The Macroeconomic Effects of Bank Capital Regulation

Sandra Eickmeier[𝕜§] Benedikt Kolb[𝕜†] Esteban Prieto[𝕜▽]

[𝕜]: Deutsche Bundesbank, [†]: EUI, [§]: CAMA, [▽]: IWH Halle. The views herein represent the opinion of the authors only and not necessarily of the Deutsche Bundesbank or the IWH Halle.

The macro effects of higher cap. requirements - A debate

Regulators/Industry

- BIS: "*modest impact on growth (...) followed by a recovery of growth towards baseline*" (MAG, 2010)
- Banking industry: "*The economic impact of these reforms (...) will be significant.*" (IIF, 2011)

Academics

- Cochrane (2014): "*zero social costs of lots more equity*"
- Calomiris (2013): "*banks will face permanently higher funding costs, which in turn will permanently reduce the supply of lending*"

Cochrane/Wall Street Journal

- WSJ (2017, March 13th): "*More bank capital could kill the economy*"
- Cochrane (2017, March 14th): "*...one of the most illogical conclusions I've seen on the WSJ pages for a long time*"

Theory is ambiguous

- More bank capital will reduce lending and growth
  - Allen et al. ('15); DeAngelo/Stulz ('15); Myers/Majluf ('84)
  - In GE models, higher requirements reduce lending and output permanently (see e.g., Elenev et al.'18).
- Higher bank capital will not reduce lending and growth
  - Admati et al ('13), Admati/Hellwig ('12), Bahaj/Malherbe ('18), Begenau ('18)

Empirical evidence largely from microeconometric studies

- Partial-equilibrium perspective.
- High level of econometric credibility.
- Large negative effects of higher capital requirements (Jimenez et al. '17).

- Not suitable to assess aggregate effects of higher requirements.

Identification of macro effects of capital regulation empirically challenging:

- Aggregate bank capital ratio is highly endogenous.
- Changes in bank capital regulation infrequent.
- Changes in bank capital regulation anticipated with substantial lead.

Our paper is the first to empirically assess the dynamic macro effects of higher aggregate capital requirements.

What we do...

- Narrative identification strategy to assess macroeconomic effects of higher bank capital requirements.

- Regulatory changes in bank capital requirements not taken to offset cyclical factors affecting the economy.
  - They are slowly drafted and subject to lengthy negotiations between, bankers, politicians and regulators, that are broad, long-lasting and structural in nature.

- As in Romer/Romer (2010), Favara/Imbs (2015) and Fieldhouse et al. (2018), we exploit this a-cyclicality to assess the dynamic macro effects of bank capital requirements.

...and what we find

- Higher capital requirements lead to a **permanent** increase in the aggregate bank capital ratio.
- Banks adjust by first reducing balance sheet size and lending .
- After 1.5 years banks start using more equity funding; assets and lending revert back to pre-regulation value.
- The credit crunch temporarily reduces production, investment and employment.
- More persistent effects on real estate lending, house prices and consumption.
- Bank risk and cost of equity drop permanently.

Narrative index of US aggregate capital requirement tightenings

- Compiled from readings of academic publications and legislative/administrative documents.

Proposed	Final	Effective date	change
Dec. '81	Dec. '81	Dec. '81	Numerical guidelines for CR
Mar. '83	Apr. '83	Nov. '83	International Lending and Supervision Act
Jul. '84	Mar. '85	Apr. '85	Common CR guidelines for all banks
Mar. '86	Jan. '89	Dec. '90	Basel I
Mar. '91	Aug. '91	Dec. '91	FDIC Improvement Act
Jul. '92	Sep. '92	Dec. '92	Prompt Corrective Action
Jan. '11	Aug. '12	Dec. '13	Basel II.5
Aug. '12	Oct. '13	Dec. '14	Basel III

- **We exploit the structure of the regulatory implementation procedure to investigate anticipation effects.**

Capital requirement tightenings not cyclically motivated

Examples of motives for tighter capital requirements:

- 1981 Event: *"Objectives of the capital adequacy guidelines program are to [...] introduce greater uniformity, objectivity, and consistency ..."*

- 1990 Event: *"... capital guidelines have a twofold purpose: To make capital requirements more sensitive to differences in risk profiles ... making the definition of bank capital uniform internationally"*

Requirement changes motivated by long-term/structural motives, are permanent in nature and the result of slow moving regulatory reforms.

