

Active Management

Lessons for investment managers, consultants, and clients.

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There are many ways investment managers, consultants, and their clients can cooperate to produce improved investment performance. The suggestions in this article are based on the fundamental law of active management, developed in Grinold [1989], Grinold and Kahn [1995], and Kahn [1998].

THE FUNDAMENTAL LAW OF ACTIVE MANAGEMENT

We define an *active position* as any difference between the investment manager's portfolio and the benchmark portfolio. Grinold and Kahn [1995] call these active "bets." Active positions give rise to the risk that the portfolio's return will differ from the benchmark's return.

What if you don't use tracking risk, but target instead total return adjusted for volatility? Are our suggestions relevant for you? Yes. You can suppose your benchmark portfolio is cash, and the arguments advanced in this article still apply. In other words, the traditional Markowitz model — the manager maximizes total return, subject to a volatility constraint — is just one special case of the more general framework we are using. In the Markowitz model, cash is the risk-free asset. In our framework, the client's benchmark is the risk-free asset.

We assume implicitly that any differences between the manager's portfolio and the benchmark reflect a deliberate, active decision. In other words, we assume managers have access to an information system that permits

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them to know in exactly what ways their portfolios differ from the benchmark portfolio, so deviations are not just random noise. If your manager does not have that capability, get a new manager. We also assume that the manager has access to analytical software that can estimate the expected risk associated with any active position. Again, if your manager does not have such software, get a new manager. It is impossible to construct optimal risk-return portfolios without this information.

What are some examples of the typical active positions a manager might take? Let's consider an equity manager first.

Suppose a manager is generally bullish on stock prices. Specifically, the manager expects the overall equity market to outperform forward equity prices. (Forward equity prices are easily calculable as the current spot prices adjusted for carry, the difference between dividend yield and the interest rate; or they can be observed directly using equity futures prices.) Such an investor would want a portfolio to be more sensitive to general equity market movements than the benchmark portfolio is. In other words, the portfolio's beta should exceed the benchmark's beta.¹ A bearish investor would want a smaller beta than the benchmark.

This is only one kind of active position, of course. The investor might think that particular sectors of the market are going to outperform other sectors. In this case, the investor might decide to overweight consumer durable stocks, while underweighting the shares of financial companies, constructing this active position so that the overall market exposure of the portfolio remains unchanged. Of course, investor views may be defined over other categories of equities, value stocks versus growth stocks, for instance. Or views on particular companies might lead the investor, for example, to overweight General Motors and underweight Ford.

Now let's consider the kinds of active positions a bond portfolio manager can make. As an equity manager makes a beta decision, the bond manager must choose the portfolio's duration. If interest rates are expected to fall (relative to implied forward interest rates), the bond manager will ordinarily want to extend duration beyond the benchmark's. A bond manager must also consider forecasts of the shape of the yield curve, compared to the shape of the forward yield curve at the forecast horizon. If the curve is expected to be steeper or flatter than the forward curve, the manager should choose a bulletized or barbelled structure. A fixed-income manager can also actively position according to the curva-

ture of the yield curve. Or overweight or underweight particular fixed-income sectors — mortgages, corporates, high-yield, foreign bonds, or emerging markets. Or overweight or underweight particular categories of credits or particular credits in the portfolio.

These decisions may be based on macroeconomic forecasts. For example, an investor expecting a recession would probably extend duration, but at the same time underweight corporate bonds. An investor who expects the volatility of interest rates to be less than the volatility discounted by the market might overweight callable bonds and mortgage-backed securities. Active positions can be based on bottom-up analysis, too, forecasts of a particular company's EBITDA, for example, or a belief that a bond's rating will improve or degrade.

Three other definitions are important: active return, active risk, and the information ratio. *Active return* is the return the manager earns (or expects to earn) in excess of the benchmark return. Active returns obviously derive from the manager's active positions. If the portfolio is invested well, active return will be positive (assuming high enough returns to overcome any excess transaction costs the active strategy imposes).

Active risk, or tracking risk, is the volatility of the manager's active return; that is, it is the annualized standard deviation of the active return. A manager who takes no active positions (who holds the benchmark portfolio) will have no active return, and no active risk.

