Macroprudential policy with capital buffers

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any views presented are my own and not necessarily those of the Bank of Canada
Macroprudential policy with capital buffers

- regulators feel banks did not have enough capital going into recent crisis
  - consider capital to be less costly than bank shareholders
- introduce capital buffers in addition to minimum requirements (MR)
  - difference is that buffer can potentially be used in crisis:
    banks can use buffer to maintain lending, but then must cut dividend
- Basel III regulatory framework introduces two types of buffers
  - constant Capital Conservation Buffer (CCB)
  - time-varying Countercyclical Capital Buffer (CCyB)
- in Canada: Domestic Stability Buffer (DSB) shares elements
Literature on ex-ante and ex-post policies

- financial crises have high social costs
  - almost always lead to policy interventions (Laeven-Valencia, 2013)

- ex-post interventions can reduce costs, e.g. recapitalization

- but ex-ante policies also matter, e.g. capital buffers
  - Lorenzoni (2008), MartinezMiera-Suarez (2012)

- can trade off ex-ante and ex-post policies
  - Bianchi (2016), Jeanne-Korinek (2019), this paper
Focus on bank long-term prospects

- literature relates bank access to funding to asset value during bank default
- reflects concern about liquidation value of bank
  - its assets worth less when bank defaults, e.g. loans not serviced
  - 2007–08 run on sale and repurchase market, Gorton-Metricks (2012)
- this paper assumes bank decision to default depends on its future prospects
  motivation:
  defaulting bank loses charter value, depends positively on future prospects
  care about liquidation value, but also about likelihood of liquidation
- use this focus to derive new implications for bank regulation
Preview of results

- **laissez-faire competitive equilibrium:**
  - banks engage in risk management through loan loss provisioning
  - lose access to market funding only occasionally, severe credit crunch

- **constrained-efficient allocation:**
  - additional capital buffers in normal times, builds resilience
  - boost bank future prospects during credit crunch
    - lending drops much less but also recovers much more slowly
    - smooth out scarcity of bank lending to economy over time

- **implication for macro-prudential regulation:** CCB, CCyB, recapitalization
Model

- infinite horizon, time periods $t = 0, 1, 2, \ldots$
- aggregate productivity shocks $s_t \in \{s_L, s_H\}$ i.i.d. with $Pr(s_t = s_L) = \rho$
- measure one of identical risk-neutral consumers:
  - supply labor inelastically, trade non-contingent bond at price $\beta < 1$
- measure one of identical short-lived firms:
  - borrow $k_{t+1}$ in period $t$, hire labor $l_{t+1}$ in period $t + 1$
  - produce $s_{t+1} k_{t+1}^\alpha l_{t+1}^{1-\alpha} + (1 - \delta)k_{t+1}$ in period $t + 1$
  - contingent loan repayment $R_{t+1} k_{t+1}$, wage bill $w_{t+1} l_{t+1}$
  - firms eat any profits, exit, and new firms enter
• measure one of identical banks:
  
  – only banks can lend to firms, denote new lending in $t$ by $\ell_{t+1}$
  
  – bank equity costly, discount dividends $d_t$ with $\gamma < \beta$
  
  – can extract $\theta \ell_{t+1}$ if bank chooses to default at end of period $t$
    
    e.g. risk-shifting or holding up creditors
    
    defaulting bank enjoys $\theta \ell_{t+1}$ but must exit afterwards
  
  – market discipline:
    
    bank has access to funding $b_{t+1}$ as long as no-default condition holds
    
    $$E_t \left[ \sum_{\tau=1}^{\infty} \gamma^\tau d_{t+\tau} \right] \geq \theta \ell_{t+1}$$
Market-imposed equity requirements

- define bank equity: \( A_t = R_t \ell_t - b_t \)

- define bank future rents:

\[
\Pi_t = \sum_{\tau=1}^{\infty} \gamma^\tau E_t \left[ \left( R_{t+\tau} - \frac{1}{\gamma} \right) \ell_{t+\tau} \right] + \sum_{\tau=1}^{\infty} \gamma^\tau E_t \left[ \frac{\beta - \gamma}{\gamma} b_{t+\tau} \right]
\]

  - first term denotes profits from lending
  - second term denotes benefit from using external finance \( b_{t+\tau} \)

- re-write no-default condition: \( \gamma E_t[A_{t+1}] \geq \theta \ell_{t+1} - \gamma E_t[\Pi_{t+1}] \)

  - equity requirement is \( \theta \) in normal times, when rents are zero
  - but lower during credit crunch, when banks earn positive rents
Competitive equilibrium and pecuniary externality

- markets for bank loans clears:

  aggregate bank lending is $K_t = k_t = \ell_t$

  bank lending return is $R_t = s_t \alpha K_t^{\alpha-1} + 1 - \delta$

- market for labor clears:

  aggregate labor is $L_t = l_t = 1$

  wage is $w_t = s_t (1 - \alpha) K_t^\alpha$

- lending returns determine bank rents, affect equity requirement

- but banks take them as given... pecuniary externality!
Second-best allocation

- competitive equilibrium not constrained-efficient:
  - can improve allocation by taking pecuniary externality into account
- maximize expected present value of dividends and wages
  - internalize how lending affects market-imposed equity requirement
  - also do not consider equity costly, discount dividends with $\beta$ as well
    - ... but cannot force banks to operate: shareholder value $\geq$ equity!
- competitive equilibrium (CE) vs. second best (SB)
  - interpret differences as due to macro-prudential concerns
### Numerical analysis

<table>
<thead>
<tr>
<th>parameter</th>
<th>value</th>
<th>target</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\beta)</td>
<td>0.94</td>
<td>around 6% interest rate on savings</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>0.93</td>
<td>6% of years in financial crisis</td>
</tr>
<tr>
<td>(\delta)</td>
<td>0.12</td>
<td>average replacement investment</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>0.35</td>
<td>capital income share</td>
</tr>
<tr>
<td>(\theta)</td>
<td>0.10</td>
<td>12.5% equity to assets in normal times</td>
</tr>
<tr>
<td>((s_L, s_H, \rho))</td>
<td>(0.8, 1.05, 0.2)</td>
<td>voluntary equity buffer absorbs one (s_L)</td>
</tr>
</tbody>
</table>

- define normal times: bank equity constant as long as \(s_H\) occurs
- compare CE and SB for three consecutive impulse responses:

\[
\{s_H, \ldots, s_H, s_L, s_H, \ldots, s_H, s_L, s_L, s_L, s_H, \ldots, s_H, s_L, s_L, s_L, s_L, s_H, \ldots, s_H\}
\]
- **capital ratio** measured by $\gamma E_t[A_{t+1}]/\ell_{t+1}$ in model
- additional buffer in SB, but more time to build it up
- **bank lending** is low when equity is low, additional buffers in SB help
- crisis in SB much less severe, but also slower recovery
- promising future profits relaxes equity requirement in SB
- **excess returns** over many periods in SB, less distortionary than spike
- smooth out scarcity of bank lending over time, reason for slow recovery!
- **dividend payouts** are allowed in SB while buffer is being rebuild
  
- need buffer that is turned off during/after crisis, like CCyB!
Conclusion

- optimal microprudential regulation:
  more lenient during financial crisis compared with Basel II...
  ... because of countercyclical margins

- optimal macroprudential regulation:
  buffers and payout restrictions as in Basel III
  but also give more time to rebuild buffers, slow down recovery...
  ... smooth out bank interest rate margins over time

- key mechanism behind macroprudential policy implication:
  margins ‘forward guidance’ reduces pressure to deleverage during crises