Cross-Border Bank Flows in Major Reserve Currencies and Banking Systemic Risk

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Abstract

This study examines how cross-border bank flows denominated in major secondary reserve currencies influence systemic banking risk using data from 33 countries between 2000 and 2021. Previous research has often examined capital flows by type, destinations or described the safe-haven status of currencies based on their tendency to appreciate or depreciate during stock market turmoil, bond market crises and foreign exchange volatility. We present a more nuanced assessment by considering whether currency-denominated cross-border flows exhibit stabilising or destabilising properties under banking systemic stress and across varying levels of market concentration. We use SRISK as the primary measure of systemic risk and panel fixed-effects estimations. We find that flows in Swiss francs and British pounds are consistently associated with reductions in systemic risk during crisis periods. Moreover, their risk-reducing capacity is more pronounced in highly concentrated banking systems, which aligns with the concentration-stability hypothesis. By contrast, flows in Japanese yen and euros display weaker and less consistent patterns. Overall, the findings demonstrate that the stabilising capacity of reserve-currency flows is conditional rather than uniform, and highlight the importance of currency composition and market structure in shaping systemic resilience.

Keywords: Cross-border bank flows; financial stability; systemic risk, safe haven currency, market concentration
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1 Introduction

In an era of heightened financial globalisation, cross-border bank flows (henceforth CBBFs) have emerged as both a driver of growth and a source of systemic vulnerability. By serving as a conduit for global liquidity, these flows play a pivotal role in cross-border banking, supporting credit provision, investment, and broader economic development (Bruno and Shin, 2013). In this way, they simplify the efficient allocation of capital, ensuring that credit reaches productive uses regardless of geographical boundaries (Hasan et al., 2021; Kose et al., 2009; Park and Yang, 2021). By promoting risk dispersion, they enable banks to diversify their exposures and reduce their vulnerability to domestic shocks, thereby enhancing the resilience of national financial systems (Allen and Carletti, 2013; Schoenmaker and Wagner, 2011).

However, these flows carry substantial risks. Their volatile and procyclical nature means that they can exacerbate macroeconomic fluctuations, transmit foreign financial shocks, and, in certain cases, trigger or amplify systemic crises in recipient countries (Ali and Iness, 2020; Caballero and Krishnamurthy, 2006; Zheng et al., 2021; Lo et al., 2024). At a micro level, financial institutions act as the primary intermediaries of these flows, and fluctuations in cross-border banking activities have been associated with increased risk-taking, excessive credit expansion, and the cross-border transmission of financial fragility (Bruno and Shin, 2014; de Haan et al., 2020; Dinger and Te Kaat, 2020). This dual nature of cross-border bank flows on financial stability has spurred scholars and regulators in various countries to conduct considerable research.

The 2007-2009 global financial crisis (henceforth GFC) exposed significant weaknesses in cross-border banking flows and external imbalances. These external imbalances, particularly those involving foreign currency exposures, have played a consequential role in major financial crises, including the Euro area sovereign debt crisis(2010-2012), the Mexican crisis (1994), and the Asian financial crisis (1997-1998) (Rogoff and Obstfeld, 2009; Obstfeld, 2012; Davis et al., 2022; Beirne et al., 2024). Moreover, a currency dimension is evident to the landscape of international cross-border banking (Takáts and Temesvary, 2020). This implies that the currency in which cross-border transactions are conducted (such as the United States Dollar(USD), Euro(EUR), or Japanese Yen(JPY)) plays a significant role. For this reason, in the context of financial globalisation, the potential risks from the currency aspects of cross-border bank flows have become a crucial area that cannot be ignored in ever-evolving macroeconomic dynamics and financial risk management.

In recent years, a growing body of literature has examined the relationship between cross-border capital flows and systemic risk*. It highlights the role of internationally active banks as important channels for risk transmission (Dinger and Te Kaat, 2020; Karolyi et al., 2023). Empirical evidence suggests that cross-border bank flows can reduce systemic risk in recipient countries, particularly when originating from countries with stronger regulations (Karolyi et al., 2023). However, existing studies largely focus on aggregate capital flows, paying limited attention to their currency composition. This represents an important gap. Since currencies are not neutral in transmitting financial conditions; instead, they embody macro-financial

*As noted by Benoit et al. (2017), systemic risk is inherently complex and resists a single, universally accepted definition. Early efforts, such as the Group of Ten (2001), describe systemic risk as the likelihood that disruptions in the financial system will significantly impair economic value, confidence, and ultimately the real economy (as cited in Hendricks et al. (2006)).

characteristics that influence investor behaviour, capital allocation, and the susceptibility of banking systems to liquidity shocks and funding stress (Avdjiev et al., 2016). Consequently, the currency denomination of cross-border banking flows may play a critical role in shaping systemic risk dynamics, particularly during crisis periods or within structurally fragile financial systems.

