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How do institutional settings condition the effect of macroprudential policies on bank systemic risk?

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ABSTRACT

This paper investigates the impact of different country-traits of the effects of macroprudential policies on systemic risks in OECD countries. The analysis documents that institutional quality, high capital stringency, and moderate supervision support macroprudential policies in mitigating systemic risks, depending on macroprudential instruments in force. Institutional, regulatory and supervisory frameworks differently affect the effectiveness of lender- *vis-à-vis* borrower-targeted policies.

1. Introduction

There exists limited research on the sources of heterogeneity in the effects of macroprudential policies on stability. This study follows Delis et al. (2012) who exemplify the importance of cross-country heterogeneity when assessing the effect of different types of bank regulation on stability and investigate whether institutional quality, regulatory, and supervisory frameworks determine the potency between macroprudential policies and systemic risks. From a regulatory viewpoint, there is an agreement that in safeguarding stability, institutional features condition the efficacy of bank regulations (Altunbas et al., 2018; Gaganis et al., 2020). We examine their importance and strength for systemic risks as a function of the institutional and regulatory environment in which banks operate. This paper is the first to examine cross-country heterogeneity in this relationship.

Building on better institutional and regulatory setups that enhance the implementation capacity of regulators, we argue that country-specific features condition the effect of macroprudential policies on stability via two channels. *First*, institutional characteristics facilitate monitoring and lower asymmetric information, limiting the capacity of banks to engage in riskier activities if their franchise values are eroded. *Second*, certain types of regulation affect banks' incentives to take on diverse risks, and investors to control risk-taking. These *channels* could influence the strength of the macroprudential policies-stability nexus.

2. Methodology

To assess how macroprudential policies (*MacroPru*) affect bank systemic risk (*SystemicRisk*), we estimate the following specification:

$$SystemicRisk_{ijt} = \alpha_0 + \beta_{j,t} \cdot MacroPru_{jt-1} + \varphi X_{ijt-1} + \gamma Z_{jt-1} + \omega_i + \mu_t + \varepsilon_{ijt}. \quad (1)$$

where $SystemicRisk_{ijt}$ is a generated dependent variable (Feenstra and Hanson, 1999). i, j, t denote respectively bank, country, and year. The relationship varies over time and countries. X_{ijt-1} is the vector of bank-level CAMEL variables (Bakkar and Pamen-Nyola, 2021). Z_{jt-1} stands for the vector of macroeconomic controls. ω_i denotes bank fixed-effects. μ_t is year fixed-effects. ε_{ijt} is the error term. We hypothesize that $\beta_{j,t}$ is a function of country-specific institutional features. To gain insight in the drivers of heterogeneity in β, we build on Beck et al. (2013) and run the following regression:

$$SystemicRisk_{ijt} = \alpha_0 + \left(\beta_0 + \beta_1 \cdot \Lambda_{jt}\right) \cdot MacroPru_{jt-1} + \varphi X_{ijt-1}$$

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$$+\gamma Z_{jt-1}+\omega_i+\mu_t+\varepsilon_{ijt}, \tag{2}$$

where Λ_{jt} is one set of country-specific features. β_1 coefficients gauge the impact of different country-characteristics on the macroprudential policies-stability relationship. All Λ_{jt} characteristics are normalized with zero-mean and unit-variance, before interacting them with *MacroPru*.

3. Data

This study uses annual data for 593 bank head-quartered in 25 OECD-countries from 2001 to 2013.[1] Financial data are retrieved from Bankscope, Bloomberg, and Thomsen-Reuters. We filter-out banks with illiquid quotation.[2] Information on macroprudential regulation is from the updated version of Cerutti et al. (2017) data set based on a comprehensive IMF's survey on Global Macroprudential Policy Instruments database.[3] Institutional quality indicators come from World Governance Indicators and Doing Business database.[4] Regulation and supervision indicators are from the four latest survey waves conducted by Barth et al. (2013). Other country-specific controls are from OECD Metadata-stats (Table 1). Banks are important from a regulatory perspective: 109 of them are included in the ECB Single Supervisory Mechanism and 18 have their bank holding companies considered SIFIs by EBA or G-SIBs by FSB/BCBS.

