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Credit booms and crises: the role of information

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** The views expressed here are my own and not those of the ECB's Executive Board or Governing Council*

Credit booms

- Fluctuations in credit are common, and more so in recent decades
  - Claessens et al. (2011): 114 credit cycles in 21=48 countries/years
  - Mendoza and Terrones (2012): 60 credit booms in 61=50 countries/years
  - Bakker et al. (2012): 175 credit booms in 170=50 countries/years

- **Good** things happen during credit booms...
  - Asset prices and GDP growth higher than in normal times
  - Investment growth twice as high as in normal times

- But they also raise **concerns**...
  - Often perceived to fuel a relaxation of lending standards and resource misallocation: "bad loans are made in good times" (old banker maxim)
  - Often followed by banking crises and low growth (Schularick and Taylor 2012)

- The now standard remedy is to impose some form of **macroprudential** regulation

- But merit depends on the underlying **source** of boom

Banking crises result in high output losses ...
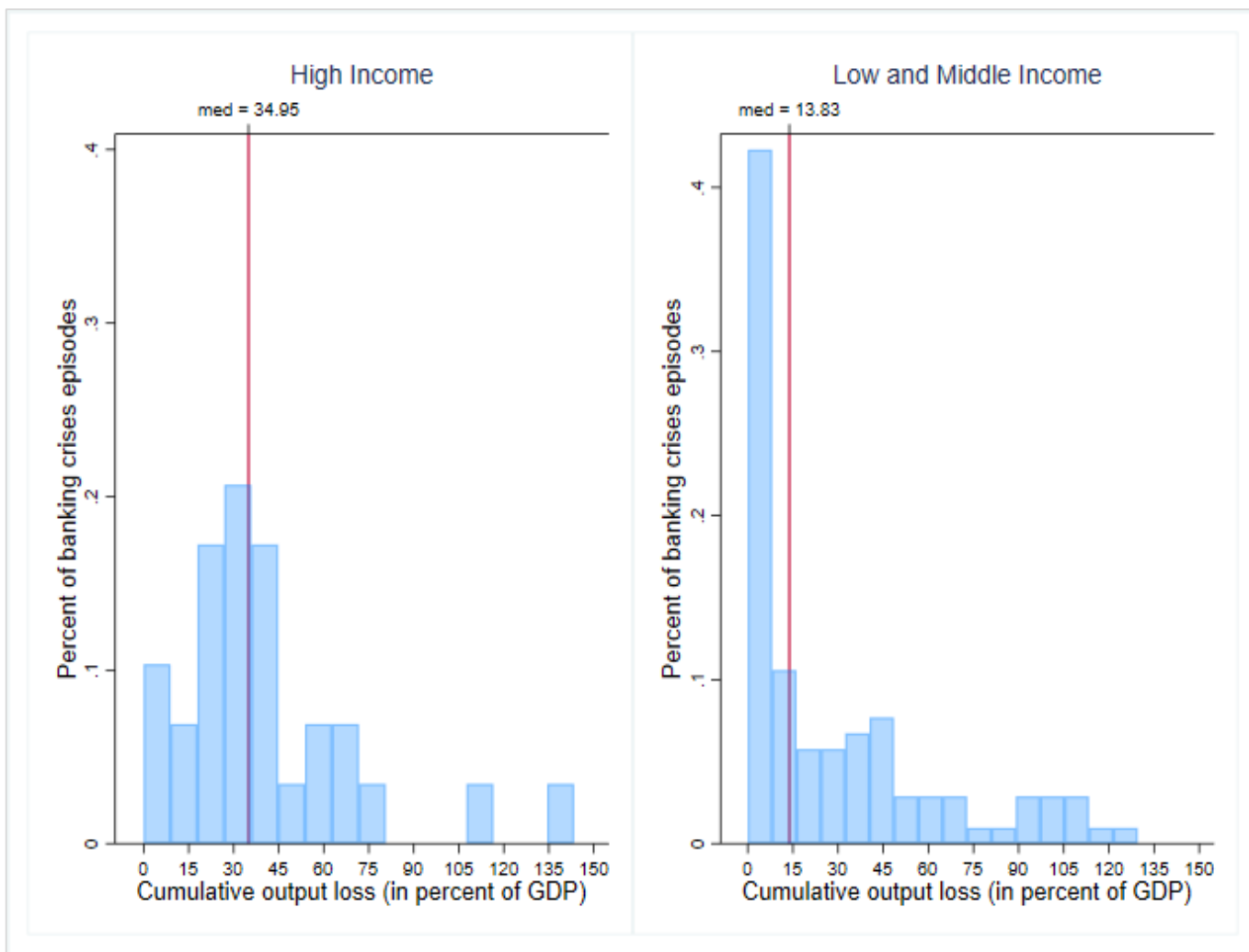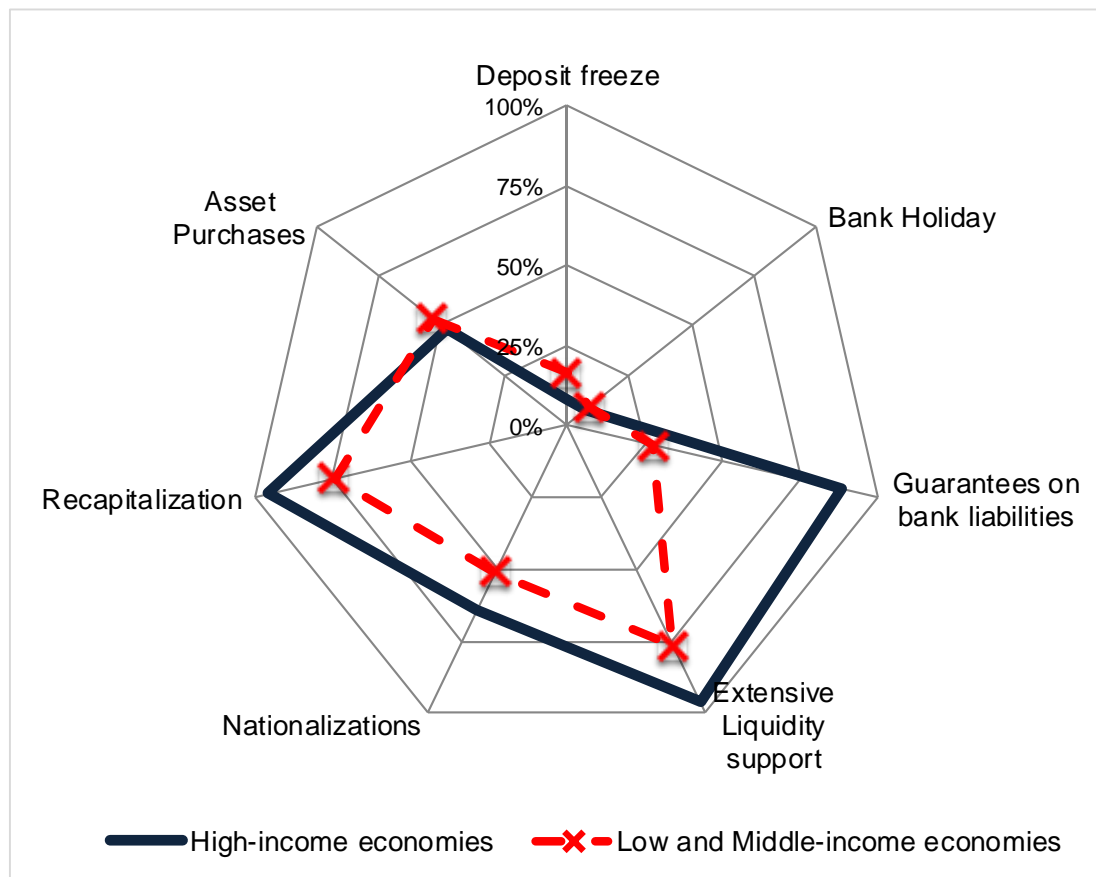

Source: Laeven and Valencia (2018)

