

ACT ON CAMPUS

THE BLACK SWAN

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The world in the year 2000 was in some ways strikingly similar to the world in 1900. Both were periods of globalisation: in preceding decades international trade had become progressively freer and international capital flows had been liberalised, leading them to increase hugely.

As well, both were times of optimism. The nineteenth century had been a century of relative peace and steady economic growth, underpinning progress in living standards, health and education; in some countries even crime was falling. In 1900 there seemed every reason to suppose that such progress would continue indefinitely.

Likewise, in 2000 world poverty was being rapidly reduced, several hitherto common and devastating diseases had been eliminated, and the communist challenge had disappeared, leading some commentators to proclaim that Western-type liberal-democratic capitalism would soon triumph worldwide.

And yet, if in 2000 we could have travelled back in time to 1900 to report on what had happened in the twentieth century, we would surely have sounded like visitors from another planet. We would have told of a world war of unprecedented destructiveness that was due to break out in Europe in a mere 14 years, and of the subsequent rise in Europe of two totalitarian empires, which clashed in another world war of even greater destructiveness, and of the subsequent Cold War which ended with the collapse of communism, the most inhuman and impoverishing doctrine the world has ever known.

If we had managed to convince our friends of 1900 that we were telling the truth, they would no doubt be relieved to know that such horrors seemed to have passed by 2000; but they might well then wonder what lay in store for us in the twenty-first century. They might reason that, just as they could not foresee the scarcely believable course of the twentieth century, so we in 2000 should not rule out the possibility of the world being engulfed in our

lifetimes by similarly unexpected events with similarly unforeseeable consequences.

Indeed, much of the optimism of 2000 has already faded. Protectionism is stirring again in the United States, the centre of the drive for globalisation. Russia's time as a Western-style liberal democracy may be over already, and its leaders are reigniting tensions with their neighbours and the West. Militant Islamic fundamentalism is on the rise in the Muslim world, challenging the legitimacy of the West. These tendencies may be the start of movements that will reshape the world, or they may not. There again, the twenty-first century may ultimately be dominated by completely different events, technologies and movements that we cannot conceive of today. At the very least, the history of the last 100 years should make us accept that the really big events that change the world are unexpected.

These musings may seem idle and somewhat sombre, but I hope they are an effective introduction to my topic, which is a book titled *The Black Swan*.¹ It's one of the most unusual and intriguing books I've read for a long time, and it's presently causing quite a stir. Its subtitle – *The Impact of the Highly Improbable* – indicates the link with my introductory remarks. Its author is Nassim Nicholas Taleb, an American financial trader of Lebanese origin. I want in this talk mainly to give his ideas an airing, without either necessarily agreeing or disagreeing with them (though I am critical of some of them), since I think it's fair to say that, whether we agree with all of them or not, they should affect the way we think about the future and about what, if anything, we can do to prepare for it.

It's by observing episodes of unexpected turmoil in financial markets that Taleb worked out what he thinks has gone wrong with our attempts to forecast events, in both finance and generally. We are wedded to the assumption that the future is likely to resemble the present. We study past events and regularities, and work out the probability of their recurring. This notion of *probability* has been refined by some modern economists into a concept of mathematical precision, and it is, we like to believe, our handle

¹ Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable*, Allen Lane, 2007.

on the future. Perhaps for most of human history the idea of probability was an adequate way to prepare for the future but not in the complex and integrated modern world of several billion people. Increasingly, Taleb argues, the world is dominated by what he calls 'Black Swans' (I'll shortly explain why he uses that term). He defines a Black Swan as an event with three attributes, thus:

First, it is an *outlier*, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact. Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence *after* the fact, making it explainable and predictable (pp xvii–xviii).

Black Swans can be benign: examples are the Internet and the unparalleled success of the Harry Potter novels. They can be malign, like the two world wars (though the First World War was surely much more unexpected than the second), or the Al-Qaeda attacks in the United States on 11 September 2001. Or they may be either, depending on your point of view; examples are the emergence of Christianity and Islam as major world religions. Black Swans can even be negative: things that almost everyone expects to happen but don't. Good examples are the world overpopulation crisis and the fear of a new ice age in the 1970s, which happily were non-events. Taleb's argument is that the future is becoming increasingly unpredictable because Black Swans are becoming more common. At any moment an infinite number of unexpected things could happen, each of them extremely unlikely. Yet some of them will happen, but of course we have no advance idea of which ones or when.

