

The Active Risk Puzzle: Implications for the Asset Management Industry

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Executive Summary

For many years, it has been widely recognized and documented that the dominant risk in almost all large pension portfolios has been market risk,¹ while the active risk contribution to overall portfolio risk has been very small. This risk allocation is optimal only if there is wide agreement that active management is likely to lead to a very small, but positive, net alpha.

In fact, we don't think this behavior reflects remarkable conformity of opinion by fund managers about market efficiency and their inability to add value through manager selection. Rather, we think this risk allocation behavior is an interesting historical anomaly, a puzzle that is likely to disappear in the years ahead.

If we are right, the risk allocation behavior of institutional investors, and the asset management industry it supports, will undergo fundamental change.

Bob Litterman, PhD

*Managing Director,
Head of Quantitative Resources*

¹ See, for example, the articles by Gary Brinson, Randolph Hood, Jr., and Gilbert Beebower, "Determinants of Portfolio Performance," in the *Financial Analysts Journal*, July/August 1986, and Brinson, Brian Singer, and Beebower, "Determinants of Portfolio Performance II: An Update," in the *Financial Analysts Journal*, May/June 1991. The latter article concludes, "Data from 82 large pension plans indicate that asset allocation policy, however determined, is the overwhelmingly dominant contributor to total return. (Over the 10-year period December 1977 to December 1987)...The overall effect of active management by plan sponsors or investment managers was negligible."

Author

BOB LITTERMAN, PhD

Managing Director, Head of Quantitative Resources

Bob is the co-developer, along with the late Fischer Black, of the Black-Litterman Global Asset Allocation Model, a key tool in Goldman Sachs Asset Management's asset allocation process. As Director of Quantitative Resources, Bob oversees the Quantitative Equities group, the Quantitative Strategies group, the Global Investment Strategies team and the PACE group, which develops and markets portfolio management and risk analysis tools. In total, these groups include nearly 100 professionals. Bob was recently awarded a place in the Risk Hall of Fame.

Prior to moving to Goldman Sachs Asset Management, Bob was the Head of Goldman Sachs' Firmwide Risk department since becoming a Partner in 1994. Prior to that, Bob spent eight years in the Fixed Income Division's research department where he was Co-Director, with the late Fischer Black, of the research and model development group.

Bob and Fischer co-wrote two papers, *Asset Allocation: Combining Investor Views with Market Equilibrium* (Sep 1990); and *Global Asset Allocation With Equities, Bonds and Currencies* (Oct 1991). Additionally, Bob and Guang-Liang He wrote a third paper, *The Intuition Behind Black-Litterman Model Portfolios* (Dec 1999). Three other papers that discuss the use of modern portfolio theory in risk management are *Managing Market Exposure* (Jan 1996), co-authored by Kurt Winkelmann, *Hot Spots and Hedges* (Oct 1996), and *The Green Zone* (Mar 2000), co-authored by Jacques Longerstaeey, Jacob Rosengarten and Kurt Winkelmann. Bob and Kurt also published *Estimating Covariance Matrices* (Jan 1998). In 1998, The Firmwide Risk department of Goldman Sachs, under Bob's leadership and in collaboration with SBC Warburg Dillon Read, co-authored the book, *The Practice of Risk Management*. Most recently in 2003, Bob was the lead author of *Modern Investment Management: An Equilibrium Approach* (2003).

Before joining Goldman Sachs in 1986, Bob was an Assistant Vice President in the Research Department of the Federal Reserve Bank of Minneapolis and an Assistant Professor in the Economics Department at the Massachusetts Institute of Technology. Bob received a B.S. from Stanford University in 1973 and a PhD in Economics from the University of Minnesota in 1980.

I. The Narrow Range of Active Risk

A pension fund typically attempts to generate return by assuming two basic risks: market risk and active risk. The fund accepts market risk through its strategic asset allocation and is subject to the skills of particular active managers through the allocation of capital to those managers. For their part, active portfolio managers attempt to add value by taking risk relative to their assigned benchmarks. The excess return relative to the benchmark is called alpha, and the risk relative to the benchmark is called active risk.²

Portfolio theory implies that the optimal allocation of the fund's risk between market and active risk should be surprisingly sensitive to the fund manager's views on the relative efficiency of markets. The more efficient markets are seen to be, the less opportunity there is for active risk to add value, and the smaller its allocation should be. However, because active risk is uncorrelated with market risk, it adds very little to overall portfolio risk. Even the expectation of small amounts of alpha from active managers should, at the margin, induce fund managers to make significant allocations to active risk.

