Dolfins project

Dangerous Derivatives: New Systemic Risks in Financial Networks with Credit Default Swaps

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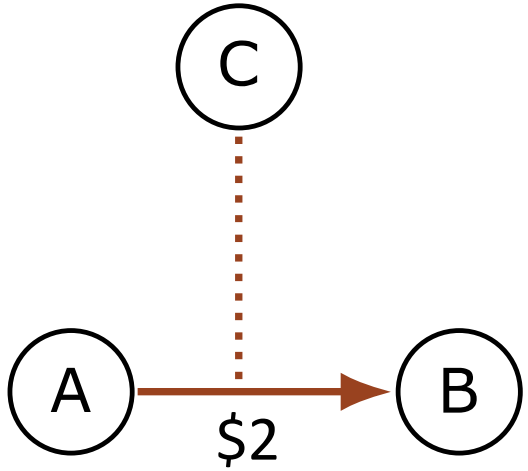
We study financial networks of debt and CDSs

Debt Contract:

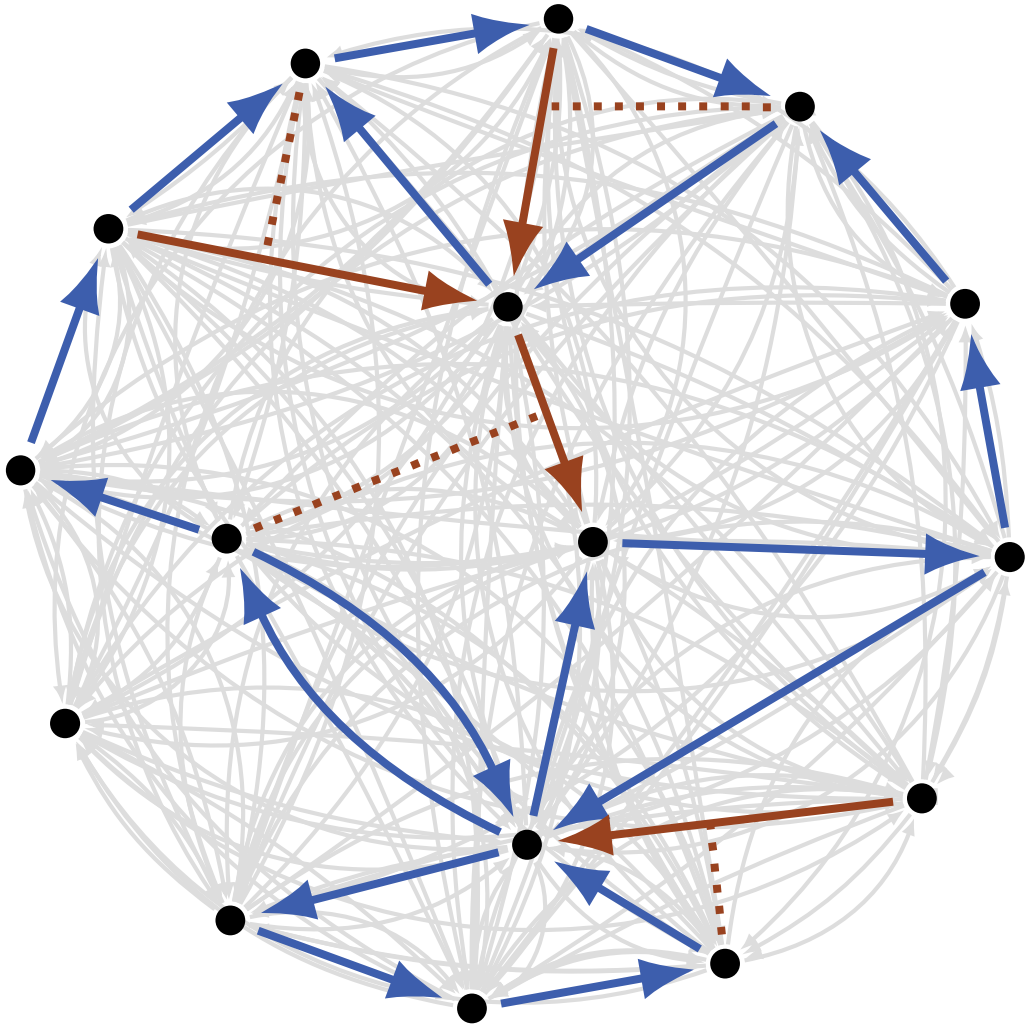
A has to pay to B $2.

Credit Default Swap (CDS):



A has to pay to B
$2 x (1 – recovery rate of C).