Additional indications:

- probit/cloglog regressions

- Elliott et al. (2013): "supervisors have never instituted a countercyclical capital regime, in which capital requirements would explicitly fluctuate with the credit cycle."

Effects of capital regulation - Method

- Local projection regressions without anticipation effects

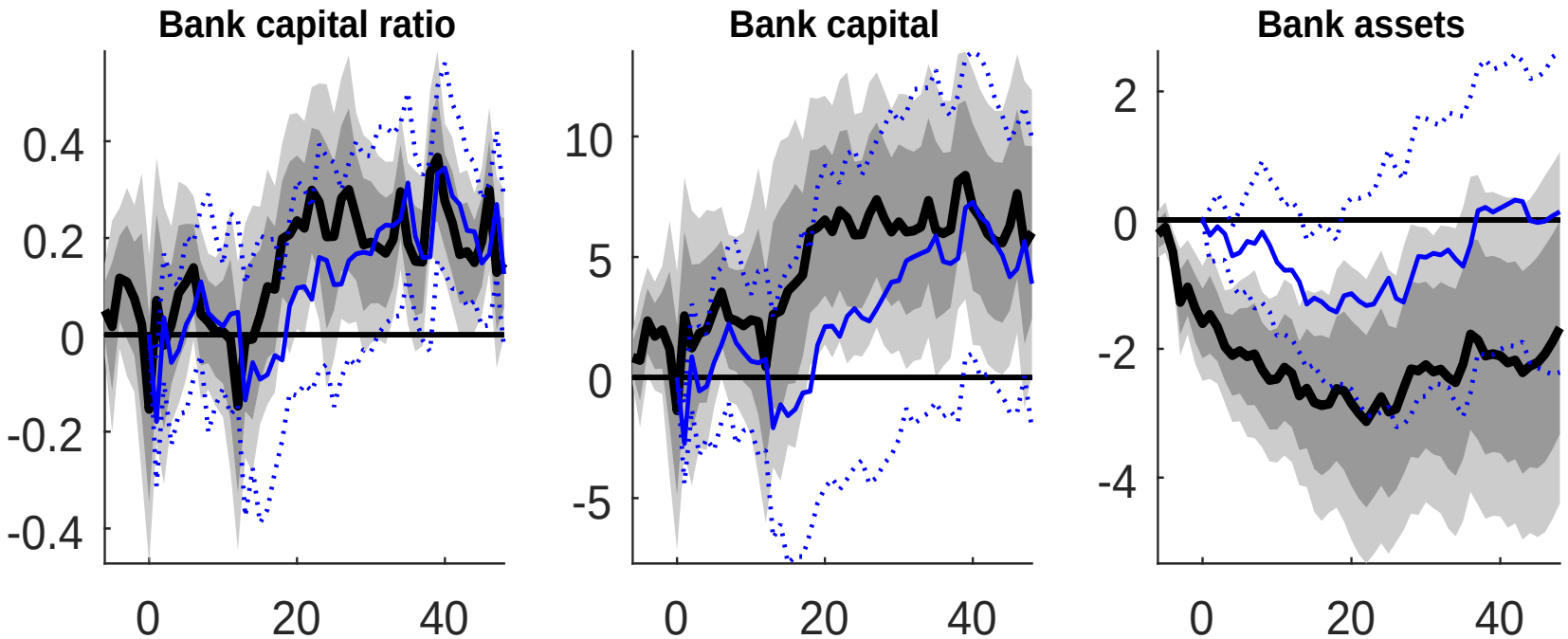
$$\tilde{y}_{t+h} = c^h + \beta^h(L)\tilde{x}_t + \gamma^h(L)CRI_t + u_t.$$

