

# Are banks too large and complex?

Luc Laeven with  
Lindsay Mollineaux, Lev Ratnovski, Yangfan Sun, and Hui Tong  
(IMF Research Department)

*The views expressed here are our own and do not reflect those of the IMF or IMF Board*

# Motivation

- Large/complex banks were at center of crisis
  - Different from S&L crisis
- Debate on optimal financial structure and TBTF policies
  - Are banks too large and complex?
  - Consequences for broader economy?

# Regulatory proposals

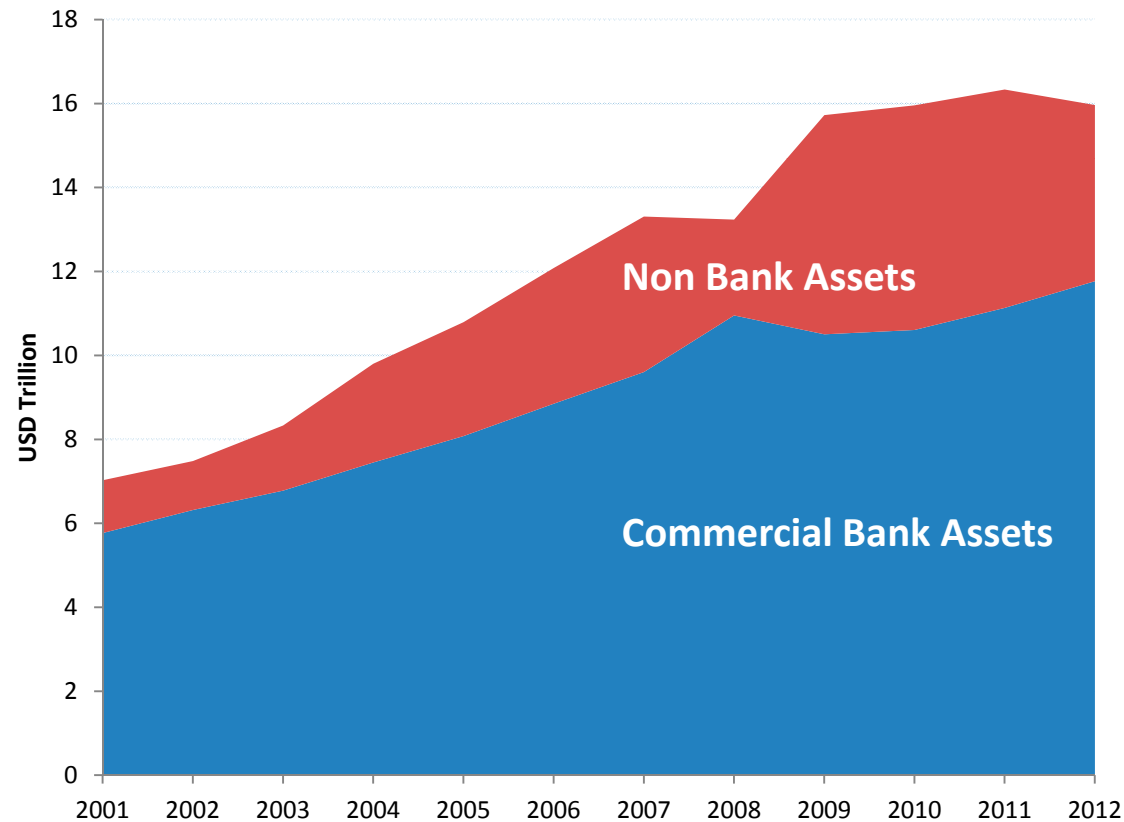
- **Main**
  - **Size**: Capital surcharges for SIFIs (Basel)
  - **Scope**: Activity restrictions (Vickers/Volcker/Liikanen)
  - **Funding**: Caps on wholesale funding (Basel LCR/NSFR)
- **But how to choose and reconcile?**
  - Understand market failures and identify sources of systemic risk

# Background

- Financial deregulation and innovation led to:
  - **Concentration:** Large banks grow in size
  - **New instruments:** Securitization, OTC derivatives, secured (repo) funding
  - **Blurred boundaries between banks and markets:** “securitized banking” (illiquid loans become tradable), scalable trading activities, wholesale funding
  - **Increased systemic risk?** Securitization reduces bank-specific risk but increases interconnectedness

# Mixing of banks and markets: the rise of shadow banking

Increasing share of “non-bank” activities in US BHC assets, 2001-2012



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago, Federal Reserve Flow of Funds

# Market failures

- Safety net subsidies promote excessive risk taking, especially for TBTF banks
  - Promotes size, complexity, and leverage
  - Long-standing prudential issue intensified by changing financial structure
- Banks do not internalize externalities of failure
- Coordination failures/asymmetric information in wholesale funding markets (“repo run”)

