The Socially Optimal Level of Capital Requirements:
A View from Two Papers

Javier Suarez*

CEMFI

Federal Reserve Bank of Chicago, 15–16 November 2012

_____

Introduction

- Capital regulation remains the centerpiece of banks' micro- and macro-prudential regulation

- Basel III has opted for:

  - Increasing the quality and quantity of the capital required to banks,

  - Promoting the maintenance of new regulatory buffers (*capital preservation + countercyclical*)

- These reforms are intended to make banks more individually and systematically resilient... and less procyclical

- Discussions about the pros and cons of this reform can be exemplified by two polar views:

  1. Academics such as Admati et al. (2011) argue that:
     - Claims about the large costs of rising the capital requirements are unwarranted
     - Rising the requirements would not destroy much total value at an individual bank level and would more than compensate from an overall social welfare perspective

  2. Banks and their lobbies work on different premises:
     - Equity financing is really more costly (& hard to access) than debt
     - Bank lending plays a key role in growth financing and imposing higher capital requirements will impair credit supply and real economic activity

- My objective here is to summarize two recent research papers that capture some of the frictions commonly emphasized by the banks:

  – Excess cost of equity financing

  – Dynamic frictions affecting the accumulation/raising of equity capital by banks

  – Economic fluctuations & systemic shocks that may give rise to procyclical effects

- Common conclusions:

  1. The socially optimal level of the capital requirements is possibly higher than the levels observed prior to this crisis

  2. The positive welfare effects of introducing higher capital requirements are compatible with the prediction that their introduction may imply losses in aggregate credit & economic activity

- The papers also yield important insights regarding:

  – The (lack of) desirability of (strong) countercyclical adjustments

  – The desirability of introducing the higher requirements in a gradual way

Paper 1 ("The Procyclical Effects of Bank Capital Regulation," with R. Repullo)

- Focuses on the *procyclicality* induced by capital requirements in the context of a simple OLG model of *relationship banking*

  - Borrowers need loans for **two consecutive periods** and become dependent on initial lenders

  - Banks with **ongoing relationships** cannot issue equity ($\rightarrow$ they only access the equity market every other period)

- Systemic risk results from banks' voluntary exposure to a rare common shock which is attractive to them

- Business/credit cycle captured as 2-state Markov chain for loans' PDs ($s=l$: low PD; $s=h$: high PD)

- Losses due to an abnormally high default rate (or an increase in the capital requirement γ_s) can produce a credit crunch

$$K \geq \gamma_s L \;\Leftrightarrow\; L \leq \frac{K}{\gamma_s}$$

$$[K: \text{ bank capital, } L: \text{ loans}]$$

- But banks may hold (voluntary) capital buffers as a precaution

- We calibrate the model with US pre-crisis data

- Two sets of results:

  1. Positive: Basel I / Basel II / Laissez-faire regime (γ=0)

  2. Normative: Basel I / Basel II / Socially optimal γ_s

- Social welfare $=$ NPV of income flows - E(social cost of bank failure)

Numerical results (i)

Loan rates and capital buffers (%)

	Rates		Capital		Buffers	
	r_l	r_h	k_l	k_h	$\triangle_l$	$\triangle_h$
Basel I	1.3	3.2	6.7	6.3	2.7	2.3
Basel II	1.3	3.3	6.9	6.7	**3.8**	**1.2**
Laissez-faire	0.8	2.5	4.2	3.4	4.2	3.4

Comments:

− Capital regime has small effect on loan rates

− Sizeable buffers: noncyclical under Basel I; higher in expansions under Basel II

Numerical results (ii)

Expected credit rationing in state s' (%)

| | Conditional on $s \to s'$ | | | | |
	$l \to l$	$l \to h$	$h \to h$	$h \to l$	Uncond.
Basel I	2.4	2.4	9.3	9.3	4.9
Basel II	0.9	**12.6**	**12.4**	5.3	5.6
Laissez-faire	3.2	3.2	17.2	17.2	8.2

Comments:

− Basel II has procyclical effects:
  ∗ increases rationing in $s' = h$, especially after $s = l$
  ∗ decreases rationing in $s' = l$, especially after $s = h$

