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.

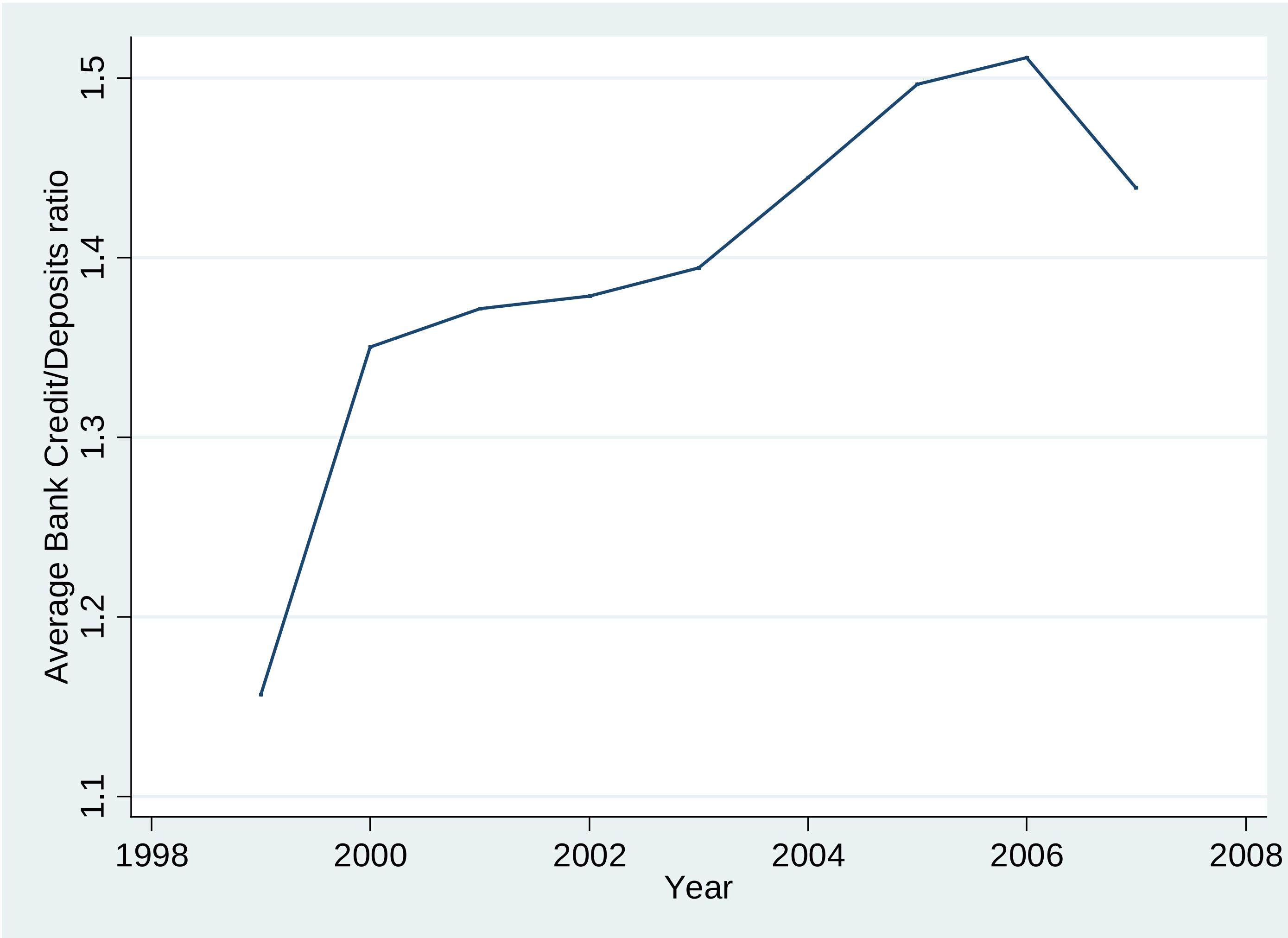
Key findings

- 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).