This would imply that there should be a wide range of allocations to active risk – reflecting fund managers' differing beliefs about market efficiency and their diverse expectations about their ability to find above-average active managers. Interestingly, in practice, we don't see the dispersion of risk allocation behavior among fund managers. Instead, a remarkable proportion of the managers of pension portfolios act in the same way – as if markets are very nearly, but not quite perfectly, efficient and that they will not be able to add much value through manager selection. This common behavior is puzzling.

II. Basic Background

Let's begin by putting forward a number of propositions that are generally agreed upon by both the academic and institutional investor communities:³

- Expected returns can be decomposed into three components: the risk-free rate, the market risk premium that accrues to passive exposure to the market and alpha, which is the expected return from exposure to risks uncorrelated with the market.⁴
- This decomposition is useful because active managers should only be paid active fees for those activities that are expected to deliver alpha.
- A fund manager is responsible for creating a level of market exposure through the strategic asset allocation and for creating active risk via the allocation of capital to active management activities.
- To the extent that they can be separated, the risk allocations to market risk and active risk should reflect the relative returns per unit of risk of these two uncorrelated sources of return.
- The return per unit of risk of the market is difficult to measure, but is generally thought to be in the range of about .2 to .3, reflecting an equity risk premium of around 4% per year (above the risk-free rate), and an annualized volatility of a globally diversified equity portfolio of around 16%.

² The situation is actually a little more complicated since active returns, defined as returns relative to a benchmark, are not necessarily uncorrelated with market returns. When such a correlation exists, one commonly decomposes the active risk into that due to the impact of the benchmark return (sometimes also to other factor returns) and what is left, the residual risk. This residual risk, sometimes called pure active risk, is by construction uncorrelated with the market and it is what we will refer to here simply as active risk.

³ For a recent well-developed exposition of these ideas, see the article by Barton Waring and Laurence Siegel, *The Dimensions of Active Management*, in the *Journal of Portfolio Management*, Spring 2003.

⁴ Alpha can be further usefully decomposed into that due to passive style and risk-factor exposures that may have positive expected returns versus the alpha (sometimes called "pure alpha") that comes from active management. Although this additional decomposition is, indeed, interesting and has its own implications, in order to focus on our main topic, we will ignore it here.

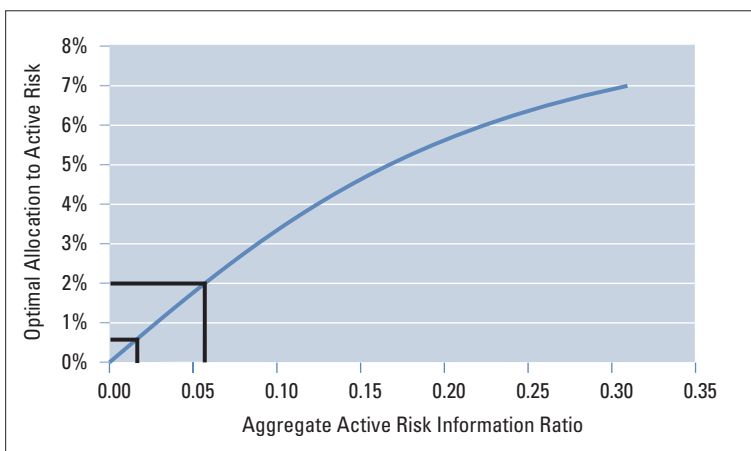
Given this background, what exactly is the active risk puzzle? Simply stated, it refers to the phenomenon that many pension funds have an active risk allocation between 50 and 200 basis points, versus an overall portfolio annualized volatility (created primarily by a 50 to 75 percent allocation to equity) of between 8 and 12 percent. These allocations are optimal if the aggregate information ratio of the active risk is only between .01 and .06.⁵ (See *Exhibit 1*)

Some market participants might find this range to be unreasonably low. Because of the benefit of diversification, the aggregate information ratio should be significantly greater than that of individual managers. Indeed, some individual managers target an information ratio of .5, a number already an order of magnitude greater than this range.⁶

Other market participants might find this range to be unreasonably high. After all, active management is a zero-sum game. Since the market is the sum of the holdings of market participants, if one participant is performing better than the market, then another is performing worse. After fees and transactions costs, one might reasonably expect the aggregate information ratio of all active managers to be negative.⁷