− Unconditionally, Basel II increases expected credit rationing

Numerical results (iii)

Probabilities of bank failure (%):

	1st period banks		2nd period banks		
	$s = l$	$s = h$	$s = l$	$s = h$	Uncond.
Basel I	0.20	**2.87**	0.03	**1.50**	0.86
Basel II	0.16	**2.25**	0.05	**0.76**	0.61
Laissez-faire	3.7	17.15	0.55	10.21	**6.09**

Comments:

$-$ γs have clear impact on the risk of bank failure

$-$ Basel II makes banks safer than Basel I, especially in state $s = h$

Social welfare vs social cost of bank failure c
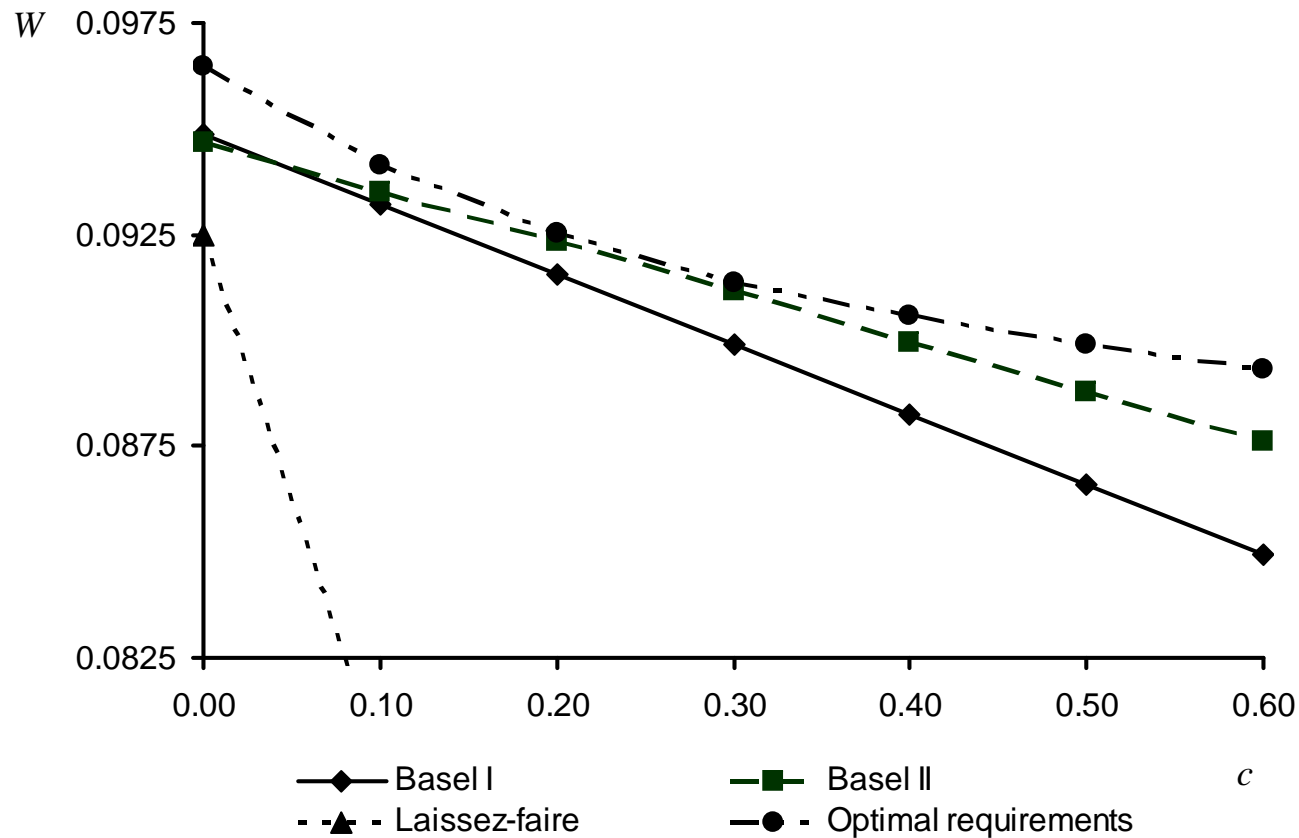
- Basel 1 $\succ$ Basel II for very low c
- Basel II requirements $\simeq$ socially optimal γs for $c \simeq 0.25$