The *information ratio* is the ratio of the manager's active return divided by the active risk. It is a summary measure of the manager's performance.

Active return, active risk, and the information ratio can all be defined either *ex ante* or *ex post*. That is, we can forecast before the fact what we expect the manager's active return, active risk, and information ratio will be. These expectations form the basis for asset allocation decisions. Or, after the fact, we can calculate what active return, active risk, and information ratio the manager actually achieves. On this basis, we can make judgments about proficiency.

Primacy of the Information Ratio

Sometimes it is asserted that a particular manager's style suits particular clients. For example, a conservative client might choose a conservative manager, even when the manager's expected future information ratio falls short of another, more aggressive manager's expected information ratio. Except in special cases, this view is incorrect.²

Investment managers can be evaluated and

selected according to their prospective information ratios only. (Historical information ratios are relevant only to the extent they help to forecast future information ratios.) A risk-averse client, one who is averse to deviation from a benchmark, should not hire a low-risk manager with an inferior prospective information ratio just because the manager's style is low-risk. Rather, the client should adopt one of two other courses of action.

Clients can either hire a more aggressive, high-information ratio manager, give the manager only a portion of the funds to manage, and invest the remainder in the benchmark portfolio (that is, in an index fund that tracks the benchmark closely). Or they can choose the high expected information ratio manager, but instruct the manager to manage the funds less aggressively than the manager usually does — that is, with less active risk — while achieving the same information ratio. In this case, the investment manager would take the usual active bets; they would just be smaller ones. More of the risk-averse client's funds would be invested instead in a benchmark-like portfolio.

In either case, the client, in effect, modulates the active risk in the portfolio by investing in two subportfolios, one with active positions and the other indexed to the benchmark. The information ratio of this blended portfolio equals the information ratio achieved on the active bets. The composition of the blend depends on how much active risk the client wants. The less active risk, the more invested in index funds.

This is hardly a new idea. In fact, it is a generalization of Sharpe's CAPM insight: The optimal portfolio for all investors consists of a single, universal risky subportfolio — in equilibrium, the market portfolio — plus another subportfolio consisting entirely of cash. In our case, the benchmark portfolio plays the role of the minimum-risk subportfolio — cash, in Sharpe's CAPM — and the collection of active bets plays the role of the market portfolio.³

Improving Your Information Ratio

If the ex ante information ratio is all that matters to selecting managers and constructing portfolios, how can we maximize it?

The ex ante information ratio has been shown by Grinold [1989] to depend directly on two factors. The first is the manager's skill. Formally, skill is the correlation between predicted active return and realized active return. It measures how accurately a manager can forecast that a prospective active bet is a good one.

The second factor is the square root of breadth or scope. Breadth measures how often a manager can find opportunities to take active positions. The more active investing opportunities, the better, because a manager who finds prospective opportunities more frequently can better diversify. Managers then need to take less risk on each active position to earn a given level of active return. A large number of small active positions is better than a few large ones, but to enjoy the luxury of taking only small active positions, you have to be able to uncover many opportunities.⁴

Using the notation in Kahn [1998], the fundamental law of active management is:

$$IR = IC\sqrt{BR}$$

where

IR = the information ratio;

IC = the information coefficient, or skill: the correlation between forecasted and realized active returns; and

BR = the breadth, or scope: the number of independent bets the manager can make per year.

The optimal amount of risk a client should take depends not only on the client's individual degree of risk aversion — that is, appetite for bearing risk — but also on the information ratio the managers are expected to deliver. Even an aggressive client should take no risk if the IR is expected to be zero or less.

Increasing the ex ante information ratio directly improves an investor's excess return, but it also improves it indirectly, since a higher IR will result in a client being willing to take more risk. This is because the prospective compensation for risk (measured in terms of active return) rises.

Relationship Between Skill and Scope

We know that the information ratio is directly proportional to a manager's skill, and to the square root of manager scope. Scope is the rate at which the manager can find attractive active opportunities — the more, the better. Skill is correlation between the manager's forecast of active return and actual realized return.

