BANK FOR INTERNATIONAL SETTLEMENTS

On book equity: why it matters for monetary policy

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* Views expressed here are mine, not necessarily those of the BIS.

Common view among corporate finance researchers

"Book equity is a stale and backward-looking measure of the market value of the firm's equity; use market capitalisation whenever possible."

Assets or enterprise value?

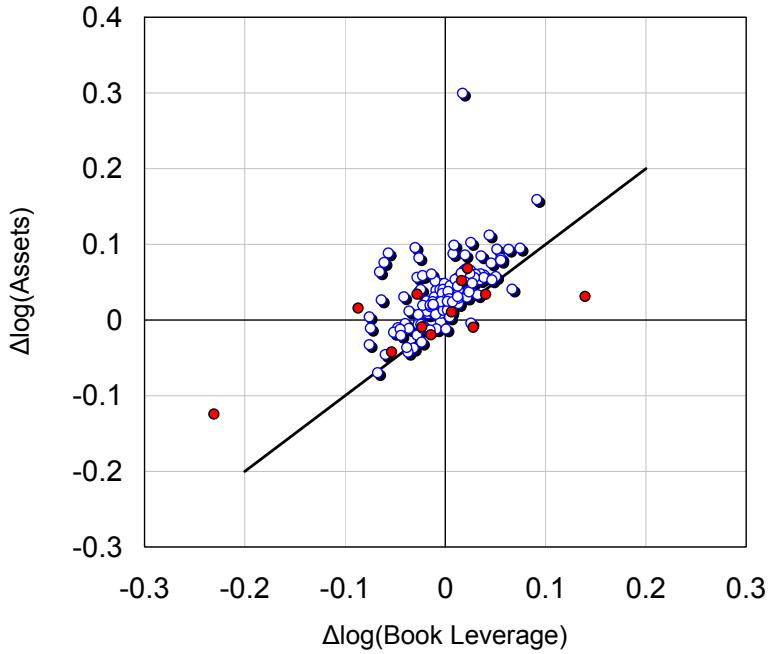
- Enterprise value defined as

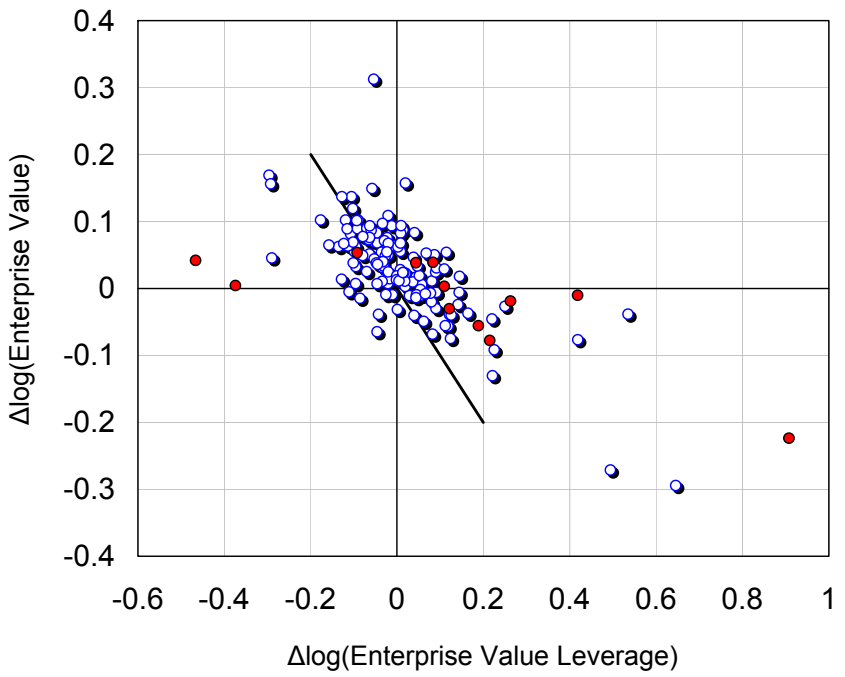
  Enterprise value = market capitalisation + debt

- Enterprise value addresses **how much a bank is worth**
- Total assets address **how much a bank lends**

- Both questions are of relevance, but corporate finance researchers have tended
  1. To focus on first, neglected second
  2. To focus on non-financial firms, neglected banks

