

What role did Mathematics play in the current financial crisis?

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Mathematical Finance has been one of the casualties of the current financial crisis. Over the past year, the news media has berated "Quants" (as Mathematicians are known in the industry) and their esoteric models for supposedly misleading the market. But how much of this blame is justified?

The current financial crisis began in what is called the "structured credit products" market. The story here went something like this:

There was a greater demand for funding in the economy than what could be provided solely by bank lending. Therefore, bankers set up legal entities to provide funding by issuing notes to investors. Some investors, such as hedge funds, were willing to tolerate high risks of loss while other investors, such as pension funds, demanded low risk. To appeal to this wide range of investors, bankers pooled several assets, such as loans, and then structured the cash flows from these assets in such a way that they were able to create "safe" and "risky" notes to sell to different types of investors.

This is where mathematics was needed. Mathematical and statistical models were required to assess the risk of the notes issued to investors. Specifically there was a need to model the correlation of defaults between assets in the pool that provided cash flows to the investors. The problem was that correlation estimates are notoriously unstable when modeling rare events such as defaults. Nevertheless, the "Quants" happily provided bankers with their best efforts at modeling correlations. This went on for years until bankers, investors, rating agencies, regulators, and all market participants began to trust these models. In 2007, unfortunately, the real world began to behave differently than what was predicted by the models. This led to even investors in "safe" notes to lose money, which in turn eventually led to the current financial crisis.

The models failed to predict reality. But the responsibility for failure lies with all market participants who directly or indirectly relied on these models. Mathematicians simply provided a tool. At a recent speech at the IACPM conference Professor Jarrow from Cornell University stated that having no model is better than having a bad model. Businessmen, however, seem to favor a bad model over no model at all.