The importance of enhancing the soundness and liquidity of the banking sector to preserve the stability of the financial system

Post-Crisis Challenges for the Economies of SEE
Bank of Greece Workshop

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ECB

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The importance of enhancing the soundness and liquidity of the banking sector to preserve the stability of the financial system

1. Soundness indicators
2. Microprudential role of capital and Basel III
3. Macro-prudential role of capital: intermediation
4. Macro-prudential role of capital: early warning
5. Conclusions

Financial Soundness Indicators of deposit takers

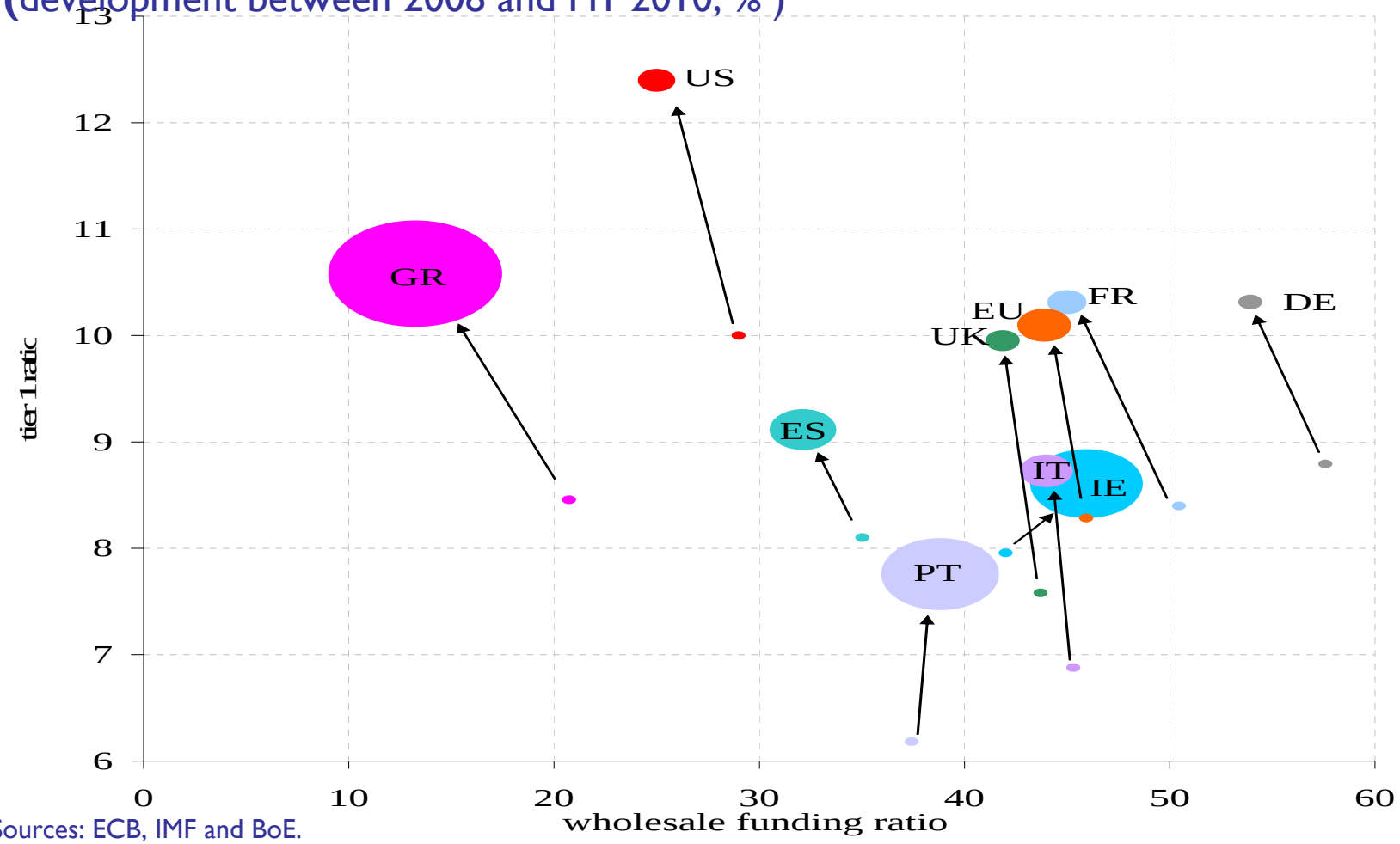
- Four categories (25 IMF FSIs)
- 1) Capitalisation (e.g. tier 1 ratio, equity to total assets (1/ "leverage"))
- 2) Liquidity (e.g. loans to deposit ratio, liquid assets to total assets)
- 3) Profitability (e.g. RoA, RoE (ambiguous))
- 4) Asset Quality (e.g. impaired loans to gross loans)

Focus on capitalisation and liquidity (policy debate)

2.5 years of deleveraging and quest for customer deposits…

(excluding sovereign crisis period)

Banking system capital ratios and reliance on wholesale funding (interbank borrowing and debt securities over total funding) in selected EU countries (development between 2008 and H1 2010; %)



Sources: ECB, IMF and BoE.
Bubble size represents 5 year CDS spreads on 2 May 2011

The (important) role of capital

- **Micro-prudential role**: loss absorbing function

  Disappointing experience during the crisis despite strong regulatory ratios (risk weights questionable; reputation issues) => Basel III

- **Macro-prudential role**:

- a) intermediation role; effect on funding costs => loan rates => growth?

  How does lower leverage affect bank funding costs?

  What is the role of perceived sovereign debt sustainability for the link between capital and funding costs?

  b) Indicator (early warning) role of capitalisation and liquidity?

  Empirical and theoretical issues; Were 2008 dots in previous chart indicative for problems to come?

Main design elements of the Basel reform package (1)

- Revised capital requirements (risk based)
  - New definition of capital
  - Strengthened risk coverage
  - Increased minimum capital requirements
  - Introduction of capital buffers on top of the minimum requirements
    - capital conservation buffer
    - counter-cyclical capital buffer

