Discussion on
"Capital Requirements, Risk Choice, and Liquidity Provision in a Business Cycle Model"

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Overview

- Very nice and ambitious paper; made me think a lot
- Challenges the common perception that higher capital requirements imply a contraction in bank lending
- Key idea:
  - Banks are the exclusive providers of debt whose safety & liquidity makes savers willing to receive a lower yield
  - Increasing capital requirements contracts banks' supply of such debt, potentially reducing such yield ($\Longrightarrow$ pecuniary externality?)
  - If reduction is big enough, extra profitability may induce bank owners to issue enough extra equity to more than offset contractive impact on bank lending

- First reaction: Well-grounded & worth-exploring mechanism but... does its radical prediction apply in practice?

- Paper undertakes the task of checking the latter quite seriously:

  - DSGE model with banks; savers value liquidity attached to deposits; "safety net subsidies" distort risk choices

  - Calibrated to recent US data (NIPA&FDIC, 99-13); finds the socially optimal capital requirement (ξ)

- Results:

  - Optimal $\xi = 14\%$ vs benchmark $\xi = 11\%$ implies significant welfare gains & no contraction in lending (+0.6%)

  - True cost of rising ξ is the reduction in liquidity services (Van den Heuvel (JME, 2008))

Comments

- Mixtures well microfounded ingredients with a number of reduced forms (especially when capturing distortions to bank behavior)
- Specifically, risk-shifting distortions are captured as a result of combining:
  - fully liable bank shareholders
  - ad-hoc transfer function which captures all sort of things

  (alternative: explicit limited liability + DI distortions)
- Prior literature overlooked the channel emphasized in the paper
  - Must have been already present in Van den Heuvel (JME, 2008)
  - Anyway, its implications for lending supply went unnoticed
- Not 100% persuaded by the current modeling strategy, but I quite like the idea

- Additionally, the paper...
  - joints small crowd attempting to bring calibration into banking
  - constitutes natural way to link discussions on liquidity & solvency regulation

Digging into the mechanism

Simplified, one-period ($t = 0, 1$), microfounded version of the model [akin to Van den Heuvel (2008) but with an interior risk choice]

- Savers' problem:

$$\max_{s,e,a} \; E[(1 + r_s)s + (1 + \tilde{r}_e)e + f(a) - \tilde{T}] + \theta u(s)$$

$$\text{s.t.:} \; s + e + a = m$$

  - risk-neutral maximizers of final wealth & utility from liquidity
  - initial wealth m; lump sum tax $\tilde{T}$ to pay for DI
  - alternative investment technology $f(a)$, with $f' > 0$, $f'' < 0$

- If the solution is interior, it is equivalent to

$$\max_{s,e} \; (1 + r_s)s + (1 + r_e^e)e + f(m - s - e) + \theta u(s)$$

- Savers' FOCs:

$$(s) \quad (1 + r_s) + \theta u'(s) - f'(m - s - e) = 0$$

$$(e) \quad (1 + r_e^e) - f'(m - s - e) = 0$$

$$(\Rightarrow \; r_e^e - r_s = \theta u'(s), \text{ decreasing in } s)$$

- Banks' problem:

$$\begin{aligned} \max_{s,e,k,\sigma} \quad & (1-\sigma)[(1+\sigma)Bk-(1+r_s)s]-(1+r_e^e)e \\ \text{s.t.:} \quad & k = s+e \\ & \xi k \leq e \end{aligned}$$

  - shareholder value maximizers (with limited liability)
  - take as given the required rate of return on equity r_e^e
  - unobservable Allen-Gale-type risk choice σ (FB is $\sigma = 0$)
  - capital requirement ξ, which is trivially binding (double reason)

$$\Rightarrow e = \xi k \;\&\; s = (1-\xi)k$$

- If the solution is interior, it is equivalent to

$$\max_{k,\sigma} \left\{(1-\sigma)[(1+\sigma)B-(1-\xi)(1+r_s)]-\xi(1+r_e^e)\right\} k$$

- Banks' FOCs:

$$(k) \quad (1-\sigma^2)B - (1-\xi)(1-\sigma)(1+r_s) - \xi(1+r_e^e) = 0$$

$$(\sigma) \quad -2B\sigma + (1-\xi)(1+r_s) = 0$$

$$(\Rightarrow \sigma = \tfrac{(1-\xi)(1+r_s)}{2B},\ \text{decreasing in } \xi)$$

which combine into

$$B + \frac{(1-\xi)^2(1+r_s)^2}{4B} - [(1-\xi)(1+r_s) + \xi(1+r_e^e)] = 0$$

[FB asset returns + risk-shifting gains – cost of capital]

- Equilibrium conditions:

  – From savers FOC for s (after using $s = (1-\xi)k$ & $s + e = k$)

$$(1 + r_s) + \theta u'((1-\xi)k) - f'(m-k) = 0$$

  – From banks' summary condition (after using $(1+r_e^e) = f'(m-k)$)

