Comments by Rafael Repullo on

Bank Competition and Financial Stability:
A General Equilibrium Exposition

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Purpose of paper

• Reexamine trade-off between competition and financial stability

• What is new?

→ Moral hazard at the firm <u>and</u> at the bank level

→ Possible increasing returns to scale in intermediation

→ General equilibrium effects

Structure of paper

- Basic model

    $\rightarrow$ Investors lend to banks

    $\rightarrow$ Banks invest in projects

- Extended model

    $\rightarrow$ Investors lend to banks

    $\rightarrow$ Banks lend to firms

    $\rightarrow$ Firms invest in projects

Main results

- Basic model with constant returns (CR) in intermediation

    $\rightarrow$ Imperfect competition is optimal

- Basic model with increasing returns (IR) in intermediation

    $\rightarrow$ Perfect competition is optimal

- Extended model with CR or relatively inefficient intermediation

    $\rightarrow$ Imperfect competition is optimal

- Extended model with IR or relatively efficient intermediation

    $\rightarrow$ Perfect competition is optimal

Outline

• Overview of literature

• Understanding the basic model

    → What happens in partial equilibrium?

    → What changes when we go to general equilibrium?

    → What is the role of bank capital?

• A few comments on the extended model

• Concluding remarks

Part 1

Overview of the literature

The traditional (charter value) view

"The legislative reforms adopted in most countries as a response to the banking and financial crises of the 1930s shared one basic idea which was that, **in order to preserve the stability of the banking and financial industry, competition had to be restrained**."

Tommaso Padoa-Schioppa (2001)

A model of the traditional view (i)

- Single risk-neutral bank

- Bank invests unit in asset with stochastic return

$$\text{Return} = \begin{cases} X, & \text{with probability } p \\ 0, & \text{with probability } 1-p \end{cases}$$

where probability of success p is privately chosen by the bank

- Cost of effort to implement p

$$c(p) = \frac{\alpha}{2} p^2$$

- Cost of deposits R

A model of the traditional view (ii)

- Bank's problem is

$$\max_{p} \left[p(X - R) - \frac{\alpha}{2} p^2 \right]$$

- Solving the first-order condition gives

$$p(R) = \frac{X - R}{\alpha}$$

A model of the traditional view (iii)

- Effect of higher competition for deposits (higher R)

$$\frac{dp}{dR} = -\frac{1}{\alpha} < 0$$

  → Lower probability of success (or higher risk)

- Conclusion: **Competition is bad for stability**

An alternative view

- What if moral hazard problem is at the level of a firm borrowing

  from a bank?

- In this setup higher competition among banks would lead to

  → Lower loan rates

  → Lower probabilities of loan default

  → Safer loan portfolios

- Conclusion: **Competition is good for stability**

- Reference: Boyd and De Nicoló (2005)

A critique of the alternative view

- Previous result assumes perfect correlation in loan defaults

    → Probability of loan default = Probability of bank failure

- What happens with imperfect correlation?

    → Increased competition reduces loan rates

    → Lower interest payments from non-defaulting loans

    → Lower margin (that provide buffer to cover loan losses)

- Conclusion: **Competition has ambiguous effect on stability**

- Reference: Martinez-Miera and Repullo (2010)

Part 2

Understanding the basic model

Partial equilibrium model (i)

- Single risk-neutral bank

- Bank invests unit in asset with stochastic return

$$\text{Return} = \begin{cases} X, & \text{with probability } p \\ 0, & \text{with probability } 1-p \end{cases}$$

  where probability of success p is privately chosen by the bank

- Cost of effort to implement p

$$c(p) = \frac{\alpha}{2} p^2$$

Partial equilibrium model (ii)

- Bank sets deposit rate R such that

$$pR = \rho$$

  $\rightarrow \rho$ is the required expected return of uninsured depositors

  $\rightarrow$ Proxy for the degree of competition in deposit market

- Endogenous variables

  $\rightarrow$ Probability of success p and deposit rate R

- Exogenous variables

  $\rightarrow$ Cost of effort parameter α and expected return ρ

Optimal contract

- Optimal contract

$$(p^*, R^*) = \arg\max_{(p,R)} \left[p(X - R) - \frac{\alpha}{2} p^2 \right]$$

$\rightarrow$ subject to incentive compatibility constraint

$$p^* = \arg\max_{p} \left[p(X - R^*) - \frac{\alpha}{2} p^2 \right]$$

$\rightarrow$ and participation constraint

$$p^* R^* = \rho$$

Solving for the optimal contract

- Two equations

  → First-order condition for incentive compatibility

$$p^* = \frac{X - R^*}{\alpha}$$

  → Participation constraint

$$p^* R^* = \rho$$

- Solution

$$p^* = \frac{1}{2\alpha}\left(X + \sqrt{X^2 - 4\alpha\rho}\right) \quad \text{and} \quad R^* = \frac{1}{2}\left(X - \sqrt{X^2 - 4\alpha\rho}\right)$$

