Comments by Rafael Repullo on

Bank Competition, Risk, and Asset Allocations: New Theory and New Evidence

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Introduction

Issues

- What is the effect of competition on the risk of bank failure?
- Is there a trade-off between competition and bank stability?

Two views

- Conventional view: competition is bad
- Boyd and De Nicolò (JF 2005): competition is good

  → Lower probability of bank failure

  → No trade-off

Introduction

- Key assumption of the extant literature

  → Banks invest in market assets with exogenous returns

- New assumption in Boyd and De Nicolò

  → Banks invest in loans

  → Risk of these loans is increasing in the loan rate

- Hence high loan rates (due to market power)

  → Higher risk of loan default

  → Higher risk of bank failure

Introduction

This paper

- Adds asset with fixed return (bond)
- New theoretical results on portfolio allocations
- New empirical tests of model predictions

Main results

- Increase in the number of banks
  - $\rightarrow$ Reduces probability of bank failure
  - $\rightarrow$ Increases proportion of assets invested in loans
- Results are supported by the empirical evidence

Setup

- n banks that compete à la Cournot for deposits and loans
- Inverse supply function of insured deposits

$$r_D(d), \text{ with } d = \sum_{i=1}^{n} d_i \text{ and } r'_D > 0$$

- Inverse demand function for loans

$$r_L(l), \text{ with } l = \sum_{i=1}^{n} l_i \text{ and } r'_L < 0$$

- Probability of default

$$p(r_L), \text{ with } p' > 0$$

- Loan defaults are perfectly correlated
- Bond rate: r_B

Setup

- Objective function of bank i

$$[1-p(r_L(l))][(1+r_L(l))l_i+(1+r_B)b_i-(1+r_D(d))d_i]$$

$$+p(r_L(l))\max\left\{(1+r_B)b_i-(1+r_D(d))d_i,0\right\}$$

$$\text{subject to } l_i+b_i=d_i$$

- Substituting constraint into objective function

$$[1-p(r_L(l))][(r_L(l)-r_B)l_i+(r_B-r_D(d))d_i]$$

$$+p(r_L(l))\max\left\{-(1+r_B)l_i+(r_B-r_D(d))d_i,0\right\}$$

Main comments

Comment 1

- There may be some problems with the theoretical results

Comment 2

- What would happen with risky market assets?

Comment 3

- What would happen with imperfect correlation in defaults?

  $\rightarrow$ Martinez-Miera and Repullo (2007)

