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CAPITAL FLOW SUDDEN STOPS, FINANCIAL CRISES AND THE ROLE OF MACROPRUDENTIAL POLICY: GLOBAL EVIDENCE

The paper investigates the relationship between sudden stops in capital flows and financial crises, and whether capital flow management measures, particularly macroprudential policy activations, contain such risks. Using a global panel on advanced and emerging economies from 1984 to 2019, findings indicate that sudden stops, particularly in debt-generating flows, significantly increase the likelihood of crises. While sudden stops in cross-border bank flows and portfolio debt flows have a marginally higher impact on banking crises, currency crises are largely driven by sudden stops in portfolio flows. Furthermore, certain heterogeneity is observed across world economies; emerging market economies are more prone to currency crises, whereas banking crises occur regardless of development level. However, macroprudential policy tightening in either systemic or cyclical categories tends to mitigate risks associated with cross-border bank flows and banking crises, whereas central bank independence alleviates risks associated with currency crises. Overall, the paper's findings emphasise the destabilising role of international capital flow volatility globally and its implications for systemic vulnerability build-up that needs to be addressed via pre-emptive macroprudential policy activations.

Keywords: *banking crisis, currency crisis, emerging economies, spillovers, macroprudential policy, vulnerabilities*

JEL:E58, G01, F32

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INTRODUCTION. In a 2012 seminal contribution, Obstfeld (2012) questioned the relevance of the current account balance (the counterpart of net capital flows) as a broad-based indicator of existing financial vulnerabilities, arguing that “global imbalances are financed by ... gross financial flows ... much larger than the current account gaps”. Hence, sudden stops (SSs) in capital flows have emerged as a core element of the financial crisis literature due to their wide implications on international financial stability.

Sudden stop (SS) episodes lead to sharp output contractions, credit crunches and currency depreciations, revealing the existing financial system fragilities and increasing policy trade-offs, often culminating in banking and currency crises. Despite a wide array of literature on determinants of sudden stops and financial crises, existing studies focus on single dimensions of such vulnerabilities. This paper offers a unified framework offering evidence from global data by evaluating the transmission mechanisms through which financial crises occur, particularly amidst heightened capital inflows episodes. Utilizing panel data from 1984 to 2019 across 57 countries from different world regions, the paper contributes to the literature in a few distinct ways. First, it provides a comprehensive empirical study on the complex relationship between sudden stops and financial crises. Second, the paper disaggregates SSs in gross capital flows episodes across categories to offer insights on the heterogeneous effects deriving from portfolio, portfolio debt, portfolio equity, cross-border bank flows, and total flows. Furthermore, the effectiveness of macroprudential policies and their subcategories is studied to explore any mitigating impact on financial crises. Lastly, by addressing existing literature and empirical shortcomings, implications both from an academic and a policy perspective are derived.

LITERATURE REVIEW. Theories of financial crises continuously evolve. First conceptualised by Krugman (1979), the first-generation currency crises model explained the Latin American debt crises of 1970-80s by the rise of inconsistent macroeconomic policies, particularly debt monetisation under a fixed exchange rate regime. The second-generation crisis models (Obstfeld, 1994; Obstfeld, 1996) presented a multiple equilibrium model where crises can occur by self-fulfilling expectations even amidst sound macroeconomic fundamentals (for example, the 1992-93 European Exchange Rate Mechanism (ERM) crisis). However, these models could not capture and predict the Asian Financial Crisis of 1997-1998. A framework extending beyond the pegged exchange rate regime to incorporate risks derived from balance sheet vulnerabilities that are not merely linked to currency crises was needed. This laid the groundwork for the third generation of crisis models (Corsetti et al., 1998; Krugman, 1999) and its further extensions that explicitly incorporated the broader channels leading to crises, including the capital flows and the financial intermediation channel. As a result, more modern theories and frameworks related to financial system vulnerabilities heavily emphasise the importance of risks deriving from capital flow volatility,

especially in the presence of financial frictions, information asymmetries, and the global financial cycle (Miranda-Agrippino & Rey, 2020; Mendoza, Enrique, 2010; Narita & Horn, 2021; Chen et al., 2024).

Consistent with the paper's objective to study sudden stops and financial crises, Reinhart and Kaminsky (1999) emphasized the need to focus on the intricate relationship between different types of financial crises and capital flows, highlighting the empirical gap on the interactions between banking and currency crises and their coincidence, the well-known "twin crises". Such occurrences were particularly prominent after the financial liberalisation of the 1980s (Cavallo, 2019). Observing crises across time, the authors suggested that banking crises reach their peak once the currency crashes, which is further exacerbated by rising interest rates to defend the exchange rate, leading to significant output contractions and recessions. This, however, did not imply a direct causal relationship between crises, but rather highlighted the interlinkages between them due to the common vulnerabilities associated with capital flows.

Against this backdrop, Calvo et al. (2004) examined the Argentinian crisis of 1998-2002, which was largely triggered by crises in other EMEs, more specifically in Russia. While other authors "blamed" the collapse on the fixed exchange rate regime and consistently unsustainable fiscal deficits (first-generation of crises models), the authors argued that the "dangerous financial cocktail" was due to (i) Argentina's relatively close economy in terms of trade openness, constraining the tradable sector's ability to withstand the exchange rate misalignment, and the (ii) liability dollarisation (the original sin, conceptualized by Eichengreen et al., 1999), both in private and corporate sectors. Under such balance sheet mismatches, even exogenous Sudden Stop episodes have disruptive consequences in terms of financial system stability.