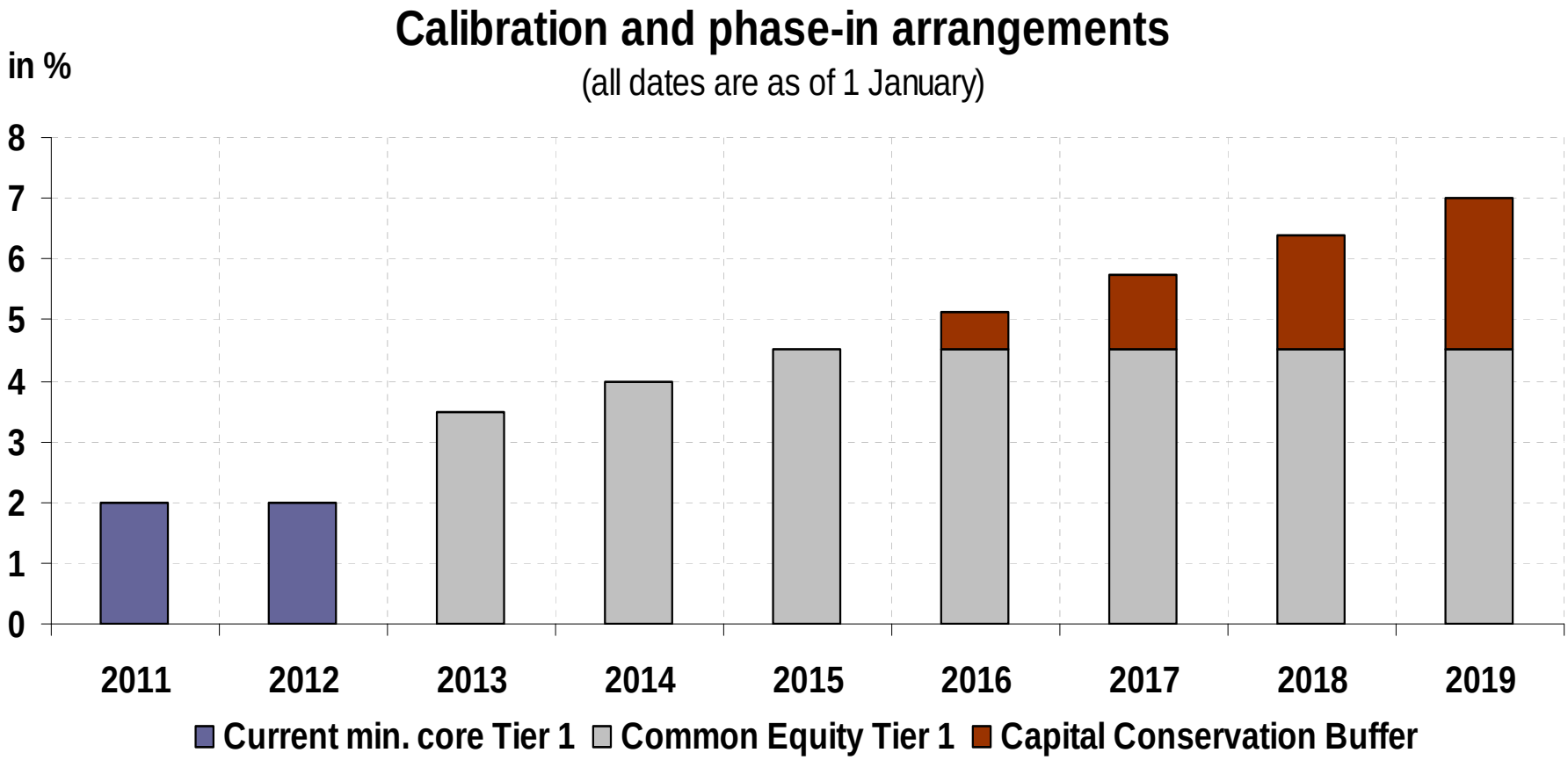
Main design elements of the Basel reform package (2)

- Leverage ratio (non-risk based) – supplementary measure
- Liquidity framework

Capital requirements

- Regulatory response
  - Enhancing the quality (i.e. loss absorbency) of the capital base
    - Focus on core elements of capital (common equity)
    - Further regulatory adjustments (items not having sufficient loss absorbing capacity will be deducted from capital; e.g. hybrid capital providers spared in current crisis)
  - Increasing the quantity of capital (minimum + buffers)
  - Ensuring harmonisation and consistent application of requirements
  - Improving banks' disclosure about their regulatory capital

Basel III - capital requirements will increase gradually…at least that is the plan



Source: BCBS.

Some issues

- Coverage of Basel III in terms of institutions/activities?
- Smooth adjustment plan feasible (market pressure, stress test reactions) ?
- Size of capital requirements? 30% (unweighted; Haldane)? "Significantly higher than 10%" (unweighted), Hellwig et al?
  (10% unweighted was in the past possible with 1-3% weighted)
- Basel III can reduce probability of (also systemic) crisis by reducing default probability of individual institutions.
- See BCBS LEI Report (2010): capital ratio from 7 to 15 reduces probability of systemic banking crisis from 4.6% to 0.3%.

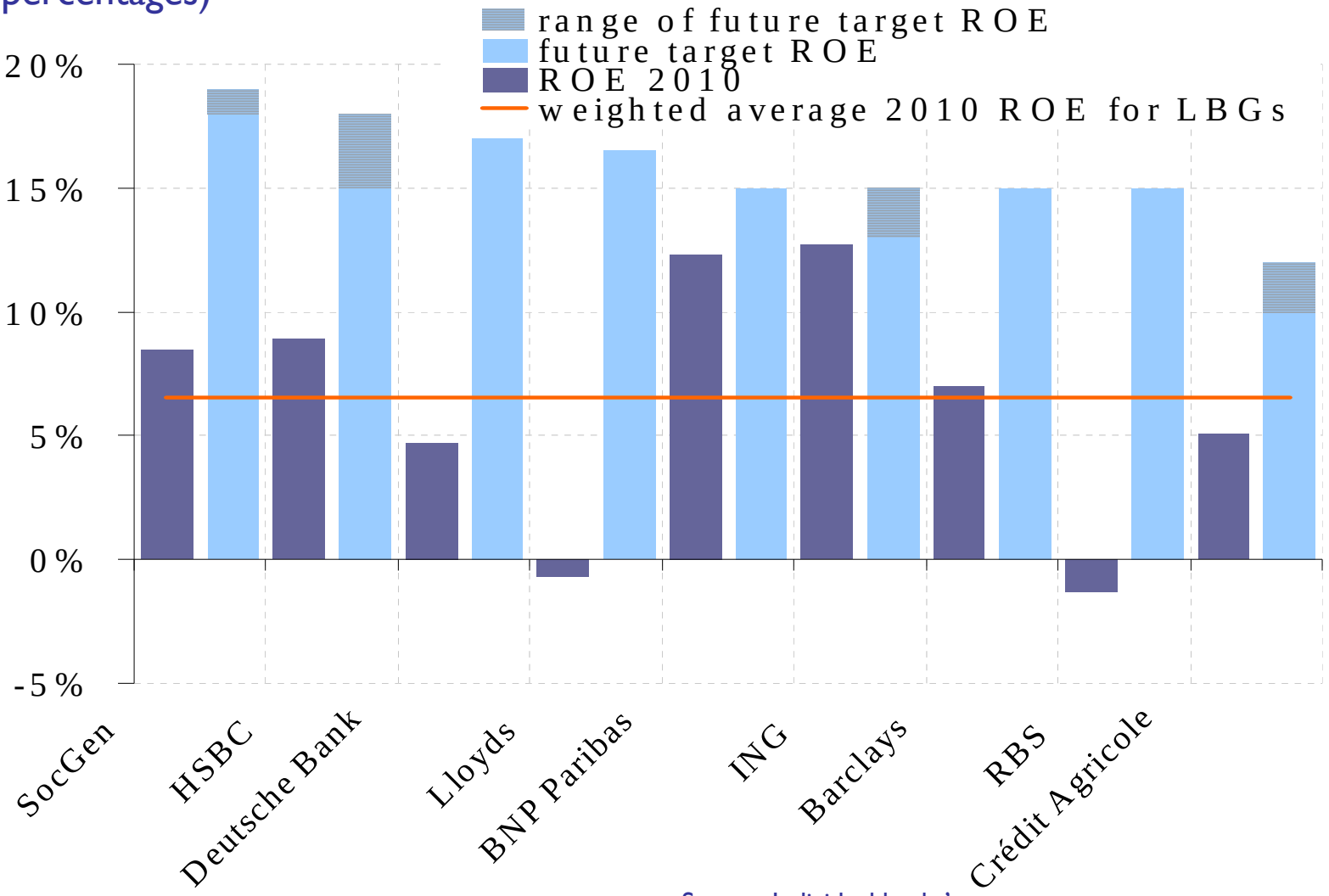
Intermediation role of capital

- Capital and funding costs:
- Increase? Equity has higher required return than debt
- Decrease? Required return on equity (and debt) will fall such that overall funding costs remain unchanged (M-M)

  M-M + CAPM (and debt beta=0): risk premium on equity declines linearly with leverage.
- Likely outcome: irrelevant steady state increase (capital x2 = +(10-40)bps funding costs; Miles et al., 2011); FSB/BCBS MAG Report on transition effects: +1p.p. T1 (over 8 years) + max15.5-18.6bps lending rates at Q35.
- Furthermore: more equity reduces risk taking incentives of bank managers

Higher return on equity for less risky banks?