Comparative statics

- Effect of increasing cost of effort parameter α

$$\frac{\partial p^*}{\partial \alpha} < 0 \quad \text{and} \quad \frac{\partial R^*}{\partial \alpha} > 0$$

$\rightarrow$ Higher risk and higher cost of deposits

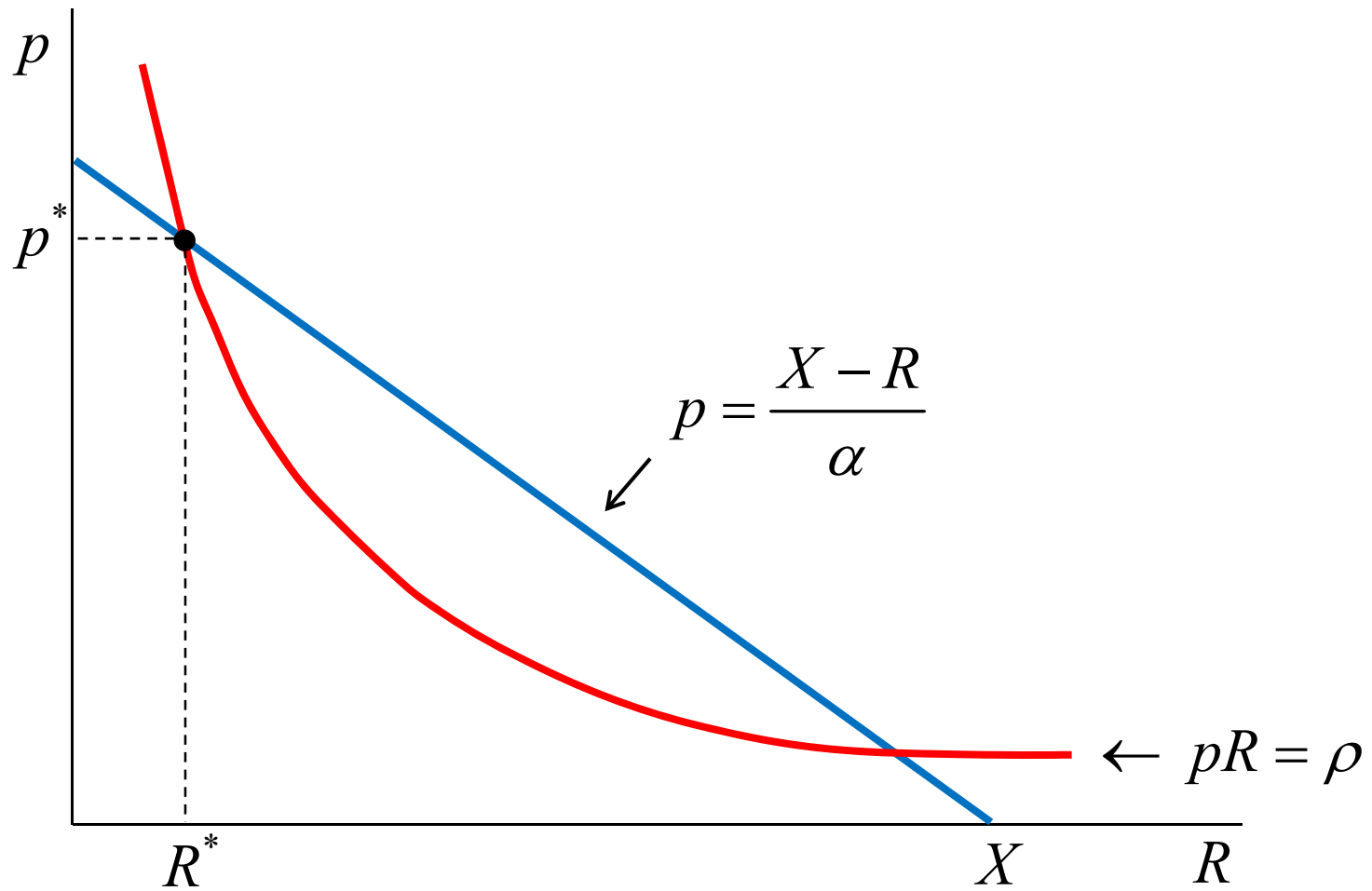- Effect of increasing competition parameter ρ

