

Banking Concentration and Financial Crises

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Financial fragility, competition and crises

- Not clear from bank based literature or from theory whether more competition induces more fragility and raises crisis incidence
 - More competition reduces franchise values and changes managerial incentives raising risk taking by banks
 - More concentration raises lending rates and induces Stiglitz Weiss moral hazard amongst bank borrowers
 - Net interest margins can be used to absorb predictable loss rates
- The New Industrial Economics literature gives indices of competition and monopoly and we can test them here using World Bank data
- They are correlated with standard variables, with concentration and capital adequacy ratios rising together

What are crises and when do we see them

- The Laevan and Valencia (2018) definition depends on policy interventions,
 - a financial crisis as a situation where the proportion of non-performing loans to total banking system assets was greater than 10%,
 - or the public bailout cost exceeded 3 percent of GDP,
 - or systemic crisis caused large scale bank nationalisation,
 - or emergency government intervention was sustained.
- Our data are all published, and cover the last 20 years
 - Capital data is available for our 19 countries from 1996 in WFDI
 - Real house price growth is from BIS and OECD
 - Competition and concentration indices are from 1996 of 1998
- Countries with crises in brackets are Australia, Belgium (2008), Canada, Denmark, (2008), Finland, France (2008), Germany (2008), Ireland (2008), Italy (2008), Japan, Netherlands (2008), New Zealand, Norway. Portugal (2008), Spain (2008), Sweden (2008), Switzerland (2008), United Kingdom (2007), United States (2007)

Setting up the estimation problem

- We use the cumulative logistic distribution which relates the probability that the dummy for crises takes a value of one to the logit of the vector of n explanatory variables:

$$Prob(Y_{it} = 1) = F(\beta X_{it}) = \frac{e^{\beta' X_{it}}}{1 + e^{\beta' X_{it}}} \quad (1.)$$

- We need to use predetermined (or previously observed) variables in order to produce an early warning system
- We follow a paper by Barrell et al (2010) and see crisis probabilities as
 - Driven by bad lending, using lagged real house price growth as a proxy
 - Reduced by capital and liquidity defences
 - Add bank concentration measures

Testing for Market Power

- 19 countries, 13 crises, 1999-2016
- Capital and Real house price growth very significant
- Bank concentration lagged is significant
- Capital and concentration correlated
- Probabilities under coefficients

Sample: 1999 2016	Base	Concentration	Preferred	No Capital
Capital(-1)	-0.668	-0.284	-0.266	
	0.000	0.023	0.026	
Real House Price Growth (-3)	10.990	14.441	14.454	12.300
	0.013	0.003	0.002	0.006
Bank Concentration		0.035		
(5 bank)		0.479		
Bank Concentration(-1)		-0.063	-0.030	-0.047
(5 bank)		0.191	0.001	0.000
Area Under Curve (AUC)	0.702	0.747	0.714	0.681
Direct Call Ratio (DCR)	9 of 13	9 of 13	9 of 13	7 of 13
False Call Ratio % (FCR)	39.82	31.61	31.31	29.79

Testing for Market Power and Contestability

- The New Industrial Economics goes beyond structural measures based on analysis of data such as 5 Bank concentration ratios
- Structural measures may miss market power that will depend on the environment driving competition and regulation
- Contestability may also matter in open markets such as the European Union where potential entry is not difficult with cross border lending
- Our aggregate World Bank measures are based on individual bank data
- Lerner index $P = (P - MC) / MC$ is a measure of market power
- The Boone index is a measure of contestability or efficiency
 $B = (\log(\text{Profits}) - A) / \log(MC)$

	Lagged and Current Lerner	Lagged and Current Boone	Current Lerner and Boone	Current Lerner
Sample: 1999 2016				
Capital(-1)	-0.303	-0.267	-0.258	-0.249
	0.034	0.028	0.036	0.041
Real House Price Growth (-3)	15.052	14.293	15.351	14.940
	0.002	0.003	0.002	0.002
Bank Concentration(-1)	-0.028	-0.030	-0.026	-0.027
(5 bank)	0.005	0.001	0.006	0.000
Lerner(-1)	2.669			
	0.355			
Lerner	-2.816		-2.296	-2.032
	0.015		0.019	0.031
Boone(-1)		0.795		
		0.195		
Boone		-1.327	-0.791	
		0.114	0.289	
Area Under Curve (AUC)	0.806	0.733	0.799	0.771
Direct Call Ratio (DCR)	10 of 13	9 of 13	9 of 13	9 of 13
False Call Ratio % (FCR)	23.08	30.7	27.66	28.27

Note Probabilities from z statistic below coefficient

Robustness: Liquidity, Credit and Europe only

- Liquidity is not significant here
- The BIS credit gap is not significant as is common using recent data
- Europe alone concentration drops out but contestability matters
- Probabilities under coefficients

