Systemic Risk Management in Financial Networks with Credit Default Swaps

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Contribution
- Study insolvency cascades in an interbank system when banks insure their interbank loans with credit default swaps (CDSs)
- A regulator imposes a systemic surcharge (i.e. tax) on CDS contracts according to how much they contribute to increasing systemic risk
- This effectively ‘rewires’ the interbank system and leads to a more resilient configuration (with lower systemic risk)

Credit Default Swaps (CDSs)
- A CDS contract \(CDFS^{\text{reg}}\) is an insurance contract on a reference entity (bank)
- An interbank loan can thus be insured using a CDS contract

CDSs ‘Rewire’ the Interbank System

Controlling Network Formation with a Systemic Surcharge
- Systemic importance of a bank \(i\) can be measured by DebtRank:
  \[ R_i(L^{\text{eff}}, C) = \frac{R_i}{\sum_i R_i} \]
- This leads to the expected systemic loss:
  \[ E_{\text{Lys}} = \frac{R_i}{\sum_i R_i} P_{\text{def}} V R_i (L^{\text{eff}}, C) \]
- Incremental effect of a CDS contract on systemic risk is easily computed:
  \[ \Delta (L^{M+\text{CDS}}) E_{\text{Lys}} = E_{\text{Lys}} (L^{M+\text{CDS}}) - E_{\text{Lys}} (L^C) \]
- CDS contracts are now priced according to how much they contribute to systemic risk

Results Simulated with the Agent-Based Model

Interbank Networks of Effective Exposures under Different Scenarios:

- Without a CDS market
- With a regulated CDS market
- With an unregulated CDS market
- With Tobin tax on interbank loans

Discussion
A CDS market regulated with this tax mechanism effectively ‘rewires’ the interbank system into a more resilient configuration. Each bank has lower systemic importance (lower DebtRank) and thus causes less damage to the interbank system following its default. An unregulated CDS market however increases systemic risk as it creates more contagion channels.