US Capital Requirements and the Business Cycle

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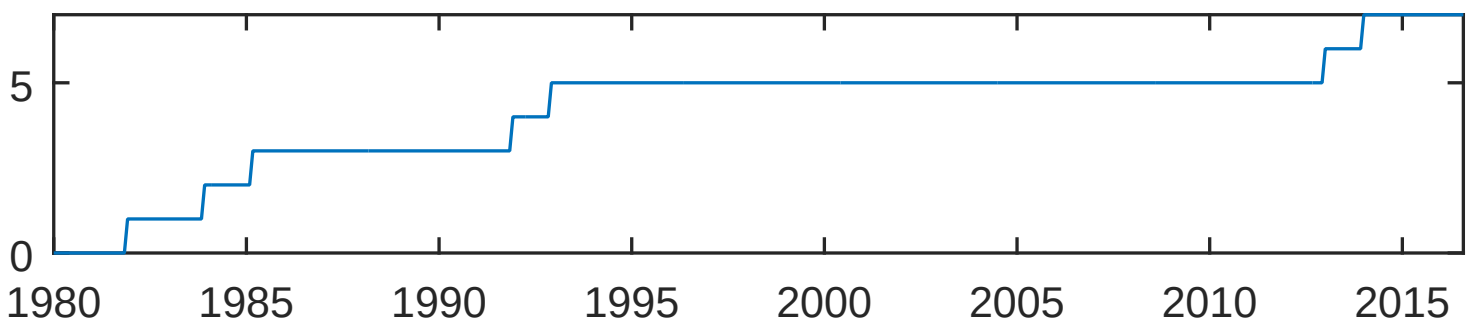
Overview

- joint with Sandra Eickmeier and Esteban Prieto (Research Centre)
- What are the macroeconomic effects of US regulatory capital requirement (CR) tightenings?
- many micro studies[1], few with a macro focus (Meeks, 2016, for UK; Sonoda and Sudo, 2016, for Japan)
- our analysis:
  - create monthly US indicator of exogenous CR changes, 1980m1-2016m9 (as in Romer and Romer, 2004)
  - check reactions of macro-financial variables in VAR
  - "Qualitative VAR" to quantify CR changes (Dueker 2005; 2006)

[1] e.g. Dietrich and James, 1983, Marcus, 1983, Wall and Peterson, 1987, Furfine et al., 1999, Van Roy, 2008, Aggarwal and Jacques, 2001, Pepe, 2013

A "narrative" indicator of US CR changes

date	change
Dec. 1981	Fed. Deposit Insurance Corp. (FDIC) sets numerical guidelines for CR
Dec. 1983	ILSA (numerical guidelines for multinational banks)
Mar. 1985	common CR guidelines by FDCI, OCC and Fed, for all banks
Dec. 1991	FDIC Improvement Act (more stringent CRs)
Dec. 1992	Prompt Corrective Action Act (progressive penalties against banks with insufficient CRs); Basel I becomes binding in G10 countries
Dec. 2013	Basel II.5 implemented
Dec. 2014	Basel III implemented



