Banking Regulation: Theory and Practice

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Outline

1. Introduction
   - Why do we regulate banks?
   - Banking regulation in theory and practice

2. Foundations of Banking Regulation
   - Unstable banking
   - Systemic risks
   - Indicators of systemic risks

3. Banking Regulation Toolbox
   - Objectives and tools
   - Liquidity and the Lender of Last Resort
   - Capital requirements
(If they care about what I say,) the views expressed in this manuscript are those of the author’s and should not be attributed to Norges Bank.
Prelude

“Now it is true that banks are very unpopular at the moment, but this (banking regulation) seems very much like a case of robbing Peter to pay Paul.” (The Economist, 20th July, 2011)
Why regulation?

Banking, as other industries, needs regulation on issues where free market cannot discipline itself, to

- Create and enforce *rules of the game*;
- Restrict *market power* and keep market competitive;
- Correct *externalities* or other *market failures* due to moral hazard and adverse selection;
- Protect the interests of *taxpayers*.
Banking regulation is special, comparing with others like telecommunications:

- Focuses more on “safety” and less on “price”;
- *Taxpayer* protection, rather than consumer protection, is more important motivation and benchmark in regulatory design;
- The outcome is a crucial *public good: financial stability*;
- It prevents the spillover to the real economy through *macro-finance linkages*, such as “financial accelerator”.
"Déjà Vu All Over Again"

In the banking crises in these different countries, history keeps repeating itself. The parallels between the banking crisis episodes in all these countries are remarkably similar, creating a feeling of déjà vu. They all started with financial liberalization or innovation, with weak bank regulatory systems and a government safety net. Although financial liberalization is generally a good thing because it promotes competition and can make a financial system more efficient, it can lead to an increase in moral hazard, with more risk taking on the part of banks if there is lax regulation and supervision; the result can then be banking crises.

However, the banking crisis episodes listed in Table 18.2 do differ in that deposit insurance has not played an important role in many of the countries experiencing banking crises. For example, the size of the Japanese equivalent of the FDIC, the Systemic banking crises, is relatively small compared to other countries.

FIGURE 18.2

Banking Crises Throughout the World Since 1970


4A second Web appendix to this chapter, can be found on this book's Web site at www.pearsonhighered.com/mishkin_eakins, discusses in detail many of the episodes of banking crises listed in Table 18.2.
## Cost of bank bailout since 1980

<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Cost as Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>1997–2001</td>
<td>57</td>
</tr>
<tr>
<td>Argentina</td>
<td>1980–1982</td>
<td>55</td>
</tr>
<tr>
<td>Thailand</td>
<td>1997–2000</td>
<td>44</td>
</tr>
<tr>
<td>Chile</td>
<td>1981–1985</td>
<td>43</td>
</tr>
<tr>
<td>Turkey</td>
<td>2000–2001</td>
<td>32</td>
</tr>
<tr>
<td>South Korea</td>
<td>1997–1998</td>
<td>31</td>
</tr>
<tr>
<td>Israel</td>
<td>1977</td>
<td>30</td>
</tr>
<tr>
<td>Ecuador</td>
<td>1998–2002</td>
<td>22</td>
</tr>
<tr>
<td>Mexico</td>
<td>1994–1996</td>
<td>19</td>
</tr>
<tr>
<td>China</td>
<td>1998</td>
<td>18</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1997–1999</td>
<td>16</td>
</tr>
<tr>
<td>Philippines</td>
<td>1997–2001</td>
<td>13</td>
</tr>
<tr>
<td>Brazil</td>
<td>1994–1998</td>
<td>13</td>
</tr>
<tr>
<td>Finland</td>
<td>1991–1995</td>
<td>13</td>
</tr>
<tr>
<td>Argentina</td>
<td>2001–2003</td>
<td>10</td>
</tr>
<tr>
<td>Jordan</td>
<td>1989–1991</td>
<td>10</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1996–2000</td>
<td>7</td>
</tr>
<tr>
<td>Sweden</td>
<td>1991–1995</td>
<td>4</td>
</tr>
<tr>
<td>United States</td>
<td>1988</td>
<td>4</td>
</tr>
<tr>
<td>Norway</td>
<td>1991–1993</td>
<td>3</td>
</tr>
<tr>
<td>Iceland</td>
<td>2007–2009</td>
<td>13</td>
</tr>
<tr>
<td>Ireland</td>
<td>2007–2009</td>
<td>8</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2007–2009</td>
<td>8</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2007–2009</td>
<td>7</td>
</tr>
<tr>
<td>Belgium</td>
<td>2007–2009</td>
<td>5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2007–2009</td>
<td>5</td>
</tr>
<tr>
<td>United States</td>
<td>2007–2009</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>2007–2009</td>
<td>1</td>
</tr>
</tbody>
</table>

