Discussion of:

The Effects of Bank Capital Buffers on Bank Lending and Firm Activity: What Can We Learn from Five Years of Stress-Test Results?

by J. Berrospide and R. Edge

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Question and Answer

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- Use *multiple bank-firm matched* U.S. data to study how stressed capital buffers of 16 large U.S. banks impact C &I lending and firm outcomes.
  - Bank-firm data allows BK to disentangle the *bank lending channel (supply)* from the *firm borrowing channel (demand)* as in Khwaja and Mian (2008, hereafter KM).

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- Using a diff-in-diff approach (loan growth before/after test and stressed capital diffs between banks), BK find that a firm which borrows from banks that on a weighted-avg. basis face a 1% larger stress-test buffer experiences a 4% (3%) lower growth rate in utilized loans (committed credit lines).

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- However, firms find other sources of credit to substitute for the reduction in loans from these banks.

Empirical Specification

$$LG_{i,j,t+1} = \alpha_{i,j} + \tau_{j,t} + \beta_1 \cdot STB_{i,t} + \beta_2 \cdot KR_{i,t} + \gamma \cdot X_{i,t} + \varepsilon_{i,j,t+1} \quad (1)$$

where

- $LG_{i,j,t+1}$ is the annual growth rate (based on 3qtr after-3qtr before disclosure of test) of C&I loans from BHC i to firm j.
- $STB_{i,t}$ is the decline in Tier 1 capital ratio at BHC i from start to minimum in the stress test in year t.
- $KR_{i,t}$ is the equity capital to assets ratio of BHC i at start of year t.
- $X_{i,t}$ is vector of BHC i controls (e.g. size, etc.) at start of year t.
- $\alpha_{i,j}$ are firm-bank fixed effects
- $\tau_{j,t}$ are firm-time fixed effects

Hypotheses: $\beta_1 < 0$ (banks in stress must pull in their loans) and $\beta_2 > 0$ (better capitalized banks can make more loans).

Empirical Questions

- Endogeneity Concerns?
    - While the KM fixed effects strategy gets around the identification problem, biases could arise if the rhs variable was anticipated.
    - KM used a plausibly exogenous shock to their rhs variable (bank liquidity) arising from *unanticipated* nuclear tests in Pakistan which led to a sudden drop in dollar-denominated deposits.
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  - The concern is that if stress test results are anticipated, banks may adjust their lending or firms adjust their borrowing prior to the shock. It would be helpful to show pre-trends of treated vs nontreated groups (as in Figure 3 of KM).
- Why stop at the "intensive" margin? What about the "extensive" (exit or enter loan) margin? Data?
- How sensitive are the firm results to the sample of multi-bank firms? KM also include single-bank firms, in which case they find strong effects. Doesn't size matter?

Structural Approach

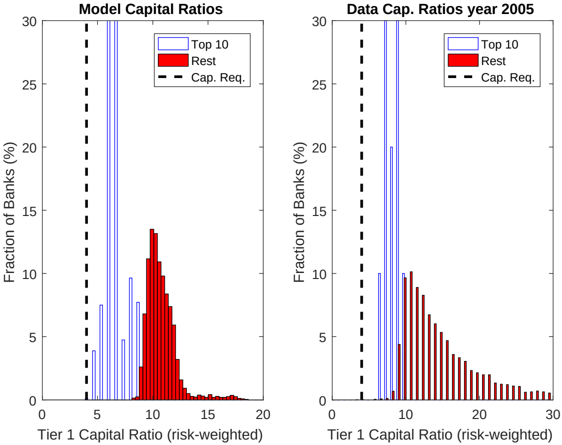
- A complementary approach is to build a structural model to analyze the interaction of risk weighted capital requirements ($\varphi_{\theta,z}$) on banks of type θ and aggregate (business cycle) shocks (z) to analyze bank lending and interest rates.
- Bank managers choose loan quantities (ℓ'_θ), riskless assets (A'_θ), dividend payments ($\mathcal{D}_\theta$), seasoned equity issuance (e_θ), and exit decisions (x'_θ) to maximize the PDV of bank cash flows given idiosyncratic funding shocks (δ_θ). DP
- Cash flows depend on the riskiness of the asset portfolio:

$$\pi'_\theta = \left\{ p(R, z')r^L - (1 - p(R, z'))\lambda \right\} \ell'_\theta + r^a A'_\theta - r^D d'_\theta.$$

