Credit Boom: the Good, the Bad, and the Ugly

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Financial development, growth, and crises

- Financial deepening both cause and effect of economic growth (Rajan and Zingales, 1998).
- However, periods of *too fast* credit growth, "lending booms," have been associated with crises in both emerging market and advanced economies
- Yet, only a few of booms end up in crises and evidence suggests they contribute to financial deepening
- Objective of this paper:
  - Find a way to identify dangerous booms
  - Investigate potential benefits of "good" booms [to be done]

Paper Part of Larger Agenda at the Fund

- Several papers on related issues are work in progress at the IMF
- Study on cyclical properties of booms, looking at both macro and micro (firm data) variables (Mendoza and Terrones)
- Paper looking at bank probability of default during booms (Detragiache, Igan, Tamirisa)
- Work on U.S. sub-prime mortgage crisis: a sectoral credit boom gone bad (Dell'Ariccia, Igan, Laeven)

Credit Booms and Crises: Theory

- "*Financial accelerators*" (Kyiotaki and Moore, JPE 1997): an increase in value of collateralizable goods releases credit constraints. Boom fuels further wealth effects etc. Negative shocks inverts cycle, leaving banking system overexposed.

- "*Institutional memory*" (Berger and Udell, JFI 2004): in periods of fast credit expansion difficult for banks to recruit enough experienced loan officers (especially if there has not been a crisis for a while). This leads to a deterioration of loan portfolios.

- *Lending booms and credit standards* (Dell'Ariccia and Marquez, JF 2006): during expansions, adverse selection is less severe and banks find it optimal to trade quality for market share, increasing crisis probability.

Credit Booms and Crises: Evidence

- Positive, but weak, link between rapid credit growth and crises: Caprio and Klingebiel (1996), Demirgüç-Kunt and Detragiache (1997), Kaminsky and Reinhart (1999).

- Gourinchas et al. (2001): some association between booms and crises. Many crises preceded by booms, but only some booms followed by crises. Mendoza and Terrones (WEO 2004): most episodes of extreme credit growth are associated with crises.

- However, financial deepening also associated with economic growth (Levine, Loayza and Beck, 2000, Rajan and Zingales, 1998)

- **Can we tell "Good" booms from "Bad" ones?**

Objective and Methodology

- Look at past credit booms and separate bad from good ones
- Make it operational:
  - Focus on contemporaneous variables only
  - Focus on commonly available data
- Provide a tool for early warning of financial distress
- Two approaches:
  - Predict bad booms in a cross-section of booms
  - Interact boom variable with other regressors in a more standard banking crises model

