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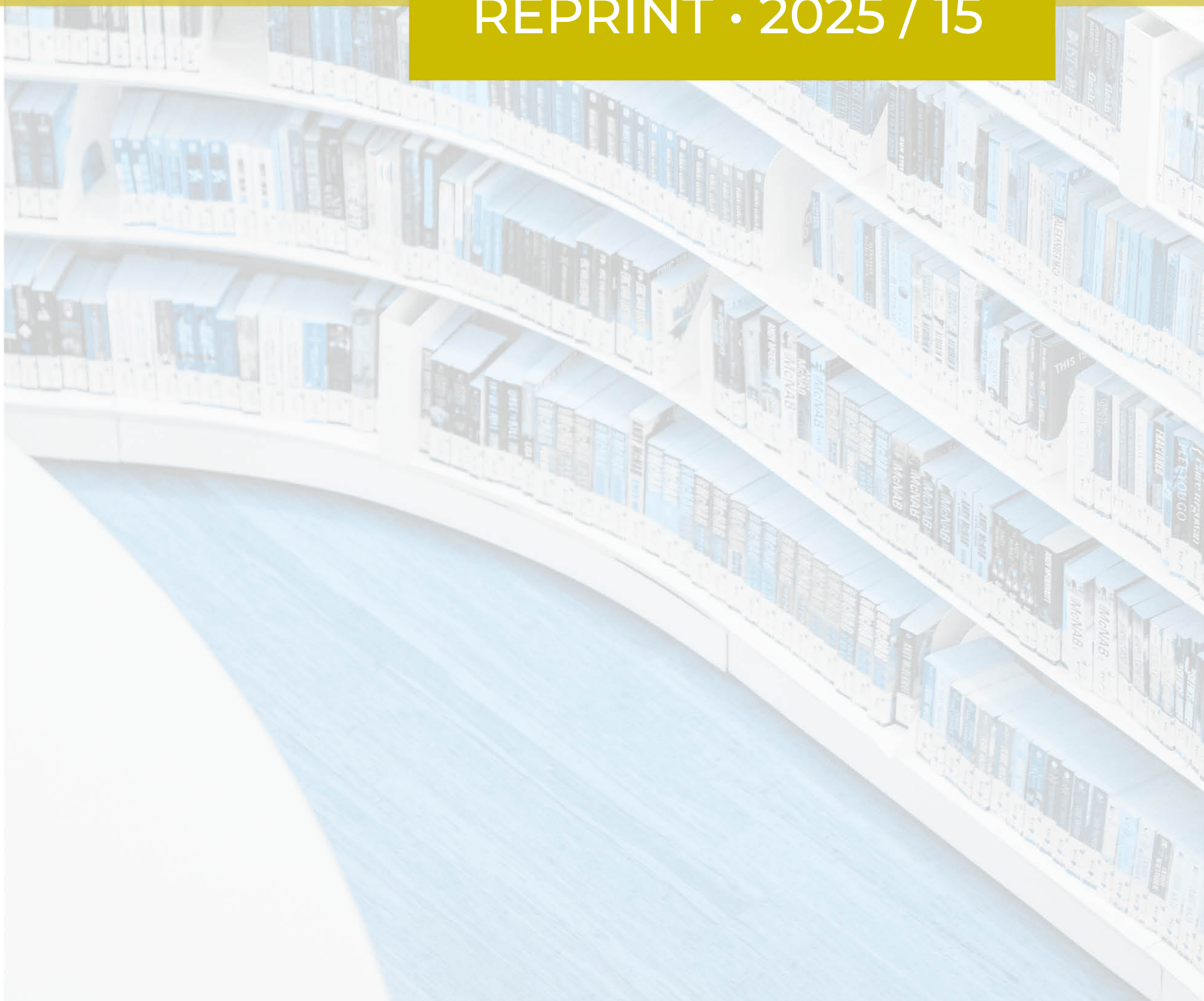

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Macroprudential Policy and Bank Systemic Risk: Does Inflation Targeting Matter? ⋆

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Abstract

This paper examines whether inflation targeting (IT) enhances the effectiveness of macroprudential policies in reducing banks' contribution to systemic risk measured by SRISK. Using bank-level data for 47 countries, our regime-dependent panel regressions suggest that tools such as DSTI limits, the CCyB, conservation buffers, and leverage limits are relatively more effective under IT. Loan restrictions appear less effective, while loan-to-value (LTV) caps show impact only in post-GFC samples. Liquidity and reserve requirements reduce SRISK under IT in higher-frequency estimations. Our findings lend credence to the view that IT strengthens the role of macroprudential policy in mitigating financial stability risks.

Keywords: Macroprudential Policies, Banks, Systemic Risk, Monetary Policy, Inflation Targeting
JEL Classification: C33, G01, G18

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1. Introduction

The global financial crisis (GFC) underscored the need for regulatory frameworks to address systemic financial risks. While microprudential regulation targets individual institutions, macroprudential policy focuses on the stability of the financial system as a whole. It is now widely recognized that microprudential tools alone are insufficient to safeguard financial stability, spurring increased interest in macroprudential approaches (Brockmeijer et al., 2013; Claessens, 2012, 2014; Saporta, 2009; Freixas et al., 2015; Hanson et al., 2011; IMF, 2013; Meuleman & Vander Vennet, 2020).

Despite widespread adoption, evidence on the effectiveness of macroprudential tools remains mixed. Cross-country studies using diverse methodologies yield inconclusive results. In practice, regulatory gaps persist, as parts of the financial system remain outside supervisory scope (Ordonez, 2018), and banks often circumvent restrictions via regulatory arbitrage or increased risk-taking (e.g., Aiyar et al., 2014; Cerutti et al., 2017a; Jiménez et al., 2017). These limitations have led some to argue for a complementary role of monetary policy in managing systemic risk (e.g., Caballero & Simsek, 2020; Farhi & Werning, 2016).

Building on this, a growing body of literature examines the interaction between macroprudential and monetary policies (see Lubis et al., 2019). Some studies highlight complementarities, noting that monetary policy can play a macroprudential role–tightening during booms and easing after crises ("leaning against the wind")–especially under flexible inflation targeting regimes that allow temporary deviations from inflation goals to support financial stability (Kim & Mehrotra, 2018; Martin et al., 2022; Laseen et al., 2017; Svensson, 2018; Van der Ghote, 2020). Nonetheless, potential conflicts have also been identified, underscoring the need for coordination (Cozzi et al., 2020). Monetary tightening can weaken borrower balance sheets and, in small open economies, fuel credit booms through capital inflows, while monetary easing may compress bank margins and encourage risk-taking (Revelo et al., 2020). Moreover, some macroprudential tools–such as the countercyclical capital buffer (CCyB)–can increase inflation and output volatility (Revelo & Levieuge, 2022).

This paper examines whether inflation targeting (IT) enhances the effectiveness of macroprudential tools in promoting financial stability. Using bank-level data for 47 advanced economies (AEs) and emerging market economies (EMEs) with diverse monetary regimes, we assess how IT conditions the impact of macroprudential policies on systemic bank risk. To do so, we use dynamic panel GMM estimators (Arellano & Bond, 1991), including macroeconomic and bank-level controls, and test instrument validity using Hansen and serial correlation tests.

We hypothesize that IT regimes enhance the effectiveness of the macroprudential stance through several reinforcing mechanisms. First, by anchoring inflation expectations and strengthening credibility, IT frameworks improve the signaling power of macroprudential tools (Choi & Cook, 2018; Taylor, 2019; Woodford, 2012), contributing to lower macroeconomic uncertainty and better bank risk profiles (Fazio et al., 2018; Louati & Boujelbene, 2020). Second, IT supports a clearer separation of objectives–monetary policy for price stability, macroprudential policy for financial stability–thereby improving the effectiveness of both (Boar et al., 2017; Cesa-Bianchi & Rebucci, 2017; Martin et al., 2022; Revelo et al., 2020). Third, flexible IT regimes allow temporary deviations from inflation targets in response to financial shocks (Kim & Mehrotra, 2018; Laseen et al., 2017; Svensson, 2018), enabling coordinated policy action. For instance, when demand is weak, inflation is below target, and credit contracts, both policies can be eased jointly to support recovery (Angelini et al., 2014; Calvo & Reinhart, 2002; Kuttner & Shim, 2016). Fourth, by fostering transparency and expanding the use of formal financial services, IT can broaden the scope and reach of macroprudential regulation (Jacome et al., 2025). Finally, in low interest rate environments, macroprudential tools help prevent the natural rate from turning negative–an especially relevant function under IT, given its vulnerability to liquidity traps (Rubio & Yao, 2020; McCallum, 2001; Van der Ghote, 2020).

While IT regimes may reinforce the overall macroprudential framework, the effectiveness of specific tools can vary. Loan-to-value (LTV) caps tend to be less effective when inflation deviates from target, as interest rate changes can leave these ratios unchanged. In contrast, debt-service-to-income (DSTI) limits, being less sensitive to short-term monetary fluctuations, are more effective in curbing credit during housing booms (Kuttner & Shim, 2016). This limitation of LTV caps is especially relevant in IT regimes with active interest rate management. Furthermore, for flexible exchange rates regimes, measures like reserve requirements on foreign exchange deposits can help mitigate currency mismatches and reduce "the fear of floating" (Calvo & Reinhart, 2002).

To examine the role of IT in shaping the relationship between macroprudential tools and financial stability, we focus on bank-level contribution to systemic risk, given the central role of banks in most financial systems. Specifically, we use SRISK (Acharya et al., 2017; Brownlees & Engle, 2017) to capture a bank's contribution to systemic risk–measured as its expected capital shortfall during a severe market downturn over a six-month horizon. Complementing this, we include ΔCoVaR (Adrian & Brunnermeier, 2016) to capture the system-wide effect of individual banks under distress. While SRISK measures the expected capital shortfall under system tail risk, ΔCoVaR reflects how the distress of a single institution affects the conditional value at risk of the financial system as a whole. Furthermore, following Meuleman & Vander Vennet (2020), we also consider systemic risk exposure using the long-run marginal expected shortfall (LRMES) (Brownlees et al., 2012), which reflects the expected equity loss a bank would incur in a pronounced market decline. While SRISK captures risk spillovers from a bank to the system, LRMES measures the risk absorbed from the system, enabling us to analyze how macroprudential tools affect both systemic contribution and exposure.

Like Meuleman & Vander Vennet (2020), this paper examines the impact of macroprudential policies on bank-level systemic risk, but differs in five key respects. First, we consider both systemic contribution and exposure, whereas they focus solely on MES. Second, our forward-looking indicators are better suited for early detection of systemic vulnerabilities (Idier et al., 2014). Third, we assess how effectiveness varies across monetary policy regimes, with particular attention to IT. Fourth, our dataset spans both AEs and EMEs, beyond the

European Union focus in their study. Fifth, we use the IMF's iMaPP database (Alam et al., 2019), which offers broader country coverage (134 vs. 28) and more granular policy categories (17 vs. 11), as well as sectoral classification advantages, compared with the ECB's MaPPED database used in their work.

Our findings provide new evidence that IT regimes enhance the relative effectiveness of most macroprudential tools in reducing banks' systemic risk contribution. DSTI limits and capital-related instruments–such as the CCyB, the conservation buffer, and the leverage ratio–are particularly effective under IT. In contrast, loan restrictions are less effective, and LTV limits show effectiveness only in post-GFC samples, likely reflecting their reduced sensitivity to interest rate dynamics. Other supply-side tools, such as limits on foreign exchange exposures and housing-related taxes, also prove effective, while liquidity and reserve requirements are only effective under IT when evaluated at higher frequency or in the post-GFC period.

Regarding banks' systemic exposure, we find that LRMES tends to increase following certain macroprudential interventions. This may reflect incentives to shift toward riskier or less regulated activities when profitability or lending capacity is constrained, consistent with the findings of Meuleman & Vander Vennet (2020). Nevertheless, the observed decline in SRISK and ΔCoVaR –even in the presence of higher LRMES–underscores the key role of deleveraging or higher capitalization in mitigating systemic risk.

To assess whether the greater effectiveness of macroprudential tools under IT reflects improved coordination with monetary policy, we analyze episodes where both policies moved in the same direction. This approach helps isolate the effect of joint policy action from that of the monetary regime itself. We find that coordination enhances the impact of macroprudential tools, suggesting that IT may reinforce their effectiveness by enabling more flexible and coordinated policy responses, where monetary and macroprudential tools can be adjusted jointly to address changing macro-financial dynamics.

We also test whether the effectiveness of macroprudential tools under IT holds within

EMEs. While such tools are generally more effective in EMEs (Akinci & Olmstead-Rumsey, 2018; Cerutti et al., 2017a; Zhou & Chen, 2024), institutional constraints–such as limited supervisory capacity–could reduce IT traction (IMF, 2013; Lim et al., 2011). Nonetheless, our results indicate that IT-enhanced macroprudential effects are preserved in the EME context.

While some studies find certain tools to be more effective in EMEs (Akinci & Olmstead-Rumsey, 2018; Cerutti et al., 2017a; Zhou & Chen, 2024), institutional constraints–such as limited supervisory capacity–could reduce IT traction (IMF, 2013; Lim et al., 2011). Our results point to mixed effects across instruments: Liquidity appears effective in reducing SRISK, whereas Capital and Tax tend to increase it.

The remainder of the paper is structured as follows. Section 2 reviews the related literature. Section 3 describes the empirical methods and data. Section 4 presents the main results along with robustness checks. Section 6 concludes.

2. Related Literature

2.1. Macroprudential Policy and Financial Stability

While macroprudential instruments have long been part of the policy toolkit (Borio & Shim, 2007; Lim et al., 2011), their use has expanded notably since the GFC, particularly in both AEs and EMEs (Akinci & Olmstead-Rumsey, 2018; Alam et al., 2019; Budnik & Kleibl, 2018; Cerutti et al., 2017a; Choi & Cook, 2018).

Most empirical studies assess the effectiveness of macroprudential policies through their impact on macro-financial conditions–such as credit growth and housing bubbles–which are closely tied to financial stability. By contrast, fewer studies examine their direct effects on bank-level risk indicators.

A growing empirical literature examines how macroprudential tools affect credit and housing markets, often highlighting cross-country differences in usage and effectiveness. According to Cerutti et al. (2017a), EMEs tend to use foreign exchange-related tools more often, while AEs rely on borrower-based instruments, with a generally greater impact on household credit–though effectiveness declines in more open, financially developed economies. Akinci & Olmstead-Rumsey (2018), based on a sample of 57 AEs and EMEs, suggest that macroprudential tightening reduces credit and house price growth, with tools being particularly effective in economies where bank lending dominates private sector financing. Zhang & Zoli (2016) demonstrate that Asian economies have relied more heavily on housing-related tools–especially LTV caps and housing taxes–using them counter-cyclically to effectively curb credit growth, house price inflation, and bank leverage. Similarly, using regional-level data from Korea, (Igan & Kang, 2011) find evidence that borrower-based measures curb house price growth and transactions. More broadly, using data from 57 countries, Kuttner & Shim (2016) show that DSTI caps and housing-related taxes significantly reduce housing credit and price growth. DSTI caps are particularly effective during credit booms, outperforming LTV limits, which may not bind when house prices adjust endogenously. This drawback of LTV limits is particularly relevant in economies with active interest rate management, where monetary policy directly influences both credit conditions and asset prices.

Another set of cross-country studies examines the role of macroprudential policy in curbing credit cycles and mitigating housing bubbles, though their effectiveness may be constrained in practice. House-price booms are more frequent in countries with higher loan-to-value ratios and mortgage funding models based on securitization or wholesale sources; thus, tools targeting these features can help contain such imbalances (Cerutti et al., 2017b). Supporting this, Lim et al. (2011) show that macroprudential instruments reduce the procyclicality of credit–that is, its tendency to amplify business cycle fluctuations. Still, these tools may not be sufficient on their own. Crowe et al. (2013) warn that circumvention may undermine their effectiveness, suggesting a complementary role for monetary policy in "leaning against the wind". Similarly, Fendoğlu (2017) argues that capital inflows can exacerbate credit cycles–driving up asset prices, easing credit conditions, and increasing balance sheet risks, particularly in EMEs. They note that borrower-based tools are especially effective when they help contain the influence of volatile portfolio flows, but that their effectiveness is weaker for foreign-currency related tools.

Beyond aggregate country-level studies, a number of papers investigate macroprudential effectiveness using bank-level data. Claessens et al. (2013) report that borrower-targeted tools slow bank asset growth across 48 countries. Evidence from Jiménez et al. (2017) indicates that the countercyclical capital buffer (CCyB) increases the survival likelihood of Spanish banks. In the UK, Aiyar et al. (2014) observe that banks subject to time-varying capital requirements reduce lending, with non-regulated banks partially offsetting the effect. More recently, Altunbas et al. (2018) demonstrate that macroprudential instruments lower expected default frequency and improve Z-scores across a sample of 67 countries. Lastly, Zhou & Chen (2024) associate such tools with reduced systemic risk (ΔCoVaR), while Meuleman & Vander Vennet (2020) identify a negative relationship with marginal expected shortfall (MES) in a panel of 113 European banks. However, the latter show that, for retail banks, lending-oriented tools and capital requirements can induce risk-shifting behavior, leading to asset compositions that make them more vulnerable to business cycle fluctuations or financial market shocks.

2.2. Macroprudential–Monetary Policy Interactions and the Role of Inflation Targeting

An expanding body of literature explores the interaction between macroprudential instruments and monetary policy, and how they jointly affect financial stability and real economic outcomes. Most of this work is based on general equilibrium models where the central bank follows a Taylor rule targeting inflation. However, how IT regimes may reinforce this complementarity–compared to other monetary policy frameworks–remains largely underexplored.

Macroprudential policies affect credit growth, which may influence aggregate demand, output, and inflation, thereby potentially modifying the optimal stance of monetary policy (Cozzi et al., 2020). Examining macroprudential intervention in low-interest-rate economies, Van der Ghote (2020) finds that by lowering systemic risk–and thus the insurance value of safe assets–macroprudential tools raises risk-free real interest rates and the natural rate of return (i.e., the equilibrium rate consistent with target inflation and full-capacity output). The author argues that macroprudential instruments help mitigate the severity of liquidity traps, by lowering systemic risk and prevent that the natural rate falls into negative terrain (see also Rubio & Yao, 2020). This complementarity is particularly relevant for IT countries, where the commitment to low and stable inflation may increase vulnerability to liquidity traps (McCallum, 2001).

A key channel of interaction arises from the fact that macroprudential tools influence variables traditionally targeted by monetary policy. For instance, adjustments to DSTI and LTV limits affect credit conditions in ways analogous to interest rate interventions, shaping household and firm spending behavior (Kuttner & Shim, 2016; Shin, 2016). Similarly, higher capital requirements can have macroeconomic effects akin to tighter monetary policy (Cecchetti & Kohler, 2012).

Macroprudential policy can also support the achievement of monetary policy objectives. Van der Ghote (2020), using a framework with a Taylor rule focused on inflation stability, find that by constraining bank leverage when crises are likely, these measures shift the distribution of potential output to the right. This implies that the economy spends less time in low-output states and more time in higher-output phases, reducing the need for accommodative monetary policy during downturns. Furthermore, Kim & Mehrotra (2017) show that, under IT regimes, expansionary macroprudential policy can help bring inflation to the target, particularly when short-term inflation expectations are high. With regard to output and inflation volatility, Angelini et al. (2014) argue that macroprudential tools provide important stabilization benefits by dampening fluctuations in response to financial sector shocks.

Other studies point to possible conflicts between monetary and macroprudential policies. Revelo & Levieuge (2022), employing a DSGE model with a Taylor-type rule, show that conflicts may arise: the activation of the CCyB can lead to higher inflation volatility and/or a wider output gap. In such cases, the degree of monetary policy accommodation becomes essential to mitigate the short-term adverse effects of tighter macroprudential regulation, highlighting the need for enhanced policy coordination. In addition, higher capital requirements, while beneficial in the long run for banks' safety, can have short-term costs by raising banks' funding costs and lowering credit supply (Mendicino et al., 2020). Furthermore, higher capital requirements and a less leveraged financial system can reduce the economy's responsiveness to monetary policy (Altavilla et al., 2020; Cozzi et al., 2020; Gambacorta & Murcia, 2020). These findings call for a close coordination between monetary and macroprudential authorities to ensure that the combined policy stance remains effective across the business and financial cycles.