- Bank equity evolves according to

$$n'_\theta = n_\theta + \underbrace{\pi'_\theta - \mathcal{D}_\theta + e_\theta - \zeta_\theta(e_\theta, z) - \kappa_\theta - c_\theta\left(\ell'_\theta\right)}_{\text{ret. earnings+equity injection}}$$

Distribution of Capital Ratios in the Model and Data



- After calibrating the model, Corbae & D'Erasmo (2018) find consistent heterogeneity in capital ratios across banks of different sizes between model and data.

Related Counterfactual to BK: Size Dependent Capital Requirements

Question: What if big banks are required to hold a larger buffer of capital (i.e. $\varphi_\theta = 0.04$) $\rightarrow$ ($\varphi_b = 0.11, \varphi_s = 0.085$))?

Microprudential:

- Despite raising costly equity and lowering dividends, big banks cut lending 5%.
- The short run impact on small bank lending falls by 6% and unprofitable ones exit.

Macroprudential:

- The short (long) run impact on loan interest rates is nearly $+100BP$ ($+30BP$).
- Small banks lose (gain) market share in the short (long) run.
- Funding for failed banks decreases in the long run by 19% (selection effects lead to allocative efficiency in banking).

Conclusion

- An interesting U.S. counterpart to Jimenez, et. al. (2017)'s dynamic provisioning paper, but how do we interpret BK's results?
    - Is there model uncertainty, detected agency problems, etc. that is causing the affected bank to cut its loan supply?
- Empirical conclusions constrained by data availability - model counterfactuals can sometimes help with future regulatory policies like Countercyclical Capital Requirements.
- What are the quantitative macroprudential implications from microprudential studies?

Bank's Dynamic Programming Problem

Manager chooses $\{\{\ell'_\theta, A'_\theta, \mathcal{D}_\theta, e_\theta\} \geq 0, d_\theta \in [0, \delta_\theta], x'_\theta \in \{0,1\}\}$ to

$$V_\theta(n_\theta, \delta_\theta; z, \mu, \cdot) = \max \Big\{ \mathcal{D}_\theta - e_\theta$$
$$+\gamma\beta E_{z'|z}\Big[\max_{x'_\theta \in \{0,1\}} \Big\{ (1 - x'_\theta) E_{\delta'_\theta|\delta_\theta} V_\theta(n'_\theta, \delta'_\theta; z', \mu', \cdot) + x'_\theta V^x_\theta(n'_\theta, \ell'_\theta) \Big\} \Big]$$

s.t.

$$\begin{aligned}
n_\theta + d'_\theta + e_\theta &\geq \ell'_\theta + A'_\theta + \mathcal{D}_\theta + \zeta_\theta(e_\theta, z) + [\kappa_\theta + c_\theta\left(\ell'_\theta\right)] \\
E[n'_\theta] &\geq \varphi_{\theta,z}(w^\ell_\theta \ell'_\theta + w^A_{\theta,z}(A'_\theta + E[\pi'_\theta])) \\
\varrho_{\theta,z} d'_\theta &\leq A'_\theta + \pi'_\theta(z' = z_C) \\
n'_\theta &= \pi'_\theta + \ell'_\theta + A'_\theta - d'_\theta \\
L^d(r^L, z) &= \ell'_\theta + L_f(z, \mu, \ell'_b) \\
\mu' &= H(z, \mu, z', M'_e),
\end{aligned}$$

▸ return