Superficially, skill is hard to improve. But let us consider it more carefully. In part, skill depends on characteristics of the manager: intelligence, wisdom, train-

ing, and experience. These are certainly hard to change. Normally, when we learn that our manager lacks these characteristics, we change managers rather than trying to change the manager.

But skill also depends on a characteristic of the market in which the manager operates, specifically, how efficient the market is. In a perfectly efficient market — one that discounts all information, and does so accurately, so as to produce forward asset prices that are the best possible unbiased forecasts of the future asset prices — even intelligence, wisdom, and experience count for nothing. In short, for a manager to have skill, in the formal sense, the market in which he is operating must entail inefficiencies.

How can we identify which markets might be inefficient? Unfortunately, we have no formal theories of market inefficiency. But we can imagine some of the things that might make a market inefficient.

One obvious candidate is institutional rigidity, created by regulations and fostered by conventional wisdom or even entrenched habit. For example, if regulations require all insurance companies and pension funds in the U.S. to purchase only investment-grade debt, then we might expect an investment in subinvestment-grade debt to have a higher expected return than that justified by its systematic risk alone. (Of course we would have to suppose that there is insufficient capital available in non-regulated investment entities to arbitrage this inefficiency away.) That is, investment restrictions may give rise to market inefficiencies. So can bias. Many years ago, for example, it was considered imprudent for pension funds to invest in equities.

The point is that one way to improve a manager's skill is to permit the manager access to more markets — in particular, markets that are subject to inefficiencies. If you accept that studying more markets gives you more investing opportunities, then skill and breadth are not independent.

We strongly suspect that market inefficiencies are transitory. They appear in a market — only to be identified, exploited, and then eliminated.⁵ Other inefficiencies may sporadically appear (and then disappear) in other markets. Accordingly, widening managers' scope may also improve their skill because they can rotate into markets that are experiencing transitory inefficiencies. The common practice of hiring a different manager for each market or sector, and then rigidly requiring each manager to stick to that sector, only runs counter to this intuitively sensible idea.

Restrictions placed on managers can act very much like regulatory constraints, to induce or promote inefficiencies. How frustrating it must be for a bond manager who has discovered a cheap BB+-rated corporate bond to be unable to buy it because he has the client's mandate for investment-grade bonds, while another manager (who may not have discovered this "cheap" bond opportunity) has the client's high-yield mandate.

There is another reason to think that a single manager who can roam widely (or a team of managers acting in concert who have a broad mandate) could demonstrate superior skill, compared to a manager who is tightly constrained to stay in a single market: home country bias. It is well known that there seems to be less international diversification than there should be according to finance theory. People in all countries seem excessively to prefer domestic assets over foreign assets, even when we account for exchange rate risks and the like. It may be that the marginal investor in most markets is a domestic investor, rather than a global investor. This may give rise to cross-border inefficiencies.

The lesson is that investors who can look across different markets may be more "skillful," in the formal sense of the fundamental law, than investors who are restricted to single markets alone. This suggests that hedge fund managers, who generally have much more latitude to cross market lines than specialist core managers do, may seem to exhibit more skill, and as a result achieve higher information ratios, even if they are not brighter than the investment professionals working for specialist managers, because they are less constrained.

Of course this disparity could be remedied by giving core managers more latitude, too. And this may be why core managers often seek broader mandates — not because they are undisciplined, but because they know they can achieve higher expected information ratios if they can exploit transitory cross-market segment anomalies as they arise.

These ideas have obvious implications for fund sponsors — particularly how sponsors should set guidelines. They are also relevant to consultants, and fund managers.

GUIDELINES

The guidelines most plan sponsors use almost inevitably result in managers achieving suboptimal investment performance. This does not mean there shouldn't be guidelines, but rather that guidelines should be constructed differently. In fact, differently constructed guide-

lines may result in *less* risk than those in common use today, while having the additional benefits of being simpler, easier to adhere to, and more transparent.

Let us first consider the purpose of guidelines. They exist to enforce the client's asset allocation decisions and to control the active risk that a manager can take.

Usually plan sponsors set guidelines by specifying classes of assets that can or cannot be included in the portfolio, or by setting position limits on specific securities or classes of securities. So, for example, common U.S. bond investment guidelines might include:

1. There can be no bonds below investment-grade.
2. Duration cannot differ from the benchmark by more than one year.
3. Mortgage-backed securities cannot constitute more than 50% of the portfolio, and IOs or POs cannot constitute more than 10% of the portfolio.
4. There can be no derivatives or structured notes.