4. Systemic risk

First, we estimate systemic risk exposure (MES, Marginal Expected Shortfall) developed in Meuleman and Vennet (2020). MES measures banks' expected equity loss when the financial market falls below a certain threshold over a given horizon:

$$MES_{i,t}^{\alpha}\equiv E\left(R_{i,t}|R_{s,t}\leq VaR_{s,t}^{q}\right) \tag{3}$$

$R_{i,t}$ is one-day bank i stock-return and $R_{s,t}\leq \mathrm{VaR}_{s,t}^{q}$ reflects the critical values when the daily market-return ($R_{s,t}$) is at/or below the worst 5% tail outcomes ($VaR_{s,t}^{q}$) over a period of 250 days. *Second*, we estimate systemic contagion risk (ΔCoVaR), developed in Anginer et al. (2014), reflecting the risk of financial markets when banks are in distress relative to the median state:

$$\Delta CoVaR_{i,t}^{q}=CoVaR_{s|i,t}^{q}-CoVaR_{s|i,t}^{median}. \tag{4}$$

$CoVaR_{s|i,t}^{q}$ is the q-percent quantile of the daily market return conditionally on banks being in distress. q is equal to 1%.[5]

[1] Sample includes commercial, savings, cooperative banks, and bank holding companies with total assets higher than USD 500 million. Due to macroprudential regulations information availability, we consider a pre-Basel III period ranging from 2001 and 2013.

[2] To achieve this, we require that the stocks' daily returns are non-zero over five rolling consecutive days, or at least 70% of the daily returns are non-zero returns during the sample period.

[3] We cross-check our data against IMF (2014) database, and against cross-country databases used by Gaganis et al. (2020). We also compare with the historical data in the MacroPrudential Policies Evaluation Database (MaPPED), and the integrated Macroprudential Policy (iMaPP) database.

[4] World Bank's Doing Business Survey website at http://www.doingbusiness.org/methodology.

[5] MES and ΔCoVaR are computed at time t given information available in $t-1$ on the financial system tail-risk, and then averaged on the yearly-basis over the period January 2000 to December 2013. Losses are expressed in positive signs. Both MES and ΔCoVaR are positive and given in absolute risk values. Thus, an increase in these systemic risk measures is given by a positive change.

5. Macroprudential policies

We use the macroprudential policies index (MPI), constructed by Cerutti et al. (2017). We disaggregate MPI into: policies aimed-at-lenders (Financial Institution-Targeted Instruments–FITI) and policies aimed-at-borrowers (Borrower-Targeted Instruments–BTI). FITI considers restrictions on financial institutions, i.e., capital and liquidity regulations, limits on certain exposures, and changes in provisioning rules. BTI refers to instruments that focus on reducing household indebtedness, i.e.: loan-to-value and debt-to-income caps.

We postulate that institutional settings improve the implementation capacity of macroprudential policies and their efficacy against instability. We follow Bermpei et al. (2018) and Gaganis et al. (2020) and focus on two sets of country-traits to design the testable hypotheses:

(i) Institutional quality. We use three characteristics: (a) *disclosure*, (b) *rule of law,* (c) *creditor rights*. They decrease adverse selection and moral hazard between lenders and borrowers and improve lending terms and loan repayments. Good institutional quality enhances the effect of macroprudential policies on stability, https://www.sciencedirect.com/science/article/pii/S1042957312000344#fn15 under better information sharing systems and strong rules of law and creditor rights.

(ii) Regulation and supervision. For the second hypothesis, we use three country characteristics: (a) *capital stringency*, (b) *supervisory power,* (c) *external governance index*, designed to protect bank charter values and prevent risk-taking behavior if charters are eroded. These influence risk-taking policies and the efficacy of macroprudential policies in increasing stability.