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**J. C. Banking Regulation in Theory and Practice**
Banking regulation: basic principles

- Banking regulation should be based on sound foundations
  - To address *well articulated problems*;
  - Using instruments working through well understood *mechanisms*;
- Banking regulation should target on *excessive* risk-taking while maintaining optimal *risk-sharing*;
- Regulatory policies should be *efficient*, or *incentive compatible*;
- Regulatory policies should be waterproof for *regulatory arbitrage*.
Financial crises and evolution of banking regulation

- Financial crisis is the most important driving force of banking regulation. The first greatest output was to create central banks worldwide;

- The second greatest output is to create global standards for banking regulation, namely, **Basel Accord** since 1988
  - **Basel I** (1988): on *credit risks* and *risk-weight* of assets;
  - **Basel II** (2004): more refinements, but failed miserably in the crisis
    - Internal Rating-Based (IRB) approach – opportunities to *arbitrage*;
    - Generates more volatilities through *procyclical* rules;
  - **Basel III** (in progress).
Reconstructing banking regulation

- Banking regulation needs to address **systemic risk**,
  - The risk or probability of breakdowns in an *entire* system, as opposed to breakdowns in individual parts;
  - Evidenced by *comovements* (*correlation*) among most or all the parts;

- Banking regulation needs to be **macroprudential** instead of microprudential, mitigating *systemic* risks instead of idiosyncratic risks;

- Banking regulation needs to be **countercyclical** instead of procyclical
  - Building up buffers and cushions in the boom in order to
  - Absorb shocks and losses in the bust.
I. The micro- and macroprudential dimensions defined

Definitions

Shades of grey are best appreciated when set against their two primitive components, black and white. Likewise, it is especially helpful to define the micro- and macroprudential perspectives in such a way as to sharpen the distinction between the two. So defined, by analogy with black and white, the macro- and microprudential souls would normally coexist in the more natural shades of grey of regulatory and supervisory arrangements.

As defined here, the macro and microprudential perspectives differ in terms of objectives and the model used to describe risk (Table 1).

<table>
<thead>
<tr>
<th></th>
<th>Macroprudential</th>
<th>Microprudential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximate objective</td>
<td>limit financial system-wide distress</td>
<td>limit distress of individual institutions</td>
</tr>
<tr>
<td>Ultimate objective</td>
<td>avoid output (GDP) costs</td>
<td>consumer (investor/depositor) protection</td>
</tr>
<tr>
<td>Model of risk</td>
<td>(in part) endogenous</td>
<td>exogenous</td>
</tr>
<tr>
<td>Correlations and</td>
<td>important</td>
<td>irrelevant</td>
</tr>
<tr>
<td>common exposures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>across institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibration of</td>
<td>in terms of system-wide distress; top-down</td>
<td>in terms of risks of individual</td>
</tr>
<tr>
<td>prudential controls</td>
<td></td>
<td>institutions; bottom-up</td>
</tr>
</tbody>
</table>

The objective of a macroprudential approach is to limit the risk of episodes of financial distress with significant losses in terms of the real output for the economy as a whole. That of the microprudential approach is to limit the risk of episodes of financial distress at individual institutions, regardless of their impact on the overall economy.