Optimal γ_S vs social cost of bank failure c
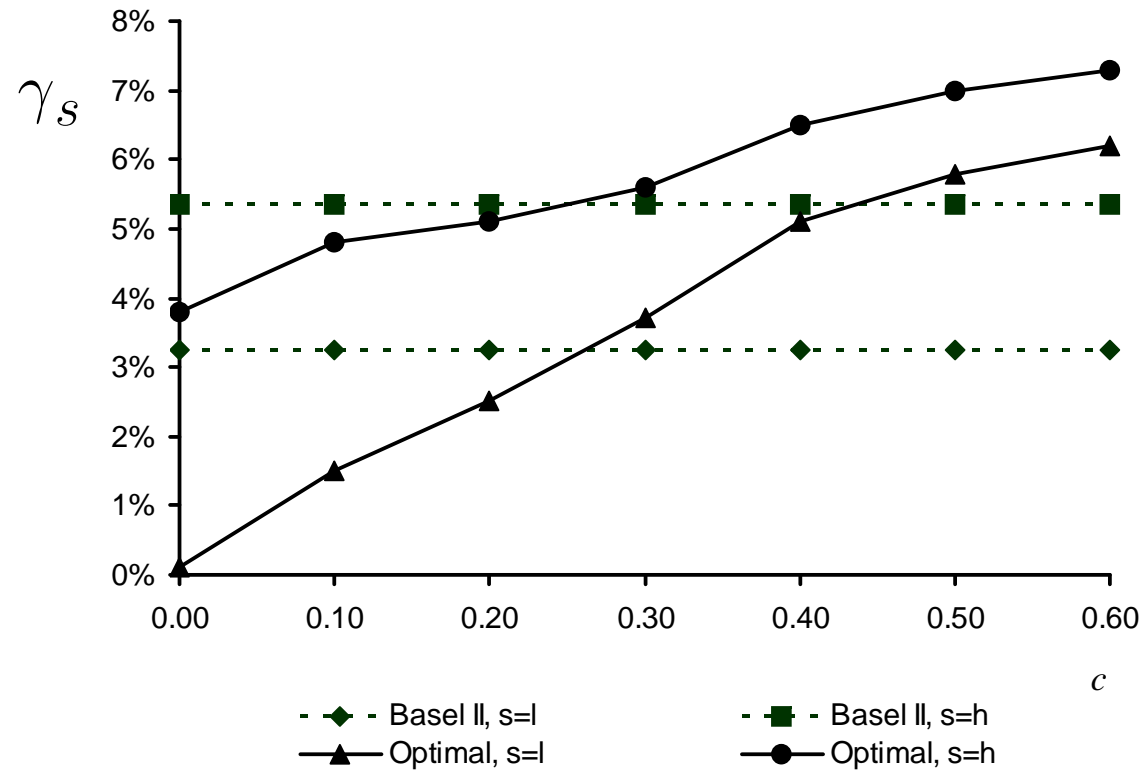
- Summing up:

1. Banks react to Basel II by increasing their *buffers*

2. Basel II is *more procyclical* than Basel I but makes bank *safer* and is generally superior in welfare terms

3. For high social cost of bank failure, the socially optimal requirements are *higher* but *less cyclically varying*

   [Consistent with Basel III?]

Paper 2 ("A Macroeconomic Model of Endogenous Systemic Risk Taking," with D. Martinez-Miera)

- Simple macroeconomic model with *endogenous* systemic risk

- Systemic risk results from banks' voluntary exposure to a rare common shock which is attractive to them due to standard *risk-shifting incentives* of levered firms

  ["Heads we win, tails you lose"]

- Banks extend loans to firms, financing investments that may be:

  − systemic (with highly correlated failures if rare shock occurs)

  − non-systemic (with low correlation failures at all times)

    [Systemic lending is more profitable if shock does not realize, but unconditionally, it is less profitable → socially inefficient]

- Capital requirements cannot be made contingent on the systemic/non-systemic nature of bank loans, because such feature is not ex ante observable to outsiders...