Realised and future targeted Return on Equity (ROE) for selected banks
(2010; percentages)



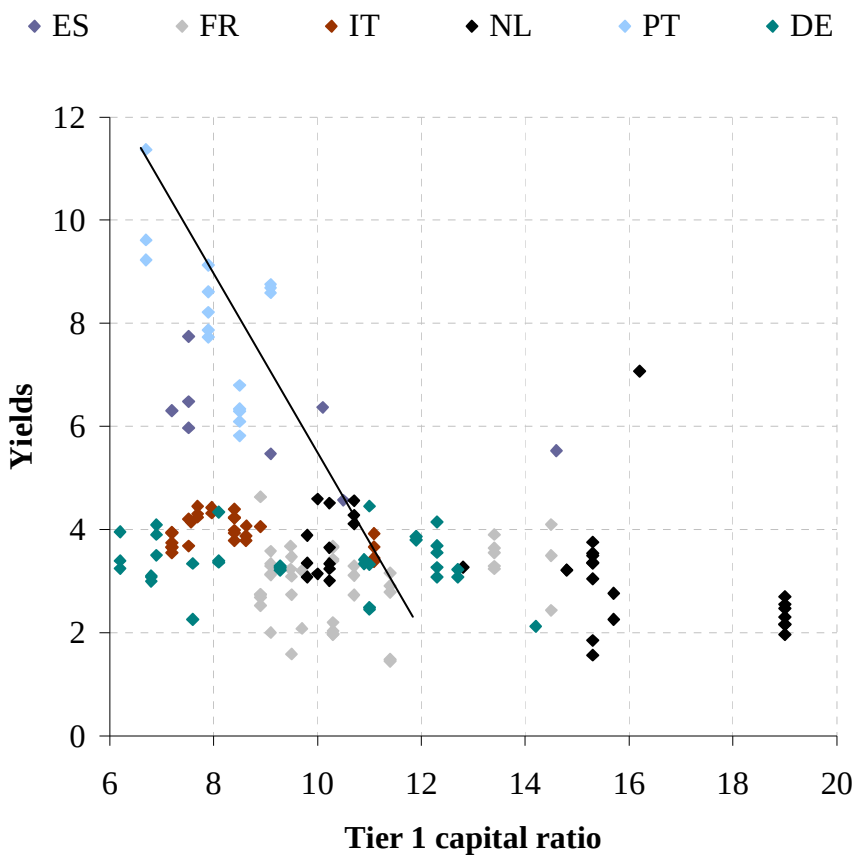
Source: Individual banks' reports.

Further evidence on funding needs

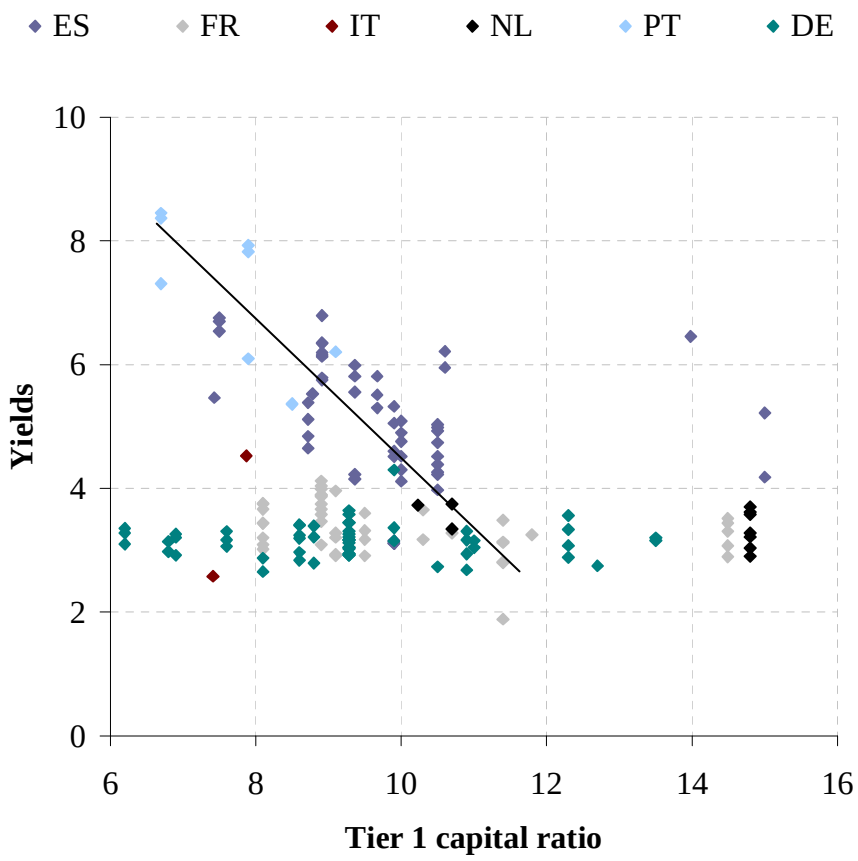
- Altunbas, Marques-Ibanez, Manganelli (2011): Pre-crisis tier 1 ratios explain recourse to Eurosystem liquidity (in 2007Q4-2009Q2, for largest 250 banks) in non-linear way (effect strongest for our "best" customers, 95 and 75 percentiles of Eurosystem liquidity/total assets)
- Also market funding and excessive loan growth significant for 95 percentile regression

Bank funding vulnerabilities and risks related to volatility of funding costs

Yields on senior unsecured debt and Tier I capital ratio of the issuer bank
(March 2011, 3-5 year maturity, percentages)



Covered bond yields and Tier I capital ratio of the issuer bank
(March 2011, 3-7 year maturity, percentages)



Expectation of performance of capitalisation and liquidity indicators for early warning purposes

