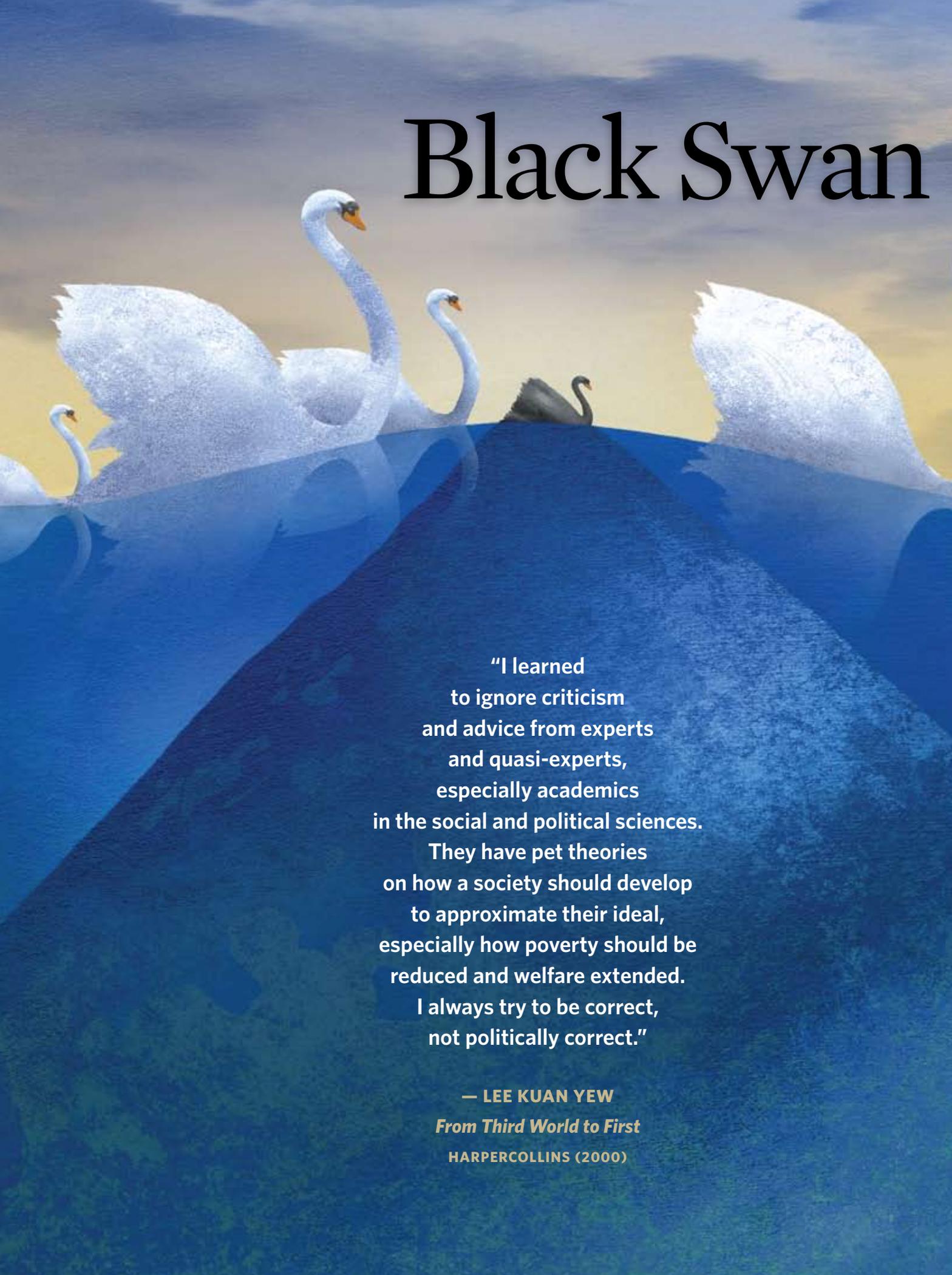


Black Swan

The background of the entire page is a photograph of a group of swans. In the foreground, several white swans are visible, their bodies and necks reflected in a dark blue, glossy surface that appears to be water. In the background, a single black swan is visible, standing on a light-colored, possibly sandy or grassy, shore. The sky is a pale, hazy blue.

