



Commentary

## Don't Blame The Quants

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Financial markets are a mess, and the excesses of the finance industry are dragging down the whole economy. In recent years, safe investments delivered unusually low returns, and hordes of investors seeking to be above average (as Garrison Keillor would say) bought extremely complicated instruments.

The investment banks created such instruments, so-called mortgage-backed securities, with payoffs that depend on the performance of hundreds or even thousands of mortgages. Many of these securities received investment-grade ratings, and their returns were significantly greater than investing in a comparably rated bond. The law that higher risk means higher expected return seemed to have been repealed. The practice of "ratings arbitrage," getting a better-than-merited rating and selling securities based on that rating, was born.

It is easy under these circumstances to point an accusing finger at the "quants" on Wall Street, that cadre of mathematics and physics Ph.D.s who crunch numbers in esoteric models. Without the quants, the complicated mortgage-backed securities that fueled the housing bubble and led to the freezing of credit might not have been created. The models used by the quants determine the prices of those securities and steer the traders who make markets in them. Without this guidance, the banks might not have touched them in the first place. To prevent a recurrence of financial crises, some call for a return to a simpler time, before derivative securities and the quants who analyze them--a time when investors bought stocks and bonds and little else.

Such complaints miss the point. When a bridge collapses, no one demands the abolition of civil engineering. One first determines if faulty engineering or shoddy construction caused the collapse. If engineering is to blame, the solution is better--not less--engineering. Furthermore, it would be preposterous to replace the bridge with a slower, less efficient ferry rather than to rebuild the bridge and overcome the obstacle.

There are very good reasons for the existence of derivative securities--and even mortgage-backed securities, the root of our present problems. Potential homeowners need investors to fund their mortgages. So how can the two come together? The Savings and Loan system was a major provider of mortgages until its spectacular collapse in the 1980s, causing the Federal Deposit Insurance Corporation to require \$120 billion from the U.S. Treasury to make depositors whole again.

Today, foreign institutions have the big money--and they would not make deposits in U.S. Savings and Loans even if such institutions were available. Energy trading did not disappear with the demise of Enron, and neither will mortgage-backed securities after this fiasco. Put simply, the bridge between lenders and borrowers will be rebuilt, because we need it. It should, however, be built with better engineering and greater simplicity than before.

Before the collapse, Carnegie Mellon's alumni in the industry were telling me that the level of complexity in the mortgage-backed securities market had exceeded the limitations of their models. The bridge was cantilevered out way too far, and the quants knew it. But in most banks, the quants are not the decision-makers. When they issue warnings that stand in the way of profits, they are quickly brushed aside. Furthermore, in addition to better engineering, the bridge must not be built this time with the shoddy construction material of no-documentation mortgage applications and a network of unscrupulous mortgage originators.

Regardless of what some may wish, we will not revert to a simpler time before derivative securities; that simpler time never existed. Options have been traded since the 17th century--and even before that, in ancient times, by some accounts.

These instruments serve an economic purpose. Southwest Airlines recently reported its 69th consecutive quarterly profit, weathering two spikes in the price of jet fuel since 1991, because it used derivative securities to hedge against price increases. International firms use derivative securities to hedge currency risk. Insurance firms sell annuities that guarantee a lifetime income and must use derivative securities to hedge against increases in longevity. The quants did not create derivative securities. The quants help us understand them, price them, trade them and manage the risk associated with them.

The quants know better than anyone how their models can fail. For banks, the only way to avoid a repetition of the current crisis is to measure and control all their risks, including the risk that their models give incorrect results. On the other hand, the surest way to repeat this disaster is to trust the models blindly while taking large-scale advantage of situations where they seem to provide trading strategies that would yield results too good to be true. Because this bridge will be rebuilt, the way out of our present dilemma is not to blame the quants. We must instead hire good ones--and listen to them.

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