So defined, the objective of the macroprudential approach falls squarely within the macroeconomic tradition. That of its microprudential counterpart is best rationalised in terms of consumer (depositor or investor) protection.

To highlight the distinction between the two, it is useful to draw an analogy with a portfolio of securities. For the moment, think of these as the financial institutions in an economy. Assume, further, that there is a (monotonically) increasing relationship between the losses on this portfolio and the costs to the real economy. The macroprudential approach would then care about the tail losses on the portfolio as a whole; its microprudential counterpart would care equally about the tail losses on each of the component securities.

The implications for the setting of prudential controls are straightforward. The macroprudential approach is top-down. It first sets the relevant threshold of acceptable tail losses for the portfolio as a whole; calibration of prudential controls in terms of system-wide distress; top-down. The microprudential approach is bottom-up. It calibrates prudential controls in terms of risks of individual institutions; bottom-up.
Why is banking so unstable?

- Instability arising from bank runs has been presented in Diamond & Dybvig (1983)
  - **Maturity transformation**: one of the most important features in banking;
  - However, runs there are easily eliminated by deposit insurance, while
  - In reality banking is generally unstable — history shows that insurance did *not* make the system more stable;

- Why is banking still so unstable?
  - Moral hazard problem prevents full insurance;
  - Fragility may be *necessary* to discipline banks.
Fragility and instability: a model

A simple model based on Diamond & Rajan (2001) and Cao & Illing (2011)

- Consider an economy extending over 3 periods, $t = 0, 1, 2$, with the following risk-neutral agents:
  - **Depositors**: born with unit endowment at $t = 0$, deposit in banks; at $t = 1$ withdraw, consume and die;
  - **Banks**: Bertrand competition in deposit market $\rightarrow$ zero profit;
  - **Entrepreneurs**: borrow from banks, produce, and repay loans.

- No asymmetric information.
Two types of entrepreneurs, distinguished by the types of their projects:

- **Safe projects**: start at $t = 0$, return $R_1 > 1$ with certainty at $t = 1$;

- **Risky projects**: start at $t = 0$, return $R_2 > R_1$, however
  - With probability $p$, realize at $t = 1$, and $1 < pR_2 < R_1$;
  - With probability $1 - p$, return postponed to $t = 2$.

Banks would love to support only risky projects, while depositors prefer safe ones: **maturity mismatch**.
Entrepreneurs have expertise on operating projects ("inalienable human capital"), while bankers only get $\gamma R_i$ ($\gamma > p$) if they operate themselves.

- Entrepreneurs would walk away if the return demanded by bankers is too high: a credible threat;
- In equilibrium bankers collect $\gamma R_i$ from projects’ return;

However, depositors do not have such collection skills.

- Bankers have the power to renegotiate with depositors at $t = 1$;
- Depositors exercise bank run as commitment device, preventing renegotiation: desire for fragility.
At $t = 0$

- Banks decide their investment plan: share $\alpha$ on safe projects and $1 - \alpha$ on risky projects, and offer deposit contracts promising the return $d_0 > 1$ to depositors;

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$ on safe projects</td>
<td>Deposits</td>
</tr>
<tr>
<td>$1 - \alpha$ on risky projects</td>
<td></td>
</tr>
</tbody>
</table>
Timing (cont’d)

- At $t = \frac{1}{2}$
  - If depositors have doubt on bank’s return, they can run on the bank — all projects have to be liquidated, with poor return $c < 1$;

- At $t = 1$
  - Banks collect early returns, and depositors withdraw $d_0$;
  - Banks may borrow from early entrepreneurs (those with safe projects and risky projects that return early) using *collateral*;

- At $t = 2$
  - Banks collect returns from late projects and repay early entrepreneurs.
Timing (cont’d)

### Timing of the model:

<table>
<thead>
<tr>
<th></th>
<th>Early Projects</th>
<th>Late Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>$t = 0$</td>
<td>Investors deposit;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bank $\alpha$ Type 1 projects $\rightarrow$</td>
<td>$R_1$</td>
</tr>
<tr>
<td></td>
<td>chooses $1 - \alpha$ Type 2 projects $\rightarrow$</td>
<td>$R_2$</td>
</tr>
</tbody>
</table>
Debt roll-over and liquidity