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).

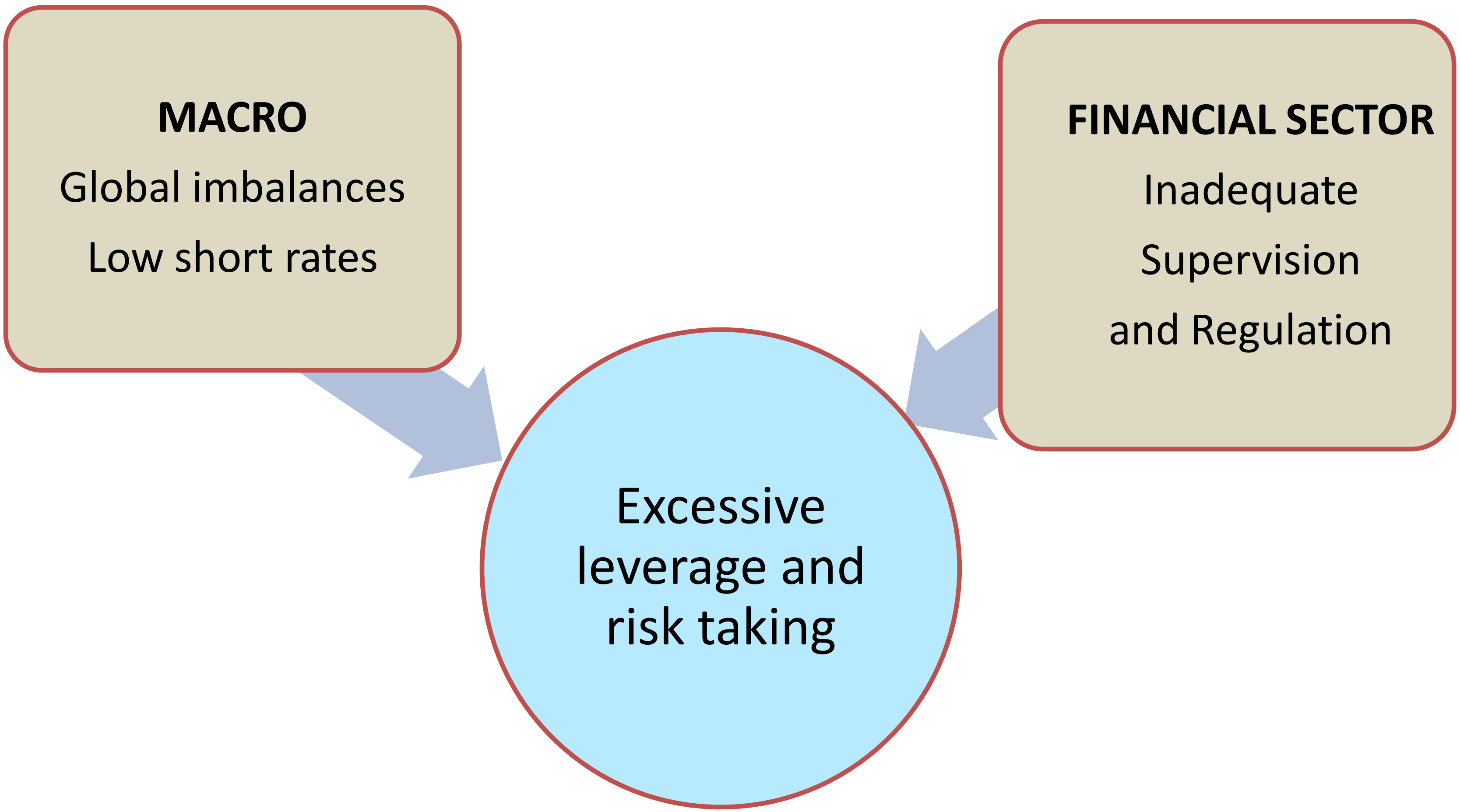
Average ratio of credit to deposits across OECD countries 1999-2007