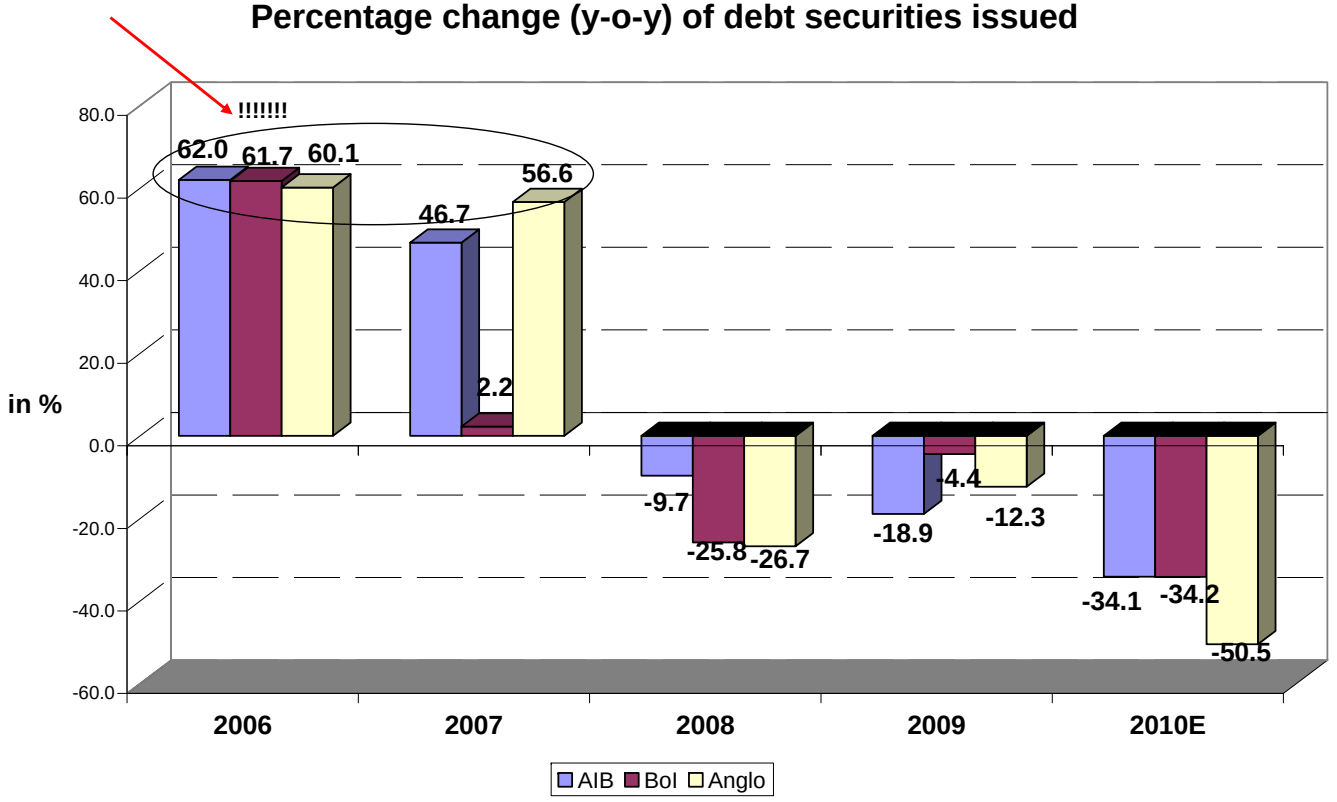
Expectations based on Shin, 2010:

- Risk weighted capital ratios useless (though Barrell et al, 2010 more positive)
- Leverage and loan to deposit ratio promising (securitisation creates collateral for non-deposit funding. "Demand for collateral assets is therefore demand for leverage")
- Asset growth increases vulnerabilities = proxy for increased interconnectedness of intermediaries if deposit funding not growing proportionally

And on example of Irish banks…

Non-core liabilities increase…

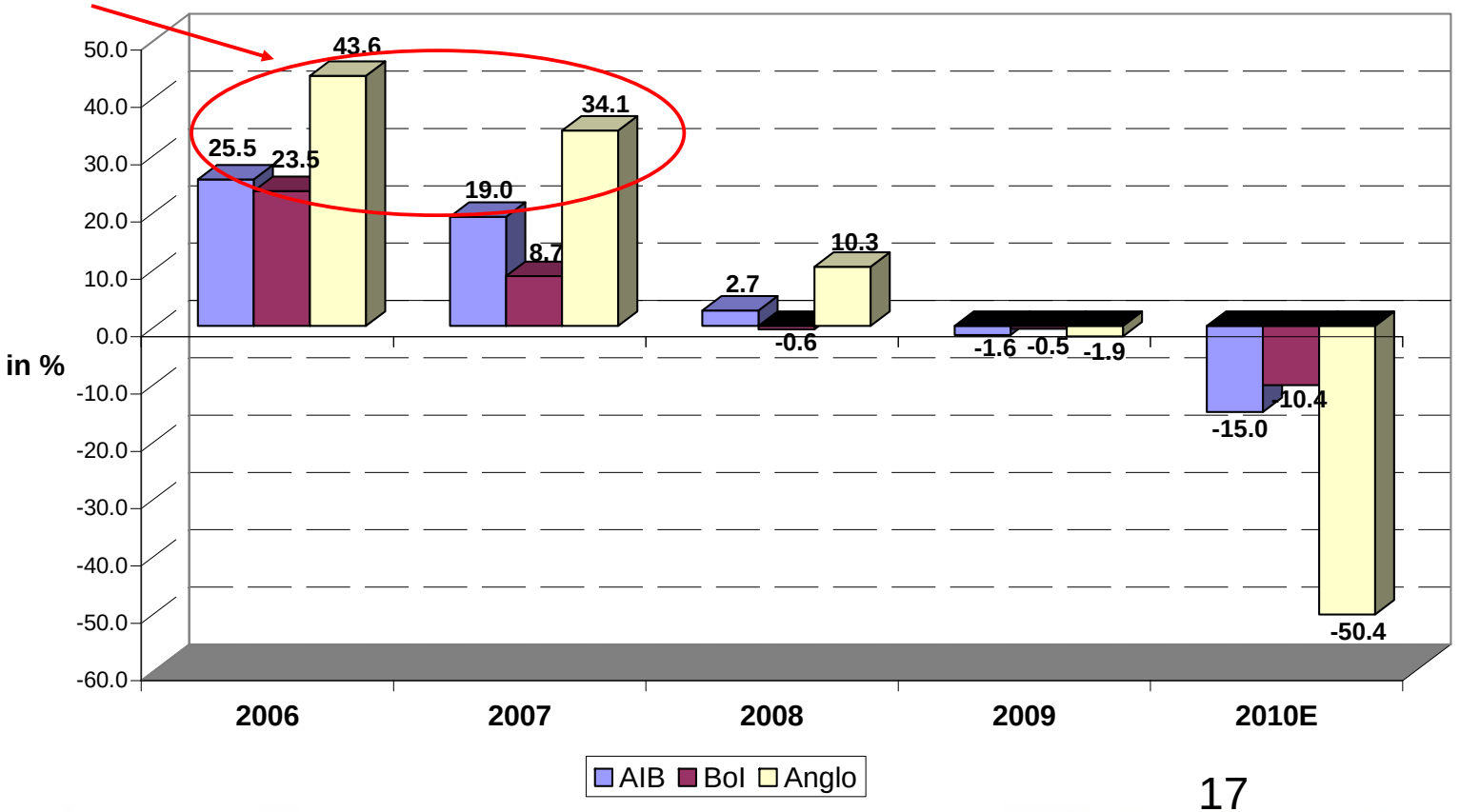
Heavy reliance on debt security markets; in 2006 and 2007 Irish banks significantly increased reliance on international debt markets, change in refinancing behaviour!



