Portfolio risk analysis should not stop at tracking error

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PORTFOLIO RISK ANALYSIS SHOULD NOT STOP AT TRACKING ERROR

Active portfolio management is the art of balancing risk and return. In the absence of arbitrage, or inside information, an active manager must take on risk in order to achieve an excess return that compensates clients for the fees charged.

The term “balance” insinuates that half of the art of portfolio construction lies in stock selection and the other half in risk management. It is therefore interesting to consider how one-sided the majority of fund management efforts are with regards the mix between research and portfolio construction. Despite recent trends to incorporate deeper risk understanding in the management of portfolios, the degree to which risk is actually viewed all too frequently comes down to little more than compliance adherence and tracking error recognition.

In this paper we aim to demonstrate that this approach to portfolio risk management is a far from optimal as reliance upon tracking error as the primary, or worse, sole risk metric is subject to two key problems:

1. There is a widespread misunderstanding of the true meaning of tracking error, resulting in its systematic misapplication but, more importantly,
2. Tracking error encompasses both beneficial risk (that which the manager expects to be rewarded for taking, such as an exposure to a stock with a favourable research recommendation) as well as detrimental risk (unintentional exposure to factors or characteristics that are incidental to the stock selection within the fund, such as a bias to illiquid stocks).

The second point here is actually the more far reaching as active managers must take on risk to achieve their excess return target however it is in the arena of unintentional risk that most performance leakage occurs and therefore it is this aspect of risk that the fund manager should be focused. Quite simply, tracking error is insufficient to reliably identify this risk.
BACKGROUND

There have been a number of trends within the finance industry over the past 30 years that have led to tracking error becoming the pre-eminent measure of risk for unleveraged equity portfolios.

● First and foremost, the move to recognising the importance of risk as a metric in the measurement of a portfolio’s success. The focus that modern portfolio theory places upon the inclusion of both risk and return to assess portfolio efficiency has driven the need to explicitly measure risk (these have ultimately been incorporated into risk-adjusted return measures such as information ratio etc.).

● The increased use of benchmarks; in order that like with like comparisons be made, portfolios have been associated with particular market segments. Hence appropriate benchmarks to provide unbiased assessments of their relative performance have been necessitated. Since tracking error provides a measure of risk to a specified benchmark it is unsurprising that this should become the risk measure of choice.

● The increase in consultant and peer review; the growth in consultant and advisor analysis has led to increased focus of risk analysis by the fund managers in order to attain recommended status. Since consultants have tended to group portfolios by market segment, the use of benchmarks and therefore tracking error as the key risk measure has been all but inevitable.

● The availability of risk forecasting tools from a wide range of vendor companies as well as brokerage firms has allowed fund managers to actively control (and therefore focus upon) their portfolios’ current tracking error rather than simply checking the realised risk after the fact.

The degree to which tracking error has become the risk measure of choice is evident in the fact that few “long only” fund managers would now be able to quote the absolute volatility of their returns or the number of down-months or the highest drawdown over the previous year however almost all managers are able to quote their fund’s tracking error.

A LITTLE KNOWLEDGE IS A DANGEROUS THING

Although at first glance it would seem that an increased focus on risk within portfolio management is a positive step, this is only true if:

1. It is both understood and acted upon by practitioners.

2. The analysis provides comprehensive details of all the portfolio’s key risks.

As the undisputed risk measure of choice, tracking error has fallen victim to its own success as it neither provides a full and comprehensive view of the risks to which a portfolio is subject and is very often misunderstood and misapplied by practitioners.

FAMILIARITY BREEDS CONTEMPT

As an almost ubiquitous measure of risk within active portfolio management, it is generally accepted that the concept of tracking error is known by all fund managers. As with most aspects of risk, it is a common problem for practitioners to underestimate the complexity of risk analysis and to overestimate their ability to innately understand it. Risk differs fundamentally from return in that we, as humans, are poor at its assessment. There are numerous examples of this, such as the “Birthday Paradox.” This describes the tendency to misestimate the likelihood associated with people within a group happening to share a birthday. For example, the probability of at least two people in a group of 60 people sharing the same birthday is in excess of 99 per cent.

