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:

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

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 $t$:

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

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).
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

May 12, 2008
$106,000

Feb. 25, 2008
$157,000

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