non-NYSE stocks), has had the effect of encouraging a “barbell” strategy: the holding of the largest- and smallest-cap stocks, with little in between. Investors continue to hold the bulk of their assets in the market leaders that are represented by the S&P 500, but seek to boost their returns by taking advantage of the small-cap effect, which they seem to believe could be captured only by holding the smallest issues.

When small stocks are defined as the NYSE fifth quintile and similar-sized Nasdaq and ASE companies, this approach is unwieldy because of liquidity and capacity limitations. There simply are not enough small stocks, thus defined, to support the appetite of large institutional investors for these securities.

Therefore, the definition of small stocks for the purpose of asset allocation has drifted toward larger issues, often represented by the Russell 2000 index, which seems to be the dominant small-cap benchmark. The Russell 2000 gained early dominance as a small-cap benchmark because it captures a segment of the market that is actually investable, while it is still small in capitalization, although representing much larger stocks than the fifth NYSE quintile.

For some investors, the barbell configuration survives. Large stocks are held in portfolios that are benchmarked to the S&P 500, and small stocks held in portfolios benchmarked to the Russell 2000.

Such investors, seeking to maximize returns by capturing the small-stock premium, often hold more than the market weight in the Russell 2000 component. Some defined-benefit pension plan sponsors, for example, are known to hold three to five times the market cap weight in small stocks. This configuration leaves mid-cap stocks underrepresented.

The Broad-Cap Approach

Another way to think about allocating across the various capitalization strata of the stock market is to construct a broad-cap index and then break it into pieces by capitalization. If investors have no beliefs about the superiority of any particular capitalization segment, they should then hold a market-weighted combination of them (that is, hold the broad-cap index). This represents the *null hypothesis*, that no investment category is inherently and naturally superior to any other. Alternatively, investors can choose their own weights for the pieces, deviating from market weights according to preferences and performance expectations for each piece.⁸

The historically common barbell approach can thus be understood as a special case of the broad-cap approach, where the weight for small stocks is boosted (and the weight for mid-cap stocks dropped to zero), because the investor believes that a small-stock premium is obtained by investing in the smallest issues. The barbell and broad-cap approaches, then, do not represent irreconcilable opposites. The barbell is simply a reweighting of the broad-

cap approach, based on a strong view of small stocks as offering superior risk-adjusted returns.

Development of Broad-Cap Indexes

Of the broad-cap indexes, the Wilshire 5000 was the first to be constructed. It is designed to capture the return and wealth behavior of the entire U.S. market portfolio, not as the basis for an index fund—thus its relative lack of investability. The Russell indexes, which came later and which are constructed for performance evaluation rather than specifically for indexing, are nevertheless well adapted to index fund management.

The Russell 2000 came to be dominant in the smaller-cap segment of the market because it is not quite as far down the capitalization spectrum as other indexes. It was in existence in the 1980s when a strong need for such an index first arose; its float adjustment is regarded as appropriate; and the index is well supported (with clear construction rules and readily available data).

Realizing that it had the oldest and best-known brand name in market averages but no market cap-weighted index that one could use to build an index fund or derivatives contract, Dow Jones & Company recently introduced its suite of global indexes, including the Dow Jones U.S. Total Market Index, initiated in February 2000. At least in part because of the wide readership of *The Wall Street Journal*, which is published by Dow Jones and which highlights the company's new global indexes, awareness of the indexes has quickly grown.

The S&P 1500, another relative newcomer, was constructed by accretion to the S&P 500. First the S&P MidCap 400 Index was developed, and then the S&P SmallCap 600. Returns on the three indexes sum to the S&P 1500, or SuperComposite.

INDEXING VERSUS ACTIVE MANAGEMENT

The advent of index funds in the 1970s, and their success in obtaining market share in the 1980s and 1990s, is a direct consequence of the spread of academic knowledge to investment practitioners. Even if the market is not efficient, Sharpe [1991] reasons, the return of all investors must sum to the market return by simple arithmetic.⁹

Thus active management is a zero-sum game, and investors should not expect to beat the market simply because they are selecting managers that are active. In an inefficient market, some managers will have the skill to beat the market, but it is incumbent on the investor to

figure out which ones, and this has historically not been an easy task.

If the market were completely efficient, then even the effort to select winning active managers would be futile. Investors in an efficient market could simply choose their risk level, and then index to the mix of asset classes that provide that risk level.

Of course, markets are not perfectly efficient, and some active managers have provided substantial alphas (excess returns). A few managers have sustained these over long periods. Goetzmann and Ibbotson [1994] show (using mutual fund data) that there is a distinct, although not powerful, tendency for winning active managers in a given period to repeat their favorable performance in the next period. Some researchers have found that this result does not hold if one controls for investment style, fees and transaction costs, and other variables, so a winners-repeat effect is an unresolved question (see, for example, Kahn and Rudd [1995]).

