



GUEST EDITORIAL

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Black Swan or Black Turkey? The State of Economic Knowledge and the Crash of 2007–2009

Nassim Nicholas Taleb has an elegant explanation for the global financial crisis of 2007–2009: It’s a black swan.¹ A black swan is a very bad event that is not easily foreseeable—because prior examples of it are not in the historical data record—but that happens anyway. My explanation is more prosaic: The crisis was a black turkey, an event that is everywhere in the data—it happens all the time—but to which one is willfully blind. **Table 1** presents large negative returns on major asset classes around the world over roughly the last century; from that perspective, the 57 percent decline in the S&P 500 Index is hardly unique. There is no mystery to be explained: Markets fluctuate, often violently, and sometimes assets are worth a fraction of what you paid for them.

Yet the market declines of 2007–2009 are sometimes accused of overturning various bodies of more or less established knowledge in financial economics and macroeconomics. Let’s examine these accusations.

Table 1. Black Turkeys All Over the Place

Asset Class	Period	Peak-to-Trough Decline
U.S. stocks (real total return)	1911–1920	51%
U.S. stocks (DJIA, daily)	1929–1932	89
Long U.S. Treasury bonds (real total return)	1941–1981	67
U.S. stocks	1973–1974	49
U.K. stocks (real total return)	1972–1974	74
Gold	1980–1985	62
Oil	1980–1986	71
Japanese stocks	1990–2009	82
U.S. stocks (S&P 500)	2000–2002	49
U.S. stocks (NASDAQ)	2000–2002	78
U.S. stocks (S&P 500)	2007–2009	57

Note: All returns are nominal price returns unless otherwise specified.

Efficient Market Hypothesis

The efficient market hypothesis (EMH) is a specific proposition about market prices (that they always reflect all available information) and not an assertion that a market economy is an efficient way to organize society (an entirely separate question). The EMH is not realistic, but it is a starting point that enables us to derive many valuable insights in finance, including the capital asset pricing model and the Black–Scholes option pricing model. Although a few diehards may still assert that markets are efficient, the contrary evidence of more than 40 years is overwhelming.

Most financial economists consider the EMH valuable because it places the burden of proof on the analyst who would beat the market. The test of the analyst’s ability to make forecasts superior to the market-consensus forecasts is the subsequent alpha, correctly calculated to remove all beta influences.

Thus, the EMH resembles the presumption of the defendant’s innocence in a criminal trial. Nobody really thinks that all or even most criminal defendants are innocent, yet it is hard to imagine a fair starting point other than the presumption of innocence. The burden of proof must be on the prosecutor to “prove” the defendant guilty.

As a realistic description of nature, the EMH has long been subject to serious challenges. Perhaps the most vivid is the crash of 19 October 1987, when the U.S. equity market fell by 22 percent in one day and some non-U.S. markets fell even more—for example, Hong Kong declined by 45 percent. In the language of the EMH, only two explanations for such a decline are possible:

1. The price was fair (reflecting all available information) before, during, and after the crash; that is, the fundamental value of U.S. stocks declined by 22 percent in one day.
2. The price was unfair at some point in time—either before the crash (the price was too high), after the crash (the price was too low), or throughout the entire episode except, perhaps, at one instant when the price was just right.

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The first explanation defies belief. No “new” news emerged on or shortly before 19 October 1987. Interest rates had been rising, some unwelcome regulation of mergers was progressing in the U.S. Congress, and there was tension in the U.S.-Iran relationship. All these factors were presumably “in the price” before the one-day 22 percent decline. The only credible explanation for the crash is the supply–demand imbalance caused by program trading associated with portfolio insurance—an inefficient-market argument. So, prices were unfair at one time or another.

By 2007–2009, you had to be a fanatic to believe in the literal truth of the EMH. The market was awash in hedge fund assets, trillions of dollars of which were leveraged to exploit market inefficiencies in a frenetic attempt to earn alpha. Such effort has the effect of making the market more, not less, efficient; but if the market were perfectly efficient, the effort would be all for naught—a conclusion defied by the successful track records of many hedge funds and other active managers.

That stocks fell by 57 percent and some financially engineered mortgage pools (as well as individual stocks) fell by 100 percent did not overturn the EMH. The EMH had been downgraded from

a testable hypothesis to an unrealistic but convenient working assumption (known to be false) decades earlier.

Optimization

Harry Markowitz’s mean–variance optimization, sometimes mislabeled modern portfolio theory (MPT), has also been accused of failing during the recent crash.² These assailants misinterpret optimization and diversification as somehow promising to eliminate investment risk.

