Collateral Crises

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The Question

- Authors' motivation: How can a small shock trigger a big crisis?
- When does a money-like asset cease to be money-like?

The Story Line

- Lots of positive-value potential investments. Entrepreneurs own ideas but need capital.
- Friction: Project output is not contractible. Collateral required.
- Entrepreneurs own land, which produces consumption value. Land can be collateral, but cannot be used as capital to run the project.
- Some land is good (high consumption value), some is bad (no value). No one knows type.
- In some pooling equilibria, all land is sufficiently valuable to finance efficient level of investment. But if lenders get information about what land is good, only good land is collateral. Lots of collateral disappears and investment falls.

Static Model

- Risk-neutral entrepreneurs and lenders.
- Production technology

$$K' = Amin\{K, L\} \text{ w/prob } q, \quad 0 \text{ w/prob } 1 - q$$

L is fixed so optimal investment is $K = L$.

- Collateral: delivers C if good, 0 otherwise.
  Assume $C > L$, so that good collateral worth more than optimal loan.
- A fraction p of land is good.

If lender has information

- With prob p, collateral is good and lender lends K units of capital against x units of collateral.
- If project succeeds (prob q), firm agrees to pay R_{IS}.
- If project fails $(1-q)$, lender gets collateral value xC.
- Expected value for lender:

$$EV = p\left(qR + (1-q)xC - K\right)$$

- Entrepreneur incentive compatibility $\rightarrow R = xC$.

$$EV = p\left(xC - K\right)$$

- Competitive lenders $\rightarrow EV = \gamma$ (info cost).
- Entrepreneur only has 1 collateral unit ($x = 1$). Maximum K: $K = C - \frac{\gamma}{p}$.

Without information

- Suppose that lender lends K in return for payment R with collateral xC.
- If project fails, lender gets expected value pxC.
- Expected value for lender:

$$EV = qR + (1 - q)pxC - K$$

- Entrepreneur incentive compatibility $\rightarrow R = pxC$.

$$EV = pxC - K$$

- Competitive lenders $\rightarrow EV = 0$.
- Entrepreneur only has $x = 1$. Maximum K: $K = pC$.

How information triggers a collapse

- Without information, lend up to pC to everyone.
- With information, lend up to $(C - \gamma/p)$ to a fraction p.
- 2 differences:
  - With information, borrowers need to be compensated for information costs. This reduces loan size.
  - Suppose info cost is small $\gamma \approx 0$, then information $\rightarrow$ concentrating lending on a few borrowers.
- Why is concentrating lending a “disaster"? Because of the optimal firm size. If $L < p(C - \gamma/p)$, then without information, all firms get all the money they need. With information, some firms can’t produce.
- But, if assortative matching is efficient, and high-quality firms have good collateral and higher optimal funding, then information improves efficiency.

Incentive to Acquire Information

- Suppose we're in a no-information equilibrium ($R = pxC$). There is an incentive to acquire information if

$$p\left(qpxC + (1-q)xC - K\right) - \gamma > pxC - K$$

$$(1-p)K - pq(1-p)xC > \gamma$$

- Substitute in zero profit in no-info eqbm ($x = K/pC$):

$$(1-p)K - q(1-p)K > \gamma$$

$$(1-p)(1-q)K > \gamma$$

- What triggers information?
  - Low prob of good land (p)
  - Low prob of project success (q)
  - High loan size (K)
- Firms limit borrowing to avoid triggering information acquisition.

Dynamics

- OLG model of young lenders and old borrowers.
- We know the type of land it was last period, but prob $1 - \lambda$ of changing type.
- This persistence makes information depreciate over time.
  With no new information, uncertainty builds. More projects get funded and consumption rises.
- Small shock to p can trigger information acquisition.
- After a long “boom," many projects are being funded with bad collateral. With information, investment plummets.

Great Ideas in Here

- Captures a novel aspect of the crisis:
  When people figured out what was in MBS, a bunch of credit evaporated.
- Something that was like money ceased to be money.
  - What makes something like money?
    No inside information about it.
  - Why is there no inside information?
    We didn't acquire it.
- Small changes in the environment can trigger information acquisition. Can fundamentally change the nature of some assets.

Questions about the model

What about risk aversion?

- Authors say: Don't worry, debt is collateralized = risk-free.
- But unscreened collateral is a lottery ticket. Risk aversion could make its value very low.
- Information resolves risk. On average this should make collateral more valuable and facilitate more lending.
- Offers a neat possibility: Over time, uncertainty grows. This makes information more valuable. Could get a crisis with *no shocks to fundamentals*.

Questions about the model

What if the project value and collateral value are correlated?

- Model assumes project success and collateral quality are independent.
- Typically, funding is to purchase a productive asset, which is itself the collateral.
- If valuable projects are also likely to generate valuable collateral, then information facilitates efficient matching of project and funding.

Does this describe the crisis?

- The crisis wasn't an event where we suddenly knew how to price each asset. To the contrary, we thought before we knew the value. In the fall of 2008, almost no one had a clue.
- In this information "crisis," anyone who needs a big loan and has good collateral can get more funding than before the information crisis.
- What happens to asset prices in the model?
  I think the projects that are funded *increase* in value.

Conclusions

- I like the idea. It's novel. An important insight here.
- This paper is already inspiring other work.
  ex: K. Hellwig and Zhang (2012)
- I'm not as comfortable with the idea that concentrating lending to high-collateral-value projects is a crisis.
- A cleaner mapping between events and the model mechanics would help.