At \( t = 1 \) banks have

- Collected return from early projects, \( \gamma [\alpha R_1 + (1 - \alpha) pR_2] \);
- Loans to the postponed projects, \( \gamma (1 - \alpha) (1 - p) R_2 \);

Early entrepreneurs have \((1 - \gamma) [\alpha R_1 + (1 - \alpha) pR_2] \);

To maximize deposit repayment to depositors, banks may borrow from early entrepreneurs, using postponed projects as collateral.
Debt roll-over and liquidity (cont’d)

- Bank’s balance sheet after $t = 1$

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late risky projects</td>
<td>Debt to early entrepreneurs</td>
</tr>
</tbody>
</table>
Bank’s optimal strategy boils down to its choice on $\alpha$, which leads to “just enough” collateral for debt roll-over

$$
\alpha = \frac{\gamma - p}{\gamma - p + (1 - \gamma) \frac{R_1}{R_2}};
$$

Depositor’s return $d_0 = \gamma [\alpha R_1 + (1 - \alpha) R_2] = \alpha R_1 + (1 - \alpha) pR_2 = E[R] > \gamma R_1$;

- Maturity transformation is *welfare improving*;
- However, if there is anything wrong in debt roll-over, banks are exposed to *liquidity risk*. 
Maturity transformation and liquidity risk (cont’d)

- Bank’s liquidity risk comes from two sources
  - **Market liquidity**: on the *assets* side, the liquid assets that can be converted to cash without much discount (“haircut”) when necessary — safe projects in this model;
  - **Funding liquidity**: on the *liabilities* side, the funding that a bank can raise without too high cost when it needs to roll over its debt — debt to the entrepreneurs in this model;

- A bank’s liquidity changes over time: a liquid balance sheet can easily becomes illiquid under market stress.
Now suppose there is uncertainty on $p$

- $p$ can take two values, $0 < p_L < p_H < \gamma$;
- $p$ is unknown at $t = 0$, and revealed at $t = \frac{1}{2}$. Probability of being $p_H$ is $\pi$;

Consider two extreme cases

- $\pi \rightarrow 1$, $\alpha_H = \frac{\gamma-p_H}{\gamma-p_H+(1-\gamma) \frac{R_1}{R_2}}$ and $d_0 = \alpha R_1 + (1 - \alpha) p_H R_2 = E [R_H]$;
- $\pi \rightarrow 0$, $\alpha_L = \frac{\gamma-p_L}{\gamma-p_L+(1-\gamma) \frac{R_1}{R_2}} > \alpha_H$ and $d_0 = \alpha R_1 + (1 - \alpha) p_L R_2 = E [R_L]$;
- What happens in between?
Liquidity risk under aggregate shock (cont’d)

- Suppose $\pi$ goes down from 1, following $\alpha_H$
  - Depositor’s return is $E[R_H]$ with probability $\pi$ and $c$ with $1 - \pi$;
  - Bank sticks to $\alpha_H$ as long as $\pi E[R_H] + (1 - \pi) c > E[R_L]$. 

![Graph showing the relationship between $E[R(\alpha_i)]$, $E[R(\alpha_L)]$, and $E[R(\alpha_H, \pi, c)]$.]
The root of evils

- **Principal-agent problems** and **limited liability** that encourage banks to take excessive risks, e.g., biased incentives from OPM (Other People’s Money) instead of MOM (My Own Money);
- **Externalities** that lead to inferior allocation of resources and risks
  - **Positive** externalities – taking the full cost while generating benefit to others – reduce necessary buffers in banking system, e.g., liquid assets holdings;
  - **Negative** externalities – taking the full benefit while cost partially borned by others – lead to excess risk-taking, e.g., interbank borrowing.
Banks need to hold some liquid assets – assets that can be easily converted to cash – in order to cushion demand shocks from depositors.