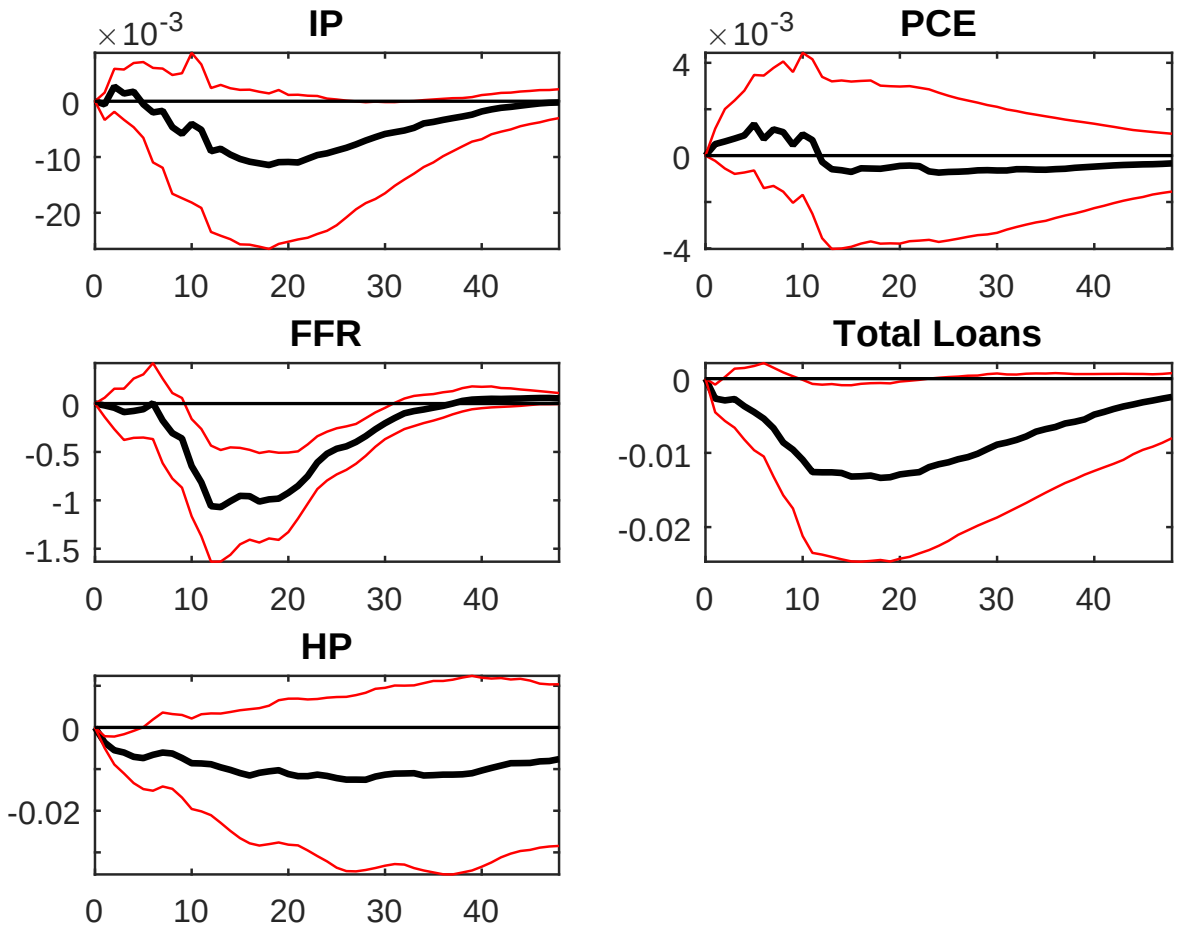
Data used in our baseline specification

use variables $Y_t = [\log(\text{IP}_t)\ \log(\text{PCE}_t)\ \chi_t\ \text{FFR}_t\ \log(\text{TL}_t)\ \log(\text{HP}_t)]$, where

IP	Industrial Production
PCE	Personal Consumption Expenditures Deflator
χ	our CR indicator
FFR	Federal Funds Rate
TL	Total Loans
HP	House Prices

