Investment Research: How Much is Enough?

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Abstract

Aside from the decision to enter the equity market, the most fundamental question an investor faces is whether to passively hold the market portfolio or to do investment research. This thesis of this paper is that there is no scientifically reliable procedure available which can be applied to estimate the marginal product of investment research. In light of this imprecision, investors become forced to rely on some combination of judgment, gut instinct, and marketing imperatives to determine both the research approaches they employ and the capital they allocate to each approach. However, decisions based on such nebulous criteria are fragile and subject to dramatic revision in the face of market movements. These revisions, in turn, can exacerbate movements in asset prices.
Introduction

Aside from the decision to enter the equity market, the most fundamental question an investor faces is whether to passively hold the market portfolio or to do investment research. A passive strategy assures that the investor will earn, approximately, the return on the market portfolio adjusted for risk and liquidity. An active strategy requires investment research. The extent to which an active investor earns risk-adjusted returns in excess of those earned by a passive investor depends on the productivity of the investment research.

If an investor chooses to do research in hopes of producing superior returns, both the type of investment research and the scale of that undertaking must be determined. Research approaches vary from standard fundamental analysis based on discounted cash flow valuations to complex computer driven strategies designed to detect and exploit short-run momentum or other market inefficiencies. The investor has to decide not only what mix of these approaches to employ, but also how many research dollars to allocate to each approach. That requires an assessment of the marginal product of each approach, not just an evaluation of the research effort generally.

The problems of determining the optimal mix of research approaches and how much to spend on each of them is not only important for active investors, it has larger implications for the operation of financial markets. Most importantly, it affects the manner in which information regarding investment opportunities and characteristics comes to be reflected in asset prices.

More specifically, it has been known, at least since the work of Grossman and Stiglitz (1980) and Cornell and Roll (1981), that markets cannot be perfectly efficient. If
they were, there would be no incentive to do investment research. But if there were no investment research, prices would lose touch with fundamental value. The equilibrium condition, therefore, is that markets must be sufficiently inefficient such that active investors earn a fair rate of return on the costs of doing investment research at the margin. Though this equilibrium condition is easy to state, it is unclear how it can be translated into practice. Given that there must be some inefficiency, how does an active investor measure the marginal productivity of any particular approach to investment research in order to determine its optimal level?

This thesis of this paper is that there is no scientifically reliable procedure available which can be applied to estimate the marginal product of investment research. Given the noisy stochastic processes that characterize equity prices, the heterogeneous nature of investment firms, the vast number of approaches to investment research, and the likelihood that the marginal product of any particular approach will change over time, statistical inference regarding the marginal product of investment research becomes so imprecise as to be virtually worthless. In light of this imprecision, investors become forced to rely on some combination of judgment, gut instinct, and marketing imperatives to determine both the research approaches they employ and the capital they allocate to each approach. Reliance on these more nebulous criteria, in place of significant statistical results, leads to a potential feedback relation between asset price volatility and investment research decisions. If decisions regarding the type and scale of investment research could be based on statistical analysis of large data sets, then they would be little affected by short-run market movements. However, investment research strategies chosen on the basis of nebulous judgments and gut instincts are a good deal more fragile
than decisions based on significant scientific evidence. Such judgments and gut instincts can be subject to dramatic reversals in response to shifts in confidence associated with market movements. These shifts, in turn, exacerbate the swings in asset prices.

The argument that the marginal product of investment research cannot be measured with anything approaching reliable precision has two basic components. To begin, any assessment of the productivity of investment research must start with an analysis of investment performance. After all, the goal of investment research is to produce positive alpha. It is informative in this regard that after 40 years of research on mutual fund performance, the question of whether superior performing funds can be identified reliably remains largely unresolved. But even if investors who earn significantly positive $\alpha$s can be identified, that is still a long way from being able to determine the investment research that was responsible for the superior performance and estimating its marginal product. Additional complications that arise when trying to estimate the marginal product of investment research include the facts that research efforts are multifaceted and the mix employed by any investment firm may change over time; that the productivity of various types of research may depend on the nature of the investment being analyzed and that research productivity depends on ever changing information sources and relationships of investment analysts.

