Bank Capital: Lessons from the Financial Crisis

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Motivation

- One of the centerpieces of bank prudential regulation is bank capital regulation:

  - Ex post, capital absorbs losses

  - Ex ante, capital encourages less risk taking, better aligning banker's incentives with socially desirable risk taking

- Can we learn something about the usefulness/possible redesign of bank capital regulation by looking at what happened during the crisis?

Motivation

- Banking systems were well capitalized based on regulatory standards before (and during) the crisis

- Yet, the crisis revealed that banks had taken on huge risks

- Why?

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Motivation

- Maybe exogenous shock was just too big

- Maybe capital position was not so strong after all…

  - What counted as capital was not really available to absorb losses

  - Measured risk exposure did not reflect true risk

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Basel III reforms

- Definition of capital is reviewed and strengthened

- Quality of Tier 1 and Tier 2 enhanced

- Tier III eliminated

- Deductions from capital harmonized

- Minimum leverage ratio of 3 percent introduced on a trial basis

Raising quality, consistency, and transparency of the capital base

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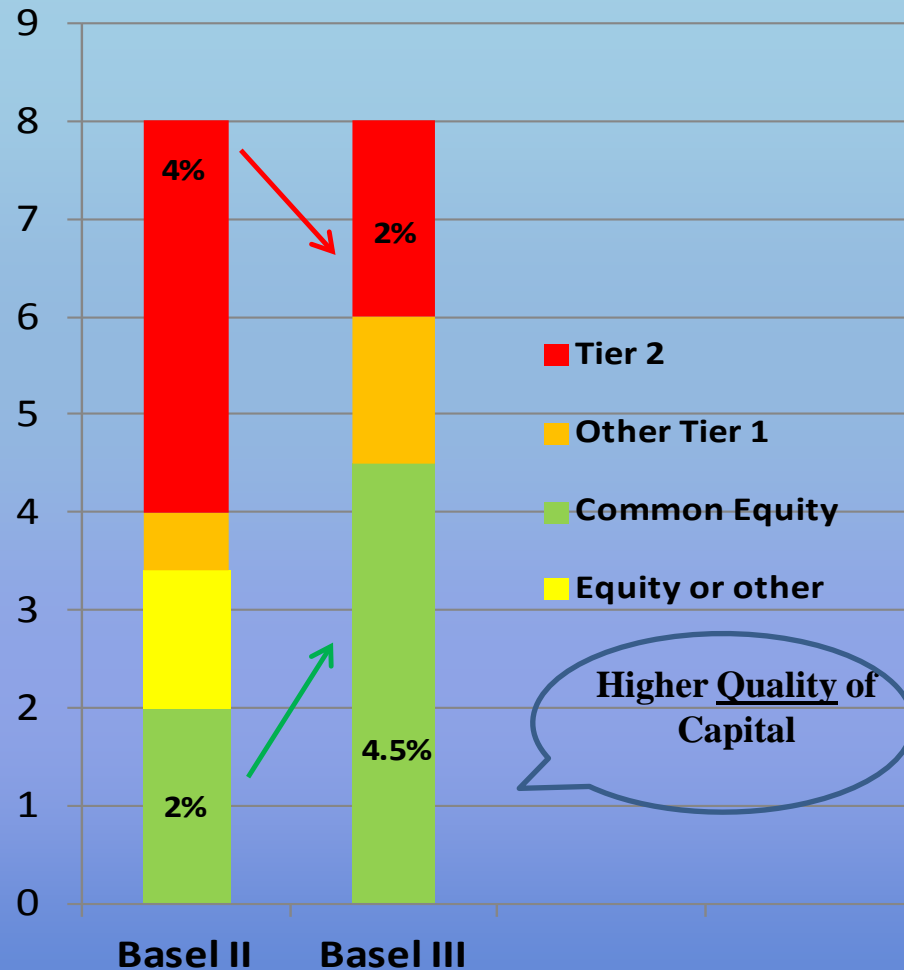
What do we do?