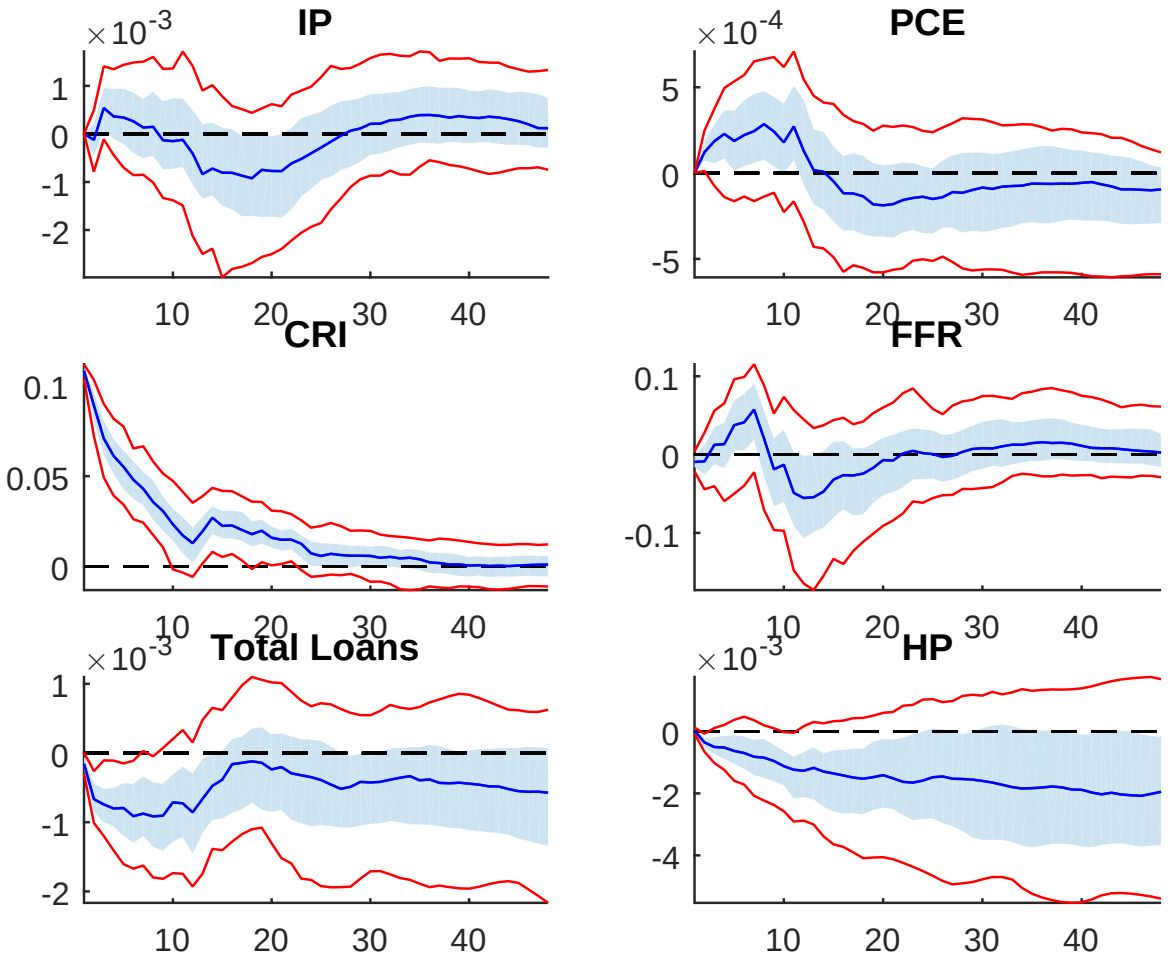
Single-equation regressions

$$y_t = \alpha_0 + \alpha_1 \cdot t + \alpha_2 \cdot t^2 + \sum_{i=1}^{12} \beta_{y,i} y_{t-i} + \sum_{i=1}^{12} \beta_{\chi,i} \chi_{t-i} + \varepsilon_t, \ \forall y \in Y$$



Recursive VAR

$$Y_t = \alpha_0 + \alpha_1 \cdot t + \alpha_2 \cdot t^2 + \sum_{i=1}^{12} \beta_{y,i} Y_{t-i} + \varepsilon_t$$



Note: data from 1980m1 to 2016m8, recursive identification with ordering as plotted

Excursion: "Qualitative VAR"

- VAR model $Y_t = \alpha_0 + \alpha_1 \cdot t + \alpha_2 \cdot t^2 + \sum_{i=1}^{12} \beta_{y,i} Y_{t-i} + \varepsilon_t$, $\text{var}(\varepsilon_t) = \Sigma$
- Bayesian approach: Gibbs sampler for β, Σ and latent variable χ_t^*
- iteratively draw

$$\chi_t^* \sim \text{truncated normal}, \quad f\left(\chi_t^* \middle| \beta^{(i)}, \{\chi_j^{*(i+1)}\}_{j<t}, \{\chi_k^{*(i)}\}_{k>t}, \Sigma^{(i)}\right)$$

$$\beta \sim \text{multivar. normal}, \quad f\left(\beta^{(i+1)} \middle| \beta^{(i)}, \{\chi_j^{*(i+1)}\}_{j<t}, \{\chi_k^{*(i)}\}_{k>t}, \Sigma^{(i)}\right)$$

