

# **Correlation in Corporate Defaults: Contagion or Conditional Independence?**

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Drawing from research with Andreas Eckner, Guillaume Horel, and Leandro Saita

## The Starting Point

The conditional mean arrival rate of default of a specific obligor:

$$e^{a + b_1 X_{1t} + \dots + b_n X_{nt}},$$

where  $X_{it}$  is a covariate, obligor-level or macro.

## Channels for Default Correlation

- Exposure to Observed Risk Factors.
- Exposure to Unobserved Risk Factors (or imperfect measurement).
- Contagion through chain-reaction defaults.
- Contagion through knock-on changes in the levels of covariates.
- Contagion through changes in the future evolution of covariates.

## What are the Main Contributions?

- Theory: Explains why the DDKS test is not a good way to expose alternative channels of default correlation.
- Empirical: Identification of some significant additional corporate default covariates not used in DDKS.
- A new contagion model based on ratings covariates, with a knock-on jump in default intensities, with decay.

## Why is This Important?

- Determination of safe levels of bank capital.
- Risk management of debt portfolios.
- Systematic risk premia for individual debt instruments.
- Rating, pricing, and hedging of collateralized debt obligations.
- Isolating systemic sources of risk.

## What Should Come Next?

- Examination of out-of-sample performance.
- Allowing for missing default-correlating covariates.
- Development of a portfolio risk model.
- Improvement of the contagion model.

## What if there are Unmeasured Covariates?

The mean arrival rate of default of a specific obligor at time  $t$ :

$$e^{a + b_1 X_{1t} + \dots + b_n X_{nt} + Y_t}$$

where  $Y_t$  is not measured (hidden or otherwise missing).