Turning now to how monetary policy affects the effectiveness of macroprudential policy, several studies highlight its stabilizing role. By smoothing business cycles, keeping inflation expectations anchored and providing liquidity to solvent institutions, monetary policy may substantially strengthen financial stability, thereby reducing the need for macroprudential tools to be activated (Altavilla et al., 2020; Kim & Mehrotra, 2018; Rubio & Yao, 2020). In this context, the IT regime plays a crucial role in anchoring inflation expectations and enhancing credibility, which in turn fosters more stable macro-financial conditions (Choi & Cook, 2018; Taylor, 2019; Woodford, 2012). Cornand & M'baye (2018) show that, compared with standard active monetary policy, IT regimes–by clearly communicating their objectives–help reduce the volatility of inflation, interest rates, and the output gap.

This greater macroeconomic stability can complement the financial stability objectives of macroprudential tools by increasing the responsiveness of financial institutions to regulatory signals. Fazio et al. (2018) find that the financial stability of banks in IT countries with average institutional quality tends to benefit from the credibility associated with the monetary policy framework. The authors argue that, by maintaining low and stable inflation through a credible framework, IT can reduce the likelihood of financial imbalances–such as asset price bubbles–by anchoring expectations and limiting excessive risk-taking (see also Louati & Boujelbene, 2020).

The macroprudential role of monetary policy takes the general form of "leaning against the wind" to contain systemic risk during the build-up phase and "cleaning up" by a relative loosening of policy during financial crises to speed up the recovery (Hafner & Lauwers, 2017; Martin et al., 2022). This dual function is particularly relevant under flexible IT regimes, which allow temporary deviations from the inflation target to accommodate financial stability considerations (Laseen et al., 2017; Svensson, 2018). Revelo et al. (2020) for a sample of IT countries, find that monetary policy enhances the impact of macroprudential actions on domestic credit growth. Thus, when demand is constrained, inflation below target and credit contracts sharply–such as after a financial shock–both macroprudential and monetary policy can be eased in a complementary manner to support credit growth and help return inflation to target. By contrast, under fixed exchange rate regimes, lowering interest rates cannot be easy, as this would put pressure on the exchange rate (Angelini et al., 2014; Calvo & Reinhart, 2002; Georgiadis & Zhu, 2021). Similarly, under monetary aggregate targeting, a decline in money demand–often associated with low economic activity–may require raising interest rates to stabilize aggregates, which can further depress credit.

However, as long as macroprudential tools are effective, most models suggest that monetary policy should remain focused on its traditional objective of price stability (Angelini et al., 2014; Martin et al., 2022; Van der Ghote, 2020). Comparing a standard Taylor rule with a flexible IT framework where the central bank also responds to asset prices, Silvo (2019) finds that when the steady-state interest rate is high, it is optimal for monetary and macroprudential policies to operate independently with distinct instruments and objectives (see also Rubio & Yao, 2020).

In non-IT countries, the separation between instruments and objectives may be less clearly articulated, with macroprudential tools sometimes serving monetary goals, potentially at the expense of their effectiveness. For example, Boar et al. (2017) find that macroprudential policies are less effective under fixed exchange rate regimes, as the frequency of macroprudential interventions is mainly driven by exchange rate management rather than financial stability objectives (see also Cerutti et al., 2017a). Regarding the use of monetary policy for macroprudential objectives, Kim & Mehrotra (2022) find that countries with flexible exchange rates appear to use the leeway granted by their monetary policy framework to respond more strongly to credit shocks with interest rate. By contrast, countries with fixed exchange rates tend to respond more vigorously with macroprudential measures.

There is an argument for monetary policy to assume a complementary macroprudential role, as macroprudential frameworks are not always fully effective in practice (e.g., Caballero & Simsek, 2020; Farhi & Werning, 2016). Perhaps the main reason is that a significant part of the financial system still operates beyond the reach of regulation (Ordonez, 2018). In this context, the independence and transparency associated with IT frameworks may help strengthen financial institutions and deepen financial markets in terms of access, depth, and efficiency (Jacome et al., 2025), thereby enhancing the effectiveness of both monetary and macroprudential policies.

Yet monetary policy itself can pose risks to financial stability through several channels (Revelo et al., 2020). First, the balance sheet channel implies that higher interest rates weaken borrowers' repayment capacity, increasing default risk. Second, the risk-shifting channel arises as tighter policy compresses bank margins, potentially encouraging excessive risk-taking to preserve profitability. Third, in small open economies, the exchange rate channel can amplify instability: higher rates attract capital inflows, fuel credit growth, and increase leverage through exchange rate externalities. The consequence is that, contrary to expectations, in these economies, raising the policy rate may induce excessive growth in credit. These considerations highlight the importance of coordination between monetary and macroprudential policies.

The effectiveness of macroprudential policies is not only influenced by the the monetary policy regime, but also by country-specific characteristics like financial development and openness (Kim & Mehrotra, 2022). Cross-country evidence reveals important implementation differences: AEs tend to rely more on borrower-based instruments, while EMEs make greater use of foreign exchange-related measures (Akinci & Olmstead-Rumsey, 2018; Cerutti et al., 2017a). These differences reflect underlying structural features. In EMEs, consistent with their higher exposure to external shocks and with fast-growing bank credit, macroprudential tools appear more effective at containing excessive credit growth and systemic risk. Conversely, in AEs, higher levels of financial development and openness tend to dampen credit and output fluctuations, reducing the relative impact of macroprudential interventions (see also Boar et al., 2017; Zhou & Chen, 2024). Finally, the overall institutional environment can influence both implementation and effectiveness. Elements such as data availability, supervisory capacity, and institutional quality are critical determinants (IMF, 2013; Lim et al., 2011).

3. Methodology and Data

3.1. Methodology

We examine the potential impact of macroprudential tools on bank systemic risk and consider how the monetary policy framework–particularly IT–may influence the stabilizing role of macroprudential policy. Our primary proxy for systemic financial risk is SRISK, as proposed by Acharya et al. (2017) and Brownlees & Engle (2017). SRISK measures a bank's expected capital shortfall (in US$ billions) during a systemic crisis. It is calculated based on a bank's leverage and its long-run marginal expected shortfall (LRMES)–the expected equity loss conditional on a major market downturn over a six-month horizon. SRISK is a function of LRMES and is computed as:

$$\mathrm{SRISK}_{i,t} = \kappa\,\mathrm{DEBT}_{i,t} - (1-\kappa)\,\mathrm{EQUITY}_{i,t}(1-\mathrm{LRMES}_{i,t}), \tag{1}$$

where DEBT is the book value of debt, EQUITY is the market value of equity, and κ is the prudential capital ratio. LRMES is calculated as $1 - \exp\Big(\log(1-d)\cdot\beta\Big)$, where d is the six-month crisis threshold, set at 40%, and β is the firm's beta. Following Brownlees & Engle (2017), we retain only positive SRISK values (i.e., expected shortfalls).

We also employ LRMES and ΔCoVaR as alternative dependent variables. LRMES captures the cross-sectional dimension of systemic risk–how much risk a bank receives from the system–while SRISK reflects the expected capital shortfall a bank would face in a systemic event, thus its contribution to systemic vulnerability. Both SRISK and LRMES focus on banks' fragility under aggregate shocks, whereas ΔCoVaR measures the contagiousness of individual banks, that is, how distress in a single institution propagates to the broader banking sector.

Following Adrian & Brunnermeier (2016), CoVaR is defined as the Value-at-Risk of the financial system j conditional on institution i being in a particular state. Let X_i and X_j denote the weekly log returns of institution i's equity price and the financial system's equity price, respectively. Formally, $\text{CoVaR}^q_{j|C(X_i)}$ is the q-quantile of the conditional distribution of X_j given the event $C(X_i)$, that is:

$$\Pr\Big(X_j \leq \text{CoVaR}^q_{j|C(X_i)} \,\Big|\, C(X_i)\Big) = q. \tag{2}$$

The marginal effect of institution i on the system is then captured by ΔCoVaR, defined as the difference between the system's CoVaR conditional on i being under distress and its CoVaR conditional on i being in the median state:

$$\Delta\text{CoVaR}^q_{j|i} = \text{CoVaR}^q_{j|X_i=\text{VaR}^q_i} \;-\; \text{CoVaR}^q_{j|X_i=\text{Median}(X_i)}. \tag{3}$$

Intuitively, ΔCoVaR captures the system-wide risk associated with the distress of a single bank relative to its normal condition. System returns are proxied by the S&P 1200 Financials index. Following Adrian & Brunnermeier (2016), we estimate the conditional CoVaR using a time-varying approach, modeling the conditional distribution as a function of a lagged state variable. In particular, we select the Chicago Board Options Exchange Volatility Index (VIX). This procedure yields a weekly panel of ΔCoVaR estimates at the 99th percentile ($q = 0.01$).

Our baseline specification is estimated using a bank-level dynamic panel model:

$$\begin{aligned} \text{SRISK}_{i,k,t} = a \cdot \text{SRISK}_{i,k,t-1} + b \cdot \text{MEC}_{k,t-1} + c \cdot \text{BSC}_{i,k,t-1} + \\ \delta \cdot \text{MPI}_{tool,k,t-1} + \beta \cdot \text{Tool}_{k,t-1} + \psi_k + \mu_{i,k,t}, \end{aligned} \tag{4}$$

where i indexes banks, k indexes countries, t denotes yearly time, ψ_k denotes country fixed effects, and $\mu_{i,k,t}$ denotes normally distributed, independent and identically distributed (i.i.d.) residuals. MEC is a vector of global- and country-level macroeconomic control variables. BSC includes bank-specific characteristics that may affect systemic risk. The full list of control variables and data sources is reported in Table 4 in Appendix 7.1.

We consider monthly indicators of macroprudential policy actions provided by the Integrated Macroprudential Policy (iMaPP) database (Alam et al., 2019). The complete list of the 22 macroprudential tools is presented in Table 3 in Appendix 7.1.

We estimate separate regressions for each macroprudential tool index ($Tool$). A positive (negative) index corresponds to a tightening (loosening) of a macroprudential instrument. Our yearly index is calculated as the average number of monthly actions, multiplied by 12 and then by 10, so that a value of 1 reflects one tightening action over a 10-year period.

As argued in Kuttner & Shim (2016), since macroprudential tools tend to be implemented in tandem rather than in isolation, it is essential to address potential omitted variable bias that may arise from estimating separate regressions for each individual instrument.[1] However, since our analysis is based on a large set of instruments–22 macroprudential tools–estimating a joint regression with all instruments is empirically challenging and may introduce multicollinearity.

To address this issue, we construct an aggregate macroprudential index orthogonal to

[1]In a similar set-up, Kuttner & Shim (2016) estimate the impact of six macroprudential instruments on credit growth, using both individual and joint regressions finding that some tools pick up the effect of other omitted measures, thereby favoring a joint specification.

the tool of interest, denoted $\text{MPI}_{\text{tool},k,t}$ for each country-year. We compute the aggregate Macroprudential Policy Index (MPI), as the sum of activations across all 22 macroprudential tools (as in Zhang et al., 2020). We then perform a bivariate principal component analysis (PCA) between MPI and the individual tool of interest. We define MPI_{tool} as the residual of MPI after removing the first principal component. In all cases, the first principal component explains more than 50% of the total variance between MPI and the individual tool, and loadings consistently have the same sign–indicating that when one instrument tightens or loosens, others tend to move in the same direction.[2]

MPI_{tool} should be interpreted as the portion of the aggregate macroprudential stance that complements the specific tool under consideration. This is particularly relevant in contexts where authorities have a wide range of instruments and may adopt countervailing policies in response to changing macro-financial conditions. For example, if borrower-based tools are already in place within the macroprudential toolkit, policymakers may respond to rising vulnerabilities by tightening the countercyclical capital buffer (CCyB) while leaving borrower-based measures unchanged to continue containing credit risk. The overall impact of the macroprudential policy stance on SRISK is then reflected in the sum $\beta + \delta$ in Equation 4, provided that both coefficients are statistically significant.

Building on this setup, we estimate the stabilizing effect of macroprudential rules conditional on the monetary policy regime. Our baseline model can be extended to a pseudo non-linear dynamic panel form, allowing for a specific impact in IT countries. Hence, our

[2]The first principal component between the aggregate MPI and each tool explains between 54% and 78% of the total variance across the 22 tools, with consistently positive loadings, except in the case of RR, where both loadings are negative. The second principal component explains between 22% and 46% of the total variance, with both loadings having opposite signs.

benchmark model is specified as follows:

$$\begin{aligned}\text{SRISK}_{i,k,t} = a \cdot \text{SRISK}_{i,k,t-1} + b \cdot \text{MEC}_{k,t-1} + c \cdot \text{BSC}_{i,k,t-1} + d \cdot \text{IT}_{k,t-1} + \\ \delta \cdot \text{MPI}_{tool,k,t-1} + \beta \cdot \text{Tool}_{k,t-1} + \gamma \cdot \text{IT}_{tool,k,t-1} + \psi_k + \mu_{i,k,t},\end{aligned} \tag{5}$$

where IT_{tool} is an interaction term between the tool and an IT regime dummy (taking 1 for IT countries, 0 otherwise). The IT-specific impact of an individual macroprudential policy tool can be captured by γ. If the IT regime reinforces the stabilizing role of a specific macroprudential tool, this should be reflected in negative estimates of γ, which we interpret as its relative effectiveness under IT. Consequently, in IT countries, absolute effect of a given tool is given by $\beta + \gamma$, provided that these coefficients are statistically significant. Since the activation of a given instrument typically coincides with the broader macroprudential toolkit–which is constructed to be orthogonal to the instrument under consideration–the overall effect under the IT framework is given by $\delta + \beta + \gamma$.

We implement GMM estimation à la Arellano & Bond (1991) to address potential unobserved endogeneity arising from the inclusion of the lagged dependent variable and to eliminate unobserved bank-specific effects. Endogenous regressors are instrumented using their lagged values in levels. The instrument set includes global and country-level macro variables (MEC), bank-specific controls (BSC), and the macroprudential policy index, all in levels.

3.2. Data and Sample Selection

We use the iMaPP Database (Alam et al., 2019), which provides monthly dummy indicators of macroprudential tightening (+1) and loosening (-1) for 15 instruments across 7 subcategories in 134 countries from 1990 to 2018. Each series is annualized by averaging monthly actions and multiplying by 12 and 10, yielding an index that reflects the average number of interventions over a 10-year horizon. The full list and definitions of instruments are provided in Table 3 in Appendix 7.1. Following Alam et al. (2019), we group measures into four main categories: demand-based, capital requirements, loan-supply-based, and liquidity or other supply-side tools. Instruments may also be targeted to specific sectors–households (HH), corporates (Corp), or general (Gen).[3]

We collect monthly SRISK and LRMES measures from NYU-VLab[4], which reports the Global Dynamic MES as defined in Acharya et al. (2017), starting in July 2000. LRMES is computed using a 40 percentage point market decline over six months, while SRISK assumes prudential capital requirements of 8 per cent for firms in Africa, Asia, and the Americas, and 5.5 for European firms. We aggregate SRISK at the bank-year level (in US$ billions), keeping only positive values, and refer to this truncated annualized series simply as SRISK. LRMES is similarly annualized by averaging monthly values per calendar year. For the computation of ΔCoVaR, we rely on weekly closing stock prices from Bloomberg for the same sample of banks reported in NYU-VLab. As a proxy for the financial system, we use the S&P 1200 Financials weekly index, also obtained from Bloomberg, while for the state variable we select the Chicago Board Options Exchange VIX, retrieved from FRED.[5]

Starting from NYU-VLab banks located in countries covered by iMaPP, we retain only those with complete macroeconomic and bank-level controls, yielding an initial sample of 59 countries (Table 5). To mitigate under-representation bias, we restrict the benchmark sample to countries with at least three banks[6], resulting in a panel of 536 banks across 47 countries

[3]Because some measures are not attributable to a specific sector and categories, the sum of actions across subcategories may not match the aggregated tool.

[4]http://vlab.stern.nyu.edu/

[5]Analogously, while the ΔCoVaR computation yields a weekly panel, we annualize these measures by taking simple averages within each calendar year to ensure comparability with the rest of our analysis.

[6]The list of financial institutions in the benchmark sample is reported using NYU-VLab naming conventions in Table 8.4, Online Appendix.

from June 2000 to December 2018.[7]

The country-level controls comprise seven macroeconomic indicators and three global variables, primarily sourced from the World Bank, BIS, FRED, and Bloomberg, with gaps filled using central bank data. As detailed in Table 4 in Appendix 7.1, we include real GDP growth (GDP), gross savings as a share of GDP (Savings), consumer price inflation (CPI), and year-on-year exchange rate growth against the U.S. dollar (FX). Monetary policy rates (INT) are sourced from the BIS when available; otherwise, from the IMF, Bloomberg, OECD, or national central banks, using REPO, discount, or short-term reference rates. We also include the Chinn-Ito index (Kaopen) for capital account openness and the IMF Financial Development Index (FD) to account for financial sector depth, access, and efficiency. Global controls include the U.S. VIX (FRED), the U.S. federal funds rate (FFR, Haver Analytics), and real global GDP growth (World Bank). Bank-level variables are obtained from ORBIS database and matched to banks listed in V-LAB; these include total assets (SIZE) and customer deposits (DEP), in log US$ billions, as well as five financial ratios: equity to total assets (CAP), net loans to total assets (LTA), non-performing loans to total loans (NPL), and pre-tax return on assets (ROA). We ensure that all banks in the sample have at least one control variable available throughout the full sample period.

Based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), we construct annual dummies identifying whether a country adopted an IT regime in a given year.[8] Non-IT regimes are grouped into three categories: exchange rate anchors (ER), monetary aggregate targeting (MA), and unclassified regimes (OT), where

[7]Robustness checks include alternative samples at yearly frequency–such as the full 59-country set, a sample excluding the United States, and a post-GFC subsample, (see Section 5.2)–as well quarterly data (see Section 5.1.5).

[8]According to the IMF, an IT regime involves a publicly announced numerical inflation target and a commitment by the monetary authority to achieve it, typically over the medium term.

no explicit nominal anchor is specified or data are insufficient.[9] Among the 47 countries in our benchmark sample (2000–2018), 28 adopted IT at least once, while 27 operated at some point under a non-IT regime. The classification of monetary and exchange rate regimes is presented in Table 5 (Appendix 7.1).

Table 6 in Appendix 7.1 presents descriptive statistics for the benchmark sample. The left panel reports results for all countries, while the right focuses on those operating under IT regimes. Macroeconomic and bank-level indicators display broadly similar distributions across groups. The number of observations (N) is reported at the bank, country, or global level, as applicable, and excludes zeros. For macroprudential tools, N reflects the number of country-year observations with at least one intervention (tightening or loosening), while the mean captures both the average direction and intensity of use. For instance, a mean of 1 corresponds to one tightening action per decade. In total, we observe 583 annualized interventions (tightening or loosening) across all instruments in the sample, of which 405 occur in IT countries. Notably, the aggregated MPI index registers 230 interventions–156 of them in IT countries–indicating that multiple tools are often activated in tandem within the same year.

Figure 1 illustrates macroprudential interventions from 2000 to 2018 using the monthly iMaPP index for the countries listed in Table 5. Tool categories are detailed in Table 3 (Appendix 7.1). The right axis reports the total number of interventions per year, and the left shows their average direction (tightening or loosening).[10] Months with no interventions are excluded; as a result, an average of zero reflects a balance between tightening and loosening, not policy inaction.