But why this name 'Black Swans'? Here is how Taleb opens his book:

Before the discovery of Australia, people in the Old World were convinced that all swans were white, an unassailable belief as it seemed completely confirmed by empirical evidence. The sighting of the first black swan might have been an interesting surprise for a few ornithologists ... but that is not where the significance of the story lies. It illustrates a severe limitation to our learning from observations or experience and the fragility of our knowledge. One single observation or experience can invalidate a general statement derived from millennia of confirmatory sightings of millions of white swans (p xvii).

The sighting of black swans by European settlers in Australia is indeed a standard textbook example of what philosophers call 'the problem of

induction' – which is that no number of supporting observations, however great, can prove a general proposition: at any time evidence contrary to the proposition may appear. Yet science and research normally proceed by 'induction', by gathering evidence, looking for regularities in the evidence, running experiments to see whether the regularities hold, and so on. In the social sciences such regularities are typically less reliable than in the physical sciences, and take the form of probabilities that can sometimes be measured. Taleb's ambition is to get away from this approach and to adopt a view of the world that is governed not by probability but by the *randomness* of an unknowable probability distribution, and so is more alert and open to the possibility of Black Swans, giving us a better chance of coping with them when they happen. I'll come back to that later.

Recall that the third attribute of a Black Swan, in Taleb's words, is that "human nature makes us concoct explanations for its occurrence *after* the fact, making it explainable and predictable". The way we typically do this is to tell a story about it. We reconstruct a sequence of events that imposes a sort of sense or logic on the Black Swan and makes it seem as if things were bound to turn out the way they did. Taleb believes that these stories are really products of our imagination, even when they are respected historical accounts of great events.

Standard accounts of the First World War, for example, describe 'mounting tensions' and 'escalating crises' in Europe in the years before 1914. But although that may make sense to us now, it's more likely that at the time the tensions between the European powers seemed the familiar stuff of international diplomacy that had been going on for decades, and that when the war broke out it came as a surprise. Taleb cites the work of Niall Ferguson, the Harvard-based historian, who looked at the prices of imperial bonds, which would reflect investors' expectations of governments' financing needs. Ferguson found that bond prices reflected no expectation of any increase in governments' demand for finance in the period before 1914 (p 14n), whereas if a war had been expected they surely would have done. Proper history would have to take that into account, and accept that luck, good and bad, plays a role in history. If you like, that's just a way of

admitting that we don't know why some things happen. But admitting our ignorance is hard for us to do.

Another example of what Taleb calls the 'narrative fallacy', that is, trying to master Black Swans by weaving them into stories that make sense to us, is the attempt to replicate benign Black Swans by rerunning the sequence of events that led up to them. Right now, publishers will be receiving a flood of manuscripts submitted by would-be authors of the next Harry Potter, all trying to reproduce what the authors believe to be the secrets of J K Rowling's success. Life stories like those of Bill Gates have inspired a genre of books on how to become a billionaire. The chances are that few of the manuscripts will be published and that none of those that are will be a great success; and surely few people who waste time reading a book on how to become a billionaire will ever be one. What we really need to know is how many people have trodden the same paths as J K Rowling or Bill Gates and ended up failures or broke. But that would spoil the comfortable narratives with which we try to make sense of Black Swans.

Indeed, Taleb fears that we're hard-wired to finding evidence that confirms what we think to be the case, rather than evidence that refutes it (the 'problem of induction' again). It probably helped humanity survive in its early development; the proverb 'once bitten, twice shy' sums up something on those lines. If so, then it follows, as Taleb is well aware, that trying to prepare for Black Swans goes against our natures and will therefore be difficult. Indeed, is it possible at all? How can we prepare for what we can't foresee? Taleb recommends what he called 'practical skepticism', a readiness always to doubt the conventional wisdom and to expect our deepest assumptions to be challenged at any time by events.

Taleb cites two social philosophers who he thinks got this right. One is Karl Popper, best-known as the author of the anti-totalitarian study *The Open Society and its Enemies*, which he wrote during the Second World War while a lecturer at what was then called Canterbury University College in Christchurch. Popper's method was not to find regularities in experience (for example, what do bestsellers have in common?) but to rigorously test

hypotheses – to try to disprove hypotheses in light of the evidence (for example, how many books that share the attributes of bestsellers have flopped? Most of them, of course). Only those hypotheses that survived such rigorous tests should be treated as if they were true, but only provisionally, since at any time they could be refuted. Naturally, Taleb sees in this approach the antidote to the ‘narrative fallacy’, if only we can make ourselves live with the consequent uncertainty.