Subsequent empirical literature embedded SS into analytical frameworks to think more comprehensively about financial crises (Broner et al., 2013; Furceri et al., 2011; Forbes and Warnock, 2021; Rey, 2015; Emter, 2022). Broner et al. (2013) document the cyclical behaviour of capital flows, characterised by high volatility, especially in gross flows. Furceri et al. (2011) study episodes of capital flow surges and bonanzas and the interlinkage with financial vulnerabilities. The authors estimate the probability of banking and currency crises on financial crises, concluding that cross-border bank flows and portfolio debt flows are significant determinants of crises. Using data from 1980–2013 over 53 emerging economies, Ghosh et al. (2016) show how capital flows fuel domestic macroeconomic and financial vulnerabilities in terms of credit growth and leverage, which in turn are the preconditions for banking and currency crises. More recent authors have focused on the co-movement of capital flows and the global financial cycle, further emphasizing the role of global push factors determining the probability of sudden stops (Miranda-Agrippino & Rey, 2020b; Eguren-Martin et al; Miranda-Agrippino & Rey, 2022; Rey & Stavrageva, 2025).

However, the previous literature used techniques such as capital flow deviations from the GDP trend or focused on current account reversals. Forbes and Warnock (2012) institutionalised the methodological views on sudden stop episodes and provided a framework to identify such episodes, particularly in gross flows. Our paper follows this methodology to identify such episodes, addressing the previous shortcomings of the literature in terms of the identification of SS and crisis episodes. Building upon Leaven & Valencia (2013) foundation, Nguyen et al. (2021) extend the financial crises database covering the year 2019, including 206 countries and identifying 51 systemic banking crises, 414 currency crises, and 200 sovereign debt crises. Most importantly, their documented evidence supports the idea that banking crises coincide or precede currency crises.

One major characteristic of the financial crisis goes back to Obstfeld's (2012) question on whether the Current Account still matters when it comes to vulnerability analysis. As documented by the author, elevated volatility and magnitude of gross capital flows are fuelling global imbalances and explain the transmission from sudden stops to financial crises, whereas domestic saving and consumption behaviour (the CA deficit) might not be a comprehensive indicator of domestic vulnerabilities anymore. Therefore, the existing balance sheet mismatches, currency and maturity composition of liabilities that are linked to gross flows, determine the severity of the risks amidst sudden stops. Hence, the paper estimates the explicit relationship between gross flows and financial crises, something that is not well incorporated into the literature.

Lastly, previous crisis episodes have shown the role of domestic macroeconomic fundamentals and policy actions that either contain or amplify the crisis consequences. The effectiveness of capital flow management measures remains debated, particularly regarding capital control measures (Clements & Kamil, 2009; Landi & Schiavone, 2018). A vast array of literature believes that the effectiveness of capital control measures is short-lived and can even exacerbate the situation during the crises. This is particularly the case when these measures are rather reactive. Against this backdrop, the role of macroeconomic policies needs to be further discussed within the financial crisis context. In a literature review on sudden stops by Cavallo (2019), the author emphasizes the guiding principle of Brunnermeier and Oehmke (2013b). As capital flows tend to be intermediated through the banking sector across borders, cross-border banking regulation is key to ensuring domestic and global financial stability. Within this context and amidst some scepticism about the pre-emptive nature of capital controls, macroprudential policy tools have emerged at the epicentre of capital flow management measures, which will be studied in the paper. Forbes & Bergant (2023) studied the macroprudential policies pre- and post-COVID-19 periods, showing that countries that tightened macroprudential policies before the pandemic disruptions had more policy space to loosen policy and experience less financial distress. Moreover, Bergant et al. (2020) show that macroprudential

policies are powerful tools to contain the risks derived from global financial distress, particularly for emerging markets. Although several more papers, including Cerutti et al. (2015b), Mirzaei et al. (2020), Kalantaryan (2024), document the mitigating role of macroprudential policies amidst credit booms and global financial distress due to inflow surges, this paper utilises the existing datasets and methodologies to examine the explicit relationship between sudden stops, crises, and macroprudential policy tightening. Moreover, whenever appropriate, central bank independence is studied as a proxy of macroeconomic policy effectiveness.

Given the literature review, the paper empirically tests the following hypotheses:

H1: SSs across capital flows categories trigger financial crises and global financial distress.

H2: SSs driven by debt-creating flows (portfolio debt and cross-border bank flows) have a stronger crisis-inducing effect.

H3: The negative effect of SSs on financial stability is stronger in emerging economies.

H4: Macroprudential policy frameworks mitigate the risk of financial crises associated with SSs.

DATA AND METHODOLOGY. To examine the extent to which SSs in capital inflows affect the likelihood of financial crises, and how the type of capital flows and domestic policy frameworks shape this relationship, the paper builds a panel dataset covering 57 emerging and advanced economies over the period 1985-2019. Sudden stop episodes across different flow categories are constructed following Forbes and Warnock's (2012) methodology. Nguyen et al. (2021) built a comprehensive yearly database on financial crises, including banking and currency crises, covering 206 countries from 1970 to 2019. The final empirical estimations, hence, are conducted on data before 2020. However, the 2020-2021 is an outlier period where global developments were driven by the outbreak of Covid-19 pandemic and consequent extraordinary monetary and fiscal policy measures, accompanied by global policy measures as well. Therefore, the inclusion of more recent years could distort the comparability of long-run trends.

