How the Stock Market Crashed in 2008

Alan Rosenthal
Failure of Prediction
Cause of the Collapse

Huge financial institutions leveraged on risky mortgage-backed securities.

Expectation vs. Reality
MORTGAGE-BACKED SECURITY (MBS)

Based on mortgage defaults

Investment
Ratings agencies gave MBSs a **AAA** rating.

Standard & Poor’s
Moody’s
Accuracy

Predicted Risk: 0.12%  vs.  Actual Risk: 28%
Why did the predictions fail?
A Closer Look at MBSs

Bundle five mortgages...
A Closer Look at MBSs

...bet on the chance that all five mortgages default.
A Closer Look at MBSs

“Subprime” mortgages: average B+ credit rating.
A Closer Look at MBSs

“Subprime” mortgages: average B+ credit rating.

>20% chance of default
Calculating Risk

Chance that all 5 mortgages default:

\[20\% ^ 5 = 0.032\%\]

(really low)
Calculating Risk

Chance that all 5 mortgages default:

$$20\% ^ 5 = 0.032\%$$

**Problem:** mortgage defaults were not independent from each other.
Realistic Risk

- Totally Independent: 0.032%
- Real Life
- Totally Dependent: 20%
Realistic Risk

- **Totally Independent**: 0.032%
- **Real Life**: Almost 1000x multiple
- **Totally Dependent**: 20%
Realistic Risk

Real estate bubble popping $\rightarrow$ Widespread defaults
Realistic Risk

Real estate bubble popping → Widespread defaults

Feedback cycle
Why did the ratings agencies fail?
Banks could go to a competing agency to get the rating they want.
Willful Ignorance

Natural human bias against uncertainty.

Unwillingness to oppose strong industry and finance trends.
For more:

*The Signal and the Noise: Why So Many Predictions Fail—but Some Don’t*

by Nate Silver