In addition, Popper had his own theory of Black Swans, though he didn’t call them that. As Taleb summarises:

Popper’s central argument is that in order to predict historical events you need to predict technological innovation, itself fundamentally unpredictable ... Prediction requires knowing about technologies that will be discovered in the future (pp 171, 173).

This is surely a knock-down argument against the possibility of reliably forecasting the future. If we knew about future inventions today, we would be inventing them today, and so they would not be future inventions but present ones. The future will be shaped in part by inventions that we cannot know about today. One reason for the Black Swan of the expected world overpopulation crisis that didn’t happen was the Green Revolution, the invention of new strains of wheat, harvested in India and Pakistan, which enabled food production to increase faster than the population. Think of that when you hear today’s fashionable forecasts of imminent environmental doom.

The other social theorist that Taleb invokes in his aid is Friedrich Hayek, who stressed uncertainty and the limits of knowledge. Taleb writes:

For Hayek, the true forecast is done organically by a system, not by fiat. One single institution, say, the central planner, cannot *aggregate* knowledge; many important pieces of information will be missing. But society as a whole will be able to integrate into its functioning these multiple pieces of information. Society as a whole thinks outside the box (p 180).

Society as a whole thus knows more and makes better forecasts than any of its individual members. This implies that society as a whole may be more prepared for Black Swans, and more able to cope with them when they happen, than is any one individual. But not invariably so: markets often have a better sense of what’s coming than do individuals, but, as we’ve seen, they apparently didn’t foresee the First World War.

But Taleb has gone beyond just advocating 'practical skepticism'; he is actually trying to make a living from it. He is 'putting his money where his mouth is' by managing an investment fund in a way that goes against the orthodox methods of risk management. As I've already mentioned, Taleb's Black Swan theory derives from his observations of unexpected volatility in stock markets, and he devotes quite a lot of his book to that subject.

The formative experience in Taleb's intellectual history took place as long ago as 1987, when he was working for an investment bank in New York. He had grown up in Lebanon during the civil war that began there in 1975; he says he noticed even then how little anyone seemed to know about what was going on. The consensus, he says, was that the war would last "a few weeks"; in fact it ended in 1990, 15 years after it began. This sense that people didn't know what was going on, even if they thought they did, never left him, and so he was better prepared than most for what happened on 19 October 1987. On that day the stock markets experienced what is still their biggest fall in a single day. Moreover, it was completely unexpected – Taleb says "it was not even the response to any discernible news" (p 18) – and it baffled and traumatised a finance industry which had convinced itself it knew how finance markets worked. What was worse, says Taleb, the industry seemed unable to learn from this event. In accordance with the third attribute of Taleb's definition of a Black Swan, the crisis was conveniently explained away and forgotten, and so the industry set itself up for another Black Swan, which duly arrived a little over a decade later, and maybe is recurring right now.

In 1997 the Nobel Prize in economics was won jointly by Robert Merton and Myron Scholes in appreciation of what the Nobel committee described as their "new method to determine the value of derivatives". The two economists were founder partners of a speculative trading firm called Long-Term Capital Management (LTCM). Relying on highly sophisticated models of risk and probability that ruled out the possibility of large deviations, the firm took on an unprecedented amount of risk. But then, in the summer of 1998, a series of events beginning with a Russian financial

crisis occurred that lay outside the scope of the firm's models. LTCM went bust and for a while threatened to bring down the entire US financial system. You can guess what happened then: the finance industry forgot about the event as soon as possible, and the industry remains wedded to the modern portfolio theory to which Merton and Scholes are major contributors. So get ready for the next financial Black Swan.

Taleb himself, however, has tried to learn from the financial Black Swans and has worked out an unorthodox investment strategy. It is to avoid what financial advisers call 'medium risk' and to combine being hyperconservative (in order to avoid harmful Black Swans) and hyperaggressive (in order to catch beneficial Black Swans). Invest most of your money – up to 90 percent – in the safest possible way, in US Treasury bills, for example. The rest you should invest in a highly speculative way, such as in venture capital portfolios, spread over as many firms as possible. Alternatively, have a highly risky portfolio but insure against possible losses of more than, say, 15 per cent. That way, sudden and unexpected stock market downturns won't do you much harm; at the same time, you give yourself some chance of gaining from the next world-changing technological breakthrough or from Harry Potter's successor.

Taleb doesn't say how well his strategy is performing compared with orthodox ones. But it's noticeable that during the financial upheaval that began in August 2007, reflecting problems with the US sub-prime loans market, many investors adopted the hyperconservative part of Taleb's strategy and, intent solely on avoiding further losses, piled into US Treasury bills.