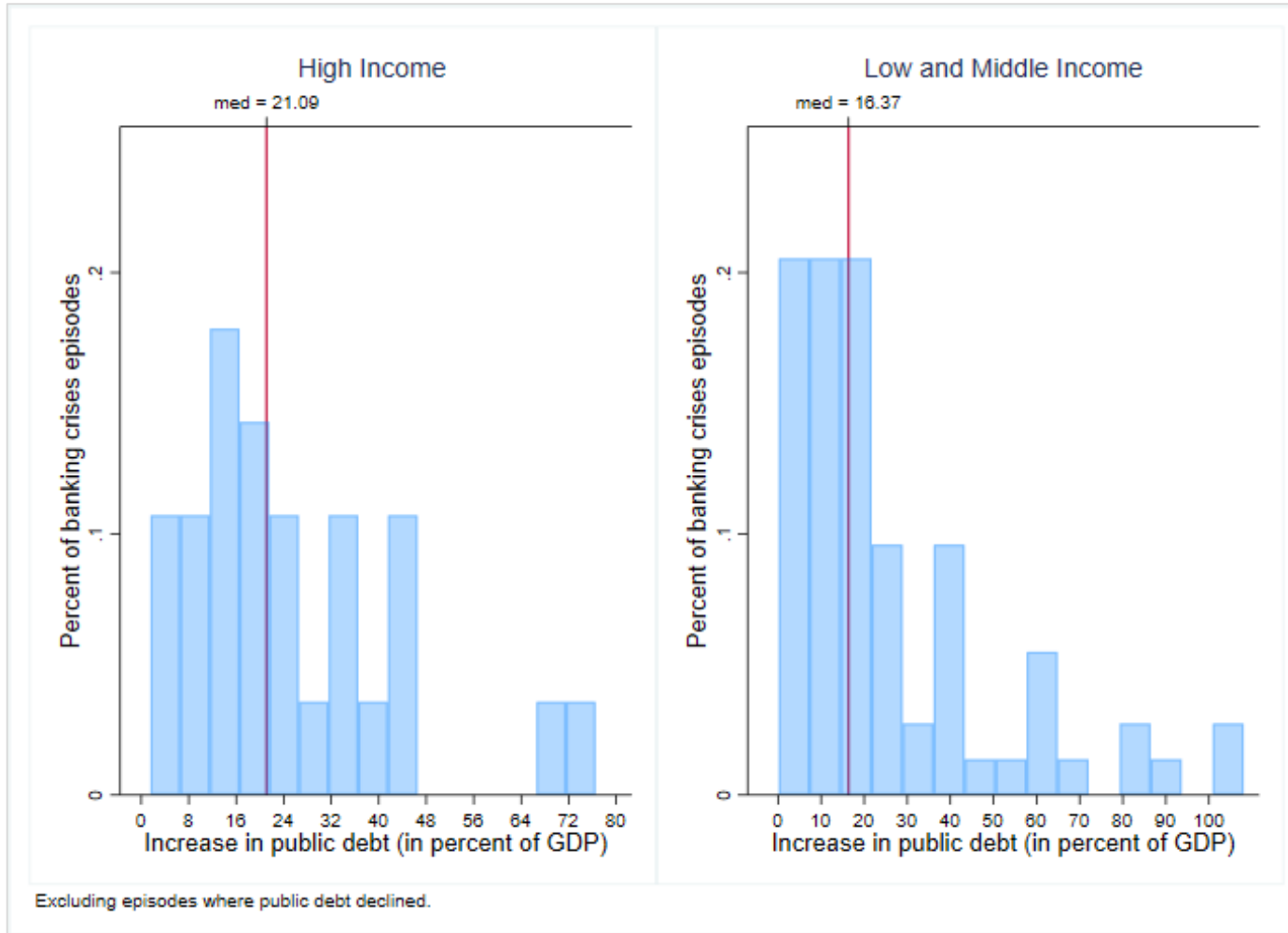# ... and are associated with high fiscal costs ...
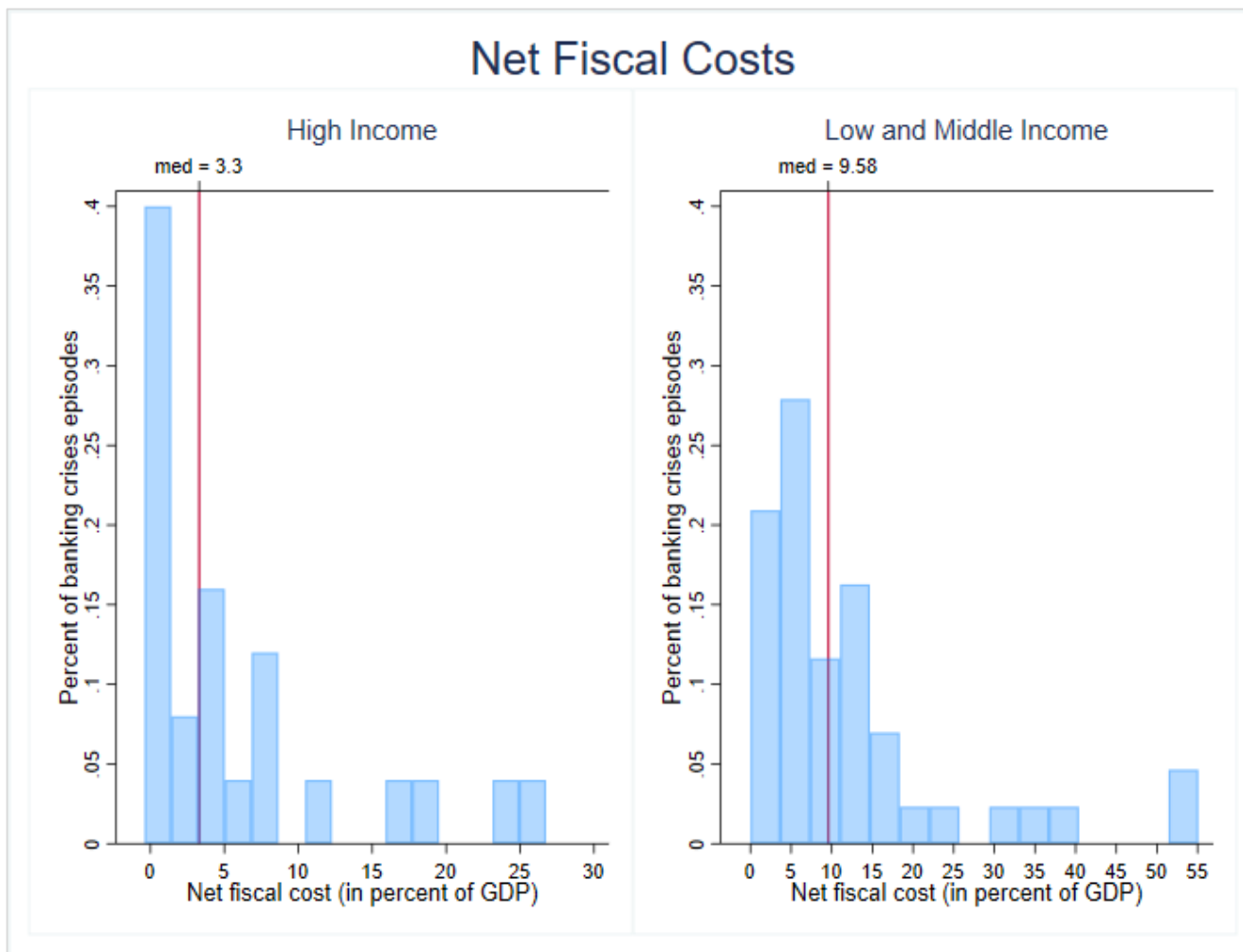
Source: Laeven and Valencia (2018)