Comment 1: A counterexample

- Linear parameterization of model

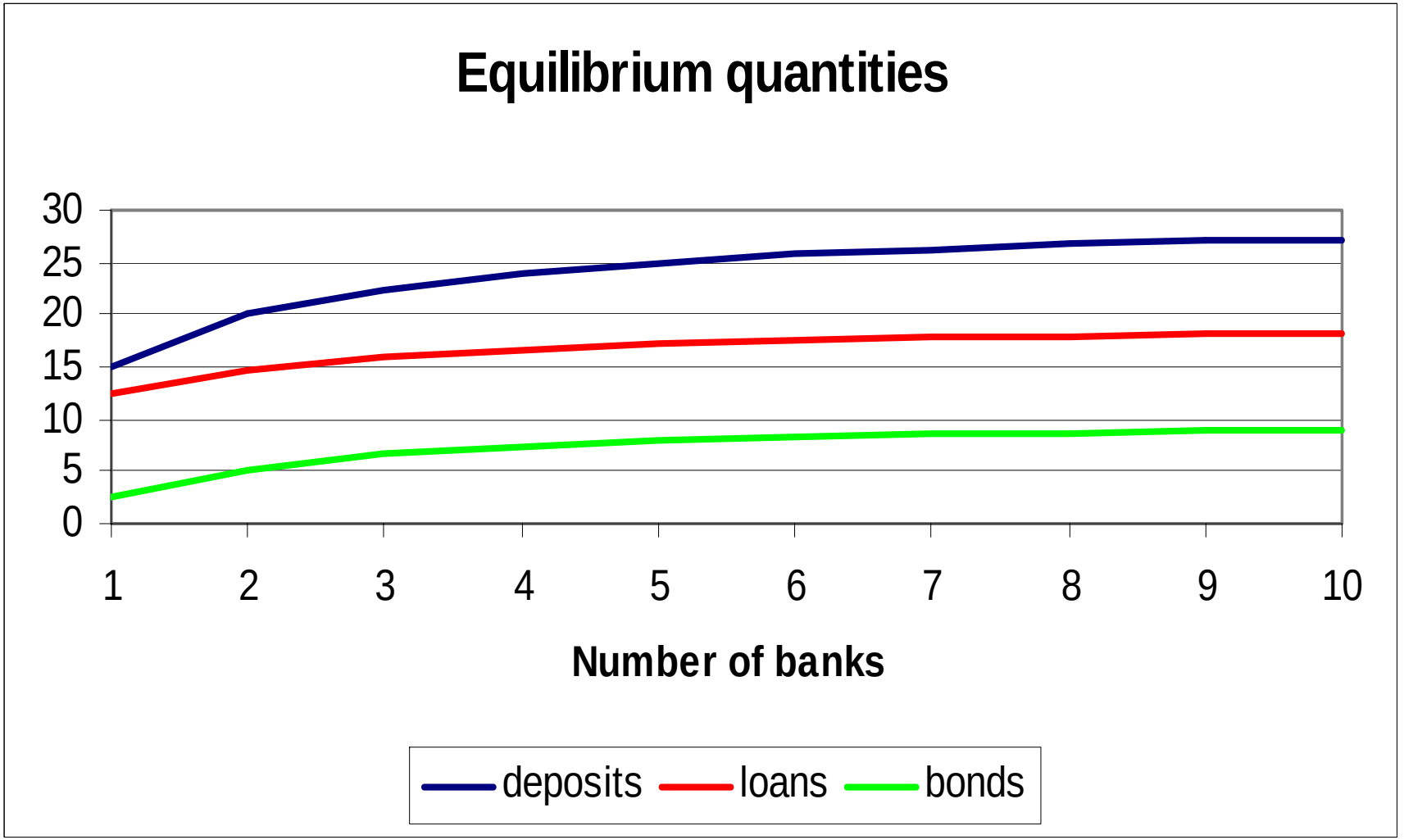
$$r_D(d) = d/100$$

$$r_L(l) = (50 - l)/100$$

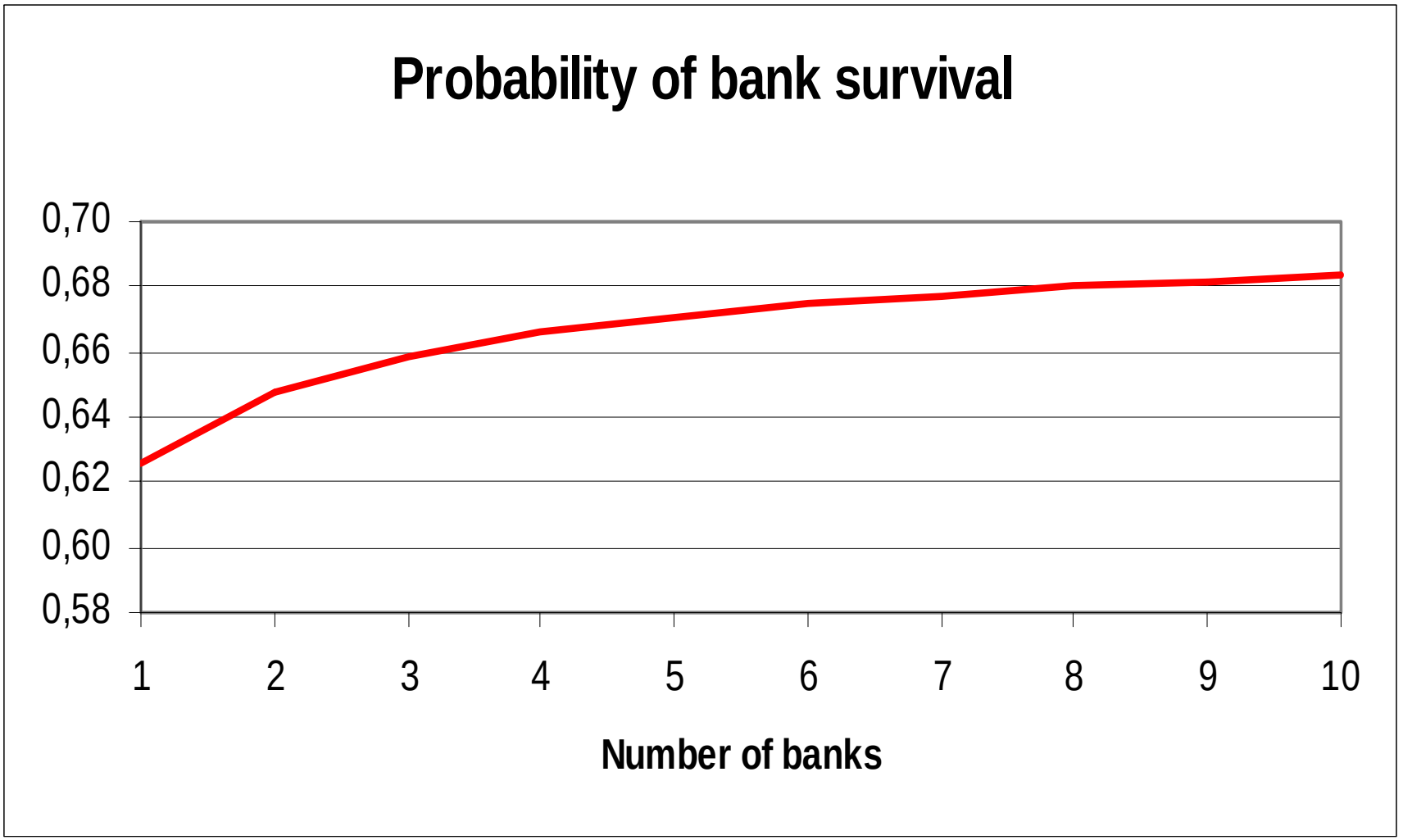
$$p(r_L) = r_L(l)$$

- Two bond rates: $r_B = 30\%$ and $r_B = 45\%$
- Not a calibration exercise!