# Sources of systemic risk?

- Size, complexity (market-based activities), wholesale funding, and leverage
  - All grew prior to the crisis esp. for large banks
  - All are correlated with measures of systemic risk (CoVaR, MES)
- Explain large part of variation in systemic risk
  - Glass half full or half empty
- Correlation between bank-specific and systemic risk is low

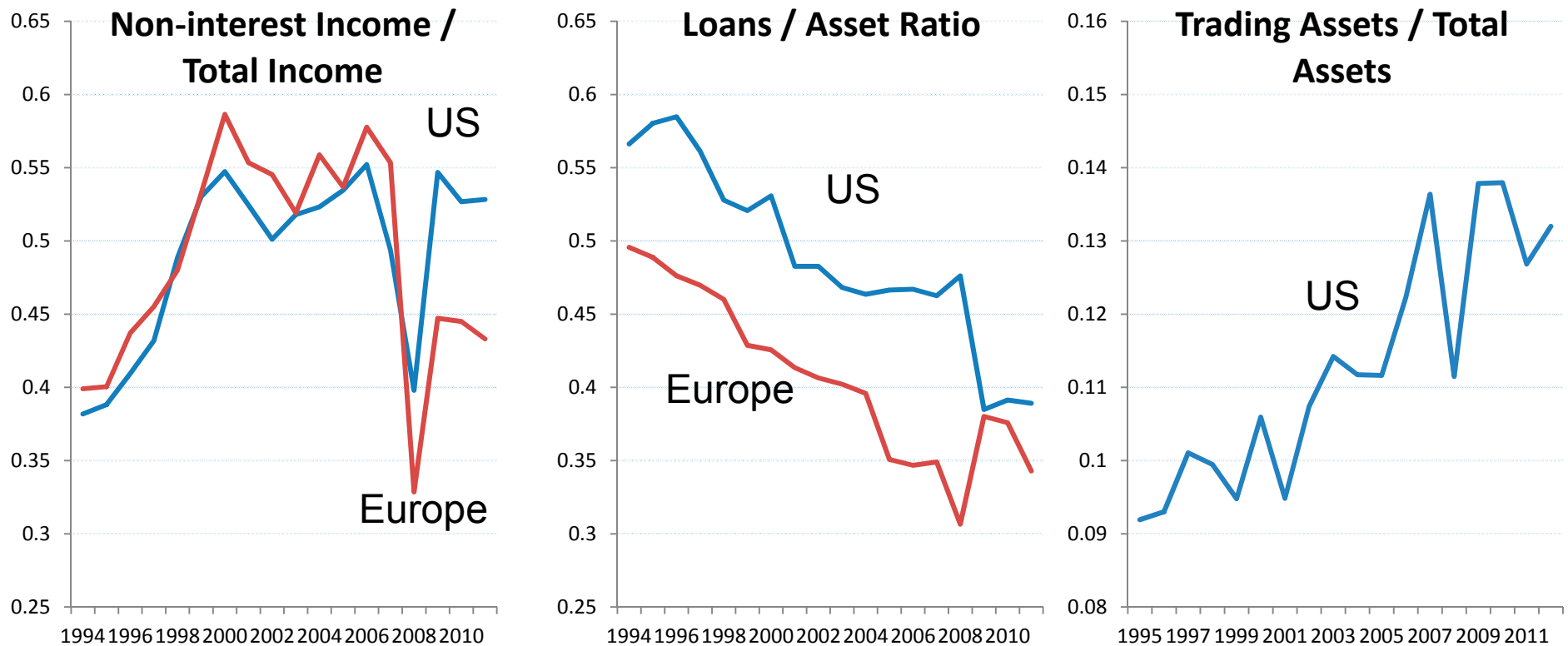
# Are large banks special?

- Large banks very different from small banks
  - Market-based business model
  - More hard-information loans
  - More trading assets
  - More securitization, wholesale funding
- Contribute more to systemic risk
- No clear economies of scale
  - But funding cost advantage
- Heterogeneity among large banks