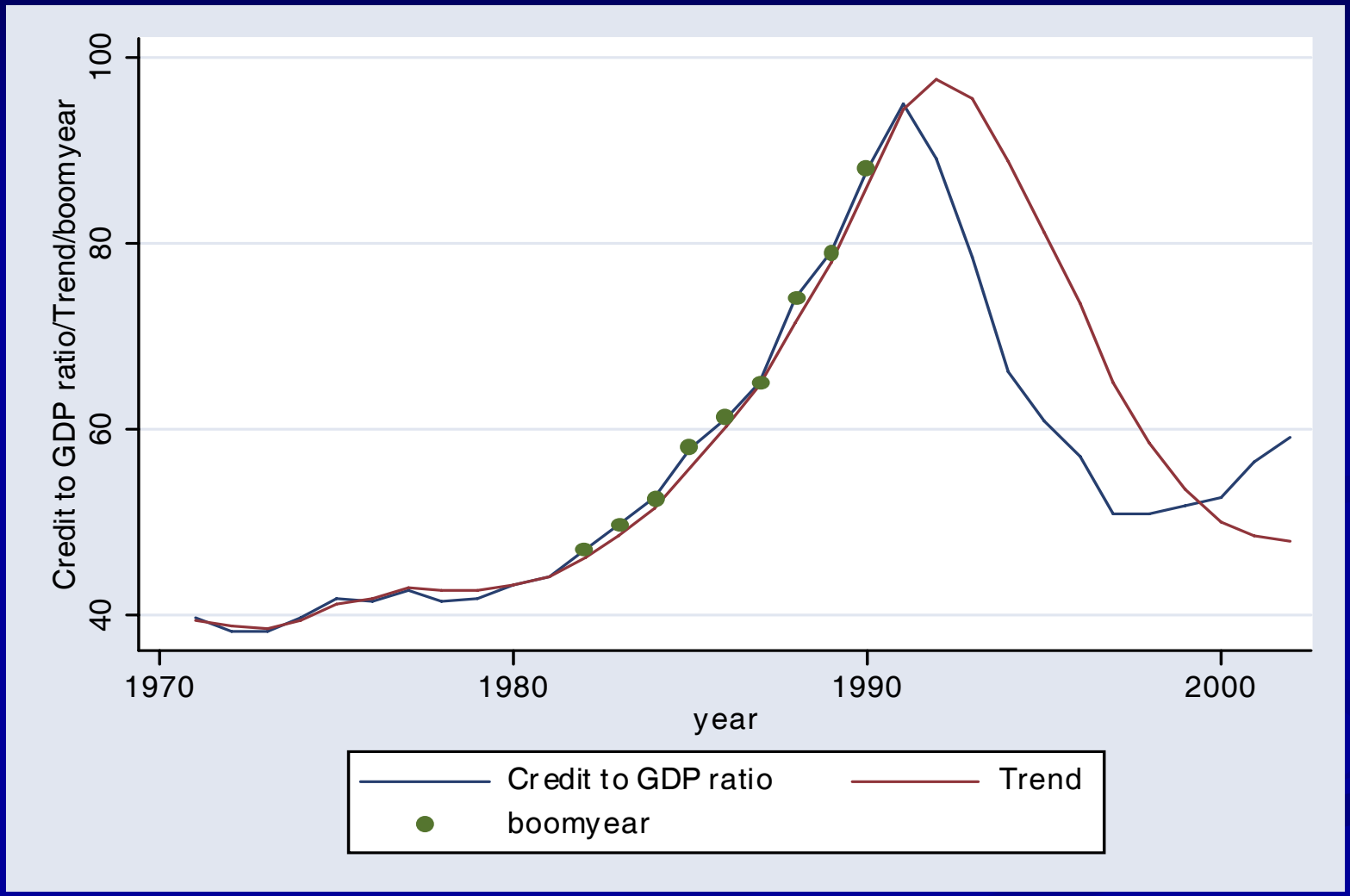
How to define lending booms

- Periods of significantly faster than normal credit growth
- Typically measured relative to GDP to control for inflation and economic growth. Mendoza and Terrones (2004) use real credit growth
- Definition should be to some extent country specific and path dependent...
  - Speed and volatility of credit varies across country/time
- ...but standard enough to allow for cross-country comparison
- Link to crises: define a boom as "bad" if crisis follows within two years from its end

