Financial System Architecture and Systematic Risk

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Motivation  Model  Equilibrium  Results  Conclusion

• No external force maintains the swing. It is the internal dynamics of the bridge that maintains the wobbling.
• There was an initial shock (a gust of wind?) that set the bridge in motion.

http://www.youtube.com/watch?v=eAXVa__XWZ8
http://www.youtube.com/watch?v=P0Fi1VcbpAI
Tacoma Bridge
Motivation  Model  Equilibrium  Results  Conclusion

US Corporate Debt Securities and Bank Loans (Davis, 2001)
The Model

• A continuum of risk neutral households with unit mass, indexed by $i \in [0,1]$, each with one unit of funds. Households must decide whether to invest their funds in direct finance, intermediated finance or not invest at all.

• A continuum of identical firms, with unit mass, which have access to the same risky technology → systematic risk.

• One representative financial intermediary which issues financial securities to households.
Public Information on the Real Sector

*(Direct finance)*

Net return is $r_D - n$

- **Fundamentals** perfectly correlated across firms

\[ r_D \sim N(\bar{r}_D, \sqrt{1/\alpha}) \]

- $n$: mass of non investors
  - Investment complementarities, synergies.
  - Endogenous.
Households - Private information

\[ \omega_i = r_D + \varepsilon_i \text{ with } \varepsilon_i \sim N\left(0, \sqrt{1/\beta}\right) \text{ iid across agents} \]

- Update beliefs on \( r_D \) (posterior)

\[ \rho_i \equiv E[r_D | \omega_i] = \frac{\alpha r_D + \beta \omega_i}{\alpha + \beta} \]
Projects are implemented. Returns are realized and financial claims are settled.

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<th>Date 0</th>
<th>Date 1</th>
<th>Date 2</th>
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<td>Public information is available.</td>
<td>1.1 Nature selects the fundamentals ($r_D$).</td>
<td>Projects are implemented.</td>
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<td>1.2 Private information becomes available.</td>
<td>Returns are realized and financial claims are settled.</td>
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<td>1.3 Investment decisions are taken.</td>
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Recall:

\[ EU = E[r_D - n|\rho_i] \]
Motivation Model Equilibrium Results Conclusion

Public Information on the Financial Sector
(Intermediated Finance)

Net return is \( r_B - n \)

with \( r_B = \bar{r}_B + \sqrt{\alpha} \sigma_B \left( r_D - \bar{r}_D \right) \)

hence: \( r_B \sim N(\bar{r}_B, \sigma_B) \)

FI offers perfectly correlated returns but different risk.

Definition: **Safe Security** means \( \sigma_B < 1/\sqrt{\alpha} \)
Motivation  Model  **Equilibrium**  Results  Conclusion

\[ \rho_i = \text{updated belief of agent } i \]

Investors in direct finance

\[ \mathbb{E}[r_B | \rho_i] = \text{expected return } r_B \text{ given belief } \rho_i \]

Optimistic

Pessimistic

Non investors

Investors in intermediated finance

Investors in direct finance

\[ \rho^T, \rho^I, \rho_i = \text{updated belief of agent } i \]
Financial Architecture
I focus on **coexistence in which banks offer safe securities**

- People use public information to coordinate their actions.

- FI “improves” the **precision** of public information.
Motivation  Model  Equilibrium  Results  Conclusion

\[ \text{Welfare} = E[(1-n) \times (1+r-n)+n] \]

\[ \alpha = 0.25, \beta = 4, \bar{r}_D = 0.6 \]
\[ \rho' = 0.4963 \]

\[ \alpha = 0.25, \beta = 4, \bar{r}_D = 0.6 \]
Conclusion

- Regulation is desirable.
- New issues:
  - Structure of competition in FI sector is important for equilibrium.
  - FI may divert resources from decentralized markets (namely stock exchanges) and reduce liquidity.
End of Presentation

Thank you!