Some commentators have portrayed the conflict between active and index fund investors as a war of ideas. As in the heliocentric versus geocentric theory of the solar system, only one can be right. The reality, however, is different, as both active and index management styles may have an important role in the portfolio. The risk and return characteristics of the investor's overall portfolio can be manipulated to achieve the desired objectives (including the satisfaction of risk budgets) by using an optimizer to combine active and index components.

In other words, the investor's central concern should be to construct a portfolio with the desired characteristics, potentially including active risk as discussed below—not to resolve a tug of war between competing categories of investment advisors. Scanlan, Enderle, and George [2002] discuss this issue in greater depth.

To put this insight into practice, Waring et al. [2000] propose a framework, called “manager structure optimization,” that combines index and active strategies in a unified way. Rather than weighting active and index management styles according to the investor's evaluation of the intellectual merits of the active versus index debate, one should optimize residual return (alpha) against residual risk (the standard deviation of the alpha term) across both kinds of managers. Such an optimization requires the investor's estimates of each manager's expected payoff (after costs) for taking residual risk, as well as an estimate of the investor's aversion to residual risk, which the authors suggest is likely to be many times higher than for market or systematic risk.

An investor who believes 1) that some managers have predictable alphas, and 2) that he or she has the skill to identify such managers, will choose at least some active managers in this approach. For such an investor, the framework makes the mix of active and index managers mean-variance efficient.¹⁰

This approach often leads those who have traditionally invested with only higher residual risk active managers to adopt a mix that is one-third to two-thirds core (where core means index funds or low residual risk active funds).

The markets of the late 1990s, when the valuations of some stocks (particularly technology and telecommunications companies) far exceeded those in other industries, not to say historical norms, caused some observers to question whether indexing still makes sense. The precipitating cause of this doubt is the observation that unseasoned companies, with little or nothing in the way of earnings or even sales, had achieved great weight in market cap-weighted indexes. When the market fell in 2000–2001, many of these companies had especially poor returns, and broad-cap indexes underperformed active managers on average (for the first time in a while).

Do events like this make index investing a poor idea? Not in our view. The observation that it is sometimes easy to beat the index by avoiding obviously overpriced stocks is just another way of advocating active management or value investing—enterprises that we support.¹¹ We would also point out that, despite the evidence of periods when active managers tended to beat their benchmarks, they have not done so on average in the long run.

Moreover, it is not necessarily obvious a priori that a stock is overpriced, even if its capitalization is large relative to earnings, sales, or other indicators of the company's value. The market price typically (but not always) reflects the decisions of investors who have considered a company's growth prospects and other fundamentals, and who have compared that company to other investment opportunities. Sometimes a high price is a fair price.

CHOOSING AN INDEX

The generally accepted criteria used to choose a broad-cap index depend somewhat on whether the index is to be used as a benchmark for active management, as a portfolio (index fund), or as a proxy for an asset class in asset allocation. Keep in mind that the best index is one that can be used for all three purposes simultaneously, so that one does not have to keep switching among indexes depending on one's purpose at a particular time.

Selecting an Asset Class Proxy

Some investors want the broadest possible index (such as the Wilshire 5000) because they want the theoretically ideal “market portfolio” or because measures of aggregate wealth figure into their decision-making. Breadth, however, should not be the sole deciding factor.

All the true broad-cap indexes we have discussed have essentially the same historical and expected returns, as well as risk and correlation characteristics. Given this, other criteria are more important. One should, for example, favor an index that has the longest and most accurate history, as well as features like style and size subindexes, fundamental data, and industry and individual-company returns that are important in one's approach to studying asset classes.

It is important, of course, that the selected index be representative of the asset class it is intended to represent. The S&P 500, for example, is not a broad-cap index and should not be used as a proxy for the full spectrum of U.S. stocks.

Selecting an Active Benchmark or Index Fund

When one is actually investing money, operational issues come to the fore in selecting an index. The criteria for selecting an active benchmark and for selecting an index fund are closely related, because if one had no views on any stock, the active portfolio would presumably be identical to the index fund.

The one difference is that active managers need more detail (including fundamental, industry, and company data), so they can evaluate bets made against the index and conduct performance attribution studies.

Float Adjustment

The importance of float adjustment has not historically been recognized, but this is quickly becoming a prominent issue in evaluating indexes. Closely held stock and cross-holdings amount to 50% to 80% of many small, illiquid issues. The proportion is frequently higher for emerging company stocks that are primarily issued to founders, employees, and venture capitalists on a restricted basis. If an index fund manager is required to hold the full (not float-adjusted) index weight in such a stock, the supply of shares may be exhausted if assets under management in the index are great. (The same caution applies to an active manager if the stock is on the buy list.)

Yet if the manager does not or cannot hold the full weight, a great deal of tracking error relative to the full-weight index is introduced, because these stocks typically have high volatility as well as a large weight in the index (before float adjustment) if the company has achieved high capitalization.