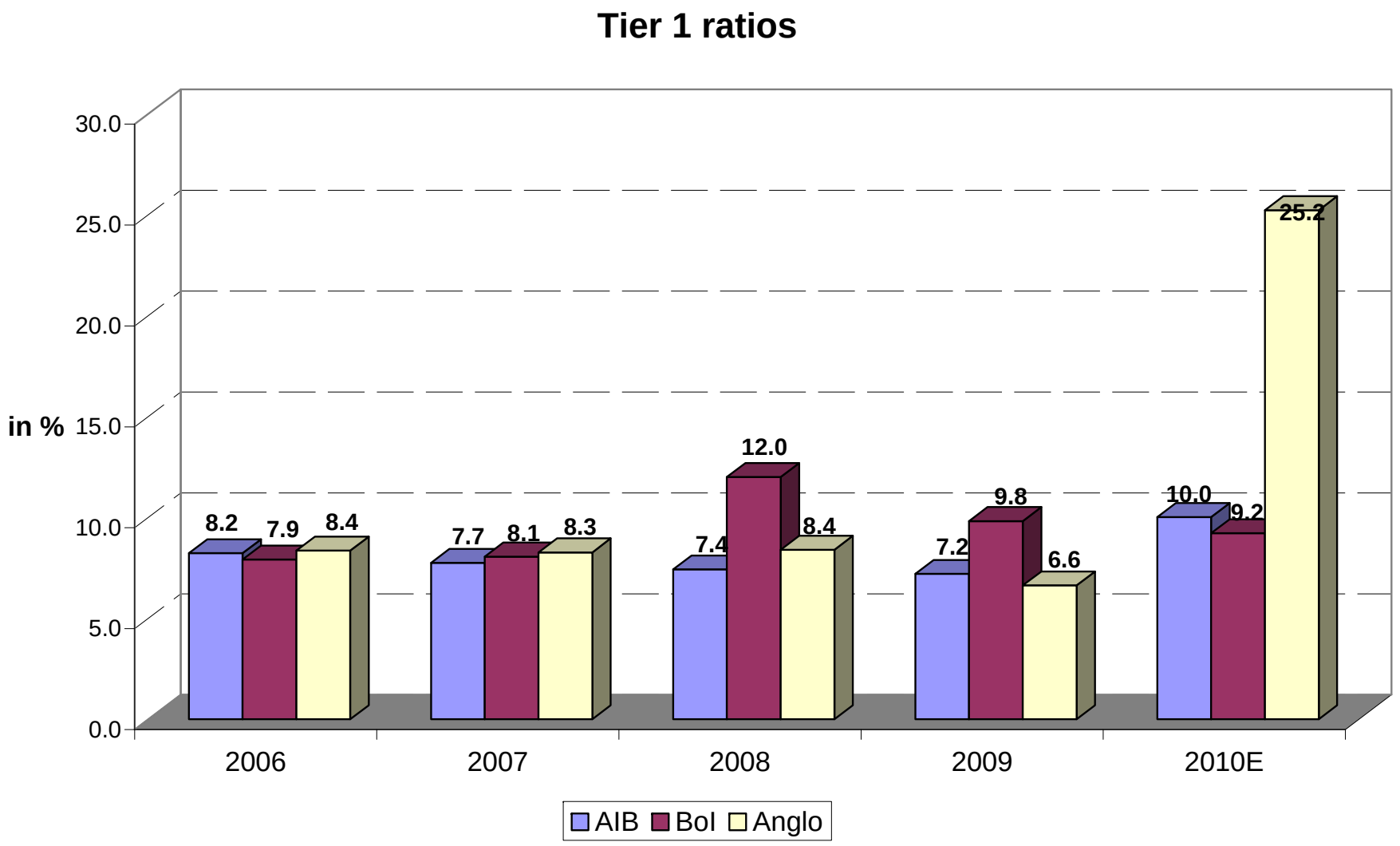
…and also credit grew

very high credit growth rate in a mature banking market

Percentage change (y-o-y) in gross customer loans



…and average capital ratios (Tier 1) kept supervisors contend



But eventually empirical question: A simple early warning model

Signalling approach by Kaminski/Reinhart, 1999

	Costly Boom/Bust Cycle (following within 6 quarters)	No Costly Boom/Bust Cycle (following within 6 quarters)
Signal issued	A	B
No signal issued	C	D

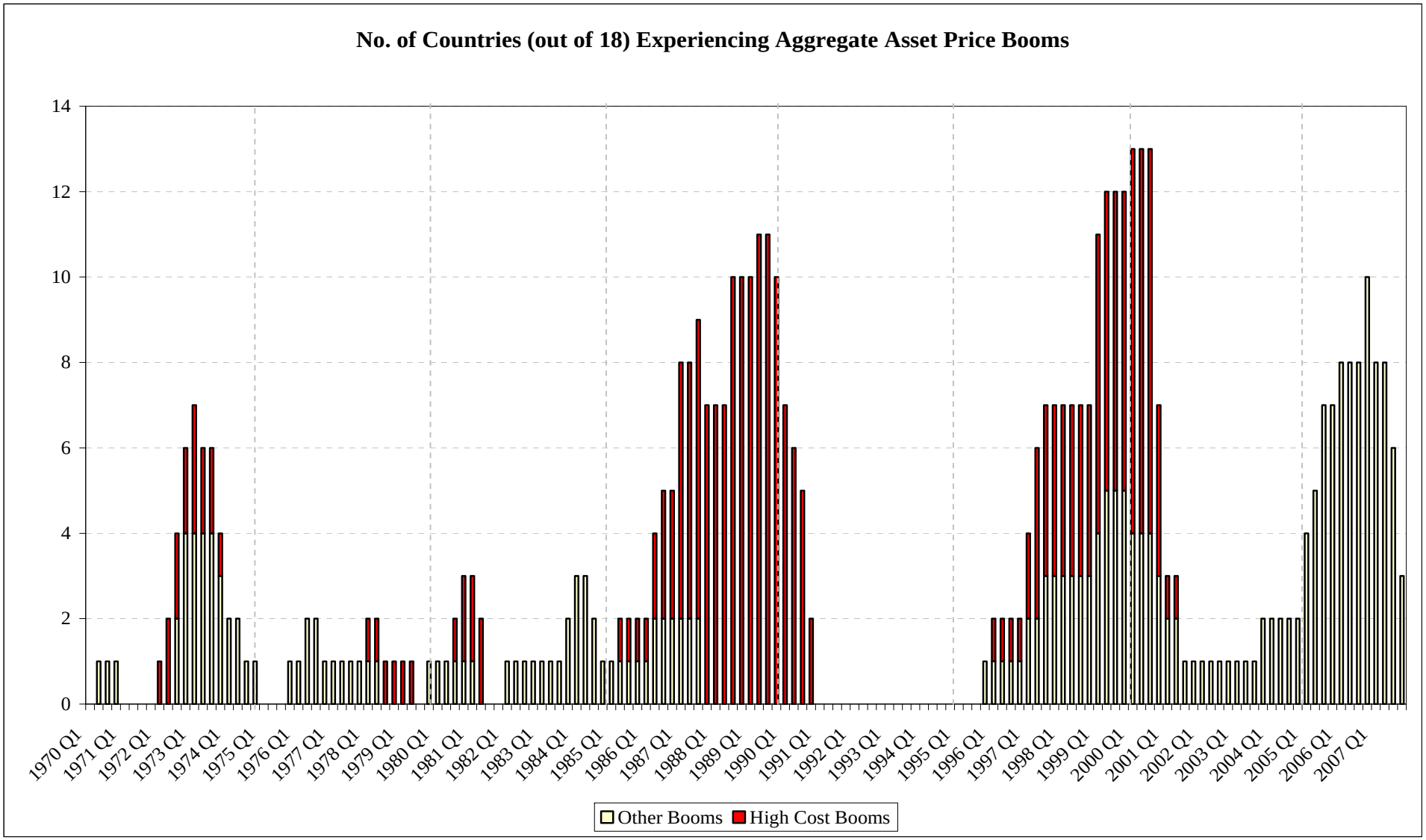
Policy Makers'Loss Function (Demirgüc-Kunt/Detragiache, 1999; Alessi/Detken, 2011) :

