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Base effects

by Tom Delic

Our everyday lives involve countless decisions made under uncertainty. Incomplete, complex, and often conflicting information can steer our thinking away from crucial underlying factors that are likely to be more beneficial inputs into decision making. One such input are base rates, which can repeatedly be ignored when we perceive new information to be more relevant to our individual situation.

Perhaps the simplest example of a base rate is the flipping of a coin. The likelihood, or base rate, of a flipped coin landing on heads is 50%. With just one event taking place (the coin flip) and two possible outcomes, most people would comfortably get to the correct answer when asked what probability they would assign to the coin landing on heads. Unfortunately, as complexity rises, we quickly start running into difficulties and lose sight of the underlying base rate. It feels intuitively correct to say the probability of getting 10 heads in a row is lower than a random sequence of heads and tails, but we know that both are equally likely.

To take it further, consider a person who would like to test to see if they have a particular virus, in which the prevalence of the virus across the population is 0.5%. The test itself is not completely accurate, with 95% of people who have the virus testing positive, and 90% of people who do not have the virus testing negative. If the person's test results come back positive, what are the odds they do in fact have the virus? The person may initially be filled with fear, believing that, having tested positive, they have a 95% chance of having the virus. The actual probability, calculated using a form of statistical inference called Bayes' Theorem, is much lower at just over 4.5%*.

As the initial base rate moves out of sight (in the above case, the prevalence of the virus across the population), the less it influences decision making and we quickly turn to the qualitative to aid our decisions. When making investment decisions, a compelling narrative, which could be good or bad and often evokes an emotional reaction in us (e.g. excitement or despair), we tend to disregard statistical data such as base rates. This can compound as we seek out further instances that confirm our newly held beliefs.

As investing sits somewhere at the intersection between skill and luck, it makes sense to anchor your decision making with base rates as a starting point, attempting to put the odds in your favour for a good investment outcome.

There is a significant archive of studies across the investment industry which can provide investors with base rate statistics, giving them areas to focus on and others to avoid. Some well-known research areas include the outperformance of stocks in the cheapest percentiles of various valuation metrics, and of funds with both a high active share and low turnover. For equity and fund analysts, this data offers pools of opportunities to begin research, knowing you are fishing in an area that has historically produced good investment returns.

Research also exists to refocus a mind that has been clouded by an exciting investment narrative, such as rose-tinted management forecasts. In an excellent Credit Suisse study[1], the authors found that across 44,000 observations from 1950 to 2014, historic net income growth rates for listed companies had zero to negative correlation with future 1-, 3- and 5-year returns. Consequently, the base rate, which is the median net income growth rate for the universe, is a more reliable starting point for an analyst's forecasts.

Base rates are a useful tool for investors when making decisions that involve factors that can disrupt the balancing of risk and reward, and while we are all susceptible to inadvertently leaving them out of our decision-making, an awareness of them should aid in improving outcomes.

* Solution:
Probability of having the virus given the person has tested positive = P(V/P) = 0.5% x 95% = 0.48%
Probability of not having the virus given the person has tested positive = P(NV/P) = 99.5% x 10% = 9.95%
P(V/P) = 0.48% / (0.48% + 9.95%) = 4.56%

Source
1 'The Base Rate Book – Earnings Growth' – Mauboussin, Callahan, Majd, December 2015

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