The Cross-Border Effects of Bank Capital Regulation

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SUMMARY

- **Research question**: hows does reciprocity in international capital requirements (CR) impact the flow of bank capital across borders and strategic incentives?
- **Reciprocity**: CR are *de facto* ruled by the jurisdiction where lending takes place
- International competition for scarce bank capital, not credit market shares
- Regulator faces trade-off between economic activity and financial stability
- **Cross-border externality**: CR moves capital to/from abroad and improves/worsens Foreign's welfare
- **Signing the externality**: nests competitive “race to the bottom” and “race to the top”
- Gains from international coordination (violation of Tinbergen Principle)

Positive Analysis

Equilibrium characterization:

- Banks default with positive probability
- Capital requirements are binding
- Regional concentration: specialization in Home or Abroad
- Conditional on $\{\gamma, \gamma'\}$, bank RoE equilize across countries

Equity capital flows across countries:

- $\gamma \uparrow$ may trigger capital inflows *or* outflows
- Direct effect: RoE $\downarrow$, **outflow**
- Indirect effect: aggregate lending $\downarrow$, total revenues $\uparrow$, RoE $\uparrow$, **inflow**

Normative Analysis

Raising CR at Home imposes an externality for Foreign

Nature of externality

$$\pi_{\gamma}^{'*} = \underbrace{\frac{dN^{'*}}{d\gamma}}_{\text{Could be } \gtreqless 0} \underbrace{\pi_{N'}^{'}\left(N^{'*}, \gamma'\right)}_{\text{Generally } >0}$$

Nash equilibria generally inefficient; gains from collaboration

Easiest to think in terms of $\gamma \uparrow$ in two states of the world:

- High ω (boom): $\gamma^{n} > \gamma^{col}$. **Negative** externaltlity. Inflows. CCyB too strict. Race to the top.
- Low ω (crisis): $\gamma^{n} < \gamma^{col}$. **Positive** externaltlity. Outflows. CCyB too loose. Race to the bottom.

Useful Parameter Statics

Capital **outflows** from $\gamma \uparrow$ are stronger with:

- High regulatory preferences for financial stability
- Scarce bank capital (low ω)
- High risk shifting
- Bank market power

Multiple countries

- Tragedy of the commons
- **Stronger** incentives to deviate; the same financial stability benefit at a lower economic cost

Comments

The paper's positive and normative results rely on three fundamental regularity conditions. We **test** them:

1. Diminishing returns to lending
2. Capital requirements always bind
3. Bank RoE equilize across countries

Minor points

1. Rise of bank market power and the future of the externality
2. Endogenous response of fiscal and monetary sides

Comment 1: Diminishing Returns to Lending

Key assumption for **indirect** effects of γ on RoE that run through aggregate returns

Any empirical support? Wheelock and Wilson (2018)

- Estimation of returns to scale on revenue and profit functions for U.S. banks
- Question: when bank output (loans) increases by 10%, by how much do revenues or profits increase?
- Estimate of > (<) 1.1 indicates increasing (decreasing) returns in revenue or profits

COMMENT 1: DIMINISHING RETURNS TO LENDING

Table 3: Returns to Scale for Largest Banks by Total Assets, 2006.Q4 and 2015.Q4

Name	Assets	Cost	Revenue	Profit
—2006.Q4—				
CITIGROUP	2082	1.1011	1.0808***	1.1355***
BK OF AMER	1672	1.0391***	1.0930***	1.1519***
JPMORGAN CHASE & CO	1543	1.1025	1.0982	1.2066***
WACHOVIA	726	1.0459***	1.0229***	1.0663
WELLS FARGO & CO	554	1.0193***	0.9996***	1.0134***
U S BC	250	1.0585***	1.0493***	1.0656***
COUNTRYWIDE	225	1.1009	1.0013***	0.9950***
SUNTRUST BK	210	1.0734***	1.0757***	1.0865
HSBC BK USA	191	1.0456***	1.0096***	0.9928***
NATIONAL CITY	160	1.0697***	1.0178***	0.9778***
—2015.Q4—				
JPMORGAN CHASE & CO	2378	1.0151***	1.1007	1.1249***
BK OF AMER	2145	1.0140***	1.1030	1.1592***
CITIGROUP	1765	1.0375***	1.1337***	1.1842***
WELLS FARGO & CO	1764	1.0347***	1.1170**	1.1180***
U S BC	418	0.9654***	1.0091***	1.0181***
BK OF NY MELLON	384	1.0697***	1.0451***	1.0348***
PNC FNCL SVC GROUP	359	0.9639***	1.0168***	1.0283***
STATE STREET	246	1.1568	1.0042***	1.0117***
T D BK	243	1.0527***	1.0666**	1.0717
BB&T	209	1.0483***	1.0795	1.1012