- For 381 banks in 12 countries we study quarterly stock returns over 2006-2009 period

- Using the crisis that started in August 2007 as an unexpected negative shock, we explore whether market participants perceived different capital definitions to be effective measures of banks' ability to withstand stress.

- All banks did poorly in terms of their stock market value, but some did better than others

Quarterly stock returns in percent: Q1..2006-Q1.2009
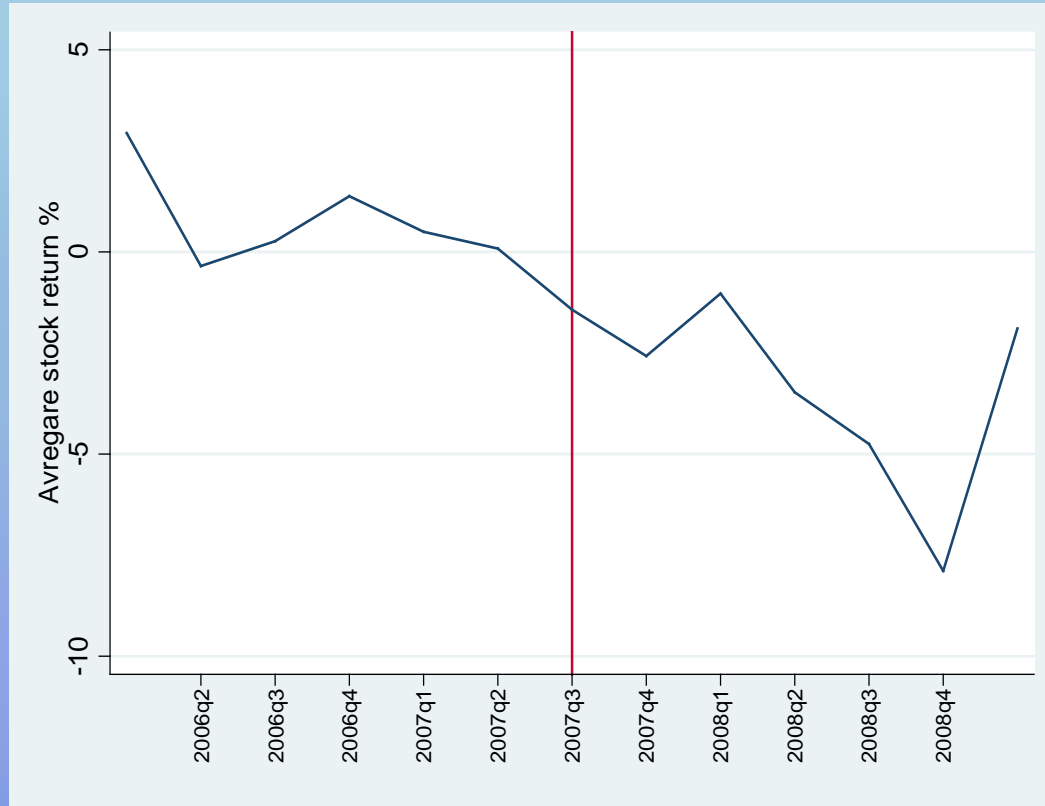
Questions

- Were better performing banks also better capitalized? Which "measure" of capital was most informative?

- Did bank size matter (large banks with assets>$50 billion – 91 banks in 8 countries)?

  – Typically large banks are more sophisticated, operate on a global scale with complex balance sheets

  – Assets maybe more opaque, better able to avoid regulation through arbitrage, and also key for macro-prudential regulation since affect stability of the system as a whole

Bank Stock Returns – Before and During the Crisis

Full Sample	Mean	Std. Dev.
Pre-crisis Q1-2006 to Q2-2007	0.4	3.6
Crisis Q3-2007 to Q1-2009	-3.5	7.8
Post Lehman Q3-2008 to Q1-2009	-5.3	9.8
Large Banks		
Pre-crisis Q1-2006 to Q2-2007	0.8	3.0
Crisis Q3-2007 to Q1-2009	-4.7	8.0
Post Lehman Q3-2008 to Q1-2009	-6.7	10.3