... including from financial sector containment and resolution policies ...
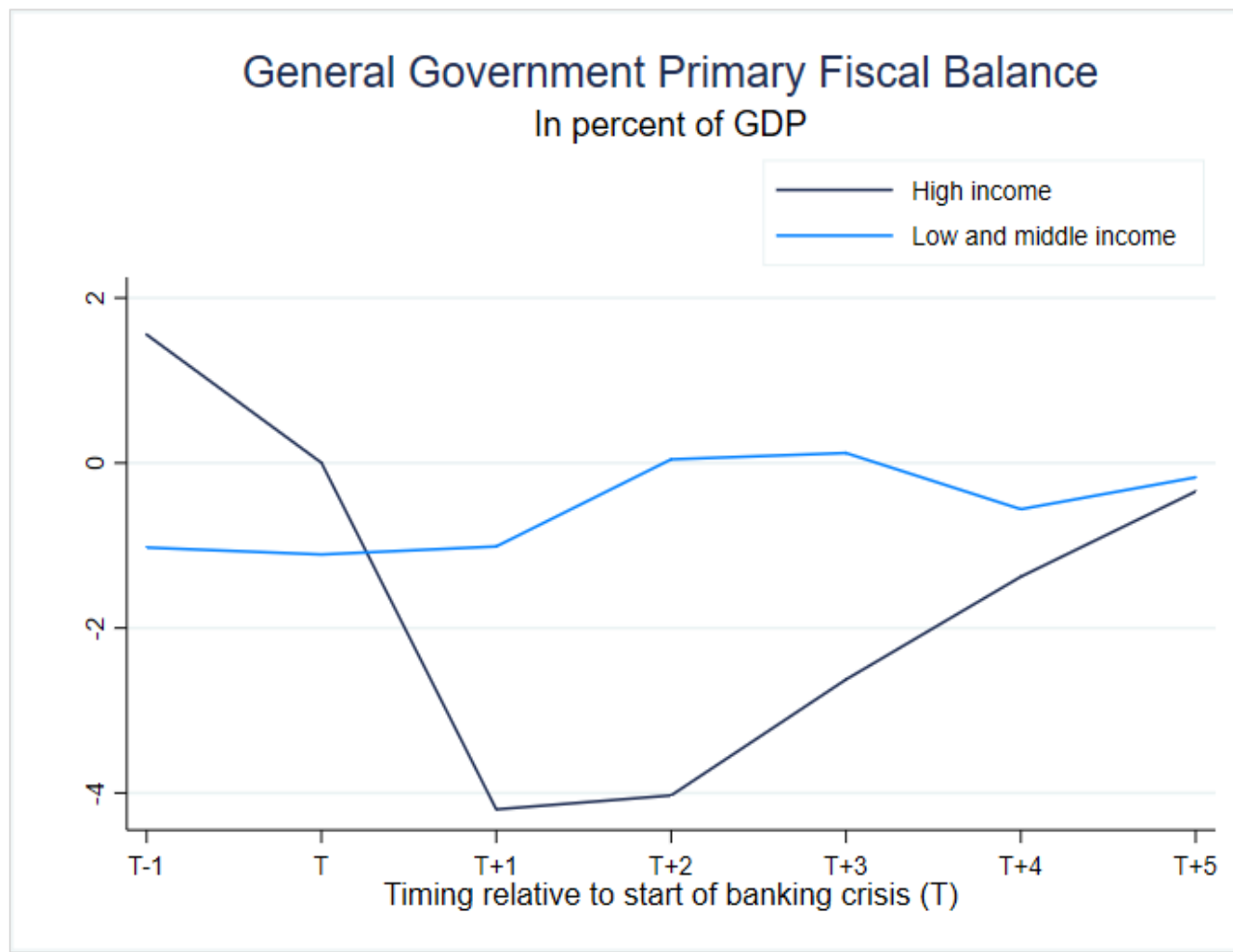