- Local projection regressions with anticipation effects

$$\tilde{y}_{t+h} = c^h + \beta^h(L)\tilde{x}_t + \gamma^h(L)\mathbf{CRI_{t+6}} + u_t.$$

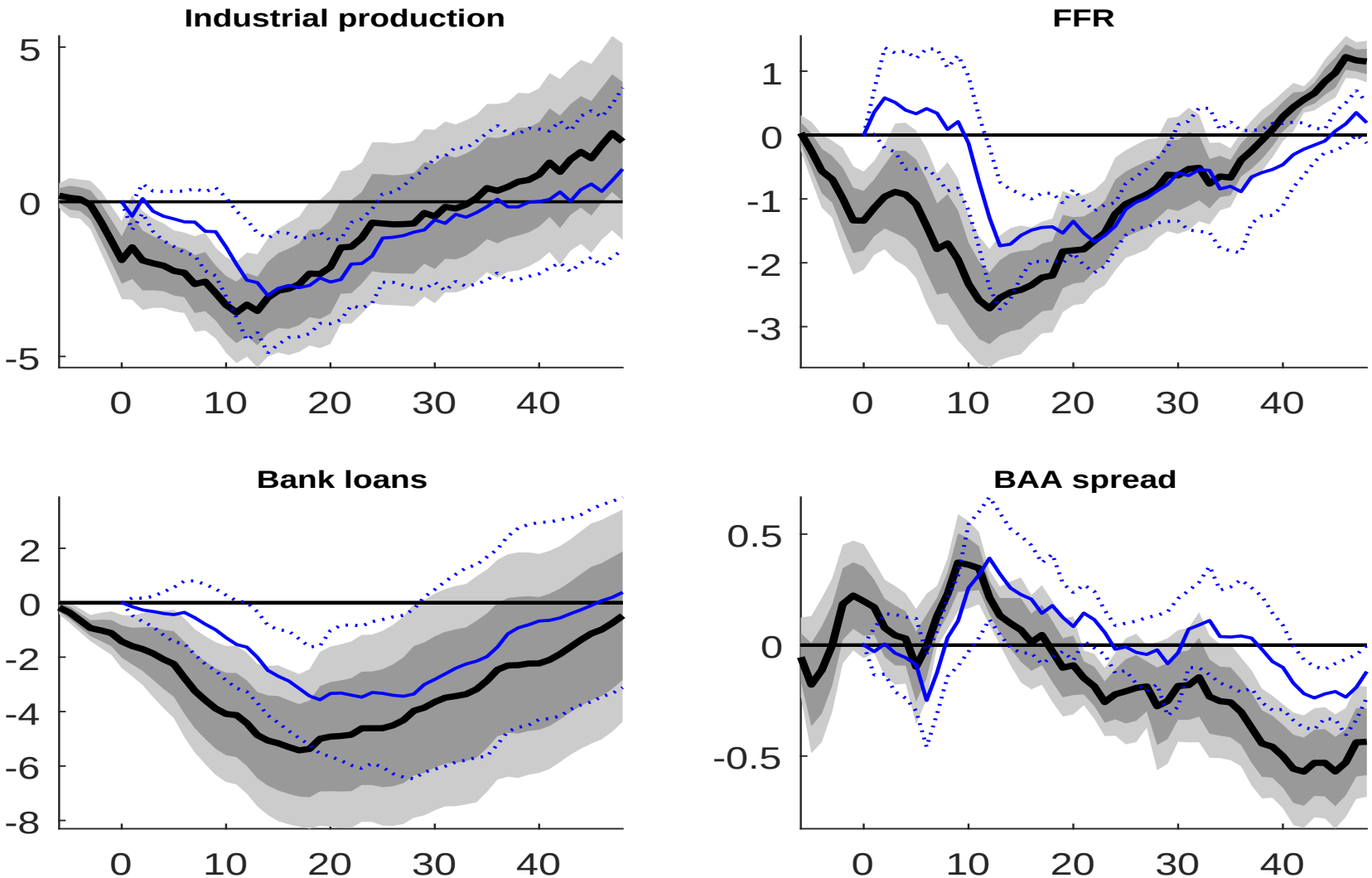
- where $\tilde{y}_{t+h} = y_{t+h} - y_t$, $\tilde{x}_t = x_t - x_{t-1}$, for non-stationary variables and $\tilde{y}_{t+h} = y_{t+h}$, $\tilde{x}_t = x_t$ for stationary variables.
- 2 lags of x_t and CRI_t and a constant, trend and squared trend.
- x_t: ind. production, PCE deflator, bank loan volumes, FFR, BAA spread, and the left-hand side variable. Baseline sample: 1979M8 - 2008M8.
- $\{\gamma_1^h\}_1^H$: impulse responses of y_{t+h} to a "typical" requirement tightening.

