The Disturbing Interaction Between Countercyclical Capital Requirements and Systemic Risk

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Motivation

- Two dimensions of systemic risk
  - time dimension (procyclicality)
  - cross-sectional (due to common exposures or interconnectedness)
- Both dimensions are usually analyzed in isolation with consequences for policy formulation

This paper: study interaction among dimensions.

Specific question: how does policy intervention in one dimension of systemic risk affect systemic risk in the other dimension?

Main results

- Key insight from model: counter-cyclical macroprudential regulation can increase systemic risk in the cross-section
- Reason: Countercylical policies insulate banks from sector-wide fluctuations but not against bank-specific shocks $\Rightarrow$ relative cost of being exposed to idiosyncratic risk increases and leads to more systemic risk-taking
- The consequence is that macroprudential policies that improve systemic risk in one dimension (countercyclicality) worsen systemic risk in the other dimension (cross-sectional risk). Ultimately they can even lead to more procyclicality.
- The reverse problem does not arise: policies that reduce cross-sectional risk at the same time lower countercyclicality.

Literature

- Procyclicality
  - Procyclicality may arise from capital (Blum and Hellwig (1995) and many others), Haircuts and margining practices (CGFS (2010)), Loan-loss provisioning (Borio et al. (2001))
  - Can make countercyclical capital requirements (CR) optimal (Kashyap and Stein (2004), Repullo and Suarez (2012))
- Cross-sectional systemic risk
  - Common exposures on asset or liability side (Rajan (1994), Acharya and Yorulmazer (2007), Wagner (2010), Farhi and Tirole (2012))
  - Banks may correlate "too much", providing rationale for policy

The model

- Two banks (A and B), can invest in project of size one, projects return $R > 1$ with probability $p > 0$ at later date and zero otherwise. Monitoring increases p to $p + \Delta p$ at a (non-monetary) cost of monitoring $c>0$ per project.
- Banks financed with equity k and (insured) deposits $1 - k$. Insured deposits create moral hazard in that banks may not monitor if though socially optimal.
- Capital can reduce moral hazard problem, which provides rationale for capital regulation. In particular, banks will monitor if $k \geq \bar{k}$. But there is an extra cost of capital ρ, so there is a trade-off...

Standard model so far...

Three additional elements

- Capital cost ρ are variable (uniform distribution, but not important for results). $\Rightarrow$ Inefficiency of flat CR.
- Funding shock with probability p_F in which case a bank cannot undertake its project. In this case (access to) project can be sold to a surviving bank. $\Rightarrow$ Systemic costs.
- Endogenous cross-bank correlation: each bank can either choose systemic funding (common to both banks) or alternative funding (bank-specific).
  - If both banks systemic: both capital costs and funding shocks are perfectly correlated. Otherwise both are uncorrelated.
  - Denote systemic capital costs with ρ_S and bank-specific funding costs with ρ_A and ρ_B.
  - Interpretation: market (nationwide) versus retail (local) funding.

Features of model

- Endogenous likelihood of "credit crunch": if both banks choose systemic funding, credit crunch arises with probability p_F, otherwise its probability is p_F^2 ($<p_F$).

- Systemic capital costs ρ^S are a proxy for the aggregate state of the economy (in bad states of the economy, bank capital is more costly)
  - Extension: correlation choice on asset side
    - return on legacy projects used to finance new projects
    - when return on legacy projects is low (bad state of the economy), there is little bank capital and cost of capital is consequently high

Timing and decision variables

1. Policy maker announces capital requirement rule conditional on aggregate state, $k(\rho^S)$.
2. Banks choose funding type (systemic or alternative).
3. Funding shocks and capital costs materialise and project transfers may take place. Afterwards banks raise funds (for one or two projects) and make the monitoring decision.
4. Projects mature.

Optimal Capital Requirements and Correlation Choices

Let us first assume that regulator can also set correlation choice. Regulator thus sets capital policy $k(\rho_S)$ and decides whether banks choose correlated (both systemic) or mixed funding (one alternative and one systemic)

- Note: alternative funding for both banks is (weakly) dominated by mixed funding (alternative plus systemic).