But optimization is just a technique for manipulating numbers! It is not a theory. It does say, by way of theoretical justification, that “investors should be concerned with risk as well as return.”³ Optimization then goes on to say how, exactly, to do that by producing a portfolio that is optimal (to investors with certain carefully specified utility functions) *given* a set of correct inputs. The required inputs are the expected return and variance of each asset and the covariance (or correlation) of each asset with every other asset. Markowitz and his successors never suggested that optimization or other aspects of MPT eliminated market risk—on the contrary, they emphasized that expected risk rises with expected return.

What today's critics of optimization are implicitly saying is that they did not have correct inputs. Their estimates of expected return were too high, or their estimates of variance were much too low. Alternatively, their estimates of both expected return and variance may have been correct, but the return distributions of certain investments (say, collateralized debt obligations backed by subprime mortgage pools) may have been so fat-tailed as to render simple mean–variance optimization useless and require more sophisticated models that take fat tails into account. These more sophisticated models substantially predate the crash and should have been used.

Some critics of optimization have a simpler tale to tell. They say that “MPT told you to diversify and diversification didn't work.” Baloney. Diversifying among 50 kinds of equities isn't diversifying—and in bad times, corporate credit and even mortgage credit are forms of equity! Diversifying into government bonds and cash *did* work, and investors who held substantial positions in those asset classes did well in the crash. “Buy, hold, and diversify” is perhaps the best short piece of investment advice ever given, but you have to define your terms—diversify into what?

Capital Asset Pricing Model and Equity Risk Premium

The recent crash has also called into question the relevance of the capital asset pricing model (CAPM), not so much because anything is wrong with asserting a linear relationship between market-related risk and expected return—for that is all the CAPM does—but because the slope of the CAPM line, which links the return on riskless cash with the expected return on the market for risky assets, *might be negative*. In other words, the expected equity risk premium might be negative.

From 1 January 1969 through 28 February 2009, the S&P 500, including reinvested dividends, had a slightly lower total return than the Ibbotson index of long-term U.S. Treasury bonds (on the basis of data from Ibbotson Associates [now Morningstar]). Forty years and two months is a long time to wait for the equity risk premium to be realized, only to be disappointed with a realization marginally below zero. (Because of the subsequent fast recovery in the stock market, this condition did not last long; but stocks are still underperforming the long bond over historical time horizons lasting decades.)

Is the *expected*, future, forward-looking equity risk premium negative?

Let's begin at the beginning. If a company with a given stream of expected cash flows issues two

securities—one a fixed-interest bond or senior claim and the other a residual interest or share of equity stock—which has the higher expected return? Clearly, no one would buy the stock if it were not priced to have a higher expected return than the bond. That's the equity risk premium—it's that simple.

Or I can make it even simpler. Every day, corporate managers go to work. They have the option to liquidate the company, put the proceeds into Treasury bills, and then go home. Or they can stay at work and operate the company. The fact that they (usually) do the latter implies that they think they can earn a higher return for shareholders that way. That too is the equity risk premium, reduced to the simplest form I can think of.

Despite the occurrence of long periods when bonds outperformed stocks, it is hard to imagine a world in which equities are not priced—on average, over time, if not always—to have higher *expected* returns than bonds. (And I have been more than a little unfair to equities by comparing them with the *long* Treasury bond, a risky strategy that almost no one pursues.) That the periods of equity underperformance can be so long means that we may have underestimated the long-run risk of equities, for which investors require compensation in the form of an expected risk premium. Why do you think it is called *risk*?

Macroeconomics and the Crash

Another thread in the literature of macroeconomics either criticizes other economists for not having forecasted or prevented the crash or apologizes for the failure of the profession. This thread reveals a profound confusion about what economics and other sciences can and should do.

Paul Krugman, whose Nobel Prize–winning work was in economic geography, not macroeconomic policy, has nevertheless become a highly visible social critic who focuses on macroeconomic questions. His salvo on economics and the crash has been widely quoted:

Few economists saw our current crisis coming, but this predictive failure was the least of the field's problems. More important was the profession's blindness to the very possibility of catastrophic failures in a market economy. During the golden years, financial economists came to believe that markets were inherently stable—indeed, that stocks and other assets were always priced just right. There was nothing in the prevailing models suggesting the possibility of the kind of collapse that happened last year.