One possible reason is the safe haven status attributed to certain currencies, which may explain their capacity to reduce systemic risk through their stabilising behaviour during periods of financial distress. Traditionally, safe haven currencies are those that tend to appreciate or at least hold their value during periods of heightened global risk, thereby acting as buffers against volatility (Ranaldo and Söderlind, 2010; Hossfeld and MacDonald, 2015). Following Kaul and Sapp (2006), this behaviour can also be seen as conditional: when global risk aversion rises and risky asset values fall, a safe haven currency strengthens in response. The Swiss franc (CHF) and Japanese yen (JPY) have long been recognised as traditional safe haven currencies (SHCs), while the euro (EUR) has shown conditional safe haven behaviour, particularly during crises originating outside the euro area (Cho and Han, 2021; Cenedese, 2015). The British pound (GBP), however, presents a more ambiguous case, with some studies suggesting that its behaviour has been inconsistent across different crisis episodes (Lee, 2017; Bussière et al., 2015). Therefore, we adopt the general conceptual underpinnings provided in the literature where SHCs offer protection during periods of high financial stress or may provide consistent protection on average (Hossfeld and MacDonald, 2015; Kaul and Sapp, 2006; Ranaldo and Söderlind, 2010). However, we refine these definitions for the context of cross-border bank flows and systemic risk. In our framework, currencies with safe-haven properties reduce systemic risk primarily during crisis periods or on average. Our definition of safe haven currency aligns with the study of Campbell et al. (2010) that currency allocation mitigates portfolio risk for global equity and bond investors. This reflects state-dependent behaviour aligned with capital preservation motives under stress.

Our approach deviates from the binary classification of currencies as ”safe havens” or ”non-safe havens”. Rather than labelling currencies as a static category, we are interested in whether currencies show safe haven characteristics in the context of cross-border banking. To clarify, some currencies may not fulfil the conventional criteria but can still effectively reduce systemic risk. Therefore, we shift our focus from safe-haven currencies to those that exhibit safe-haven properties during crises instead. In doing so, we analyse whether certain currencies tend to reduce systemic risk during crises, based on their cross-border banking flows and their impact on banking stability. In our study, cross-border bank flows that contribute to risk reduction are characterised as possessing safe haven properties, irrespective of their conventional classification. This conceptual shift is crucial because systemic risk in banking has fundamentally different risk transmission mechanisms, amplification, and management strategies from the asset market turmoil. Hence, we examine whether cross-border CHF, JPY, EUR, and GBP bank flows reduce systemic risk in the banking sector as measured by the Systemic Risk Index (SRISK). SRISK is a comprehensive, forward-looking metric developed by Acharya and Yorulmazer (2007); Acharya et al. (2012, 2017) and expanded in subsequent work by Engle and Richardson (2015); Engle (2016); Brownlees and Engle (2017). It estimates the capital shortfall a financial institution would face under a market-wide stress scenario. This metric is akin to a regulatory stress test (Engle, 2018). This measure is capital-based, making it particularly effective in identifying which banks are most vulnerable during a system-wide crisis.

First, we ask whether cross-border bank flows denominated in major non-USD reserve currencies—specifically the Swiss franc (CHF), Japanese yen (JPY), euro (EUR), and British pound (GBP)—influence systemic risk (SRISK) in the banking systems. Building on this, we investigate whether the relationship is conditional, varying across crisis and non-crisis periods, and whether currencies commonly perceived as safe havens behave differently under financial stress. Considering 33 countries across the globe, we find that CHF and GBP flows significantly reduce banking systemic risk, demonstrating a safe-haven-like behaviour, particularly during periods of financial stress. In contrast, JPY flows do not exhibit a consistent risk-reducing effect, and instead show more complex behaviour in different market conditions. Additionally, EUR flows exhibit safe haven properties in non-Euro area countries, acting as a stabilising force during times of crisis, but their role appears more nuanced when considering Eurozone countries themselves.

This study excludes USD-denominated flows from the empirical analysis. The dollar's role as the dominant global reserve currency and primary safe haven is extensively documented (Georgiadis et al., 2024; Ranaldo and Söderlind, 2010; Rey, 2015). Therefore, its dynamics are qualitatively different from other currencies. Rather than reacting to the sentiment of the global risk, the USD drives the global financial cycle itself, acting as the primary transmission channel for monetary and liquidity shocks (Miranda-Agrippino and Rey, 2020). Including it alongside secondary reserve currencies would therefore produce incomparable results. Emter et al. (2024) further show that the dollar is uniquely embedded in global banking structures. Practically, the USD accounts for approximately 50% of global cross-border bank flows (**Table 1**), and the BIS separately reports currency composition only for the remaining four major reserve currencies. For these reasons, the analysis focuses on CHF, JPY, EUR, and GBP, whose safe haven properties are more conditional, context-dependent, and empirically open (Fatum and Yamamoto, 2016; Hossfeld and MacDonald, 2015; Lee, 2017).

This study makes several contributions to the literature on financial stability, cross-border banking, and safe-haven currencies. First, it examines how cross-border bank flows by currency shape systemic risk in the banking sector. By moving beyond the asset pricing domain, we capture a distinct dimension of safe haven currencies in the cross-border banking system that remains largely absent in the existing literature. Second, we take the currency-based lending patterns identified by Takáts and Temesvary (2020) and show how they relate to financial stability. They show that changes in monetary policy in the United States, the euro area and Japan affect cross-border bank lending denominated in USD, EUR and JPY, respectively. We build on this idea by taking the next step. We examine what these currency-denominated flows mean for systemic risk. In this way, we extend their narrative from how monetary changes move currency-specific lending to how these currency flows affect broader financial stability. This contributes to the relevant research on cross-border bank flows and systemic financial risks.