**"I learned
to ignore criticism
and advice from experts
and quasi-experts,
especially academics
in the social and political sciences.
They have pet theories
on how a society should develop
to approximate their ideal,
especially how poverty should be
reduced and welfare extended.
I always try to be correct,
not politically correct."**

— LEE KUAN YEW
From Third World to First
HARPERCOLLINS (2000)



or Black-Scholes?

The Crisis of the Actuarial Profession

BY GERRY SMEDINGHOFF

How do you price future financial risks in a world dominated by unexpected single events whose probability can't be measured?

LIKE PIERRE DE FERMAT, WHO KNEW THE TRUTH OF HIS LAST theorem (asserting that $x^n + y^n = z^n$ has no solutions for $n > 2$) but couldn't prove it, Lee Kuan Yew (prime minister from 1965 to 1990 of the tiny Third World castoff nation of Singapore) knew not to trust the various money-grubbing, power-hungry, status-seeking social engineers who offered advice to his newborn republic. But how to prove he was right?

Those familiar with 20th-century political theory will note how much Lee Kuan Yew's quote sounds like the fifth canon of conservatism from Russell Kirk's 1953 landmark book, *The Conservative Mind*, which recommends, "Faith in prescription and distrust of 'sophisters, calculators and economists' who would reconstruct society upon abstract designs."

Centuries after his death, Fermat was finally vindicated by Andrew Wiles' rigorous proof of his famous last theorem. Lee Kuan Yew wouldn't have to wait nearly as long for vindication on the success of Singapore and his leadership. However, he and Kirk would have to wait nearly half a century for someone to present the detailed, verifiable proof of their assertion and faith.

That proof is presented by Nassim Nicholas Taleb in his recent book, *The Black Swan*, a sequel to his 2001 best-seller, *Foiled by Randomness*. The title refers to the centuries-old assumption in colonial Europe that all swans were white, simply because no one had ever seen a black swan. This assumption held until the British Empire extended to Australia, where black swans were eventually discovered. Appropriately enough, the Jurong Bird Park in Singapore has a collection of black swans on display.

Philosophically speaking, the Black Swan problem holds that you can never prove a negative. You can't prove that black swans, flying penguins, the Loch Ness Monster, God, or Martians don't exist. It takes only one instance of a verified observation to disprove such an assertion. To quote the philosopher Karl Popper, "You know what is wrong with a lot more confidence than you know what is right."

The problem with academics in the social and political sciences, along with sophisters, calculators, economists (and actuaries), is that they can confuse, distort, evade, fudge, and eventually lie their way out of most any contradiction or failure. Observing one of these practitioners, you can't tell with any certainty whether they cheat on their spouse, their taxes, or their business partners. However, you know with apodictic certainty that none of them can cheat the laws of gravity and physics. Hence, this becomes the gold standard for retrospective measurement.

The acuity scale for those (such as mountain climbers, scuba divers, and pilots) engaging in high-risk, high-stress activities that demand precise assessment of, and respect for, the laws of physics consists of four questions representing increasing levels of alertness and orientation. Taleb applies these to the sophisters, calculators, and economists of our age:

- 1) Who are you?
- 2) Where are you?
- 3) What time it is?
- 4) What has just happened?

Where Are You?

The main focus of *The Black Swan* is the second question, "Where are you?" Taleb demonstrates how the vast majority of so-called professionals listed above are enamored and seduced by the elegance, order, and simplicity of the Gaussian (normal) distribution, also known as the bell curve, even though it rarely applies in the real world. He defines two polar universes:

› *Mediocristan*, which is represented by the Gaussian distribution of averages, norms, standard deviations, and mediocrity, and

which is defined by the tyranny of the majority;

› *Extremistan*, which is dominated by unexpected single events whose probability cannot be measured and which is defined by the tyranny of the singular.

Taleb illustrates the difference between the two environments with a simple example: Take a random sample of 1,000 people, and calculate their average height and weight. Even if you add the tallest and heaviest human being on the planet to your sample, the average height and weight are barely affected. This is *Mediocristan*.

Now consider the average net worth of your sample, and add Bill Gates. Instantaneously, the environment has been completely redefined by one datum. This is *Extremistan*. Events such as earthquakes, hurricanes, and tornadoes, as well as famines, riots,

and wars, represent the universe of *Extremistan*.