To estimate the likelihood of crises, the baseline empirical approach uses a pooled probit model with country-level clustered standard error. Since the purpose of the study is to identify general cross-country relationships between sudden stops and financial crises, country fixed effects are excluded. Moreover, most of the variables related to sudden stops and macroprudential policies are somewhat synchronised across countries and are not merely a country-level idiosyncratic shock. Hence, year fixed effects are also excluded because they could absorb the impact of such factors.

The empirical model is as follows.

$$\Pr(\text{Crisis}_{(i,t)} = 1) = \Phi(\alpha + \beta \cdot \text{SS}_{(i,t-1)} + \delta \cdot \text{Policy}_{(i,t-1)} + \gamma' \cdot X_{(i,t-1)})$$

Where $Crisis_{(i,t)}$ is a dummy equal to 1 if the country i experiences a banking or currency crisis in time t . $SS_{(i,t-1)}$ is a dummy equal to 1 if the country i experienced any type of sudden stop in $t-1$. $X_{(i,t-1)}$ is a vector of control variables, all lagged one period. $\Phi(\cdot)$ denotes the standard normal cumulative distribution function. $Policy_{(i,t-1)}$ captures macroprudential policy tightening in $t-1$. Following Cerutti et al. (2015b), Mirzaei & Samet (2022), and Kalantaryan (2024), macroprudential policy activation is measured using the IMF's iMaPP dataset, which incorporates a dummy variable whenever a country experiences any type of macroprudential policy tightening across 17 categories. To effectively capture the heterogeneous impacts deriving from macroprudential policies, the overall policy index is then divided into 4 subcategories.

MaPP Capital: tightening Capital-based tools, e.g., Countercyclical Capital Buffer, Capital Conservation Buffer, Systemically Important Financial Institutions Buffer, Capital Requirement on FX Exposures, Leverage Ratio Requirement, Loan-Loss Provisioning Requirement

MaPP Liquidity: tightening liquidity/funding-based tools, such as Liquidity Coverage Ratio (LCR), Loan to Deposit Ratio (LTD, Foreign Currency Liquidity Requirement

MaPP Borrower: tightening borrower-based measures, such as the Loan to Value ratio (LTV), Debt Service to Income (DSTI), and Capital Requirement on Household Credit

MaPP FX: tightening FX tools, such as Limits on FX Lending / FX Exposure, Foreign Currency Liquidity Requirement, Capital Requirement on FX Exposures

Additional domestic economic controls include domestic credit, the current account deficit, inflation, current account openness, central bank independence index obtained primarily from the IMF, World Bank WDI, Chinn–Ito index (Chinn et al., 2006), and Garriga (2024). Robustness checks are conducted using the Correlated Random Effects (CRE/Mundlak) approach, which is employed to capture the potential cross-country heterogeneity and the common global shock by incorporating within-country means of the independent variables. A detailed explanation of the data sources and description is presented in Table 5 of the Appendices. Countries included in the descriptive and empirical analysis are included in Table 7 of the Appendices.

Results

The section employs the selected methodological approaches to analyse the impact of sudden stops in disaggregated capital flows on the likelihood of financial crises, namely banking and currency. Table 1 and Table 2 present the outcomes derived from the baseline model specification, focusing on sudden stops, macroprudential policies, and country development levels. Table 3 depicts the differences in disaggregated SSs in portfolio flows leading to banking and currency crises, while Table 4 captures the mitigating impact of macroprudential policies across different categories.

Before moving to the empirical estimations, several descriptive measures supporting the proposed hypothesis are presented. Figure 1 shows the share of countries experiencing sudden stops (portfolio and cross-border bank flows) and financial crises over the years. Notably, SSts are more frequent, with spikes particularly prominent in times of global or regional financial distress, such as the Asian Financial Crisis (1997), the Global Financial Crisis (2013), and the Taper Tantrum (2013). Hence, a co-movement between SS episodes and crises is observed, whereby both banking and currency crises tend to coincide with such episodes and each other.

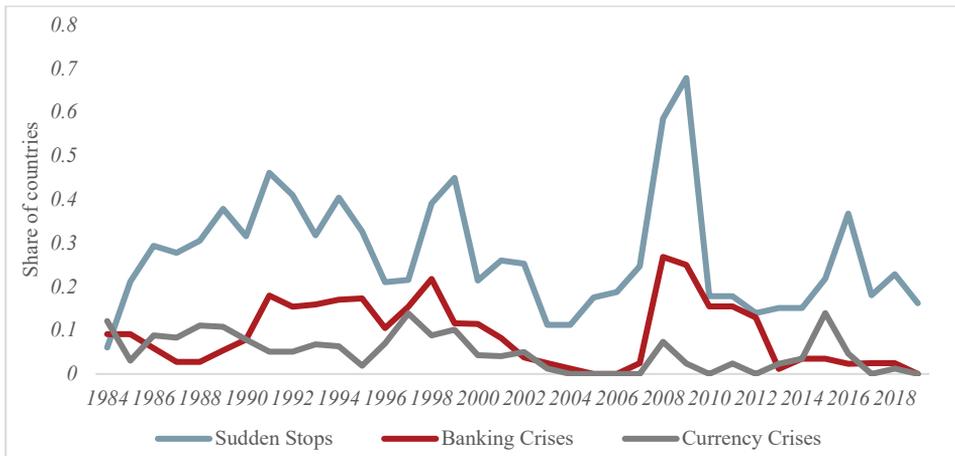


Figure 1. Share of countries experiencing an event each year SS in Total Flows and Crisis¹