Effects of capital regulation - Adjustment of Banks



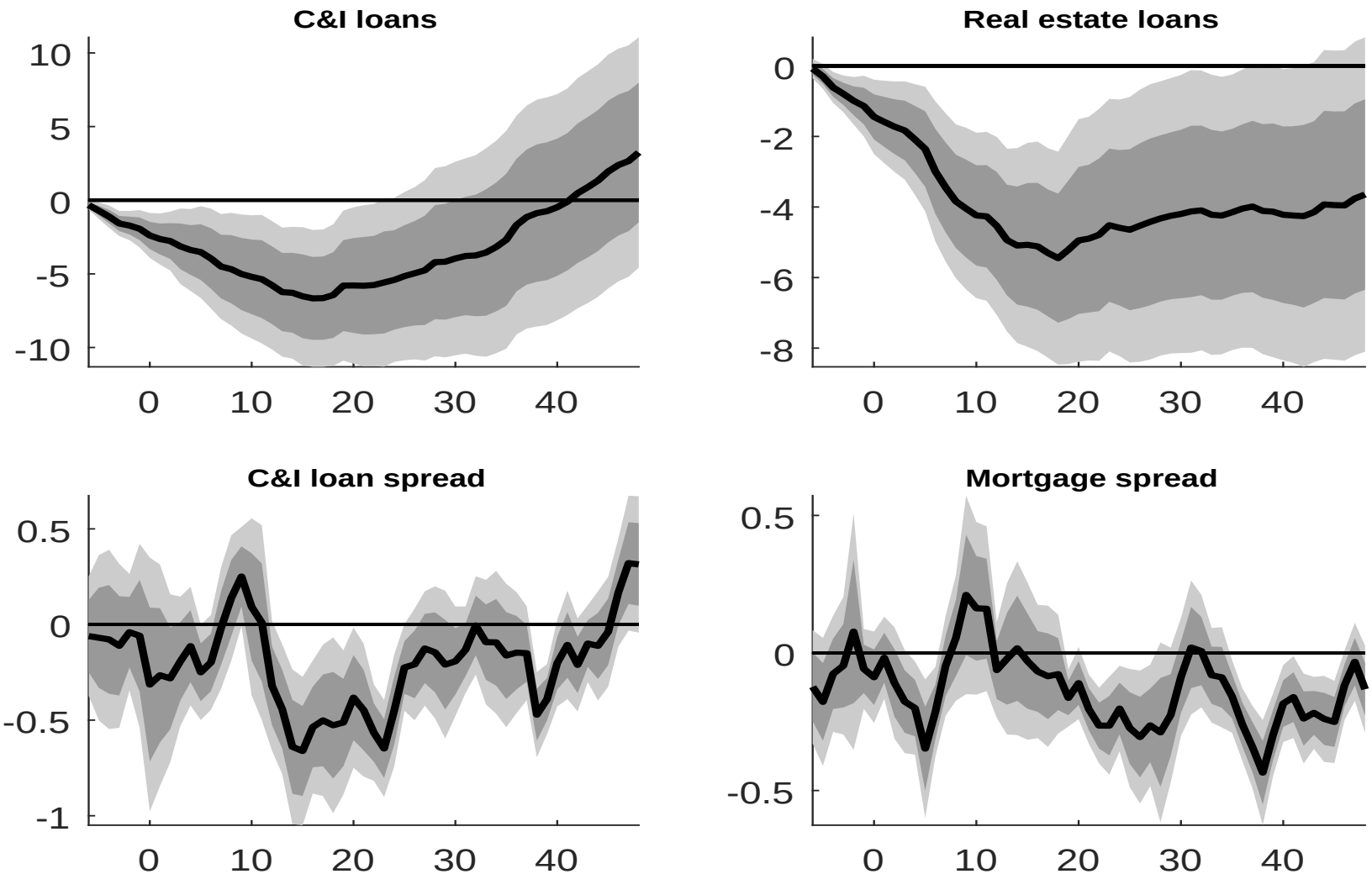
Blue solid lines are the point estimates and blue dashed lines are the 90% confidence bands from the model without anticipation effects. Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