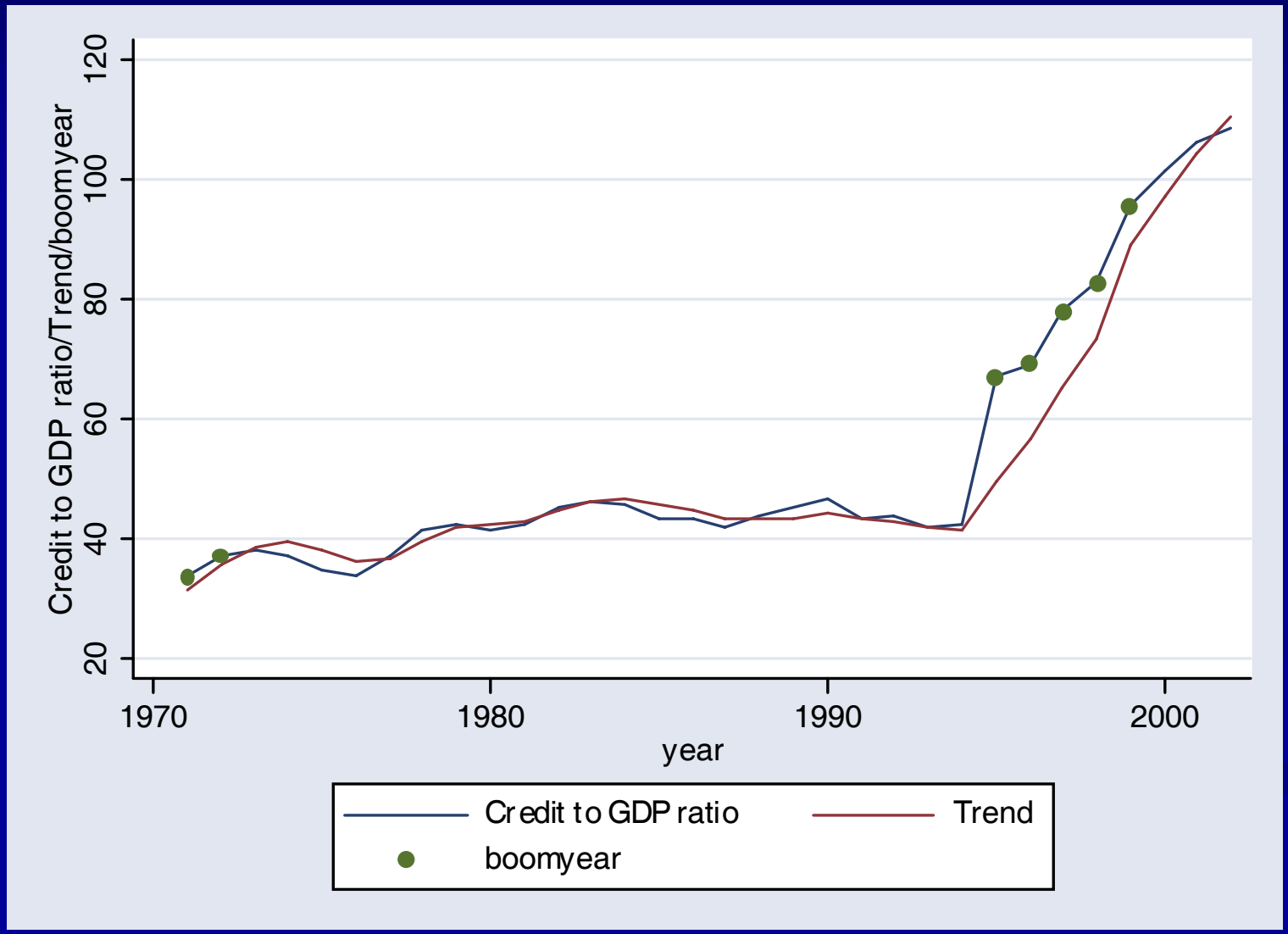
How to define lending booms

- Credit-to-GDP ratio is typically trended.
- Approximate its evolution with a rolling non-linear trend (Gourinchas et al., 2001).
- Compute rolling standard deviation of deviations from trend. Allow for country/path dependent patterns (Mendoza & Terrones, 2004).
- Focus on both growth and level of credit-to-GDP ratio.
- "Lending boom" needs to meet either of these conditions:
  - deviation from trend > 1.5 times SD & growth of credit-to-GDP ratio > 10%.
  - growth of credit-to-GDP ratio > 20%.
- Alternative definition: growth of credit-to-GDP ratio > 10%.

Bad boom: Finland 1980s



Good boom: Ireland 1990s

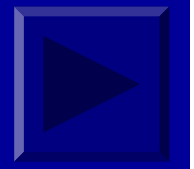


Dataset

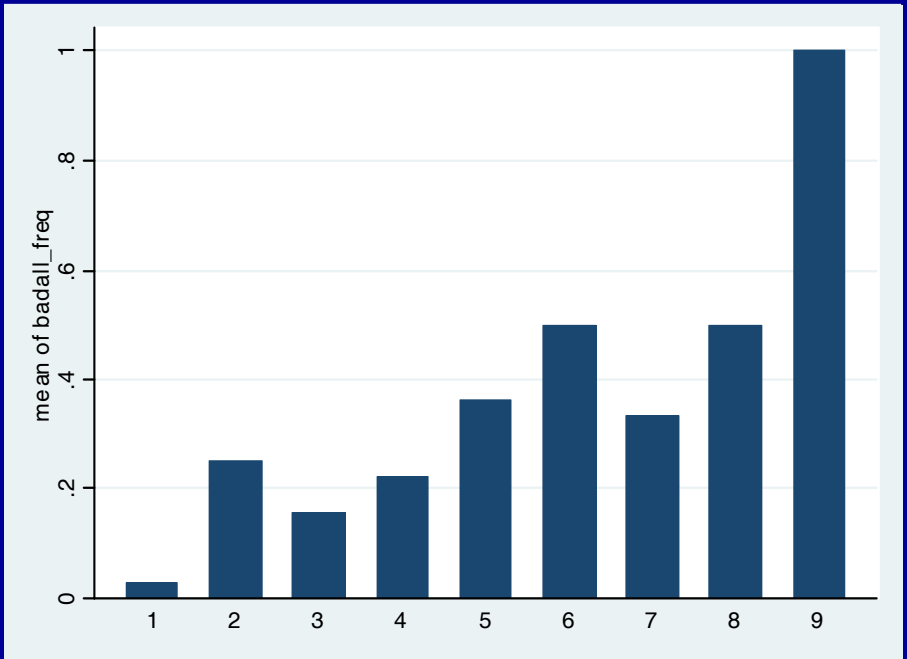
- Try to keep to variables that are available cross country:
  - Credit to the private sector (IFS)
  - Correct for breaks in the series
  - Banking crisis data from Caprio et. al (2003)
  - Control variables from WB and IFS
  - Abiad-Mody dataset on financial sector liberalization