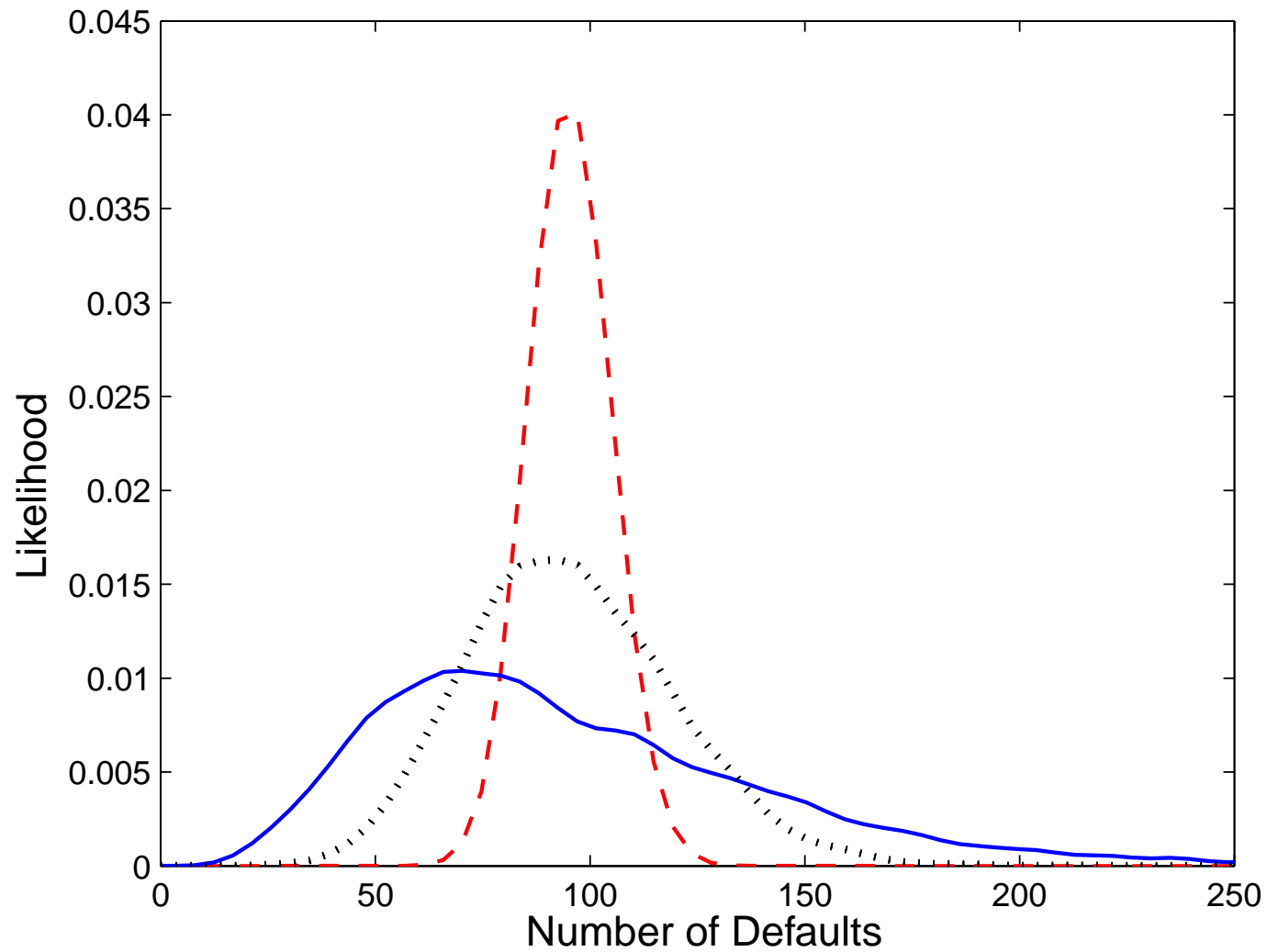
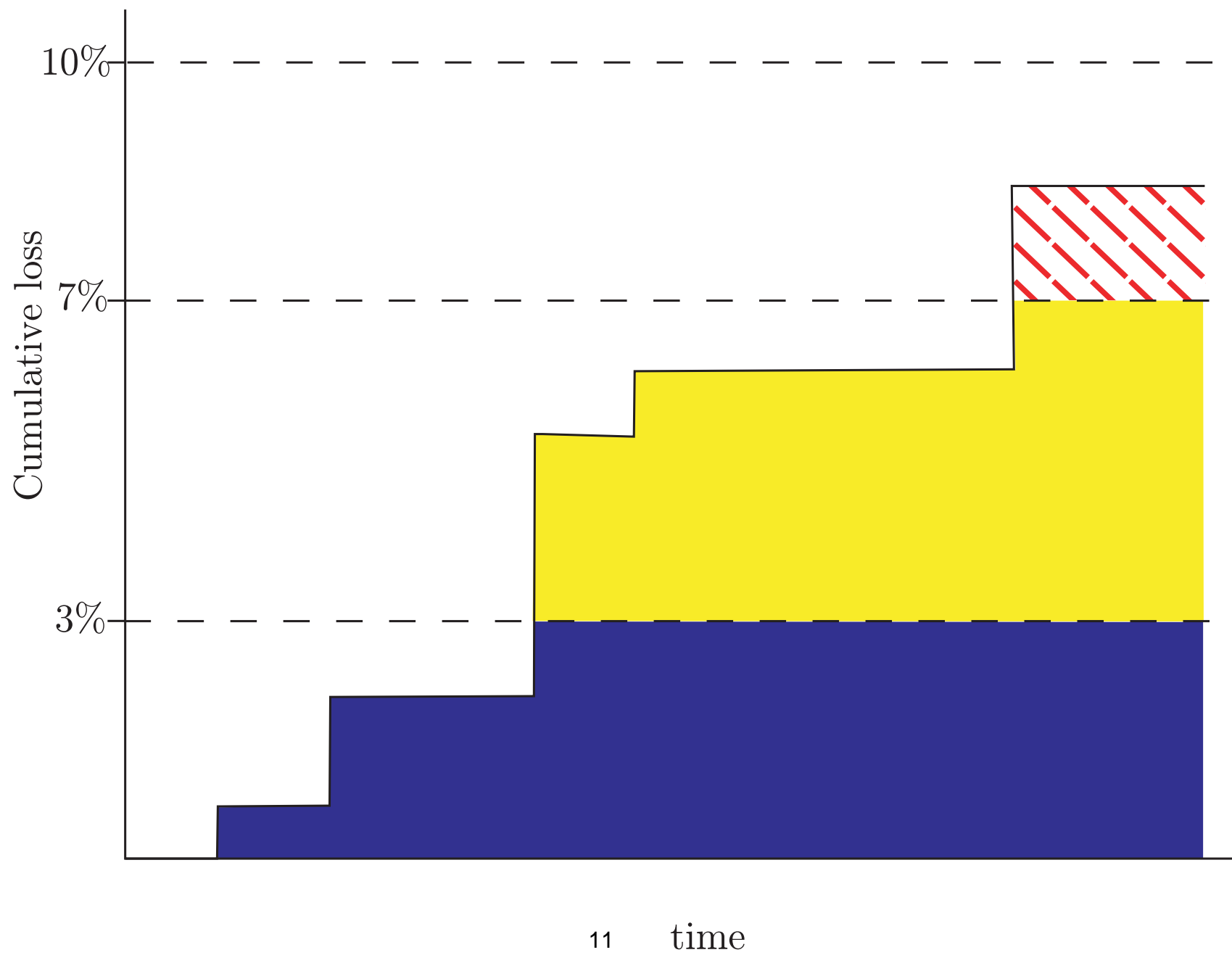