Third, this study introduces banking sector market concentration (MC) as a conditioning factor in the currency flow–systemic risk relationship. Although MC has been widely discussed in the literature, few studies have examined how it might moderate the risk transmission effects of currency flows during crises. Therefore, this study provides new empirical insights into how domestic banking market structures can amplify, dampen, or otherwise shape the systemic risk implications of foreign currency exposures. For example, our results show that during crises, CHF and GBP flows are associated with a reduction in systemic risk. However, the risk-reducing effect of these flows becomes more pronounced in highly concentrated banking systems. These patterns highlight how the structure of the domestic banking sector can meaningfully condition the (de)stabilising effects of foreign currency exposures. However, the USD accounts for approximately 50% of cross-border banking activities worldwide. Additionally, recognising the extensive focus in the literature on the U.S. dollar, which is well-acknowledged as the primary global safe haven currency (Bruno and Shin, 2015a; Georgiadis et al., 2024; Sharma and Karmakar, 2023), our analysis deliberately centres on the four other major non-USD reserve currencies, namely CHF, JPY, EUR, and GBP, where empirical findings remain fragmented and contested. This allows us to bring forward fresh evidence on their evolving roles in global financial stability through the cross-border banking channels.

Another key contribution of this study lies in the construction of a novel panel dataset that captures currency-denominated cross-border bank flows, paired with systemic risk indicators such as SRISK and Z-scores across a wide set of countries. We construct a novel data set using cross-border bank flows from the Bank for International Settlements (BIS), the systemic risk measures of the Volatility Laboratory, and macro-financial indicators from the World Bank and the Federal Reserve Bank of St. Luis. This allows for a more nuanced and consistent analysis of how currency-denominated flows relate to systemic risk across countries. To the best of our knowledge, this is one of the first attempts to empirically assess the role of currency composition of international banking claims in shaping systemic risk. Our study also contributes to the literature by employing a panel data model that includes specific interaction terms for crisis periods. This helps us understand how risk spreads differently depending on conditions in the banking system. It also follows recent research suggesting that to measure systemic risk properly, we need to consider how different regimes, sectors, and financial structures interact, especially in a globally connected and currency-diverse world.

The remainder of this paper is organised as follows. Section 2 presents the relevant literature. Section 3 develops the hypotheses of this study within the broader debates on cross-border banking, systemic risk, and currency denomination. Section 4 outlines the data, variables, and empirical strategy employed. Section 5 provides a comprehensive overview of the descriptive statistics. It highlights key trends and patterns in the dataset used. Section 6 reports the empirical findings and discusses in-depth of results. Section 7 presents robustness tests and subsample analyses. Finally, Section 8 concludes by summarising the key findings, highlighting contributions to the literature, and offering suggestions for future research and policy considerations.

2 Literature Overview

Our study relates to several strands of the literature. First, and most directly, to the literature on systemic risk in banking and its measurement, particularly work that develops forward-looking, market-based indicators such as SRISK and highlights the role of leverage and capital shortfalls in predicting financial fragility (Acharya et al., 2012; Brownlees and Engle, 2017). Second, it links to the extensive body of research on cross-border banking and financial stability, which examines how financial intermediation, capital flows, and institutional linkages influence domestic risk, often with attention to contagion and regulatory asymmetries (Cetorelli and Goldberg, 2012; Karolyi et al., 2023; Peek and Rosengren, 2000). Third, it relates to the growing literature on the role of currency denomination in financial transmission, which argues that the currency in which claims are held—not just their size—can shape the dynamics of capital flows, risk exposure, and policy spillovers (Avdjiev and Takáts, 2019; Takáts and Temesvary, 2020). Fourth, it relates to studies on the safe haven behaviour of currencies, particularly those that assess the performance of the Swiss franc, Japanese yen, and others under conditions of heightened uncertainty (Hossfeld and MacDonald, 2015; Ranaldo and Söderlind, 2010; Wong and Fong, 2018). Finally, our work intersects with a growing literature that examines how the effects of cross-border bank flows on systemic risk may depend on broader macro-financial conditions. Bruno and Shin (2015a) and Bruno and Shin (2015b), for instance, emphasise that global liquidity spillovers are not uniform but vary according to financial stress, particularly through the risk-taking behaviour of banks. While their focus is not on currency denomination per se, the idea that systemic outcomes are regime-sensitive supports our approach of interacting currency-specific flows with crisis indicators and structural variables like market concentration.

2.1 Systemic Risk in Banking and Its Measurement

The global financial crisis of 2007-09 sharply intensified academic and regulatory focus on systemic risk. As financial systems became increasingly complex and interconnected, the limitations of institution-specific risk measures became more apparent. A critical shift in recent years has been toward measuring systemic risk not just in terms of realised crises, but in terms of ex ante vulnerabilities. Ex ante vulnerabilities refer to the potential risks and weaknesses identified before they materialise. However, there is no consensus on the most effective way to measure risk within the financial system (Garcia-Jorcano and Sanchis-Marco, 2021). Several studies have undertaken comparative evaluations to assess the effectiveness of leading indicators (Benoit et al., 2017; Bisias et al., 2012; Sedunov, 2016; Zhang et al., 2015). The results of these studies indicate that different measures tend to capture unique aspects of systemic risk. For instance, Adrian and Brunnermeier (2016) proposed the CoVaR measure. This measure focuses on the co-movement of financial institutions during periods of distress. It is particularly useful for understanding how distress within one institution can affect others, highlighting the interconnectedness within the financial system. Further, Acharya et al. (2012, 2017) introduced the Marginal Expected Shortfall (MES) to estimate a financial institution's expected loss during extreme market downturns. MES helps illustrate how individual risk contributes to system-wide distress. However, critics have noted that MES alone may not fully capture the scale-driven risks posed by large, highly leveraged, and deeply interconnected financial firms (Cai et al., 2015; Cevik et al., 2024). To address these limitations, researchers have proposed a more comprehensive, forward-looking metric: the Systemic Risk Index (SRISK) (Acharya and Yorulmazer, 2007; Acharya et al., 2012, 2017; Engle and Richardson, 2015; Engle, 2016; Brownlees and Engle, 2017).