In our view, however, what is most puzzling is not that the range of active risk taken is too low or too high, but rather, that it is *so narrow*. Why, on one hand, are there not more fund managers who recognize the relative efficiency of the market and invest only in index products? And why, on the other hand, are there not more fund managers who significantly increase their active risk allocation reflecting their own confidence in being able to find managers with above-average skills who consistently add alpha? The narrow range of active risk taken only makes sense if the managers of these funds all expect to add, on a net basis, only a tiny bit of positive value. It is important to note that that this common expectation requires not only that markets are, in general, very efficient, but more oddly, that none of the fund managers feel that they have any particular ability to pick active managers that will outperform the average.

Exhibit 1: Optimal Risk Allocations Reveal Modest IR Expectations



Source: Goldman Sachs Asset Management

⁵ The math that drives these numbers is relatively simple calculus. Basically, you solve for the information ratio for which the given amount of active risk is optimal. Given 12 percent portfolio risk with an expected equity risk premium of 4 percent, the allocation of 50 basis points of active risk is justified when there is an information ratio of .010; at the other extreme, given only 8 percent portfolio risk, the allocation of 200 basis points of active risk is justified when the information ratio is .064.

⁶ Other evidence may be brought to bear as well. Many managers have long track records with information ratios well above .5. As is well known, however, such past performance is a poor predictor of future performance. In many asset classes and time periods, the median manager information ratio is well above the .01 to .06 range as well, but here, again, such comparisons are questionable due to the difficulty in assessing survivorship bias.

⁷ One counter to such pessimism is that institutional managers may be able to profit from the poor performance of others, such as perhaps retail investors and central banks. Also, the issue isn't the average performance; the issue is if one can find some skilled managers who can be expected to outperform. In general, if managers differ in skill, some can be expected to profit from the mistakes of others.

III. Explaining the Active Risk Puzzle

Some authors observing this perplexing use of active risk have concluded that investors actually have two separate risk aversions, one with respect to market risk, and another, much higher risk aversion, to active risk.⁸ In our view, this suggestion is a convenient fiction that allows one to explain away this puzzling behavior,⁹ but does not reflect the overall goal of maximizing portfolio return for a given level of portfolio risk. If the investor truly expects higher returns to be available through active management with little impact on portfolio risk, then why would the investor not take that risk? If there is significant uncertainty about the appropriate expectation for active returns, then we would expect to see a greater, not a lesser, diversity of active risk allocations.

Alternatively, one might explain the active risk puzzle to be the result of an aversion on the part of fund managers to taking career (sometimes called “peer”) risk that would arise if they were to create the opportunity for too much underperformance relative to their strategic benchmark. In this case, two different risk aversions make sense because they apply to very different risks faced by different individuals – the career risk of the fund manager versus the contribution risk of the plan sponsor. This creates a tendency to invest “along with the pack” because it is “safer.” If this behavior exists, the plan sponsor has an agency issue that needs to be addressed. One might also argue that there is an agency issue between the plan sponsor and the corporate shareholders (or taxpayers in the case of public plans). Here, the argument is that active risk is less transparent to ultimate stakeholders, and that the plan sponsor faces higher penalties if poor performance is coupled with lack of transparency. However, again, the issue should be addressed directly, perhaps through better communication.

Another explanation is that active risk and strategic asset allocation decisions have historically been linked because the fund manager could not easily separate the allocation of risk along these two dimensions. It turns out that distributing capital to traditional active managers according to the weights in typical asset allocations generates the low levels of active risk in the ranges typically seen today. This relatively low aggregate active risk is due to the risk-reducing benefits of diversification. Recently, with the development of liquid derivatives markets, funds have better tools to effectively separate these decisions. Some might argue that liquidity and counter-party credit concerns still prevent very large funds from making this separation, but clearly, these constraints should diminish over time.

Most likely, the true explanation for this behavior is a combination of all these factors. Whatever the reasons, we believe that it is unlikely to persist. It is simply not optimal for all funds to take just a little bit of active risk. We are already seeing clear signs of change in the industry in terms of active-risk seeking. For example, a number of large endowment, foundation, and significant family office portfolios, already take much more active risk, and often less market risk, than the typical pension fund does. Moreover, the estimated ten-fold growth of hedge fund assets over the past decade reflects growing allocations from pension funds, as well as other investors, to relatively unconstrained sources of active risk.¹⁰

⁸ Richard Grinold and Ronald Kahn made this case in their book, *Active Portfolio Management*, 2nd ed. New York: McGraw-Hill, 2000a. More recently Barton Waring and Laurence Siegel made the case in their *Journal of Portfolio Management* article cited earlier.