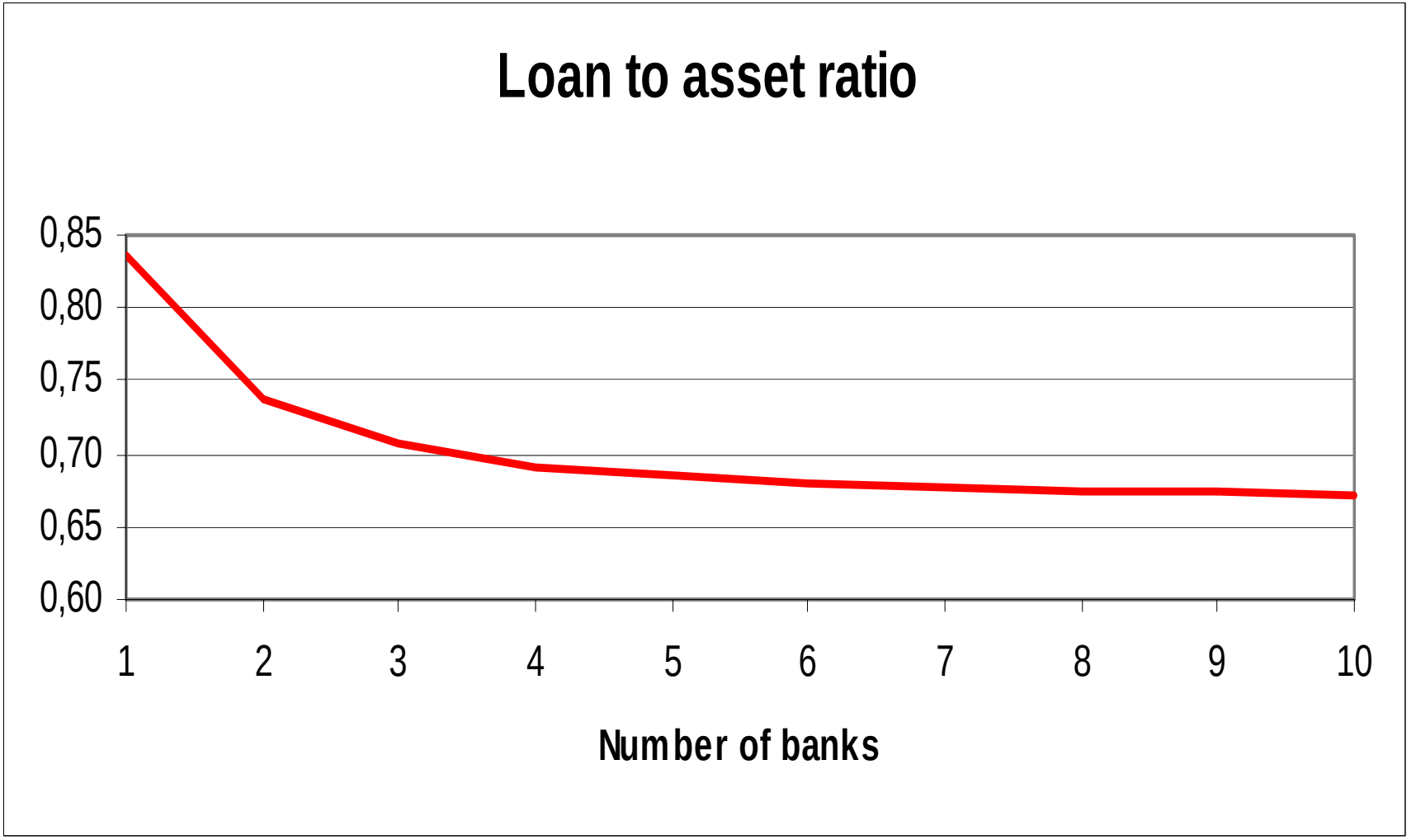
Results for $r_B = 30\%$



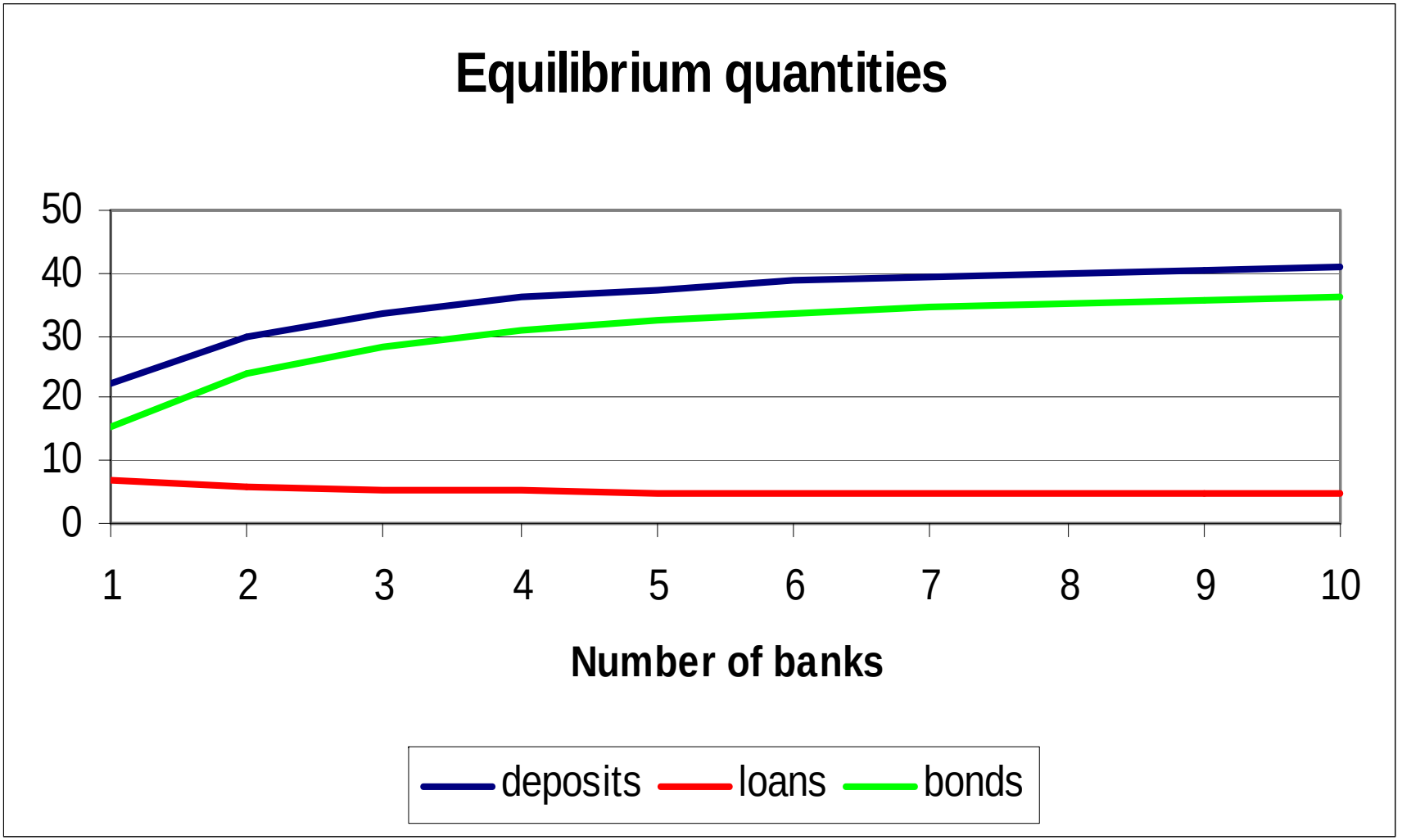
Results for $r_B = 30\%$



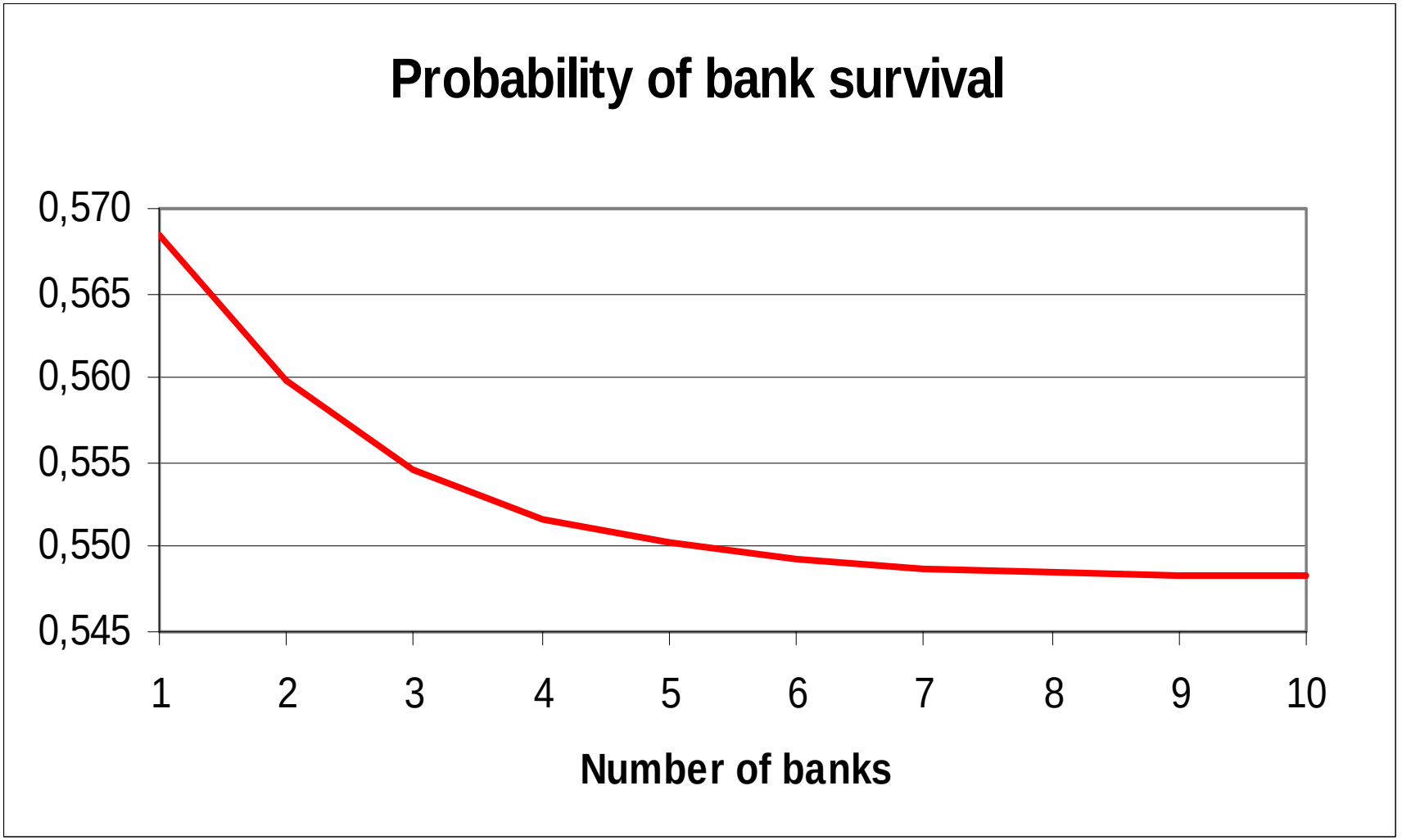
Results for $r_B = 30\%$



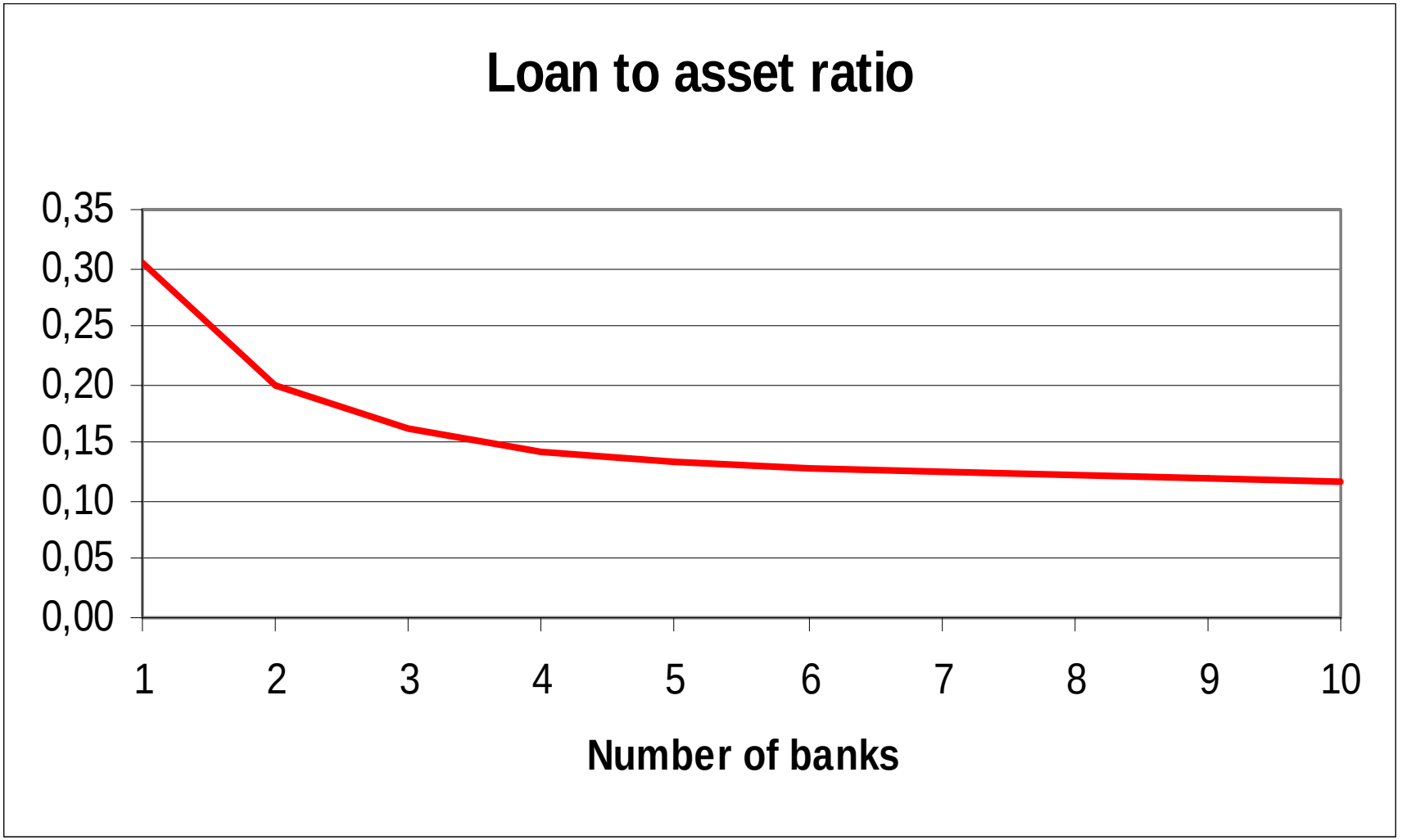
Results for $r_B = 45\%$



Results for $r_B = 45\%$



Results for $r_B = 45\%$



