Macroprudential policies and the cost of bank equity: International evidence

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Introduction

- The use of the term macroprudential can be traced back to the late 1970s, with macroprudential policies gaining some popularity in the late 1990s and 2000s (Clement, 2010).

- However, it was not until the 2008 financial crisis that macroprudential policies attracted substantial attention.

- The crisis revealed important weaknesses in the regulatory framework, and policy makers responded with the adoption of macroprudential policies that aim to address systemic risk and promote the financial stability of the entire financial system, rather than individual institutions.

- As a result, while macroprudential policies were used sporadically until that time, in the aftermath of the crisis one country after the other started introducing macroprudential policies in its regulatory toolbox (Lee et al., 2011; Cerutti et al., 2017; Alam et al., 2019)

Introduction (cont.)

- The interest of policy makers was followed by the interest of researchers, resulting in numerous studies that aim to improve our understanding of macroprudential regulation.

- The present study focuses on the impact of macroprudential policies on the cost of equity of banking institutions.
  - Our main results can be summarized as follows:
    - Macroprudential policies are negatively associated with the cost of equity
      - ✓ It seems that the above finding is driven by financial institutions – targeted policies
      - ✓ Borrower – targeted policies are, in general, statistically insignificant

    - We attempt to identify the channel through which MAPs influence bank cost of equity
      - ✓ We find that MAPs are positively associated with forward looking bank stability
      - ✓ In turn, bank stability is negatively associated with the bank cost of equity

Review of the Literature

Our study relates to two strands of the literature

1. **Studies on macroprudential policies**

- Many of these studies focus on the effect of MAPs at macro level outcomes, like:
  - ✓ **Economic growth** (Boar et al., 2017),
  - ✓ **Credit growth and house price appreciation** (Akinci and Olmstead-Rumsey, 2018),
  - ✓ **Banking and bond inflows** (Bruno et al., 2017),
  - ✓ **Industrial growth** (Madeira, 2024).

- Other studies on the effect of MAPs on on bank-level outcomes, like:
  - ✓ **Bank risk-taking** (Altunbas et al., 2018)
  - ✓ **Funding costs**, measured by total interest expense to average interest-bearing liabilities and ROE (Cehajic and Kosak, 2021)
  - ✓ **Profitability** (Davis et al., 2022)
  - ✓ **Systemic risk** (Narayan and Kumar, 2024)
  - ✓ **Composition of the banks' balance sheet** (Mandas and Goodell, 2025)
  - ✓ **Loan loss provisioning policy** (Olszak et al., 2025)

Review of the Literature

Our study relates to two strands of the literature

2. Studies examining the determinants of bank cost of equity

- ✓Voluntary disclosures (Poshakwale and Courtis, 2005),
- ✓Regulatory changes, like Dodd-Frank in the U.S. (Kovner and Van Tassel, 2022),
- ✓Capital strength (Belkhir et al., 2021),
- ✓Macroeconomic conditions (Maccario et al., 2002)
- ✓Social capital (Pasiouras and Samet, 2022)

MAPs and Cost of Equity

The relationship between MAPs and bank COE is ambiguous

- On the one hand, MAPs have been associated with lower probability of banking crises (Nakatani, 2020) and lower bank risk-taking (Altunbas et al., 2018).
  - ➢In turn, higher bank stability (lower risk-taking) means that shareholders may settle with a lower rate of return for the investment.
    - ✓For example, studies of non-financial firms show an association between the existence of board risk committees and COE (Al-Hadi et al., 2018), internal control reports, investors' risk assessments and firms' COE (Ashbaugh-Skaife et al., 2009), asset risk and COE (Abudy et al., 2016), customer concentration, supplier's risk and COE (Dhaliwal et al., 2016).

MAPs and Cost of Equity (cont.)

The relationship between MAPs and bank COE is ambiguous

- On the other hand, MAPs can come with additional costs for banks. For example, Cyree (2016) mentions that possible effects of regulatory burden include an increase in the number of employees to handle the new rules, an increase in average pay, a fall in technology expenditures if banks hire compliance personnel and shift expenditures away from technology, or a rise in technology expenditures if banks shift to technology to handle new rules and regulations.