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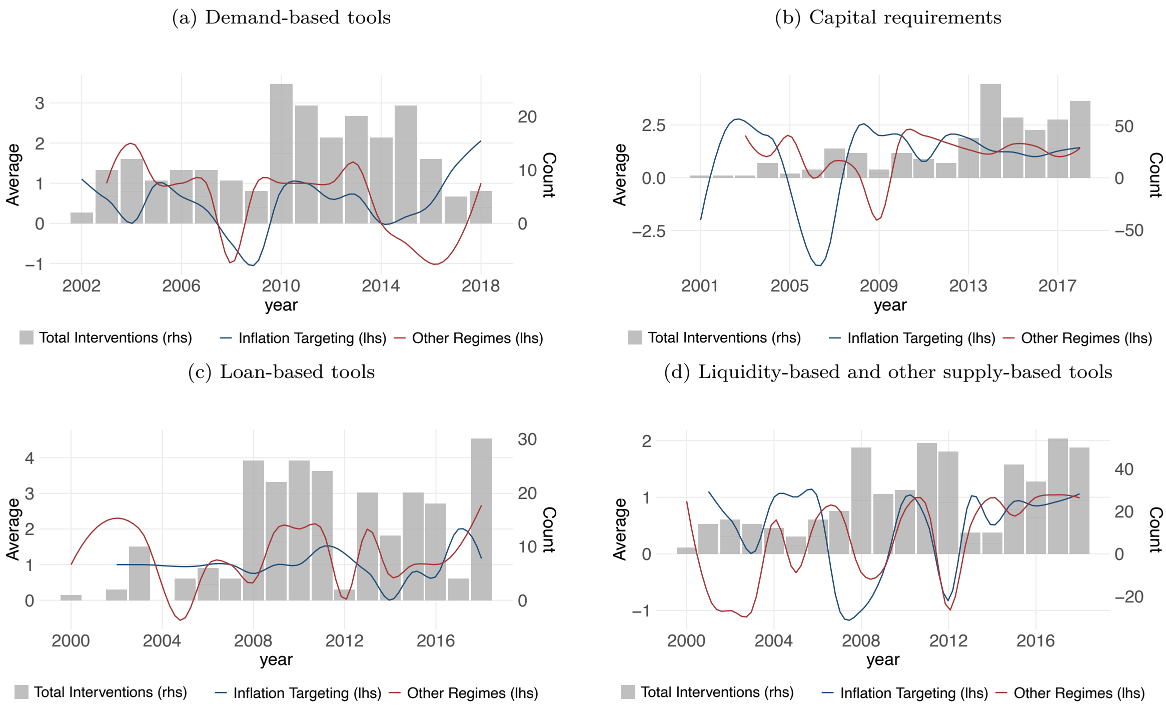
[9] ER regimes include currency boards, conventional pegs, crawling pegs, and other managed arrangements; MA regimes target the growth rate of a monetary aggregate (e.g., reserve money, M1, M2).

[10] Figure 1 reflects the within-year frequency of monthly interventions, whereas Table 6 reports annualized statistics based on calendar-year averages.

Demand-based and liquidity-related tools became more accommodative during the GFC, then gradually shifted to tightening. IT countries tightened earlier, while non-IT countries continued began tightening only in 2018. Capital requirements show marked loosening during the GFC, especially in non-IT countries, while interventions in IT countries remained, on average, in the tightening direction. Liquidity and other supply-based tools also show a notable loosening episode around the 2012 European debt crisis across all regimes.

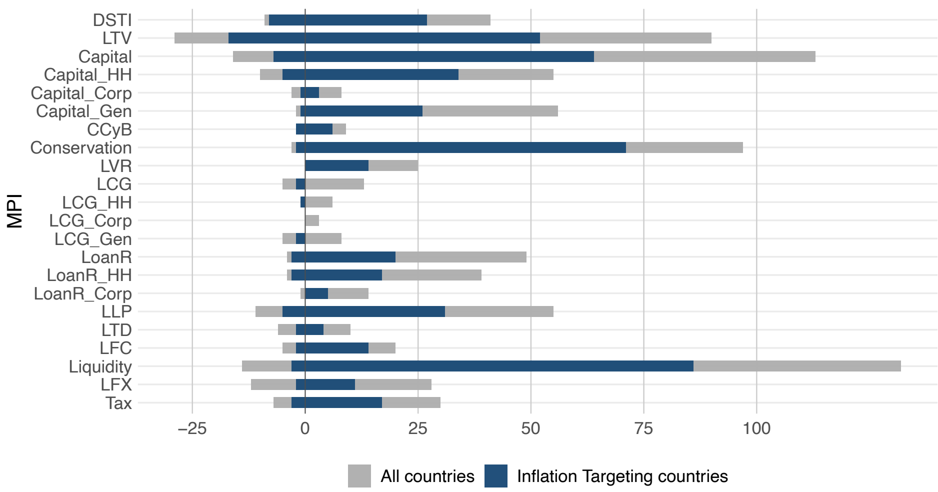
Figure 1: Macroprudential Policy Interventions by Tool Type



Note: Panels group tools as in Table 3, based on monthly interventions (excluding inaction) for countries in Table 5. Left axis: annual *average* of the index; right axis: total number of interventions (*count*).

Beyond aggregate categories, the frequency of use varies widely across individual tools. Figure 2 reports total monthly interventions per tool, separately for IT countries and the full sample. RR (excluded due to scale), Liquidity, Capital, LTV, DSTI, and Conservation appear most frequently, while sectoral tools are less common. For the individual regressions, we focus on tools with more than ten interventions over the sample period. Some, like LVR and LCG_Corp, are never loosened in any country, while others–such as CCyB and LCG_HH–are never loosened under non-IT regimes.

Figure 2: Number of Macroprudential Policy Interventions by Instrument and Direction



Note: Bars reflect tightening (positive) and loosening (negative) macroprudential interventions at the country-month level. Sample covers countries in Table 5. Reserve requirements (RR) omitted for scale: 232 (103) tightening and 169 (105) loosening actions in All (IT).

The distribution of SRISK at the time of macroprudential interventions–without implying causality–suggests that, under IT regimes, tightening is more responsive to elevated systemic risk, whereas in non-IT countries it tends to occur around average risk levels. This may reflect a more risk-based approach in IT countries, while in other regimes macroprudential tools may also pursue monetary objectives. Exceptions include DSTI and conservation buffers, which appear more structural under IT. CCyB, in contrast, is more frequently activated during episodes of elevated systemic risk in IT countries (see Figure 4 in the Online Appendix 8.1).

4. Empirical Results

Section 4.1 presents results from the benchmark model, which includes interactions with the IT regime (Equation 5). We then examine whether IT further enhances macroprudential effectiveness when monetary and macroprudential policies move in the same direction (Section 4.2). All regressions are estimated separately for 15 instruments using the benchmark sample of 536 banks in 47 countries (2000–2018), as described in Section 3.2.[11]

Section 5.1 presents additional results, including the baseline model without IT (Equation 4), a subsample analysis for EMEs, an extension using LRMES and ΔCoVaR, and quarterly estimations. Further robustness checks in Section 5.2 assess the sensitivity of results to alternative samples and time periods.

In our panel dynamic specification, the significance of the explanatory variables–including the macroprudential policy stance–can be interpreted as Granger-causality, assuming the validity of the instruments used for the GMM estimation. The Hansen J-test confirms the validity of this assumption across all regressions, whereas the Arellano–Bond test rejects second-order serial correlation in the residuals.

Due to the autoregressive structure of the model, the significance of the post-policy effect of the macroprudential intervention on systemic risk is evaluated using the delta method (see Kuttner & Shim, 2016). The resulting sum of scaled coefficients, when statistically significant, reflects the average one-year change in SRISK (in US$ billions) in response to the macroprudential policy intervention.[12]

4.1. Benchmark Model

We present results from the benchmark specification (Equation 5), which includes interaction terms with the IT regime. As shown in Section 5.1.1, the baseline model (Equation 4) yields consistent signs for macroprudential tools when coefficients are significant.

Table 1 reports the average one-year-ahead effect associated with each coefficient of interest with p-values based on delta-method standard errors. Full regression outputs–including control variables–are reported in the Online Appendix 8.2.1. Estimated coefficients for

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[11]Instruments with fewer than 10 annual observations are excluded (see Tables 3 and 6, Appendix 7.1).

[12]The average one-year-ahead effect is calculated as $0.5\times[\phi(1+\alpha)]$, where α is the autoregressive coefficient and ϕ refers to the coefficient of interest–either β, δ, or γ. When interpreting the overall policy effect, ϕ corresponds to the sum of relevant terms (e.g., $\beta + \delta$ in Equation 4, or $\beta + \delta + \gamma$ in Equation 5).

macroeconomic and bank-level controls are consistent with expectations (see interpretation in Section 8.3).

Table 1: Estimated Impact of the Macroprudential Tools on SRISK

	MPI_{Tool}	Tool	IT_{tool}
DSTI	-0.992***	0.946***	-0.928***
LTV	-0.658***	0.464***	-0.156
Capital	-0.234	0.588***	-0.362***
Capital_HH	-1.193***	0.515***	-0.202
Capital_Gen	0.286	0.679***	-0.531***
CCyB	-2.248***	5.721**	-4.129*
Conservation	-1.108***	1.048***	-0.997***
LVR	-1.250***	1.230***	-0.529**
LoanR	-1.011***	0.458***	0.403*
LoanR_HH	-1.170***	0.488***	0.634***
LLP	-0.900***	1.471***	-1.121***
Liquidity	-0.437***	-0.158	0.529***
LFX	-1.563***	1.995***	-1.410*
Tax	-1.431***	0.819***	-1.126***
RR	-0.349***	0.103***	-0.111

Notes: *p<0.1; **p<0.05; ***p<0.01. Table reports coefficients estimated from Equation 5, using two-step GMM and the benchmark sample of 47 countries. Descriptive statistics in Table 6. Coefficients and standard errors are scaled using the delta method to reflect the one-year-ahead average post-policy impact on SRISK. Full results in Appendix 8.2.1.

We find that for nearly all of the 15 tools examined, the aggregated macroprudential index MPI_{tool} has a negative and significant effect on SRISK ($\delta<0$), while the coefficient on the individual tool is positive ($\beta>0$). The positive sign on Tool likely reflects that the tightening of individual instruments is associated with increasing, rather than declining, SRISK. This pattern is consistent with risk-shifting behavior, as documented by Meuleman & Vander Vennet (2020), whereby retail banks disinvest from certain types of assets and shift their portfolios toward exposures that make them more vulnerable to business cycle or financial market shocks.

Since MPI_{tool} is constructed to be orthogonal to the individual Tool, it captures the complementary stance of the broader macroprudential toolkit. Thus, while a tightening of a specific instrument may raise SRISK through banks' risk-shifting behavior, the negative coefficient on MPItool reflects the stabilizing role of other instruments in place. To evaluate the overall impact of tightening a specific instrument while accounting for the broader policy stance, we therefore consider the net impact of MPI_{tool} and Tool ($\delta + \beta$). We find that, for most tools, the negative effect dominates, ranging from 0.020 to 0.612 US$ billion, or 0.03% to 0.94% of average SRISK (see Table 6), implying that when these instruments are activated as part of a broader package, macroprudential policy helps reduce SRISK. By contrast, for CCyB, loan loss provision (LLP) requirements, and limits to exchange rate exposures (LFX), the positive effect dominates, suggesting that their activation is associated with higher SRISK, and that in combination with other policy tools, no measurable reduction in SRISK is observed within a one-year horizon. Overall, this suggests that a single instrument is insufficient to reduce SRISK over a one-year horizon, whereas the aggregate macroprudential stance across multiple instruments contributes to systemic risk mitigation.

Turning to regime heterogeneity, the interaction term between Tool and the IT dummy (γ) is negative across most instruments, indicating relative effectiveness under IT. This finding indicates that the increase in SRISK associated with the activation of an individual tool ($\beta > 0$) is partially offset under IT frameworks. Only for Tax is the offset complete, with $\beta + \gamma < 0$, implying that in IT countries the activation of this instrument is associated with a absolute reduction in SRISK. Taken together, these results suggest that IT regimes exert a stabilizing influence by dampening, and in some cases fully reversing, the risk-increasing short-run impact of macroprudential tools.

The effect of the overall policy stance under IT frameworks, measured as $\delta + \beta + \gamma$, when statistically significant, generally implies a reduction in SRISK, with magnitudes ranging from 0.07% to 2.49% of average SRISK.[13] Expressed in US$ billion of SRISK, this corresponds, for example, to reductions of -0.98 for debt service-to-income caps (DSTI), -0.66 for the countercyclical capital buffer (CCyB), -1.06 for the capital conservation buffer (Conser-

[13]Statistical insignificance does not necessarily imply ineffectiveness; in most cases, it reflects limited usage, which may constrain the ability to detect measurable effects (see Figure 2).

vation), -0.55 for leverage limits (LVR), -0.55 for loan loss provisioning (LLP), -0.98 for limits on FX exposures (LFX), and -1.74 for housing-related taxes (Tax).

4.1.1. Demand–Based Measures

Demand-based measures are typically employed to moderate credit expansion by constraining borrowing capacity. Among them, DSTI caps are often considered the most effective.[14] Accordingly, we find that in IT countries, DSTI limits are significantly associated with lower SRISK, whereas LTV limits show no significant impact.

The greater relative effectiveness of DSTI caps under IT likely reflects their complementarity with monetary policy in addressing macro-financial imbalances and containing excessive credit fluctuations, allowing both policies to move in the same direction (Kim & Mehrotra, 2017; Laseen et al., 2017; Svensson, 2018). For example, when inflation is below target and credit is contracting, both interest rates and DSTI limits can be eased to support recovery. In contrast, under fixed exchange rate regimes, monetary policy lacks such flexibility. Defending the currency may require raising interest rates even amid credit tightening (Angelini et al., 2014; Calvo & Reinhart, 2002; Georgiadis & Zhu, 2021; Kuttner & Shim, 2016).

While DSTI limits are less sensitive to short-term fluctuations, whereas LTV limits may lose effectiveness when inflation deviates from target, as interest rate changes affect both credit and asset prices, keeping the ratio relatively stable. Accordingly, we find that when monetary and macroprudential policies tighten in tandem, DSTI limits significantly reduce SRISK, while the effect of LTV limits is not statistically significant (see Section 4.2). However, this result should be interpreted with caution, as LTV caps become significant in the post-GFC sample and at a quarterly frequency (Sections 5.2 and 5.1.5), showing a reduction in SRISK under IT.

[14]For example, Kuttner & Shim (2016) find their impact on credit growth to be more than twice that of LTV limits.

4.1.2. Capital Requirements

Capital requirements aim to strengthen bank resilience by ensuring adequate loss-absorbing capacity during periods of financial stress and help maintain the flow of credit in downturns. While capital tools may raise funding costs in the near term (Cozzi et al., 2020; Revelo et al., 2020), in the long run, they tend to limit debt procyclicality (Ćehajić & Košak, 2021).

Based on the iMaPP database, we distinguish four types (see Table 3): general capital requirements (Capital), which include minimum capital ratios, risk weights, and systemic risk buffers–either broad-based or sector-specific (e.g., targeted at households, Capital_HH); the countercyclical capital buffer (CCyB); the capital conservation buffer (Conservation) aligned with Basel III standards; and leverage-based requirements (LVR).

In our analysis, several of these tools–namely CCyB, Conservation, and LVR–are significantly relatively more effective under IT regimes. When considering the net impact of the overall macroprudential stance without the IT interaction term ($\beta + \delta$), the economic effects appear more limited: although statistically significant, the impacts of Conservation and LVR are close to zero, while the CCyB is associated with an increase in SRISK. By contrast, Capital_HH consistently contributes to reducing SRISK.[15]

Regarding broad-based CCyB, Revelo & Levieuge (2022) show that its activation may conflict with monetary policy objectives, potentially amplifying inflation and output volatility.[16] However, the authors note that such conflicts are mitigated under flexible inflation targeting when monetary and macroprudential policies are coordinated. Consistent with this view, we find that in IT countries, the CCyB is associated with a significant reduction in SRISK, with a net effect of -0.66 US$ billion. Moreover, irrespective of the monetary regime,

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[15]For Capital_HH, we find that IT interaction term is not statistically significant when employing the benchmark sample, while it becomes significant in the post-GFC sample.

[16]In line with this, Galaasen & Solheim (2018) find that sector-targeted CCyB can stabilize lending more effectively and at lower cost than broad-based buffers during crises, using a partial equilibrium model.

coordinated tightening of monetary policy and the CCyB leads to a decline in SRISK (see Table 2). These findings empirically support the argument that CCyB implementation may require close coordination with monetary authorities.

Similarly, both the conservation buffer and LVR show a significantly negative net effect under IT. However, as shown in Section 4.2, the conservation buffer reduces SRISK when tightened in tandem with monetary policy, whereas LVR increases SRISK under the same conditions. This suggests that, like the CCyB, the conservation buffer may benefit from the flexibility of IT regimes, which facilitate coordinated policy responses during financial stress. In contrast, the LVR's effectiveness under IT seems less related to coordination as discussed in Section 4.2.

One such feature may be the enhanced credibility and transparency of IT regimes, which can strengthen the signaling effect of macroprudential measures. By lowering perceived risk following policy announcements, IT may mitigate the typical increase in capital costs associated with the implementation of tighter regulatory capital requirements.[17]

4.1.3. Loan–Supply–Based Measures

Loan restrictions (LoanR)–such as constraints on loan characteristics–aim to limit the transmission of adverse macroeconomic conditions from borrowers to banks' balance sheets. Instead of targeting borrowers directly, these measures shape the composition of loan portfolios to preserve a balanced bank risk profile. In our sample, interventions typically cap floating loan rates, likely to reduce banks' exposure to interest rate shocks and borrower defaults.

We find that, even without considering the IT-specific effects, the total impact of the policy stance when these tools are activated is generally associated with lower SRISK. However,

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[17]For example, capital buffers were phased in the European Union under the CRR (Regulation EU No 575/2013) and CRD IV (Directive 2013/36/EU) framework, allowing banks to anticipate and adjust gradually. This may have complemented the signaling effects and policy coordination mechanisms.

in most cases, while the interaction term with IT regimes is positive, the net effect indicates a reduction in SRISK under IT. In the quarterly estimation, however, the cumulative impact turns positive, which warrants caution. While we refrain from making a conclusions on their overall effectiveness, this suggests that LoanR tends to be relatively less effective under IT.

One possible explanation is that the prevalence of fixed-rate lending weakens monetary policy transmission under IT. This reduced sensitivity may limit the scope for coordination between interest rate policy and macroprudential instruments–one of the key advantages of IT frameworks. Indeed, in our coordination exercise, we find that loan restrictions are not effective when adjusted in the same direction as monetary policy, providing some empirical support for this interpretation. Moreover, most IT countries in our sample faced persistently low interest rates over the period studied (see Table 6), further limiting the stabilizing potential of restrictions on floating-rate loans.

Loan loss provisioning (LLP) requirements–especially when implemented preemptively–can lower systemic risk by reducing the likelihood of loan default. However, these tools may be pro-cyclical, as banks are often required to increase provisions precisely when credit quality worsens (BIS, 2021). Consistent with this, we find that, without accounting for the IT term, the net effect of the overall macroprudential stance is associated with an increase in SRISK. Yet, when considering the IT effect, the net impact turns negative, suggesting that the credibility of IT frameworks may strengthen the signaling role of such measures, lowering perceived banking risk.

4.1.4. Liquidity Requirements and Other Supply–Based Measures

Among these tools, only LFX and housing-related taxes consistently reduce systemic risk under IT regimes. By contrast, reserve and liquidity requirements are not significant in the benchmark model (Tables 1 and 13), but yield reductions in SRISK under the quarterly specification.

Limits on foreign currency exposures (LFX) significantly reduce systemic risk in IT countries, but are associated with higher SRISK when the monetary policy regime is not accounted for.[18] This aligns with Fendoğlu (2017), who, using a panel of 18 EMEs under different monetary regimes, finds that FX-related macroprudential measures are generally ineffective in curbing credit cycles driven by portfolio inflows. A potential unintended effect is a shift toward domestic currency exposures, which may increase the procyclicality of bank portfolios–especially in small open economies. This shift may raise banks' market beta and, in turn, their expected capital shortfall impacting SRISK.[19]

In IT countries, the significant effect of LFX on reducing SRISK may reflect a signaling role. As noted by Calvo & Reinhart (2002) and Georgiadis & Zhu (2021), in flexible exchange rate regimes, instruments like FX reserve requirements help address currency mismatches and reduce the "fear of floating". Accordingly, activating LFX measures may signal policy credibility and contribute to macro-financial stability–making them particularly beneficial under IT, as the exchange rate absorbs capital flow shocks.

Tax-based measures show strong effects on systemic risk within IT regimes. This is consistent with Kuttner & Shim (2016), who find that housing-related taxes reduce credit growth by dampening demand. By increasing the cost of home ownership and transactions, these tools affect house prices even when households are not credit-constrained. Given their diversity–e.g., wealth taxes, subsidies, stamp duties–they are less sensitive to the monetary policy stance. Unlike LTV limits, which may lose effectiveness when rate increases lower house prices and raise LTV caps, tax-based tools may remain effective regardless of the monetary policy stance. Indeed, when housing-related tax measures are tightened concurrently with monetary policy, we observe a significant reduction in SRISK. This supports the view that

[18] This result should be interpreted with caution. While LFX is associated with higher SRISK in the benchmark model outside IT regimes, this pattern is less pronounced in the quarterly sample, where the cumulative effect turns significantly negative (see Section 5.2).