Comment 1: Summing up

Increase in the number of banks:

- May not increase proportion of assets invested in loans

  → Because banks prefer to invest in bonds

- May not reduce the probability of bank failure

  → Because of higher risk-shifting incentives

Comment 2: Other risky assets

- Why assume that the alternative asset is safe?

  $\rightarrow$ Banks also invest risky market assets

- Combine BDN with HMS (or Allen-Gale)
- Conjecture: effect of competition would be ambiguous

Comment 3: Imperfect default correlation

Single risk factor model

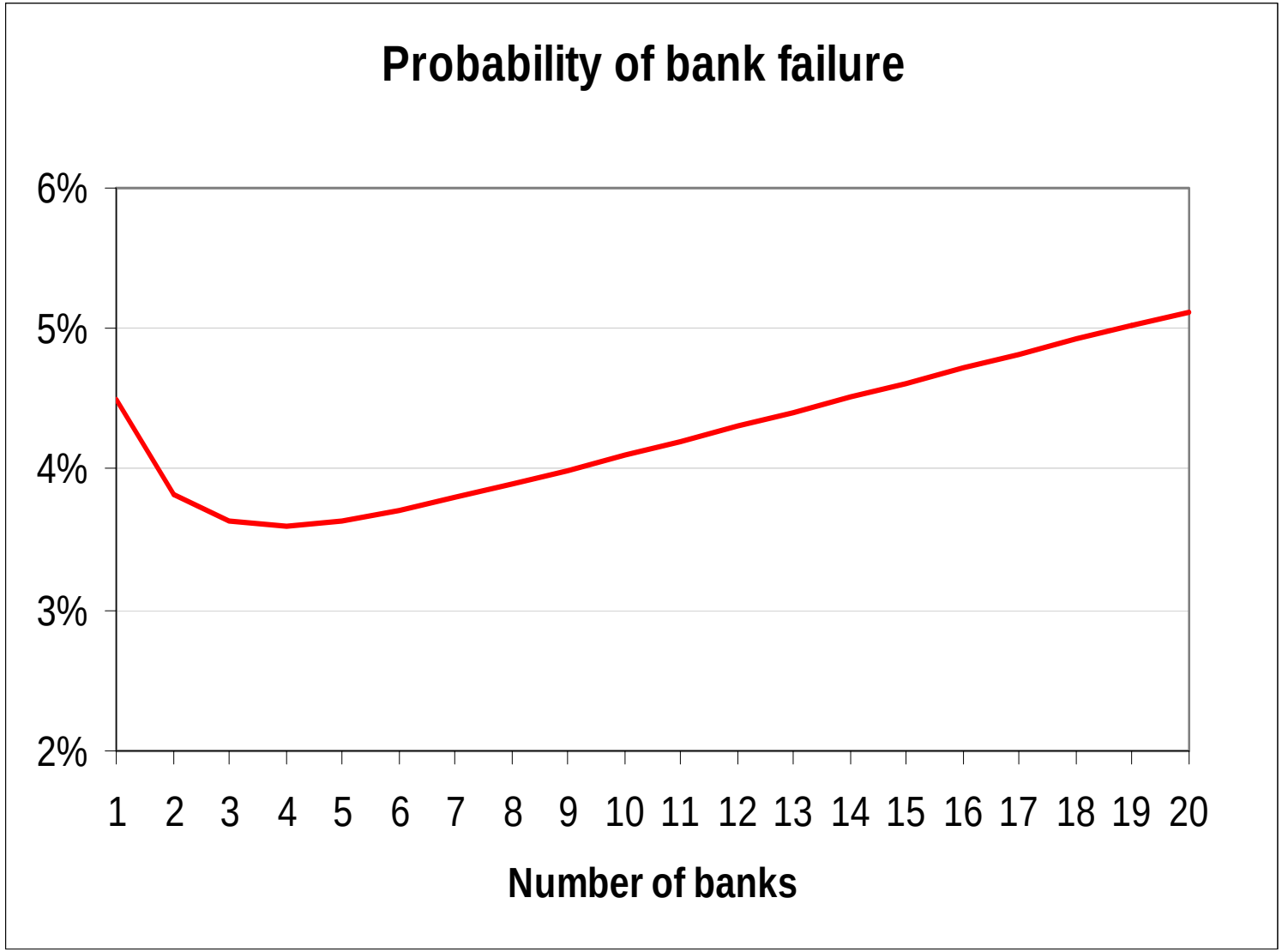
- Loan defaults are driven by
  - Systematic risk factor (with weight ρ)
  - Idiosyncratic risk factor (with weight $1 - \rho$)
- Systematic risk factor explains correlation in defaults
- With $\rho = 0$ we have independent defaults
- With $\rho = 1$ we have case in Boyd and De Nicolò (2005)
- In Martinez-Miera and Repullo (2007) we assume $0 < \rho < 1$