And if you put a little thought into it, you soon realize that most of your life is spent within the realm of *Extremistan*: where you met your spouse; how you chose your college major; having a baby; getting drafted, married, divorced, or fired. When one of these events was added to the sum total of your life, it completely, dramatically, and irrevocably changed it.

Despite this, humans have both an innate weakness and insatiable urge for descriptions in the form of stories—with a beginning, middle, and end—as if they make sense. Taleb calls this phenomenon "the bias of narrative." Regardless of what happens, regardless of how random, unpredictable, unwarranted, or unnecessary events are, we humans insist that the events that shape our lives have some meaning. Thus we are hard-wired to weave nearly every random, meaningless event into a consistent, meaningful story of what happened and why, because explanations make us feel comfortable, safe, and secure.

Even though every actuarial exam, finance course, and even every Nobel Prize-winning economist teaches the Gaussian distribution within the confines of *Mediocristan*, the concept doesn't apply to financial markets. It applies only to casinos—and then only on the casino floor. Taleb gleefully recalls his consultation with a Las Vegas casino that proudly displayed its highly sophisticated financial risk models but completely ignored the four black-swan events posing the greatest threat to its business:

› It lost \$100 million when the Siegfried & Roy show was abruptly terminated after a tiger in the act mauled one of the performers.

› A disgruntled building contractor attempted to dynamite one of its casinos.

› Internal Revenue Service forms documenting gamblers' winnings were never filed, and withholding taxes were not paid, resulting in criminal negligence that almost cost the casino its gambling license.

› The casino owner's daughter was kidnapped, forcing him to

tap the business's cash, which violated Nevada gambling laws.

Thus, our largest problem is that we think and act as if we are living in the stable, predictable, and manageable environment of *Mediocristan*, when most of the time we unknowingly live in the unstable, unpredictable, and uncontrollable environment of *Extremistan*. We spend most of our waking hours daydreaming in the fantasy world of *Mediocristan*, agonizing about how to allocate our 401(k) investments or whether to refinance our mortgage. Then suddenly, we are jolted from our dreaming and wake up in the real world of *Extremistan*, where we find out we have cancer. And we are now forced to gamble with our lives as we must weigh the treatment options and survival chances impersonally handed to us by a harried doctor who is already 20 minutes late picking up his kids from day care.



Humans have both an innate weakness and insatiable urge for descriptions in the form of stories—with a beginning, middle, and end—as if they make sense.

Who Are You?

If you think you're a professional or expert in your field, think again. Taleb shows how and why stockbrokers, psychologists, judges, economists, finance professors, political scientists, and (yes, even) actuaries are fools who only claim to be experts because people and institutions are still willing to pay them reasonable sums for their "expertise."

This is an easy proof, as it merely entails collecting the publicly available data. Taleb's insight is his ability to describe how and why we allow ourselves to be fooled by what he calls the "triplet of opacity":

› *Illusion of Understanding*—This is the "instant expert" phenomenon that dominates cocktail-party conversation and serves as the job description for television talking heads, where everyone is simultaneously an expert on the stock market, global warming, the Iraq war, and who will be the next American Idol. The opinions of instant experts are delivered in snappy sound bites, which they hope will be repeated as mantras by the masses next week.

› *Retrospective Distortion*—This is the "I told you so" or "Monday morning quarterback" tendency that afflicts us all. We all knew the subprime mortgage market was going to implode. And that the world's most popular Internet search engine, Alta Vista, would fail while its successor, Google, would be wildly successful.

› *Platonification*—This is the bias toward overvaluation of factual information and reliance on expertise. We tend to believe that the stock markets are driven by such underlying leading indicators as new housing starts, the unemployment rate, the presidential election cycle, or who won the Super Bowl. We like to think the Federal Reserve controls the economy and that Alan Greenspan, Ben Bernanke, or the Wizard of Oz knows what's he's doing, despite the fact that the Federal Reserve was unable to prevent the Depression of the 1930s and that, as Milton Friedman and Anna Schwartz detail in *A Monetary History of the United States*, the Federal Reserve actually caused it.

