Comments by Rafael Repullo on

Financial Institution Dynamics and Capital Regulations

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5th BIS Consultative Council for the Americas Conference

Bogotá, Colombia, 22-23 May 2014

Purpose of paper

- Provide a rationale for two features of banking regulation

  → Minimum capital requirements

  → Capital conservation buffer of Basel III

- What is new?

  → Agency problem between bank manager and shareholders

- How is it motivated?

  → High bank payouts in the early stages of the crisis

Structure of paper

- Introduction
- Some suggestive evidence
- A primer on Basel III
- **Dynamic model of a bank without deposits**
- **Dynamic model of a bank with deposits**
- Conclusion

Model 1: Bank without deposits

- Bank run by risk-averse manager

  → Manager chooses dividend payments and equity issues

  → Manager compensation linked to dividend payments

- Key assumption

  → Manager cannot commit to paying future dividends

  → Time inconsistency problem

- Main result

  → Underinvestment (relative to first-best)

Model 2: Bank with insured deposits

- Incorporating insured deposits and exogenous default risk

  → Distortions generated by deposit insurance

- Main result

  → Excessive leverage (relative to first-best)

Preliminary comments

- Model 1 is not a model of a bank

  → Dynamic model of firm fully funded with equity

- Model 2 adds one specific feature of banks: insured deposits

  → No borrower screening, loan monitoring, risk-shifting, etc.

Main comments

- Conflict between managers and shareholders is interesting

  → Shed light on roles of outside and inside equity

- Formal analysis is very complicated

  → It is difficult to see what is driving the results

- Some assumptions are not properly justified

  → Results may not be robust

- Policy analysis is incomplete

  → "Two types of regulations would likely be necessary"

What am I going to do?

- Comment on some special assumptions of the model

  → Are they needed for the results?

- Consider a simpler setup

  → In fact, a one-period model

Part 1

Some comments on the assumptions

Standard assumptions

- Manager is risk-averse and shareholders are risk-neutral
- Manager is more impatient than shareholders
- Concave production function
- Proportional cost of equity issuance

Special assumptions (model 1)

- Manager's compensation is fraction ψ of dividends paid

  → Reduced form: No analysis of optimal agency contract

  → Why not a function of share prices?

- Fraction $1 - \gamma$ of compensation accrues to future shareholders

  → Why do we need this?

  → Why not simply assume $\gamma = 1$?

- First-best defined by eliminating differences in impatience

  → Does this make any sense?

Special assumptions (model 2)

- Bankruptcy threshold level of capital $\underline{n}$ is not zero

  → Why not?

- Outside option of manager of defaulting bank is $V(\underline{n})$

  → Why does it depend on $\underline{n}$?

- Increasing (internal) cost of raising deposits $h(d)$

  → Why do we need this?

Part 2

A simple model

A simple model

- Two dates $t = 0, 1$
- Risk-neutral manager that gets fraction ψ of dividends paid
- Manager discount factor = Shareholders discount factor = $\beta < 1$
- Cost of raising equity = 0
- Deposit rate = 0
- Safe investment

Notation

- Initial net worth = n
- Initial dividend paid = z
- Manager compensation $c = \psi z$
- New equity raised = m
- Bank capital = $y = (n - z - c) + m$
- Bank deposits = d
- Bank investment = $y + d$
- Bank return = $f(y + d) = (y + d)^{1/2}$

Allocation of final payoff

- Final payoff $f(y + d)$

  → First used to pay deposits d

  → Then used to pay shareholders and manager $f(y + d) - d$

  → Shareholders get

$$\frac{1}{1+\psi}[f(y+d)-d]$$

  → Manager gets fraction ψ of dividends paid

$$\frac{\psi}{1+\psi}[f(y+d)-d]$$

Model 1: Bank without deposits

- Manager's problem

$$\max_{(z,m)} \left[\psi z + \beta \frac{\psi}{1+\psi} f(y) \right]$$

subject to PC of new shareholders

$$m = \beta \frac{m}{y} \frac{1}{1+\psi} f(y)$$

→ LHS of constraint: new equity raised at $t = 0$

→ RHS of constraint: discounted value at $t = 1$

→ Note: new shareholders get share m/y of bank's capital

Solution of model 1

- If optimal decision involves $m > 0$ we have

$$m = \beta \frac{m}{y} \frac{1}{1+\psi} f(y) \text{ implies } y = \left(\frac{\beta}{1+\psi} \right)^2$$