- Capital requirements are satisfied with the wealth that *bankers* accumulate via earnings retention

- Importantly, even a flat capital requirement γ can help control banks' systemic gambling incentives

  - Standard leverage-reduction effect from rising γ

  - Increase in the incentives to preserve wealth when other bankers are losing wealth

    [*Last bank standing effect* like in Perotti-Suarez 2002]

- However, increasing γ makes bank capital effectively scarcer at all times $\Rightarrow$ less credit $\Rightarrow$ lower economic activity

- Minimal notation needed to understand the figures:

  – Single *state variable* is bankers' aggregate wealth e

  – Two important endogenous variables (functions of e)

  $v(e)$: value of one unit of bankers' wealth

  $x(e)$: fraction of e devoted to systemic lending activities
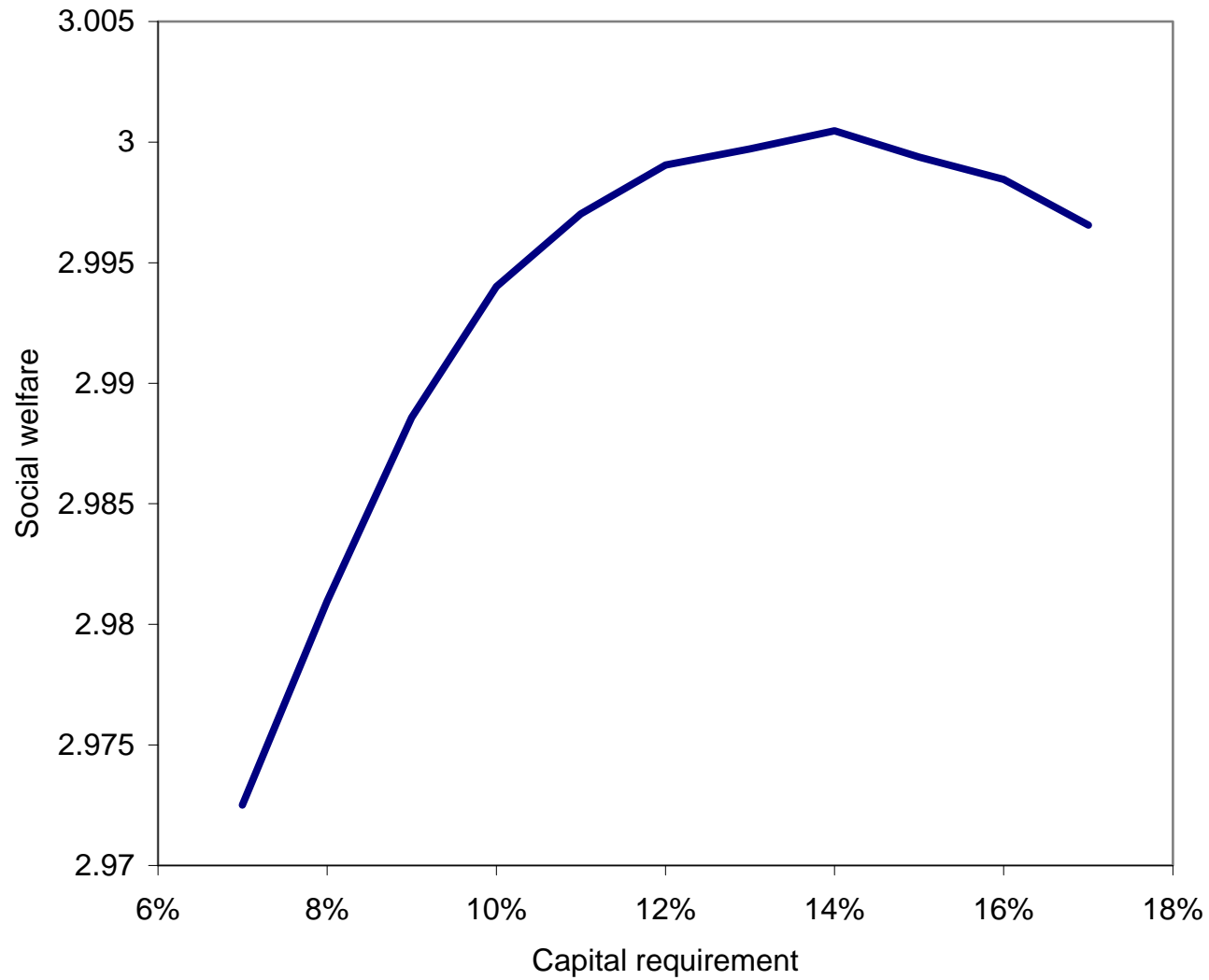
Social welfare W as a function of γ