- There’s opportunity cost in holding liquid assets, while it benefits stressed banks through interbank lending;
- Positive externality → systemic liquidity shortage among banks.
Introduction

There has been a secular decline in liquid assets as a share of bank balance sheets over the last three decades. Figure 1 depicts the liquidity ratios of the banking systems in the United States and the United Kingdom during this period. While the average liquidity ratio for US banks was roughly constant at a level of 5–7% during the 1980s and early 1990s, it dropped to below 1% before the outbreak of the financial crisis in 2007. A similar picture arises for the UK, where the liquidity ratio was steady at a level of about 3% during the 1980s and early 1990s, dropping to a level of 1% and below in the 2000s.

Liquid assets as share of banks’ balance sheets: US & UK
Example: network externality

\begin{center}
\begin{tikzpicture}
  \node (A) at (0,0) {$A$};
  \node (B) at (1,0) {$B$};
  \node (C) at (1,1) {$C$};
  \node (D) at (0,1) {$D$};
  \draw[->] (A) -- (B);
  \draw[->] (B) -- (C);
  \draw[->] (C) -- (D);
  \draw[->] (D) -- (A);
\end{tikzpicture}
\begin{tikzpicture}
  \node (A) at (0,0) {$A$};
  \node (B) at (1,0) {$B$};
  \node (C) at (1,1) {$C$};
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\end{tikzpicture}
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  \draw[->] (B) -- (C);
  \draw[->] (C) -- (D);
  \draw[->] (D) -- (A);
\end{tikzpicture}
\end{center}
Example: network externality (cont’d)

- Interbank lending makes the banks a “web of claims”, or banking network;
- One bank’s failure leads to losses of connecting banks’; bank failure may further spread over the network – contagion or “domino effect”;
- In good time banks make profit with borrowed money from other banks, while in bad time the connecting banks suffer from losses, too – negative externality;
- Too much reliance on interbank lending – “too-interconnected-to-fail”.
The devil in the details

- Financial history suggests the following *lead indicators* for systemic events:
  - “Capital Flow Bonanzas”;
  - Waves of financial innovation;
  - Housing boom;
  - Financial liberalization;
  - After all, *credit growth* seems single best indicator for financial instability;

- Regulators need watch the indicators, while design rules to target sources of systemic risks.
Mitigate and prevent excessive credit growth

- *Credit crunch externalities*: a sudden tightening of the conditions required to obtain a loan, resulting in a reduction of the availability of credit to the non-financial sector;
- *Endogenous risk-taking*: incentives that during a boom generate excessive risk-taking and, in the case of banks, a deterioration of lending standards;
- Risk illusion: collective *underestimation* of risk related to short-term memory and the infrequency of financial crises;
- *Bank runs*: the withdrawal of wholesale or retail funding in case of actual or perceived insolvency;
- *Network externalities*: contagious consequences of uncertainty about events at an institution or within a market.
Mitigate and prevent excessive *maturity mismatch* and *market illiquidity*

- *Fire sales externalities*: arise from the forced sale of assets due to excessive asset and liability mismatches. This may lead to a liquidity spiral whereby falling asset prices induce further sales and spillovers to financial institutions with similar asset classes;

- *Bank runs*;

- *Market illiquidity*: the drying-up of interbank or capital markets resulting from a general loss of confidence or very pessimistic expectations.
Objectives and related market failures (cont’d)

- Strengthen the resilience of *financial infrastructures*
  - *Network externalities*;
  - *Fire sales externalities*;
  - Compensation structures that provide *incentives for risky behavior*;

- Reducing *moral hazard*
  - Excessive risk-taking due to *expectations of a bailout* due to the perceived system relevance of an individual institution, or “*too-big-to-fail*”.
Banking regulation instruments

1. Mitigate and prevent excessive credit growth and leverage
   - Countercyclical capital buffer
   - Sectoral capital requirements (including intra-financial system)
   - Macro-prudential leverage ratio
   - Loan-to-value requirements (LTV)
   - Loan-to-income/debt (service)-to-income requirements (LTI)