With regards to tracking error, there is often a fundamental misunderstanding in its definition that may lead to a very serious sense of false security. For example, consider the three portfolios and their respective return profiles in the charts below. All are benchmarked to a common index but exhibit very different returns, but which has the lowest tracking error?

Figure 1.

Two year performance histories of three portfolios with a common benchmark. which has the lowest tracking error?

1. A simple search on the internet using the keywords Birthday Paradox will provide the mathematics.
The three funds shown in Figure 1 have tracking errors of 0 per cent, 5 per cent and 10 per cent respectively. Hence portfolio A, which has an excess return of 0.5 per cent every month, has the lowest tracking error since the volatility of a constant excess return is zero. Of course this is an unlikely real-life scenario but the point is used to illustrate the very common misunderstanding about tracking error. This is most severe when tracking error is considered as the bounds around which out/under performance is likely to be held.

For example, a very common misconception is that if a portfolio is measured to have a tracking error of 5 per cent then with 95 per cent likelihood, the active return of the portfolio will be +/-10 per cent over the coming year. This simply is not the meaning of tracking error. It is that the volatility of the excess returns will likely be within 10 per cent subject to 95 per cent confidence bound. Any systematic out or underperformance may well take the actual total return considerably beyond the stated tracking error measures or multiples thereof. Hence when a practitioner sees an active return of twice the tracking error it is more often than not due to an alpha component rather than it being a two-standard deviation event.

To consider tracking error as providing boundaries of performance is to lull oneself into a false sense of security. This is compounded by the fact that one of the most likely causes of suffering underperformance is any failure to adhere to the best information/analysis available. Of course adherence to internal research is not included in a tracking error. Nor, as we see are many other aspects of practical portfolio risk.

**Jack of all trades but master of none**

As a single measure of risk, there is little doubt that tracking error is very good. For example, when tracking error is forecast using risk modelling techniques, such as multi-factor modelling (as undertaken by the majority of the risk vendor systems available) many facets such as style, economic factors and even liquidity may be included within its auspices.

However, there are two key issues that must be remembered before signing off on tracking error as the be all and end all of risk measurement.

First, no risk model encompasses all of the drivers that affect portfolio returns and hence the risks to which they are susceptible. More importantly however, the measurement incorporates both beneficial risk as well as detrimental risk.

Since active managers are compelled to provide returns at least in excess of the fees they charge, it is inevitable that they must take on risk in order to achieve excess return. Tracking error does not readily identify whether the risks being taken are likely to be rewarded. It may be unreasonable to expect any measure to do so however it is reasonable to expect a manager to identify the risks expected to be rewarded and those that are unintentionally being taken. It is these unintentional risks where the true problems lie in wait for a fund.

Therefore risk measurement should focus on the identification of unintentional risk rather than a blanket “catch-all” of total risk that tracking error provides. After all, the intentional risk is hoped to provide the alpha and, as such, should not be traded away.

**The devil is in the detail**

To isolate intentional risk versus unintentional risk, the drivers of risk must be examined. As already mentioned most risk modelling methodologies provide a set of “factors” that outline the drivers of risk that contribute to the tracking error as defined by the particular model. These can be good at isolating some of the risk detail but no model provides a full and comprehensive measure. Worse, none are able to measure or incorporate in any way, the most important source of portfolio risk, adherence to research.

The very essence of most active management is the belief that the particular manager’s investment process identifies undervalued stocks allowing outperformance to be generated. If the portfolio does not accurately reflect the recommendations generated by this investment process then a clear performance risk is generated. Tracking and controlling for this should be the first priority of an active manager and is, accordingly, the first inconsistency identified in client/consultant reviews as it is the investment process for which clients ultimately pay active management fees.

Of course portfolio design is not simply the purchase of favoured stocks as in doing so will lead to unintentional biases. Some of these biases are able to be identified by risk models. Examples include sector or country biases and basic style biases such as size.
and value or growth. ie by simply overweighting the stocks favoured by internal research, the resulting portfolio may experience tilts in various sectors or, if international, countries. These biases may be the driving sources of risk as identified by the risk models. Such information can then be used by the fund manager to compensate by rebalancing the fund in such a way as to ameliorate such imbalances.