**Measuring the marginal product of investment research**

The fundamental arguments of Grossman and Stiglitz (1980) and Cornell and Roll (1981), imply that the equity market must be sufficiently inefficient such that the marginal return from engaging in investment research equals its marginal cost. For simplicity, I make the reasonable assumption that investors are able to measure the
marginal costs of various research efforts. Consequently, the investment research decision depends on assessment of the marginal product of various approaches to investment research. In this context, it is worth noting that the marginal product is not determined exclusively by excess returns. Many professional money managers are paid fees that are based, at least in part, on assets under management. As a result, the marginal product of investment research to the firm includes the impact of research on the accumulation of assets under management. Although research on mutual fund flows, as exemplified by the work of Chevalier and Ellison (1997) and Sirri and Tufano (1998), finds that fund flows are strongly related to lagged measures of excess returns, short-term superior performance is not the only avenue for attracting new investors. Some investment companies, such as the Capital Group, have been successful in marketing their “investment research” on its own merits.

Putting aside marketing issues for the moment, the basic foundation for any assessment of the marginal product of investment research is whether associated superior returns can be identified. I analyze this and other questions involving investment research from the standpoint of a professional money management firm. This is sensible because professional investors have come to dominate the market. French (2008) reports that by 2007 direct holdings by individual investors had fallen to 21.5% of the market and were a smaller fraction of total volume. Furthermore, institutional investors are far more active in investment research, in large part because economies of scale make it possible for them to employ professional investment analysts.

With respect to performance assessment, the most extensive research has been done on mutual funds because reporting requirements for mutual funds have historically
been the most comprehensive. Beginning with the path breaking work of Jensen (1968) and continuing up through recent research by Fama and French (2009), there have been hundreds of papers written on mutual fund performance, most of which examine the extent to which superior returns earned by individual funds are sufficiently persistent that they can be attributable to skill and not luck. The simple fact that this literature is so large and on-going is evidence that it is difficult to identify and quantify superior performance. There is no similar on-going debate in meteorology as to whether the average temperature in Chicago in July is higher than the average temperature in January.

Before turning to the specific analysis, it is important to note that what Fama and French call equilibrium accounting adds a twist to measuring the marginal product of investment research compared to the marginal product labor or capital in typical industrial situations. In particular, equilibrium accounting says that investors as a group must earn the valued-weighted market return. Assuming that passive investors hold the market portfolio, it follows that the only way for an active investor to achieve positive $\alpha$ is at the expense of other active investors.\(^1\) This implies that for active investors in the

\[^{1}\text{In the text and throughout this paper, I ignore the complexity that } \alpha \text{ depends upon the index with respect to which performance is measured. It is possible, for example, that passive investors hold portfolios, such as the S&P 500 that are not mean/variance efficient. In that case, active investors can have } \alpha \text{ positive a in the aggregate. These second order effects do not have a meaningful impact on the arguments developed in the text.}\]
aggregate both $\alpha$, and therefore, the marginal product of investment research must be zero!\(^2\)

Given the large number of active investors, the equilibrium condition that the aggregate $\alpha$ must be zero should have little impact on the decision making of individual investment companies. The fundamental questions that such companies must answer is does the firm earn a positive $\alpha$, and if so, how did the firm’s research help produce the superior returns. I address these questions sequentially.

The first question is whether there is reliable evidence that at least some investment companies can consistently produce a significantly positive $\alpha$. The scientific research on this question is not encouraging. Below I briefly summarize some key results from forty years of mutual fund research. A similar, though less extensive body of research, reports similar findings for other professional investment companies.

Equilibrium accounting provides a starting point for interpreting the results of the research on mutual fund performance. When applied to the mutual fund industry as a whole, equilibrium accounting implies that in order for mutual funds in the aggregate to earn a positive $\alpha$, they must do so at the expense of active investors other than mutual funds. There is no evidence of such aggregate superior performance on the part of the mutual fund industry as a whole. Using the most recent data for the period from 1984 to 2006, a period during which the CRSP mutual fund database is relatively free of biases, Fama and French (2009) find that mutual funds as a whole underperform by about the

\(^2\) Although the aggregate marginal product is zero from the standpoint of investors, the net social benefit will be positive if competition among active investors leads to more accurate security pricing which thereby improves the allocation of capital.
amount of costs (fees and expenses). Put differently, in terms of gross returns the aggregate mutual fund $\alpha$ is zero.

