Tamohara
INVESTMENT MANAGERS

Mean Reversion and the role of Normalisation in Investing **October 2017**

As part of our research process, we spend a large amount of time and resources on conducting primary research on our portfolio companies. This involves traveling across the country to meet with dealers, distributors, suppliers, and competitors of the companies under coverage. In order to beat the frequent flight delays and the subsequent long waiting hours at the airport, I devised a strategy that I started using before booking my flights. For each flight that I would short-list, I would check the last five days data of take-off and landing timings, and then pick a flight with the least delays. To my excitement, this system worked really well initially. My happiness, however, was short-lived, as I soon started experiencing delays again, despite choosing flights that were mostly on time.

During one such long wait at the airport, it dawned upon me that I had ignored a couple of important considerations in drawing my conclusions. Firstly, flight delays can be caused by several factors, most of which are uncorrelated with each other. For instance, bad weather, mechanical/technical issues, congestion, accidents, are some of the reasons for a delay in flight, and neither of them necessarily leads to the other. Secondly, many of the reasons for flight delays like weather, accidents etc are random events i.e. luck/chance determine their occurrence. I was immediately reminded of a phenomenon called Mean Reversion.

What goes up, must come down…

Mean Reversion is derived from a statistical observation called Regression to the Mean which states that: *'if a variable is extreme on its first measurement, it will tend to be closer to the average on its second measurement—and if it is extreme on its second measurement, it will tend to have been closer to the average on its first'* (Source: Wikipedia). In other words, extreme outcomes tend to be followed by more moderate ones. This is true in any complex phenomena that is dependent on many variables and where there is an element of chance/luck involved. In fact, the intensity with which mean reversion affects an activity is directly proportional to the element of luck controlling the outcome in that activity.

Arguably, stock market investing is one such activity where, in addition to skill, luck also plays a significant role in determining an investor's performance. One could therefore infer that stock market returns should tend to mean revert, i.e. a period of high returns should be followed by a period of low returns. This is indeed true over the long term (periods of more than a year). For instance, the two-decade average return on BSE500 since 1st February' 1999 (inception of index) to 30th September' 2017 is a CAGR of 15.16%! The return since inception of index till 8th January' 2008 (peak of previous Bull Market) was a stupendous CAGR of over 27%. What followed next was mean reversion of returns – CAGR of 5%. As an aside, for investors that are worried about market levels and fear a sharp fall in prices following the bull run in the last few years, the last 5-year (30th September 2012 to 30th September 2017) return CAGR of broader BSE 500 has been 13.5%, below long-term averages and nowhere close to a bull market return.

The phenomenon of mean reversion provides an explanation for the disappointment of the retail investor. Typically, retail investors are said to chase returns – i.e. invest in the markets following years of high returns. There is no doubt that these investors end up with underwhelming returns, as they typically witness mean reversion first-hand. The same is true for fund-flows. In an extensive study of the Morningstar fund ratings and subsequent performance of high rated funds, published in The Wall Street Journal, authors Kirsten Grind, Tom McGinty, and Sarah Krouse highlight that: *'Funds that earned high star ratings attracted the vast majority of investor dollars. Most of them failed to perform. Of funds awarded a coveted five-star overall rating, only 12% did well enough over the next five years to earn a top rating for that period; 10% performed so poorly they were branded with a rock-bottom one-star rating.'* Rather than criticizing the Morningstar rating system, the article highlights the flaw of a backward-looking system – i.e. drawing conclusions on the future based only on the historical data. In other words, any system that merely relies on the extrapolation of the recent past in to the future is bound to not work, mainly due the phenomenon of mean reversion.

Mean Reversion is observed not just in the markets, but also in the businesses that underlie the stocks that form the market. No matter how skilled a business manager is, it is inevitable for a business to ignore the vagaries of the macro-economic environment it operates in. Similarly, political developments, natural disasters, geo-political tensions cannot be hedged effectively. Thus, business outcomes also have an element of randomness in them. In other words, business results tend to mean revert too! In our view, the investing community remains oblivious to this important tendency. In their myopic outlooks, investors extrapolate the most recent business outcome in to the future, a behaviour also known as Recency Bias. Consequently, strong growth is projected to remain strong, whereas a cyclical downturn is generally projected as a structural problem – one of the main reasons for market excesses (peaks and bottoms).