There is very much more of interest in this book, which I cannot even summarise here. Some of it is quite hard going, for which Taleb tries to compensate with an ultra-casual and entertaining style. But I want to say a few words about my reaction to Taleb's central ideas.

First, the 'problem of induction': the fact that any number of identical observations can't prove that a general proposition (like 'all swans are

white') is true, whereas a single observation (like the appearance of a black swan) can prove that it's false. This may be the case, but we surely have to conduct our lives largely on the basis of continuing regularities. Will the sun rise tomorrow? It has done so every morning in human experience, but that doesn't prove that it will do so again tomorrow. But it's a fair bet that it will, and it is reasonable to arrange our lives on that assumption. Most scientific theories, like gravity and the laws of motion, are working hypotheses. I don't see how we could live without assuming that the familiar regularities will continue. That doesn't commit us to any philosophical position, and we can be mentally prepared for the possibility that those regularities may not be borne out. Likewise, if I need an operation, I hope the surgeon will use methods that have worked in the past rather than conducting an experiment to test some new medical theory that may well lead to more successful operations if it's sound but have disastrous consequences for me if it isn't. The sheer economics of living obliges us to generalise from experience much or most of the time. The message I take from the book is the need to be alert to the conditional nature of assumptions based on induction.

Second, I'm not wholly convinced by Taleb's critique of the finance industry. Efficient market theory predicts that the reliability of most professional financial forecasts is low, since price movements should follow a random walk, perhaps around a trend. We should indeed be sceptical about the accuracy of highly sophisticated, computerised and allegedly infallible mathematical models of risk pricing. They may give forecasters an edge, but they cannot eliminate the problem of randomness. For most of us, it's better to be 'roughly right rather than precisely wrong', as Taleb puts it (p 285). Yet in recent decades the stock markets have been reasonably stable and have performed quite well. The two main rules of thumb for investing in stock – invest for the long term, and diversify your portfolio – seem well-founded. Taleb's investment strategy of combining 'hyperconservatism' and 'hyperaggression' proposes that he can predict which Black Swans are going to be benign rather than malign. It is not obvious why this strategy will outperform conventional approaches.

In line with this interpretation, I'm not convinced that the financial Black Swans of 1987 and 1998 were quite the events Taleb implies they were. He suggests that they are evidence of what he calls "naïve globalisation". While generally favouring globalisation, he writes:

. . . it creates interlocking fragility, while reducing volatility and giving the appearance of stability. In other words it creates devastating Black Swans. We have never lived before under the threat of global collapse. Financial institutions have been merging into a smaller number of very large banks. Almost all banks are now interrelated . . . the increased concentration among banks seems to have the effect of making financial crisis less likely, but when they happen they are more global in scale and hit us very hard (pp 225–6).

But whereas the crises of 1987 and (especially) 1998 might have been global in scale, I don't think their impact was particularly hard. New Zealand was perhaps a partial exception in 1987 but other factors (in particular, the disintegration of the Lange Labour government) impacted at the same time. In most economies, markets recovered quite quickly, and they were not clearly responsible for any subsequent slowdowns in the real economy. The obvious comparison is with the stock market crash of 1929 and the ensuing Great Depression of the 1930s, a genuine catastrophe largely brought on by Federal Reserve mismanagement of monetary policy and a *retreat* from globalisation as countries erected tariff barriers against each other's exports. "Naïve globalisation" looks a better bet than naïve protectionism. Globalisation may well have the opposite effect to that envisaged by Taleb: it makes financial crises worldwide in their reach, but it may thereby *dissipate* them by spreading the pain wide and making the necessary adjustments easier.

Still, the future is uncertain and in many ways unknowable, and that may serve as a summary of the core of sense in Taleb's book. As I tried to show in my introduction, the events of the twentieth century, especially its first half, breached the limits of the possible, even the conceivable, that had been taken for granted for centuries beforehand. The interconnectedness of the modern world does greatly increase the reach of the unintended and unforeseeable consequences of actions and events. The existence of a Black Swan can be hypothesised, but its occurrence is always a surprise. Some may expect it and plan accordingly; others may not. If decisions were taken by majority vote, society would be unprepared. But societies that are free and open are best equipped to correct the intellectual errors

that disarm us in the face of the unexpected; and those societies in which decision-making is as decentralised as possible are best able to adapt to the unexpected when it arrives.