- Substituting this result into manager's objective function gives

$$\max_z \left[\psi z + \beta \frac{\psi}{1+\psi} f(y) \right] = \psi \left[z + \left(\frac{\beta}{1+\psi} \right)^2 \right]$$

- Which implies maximum feasible dividends z

$$z + c = (1+\psi) z = n \quad \rightarrow \quad z = \frac{n}{1+\psi}$$

Comments on the solution (i)

- Initial net worth is fully distributed to shareholders and manager
- New shareholders provide all the capital: $m = y$
- Note interesting feature of solution

  → Bank pays dividends and raises equity at same time

  → Small cost of raising equity would not change the result

Comments on the solution (ii)

- For $\psi < 1$ we get an overinvestment result

  → First-best obtained by solving

$$\max_y \ [\beta f(y) - y]$$

  → First-order condition

$$\beta f'(y) = \frac{\beta}{2y^{1/2}} = 1 \ \rightarrow \ y^* = \left(\frac{\beta}{2}\right)^2 < \left(\frac{\beta}{1+\psi}\right)^2 = y$$

Model 2: Bank with deposits

- Manager's problem

$$\max_{(z,m,d)} \left[\psi z + \beta \frac{\psi}{1+\psi} [f(y+d) - d] \right]$$

subject to PC of new shareholders

$$m = \beta \frac{m}{y} \frac{1}{1+\psi} [f(y+d) - d]$$

→ LHS of constraint: new equity raised at $t = 0$

→ RHS of constraint: discounted value at $t = 1$

→ Note: new shareholders get share m/y of the bank's capital

Solution of model 2

- If optimal decision involves $d > 0$ we have first-order condition

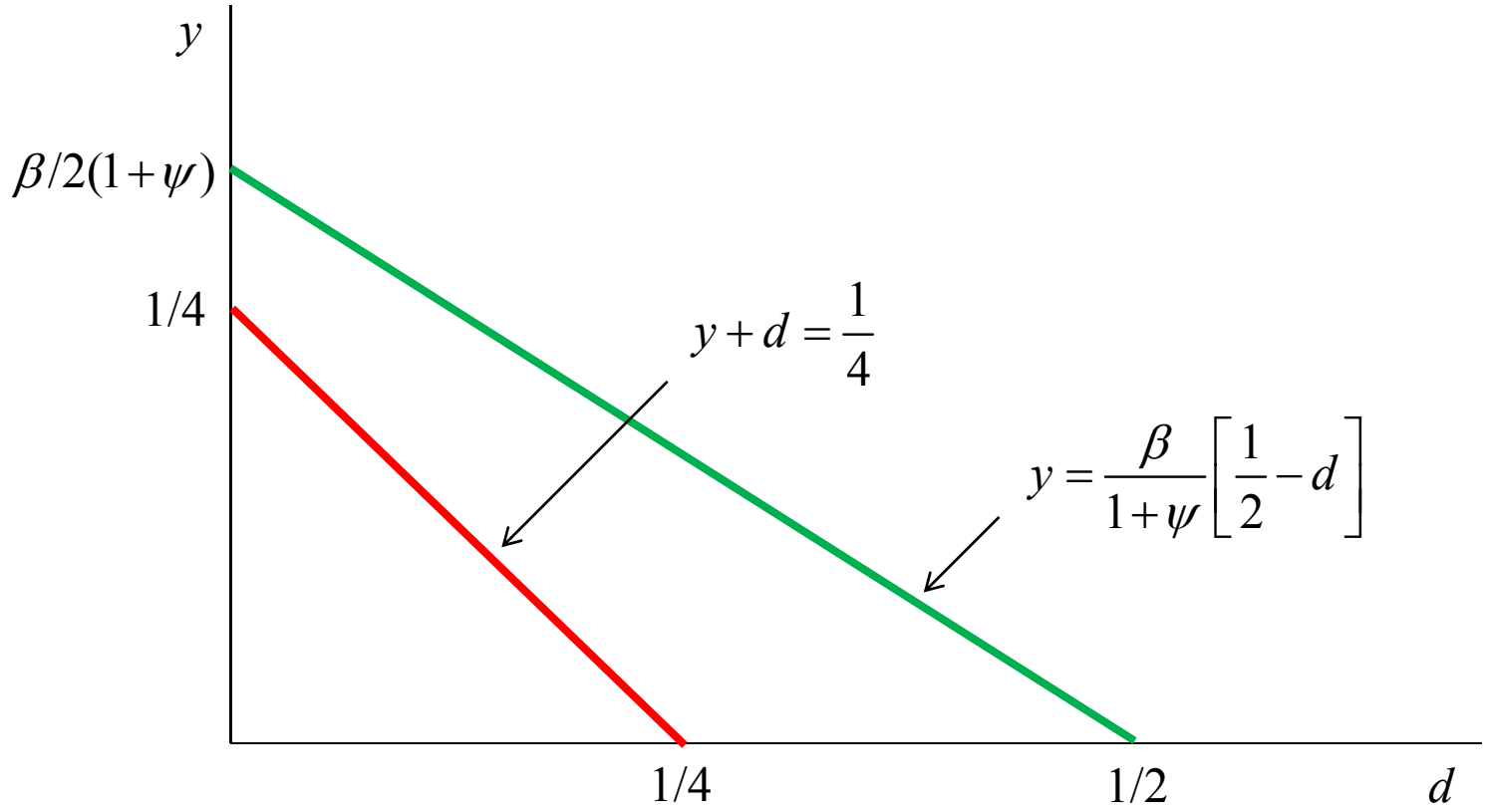
$$f'(y+d) = \frac{1}{2}(y+d)^{-1/2} = 1 \text{ which implies } y+d = \frac{1}{4}$$