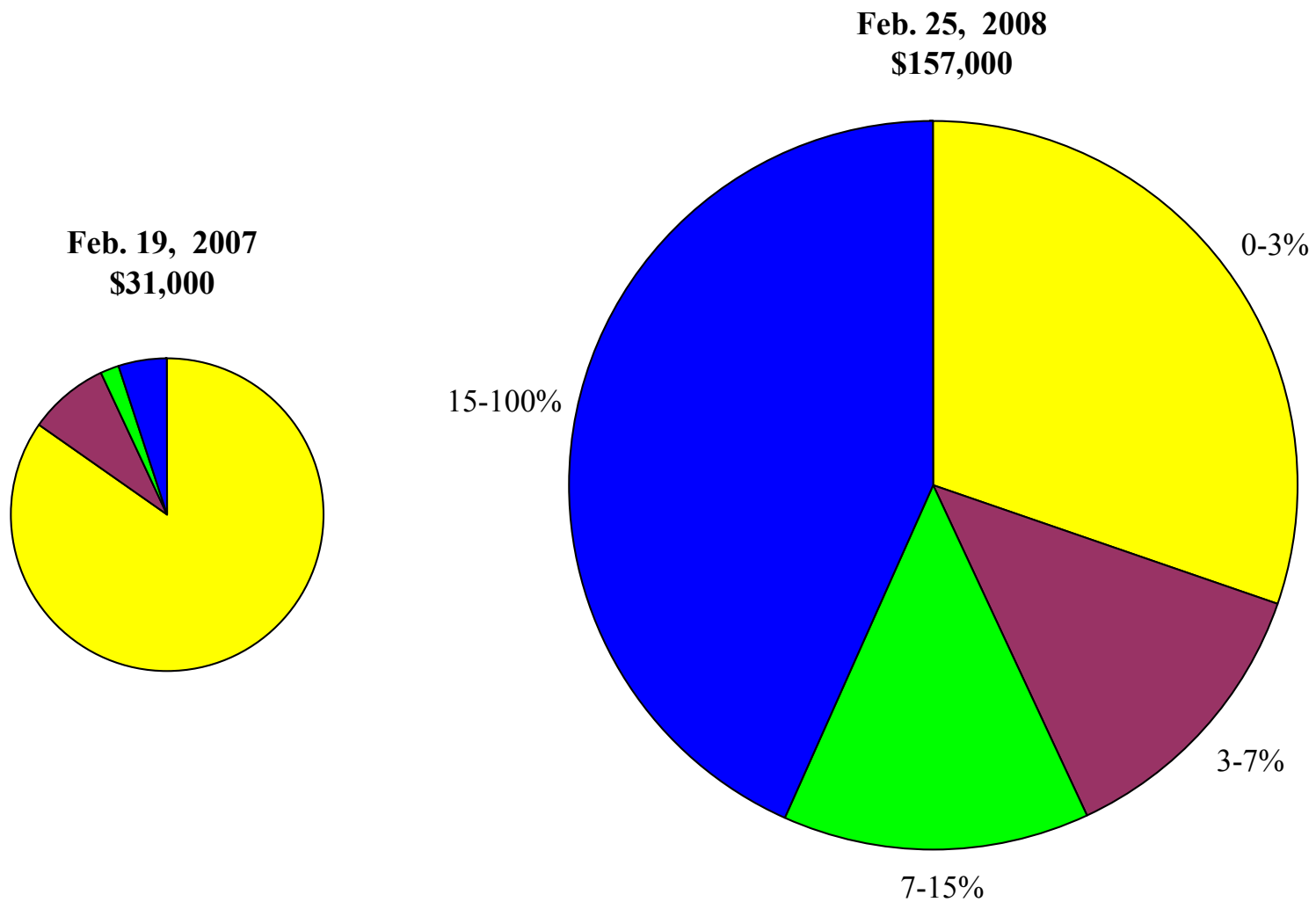