6. Results

Table 2 reports the results from Eq. (2), where heterogeneity in the macroprudential policy-stability relationship is allowed. The effect of country-traits is analyzed in two ways: (i) including one panel of interaction terms with MPI at-a-time, and (ii) including both sets of interaction terms simultaneously. The findings indicate that macroprudential policies have significant mitigating effects on systemic risk, suggesting that: macroprudential

$MPI_{t-1}\times Disclose_t$, $MPI_{t-1}\times ROL_t$ and $MPI_{t-1}\times Creditor\_rights_t$

policies constrain excessive bank risk-taking and enhance stability (Columns:1-8). Analyzing the conditioning effect of institutional quality (Columns:3-4, 7–8), we find that the interaction terms are negative and significant at 1%. The negative effect of macroprudential policy on systemic risks exposure and contagion risks strengthens at higher institutional quality levels, i.e., in countries under: (a) effective information sharing systems, (b) stronger creditor rights, (c) higher levels of rules of law, implying that institutional characteristics may shape the efficacy of macroprudential regulations.[6]

In Columns (5–8), the coefficient on the interaction terms $MPI_{t-1}\times Capital\_stringency_t$ enters negative, suggesting that the negative effect of MPI on systemic contagion risks strengthens under stringent capital requirements. This aligns with Anginer et al. (2014) who find that well-capitalized banks have higher incentives to monitor.

We also find that the coefficient of the interaction term $MPI_{t-1}\times Supervisory\_power_t$ is positive and significant at 1% in all cases,

[6] The results are not only statistically significant, but also qualitatively and economically meaningful. Agarwal et al. (2014) and Gaganis et al. (2020) support and provide more explanations for these findings.

Table 1
Descriptive statistics.

	Obs.	Mean	Sd,	Min	Max	Source	Definition
Panel A. Bank and country characteristics							
Macroprudential policies							
MPI	5412	2.609	0.889	0.000	5.000	Updated version of Cerutti et al. (2017)	Aggregated macroprudential policies Index.
FITI	5412	0.995	0.881	2.353	5.000	Updated version of Cerutti et al. (2017)	Financial Institution-Targeted macroprudential instruments Index.
BTI	5412	0.335	0.300	0.073	2.000	Updated version of Cerutti et al. (2017)	Borrower-Targeted macroprudential instruments Index.
Systemic risk							
MES	5412	1.585	1.836	−1.681	9.633	Bloomberg	Marginal Expected Shortfall (%).
ΔCoVaR	5412	1.564	1.688	−3.436	6.994	Bloomberg	Delta conditional VaR (%).
CAMEL controls	5412						
Size	5412	8.251	2.202	4.362	14.210	Bloomberg, Thomsen-Reuters Advanced Analytics (TRAA).	Natural logarithm of bank total assets (in $ USDbillion).
Leverage	5412	0.094	0.048	0.018	0.532	Bloomberg, TRAA	Total equity over total assets.
ROA	5412	0.006	0.010	−0.052	0.061	TRAA	Return on assets, ratio of net income to total assets.
Funding	5412	0.893	0.136	0.338	1.000	Bloomberg, TRAA	Retail funding, total customer deposit divided by total funding.
Liquidity	5412	1.088	0 .329	0.218	2.311	Bloomberg, TRAA	Net loans over total deposit
Efficiency	5412	0.465	0.140	0.149	0.899	TRAA	Non-interest expense over total income.
Loans	5412	0.699	0.153	0.146	1.000	TRAA	Net loans over total assets.
Macroeconomic controls							
PolicyRate	5412	2.520	3.750	0.000	60.000	OECD Metadata stats, IMF WDI	Central bank short-term policy rate (%).
GDP	5412	1.724	1.756	−8.540	7.150	OECD stats Metadata, IMF WEO	Annual gross domestic product growth rate (%).
Inflation	5412	0.021	0.012	−0.013	0.058	OECD stats Metadata, IMF WEO	Annual inflation rate.
Panel B. Institutional settings							
Institutional quality							
Disclose	5412	0.905	0.172	0.250	1.000	Doing business database	Depth of information sharing index. Strength of information content of the credit bureaus.
ROL	5412	1.512	0.277	−0.721	1.988	World Governance Indicators	Rule of law. Extent to which agents have confidence in and abide by the rules of society.
Creditor_rights	5412	1.207	0.617	0.000	4.000	Doing business database	Creditor rights index. Strength of collateral and bankruptcy laws protect the rights of borrowers and lenders.
Regulation and supervision							
Capital stringency	5412	8.862	1.226	4.000	11.000	Bank regulation and supervision database. Barth et al. (2013)	Overall capital stringency index. Strength of capital regulation.
Supervisory power	5412	9.128	1.632	4.000	10.000	Bank regulation and supervision database. Barth et al. (2013)	Official supervisory power. Power of bank supervisory agency.
EGI	5412	15.853	2.050	11.000	18.000	Bank regulation and supervision database. Barth et al. (2013)	External governance index. Strength of the external auditors, financial statement transparency, and the existence of an external rating.