Book leverage is procyclical; enterprise value leverage is countercyclical





Book leverage = Total assets / equity
Enterprise value leverage = Enterprise value / market cap

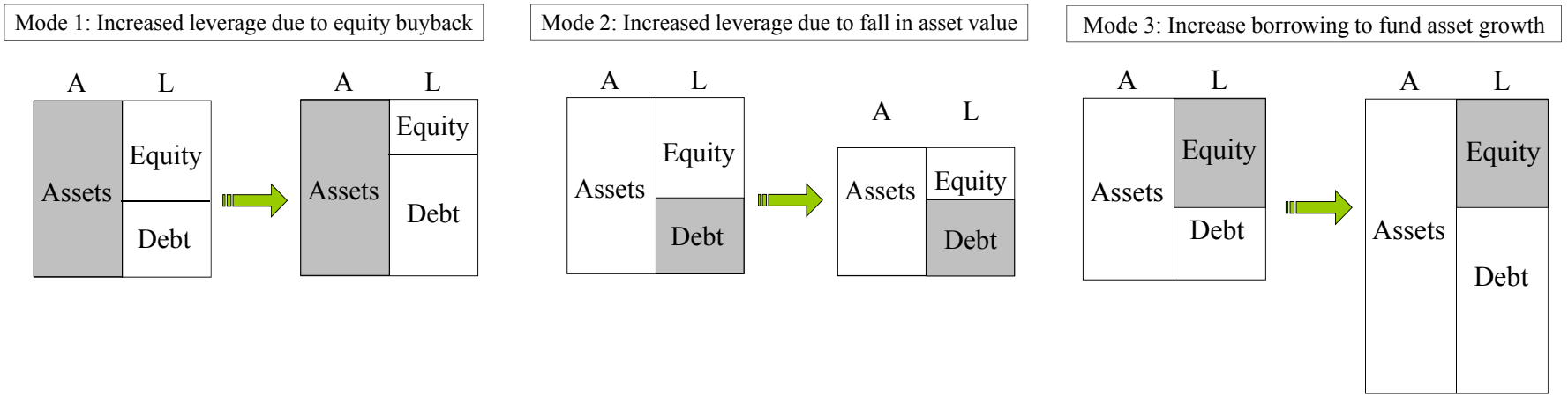
Source: Adrian and Shin (2014) for US commercial banks and broker-dealers.

Why book equity matters

1. Book leverage (not EV leverage) matters for asset pricing
   - Lower book leverage (tighter lending conditions) associated with higher asset returns
     - Adrian, Etula and Muir (2014) for cross section evidence
     - Adrian, Moench and Shin (2014) for time series
2. Book equity is the foundation for lending
   - Importance of book equity for monetary policy transmission
     - Gambacorta and Shin (in progress)

