Does Regulatory Bank Oversight Impact Economic Activity? A Local Projections Approach

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Introduction: Macroprudential Policy and Real Activity

- Research on the effects of monetary and fiscal policy on the macroeconomy is extensive
- The macroeconomic transmission of macroprudential policy is examined less rigorously
- Some of the existing literature finds small effects of exogenous variation in macroprudential policy variables on real activity
- This paper:
  - focuses on banks' CAMELS ratings as a macroprudential policy tool;
  - develops a theoretical model of rating assignment that describes possible sources of its exogenous variation;
  - discusses alternative techniques of estimating the effect of macroprudential shocks on the macroeconomy;
  - finds the effects to be nonlinear and asymmetric: bank downgrades, especially large ones, have a strong negative effect on real activity whereas upgrades have no effect

Related Literature

- Peek and Rosengren (1995) Peek et al. (2003) find that regulatory actions can amplify the results of a credit crunch on the economy;

- Berger et al. (2001) suggest that the magnitude of the effect of supervisory shocks on the macroeconomy appears to be relatively small;

- Bassett et al. (2012) find them to be short-lived and fairly insignificant;

- Curry et al. (2008) and Ramirez and Fissel (2013) note that they appear to be inconsistent over time and over different loan categories.

- **This paper:** Finds stronger effects than previous literature and finds a unifying framework for explaining its results.

Data: Overview

- All data are quarterly for 1984q1—2013q4
- Endogenous variables:
  - Asset-weighted average composite CAMELS rating for the banking industry:

