Risk management, the global financial crisis and regulatory reform: Lessons for Asia and research agenda

René M. Stulz
Roadmap

• Some evidence on the crisis
  – Incentives, governance, and regulation
• Risk management in financial institutions and the crisis
• Regulatory reform after the crisis
  – Dodd-Frank, Basel 2.5, Basel III, and more
  – Unforeseen consequences
  – Is there a better way?
• Research agenda
Some evidence on the crisis
What failed and why did it matter?

• Blinder: “Give smart people go-for-broke incentives and they will go broke. Duh.”

• FCIC: “...dramatic failures of corporate governance and risk management at many systemically important institutions were a key cause of this crisis.”

• Rajan: “Financial firms were taking tail risk.”

• Acharya, Schnabl, and Suarez: “...banks increasingly devised securitization methods that allowed them to concentrate risks on their balance sheets which eventually led to the largest banking crisis since the Great Depression.”
Evidence from Beltratti/Stulz
Journal of Financial Economics

• Look at how variables proxying for factors that caused or aggravated the crisis are related to performance of banks during the crisis

• Start from the 1,648 financial institutions on Bankscope with total assets in excess of $10bn as of 2006

• Keep banks with data on the characteristics we use and with returns on Datastream as of beginning of July 2007

• Find 442 banks; focus mostly on 164 banks with assets in excess of $50 bn (32 countries)
Characteristics of banks that performed better during the crisis

- More equity (tier 1 capital ratio) in 2006: 9.6% vs 8.6%
- More deposits: 69.7% versus 50.1%
- Less funding fragility
- Less non-interest income: 34.0% versus 43.6%
- Lower distance to default!
- More idiosyncratic volatility!
Regressions with country fixed effects

- Dependent variable: Buy-and-hold return from July 2007 to December 2008
- Positive impact of Tier 1 capital
- Performance increases with deposits/assets
- Loans to assets is insignificant
- Fragility is highly significant
- Performance is worse for banks that did better in 2006
- Banks with more shareholder-friendly boards performed worse
Regulation and crisis performance

• Use 2006 version of indices developed by Levine and co-authors

• \textit{Official}: index of power of the commercial bank supervisory agency (e.g. meet with auditors, intervene in a bank...)

• \textit{Capital}: index of regulatory oversight of bank capital (e.g. how tight is the definition of capital)

• \textit{Restrict}: index of regulatory restriction on the activities of banks (e.g. own non-financial corporations, securities trading...)

• \textit{Independence}: index of independence of supervisory authority

• Only \textit{Restrict} is significant. Banks did better in countries where restrictions on their activities were stronger
Summary

• Capital positively related to performance
• Pre-crisis risk measures do not forecast performance
• More traditional banks fared better
• Regulation mattered only to the extent that it made banks more traditional
• Banks with boards more aligned with shareholder interests performed worse
Governance and incentives

- Governance experts argue that CEO incentives are better when CEOs own more shares

- How did that work out?
1. James Cayne (Bear Stearns, $1,062 million)
2. Richard Fuld (Lehman Brothers, $911.5 million)
3. Stan O’Neal (Merrill Lynch, $359 million)
4. Angelo Mozilo (Countrywide Financial, $285 million)
5. Robert J. Glickman (Corus Bankshares, 281.1 million)
## Bank performance and ownership

<table>
<thead>
<tr>
<th></th>
<th>Stock returns</th>
<th>ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonus/Salary</td>
<td>0.014</td>
<td>0.09</td>
</tr>
<tr>
<td>Ownership ($)</td>
<td>-0.079**</td>
<td>-0.073**</td>
</tr>
<tr>
<td>Equity risk ($)</td>
<td>0.030</td>
<td>0.022</td>
</tr>
</tbody>
</table>

Fahlenbrach and Stulz, 2011 JFE
Why did banks hold highly-rated tranches of securitizations?