Furthermore, Figure 2 reveals the heterogeneity across AEs and EMEs in experiencing crisis episodes. Unlike currency crises that tend to be associated with emerging economies (consistent with the “Original sin” theory), banking crises are more common across both AEs and EMEs. Notably, history has shown that banking crises tend to be triggered by financial vulnerability build-up in AEs and then transmitted globally. Moreover, Figure 3 illustrates the crisis probability conditioned upon an SS episode in the previous period, clearly indicating that the probability of both banking and currency crises is higher if the economy experienced an SS in the previous period. These observations are broadly consistent with the earlier proposed hypothesis.

¹ Throughout the paper, financial crises data is taken from Nguyen et al. (2021). Sudden stop episodes are constructed by the author using raw data on Balance of Payments Statistics from the IMF’s International Financial Statistics (IFS) dataset, following threshold-based approach explained in Table 5 in Appendices.

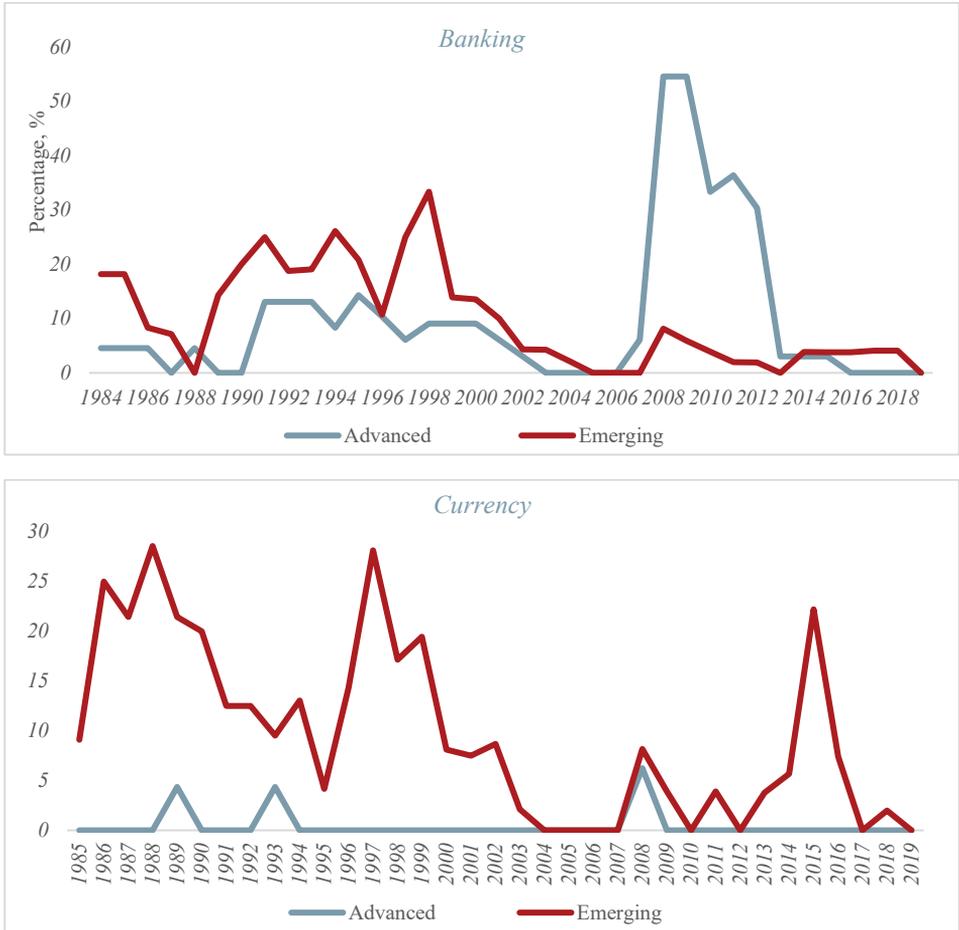


Figure 2. Share of advanced and emerging economies experiencing banking and currency crises

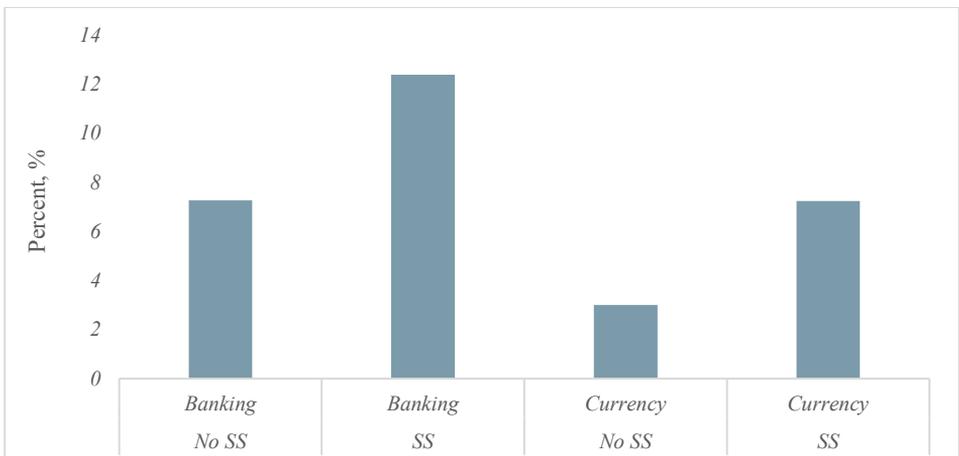


Figure 3. Crisis Probability Conditional on Sudden Stop

Baseline estimations are presented in Table 1 for banking crises and Table 2 for Currency crises. Odd-numbered columns only consider sudden stop episodes