  - ➢ Focusing on the regulatory costs imposed by the Dodd-Frank Act, Alvero et al. (2023) estimate that a bank with $50 billion in assets is experiencing a yearly regulatory cost of $4.16 million per year or 0.52% of average annual profits.
  - ➢ A November 2015 report by American Action Forum highlights that since passage, the Dodd-Franc Act legislation produced more than 75.5 million paperwork burden hours and imposed $34.3 billion in direct compliance costs.

  ❖ As a result, MAPs could hurt bank profits (Davis et al. 2022) and could prompt shareholders to demand a higher rate of return in anticipation of lower cash flows in the future.

Sample

Bank-level data are collected from Datastream, for all the commercial bank equities listed on all the stock exchanges around the world during the period.

We merge these data with information from the following two databases:

(i) Institutional Brokers Earnings Services (I/B/E/S) from Thomson Reuters, which provides analyst forecast data, and (ii) Thomson Reuters and Bloomberg, which provide bank financial statement information.

Data for macroprudential regulations per country are from the updated version of the Cerutti et al. (2017) database. Data in Cerutti et al. (2017) are available for the period 2000-2017.

- Given the lag of MAPs in our analysis, we actually cover the period 2001-2018 in terms of bank cost of equity.

We further extract country-level data from the World Development Indicators,

The final sample consists of 1,088 unique banks from 34 countries.

- 7,903 bank-year observations over the period that we examine.

Dependent variable: Cost of Equity

- Following past banking literature (e.g., Belkhir et al., 2021; Berger et al.,2022; Pasiouras and Samet, 2022), we measure a bank's cost of equity capital (*COE*) as the average of four popular implied cost of equity models developed by Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Ohlson and Juettner-Nauroth (2005), which we refer to as r_{CT}, r_{GLS}, r_{MPEG}, and r_{OJN}, respectively.

- We note that r_{OJN} is estimated in a closed form solution while r_{CT}, r_{GLS}, and r_{ES} involve numerical techniques wherein the solution is bounded between 0 and 100 percent.

- Averaging across the four models ensures that the characteristic features of any single model are not unduly driving our results.

- We require banks to have a positive one-, two-, and three year-ahead earnings forecast, a long-term growth estimate, book values, and stock prices to compute implied cost of equity estimates.

- Following Frankel and Lee (1998) and Hail and Leuz (2009), we replace the missing or negative earnings forecasts with the historical earnings per share, estimated using the book value per share at the beginning of the year and the three-year median return on equity in the same year, country, and industry.

Dependent variable: Cost of Equity (cont.)

The implied cost of capital is the discount rate (r) that equates the present value of future dividends ($D_{t+\tau}$) to the current stock price (P_t):

$$P_t = \sum_{\tau=1}^{\infty} \frac{D_{t+\tau}}{(1+r)}$$

Key independent variable: MAPs

The database of Cerutti et al. (2017) covers 12 instruments:

(1) Loan to value ratio (LTV), which limits highly levered mortgage down payments
(2) Debt to income ratio (DTI), which limits household indebtedness
(3) Limits on foreign currency loans (FC), which reduces vulnerability to foreign-currency risks
(4) Limits on domestic currency loans (CG), which limits credit growth directly
(5) Reserve requirement ratio (RR), which is the minimum amount of reserves that must be held by a bank;
(6) Limits on interbank exposures (INTER), which limits the fraction of liabilities held by the banking sector or by individual banks;
(7) General countercyclical capital buffer/requirement (CTC), which requires banks to hold more capital during upturns;
(8) Time-varying/dynamic loan loss provisioning (DP), which requires banks to hold more loan-loss provisions during upturns;
(9) Leverage ratio for banks (LEV), which limits banks from exceeding a fixed minimum leverage ratio;
(10) Capital surcharges on systematically important financial institutions (SIFI), to hold a higher capital level than other financial institutions;
(11) Concentration limits (CONC), which limits the fraction of assets held by a limited number of borrowers, and
(12) Tax on financial institutions (TAX), which reduces revenues of financial institutions.