Figure 1: $W(\gamma)$ [we compare γ^*=14% with γ=7%]
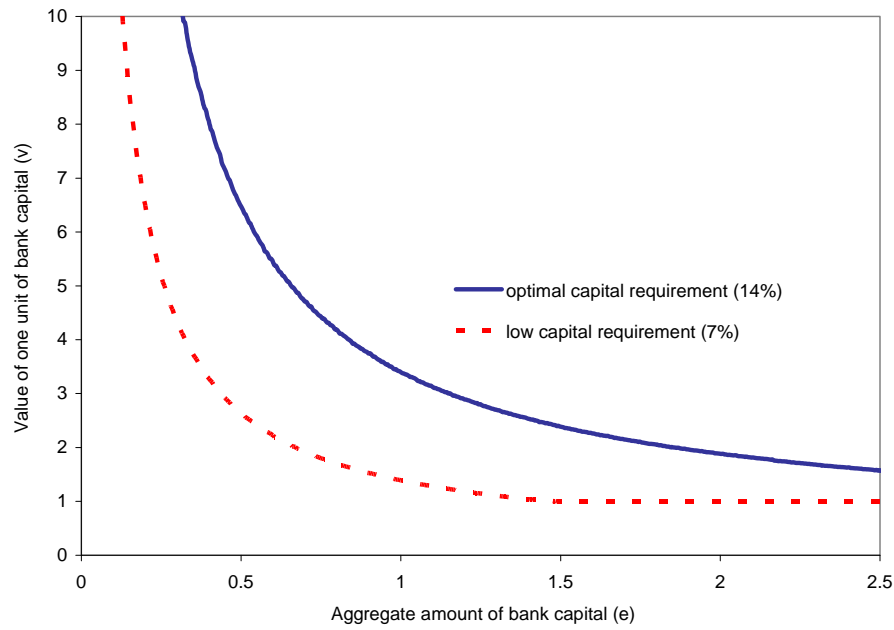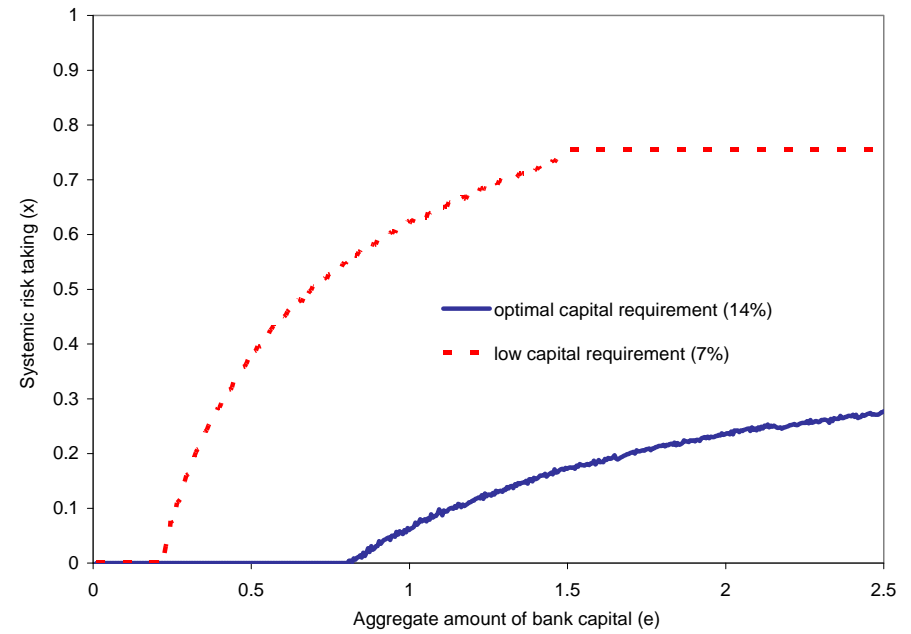
$v(e)$ and $x(e)$ under low and optimal γ