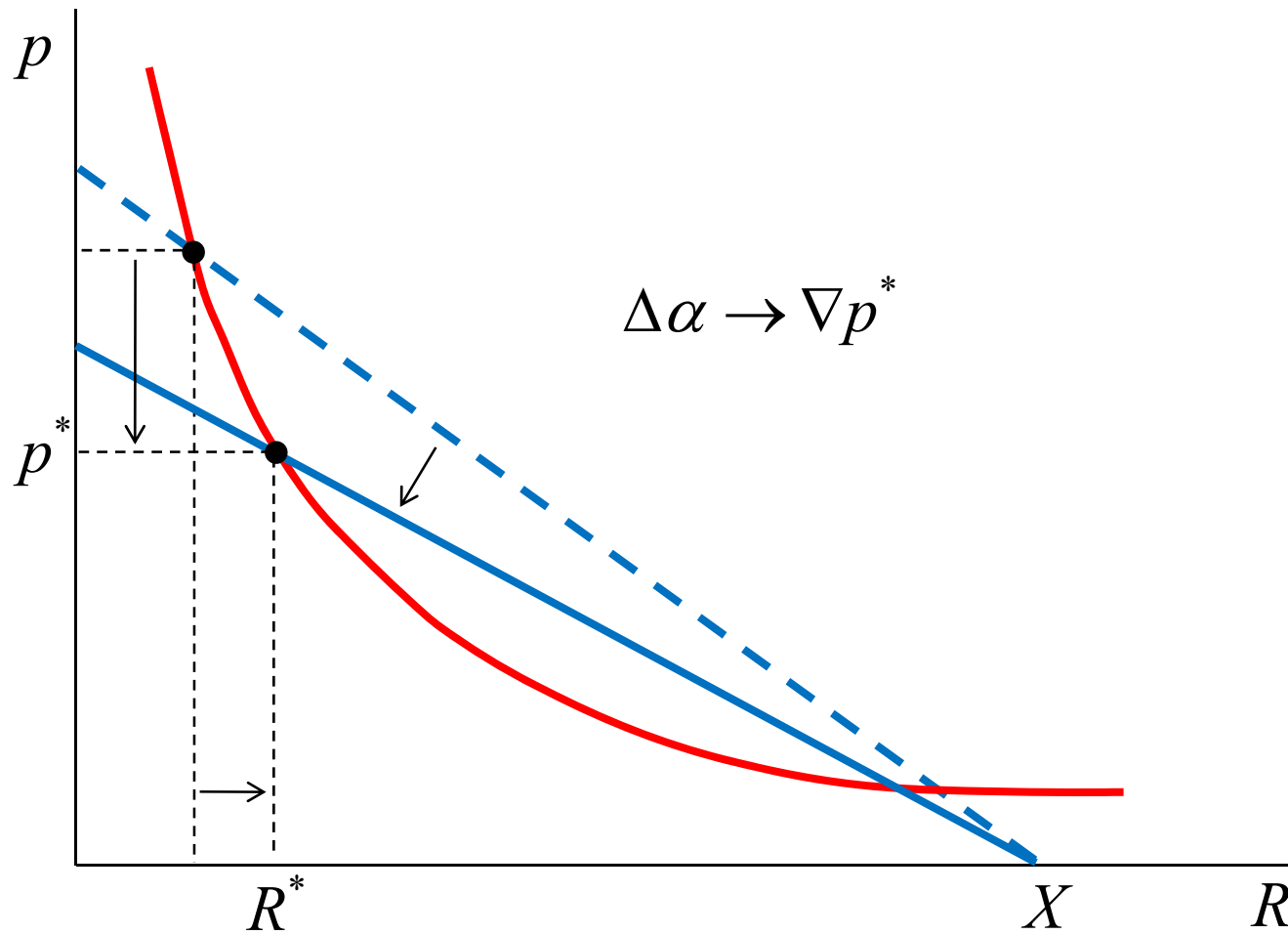$$\frac{\partial p^*}{\partial \rho} < 0 \quad \text{and} \quad \frac{\partial R^*}{\partial \rho} > 0$$

