

From the Board

The Arithmetic of Active Management

by William F. Sharpe, Timken Professor Emeritus of Finance, Stanford University, and Chairman, William F. Sharpe Associates

"Today's fad is index funds that track the Standard & Poor's 500. True, the average soundly beat most stock funds over the past decade. But is this an eternal truth or a transitory one?"

"In small stocks, especially, you're probably better off with an active manager than buying the market."

"The case for passive management rests only on complex and unrealistic theories of equilibrium in capital markets."

"Any graduate of the ___ Business School should be able to beat an index fund over the course of a market cycle."

Statements such as these are made with alarming frequency by investment professionals.¹ In some cases, subtle and sophisticated reasoning may be involved. More often (alas), the conclusions can only be justified by assuming that the laws of arithmetic have been suspended for the convenience of those who choose to pursue careers as active managers.

If "active" and "passive" management styles are defined in sensible ways, it *must* be the case that

- (1) before costs, the return on the average actively managed dollar will equal the return on the average passively managed dollar and
- (2) after costs, the return on the average actively managed dollar will be less than the return on the average passively managed dollar.

These assertions will hold for *any* time period. Moreover, they depend *only* on the laws of addition, subtraction, multiplication and division. Nothing else is required.

Of course, certain definitions of the key terms are necessary. First a *market* must be selected—the stocks in the S&P 500, for example, or a set of "small" stocks. Then each investor who holds securities from the market must be classified as either *active* or *passive*.

- A *passive investor* always holds every security from the market, with each represented in the same manner as in the market. Thus if security X

represents 3 per cent of the value of the securities in the market, a passive investor's portfolio will have 3 per cent of its value invested in X. Equivalently, a passive manager will hold the same percentage of the total outstanding amount of each security in the market.²

- An *active investor* is one who is not passive. His or her portfolio will differ from that of the passive managers at some or all times. Because active managers usually act on perceptions of mispricing, and because such perceptions change relatively frequently, such managers tend to trade fairly frequently—hence the term "active."

Over any specified time period, the *market return* will be a weighted average of the returns on the securities within the market, using beginning market values as weights.³ Each passive manager will obtain precisely the market return, before costs.⁴ From this, it follows (as the night from the day) that the return on the average actively managed dollar *must* equal the market return. Why? Because the market return must equal a weighted average of the returns on the passive and active segments of the market. If the first two returns are the same, the third must be also.

This proves assertion number 1. Note that only simple principles of arithmetic were used in the process. To be sure, we have seriously belabored the obvious, but the ubiquity of statements such as those quoted earlier suggests that such labor is not in vain.

To prove assertion number 2, we need only rely on the fact that the costs of actively managing a given number of dollars will exceed those of passive management. Active managers must pay for more research and must pay more for trading. Security analysts (e.g., the graduates of prestigious business schools) must eat, and so must brokers, traders, specialists and other market-makers.

Because active and passive returns are equal before cost, and because active managers bear greater costs, it follows that the after-cost return from active management *must* be lower than that from passive management.

This proves assertion number 2. Once again, the proof is embarrassingly simple and uses only the most rudimentary notions of simple arithmetic.

Enough (lower) mathematics. Let's turn to the practical issues.

Why do sensible investment professionals continue to make statements that seemingly fly in the face of the simple and obvious relations we have described? How can presented evidence show active managers beating "the market" or "the index" or "passive managers"? Three reasons stand out.⁵

1. Footnotes appear at end of article.

- First, the passive managers in question may not be truly passive (i.e., conform to our definition of the term). Some index fund managers "sample" the market of choice, rather than hold all the securities in market proportions. Some may even charge high enough fees to bring their total costs to equal or exceed those of active managers.
- Second, active managers may not fully represent the "non-passive" component of the market in question. For example, the set of active managers may exclude some active holders of securities within the market (e.g., individual investors). Many empirical analyses consider only "professional" or "institutional" active managers. It is, of course, possible for the average professionally or institutionally actively managed dollar to outperform the average passively managed dollar, after costs. For this to take place, however, the non-institutional, individual investors must be foolish enough to pay the added costs of the institutions' active management via inferior performance. Another example arises when the active managers hold securities from outside the market in question. For example, returns on equity mutual funds with cash holdings are often compared with returns on an all-equity index or index fund. In such comparisons, the funds are generally beaten badly by the index in up markets, but sometimes exceed index performance in down markets. Yet another example arises when the set of active managers excludes those who have gone out of business during the period in question. Because such managers are likely to have experienced especially poor returns, the resulting "survivorship bias" will tend to produce results that are better than those obtained by the average actively managed dollar.
- Third, and possibly most important in practice, the summary statistics for active managers may not truly represent the performance of the average actively managed dollar. To compute the latter, each manager's return should be weighted by the dollars he or she has under management at the beginning of the period. Some comparisons use a simple average of the performance of all managers (large and small); others use the performance of the median active manager. While the results of this kind of comparison are, in principle, unpredictable, certain empirical regularities persist. Perhaps most important, equity fund managers with smaller amounts of money tend to favor stocks with smaller outstanding values. Thus, *de facto*, an equally weighted average of active manager returns has a bias toward smaller-capitalization stocks vis-a-vis the market as a whole. As a result, the "average active manager" tends to be beaten badly in periods when small-capitalization stocks underperform

large-capitalization stocks, but may exceed the market's performance in periods when small-capitalization stocks do well. In both cases, of course, the average actively managed dollar will underperform the market, net of costs.