Reason for (1) lies in (2); in any case, (2) is a key policy imperative

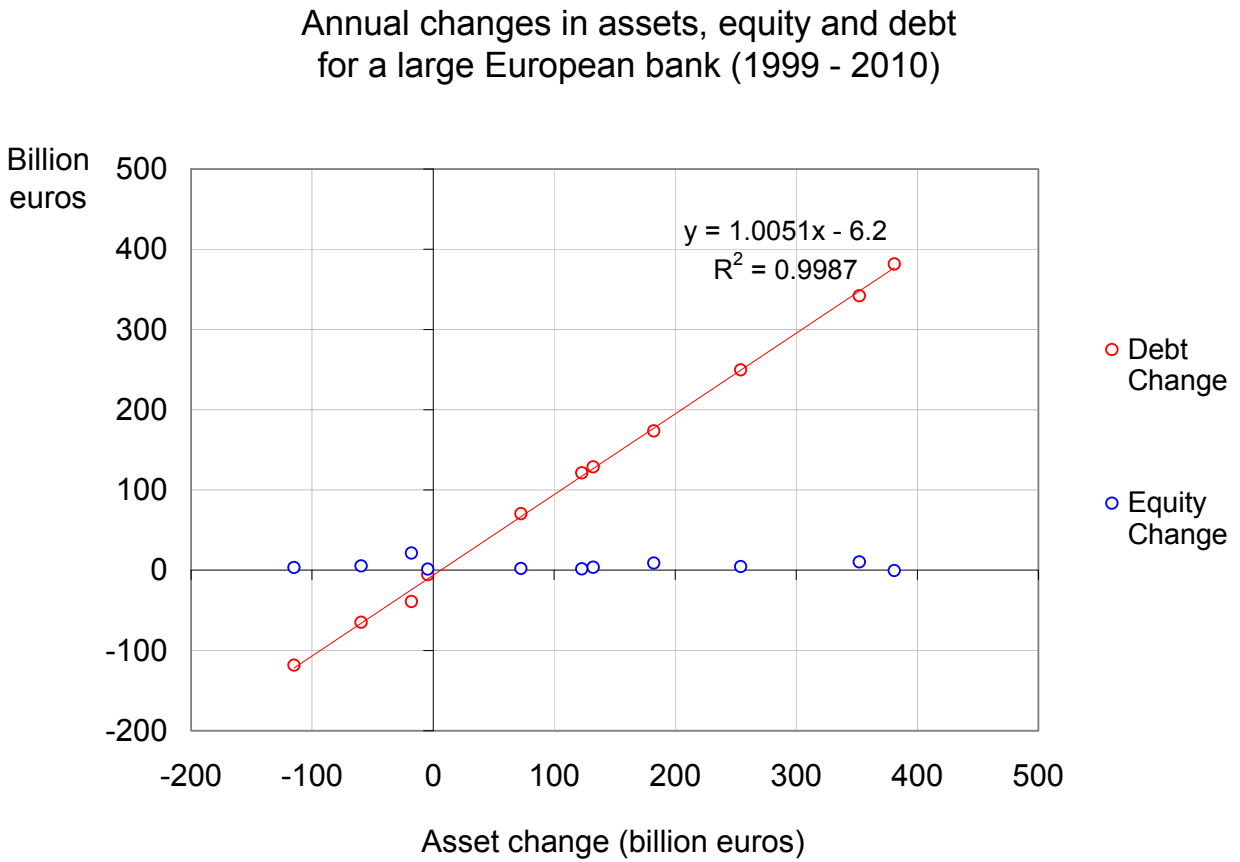
Three modes of leveraging up



Mode 1: equity buy-back through a debt issue