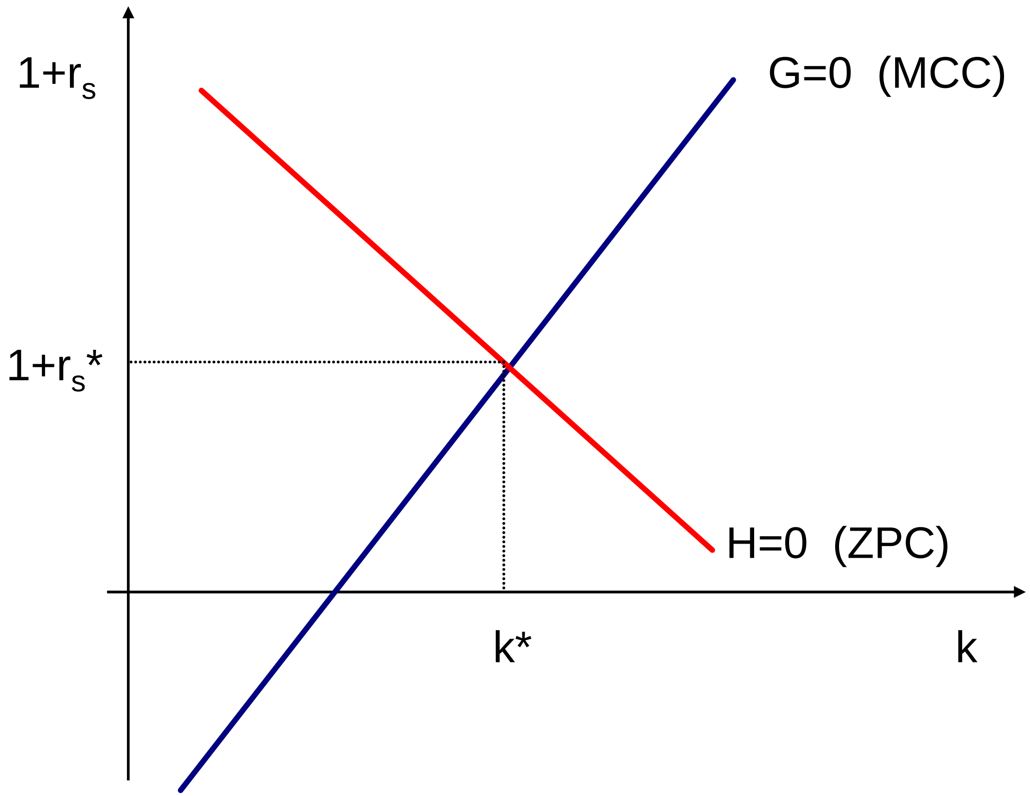
$$B + \frac{(1-\xi)^2(1+r_s)^2}{4B} - [(1-\xi)(1+r_s) + \xi f'(m-k)] = 0$$

- Simple system with 2 equations, 2 unknowns:

$$G(\underset{+}{r_s},\ \underset{-}{k};\ \underset{+}{\theta},\ \underset{+}{m},\ \underset{+}{\xi}) = 0 \quad (G_\xi{=}0 \text{ if } \theta{=}0) \qquad \text{(MCM)}$$

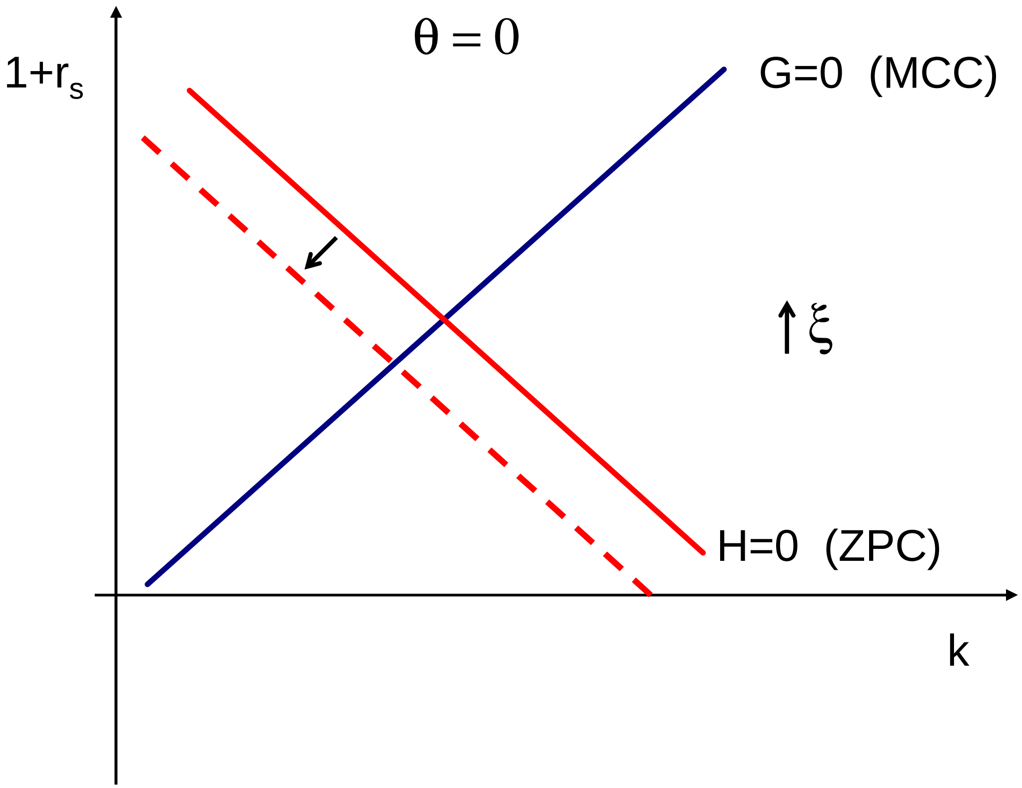
$$H(\underset{-}{r_s},\ \underset{-}{k};\ \underset{+}{B},\ \underset{+}{m},\ \underset{-}{\xi}) = 0 \qquad \text{(ZPC)}$$

