How does capital and liquidity regulation change bank credit supply?

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1. Some motivation
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Basel Committee on Banking Supervision reforms - Basel III

Strengthens microprudential regulation and supervision, and adds a macroprudential overlay that includes capital buffers.

Capital

Pillar 1

Capital

All Banks

Quality and level of capital
Greater focus on common equity. The minimum will be raised to 4.5% of risk-weighted assets, after deductions.

Capital loss absorption at the point of non-viability
Contractual terms of capital instruments will include a clause that allows – at the discretion of the relevant authority – write-off or conversion to common shares if the bank is judged to be non-viable. This principle increases the contribution of the private sector to resolving future banking crises and thereby reduces moral hazard.

Capital conservation buffer
Comprising common equity of 2.5% of risk-weighted assets, bringing the total common equity standard to 7%. Constraint on a bank's discretionary distributions will be imposed when banks fall into the buffer range.

Countercyclical buffer
Imposed within a range of 0-2.5% comprising common equity, when authorities judge credit growth is resulting in an unacceptable build up of systematic risk.

Risk coverage

Securitisations
Strengthens the capital treatment for certain complex securitisations. Requires banks to conduct more rigorous credit analyses of externally rated securitisation exposures.

Trading book
Significantly higher capital for trading and derivatives activities, as well as complex securitisations held in the trading book. Introduction of a stressed value-at-risk framework to help mitigate procyclicality. A capital charge for incremental risk that estimates the default and migration risks of unsecuritised credit products and takes liquidity into account.

Counterparty credit risk
Substantial strengthening of the counterparty credit risk framework. Includes: more stringent requirements for measuring exposure; capital incentives for banks to use central counterparties for derivatives; and higher capital for inter-financial sector exposures.

Bank exposures to central counterparties (CCPs)
The Committee has proposed that trade exposures to a qualifying CCP will receive a 2% risk weight and default fund exposures to a qualifying CCP will be capitalised according to a risk-based method that consistently and simply estimates risk arising from such default fund.

Containing leverage

Leverage ratio
A non-risk-based leverage ratio that includes off-balance sheet exposures will serve as a backstop to the risk-based capital requirement. Also helps contain system wide build up of leverage.

Pillar 2

Risk management and supervision

Supplemental Pillar 2 requirements.
Address firm-wide governance and risk management; capturing the risk of off-balance sheet exposures and securitisation activities; managing risk concentrations; providing incentives for banks to better manage risk and returns over the long term; sound compensation practices; valuation practices; stress testing; accounting standards for financial instruments; corporate governance; and supervisory colleges.

Pillar 3

Market discipline

Revised Pillar 3 disclosures requirements
The requirements introduced relate to securitisation exposures and sponsorship of off-balance sheet vehicles. Enhanced disclosures on the detail of the components of regulatory capital and their reconciliation to the reported accounts will be required, including a comprehensive explanation of how a bank calculates its regulatory capital ratios.

SIFIs

In addition to meeting the Basel III requirements, global systemically important financial institutions (SIFIs) must have higher loss absorbency capacity to reflect the greater risks that they pose to the financial system. The Committee has developed a methodology that includes both quantitative indicators and qualitative elements to identify global systemically important banks (SIBs). The additional loss absorbency requirements are to be met with a progressive Common Equity Tier 1 (CET1) capital requirement ranging from 1% to 2.5%, depending on a bank's systemic importance. For banks facing the highest SIB surcharge, an additional loss absorbency of 1% could be applied as a disincentive to increase materially their global systemic importance in the future. A consultative document was published in cooperation with the Financial Stability Board, which is coordinating the overall set of measures to reduce the moral hazard posed by global SIFIs.

Liquidity

Global liquidity standard and supervisory monitoring

Liquidity coverage ratio
The liquidity coverage ratio (LCR) will require banks to have sufficient high-quality liquid assets to withstand a 30-day stressed funding scenario that is specified by supervisors.

Net stable funding ratio
The net stable funding ratio (NSFR) is a longer-term structural ratio designed to address liquidity mismatches. It covers the entire balance sheet and provides incentives for banks to use stable sources of funding.

Principles for Sound Liquidity Risk Management and Supervision
The Committee's 2008 guidance *Principles for Sound Liquidity Risk Management and Supervision* takes account of lessons learned during the crisis and is based on a fundamental review of sound practices for managing liquidity risk in banking organisations.

Supervisory monitoring
The liquidity framework includes a common set of monitoring metrics to assist supervisors in identifying and analysing liquidity risk trends at both the bank and system-wide level.

How do we think about this?

1. Need to decide the economic function of bank and the financial system ➔

2. Which Modigliani and Miller assumptions to discard?

3. Tradeoff between simplicity and generality
   - Today is a first step but I hope is the natural one

Model Characteristics

General equilibrium

- Incomplete Asset Markets
- One good
- Two periods
- Three agents

- *Financial system helps with*
  - *Risk sharing*
  - *Credit constraints*

Externalities from the financial system:

- Default amplification

(Lots of other things to add, that I will discus at the end)

The Agents

- A poor entrepreneur (P) that owns the rights to a project but must borrow to implement it

- A rich saver (R) who can invest in a riskless asset, can lend directly to P, or save via a bank

- A banker (B) with some own funds who can raise funds from R and invest in P.

t=1	t=2
R chooses: -How much to invest with P, B or in the riskless asset -Whether to fund B with deposits or equity - How much to consume this period	3 outcomes for P's project (High, Med, Low) P repays all loans to R & B (or defaults) B repays deposits first (or defaults) and then pays pro-rata dividends on equity
B chooses: -Whether to make deposits or to buy bank equity -Whether to invest in the riskless asset -Scale of the loan to P -How much to consume this period	All agents consume

P chooses:
- The scale of the risky investment
- How much to consume this period

Contract restrictions

- No short sales (against either P or B)
- **Limited liability for B and P**
- P cannot/will not issue equity
- B operates on two dimensions: one side of her brain manages the assets of the bank, the other side decides what to do with her wealth

- Market incompleteness means no way to solve for a planner's set of allocations

What is the Role of the Bank?