Effects of capital regulation - Response of the macroeconomy



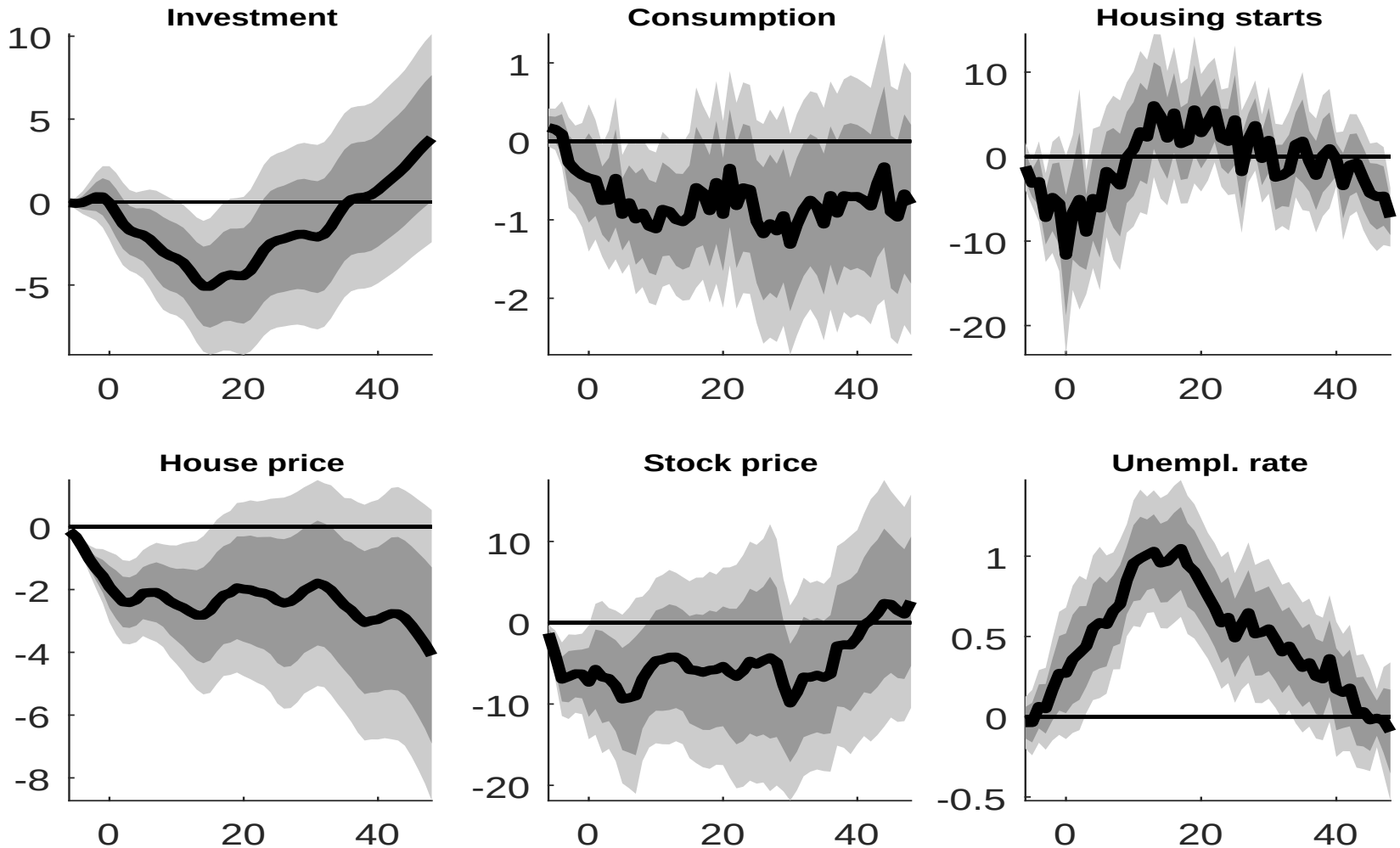
Blue solid lines are the point estimates and blue dashed lines are the 90% confidence bands from the model without anticipation effects. Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