The time factor

"But regression to the mean is not a natural law. Merely a statistical tendency. And it may take a long time before it happens."

- Peter Bevelin in Seeking Wisdom: From Darwin to Munger

Outcomes that are driven by randomness can deviate sharply in the short term, however, in the long term, they tend to gyrate around a mean. Consider a fair coin toss for example. Here, the outcome is based purely on luck, as there is no skill involved in determining the outcome of the coin toss. Thus, the outcome should mean revert. This, however, does not imply that if the first toss lands a head, the next consecutive toss will land a tail. Rather, over a fairly large number of coin tosses, the number of heads and tails would be nearly identical. Thus, one of the necessary conditions for mean reversion is a large sample size, or in investing parlance, a long time-horizon.

For business analysts, what this implies is that while it may be difficult to forecast the near-term growth with precision, one can be reasonably sure that in the long term, growth will mean revert to more sustainable levels (historical average or industry averages or overall economic growth, depending on the nature of the business and the size of its opportunity in comparison to its current size). It is ironical then, that more effort is spent in forecasting the near-term growth (more randomness) than in determining the long term sustainable growth (higher certainty).

Normalisation is the key

In his book The Success Equation, Michael J. Mauboussin writes: *"Understanding and using the phenomenon of reversion to the mean is essential in making sound predictions [decisions]… Reversion to the mean is most pronounced at the extremes, so the first lesson is to recognize that when you see extremely good or bad results, they are unlikely to continue that way. This doesn't mean that good results will necessarily be followed by bad results, or vice versa, but rather that the next thing that happens will probably be closer to the average of all things that happen."*

We deduce a three-step approach to better deal with mean reversion from the above:

A. <u>Identify</u>: When looking at an event, it is important to first determine the role of luck in the outcome. For example, there is very little luck involved in a game of chess, whereas a coin toss is mostly a matter of luck.
B. <u>Anticipate</u>: Having identified the extent of the role of luck, it is important to acknowledge that events with a high involvement of luck will have a high likelihood of mean reversion. Thus, each time you seen an outcome that seems to be away from the average outcome, expect the next outcome to be closer to the average outcome.
C. <u>Project</u>: Rather than extrapolate the immediate next outcome, focus on the long-term trend.

"The goal of forecasting is not to predict the future but to tell you what you need to know to take meaningful action in the present."

- Paul Saffo in Six Rules for Effective Forecasting

As part of our research process, we deal with mean reversion by focusing on the long term and on normalisation. Thus, our financial forecasts include a long term normalised forecast. In this way, we avoid the trap of extending the trend i.e. projecting the current growth trajectory well in to the future. For businesses that are currently showing exceptional growth, our process ensures that analysts forecast lower growth in the future, and vice versa.

We believe that investors evaluating investment managers would also benefit from a similar approach. In looking at performance over a 10-15 year horizon, investors can reduce the element of luck in the performance as it would have mean reverted by then. Thus, the performance will be a better reflection of the investment manager's skill and process. This can further be tested by looking at fund performance in years of bad overall markets as then the support from luck would mostly be missing. In other words, seeking a process which is rational and logical is more relevant for investors rather than just following the returns of a fund on a standalone basis.

A word of caution before we end this note. Decisions that are based on a single mental model are bound to be less than accurate. There is no system that is devoid of flaws; mean reversion has its own limitations. As mentioned earlier, mean reversion is usually observed over a long period and may not work in the short term. Thus, it is important to recognise that any business that reports an above average growth or any investment manager that generates top quartile returns may continue to do so for an extended period before mean reverting. Basing short term actions purely on mean reversion may lead to undesired results. Use mean reversion as one of the tools for decision making rather than the only tool. It is for this reason that in addition to normalised earnings, our process also emphasizes on primary research, for it is only on the ground that the first signs of any trend reversal are found.

On that note, our next flight is ready for take-off. Until another time…

On behalf of Team Tamohara,
Devang Mehta & Tejas Gutka

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