Methodology

- Regress quarterly stock returns on various measures of capital, allowing for different coefficients in the crisis period – controlling for country/time dummies and bank characteristics

- Different capital variables

  - Regulatory ratio (Tier 1+Tier 2)/Risk-weighted assets(RWA)

  - Leverage ratio (Tier 1+Tier 2)/assets

  - Tier 1 and Tier 2 risk weighted ratios

  - Tier 1 and Tier 2 leverage ratios

  - Tangible equity/tangible assets

Capital definitions

- Total capital= Tier I + Tier II

- Tier I capital:
  - Shareholders' funds
  - Perpetual, non-cumulative preference shares

- Tier II capital:
  - Hybrid capital
  - Subordinated debt
  - Loan loss reserves
  - Valuation reserves

- Tangible common equity = Shareholder funds – non-tangible common equity
  - Non-tangible common equity = tax deferred assets +mortgage servicing rights + minority interest in financial intermediaries +other

Summary Statistics – Capital Ratios

Full Sample	Median	Std. Dev.
RWR	11.9	2.8
RWR (tier 1)	9.7	2.8
LR	7.8	2.5
LR (tier 1)	6.3	2.4
Large Banks		
RWR	11.7	2.4
RWR (tier 1)	8.2	1.9
LR	6.5	2.2
LR (tier 1)	4.6	1.7

Stock Market Performance and Bank Capital

	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-Crisis		Crisis		Post-Lehman	
	RWR	LR	RWR	LR	RWR	LR
Tier1*Large	-0.034	0.088	0.165	0.536***	0.123	0.720**
	[0.090]	[0.093]	[0.154]	[0.181]	[0.257]	[0.323]
Tier1*Small	0.036	0.036	0.08	0.151	0.033	0.141
	[0.045]	[0.066]	[0.114]	[0.148]	[0.158]	[0.214]
Tier2*Large	0.039	-0.053	0.103	0.357	0.008	0.269
	[0.101]	[0.158]	[0.189]	[0.283]	[0.295]	[0.388]
Tier2*Small	0.08	-0.052	0.049	0.161	-0.126	0.28
	[0.060]	[0.076]	[0.130]	[0.214]	[0.248]	[0.369]
Controls*Large	x	x	x	x	x	x
Controls*Small	x	x	x	x	x	x
Country*Year FE	x	x	x	x	x	x
Nber. Obser.	1820	1650	2229	2076	949	897
R squared	0.23	0.23	0.15	0.16	0.22	0.23

Note: (*), (**) and (***) stand for statistically significant at the 10%, 5 % and 1 % level, respectively.

Robust standard errors clustered by bank reported in brackets.

Summary of findings

- In crisis times, there is evidence that banks with more capital did better:

    – Especially among larger banks and among the initially less well capitalized banks

    – The simple capital/total assets ratio (leverage ratio) more relevant than the Basel ratio, especially for large banks (crudest measure of risk exposure more informative than measure used by regulators)

    – There is also evidence that "higher quality" Tier I capital and common equity were rewarded by stock market investors

Robustness

- Alternative specifications (estimate the model separately for different periods, for different size groups, for the period after Lehman, split by initial level of capital rather than size)

- Alternative variables and samples (size measured as operating income > US 1B; include RWA/TA; sensitivity to control variables; include countries with less than 5 banks; identify banks that were recapitalized)

- Alternative estimation techniques (weighted least squares; cluster errors by country, quarter, and by both rather than by bank)

Policy Implications

- Stronger capital position is an important asset during a systemic crisis, hence the current emphasis on strengthening capital requirements is broadly appropriate.

- Need to put more emphasis on "non risk-adjusted" measures of capital (i.e., leverage ratio) especially for large banks

  – Plans to introduce a minimum leverage ratio in addition to the risk weighted capital goes in this direction

- Greater emphasis on "higher quality capital" in the form of Tier 1 capital or tangible equity seems justified.