- Paper with Erel and Nadauld, RFS
- We focus on publicly traded U.S. BHCs as of December 31, 2006
- For the typical bank, holdings of highly-rated tranches (AAA and AA) were economically trivial
  - Median holdings over assets of 0.15% in 2006
  - But, holdings are skewed as mean is 1.3% in 2006
- Big differences across big three: Citi, 5.75%, BAC, 1.96%, JPM, 1.09%
- Banks with the highest holdings were not riskier before the crisis but they had worse performance during the crisis
Results

• Securitization-active banks held more highly-rated tranches
  – Evidence consistent with “skin in the game” arguments

• Holdings increased with bank assets, but the largest banks did not have higher percentage holdings
  – Inconsistent with a simple “too-big-to-fail” incentives of banks as an explanation

• No proxy for incentives is significant
  – Governance index, trading, excess comp., bonus/salary, risk management index
Risk management
Risk management and crisis

• Ellul and Yerramili, JF

• Construct risk management index based on:
  – CRO centrality
  – Is there a CRO?
  – Is CRO executive?
  – Is CRO top five in compensation?
  – Does risk committee meet more than audit?
  – Does risk committee have somebody with experience?
Delinquency and FICO paradox

Red line is for FICO 620-624/Dotted line is for FICO 615/619
Source is Keys, Mukherjee, Seru, and Vig
A possible explanation for paradox is that banks underwrite more poorly loans to FICO above 620 because they can securitize.

- Risk management mitigates the moral hazard.
- More highly paid CRO relative to the executive team makes the paradox disappear.
Risk management and risk taking

• Risk management is not minimizing risk: There is an optimal level of risk for shareholders

• Too little risk means that the bank is not taking full advantage of its capabilities: It is turning down positive NPV projects

• Too much risk means that the bank is losing business because it is too risky
Good risk management: A misconception

• With good risk management, there will be material losses
  – Downside of risk taking that is value creating
  – It is not feasible and not economically sensible to eliminate all bad risks
  – It is not feasible and not economically sensible to monitor risks in such a way that material losses are not possible

• Good risk management is about insuring that the firm has the optimal amount of risk

- Multi-tiered
- Integrated Risk Framework

1. Firm’s financial targets
2. Risk Appetite
3. Risk Equity
4. Risk Limits
   - Portfolio Limits
   - Single Transaction Limits
   - Concentration Limit
   - Country Limits
Role of risk management

• Suppose the relation between risk and value is concave: there is a risk level that maximizes shareholder wealth
• The CEO would pick that level to maximize bank value absent agency problems if she could do so costlessly
• In a real world bank, there is a coordination problem: risk taking is the result of the activities of the employees of the bank
• The CEO cannot pick the risk without a coordination device
• The risk management organization is that coordination device
Risk management’s coordination role

• To perform its coordination role, risk management is required to identify, measure, aggregate, and monitor risks within the firm.

• Though it is called risk management, it is a misnomer: the CEO, not the CRO, manages the risk of the firm.

• With decentralized risk taking, four problems have to be addressed:
  – Agency problem
  – Bad risk problem
  – Measurement problem
  – Risk governance problem
Risk measurement

• The amount of risk is firm-wide
• Aggregation problem
• Technology to measure firm-wide risk is underdeveloped
• Model risk is underappreciated
• Business risk is often ignored
• Basel #whatever ignores business risks and ALM risks
## VaR exceptions