Problems arise in what the risk models fail to incorporate in their risk analysis. Although the most important of these may be the adherence to internal research (being overweight a stock that the internal research recommends as being underweighted etc), there are many further examples that should be considered. For example, the following factors should be considered when looking for unintentional risks in a portfolio.

- **Liquidity**: any position in stocks that are illiquid should be seen as providing an unintentional risk as little benefit is attained by their illiquidity but extreme harm can be experienced in times of market volatility.

- **Style**: although incorporated into many risk forecasting models, style is frequently nominated as a facet of particular funds and should be monitored as defined by the fund not the risk model.

- **Concentration**: portfolios that take on extremes in concentration are subject to the risk of extreme performance deviations. Alternatively, excessive diversification reduces the opportunity to provide sufficient excess returns as demanded by clients.

- **Ad-hoc factors**: markets are susceptible to specific drivers from time to time. Currently one such driver is very much in play, exposure to the sub-prime market. The ability to include such factors, when prevailing, into risk analysis is vital for good risk management.

- **Earnings surprise where available**: where an investment process includes internally generated earnings forecasts, it is possible to track the portfolio’s exposure to earnings surprise (the difference between the internally generated EPS forecast and that of market consensus). Where conviction is high in the internally generated figures, the portfolio should be accordingly biased to the “expected” surprise.

- **Mandate compliance**: perhaps the most important unintentional risk form a legal perspective is that of compliance to mandates. Where funds are mandated to comply to predefined limits, whether allocation to sector, stock, active weight etc. any breach opens the manager to the risk of losing the account or, at the extreme, possible compensation claims.

- **Performance**: although not strictly a risk in of itself, the use of performance as a feedback measure is invaluable in assessing risk, specifically research risk. Where the performance of an active position (this may very well be an effective short position where the fund does not hold a stock) has behaved unexpectedly, the manager should ask the question whether the research conclusion is wrong, ie using the performance, both good and bad to raise questions can provide invaluable risk identification opportunities.

In all of these cases, traditional risk modelling provides partial or no information. It is in these details that performance is leaked since funds exposed to such factors are susceptible to systematic performance drift. Since such themes in markets can frequently overwhelm the modest goals of active performance targets the very fact that a fund may be exposed to such dramatic swings negates the very value of the research being undertaken. ie whether a positive return is ultimately achieved is more down to chance with regards which side of the bias the fund lies.

**CONCLUSIONS**

Undoubtedly, tracking error is the best single point estimate of risk in a portfolio but just as a portfolio manager would consider it absurd to manage the return aspect of a portfolio with a single investment pick, so too it should be seen that managing risk in a portfolio with a single figure is inappropriate. This is especially apparent when it is recognised that tracking error does not distinguish between risks that are expected to provide positive returns and those that have no expectation attached.

Although it would be impossible to prove such an assertion, it remains an interesting intellectual question as to how many mandate constraints imposed upon managers are due to clients trying to restrict unintentional risks entering funds. For example, typical mandates might impose limits on sector, country and stock allocation and may include adherence to a predefined style band. Consultants regularly assess and check for adherence to research and, more and more frequently, conditions are being placed on monitoring of trading days to exit from investment positions. It is unfortunate that these issues should be mandated as they reduce the freedom of the manager to achieve active returns. If confidence was sufficient in the manager that proper checks and monitoring were in place then measured investments that breached certain usually mandated constraints may be tolerated as considered investment decisions.

Of course, the use of compliance rather than proper risk monitoring has a more insidious effect on the finance industry, it removes the flexibility from the manager, the very heart of what the client is paying for and then, to compound this problem, it aligns all portfolio’s into similar designs, reducing diversification opportunities at a macro level and limits upside. In short, the use of strict mandates and tracking error as risk controls alone is akin to using a blunt instrument to undertake a surgical procedure. Managers should be encouraged to utilise comprehensive and thorough risk analysis in conjunction with investment research to enable the capturing of recognisable market opportunities.