suggesting that the negative effect of macroprudential policies on systemic risks weakens at greater supervisory power. This aligns with the "*private interest view*" of bank regulation and supervision (Barth et al., 2008). The interaction term $MPI_{t-1} \times EGI_t$ is negative and significant in the case of MES. The effect of macroprudential

Table 2
Systemic risk and macroprudential policies: heterogeneous relationship.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	MES	ΔCoVaR	MES	ΔCoVaR	MES	ΔCoVaR	MES	ΔCoVaR
MPI_{t-1}	−0.132**	−0.191***	−0.176**	−0.557***	−0.285***	−0.0466	−0.534***	−0.417***
	(−2.37)	(−3.11)	(−2.10)	(−5.61)	(−2.97)	(−0.45)	(−4.66)	(−3.58)
MPI_{t-1} × Disclose $_t$			−0.320***	−0.270***			−0.485***	−0.252***
			(−3.32)	(−4.18)			(−7.81)	(−4.43)
MPI_{t-1} × ROL_t			−0.363***	0.139**			−0.390***	0.159***
			(−3.46)	(2.32)			(−6.60)	(2.70)
MPI_{t-1} × $Creditor\_rights_t$			−0.300***	−0.192***			−0.390***	−0.202***
			(−4.31)	(−4.32)			(−8.69)	(−4.73)
MPI_{t-1} × $Capital\_stringency_t$					−0.0327	−0.0611**	0.0334	−0.0453***
					(−1.26)	(−2.27)	(−1.25)	(−3.17)
MPI_{t-1} × $Supervisory\_power_t$					0.0945***	0.0482***	0.0866***	0.0412***
					(3.04)	(4.44)	(5.94)	(5.87)
MPI_{t-1} × EGI_t					−0.312***	0.00769	−0.354***	−0.0568
					(−5.15)	(0.11)	(−6.21)	(−1.86)
$Disclose_t$			0.132	−0.0764			0.116	−0.0372
			(1.05)	(0.90)			(1.10)	(0.65)
ROL_t			0.642***	0.212			1.043***	0.391**
			(2.70)	(1.21)			(6.14)	(2.24)
$Creditor\_rights_t$			−0.033	−0.012			−0.126*	−0.0763
			(−0.46)	(−0.20)			(1.71)	(0.37)
$Capital\_stringency_t$					−0.0786	−0.0231	−0.0483	−0.0469
					(−1.31)	(−0.46)	(−0.96)	(−0.88)
$Supervisory\_power_t$					−0.0798	0.0230	−0.0237	0.0552
					(−1.32)	(0.30)	(−0.42)	(0.72)
EGI_t					0.896***	0.180	0.907***	0.410*
					(4.95)	(0.75)	(5.48)	(1.73)
$Size_{t-1}$	0.365***	0.0241**	0.384***	0.0812**	0.263*	0.0299***	0.293**	0.0815*
	(2.69)	(2.22)	(2.84)	(2.74)	(1.88)	(5.27)	(2.08)	(1.99)
$Leverage_{t-1}$	3.514***	2.880***	3.737***	2.864***	3.672***	3.058***	3.835***	3.033***
	(3.82)	(3.08)	(4.07)	(3.11)	(3.95)	(3.17)	(4.16)	(3.21)
RoA_{t-1}	−18.99***	−5.948*	−18.85***	−6.473*	−19.49***	−5.559	−18.86***	−6.128*
	(−5.02)	(−1.69)	(−5.02)	(−1.84)	(−5.23)	(−1.61)	(−5.07)	(−1.77)
$Funding_{t-1}$	0.376	0.796**	0.402	0.869**	0.302	0.757**	0.361	0.858**
	(1.01)	(2.23)	(1.11)	(2.47)	(0.81)	(2.15)	(1.01)	(2.45)
$Liquidity_{t-1}$	−0.938***	−0.391**	−0.943***	−0.438**	−0.873***	−0.384**	−0.853***	−0.431**
	(−4.48)	(−2.19)	(−4.54)	(−2.46)	(−4.34)	(−2.16)	(−4.29)	(−2.43)
$Efficiency_{t-1}$	−1.017**	−0.316	−0.905**	−0.302	−0.887**	−0.352***	−0.663*	−0.299*
	(−2.41)	(−0.79)	(−2.14)	(−0.75)	(−2.19)	(−2.75)	(−1.93)	(−1.90)
$Loan_{t-1}$	−1.545***	−0.418	−1.452***	−0.439*	−0.887**	−0.440**	−1.110***	−0.460*
	(−4.27)	(−1.20)	(−4.11)	(−1.91)	(−3.74)	(−2.39)	(−3.25)	(−1.98)
$PolicyRate_{t-1}$	0.0189	−0.0247	0.0416	−0.0643*	0.0700*	−0.0542	0.0887**	−0.101**
	(0.62)	(−0.73)	(1.18)	(−1.87)	(1.81)	(−1.39)	(2.19)	(−2.58)
GDP_{t-1}	−0.0592**	−0.0686**	−0.0493*	−0.0615**	−0.0836***	−0.0404*	−0.0663**	−0.0360*
	(−1.99)	(−2.49)	(−1.73)	(−2.22)	(−3.18)	(−1.75)	(−2.51)	(−1.90)
$Inflation_{t-1}$	13.50***	−1.583	12.09**	−0.525	11.40**	0.717**	9.081**	1.990**
	(2.77)	(−0.33)	(2.58)	(−0.11)	(2.45)	(2.25)	(2.07)	(2.74)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5412	5412	5412	5412	5412	5412	5412	5412
R-squared	0.392	0.364	0.399	0.368	0.405	0.367	0.415	0.373
Adjusted R–squared	0.389	0.361	0.396	0.365	0.402	0.364	0.411	0.369
Fischer test (*p*-value)	44.87***	67.74***	41.06***	60.53***	41.07***	61.64***	44.53***	56.34***
Cluster	Banks	Banks	Banks	Banks	Banks	Banks	Banks	Banks
No of banks	593	593	593	593	593	593	593	593