### 4. Classification of banks according to VAR exceptions

<table>
<thead>
<tr>
<th>Zone</th>
<th>Bank</th>
<th>Confidence interval</th>
<th>Number of realised exceptions in stressed period</th>
<th>Harmonised number of exceptions occurred during stressed period</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>Lehman Brothers</td>
<td>95%</td>
<td>13</td>
<td>2-3</td>
<td>Green [0-4] exceptions</td>
</tr>
<tr>
<td>US</td>
<td>Goldman Sachs</td>
<td>95%</td>
<td>13</td>
<td>2-3</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>Morgan Stanley</td>
<td>95%</td>
<td>18</td>
<td>4-5</td>
<td>Yellow [5-9] exceptions</td>
</tr>
<tr>
<td>Europe</td>
<td>BNP Paribas</td>
<td>99%</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>JP Morgan</td>
<td>99%</td>
<td>10</td>
<td>10</td>
<td>Red ≥10 exceptions</td>
</tr>
<tr>
<td>US</td>
<td>Bear Stearns</td>
<td>95%</td>
<td>34</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>Credit Suisse</td>
<td>99%</td>
<td>25</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>Société Générale</td>
<td>99%</td>
<td>29</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>Deutsche Bank</td>
<td>99%</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>UBS</td>
<td>99%</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

*Source: annual reports, Calculations: Banque de France/DSF*

Risk Limits

- Risk Appetite Limits
  - The overall limit is driven by Risk Appetite which is approved by the Executive Committee.
  - Limits are set by Risk Management in conjunction with the business heads.
  - Limits are cascaded down to the divisions and businesses.

- Credit Limits
  - All counterparties are given internal ratings.
  - Every counterparty has a limit which is subdivided into product limits
    - no diversification benefit is given to any counterparty across products
  - The largest counterparties by industry, region and product are reviewed on a quarterly basis.
  - All counterparties rated below “A” are formally reviewed on an annual basis
Limits of limits

• We don’t have a theory of limits

• Limits can’t control risks that are not observed and are not measured by risk management

• Limits can’t control risks where risk management is not allowed to put limits

• Banks don’t put limits on strategic risks
October 2007: a consortium led by RBS took over ABN Amro in a deal valued $98.5 billion

Succeeded by outbidding Barclays

Investment banker: “There is stuff in here we can’t even value.” Goodwin: “Stop being such a bean counter.”

“RBS credit traders (...) were horrified at what they found.”
• Others tools to make risk management more effective:
  – Risk governance
  – Incentives
  – Culture
Regulatory reform
Regulation follows crises
Basic Principles:

1) Identify specific problems that motivate regulation

2) Worry about unintended consequences

3) Consider systemic impact of regulations

4) Force firms to bear the full costs of their actions
Capital Requirements

• Focus on macro-prudential goal of protecting the system from fire-sale and credit-crunch spillovers
  – Greater capital requirements for large banks and banks with less liquid assets

• Heavy use of short-term debt causes system fragility
  – Capital requirements should be higher with more short-term debt financing

• Higher capital and liquidity requirements will create strong pressure for activities to migrate out of regulated banking sector
U.S. Basel III: Higher Capital Ratios

Leverage Capital Requirements

U.S. Leverage Ratio: Tier 1 capital to average total consolidated assets (minus amounts deducted from Tier 1 capital) must be at least 4%. Applies to all U.S. banking organizations.

Basel III Supplementary Leverage Ratio: Tier 1 capital to "total leverage exposure," which takes into account both on- and off-balance sheet exposures, must be at least 3%. Applies only to advanced approaches banking organizations.

Future changes: The leverage ratios in the U.S. Basel III final rule may ultimately change as the result of a proposal to impose a higher leverage ratio on certain U.S. banking organizations. This proposal was issued on July 9, 2013 and applies only to the eight U.S. G-SIBs.

Existing Capital Rules

Tier 1
4.0%

Tier 2
4.0%

Additional Tier 1
1.5%

Common Equity Tier 1: New tier of capital
4.5%

Common Equity Tier 1:
Capital conservation buffer
> 2.5%

Common Equity Tier 1:
Countercyclical buffer (if deployed)
0% - 2.5%

Common Equity Tier 1:
G-SIB surcharge
1% - 2.5%

U.S. Basel III Final Rule

G-SIB surcharge and countercyclical buffer only apply to certain large, internationally active U.S. banking organizations.