Figure 2a: $v(e)$

Figure 2b: $x(e)$

Equilibrium dynamics with low and optimal γ

Equilibrium dynamics (CR=7%)
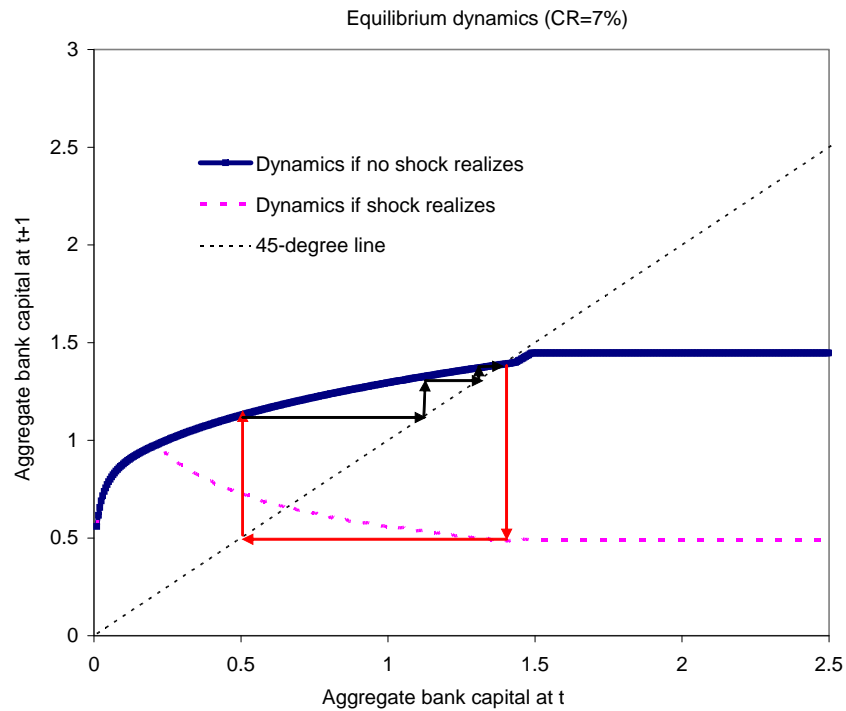
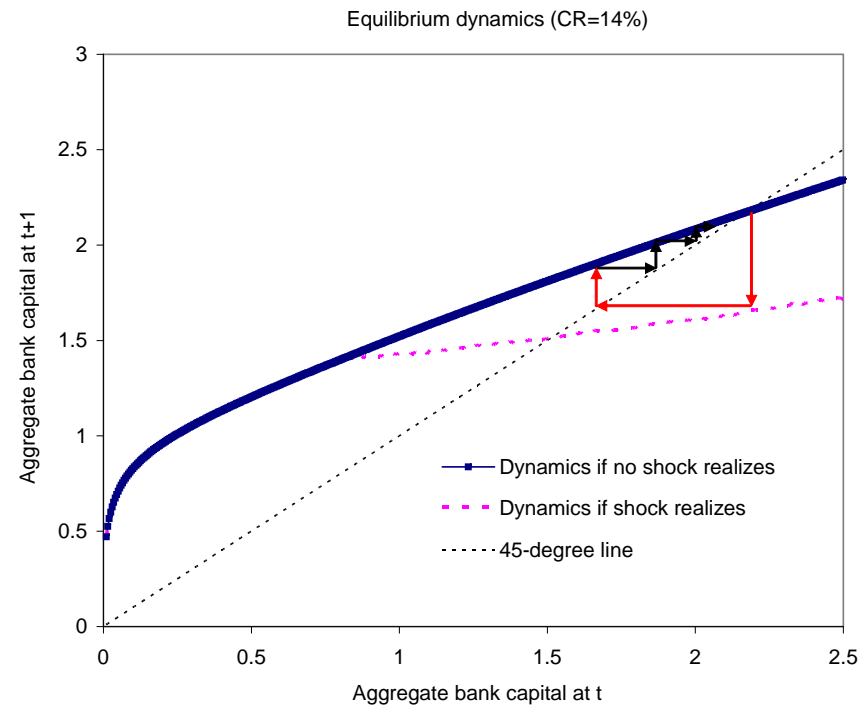**Figure 3a** $(\gamma = 7\%)$