Mode 2: dividend financed by asset sale
Mode 3: increased borrowing to fund new assets

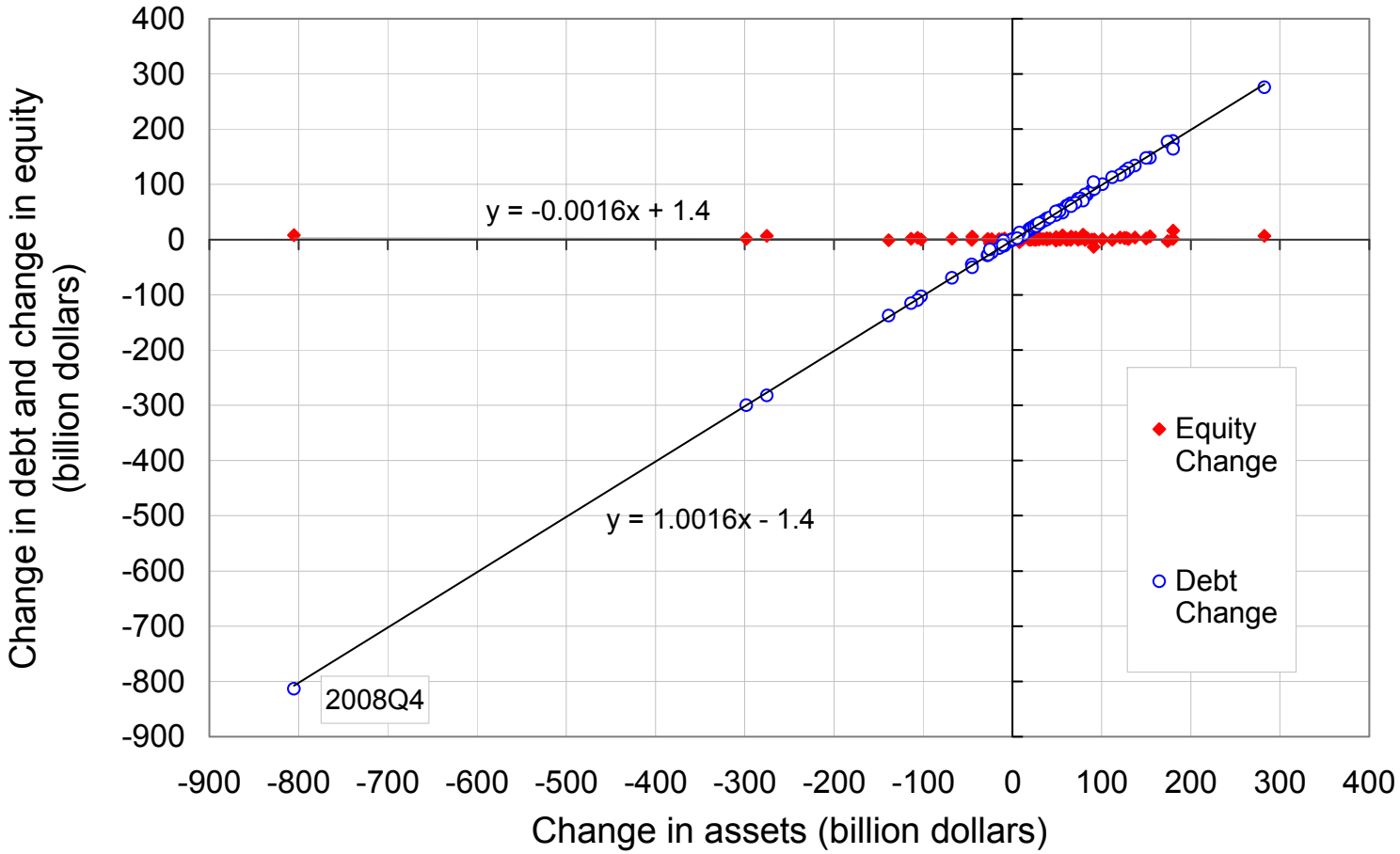
Grey cell indicates balance sheet component that is held fixed