$$L = \theta \frac{C}{A+C} + (1-\theta)\frac{B}{B+D}.$$

Some methodological improvements

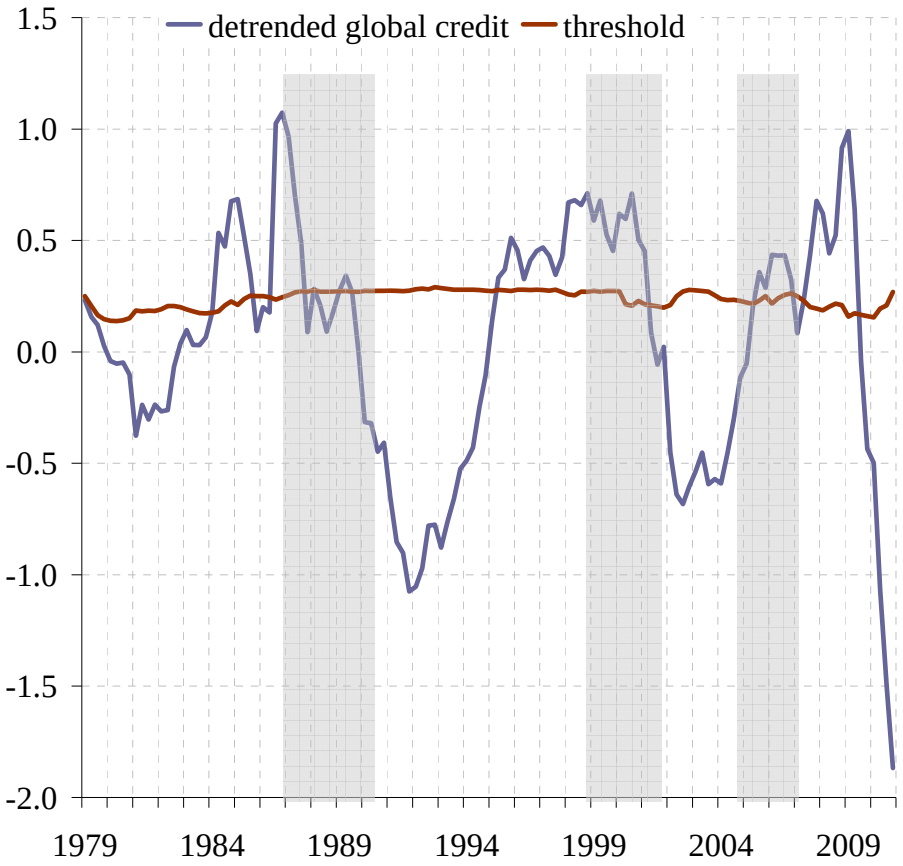
- Quasi real time, out of sample evaluation
- Policy makers preferences accounted for in intuitive way
- Tougher usefulness measure than noise to signal ratio
- Caveats:
  - costly aggregate asset price booms not banking crisis
  - boom identification not necessarily robust
  - unbalanced data panel

Identified aggregate asset price booms



The best single measure in this type of exercise

Global credit gap for advanced economies
(Q1 1979 – Q4 2010; percentages)



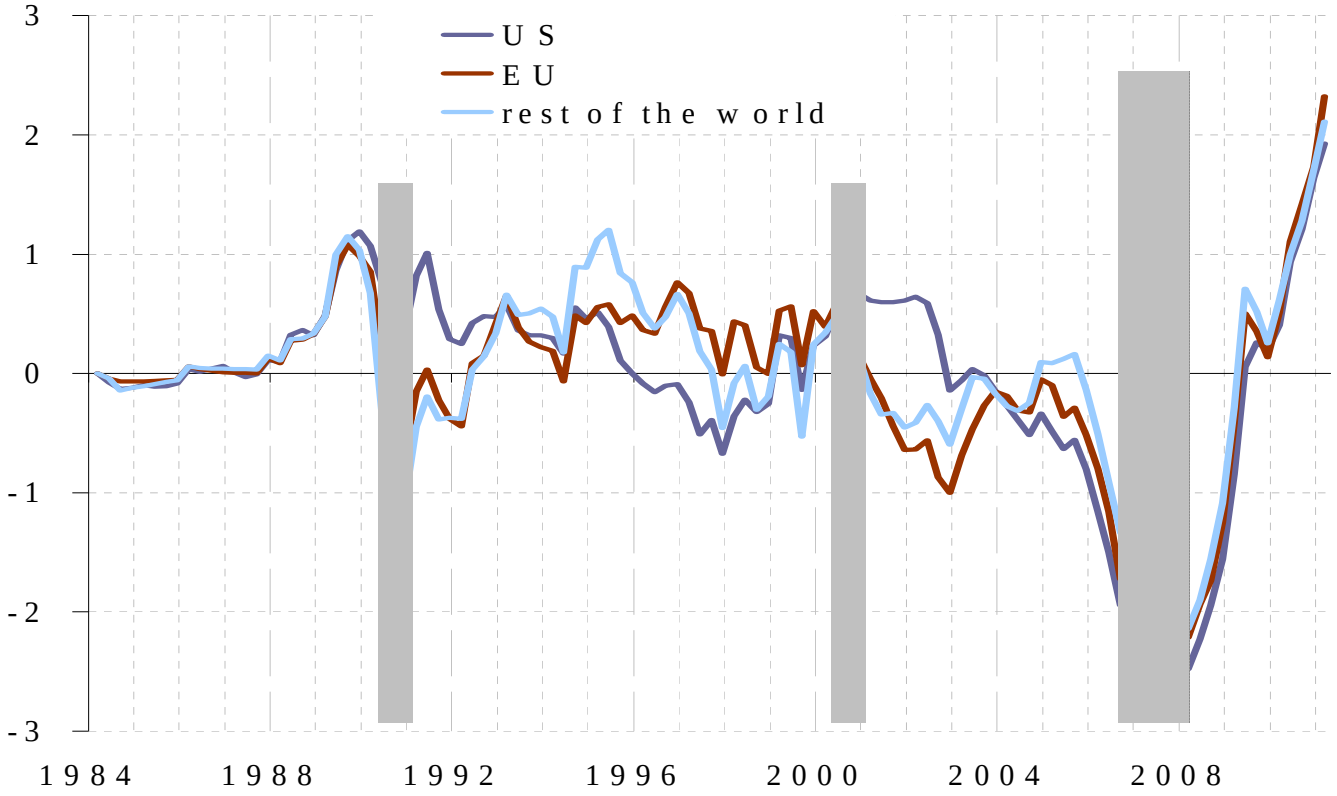
Source: Based on L. Alessi and C. Detken, "Quasi real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity", European Journal of Political Economy, forthcoming.