The champion of the triplet of opacity is Steve Forbes, editor-in-chief of *Forbes* magazine, who declared in the May 16, 1989, issue (when the Dow Jones industrial average stood at 2,000) that the Dow would be at 3,000 if it weren't for the trade barriers enacted by Congress. Eighteen months later, in the Nov. 13 issue (with the Dow near 2,600), he claimed it could get to 3,000 if (a) Congress cut the capital gains tax, (b) the United States stopped trying to devalue the dollar, and (c) the Federal Reserve lowered interest rates. Despite President Bush's 1990 tax increase, mounting pressure for trade restrictions, and several Federal Reserve interest rate cuts, the Dow stood well above 3,000 on Election Day in 1992, when Bush was soundly defeated by Bill Clinton.

Forbes is the opacity champion because he doesn't learn from his mistakes. In the Sept. 14, 1992, issue, he confidently predicted that Bush would defeat Clinton in a landslide because "Bush's program will make him one of our great reform presidents." Only eight weeks later, in the Nov. 9 issue, Forbes reversed himself and predicted a Clinton victory, noting that Bush's efforts were "too late" and concluding with the boast that, "I haven't been wrong on a presidential prediction since ... 1960." You don't need to be an actuary to correctly predict the toss of a coin 100 percent of the time if you are allowed to choose both heads and tails.

Thus Taleb answers the question of "who you are" with the test of whose money is at stake and whether your success is judged on the accuracy of your analysis. Actuaries, bankers, and economists gamble with other people's money and are rarely held accountable for their predictions. Taleb has little respect for such charlatans and advises his readers to ignore their pontifications. Instead, he has developed an immense respect for military scenario planners, who put their own lives at risk and who "thought, behaved and acted like philosophers—far more so than philosophers—[who] deal with randomness with genuine, introspective intellectual honesty, unlike academics and corporate executives using other people's money."

Just as philosophers command you to know yourself and contend that the unexamined life is not worth living, actuaries should take note of Taleb's comments on "bankers of the lending variety [who traditionally] have been pear-shaped, clean-shaven and dress in possibly the most comforting and boring manner, in dark suits, white shirts and red ties. Banks hire dull people and train them to be even more dull. But this is for show. In the summer of 1982, large American banks lost close to all of their past earnings (cumulatively) they ever made in the history of American banking ... It took just one summer to figure out that this was a sucker's business and that all their earnings came from a very risky game. All that while the bankers led everyone into believing that they were 'conservative.' They are not conservative; just phenomenally skilled at self-deception by burying the possibility of a large devastating loss under the rug."

What Has Just Happened?

If you're one of these experts, how do you explain your failure to anticipate and account for the effects of these Black Swan events? To match his triplet of opacity, Taleb offers a triplet of excuses you can invoke to evade any responsibility for your errors and incompetence:

› *Claim you were playing a different game*—You're an expert, but your expertise isn't the cause of your failure. You instinctively knew that Priceline was the future of airline ticket purchases. And, of course, you were proven correct. However, your glowing predictions of the company's future in 1999 shouldn't have been interpreted as recommendations to purchase its stock, which soon lost more than 90 percent of its value and has yet to recover.

› *Invoke the outlier*—You're the expert, but you can't be held responsible for events outside your area of expertise. You were correct in predicting that the fundamentals of U.S. airline stocks were sound and poised for exponential growth at the dawn of the new millennium, when air traffic was at a record high. But you couldn't predict the events of Sept. 11, 2001, nor should you be held financially responsible for the resulting losses of investors who took your advice.

› *Claim you were almost right*—Not only are you an expert, but your model proves that you're a genius. If anyone challenges your claims, respond by showing how a few minor adjustments to your model would have predicted the eventual outcome. If you knew the Thai baht was going to collapse in 1997, or if the Nasdaq composite index would lose 80 percent of its value from its peak in early 2000, then you would have plugged these data into your models and your predictions would have been very close to the status quo.