# Increased importance of non-interest income and trading: interconnectedness with markets

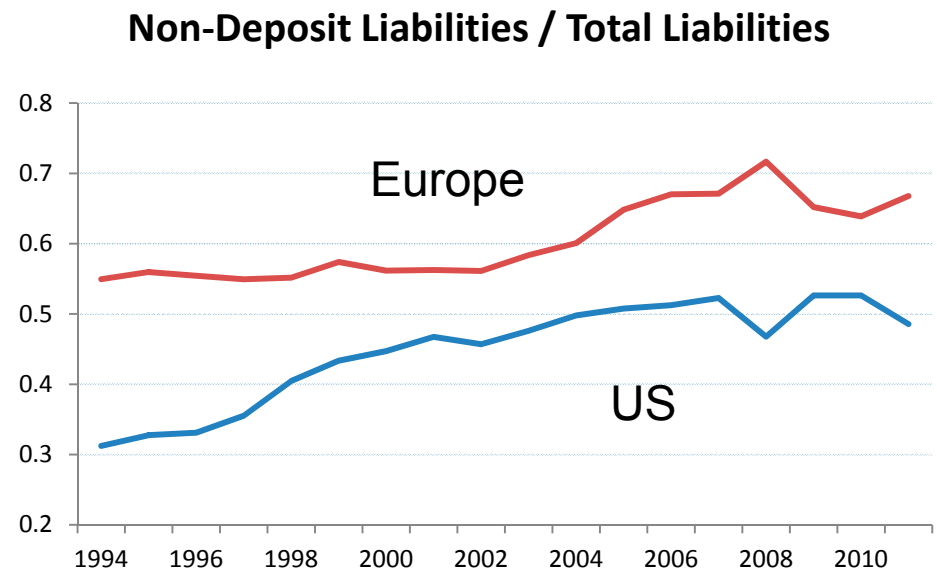
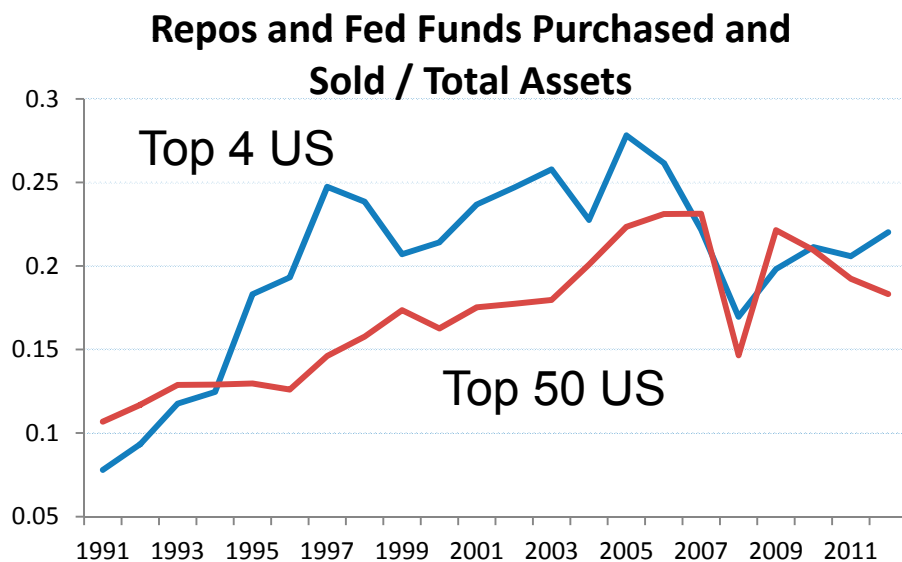
Ratios of the Largest US BHCs and European Banks, 1994-2011 1/



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago, and Bankscope  
1/ For France, Germany, UK, top 4 banks. For US, top 50 BHCs.

# More repos and wholesale funding: interconnectedness with markets and other FIs

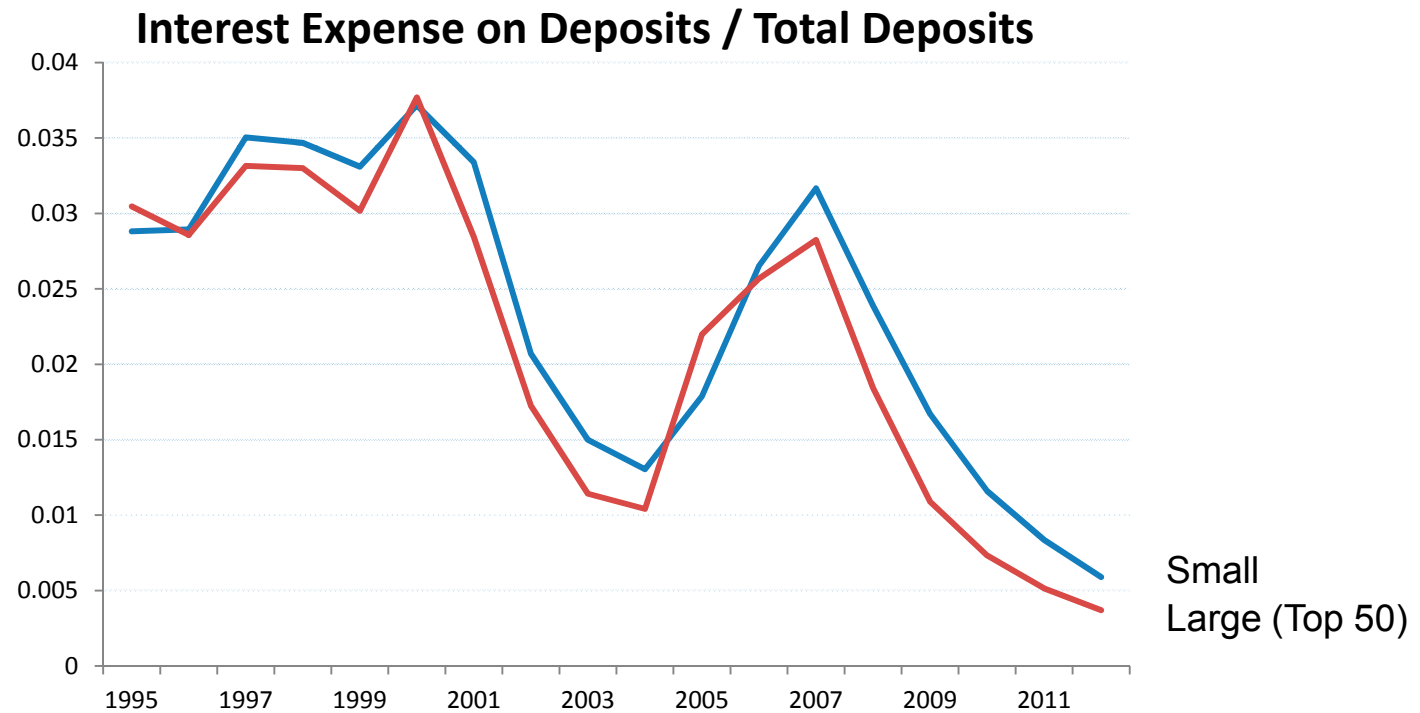
Ratios of the Largest US BHCs and European Banks, 1991-2012 1/