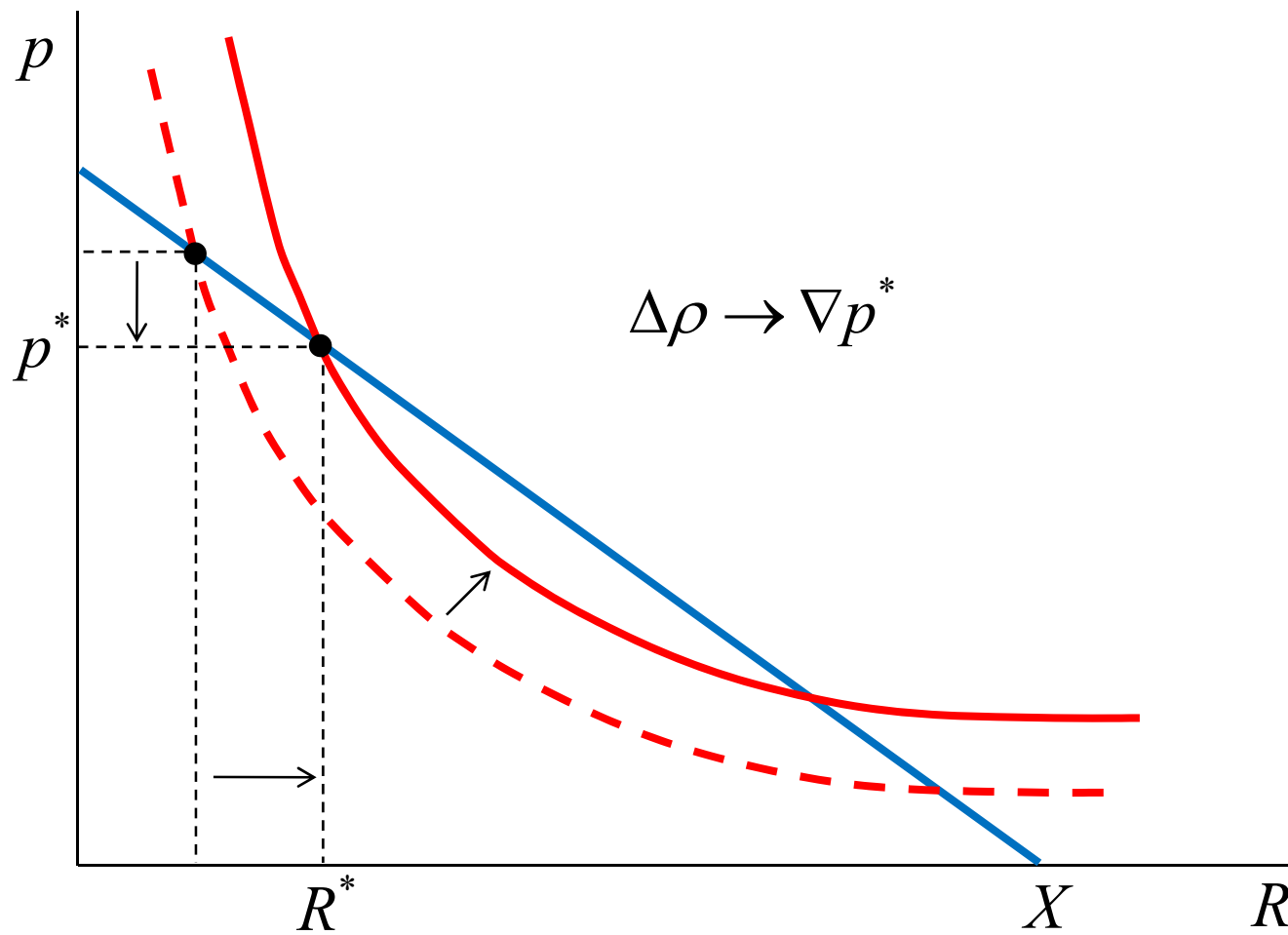$\rightarrow$ Higher risk and higher cost of deposits

$\rightarrow$ **Competition is bad for stability**

Optimal contract

Increasing cost of effort

Increasing competition

$\Delta \rho \rightarrow \nabla p^*$

Bank's payoff

- Bank's payoff

$$\Pi^*(\alpha, \rho) = p^*(X - R^*) - \frac{\alpha}{2}(p^*)^2 = \frac{1}{8\alpha}\left(X + \sqrt{X^2 - 4\alpha\rho}\right)^2$$

- Comparative statics

$$\frac{\partial \Pi^*}{\partial \alpha} < 0 \quad \text{and} \quad \frac{\partial \Pi^*}{\partial \rho} < 0$$

→ Lower payoff with higher costs (of effort or of deposits)

From partial to general equilibrium

- Would general equilibrium effects reverse the result?

