The Need to Differentiate between Noise and Skill
Too many fooled by randomness?

By Tim Unger and Michael Blayney
Head of Strategy Strategic Research and Senior Investment Consultant, Watson Wyatt

Most outcomes in life are impacted by skill (or a lack of it) as well as noise (random chance or luck). What do we mean by this in practice? We mean that a portion of any outcome is likely to relate to the process that was put in place to produce it whilst another portion is likely to relate to random factors, or noise. In turn this means that if a particular event is heavily impacted by noise then the associated outcome may not be consistent with the process that was put in place to produce it. More simply, a bad result may arise even if the process behind it was actually quite sound.

Clearly outcomes in certain areas of life are less influenced by luck than others. For example, Nassim Nicholas Taleb in his book *Fooled by Randomness* notes that dentists producing good results for their patients probably do so because they are skilful dentists; the random element is limited. Conversely however, there are certain areas of life where outcomes are rather more influenced by noise, and investment is one of these areas. The potential impact of noise on outcomes in fields such as investment is noted in popular expressions as shown in Table 1.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Good</th>
<th>Bad</th>
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<tbody>
<tr>
<td>Process</td>
<td></td>
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<tr>
<td>Good</td>
<td>Deserved success</td>
<td>Bad break</td>
</tr>
<tr>
<td>Bad</td>
<td>Dumb luck</td>
<td>Poetic justice</td>
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Table 1. Popular expressions related to the role of chance


Unfortunately there are also many instances where the impact of random chance on results is not recognised. For example, past outcomes of a roulette wheel are sometimes shown alongside roulette tables. Similarly lottery announcers often specify how often a number has previously been called. Both of these activities make little sense given that each spinning of the wheel or picking of the ball is an independent event if considered in isolation. They imply that there could be skill involved in picking the outcomes in these games when in reality they result from a random process.

THE IMPORTANCE OF HUMILITY

Fundamentally if we suspect that noise is impacting a particular set of outcomes then we might like to show some restraint when judging a process using past outcomes alone. For example, outcomes in the field of trading may well partially represent luck. Given this fact if a trader has had a good set of results, he may well be wise to evidence some humility with regard to such results. He should be asking whether in reality he just got lucky.

Similarly, superannuation fund trustees should worry about labelling an active manager a “bad” manager as a result of a period of bad past performance. Perhaps the process that helped to produce such performance was bad. Then again, perhaps the process was good but a bad break resulted in a poor outcome. More succinctly, a good manager may actually produce bad performance from time to time. We believe that this point is often undeveloped in the minds of fiduciaries.

FINANCIALLY DETRIMENTAL TOO

We have seen that a failure to differentiate between luck and skill may simply be unfair – it could cause us to make the wrong judgment on a person’s ability.

In addition to unfairness however, making the wrong judgment as a result of noise may also damage your wealth, or rather the wealth of your superannuation fund members. For example, if we assume that an active manager with a good process will outperform an active manager with a bad process over the long run, sacking the manager with the good process as a result of short-term noise may be a poor decision from a financial perspective. A failure to appreciate the impact of noise not only can cause us to make wrong judgments, it can also cause us to make wrong decisions as well.

ILLUSTRATING THE IMPACT OF NOISE

In reality it is very hard to quantify precisely the likely impact of noise on an investment (or any other) outcome. We can however theorise why the impact of noise on investment outcomes is likely to remain into the long-term. To do this it will be helpful to introduce the concept of probability, or more precisely the probability distribution.

The probability distribution

Noise creates additional doubt with regard to future outcomes, and the language of quantifying such doubt is probability. (If we are completely unsure as to the range within which a set of future outcomes will fall, we are said to be completely uncertain and probability will not be of assistance – we will avoid a discussion of this here however.)

Central to the concept of probability is the probability distribution. Let us look at the example in figure 1. Line A shows the actual probability distribution of a single manager’s active returns relative to a benchmark (skill and noise included) over three years. This is simply a graphical distribution of the value (horizontal axis) and frequency (vertical axis) of a series of active return outcomes.