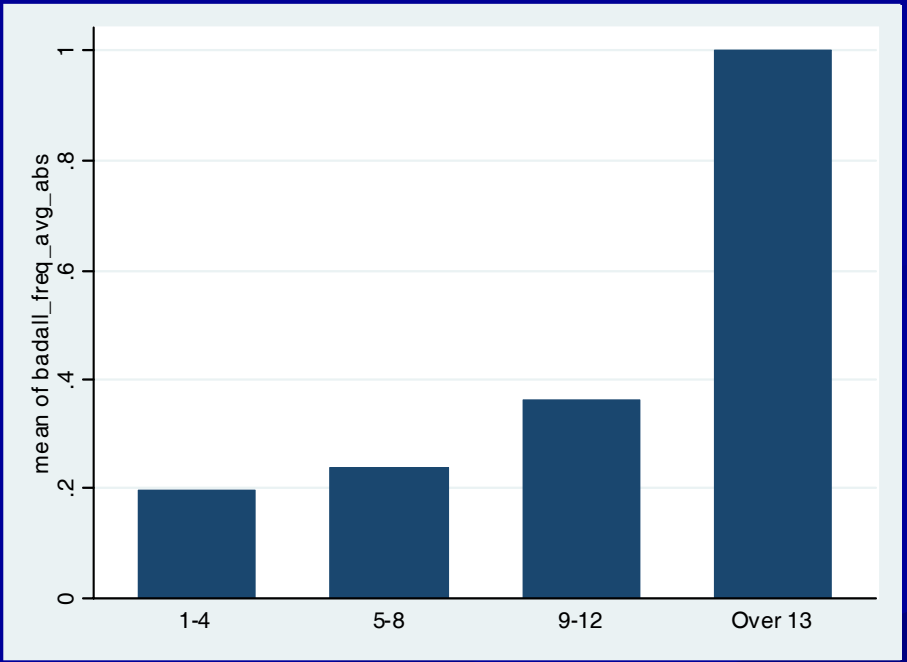
Stylized Facts

- Identified 135 booms in about 100 countries:
  - 104 soft landing, "good"
  - 31 precede banking distress (about 100 episodes) "bad"
  - of which 23 systemic crises (about 70 episodes) "ugly"
  - Larger numbers, but similar proportions with alternative criterion
- Bad and good booms are not alike (on average)
- Descriptive Statistics



Boom Characteristics Matter





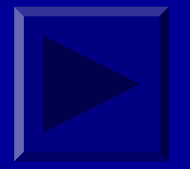
Bad and Good booms: Descriptive Stats

	Good	Bad
Inflation	11.9	19.0
GDP growth	6.7	5.4
CA/GDP	-2.9	-3.0
GDP per capita	$5675	$6350
Credit/GDP	29.7	38.4
ΔCredit/GDP	4.0	4.2
Duration	2.9	5.1
Openness (trade/GDP)	0.62	0.43
Supervisory Index	1.03	0.31

Sub-sample of 79 booms for which all the data is available, and inflation < 100%

Results So Far

- Logit regressions indicate that bad booms:
  - Are larger
  - Last longer
  - Are associated with higher inflation rates
  - Occur in less open economies
  - Are accompanied by weaker bank supervision
  - Are accompanied by lower growth (weak significance)
  - Are accompanied by larger CA deficits (weaker significance)
- Coefficients are fairly consistent across boom definitions.
- Effects are economically relevant:
  - 1 year in duration increases crisis probability by 4 percent



Effects are Economically Relevant

Table 3. Marginal Effects

Dependent variable: Probability of a crisis to occur within two years form the boom	Base criterion	Credit-to-GDP growth over 10 percent	HP filter over entire sample
Duration	0.04*	0.03**	0.06
Size	0.05**	0.05***	0.06**
Inflation	0.004***	0.004***	0.004
Growth (GDP percapita)	-1.01**	-0.53	-0.61
Current Account Balance	1.05	0.71	1.40
Openness	-0.26	-0.18	-0.31
Quality of Supervision	-0.24***	-0.22***	-0.41

Episodes of hyperinflation (over 100 percent a year average) are excluded.