Proposition 1

The welfare-maximing policy rule is countercyclical: $\mathrm{Cov}(k^*, \rho^s) < 0$ *and takes the form:*

$$k^*(\rho^S) = \begin{cases} \bar{k} & \text{if } \rho^S \leq \hat{\rho}^* \\ 0 & \text{otherwise} \end{cases}$$

The reason: trade-off between benefits from monitoring and cost of capital. If capital costs are sufficiently high (bad state), the cost of incentivising banks to monitor outweigh the benefits of it.

Optimal Capital Requirements and Correlation

Proposition 2

There is a critical value $\widehat{p}_F$, such that for $p_F \geq \widehat{p}_F$ mixed funding maximizes welfare, while for $p_F < \widehat{p}_F$ correlated funding is welfare-maximizing.

Cost of correlated funding: Under systemic funding, likelihood of credit crunch (no project undertaken) is higher
Benefit of correlated funding: conditional on a project undertaken, expected capital costs are lower for systemic funding due to insurance function of countercyclical capital requirements. We have that

$$\pi^S - \pi^I = -Cov(k, \rho^S),$$

where π^S and π^I denote the expected benefit from undertaking a project with systemic and alternative funding, respectively.

- Costs are increasing in p_F and hence for sufficiently high p_F mixed funding is optimal

Optimal capital requirements when correlation choice is private

Now assume that regulator cannot control correlation choices. In this case, announced capital requirement rule may affect correlation choice of banks. Solution is obtained by backward induction. Last stage: banks play Nash in funding strategy.

Trade-off for a bank when choosing systemic funding (when other bank has already chosen systemic funding) is similar to before: systemic funding reduces expected number of projects that can be undertaken but reduces capital costs conditional on project being undertaken

However, private trade-off is not identical to social trade-off

Systemic externality

- Private cost of correlated funding: one project can no longer be undertaken when systemic funding shock arrives (social cost: two projects cannot be undertaken)
- Externality: A bank does not internalize the impact of choosing systemic funding on other bank's payoff. Choosing systemic funding eliminates the other bank's option to acquire projects from a failing bank, posing a (negative) systemic externality from correlated funding.

Proposition 3

For a given capital requirement rule, banks may choose correlated funding even if mixed funding maximizes welfare.

Optimal capital requirements when correlation is private

Proposition 4

Compared to $k^*(\rho^S)$, the optimal policy rule now displays either the same or lower countercyclicality.

Intuition: Countercyclicality increases incentives to correlate (because of $\pi^S - \pi^I = -Cov(k, \rho^S)$). If welfare-maziming outcome is mixed funding, it may be optimal to lower countercyclicality in order to implement mixed funding.

Discussion

- Countercyclical policies may increase "procyclicality": Countercyclicality may induce banks to choose correlated funding. A given aggregate shock then has bigger implications (in particular, higher likelihood of credit crunch).
- Cross-sectional policies are preferred. Suppose regulator has a policy tool that discourages banks from choosing correlated exposures. This will both reduce cross-sectional risk but also lower procyclicality as exposure to aggregate state declines.
- Mechanism is not confined to capital regulation. The same intuition holds for other types of counter-cyclical bank regulation that is based on aggregate triggers.

Role of credibility

Note: we assumed that the regulator can commit.

Proposition 5

If the regulator lacks commitment, the availablity of a countercylical policy tool may reduce welfare (compared to situation where regulator can only set fixed capital requirements).

Reason: *ex post* it is optimal to provide a lot of insurance against aggregate fluctuations (fluctuations in ρ_S). Banks thus anticipate that a large degree of insurance is provided. They may thus choose correlated funding even if mixed funding is optimal. A countercyclical policy tools may lead to lower welfare.

$\Rightarrow$ This provides a negative message for Basel III which envisages discretionary macro-prudential policies

Summary

- The two dimensions of systemic risk, procyclicality and cross-sectional risk, are inherently related.
- Policies that address one dimension of systemic risk will also affect the other dimension
- In particular, counter-cyclical bank regulation might increase cross-sectional risk. By contrast, policies that reduce cross-sectional risk reduce procyclicality.
- Lack of commitment worsens the appeal of a countercyclical policy tool.