Annual changes in balance sheet components for a large European bank



Source: Bankscope.

US broker-dealer sector



Source: US Flow of Funds, (1990Q1–2012Q2).

Some observations on the scatter charts

- Pattern revealed in scatter chart turns out to be quite general; banks change leverage according to Mode 3
- Scatter chart of asset change and debt change has slope of 1
  - Assets change one-for-one with change in debt
  - Change in equity is insensitive to change in assets
  - Leverage is procyclical
    - No kink in relationship between asset change and debt change
    - During booms, bank expands through debt not equity

An analogy

- Bank equity ↦ Foundations of building
- Bank lending ↦ Building itself
- Leverage ↦ Height of building relative to its foundations

- During credit boom, the bank adds new floors to the building on the same foundations

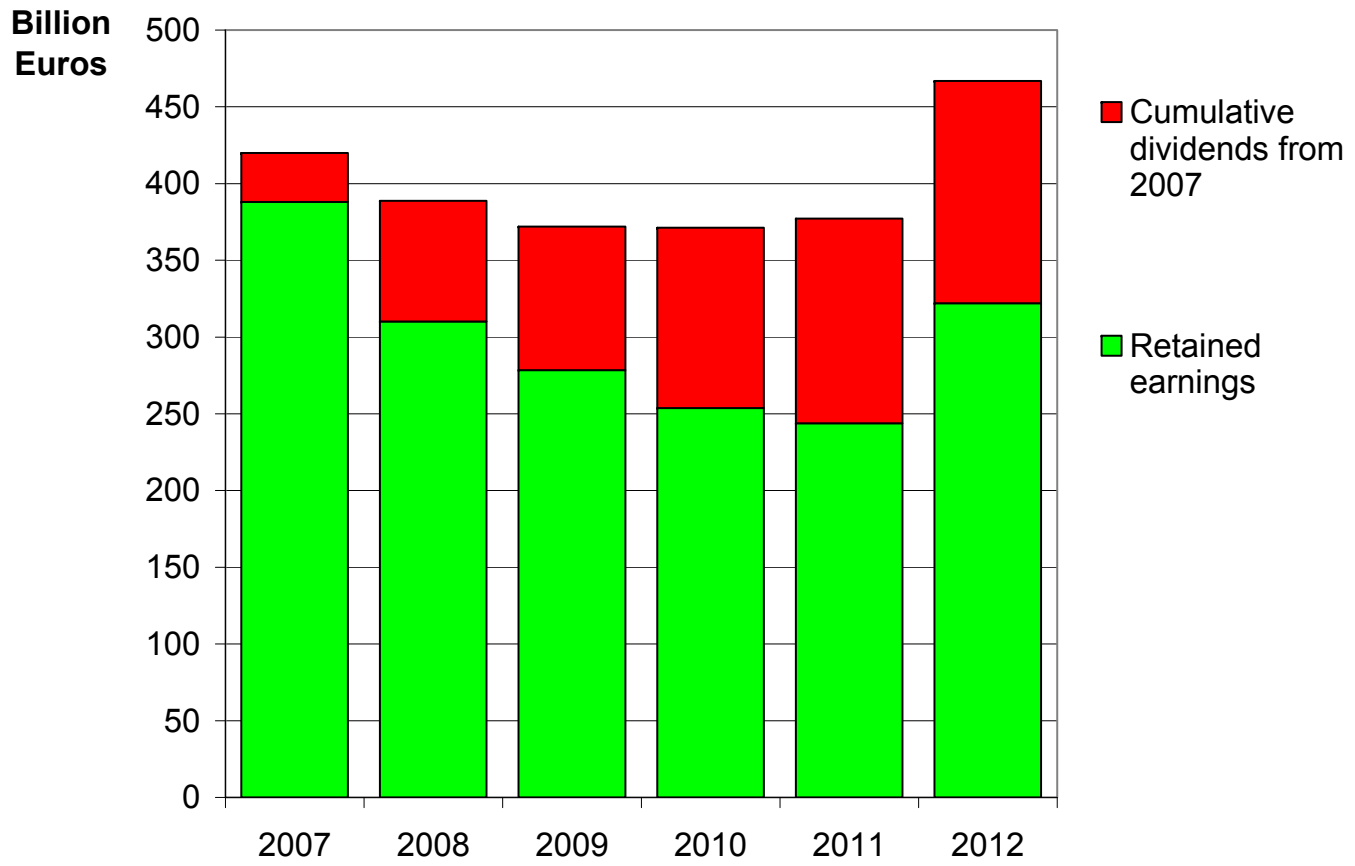
Sutyagin House, Archangel (circa 2007)

Sutyagin House, Archangel (circa 2008)

Asymmetry over the cycle

- Building new floors during credit boom is easy
- But dismantling the building during downturn is difficult and painful
  - Credit growth halts
  - Borrowers that rely on banks (eg SMEs) face credit squeeze and higher risk premium
  - Anything that chips away at foundations of building makes pain worse

Retained earnings and cumulative dividends for 28 euro area banks



Observations

- No equity raised in booms
  - Implies shadow value of equity >1 or banking is not constant returns to scale
- But pay out equity as dividends
  - Implies shadow value of equity ≤1