Effects of capital regulation - Transmission to loans and loan spreads



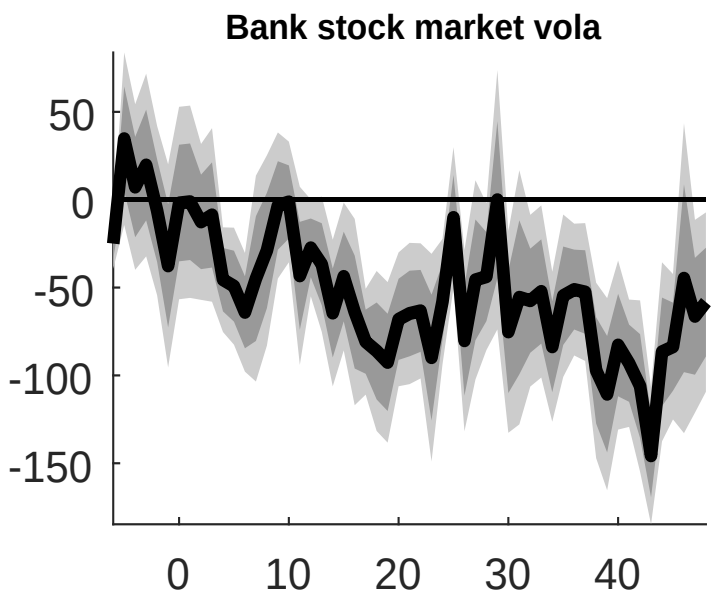
Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

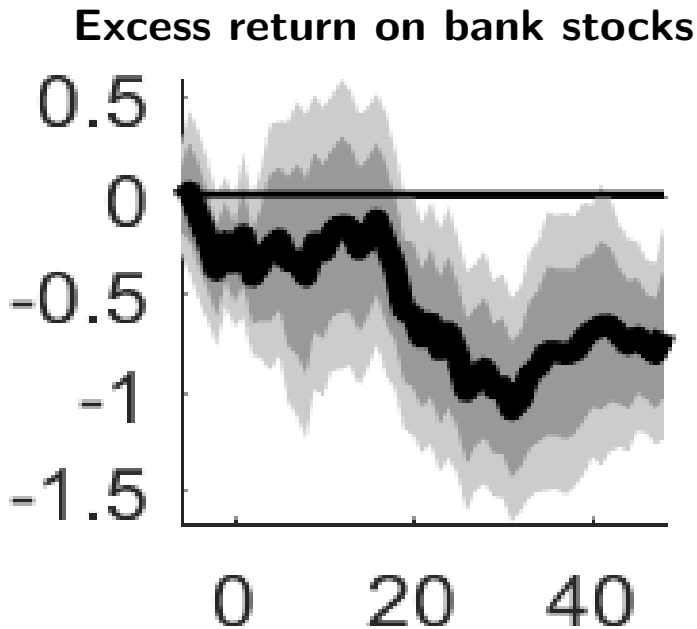
Effects of capital regulation - Transmission to Firms and Households



Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

Why has a permanent increase in bank capital ratio only temporary real effects?