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Meanwhile, macroeconomists were divided in their views. But the main division was between those who insisted that free-market economies never go astray and those who believed that economies may stray now and then but that any major deviations from the path of prosperity can and will be corrected by the all-powerful Fed. Neither side was prepared to cope with an economy that went off the rails despite the Fed's best efforts.⁴

Actually, many economists were vocal about what they saw as an unfolding crisis. Some focused on subprime mortgages themselves, others on the role of a housing bubble in the real economy, others on the vulnerabilities of the banking system, still others on the potential contagion to other industries and countries. In reply to Krugman, the University of Chicago's John Cochrane argued that no serious economist ever said that markets couldn't fluctuate widely or even crash:

The case for free markets never was that markets are perfect. The case for free markets is that government control of markets, especially asset markets, has always been much worse. Free markets are the worst system ever devised—except for all of the others.

Krugman at bottom is arguing that the government should massively intervene in financial markets, and take charge of the allocation of capital. . . . To reach this conclusion, you need theory, evidence, experience, or any realistic hope that the alternative will be better.⁵

Cochrane goes on to cite a large number of instances in which government completely failed at such tasks. In essence, he argues that the attack on economics and its relationship to the crash is political—and collectivist in its politics.

I am sympathetic to Cochrane's explanation, but I prefer a simpler one. People expect too much of experts. Blaming economics for the crash is only slightly more sensible than blaming geology for the eruption of the Icelandic volcano Eyjafjallajökull. Economics and geology are both inexact sciences. Their goal is, first and foremost, to make sense of data. That is what science does. A side benefit of studying either economics or geology is that we might be able to learn when to move away from impending danger. Because economics is a science of the human, it might also tell us how to prevent the dangerous event in the first place. But more likely it will not, because free human beings do not typically do what economists tell them to do.

In a related vein, Narayana Kocherlakota, president of the Federal Reserve Bank of Minneapolis, has offered a beautifully written but sadly mistaken apology for the failure of macroeconomics itself:

I believe that during the last financial crisis, macroeconomists (and I include myself among them) failed the country, and indeed the world. In September 2008, central bankers were in desperate need of a playbook that offered a systematic plan of attack to deal with fast-evolving circumstances. Macroeconomics should have been able to provide that playbook. It could not.⁶

A playbook? Economics is that part of the human drama that is concerned with how we make a living and allocate scarce resources. We write the playbook. Macroeconomists set themselves too difficult a task if they would rewrite it for us. No wonder some of them think they failed.

By and large, macroeconomists have nothing to apologize for. Like other scientists, their job is to make sense out of seemingly chaotic data from nature. Their hypotheses are constantly being tested, rejected, and refreshed with new hypotheses. Only when macroeconomists stop testing the limits of their knowledge and start proclaiming received wisdom to policymakers do they risk having a reason to apologize. Those macroeconomists and policymakers who promised us a glorious new age of high growth and low volatility—through monetary policy or other means, such as countercyclical government spending—may be justified in feeling sheepish (and their followers may be justified in feeling sheeplike!).⁷ I am pretty sure that global growth will continue to surprise on the upside, but not with low volatility and not because of macroeconomic policies but despite them. Growth will happen because people, left to their own devices, will do almost anything they can to make better lives for themselves and their children.

Notes

1. Nassim N. Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007).
2. As I see it, the term *MPT*, correctly used, signifies a real theory in a philosophical sense and embraces the work of not only Harry Markowitz but also William Sharpe, Merton Miller, Franco Modigliani, Jack Treynor, Fischer Black, and many others. Markowitz's normative algorithm should be called *optimization* or *mean-variance optimization*.
3. Harry M. Markowitz, *Portfolio Selection: Efficient Diversification of Investments* (New York: John Wiley & Sons, 1959).
4. Paul Krugman, "How Did Economists Get It So Wrong?" *New York Times* (2 September 2009): www.nytimes.com/2009/09/06/magazine/06Economic-t.html?_r=1; retrieved 29 May 2010.
5. John H. Cochrane, "How Did Paul Krugman Get It So Wrong?" (2009): <http://modeledbehavior.com/2009/09/11/john-cochrane-responds-to-paul-krugman-full-text/>; retrieved 29 May 2010.
6. Narayana R. Kocherlakota, "Modern Macroeconomic Models as Tools for Economic Policy" (2010): www.minneapolisfed.org/publications_papers/pub_display.cfm?id=4428; retrieved 29 May 2010.
7. Even the low measured volatility of the two decades *preceding* the crash is suspect. Christina Romer, chair of President Obama's Council of Economic Advisers, studied modern macroeconomic data using methods from the more volatile pre-World War II period and concluded that the "Great Moderation" was essentially a data error: Rather than reflecting any actual change, it arose from the changing *methods* used to measure the volatility of the real economy. See Christina D. Romer, "Is the Stabilization of the Postwar Economy a Figment of the Data?" *American Economic Review*, vol. 76, no. 3 (June 1986):314–334.