We study financial networks of debt and CDSs



We study the **Clearing Problem** to understand the behavior of CDS networks

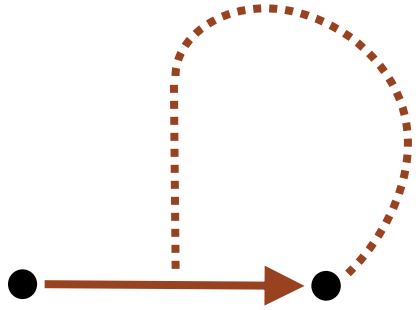
clearing problem
≠
clearing house

- **Given:** Financial network, exposed to a shock
- **Determine:** For each bank: In default? Recovery rate?
- Model: Eisenberg/Noe + Costs of bankruptcy + CDSs
- Without CDSs: Easy!

CDSs can give rise to **Default Ambiguity**

- The clearing problem may have **no solution**
- → Cannot decide who's in default
- → Delays bank's resolution
- → Network stress tests inconclusive

Default Ambiguity appears due to certain circular dependency structures



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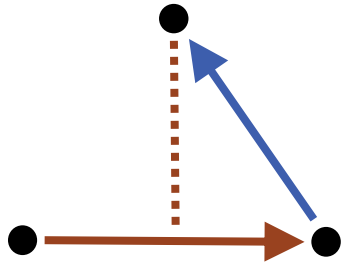

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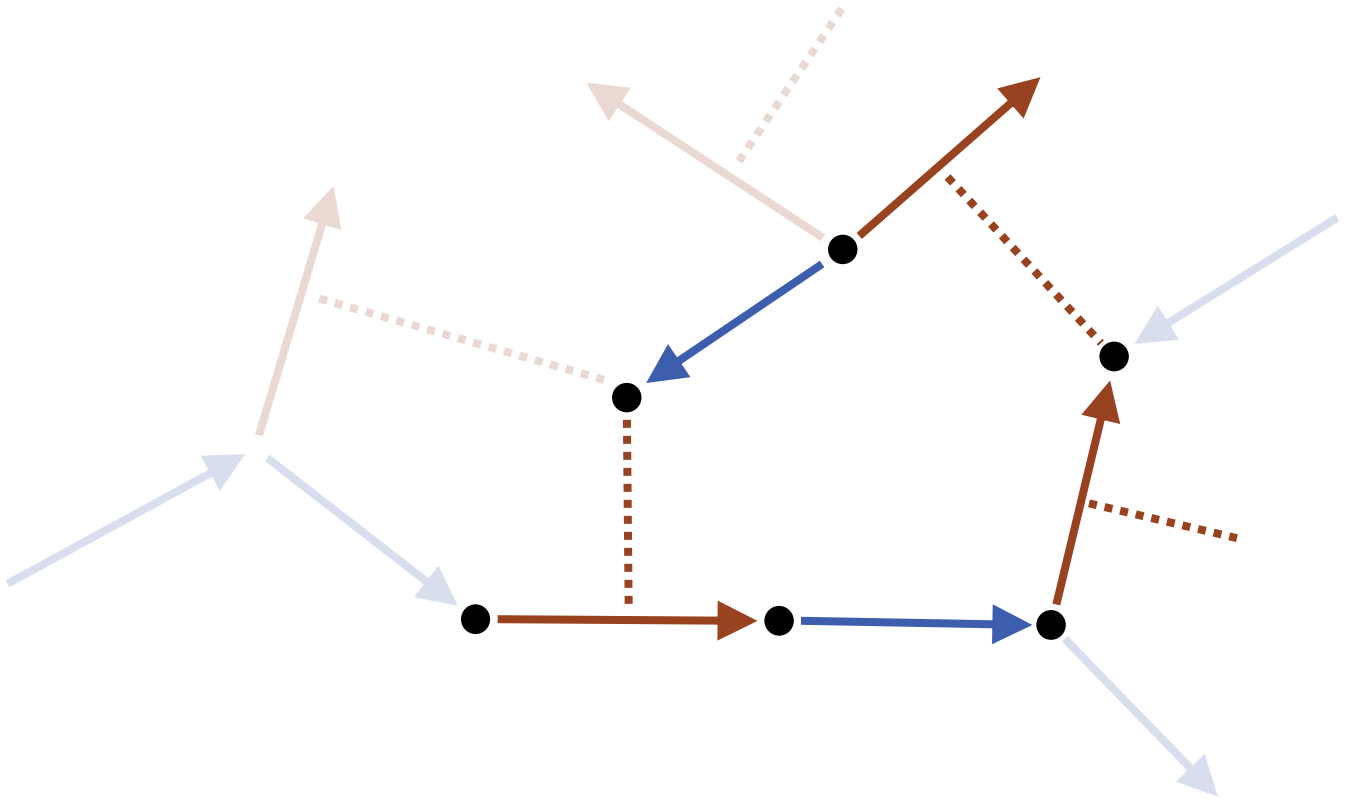