Key independent variable: MAPs (cont.)

Cerutti et al. (2017) assigned the value of 1, if the measure was in place in the reference year, and a value of 0 otherwise

Borrower-targeted index (BTI): sum of the scores on LTV and DTI

Financial institution-targeted index (FITI): sum of the scores on the other ten instruments

Total macroprudential index (MPI) = BOR + FIN

Control variables

- **Bank-level**
  - ✓EQUITY: total equity to total assets
  - ✓LLP: loan loss provisions to total loans
  - ✓COST: salaries and benefits to total assets
  - ✓ROA: return on assets
  - ✓DEP: deposits to total assets
  - ✓SIZE: natural logarithm of total assets

- **Country-level**
  - ✓LNGDP: natural logarithm of GDP per capita
  - ✓INFL: Annual realized inflation

Methodology

We investigate the relationship between macroprudential policies and the cost of equity of banking institutions by estimating the following regression model:

$$COE_{i,j,t} = \alpha_0 + \beta\, MAPS_{j,t-1} + \gamma \boldsymbol{BC}_{i,j,t-1} + \delta\, \boldsymbol{CC}_{j,t-1} + \zeta\, \boldsymbol{Year} + \varepsilon_{i,j,t}$$

Where: $\mathrm{COE}_{i,t}$ is the cost of equity of bank *i* in country *j* in time *t*, $\mathrm{MAPs}_{j,t-1}$ refers to the macroprudential policies index (MPI, FITI, BTI) in country *j* in time *t-1*, $\mathbf{BC}_{i,j,t-1}$ is a vector of bank-level control variables for bank *i* in country *j* in time *t-1*, $\mathbf{CC}_{j,t-1}$ is a vector of country-level control variables for country *j* in time *t-1,* **Year** is a set of year dummies, $\varepsilon_{i,j,t}$ represents an error term, and α_0, β, γ, δ, ζ are parameters to be estimated. Errors are clustered by bank

Baseline Results

	(1)	(2)	(3)
MPI	-0.003***		
	(-4.630)		
FITI		-0.005***	
		(-5.500)	
BTI			0.001
			(0.641)
Constant	0.305***	0.303***	0.299***
	(12.832)	(12.806)	(12.368)
Control variables	YES	YES	YES
Observations	7,903	7,903	7,903
R-squared	0.259	0.261	0.255

Disaggregating the FITI

	(1)	(2)	(3)	(4)	(5)
Limit Dom. Loans	-0.011***				
	(-2.588)				
Conc. Limits		-0.010***			
		(-3.148)			
General Count. Buff			0.000		
			(0.057)		
Limit For. Loans				-0.002	
				(-0.478)	
Time varying LLP					-0.017***
					(-4.801)
Constant	0.301***	0.309***	0.300***	0.301***	0.305***
	(12.510)	(13.049)	(12.455)	(12.366)	(12.894)
Control variables	YES	YES	YES	YES	YES
Observations	7,903	7,903	7,903	7,903	7,903
R-squared	0.256	0.257	0.255	0.255	0.259

Disaggregating the FITI (cont.)

	(6)	(7)	(8)	(9)	(10)
Limit Interb. Expos	-0.009***				
	(-3.431)				
Leverage ratio		-0.014***			
		(-4.831)			
Reserve req. ratio			-0.016***		
			(-2.778)		
SIFI				-0.002	
				(-0.531)	
TAX					0.004
					(0.899)
Constant	0.294***	0.286***	0.302***	0.301***	0.299***
	(12.162)	(11.562)	(12.541)	(12.546)	(12.368)
Control variables	YES	YES	YES	YES	YES
Observations	7,903	7,903	7,903	7,903	7,903
R-squared	0.258	0.261	0.256	0.255	0.255

Some robustness test

1. Exclude the US banks (we drop 4,762 obs).

✓MPI: Negative and statistically significant (1%)

✓FITI: Negative and statistically significant (1%)

✓BTI: Negative and statistically significant (5%)