Definitions of all variables are listed in Table 1. Standard errors are reported in parentheses below their coefficient estimates and adjusted for both heteroskedasticity and within correlation clustered at the bank level. ***, **, and * indicate significance of the p-value respectively at the 1%, 5%, and 10% levels.

policies in reducing systemic exposure is higher in strong private monitoring.

Our full sample relationship hides a substantial amount of heterogeneity in the relationship between MPI and MES/ΔCoVaR. While institutional quality increases significantly the efficacy of macroprudential policies in enhancing stability, this efficacy depends critically on the regulatory and supervisory framework in force.

7. MPI disaggregation

We hypothesize that these country-traits affect types of macroprudential policies in a heterogeneous way and disaggregate MPI into: FITI *versus* BTI. Table 3 shows that both borrower- and lender-targeted instruments are negatively related to systemic risks, with BTI coefficients being the highest (Columns:1–6). This is consistent with Meuleman and Vennet (2020) who find that policies aimed-at-borrowers (loan-to-value and debt-to-income) are effective in reducing banking vulnerabilities, as real-estate markets are important drivers of financial cycles, while borrower-targeted instruments face less implementation challenges. Country-traits exert opposite conditioning effects (on stability) for lender- *vis-à-vis* borrower-targeted policies.

Better institutional quality in terms of information sharing, rule of law, and creditor rights, significantly increase the effectiveness of FITI in reducing systemic risks, thus, enhancing stability. Coefficients on the interaction terms: $FITI_{t-1} \times Disclose_t$,

Table 3
Systemic risk and instruments: heterogeneous relationship.