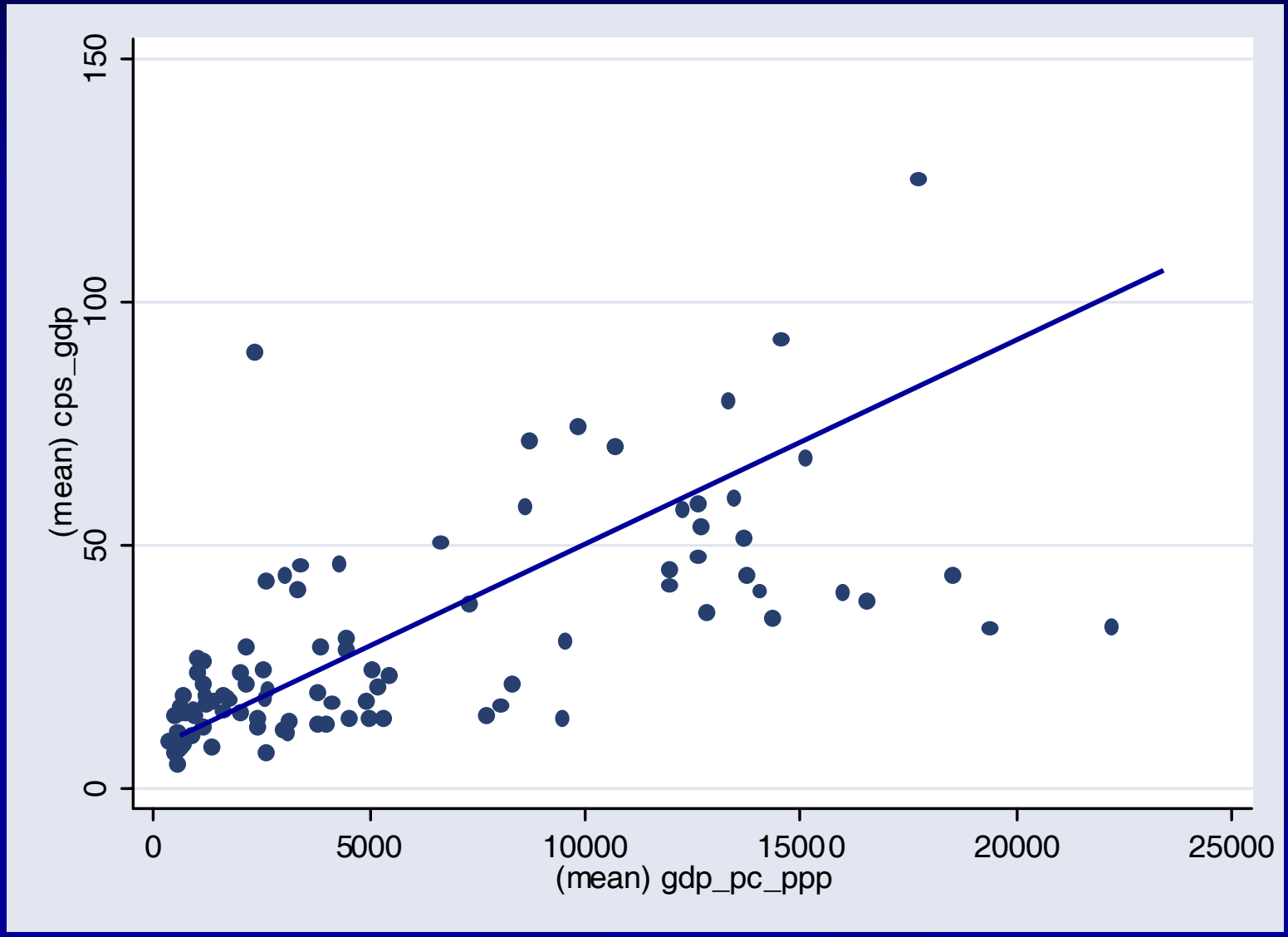
A Few Words of Caution...