and macroprudential policy activations, while even-numbered columns extend the model specification to include respective control variables, as well as a dummy variable whenever the country of interest is an emerging economy. Results, aligned with the hypothesis, suggest that financial crises are heavily influenced by sudden stop episodes in capital flows (H1). However, disaggregation across flow categories reveals that while SSs in total flows increase the likelihood of crises, it is the SSs in cross-border bank flows that heavily influence such a relationship, whereas portfolio flows, at least when portfolio equity and debt flows are aggregated, do not predict banking crises. More specifically, on average, a sudden stop episode in Cross-border bank flows increases the likelihood of a banking crisis by around 14.2 percentage points. The incorporation of domestic credit, broadly aligned with the literature findings discussed earlier, supports the direct link between banking crises and previous credit growth, particularly when fuelled by surges in capital flows. The magnitude of the variable is relatively small due to its slow-moving nature. A crucial policy implication is driven by the inclusion of the macroprudential policy tightening dummy. While capital flows and credit expansions are accompanied by a build-up of domestic and global vulnerability, a timely activation of macroprudential policies targeting the risks of the banking sector can significantly reduce the likelihood of crises (H4). The baseline results suggest that macroprudential tightening reduces the probability of a banking crisis by around 5 percentage points and by around 9 to 10 percentage points if a sudden stop in Cross-border bank flow is present.

Table 1

Comparative Effects of Different Sudden Stop Types on Banking Crisis Risk

	<i>SS in Cross-border bank flows</i>		<i>SS in Portfolio flows</i>		<i>SS in Total SS</i>	
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Sudden Stop	0.573*** (0.107)	0.642*** (0.143)	0.127 (0.128)	0.062 (0.152)	0.549*** (0.123)	0.603*** (0.152)
MaPP Tightening	-0.339** (0.124)	-0.365* (0.157)	-0.306** (0.108)	-0.364** (0.132)	-0.328** (0.122)	-0.390* (0.154)
Domestic Credit		0.005* (0.002)		0.004* (0.002)		0.005* (0.002)
Openness		-1.297** (0.502)		-0.908*** (0.504)		-1.285* (0.502)
Emerging Dummy		-0.445 (0.402)		-0.140 (0.567)		-0.427 (0.397)
Observations	1423	1086	1976	1483	1423	1086
Adj. R ²	0.042	0.098	0.008	0.081	0.039	0.093

Note: All models are estimated using a probit model with country-clustered standard errors. Total flows include all types of capital flows. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

This further supports the call to effectively regulate cross-border bank flows as a major volatile component of international capital flows. Macroprudential

policies, particularly in a pre-emptive nature, can help to lean against the wind. Emerging economy variable, on the other hand, does not show any significant effect on the banking crises likelihood, which is consistent with Figure 2, suggesting that both advanced and emerging economies experience banking crises with similar frequency and intensity. Therefore, banking crises are not confined to a specific income group but are rather rooted in vulnerabilities common across regions.

Similar results are observed when studying the determinants of currency crises. In Table 2, SSSs across categories, particularly portfolio flows, tend to increase the likelihood of currency crises. On average, a sudden stop episode in Portfolio flows and Total flows increases the likelihood of a banking crisis by around 6.3-7.6 percentage points. However, unlike banking crisis estimations, macroprudential policy tightening does not reveal any mitigating role for currency crises. Since currency crises are heavily linked to the indebtedness of an economy as well as its dollarisation levels, the central bank's independence is instead used to capture institutional quality and policy credibility that could curb exchange rate speculations. Results reveal that the more independent and credible the central bank is, the less likely an economy is to experience a currency crisis. Moreover, emerging economies face a significantly increased likelihood of a currency crunch (H3). Overall, both banking and currency crises globally tend to precede sudden stop episodes in capital flows, while certain domestic conditions enable leaning against the wind, particularly macroprudential policies and capital account openness.

Table 2

Comparative Effects of Sudden Stop Types on Currency Crisis Risk: Role of Macroprudential Tightening

	<i>SS in Cross-border bank flows</i>		<i>SS in Portfolio flows</i>		<i>SS in Total SS</i>	
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Sudden Stop	0.370* (0.148)	0.441** (0.169)	0.665*** (0.130)	0.892*** (0.136)	0.784*** (0.173)	1.057*** (0.209)
MaPP Tightening	0.056 (0.198)	-0.059 (0.229)	-0.050 (0.158)	-0.127 (0.185)	0.076 (0.208)	-0.075 (0.250)
CA Deficit		-0.013 (0.021)		-0.008 (0.011)		-0.017 (0.019)
KA Open		-1.286*** (0.372)		-1.622*** (0.321)		-1.464*** (0.371)
Emerging Dummy		0.736** (0.250)		0.716** (0.241)		0.833** (0.292)
Observations	1,423	1,337	1,971	1,837	1,423	1,337
Adj. R ²	0.005	0.190	0.043	0.232	0.065	0.269

