Credit Market Competition and Liquidity Crises

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May 9, 2012

Motivation

- There is a long-standing debate on whether competition is beneficial or detrimental to financial stability
- Key issue is how competition affects banks' and borrowers' risk taking behavior. Two opposing views:
  - *Competition - Fragility View*
    Keeley (1990): Competition induces bank managers to take excessive risk
  - *Competition - Stability View*
    Boyd & De Nicolo (2005): Competition improves borrowers' incentives and thus bank asset risk
- Evidence is also mixed

The recent crisis and the role of liquidity

- Recent crisis has reopened debate: Has competition contributed to the crisis?
  - Yes, it has worsened banks' incentives
  - No, countries with similar market structure have been affected very differently by the crisis (e.g., Australia, Canada, UK)
- One issue that has been overlooked is the link between competition and liquidity as a source of risk
  - Liquidity has played a crucial role in the recent crisis because of maturity transformation and rollover risk
  - Banks' reserves and market liquidity determine asset prices, and thus banks' ability to withstand liquidity shocks

Our paper

- Novel theory where credit market competition affects the opportunity cost of holding liquidity, and thus is crucial for the emergence of liquidity crises
- Standard two-periods banking model based on Allen and Gale (2004) and Allen, Carletti and Gale (2009) with liquidity uncertainty
- Banks face (aggregate) uncertainty concerning their liquidity demands
  - Two states of nature, good (low fraction of early depositors) and bad (high fraction of early depositors)
  - Banks can meet their liquidity demand either by holding reserves or selling loans on a competitive interbank market
  - Asset prices are endogenous and volatile across states

Results in a nutshell I

- Competition is beneficial to financial stability
  - A *No Default* equilibrium exists when competition is intense
  - A *Mixed* equilibrium, in which some banks are safe and some default, exists when competition is low
  - Intuition: cost of holding reserves depends on degree of competition
- The degree of competition from which the mixed equilibrium exists and the number of defaulting banks decrease with the probability of the bad state
  - The degree of competition and the level of exogenous risk are substitute in determining banks' risk taking behavior and financial stability

Results in a nutshell II

- The optimality of crises depends on whether they allow banks to reduce reserves and grant more loans
  - Default is efficient when the probability of the bad state is low
  - Default is *not* efficient when such a probability is high
  - Intuition: Default introduces some contingency in the repayment to consumers and may allow the system to economize on reserves
- Implications for credit availability
  - Default leads to greater credit availability when the exogenous risk of the economy is low, and to lower credit availability when such a risk is high

The model I

- $t = 0, 1, 2$
- There are three types of agents in the economy: banks, consumers and entrepreneurs
- Banks raise funds from consumers in exchange for a deposit contract and invest in reserves and loans
- Banks are monopolist on the deposit market and compete for loans
- Banks can sell loans in a competitive interbank market. The price is determined by the aggregate demand and supply of liquidity in the market

The model II

- Banks invest R in reserves (storage) and L in safe loans generating V at date 2 and giving the bank a return

$$r = \gamma V$$

- Depositors are *ex ante* identical but of two types *ex post*: *early* and *late* depositors. The probability of being an *early* consumer is

$$\lambda_\theta = \begin{cases} \lambda_L & \text{w.p. } \pi \\ \lambda_H & \text{w.p } 1-\pi \end{cases}$$

- Two key parameters in the model: γ and π

The emergence of liquidity crises

- A crisis occurs in equilibrium when P_θ is so low that the bank cannot fulfill its commitments to depositors
- When this happens, late consumers run, the bank liquidates all its loans and makes zero profits, depositors receive a pro-rata share of bank's resources

No Default Equilibrium

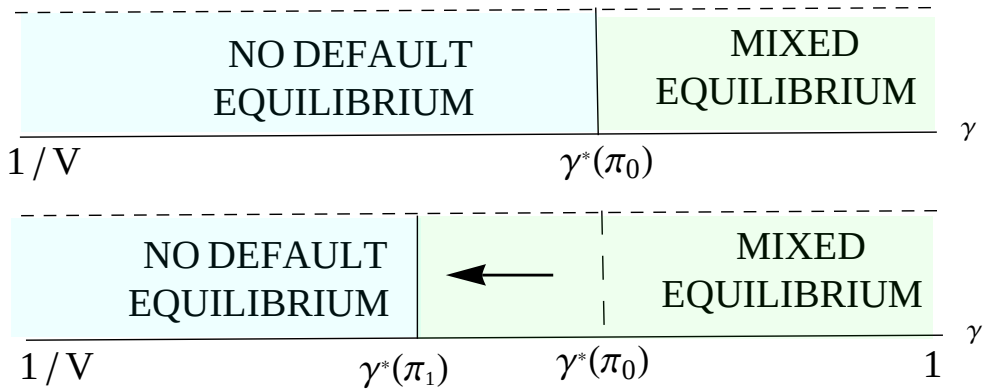
- All consumers withdraw according to their time preferences and no run occurs
- Banks behave symmetrically and remain solvent
- Each bank has enough reserves to withstand any liquidity shock