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago, and Bankscope  
1/ France, Germany, UK. US BHCs with assets in excess of \$500 million.

# Funding cost advantage of large banks

Ratio of deposit funding cost, US BHCs by size group, 1995-2012 1/

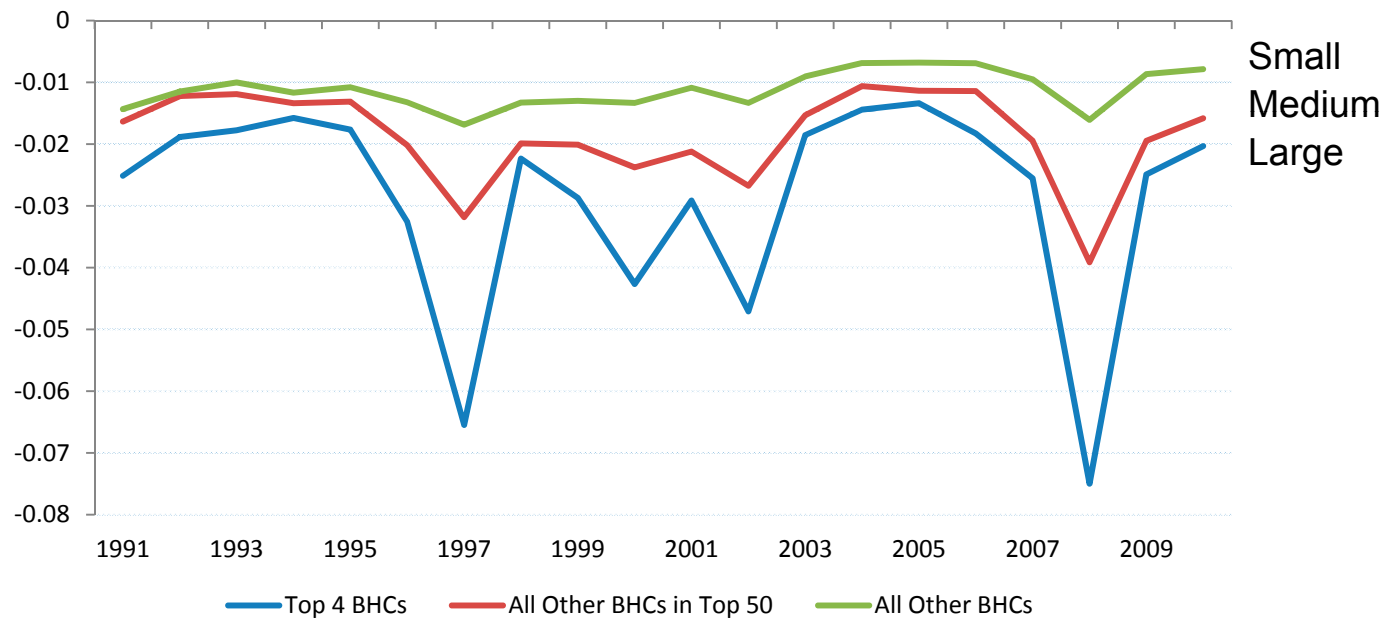


Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago

1/ BHCs with over \$500 million in assets

# Large banks contribute more to systemic risk

Average  $\Delta\text{CoVaR}$ , US BHCs, by size group, 1991-2010



Bank  $i$ 's  $\Delta\text{CoVaR}$  is the VaR of the banking system conditional on bank  $i$  being **in distress** compared to when bank  $i$  is in its **median state**, and indicates the marginal contribution of bank  $i$  to the banking system's overall systemic risk