Note: All models are estimated using a probit model with country-clustered standard errors. Total flows include all types of capital flows. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3

**Comparative Effects of Sudden Stop Types on Currency Crisis Risk:
Role of Central Bank Independence**

	<i>SS in Cross-border bank flows</i>		<i>SS in Portfolio flows</i>		<i>SS in Total SS</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Sudden Stop	0.327* (0.128)	0.384* (0.149)	0.501*** (0.120)	0.701*** (0.119)	0.656*** (0.145)	0.888*** (0.163)
CBI Weighted	-0.860* (0.341)	-0.240 (0.430)	-0.731* (0.308)	-0.174 (0.385)	-0.896* (0.359)	-0.269 (0.467)
CA Deficit		-0.006 (0.019)		-0.004 (0.011)		-0.008 (0.019)
KA Open		-1.406*** (0.396)		-1.613*** (0.328)		-1.551*** (0.424)
Emerging Dummy		0.654** (0.223)		0.621** (0.211)		0.702** (0.232)
Observations	1,727	1,608	2,294	2,148	1,727	1,608
Adj. R ²	0.029	0.195	0.036	0.210	0.065	0.248

Note: All models are estimated using a probit model with country-clustered standard errors. Total flows include all types of capital flows. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Since SSs in portfolio flows exhibited no effects on banking crises, while being a significant determinant of currency crises, further disaggregation into debt and equity flows is conducted to examine if there is any heterogeneity in their impact on financial crises. Results are presented in Table 3. Such disaggregation reveals that while total volumes could not systematically predict crises, their components can. SSs in both portfolio debt and equity flows are significant determinants of banking crisis likelihood, particularly and prominently debt flows (H2). On the other hand, while aggregated portfolio flows revealed significant implications for currency crises, results show that portfolio equity flows do not significantly predict currency crises, whereas SSs in portfolio debt flows are systematically associated with a higher likelihood of currency crises. Such findings suggest that reversals in non-debt portfolio flows mainly affect the asset prices and might have indirect effects on currency crises, whereas debt-related flow reversals create direct pressure on the balance sheets and external vulnerabilities, hence are better predictors of balance of payment crises. This is particularly relevant in times of external vulnerabilities associated with liability dollarisation. If SSs in portfolio debt flows as well as cross-border bank flows are strongly associated with currency crises, then the more currency and maturity mismatch in terms of liability dollarisation global economies experience, the more vulnerable they are to systemic crises.

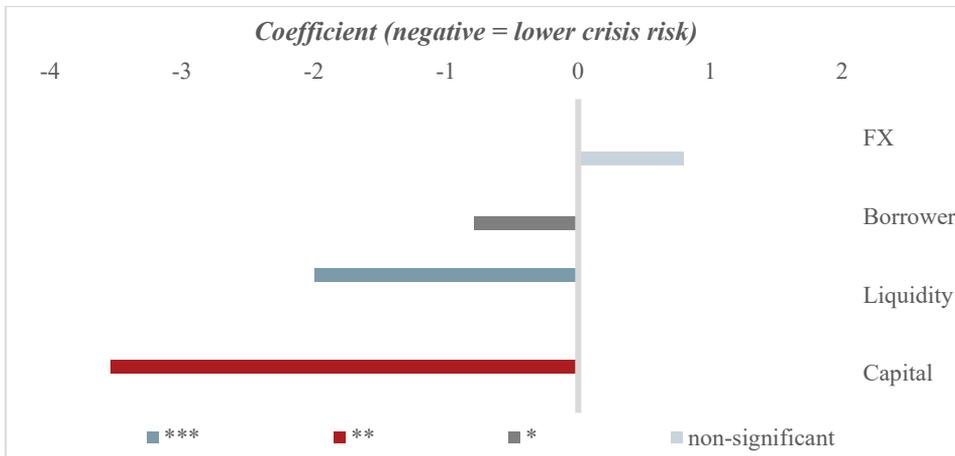
Table 4

Portfolio Flow Composition and Financial Crisis Risk: Equity vs Debt Sudden Stops

	Banking crises			Currency Crises		
	Portfolio SS	Portfolio Debt SS	Portfolio Equity SS	Portfolio SS	Portfolio Debt SS	Total SS
	(1)	(2)	(3)	(4)	(5)	(6)
Sudden Stop	0.127 (0.128)	0.453*** (0.094)	0.209* (0.127)	0.665*** (0.130)	0.631*** (0.157)	0.784*** (0.173)
MaPP Tightening	-0.306** (0.108)	-0.284** (0.113)	-0.318** (0.111)	-0.050 (0.158)	0.084 (0.163)	0.076 (0.208)
Observations	1,976	1,733	1,740	1,971	1,739	1,423
Adj. R ²	0.008	0.025	0.012	0.043	0.037	0.065

Note: All models are estimated using a probit model with country-clustered standard errors. Total flows include all types of capital flows. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Although sudden stops are rather frequent and large in magnitude, they do not always translate into crises, which raises the question of what macroprudential policy toolkits contribute to the prevention of crises. Hence, different macroprudential policy categories are used to predict banking crises, namely Capital, Liquidity, Borrower, and Foreign Currency subcategories. The coefficients' magnitudes are presented in Figure 4.