Given that the industry as a whole fails to outperform the market, the question becomes whether certain funds consistently produce superior results. Here equilibrium accounting implies that, given the aggregate $\alpha$ of zero, any superior performance on the part of one fund must be offset by inferior returns for other mutual funds. The common approach to the problem of identifying superior performance, utilized by Grinblatt and Titman (1992) and Carhart (1997), among others, is to test for persistence in fund returns. That is, to determine whether past winners continue to produce high returns and past losers continue to underperform. As Fama and French (2009) observe, however, these tests have a weakness. They rank funds on short-term past performance which makes persistence difficult to identify because allocation of funds to winner and loser portfolio is based largely on noise. It is primarily for this reason that the persistence tests have been inconclusive. Some papers find weak evidence of persistence and other do not.

To develop a more powerful test, Fama and French take a new tack using long histories of individual fund returns and bootstrap simulations to infer the existence of superior and inferior managers. Applying their new procedure, Fama and French conclude that the simulation results are disheartening for investors. They observe that even the extreme right tail of the cross section is dominated by fund managers that lack skill sufficient to produce expected returns that cover the costs funds impose on investors. Overall, they conclude that, “there is no evidence of fund managers with skill sufficient to cover costs.”
The bottom line is this. Forty years of painstaking academic research has failed to find consistent meaningful evidence of superior performance on the part of individual mutual funds or the mutual fund industry. That being the case, it is hard to see how fund managers could estimate the marginal product of research to be anything other than zero. However, the academic literature remains somewhat controversial and, needless to say, most professional money managers claim that they do produce superior returns. Therefore, to move the analysis to the next stage, I assume that funds with consistently positive \( \alpha \) can be identified. Even given this assumption, there is still a long way to go to estimate the marginal product of investment research.

The academic literature on mutual fund performance does not drill down to investigate precisely how investment research produces superior returns (assuming that it does). Instead, the almost universal approach is to assume that some professional investment companies possess a nebulous attribute called “skill” which is the source of positive \( \alpha \). The typical framework is spelled out by Berk and Green (2004) who say, “Funds differ in their managers’ ability to generate expected returns in excess of those provided by a passive benchmark . . . we do not model the source of successful managers’ abilities.” For investment companies to assess the marginal product of investment research, they would have to drill deeper than concluding that the firm had some vague “skill.” The source of that skill would have to be identified. This raises several vexing issues.

First, investment companies are not homogenous units. They employ numerous people who use various approaches to research and investment decision making. Furthermore, as valuation theory highlights, the most important aspects of investment
assessment are understanding and forecasting the performance of the business being analyzed. The manner in which an analyst forecasts future business performance is inherently individualistic. In addition to personal knowledge of the company and the industry, forecasts depend upon contacts the analyst has within the company and the industry. With respect to those contacts, the analyst must also discern when they are providing valuable information as opposed to spreading unreliable rumors. Both analysts' firm specific knowledge, and particularly his or her contacts, are unlikely to be constant across companies. Furthermore, it is likely that both the extent of the specialized knowledge and the reliability of the relationships will change over time. As a result, the marginal product of investment research cannot be assumed to be a constant attribute of an investment company, or even to remain constant in the case of an individual analyst.

The best way to cope with the foregoing problems would be to assess the marginal product of research on an investment by investment basis. Presumably, individual investment decisions are based largely on the application of one research approach to a given company. Therefore, the success of that investment could be used as a basis for estimating the marginal product of the research approach used when making the investment decision without facing all the difficulties discussed above. But here the problem of noise, which has played havoc with the research on mutual fund performance, becomes virtually insurmountable obstacle. The underlying statistical problem can be summarized as follows. Assume that the true but unobservable level of superior performance is $\alpha$. The time period needed to detect superior performance of $\alpha$ at the significance level of 95% is given, approximately, by the equation,
\[ T = (1.96 \frac{s}{\alpha})^2. \]  

(1)

In equation (1), \( s \) is the standard deviation of residual returns from the model being used to define expected returns. The most popular models in the recent academic literature have been the Fama-French (1992) three factor model or the Fama-French model supplemented by a fourth factor to account for momentum.