[19] In Section 5.1, we show that under IT regimes, LFX significantly increases LRMES, see Table 9 reported in Appendix 7.2.

their effectiveness may be enhanced by policy coordination.

Reserve requirements (RR) and liquidity requirements both impose balance sheet constraints that may affect banks' response to macro-financial conditions and influence systemic risk. RR compels banks to hold a share of their liabilities as deposits at the central bank, while liquidity requirements typically take the form of a minimum ratio of high-quality liquid assets–such as government bonds–relative to specific liabilities.

While we do not find robust evidence of effectiveness for RR and liquidity requirements under IT in the yearly specification, both instruments become statistically significant in the quarterly analysis, suggesting that their impact is short-lived (one to two quarters) and dissipates within a year. This aligns with Cantú et al. (2024), who recently show that tightening reserve requirements can dampen credit cycles. However, as discussed in Section 4.2, these tools are associated with higher SRISK when monetary policy tightens simultaneously.

4.2. Monetary and Macroprudential Policy Coordination

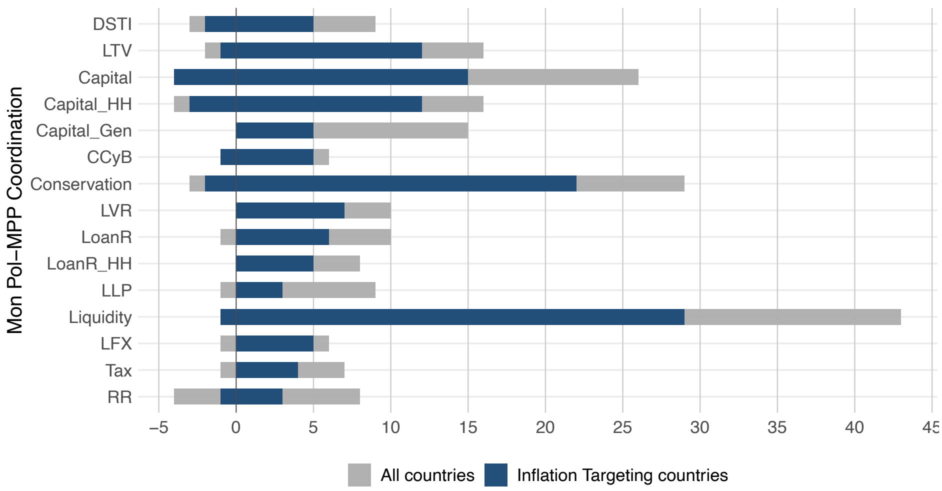
To assess whether the enhanced effectiveness of macroprudential tools under IT reflects improved coordination with monetary policy, we examine episodes of joint tightening or loosening. This isolates the effect of coordination from that of the regime itself and evaluates whether simultaneous adjustments amplify macroprudential impact on systemic risk.

We capture these episodes using an interaction index, $INT \times Tool$, which takes positive values when both policies tighten, negative when both loosen, and zero otherwise. The monetary policy stance (INT) is proxied by the year-on-year change in the policy rate, standardized by each country's historical mean and standard deviation. Since *Tool* reflects the annual number of macroprudential activations, the index captures both the direction and intensity of policy coordination. The coefficient on the interaction term should therefore be interpreted as the additional impact on SRISK of the joint occurrence of a policy-rate change (measured in country-specific standard deviations) with one corresponding macroprudential action in the same direction (both tightening or both loosening), relative to episodes in which monetary and macroprudential policies do not move in the same direction.

Out of 583 annualized macroprudential policy interventions in our sample, 199 are coordinated with monetary policy. Of these, 137 episodes (69%) occur in IT countries, which indicates that policy coordination is more prevalent under IT regimes.

Figure 3 shows that conservation buffers and liquidity measures are most often coordinated with the monetary stance. Among demand-based tools, LTV limits exhibit slightly more coordination, possibly to offset the loosening effect of unchanged caps during easing. Still, non-coordinated interventions remain far more common (see Figure 2). Reserve requirements (RR) are rarely coordinated in the same direction with monetary policy: of 335 interventions, only 10 align with the monetary stance–an even rarer occurrence in IT countries.

Figure 3: Number of Macroprudential Policy Interventions Coordinated with the Monetary Policy Stance by Instrument and Direction



Note: Bars reflect country-month macroprudential interventions aligned with monetary policy: tightening (positive) or loosening (negative). Sample covers countries in Table 5.

Table 2 reports results using the delta method, with coefficients and standard errors scaled to reflect average post-policy effects on SRISK. The regressions, estimated via two-step GMM for 47 countries, replacing the IT interaction term with a policy coordination interaction (INT×Tool) in the benchmark model (Equation 5). We find that the estimated coefficient on the policy-coordination interaction term is statistically significant and negative for DSTI, Capital, CCyB, Conservation, and Tax, indicating that the coordination of these tools with monetary policy contributes to lowering SRISK.

We note that, when significant, the coordination term generally mirrors the IT interaction, suggesting that much of the enhanced effectiveness observed under IT may be explained by improved coordination across policy domains. The only exception is LVR, where the benchmark IT specification yields a negative coefficient, while the policy-coordination interaction term is positive. Furthermore, results show that when significant, the signs of both the aggregate index and individual tools remain consistent with the benchmark specification. Full and unscaled regression outputs are available in the Online Appendix 8.2.2.

Table 2: Estimated Impact of Coordinated Monetary and Macroprudential Policies on SRISK

	MPI_{Tool}	Tool	$INT \times$ Tool
DSTI	-1.359***	0.676***	-2.256***
LTV	-0.768***	0.448***	-0.067
Capital	-0.275*	0.360***	-0.335***
Capital_HH	-1.175***	0.385***	0.107
Capital_Gen	-0.095	0.464***	-0.034
CCyB	-1.322***	3.138***	-2.115***
Conservation	-0.612***	0.640***	-0.913***
LVR	-2.093***	0.907***	0.448***
LoanR	-1.154***	0.669***	0.006
LoanR_HH	-1.371***	0.796***	0.012
LLP	-1.100***	0.264*	0.017
Liquidity	-0.737***	0.167*	0.455***
LFX	-1.549***	0.716***	-0.731
Tax	-1.284***	0.358*	-1.976***
RR	-0.349***	-0.076**	0.616***

Notes: *p<0.1; **p<0.05; ***p<0.01. Table reports coefficients from a specification analogous to Equation 5, replacing the IT term with the coordination interaction ($INT \times$ Tool). Estimates use two-step GMM and the benchmark sample of 47 countries. Descriptive statistics in Table 6. Coefficients and standard errors scaled using the delta method to reflect the one-year-ahead average post-policy impact on SRISK. Full results in Appendix 8.2.2.

Turning to the tools associated with higher SRISK under coordination, we identify LVR, Liquidity, and RR. The LVR, defined as the ratio of capital to non-risk-weighted exposures, tends to rise mechanically when interest rates increase, as these exposures often include long-duration assets like sovereign bonds that lose value more sharply. When implemented alongside an interest rate hike, tightening the leverage ratio may raise the cost of capital more than tightening other capital requirements based on risk-weighted assets. RR initially raises banks' marginal cost of funding and weakens balance sheet positions (Cantú et al., 2024). As such, joint tightening may amplify funding pressures to a degree that undermines financial stability. We find that when tightened jointly with monetary policy, Liquidity and RR measures are associated with increased systemic risk. This could account for the relatively low incidence of coordination with monetary policy, despite the high prevalence of RR (see Figures 2 and 3). However, this pattern reverses under IT regimes, possibly due to the signaling role of the framework–lowering perceived banking risk–and the greater independence of monetary policy, which makes simultaneous tightening less common.

5. Robustness Checks and Extensions

To complement the benchmark results, we conduct a set of robustness checks and alternative model specifications. Tables 7 to 10 in Appendix 7.2 report the relevant coefficients and significance levels, using the delta method to reflect the average one-year post-policy impact on systemic risk.[20]

We perform four specification exercises: (i) excluding the IT interaction to assess whether macroprudential effects hold independently of the monetary regime; (ii) comparing AEs and EMEs to test for differential effectiveness given differences in financial depth, institutional quality, and external vulnerability; and (iii) replacing SRISK with LRMES to assess whether macroprudential tools reduce exposure to systemic risk rather than contribution to it; and (iv) employing ΔCoVaR as dependent variable to evaluate whether macroprudential tools help mitigate the system-wide effect of individual banks in distress. These exercises are conducted using the benchmark sample of 536 banks in 47 countries (2000–2018). Finally, we re-estimate the benchmark specification using alternative samples–quarterly data, the full panel, a post-GFC subsample, and a sample excluding the United States–to verify the

[20]Full regression outputs are available upon request.

robustness of results across country compositions and time horizons.

5.1. Alternative Specifications

5.1.1. Baseline Model

We evaluate a *baseline* specification that excludes the IT effect (Equation 4). By doing so, we assess whether the estimated coefficients for macroprudential tools remain consistent with the benchmark specification. The results suggest that the benchmark model is robust: their signs match those in the benchmark specification wherever coefficients are statistically significant.

We find that the combined effect of the aggregate macroprudential stance and the corresponding individual tool is negative for nearly all instruments–except for Capital–indicating a reduction in SRISK ranging approximately 0.3 to 1.5 US$ billions (see Table 8 in Appendix 7.2).[21]

5.1.2. Emerging Market Economies and the Effectiveness of IT

We examine whether the enhanced effectiveness of macroprudential tools under IT regimes holds within EMEs. Rather than assessing the overall impact of such tools in EMEs–a subject well documented in the literature (e.g., Akinci & Olmstead-Rumsey, 2018; Cerutti et al., 2017a; Fendoğlu, 2017; Zhou & Chen, 2024)–we focus on whether IT frameworks continue to amplify policy effectiveness in environments with greater structural constraints.

As noted by Cerutti et al. (2017a), EMEs are more vulnerable to external shocks, including volatile capital flows and terms-of-trade fluctuations, and often face less liberalized financial systems, deeper market imperfections, and weaker institutional capacity. While our empirical model includes several of these features as control variables, such conditions may nonetheless undermine the effectiveness or consistency of macroprudential implementation.

[21] The exclusion of the IT interaction term may introduce omitted variable bias, potentially affecting the estimated coefficients. Therefore, the coefficients in this specification should be interpreted with caution.

This is particularly relevant given our findings suggest that IT regimes may strengthen macroprudential effectiveness partly via improved institutional quality and governance. Where such institutional underpinnings are weaker, these benefits may be reduced, limiting the traction of macroprudential policy (IMF, 2013; Lim et al., 2011).

To test whether the structural features of EMEs weaken the macroprudential gains from IT, we estimate an extended version of the benchmark model that interacts each macroprudential instrument with both the monetary policy regime and the country grouping, according to the IMF's World Economic Outlook (WEO) classification (see Table 5). The model specification is:

$$\begin{aligned}\text{SRISK}_{i,k,t} = a \cdot \text{SRISK}_{i,k,t-1} + b \cdot \text{MEC}_{k,t-1} + c \cdot \text{BSC}_{i,k,t-1} + d \cdot \text{IT}_{k,t-1} + \\ \delta \cdot \text{MPI}_{tool,k,t-1} + \beta \cdot \text{Tool}_{k,t-1} + \gamma \cdot \text{IT}_{tool,k,t-1} + \rho \cdot \text{EME\_IT}_{tool,k,t-1} + \psi_k + \mu_{i,k,t},\end{aligned} \tag{6}$$

where EME_IT_tool takes a non-zero value for EMEs that operate under IT regimes. This specification allows us to examine heterogeneity in the policy impact across different country groups.

Descriptive statistics for the full sample and the EME subsample under IT regimes are reported in Table 19 in the Online Appendix.[22] Some policy measures in this subsample–such as the CCyB–have limited annual data, so we refrain from drawing conclusions based on them.

The estimated coefficients retain the same sign as in the benchmark model, although the smaller sample size weakens statistical significance for some tools (see Table 8 in Appendix 7.2). The effect for emerging economies is somewhat mixed across different instruments. Regarding relative effectiveness, we find that the coefficient on the EME_IT interaction term is positive and significant for Capital, LVR, Tax, and RR, while it is negative and

[22]During the benchmark sample period, EMEs under IT registered 188 monthly macroprudential interventions, compared to 384 in the overall IT group (AEs and EMEs) and 578 in the full sample.

significant for LLP, Liquidity and LFX.

Regarding LFX instruments, Fendoğlu (2017) finds that FX-related tools are often ineffective in curbing the credit cycle in EMEs facing portfolio inflows, when operating under various monetary policy regimes. In contrast, our results show a significant negative coefficient for EMEs under IT, suggesting enhanced relative effectiveness in that context. These findings, however, should be interpreted with caution, as the coefficient on the IT interaction term is not statistically significant.

When summing the three coefficients associated with a specific tool (whenever statistically significant), we find that Liquidity reduce SRISK under the IT framework, whereas Capital, LVR, Tax, and RR appear to increase it. Notably, Liquidity shows a significant effect in reducing SRISK within the EME-IT group, whereas results for this tool are inconclusive in the benchmark specification for the full IT group. This is consistent with prior empirical evidence highlighting the effectiveness of such policies in these countries (Cerutti et al., 2017a).

When accounting for the aggregate macroprudential stance, the overall effect points to a reduction in SRISK for LVR and RR, an effect close to zero for Capital, and a positive impact for Tax. This suggests that while individual instruments may not suffice to reduce SRISK over a one-year horizon in EMEs, the combined use of certain tools contributes to systemic risk mitigation.

5.1.3. Systemic Risk Exposure Using LRMES

We re-estimate the benchmark model using LRMES–which captures exposure to market-wide distress–instead of SRISK, a measure of systemic contribution (see Section 3.1). This shift enables a cross-sectional assessment of macroprudential effectiveness.

Several tools show statistically significant coefficients, generally consistent in sign with SRISK results (see Table 9 in Appendix 7.2). The interaction with IT regimes is consistently negative, indicating that countries under IT frameworks are relatively more effective at containing systemic risk exposure, with the exception of Tax and RR, which show positive signs.

When considering the net effect of the broader macroprudential toolkit, we find that–when all coefficients are statistically significant–the policy stance is associated with an increase in LRMES. This result also holds when the IT interaction term is included. For this group, the overall effect on the LRMES following policy tightening ranges from 0.01 (Conservation) to 0.37 (CCyB), implying an increase of roughly 0.3% to 1% relative to the average LRMES of 37.9 (see Table 6).

These findings align with Meuleman & Vander Vennet (2020), who document that macroprudential tightening can raise ex-post MES, particularly for retail-oriented banks. The authors attribute this to unintended risk-shifting behaviors, including avoidance strategies, regulatory arbitrage, and portfolio reallocation, as banks facing tighter capital constraints may seek higher-yield, lower-regulation activities or shift risk across jurisdictions or business lines.

In contrast, results using SRISK as the outcome suggest that many macroprudential tools are relatively effective under IT regimes. As shown in Equation 1, SRISK is a function of LRMES; thus, even if banks engage in risk-shifting–raising LRMES through changes in asset composition–their systemic contribution may still decline due to deleveraging or higher capitalization. This indicates that macroprudential effectiveness in reducing systemic risk operates primarily through adjustments in banks' capital and liability structure, thereby affecting their systemic importance. While such changes may increase exposure to market-wide distress in the short term, the overall macroprudential policy stance can still reduce systemic risk over the one-year horizon following the intervention.

5.1.4. System-Wide Impact of Individual Bank Distress Using $\Delta CoVaR$

To capture the system-wide impact of individual bank distress, we employ ΔCoVaR. Unlike SRISK, which reflects banks' capital exposure to market tail events, ΔCoVaR captures how shocks originating in a single institution propagate to the broader financial sector. This measure enables us to assess whether macroprudential instruments and monetary policy frameworks affect their potential to propagate distress across the system.

Several tools show statistically significant coefficients, generally consistent in sign with those obtained when using SRISK as the dependent variable (see Table 9 in Appendix 7.2). The estimated coefficient on the interaction with IT regimes is generally negative, indicating that countries under IT frameworks are relatively more effective at containing the systemic impact of individual bank distress. The exceptions are Conservation, LoanR, LLP, and Liquidity, which display positive signs for the IT_Tool coefficient. However, when all three coefficients are statistically significant, their sum indicates that a tighter macroprudential stance is associated with a decrease in ΔCoVaR in IT countries, showing an overall effective impact for these countries. When the aggregate macroprudential policy effect is not considered, as with SRISK, Tax is the only measure associated with absolute effectiveness under IT frameworks, as indicated by the negative sum of the coefficients on Tool and IT_Tool.

While the overall macroprudential toolkit may raise risk exposure (LRMES) over a one-year horizon due to bank risk-shifting, we find that contributions to systemic risk can be mitigated under IT frameworks. In the case of SRISK, this mitigation operates through deleveraging and higher capitalization, whereas ΔCoVaR suggests that the reduction in banks' systemic importance works through improved market perceptions of their balance sheet structures.

5.1.5. Quarterly Frequency Estimation

To test whether the results hold over a shorter horizon, we re-estimate the benchmark model while maintaining its original structure, including four lags for both the autoregressive term and the macroprudential tools. Given that SRISK is forward-looking–reflecting expected distress over the next two quarters–macroprudential variables are lagged by two quarters to ensure exogeneity and mitigate reverse causality. The quarterly model is specified as follows:

$$
\begin{aligned}
\text{SRISK}_{i,k,t} = &\sum_{q=1}^{4} a_q \cdot \text{SRISK}_{i,k,t-q} + b \cdot \text{MEC}_{k,t-2} + c \cdot \text{BSC}_{i,k,t-2} + d \cdot \text{IT}_{k,t-2} \\
&+ \sum_{q=2}^{5} \delta_q \cdot \text{MPI}_{tool,k,t-q} + \sum_{q=2}^{5} \beta_q \cdot \text{Tool}_{k,t-q} + \sum_{q=2}^{5} \gamma_q \cdot \text{IT}_{tool,k,t-q} + \psi_k + \mu_{i,k,t}.
\end{aligned} \tag{7}
$$

Due to data limitations, we include only core macro-financial indicators available quarterly: the real effective exchange rate (FX), short-term interest rate (INT), global GDP, VIX, and the U.S. Federal Funds Rate (FFR). Some macroprudential tools are excluded due to sparse observations, and the estimation period is restricted to the post-GFC years, as extending the sample quarterly would leave more periods without interventions–especially compared to the annual frequency.

Quarterly results are summarized in Table 7, Appendix 7.2. Coefficients and standard errors are scaled to reflect the average one-year post-policy effect across four quarters as in Kuttner & Shim (2016). We find that some macroprudential tools with inconclusive effects in the benchmark model become statistically significant in the quarterly specification. This suggests that higher-frequency data improves identification, as their impact may be short-lived (one to two quarters) and dissipate within a year. This pattern applies to LTV, Liquidity, and RR.

While, in general, the signs of the estimated coefficients coincide with those in the benchmark specification, the quarterly results indicate that a larger set of tools are associated with an absolute reduction in SRISK under the IT framework. In particular, we observe that for individual tools such as LTV, LLP, and RR, the sum of the estimated coefficients on Tool and IT_Tool is negative, whereas in the annual specification only Tax yielded a negative effect. Furthermore, although LFX appears to increase SRISK under IT in the quarterly data, once the broader policy stance is taken into account, it contributes to mitigating SRISK, in line with our benchmark findings. In contrast, LoanR, which in the yearly specification displayed a positive IT interaction but still implied a reduction in SRISK once the full effect was aggregated, in the quarterly specification the aggregated effect turns positive. This indicates that the results on LoanR should be interpreted with caution.

5.2. Alternative Samples

As a robustness check, we first re-estimate the model using the full, unrestricted sample–including all banks and countries–removing the minimum three-bank-per-country requirement (see Table 5). We then construct two alternative samples based on the benchmark: one excluding the United States, and another restricted to the post-GFC period (2009–2018). These variations test the sensitivity of the results to sample size, the influence of a large systemic economy, and the post-GFC period, during which the macroprudential stance and institutional frameworks evolved significantly.[23]

No instances are found in which the sign of a coefficient changed across samples while remaining statistically significant (see Table 10 in Appendix 7.2). Notably, when restricting the sample to the post-GFC period, several tools that are not significant in the benchmark specification–such as LTV, Capital, and RR–significantly reduce SRISK under IT regimes.