- But then if the optimal decision involves $m > 0$ we get

$$m = \beta \frac{m}{y} \frac{1}{1+\psi}\left(\frac{1}{2} - d\right) \text{ which implies } y = \frac{\beta}{1+\psi}\left(\frac{1}{2} - d\right)$$

A preliminary result (i)

- We have two linear equations with two unknowns (y and d)



A preliminary result (ii)

- There is no solution with $d > 0$ and $m > 0$ if

$$\frac{\beta}{2(1+\psi)} > \frac{1}{4} \quad \rightarrow \quad 1+\psi < 2\beta$$

- In this case either $d = 0$ or $m = 0$

  → Model 1 shows what happens when $d = 0$

  → We now analyze what happens when $m = 0$

Solution of model 2 with no equity issuance

- If optimal decision involves $d > 0$ we have first-order condition

$$f'(y+d) = \frac{1}{2}(y+d)^{-1/2} = 1 \text{ which implies } y+d = \frac{1}{4}$$

- But then manager's problem becomes

$$\max_{(z,d)} \left[\psi z + \beta \frac{\psi}{1+\psi} [f(y+d) - d] \right]$$

- Substituting $(1+\psi)z + y = n$ and $y+d = \frac{1}{4}$ gives

$$\max_d \frac{\psi}{1+\psi} \left[n + d - \frac{1}{4} + \beta \left(\frac{1}{2} - d \right) \right] \text{ which implies } d = \frac{1}{4} \rightarrow y = 0$$

Comments on the solution

- Initial net worth is fully distributed to shareholders and manager
- Depositors provide all the new funding for the bank
- Note interesting feature of solution
  - → Bank operates with zero capital
  - → Result driven by assumption $\beta < 1$
- Risky investment + deposit insurance would yield same result

Final solution of model 2

- We have shown that solution involves either $d = 0$ or $m = 0$

  → Manager's payoff when $d = 0$

$$U_m = \frac{\psi}{1+\psi}\left[n + \frac{\beta^2}{1+\psi}\right]$$

  → Manager's payoff when $m = 0$

$$U_d = \frac{\psi}{1+\psi}\left[n + \frac{\beta}{4}\right]$$

- If $1 + \psi < 2\beta$ we have $U_m > U_d$

  → Bank will not want to take deposits

Summing up

- Simple model keeps key assumption of original model

  → Manager's compensation is fraction ψ of dividends paid

- Simple model yields some of the original results

  → Bank pays dividends and raises equity at same time

- Simple model yields some surprising results

  → Bank would not want to take deposits

  → It would not be a bank!

Intuition for the results

- Manager compensation depends on dividends paid

  → Manager gets no compensation out of debt payments

  → Hence preference for equity rather than debt finance

- Manager prefers high dividend payments

  → Hence paying dividends and raising equity at same time

Concluding remarks

- Introducing agency problems in banking is interesting

  → But need microfoundations for management compensation

- Model is too complicated

  → And some restrictive assumptions may not be needed

- Policy analysis requires to specify a social welfare function

  → Difficult with heterogeneous agents