Equilibrium dynamics (CR=14%)

Figure 3b $(\gamma = 14\%)$

Quantitative results

- Optimal capital requirements: positive and large (14%)

- Comparison γ=7% $\rightarrow$ γ=14% (unconditional means)

  - Lower fraction of systemic loans: 71% $\rightarrow$ 24%

  - Higher loan rates: 4.1% $\rightarrow$ 5.6%

  - Lower macro aggregates: bank credit (–21%), GDP (–7%)

  - Higher social welfare: $\simeq$ +0.9% permanent consumption

- Variation in year-after-shock aggregates:

  * γ=7%: loan rate (+11.6pp), bank credit (-65%), GDP (-32%)

  * γ=14%: loan rate (+2.5pp), bank credit (-24%), GDP (-10%)

Value of gradualism
(Welfare for different γs & years of transition)
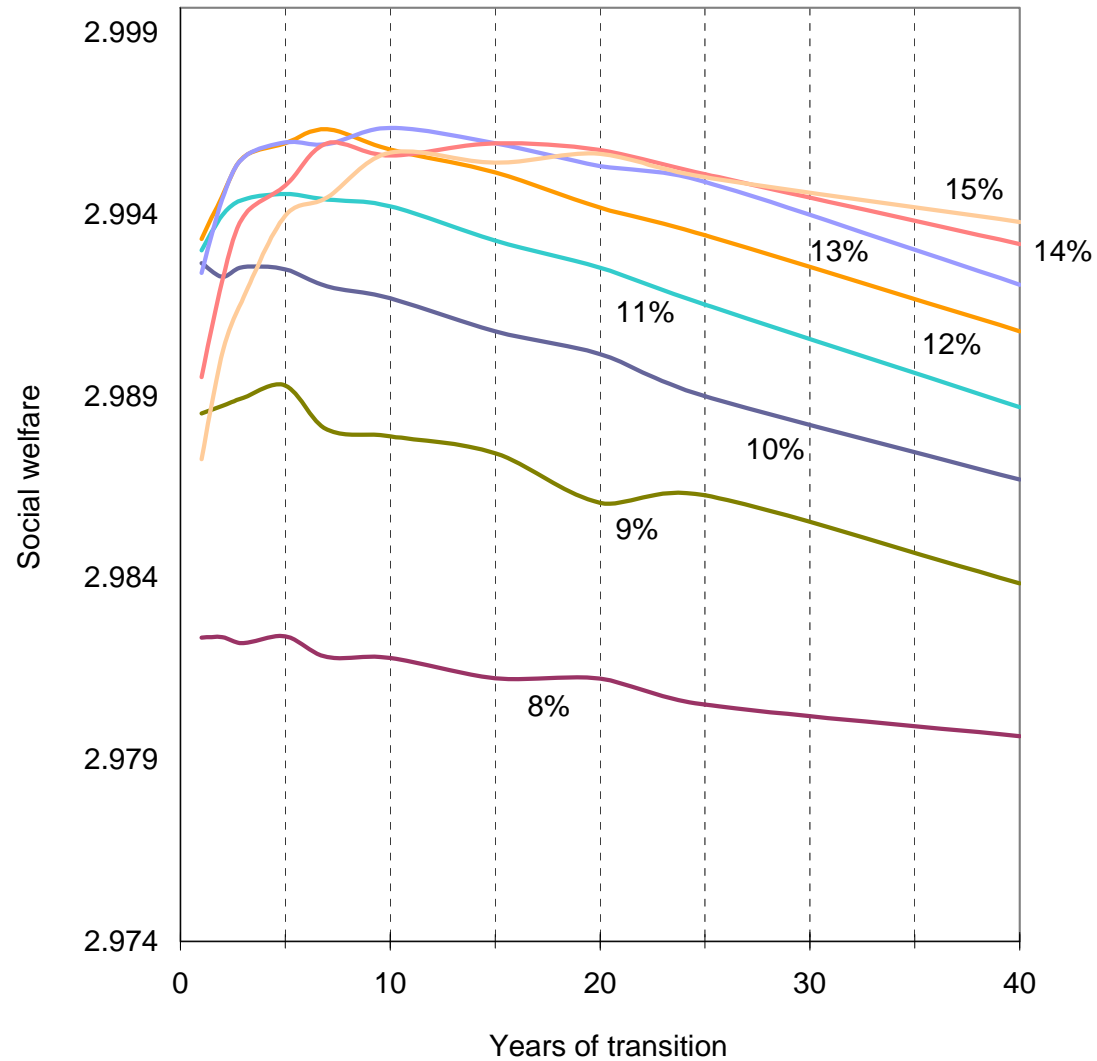
- Summing up:

1. Capital requirements have a significant impact on systemic risk-taking, macroeconomic & banking indicators, and welfare

2. Socially optimal capital requirements: a) are quite high, b) involve a sizeable reduction in GDP relative to the status quo, and c) should be gradually introduced

Conclusions

- The explicit normative analysis of bank regulation can yield surprising results

- One does not need to minimize the importance of frictions affecting the cost (or the raising) of equity financing to find significant welfare gains associated with the reinforcement of capital requirements:

  - Higher capital requirements are likely to reduce credit and GDP

  - But this is a price worth paying (in social welfare terms) in order to reduce bank failure probabilities & induce better ex ante risk taking decisions

- The optimal design of capital regulation calls for:

  - An explicit recognition of complex trade-offs

  - The adoption of a proper *social risk management* perspective

  - The full consideration of dynamic issues that may be of relevance to establish

    * The right time for the adoption of higher requirements

    * The extent to which such adoption must be gradual over time

    * The possible need for countercyclical adjustments

References

Admati, A., P. DeMarzo, M. Hellwig, and P. Pfleiderer (2011), "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive," Stanford GSB Research Paper No. 2063.

Basel Committee on Banking Supervision (2010), Basel III: A global regulatory framework for more resilient banks and banking systems, Basel, Switzerland: Bank for International Settlements.

Brunnermeier, M., and Y. Sannikov (2011), "A Macroeconomic Model with a Financial Sector," mimeo, Princeton University.

Freixas, X., and J.-C. Rochet (2008), *Microeconomics of Banking*, 2nd Edition, Cambridge, MA: MIT Press.

Gertler, M., and N. Kiyotaki (2010), "Financial Intermediation and Credit Policy in Business Cycle Analysis," in Benjamin Friedman

and Michael Woodford (eds.), *Handbook of Monetary Economics*, vol. 3, Elsevier, 547–599.

Hanson, S., A. Kashyap, and J. Stein (2011), "A Macroprudential Approach to Financial Regulation," Journal of Economic Perspectives, 25, 3–28.

Martinez-Miera, D., and J. Suarez (2012), "A Macroeconomic Model of Endogenous Systemic Risk Taking," CEPR DP 9134.

Perotti, E., and J. Suarez (2002), "Last Bank Standing: What Do I Gain if You Fail?," *European Economic Review*, 46, 1599-1622

Repullo, R., and J. Suarez (2012), "The Procyclical Effects of Bank Capital Regulation," *Review of Financial Studies*, forthcoming.