A global mandate might include all these, plus others such as:

1. There can be no emerging market securities.
2. At all times the portfolio must be at least 90% hedged back into U.S. dollars.
3. European bonds cannot constitute less than 10%, or more than 50%, of the portfolio.
4. Forward foreign exchange contracts can be used only for hedging purposes; using them to assume direct foreign currency exposures is not allowed.

The purpose of these restrictions is clear: to insure that the portfolio does not look too different from the benchmark. This is important if the portfolio is to behave statistically similarly (in terms of its variance and its correlations with other asset classes) to the way the sponsor expects it to perform. In other words, the sponsor needs to know that the funds allocated to this asset class conform to the assumptions the plan sponsor used when it made its overall asset allocation. This objective is laudable: If a manager's portfolio behaves radically differently from the benchmark, than the client's allocation to this asset class — which is premised on how the asset class behaves statistically — will be inefficient.⁶

In other words, by assuming too much tracking risk compared to the benchmark, a portfolio manager can make a mockery of the client's optimal asset alloca-

tion decisions. The client should enforce controls to assure that doesn't happen.

If the object of guidelines is to control tracking risk, then a simple suggestion is to eliminate guidelines like those cited above, and to substitute instead a simple guideline like:

At no time can the ex ante tracking risk of the portfolio exceed 150 basis points.

This leaves two issues unresolved. First, this guideline controls normal market risk, but not other kinds of risk. It can substitute only for a collection of guidelines that are designed to control market risks. It is not comprehensive. Other guidelines must still be in place to control operational risks and counterparty credit risks, for example. Moreover, value at risk models are calibrated for "normal" markets. The variances and correlations among markets sometimes change abruptly. A sponsor might, therefore, wish to augment value at risk constraints with other restrictions.

Second, this guideline leaves unclear how the ex ante tracking risk of the portfolio should be measured, and by whom. Discussing alternative approaches to estimating value at risk (VaR) is beyond the scope of this article, but we can consider this second question in more detail.

One option is to let the investment manager estimate the portfolio's tracking error. Most managers have in place models and software for estimating a portfolio's (VaR), that is, its ex ante tracking risk.⁷ Of course not all models are alike, and they will certainly not produce identical VaR estimates. But most investment managers have carefully designed and constructed the VaR models they use, and letting the manager report the VaR permits the plan sponsor to benefit from the manager's thought and work.

It also, of course, puts the fox in charge of the henhouse. If the purpose of the VaR guideline is to restrict the investment manager's discretion, then it is an incontrovertible conflict for the manager to measure VaR. If, after the fact, the portfolio were to sustain losses in excess of what the ex ante VaR prediction suggests are plausible, then questions would inevitably arise as to whether the manager's VaR estimate is unbiased, or whether the VaR model had deliberately understated the portfolio's risk.

Who else could measure the tracking risk? Another choice is the plan sponsor. All the sponsor needs to do is develop VaR models for each class of securities in which it invests. This is obviously inefficient — why

would every pension sponsor in the U.S. develop its own, proprietary VaR systems? It is expensive and probably unworkable.

Who, then, should supply this service — be an objective judge of managers' VaR, and an advocate for the plan sponsor? The consulting community. Many consultants have the technical expertise to develop VaR models. Others could acquire that expertise from Wall Street. Moreover, they already have relationships of trust with their plan sponsor clients. They are agents of the plan sponsors, not of fund managers. Plan sponsors should look to their consultants to enforce VaR guidelines and to estimate their managers' ex ante tracking risk.

IMPLICATIONS FOR INVESTMENT MANAGERS

The implications for investment management relate to the kinds of firms that are likely to produce superior IRs, and how an investment management firm might organize itself to enhance its skill and breadth, and therefore its IR.