6. Conclusion

This paper examines whether inflation targeting (IT) regimes enhance the effectiveness of macroprudential policies in reducing bank-level systemic risk. Using a panel of 47 countries from 2000 to 2018, we find that several macroprudential tools are relatively more effective under IT, particularly in reducing banks' contribution to systemic risk, as measured by SRISK (Acharya et al., 2017; Brownlees & Engle, 2017). Specifically, while the activation of macro-

[23] Beyond its relative size and representativeness in our banking sample, the United States is excluded due to potential ambiguity regarding partial IT characteristics with formal IT adoption. Although the United States is not officially classified as an IT country, the Federal Reserve has adopted many elements of such a framework. As noted by Hüpper & Kempa (2023), the numerical inflation objective announcement in 2012 was explicitly framed as a clarification–not a shift–in its longstanding strategy for achieving price stability.

prudential tools tends to raise SRISK–consistent with risk-shifting behavior documented by Meuleman & Vander Vennet (2020)–this adverse effect is partially offset under IT. This result holds across measures and specifications, including quarterly and alternative samples.

Two mechanisms appear central to this effect: greater policy credibility, which mitigates macroeconomic uncertainty, and increased monetary discretion, which facilitates coordination with financial stability goals. Even abstracting from the regime, we find that monetary and macroprudential policies are generally more effective in reducing systemic risk when they move in the same direction.

When accounting for the net effect between individual instruments and the overall macroprudential stance, under the IT framework, fewer tools exhibit significant effectiveness. Specifically, DSTI limits, CCyB, the conservation buffer, LVR limits, LLPs, LFX measures, and tax-based instruments are associated with statistically significant reductions in SRISK. These effects range from 0.07% to 2.49% of average SRISK. In contrast, when the IT-specific effect is not accounted for, CCyB, LLP, and LFX are associated with higher SRISK, consistent with prior literature on side effects like increased funding costs or pro-cyclical domestic currency exposures.

Some tools show limited effectiveness under IT. Loan restrictions appear less effective–possibly due to weaker monetary transmission when a large share of lending is at fixed rates–although we refrain from concluding that they are ineffective in this context. LTV limits are only effective in post-GFC samples, likely due to their sensitivity to interest rate dynamics. Liquidity and reserve requirements also reduce SRISK under IT, but only in quarterly specifications, suggesting they are better evaluated at higher frequencies.

The decline in SRISK and ΔCoVaR–despite higher LRMES–indicates that macroprudential policy reduces systemic risk primarily through balance sheet adjustments such as deleveraging and stronger capitalization, or even through market expectations of such adjustments, even if these changes temporarily raise banks' exposure to market-wide distress. Future research should examine how balance sheet adjustments and market perceptions jointly shape systemic risk, by decomposing measures such as SRISK into their underlying drivers.

Finally, for emerging markets we find only partial evidence that the IT-enhancing effect persists, as effectiveness varies across instruments. For instance, LVR and Tax do not appear to reduce SRISK for EMEs under IT–likely reflecting limited credibility and monetary independency–whereas Liquidity may exhibit an enhanced effect.

Overall, our findings highlight the importance of monetary and macroprudential coordination for financial stability, and provides empirical support for the view that IT regimes strengthen the effectiveness of macroprudential tools in reducing banks' contribution to systemic risk. Further research could explore, from a theoretical perspective, the channels through which monetary regimes shape macroprudential transmission.

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7. Appendix

7.1. Descriptive Tables

Table 3: Definitions of Macroprudential Policy Tools

Variable	Definition
Demand-based	
[1] DSTI	Limits to the debt-service-to-income ratio restrict the size of debt services relative to income (targeted at housing loans, consumer loans, and commercial real estate).
[2] LTV	Limits to the loan-to-value ratios, including those mostly targeted at housing loans, but also includes those targeted at automobile loans and commercial real estate loans.
Capital requirements	
[3] Capital	Bank capital requirements, including risk weights, systemic risk buffers, and minimum capital requirements. Subcategories: household (HH), corporate (Corp), and broad-based (Gen).
[4] CCyB	Requirement for banks to maintain the countercyclical capital buffer.
[5] Conservation	Requirements to maintain a capital conservation buffer, including Basel III standards.
[6] LVR	Limit on bank leverage based on capital over non-risk-weighted exposures.
Loan-supply-based	
[7] LCG	Limits on credit growth or volumes, by sector (HH or Gen), and penalties for excessive credit.
[8] LoanR	Loan restrictions, including limits and prohibitions based on loan or bank characteristics. Subcategory: HH or Corp.
[9] LLP	Loan loss provisions for macroprudential purposes (e.g., dynamic provisioning).
[10] LTD	Limits on loan-to-deposit ratio and penalties for high LTD.
[11] LFC	Limits on foreign currency lending, or FX loan rules and recommendations.
Liquidity requirements and other supply-based	
[12] Liquidity	Tools to reduce systemic liquidity and funding risk, such as LCR, NSFR, core funding ratios, and non-currency-specific debt restrictions.
[13] RR	Reserve requirements for macroprudential objectives, in domestic or FX currency.
[14] LFX	Limits on net/gross open FX positions, FX exposures/funding, or mismatch regulations.
[15] Tax	Taxes/levies on transactions, assets, or liabilities, including stamp duties and capital gains taxes.

Note: Own elaboration based on Alam et al. (2019).

Table 4: Data Source and Variable Description

Variable	Description	Source	Unit
Country-Specific Macroeconomic Controls			
GDP	Real GDP (annual growth)	WEO[a]	%
Savings	Gross domestic savings (percent of GDP)	WEO[a]	%
FX[g]	Exchange rates per US$ (yoy growth)	Bloomberg	%
INT[g]	Central bank policy rate (yoy difference)	BIS[b]	pp
CPI	Consumer price index (yoy growth)	WEO[c]	%
FD	Index of financial development	IMF[d]	Index
Kaopen	Capital account openness	Chinn-Ito[d]	Index
Global Macroeconomic Controls			
VIX[g]	U.S. CBOE Volatility Index (yoy average)	FRED	Index
Global.GDP[g]	Global real GDP (yoy growth)	WEO	%
FFR[g]	U.S. Fed's policy rate (yoy difference)	FRED[e]	pp
Bank-Specific Characteristics			
SIZE	Total assets	Orbis	ln US$ bn[f]
DEP	Total customer deposits	Orbis	ln US$ bn[f]
ROA	Pre-tax income to total assets	Orbis	%
NPL	Non-performing loans to total loans	Orbis	%
CAP	Equity to total assets	Orbis	%
LTA	Net loans to total assets	Orbis	%

Notes: Some data sources are country-specific. [a] Bloomberg is used for Korea and Taiwan; [b] Central Bank for Nigeria, Bloomberg for Taiwan and the United Arab Emirates, IMF for Kuwait, Morocco, Peru, Saudi Arabia, Singapore, Turkey, and Vietnam, OECD for Indonesia and Greece, and WEO for Japan; [c] Bloomberg for Taiwan and respective Central Banks for missing periods in Argentina and the United Arab Emirates; [d] Taiwan is not available in the database; [e] When the Fed's rate is constrained by the zero lower bound, the shadow short rate from Haver Analytics is used instead. [f] SIZE and DEP are expressed in natural logarithms of US$ billions. [g] Variables available at quarterly frequency include FX, INT, VIX, FFR, and Global.GDP. The quarterly exchange rate (FX) series is sourced from the IMF's nominal effective exchange rate, index (2010=100), weighted average. Global.GDP is taken from the IMF's Quarterly Gross Domestic Product (GDP) series in constant prices, seasonally adjusted, World Aggregate.

Table 5: Monetary Policy Regimes and Bank Representation Across Countries

n	IFSCode	Country	Economy	IT	ER	MA	OT	nbanks
1	213	Argentina	EME	2015–2018	1999–2007	2008–2014	-	3
2	193	Australia	AE	1999–2018	-	-	-	9
3	122	Austria	AE	2008–2018	1999–2007	-	-	5
4	419	Bahrain	EME	-	1999–2018	-	-	1
5	124	Belgium	AE	2008–2018	1999–2007	-	-	4
6	223	Brazil	EME	1999–2018	-	-	-	6
7	156	Canada	AE	1999–2018	-	-	-	9
8	228	Chile	EME	1999–2018	-	-	-	4
9	924	China	EME	-	1999–2018	2010–2013	-	32
10	233	Colombia	EME	1999–2018	-	-	-	4
11	960	Croatia	EME	-	2007–2018	-	1999–2006	2
12	423	Cyprus	AE	2008–2018	1999–2007	-	-	3
13	935	Czech Republic	AE	1999–2018	-	-	-	1
14	128	Denmark	AE	-	1999–2018	-	-	4
15	172	Finland	AE	2008–2018	1999–2007	-	-	3
16	132	France	AE	2008–2018	1999–2007	-	-	20
17	134	Germany	AE	2008–2018	1999–2007	-	-	14
18	174	Greece	AE	2008–2018	1999–2007	-	-	6
19	944	Hungary	EME	1999–2018	-	-	-	2
20	534	India	EME	2014–2018	-	-	1999–2013	39
21	536	Indonesia	EME	2005–2018	-	1999–2004	-	12
22	178	Ireland	AE	2008–2018	1999–2007	-	-	3
23	436	Israel	AE	1999–2018	-	-	-	3
24	136	Italy	AE	2008–2018	1999–2007	-	-	22
25	158	Japan	AE	2013–2018	-	-	1999–2012	41
26	439	Jordan	EME	-	1999–2018	-	-	4
27	916	Kazakhstan	EME	2015–2018	2007–2014	-	1999–2006	1
28	542	Korea	AE	2000–2018	-	-	1999–1999	15
29	443	Kuwait	EME	-	1999–2018	-	-	6
30	446	Lebanon	EME	-	1999–2018	-	-	1
31	548	Malaysia	EME	-	1999–2007	-	2008–2018	3
32	181	Malta	AE	2008–2018	1999–2007	-	-	2
33	684	Mauritius	EME	-	2006–2007	-	1999–2018	1
34	273	Mexico	EME	2001–2018	-	-	1999–2000	4
35	686	Morocco	EME	-	1999–2018	-	-	3
36	138	Netherlands	AE	2008–2018	1999–2007	-	-	5
37	694	Nigeria	EME	-	2006–2006	2008–2018	1999–2007	3
38	142	Norway	AE	2001–2018	1999–2000	-	-	5
39	564	Pakistan	EME	-	1999–2009	2011–2013	2010–2018	2
40	293	Peru	EME	2002–2018	1999–2001	-	-	3
41	566	Philippines	EME	1999–2018	-	-	-	6
42	964	Poland	EME	1999–2018	-	-	-	9
43	182	Portugal	AE	2008–2018	1999–2007	-	-	2
44	922	Russia	EME	2015–2018	2007–2010	-	1999–2014	3
45	456	Saudi Arabia	EME	-	1999–2018	-	-	10
46	576	Singapore	AE	-	2007–2018	-	1999–2006	5
47	961	Slovenia	AE	2008–2018	1999–2007	-	-	1
48	199	South Africa	EME	1999–2018	-	-	-	8
49	184	Spain	AE	2008–2018	1999–2007	-	-	7
50	144	Sweden	AE	1999–2018	-	-	-	6
51	146	Switzerland	AE	2009–2010	-	-	1999–2018	19
52	528	Taiwan	AE	-	1999–2014	-	2015–2018	23
53	578	Thailand	EME	2000–2018	1999–1999	-	-	6
54	186	Turkey	EME	2002–2018	1999–2001	-	-	17
55	926	Ukraine	EME	2016–2018	1999–2013	2010–2015	2009–2009	2
56	466	United Emirates	EME	-	1999–2018	-	-	7
57	112	United Kingdom	AE	1999–2018	-	-	-	19
58	111	United States	AE	-	-	-	1999–2018	91
59	582	Vietnam	EME	-	1999–2018	-	-	3

Note: Monetary policy regimes are based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). IT refers to inflation targeting regimes, ER to exchange rate anchor regimes, MA to monetary aggregate targeting, and OT where no explicit nominal anchor is specified or where the regime is unclassified. Economy classifications follow the October 2019 edition of the IMF's *World Economic Outlook* (WEO), where AE denotes Advanced Economies and EME denotes Emerging Market Economies. The table presents the full sample; the benchmark sample excludes countries with fewer than three banks.

Table 6: Descriptive Statistics

Variable	**ALL**					**IT**				
	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N
SRISK	64.782	210.525	0.000	2,015.247	1,904	70.032	211.109	0.000	1,997.571	1,180
LRMES	33.939	13.782	-15.873	84.469	3,861	37.887	12.682	-8.555	84.469	2,056
ΔCoVaR	3.181	2.278	-4.569	21.380	3,494	3.155	2.097	-4.018	11.705	1,832
GDP	2.776	2.576	-9.130	25.160	394	2.702	2.762	-9.130	25.160	252
Savings	25.702	9.908	-6.150	61.290	395	24.390	6.194	8.330	57.080	253
FX	-0.983	7.750	-50.559	23.290	370	-1.485	9.609	-50.559	21.676	253
INT	-1.203	113.390	-1,900.000	520.000	322	-1.820	128.215	-1,900.000	520.000	219
CPI	2.561	3.272	-2.100	42.800	395	2.769	3.437	-2.100	42.800	253
FD	67.468	23.841	0.000	97.671	387	67.062	18.582	29.040	96.916	253
kaopen	1.342	1.384	-1.920	2.330	19	1.282	1.390	-1.920	2.330	19
Global.GDP	3.553	0.508	-0.140	5.420	19	3.530	0.328	2.640	5.410	19
VIX	16.836	4.088	11.090	32.620	19	16.229	3.367	11.090	31.650	19
FFR	-35.662	97.316	-185.417	315.040	395	-52.757	85.207	-176.516	198.250	253
SIZE	3.686	1.719	-3.912	8.131	3,855	3.686	1.779	-3.912	7.969	2,052
DEP	2.878	1.940	-4.605	7.836	3,416	2.778	2.051	-4.605	7.435	1,809
ROA	1.609	3.690	-85.000	39.000	3,253	1.358	3.928	-85.000	39.000	1,647
NPL	3.559	6.677	0.000	79.000	2,968	4.830	8.052	0.000	72.000	1,619
CAP	13.505	14.403	-44.000	100.000	3,857	12.673	14.178	-44.000	100.000	2,054
LTA	52.280	24.076	0.000	99.000	3,622	53.671	23.859	0.000	97.000	1,943
MPI	11.769	19.898	-70.000	130.000	230	12.315	19.527	-70.000	90.000	156
MPI_index	0.121	0.350	-1.176	2.249	395	0.134	0.382	-1.176	2.249	253
DSTI	0.298	2.613	-10.000	10.000	25	0.092	2.745	-10.000	10.000	18
LTV	0.308	3.921	-20.000	20.000	52	0.540	4.013	-10.000	20.000	35
Capital	1.582	4.632	-10.000	30.000	59	1.333	4.810	-10.000	30.000	42
Capital_HH	0.378	3.123	-10.000	30.000	32	0.214	3.382	-10.000	30.000	26
Capital_Corp	0.233	1.593	-10.000	10.000	5	0.438	2.162	-10.000	10.000	5
Capital_Gen	1.191	3.806	-10.000	20.000	36	0.676	3.689	-10.000	20.000	18
CCyB	0.080	2.140	-10.000	20.000	11	0.131	2.898	-10.000	20.000	10
Conservation	1.935	4.217	-10.000	10.000	78	2.957	4.953	-10.000	10.000	59
LVR	0.992	2.990	0.000	10.000	26	0.778	2.680	0.000	10.000	18
LCG	0.003	0.702	-10.000	20.000	3	-0.034	0.583	-10.000	0.000	1
LCG_HH	-0.008	0.534	-10.000	10.000	2	-0.034	0.583	-10.000	0.000	1
LCG_Corp	0.010	0.322	0.000	10.000	1	0.000	0.000	0.000	0.000	0
LCG_Gen	0.003	0.702	-10.000	20.000	3	-0.034	0.583	-10.000	0.000	1
LoanR	0.549	2.685	0.000	30.000	24	0.705	2.561	0.000	10.000	18
LoanR_HH	0.479	2.566	0.000	30.000	19	0.584	2.345	0.000	10.000	14
LoanR_Corp	0.124	1.108	0.000	10.000	6	0.233	1.510	0.000	10.000	6
LLP	0.298	2.363	-10.000	20.000	19	0.156	2.568	-10.000	20.000	11
LTD	-0.016	1.115	-10.000	10.000	5	0.044	1.266	-10.000	10.000	3
LFC	0.093	0.961	0.000	10.000	5	0.156	1.238	0.000	10.000	4
Liquidity	3.191	5.493	-10.000	30.000	99	3.234	5.786	-10.000	30.000	65
RR	-0.440	7.057	-70.000	60.000	38	-0.559	5.712	-70.000	50.000	26
LFX	0.155	2.004	-10.000	20.000	16	0.263	2.634	-10.000	20.000	12
Tax	0.329	2.337	-10.000	30.000	19	0.443	2.710	-10.000	30.000	12

Note: Descriptive statistics are reported for our benchmark sample of 47 countries. The left panel shows the full sample; the right panel covers inflation targeting (IT) countries. Macroprudential instruments are classified as household (HH), corporate (Corp), or general (Gen). Each MPI index is computed at the country level as the average of monthly interventions (+1 for tightening, –1 for loosening), multiplied by 12 and 10 to reflect a 10-year frequency. Observations (N) are at the bank, country or global level and exclude zero entries. Savings equal GDP minus total consumption (WEO) and may be negative. Extreme interest rates values corresponds to the 2000–2001 crisis in Turkey.

7.2. Robustness and Extension Results

Table 7: Robustness checks: Quarterly Frequency

	MPI_Tool	Tool	IT_Tool
DSTI	-0.362**	1.116	-0.695
LTV	-0.703***	0.215***	-0.341***
Capital	-0.110	0.070	-0.034
Conservation	-0.066	-0.008	-0.477***
LVR	-0.591***	-0.163	-1.112***
LoanR	-0.432***	-0.507***	1.376***
LLP	-0.108	0.366**	-0.488***
Liquidity	-0.350***	0.482***	-0.433***
LFX	-0.644**	-2.236***	2.616***
RR	-0.168**	0.460***	-0.518***

Note: *p<0.1; **p<0.05; ***p<0.01. The table reports estimated coefficients, following the quarterly specification (Equation 7). Estimates are obtained using two-step GMM regressions based on the post-GFC sample starting in 2009 Q1. Coefficients and standard errors are scaled using the delta method to represent the four-quarters average post-policy impact on SRISK, six-month after the macroprudential intervention.

Table 8: Robustness checks: Alternative specifications (1/2)

	Dependent Variable: **SRISK**								
	Benchmark			Baseline		Advanced vs Emerging Economies			
	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	$Tool$	MPI_{Tool}	Tool	IT_{Tool}	EME_IT_{Tool}
DSTI	-0.992***	0.946***	-0.928***	-1.531***	0.681***	-1.738***	0.655***	-0.221	0.164
LTV	-0.658***	0.464***	-0.156	-0.802***	0.450***	-0.774***	0.706***	-0.269	-0.069
Capital	-0.234	0.588***	-0.362***	-0.308*	0.357***	-0.329*	0.653***	-0.864***	0.597***
Capital_HH	-1.193***	0.515***	-0.202	-1.125***	0.407***	-1.082***	0.553***	-0.328	0.235
Capital_Gen	0.286	0.679***	-0.531***	-0.084	0.441***	-0.129	0.872***	-1.476*	0.983
CCyB	-2.248***	5.721**	-4.129*	-2.278***	1.644***	-1.346***	2.070	-0.813	-0.562*
Conservation	-1.108***	1.048***	-0.997***	-1.158***	0.313***	-0.980***	1.344***	-1.208***	-0.152
LVR	-1.250***	1.230***	-0.529**	-1.682***	0.994***	-1.506***	1.438***	-1.443***	1.036***
LoanR	-1.011***	0.458***	0.403*	-1.048***	0.661***	-0.657**	0.962***	-0.172	-0.691
LoanR_HH	-1.170***	0.488***	0.634***	-1.306***	0.797***	-0.645*	0.988***	-0.009	-0.920
LLP	-0.900***	1.471***	-1.121***	-1.097***	0.269	-1.189***	1.685***	3.005	-4.511**
Liquidity	-0.437***	-0.158	0.529***	-0.768***	0.385***	-0.096	-0.583***	1.460***	-0.932***
LFX	-1.563***	1.995***	-1.410*	-1.602***	0.723***	-1.786***	2.630***	3.405	-5.544**
Tax	-1.431***	0.819***	-1.126***	-1.344***	-0.120	-1.403***	1.055***	-1.286***	2.504**
RR	-0.349***	0.103***	-0.111	-0.393***	0.108***	-0.294***	0.133***	-1.189***	1.203***

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports coefficients from a two-step GMM estimation, where the dependent variable — either SRISK, LRMES or ΔCoVaR— is regressed on each macroprudential policy tool separately. *Benchmark* follows Equation 5; *Baseline* follows Equation 4; and *Advanced vs. Emerging Economies* follows Equation 6. Results are based on a benchmark sample of 47 countries. Descriptive statistics are reported in Table 6. Coefficients are scaled using the delta method and represent the one-year ahead average post-policy impact on SRISK.