A parallel strand of research has examined how banks' income structures and business models affect their contribution to systemic risk. De Jonghe (2010) finds that banks with a greater reliance on non-interest-generating activities—particularly those associated with financial conglomerates—exhibit higher tail risk, especially during periods of stress. His findings suggest that diversification across non-traditional banking activities does not necessarily enhance stability and may, in fact, increase exposure to extreme downturns. Brunnermeier et al. (2020) reinforce this concern by showing that non-interest income, particularly trading and other non-core income, is positively associated with systemic risk in U.S. banks. Their decomposition reveals that non-interest income contributes to both tail risk and interconnectedness and is more volatile than traditional interest income. While these studies differ in methodology and focus, they both point to a shared insight that non-interest income can increase systemic fragility, either by amplifying exposure to extreme shocks or by deepening network-based contagion channels.

Overall, interconnectedness shows dual characteristics. It can both stabilise and destabilise, which mirrors insights from modern portfolio theory (MPT) of Markowitz (1952). MTP advocates for a diversification spectrum that reduces idiosyncratic risk. Yet in a globalised financial system, diversification across borders introduces new channels for shock transmission, particularly through trade ties, financial linkages, and currency mismatches (Cetorelli and Goldberg, 2009; Dornbusch et al., 2000). This is where dominant currency dynamics begin to intersect with the literature on systemic risk. Recent studies emphasise that it is not just the size of foreign exposure that matters, but its composition, structure, and currency denomination (Cetorelli and Goldberg, 2012; Karolyi et al., 2023). Therefore, a banking system's systemic risk may depend not only on how much it borrows or lends abroad, but also on the currency in which these flows are denominated, how they behave under stress, and how they interact with global financial regimes.

2.2 Cross-Border Bank Flows and Financial Stability

CBBFs have received significant attention in recent years in the literature. They play the role of both a source of financial stability and a potential amplifier of systemic risk. However, the empirical evidence is far from uniform. Some studies point to a stabilising role, particularly when flows originate from well-regulated financial systems. Karolyi et al. (2023), for example, find that greater CBBFs are associated with reduced systemic risk in the banking systems of recipient countries. They document that cross-border lending can serve as a financial buffer, particularly through channels such as regulatory arbitrage and international diversification.Abbassi et al. (2022) conduct an event study of the Lehman collapse and the Eurozone sovereign debt crisis. They document a sharp contraction in cross-border liquidity, which precipitated localised financial fragility. These findings align with earlier concerns that cross-border banking may become procyclical: abundant during booms but prone to reversal during shocks.

The impact of cross border flows depends on the structure of the recipient economy. Bremus (2015) finds they can reduce market concentration and improve resilience in OECD countries. In contrast, Bretschger et al. (2012) argues that financial integration can increase contagion when regulation is weak. Gondwe et al. (2025) shows that in Sub Saharan Africa, foreign bank presence can reduce stability, especially where governance is poor. Overall, the effects are context dependent and shaped by institutions, regulation, and the type of flows.

At the bank level, the microeconomic effects of CBBFs also merit attention. Dinger and Te Kaat (2020), using euro-area data, show that such flows materially affect risk-taking behaviour and lending practices. Their findings underscore that international exposure changes not only the balance sheet size but also the risk profile of banks. Moreover, Demir and Önder (2025) study cross-border lending in 25 European countries using BIS data. They observe that the euro contributes positively to financial stability during crises. This suggests that currency integration may be more effective than legal harmonisation in making international bank lending safer. This raises questions about how cross-border credit shapes systemic risk when flows are large, volatile, or denominated in foreign currencies.

Overall, the literature suggests that cross-border bank flows can be stabilising, but not unconditionally. Much depends on the source and destination of the flows, the crisis regime, and potentially, the currency composition of capital flows. Yet surprisingly few studies directly investigate these flows through the lens of systemic risk measures.

2.3 The Role of Currency Denomination in Risk Transmission

The composition of cross-border bank flows by currency has become an important lens for understanding how financial shocks are transmitted globally. Traditional studies have focused on exchange rate movements and monetary policy spillovers in shaping international banking activity. More recent work, however, emphasises the role of currency denomination itself as a source of risk. This approach highlights that the currency of a claim is not neutral, but can influence the transmission of financial stress and broader macroeconomic outcomes, including economic activity and public debt dynamics (Reinhart, 2022). As such, currency denomination can act as a distinct channel of risk transmission in cross-border lending. Key studies, including Avdjiev and Takáts (2019) and Takáts and Temesvary (2020), highlight the importance of currency in shaping cross-border lending and monetary policy transmission. However, their focus remains on lending outcomes, whereas this study instead emphasises financial stability implications. Moreover, these studies do not consider other major reserve currencies, such as the Swiss franc and the British pound, which may exhibit different dynamics during periods of stress.

Further, Fischer and Yeşin (2022) complement the importance of currency denomination. Their study of CHF-denominated loans in Central and Eastern Europe reports significant balance sheet vulnerabilities. These exposures mount where borrowers hold unhedged foreign currency liabilities. However, Arslanalp et al. (2022) focus on the emergence of other reserve currencies. They note that central banks are diversifying into non-traditional reserve currencies, such as the Chinese renminbi and the euro. These studies highlight that the currency of cross-border flows can significantly affect global banking risks. Moreover, this diversification changes the structure of international financial intermediation and raises questions about how future crises might unfold with different currency configurations.