  $$r_t = \frac{\sum_{i=1}^{N_t} a_{it} r_{it}}{\sum_{i=1}^{N_t} a_{it}}$$
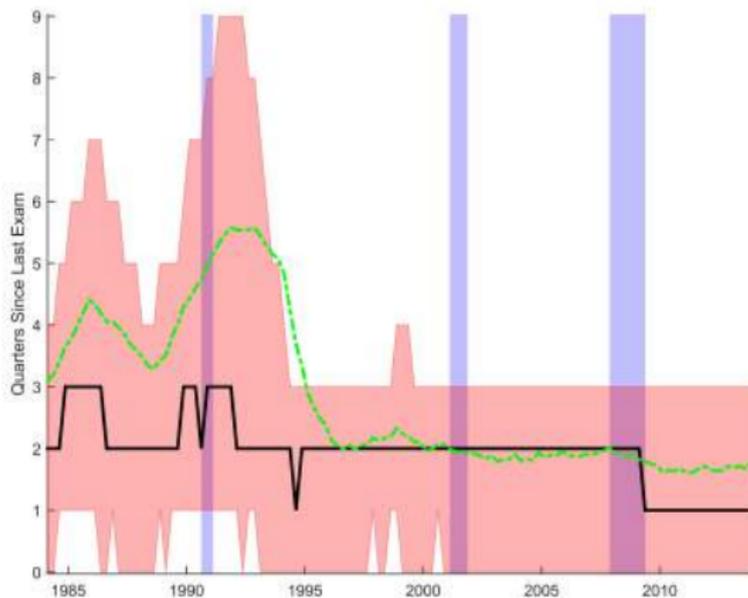
  - Measures of real activity: real GDP growth, change in total capacity utilization rate, change in the unemployment rate
- Exogenous controls:
  - Set 1: historical macroeconomic variables (FRED2)
  - Set 2: historical banking aggregates (QBP)
  - Set 3: consensus expectations of future macroeconomic conditions (SPF)
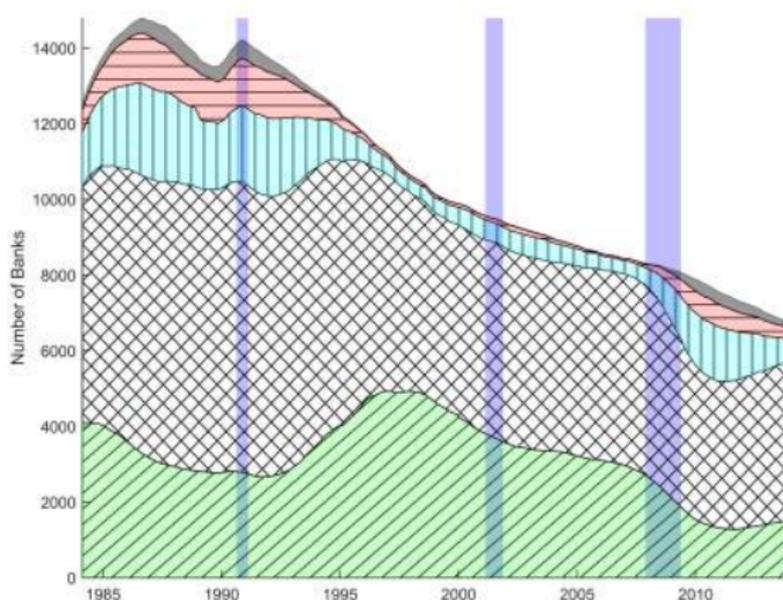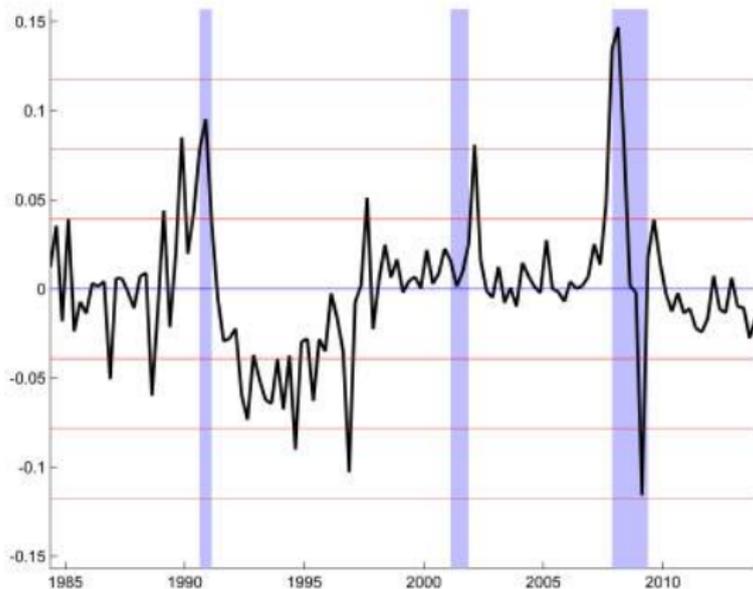
Distribution of CAMELS Ratings 1984-2013: Green, diagonal—1;
White, cross-hatched—2; Cyan, vertical—3; Pink, horizontal—4;
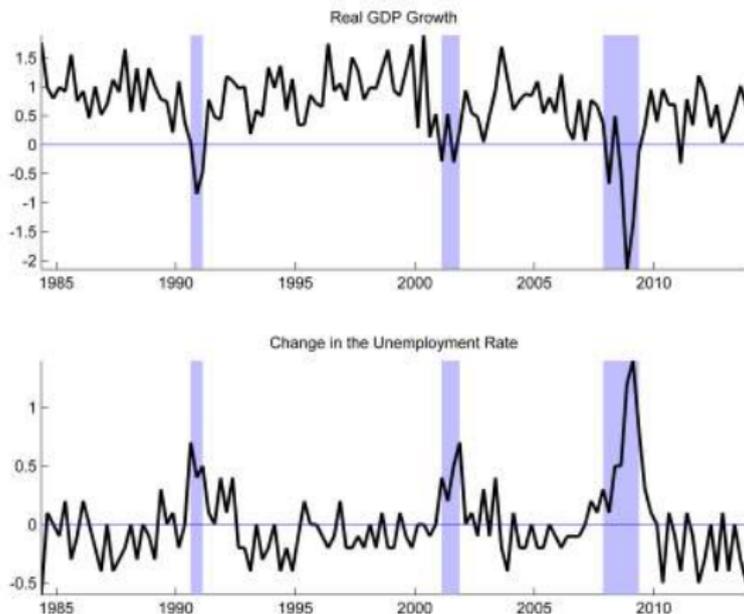Black—5; Shaded areas—NBER-defined recessions

CAMELS exams frequency 1984-2013: Red areas: 25th—75th percentiles; Punctuated green line—mean; Solid black line—median; Blue shaded areas—NBER-defined recessions

