

What Caused the Global Financial Crisis?

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Contribution

- We document how **ample liquidity** ahead of the crisis encouraged increases in **leverage sourced in wholesale funding markets**.
 - for OECD countries over 1999-2007
- We provide **evidence** on the **ultimate drivers** of the build-up
 - Was it **monetary policy** (low short rates)?
 - Was it **global imbalances** (capital flows)?
 - Did differences in the **supervisory regime** matter?
- We investigate whether monetary policy affected the **direction** of capital flows.

Key findings

- Capital flows rather than low policy rates were the key driver of increases in leverage sourced in wholesale markets.
 - Capital flows reduced the spread between long and short rates, causing banks to “lever up”.
 - The effect of capital flows on financial imbalances is less pronounced where the supervisory environment was strong.
- Main findings carry through to alternative measures of financial imbalances
 - e.g. credit to GDP, household indebtedness to GDP; and house prices.
- Monetary policy had an effect on the direction of capital flows
 - Capital inflows are higher where policy rates were high relative to global rates (especially in smaller advanced economies).

Overview

- Monetary policy and global imbalances: channels
- Main outcome variable and empirical approach
- Main results
- Robustness: alternative outcome variables
- Causes of capital flows

Monetary policy: channels

- Loose monetary policy (a low short-term rate)
 - reduces the cost of wholesale funding and leads intermediaries to build up of leverage. (Shin)
 - increases demand for and supply of credit (mortgages) causing asset (house) prices to rise (Borio and Zhu, Taylor)