2. Mitigate and prevent excessive maturity mismatch and market illiquidity
   - Macro-prudential adjustment to liquidity ratio (e.g. liquidity coverage ratio)
   - Macro-prudential restrictions on funding sources (e.g. net stable funding ratio)
   - Macro-prudential unweighted limit to less stable funding (e.g. loan-to-deposit ratio)
   - Margin and haircut requirements
3. **Limit direct and indirect exposure concentration**
   - Large exposure restrictions
   - CCP clearing requirement

4. **Limit the systemic impact of misaligned incentives with a view to reducing moral hazard**
   - SIFI capital surcharges

5. **Strengthen the resilience of financial infrastructures**
   - Margin and haircut requirements on CCP clearing
   - Increased disclosure
   - Structural systemic risk buffer
Central bank as the lender of last resort

- The classical doctrine (Thornton, 1802 and Bagehot, 1873): during market stress
  - Lend only against good collateral to solvent banks;
  - Lend at a penalty rate (to banks that are illiquid);
  - Credible policy: willing to lend without limits;

- However, it is generally hard to follow
  - Impossible to distinguish illiquidity and insolvency;
  - Creates moral hazard problem, e.g., too-big-to-fail;
  - Subject to political pressure and regulatory capture;

- Liquidity regulation is needed.
Central bank doesn’t create real value, but rather inject fiat money into banking system against good collateral (late projects)

Depositors: nominal deposit contract \( d_0 \)

- \( t = 0: p \) unknown
- \( t = 0.5: p \) revealed

Banker decides

- \( \alpha \)
- \( 1 - \alpha \)

Central Bank

Money injection at \( p_L \)

Investor’s Return

\[ \pi_1, \pi_2 \]

\[ R[\alpha(p_L)] \]

\[ R[\alpha(p_H), c] \]

\[ R[\alpha(p_H), k] \] with prob. \( p \)

\[ R_2 \] with prob. \( 1 - p \)
Lender of last resort and bank run

- Suppose \( \pi \) is sufficiently high so that banks choose \( \alpha_H \)
  - Depositors get \( d_0 = E[R_H] \) real return under \( p_H \)
- But when \( p_L \) gets revealed, depositors have two choices
  - If they do not run, they get paid \( d_0 = E[R_H] \) nominal return which allows them to buy \( \alpha_H R_1 + (1 - \alpha_H) p_L R_2 > 1 \) real goods;
  - If they run, they get real liquidation value \( c < 1 \).
- Of course they won’t run. With lender of last resort policy, depositors get higher real return than market solution:
  \[
  \pi E[R_H] + (1 - \pi) [\alpha_H R_1 + (1 - \alpha_H) p_L R_2] > \pi E[R_H] + (1 - \pi) c.
  \]
Moral hazard and liquidity regulation

- Unfortunately, this cannot be the equilibrium outcome
  - Delayed (high return) projects are good collateral, allowing banks to borrow and promise higher nominal return to depositors: no need to hold liquid assets;
  - Competition makes all banks choose \( \alpha = 0 \);
  - Depositors get nominal return \( d'_0 = \gamma R_2 > d_0 \), while the real return is \( \pi p_H R_2 + (1 - \pi) p_L R_2 \), lower than \( \pi E [R_H] + (1 - \pi) [\alpha_H R_1 + (1 - \alpha_H) p_L R_2] \);

- Moral hazard arising from central bank policy — depositors get worse off!