Thus, the advantage of making the float adjustment—that it makes an index more macroconsistent—moves quickly from theoretical to practical importance with these small-float companies. The greater the proportion of illiquid and closely held stock, the more difficult it is for an index fund manager to obtain a full market-cap proportion. Schoenfeld, Handley, and George [2000] point out that there is a trade-off here too. An index that makes precise float adjustments, and that keeps them up to date, will experience higher turnover (and thus higher transaction costs) than a full-float index.

A closely related criterion is the exclusion of illiquid issues. For the same reason that it is difficult to track an index that includes stocks having a limited float, it is also difficult to track an index that includes thousands of small, illiquid issues. While the illiquid issues included in the Wilshire 5000 but excluded from other indexes such as the Russell 3000 and Dow Jones U.S. Total Market Index are individually small, the large number of such stocks causes them to add up to a significant amount of capitalization. Thus we would counsel investors to use indexes constructed with a conscious liquidity screen, or else indexes that do not need one because they do not go that far down the capitalization scale.

Other Operational Issues

Investors should choose an index that is easy to use. Some indexes are better supported by the index provider than others. For example, some of the public websites providing return and constituent data are more complete, timely, and convenient than others. As we note earlier, the establishment of clear, objective, and widely disseminated rules for stock addition and deletion (and for other index maintenance actions) makes it more practical to manage the fund to the index, or to use the index as a benchmark. By this criterion, the S&P 1500 is less desirable than the other broad-cap indexes.

Finally, all other factors equal, a high degree of acceptance by the broad investment community makes an index more useful and valuable.

ENDNOTES

A version of this article with more detailed tables of index characteristics was published in May 2002 in *Investment Insights* (Vol. 5, no. 2), a Barclays Global Investors publication, and can be obtained by request from Matthew Scanlan (Matthew.Scanlan@barclaysglobal.com).

¹By “the market,” we mean, technically speaking, the expected cash flows from the corporate sector, and the discount rate at which those cash flows are reduced to a present value by investors (reflecting the systematic risk to which those cash flows are subject).

²To be precise, the original index included 233 stocks in 26 industry groups, but a narrower index, the S&P 90-Stock Composite Index (consisting of 50 industrial, 20 railroad, and 20 utilities), was the direct predecessor of the S&P 500, which started on March 1, 1957. The Ibbotson and Sinquefeld and Ibbotson Associates studies link the S&P 90, from January 1, 1926, through February 28, 1957, with the S&P 500, from March 1, 1957, through the present, to form one continuous series representing large-capitalization stocks. All three indexes—the original S&P with 233 stocks, the S&P 90, and the S&P 500—are market capitalization-weighted. See Ibbotson and Sinquefeld [1976] and *Stocks, Bonds, Bills, and Inflation* [2002].

³The trust department of Wells Fargo Bank, the predecessor organization of BGI, is widely credited with developing the first index fund between 1970 and 1973. See Jahnke [1990].

⁴The Wilshire 5000 does not include all U.S. publicly traded securities. Standard & Poor's maintains an internal equity database, but not an index, that as of December 31, 2001, included 8,579 U.S. common issues (including NYSE, ASE, Nasdaq National Market, and Nasdaq Small Cap issues), plus 1,476 ADRs and foreign stocks traded in the U.S., for a total of 10,055 common stocks. Dow Jones's internal database, of which its U.S. Total Market Index represents 95% by capitalization, included 5,908 stocks as of September 2001.

⁵Including changes due to mergers, acquisitions, spin-offs, and so forth.

⁶For a review of the literature on the small-capitalization stock premium, including an account of its discovery, see Clothier, Waring, and Siegel [1998].

⁷In updates of their initial study, Ibbotson and Sinquefeld (and Ibbotson Associates) constructed a small-cap index consisting of the fifth (smallest) quintile of NYSE stocks, plus Nasdaq and ASE stocks in the same capitalization range as the NYSE quintile.

⁸Ibbotson Associates eventually came around to this view. The last few years' *Stocks, Bonds, Bills, and Inflation Yearbooks* emphasize the broad-cap approach, using the CRSP indexes, which sort the stock market into deciles by capitalization and present returns and other data for each decile. CRSP indexes cannot be used as benchmarks for portfolio management because they are not updated on a real-time basis.

⁹The concept of active management as a zero-sum game is much older, but the Sharpe [1991] article is the best presentation of it.

¹⁰By “mean-variance efficient” in this case, we mean that each point on the efficient frontier maximizes the mean (expected) *residual* return, or alpha, for each level of *residual* risk (standard deviation of alpha).

¹¹See Waring et al. [2000] for a discussion of methods that integrate active and index investing into a unified portfolio strategy. By the way, value investing need not involve active management; it could mean holding a value-style *index* fund.

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