Figure 1: Default losses 1998-2003, on 1813-firm portfolio, with frailty (blue) and without (red).  
Source: Duffie, Eckner, Horel, Saita (2008).



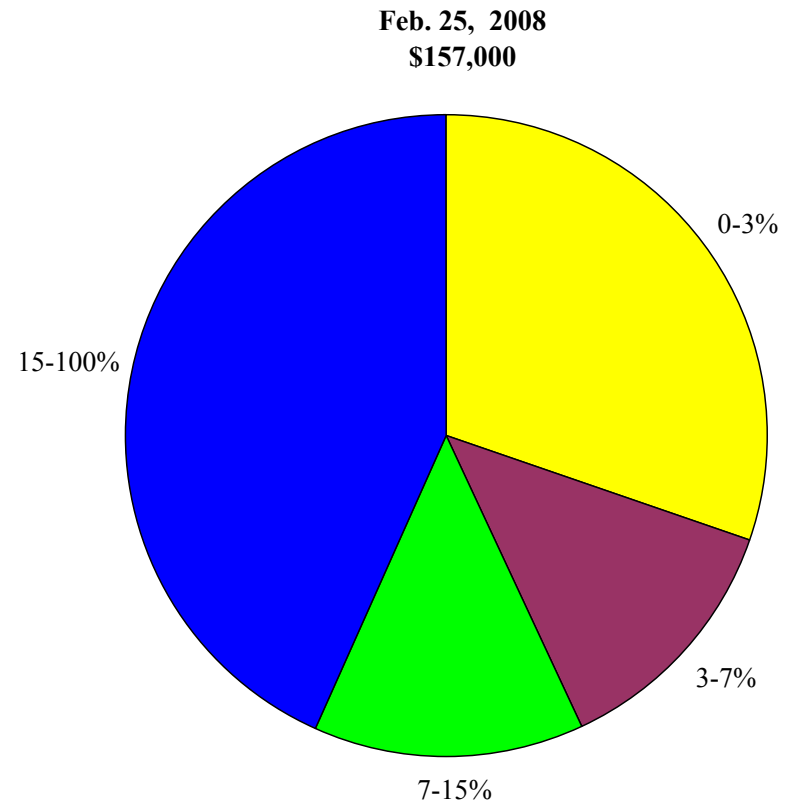
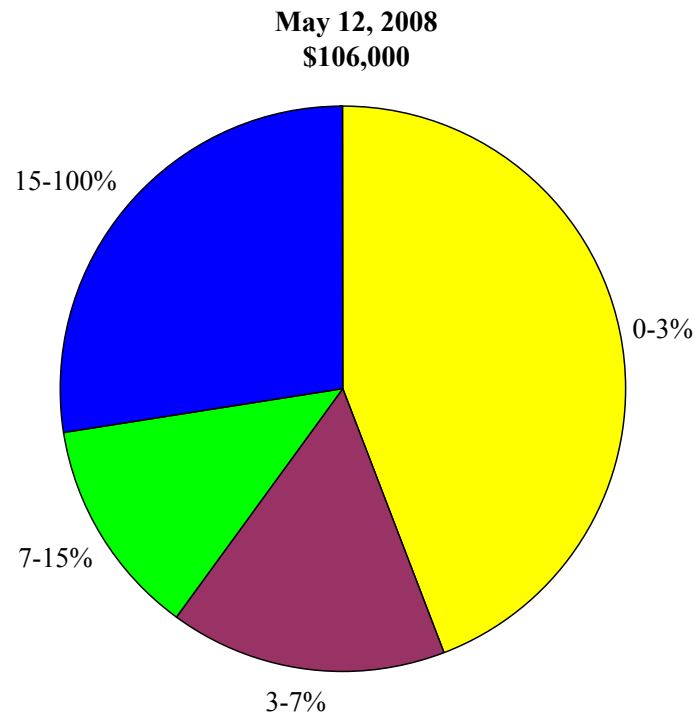


## Default Insurance on \$10 Million Investment Grade Corporate Debt Portfolio Annual Premiums on 5-Year Coverage



Source: CDX.NA.IG.5yr Tranche Pricing, Morgan Stanley

**Default Insurance on \$10 Million Investment Grade Corporate Debt Portfolio  
Annual Premium on 5-Year Coverage**



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