Table 9: Robustness checks: Alternative specifications (2/2)

	Dependent Variable: **SRISK**			Dependent Variable: **LRMES**			Dependent Variable: **ΔCoVaR**		
	Benchmark			Benchmark			Benchmark		
	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	Tool	IT_{Tool}
DSTI	-0.992***	0.946***	-0.928***	-0.128***	0.438***	-0.006	-0.019***	0.028***	-0.017***
LTV	-0.658***	0.464***	-0.156	-0.066***	0.223***	-0.022**	-0.023***	0.006***	0.001
Capital	-0.234	0.588***	-0.362***	-0.038***	0.254***	-0.106***	-0.008***	0.014***	-0.007***
Capital_HH	-1.193***	0.515***	-0.202	-0.085***	0.334***	0.005	-0.017***	0.025***	-0.020***
Capital_Gen	0.286	0.679***	-0.531***	-0.101***	0.422***	-0.185***	-0.012***	0.019***	-0.007***
CCyB	-2.248***	5.721**	-4.129*	-0.252***	0.546***	0.078*	-0.051***	0.034***	0.002
Conservation	-1.108***	1.048***	-0.997***	-0.024	0.233***	-0.198***	-0.028***	0.002**	0.008***
LVR	-1.250***	1.230***	-0.529**	-0.243***	0.603***	-0.209***	-0.033***	0.035***	-0.021***
LoanR	-1.011***	0.458***	0.403*	-0.123***	0.318***	-0.115***	-0.040***	0.008***	0.013***
LoanR_HH	-1.170***	0.488***	0.634***	-0.141***	0.341***	-0.138***	-0.044***	0.010***	0.016***
LLP	-0.900***	1.471***	-1.121***	-0.165***	0.327***	0.009	-0.032***	-0.001	0.017***
Liquidity	-0.437***	-0.158	0.529***	-0.035***	0.171***	-0.100***	-0.017***	0.003***	0.009***
LFX	-1.563***	1.995***	-1.410*	-0.285***	0.413***	0.091**	-0.039***	0.043***	-0.026***
Tax	-1.431***	0.819***	-1.126***	-0.155***	0.367***	0.025***	-0.051***	0.009***	-0.013***
RR	-0.349***	0.103***	-0.111	-0.082***	0.048***	0.055***	-0.011***	0.003***	-0.000

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports coefficients from a two-step GMM estimation, where the dependent variable — either SRISK, LRMES or ΔCoVaR— is regressed on each macroprudential policy tool separately. *Benchmark* follows Equation 5; *Baseline* follows Equation 4; and *Advanced vs. Emerging Economies* follows Equation 6. Results are based on a benchmark sample of 47 countries. Descriptive statistics are reported in Table 6. Coefficients are scaled using the delta method and represent the one-year ahead average post-policy impact on SRISK.

Table 10: Robustness Checks: Alternative Samples

	Dependent Variable: *SRISK*											
	Benchmark Sample			Full Sample			Excl. USA			Post-GFC		
	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	Tool	IT_{Tool}	MPI_{Tool}	Tool	IT_{Tool}
DSTI	-0.992***	0.946***	-0.928***	-1.223***	1.032***	-0.995***	-0.355	-0.164	0.236	-1.713***	0.760***	-0.245
LTV	-0.658***	0.464***	-0.156	-0.707***	0.484***	-0.110	0.030	0.197*	-0.105	-0.461***	0.575***	-0.338**
Capital	-0.234	0.588***	-0.362***	-0.270*	0.604***	-0.359***	-0.110	0.392***	-0.289***	-0.457**	0.489***	-0.248**
Capital_HH	-1.193***	0.515***	-0.202	-1.217***	0.624***	-0.318**	-0.377*	0.103	0.039	-1.310***	0.573***	-0.274
Capital_Gen	0.286	0.679***	-0.531***	0.197	0.695***	-0.519***	0.493	0.336*	-0.452***	-0.395	0.700***	-0.330**
CCyB	-2.248***	5.721**	-4.129*	-2.143***	4.179*	-2.658	-0.631	4.991**	-4.190*	-1.787***	7.810***	-6.208**
Conservation	-1.108***	1.048***	-0.997***	-1.199***	1.115***	-0.995***	-0.676***	0.883***	-1.079***	-1.417***	1.066***	-1.109***
LVR	-1.250***	1.230***	-0.529**	-1.591***	1.398***	-0.495**	-0.215	0.452	-0.550	-1.779***	1.070***	-0.218
LoanR	-1.011***	0.458***	0.403*	-1.220***	0.557***	0.412	-0.338	0.031	0.623***	-0.502	0.520***	0.040
LoanR_HH	-1.170***	0.488***	0.634***	-1.111***	0.536***	0.649***	-0.517	-0.051	0.949***	-0.652	0.445***	0.385
LLP	-0.900***	1.471***	-1.121***	-1.033***	1.302***	-0.899***	0.125	0.621***	-0.802***	-1.272***	0.980***	-0.624**
Liquidity	-0.437***	-0.158	0.529***	-0.464***	-0.136	0.534***	-0.144	0.269*	-0.086	-0.563***	0.220	0.265
LFX	-1.563***	1.995***	-1.410*	-1.698***	1.880***	-1.267*	-0.386	0.008	-0.035	-1.753***	1.770**	-1.214
Tax	-1.431***	0.819***	-1.126***	-1.638***	0.876***	-1.079***	-0.646*	0.450**	-1.091***	-1.503***	0.811***	-1.147***
RR	-0.349***	0.103***	-0.111	-0.332***	0.112***	-0.155**	-0.220***	-0.050	-0.146*	-0.287***	0.205***	-0.296***

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports coefficients from a two-step GMM estimation of Equation 5, with *SRISK* as the dependent variable. Estimates use four samples: the benchmark sample of 47 countries (see Table 6); the full sample of 59 countries; a restricted sample excluding the United States; and a post-GFC sample starting in 2009. Coefficients and standard errors are scaled using the delta method to reflect the one-year-ahead average post-policy impact on SRISK.

8. Online Appendix

8.1. Distribution of SRISK During Macroprudential Tightening

This appendix examines the distribution of SRISK levels at the time of macroprudential policy tightening. Figure 4 displays the number of monthly observations across strictly positive SRISK levels (standardized at the country level, using within-country means and standard deviations).[24]

The distribution of SRISK around macroprudential interventions reveals differences across monetary regimes. Without implying causality, interventions under inflation targeting appear more responsive to elevated systemic risk, as tightening tends to cluster at higher SRISK levels. In contrast, interventions in non-IT regimes are more evenly distributed, suggesting less risk-sensitive deployment. This may reflect a stronger financial stability focus in IT frameworks, while in non-IT settings, macroprudential tools may also serve broader goals, such as supporting monetary or exchange rate policy.

There are some exceptions. In IT countries, tools like DSTI caps and the conservation buffer follow a more structural pattern, with interventions occurring at moderate SRISK levels. By contrast, the CCyB is more likely to be activated when systemic risk is already high, suggesting a degree of procyclicality in capital buffer adjustments, as policymakers respond to realized risk.

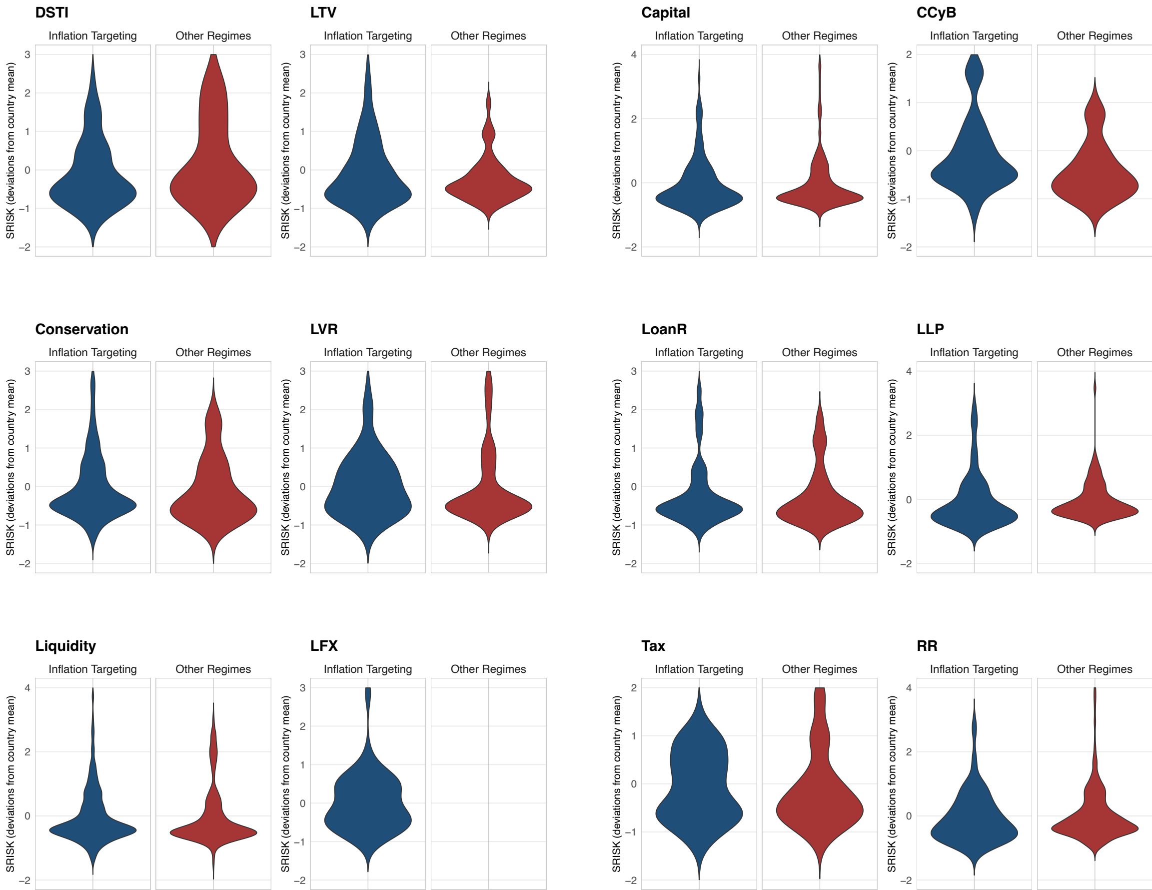
8.2. Full Regression Results

8.2.1. Benchmark

This appendix reports the complete set of estimated coefficients from our benchmark specification. The regressions follow a two-step GMM specification following Equation 5. Results

[24] We consider the full sample of countries in Table 5. In contrast to Figure 2, which reports all interventions (loosening and tightening) regardless of SRISK, here we include only those occurring at strictly positive SRISK levels and instrument tightening. As a result, some SRISK values exhibit very few interventions, such as the LFX under non-IT regimes, which is omitted from the plot due to scale constraints.

Figure 4: SRISK at the Time of Macroprudential Tightening



Notes: The figure shows the distribution of monthly SRISK values (standardized at the country level) at the time of macroprudential policy tightening. Panels distinguish between IT (blue) and non-IT (red). Observations outside the 1st and 99th percentiles are excluded to reduce the influence of extreme values.

are based on the benchmark sample of 47 countries, with descriptive statistics provided in Table 6.

Table 11: Benchmark: Demand-Based Measures

	Dependent variable: SRISK	
	DSTI	LTV
$SRISK_{t-1}$	0.64***	0.64***
GDP_{t-1}	−0.07	−0.26
$Savings_{t-1}$	0.67**	0.79**
FX_{t-1}	0.07**	0.12***
INT_{t-1}	0.01***	0.01***
CPI_{t-1}	0.83***	0.42*
FD_{t-1}	1.85***	2.02***
$kaopen_{t-1}$	−5.94**	−11.30***
$Global.GDP_{t-1}$	10.31***	10.07***
VIX_{t-1}	1.92***	1.86***
FFR_{t-1}	−0.02***	−0.02***
$SIZE_{t-1}$	50.29***	47.18***
DEP_{t-1}	−13.57***	−14.28***
ROA_{t-1}	−0.48***	−0.51***
NPL_{t-1}	0.16	0.09
CAP_{t-1}	0.13	0.09
LTA_{t-1}	−0.85***	−0.66***
IT_{t-1}	−25.17***	−23.94***
MPI_DSTI_{t-1}	−1.21***	
$DSTI_{t-1}$	1.16***	
$IT.DSTI_{t-1}$	−1.13***	
MPI_LTV_{t-1}		−0.80***
LTV_{t-1}		0.57***
$IT.LTV_{t-1}$		−0.19
Observations	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately, following Equation 5. The results are based on the benchmark sample of 47 countries; descriptive statistics are provided in Table 6.

Table 12: Benchmark: Capital Requirements

	Dependent variable: SRISK					
	Capital	Capital_HH	Capital_Gen	CCyB	Conservation	LVR
$SRISK_{t-1}$	0.63***	0.64***	0.63***	0.64***	0.63***	0.63***
GDP_{t-1}	−0.16	−0.13	−0.09	−0.38	−0.25	−0.22
$Savings_{t-1}$	1.18***	1.09***	0.96***	0.69*	0.76**	0.91***
FX_{t-1}	0.13***	0.08**	0.10***	0.10***	0.18***	0.08**
INT_{t-1}	0.01***	0.01***	0.01***	0.01***	0.02***	0.01***
CPI_{t-1}	1.04***	0.99***	1.18***	0.99***	0.84***	1.01***
FD_{t-1}	1.98***	1.42***	1.62***	2.08***	2.44***	1.64***
$kaopen_{t-1}$	−7.68**	−14.87***	−12.14***	−21.07***	−12.50***	−13.97***
$Global.GDP_{t-1}$	10.57***	10.01***	11.42***	10.17***	10.40***	10.67***
VIX_{t-1}	1.96***	1.97***	1.98***	2.03***	1.94***	1.97***
FFR_{t-1}	−0.02***	−0.02***	−0.01***	−0.02***	−0.02***	−0.02***
$SIZE_{t-1}$	51.20***	51.27***	51.23***	54.53***	49.25***	50.03***
DEP_{t-1}	−13.66***	−13.50***	−11.52***	−14.73***	−11.93***	−12.02***
ROA_{t-1}	−0.62***	−0.46***	−0.66***	−0.48***	−0.47***	−0.29*
NPL_{t-1}	0.15	0.09	0.29	0.13	0.00	0.24
CAP_{t-1}	0.20	0.24	0.45**	0.24	0.27	0.32*
LTA_{t-1}	−0.83***	−0.55***	−0.62***	−0.85***	−0.76***	−0.61***
IT_{t-1}	−20.22***	−24.95***	−19.85***	−28.54***	−21.97***	−26.45***
$MPI\_Capital_{t-1}$	−0.29					
$Capital_{t-1}$	0.72***					
$IT.Capital_{t-1}$	−0.44***					
$MPI\_Capital\_HH_{t-1}$		−1.46***				
$Capital\_HH_{t-1}$		0.63***				
$IT.Capital\_HH_{t-1}$		−0.25				
$MPI\_Capital\_Gen_{t-1}$			0.35			
$Capital\_Gen_{t-1}$			0.83***			
$IT.Capital\_Gen_{t-1}$			−0.65***			
MPI_CCyB_{t-1}				−2.74***		
$CCyB_{t-1}$				6.98**		
$IT.CCyB_{t-1}$				−5.04*		
$MPI\_Conservation_{t-1}$					−1.36***	
$Conservation_{t-1}$					1.28***	
$IT.Conservation_{t-1}$					−1.22***	
MPI_LVR_{t-1}						−1.53***
LVR_{t-1}						1.51***
$IT.LVR_{t-1}$						−0.65**
Observations	536	536	536	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately, following Equation 5. The results are based on the benchmark sample of 47 countries; descriptive statistics are provided in Table 6.

Table 13: Benchmark: Loan-Supply-Based Measures

	Dependent variable: SRISK		
	LoanR	LoanR_HH	LLP
$SRISK_{t-1}$	0.64***	0.64***	0.64***
GDP_{t-1}	−0.11	−0.16	−0.08
$Savings_{t-1}$	1.21***	1.26***	0.38
FX_{t-1}	0.08**	0.07**	0.12***
INT_{t-1}	0.01***	0.01***	0.01**
CPI_{t-1}	0.88***	0.86***	0.34
FD_{t-1}	2.19***	1.98***	1.95***
$kaopen_{t-1}$	−15.16***	−15.21***	−19.02***
$Global.GDP_{t-1}$	9.65***	9.96***	10.17***
VIX_{t-1}	1.92***	1.98***	1.76***
FFR_{t-1}	−0.02***	−0.02***	−0.02***
$SIZE_{t-1}$	49.98***	50.50***	46.14***
DEP_{t-1}	−16.77***	−16.63***	−14.71***
ROA_{t-1}	−0.52***	−0.50***	−0.43**
NPL_{t-1}	0.13	0.09	0.06
CAP_{t-1}	0.18	0.19	−0.08
LTA_{t-1}	−0.53***	−0.56***	−0.88***
IT_{t-1}	−26.32***	−25.71***	−25.93***
MPI_LoanR_{t-1}	−1.23***		
$LoanR_{t-1}$	0.56***		
$IT.LoanR_{t-1}$	0.49*		
$MPI\_LoanR\_HH_{t-1}$		−1.43***	
$LoanR\_HH_{t-1}$		0.59***	
$IT.LoanR\_HH_{t-1}$		0.77***	
MPI_LLP_{t-1}			−1.10***
LLP_{t-1}			1.79***
$IT.LLP_{t-1}$			−1.37***
Observations	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately, following Equation 5. The results are based on the benchmark sample of 47 countries; descriptive statistics are provided in Table 6.

Table 14: Benchmark: Liquidity Requirements and Other Supply–Based Measures

	Dependent variable: SRISK			
	Liquidity	LFX	Tax	RR
$SRISK_{t-1}$	0.64***	0.64***	0.64***	0.63***
GDP_{t-1}	−0.22	−0.20	−0.20	−0.01
$Savings_{t-1}$	1.28***	0.55	0.98***	1.14***
FX_{t-1}	0.07**	0.08**	0.13***	0.10***
INT_{t-1}	0.02***	0.02***	0.02***	0.02***
CPI_{t-1}	1.22***	0.97***	0.99***	0.94***
FD_{t-1}	1.72***	2.09***	2.42***	1.92***
$kaopen_{t-1}$	−10.01***	−20.33***	−11.81***	−15.29***
$Global.GDP_{t-1}$	10.46***	10.25***	10.04***	10.18***
VIX_{t-1}	2.19***	1.95***	1.99***	2.11***
FFR_{t-1}	−0.03***	−0.02***	−0.02***	−0.02***
$SIZE_{t-1}$	55.78***	50.52***	48.94***	51.24***
DEP_{t-1}	−10.64***	−14.17***	−11.53***	−13.75***
ROA_{t-1}	−0.49***	−0.51***	−0.56***	−0.33*
NPL_{t-1}	0.14	0.14	0.20	0.04
CAP_{t-1}	0.58***	0.02	0.29	0.32*
LTA_{t-1}	−0.59***	−0.92***	−0.70***	−0.64***
IT_{t-1}	−22.89***	−27.53***	−27.36***	−18.66***
$MPI\_Liquidity_{t-1}$	−0.53***			
$Liquidity_{t-1}$	−0.19			
$IT.Liquidity_{t-1}$	0.65***			
MPI_LFX_{t-1}		−1.91***		
LFX_{t-1}		2.44***		
$IT.LFX_{t-1}$		−1.72*		
MPI_Tax_{t-1}			−1.75***	
Tax_{t-1}			1.00***	
$IT.Tax_{t-1}$			−1.37***	
MPI_RR_{t-1}				−0.43***
RR_{t-1}				0.13***
$IT.RR_{t-1}$				−0.14
Observations	536	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately, following Equation 5. The results are based on the benchmark sample of 47 countries; descriptive statistics are provided in Table 6.