One expert who has had a monumental impact on postwar eco-

conomic thought is Paul Samuelson, the 1970 Nobel Prize winner and author of *Economics*. Originally published in 1948, *Economics* has been through 18 editions and sold several million copies. With intellectual rigor that Taleb would admire, Mark Skousen wrote a comprehensive retrospective of the first 15 editions in the *Journal of Economic Perspectives*: “Starting with the fifth edition (1961), Samuelson states that economists ‘seem to agree that recent growth rates [in socialist economies] have been considerably greater than ours as a percentage per year.’ The 12th edition (1985) showed a table declaring that between 1928 and 1983, the Soviet Union had grown at a remarkable 4.9 percent annual growth rate, higher than the United States, United Kingdom, Germany, and Japan. By the 13th edition (1989), Samuelson declared, ‘the Soviet economy is proof that, contrary to what many skeptics had earlier believed, a socialist command economy can function and even thrive.’”

Dr. Yuri Maltsev, who defected from the Soviet Union in the late 1980s and who is now a professor of economics at Carthage College in Kenosha, Wis., met Samuelson in 1990 and inquired with amazement how he could possibly believe the Soviet economy had higher per capita incomes and growth rates than that of the United States. Samuelson’s uninspiring response was, “Who could know that it [information on the Soviet economy] was all fake?” as if to say, “I’m a genius who can’t be bothered with details and can’t be responsible for testing my theories against reality.”

Another expert who left his indelible mark on the U.S. economy is Robert Myers, the former chief actuary for the Social Security Administration. Myers was more honest than Samuelson. In his article “How Bad Were the Original Actuarial Estimates for Medicare?” published in February 1994 issue of *The Actuary*, he admits that the 1990 costs were more than seven times greater than he projected. Myers can’t resist the natural human tendency to claim he was “almost right.” He attempts to shift the focus from costs of the Medicare program to costs as a percentage of payroll. This, plus a few other adjustments to “dress up the pig,” makes him look more accurate. However, to his credit, Myers concludes by noting that if he were an honorable man, he should commit suicide.

What Time Is It?

Taleb considers the ultimate Extremistan environment to be a turkey farm, where domestic birds are regularly fed and housed in comfortable surroundings for 1,000 days. Then, in mid-November, on day 1,001, the average turkey’s head is chopped off and its remains wind up on someone’s Thanksgiving dinner table. The slaughter on day 1,001 represents an unexpected Black Swan event for the



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turkey, but a planned Mediocristan event for the turkey farmer. Taleb poses the question, “If you are a turkey being fed for a long period of time, you can either naively assume that feeding *confirms your safety*, or be shrewd and consider that it *confirms the danger* of being turned into supper.”

When it’s too late, when you’re blindsided and overwhelmed by events, the psychology of task orientation identifies three coping mechanisms for task saturation in extreme adrenaline situations, as well as for everyday life:

- › *Shut Down*—Quit or give up;
- › *Compartmentalize*—Hide and immerse yourself in busy work, and avoid confronting the primary task;
- › *Channelize*—Focus on one thing, and ignore everything else.

With respect to charlatans who forecast for a living, Taleb documents cases of the last two options and recommends that such experts choose the first. He tells the story of one obscure government economist who forecast in January 2004 that the price of oil would be \$27 a barrel in 2029, slightly higher than it was at the time. Six months later, when the price of oil doubled, he immediately revised his 25-year forecast to \$54 a barrel.

Taleb knows better than to make such ridiculous predictions. He advises readers to ignore all economists and forecasters who use the terms “equilibrium” and “normal distribution,” because “the notion of a standard deviation is meaningless outside of Mediocristan ... Accumulating knowledge in Mediocristan does not correlate to knowledge accumulation in Extremistan.”

When Taleb asks these forecasters why they make predictions, the inevitable reply he gets is, “because that’s my job.” His response is to tell them to get another job. This response—actually a command—isn’t meant to be a sarcastic put-down but a serious ethical proposition. He notes that “the interest of civil servants is to survive and perpetuate—not to get at the truth ... Anyone who causes harm by forecasting should be treated as either a fool or a liar. Some forecasters cause more damage to society than criminals. Please, don’t drive a school bus blindfolded.”

At least one actuary, Harry Ploss, gets credit for a well-rounded task orientation. At a 1982 actuarial conference on life insurance investment strategies, almost a decade before the collapse of the savings and loan industry, he stated, “Change will come, and the more we resist it the more expensive it may be ... This could set our industry back several years in our struggle to survive in the future competitive environment. The rising interest rates have contributed to our problem. Immunization calculations did not fully recognize rising policy loan/surrender rates. In this area, the

S&Ls have a far more serious problem but have survived at least for the time being. Their balance sheet is fit for a morgue, but they have postponed bankruptcy by paying money-market rates on new accounts as well as renewing accounts.”

