Comments by Rafael Repullo on

Money in a Theory of Banking

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Introduction

Purpose of paper

Introduce money (and monetary policy) in the theory of banking developed in earlier papers (*JF* 2000, *JPE* 2001, *JF* 2005)

- What happens with *nominal* deposit contracts?
- Can monetary policy help avert bank failures?
- Is there a bank lending channel and how does it operate?

Introduction

“It is with peculiar diffidence and even apprehension that one ventures to open ones’ mouth on the subject of money.”

John R. Hicks (1935)

General comments

- Important issues on which original research is needed
- Starting point: theory of banking with microfoundations
- But way in which money is introduced is very complicated
  - Model with six dates and five types of agents
  - Special structure of preferences and endowments
  - Transactions and fiscal demands for money
  - Government taxes (payable in cash), etc.

A simple version of the (real) model

- Three dates $(t = 0, 1, 2)$
- Three risk-neutral agents: investors, entrepreneurs, bankers
- Single consumption good that can be costlessly stored

- **Investors**
  - Unit endowment at $t = 0$
  - Utility function $U(c_0, c_1) = c_0 + c_1$

A simple version of the (real) model

- **Entrepreneurs**
  - Zero endowments
  - Project that requires unit investment at $t = 0$ and yields

	$t = 1$	$t = 2$	proportion
early	C	0	α
late	0	C	$1 - \alpha$

  - Utility function $U(c_1, c_2) = c_1 + c_2$
  - Aggregate uncertainty: α is a random variable with cdf $F(\alpha)$

A simple version of the (real) model

- **Bankers**
  - – Zero endowments
  - – Raise (real) demand deposits from investors at $t = 0$
  - – Offer (real) short-term loans to entrepreneurs at $t = 0$
  - – Can enforce repayment of a fraction γ of project returns
  - – Utility function $U(c_1, c_2) = c_1 + c_2$

A simple version of the (real) model

- **Bankers**
  - Can collect γC at $t = 1$ from early entrepreneurs
  - Can collect γC at $t = 2$ from late entrepreneurs
  - Can collect c at $t = 1$ from late entrepreneurs (liquidation)

$$c < 1 < \gamma C < C$$

  - Can raise fresh deposits at $t = 1$ from early entrepreneurs

A simple version of the (real) model

- Notation

  d = (gross) deposit rate

  λ = (gross) loan rate

- Assumption

  There are more entrepreneurs than investors $\rightarrow$ $\lambda = \gamma C$

Possible equilibrium at t = 1

- If $d \leq \alpha\gamma C$ bankers can pay investors with loan proceeds
  - Investors get d
  - Entrepreneurs get

$$\alpha(1 - \gamma)C + (1 - \alpha)(1 - \gamma)C = (1 - \gamma)C$$

  - Bankers get

$$(\alpha\gamma C - d) + (1 - \alpha)\gamma C = \gamma C - d$$

Possible equilibrium at $t = 1$

- If $d > \alpha\gamma C$ bankers need to
  - either raise new deposits from early entrepreneurs at rate r

	$t = 1$	$t = 2$
payoffs	1	$-r$

  - or liquidate late projects

	$t = 1$	$t = 2$
payoffs	c	$-\gamma C$

- **Lemma 1**

  Bankers prefer to raise new deposits if $\gamma C/c > r$

  Bankers prefer to liquidate late projects $\gamma C/c < r$

Possible equilibrium at $t = 1$

- If $d > \alpha\gamma C$ and

$$\alpha(1 - \gamma)C \geq d - \alpha\gamma C \quad \Leftrightarrow \quad d \leq \alpha C$$

  - early entrepreneurs have sufficient funds to cover shortfall
  - $r = 1$ and bankers raise new deposits

- If $d > \alpha\gamma C$ and $d > \alpha C$
  - bankers need to liquidate late projects
  - $r = \gamma C/c$ and total funds available are

$$\alpha\gamma C + \mu(1 - \alpha)c + (1 - \mu)(1 - \alpha)\gamma C/r = \alpha\gamma C + (1 - \alpha)c$$