- While model seems stable across boom definitions, its fit is not particularly good (Pseudo R^2: 0.2-0.4)
  - This is to be expected in models of crises
  - Yet, caution granted when using for forecasting
  - Also, some results are not fully consistent across models
- Causality issues should be carefully considered before using results for policy analysis
  - Regressions in this paper reflect associations, not necessarily causal linkages
  - Comparative statics may not apply

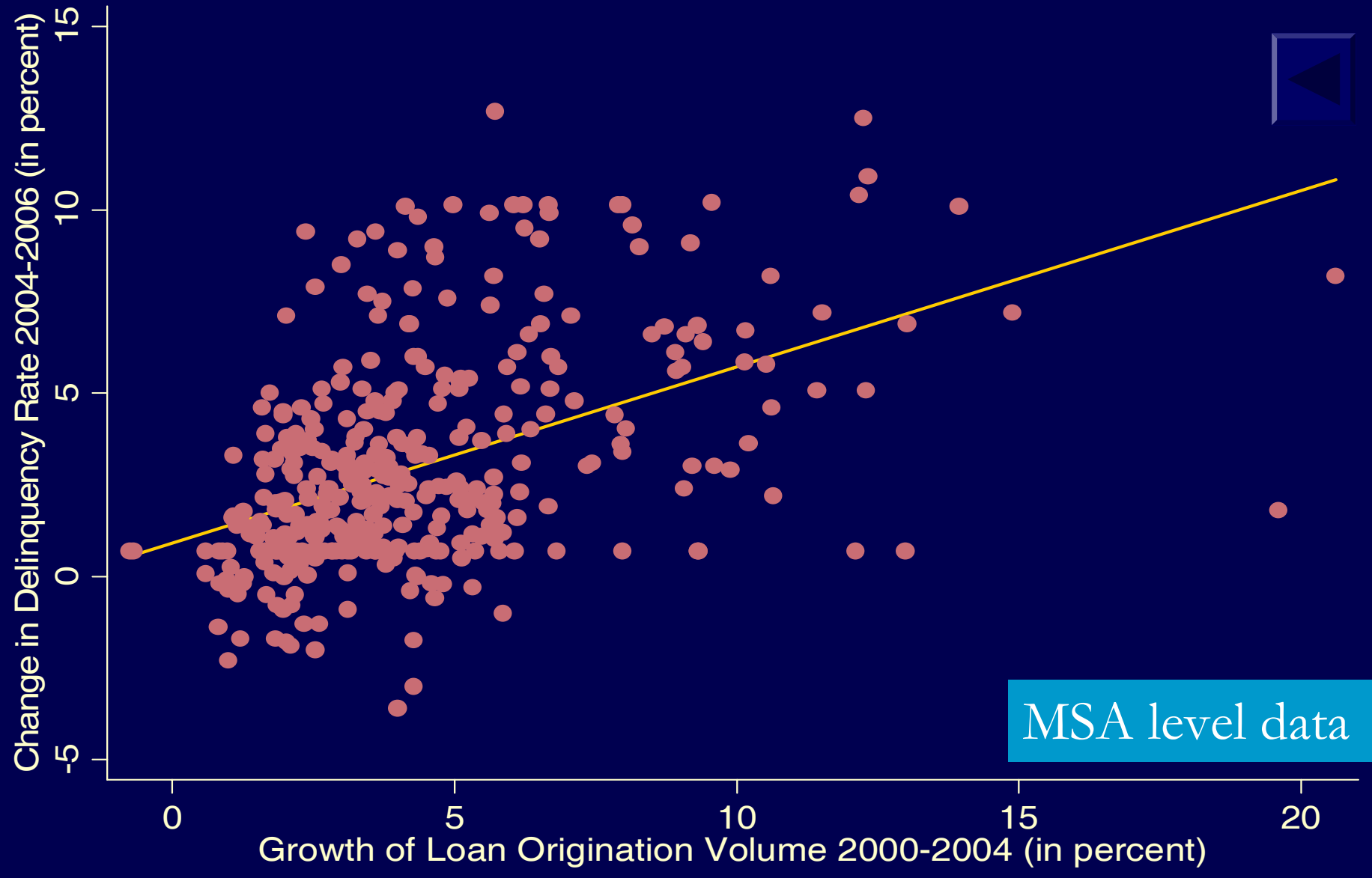
To do...