  $\rightarrow$ Model underlying Basel II capital requirements

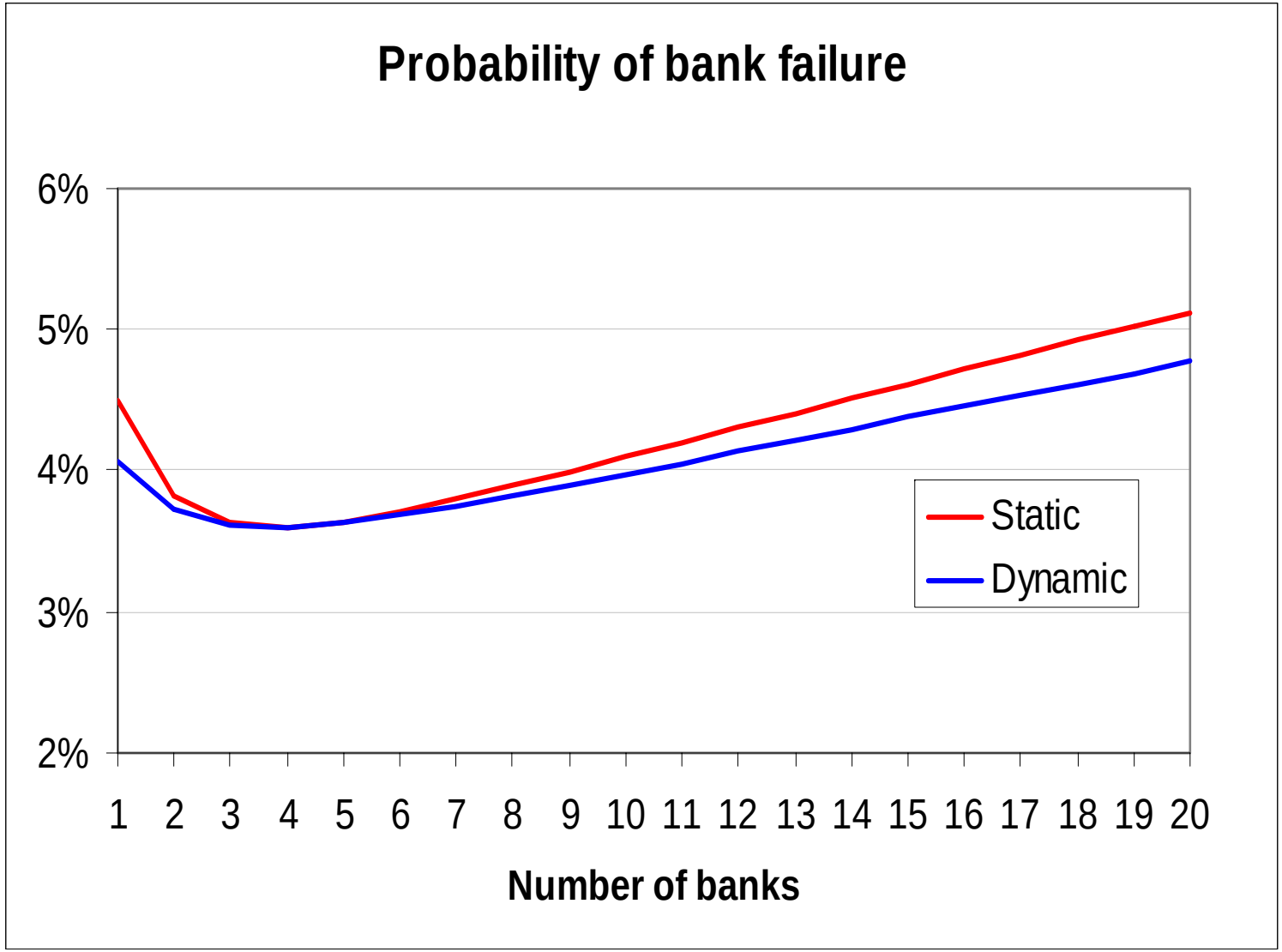
Comment 3: Imperfect default correlation