Data: CAMELS—Aggregate Measure

Magnitude of Changes in Asset-weighted Average CAMELS Rating 1984-2013; Shaded areas—NBER-defined recessions; red solid lines: $\pm\sigma_{\triangle r}$; red dashed lines: $\pm2\sigma_{\triangle r}$; red punctuated lines: $\pm3\sigma_{\triangle r}$

Data: Endogenous Variables

Measures of Real Activity 1984-2013; Shaded areas—NBER-defined recessions

Data: Set X1—Historical Macroeconomic Controls

- annualized percentage change in the GDP deflator (inflation rate)
- federal funds rate
- term spread (10-year to 3-month treasuries)
- HPI growth
- stock returns
- University of Michigan Index of Consumer Sentiment
- spread between the 30-year mortgage rate and the 3-month T-bill yield

Data: Set X2—Banking Controls

- **Capital Adequacy**: Leverage ratio;
- **Asset Quality**: noncurrent loan ratio, ratio of noncurrent loans to reserves for losses, ratio of loans secured by real estate to total assets, ratio of commercial and industrial loans to total assets, ratio of loans to other depository institutions to total assets;
- **Management Capability**: Ratio of noninterest expense to total revenue;
- **Earnings**: Return on assets, net interest margin;
- **Liquidity**: Ratio of securities, federal funds sold, and reverse repurchase agreements to total assets, ratio of brokered deposits to total assets;
- **Sensitivity to Risk**: Return on risky assets defined as noninterest income net of deposit fees and fiduciary income divided by total assets

Data: Set X3—Expectations of Future Macroeconomic Conditions

- real GDP (growth rate);
- inflation rate as measured by the GDP deflator (growth rate);
- corporate profits (growth rate);
- unemployment rate (change);
- housing starts (growth rate);
- Treasury bill yield (change).

Estimation: Local Projections

- Linear specification:

$$\mathbf{y_{t+s}} = \alpha^{\mathbf{s}} + \sum_{p=1}^{P} \mathbf{B_p^{s+1} y_{t-p}} + \mathbf{D^{s+1} x_t} + \mathbf{u_{t+s}^s}$$

- Nonlinear specification:

$$\mathbf{y_{t+s}} = \alpha^{\mathbf{s}} + \mathbf{B_1^{s+1} y_{t-1}} + \mathbf{Q_1^{s+1} y_{t-1}^2} + \mathbf{C_1^{s+1} y_{t-1}^3}$$
$$+ \sum_{p=2}^{P} \mathbf{B_p^{s+1} y_{t-p}} + \mathbf{D^{s+1} x_t} + \mathbf{u_{t+s}^s}$$

- Impulse responses:

$$\mathbf{\Phi_{s,f}} = \frac{1}{f} \mathbf{\hat{\Gamma}_1^s} \Lambda,$$

where:
- $\mathbf{\hat{\Gamma}_1^s} = [\mathbf{\hat{B}_1^s} \ \mathbf{\hat{Q}_1^s} \ \mathbf{\hat{C}_1^s}]$
- $\Lambda = [d; \ 2\bar{y}_{t-1}d + d^2; \ 3\bar{y}_{t-1}^2 + 3\bar{y}_{t-1}d + d^3]$
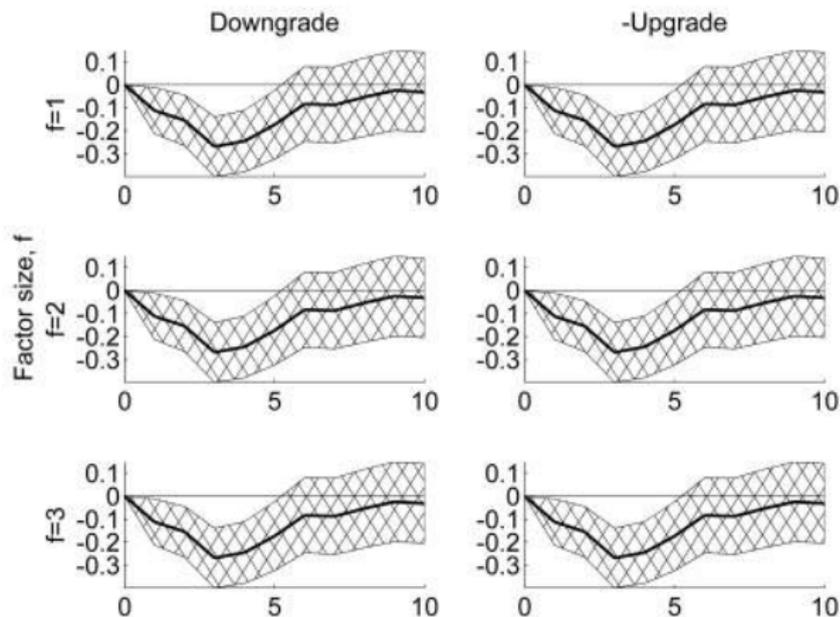- $d = \mathbf{B_0}[0 \ f]'$, where $f = [1, \ 2, \ 3]$