Source: Laeven and Valencia (2018)

… that contribute to large increases in public debt

Source: Laeven and Valencia (2018)

... despite supportive fiscal policy

Source: Laeven and Valencia (2018)

Distinguishing good and bad booms is challenging

- Using international data on 170 countries over the period 1970-2010, Dell'Ariccia, Igan, Laeven, and Tong (2015) show that only about **1-in-3** credit booms (defined either on the basis of real credit growth or deviations from trend) end up in a financial crisis or below-trend economic performance

- This implies that the cost of intervening too early and running the risk of stopping a good boom have to be carefully **weighted** against the desire to prevent financial crises

Credit booms gone wrong

Table 3. Credit Booms Gone Wrong							
	Followed by economic underperformance?						
Followed by financial crisis?	**No**		**Yes**		**Total**		
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**	
No	54	31%	64	37%	118	67%	
Yes	16	9%	41	23%	57	33%	
Total	70	40%	105	60%	175		

Notes: Number and proportion of credit boom episodes are shown. A boom is followed by a financial crisis if a banking crisis happened within the three-year period after the end of the boom and is followed by economic underperformance if real GDP growth was below its trend, calculated by applying a moving-average filter, within the six-year period after the end of the boom.

Source: Table 3 in Dell'Ariccia, Igan, Laeven, and Tong (2015)

