

You Can't Handle the Truth! (Sorry, the Loss!)

As a holder of a Bachelor of Science degree with majors in Mathematics and Statistics, I am frequently ridiculed (often by my MitonOptimal colleagues!) for being a regular buyer of a lottery ticket. Common comments made follow the trend of "Don't you know you've got more chance of being hit by lightning/bus/cow than winning?" and "Do you know how small your chances are of winning?". This was exacerbated by an accusation (also by a MitonOptimal colleague) that my love of surfing (and hence exposure to sharks) was antithetical to my avowed risk-mitigation stance in portfolio management.

Firstly, the lottery. As a stats major, I know exactly what my odds of winning are. In South Africa, our National Lottery consists of choosing six numbers between 1 and 49 inclusive (in stats-speak, without replacement). Hence there are 10,068,347,520 different permutations, of which I have to select the correct one to win the big prize. My chances of winning are infinitesimal, but with a current jackpot of about R30,000,000, it's tempting to play. More importantly, my chances of losing are almost inevitable but, critically, there are two things I know about that. The least important is that I know the exact odds. The most important is that I can afford the loss. Ten lines of randomly drawn numbers cost R100 and I am fortunate to be able to lose it and know I'm going to. (But just imagine if I won!).

In stats-speak, the expected value of one's return is the value of the return multiplied by the probability of the return. I know the expected value of my return on the ten lines of lottery numbers is very close to -R100. Incidentally, and here is where the Maths part comes in, my chances of winning are infinitely greater than those of my colleagues who haven't bought a ticket!

Bringing this back to investments and how we manage portfolios, here I borrow from the extraordinary Nicholas Nassim Taleb who has written two of the most seminal books on investing ever and introduced us to the much-misinterpreted expression of "Black Swan".



**Discretionary
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Taleb was asked what he thought the markets were going to do and he averred that he was bearish but thought the market had a 70% chance of going up. His audience couldn't reconcile a bear who thought the market was rising. When quizzed about it, Taleb explained that he thought the market had a 70% chance of going up about 2% but a 30% chance of dropping about 20%. Therefore, the expected value of one's investment in the market was $(70\% \times 2\%) + (30\% \times -20\%) = -4.6\%$. So, he was bearish as he expected to lose money.

All too often, investors rely on probabilities without taking into account the size of the outcomes that accompany the probability. And as Taleb says, if you can't handle the size of the loss should it occur, even if it's a one-in-two-hundred-year probability, don't invest! It's not the probability that matters – it's the size of the event.

That is why we construct multi-asset, multi-outcome portfolios for clients, using uncorrelated asset classes and portfolios, to both reduce the probability of loss AND the size of the loss if markets should fall.

Finally, referring this logic back to one of my favourite pastimes surfing. In the last 100 years, there have been about 400 shark attacks on South African beaches, and 6 of them occurred where I surf, the last one being in 2014. That means that my probability

of encountering a shark, using 100 years of data, is about 6 in 36,500,000, assuming that approximately 1,000 people surf every day up and down the coast of South Africa (a considerable underestimate I am sure). So, using my argument above, I should not be using the 1 in 6,000,000 probability of being attacked, I should be assessing if I can handle the loss of being attacked, which I clearly cannot. But surfers are 'stupid' that way, even maths and stats graduates, and it is just too much fun!

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