Real GDP growth as real activity: Filled blue 95% confidence interval and dashed mean response—Cholesky SVAR; Cross-hatched 95% confidence interval and solid mean response—linear local projection; Left column—downgrades; Right column—upgrades

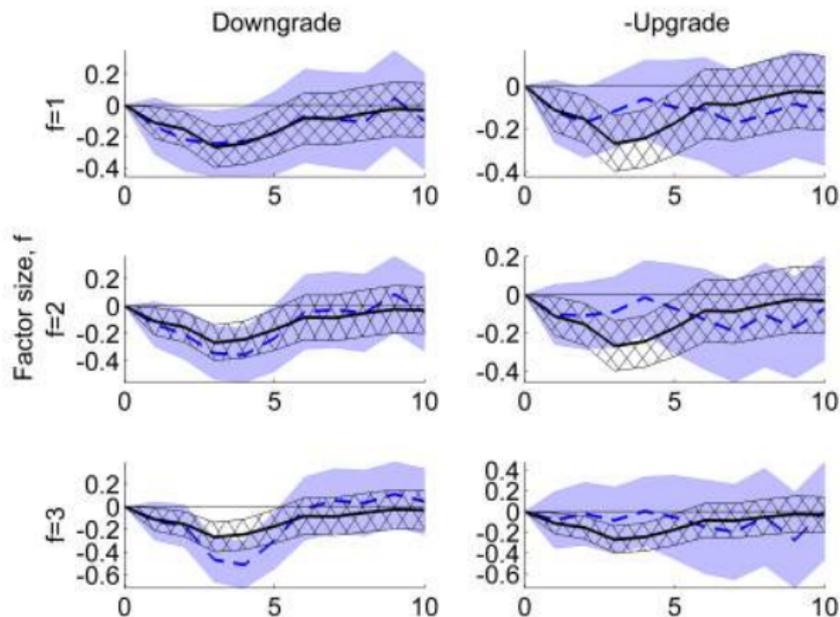# Preview of Baseline Results (without Exogenous Controls)

- Red—linear; Blue—nonlinear
- Left column—positive CAMELS shocks (downgrades); Right column—negative CAMELS shocks (upgrades, negative IRF to negative shock)
- Symmetry suggests that IRFs in the two columns have identical shapes
- Rows—shocks of 1, 2, and 3 standard deviations of a given shock
- Linearity suggests that IRFs in all rows will have identical shapes
- Paper finds similar results for real GDP growth and change in the unemployment rate (previously also for change in total capacity utilization)