	(1) MES	(2) ΔCoVaR	(3) MES	(4) ΔCoVaR	(5) MES	(6) ΔCoVaR
$FITI_{t-1}$	−1.067***	−1.026***			−0.304***	−0.773***
	(−3.95)	(−4.71)			(−3.39)	(−3.41)
$FITI_{t-1}\times Disclose_t$	−0.863***	−0.593***			−0.499***	−0.442***
	(−5.09)	(−4.78)			(−2.83)	(−3.30)
$FITI_{t-1}\times ROL_t$	−0.409***	0.247***			−0.570***	0.185**
	(−4.69)	(3.28)			(−6.33)	(2.47)
$FITI_{t-1}\times$ Creditor_rights	−0.596***	−0.357***			−0.383***	−0.269***
	(−6.33)	(−5.76)			(−3.76)	(−4.29)
$FITI_{t-1}\times$ Capital_stringency$_t$	−0.0736**	−0.0160**			−0.0542*	−0.0270*
	(−2.30)	(−2.49)			(−1.83)	(−1.83)
$FITI_{t-1}\times$ Supervisory_power$_t$	0.0679*	0.0074**			0.118***	0.0037*
	(1.84)	(2.19)			(3.35)	(1.86)
$FITI_{t-1}\times EGI_t$	0.253***	0.0446			0.242***	0.0637*
	(3.54)	(0.63)			(3.55)	(1.81)
BTI_{t-1}			−7.351***	−3.066	−6.874***	−2.536*
			(−3.34)	(−1.09)	(−3.07)	(−1.89)
$BTI_{t-1}\times Disclose_t$			3.365***	1.625	2.427**	1.212*
			(2.88)	(1.26)	(2.02)	(1.93)
$BTI_{t-1}\times ROL_t$			1.238***	0.681**	0.638***	0.366*
			(3.64)	(2.32)	(3.57)	(1.97)
$BTI_{t-1}\times$ Creditor_Rights$_t$			2.271***	1.145**	1.664**	0.657**
			(2.99)	(2.26)	(2.04)	(2.51)
$BTI_{t-1}\times$ Capital_stringency$_t$			−1.161***	−0.341*	−1.142***	−0.228*
			(−6.72)	(−1.72)	(−6.40)	(−1.80)
$BTI_{t-1}\times$ Supervisory_power$_t$			−2.790***	−0.810	−2.519***	−0.917*
			(−3.02)	(−0.64)	(−2.73)	(−2.03)
$BTI_{t-1}\times EGI_t$			−1.882**	−1.005	−1.895**	−0.849*
			(−2.40)	(−0.94)	(−2.37)	(−1.79)
$Disclose_t$	−0.012	−0.115	0.237***	0.151**	−0.087	−0.130
	(−0.10)	(−1.37)	(3.58)	(2.30)	(−0.73)	(−1.49)
ROL_t	0.936***	0.213*	−0.111	0.485***	1.242***	0.292*
	(4.57)	(1.89)	(−0.77)	(3.76)	(5.86)	(1.83)
Creditor_rights$_t$	−0.116	−0.079*	−0.122***	−0.098**	−0.106	−0.079*
	(1.54)	(−1.91)	(−2.52)	(−2.23)	(−1.61)	(−0.73)
Capital_stringency$_t$	−0.104*	−0.0922*	0.0502*	−0.105***	−0.0330	−0.0766
	(−1.74)	(−1.69)	(1.75)	(−2.82)	(−0.63)	(−1.39)
Supervisory_power$_t$	−0.0166	0.0963	−0.161***	0.0710*	−0.0872	0.0893
	(−0.26)	(1.22)	(−3.29)	(1.95)	(−1.47)	(1.09)
EGI_t	0.759***	0.416**	−0.00717	0.269**	0.711***	0.448*
	(4.14)	(2.00)	(−0.07)	(2.05)	(3.90)	(1.80)
$Size_{t-1}$	0.302**	0.087*	0.321**	0.095	0.300**	0.090*
	(2.14)	(1.78)	(2.34)	(1.17)	(2.11)	(1.81)
$Leverage_{t-1}$	3.790***	3.003***	3.676***	3.013***	3.836***	3.031***
	(4.12)	(3.19)	(3.99)	(3.19)	(4.17)	(3.21)
RoA_{t-1}	−19.07***	−6.174*	−19.71***	−6.261*	−18.87***	−6.179*
	(−5.10)	(−1.79)	(−5.21)	(−1.80)	(−5.06)	(−1.78)
$Funding_{t-1}$	0.324	0.862**	0.273	0.849**	0.281*	0.849**
	(0.91)	(2.48)	(0.73)	(2.42)	(1.78)	(2.42)
$Liquidity_{t-1}$	−0.812***	−0.416**	−0.913***	−0.436**	−0.808***	−0.430**
	(−4.03)	(−2.35)	(−4.48)	(−2.47)	(−4.03)	(−2.41)
$Efficiency_{t-1}$	−0.639	−0.310	−0.950**	−0.324	−0.567*	−0.311
	(−1.55)	(−0.77)	(−2.28)	(−0.82)	(−1.88)	(−0.77)
$Loan_{t-1}$	−1.050***	−0.465	−1.467***	−0.513	−0.990***	−0.475*
	(−3.04)	(−1.35)	(−4.08)	(−1.49)	(−2.87)	(−1.75)
$PolicyRate_{t-1}$	−0.0889**	−0.101***	0.00327	−0.0798**	−0.0897**	−0.100**
	(−2.29)	(−2.75)	(0.10)	(−2.14)	(−2.25)	(−2.57)
GDP_{t-1}	−0.0517*	−0.0381	−0.0742**	−0.0559**	−0.0463*	−0.0470*
	(−1.80)	(−1.41)	(−2.17)	(−2.05)	(−1.94)	(−1.70)
$Inflation_{t-1}$	10.26**	2.140	15.55***	0.206	10.86**	1.697*
	(2.18)	(0.49)	(2.98)	(0.04)	(2.35)	(1.87)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5412	5412	5412	5412	5412	5412
R-squared	0.414	0.373	0.401	0.372	0.420	0.374
Adjusted R–squared	0.411	0.369	0.397	0.368	0.415	0.369
Fischer test (*p*-value)	40.86***	56.40***	107.9***	66.66***	102.2***	58.66***
Cluster	Banks	Banks	Banks	Banks	Banks	Banks
No of banks	593	593	593	593	593	593