Source: Adrian and Brunnermeier

# Bank-specific $\neq$ systemic risk

Correlation	$-\Delta\text{CoVaR}$
$\sigma(r_E)$	0.17***
$\mu(r_E)$	0.02

**US BHCs, 1991-2010**

\*\*\* denotes statistical significance at the 1% level

# Conclusions

- Large banks *are* too large and complex
  - Create externalities (systemic risk)
  - Size and complexity grew over time
  - Trading, securitization, and wholesale funding pose significant systemic risk
- Banks have no incentives to shrink
  - TBTF rents (cheaper funding)
  - Managerial incentives (“empire building”)
- Need to deal simultaneously with size, complexity, and leverage (they are related but not equivalent)

# Policy

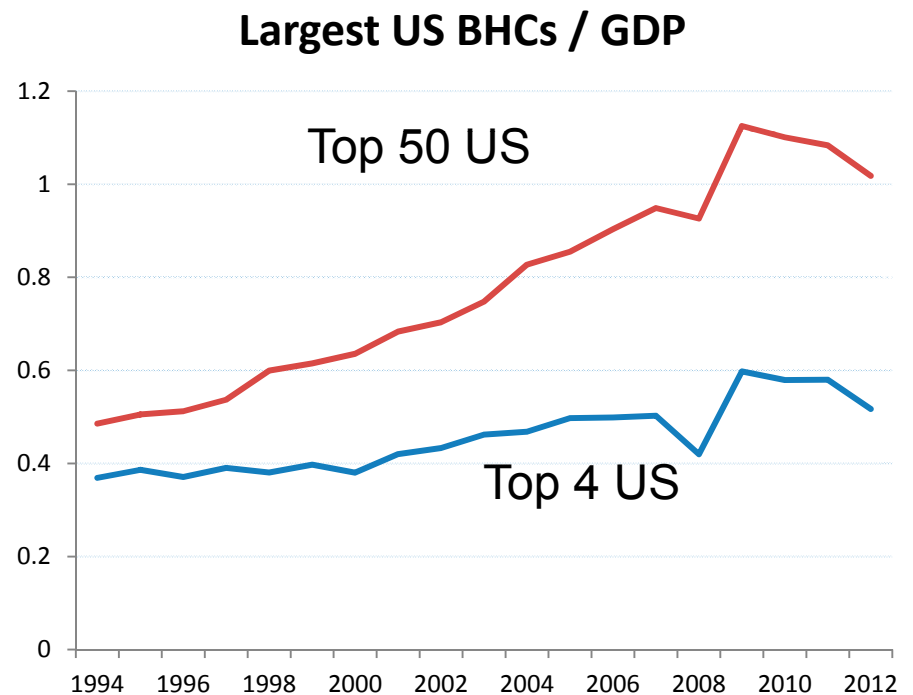
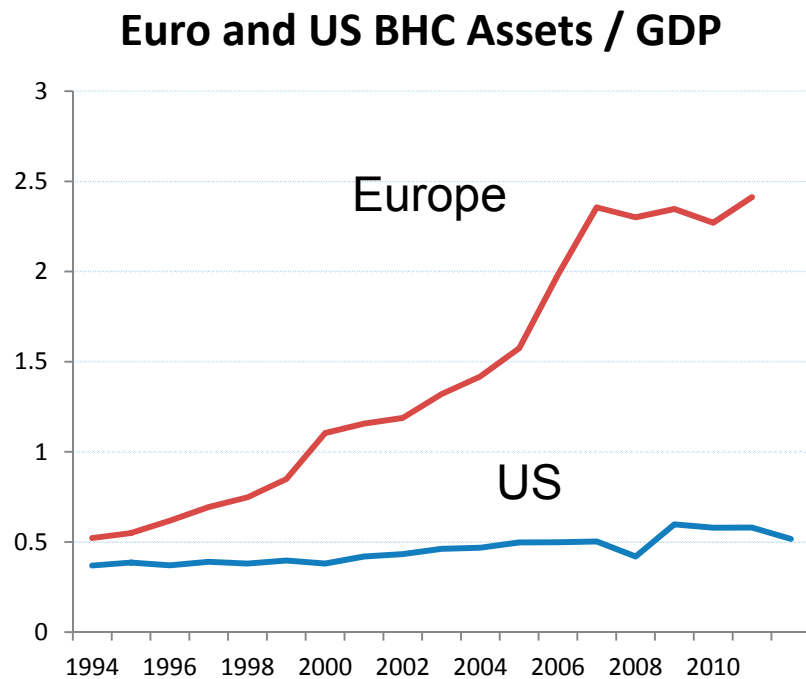
- Improve **resolution frameworks**
  - reduce TBTF subsidies; hard to accomplish
- Just **more capital**
  - effective, but blunt: if too high / not targeted can be costly
- **Quantity**-based tools (Volcker/Vickers/Liikanen)
  - hard to distinguish between lending and trading
- **Price**-based tools (SIFI surcharge)
  - targeted but optimal level to be determined
- **Macroprudential** regulatory approach
  - reduce systemic risk of *whole* financial system