Sample: 1999 2016	Add Liquidity	Add Credit Gap	Europe Only	Europe Only (2)
Capital(-1)	-0.223	-0.238	-0.309	-0.584
	0.084	0.053	0.087	0.000
Real House Price Growth (-3)	13.013	12.382	13.102	12.307
	0.012	0.016	0.011	0.015
Bank Concentration(-1)	-0.023	-0.028	-0.019	
(5 bank)	0.028	0.003	0.113	
Lerner	-1.949	-2.292	-1.871	-2.624
	0.039	0.018	0.090	0.010
Liquidity(-1)	-0.043			
	0.374			
Credit gap(-1)		0.027		
		0.145		
Area Under Curve (AUC)	0.702	0.747	0.714	0.681
Direct Call Ratio (DCR)	8 of 13	9 of 13	8 of 12	8 of 12
False Call Ratio % (FCR)	27.96	27.36	30.42	34.17

Causality from the credit gap to house prices

- House prices may be caused by credit in some countries
- 1996 to 2016 positive evidence of causality
- Run up to crisis in 2007/8 no causality
- Policy may change patterns

	Full Sample	Full Sample	Europe	Europe
	1996-2016	1996-2007	1996-2016	1996-2007
Real House Price growth (-1)	0.817826	0.869589	0.828276	0.806013
	0	0	0	0
Real House Price growth (-2)	-0.167438	-0.185593	-0.17697	-0.111544
	0.0014	0.0088	0.0038	0.1781
BIS Credit Gap(-1)	-0.000379	-0.000882	-0.000404	-0.001118
	0.2821	0.082	0.2766	0.0361
BIS Credit Gap(-2)	5.30E-07	1.06E-03	-5.56E-05	1.01E-03
	0.9988	0.0452	0	0.0732
Granger Test of Gap F-stat	3.536164	2.053396	4.261419	2.259771
(with constant) Prob	0.0301	0.1307	0.015	0.1076

Calibrating Macprudential Policy

- We estimate a log odds ratio

$$\text{Log}(p_{it}/(1-p_{it})) = \beta'X_{it}$$

- Solve this for capital

$$\text{Log}(p_{it}/(1-p_{it})) = \beta_1'X_{1it} + \beta_c \text{Cap}_{it}$$

$$\text{Cap}_{it} = \log(p_{it}/(1-p_{it})) / \beta_c - \beta_1'X_{1it} / \beta_c$$

- Then either target the prob with the stock of capital
- Or set the change in prob to zero with capital as an instrument when driving variables change

*Reduce crisis probability by 1%
needs increase in capital ratio*

1.5% (not linear)

*Capital increase to offset a % point
fall in Lerner index*

0.045%

*Capital increase needed to offset a
1% rise in real house prices*

0.21%

Crisis probabilities are rising marginally

(figures in bold have probability over 3%)

	Australia	Belgium	Canada	Denmark	Finland	France	Germany	Ireland	Italy	Japan
2016	0.0232	0.0123	0.0143	0.0099	0.0151	0.0159	0.0291	0.0038	0.0084	0.0254
2017	0.0285	0.0097	0.0177	0.0103	0.0143	0.0180	0.0319	0.0242	0.0143	0.0196
2018	0.0304	0.0115	0.0216	0.0189	0.0096	0.0158	0.0399	0.0055	0.0143	0.0298
2019	0.0191	0.0106	0.0499	0.0151	0.0157	0.0238	0.0457	0.0043	0.0236	0.0329
	Netherlands	New Zealand	Norway	Portugal	Spain	Sweden	Switzerland	UK	US	Average
2016	0.0045	0.0282	0.0044	0.0054	0.0022	0.0317	0.0337	0.0250	0.0048	0.0156
2017	0.0144	0.0198	0.0031	0.0060	0.0091	0.0105	0.0285	0.0070	0.0032	0.0153
2018	0.0207	0.0487	0.0050	0.0081	0.0155	0.0098	0.0270	0.0137	0.0111	0.0188
2019	0.0263	0.0646	0.0046	0.0227	0.0181	0.0193	0.0228	0.0152	0.0269	0.0243

Conclusions

- Concentration and Market Power matter for understanding crises
 - Increases in concentration reduce crisis incidence
 - Market power matters more in European contestable markets
- Capital (not risk weighted) is a strong defence against crises
- Real house price growth is a common problem
 - Bad lending takes place in the upturn in most countries
 - Implications in the downturn depends on insolvency rules
- Little evidence credit gap raised crisis incidence (directly or indirectly)
- Macroprudential policy should be calibrated using capital to offset excess house price growth and changes in market power
- Why do we 'miss' Germany, Netherlands, Switzerland and Portugal?