Note: All models are estimated using a probit model with country-clustered standard errors. NS means non-significant. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 4. Effect of Macroprudential Policy Tightening on Banking Crisis Probability

MaPP Capital measures are strongly significant, indicating that tightening capital-based tools (e.g., capital buffers) greatly lowers crisis risk. An unusually large coefficient is primarily due to the less frequent activation of such measures, as they are classified as *systemic macroprudential policies*. Tightening Liquidity measures (e.g., LCR, LTD) also significantly reduces crisis likelihood. Borrower-based measures, however, have a marginally significant mitigating impact, indicating that borrower-based tightening helps, but less directly in systemic

crises. These 2 subcategories broadly incorporate the *cyclical measures of macroprudential policies*, which could explain their smaller magnitude as opposed to systemic measures. FX tools, on the other hand, exhibit no statistical significance and may be due to their rather reactive nature as opposed to being preemptive. Hence, capital and liquidity-based measures are most effective in mitigating banking crisis risks across global observations, mostly due to the systemic components of the policies that are intended to act preemptively.

To place these findings into a broader context within the current global financial environment, it is essential to understand the post-2020 developments. The Covid-19 pandemic and the consequent post-pandemic shocks, including unprecedented monetary policy tightening across the globe, heightened geopolitical uncertainties, and supply chain bottlenecks, provided an important external validation of the relevance and the mechanisms identified in this study and the literature. Recent evidence has documented that these shocks generated large and sharp capital flow reversal episodes, particularly in emerging market economies, accompanied by financial distress. However, significant, large-scale systemic financial crisis episodes did not materialize. Cavallo et al. (2013) describe these sudden stops in the absence of system-wide financial crises as the “dog that didn’t bite”. The authors attributed this mainly to the improved domestic fundamentals across emerging economies and the dependence of domestic financial markets. Although these episodes fall outside the sample period of the empirical investigation of this paper, such documented patterns mirror the sudden stop dynamics and transmission channels emphasized in our results, reinforcing the relevance of the study beyond the pandemic period.

To ensure the robustness of the findings derived from the baseline pooled Probit model, the Correlated Random Effects (CRE/Mundlak) approach is employed to capture the potential cross-country heterogeneity and the common global shock. Such an approach facilitates the separation between within-country effects and between-country differences by incorporating the country-specific means of the explanatory variables. The inclusion of the country-specific means avoids omitting observations as opposed to the fixed effects model and captures the unobserved heterogeneity. This helps to differentiate further whether derived policy effects reflect domestic policy effectiveness or the global co-movements or shocks. These results, however, should be viewed as indicative rather than definitive.

Looking at Table 6 in the Appendices, it is notable that macroprudential policy appears effective in baseline pooled specifications, which reflects the cross-border relationship between global shocks and policy effectiveness. However, once controlling for year-fixed effects in the CRE, the effectiveness dissipated. This means that the year effects account for most of the crisis incidence and indicate that there is synchronization across countries where global conditions and macroprudential policies move hand in hand. This suggests that the macroprudential policies may not just prevent crises, but they are a reaction

to the global financial or domestic financial conditions that help to alleviate their effects. This once more shows that both capital flows are synchronized across countries, consistent with the global financial cycle.

Further research could extend the paper's analysis to explicitly capture the post-pandemic period by evaluating crisis-type episodes on a higher frequency data. This could capture the intensity or timing of policy interventions as well as immediate effects translated from sudden stops. In addition, market-based stress indicators, such as sovereign spreads sensitivity to global conditions, would further enhance the implications for countries that are in early stages of financing integration and are beginning to attract capital flows at a larger magnitude. Moreover, examining spillovers across emerging economies and different regions could further enrich the analysis for emerging economies

CONCLUSIONS. SS episodes in capital inflows continue posing risks for global financial stability. This paper examines the relationship between financial crises, namely banking and currency, and SS episodes across different categories. Utilizing global panel data from different world regions across the period 1984-2019, SS episodes across disaggregated flow categories are identified. Overall, both banking and currency crises globally tend to precede SS episodes in capital flows, while certain domestic conditions enable leaning against the wind, particularly macroprudential policies.

Importantly, paper findings suggest that not all SSs are similar. SSs in cross-border bank flows tend to be highly associated with banking crises, whereas SSs in portfolio debt flows are a major source of fueling currency crises. This suggests that the composition of capital flows matters, and disaggregating flows across categories reveals vulnerabilities associated with them. Moreover, global exposure to crises differs across development levels. Emerging economies (EMEs) are more prone to currency crises, while banking crises are common across both advanced economies (AE) and emerging economies (EM). Therefore, banking crises are not confined to a specific income group but are rather rooted in vulnerabilities common across regions.

At the same time, not all SSs end up in financial crises. Economies that experienced macroprudential policy tightening amidst heightened capital flow volatility episodes significantly reduced the risks associated with banking crises. This shows the effectiveness of pre-emptive policy approaches adopted heavily by global economies after the GFC to address risks stemming from the financial sector. Among various policy subcategories, capital- and liquidity-based measures entail marginally higher mitigating impacts, whereas borrower-based measures offer a limited yet significant impact on banking crises mitigation. This implies that strengthening capital and liquidity requirements in times of financial turmoil provides domestic antidotes to vulnerabilities fueled by external economic forces. Since currency crises are heavily linked to the indebtedness of

an economy as well as its dollarization levels, economies with more independent central banks tend to face a reduced risk of currency crises.