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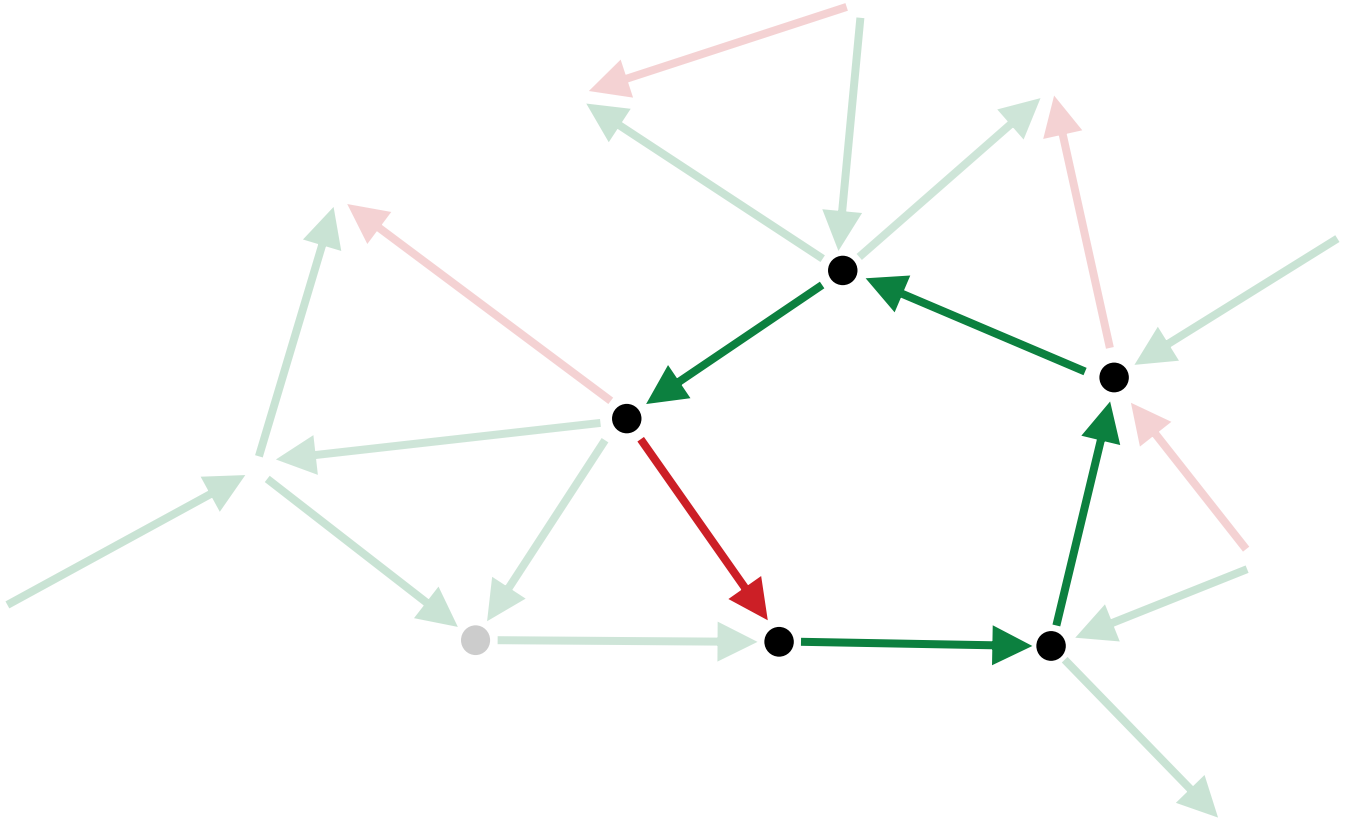

Dependency analysis lets us evaluate policies for effectiveness against default ambiguity

- Banning naked CDSs is effective
- Central counterparty clearing is *not* effective

CDSs pose new computational challenges

- No clearing algorithm guaranteed efficient in the worst case
  - Computational complexity: NP-hard / PPAD-hard
- Standard algorithms don’t work any more
- → Stress-testing with CDSs not easily possible
- Specialized algorithms needed (Work in progress)

Future Work

- Simulation Framework ← Random networks with CDSs
- Effects of these new risks, e.g., on CDS prices?
- Endogenous formation of the CDS network