Additional charts



# Banking assets outpaced GDP

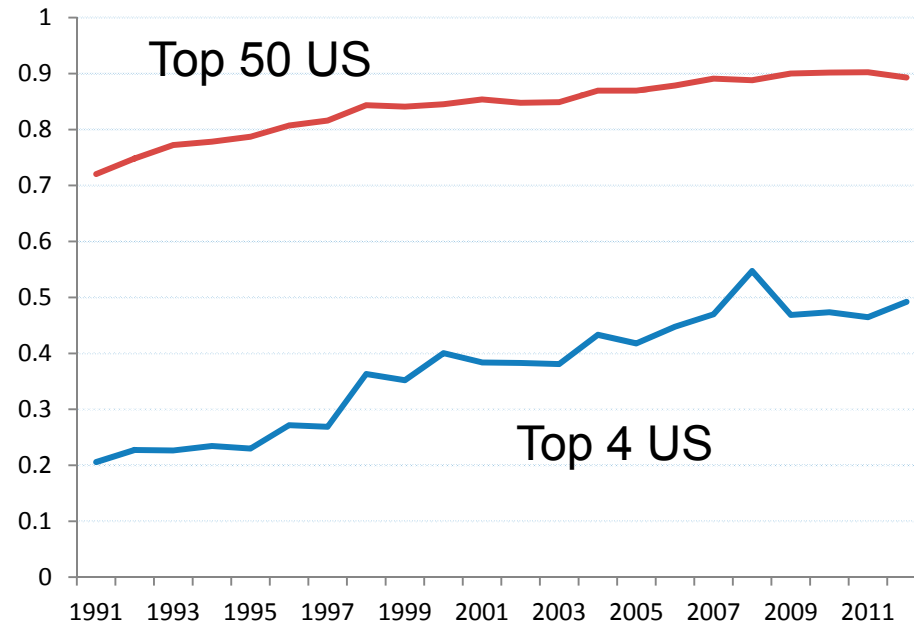
Ratios of the Largest US BHCs and European banks to GDP, 1994-2012 1/



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago, and Bankscope  
1/ France, Germany, UK. US BHCs with assets in excess of \$500 million.

# Bank concentration increased as large banks grew in size

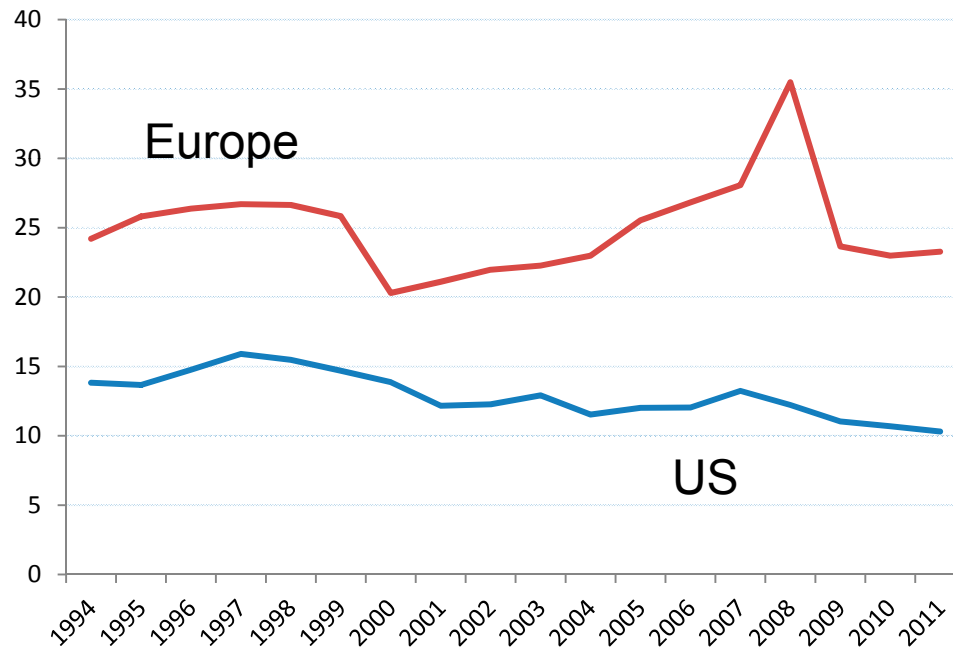
Top 4 and Top 50 concentration ratio, US BHCs, 1995-2012



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago  
1/ Population is US BHCs with assets in excess of \$500 million.