The risks embedded in currency-denominated flows become most visible during periods of stress, when spillovers intensify across borders. Existing studies show that shocks, whether from crises, monetary policy, or exchange rate movements, transmit through currency exposures and can amplify contagion (Kim et al., 2015; Chen et al., 2016; Siklos and Stefan, 2021). This suggests that the currency composition of bank balance sheets is a key factor in shaping cross-border transmission and systemic fragility. What stands out is not just the role of the exchange rate, but how the currency composition of bank balance sheets shapes the response. Overall, the literature remains uneven, with most studies focusing on the dollar and much less evidence on other key currencies such as CHF, JPY, GBP, and EUR. As global financial linkages deepen, understanding how the currency composition of cross-border flows shapes systemic risk remains an important research gap.

2.4 Safe haven Currencies and Conditional Behaviour

The notion of "safe haven" currencies (SHCs) is foundational to understanding international capital flows and currency dynamics during times of global financial distress. These are currencies that investors tend to flock to in periods of heightened risk or uncertainty. Investors expect them to hold their value or appreciate while riskier assets depreciate. Traditionally, the U.S. dollar (USD), Swiss franc (CHF), and Japanese yen (JPY) have held this status for a long time. However, growing evidence shows that safe haven behaviour is conditional, asymmetric, and time varying, largely based on evidence from stock, foreign exchange, and bond markets. Studies find that currencies like the CHF and JPY tend to appreciate during periods of stress, while others such as the EUR and GBP show weaker or less consistent responses (Ranaldo and Söderlind, 2010; Cho and Han, 2021; Habib and Stracca, 2012). Overall, safe haven properties are not universal but depend on market conditions and underlying fundamentals.

A growing literature shows that safe haven behaviour is conditional, asymmetric, and time varying. Currencies such as CHF and JPY tend to appreciate during periods of stress, while others, including EUR and GBP, display weaker or more inconsistent responses (Ranaldo and Söderlind, 2010; Cho and Han, 2021; Habib and Stracca, 2012). A related strand questions whether crisis appreciation reflects true safe haven behaviour. Hossfeld and MacDonald (2015) show that CHF retains its haven role after controlling for carry trade dynamics, whereas JPY's appreciation is partly driven by funding effects. Evidence on CHF, however, remains mixed (Grisse and Nitschka, 2015). The empirical behaviour of EUR and GBP is particularly ambiguous. Some studies classify them as "equity-like," as they tend to depreciate alongside risky assets during crises (Lee, 2017). However, there is also evidence of event-specific safe haven behaviour, especially for GBP, which may provide protection under certain market or asset conditions (Ciner et al., 2013; Ming et al., 2023). Overall, this literature suggests that safe haven properties are not uniform and depend on the source of risk, market conditions, and underlying mechanisms.

The literature identifies currencies such as the CHF and JPY as traditional safe havens, supported by clear macro-financial fundamentals. The Swiss franc's status is linked to strong institutions, low sovereign risk, and its role as a "stability premium" asset, attracting capital during periods of stress (Baltensperger and Kugler, 2016; Kugler and Weder, 2002, 2005). Similarly, the Japanese yen benefits from Japan's creditor position and its use in carry trades, which leads to appreciation during crisis-driven unwinding (MacDonald and Nagayasu, 2015). However, similar characteristics also exist in currencies such as the EUR and GBP, yet their safe haven status remains inconsistent. For the euro, heterogeneity across member states leads to uneven responses to stress, with capital flowing toward lower-yield economies but away from higher-risk ones (Habib and Stracca, 2012). In the case of the pound, evidence points to more conditional behaviour, shaped by domestic risks and mixed performance across crises (Fatum and Yamamoto, 2016; Michelis et al., 2024). Overall, these differences suggest that safe haven properties are not solely determined by structural fundamentals. Instead, they depend on context and may vary across currencies and periods. It therefore calls for a more data-driven and empirically based approach.

2.5 Market Structure and Systemic Risk

Our study also speaks to a growing strand of literature that emphasises the interaction between international banking flows and structural market features, such as concentration. The link between market concentration and financial stability remains debated. Some studies argue that concentration enhances stability through stronger, more diversified institutions (Beck et al., 2006; Demirgüç-Kunt and Detragiache, 2002; Sain and Kashiramka, 2023), while others suggest it can reduce competition and encourage risk-taking, increasing fragility (Uhde and Heimeshoff, 2009; Cuestas et al., 2020; Elfeituri, 2022). Related work shows that cross-border banking can reduce concentration and improve stability. For example, Bremus (2015) finds that international banking activity lowers market concentration, supporting the concentration–fragility view. However, evidence is mixed. Zhang et al. (2013) report a negative relationship between concentration and performance in BRICS countries, while Bretschger et al. (2012) and Calice et al. (2021) suggest a non-linear effect, where both very high and very low concentration can undermine stability.

Despite mixed views on market concentration and financial stability, less attention has been given to how concentration interacts with cross-border bank flows. The impact of such flows is likely to vary across market structures. More concentrated systems may absorb foreign exposures more effectively, but they may also amplify risk through interconnected "too-big-to-fail" institutions. In this context, flows in safe haven currencies such as CHF and JPY may reduce systemic risk, but only where institutional capacity is strong. In less concentrated systems, the same flows may be neutral or destabilising, particularly when risk management is weaker. Overall, this suggests that the effects of currency-denominated flows depend not only on global conditions, but also on domestic market structure.