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) 1999-2007

	(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%

Drivers of Leverage in the Banking Sector 1999-2007

Countries' regulatory and supervisory framework

	(1)	(2)	(3)	(4)	(5)	(6)
Current account %GDP	-0.027**	-0.025*	-0.026*	-0.026*	-0.026*	-0.026**
Deviation of policy rate from Taylor rule	0.018	0.018	0.018	0.018	0.018	0.018
Central bank supervision index	-0.159					-0.195*
Supervisor power index		-0.068**				-0.080***
Banking sector activity restriction index			0.058			0.047
Banking sector entry barriers index				-0.038***		-0.049
Capital regulation stringency index					-0.014	0.074
Constant	1.615***	2.341***	1.027*	1.896***	1.578***	2.329***
Year FE	x	x	x	x	x	x
Observations	196	196	196	196	196	196
Number of countries	22	22	22	22	22	22
R-squared	0.25	0.25	0.25	0.25	0.25	0.25

Robust standard errors 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)
	Credit/GDP		Financial sector credit/deposits		Household 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**	-1.416***	0.23
	[0.305]	[0.259]	[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

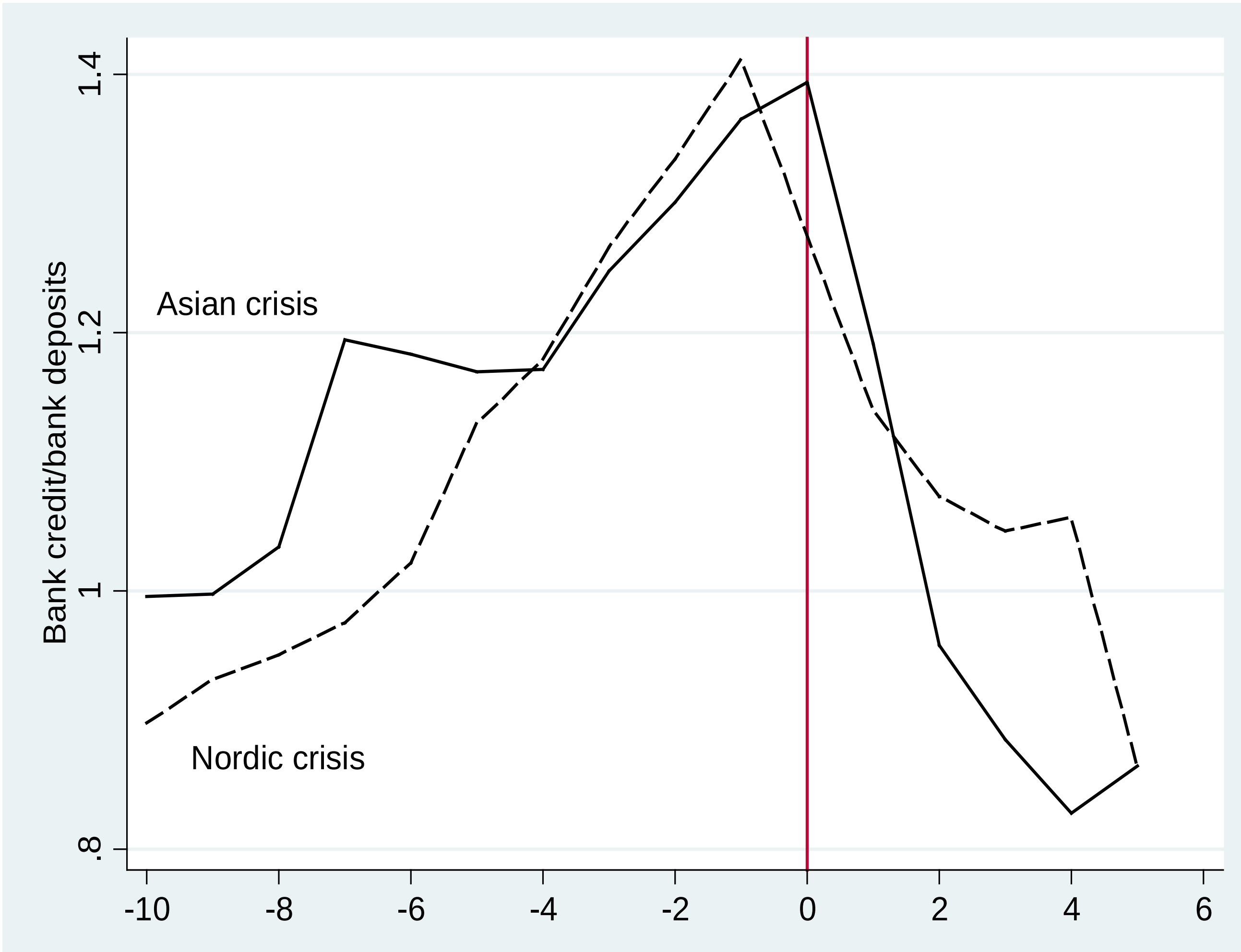
Robust standard errors in brackets

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

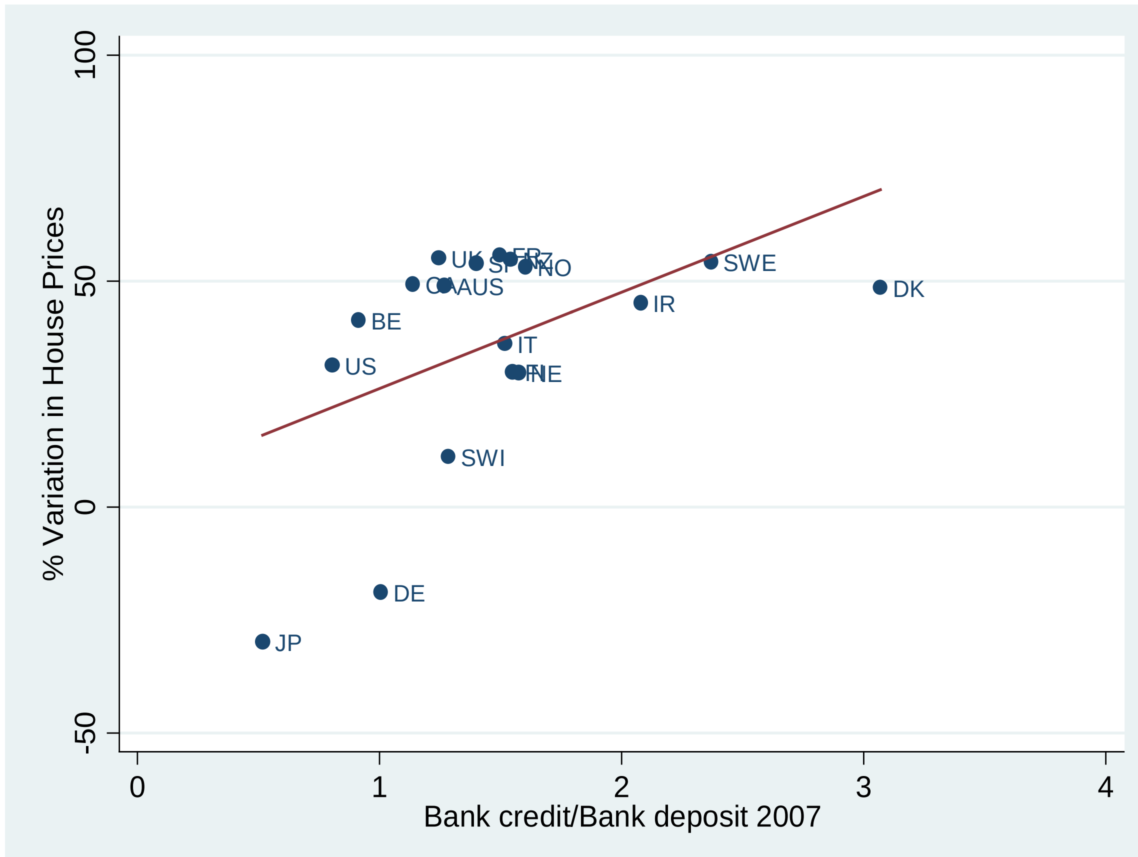
Implications for macroprudential policy

- 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)