  where μ denotes share of late projects liquidated

Possible equilibrium at $t = 1$

Summing up: 4 regions in α-d space

- $d \leq \alpha\gamma C$

  → Bankers do not have to raise new funds

- $\alpha\gamma C < d \leq \alpha C$

  → They raise funds from early entrepreneurs at rate $r = 1$

- $\alpha C < d \leq \alpha\gamma C + (1 - \alpha)c$

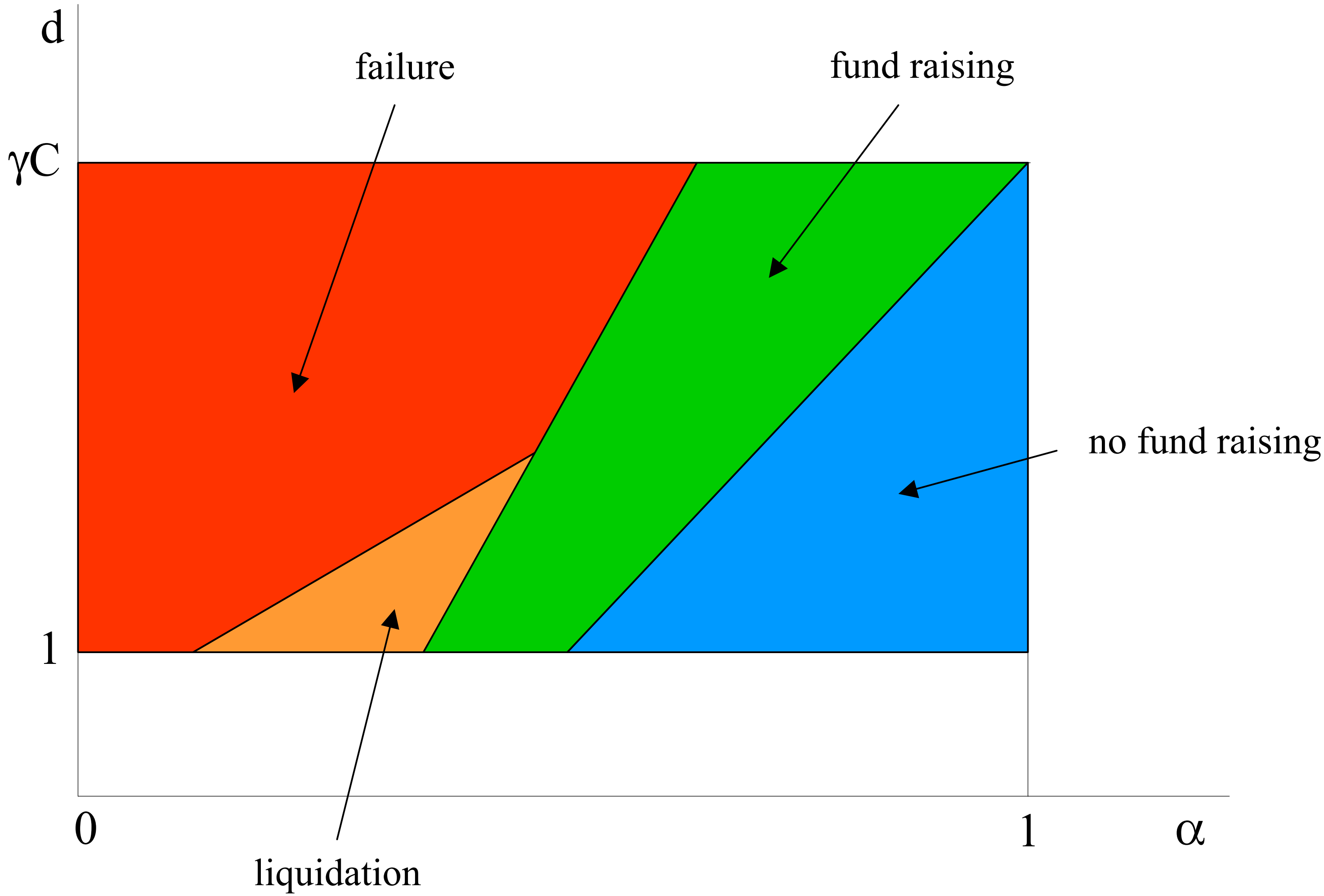
  → They raise funds from early entrepreneurs at rate $r = \gamma C/c$

  and liquidate some late projects

- $d > \alpha\gamma C + (1 - \alpha)c$

  → Bank fails

Possible equilibrium at t = 1



Equilibrium at $t = 0$

- Competitive banks drive profits to zero

  $\rightarrow$ Deposit rate d = Loan rate $\lambda = \gamma C$

- Equilibrium payoffs
  - Investors $\gamma C[1 - F(\gamma)] + cF(\gamma)$
  - Entrepreneurs $(1 - \gamma)C[1 - F(\gamma)]$
  - Bankers: 0

What about money?

- Suppose that we have nominal deposits
- Let d now denote the nominal deposit rate
- Let $P(\alpha)$ denote the nominal price of the good at $t = 1$
- Assume that $P'(\alpha) < 0$

  → nominal prices are decreasing in the level of output
- Change in regions in α-d space

  → e.g. bankers do not have to raise funds when $d \leq \alpha\gamma CP(\alpha)$

  → Fall in α is compensated by increase in $P(\alpha)$

Key results

- Nominal deposits hedge banking system against real shocks
- With cash-in-advance $P(\alpha) \propto 1/\alpha$, so perfect hedge!
- But nominal deposits expose system to nominal shocks

  $\rightarrow$ Potential role for monetary policy

Final comments

- Very interesting result, but I would be happier with a simpler model of determinants of nominal prices

- Role of lender of last resort should be discussed

  → Real vs. nominal liquidity shortages

- We have nominal deposit contracts and real loan contracts

  → Does not seem very realistic

  → But with nominal loans we would be back to square one