To repeat: Properly measured, the average actively managed dollar must underperform the average passively managed dollar, net of costs. Empirical analyses that appear to refute this principle are guilty of improper measurement.

This need not be taken as a counsel of despair. It is perfectly possible for *some* active managers to beat their passive brethren, even after costs. Such managers must, of course, manage a minority share of the actively managed dollars within the market in question. It is also possible for an investor (such as a pension fund) to choose a set of active managers that, collectively, provides a total return better than that of a passive alternative, even after costs. Not all the managers in the set have to beat their passive counterparts, only those managing a majority of the investor's actively managed funds.

An important corollary is the importance of appropriate *performance measurement*. "Peer group" comparisons are dangerous. Because the capitalization-weighted average performance of active managers will be inferior to that of a passive alternative, the former constitutes a poor measure for decision-making purposes. And because most peer-group averages are not capitalization-weighted, they are subject to additional biases. Moreover, investing equal amounts with many managers is not a practical alternative. Nor, *a fortiori*, is investing with the "median" manager (whose identity is not even known in advance).

The best way to measure a manager's performance is to compare his or her return with that of a *comparable passive alternative*. The latter—often termed a "benchmark" or "normal portfolio"—should be a *feasible* alternative identified *in advance* of the period over which performance is measured. Only when this type of measurement is in place can an active manager (or one who hires active managers) know whether he or she is in the minority of those who have beaten viable passive alternatives.

Footnotes

1. The first two quotations can be found in the September 3, 1990 issue of *Forbes*.
2. When computing such amounts, "cross-holdings" within the market should be netted out.
3. Events such as mergers, new listings and reinvestment of dividends that take place during the period require more complex calculations but do not affect the basic principles stated here. To keep things simple, we ignore them.
4. We assume here that passive managers purchase their securities before the beginning of the period

in question and do not sell them until after the period ends. When passive managers do buy or sell, they may have to trade with active managers; at such times, the active managers may gain from the passive managers, because of the active man-

agers' willingness to provide desired liquidity (at a price).

5. There are others, such as differential treatment of dividend reinvestment, mergers and acquisitions, but they are typically of less importance.

Ten Commandments of Financial Statement Analysis

by William H. Beaver, Joan E. Horngren Professor of Accounting, Graduate School of Business, Stanford University

Individuals must pass a proficiency test before obtaining a driver's license. By contrast, investors need not pass any proficiency test before trying to use financial statements as part of their investment analysis. Investors are not required to have taken a course in accounting or financial statement analysis. They are not required even to have read or understood books written on the subject. Yet analyzing financial statements requires at least as much knowledge and skill as driving an automobile. Perhaps each financial statement should contain a warning to potential users, similar to those found on many products. The warning would include at least the following 10 commandments.

1. Thou shalt not use financial statements in isolation, but only in the broader context of other available information. The additional information includes data on economy-wide conditions and industry-wide conditions.

2. Thou shalt not use financial statements as the only source of firm-specific information. There are many other sources of information about the company. Consider, for example, the popular financial press and periodicals, as well as analysts' reports.

3. Thou shalt not avoid reading footnotes, which are an integral part of financial statements. Financial statements cannot be reasonably analyzed without reading and understanding the footnotes. By analogy, a temperature of 10 degrees is meaningless in isolation, unless one knows whether it is being measured on the Celsius or Fahrenheit scale. In a given country, a uniform temperature scale may be assumed. The same is not true of the accounting methods used under generally accepted accounting principles. GAAP, for example, permits a variety of inventory and depreciation methods. A description of a company's accounting policies is included as a part of the footnotes.

4. Thou shalt not focus on a single number. The investor should read and understand *all* the material presented in the financial statements. Financial statements are not designed to be reduced to a single number. Net income is not intended to be *the* number

that summarizes *all* the information relevant to making an investment decision. A user must analyze growth and leverage, among other factors, as well as profitability.

5. Thou shalt not overlook the *implications* of what is read. It is not sufficient simply to know that a company is a high-growth firm or a highly leveraged firm; one must also know that such characteristics typically imply higher risk, as well.

6. Thou shalt not ignore events subsequent to the financial statements. Financial statements are not forecasts of the future. The annual financial statements report the financial condition of the company as of year-end. They do not purport to capture the effects of events that occur after year-end. They thus become increasingly out-of-date as the year progresses. The rate of deterioration in timeliness is related to many factors, including the growth rate of the firm.

7. Thou shalt not overlook the limitations of financial statements. Financial statements report on only a specified set of events, not all events or all possible financial effects of a single event. Financial statements do not generally represent estimates of the market values of the reported assets and liabilities, nor do they reflect changes in the market values of those assets and liabilities.

8. Thou shalt not use financial statements without adequate knowledge. Investors should be sufficiently competent to read, understand and analyze financial statements. Otherwise, the investor cannot be called a user of financial statements in any meaningful sense.

9. Thou shalt not shun professional help. If unwilling or unable to attain adequate knowledge, the investor should defer to someone who does have such ability, such as a financial analyst. If unwilling or unable to obtain help, the investor should hand over a portion of the investment process (hence a portion of the investment decision itself) to a professional manager.

10. Thou shalt not take unnecessary risks. If unwilling or unable to obtain professional help, the investor should undertake investments where investment risk is minimal, or where analysis of financial statements is not an issue. Investment in U.S. Treasury bills is one example.

Of course, there may be more than 10 commandments for financial statement analysis, but these capture the primary issues.

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