- Refine logit regressions:
  - Include additional regulatory and structural variables
  - Improve data coverage
  - Try alternative models for panel approach
- Duration model?
- Consider policy response:
  - Are there policies that reduce the likelyhood of bad booms?
  - Need to expand dataset
- Investigate potential benefits of “good” booms

Financial intermediation and growth

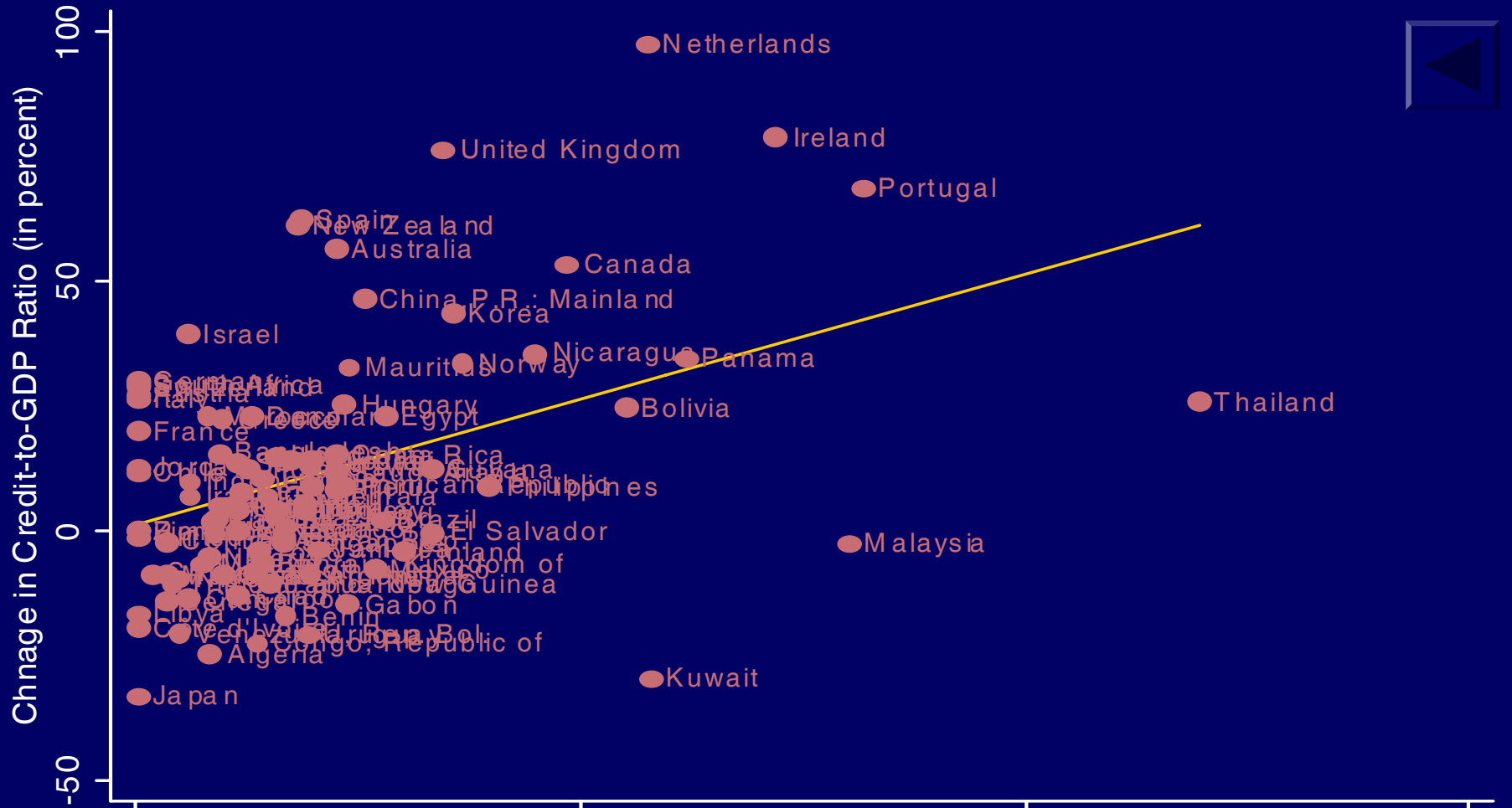


Subprime Crisis: A Credit Boom Gone Bad?



Credit Booms and Financial Deepening

(1985-2004)



Booms and Crises