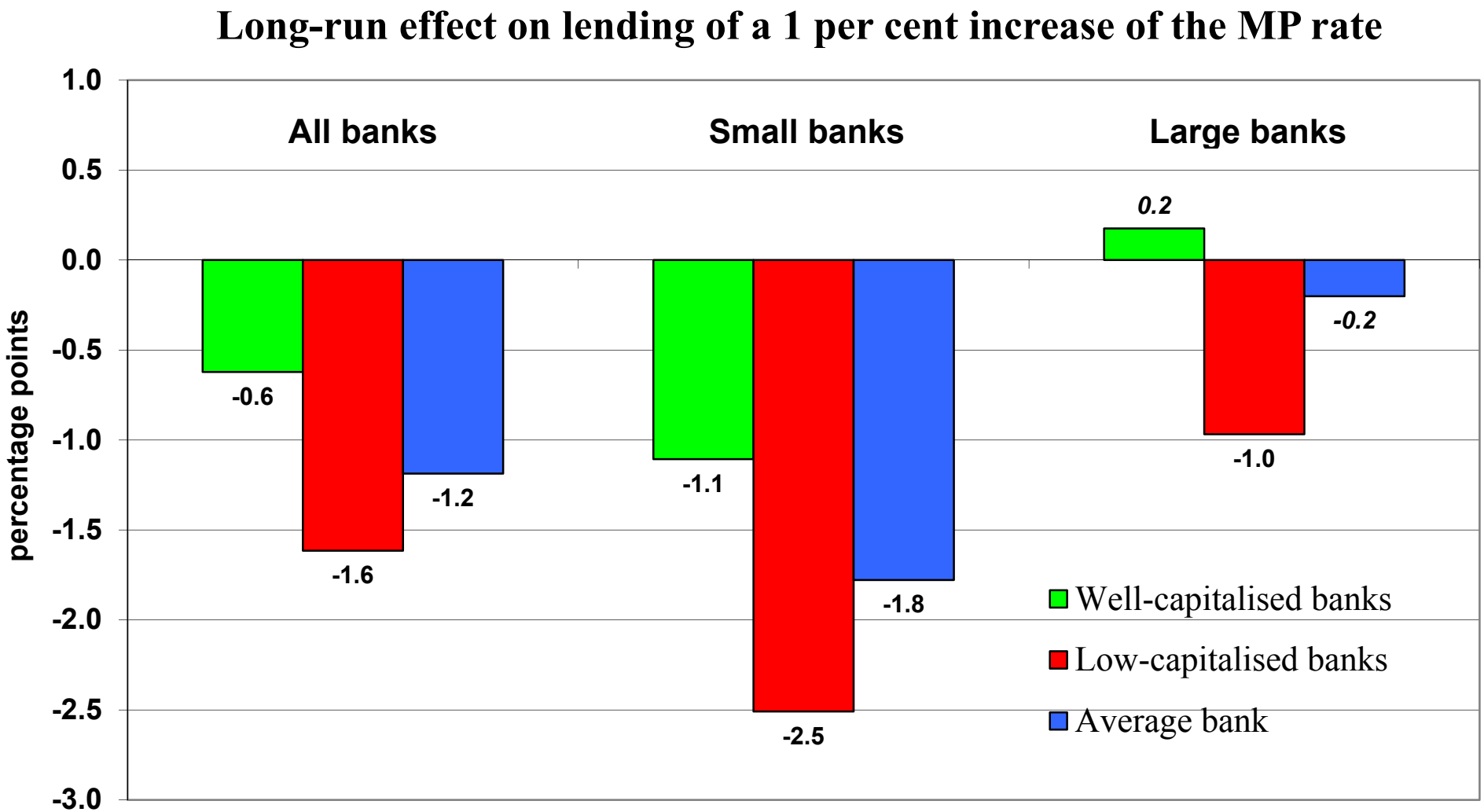
- Theorem in corporate finance of banking?
  - *The following pair of statements cannot both be true at the same time:*
  1. *Banks are (enterprise) value-maximising*
  2. *Banking business is constant returns to scale*

Lending and book equity

Two possible channels why well capitalised banks are less sensitive to monetary policy shocks

- New bank capital can be lent out
- Well capitalised banks have easier access to funding
- Evidence documented in
  - Kashyap and Stein, 1995, 1999
  - Kishan and Opiela, 2000
  - Gambacorta and Mistrulli, 2004

Bank capital in the bank lending channel literature



Source: Gambacorta and Mistrulli (2004 JFI). Sample of 556 Italian banks (quarterly data over 1992-2001).

Unit elasticity between bank capital and total assets

Variables	Ln (Total assets)	Ln (Total exposure)	Ln (Total assets)	Ln (Total exposure)
Log (Common Equity)	0.9852***	1.0034***	0.9850***	1.0030***
	(0.0099)	(0.0095)	(0.0097)	(0.0092)
Time fixed effects	yes	yes	yes	yes
Macroeconomic controls (1)	no	no	yes	yes
Observations	1,979	1,979	1,979	1,979
R-squared	0.8563	0.8685	0.8640	0.8777

Note: The sample includes annual data of 109 international banks operating in 14 advanced economies over the period 1995-2012. Annual data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Macroeconomic controls include GDP growth, house price growth, stock market growth and three-month interbank rate. The first three variables are weighted according the location of banks' ultimate borrowers; the interbank rate is a weighted averages across the jurisdictions in which each bank gets funding.

Source: Gambacorta and Shin (in progress).