- Graphically (i):



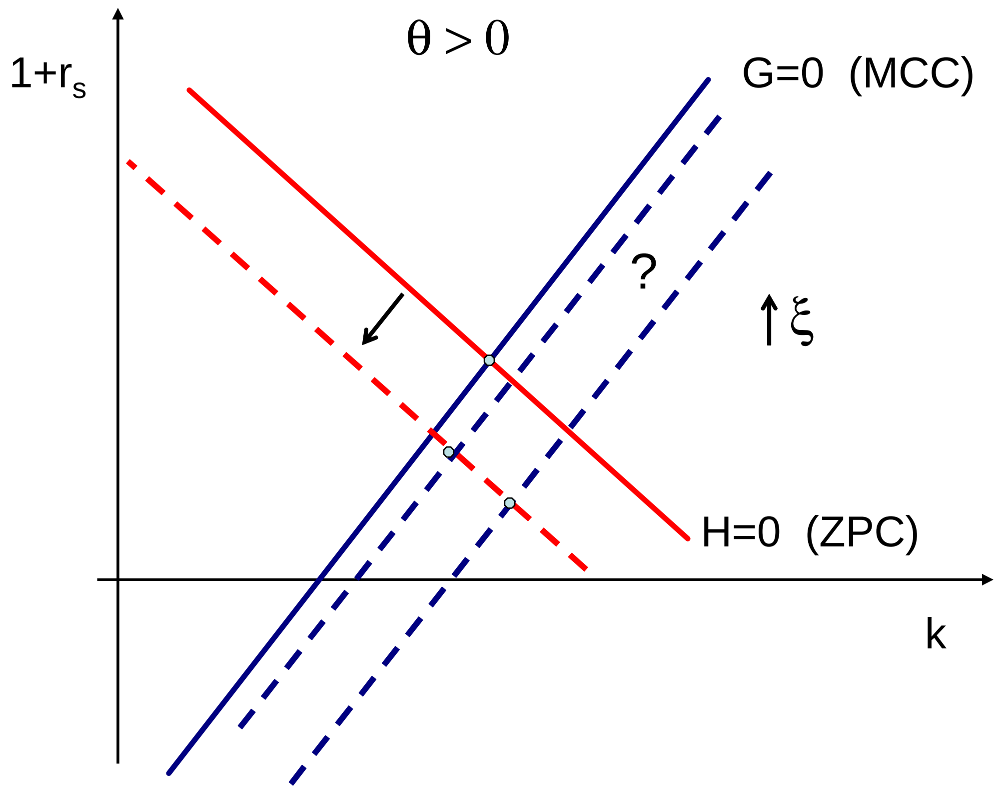
  - Single crossing; easy-to-sign comparative statics
  - Increasing ξ moves H (ZPC) down
  - With $\theta > 0$, ξ also moves G (MCC) down

- Graphically (ii):



With $\theta = 0$, conventional wisdom on effects of rising ξ is right: k falls

- Graphically (iii):



With $\theta > 0$, effect on k changes sign if and only if

$$\frac{dr_s}{d\xi}_{|G} < \frac{dr_s}{d\xi}_{|H}$$

$[G$ falls vertically more than $H]$

- Formally, the condition is equivalent to having

$$\varepsilon_{r_e^e - r_s, s} > \frac{1}{1-\sigma}\left[1 + \frac{\sigma(1+r_s)}{r_e^e - r_s}\right] > 1$$

- Not implausible!

  E.g. for $\sigma = 0.01$, $r_s = 0.02$, $r_e^e = 0.04$ requires

$$\varepsilon_{r_e^e - r_s, s} > 1.525$$

  [1% fall in s induces fall in r_s of about 3pb!]

- Anyway, an empirical question:

  How unsubstitutable is the debt issued by regulated banks?