Mixed Equilibrium

- Avoiding default is costly in terms of foregone returns on loans.
- Banks behave differently
  - A fraction ρ of banks are safe and hold enough reserves to withstand liquidity shocks
  - A fraction $(1-\rho)$ of banks are risky and default in the bad state
- The interbank market is active: safe banks buy loans, risky banks sell them
- Depositors are indifferent between the two types of banks
- Banks are indifferent between being safe and risky

Competition and Stability

- Result I: There exists a degree of credit market competition γ^* such that the no default equilibrium exists for any $\gamma \leq \gamma^*$ and the mixed equilibrium exists for any $\gamma \geq \gamma^*$.
- Result II: The threshold γ^* decreases with the level of exogenous risk π



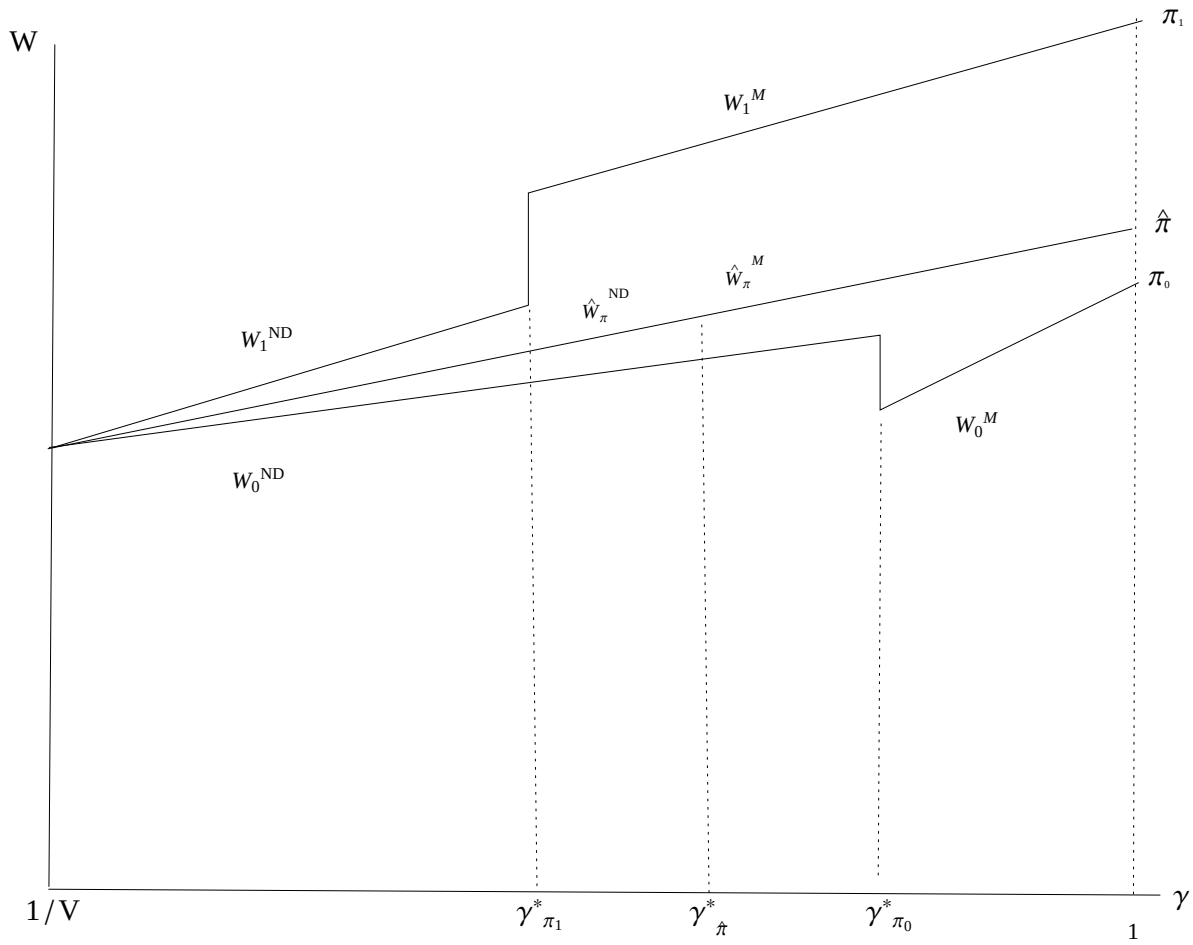
with $\pi_1 > \pi_0$.

- Competition γ and risk π are substitute in determining banks' risk taking behavior and financial stability

Welfare

- Welfare is defined as total profits of banks and borrowers (consumers are kept at their reservation utility)
- When the two equilibria coexist, welfare is increasing in the number of loans granted
- Default introduces some contingency in the repayment to consumers. Is this optimal?
- Yes, if it allows the system to grant more loans. This is the case when the exogenous risk is low

Welfare Comparison



Conclusions

- Competition is beneficial to financial stability, but not necessarily to welfare
- The degree of (exogenous) risk in the economy plays an important role in shaping the relationship between competition and stability
- Economies with the same level of competition may differ in terms of stability depending on the level of exogenous risk
- The efficiency of crises depends on the level of exogenous risk