- Creating both debt and equity claims potentially improves the investment opportunities for R

- Extension: B has a comparative advantage at collecting on defaults
  - Short cut to approximate Diamond-Rajan (2001)
  - Will obviously lead to additional credit extension

- **Creates the potential for risk shifting by B due to limited liability – B fails to recognize that taking more risk will raise its cost of funding.**

P's Optimization Problem

$$\overline{U}^P = U_1^P(c_1^P) + \sum_s \omega_{2s} U_{2s}^P(c_{2s}^P)$$

subject to

$$c_1^P \leq e_1^P$$

$$c_{2s}^P \leq max[A_{2s} I^a - I(1 + r^I), 0] + e_{2s}^P$$

R's Optimization Problem

$$\overline{U}^R = U_1^R(c_1^R) + \sum_s \omega_{2s} U_{2s}^R(c_{2s}^R)$$

subject to

$$c_1^R + P_{eq}^R x_{eq}^R + D^R + LIQ^R \leq e_1^R$$

$$c_{2s}^R \leq \frac{x_{eq}^R}{E^B + x_{eq}^B + x_{eq}^R} Div_{2s} + V_{2s}^D D^R(1 + r^D) + LIQ^R + e_{2s}^R$$

B's Optimization Problem

$$\overline{U}^B = U_1^B(c_1^B) + \sum_s \omega_{2s} U_{2s}^B(c_{2s}^B)$$

subject to

$$c_1^B + P_{eq}^B x_{eq}^B + D^B + LIQ^B \leq e_1^B$$

$$I + LIQ \leq P_{eq}^B\left(x_{eq}^R + x_{eq}^B\right) + D^R + D^B + E^B$$

$$c_{2s}^R \leq \frac{E^B + x_{eq}^B}{E^B + x_{eq}^B + x_{eq}^R} Div_{2s} + V_{2s}^D D^B(1 + r^D) + LIQ^B + e_{2s}^R$$

$$Div_{2s} = max[V_{2s}^I I(1 + r^I) + LIQ - (D^R + D^B)(1 + r^D), 0]$$

Generic properties of the equilibrium (with bank lending and default allowed)

- B never chooses to buy equity in the bank
  - Since B cannot make equity investments in P, the upside from lending is limited
- B ignores the effect of defaults on depositors, hence will opt to "risk shift" on the margin
  - R knows this and will raise the interest rate to account for it.
- In an unregulated equilibrium LIQ=0
  - **B cares only cases when the bank is solvent and needs to repay $r^D > 0$ to depositors. So , while the liquid asset has zero yield**
- Also calibrate so that P defaults all but the high state, and B defaults on deposits in the low state

Alternative: Direct Lending by R and B to P

- Solve the model with B present and then analyze transfers that replicate $D^B = D^R = 0$
- In this case all of R's saving is equity in B
- Compared to the case with deposits:
  - R gets lower payoff in the low and medium state and a higher payoff in the good state
  - B gets the opposite
  - P gets less credit, so is clearly worse off
  - Welfare for B & R depend on their risk aversion

Alternative: Unlimited liability

- Bounds lending to P to be below his endowment
- Bounds deposits to be less than P's repayment and B's endowment
- Greatly reduces lending to P, leaving him worse off.
- Taking away the default option also makes B worse off
- R gets safer savings, but they earn a much lower return. In our calibration, he is worse off too.

Risk Shifting

- As usual limited liability increases the bank's risk appetite. By making more loans P is better off.

- Depositors demand a higher interest rate to compensate for this effect. (Note with deposit insurance this would not be the case.)

- Regulation can force bankers to deal with the misaligned incentives, but the regulations can alter
  - Risk-taking and credit supply
  - The mix of deposits and equity and amount of insurance for depositors

Capital regulation

- Mandating that R supplies more capital leads R to cut back on deposits
- **To a first approximation the size of the balance sheet hardly changes**.
- R already was at an interior optimum regarding deposit and equity choices so an envelope theorem argument applies.
- Deposit rates fall, but incentive to take risk is unaltered.
- So credit extension is little affected

Liquidity regulation

- Mandating that B must invest in LIQ, will lower the return on assets (and dividends).
- **B does not realize that her cost of funding will be lower due to the lower risk of assets.**
- So B tries to boost the return on loans, which requires less lending to P.
- Makes P worse off, R and B better off
  - This better internalizes B's propensity to gamble than having R charge a higher interest rate.

Conclusions

- Limited liability tempts banks to risk shift.
- Capital and/or liquidity regulation can reduce this risk.
- They operate differently through two channels:
  - **Tilting B's incentives to take risk due to limited liability**
  - **Affecting the incentives of R to save through the bank**
- Liquidity regulation shrinks risk (and credit extension) relatively more
  - But it leaves borrowers worse off

Extensions

- Add deposit insurance (which means R no longer internalizes the consequences of deposit default).

- Add more periods that allow the bank to have a maturity mismatch
  - Raises the possibility of a run

- Add another investment opportunity in the additional period.
  - Raises the value of the liquid asset