Good and bad booms in international comparison

Figure 7. Bad versus Good Booms

Booms that last longer and that develop faster are more likely to end up badly. Booms that start at a high level of credit-to-GDP also tend to be bad.
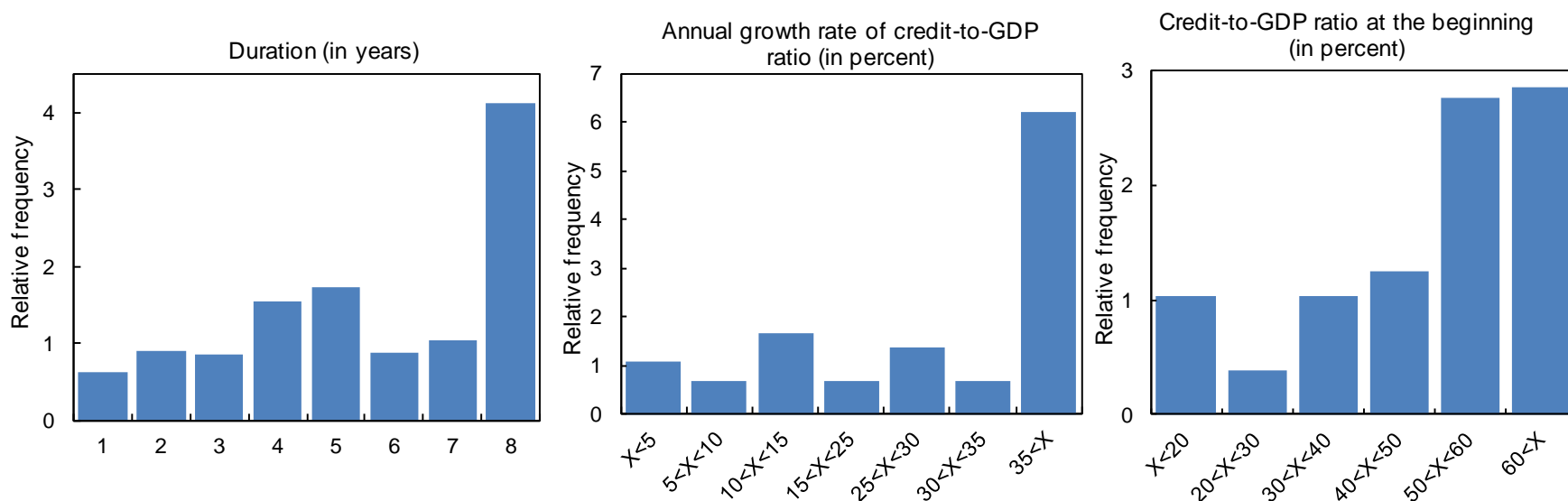
Sources: IMF *International Financial Statistics*; staff calculations.
Notes: Relative frequency is the frequency of a given attribute in bad booms divided by the frequency in good booms. Credit booms are identified as episodes during which the growth rate of credit-to-GDP ratio exceeds the growth rate implied by this ratio's backward-looking, country-specific trend by a certain threshold. Bad booms are those that are followed by a banking crisis within three years of their end.

Source: Dell'Ariccia, Igan, Laeven, and Tong (2015)

A new theory of credit booms based on information

- Collateral Booms and Information Depletion
  - Joint work with Vladimir Asriyan and Alberto Martin (CREi)

- Focus on key concern of credit booms: **Fall in credit quality**
  - Deteriorating information about borrowers (Becker et al. 2018)
  - Credit goes to "worse" quality projects (Asea and Blomberg 1998, Keys et al. 2010)

- Complementary to alternative explanations: Resource misallocation (Garcia Santana et al. 2017, Gopinath et al. 2017)

- We propose a framework to think about the relationship between credit booms and **information production**

Main questions of the model

- How do credit booms shape investment and its composition?

- Does the **source** of the credit boom matter?

- Is information production **efficient** during credit booms?

Main ingredients of the model: financial frictions and imperfect information

- Entrepreneurs need credit to undertake long-term projects.
  - Projects are heterogeneous in "quality," low (L) or high (H)
  - Low quality projects allow entrepreneurs to extract rents (agency problem)

- Lenders have two ways of protecting themselves:
  - Collateralization (q): ask entrepreneurs to put up assets as collateral
  - Screening (ψ): produce costly but durable information about project quality

- Collateralization-screening mix depends on aggregate value of collateral

- In the model, no distinction between bank or non-bank intermediation; what matters is the ability to screen

