



**Who caused the financial crisis?** I've been spending a lot of time trying to understand the greatest financial mess since the 1930s. There were so many possible perpetrators that it is impossible to allocate blame precisely. However, several features of our complex financial structure helped spread the problems and make them worse.

**The blame game.** Some point to the CRA (Community Reinvestment Act) and to both Fannie Mae and Freddie Mac as causing the crisis by extending home ownership beyond the ability of buyers to pay back their mortgages.

It is also tempting to single out individuals. Alan Greenspan is faulted for doing nothing to prevent the spread of subprime mortgages. He is also accused of keeping interest rates too low for too long, thereby causing the twin housing and stock market bubbles.

Then there were the bond rating agencies who gladly gave AAA ratings to securities that eventually became worthless. Meanwhile, government seemed to look the other way as financial institutions engaged in increasingly risky business.

And the list goes on. However, one basic problem in finding fault is what the statisticians call "multicollinearity." So many things were happening at the same time that it is impossible to disentangle their separate contributions. Instead, let's examine what helped make the financial chaos so virulent and so contagious.

**Risk Mismanagement.** Widespread misunderstanding of risk measurement greatly exacerbated the problems. False feelings of security led to over-pricing of assets and what amounted to excessive risk-taking.

Many participants confused *financial uncertainty* with *casino risk*. In the interest of science, I've visited several Native American "gaming casinos" as they like to be called. There, the odds of every possible betting outcome can be calculated. One casino kindly gave me a "Roulette Score Card" so I could lose my money more knowledgeably (the odds always favor the house!). The card showed the probability of success for each of the bets possible at the table. For example, if you put a chip on any one number, the odds of winning are 35 to 1. That's true no matter where you are – as long as the game is not rigged.

Financial situations, on the other hand, usually have a very large number of possible outcomes. Many of these are "surprises" which, by definition, are impossible to predict and to figure their odds. Hence, there's really no simple way of calculating risk. Sure, financial types have come up with surrogates such as VAR (Value At Risk). This was widely used because it could readily be computed. In most cases, all you had to do is look back at some historic period and calculate how often the outcome was outside your acceptable range. If these large losses only occurred 1 percent of the time, then only 1 percent of your investment was at risk. The usual assumption was that risks are "normally" distributed.

Most VAR calculations use only the past few years of data, thereby leaving out major episodes of stress such as the Great Depression. This gave a false sense of confidence with the result that financial markets were taking on much more risk than they realized. In his book, *The Black Swan*, Nassim Nicholas Taleb says that it is the highly improbable events that are the cause of many financial crises. A large decline in U.S. house prices was viewed as highly unlikely — until it happened.

Insurance is also very easy to misunderstand. I have a lot of confidence in the company that insures my home against fire. They employ actuaries who can calculate the odds of a house catching fire during some time period from lightning and even human carelessness. Premiums are priced to reflect these probabilities and to have enough funds for contingencies. The system works well because only a few homes catch fire in any given year. However, there's no way any insurance program could pay off if *all* homes went up in flames at the same time! Problems arise even if a large share of insured homes catch fire. There's no way to insure against a *systemic* event!

Mortgage-backed securities (MBS) are pools of individual home mortgages that are combined into a financial

## Musings & Amusings: *Financial Crises*

**Mark Twain:** "History never repeats itself, but it does rhyme."

**Yogi Berra:** "It ain't over 'til it's over!"

**Warren Buffett:** "Derivatives are financial weapons of mass destruction."

instrument resembling a bond. Those who bought MBS often purchased “insurance” that supposedly protected them against default. In most cases, this took the form of credit default swaps (CDS) written by the likes of AIG. Although AIG is an insurance company, CDS really weren’t insurance products because AIG held no reserves against them. Massive problems arose when housing prices started to fall and MBS values collapsed. It was exactly the same as if most houses caught fire at the same time! The federal government had to come in and make good on AIG’s bad bets to keep the meltdown from spreading even further!

Leverage can be used to increase the payoff from any bet. If I put 100 percent down to buy a house and prices rise 5 percent, I get a 5 percent return on my investment. However, if I only put 10 percent down, the return on my initial bet soars to 50 percent.

In an era of rising houses prices and financial euphoria it was very enticing to leverage as much as possible. Not only did homebuyers put down as little as a possible, but investment banks sought to expand their earnings through leverage ratios of 30 to 1 and more!

Of course, leverage also magnifies the negative effects of falling asset prices. For a company leveraged 20 to 1, a “mere” 5 percent decline in the value of its loan and securities portfolio can wipe out all of the institution’s equity. When the black swan in the form of the Russian government bond default hit the Long Term Capital Hedge Fund in 1998, LTC’s capital evaporated in a matter of hours thanks to leverage estimated to be as high as 50 to 1!

Maturity mismatching is essential to the functioning of the commercial and savings banking system. Depositors want quick, easy access to their funds via checking and savings accounts. The banks, in turn, lend these funds out to investors who want longer maturities. This process, known as intermediation, helps channel savings into investments. The banks make money on the spread between deposit rates and investment returns. The system works because banks are required to hold some reserves against these deposits and – even more important – because many deposits are insured by the FDIC. Deposit insurance means that we almost never see runs on banks as we did with great regularity until the FDIC was established in 1933.

However, since the 1970s, a vast “shadow banking system” has developed in the United States. These “nonbank” financial institutions also use short-term liabilities to make longer term loans and hold securities. However, these liabilities are not insured deposits. Rather they consist of commercial paper and the proceeds from repurchase agreements. Commercial paper is a very short term unsecured promissory note issued by a corporation. A manufacturing company might use it to meet seasonal

working capital needs. But a shadow bank would issue this paper to finance its holdings, e.g., of subprime MBS. It can also raise funds through borrowing against these or other securities by putting them up as collateral in a “repo agreement” which is usually a very short term loan.

During the 2007 and 2008 asset price meltdown, buyers refused to renew the commercial paper and the repos issued by many of the “shadow banks.” This amounted to a run on the shadow banks that pushed many to the brink of bankruptcy and some over the edge! Many institutions were forced to sell their better securities, causing prices to fall further as they flooded the market. These losses were quickly amplified by the much higher leverage that existed in the shadow banks. One of the ways the Federal Reserve used to stop the implosion was to lend funds to these firms via the Discount Window. The Fed had become the “lender of last resort” to the huge shadow banking system.

**Implications:** A number of conclusions flow from the above discussion, e.g.

Leverage limits for all financial institutions can help keep the consequences of decisions gone awry from being magnified.

CDS and other so-called “derivatives” should be traded on exchanges where collateral requirements can be imposed.

Congress is in the process of enacting sweeping financial regulations that will address many of these issues. However, this may only be a start of the process. Additional legislation may be required.

Perhaps even more important, individuals and businesses will have to start learning how to manage more effectively in the face of uncertainty. They must deal with the fact that VAR and other quantitative techniques are only the start of the risk-management process. In the final analysis, human judgment will have to prevail.

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