Recent ECB studies find:
74-82% correct warnings
26-32% false alarms
95% (70%) of booms (busts) predicted in at least one of 6 (8) preceding quarters

Reinhart and Rogoff (2009), "This time is different": It is feasible to establish "an effective and credible early warning system capable of producing relatively reliable signals of distress from the various indicators in a timely manner"

A new indicator to be tested…

Deviations of credit risk conditions from macro fundamentals for financial firms
(Q1 1984 – Q1 2011)



Sources: Moody's DRD, Moody's KMV CreditEdge, Thomson Reuters Datastream and ECB calculations.
Notes: Horizontal axis measures time, while the vertical axis absolute deviations of risk conditions from fundamentals. See "Systemic risk diagnostics: coincident indicators and early warning signals" (2010) Schwaab, Koopman, Lucas.

Introducing some capital and liquidity soundness indicators…EU-11 (some preliminary results…)

Average results EU, same quartile

Indicators	Loss	Opt. Percentile	Min Percentile	Max Percentile	Coeff. Variation	% booms called	A/(A+C)	B/(B+D)	n2s	A/(A+B)	diffprob	ALT	s2n
Global PC gap	0.3130	65	30	95	0.3029	0.7114	0.6219	0.2478	0.3985	0.5788	0.2187	5.5648	2.5095
CBI US ABS	0.3407	20	10	70	0.7824	0.9872	0.8706	0.5520	0.6340	0.4768	0.1069	5.6645	1.5774
Global PC lev	0.3746	75	5	90	0.3840	0.8891	0.7705	0.5196	0.6744	0.4507	0.0906	5.4278	1.4827
CBI EU ABS	0.3903	85	20	95	0.4562	0.5851	0.3172	0.0978	0.3084	0.6434	0.2735	3.8968	3.2429
PC2GDP	0.4211	95	5	95	0.3283	0.6438	0.4734	0.3156	0.6668	0.4395	0.0794	5.0291	1.4998
PC2GDP gap	0.4269	80	25	80	0.3842	0.5791	0.3266	0.1804	0.5523	0.5164	0.1563	4.1252	1.8107
L2D gap	0.5037	85	10	95	0.4074	0.0944	0.1075	0.1099	1.0223	0.3833	-0.0077	2.9286	0.9781
L2D	0.5058	90	50	90	0.2235	0.1153	0.1348	0.1547	1.1476	0.3827	0.0550	3.6250	0.8714
TA2GDP gap	0.5115	95	25	95	0.3766	0.0148	0.0180	0.0335	1.8582	0.3000	-0.1538	1.2500	0.5382
CBI EU	0.5273	95	5	95	0.5967	0.0166	0.0086	0.0632	7.3746	0.0606	-0.3093	1.0000	0.1356
TA2CAP	0.5298	70	5	95	0.5622	0.1841	0.2714	0.3179	1.1712	0.4218	0.0742	3.1201	0.8538
TA2GDP	0.5954	95	5	95	0.7618	0.0473	0.0612	0.2260	3.6921	0.1426	-0.2533	1.5000	0.2709

CBI EU - Credit Bubble Indicator for EU, start date Q1 1985
CBI EU ABS - Credit Bubble Indicator for EU in absolute value, start date Q1 1985
CBI US ABS - Credit Bubble Indicator for US in absolute value, start date Q1 1985
Global PC gap - Global Private Credit (gap), start date Q1 1984
Global PC lev - Global Private Credit (levels), start date Q1 1984
L2D - Loans to deposits ratio (levels), start date Q3 1997 - Q4 2002
L2D gap - Loans to deposits ratio (gap), start date Q3 1997 - Q4 2001
PC2GDP - Private Credit to GDP ratio (levels), start date Q1 1984
PC2GDP gap - Private Credit to GDP ratio (gap), start date Q1 1984
TA2CAP - Total Assets to Capital and reserves ratio (levels), start date Q4 1997 - Q1 2002
TA2GDP - Total Assets to GDP ratio (levels), start date Q3 1997 - Q4 2003
TA2GDP gap - Total Assets to GDP ratio (gap), start date Q3 1997 - Q4 2003

Introducing some capital and liquidity soundness indicators…EA-8 (some preliminary results…)

Weighted average results EA, same quartile

Indicators	Loss	Opt. Percentile	Min Percentile	Max Percentile	Coeff. Variation	% booms called	A/(A+C)	B/(B+D)	n2s	A/(A+B)	diffprob	ALT	s2n
Global PC lev	0.2935	75	5	90	0.4378	0.9642	0.8808	0.4679	0.5312	0.4792	0.1460	5.7019	1.8826
CBI US ABS	0.3105	20	10	70	0.8109	0.9982	0.9174	0.5385	0.5870	0.4692	0.1240	5.7946	1.7036
CBI EU ABS	0.3287	85	20	95	0.4449	0.7362	0.4054	0.0628	0.1549	0.7612	0.4160	4.2816	6.4573
TA2CAP	0.3597	45	5	85	0.6201	0.2302	0.2698	0.1805	0.6689	0.6263	0.2162	3.8121	1.4951
Global PC gap	0.3750	35	30	95	0.3593	0.9199	0.6783	0.4282	0.6314	0.4401	0.1069	4.9986	1.5839
TA2GDP gap	0.4295	85	25	95	0.4229	0.2102	0.1053	0.1219	1.1576	0.4009	-0.0204	2.1909	0.8638
L2D	0.4361	90	50	90	0.2465	0.1134	0.1155	0.1644	1.4233	0.1440	0.0128	1.2564	0.7026
PC2GDP	0.4378	95	70	95	0.1149	0.6554	0.4788	0.3543	0.7401	0.4050	0.0718	5.0616	1.3512
L2D gap	0.4383	95	10	95	0.4760	0.0058	0.0075	0.0291	3.8894	0.0881	-0.1159	0.0881	0.2571
PC2GDP gap	0.4454	80	25	80	0.3927	0.5492	0.3170	0.2079	0.6557	0.4607	0.1275	3.8422	1.5251
TA2GDP	0.4817	10	5	95	0.9477	0.3937	0.7114	0.9461	1.3299	0.3915	-0.0298	4.4712	0.7519
CBI EU	0.5160	95	5	95	0.5746	0.0424	0.0224	0.0544	2.4249	0.1629	-0.1823	0.4888	0.4124

CBI EU - Credit Bubble Indicator for EU, start date Q1 1985
CBI EU ABS - Credit Bubble Indicator for EU in absolute value, start date Q1 1985
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TA2GDP gap - Total Assets to GDP ratio (gap), start date Q3 1997 - Q4 2003

Conclusions

- There are important micro and macro-prudential reasons for strongly capitalised banks

  There is some evidence that the probability of crises depends on banks capitalisation as well as their funding costs and wholesale market access.
- The costs of higher capital ratios seem often to be overestimated
- The marginal value added of capital ratios as well as leverage for early warning exercises remains to be proven. The former is less surprising than the latter. It seems difficult to beat the global private credit gap in a simple signalling approach horse race as an early warning indicator.