# Increase in leverage prior to crisis: more so in Europe

Leverage (A/E) of largest US BHCs and European <sup>1/</sup> banks, 1994-2011



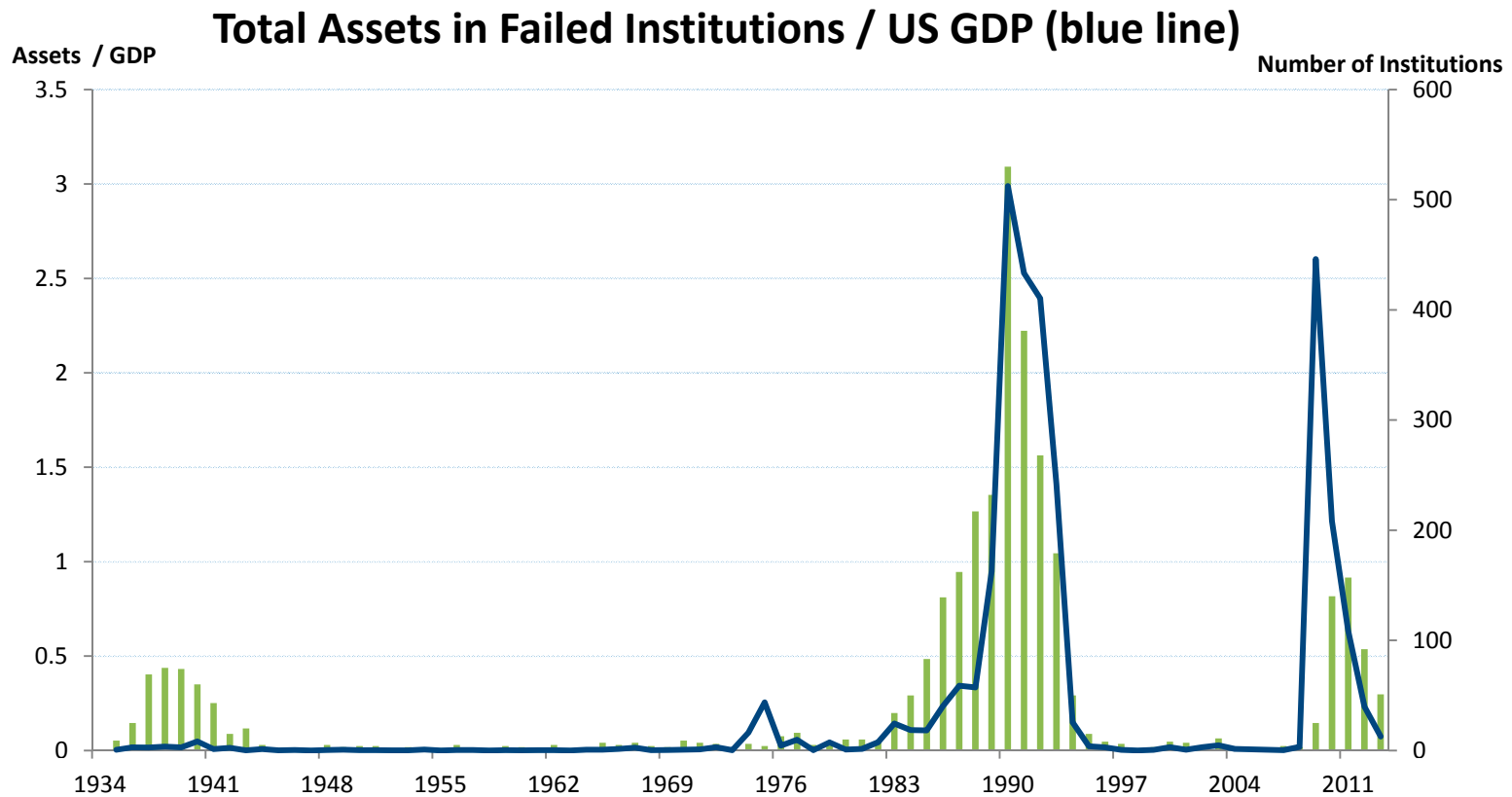
Notable difference between Europe and US:  
Balance sheet data mask risk transferred through securitization and exposures  
reported off balance sheet

Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago, and Bankscope  
<sup>1/</sup> France, Germany, UK. US BHCs with assets in excess of \$500 million.

# Hard to close large banks (too big to fail)

## S&L and subprime crisis compared

Assets of Failed US Banks Relative to US GDP, 1933-2013



Source: US FDIC.

