Financial instruments could be spiked with unfindable risks

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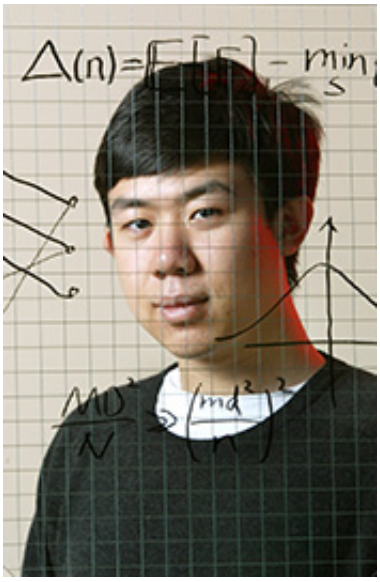

Rong Ge, a graduate student in computer science, was part of a team that used intractability theory to study the pricing of financial derivatives. (Photo by Frank Wojciechowski)

(PhysOrg.com) -- In a result that may have implications for financial regulation, researchers from computer science and economics have revealed potentially impenetrable problems with the pricing of financial derivatives. They show that sellers of these investments could purposefully include pieces of bad risk that no buyer could detect even with the most powerful computers.

The research focused on collateralized debt obligations, or CDOs, an investment tool that combines many mortgages with the promise of spreading out and lowering the risk of default. The team examined what would happen if a seller knew that some mortgages were "lemons" and structured a package of CDOs to benefit himself. They found that the manipulation may be impossible for buyers to detect either at time of sale or later when the derivative loses money.

The team consists of Sanjeev Arora, director of Princeton's Center for Computational Intractability, his colleague Boaz Barak, economics professor Markus Brunnermeier, and computer science graduate student Rong Ge.

It is now standard wisdom that a major culprit in the 2008 financial meltdown was use of simplistic mathematical models of risk at financial firms. This paper, released as a working draft Oct. 15, suggests that the problems may go deeper.

"We are cautioning that even if you have the right model it's not easy to price derivatives," Arora said. "Making the models more complicated will not make these effects go away, even for computationally sophisticated."

Arora noted that the problem arises from asymmetric information between buyers and sellers, and goes against conventional wisdom in economic theory, which holds that derivatives reduce the negative effects of such unequal information.

"Standard economics emphasizes that securitization can mitigate the cost of asymmetric information," Brunnermeier said. "We stress that certain derivative securities introduce additional complexity and thus a new layer of asymmetric information that can be so severe it overturns the initial advantage."

Brunnermeier noted that the finding came from combining computer science and finance, which has not been done before but has the potential for further insights. “I anticipate that both fields can enrich each other,” he said.

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