⁹ Waring and Siegel explain it this way, “Policy bets (our ‘market risk’) are expected to be rewarded unconditionally, and proportionally to risk taken. Active bets are rewarded only conditionally on skill, and in a declining proportion to risk taken at that; they aren’t rewarded at all on average. Thus, one kind of risk is more worth taking than the other. Putting it this way, it makes sense that investors would give a higher risk budget to unconditionally expected market returns than to highly conditional and proportionally declining expected alphas. We should almost certainly implement this observation by using a risk aversion term that is higher when we are optimizing in the active risk dimension than when we are optimizing in the policy of strategic asset allocation dimension.”

¹⁰ See, “Hedge Funds Appear Set for Strong Year,” in the *Wall Street Journal*, European edition, Jan. 7, 2004.

IV. The Future of Asset Management

Given these evolutions, what changes should we expect to see in the investment management industry?

Higher allocations to active risk

If there are inefficiencies in the markets, funds will try to exploit them more aggressively by taking more active risk. Some large funds have clearly started to move in this direction. For example, last year, General Motors issued debt to bring its pension plan to a fully-funded status. And, in a conference call with analysts, GM announced its new strategy to shift more of its pension funds into strategies that aren't as closely linked to overall market performance. Instead, these investments would rely more heavily on active management.

Relaxing constraints

Funds will take active risk only where active managers' attempts to exploit inefficiencies are likely to be successful after transactions costs and fees. Portable alpha strategies will allow capital to flow to active management opportunities independent of the strategic asset allocation. Active management activities may move from more-developed to less-developed markets. Unnecessary constraints on active managers that reduce alpha creation will also be loosened. In particular, the traditional stock-picking equity manager who has a no-short constraint may be disadvantaged relative to low-risk enhanced index strategies on one hand, and high-risk long/short hedge funds on the other, both of which seek to create alpha from identifying stocks that are expected to have relatively poor, performance.

Maximizing capital efficiency

Funds looking to increase active risk will find that the capital required to generate active risk is the ultimate constraint on alpha generation, rather than the level of active risk itself. Compare, for example, the risk of an allocation to a globally diversified portfolio of equities, which has about 16% annualized volatility, to the risk of an allocation to a diversified portfolio of hedge funds, which has about 4% active risk. Using these volatility estimates, and noting that the active risk of the hedge funds is uncorrelated with equity risk¹¹ in a portfolio with a 50% allocation to equity, allocating 50% of capital from cash to hedge funds increases overall volatility from 8% to 8.25%,¹² an increase of only 3 percent! Whereas risk itself is generally the constraint on equity allocations, it is clearly not the constraint with respect to allocations to active management.

When capital is the constraint on generating alpha, a different approach to optimizing portfolios is required, and different investment structures make sense. Risk budgeting, which focuses on increasing the aggregate information ratio, is replaced with capital budgeting, which maximizes the opportunity to generate alpha. More specifically, when there is a binding constraint on available capital, investment strategies should be judged on the basis of alpha per unit of capital. Using scarce capital to create passive market exposures is inefficient. Instead, fund managers should focus on using capital to generate alpha. To the extent that a fund sponsor can borrow to increase the availability of capital, it may be advantageous to do so. Finally, strategies with high active risk are preferred to ones with low active risk, even if the aggregate information ratio is lower, so long as the total expected alpha is higher.¹³ The bottom line is that it is critically important to recognize when the level of active risk is not an important constraint; in this common situation, optimal portfolio construction requires a completely different set of trade-offs.

¹¹ Many hedge funds, and therefore a diversified portfolio, are correlated with equities. In the context of this example, we separate the equity exposure of the hedge funds, including it in the 50% equity allocation, from the active risk. More generally, the almost universal performance fee structure of hedge funds does raise a concern about obtaining equity exposure from hedge funds, but that is a different issue.

¹² The weight of the combined portfolio is $\sqrt{8^2 + 2^2} = \sqrt{68} = 8.25$

¹³ The overall goal is still maximizing overall portfolio expected return for a given level of risk, but also subject to a constraint on the availability of capital.