Baseline Results: Linear Model

Real GDP growth as real activity: Cross-hatched 95% confidence interval and solid mean response—linear model
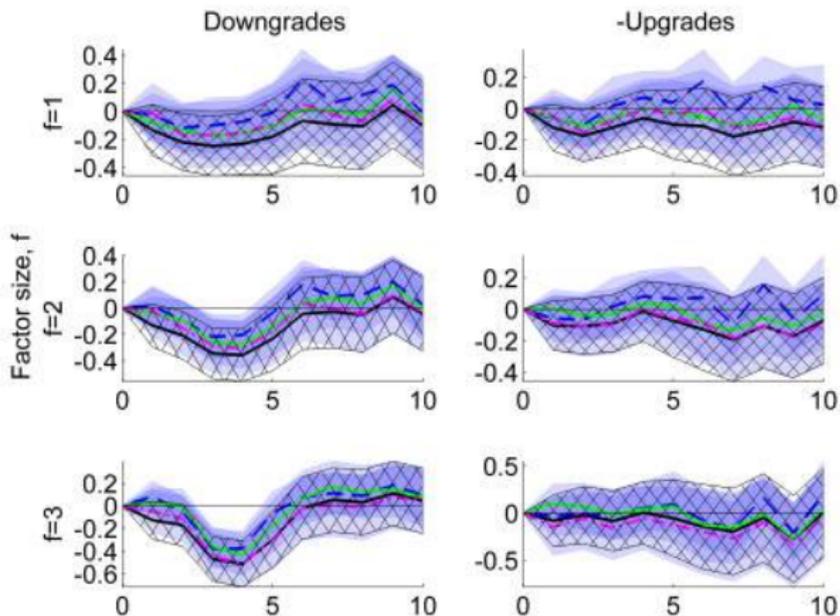
Real GDP growth as real activity: Filled blue 95% confidence interval and dashed mean response—nonlinear model; Cross-hatched 95% confidence interval and solid mean response—linear model

# Preview of Robustness Check Results (with Exogenous Controls)

- Motivation:
  - Impulse response coefficients may suffer from omitted variable bias
  - Shocks may be picking up something other than exogenous variation in CAMELS ratings

- Results relative to the baseline:
  - Blue—nonlinear without controls; Green—nonlinear with controls
  - Summary: main results carry through, although statistical significance deteriorates and the effects are somewhat smaller

Results: Effect of Exogenous Controls

Cross-hatched 95% CI and solid mean response—no controls; Filled blue 95% CI—with controls; Dashed blue line—macro controls (X1); Solid green line—Banking controls (X2); Punctuated magenta line—SPF controls (X3)

Robustness Check: Model with Inflation, FFR, and Share of Loans in Bank Credit
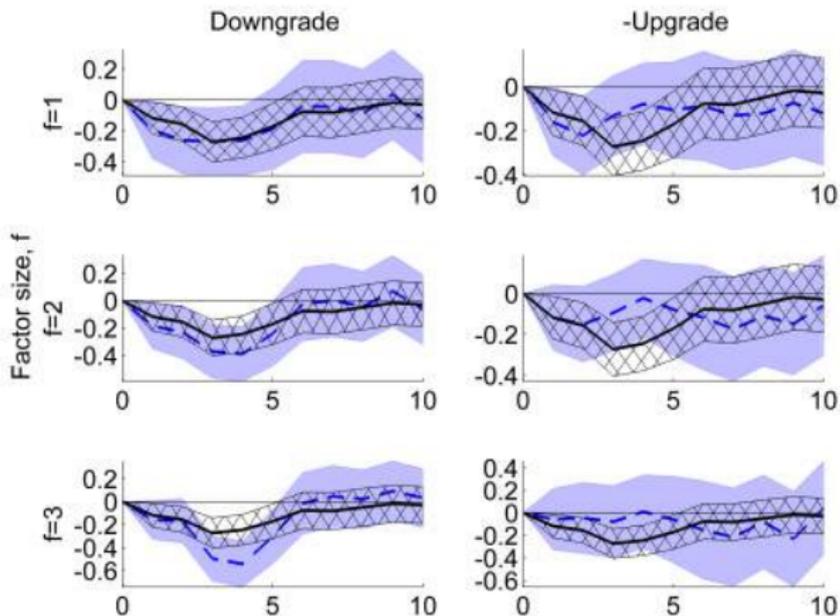
Real GDP growth as real activity: Filled blue 95% confidence interval and dashed mean response—nonlinear model; Cross-hatched 95% confidence interval and solid mean response—linear model

Concluding Remarks

- Shocks to CAMELS ratings appear to have strong effects on real macroeconomic activity

- This effect appears to be asymmetric: banking downgrades result in contractions whereas upgrades do not result in expansion

- It also appears to be nonlinear: largest downgrades have the strongest effect whereas largest upgrades the weakest

- The effect of exogenous shocks to bank ratings on real activity appears to be at least comparable to monetary policy shocks and other credit market disruptions