- Two effects of market power:
  - → *Risk-shifting effect*: Higher risk of loan default (as in BDN)
  - → *Margin effect*: Higher payments on non-defaulting loans
- Ambiguous effect on risk of bank failure
- Results in Martinez-Miera and Repullo (2007)
  - – U-shaped relationship between competition and bank risk
  - – Obtains for static and dynamic model (with charter values)
  - – Obtains for Cournot and Salop model of competition

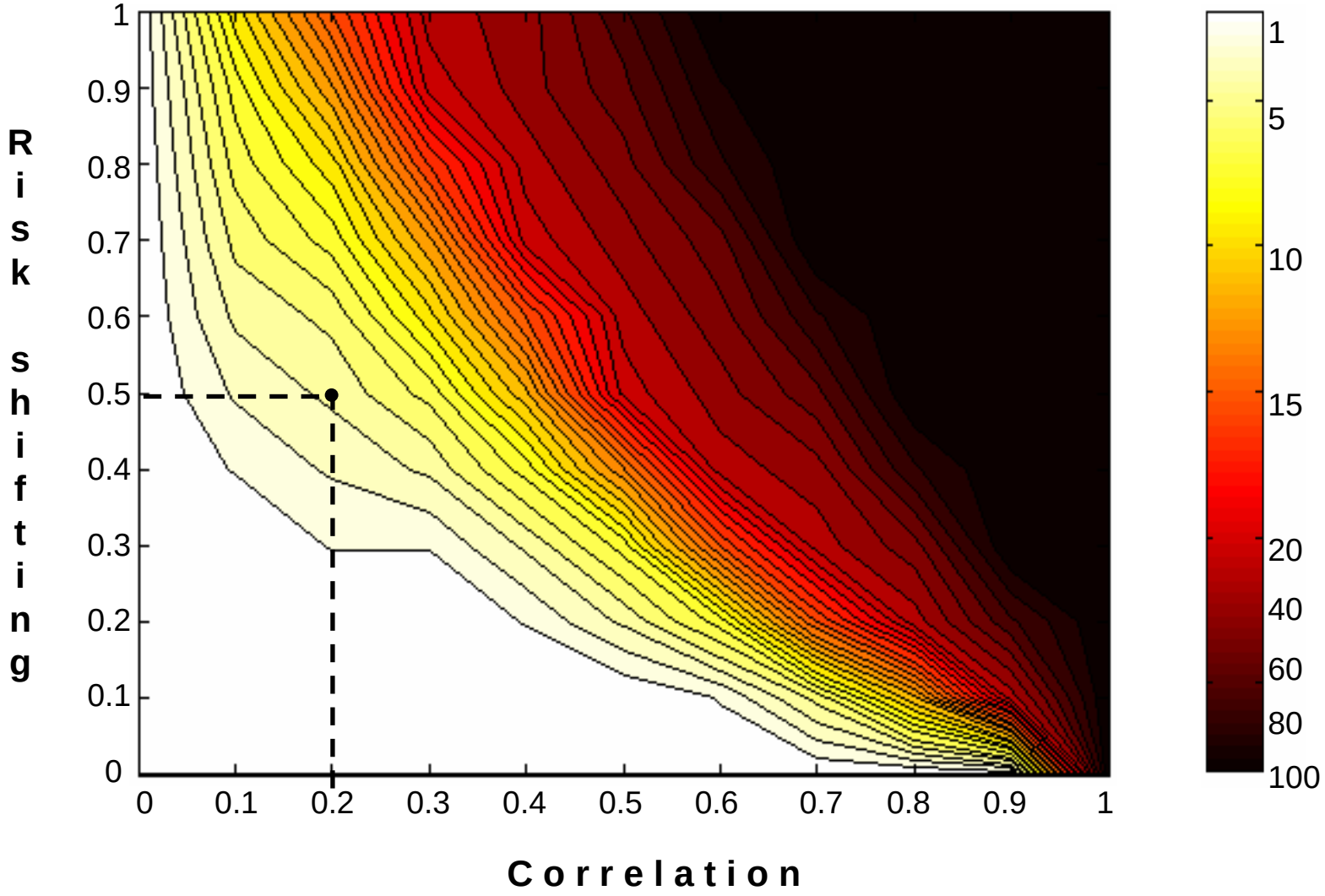
Numerical results: static model



Numerical results: dynamic model



Number of banks that minimize prob. failure



Comments on empirical results

- Weak proxy of bank risk: Z-score = $(K/A + ROA)/ \sigma(ROA)$

  $\rightarrow$ Large measurement error in $\sigma(ROA)$

- Model does not allow for volatility in bank returns
- Model does not incorporate banks' capital decision

  $\rightarrow$ Cannot say that "results are fully consistent with the predictions of theory"

- Include quadratic term in HHI to test U-shaped relationship

Final remarks

- Effect of competition on prob. of bank failure is ambiguous

  $\rightarrow$ Two opposite effects: risk-shifting (+) and margin (–)

- This is essentially an empirical issue

  $\rightarrow$ Need more empirical work!