# Absence of scale economies

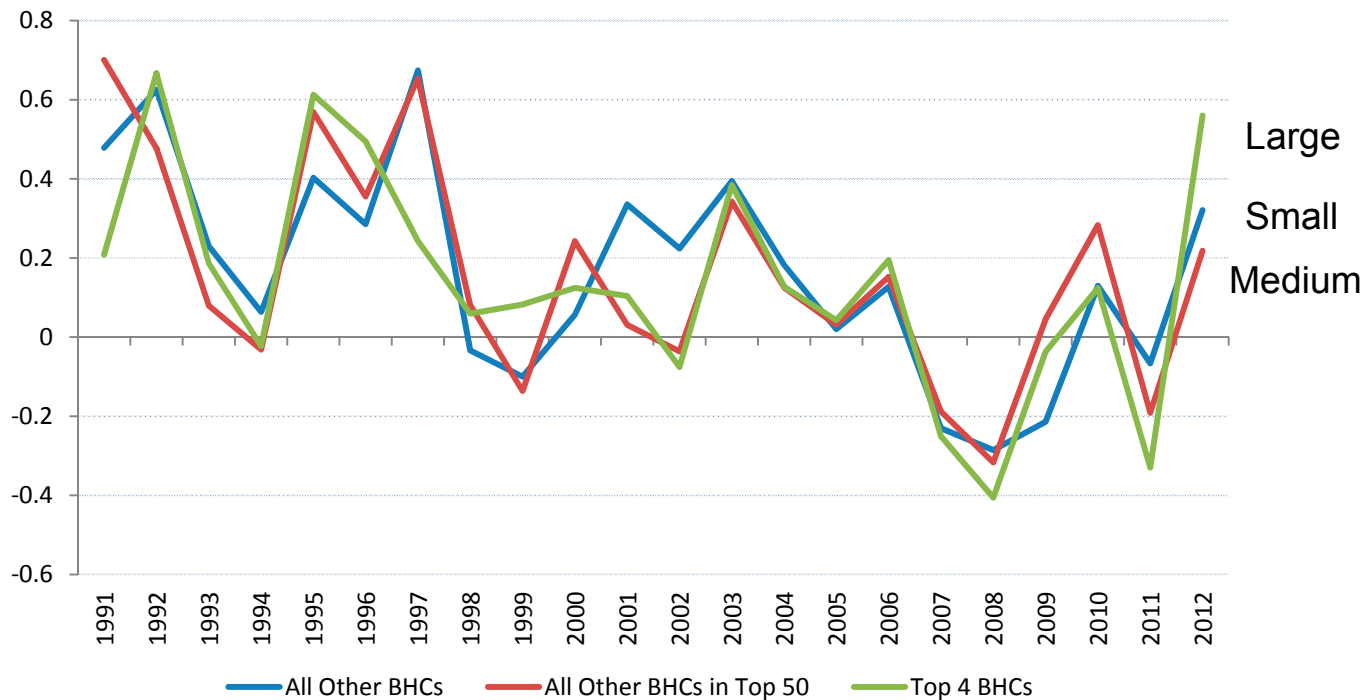
Cost efficiency, average across BHCs by size group, 1994-2002

	Stochastic frontier model			
	Cost function with (pos) inefficiency			
	Time-invariant		Time-varying	
Size group (total assets)	No cross- products	Cross- products	No cross- products	Cross- products
< 1 billion	0.16	0.29	0.18	0.43
1 - 2 billion	0.15	0.27	0.19	0.41
2 - 10 billion	0.14	0.25	0.18	0.38
10 - 50 billion	0.13	0.24	0.17	0.37
> 50 billion	0.15	0.30	0.19	0.41

Source: Staff calculations based on US BHC data

# Overall, large banks do not generate higher returns for equity investors

Average annualized cumulative bank equity returns  
US BHCs, by size group, 1995-2012



Source: FFIEC Central Data Repository, Federal Reserve Bank of Chicago

# Drivers of $\Delta\text{CoVaR}$ (systemic risk)

Table 2. Correlation of  $\Delta\text{CoVaR}$  and bank characteristics , US BHCs, 1994-2010

	Total assets	Non-interest income ratio	Income diversity	Asset diversity	Non-deposit liabilities ratio	Gross repos to assets
Non-interest income ratio	0.19*					
Income diversity	0.20*	0.80*				
Asset diversity	0.55*	0.31*	0.19*			
Non-deposit liabilities ratio	0.31*	0.31*	0.20*	0.42*		
Gross repos to assets	0.24*	0.17*	0.18*	0.38*	0.54*	
<b><math>-\Delta\text{COVAR}</math></b>	<b>0.19*</b>	<b>0.25*</b>	<b>0.22*</b>	<b>0.20*</b>	<b>0.17*</b>	<b>0.16*</b>

\* Significant at the 1% level

# Large banks enjoy support from strong sovereigns: TBTF subsidies

Ordered Probit regression, years 2007 and 2009, international sample of stock exchange listed deposit-taking banks

Dependent variable: Support Rating Floor	2007				2009			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Sovereign rating	0.16***	0.06	-0.19**	-0.17	0.16***	0.07*	-0.35***	-0.30*
Tier 1 capital ratio				-0.03				-0.03
Deposits to assets ratio				0.01				-0.00
Loans to assets ratio				-0.00				-0.01
Ln(Assets)		0.76***	0.03	0.08		0.830***	-0.348	-0.19
Sovereign rating * Ln(Assets)			0.06***	0.06*			0.11***	0.09**
Number of banks	129	129	129	114	129	129	129	117
Pseudo R-squared	0.07	0.22	0.24	0.26	0.07	0.23	0.28	0.30

Note: \*\*\*, \*\*, \* significant at the 1%, 5%, 10% level

T-test indicates that coefficient on interaction term in regressions (3) and (4) are significantly different at 1% level across two subsamples.