3 Hypothesis Development

Systemic banking risk is influenced by cross-border capital flows and their currency composition. A key channel is the exchange rate valuation effect. When currencies depreciate during stress, the value of foreign currency assets and liabilities changes. This can weaken balance sheets, especially when there are currency mismatches[†]. In contrast, safe-haven currencies tend to remain stable or appreciate in periods of global uncertainty. This helps limit valuation losses and supports balance sheets. As a result, such currencies can reduce systemic risk during crises. This study focuses on four major secondary reserve currencies. Their safe-haven behaviour is often conditional and asymmetric (Fatum and Yamamoto, 2016; Hossfeld and MacDonald, 2015; Lee, 2017).

[†]Currency mismatch means that an entity earns money in one currency but has to pay its debts or expenses in another currency.

Table 1: Share of Global CBBFs in 2021 (%)(BIS)

Currency	Claims	Liabilities
CHF	1.26	1.32
GBP	4.81	5.35
JPY	5.28	2.57
EUR	30.00	29.92
USD	47.02	47.74

3.1 CHF and JPY: Traditional Safe Haven Currencies

The Swiss franc accounts for just over one percent of global cross-border banking claims and liabilities, yet it carries a well-established safe haven reputation grounded in Switzerland's political stability and conservative monetary policy (**Table 1**). This makes CHF a strong candidate for testing whether perceived safety, rather than scale, drives systemic risk dynamics. The Japanese yen holds a larger share, around five percent of claims and 2.5 percent of liabilities, but its role is more complex. It serves both as a carry trade funding currency, subject to sharp reversals during risk-off episodes, and as a regional safe haven, particularly in Asia. This dual identity suggests yen flows may show limited effects in normal periods but stabilising properties during stress. Empirical evidence supports these characterisations. Ranaldo and Söderlind (2010), Fatum and Yamamoto (2016), and Grisse and Nitschka (2015) find that both CHF and JPY appreciate during global financial stress. The JPY's carry trade role introduces conditionality (Hossfeld and MacDonald, 2015; Wong and Fong, 2018), but the broader literature suggests both currencies have neutral effects on systemic risk in normal periods and risk-reducing effects during crises.

Thus, we propose:

H1a: CHF-denominated cross-border bank flows have no significant effect on systemic risk in normal periods.

H2a: CHF-denominated cross-border bank flows significantly reduce systemic risk during crisis periods, consistent with traditional safe haven behaviour.

H1b: JPY-denominated cross-border bank flows do not significantly affect systemic risk in normal periods.

H2b: JPY-denominated cross-border bank flows may reduce SRISK during crises, reflecting conditional or context-dependent safe haven behaviour.

3.2 EUR: Conditional Safe Haven Behaviour

The euro occupies a more nuanced position than CHF or JPY. It is not traditionally classified as a safe haven, yet emerging studies suggest it can display conditional safe haven properties (Cenedese, 2015; Cho and Han, 2021; Habib and Stracca, 2012). Tachibana (2018) shows that the euro did not serve as a haven for the euro area stock markets during past crises, unlike the CHF and USD in their respective stress periods. This suggests the euro is unlikely to be perceived as a safe haven within the Euro area, particularly when the crisis originates there.Yet the euro accounts for nearly one-third of global cross-border banking activity (**Table 1**). Its scale alone implies potential influence on systemic risk dynamics. However, its regional concentration within the Euro area, combined with episodes of internal fragmentation, limits the consistency of any safe haven role. Outside the Euro area the picture differs. The euro's liquidity, market depth, and stability may attract institutions in non-EU countries seeking safety from external shocks. This points to a conditional safe haven role, one that is context-dependent and region-specific rather than universal.

Thus, based on this regional asymmetry in safe haven behaviour, we hypothesise that:

H1c: EUR-denominated cross-border bank flows do not significantly reduce systemic risk in normal periods.

H2c: EUR-denominated cross-border bank flows reduce systemic risk in non-EU countries during global crises, consistent with conditional safe haven behaviour.

GBP: Ambiguous and Evolving Behaviour

The British pound occupies a mid-tier position in global cross-border banking flows, with shares of around 5 percent in both claims and liabilities. While it remains a major reserve currency, several studies classify it as "equity-like" or a risk-sensitive currency, which tends to depreciate in times of market stress (Lee, 2017; Bussière et al., 2015). However, there is some emerging evidence of context-specific safe haven behaviour, particularly during euro-area-specific crises (Cenedese, 2015; Ming et al., 2023). Despite this, the broader consensus suggests that GBP-denominated flows are unlikely to provide a stabilising effect on systemic risk during global crises and may even amplify risk due to volatility and historical instability (e.g., Brexit episodes). However, the role of London as one of the global financial hubs might have a different influence on GBP when it comes to the financial industry and cross-border banking.

Thus, we propose:

H1d: GBP-denominated cross-border bank flows have limited or ambiguous effects on SRISK in normal periods.

H2d: GBP-denominated flows may reduce SRISK during crises, indicating conditional or unexpected safe haven behaviour.

