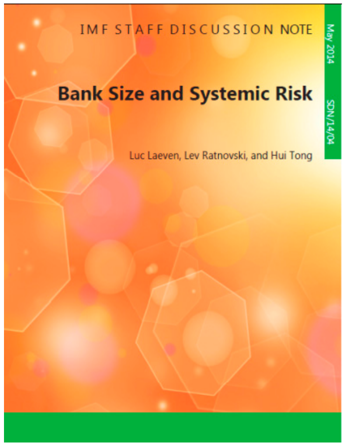

IMF Staff Discussion Note 14/04
http://www.imf.org/external/pubs/ft/sdn/2014/sdn1404.pdf

Bank Size and Systemic Risk

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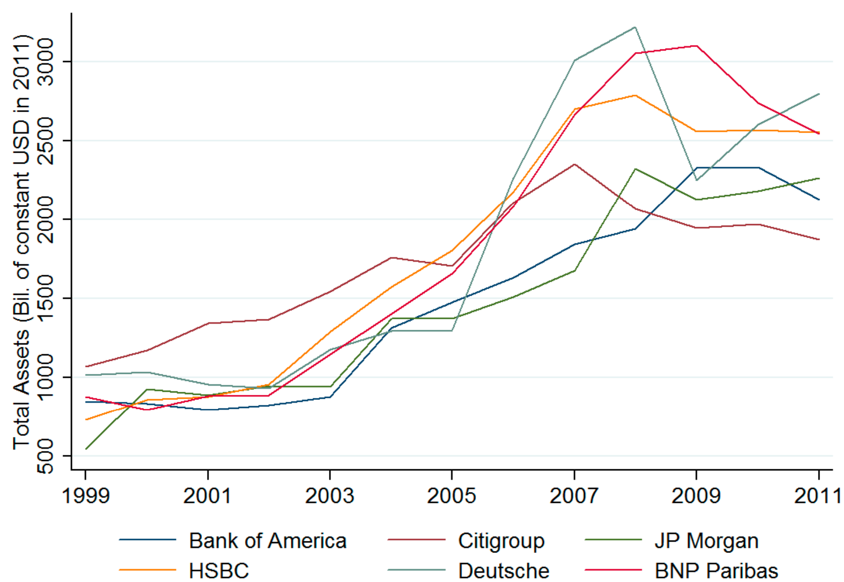
Outline

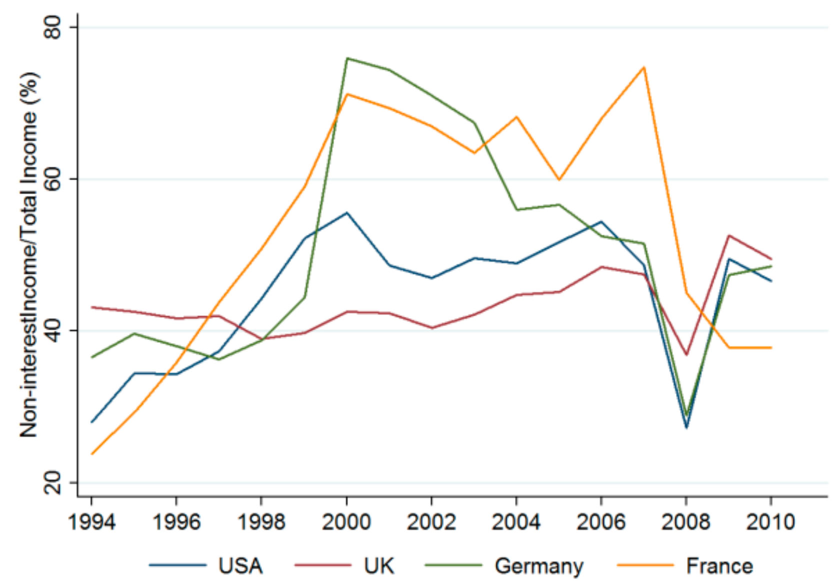
- Basic facts about large banks
  Recent growth, risky business model
- What drives the business model?
  Too-big-to-fail vs. economies of scale
- What are the risks?
  Individual risks vs. systemic risk: some new results
- Policy implications