Taleb attests to the fact that stating reality to someone wedded to Mediocristan can easily provoke anger and ad hominem attacks. In the 2005 book *Fortune's Formula*, William Poundstone recounts a vitriolic reaction from Myron Scholes, the Nobel Prize winner in economics and principal of Long-Term Capital Management (LTCM), which went bust in 1998 and nearly brought down the U. S. monetary system with it. Interrupting Scholes during a roadshow speech promoting LTCM, Andrew Chow, a Conseco derivatives trader, argued, “There aren't that many opportunities. You

Astute historians acknowledge that, had Adolph Hitler died or been assassinated in the spring of 1939, he would have been immortalized as the greatest statesman in German history.

he were sent to Berlin to chronicle the inevitable war that would erupt in late 1939, even though no one in Britain, France, or Germany thought another war could be possible after the War to End All Wars ended two decades earlier.

The chronicler of history who most closely wrote with Taleb's thesis in mind was the British journalist Malcolm Muggeridge (1903-1990), who insisted that the history of the 20th century was written in 1871 when Fyodor Dostoyevsky published his novel *The Devils*. A century would pass before Robert Conquest's *The Great Terror* and Albert Speer's *Inside the Third Reich* would finally substitute real names for Dostoyevsky's fictional characters.

Muggeridge was intrigued, obsessed, and ultimately entertained by the circus of British politicians, nobility, and celebrities—who all lived through the Black Swan events of the War to End All Wars, the Roaring 20s, the Great Depression, and now another war, which at the time was called the Phony War—and how they were blindsided by each of these events. He can't help but laugh at the politicians who rejoiced at the Kellogg-Briand pact, which



can't make that kind of money in Treasury markets.” Scholes snapped back, “You're the reason—because of fools like you, we can.”

Fools and their money are soon parted but only in Mediocristan casinos. In Extremistan, the experts and their money—after a long delay and a sudden unexpected Black Swan event—are eventually parted. It's the fools—when the Black Swan (like the Grim Reaper) exacts its pound of flesh—who clean up and walk away with the loot, while the experts are left to retreat with their bias toward the narrative and the triplets of opacity and excuses as they file for bankruptcy.

Lessons of History

Just as Taleb's proof of the fraudulence of sophisters, calculators, economists, et al. focuses as much on what they don't say as on what they say, he advises his readers to study history in the same manner. Because of the inherent bias of history, which is “written by the winners,” you need to read, imagine, and intuit the history that isn't written to truly understand it.

His case study of the bias and deceit of written history is William Shirer's *Berlin Diary 1934-1941*, which purported to be his diary as a correspondent in Berlin during that period. Taleb notes that the diaries don't include any irrelevant items of the time, which were carefully edited out later when the book was published.

This is easily demonstrated. Imagine a diary of a Manhattan resident from 1996 to 2002. The entries prior to the World Trade Center attack would have focused on such irrelevancies as the Spice Girls, dancing the *macarena*, fear about Y2K, and the raging bull market in high-tech stocks, and certainly not on the rising trend of Islamic fundamentalism and antagonism toward the United States. Of course, there were many similar trivialities in Germany of the 1930s. Yet Shirer's history was written as if

outlawed war for all time in 1928, marched at the front of the parade in 1938 to celebrate Neville Chamberlain's “peace in our time” triumph in Munich, and then scrambled to prepare for war in September 1939. And as these events were unfolding, they were all convinced that the greatest threat to the British Empire was King Edward VIII's decision to marry an American divorcee.

In his 1940 book, *The Thirties*, Muggeridge reviews the roller-coaster events of the decade, describing the non-history that no one else bothers to write, let alone consider. Recounting public opinion about the War to End All Wars, he noted, “year by year the two minutes' silence on Armistice Day was becoming more formal ... gradually, the Great War became the War, then, more ominously, the last war.” Years later, Muggeridge quipped, “The only thing the British learned from two world wars was to develop a healthy respect for the Germans.”