3.3 Market Concentration as a Conditioning Factor

Building on conflicting results in the literature regarding the role of market concentration (Beck et al., 2006; Bretschger et al., 2012; Calice et al., 2021; Demirgüç-Kunt and Detragiache, 2002), we further extend our hypotheses by introducing interaction terms with market concentration (MC). Higher MC may either buffer systemic risk by concentrating resources in larger, more resilient banks or amplify risk through excessive risk-taking and reduced competition. Thus, it is reasonable to expect that the effects of currency-denominated cross-border bank flows on SRISK may vary with the degree of MC, particularly during crises. Further, based on the study of Bremus (2015), which shows the reducing capacity of cross-border banking on market concentration, we assume that flows in traditional safe-haven currencies reduce risk. The EUR is more volatile than the GBP (Malik, 2005) and holds a dominant share in cross-border bank flows. Moreover, both of them have ambiguous behaviour in the literature. Thus, we remain open to the possibility that its effects on SRISK may be highly conditional on MC levels and crisis regimes, reflecting its unstable or context-specific role in systemic risk

dynamics. Thus, we hypothesise:
H1e: Cross-border flows in safe haven currencies (CHF, JPY) reduce systemic banking risk considering market concentration and crisis periods.
H2e: Flows in non-safe haven currencies (EUR, GBP) do not consistently reduce systemic risk; their effects are ambiguous and depend on market concentration and crisis periods.

4 Methodology

4.1 Data and Variables

We use data on cross-border claims and liabilities from the BIS locational banking statistics (LBS) as our main source for the period 2000-2021. The sample includes 33 countries, selected based on the availability of cross-border banking flows denominated in those secondary reserve currencies. The list of countries is reported in **Table 2**. The LBS records outstanding claims and liabilities of globally operating banks located in source countries against their counterparts in other jurisdictions. In a seminal study of Choi and Furceri (2019) dropped offshore financial countries from their sample according to the classification of the IMF, assuming that they may behave anomalously from the other members of the sample. However, we are not excluding them from our analysis since those offshore financial countries—Cyprus, Hong Kong, Ireland, Luxembourg, and Switzerland—play a significant role in cross-border banking activities.

Table 2: List of Countries Used in the Study

Country	**Country**	**Country**
Australia	Austria	Belgium
Brazil	Canada	Chile
China	Cyprus	Denmark
Finland	France	Germany
Greece	Hong Kong	India
Ireland	Italy	Japan
Korea	Luxembourg	Mexico
Netherlands	Norway	Philippines
Portugal	Russia	South Africa
Spain	Sweden	Switzerland
Turkey	United Kingdom	United States

We use outstanding amounts (stocks) of cross-border claims and liabilities rather than exchange-rate-adjusted flows. While BIS-adjusted flows capture short-term changes, our focus is on the build-up of exposure over time. Stock data better reflects the total risk on bank balance sheets, which is more relevant for systemic vulnerability. Moreover, stocks provide a more stable measure of foreign currency positions. We therefore construct a net measure of exposure, defined as claims minus liabilities by currency, referred to as Net Claims by Currency. To account for differences in financial system size, we scale systemic risk and cross-border exposures by central bank total assets (CBTA). This reflects the central bank's capacity to absorb shocks, which varies across countries. CBTA is more relevant than GDP, as it captures the resources available for liquidity support and crisis management (Borio and Disyatat, 2010).

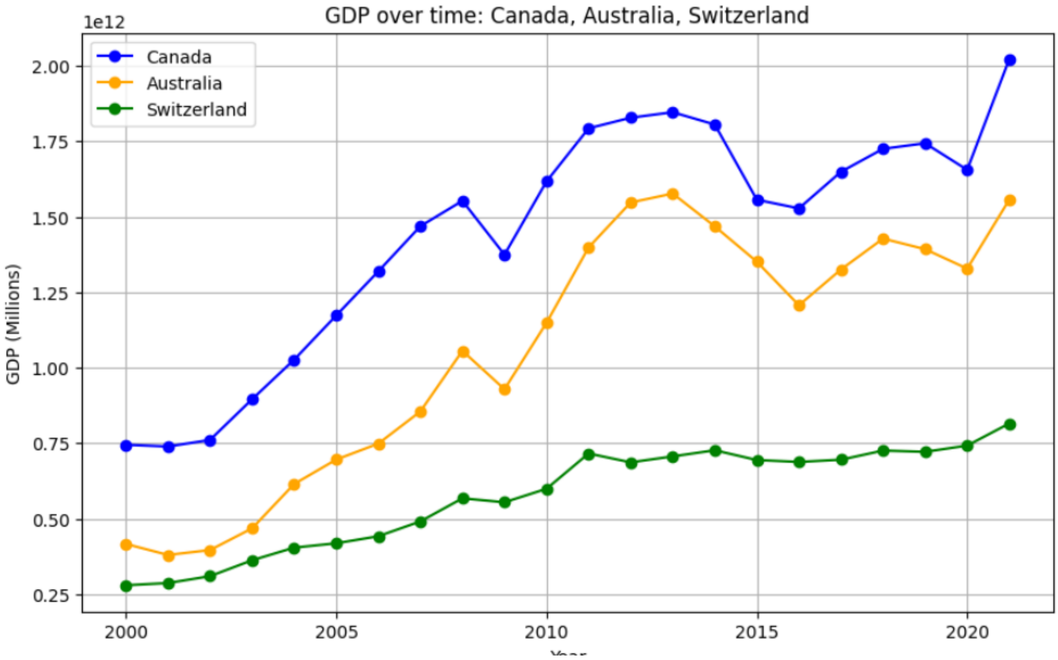

Figure 1: GDP-Canada, Switzerland, and Australia (source: World Bank)

This distinction is important for countries with small economies but large financial systems. For example, although economies like Canada and Australia have higher GDP than Switzerland, the Swiss central bank holds relatively larger assets ((**Figure 1**,**Figure 2**)). This reflects differences in policy frameworks and market intervention. Using GDP in such cases may overstate risk and understate institutional capacity. Instead, central bank balance sheets better capture financial system depth and policy tools (Cerutti et al., 2017). Therefore, CBTA provides a more meaningful benchmark for analysing cross-border exposures and risk management.