Basic facts on large banks

Large banks grew in size since late 1990s

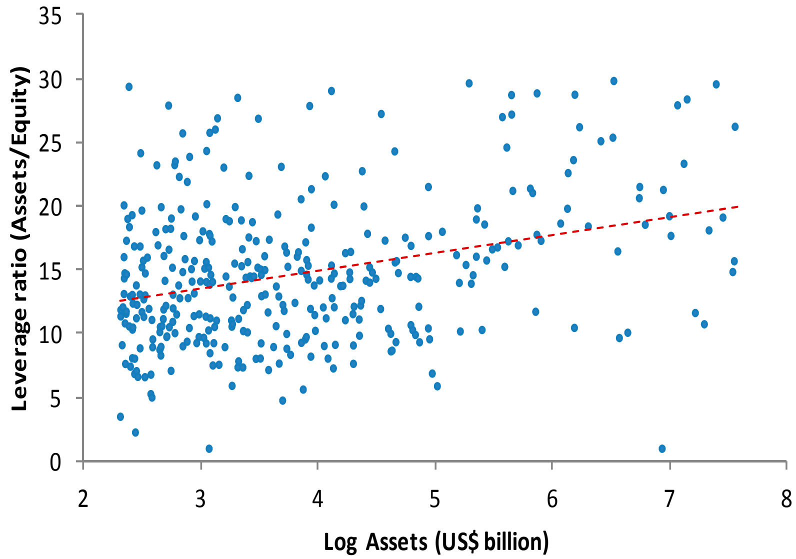


Engaged more in market-based activities

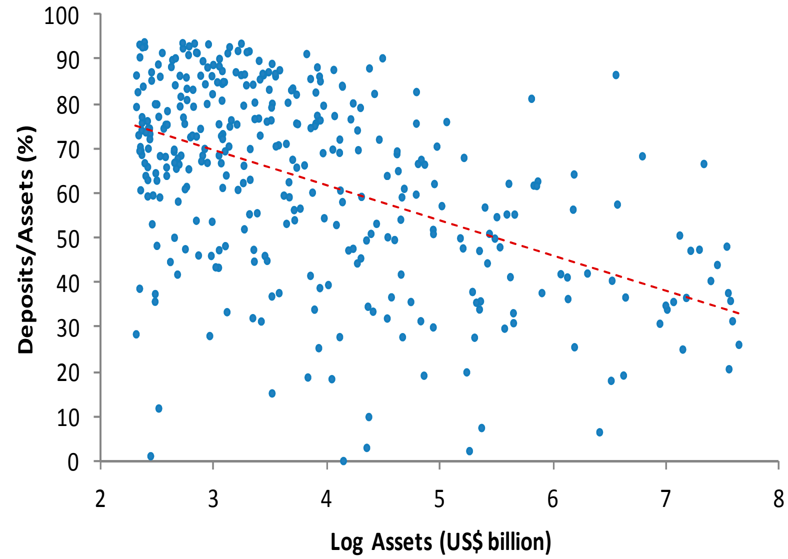


Riskier business model in large banks

More leverage



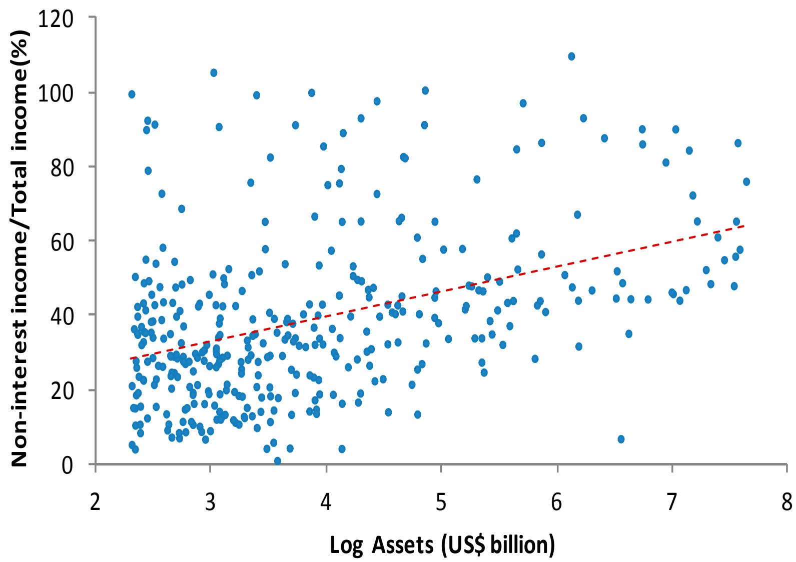
Less stable funding



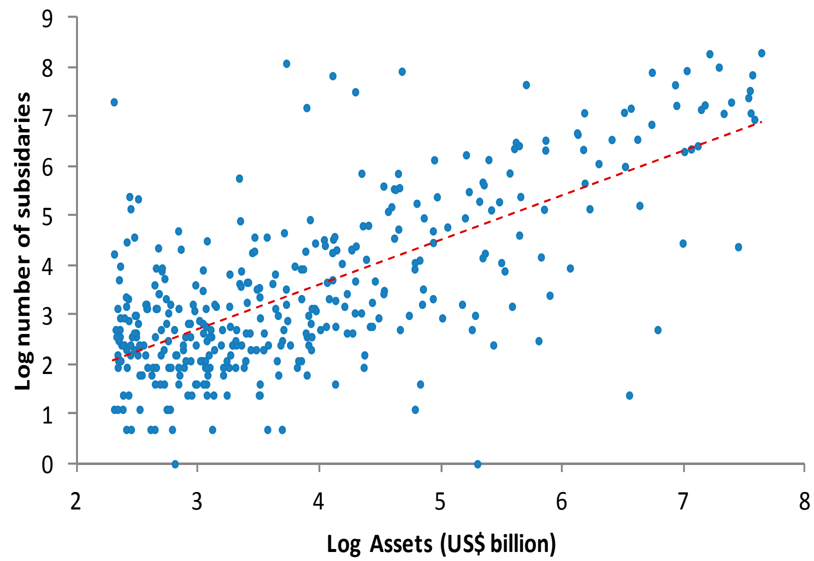
2011. Assets are in log bln US$ (2 corresponds to US$7.4 bln, 5 to US$148 bln)

Riskier business model in large banks

More market-based activities



More organizationally complex



2011. Assets are in log bln US$ (2 corresponds to US$7.4 bln, 5 to US$148 bln)

Economics of large banks

- **Too big to fail subsidies**
  - Lower cost of debt, especially for riskier banks
  - Predisposes to use leverage, unstable funding, risky (and cyclical) market-based investments
  - Strong evidence (GFSR Apr 2014)
    - 15 basis points through the cycle
    - In 2012: $70 bln US; $200 bln EA

Economics of large banks

- **Economies of scale**
  - Early evidence: first $50 bln in assets (Benston 92; Berger Mester 97; Peristiani 97)
  - Later evidence: $16-45 bln US /year (Kovner et al 2013)
    - 0.2% of $20 trln US banking system
    - Compare $12 trln cost of the crisis (Luttrel et al 2013)
  - Excludes benefits to customers, so limits on bank size may be costly

Economics of large banks

- Summary
  - **Economies of scale present, but TBTF also important**
  - **Banks may be “too large”, but optimal size hard to establish**

Risk in large banks

- **How does bank size (and structure) affect risk?**
- **Effects of pre-crisis bank characteristics** (2006)
  - Size, market-based activities, org. complexity
  - Interaction of size with capital and funding
- **… On bank risk during the crisis** (2007:8 – 2008:12)
  - Standalone risk: decline in stock price
  - Systemic risk contributions: *SRISK* (Acharya et al 2012)

  - 370 banks, 52 countries; all listed banks >$10 bln assets

Risk in large banks

- *SRISK*
  - Capital shortfall under a negative shock (market off 40%)
  - Capital losses create externalities – systemic risk
  - Determined by:
    - Bank stock volatility during a crisis
    - Covariance of bank stock with the market
    - Bank leverage and size