Transitional Arrangements

8% total capital
6% tier 1 capital
### Product-specific RoEs show highest impact on structured products, especially credit and rates

RoE (effect), Percent (Percentage points)

<table>
<thead>
<tr>
<th>Asset class</th>
<th>Pre regulation</th>
<th>Basel III/Other</th>
<th>Post regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B II.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mkt risk</td>
<td>CCR</td>
</tr>
<tr>
<td><strong>1</strong> FX</td>
<td>30</td>
<td>-8</td>
<td>0</td>
</tr>
<tr>
<td><strong>2a</strong> Rates - Flow</td>
<td>19</td>
<td>-6</td>
<td>-5</td>
</tr>
<tr>
<td><strong>2b</strong> Rates - Strctrd</td>
<td>15</td>
<td>-4</td>
<td>-6</td>
</tr>
<tr>
<td><strong>3a</strong> Credit - Flow</td>
<td>18</td>
<td>-8</td>
<td>0</td>
</tr>
<tr>
<td><strong>3b</strong> Credit - Strctrd</td>
<td>17</td>
<td>-9</td>
<td>-2</td>
</tr>
<tr>
<td><strong>4</strong> Commodities</td>
<td>20</td>
<td>-6</td>
<td>-3</td>
</tr>
<tr>
<td><strong>5</strong> Cash Equities</td>
<td>25</td>
<td>-5</td>
<td>0</td>
</tr>
<tr>
<td><strong>6a</strong> EQD - Flow</td>
<td>25</td>
<td>-8</td>
<td>-1</td>
</tr>
<tr>
<td><strong>6b</strong> EQD - Strctrd</td>
<td>27</td>
<td>-10</td>
<td>-4</td>
</tr>
<tr>
<td><strong>7</strong> Prime Svcs</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>8</strong> Prop Trading</td>
<td>35</td>
<td>-22</td>
<td>-1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20</td>
<td>-7</td>
<td>-3</td>
</tr>
</tbody>
</table>

Borrowed from McKinsey/Toni Santomero
• One important evolution is that capital requirements are complemented by a variety of stress tests

• Stress tests have several problems:
  – Lack of transparency of models
  – Time and resource consuming
  – Assumptions can become politicized
  – Difficulty in planning for financial institutions
Example: Fannie and Freddie

2-Year Horizon

Source: The failure of supervisory stress testing by Frame, Gerardi, and Willen
How the world has changed

• “Deutsche Bank CRO: derivatives becoming loss leader”

• SLR caps netting and puts 5% add-on on non-cleared CDS, so firms are exiting the business – DB, CS

• More generally, dealer inventories of credit securities were $235 billion in October 2007; they are $60 billion now
On Oct. 15, the yield on the 10-year Treasury note tumbled to its biggest one-day decline since 2009.
Derivatives Growth Stalled
Credit-default swaps

Notional amount of OTC derivatives outstanding


Credit default swaps
Single-name instruments
of which index products
Where are we?

• Will banks be able to perform their role in the new financial system?

• Where should regulatory intervention stop?

• Is TBTF worse than before?

• Real estate was at the core of the crisis, but nothing has been done in the U.S.
We don’t know we have a bubble until it has popped
This has been the wrong approach.
Right approach: What is the probability it is a bubble and what are the future costs if it is?
Research agenda
• What are the determinants of the size of the financial sector?
• How does size and composition of financial sector affect growth and risk?
• What are the dynamics of liquidity?
• How to devise more robust risk measures for capital requirements?
• How to assess firm-wide risk management and risk measures?
• How important is moral hazard for banks?
• How important is regulatory and policymaker model risk?
Conclusion

• Support for popular crisis theories is weak
• Bad expectations played more of a role than modern finance allows for
• Risk management can be done better, but it will not necessarily make the world safer
• Regulation reform should engineer the financial system for growth, not for gridlock
• Can’t make progress without research