Death of the Boutique

What skills should investment managers have to be successful? The fundamental law of active management virtually assures that investment boutiques — specialists in only one market, or even one particular kind of trade in one market — are bound to achieve inferior information ratios. Remember that the information ratio depends not only on skill, but also on the square root of the number of bets a manager can make per year. A boutique is destined to find only a few useful bets, because its scope is limited. A specialized boutique that can make only four bets a year will achieve an information ratio only half that of a similarly skilled but less constrained investment manager, if the less constrained manager can find sixteen bets per year. It would take an implausible skill advantage to overcome these odds.

Moreover, as we have argued, broadening managers' scope may also enhance their skill, by permitting them to take advantage of sectors with transitory market inefficiencies.

You may say this argument is unfair to boutiques. In reality, a sponsor would not compare hiring a generalist manager to hiring a *single* boutique. Instead, it would compare a generalist manager and a collection of boutiques. In principle, the *collection* of boutiques could, the

sponsor would hope, mimic the expertise and diversification potential of a generalist manager.

Unfortunately, it does not work that way in practice. Suppose a sponsor has selected two boutique managers, one to manage corporate bonds and the other to manage mortgage-backed securities. At times there will be attractive opportunities in the corporate market, and at other times there will be opportunities in the mortgage market. Sometimes both will have attractive investment opportunities, but at other times one or the other manager will not have any attractive active positions to take.

Let's suppose the corporate manager has identified an inefficient price — that is, a high-information ratio opportunity — in its market, while the mortgage manager, at that time, can find none. Ideally the plan sponsor would like to transfer assets from mortgages to corporates, at least temporarily. But by what mechanism could this transfer of funds occur? Practically speaking, the client could not know that it is desirable to temporarily reallocate funds, so it would not.

Now suppose the same corporate manager and mortgage manager are both employed as specialist managers, but both work at the same generalist bond firm. Now it is quite practical to transfer funds from the corporate market to the mortgage market, and back again, depending on where the more attractive opportunities lie. All that is required is that the corporate and mortgage managers compare notes periodically, and accurately report what opportunities are available in each specialist niche.

There might be yet another manager at the firm — a “generalist” bond manager — whose role it is to consider the opportunities presented by different bond sectors, and make allocations among the corporate subportfolio, the mortgage subportfolio, and other subportfolios. The generalist's job is to synthesize the insights of all the specialty managers. In other words, the generalist manages allocations to specialist managers, but with information better than that available to the usual fund-of-funds manager or plan sponsor.⁸

Rise of Globalism

If having many kinds of bets to choose from — that is, multiple potential sources of value added — is the key to raising your information ratio, then we are compelled to conclude that a global manager should outperform a domestic-only manager (measured by IR). Simply put, the global manager has many more ways to

add value — many more potential bets to make. The difference is not small; a global manager who is monitoring twenty markets, plus various spread relationships among these markets, plus nineteen foreign exchange rates, plus various cross foreign exchange rates, is likely to have many, many more interesting opportunities than a manager who is looking only at a domestic market.⁹

The global manager's advantage is compounded by the fact that many of the most attractive investment opportunities involve cross-market investing, exploiting domestic-only investors' myopia. Moreover, many foreign markets are less efficient than the U.S. market, which has a surfeit of sophisticated arbitrageurs.

So not only is the global manager going to have many more potential bets to choose from, such a manager is also likely to be able to demonstrate more skill — not because of any innate superior qualities, but because of the nature of the markets. A global manager's information ratio should be higher than that achievable by a domestic-only manager.¹⁰

This may seem of mere theoretical interest to a plan sponsor who needs an account to be managed against a U.S. benchmark. Not so. "Portable alpha" allows the information ratio a global manager can accomplish to be transported to a U.S.-only portfolio — if the sponsor's guidelines permit.

We can demonstrate one of several ways this can be accomplished. Suppose a client wants its bond funds managed against the Lehman Aggregate Index, but would like to achieve the higher information ratio of a global bond manager. The client could first hire a global manager, and give the manager a global benchmark to beat, say, the J.P. Morgan Global Index, unhedged. Then the client could enter into a total return swap, promising to pay a counterparty the return on the J.P. Morgan Global Index, unhedged, in exchange for receiving the return on the Lehman Aggregate Index.