Equilibrium dynamics

Given $\{k_0^H, k_0^L, k_0^\mu\}$ and process $\{q_t, A_t\}_{t \geq 0}$, equilibrium is characterized by:
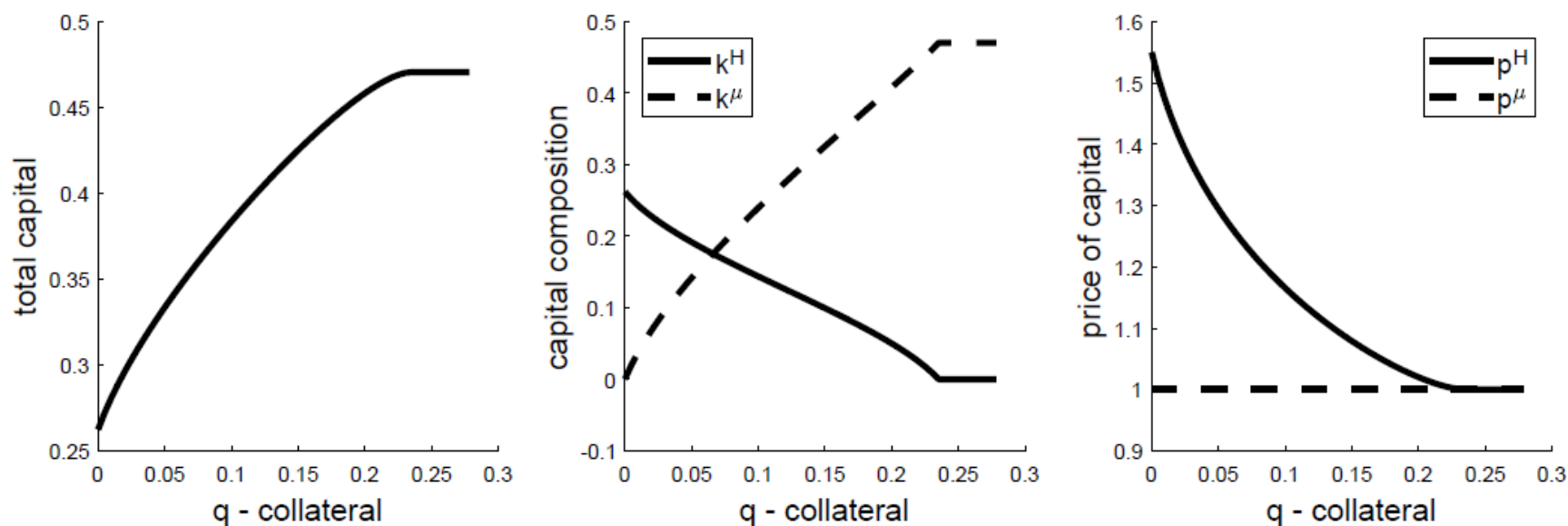
▶ Zero expected profits on H-type capital:

$$1 + \frac{\psi(s_t)}{\mu} = \frac{E_t\left\{r_{t+1} + (1-\delta)\left(1 + \frac{\psi(s_{t+1})}{\mu}\right)\right\}}{\rho},$$

▶ H-type capital accumulation: $s_t = \max\left\{0, \frac{k_{t+1}^H - (1-\delta)k_t^H}{\mu}\right\}$,

▶ No production of L-type capital: $k_{t+1}^L = 0$.

▶ Unscreened capital (weakly) constrained by collateral:

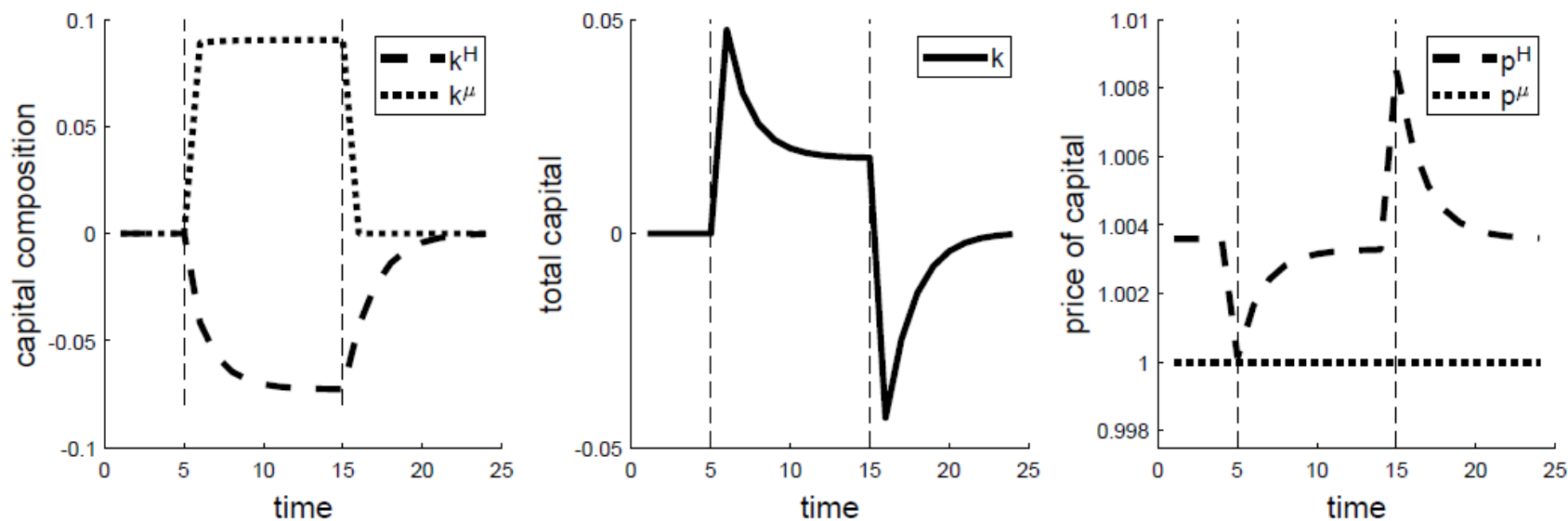$$k_{t+1}^\mu = \min\left\{\frac{\rho q_t}{\rho - \mu E_t\{r_{t+1} + 1 - \delta\}}, \; k_{t+1}^*\right\},$$