Background slides

Check for redundancy of some of the indicator variables

Correlation Tables

Data from Q4 1997 to Q4 2010 *

Private Credit/GDP vs LTD

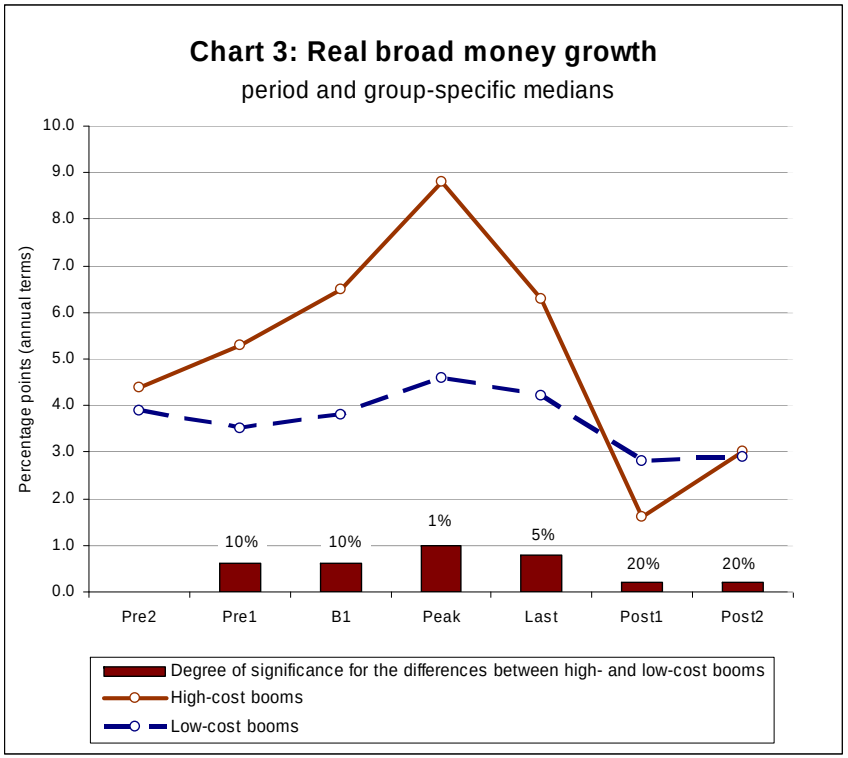
	BE	DE	DK	ES	FI	FR	GB	IE	IT	NL	SE
Q4 1997 - Q4 2010	0.710	0.301	-0.711	0.503	0.712	-0.265	0.660	0.338	0.221	0.020	0.453
Q4 1997 - Q2 2007	0.112	-0.044	-0.532	0.963	0.960	-0.603	0.400	0.700	0.883	0.890	0.659
Q3 2007 - Q4 2010	-0.429	-0.425	0.347	-0.992	-0.836	0.625	0.317	-0.881	-0.974	-0.379	-0.791

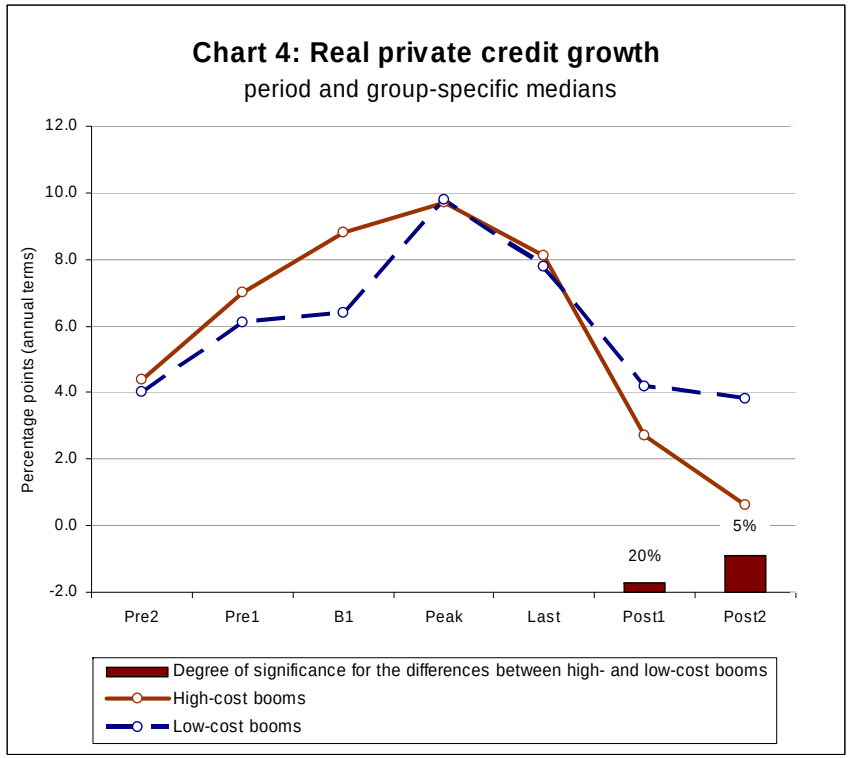
Leverage vs Tot.Assets/GDP

	BE	DE	DK	ES	FI	FR	GB	IE	IT	NL	SE
Q4 1997 - Q4 2010	0.070	-0.698	0.199	0.464	0.203	0.765	0.664	0.748	-0.704	0.598	0.676
Q4 1997 - Q2 2007	0.478	-0.674	0.342	0.673	-0.732	0.536	0.932	0.973	-0.106	0.873	0.610
Q3 2007 - Q4 2010	0.536	0.398	0.935	-0.660	0.938	-0.346	-0.232	-0.546	-0.281	0.212	-0.241

* Except for Denmark (Q4 2000 - Q2 2009), United Kingdom (Q1 1999 - Q4 2010) and Sweeden (Q4 2001 - Q2 2009)

Some stylised facts about money and credit growth during aggregate asset price booms





Source: Adalid/Detken (2007)

Basel III - Liquidity risk standards

- Crisis experiences:
  - Over-reliance on short-term market funding to finance longer-term assets
  - Faulty assumptions and plain disregard of market liquidity
  - Neglect of certain sources of cash flow drains (e.g. margin requirements)

  => Inadequacy of liquidity risk management at many firms

Basel III - Liquidity risk standards

- Regulatory response

  - Raising international liquidity risk standards
    - Introduction of "Principles for Sound Liquidity Risk Management and Supervision" in 2008
    - Regulatory liquidity risk framework as part of Basel III, issued in 2010

Basel III - Liquidity risk standards

1. Liquidity Coverage Ratio (LCR):

$$\text{LCR} = \frac{\text{Stock of highly liquid assets}}{\text{Expected net cash outflow in 30 days}} \overset{!}{\geq} 1$$

- Purpose:
  - Establish a minimum level of high-quality liquid assets to withstand an acute stress scenario lasting one month

Basel III - Liquidity risk standards

2. Net stable funding ratio (NSFR):

$$\text{NSFR} = \frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} \overset{!}{\geq} 1$$

- Purpose:
  - To ensure a closer alignment of the funding of longer-term assets or activities by more stable medium or longer-term liability and equity financing

Very high (overstated) profitability