2. Restrict the sample to large banks (use a sample of 3,950 obs).

✓MPI: Negative and statistically significant

✓FITI: Negative and statistically significant

✓BTI: Negative and statistically insignificant

3. Restrict the sample to small banks (use a sample of 3,953 obs).

✓MPI: Negative and statistically insignificant

✓FITI: Negative and statistically significant (5%)

✓BTI: Positive and statistically significant (10%)

Alternative methodologies

- **Endogeneity**: We instrument MAPS with the years since independence
  - ➢Earlier studies have used this as an instrument for prudential regulations (Barth et al., 2006; Barth et al., 2013) and financial consumer protection policies (Gaganis et al., 2020)

	(1)	(2)	(3)
MPI_instrumented	-0.005**		
	(-2.311)		
FITI_instrumented		-0.005**	
		(-2.338)	
BTI_instrumented			0.819
			(0.171)
Constant	0.222***	0.220***	-0.145
	(12.838)	(12.695)	(-0.066)
Control variables	YES	YES	YES
Observations	7,424	7,424	7,424
R-squared	0.214	0.220	0.431

Alternative methodologies (cont.)

1. Fama–MacBeth regressions

✓MPI: Negative and statistically significant (1%)

✓FITI: Negative and statistically significant (1%)

✓BTI: Negative and statistically insignificant

2. Bank fixed-effects regressions

✓MPI: Negative and statistically significant (1%)

✓FITI: Negative and statistically significant (1%)

✓BTI: Negative and statistically significant (5%)

3. Bank random-effects regressions

✓MPI: Negative and statistically significant (1%)

✓FITI: Negative and statistically significant (1%)

✓BTI: Negative and statistically insignificant

Bank stability as a possible channel

Following Hafeez et al. (2022) we construct a forward-looking Z-score, using an 8-quarter forward-looking moving window.

- The forward-looking moving window consists of actual values of the z-score elements (i.e., total assets, equity, and net income) for the latest 7 quarters (i.e., six previous quarters and the current quarter) and the analysts' estimates of relevant elements (i.e., total assets, equity, and net income) provided in the current quarter.

- Hafeez et al. (2022) show that the predictive ability of the forward-looking z-score on banks' downward risk is better than the standard Z-score, not subject to being backward-looking as standard Z-score, significantly associated with the probability of default and market-based risk measures

$$Fz\_score_{i,t} = \frac{\frac{\sum_{n=1}^{T} ROA_{i,t+1-n} + \widehat{ROA}_{i,t}}{T+1} + \widehat{CAR}_{i,t}}{\sigma\left(ROA_{i,t+1-T}, \ldots, ROA_{i,t}, \ \widehat{ROA}_{i,t}\right)}$$

Bank stability as a potential channel

	(1) Z-SCORE	(2) COE	(3) RAR	(4) COE	(5) RAC	(6) COE
MPI	0.026***		1.444***		0.047***	
	(10.874)		(7.204)		(2.612)	
Z-SCORE predicted		-0.119***				
		(-4.547)				
RAR predicted				-0.002***		
				(-4.547)		
RAC predicted						-0.065***
						(-4.547)
Constant	3.541***	0.716***	-17.236***	0.257***	-0.019	0.293***
	(50.241)	(7.571)	(-2.893)	(10.222)	(-0.036)	(12.479)
Control variables	YES, except ROA and EQUITY	YES	YES, except ROA and EQUITY	YES	YES, except ROA and EQUITY	YES
Observations	7,846	7,846	7,846	7,846	7,846	7,846
R-squared	0.122	0.259	0.059	0.259	0.057	0.259

RAR: Risk-adjusted return = ROA / Standard deviation ROA

RAC: Risk-adjusted capitalization = Equity to assets / Standard deviation of ROA

Conclusions

- Using a sample of around 1,000 banks operating in 34 countries over the period 2001-2018, we find that macroprudential policies - and in particular, financial institutions targeted policies - are negatively associated with the cost of equity

- We suggest that macroprudential policies enhance bank stability, which in turn results in lower required rate of return from shareholders

- A few things that we plan to examine as we go forward with our analysis
  - How do macroprudential policies interact with microprudential reguirements?
  - How do macroprudential policies interact with informal institutions (e.g. social capital)?
  - Other suggestions that you may have….

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