Because mutual funds almost invariably hold widely diversified portfolios, their standard deviation of return tends to be less than that for individual investments. For the same reason, the correlation of mutual fund returns with the Fama-French factors, particularly the market factor, is generally high. In combination, these factors results in a lower residual standard deviation and allow for more accurate estimation of \( \alpha \). For example, on an annualized basis, residual standard deviations of 3\% to 4\% are common for mutual funds. Even so, equation (1) implies that sample periods of approximately 5 years are required to identify superior performance on the order of 3\% per year.

For individual securities, the situation is quite different. Higher return standard deviations and lower correlations with the factors result in residual standard deviations on the order of 15\% or more for most securities. This implies that to discern significant superior performance of 3\% at the 95\% level requires approximately 100 years of data. Assuming that the true \( \alpha \) were as high as 10\%, almost 10 years of data still would be required. Even if superior performance can be identified using such long sample periods, the length of the sample period raises the question of whether it is reasonable to believe that the current marginal product of research is the same as that which existed at the time the investment decision was made a decade or more previously.
But there is a more basic problem. Investors rarely hold securities for anything approaching 10 years. French (2008) reports that the average holding period for all NYSE, Amex and NASDAQ stocks was less than six months in 2007. Presumably, this overestimates the holding period of active investors because it includes passively managed money. Over such a short holding period, it is simply impossible to separate skill and luck with any precision. Consequently, the marginal product of the research on which investment decisions must be based is measured with such massive error that from a statistical perspective it is completely unreliable. As a result, confidence in the utility of the research must be based on something other than scientific analysis of performance.

Perhaps in recognition of these problems, investment companies that highlight their research generally speak broadly about their culture and their dedication to long-run analysis. As mentioned earlier, the marketing materials of the Capital Group are an example of this approach. In this context, the research effort serves as a marketing tool designed to reassure clients that the firm is performing quality due diligence. Whether these investment companies have internal mechanisms designed to assess the marginal produce of investment research is a question beyond the scope of this paper. Like Coca-Cola’s syrup formula, the details of their research efforts are matters about which investment management firms rarely speak.

The foregoing analysis leads to one inevitable conclusion. The marginal product of investment research cannot be estimated with reasonable precision in a scientifically objective fashion. In deciding what type of investment research to undertake and in determining the optimal scale of that research, investors are thus forced to rely on things
other than analysis of the data. Whether explicitly recognized or not, factors like judgment and gut instinct must play an important role.

**Implications of the analysis**

The limitation on the ability to estimate the marginal product of investment research has a number of important implications for the operation of markets and the behavior of asset prices. In particular, it provides insight into why equity markets are susceptible to periodic booms, panics and crashes.

Because the productivity of the underlying research on which investment decisions are based cannot be assessed with any reasonable precision, those decisions become fragile and subject to second guessing and sudden revision. Consider, for instance, the situation in which investment decisions are based on a comparison of discounted cash flow (DCF) estimates of value with market prices. Assume that based on such a comparison an investor determines that a company’s stock price is undervalued and purchases a substantial amount. If the price of that company’s stock subsequently falls, but no information is released that causes the investor to revise the DCF model, the investor can react in one of two basic ways. On the one hand, the investor may increase the position on the grounds that the DCF model now predicts that the stock is even more underpriced. On the other hand, the decline in price may lead the investor to question his judgment, abandon the DCF valuation for that company, and sell the stock. Which path the investor follows will be affected by how confident he is in the underlying research on which the DCF model is based. The analysis presented here implies that any such confidence faces significant rational limitations.
Turning to investors as a whole, to the extent that have confidence in their research, irrational swings in stock prices should be mitigated. If prices move without the release of information that impacts fundamentals, investors should maintain their valuations and lean against the change in prices. On the other hand, if investor confidence in the accuracy of research is limited, there will come a point at which some investors abandon their valuations and liquidate their positions. This selling, in turn, further depresses prices causing more investors to abandon their valuations. The resulting spiral leads to a crash in asset prices that would not occur if investors had confidence in their valuations.

Finally, none of the arguments developed here are time sensitive. There is no new technology on the horizon that will make for accurate estimation of the marginal product of investment research. As a result, none of the conclusions presented are likely to be affected in the near future. In particular, the fragility of investment decision making and the associated volatility of asset prices will be with us for a long time.
REFERENCES