where $r_t = A_t\alpha(k_t^H + k_t^\mu)^{\alpha-1}$, $k_{t+1}^* \equiv \max\left\{\left(\frac{\alpha}{\rho+\delta-1}E_tA_{t+1}\right)^{\frac{1}{1-\alpha}} - k_{t+1}^H, 0\right\}$.

Effect of collateral (*q*)

The figure depicts the equilibrium capital stock, its composition and capital prices, as a function of collateral value *q*, in the economy with full depreciation.

Collateral boom-bust episode

The figure depicts the equilibrium evolution of the capital stock, its composition and capital prices throughout a collateral boom-bust episode. Economy switches temporarily to the high-collateral value state between periods 5 and 15.

Model findings

- Collateral-driven boom: an increase in **collateral values**
  - Raises overall investment and economic activity
  - But there is a compositional effect: unscreened up, screened down
    - Lower incentives to produce information
    - Information depletion over time

- Longer booms → more info depletion → larger busts, slower recoveries

- **Normative** aspects of credit booms:
  - "Misallocation" may increase during booms, but save on screening costs
  - If anything, there is too much information!

- More broadly, the **source** of the credit boom matters
  - Productivity-driven booms do not deplete information

Testable implications

- Investment is increasing in collateral values

- Share of unscreened investment is increasing in collateral values

- Collateral bust is followed by fall in investment, and more so the larger is the share of unscreened investment in the boom

Empirical strategy

- Identify **shocks** to outside collateral
    - Build on Chaney et al. (2012): How does the value of firms' real estate affect their investment?
    - Extend sample: COMPUSTAT firms 1993-2012
    - Real estate assets in 1993: infer market value using local real estate inflation

- Measure **unscreened** investment
    - Proxy firm-level information: **bid-ask spread** on firm stock
    - Used in finance/accounting as measure of firm-level information (Huang and Stoll 1997, Kelly and Ljungqvist 2012)
    - Alternative measures: ratio of intangible to tangible fixed assets, analyst coverage

Empirical findings

- Firms' investment increases with real estate value

- Effect stronger for firms with high spread

- Regions with larger real estate booms allocate more investment to high spread firms

- During housing bust (2007-2012): Fall in investment stronger in regions that allocated more investment to high-spread firms during boom

Conclusions

- Financial crises are often preceded by credit booms

- Present **new theory** of credit booms based on information depletion: Rising collateral values boost economic activity but reallocate investment towards less information-intensive activities

- Lower incentives to produce **information** → information depletion over time; Longer booms → more info depletion → larger busts

- **Normative** aspects of credit booms:
  - Misallocation may increase during booms, but saves on screening costs
  - If anything, there is too much information! (agents understand that when the bust comes screened projects will be very valuable)
  - For information generation to be suboptimally low, there must be an additional distortion that prevents agents from internalizing its social value (e.g. market illiquidity, economy-wide learning-by-doing)

- The **source** of the credit boom matters
  - Productivity-driven booms do not lead to information depletion

Implications

- Optimal **regulation** requires understanding the **source** of booms
  - Need to preserve productivity-driven booms
  - Using credit gaps to design macroprudential regulation (e.g. countercyclical capital buffers) may be insufficient, and even misguided
  - Allow for deviations from long-run trend driven by productivity growth to be excluded from the computation of credit gap measures?

- Regulation of credit intermediation by **non-banks**
  - Do banks have superior screening technology? What if with technological advances they lose their edge?
  - Is there an overproduction of information in the economy?