With these two axes it is possible for us to evaluate the proportion of the total number of outcomes which will exceed a particular value. In this example we can see that the most frequent outcome associated with this active manager is to beat the benchmark by +0.2 per cent per annum (and that 65 per cent per annum of returns will exceed the benchmark, or 0.0 per cent per annum, after three years). As a result the highest part of the probability distribution is at +0.2 per cent per annum, or in other words the most frequent (median) observation is +0.2 per cent per annum. However, the outcome associated with the active manager is not always +0.2 per cent per annum Sometimes the outcome has been higher; sometimes it has been lower and even negative.

Now we can turn our attention to the blue line. This is the distribution of active returns which would have arisen if there had been a perfect map of skill to outcomes for this active manager; in other words if there had been no noise. We can see that noise and skill (the red line) result in a wider distribution of returns relative to that justified by skill alone, although the most frequent active return would again have been +0.2 per cent per annum.

We can also see that noise explains a large proportion of the negative returns for this active manager; the line illustrating skill (line B) is below 0.0 per cent per annum, to less of
an extent than the red line (representing both noise and skill) is.

So what is the key message that fiduciaries should derive from looking at this diagram? Let us assume that the negative performance, due purely to noise in this case, will wholly occur during a shorter, say three year, period. This is a “good” manager which underperforms for a short three year period purely as a result of random influences. Fiduciaries that are not mindful of the potential impact of noise may make the wrong decision; they may terminate an essentially skilful manager.

IDENTIFYING SKILL FROM NOISE

Under certain circumstances, after enough time has passed the shape of the distribution of active manager returns (containing noise and skill – the red line) should end up mimicking the shape of the distribution of skill alone (the blue line).

What circumstances are required for this situation to arise though? Two conditions:

1. The people implementing the active management process would have to stay the same (this assumes that the genetic ability of the people implementing a process remains fairly stable).
2. The environment (firm environment, market conditions) within which the process is being applied would have to remained unchanged.

In reality the two requirements above are very seldom, if ever, achieved within the world of active management. This means that even long and deep datasets of past performance are unlikely to yield meaningful information regarding the existence or otherwise of a truly skilful manager. There is a rationale for the oft-quoted risk warning “You should note that information on past performance is not necessarily a guide to future performance.”

NOT SUCUMBING TO NOISE

The conclusion above may seem rather unsatisfactory. As humans we tend not to like situations where experts in a field admit to limitations to the scope of their knowledge – after all, experts get paid for their knowledge not for their humility!

However, appreciating that we cannot always distinguish between noise and skill within outcomes is central to the advice given by investment advisers. Put more succinctly, our job is very often to avoid succumbing to the impact of noise.

Examples of investment consultants trying to strip out the impact of noise in decision-making are included below:

- When trying to predict prospective outperformance of active managers, we focus on process as opposed to outcome. Indeed this explains why we use qualitative research methods when carrying out investment manager research in addition to quantitative techniques on past track records.
- When establishing long-term return assumptions for different asset classes we rely on large and long-term datasets. Ultimately this assumes greater stability in capital market conditions than within active manager return datasets.
- When reviewing an active manager as well as ourselves we recommend that clients use an array of different measures, not just single measures of past performance.
- When searching for active strategies that are likely to outperform we may well favour those approaches which are less dependent on particular individuals if they have capacity. For example we are relatively favourable towards the potential for beta primes to outperform cap-weighted benchmarks in a sustainable way given their potential capacity and independence from personnel change.

CONCLUSION

In this paper we have sought to bring to life what for many is a rather dry area – the impact of noise on investment outcomes. The statistical methodology underlying probability distributions can be rather technical. The importance of an appreciation of noise for investment decision-making at the fiduciary level is, however, very important.

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2 See Flight Plan, Watson Wyatt, November 2006, for further explanation of the beta prime concept