These findings are particularly relevant for small open economies, such as Armenia, that are heavily exposed to external financing shocks. In such economies, the composition of capital flows as well as the dominance of debt-generating portfolio and bank flows can fuel vulnerabilities that can translate into currency and banking crises. The prevention of such risks requires credible domestic policies by preserving central bank independence and safeguarding pre-emptive macroprudential policy activations.

Overall, such findings suggest that global policy coordination is crucial as capital flows tend to co-move with the global financial cycle, making even advanced economies vulnerable to crises. Therefore, stringent policies globally on cross-border bank and other debt-generating flows to safeguard against maturity and currency mismatches, particularly in emerging economies, are crucial. Macroprudential policies have shown to be effective in containing risks and providing resilience in times of global distress, meaning that pre-emptive policy measures, along with credible institutional practices, are essential to somewhat alleviate any disruptive consequences associated with SSSs in capital flows.

Appendices

Table 5

Description of selected variables

<i>Variable</i>	<i>Definition</i>	<i>Source</i>
Banking crisis	Dummy variable equal to 1 whenever a country experiences a banking crisis in a given year. Authors define banking crises whenever widespread signs of financial distress in the banking system are observed, such as bank runs, bank losses, and/or bank liquidations. These shall be accompanied by significant government policy interventions.	Nguyen et al. (2021)
Currency crisis	Dummy variable equal to 1 whenever a country experiences a currency crisis in a given year. Currency crises occur whenever the domestic currency against the US dollar depreciates by at least 30% every year, and the change exceeds the previous year's change by at least 10%	Nguyen et al. (2021)
Sudden Stop in capital flows	Based on methodology derived from Forbes & Warnock (2012) , a sudden stop episode occurs when capital flows (across each category) fall below 1 standard deviation from the 5-year rolling mean, and at least in one quarter during that period, they fall below 2 standard deviations before recovering. Sudden stops are identified on a quarterly basis and then transferred to a yearly binary variable to capture the existing volatility throughout the year.	The author's calculations with raw data taken from the IMF's IFS

Macroprudential Policy	Dummy variable equal to 1 if a country experiences any tightening across different policy tools each year.	IMF iMaPP dataset (Alam et al., 2019)
Mapp Capital	Countercyclical capital buffer; capital conservation buffer; Additional capital requirements for systemically important institutions; FX-related capital requirements; Leverage Ratio requirement; Loan Loss Provisions	IMF iMaPP dataset
Mapp Liquidity	Measures taken to mitigate systemic liquidity and funding risks, including minimum requirements for liquidity coverage ratios, liquid asset ratios, net stable funding ratios, core funding ratios, and external debt restrictions that do not distinguish currencies.	IMF iMaPP dataset
Mapp Borrower	Loan-to-value ratio, Debt-Service-to-Income, Capital, or risk-weight measures targeting household lending	IMF iMaPP dataset
MaPP FX	Limits on FX lending, FX-specific capital requirements, FX-related liquidity, or funding constraints	IMF iMaPP dataset
Central Bank Independence	The index is the weighted average of four dimensions capturing de jure central bank independence, ranging from 0 to 1. Dimensions include personnel rules, policy-formulation authority, objectives, and legal lending limits.	Garriga (2024)
Credit/ GDP	Credit to GDP growth (annual %)	World Bank GFDD
Inflation	Inflation, consumer prices (annual %)	World Bank GFDD
Current Account Deficit	Current Account Deficit/ GDP	World Bank GFDD
Capital Account Openness	Degree of capital account openness, measured by the Chinn–Ito KAOPEN index, which ranges from 0 to 1, with higher values indicating greater financial openness and stability.	Chinn et al. (2006)

Table 6

CRE/Mundlak robustness check

	<i>Banking Crises</i> (1)	<i>Currency Crises</i> (2)
SS in Cross-border bank flows	0.281** (0.116)	
SS in Portfolio Flows		0.363*** (0.103)
Macroprudential Tightening	-0.127 (0.158)	-0.228 (0.169)
Within-country Mean (SS Cross-border)	-0.333 (1.142)	0.391 (1.894)
Within-country Mean (SS Portfolio)		0.391 (1.894)
Within-country Mean (Tightening)	0.408 (0.720)	2.272** (0.961)
Observations	1,391	1,898
Adj. R ²	0.160	0.083

Note: All models are estimated using a probit model with the CRE/Mundlak approach. Significance levels:

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7

Country classification by region

<i>Region</i>	<i>Countries</i>
Europe & Central Asia:	UK, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Finland, Greece, Iceland, Ireland, Portugal, Spain, Turkey, Cyprus, Armenia, Belarus, Albania, Georgia, Kazakhstan, Kyrgyzstan, Bulgaria, Moldova, Russia, Ukraine, Czechia, Slovakia, Estonia, Latvia, Serbia, Montenegro, Hungary, Lithuania, Croatia, Slovenia, North Macedonia, Bosnia & Herzegovina, Poland, Romania
Latin America & Caribbean:	Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Rep., Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru, Jamaica
Asia & Pacific:	Japan, Indonesia, Korea (Rep.), Malaysia, Philippines, Singapore, Thailand, China, Japan, Indonesia, Korea (Rep.), Malaysia, Philippines, Singapore, Thailand, China, Australia, New Zealand
MENA	Israel, Jordan, Qatar, Saudi Arabia

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