8.2.2. Policy Coordination

This appendix reports the complete set of estimated coefficients from the analysis of monetary and macroprudential policy coordination. As discussed in Section 4.2, the regressions follow a two-step GMM specification analogous to Equation 5, but replace the IT interaction term (IT_{Tool}) with the coordination term ($INT \times \text{Tool}$). Results are based on the benchmark sample of 47 countries, with descriptive statistics provided in Table 6.

Table 15: Policy Coordination: Demand-Based Measures

	Dependent variable: SRISK	
	DSTI	LTV
$SRISK_{t-1}$	0.63***	0.64***
GDP_{t-1}	0.06	−0.16
$Savings_{t-1}$	0.70**	1.01***
FX_{t-1}	0.14***	0.07**
INT_{t-1}	0.02***	0.02***
CPI_{t-1}	1.26***	1.07***
FD_{t-1}	2.07***	2.40***
$kaopen_{t-1}$	−13.01***	−12.16***
$Global.GDP_{t-1}$	10.01***	9.69***
VIX_{t-1}	1.96***	1.95***
FFR_{t-1}	−0.02***	−0.02***
$SIZE_{t-1}$	52.12***	51.31***
DEP_{t-1}	−12.88***	−14.93***
ROA_{t-1}	−0.36**	−0.47***
NPL_{t-1}	0.10	0.11
CAP_{t-1}	0.21	0.09
LTA_{t-1}	−0.76***	−0.78***
IT_{t-1}	−26.96***	−25.69***
MPI_DSTI_{t-1}	−1.66***	
$DSTI_{t-1}$	0.83***	
$INT \times \text{DSTI}_{t-1}$	−2.76***	
MPI_LTV_{t-1}		−0.94***
LTV_{t-1}		0.55***
$INT \times \text{LTV}_{t-1}$		−0.08
Observations	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately. Estimates follow a specification analogous to Equation 5. The results are based on the benchmark sample of 47 countries. Descriptive statistics are provided in Table 6.

Table 16: Policy Coordination: Capital Requirements

	Dependent variable: SRISK					
	Capital	Capital_HH	Capital_Gen	CCyB	Conservation	LVR
$SRISK_{t-1}$	0.63***	0.64***	0.63***	0.64***	0.63***	0.64***
GDP_{t-1}	−0.12	−0.23	0.17	−0.43	0.21	−0.39
$Savings_{t-1}$	1.29***	1.22***	0.59*	1.03**	0.82**	1.26***
FX_{t-1}	0.10***	0.07**	0.09***	0.23***	0.14***	0.10***
INT_{t-1}	0.02***	0.01***	0.01***	0.02***	0.02***	0.01***
CPI_{t-1}	1.21***	0.93***	0.88***	0.72**	1.36***	1.07***
FD_{t-1}	2.02***	1.72***	1.65***	1.85***	2.03***	1.73***
$kaopen_{t-1}$	−8.21**	−16.57***	−13.41***	−26.95***	−18.63***	−10.36**
$Global.GDP_{t-1}$	10.75***	10.01***	10.69***	10.79***	9.38***	10.40***
VIX_{t-1}	2.06***	2.00***	1.92***	2.22***	2.14***	1.92***
FFR_{t-1}	−0.02***	−0.03***	−0.01***	−0.03***	−0.03***	−0.02***
$SIZE_{t-1}$	48.62***	52.07***	50.17***	50.77***	53.27***	51.09***
DEP_{t-1}	−11.26***	−13.43***	−13.05***	−12.86***	−14.41***	−14.84***
ROA_{t-1}	−0.46***	−0.35**	−0.57***	−0.53***	−0.36**	−0.46***
NPL_{t-1}	0.04	0.03	0.18	0.14	0.09	0.15
CAP_{t-1}	0.40**	0.23	0.35*	0.15	0.30	0.11
LTA_{t-1}	−0.67***	−0.46**	−0.69***	−0.71***	−0.66***	−0.70***
IT_{t-1}	−22.21***	−26.82***	−23.26***	−23.22***	−22.81***	−25.29***
$MPI\_Capital_{t-1}$	−0.34*					
$Capital_{t-1}$	0.44***					
$INT \times \text{Capital}_{t-1}$	−0.41***					
$MPI\_Capital\_HH_{t-1}$		−1.44***				
$Capital\_HH_{t-1}$		0.47***				
$INT \times \text{Capital\_HH}_{t-1}$		0.13				
$MPI\_Capital\_Gen_{t-1}$			−0.12			
$Capital\_Gen_{t-1}$			0.57***			
$INT \times \text{Capital\_Gen}_{t-1}$			−0.04			
MPI_CCyB_{t-1}				−1.61***		
$CCyB_{t-1}$				3.82***		
$INT \times \text{CCyB}_{t-1}$				−2.58***		
$MPI\_Conservation_{t-1}$					−0.75***	
$Conservation_{t-1}$					0.78***	
$INT \times \text{Conservation}_{t-1}$					−1.12***	
MPI_LVR_{t-1}						−2.56***
LVR_{t-1}						1.11***
$INT \times \text{LVR}_{t-1}$						0.55***
Observations	536	536	536	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately. Estimates follow a specification analogous to Equation 5. The results are based on the benchmark sample of 47 countries. Descriptive statistics are provided in Table 6.

Table 17: Policy Coordination: Loan-Supply-Based Measures

	Dependent variable: SRISK		
	LoanR	LoanR_HH	LLP
$SRISK_{t-1}$	0.64***	0.64***	0.64***
GDP_{t-1}	−0.13	−0.31	0.04
$Savings_{t-1}$	1.11***	1.35***	0.23
FX_{t-1}	0.11***	0.11***	0.11***
INT_{t-1}	0.02***	0.02***	0.01***
CPI_{t-1}	0.95***	0.87***	0.71**
FD_{t-1}	2.39***	2.44***	2.02***
$kaopen_{t-1}$	−19.26***	−18.31***	−20.53***
$Global.GDP_{t-1}$	9.87***	10.33***	9.77***
VIX_{t-1}	1.96***	2.02***	1.81***
FFR_{t-1}	−0.02***	−0.02***	−0.02***
$SIZE_{t-1}$	52.15***	51.69***	47.03***
DEP_{t-1}	−15.83***	−15.49***	−14.44***
ROA_{t-1}	−0.55***	−0.59***	−0.51***
NPL_{t-1}	0.16	0.19	0.10
CAP_{t-1}	0.26	0.22	0.05
LTA_{t-1}	−0.74***	−0.78***	−0.76***
IT_{t-1}	−26.15***	−25.38***	−26.73***
MPI_LoanR_{t-1}	−1.41***		
$LoanR_{t-1}$	0.82***		
$INTxLoanR_{t-1}$	0.01		
$MPI\_LoanR\_HH_{t-1}$		−1.67***	
$LoanR\_HH_{t-1}$		0.97***	
$INTxLoanR\_HH_{t-1}$		0.01	
MPI_LLP_{t-1}			−1.34***
LLP_{t-1}			0.32*
$INTxLLP_{t-1}$			0.02
Observations	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately. Estimates follow a specification analogous to Equation 5. The results are based on the benchmark sample of 47 countries. Descriptive statistics are provided in Table 6.

Table 18: Policy Coordination: Liquidity Requirements and Other Supply–Based Measures

	Dependent variable: SRISK			
	Liquidity	LFX	Tax	RR
$SRISK_{t-1}$	0.64***	0.64***	0.64***	0.63***
GDP_{t-1}	0.02	−0.25	−0.39	0.10
$Savings_{t-1}$	0.72**	0.53	1.44***	1.26***
FX_{t-1}	0.14***	0.09**	0.15***	0.00
INT_{t-1}	0.01***	0.02***	0.02***	0.00
CPI_{t-1}	1.03***	0.93***	1.10***	1.08***
FD_{t-1}	2.28***	2.16***	2.04***	1.84***
$kaopen_{t-1}$	−12.46***	−19.15***	−12.52***	−11.25***
$Global.GDP_{t-1}$	9.43***	10.24***	10.52***	8.30***
VIX_{t-1}	1.68***	1.95***	2.12***	1.93***
FFR_{t-1}	−0.02***	−0.02***	−0.02***	−0.02***
$SIZE_{t-1}$	42.77***	50.84***	53.79***	50.54***
DEP_{t-1}	−12.16***	−13.87***	−13.75***	−13.37***
ROA_{t-1}	−0.38**	−0.49***	−0.54***	−0.31*
NPL_{t-1}	0.12	0.16	0.15	0.03
CAP_{t-1}	0.05	0.08	0.26	0.27
LTA_{t-1}	−0.55***	−0.87***	−0.79***	−0.53***
IT_{t-1}	−26.63***	−27.52***	−24.29***	−39.91***
$MPI\_Liquidity_{t-1}$	−0.90***			
$Liquidity_{t-1}$	0.20*			
$INTxLiquidity_{t-1}$	0.55***			
MPI_LFX_{t-1}		−1.89***		
LFX_{t-1}		0.87***		
$INTxLFX_{t-1}$		−0.89		
MPI_Tax_{t-1}			−1.57***	
Tax_{t-1}			0.44*	
$INTxTax_{t-1}$			−2.41***	
MPI_RR_{t-1}				−0.43***
RR_{t-1}				−0.09**
$INTxRR_{t-1}$				0.75***
Observations	536	536	536	536

Notes: *p<0.1; **p<0.05; ***p<0.01. Each column reports the coefficients obtained from a two-step GMM estimation, where the dependent variable, *SRISK*, is regressed on each macroprudential policy tool separately. Estimates follow a specification analogous to Equation 5. The results are based on the benchmark sample of 47 countries. Descriptive statistics are provided in Table 6.

8.3. Results on Macroeconomic and Bank Controls

The signs of bank-specific and macroeconomic control variables are consistent across all 15 regression models and generally align with expectations. For clarity, we present only the estimated coefficients from the benchmark specification (see Tables 11–14); however, the direction of significant coefficients remains robust across alternative specifications and samples summarized in Tables 7, 8, 9 and 10 in Appendix 7.2.[25]

Given the cross-border interconnectedness of open economies through financial and trade channels, our results show that systemic risk is shaped by global monetary policy, investor risk aversion, exchange rate dynamics, and global GDP growth. First, tighter U.S. monetary policy appears to mitigate systemic risk, as indicated by the significantly negative coefficients on the lagged federal funds rate (FFR) in most regressions–possibly due to reduced capital inflows that restrain excessive credit growth in recipient economies. Second, global risk sentiment, proxied by the VIX, consistently has a significant positive effect on systemic risk, suggesting that heightened market volatility amplifies financial fragility among banks. Third, global GDP growth also shows a positive and significant relationship with systemic risk, potentially reflecting the effects of buoyant investment sentiment and increased credit demand that may amplify the systemic relevance and exposure of banks.[26] Lastly, the coefficient on exchange rate growth (FX) tends to be statistically insignificant across specifications. One possible explanation is that the adverse balance sheet effects of depreciation–via increased foreign currency liabilities (Choi & Cook, 2004)–is offset in some cases by gains in export competitiveness and the valuation of foreign-currency-denominated bank assets.

Regarding domestic factors, savings-to-GDP (Savings), policy interest rates (INT), infla-

[25] Complete regression outputs are available from the authors upon request.

[26] The destabilizing effect of global GDP growth on systemic risk is consistent with the "volatility paradox" (Brunnermeier & Sannikov, 2014) and the notion of intertemporal trade-offs between short-term stimulus and long-term vulnerabilities (Adrian et al., 2022).

tion (CPI), the financial development (FD) index, and the capital account openness (kaopen) index are found to have statistically significant effects on systemic risk–though not in all regressions–with estimated coefficients consistently display the same sign. In contrast, GDP growth does not appear to have a statistically significant effect, although its negative sign suggests it may contribute to reducing systemic risk, as stronger economic activity improves the repayment capacity of borrowers. However, when GDP growth is driven by credit expansions, systemic risk may rise over time (Adrian et al., 2022), potentially offsetting these gains.

Both policy interest rates and inflation are associated with higher levels of systemic risk, possibly reflecting tighter domestic financial conditions and increased debt service burdens. Higher interest rates can raise funding costs for banks and reduce asset valuations, while elevated inflation may erode real incomes and repayment capacity, thereby increasing credit risk across the financial system (Laseen et al., 2017). The index of financial development (FD) is associated with financial deepening and broader access to financial services, which increases systemic risk by expanding the scale of financial intermediation. A plausible reason is that faster growth of financial institutions is accompanied by greater risk-taking and high leverage, particularly when the financial system is poorly regulated and supervised, see Sahay et al. (2015). Similarly, the deposit-to-GDP ratio is found to increase SRISK significantly in some regressions. When deposit funding increases rapidly and dominates banks' liabilities, financial institutions may become more vulnerable to deposit withdrawals, particularly under systemic stress, as highlighted by Demirgüç-Kunt & Huizinga (2010), highlighting that higher deposit funding ratios are associated with increased bank risk, as measured by lower Z-scores.

By contrast, greater capital account openness appears to reduce systemic risk, possibly by enabling broader cross-border asset diversification and enhancing the resilience of bank balance sheets to domestic shocks, consistent with the findings of Zhou & Chen (2024). In more open economies, banks may gain access to a wider set of investment opportunities, including safer or less correlated assets abroad, thereby mitigating concentration risk and improving overall systemic stability (Forbes & Warnock, 2012; Beck et al., 2006).

Turning to bank-specific factors, three variables are found to be significant. First, bank size is positively and significantly associated with systemic risk, consistent with the idea that larger banks have greater systemic importance and may engage in riskier behavior due to moral hazard concerns (e.g., Laeven et al., 2016). Second, systemic risk is significantly lower for banks with a higher share of customer deposits, which represent core funding–typically more stable than non-core sources such as wholesale funding–and support liquidity management. Third, the loan-to-total-assets (LTA) ratio consistently exhibits a negative and statistically significant coefficient, likely reflecting a more traditional, loan-oriented banking model that is less dependent on volatile market-based investment activities.

The remaining bank-level controls–including return on assets (ROA), equity-to-assets ratio (CAP), and non-performing loan (NPL) ratio–yield statistically insignificant coefficients, a result similar to that of Meuleman & Vander Vennet (2020). This lack of significance may reflect offsetting mechanisms. For instance, higher profitability could indicate both higher risk-taking (raising systemic vulnerability) and stronger shock absorption capacity (lowering systemic risk). The NPL ratio, while not statistically significant, it displays the expected positive sign, consistent with its interpretation as a measure of credit risk associated to banking crises (e.g., Kaminsky & Reinhart, 1999, Nkusu, 2011).

8.4. List of Banks in the Benchmark Sample

This list of bank names corresponds to the benchmark sample, and reflects the institutional names as reported in the V-Lab database.

1. 3i Group PLC
2. 77 Bank Ltd/The
3. Aareal Bank AG
4. ABC arbitrage
5. Aberdeen Asset Management PLC
6. ABG Sundal Collier Holding ASA
7. ABN AMRO Group NV
8. Absa Group Ltd
9. Abu Dhabi Commercial Bank PJSC
10. Acom Co Ltd
11. Adira Dinamika Multi Finance Tbk PT
12. AEON Financial Service Co Ltd
13. AEON Thana Sinsap Thailand PCL
14. Affiliated Managers Group Inc
15. African Phoenix Investments Ltd
16. Agricultural Bank of China Ltd
17. AIB Group PLC
18. Akbank TAS
19. Al Rajhi Bank
20. Alandsbanken Abp
21. Alawwal Bank
22. Albaraka Turk Katilim Bankasi AS
23. Alinma Bank
24. Ally Financial Inc
25. Alpha Bank AE
26. Altarea SCA
27. American Capital Ltd
28. Ameriprise Financial Inc
29. Andhra Bank

30. Aozora Bank Ltd
31. Apollo Investment Corp
32. Arab Bank PLC
33. Arab National Bank
34. Associated Banc-Corp
35. Asya Katilim Bankasi AS
36. Attica Bank SA
37. Attijariwafa Bank
38. Australia & New Zealand Banking Group Ltd
39. Avanza Bank Holding AB
40. Axis Bank Ltd
41. Azimut Holding SpA
42. Banca Carige SpA
43. Banca Generali SpA
44. Banca Intermobiliare SpA
45. Banca Monte dei Paschi di Siena SpA
46. Banca Popolare di Milano Scarl
47. Banca Popolare di Sondrio SCARL
48. Banca Profilo SpA
49. Banco BBVA Argentina SA
50. Banco BBVA Peru SA
51. Banco Bilbao Vizcaya Argentaria SA
52. Banco BPM SpA
53. Banco Bradesco SA
54. Banco de Bogota SA
55. Banco de Chile
56. Banco de Credito del Peru
57. Banco de Credito e Inversiones
58. Banco de Sabadell SA
59. Banco di Desio e della Brianza SpA
60. Banco di Sardegna SpA
61. Banco do Brasil SA
62. Banco do Estado do Rio Grande do Sul SA
63. Banco Macro SA
64. Banco Popular Espanol SA
65. Banco Santander Brasil SA
66. Banco Santander Chile
67. Banco Santander Mexico SA Institucion de Banca Multiple Grupo Financiero Santand
68. Banco Santander SA
69. BanColombia SA
70. Bank BPH SA
71. Bank BTPN Tbk PT
72. Bank Central Asia Tbk PT
73. Bank CIMB Niaga Tbk PT
74. Bank Cler AG
75. Bank Danamon Indonesia Tbk PT
76. Bank for Foreign Trade of Vietnam JSC
77. Bank Handlowy w Warszawie SA
78. Bank Hapoalim BM
79. Bank Mandiri Persero Tbk PT
80. Bank Maybank Indonesia Tbk PT
81. Bank Millennium SA
82. Bank Negara Indonesia Persero Tbk PT
83. Bank of Africa
84. Bank of America Corp
85. Bank of Ayudhya PCL
86. Bank of Baroda
87. Bank of Beijing Co Ltd
88. Bank of China Ltd
89. Bank of Communications Co Ltd
90. Bank of Cyprus Plc
91. Bank of Hangzhou Co Ltd
92. Bank of Hawaii Corp
93. Bank of Ireland Group PLC
94. Bank of Jiangsu Co Ltd
95. Bank of Jinzhou Co Ltd
96. Bank of Montreal
97. Bank of New York Mellon Corp/The
98. Bank of Nova Scotia/The
99. Bank of Queensland Ltd
100. Bank of the Philippine Islands
101. Bank of Tianjin Co Ltd
102. Bank of Yokohama Ltd/The
103. Bank Otkritie Financial Corp PJSC
104. Bank OZK
105. Bank Pan Indonesia Tbk PT
106. Bank Pekao SA
107. Bank Rakyat Indonesia Persero Tbk PT
108. Bank Sarasin & Cie AG
109. Bank Tabungan Negara Persero Tbk PT
110. Bankia SA
111. Bankinter SA
112. BankUnited Inc
113. Banque Cantonale de Geneve
114. Banque Cantonale Vaudoise
115. Banque Centrale Populaire
116. Banque Saudi Fransi
117. Barclays PLC
118. Basler Kantonalbank
119. BDO Unibank Inc
120. Bendigo & Adelaide Bank Ltd
121. Berlin-Hannoversche Hypothekenbank AG
122. Berner Kantonalbank AG
123. BFI Finance Indonesia Tbk PT
124. BGC Partners Inc
125. BKS Bank AG
126. BlackRock Inc
127. Blackstone Group LP/The
128. BM Bank JSC
129. BNK Financial Group Inc
130. BNP Paribas SA
131. BOK Financial Corp
132. Boubyan Bank KSC
133. Boursorama
134. BPER Banca
135. Brewin Dolphin Holdings PLC
136. Burgan Bank
137. Caisse Regionale de Credit Agricole Mutuel Alpes Provence*
138. Caisse Regionale de Credit Agricole Mutuel d'Ille-et-Vilaine*
139. Caisse Regionale de Credit Agricole Mutuel de la Touraine et du Poitou*
140. Caisse Regionale de Credit Agricole Mutuel de Normandie-Seine*
141. Caisse Regionale de Credit Agricole Mutuel de Paris et d'Ile-de-France*
142. Caisse Regionale de Credit Agricole Mutuel Nord de France*
143. CaixaBank SA
144. Canadian Imperial Bank of Commerce/Canada
145. Canadian Western Bank
146. Canara Bank
147. Capital One Financial Corp
148. Capitec Bank Holdings Ltd
149. Capitol Federal Financial Inc
150. Cathay Financial Holding Co Ltd
151. CETIP SA - Mercados Organizados
152. Challenger Ltd/Australia
153. Chang Hwa Commercial Bank Ltd
154. Changjiang Securities Co Ltd
155. Charles Schwab Corp/The
156. Chiba Bank Ltd/The
157. China Banking Corp
158. China CITIC Bank Corp Ltd
159. China Construction Bank Corp
160. China Development Financial Holding Corp
161. China International Capital Corp Ltd
162. China Merchants Bank Co Ltd
163. China Zheshang Bank Co Ltd
164. Chugoku Bank Ltd/The
165. CIC
166. CIT Group Inc
167. CITIC Securities Co Ltd
168. Citigroup Inc
169. Citizens Financial Group Inc
170. City National Corp/CA
171. City Union Bank Ltd
172. Close Brothers Group PLC
173. CME Group Inc/IL
174. COL Financial Group Inc
175. Comdirect Bank AG
176. Comerica Inc
177. Commerce Bancshares Inc/MO
178. Commerzbank AG
179. Commonwealth Bank Of Australia
180. Compass Bancshares