As if anticipating Steve Forbes 60 years later, Muggeridge wrote of Lord Beaverbrook, “There are, indeed, few more tantalizing situations in life than a Press Lord's. He has money, he has his circle of paid flatterers; he can have as much publicity as he likes since the headlines are his own to get into, and can make others famous or infamous as he pleases. Yet whenever he attempts to exercise his potential authority, he finds himself frustrated. This inability to translate circulation into enduring political influence has been particularly galling to Lord Beaverbrook, for whom politics have a great fascination.”

One of Muggeridge's techniques of historical perspective was to review obituaries that would never have been written or published had the person in question died 10 years earlier. Astute historians acknowledge that, had Adolph Hitler died or been assassinated in the spring of 1939, he would have been immortalized as the greatest statesman in German history. He would have been an icon who restored the postwar honor of a defeated Germany, just

as Charles de Gaulle would eventually do for France. As with John Kennedy in the United States, public buildings housing the best of German arts, history, and science would bear his name, and silver coins engraved with his profile would be collector's items.

Ban This Book

The Black Swan doesn't qualify as required or highly recommended reading or the one book you must read this year. Rather, it should be banned by actuarial organizations. Just as Galileo's *Dialogue Concerning the Two Chief World Systems* was denounced by the Roman Catholic Church four centuries ago, Taleb's writings should be *primus inter pares* on the list of forbidden works among actuaries. Ideally, *The Black Swan* would have an immediate and permanent place on the Society of Actuaries exam syllabus. But the resulting cognitive dissonance could be too great for most actuaries.

Actuaries like to build their models on the Gaussian distribution. When they make 40-year projections for Medicare and Social Security solvency, sign Schedule B's for airline and steel company defined benefit pension plans, or do cash flow testing for life insurance company solvency, they aren't displaying professional expertise as much as they are fooling themselves by retreating to the comfort and safety of the womb of Mediocristan. That's what they learned in the agonizing process of studying for those exams. And it's easier to double your 25-year projection for

the price of oil than to quit your job and admit that what you've learned and devoted your life to is largely nonsense.

Taleb's concluding advice expands on the maxims of Lee Kuan Yew and Russell Kirk. He writes, "Accept that being human involves some amount of epistemic arrogance in running your affairs. Do not try to always withhold judgment—opinions are the stuff of life. Do not try to avoid predicting. [Do not] stop being a fool. Just be a fool in the right places ... What you should avoid is unnecessary dependence on large-scale harmful predictions—those and only those. Avoid the big subjects that may hurt your future: be fooled in small matters, not in the large. Do not listen to economic forecasters or to predictors in social sciences (they are mere entertainers), but do make your own [weather] forecasts for your picnic. By all means, demand certainty for the next picnic; but avoid government Social Security forecasts for the year 2040. Know how to rank beliefs, not according to their plausibility, but by the harm they may cause."

To illustrate the proof, the vital necessity of distrusting and ignoring the advice of sophisters, calculators et al., and the difference between being correct versus politically correct, go back in time nearly 50 years to 1959—when Cuba was a modern tropical tourist paradise untouched by World War II—while Singapore was a Third World state still recovering from the devastation of its wartime occupation by the Japanese. Which country would you have invested in? And which country would you have thought had the brighter future?

Lee Kuan Yew and Fidel Castro are only two years apart in age. Both took over formerly colonized nations at the same point in history and at the same point in their lives. Castro chose to follow the path of socialism, statist repression, and rule by force. Lee Kuan Yew chose the path of capitalism, individual liberty, and the rule of law. Singapore's choices in the past half century transformed it into the second freest and most prosperous nation on Earth. Cuba chose the opposite path, creating the poorest nation in the Western hemisphere.

The title of the second volume of Lee Kuan Yew's memoirs is *From Third World to First*. The title of Fidel Castro's memoirs naturally should be *From First World to Third* or more appropriately *From First to Worst*.

As much as you desire, love, and need the narrative and the comfort, safety, and security of the playground of Mediocristan, remember that you were born, are living, and will die in the chaotic, unpredictable, and unexplainable battlefield of Extremistan. Taleb would argue that Lee Kuan Yew and Fidel Castro are Black Swans. He admits that his life is a Black Swan event. And he closes his book with the statement, "Stop looking a gift horse in the mouth—remember that you are a Black Swan." ●

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