Risk in large banks

- *SRISK during the crisis*

1	Royal Bank of Scotland	United Kingdom
2	Deutsche Bank	Germany
3	Barclays	United Kingdom
4	BNP Paribas	France
5	Credit Agricole	France
6	Citigroup	United States
7	JPMorgan Chase	United States
8	UBS	Switzerland
9	ING Groep	Netherlands
10	Bank of America	United States

Individual risk (stock returns)

Dependent variable: Returns Jul 2007 – Dec 2008	(1)	(2)	(3)	(4)
Return in 2006	0.0208	0.0207	-0.165	0.00256
	(0.0901)	(0.0894)	(0.212)	(0.0977)
Log Assets($)	-2.698*	-4.160***	-1.495	-5.238***
	(1.500)	(1.515)	(1.966)	(1.812)
Tier 1 Ratio	1.055	1.234	5.400**	
	(0.973)	(0.982)	(2.494)	
Deposits/Assets	58.64**	57.15***	49.17*	
	(22.01)	(20.22)	(28.21)	
Loans/Assets	-50.40***	-47.20***	-21.63	-41.39**
	(9.459)	(9.640)	(23.93)	(16.63)
Non-interest income	2.501	-2.061	-19.84	-13.52
	(20.72)	(21.23)	(25.12)	(11.51)
Log Subsidiaries		2.176*		0.760
		(1.115)		(0.767)
Leverage				-0.622**
				(0.262)
Funding Fragility				-20.60**
				(7.911)
Observations	302	302	115	359
R-squared	0.421	0.425	0.531	0.362

Systemic risk (*SRISK*)

Dependent variable: SRISK in July 2007 to Dec 2008	(1)	(2)	(3)	(4)	(5)	(6)
SRISK in 2006	0.902***	0.449**	0.966***	0.659***	0.598***	0.474**
	(0.195)	(0.213)	(0.162)	(0.197)	(0.171)	(0.201)
Log Assets($)	5.368***	14.54***	5.582***	8.054***	24.80***	28.76***
	(1.379)	(2.562)	(1.224)	(1.822)	(3.666)	(4.541)
Tier 1 Ratio	-0.423	-2.303		2.653***	3.271***	3.320***
	(0.341)	(1.423)		(0.602)	(0.710)	(0.745)
Deposits/Assets	3.115	-13.47		0.365	-1.586	27.32**
	(4.182)	(8.428)		(5.377)	(5.041)	(13.45)
Loans/Assets	-4.114	-12.49	0.993	4.678	62.28***	55.76***
	(3.493)	(11.23)	(3.293)	(3.344)	(12.13)	(12.95)
Non-interest income	-7.586*	-10.52	-4.055	-54.84***	-10.90***	-9.551**
	(4.518)	(9.466)	(3.329)	(10.59)	(3.582)	(3.565)
Log Subsidiaries	1.917**		1.249**	1.981**	1.862**	1.786***
	(0.893)		(0.502)	(0.773)	(0.736)	(0.660)
Leverage			0.114			
			(0.127)			
Funding Fragility			-4.037			
			(2.538)			
Log Assets * Tier 1 Ratio				-0.880***	-1.090***	-1.120***
				(0.187)	(0.207)	(0.224)
Log Assets * Non-interest income				13.28***		
				(2.839)		
Log Assets * Loans/Assets					-16.61***	-14.62***
					(3.340)	(3.406)
Log Assets * Deposits/Assets						-8.042**
						(3.879)
Observations	285	110	338	285	285	285
R-squared	0.840	0.905	0.846	0.869	0.871	0.877

Results

- Large banks are riskier than smaller banks
- Large banks create more systemic risk when they have low capital or unstable funding

- Large banks create more systemic risk (but not standalone risk) when they engage more in market-based activities or organizationally complex
- Effect of variance vs. correlation

Summary: Large banks

- Grew since late 1990s
- Low capital, unstable funding, market-based, org. complexity
- TBTF vs. Economies of scale
- Hard to establish optimal size
- Higher standalone and systemic risk,
  when low capital / unstable funding
- Higher systemic risk (but not standalone)
  when market-based activities or org. complex
- Systemic risk-based capital surcharges + better resolution