Well capitalised banks have cheaper funding …

Explanatory variables	Dependent variable: Average cost of funding (percentage points)					
(Common equity/ Total assets) $_{t-1}$	-0.0403**			-0.0361**		
	(0.0164)			(0.0147)		
(TIER1/ Total exposure) $_{t-1}$		-0.1623***			-0.1090***	
		(0.0217)			(0.0207)	
(TIER1/ RWA) $_{t-1}$			-0.0378***			-0.0293***
			(0.0108)			(0.0102)
Bank fixed effects	yes	yes	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes	yes	yes
Macroeconomic controls (1)	no	no	no	yes	yes	yes
Observations	1,827	1,409	1,609	1,827	1,409	1,609
R-squared	0.7507	0.7445	0.7399	0.8033	0.7962	0.7883

Note: The sample includes annual data of 109 international banks operating in 14 advanced economies over the period 1995-2012. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Macroeconomic controls include GDP growth, house price growth, stock market growth and three-month interbank rate. The first three variables are weighted according the location of banks' ultimate borrowers; the interbank rate is a weighted averages across the jurisdictions in which each bank gets funding.

Source: Gambacorta and Shin (in progress).

… and get more funding

Explanatory variables	Dependent variable: Growth rate of non-equity funding					
(Common equity/ Total assets) $_{t-1}$	1.6289***			1.6226***		
	(0.5231)			(0.5265)		
(TIER1/ Total exposure) $_{t-1}$		0.9423**			0.8278*	
		(0.4328)			(0.4602)	
(TIER1/ RWA) $_{t-1}$			0.4064*			0.3341
			(0.2113)			(0.2196)
Bank fixed effects	yes	yes	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes	yes	yes
Macroeconomic controls (1)	no	no	no	yes	yes	yes
Observations	1,866	1,388	1,584	1,866	1,388	1,584
R-squared	0.1520	0.3694	0.3377	0.1538	0.3763	0.3406

Note: The sample includes annual data of 109 international banks operating in 14 advanced economies over the period 1995-2012. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. (1) Macroeconomic controls include GDP growth, house price growth, stock market growth and three-month interbank rate. The first three variables are weighted according the location of banks' ultimate borrowers; the interbank rate is a weighted average across the jurisdictions in which each bank gets funding.

Source: Gambacorta and Shin (in progress).

Bank capital and lending

Explanatory variables	Dependent variable: Growth rate of lending					
(Common equity/ Total assets) $_{t-1}$	0.5650***			0.4127**		
	(0.1683)			(0.1688)		
(TIER1/ Total exposure) $_{t-1}$		0.6833**			0.6065**	
		(0.3095)			(0.2973)	
(TIER1/ RWA) $_{t-1}$			0.6468***			0.3784*
			(0.1975)			(0.2281)
Lagged dependent variable	yes	yes	yes	yes	yes	yes
Bank fixed effects	yes	yes	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes	yes	yes
Macroeconomic controls (1)	no	no	no	yes	yes	yes
Observations	1,734	1,362	1,582	1,734	1,361	1,577
Serial correlation test (2)	0.731	0.484	0.206	0.383	0.215	0.0989
Hansen Test (3)	0.547	0.605	0.440	0.848	0.902	0.717

Note: The sample includes annual data of 109 international banks operating in 14 advanced economies over the period 1995-2012. Standard errors in parentheses. The model is estimated using the dynamic Generalized Method of Moments (GMM) panel methodology to obtain consistent and unbiased estimates of the relationship between bank capital and lending growth. *** p<0.01, ** p<0.05, * p<0.1. (1) Macroeconomic controls include GDP growth, house price growth and three-month interbank rate. The first two variables are weighted according the location of banks' ultimate borrowers; the interbank rate is a weighted average across the jurisdictions in which each bank gets funding. (2) Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second-order serial correlation. (3) Reports p-values for the null hypothesis that the instruments used are not correlated with the residuals.

Source: Gambacorta and Shin (in progress).

Two approaches to bank capital

1. Equity
2. Loss-absorbing layer shielding depositors and tax payers

- These two approaches to bank capital played out in 1988 Basel Accord; reflected in recognition of both Tier 1 and Tier 2 capital
- Moderating cyclical variation in credit is easier when
  - Leverage is insensitive to cyclical variation of measured risks
  - Conservation of equity is achieved during downturns
  - CoCos convert at higher thresholds to conserve lending