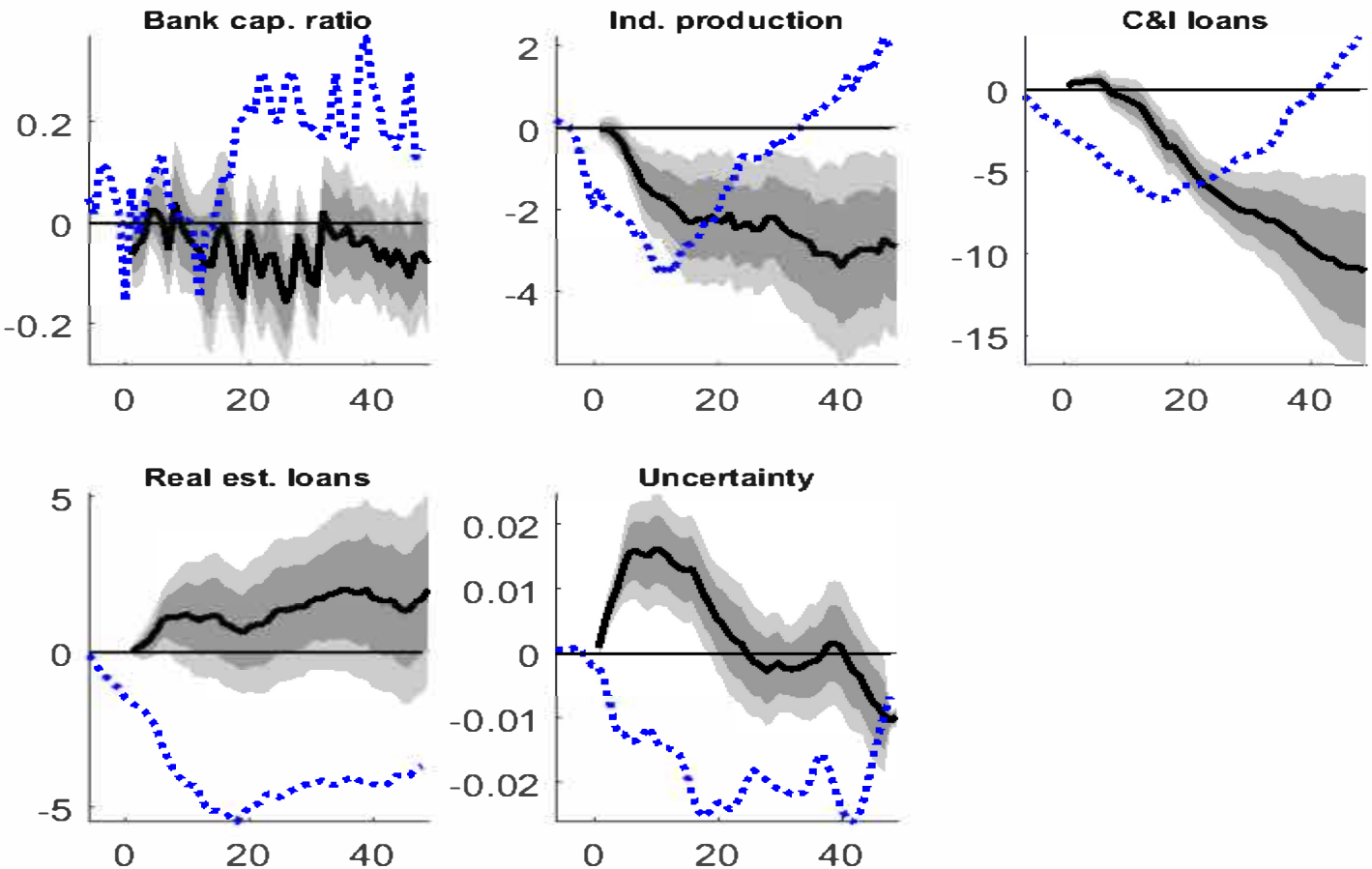




Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

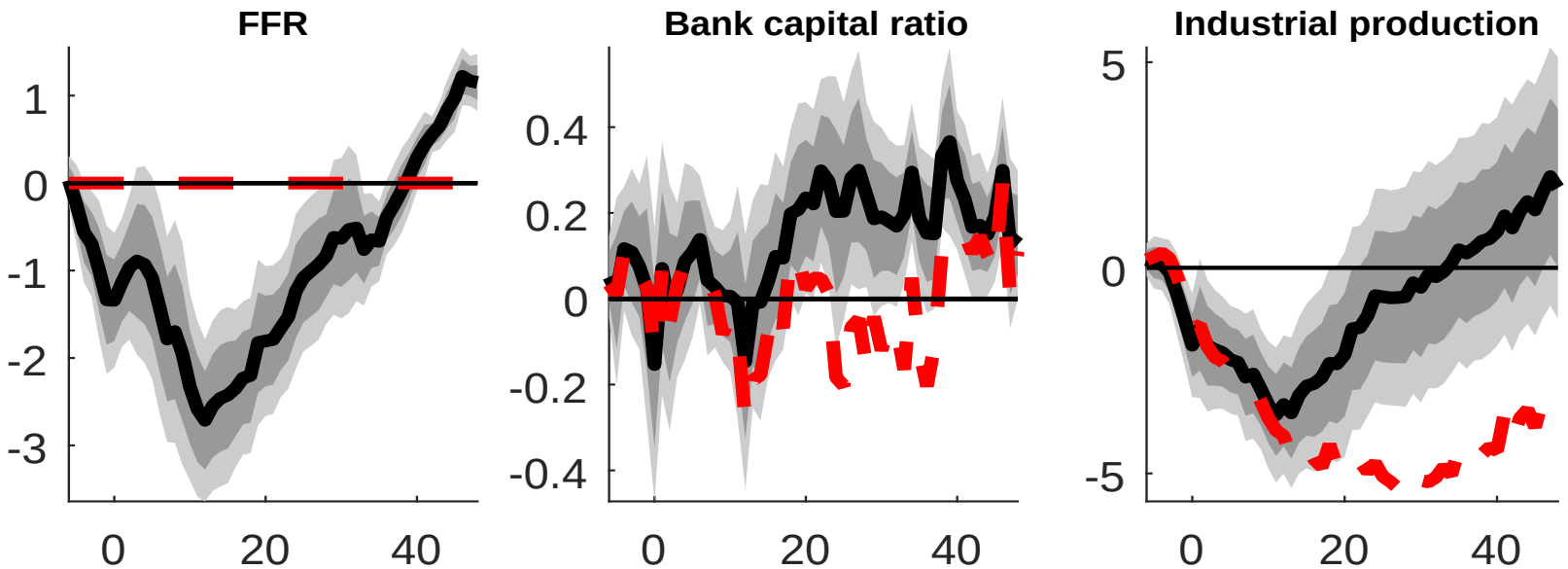
Banking system becomes less risky and cost of equity drops.

Capital requirement tightening vs. financial shock



Blue dashed lines are the point estimates after a tightening in capital requirements with anticipation effects. Black solid lines are the point estimates from a credit supply shock (ebp) and the light (dark) shaded area correspond to the 90% (68%) confidence bands.

Macropru/Monetary policy interaction - A counterfactual analysis



Black solid lines are the point estimates from the model with anticipation effects and the light (dark) shaded area correspond to the 90% (68%) confidence bands. Red dashed lines are counter-factual impulse-response functions setting the path of the federal funds rate to zero.

Robustness checks that leave results qualitatively unaffected

- Varying anticipation horizon
- Excluding ILSA/FDICIA
- Varying lag length of CRI
- Cumulating the CRI
- Different sample periods
- Removing individual CRI events individually
- Add Market Risk in 1997
- Add Capital Requirement tightening for multinational banks in 1983
- Adding additional control variables

Conclusion

- We propose a narrative identification strategy to analyze the macro effect of bank capital requirement tightenings in the US.
- Regulatory changes in capital requirements are not taken to offset cyclical factors affecting the economy.
- We use the narrative indicator to examine the dynamic effects of capital requirement tightenings.
    - Higher capital requirements lead to a **permanent** increase bank capital ratio.
    - Banks first reducing balance sheet size and lending, before adjusting lending back to pre-regulation value.
    - Credit crunch temporarily reduces production, investment and employment.
    - More persistent effects on real estate lending and house prices.
    - Bank risk and cost of equity drop permanently.