The result? The sponsor receives the Lehman Aggregate's return, plus any active return earned by the global manager, and bears active risk equal to that in the global manager's portfolio. In other words, the benchmark is domestic, but the sponsor gets the information ratio associated with global management.

CONCLUSIONS

The fundamental law of active management says that investment performance depends on two factors: skill and scope. We have emphasized the importance of broad-

ening an investment manager's scope. Why? First, we know that information ratio rises as the square root of scope. Second, we argue that wider scope may also mean increased skill, in a world in which market inefficiencies are transitory and the degree of inefficiency in various markets changes through time.

A plan sponsor can help widen a manager's scope by choosing the broadest possible guidelines that are consistent with the sponsor's risk appetite. A very simple restriction, directly restricting the manager's ex ante tracking risk, is better than the usual ad hoc laundry list of guidelines. This means someone must measure ex ante tracking error objectively, and this is a natural role for consultants to play. A plan sponsor can also widen a manager's scope by using an asset allocation design with fewer, broader asset classes. Of course then the sponsor must choose managers who are skilled at exploiting cross-market opportunities. This implies that, all other things equal, a specialist boutique manager is at a disadvantage compared to a team of specialists working together, coordinated by a generalist portfolio manager.

Money managers can organize their firms to broaden their scope. We argue that the fundamental rule argues against domestic-only managers and in favor of global managers. And it argues against boutiques and in favor of broader, and probably larger, investment management companies. The managerial challenge is to design big companies that have the small company feel that most portfolio managers prefer, and to encourage teamwork.

We suggest investment management firms should be organized around two groups of portfolio managers: specialists in particular markets, who otherwise might be working for a boutique; and generalists, who can review all the opportunities uncovered by market specialists, and allocate investments to the best ideas. The generalist's objective should be to insure that the marginal expected return per unit of marginal risk is the same for every active position in the portfolio. This requires accurate, unbiased information from all the specialists regarding the investment opportunities available in their sectors. In other words, a generalist needs teamwork.

The implication is that specialists should not be rewarded on the basis of how many of the ideas they generate end up being expressed in client portfolios. To do so is to encourage merely cheerleading for a market sector. Instead, specialists' compensation should be tied to the performance of the team — in other words, the information ratio produced by the overall portfolio process.

ENDNOTES

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¹We use beta in its conventional single-factor CAPM meaning.

²The special cases are: 1) if the risk-averse client's guidelines would not permit the aggressive manager to achieve the usual information ratio; or 2) if borrowing or other constraints would not permit the conservative manager to leverage active positions for a risk-seeking client.

³As in the conventional CAPM, we ignore complications, such as taxes, that may make the optimal active bets investor-specific.

⁴The bets must be independent. Given a collection of bets that are correlated, we could find how many equivalently independent bets there are by extracting orthogonal factors.

⁵Dimson and Marsh [1999] document this for a number of equity market anomalies.

⁶Grinold and Kahn [1995] argue that tracking risk is important to investment managers because high tracking risk means an increased probability of ranking among the worst-performing managers in your category, and thus facing termination. Low tracking risk probably means you will finish somewhat in the middle of the herd, so you won't be picked off by a predator. Implicit in this is the assumption that clients have asymmetric utilities: Underperforming by 100 bp hurts more than outperforming by 100 bp helps. Most practicing investment managers would probably agree. You are unlikely to be terminated for producing average performance, but you are unlikely to be given substantially more funds to manage just because you substantially outperformed your peers. So investment managers face business risks when they permit tracking risk to increase too much.

⁷VaR is easily calculated from tracking risk. Knowing one, you also know the other, so the terms are almost interchangeable. Tracking risk is the portfolio's volatility compared to the benchmark; VaR can be found by multiplying this by the appropriate z-value, so as to produce a 95% confidence interval for the portfolio's underperformance.

⁸More formally, the generalist's job is to insure that the ratio of marginal expected return to marginal tracking risk is the same for all active positions in the portfolio.

⁹With twenty markets, there are only nineteen foreign exchange rates, as one of the markets is the domestic market.

¹⁰Global investing also has possible disadvantages that must be balanced against improved breadth. For example, it requires a larger team, so more resources must be devoted to coordination and control; there may be tax disadvantages; information, transaction, and custody costs may be higher.

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