181. Concordia Financial Group Ltd
182. Corp Financiera Colombiana SA
183. Countrywide Financial
184. Credit Agricole Atlantique Vendee*
185. Credit Agricole du Morbihan*
186. Credit Agricole Loire Haute-Loire*
187. Credit Agricole Sud Rhone Alpes*
188. Credit Saison Co Ltd
189. Credit Suisse Group AG
190. Credito Bergamasco SpA
191. Credito Emiliano SpA
192. Credito Valtellinese SpA
193. CTBC Financial Holding Co Ltd
194. Cullen/Frost Bankers Inc
195. Cyprus Popular Bank PCL
196. Daiwa Securities Group Inc
197. Danske Bank A/S
198. DBS Group Holdings Ltd
199. DCB Bank Ltd
200. DeA Capital SpA
201. Delta Lloyd NV
202. Dena Bank
203. Denizbank AS
204. Deutsche Bank AG
205. Deutsche Boerse AG
206. Deutsche Postbank AG
207. Dexia SA
208. DGB Financial Group Inc
209. Dhanlaxmi Bank Ltd
210. Discover Financial Services
211. DNB ASA
212. Dubai Financial Market PJSC
213. Dubai Islamic Bank PJSC
214. Dundee Corp
215. DVB Bank SE
216. E*TRADE Financial Corp
217. E.Sun Financial Holding Co Ltd
218. East West Bancorp Inc
219. Edmond de Rothschild Suisse SA
220. EFG International AG
221. Emirates NBD PJSC
222. EnTie Commercial Bank Co Ltd
223. Erste Group Bank AG
224. Eurobank Ergasias Services and Holdings SA
225. Everbright Securities Co Ltd
226. EXOR NV
227. Far Eastern International Bank
228. FBN Holdings PLC
229. Federal Bank Ltd
230. Fifth Third Bancorp
231. Financiere de Tubize SA
232. FinecoBank Banca Fineco SpA
233. First American Financial Corp
234. First Citizens BancShares Inc/NC
235. First Financial Holding Co Ltd
236. First Gulf Bank PJSC
237. First Hawaiian Inc
238. First Horizon National Corp
239. First Niagara Financial Group Inc
240. First Republic Bank/CA
241. FirstRand Ltd
242. FNB Corp/PA
243. Fonciere De Paris SIIC
244. Founder Securities Co Ltd
245. Franklin Resources Inc
246. Fubon Financial Holding Co Ltd
247. Fukuoka Financial Group Inc
248. Fulton Financial Corp
249. Gentera SAB de CV
250. Getin Holding SA
251. Getin Noble Bank SA
252. Goldman Sachs Group Inc/The
253. GRENKE AG
254. Groupe Bruxelles Lambert SA
255. Grupo Aval Acciones y Valores SA
256. Grupo Financiero Banorte SAB de CV
257. Grupo Financiero Galicia Sa
258. Grupo Financiero Inbursa SAB de CV
259. Guanghui Energy Co Ltd
260. Guaranty Trust Bank PLC
261. Gulf Bank KSC
262. Gunma Bank Ltd/The
263. GuocoLand Ltd
264. Guoyuan Securities Co Ltd
265. Hachijuni Bank Ltd/The
266. Haci Omer Sabanci Holding AS
267. Haitong Securities Co Ltd
268. Hana Financial Group Inc
269. Hancock Whitney Corp
270. HDFC Bank Ltd
271. Hellenic Bank PLC
272. Hiroshima Bank Ltd/The
273. Hitachi Capital Corp
274. Hokuhoku Financial Group Inc
275. Home Capital Group Inc
276. Hong Leong Bank Bhd
277. Hong Leong Financial Group Bhd
278. Housing Bank For Trade And Finance (The)
279. HQ AB
280. HSBC Holdings PLC
281. HSBC Trinkaus & Burkhardt AG
282. Hua Nan Financial Holdings Co Ltd
283. Huatai Securities Co Ltd
284. Hudson City Bancorp Inc
285. Huishang Bank Corp Ltd
286. Huntington Bancshares Inc/OH
287. IBERIABANK Corp
288. ICICI Bank Ltd
289. IDBI Bank Ltd
290. IDFC Ltd
291. IFCI Ltd
292. IGM Financial Inc
293. IKB Deutsche Industriebank AG
294. Immigon Portfolioabbau AG
295. Indian Bank
296. Indian Overseas Bank
297. IndusInd Bank Ltd
298. Industrial Bank Co Ltd
299. Industrial Bank of Korea
300. Industrial Securities Co Ltd
301. ING Bank Slaski SA
302. ING Groep NV
303. ING Vysya Bank Ltd
304. Intermediate Capital Group PLC
305. International Personal Finance PLC
306. Investec Ltd
307. Investec PLC
308. Investors Bancorp Inc
309. Israel Discount Bank Ltd
310. Itau CorpBanca
311. Itau Unibanco Holding SA
312. Iyo Bank Ltd/The
313. Jammu & Kashmir Bank Ltd/The
314. Japan Post Bank Co Ltd
315. Jiangsu Changshu Rural Commercial Bank Co., Ltd.
316. Jordan Kuwait Bank
317. Joyo Bank Ltd/The
318. JPMorgan Chase & Co
319. Julius Baer Group Ltd
320. Jyske Bank A/S
321. Karnataka Bank Ltd/The
322. Karur Vysya Bank Ltd/The
323. Kasikornbank PCL
324. KB Financial Group Inc
325. KB Insurance Co Ltd
326. KBC Groep NV
327. KeyCorp
328. KGI Bank
329. KGI Securities Co Ltd
330. King's Town Bank Co Ltd
331. KIWOOM Securities Co Ltd
332. KOC Holding AS
333. Korea Investment Holdings Co Ltd
334. Kotak Mahindra Bank Ltd
335. Krung Thai Bank PCL
336. Kuwait Finance House
337. Kuwait Projects Co Holding KSCP
338. Lakshmi Vilas Bank Ltd/The
339. Landesbank Berlin Holding AG
340. Legg Mason Inc
341. LIC Housing Finance Ltd
342. Lloyds Banking Group PLC
343. Luzerner Kantonalbank AG
344. M&T Bank Corp
345. Macquarie Group Ltd

346. Mahindra & Mahindra Financial Services Ltd
347. Man Group PLC
348. Marfin Investment Group Holdings SA
349. Marsh & McLennan Cos Inc
350. Matsui Securities Co Ltd
351. Maybank Kim Eng Securities Thailand PCL
352. Mebuki Financial Group Inc
353. Mediobanca SpA
354. Mega Financial Holding Co Ltd
355. Metro Bank PLC
356. Metropolitan Bank & Trust Co
357. Mirae Asset Daewoo Co Ltd
358. Mitsubishi Estate Co Ltd
359. Mitsubishi UFJ Financial Group Inc
360. Mizrahi Tefahot Bank Ltd
361. Mizuho Financial Group Inc
362. Mizuho Trust & Banking Co Ltd
363. Morgan Stanley
364. National Australia Bank Ltd
365. National Bank of Canada
366. National Bank of Greece SA
367. National Bank of Kuwait
368. National Bank of Ras Al-Khaimah PSC/The
369. National City Corporation
370. National Commercial Bank
371. Natwest Group PLC
372. Nedbank Group Ltd
373. New York Community Bancorp Inc
374. NH Investment & Securities Co Ltd
375. Nishi-Nippon City Bank Ltd/The
376. Nomura Holdings Inc
377. Nordea Bank Abp
378. Nordnet AB
379. Northeast Securities Co Ltd
380. Northern Trust Corp
381. Oberbank AG
382. Oldenburgische Landesbank AG
383. Oriental Bank of Commerce
384. ORIX Corp
385. Oversea-Chinese Banking Corp Ltd
386. PacWest Bancorp
387. Paragon Banking Group PLC
388. Pargesa Holding SA
389. People's United Financial Inc
390. Permanent TSB Group Holdings PLC
391. Ping An Bank Co Ltd
392. Pinnacle Financial Partners Inc
393. Piraeus Bank SA
394. PNC Financial Services Group Inc/The
395. Pohjola Bank Oyj
396. Postal Savings Bank of China Co Ltd
397. Poste Italiane SpA
398. Power Finance Corp Ltd
399. Powszechny Zaklad Ubezpieczen SA
400. Principal Financial Group Inc
401. Prosperity Bancshares Inc
402. Provident Financial PLC
403. Punjab & Sind Bank
404. Punjab National Bank
405. QNB Finansbank AS
406. Raiffeisen Bank International AG
407. Rathbone Brothers PLC
408. Raymond James Financial Inc
409. Regions Financial Corp
410. Reliance Capital Ltd
411. Resona Holdings Inc
412. RHB Bank Bhd
413. Ringkjoebing Landbobank A/S
414. Riyad Bank
415. RMB Holdings Ltd
416. Rosbank PJSC
417. Rothschild & Co
418. Royal Bank of Canada
419. Samba Financial Group
420. Samsung Card Co Ltd
421. Samsung Securities Co Ltd
422. Santander Bank Polska SA
423. Sapporo Hokuyo Holdings Inc
424. Saudi British Bank/The
425. Saudi Investment Bank/The
426. SBI Holdings Inc/Japan
427. Schroders PLC
428. Scotiabank Peru SA
429. Security Bank Corp
430. SEI Investments Co
431. Sekerbank TAS
432. Senshu Ikeda Holdings Inc
433. Seven Bank Ltd
434. Shanghai Commercial & Savings Bank Ltd/The
435. Shanxi Securities Co Ltd
436. Shiga Bank Ltd/The
437. Shin Kong Financial Holding Co Ltd
438. Shinhan Financial Group Co Ltd
439. Shinkin Central Bank
440. Shinsei Bank Ltd
441. Shizuoka Bank Ltd/The
442. Shriram Transport Finance Co Ltd
443. Signature Bank/New York NY
444. Sinolink Securities Co Ltd
445. SinoPac Financial Holdings Co Ltd
446. Sinpas Gayrimenkul Yatirim Ortakligi AS
447. Skandinaviska Enskilda Banken AB
448. SLM Corp
449. Societe Generale SA
450. Societe Immobiliere de Location pour l'Industrie et le Commerce
451. South Indian Bank Ltd/The
452. Southwest Securities Co Ltd
453. SpareBank 1 SMN
454. SpareBank 1 SR-Bank ASA
455. SRH NV
456. SSI Securities Corp
457. Standard Bank Group Ltd
458. Standard Chartered PLC
459. State Bank of Bikaner & Jaipur
460. State Bank Of India
461. State Bank of Mysore
462. State Bank of Travancore
463. State Street Corp
464. Sterling Bancorp/DE
465. Stifel Financial Corp
466. Storebrand ASA
467. Sumitomo Mitsui Financial Group Inc
468. Suncorp Group Ltd
469. SunTrust Banks Inc
470. Suruga Bank Ltd
471. SVB Financial Group
472. Svenska Handelsbanken AB
473. Swedbank AB
474. Swiss Life Holding AG
475. Swissquote Group Holding SA
476. Sydbank A/S
477. Synovus Financial Corp
478. T Rowe Price Group Inc
479. Ta Chong Bank Ltd
480. Taishin Financial Holding Co Ltd
481. Taiwan Business Bank
482. Taiwan Cooperative Bank
483. TCF Financial Corp
484. TD Ameritrade Holding Corp
485. Texas Capital Bancshares Inc
486. TFS Financial Corp
487. TMB Bank PCL
488. Tokyo Century Corp
489. TP ICAP PLC
490. Truist Financial Corp
491. Turk Ekonomi Bankasi AS
492. Turkiye Garanti Bankasi AS
493. Turkiye Halk Bankasi AS
494. Turkiye Is Bankasi
495. Turkiye Kalkinma Bankasi AS
496. Turkiye Sinai Kalkinma Bankasi AS
497. Turkiye Vakiflar Bankasi Tao
498. UBS Group AG
499. UCO Bank
500. UMB Financial Corp
501. Umpqua Holdings Corp
502. UniCredit SpA
503. Union Bank Of Taiwan
504. Union Bank/Jordan
505. Union Financiere de France BQE SA
506. Union National Bank PJSC

507. Unione di Banche Italiane SpA
508. United Bankshares Inc/WV
509. United Overseas Bank Ltd
510. UOB-Kay Hian Holdings Ltd
511. Valiant Holding AG
512. Valley National Bancorp
513. Van Lanschot Kempen NV
514. Vietnam Joint Stock Commercial Bank for Industry and Trade
515. Vijaya Bank
516. Visa Inc
517. Vontobel Holding AG
518. VZ Holding AG
519. Wachovia Bank
520. Washington Federal Inc
521. Webster Financial Corp
522. Wells Fargo & Co
523. Western Alliance Bancorp
524. Westpac Banking Corp
525. Wintrust Financial Corp
526. Woori Bank
527. Wuestenrot & Wuerttembergische AG
528. Yamaguchi Financial Group Inc
529. Yapi Kredi Finansal Kiralama AO
530. Yes Bank Ltd
531. Yuanta Financial Holding Co Ltd
532. Yuanta Securities Korea Co Ltd
533. Zenith Bank PLC
534. Zhongyuan Bank Co Ltd
535. Zions Bancorporation
536. Zuger Kantonalbank AG

8.5. Descriptive Statistics Emerging Market Economies under IT regime

Table 19: Descriptive Statistics – EMEs Under IT

Variable	ALL					EME_IT				
	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N
SRISK	64.782	210.525	0.000	2,015.247	1,904	9.293	34.377	0.000	361.904	814
LRMES	33.939	13.782	-15.873	84.469	3,861	36.187	10.997	4.113	61.863	2,383
ΔCoVaR	3.181	2.278	-4.569	21.380	3,494	2.946	2.004	-4.018	11.705	695
GDP	2.776	2.576	-9.130	25.160	394	4.812	2.722	-3.550	11.110	328
savings	25.702	9.908	-6.150	61.290	395	25.773	5.701	15.210	35.520	328
FX	-0.983	7.750	-50.559	23.290	370	-5.198	10.370	-50.559	21.676	328
INT	-1.203	113.390	-1,900.000	520.000	322	-23.392	205.289	-1,900.000	520.000	294
CPI	2.561	3.272	-2.100	42.800	395	5.293	4.458	-0.900	42.800	328
FD	67.468	23.841	0.000	97.671	387	46.506	10.055	29.040	75.304	328
kaopen	1.342	1.384	-1.920	2.330	19	-0.329	0.950	-1.920	2.330	68
Global.GDP	3.553	0.508	-0.140	5.420	19	3.525	0.332	2.640	5.410	68
VIX	16.836	4.088	11.090	32.620	19	16.237	3.351	11.090	31.650	68
FFR	-35.662	97.316	-185.417	315.040	395	-56.046	84.790	-176.516	198.250	328
SIZE	3.686	1.719	-3.912	8.131	3,855	3.200	1.361	-2.996	6.321	2,383
DEP	2.878	1.940	-4.605	7.836	3,416	2.606	1.462	-4.605	6.029	2,151
ROA	1.609	3.690	-85.000	39.000	3,253	2.153	2.896	-21.000	23.000	2,244
NPL	3.559	6.677	0.000	79.000	2,968	4.338	4.707	0.000	52.000	2,071
CAP	13.505	14.403	-44.000	100.000	3,857	13.048	11.465	-44.000	100.000	2,383
LTA	52.280	24.076	0.000	99.000	3,622	61.072	15.887	0.000	97.000	2,359
MPI	11.769	19.898	-70.000	130.000	230	13.783	22.729	-70.000	90.000	98
MPI_index	0.121	0.350	-1.176	2.249	395	0.223	0.485	-1.176	2.014	328
DSTI	0.298	2.613	-10.000	10.000	25	-0.393	2.777	-10.000	10.000	3
LTV	0.308	3.921	-20.000	20.000	52	0.236	4.573	-10.000	10.000	14
Capital	1.582	4.632	-10.000	30.000	59	2.291	6.526	-10.000	30.000	24
Capital_HH	0.378	3.123	-10.000	30.000	32	-0.170	4.386	-10.000	30.000	10
Capital_Corp	0.233	1.593	-10.000	10.000	5	0.942	3.140	-10.000	10.000	1
Capital_Gen	1.191	3.806	-10.000	20.000	36	1.505	5.698	-10.000	20.000	13
CCyB	0.080	2.140	-10.000	20.000	11	-0.497	2.175	-10.000	0.000	1
Conservation	1.935	4.217	-10.000	10.000	78	3.220	4.675	0.000	10.000	20
LVR	0.992	2.990	0.000	10.000	26	1.217	3.272	0.000	10.000	8
LCG	0.003	0.702	-10.000	20.000	3	-0.092	0.953	-10.000	0.000	1
LCG_HH	-0.008	0.534	-10.000	10.000	2	-0.092	0.953	-10.000	0.000	1
LCG_Corp	0.010	0.322	0.000	10.000	1	0.000	0.000	0.000	0.000	0
LCG_Gen	0.003	0.702	-10.000	20.000	3	-0.092	0.953	-10.000	0.000	1
LoanR	0.549	2.685	0.000	30.000	24	0.654	2.475	0.000	10.000	4
LoanR_HH	0.479	2.566	0.000	30.000	19	0.654	2.475	0.000	10.000	4
LoanR_Corp	0.124	1.108	0.000	10.000	6	0.301	1.710	0.000	10.000	2
LLP	0.298	2.363	-10.000	20.000	19	-0.026	3.656	-10.000	20.000	6
LTD	-0.016	1.115	-10.000	10.000	5	0.118	2.076	-10.000	10.000	3
LFC	0.093	0.961	0.000	10.000	5	0.288	1.673	0.000	10.000	1
Liquidity	3.191	5.493	-10.000	30.000	99	3.717	7.117	-10.000	30.000	33
RR	-0.440	7.057	-70.000	60.000	38	-0.524	8.867	-70.000	50.000	25
LFX	0.155	2.004	-10.000	20.000	16	0.550	4.123	-10.000	20.000	7
Tax	0.329	2.337	-10.000	30.000	19	-0.026	1.024	-10.000	10.000	6

Note: Descriptive statistics are reported for our benchmark sample of 47 countries. The left panel shows the full sample; the right panel covers inflation targeting (IT) countries. Macroprudential instruments are classified as household (HH), corporate (Corp), or general (Gen). Each MPI index is computed at the country level as the average of monthly interventions (+1 for tightening, –1 for loosening), multiplied by 12 and 10 to reflect a 10-year frequency. Observations (N) are at the bank, country or global level and exclude zero entries. Savings equal GDP minus total consumption (WEO) and may be negative. Extreme interest rate values correspond to the 2000–2001 crisis in Turkey.