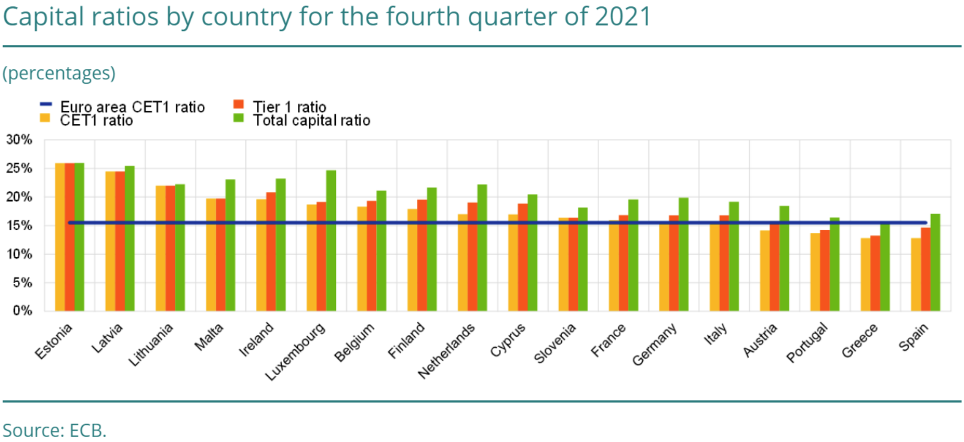
2006: strong support for diminishing returns in revenue. 2015: mixed

Evidence for European banks supports diminishing returns (Anolli, Becalli, Borello 2015)

Comment 2: Capital Requirements Bind

- Presence of capital requirements matters by itself
- But whether the constraint **binds** in equilibrium is not obvious - depends on model, choice
- Can look at the **empirical** distribution of capital ratios by country
- 2021: ECB total capital ratio requirement - 14.9%. CET1 requirement - 10.5%

Comment 2: Capital Requirements Bind



The capital ratio constraint appears **slack** for the Euro Area; binds for Greece (Portugal?)

Rich heterogeneity in country-specific Lagrange multipliers on the constraint

Comment 3: Bank Returns Equalise Across Countries

- Equilization of bank RoE across Home and Foreign a feature of the environment
- But also result of **assumptions** of free financial mobility, no-arbitrage
- Big literature on misallocation of capital (credit and otherwise) across Europe
- **Financial frictions** may matter; generate externalities of their own that amplify/dampen the cross-border flow externality
- With 2 periods also hard to distinguish “short” vs “long” run

Comment 3: Bank Returns Equalise Across Countries

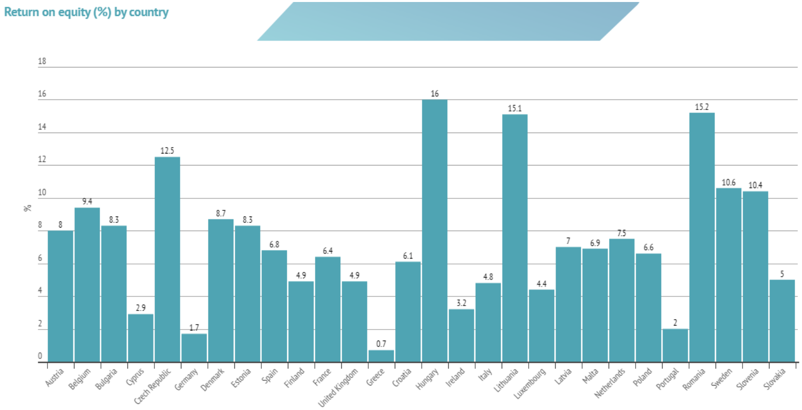


FIGURE: Data for 2019. Source: EBF

Bank RoE **varies** greatly by country; admittedly just a short-run snapshot

An “equilibrium”, long-run calculation needed

Minor Comments

1. Bank market power
   - Bellifemine, Jamilov, and Monacelli (2022) document the rise of **credit and deposit** market power of banks
   - Implications for CR and capital flows not entirely clear from paper
   - More elastic loan demand (outflows) but higher equilibrium profits (inflows)?
   - Perhaps a more involved discussion is warranted for the topic

2. Endogenous response of monetary or fiscal sides missing
   - Trade-offs between macropru, financial stability, and monetary policy well documented (Laeven, Maddaloni, Mendicino 2022)
   - In particular, fiscal subsidization of domestic bank capital offsets coordination gains
   - Can generalize and assume a **fiscal capacity constraint** that binds in equilibrium
   - Results will likely still go through but dampened

Conclusion

Great paper! Very well written

Rich, compact, elegant framework on a policy-relevant question

Comments are mostly on how to generalize key assumptions

1. Diminishing returns to lending
   - Assumption seems broadly validated
2. Capital requirements always bind
   - Can you generalize to allow for an occassionally binding CR constraint?
3. Bank RoE equilize across countries
   - Can you introduce a financial friction to eliminate cross-border no-arbitrage, at least for the short-run? An exogenous wedge?