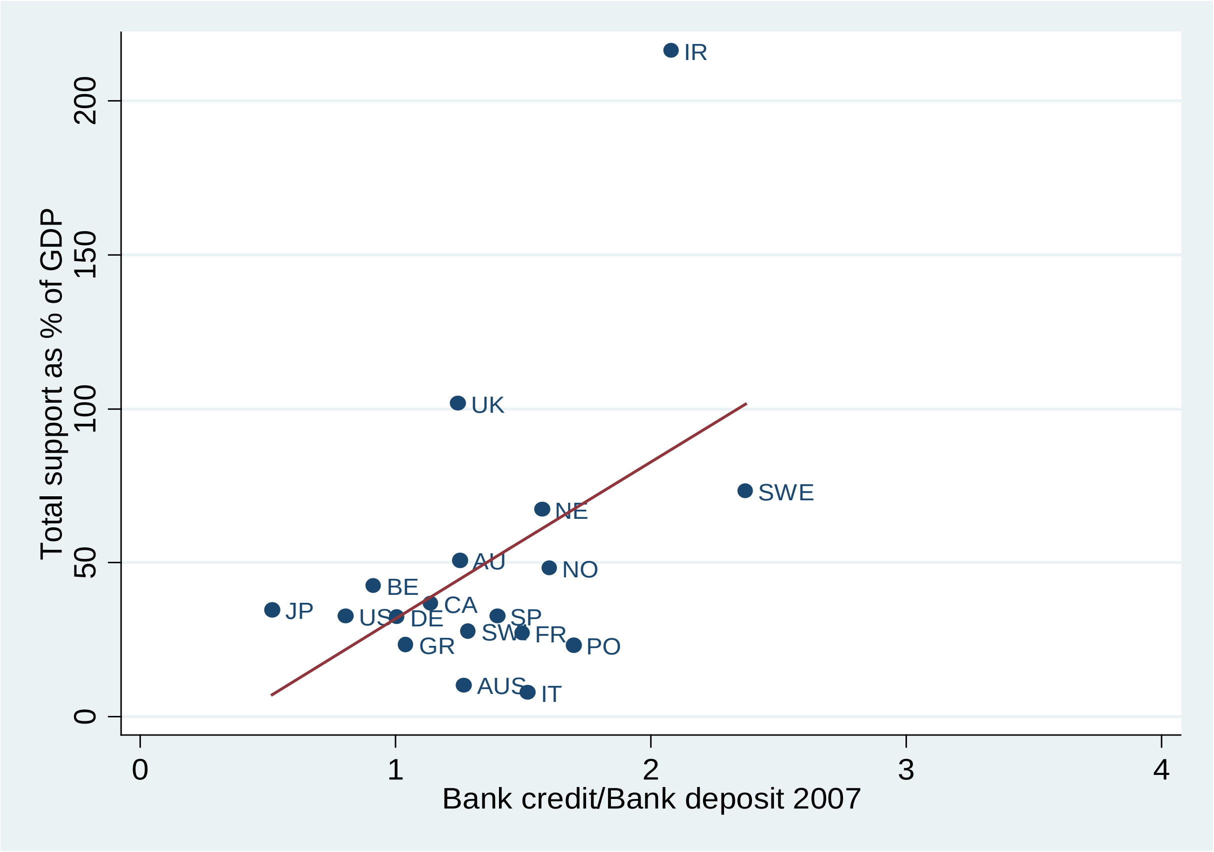
Credit to deposits around crises events



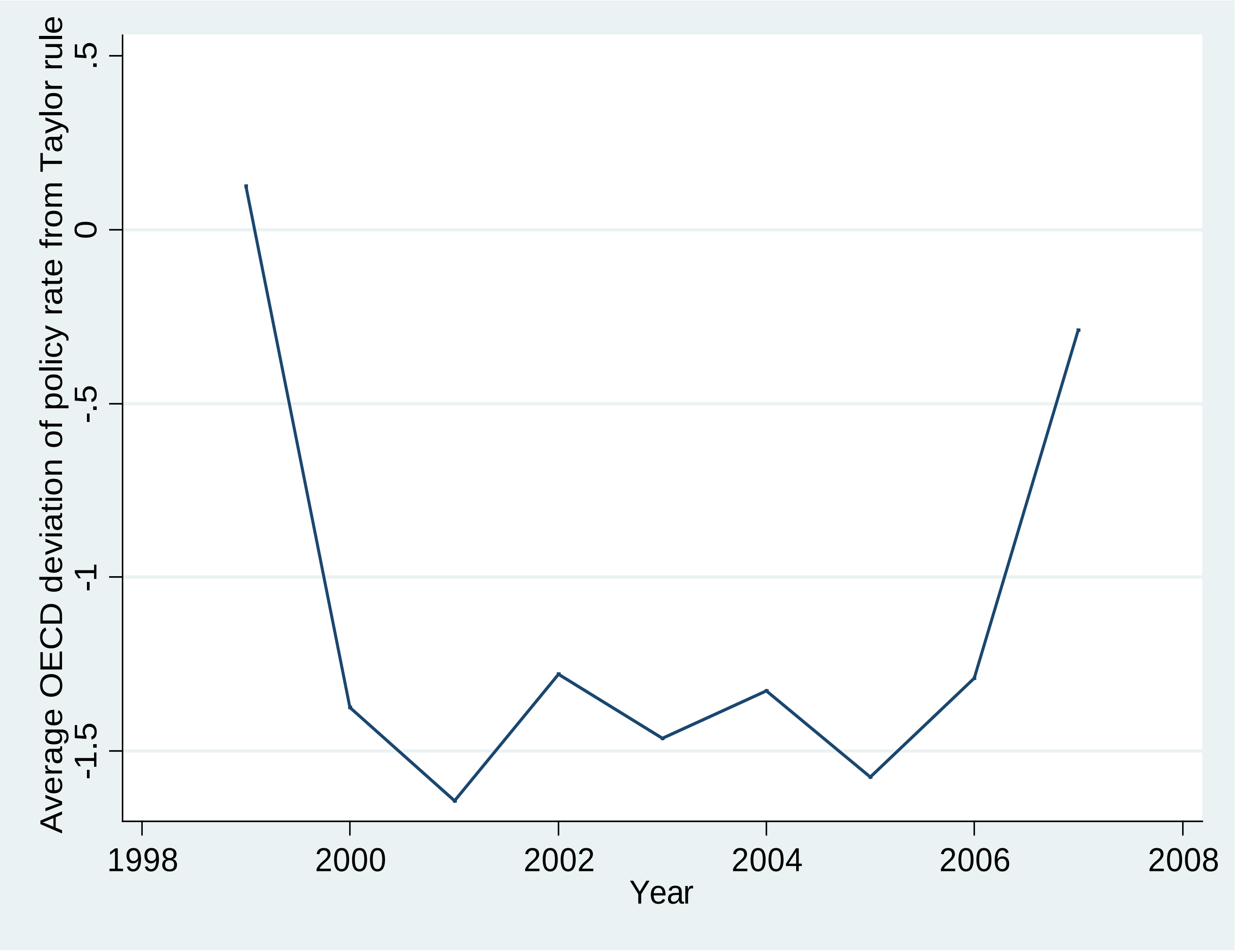
Correlation between leverage and house price increase



Correlation between leverage and Support to the financial sector



Average OECD country monetary policy stance 1999-2007



Average long-term short-term spread, OECD countries 1999-2007

Cross-sectional variation of current account imbalances