- Solution? Imposing \( \alpha_H \) as entry requirement to complement!
Capital adequacy requirement

- Capital requirement is one of the best examples on how to design proper rules in financial regulation;
- Capital requirement is a good instrument
  - Provides *cushion* to absorb losses and avoid contagious spillover to the rest of the system;
  - Align with incentives: more “*skin-in the game*”, encourage monitoring and avoid excess risk-taking;
  - Can reflect the risk in banks’ assets: more risk, higher capital ratio;
  - Easy to understand and implement.
Capital adequacy in design

- Capital requirement should be higher for SIFIs;
- Should be high enough to weather unanticipated systemic events;
- It should be waterproof for regulatory arbitrage
  - Should focus on tier-1 capital (common equity);
  - Should be less flexible in calculating risk weights of assets;
- Capital requirement rules should avoid procyclicality
  - Need to put a brake on banks’ credit supply in the boom, while
  - Provide more room to cushion banks’ losses in the bust.
Procyclicality: in the boom

<table>
<thead>
<tr>
<th>Assets</th>
<th>Equity</th>
<th>Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in value of assets</td>
<td>Increase in equity</td>
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<tr>
<th>Assets</th>
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<tbody>
<tr>
<td>Increase in investments</td>
<td>New borrowing</td>
<td></td>
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</tbody>
</table>
Suppose capital ratio is required to be no less than 33%;

In the boom, profit from each bank’s assets makes equity ("net worth") doubled – now capital ratio becomes 50%;

The capital requirement allows every bank to take in more debt for more investments, expanding its balance sheet by 50%;

Demand for assets↑ → asset price↑ → banks’ profit↑ → net worth↑ → debt↑ & demand for assets↑...

Making banking sector expand more in the boom.
Procyclicality: in the bust

- Decrease in value of assets
- Decrease in equity
- Decrease in investments
- Reduced debt
Suppose capital ratio is required to be no less than 33%;
In the bust, loss from each bank’s assets makes equity halved – now capital ratio becomes 16.5%;
The capital requirement forces every bank to cut off investments, contracting its balance sheet by 20%;
Demand for assets↓ → asset price↓ → banks’ loss↑ → net worth↓ → debt↓ & demand for assets↓...
Making banking sector *contract more in the bust*. 
On 4 June 2013, the Norwegian parliament adopted the proposal from the Ministry of Finance for higher capital requirements for Norwegian banks in accordance with CRD IV. All domestically chartered banks in Norway are required to hold a minimum CET1 ratio of 4.5% as of 1 July 2013. The conservation buffer requirement was also implemented at the same time. In addition, a systemic risk buffer requirement of 3% CET1 for domestically chartered banks’ risk-weighted exposures in Norway will also be implemented gradually, starting at 2% on 1 July 2013 and coming into full effect on 1 July 2014. Furthermore, banks judged to be systemically important (SIFI) will have a 1% CET1 buffer as of 1 July 2015, stepped up to 2% CET1 by 1 July 2016. I.e., all domestically chartered banks in Norway are required to have a CET1 capital ratio of 9% as of 1 July 2013 and 10% as of 1 July 2014. SIFIs will have to step up further to 11% as of 1 July 2015 and 12% as of 1 July 2016. Chart 5.2 provides an illustration of the requirements and their expected developments over the next few years.

Chart 5.2: Phasing in of new CET1 requirements in Norway

Source: Ministry of Finance and Norges Bank.

Note: The EBA requirement refers to the decision by the European Banking Authority under which 71 systemically important EU banks were required to hold a minimum CET1 ratio of 9% as of 30 June 2012. The Norwegian FSA decided to apply the same minimum requirement to all Norwegian banks as of June 2012. The counter cyclical buffer is in the illustration set to its maximum potential value.
Countercyclical capital buffer in design (Norway)

- Minimum capital ration increased to 4.5% from 2% (Basel II);
- Additional *conservation buffer* to cushion *idiosyncratic risks* and *systemic risk buffer* to weather *systemic events*;
- Addition buffer for identified *SIFIs*;
- Building up *countercyclical capital buffer* in the good time
  - To cool down booming credit supply, and
  - Allow banks to use the buffer for loss absorption during future downturn, subject to restrictions on executives’ compensation.
Banking regulation is special:

- More focus on “safety” than “price”;
- Much greater macroeconomic consequences and implication for taxpayers’ interests;

Banking regulation design must come from sound economic theories

- Using instruments directly targeting on market failures, based on clear lead indicators;
- Rules need to be macroprudential, countercyclical and arbitrage-proof.

J. C. Banking Regulation in Theory and Practice