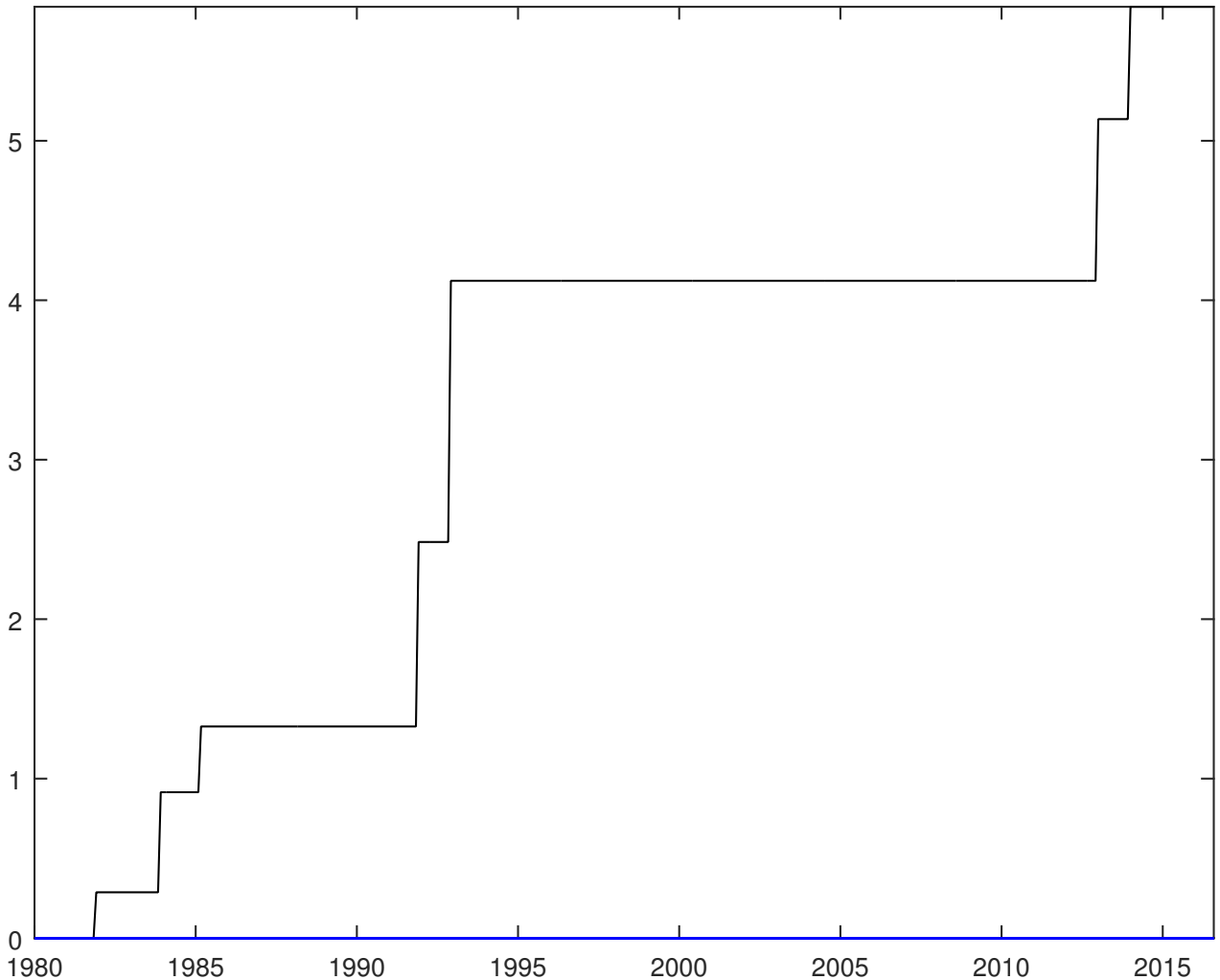
$$\Sigma \sim \text{inverse Wishart}, \quad f\left(\Sigma^{(i+1)} \middle| \beta^{(i+1)}, \{\chi_t^{*(i+1)}\}_{t \in T}\right)$$

- use Kalman smoother to draw $\chi_t^* \in S_t$:

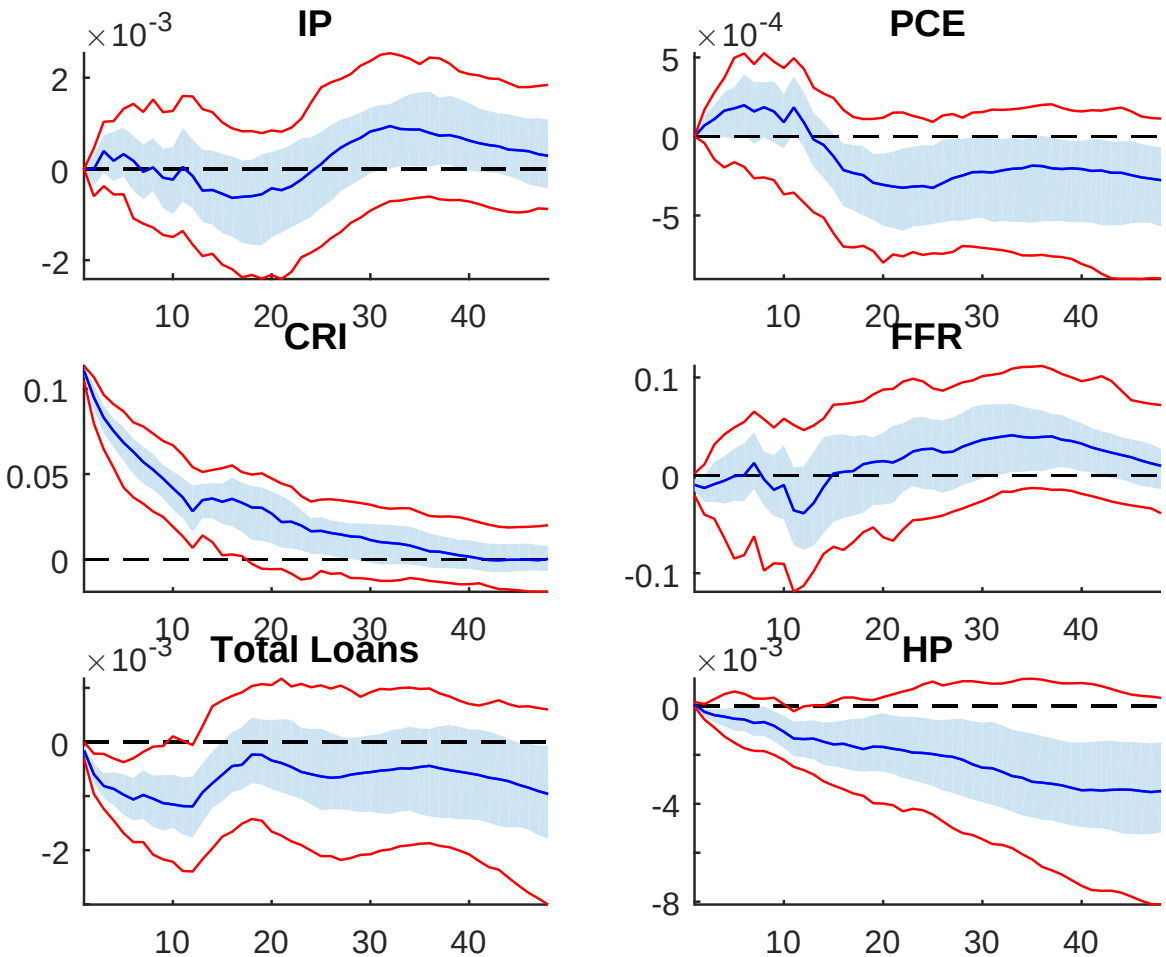
$$S_t = F \cdot S_{t-1} + w_t, \qquad \text{where } \text{var}(w_t) = \Sigma_w$$
$$Y_{-\chi,t} = H \cdot S_t + v_t, \qquad \text{where } \text{var}(v_t) = \Sigma_v$$

Results from the QVAR (1/2)

The CR indicator weighted by our QVAR:

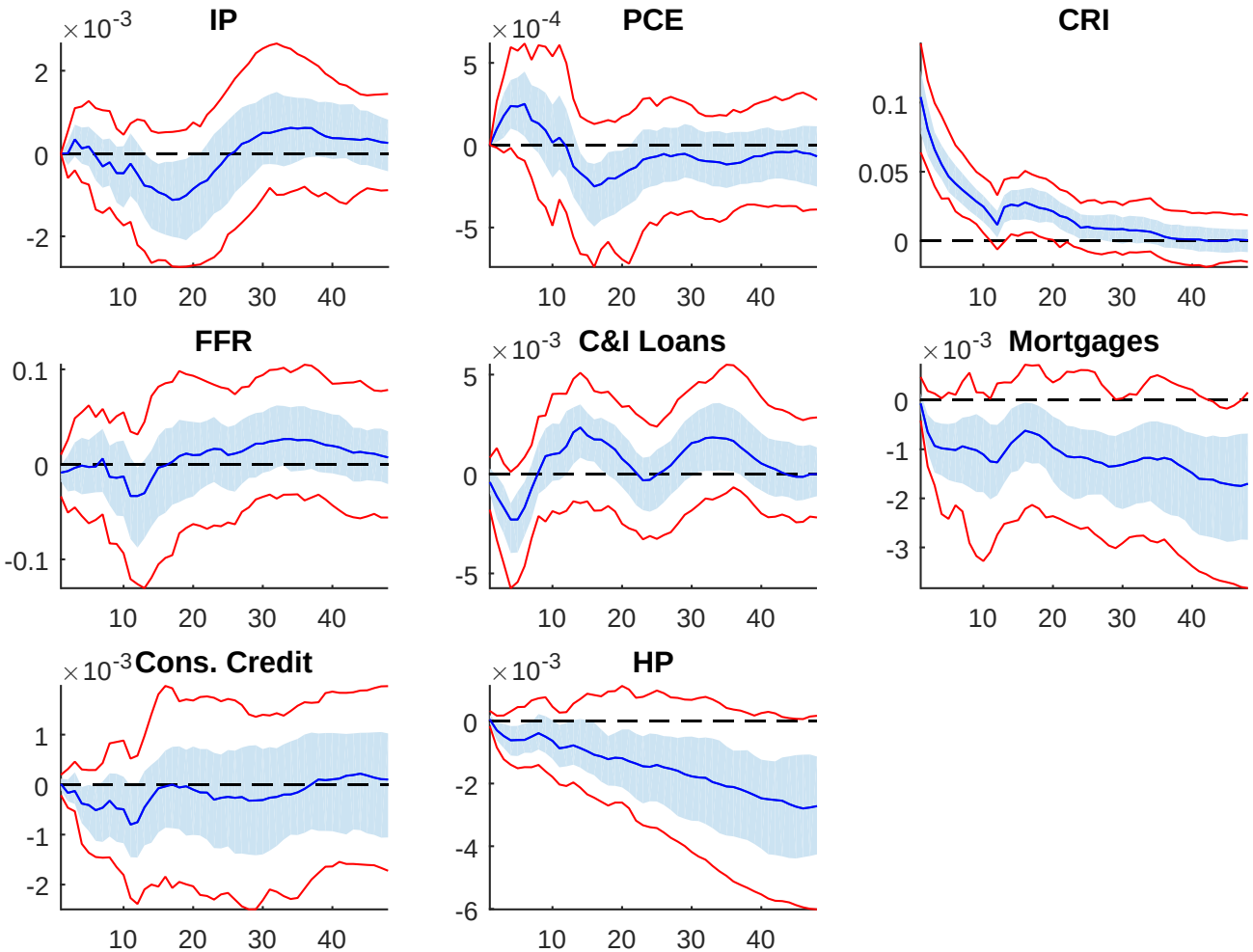


Results from the QVAR (2/2)



Note: data from 1980m1 to 2016m8, recursive identification with ordering as plotted; cumulated 12 lags, const., lin. & quadr. trend; 1,000 draws from Gibbs sampler (after 5,000 burn-in draws), 95% (red) and 68% (blue) confidence bands

Results for different loan types



Note: C&I loans: Commercial and Industrial loans; Cons. Credit: Consumer Credit

Summary and outlook

Main results:

- macro-financial interaction matters for transmission of CR changes
- financial variables more affected than real economy

  $\Rightarrow$ CRs as a macroprudential tool in US might not be "blunt"

Possible extensions:

- control for anticipatory effects: use Blaschke transformation as in Forni et al. (2014a), Forni et al. (2014b)
- extend focus to panel of/other countries (Germany?)
- rationalise the dynamics in a DSGE model, e.g. à la Gertler et al. (2012)

"Common Banking Regulation and the Business Cycle in a Monetary Union"

- two-country model (Germany and Spain)
  - both have bank leverage (Gerali et al., 2010) and firm leverage (Gertler and Karadi, 2011)
  - interact via goods trade and interbank market; common monetary policy
  - unification of banking regulation: differences in firm and bank leverage disappear/diminish
- results of estimation
  - financial shocks explain about one fifth of German and two fifth of Spanish GDP growth volatility
  - common regulation aligns business cycles across countries, increases welfare and would have reduced effect of Great Recession
- possible extensions:
  - RoW block
  - effects of new banking regulation (Basel IV?): EA core v periphery

That's it...