Focus on strategies that provide higher alpha per unit of capital

If we focus on ranking investment strategies on the basis of active risk per unit of capital, high volatility overlay strategies, such as active currency management and global tactical asset allocation (GTAA), are the most attractive. Next, come high volatility hedge funds, followed by traditional active managers, low volatility hedge funds, and finally, enhanced or structured indexation strategies. Of course, net alpha is ultimately the objective, and thus, one cannot simply look at active risk. One still has to make informed judgments about expected information ratios after fees. (See *Exhibit 2*)

Growth of overlay strategies

We have seen exponential growth in the demand for overlay strategies, such as active currency and commodity management, as well as global tactical asset allocation (GTAA). Today, the top 10 TAA managers manage over \$53 billion.¹⁴ Among many attractive features, these sources of active management feature minimal ratios of capital to active risk, and therefore, can provide more alpha per unit of capital. Also, certain overlay strategies are less capacity-constrained, especially if they invest in larger global markets such as currency.

Growth of hedge funds

Similarly, the hedge fund industry, which provides active management in concentrated forms, has grown exponentially in the past decade. In fact, hedge fund industry assets grew from approximately \$167 billion in 1993 to \$818 billion in 2003.¹⁵ This growth should continue for some time. Moreover, the growing demand for hedge funds will result in both an increasing number and type of hedge funds in the marketplace. Since compensation structures for skilled individuals in this industry are among the best available, we believe there will be a continued migration of skilled portfolio managers to hedge funds.

Reducing costs through indexation strategies

Over time, as markets become more efficient, some funds will begin to recognize that they are not likely to be successful in the active management game. Funds that recognize that they lack a competitive advantage and are, therefore, not likely to succeed in creating positive returns from significant active management activities may focus, instead, on reducing costs through the use of indexation and enhanced indexation strategies.

Exhibit 2: A Closer Look at Alpha per Unit of Capital

Consider a \$5 billion pension fund that has \$200 million of capital to put to work and is looking to increase alpha. For any fixed amount of capital, the higher the volatility, the more alpha that can be generated.

	Volatility	Increase in Active Risk	Alpha Generated
GTAA	30%	120 basis points	\$30 million
Hedge Fund	10%	40 basis points	\$10 million
Basket of Hedge Funds	4%	16 basis points	\$4 million
Structured Equity	4%	16 basis points	\$4 million
Enhanced Index	2%	8 basis points	\$2 million

Although it might be unrealistic to assume that the information ratio would be the same for all strategies, for the purposes of this example, we assume an expected information ratio of .5 after fees for all strategies.

Alpha Generated = Volatility x Capital x Information Ratio

This chart is for illustrative purposes only. It is not and should not be viewed as predictions or projections of future returns of those classes of assets or any investments, including any fund or separate account managed by Goldman Sachs Asset Management, Goldman, Sachs & Co., or any other brokerage account.

Of course, holding the information ratio constant is not a realistic assumption. Notice, however, that when the availability of capital is the constraint on alpha generation, the optimal choice would be to hire the overlay manager, even if his information ratio were half that of all the others. This is true simply because the total alpha produced would still be highest for the overlay manager.


¹⁴ Source: *Global Investor Magazine*, "TAA Comes Back from the Dead," November 2003.

¹⁵ Source: Hedge Fund Research, Inc., "Fourth Quarter 2003 Report," dated February 2004.

Survival of the fittest

Not everyone can be successful in this approach, and success may become more difficult to achieve over time. Given the zero-sum nature of alpha creation, the market must always be relatively efficient, at least in the sense that it cannot be easy for everyone to create alpha. Moreover, strategies and managers that consistently create alpha will attract attention and capital. Eventually, limited capacity will drive the expected returns from those sources lower. In this sense, the demand for alpha will drive the market toward greater efficiency. Thus, finding the best sources of alpha will require a dynamic, contrarian search process that focuses on areas that are currently out of favor.

As markets get more efficient, finding skill will become more difficult. And, since finding manager skill requires skill at the fund level and is a zero-sum game, we believe Boards and CIOs will have to heighten their focus on developing a sustainable skill advantage over their peers, or default to an indexing strategy at the lowest possible cost, thus solving the active risk puzzle. Smart funds should either maintain a purely indexed approach at the lowest possible cost in staff and fees, or invest in active risk, develop the organizational skills and resources to pick skilled managers, and jealously protect this skill just as their parent organizations work to protect their own competitive advantage. The days of “investing with the pack” are numbered.



For more information on Active Alpha Investing, visit our website at activealpha.gs.com.

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