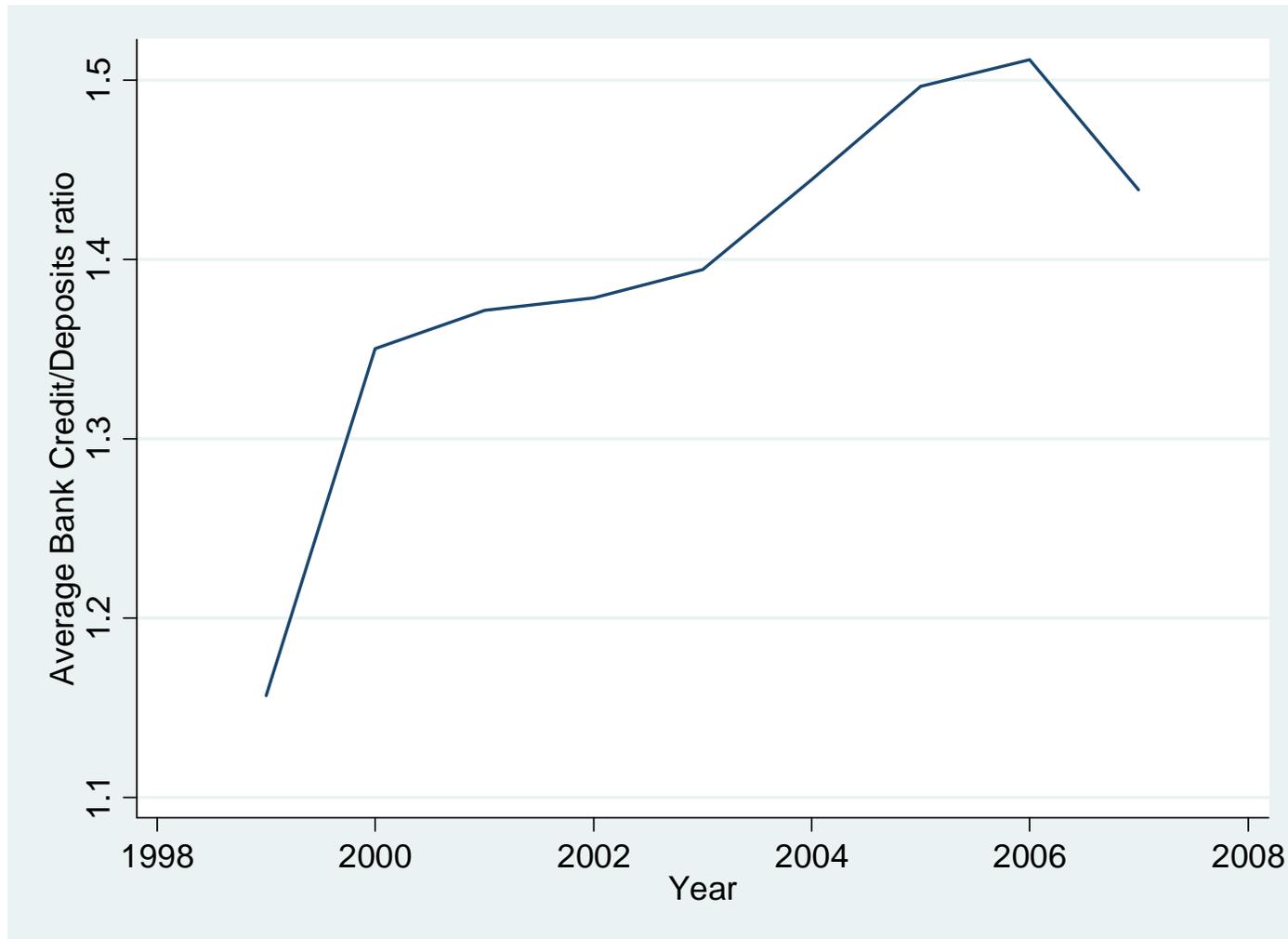
Global imbalances: channels

- Global imbalances (large capital inflows)
 - reduce long-term rates (compress spreads), causing financial institutions to lever up and “search for yield” (Bernanke, King, Rajan)
 - increase the supply of credit to the domestic economy and may cause asset bubbles (Ostry et al, Reinhart and Rogoff)

Outcome: ratio of bank credit to deposits

- Captures at country-level the build-up of leverage through expanded wholesale funding.
 - Turned into Achilles heel of the system when wholesale funding dried up from August 2007 (Oct 2008)
 - Robust predictor of distress at banking firms since August 2007 (Huang and Ratnovski, IMF)
 - Correlates strongly with ex post financial sector support at the country level (47 % at 5 per cent significance)
 - Increased ahead of global crisis and ahead of other regional crises (Nordic and Asian crises).

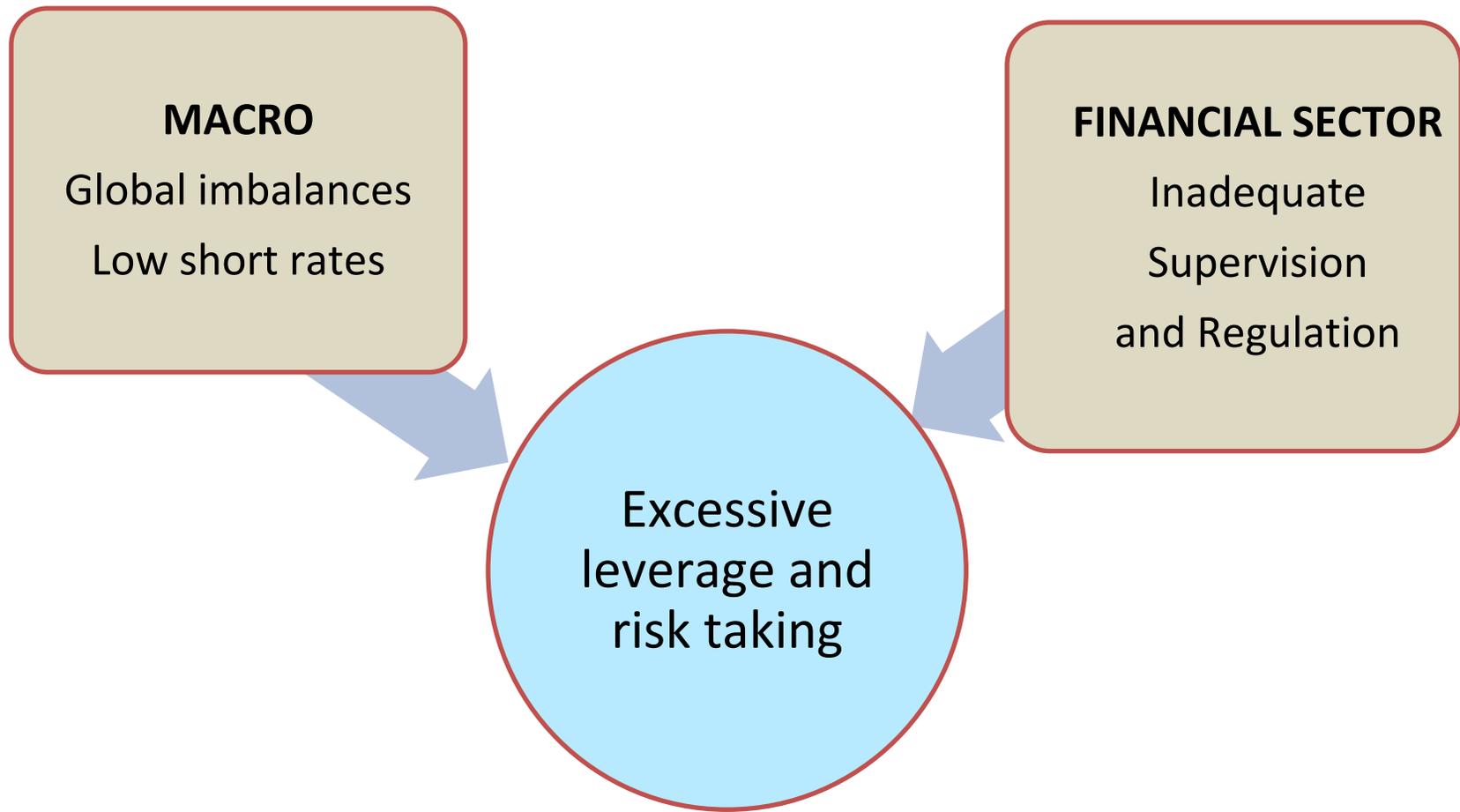
Average ratio of credit to deposits across OECD countries 1999-2007