Thank you for your attention!

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Literature IV

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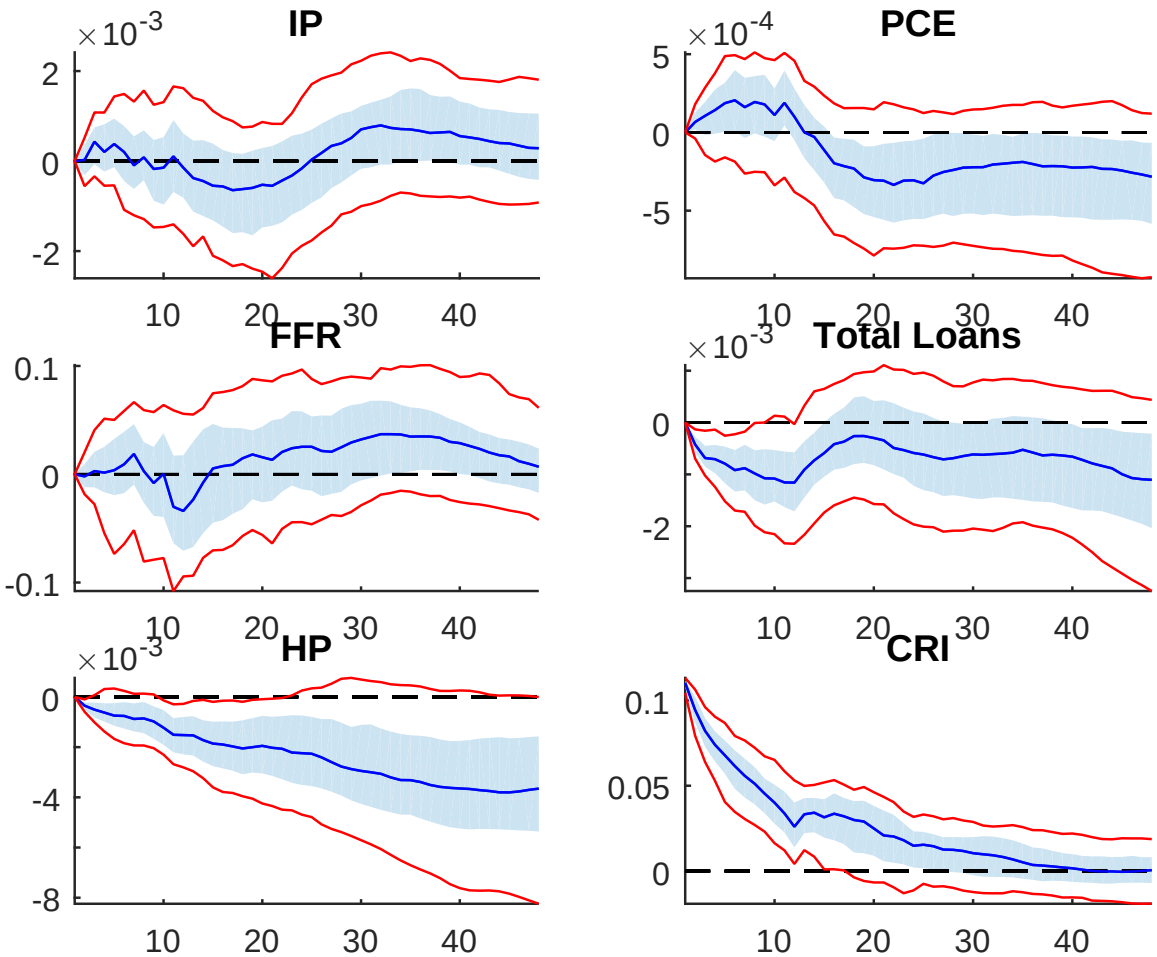
Recursive VAR with CRI ordered last



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