$FITI_{t-1} \times ROL_t$ and $FITI_{t-1} \times Creditor\_rights_t$ are negative and significant at 1%. Banks from countries with greater institutional setups can significantly moderate the effect of BTI on stability (positive and significant coefficients on the interaction terms $BTI_{t-1} \times Disclose_t$, $BTI_{t-1} \times ROL_t$ and $BTI_{t-1} \times Creditor\_rights_t$.

Regarding the regulatory framework, both FITI and BTI are associated with increases in perceived systemic risk under stricter capital regulations. Coefficients related to the interaction terms $FITI_{t-1} \times Capital\_stringency_t$ and $BTI_{t-1} \times Capital\_stringency_t$ enter negative and significant. Turning to the supervisory power, different mitigating effects emerge. We find significant positive and negative coefficients for $FITI_{t-1} \times Supervisory\_power_t$ and $BTI_{t-1} \times Supervisory\_power_t$, respectively, suggesting that the mitigating effect of FITI on systemic risks subdues at greater supervisory power, but strengthens at higher levels the effect of BTI on stability. Relating to the private monitoring, the results illustrate that the benefit in reducing risk exposure with FITI weakens under greater private monitoring (the negative and significant coefficients on $FITI_{t-1} \times EGI_t$). Coefficients associated with $BTI_{t-1} \times EGI_t$ are negative and significant, implying that the effect of BTI in reducing systemic risks strengthens at higher levels of private monitoring. Better institutional, regulatory, and supervisory frameworks improve the implementation efficacy of FITI against systemic risks, but not that of BTI. The result is explicable considering that FITI directly affects banks, given direct rules and regulations imposed on them. However, BTI are indirect instruments, relying on the assumption that banks-borrowers customers change their behavior in financial dealings. Borrowers may have more flexibility through informal credit channels and their alternative agreements with the real economy. Hence, institutional, regulatory, and supervisory capacity are more effective for institutional counterparts, instead of banks' customers. We subject our findings to certain robustness checks. These results align with our main findings.[7]

8. Conclusion

This paper assessed how institutional features made macroprudential policies work better to address stability. The analysis documented differential impacts on their effectiveness. It showed that its efficacy depended critically on institutional and regulatory environments.

Macroprudential policies enhanced stability in countries with better institutional quality, greater capital stringency, and weak supervisory power, while private monitoring documented *mixed findings*. These country-traits affected differently lender- *vis-à-vis* borrower-targeted policies. Institutional quality enhanced lender-targeted policies efficacy and undermined that of borrower-targeted policies, whereas tight capital and supervision moderated lender-targeted policies efficacy but strengthened borrower-targeted policies. The findings help to understand the conflicting evidence and connect to the debate on regulatory reforms.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2021.110123.

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[7] Robustness checks results are reported in the online Appendix.