Empirical approach

- For OECD countries, 1999-2007, regress outcome variable (credit to deposits) on
 - **monetary policy stance** (deviation from Taylor rule)
 - **capital flows**
 - current account
 - long-term short-term spread
 - **supervisory variables**
 - year-fixed and country-fixed effects, where possible
- Use **interactions** between macro-and supervisory variables to strengthen causal interpretation.

Interactions



Supervision and regulation

- Central bank supervision
 - May lead to tougher supervision, e.g. of liquidity
- Supervisory and resolution powers
 - May reduce moral hazard
- Restrictions on activities
 - Can facilitate supervisory monitoring and reduce moral hazard
- Entry barriers
 - Can lower competition and reduce risk taking
- Capital regulation stringency
 - Can increase resilience to shocks but may also constrain credit

Main results

Macroeconomic drivers of leverage (credit to deposits)

	(1)	(2)	(3)	(4)
Current account %GDP	-0.029**		-0.029*	
Deviation of policy rate from Taylor rule	0.018		-0.006	
Long-term-short term spread		-0.063*		-0.056**
Country FE	x	x	x	x
Year FE	x	x		
Observations	196	196	196	196
Number of countries	22	22	22	22
R-squared	0.25	0.19	0.08	0.03

Robust standard errors clustered by country in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Macro and supervisory variables - interaction effects

	(1)	(2)	(3)
	Macro-Factors		
	current account	Long-term short term spread	Monetary policy stance
Current account %GDP	-0.124**		-0.026**
Deviation of policy rate from Taylor rule	0.024		-0.07
Long term-short term spread		-0.380**	
Macro-Factor*Central bank supervision	0.012*	0.040***	0.009
Macro-Factor*Supervisor power	0.002**	0.008***	0.014*
Macro-Factor*Activity restriction	-0.002	0.007	-0.006
Macro-Factor*Entry barriers	0.016***	0.014*	-0.001
Macro-Factor*Capital regulation	-0.012	-0.003	-0.006
Year FE	x	x	x
Country FE	x	x	x
Observations	196	196	196
Number of countries	22	22	22
R-squared	0.34	0.23	0.29

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Robustness

Alternative outcome variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Financial sector		Household			
	Credit/GDP		credit/deposits		debt/GDP		House price index	
Current account %GDP	-0.038**	-0.038**	-0.031**	-0.031**	-0.013**	-0.012**	-2.242**	-2.199**
Deviation of monetary policy from Taylor rule	0.008	0.000	0.024	0.021	0.008	0.010	0.218	-1.111
Real GDP growth rate		-0.03		0.02		-0.008		-4.364*
Inflation rate		-0.014		-0.011		-0.002		-2.685
Country FE	x	x	x	x	x	x	x	x
Year FE	x	x	x	x	x	x	x	x
Observations	184	182	192	190	187	186	162	161
Number of countries	21	21	22	22	21	21	18	18
R-squared	0.45	0.44	0.25	0.24	0.73	0.73	0.73	0.73

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Robustness

- Alternative outcomes
- Alternative measures of monetary stance
 - e.g., prolonged deviations from Taylor
- All variables lagged (endogeneity)
- Alternative samples
 - euro area only; OECD excluding U.S.
 - boom period, 2003-2007

Extension

Drivers of “global imbalances”

Determinants of the current account (capital flows)

	Small countries		Large countries
	(1)	(2)	(3)
Government budget surplus %GDP	0.233	0.313	-0.087
Openess ([Exports+Imports]/GDP)	0.044	0.063	0.043
Private savings rate	0.262***	0.166	0.471**
Output growth	-0.18	-0.813	1.426**
Domestic-USA spread	-0.796** [0.305]	-1.416*** [0.259]	0.23 [0.313]
Country FE	x	x	x
Year FE	x	x	x
Number of observations	191	95	96
Number of countries	22	11	11
R-squared	0.33	0.44	0.34

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Implications for macroprudential policy

- Monetary “leaning” is second-best and can be counterproductive (esp. in small countries)
- Macroprudential policies need to address vulnerabilities from capital inflows
 - countercyclical capital, charges on liquidity risks
- Also review:
 - role of central banks in regulation
 - supervisory and resolution powers
 - entry barriers (competition)