  $\rightarrow$ A priori, it seems unlikely

  $\rightarrow$ Could get two opposite effects, with an ambiguous result

General equilibrium model (i)

- Continuum of agents characterized by labor productivity $q \in [0,1]$

- Agents choose to be bankers or workers: in equilibrium

  $\rightarrow q \in [0, q^*]$ are bankers

  $\rightarrow q \in [q^*, 1]$ are workers (and then depositors)

  [Note: bankers are low productivity workers]

- Supply of deposits

$$Z^* = Z(q^*) = \int_{q^*}^{1} q \; dq$$

General equilibrium model (ii)

• With constant returns to scale in intermediation

  → Cost of effort α is a constant

• Equilibrium condition

$$\Pi^*(\alpha, \rho) = q^* \underbrace{p^* R^*}_{\rho} = q^* \rho$$

  → Payoff of banker = Payoff of marginal worker

• Higher competition increases proportion of workers

  → But this has no effect on banks' choice of risk

General equilibrium model (iii)

• With increasing returns to scale in intermediation

→ Cost of effort to implement p is

$$c(p, Z) = \frac{\alpha}{2Z} p^2$$

→ Externality in the cost of effort function

→ Higher supply of deposits (Z) implies lower cost of effort

[Note: no need for a coalition to form a single bank]

General equilibrium model (iv)

- Equilibrium condition

$$\Pi^*(\alpha(Z(q^*)), \rho) = q^* \underbrace{p^* R^*}_{\rho} = q^* \rho$$

  → Payoff of banker = Payoff of marginal worker

- As before, higher competition increases proportion of workers

  → But now this has an effect on banks' choice of risk

General equilibrium model (v)

• Effects of higher competition $(\Delta\rho)$

$\rightarrow$ Direct (or partial equilibrium) effect

$$\Delta\rho \rightarrow \nabla p$$

$\rightarrow$ Indirect (or general equilibrium) effect

$$\Delta\rho \rightarrow \Delta Z \rightarrow \nabla\alpha \rightarrow \Delta p$$

$\rightarrow$ **Competition has ambiguous effect on stability**

[Note: result in Proposition 3 may not be robust]

What about bank capital?

- Model assumes that bankers can "create" capital k at the cost

$$c(k) = \frac{\beta}{2} k^2$$

- Bankers' problem is

$$\max_{k} \left[pXk - \frac{\beta}{2} k^2 \right]$$

- Solving the first-order condition gives

$$k = \frac{pX}{\beta}$$

$\rightarrow$ Optimal choice of capital is linear in p

$\rightarrow$ **Capital does not add anything to the model**

Part 3

Comments on the extended model

The extended model (i)

- Extended model features

    $\rightarrow$ Moral hazard for firms: Firms choose p^F

    $\rightarrow$ Moral hazard for banks: Banks choose p^B

- Bank risk is given by

$$1 - p = 1 - (p^F \times p^B)$$

[Note: p^B could be interpreted as monitoring effort]

The extended model (ii)

- Overview of literature has shown

    $\rightarrow$ Higher competition for loans makes loans safer

    $\rightarrow$ Higher competition for deposits makes banks riskier

- **Competition should have an ambiguous effect on stability**

Comments on extended model

- The idea that default risk is determined by firms' risk-taking

  decision and the banks' monitoring decision seems promising

- Apart from this, model is unnecessarily complicated

  → Sets of bankers-workers and entrepreneurs-workers

  → Firms and banks that "create" capital

  → Both constant and increasing returns

  → Why do we need to have a fixed setup cost for banks?

Concluding remarks

Concluding remarks (i)

- Paper concludes

  "Our results suggest that supporting bank profitability (or charter values) with rents… **may be unwarranted**."

- Paper could equally conclude

  "Our results suggest that supporting bank profitability (or charter values) with rents… **may be warranted**."

Concluding remarks (ii)

- No need for a coalition of entrepreneurs to form a single firm

    → Use externality in entrepreneurs' cost of effort function

- No need for a coalition of bankers to form a single bank

    → Use externality in bankers' cost of effort function

- There are better ways of introducing bank capital

    → Funds provided by special class of investors

- Model of a single bank lending to a single firm

    → Imperfect default correlation would be more interesting

Concluding remarks (iii)

• No need to have a single comprehensive (complicated) model

    → Better to understand distinct forces that drive the results

• Extant literature suggests that results are bound to be ambiguous

    → In the end it is a matter to be elucidated by empirical work