Our second data source is from the Volatility Laboratory (V-Lab) at New York University (New York University, nd), which includes our main dependent variables, SRISK. We use SRISK[‡] values from the end of each year following Brownlees and Engle (2017). We use V-Lab data because it specialises in financial risk management and systemic risk analysis. It provides expert and accurate data because it uses methodologies that are based on rigorous academic research, such as methods proposed by Acharya et al. (2017); Brownlees and Engle (2017); Engle (2016). In the recent literature on financial (in)stability, researchers across domains have made use of the data from V-Lab (Appendix C).

In addition to the BIS and the V-Lab, we incorporate a set of bank-market and macroeconomic variables to strengthen our analysis. We draw these variables from two well-established databases: the Global Financial Development Database (WBGFDD) of the World Bank (2024), and the Federal Reserve Economic Data (FRED) maintained by the Research Division

[‡]We focus solely on capital shortfalls, setting any surplus values to zero to ensure the measure reflects only systemic vulnerabilities, as per Brownlees and Engle (2017).

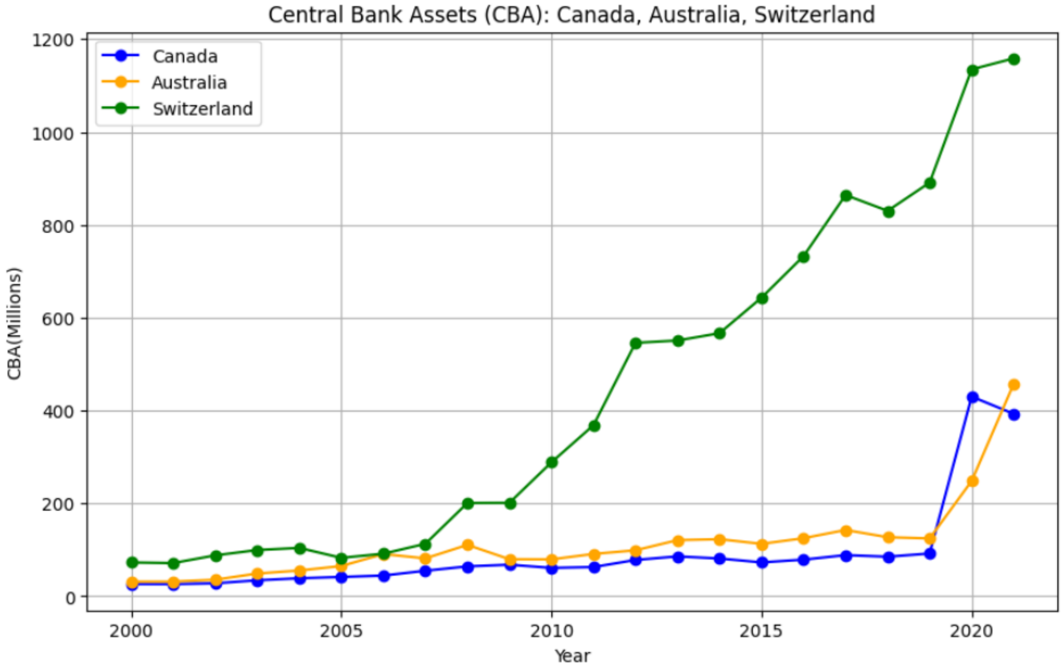

Figure 2: Central Bank Total Assets (source: BIS)

of the Federal Reserve Bank of St. Louis (2024). A detailed list of all variables, definitions, and data sources is provided in ??, Table 23.

4.2 Systemic Risk Measurement

In our study, we adopt the SRISK measure as defined by Brownlees and Engle (2017), which provides a forward-looking estimate of a financial institution's expected capital shortfall under a prolonged market downturn. SRISK is measured based on the bank's balance sheet size, leverage, and its anticipated equity loss under a market stressed condition, known as Long Run Marginal Expected Shortfall (Engle et al., 2024). The NYU Stern Systemic Risk Ranking denotes the firm's share of the financial sector's total capital shortfall. Firms with a high SRISK are not only the most affected in a crisis but also contribute significantly to the crisis. V-LAB computes the SRISK following Brownlees and Engle (2017) as follows:

$$\begin{aligned}\mathrm{SRISK}_{i,t} &= \mathbb{E}_{t-1}\left(\text{Capital Shortfall}_i \mid \text{Crisis}\right)\\ &= \mathbb{E}_{t-1}\left(k(\mathrm{Debt}_{i,t}+\mathrm{Equity}_{i,t}) - \mathrm{Equity}_{i,t} \mid \text{Crisis}\right)\\ &= k\cdot \mathrm{Debt}_{i,t} - (1-k)(1-\mathrm{LRMES}_{i,t})\cdot \mathrm{Equity}_{i,t} \qquad (1)\end{aligned}$$

Where i, t stand for bank and time, k represents the capital requirement, $\mathrm{Equity}_{i,t}$ refers to the firm's current market capitalization, $\mathrm{Debt}_{i,t}$ is the book value of debt, and LRMES stands for the Long Run Marginal Expected Shortfall. V-Lab computes LRMES with the following formula:

$$\mathrm{LRMES} = 1 - \exp\left(\log(1-d)\cdot\beta\right) \qquad (2)$$

where d is the six-month crisis threshold for market index decline, which is set at 40%, and β represents the measure of a stock's volatility relative to the overall market.

To strengthen the validity of our findings, we also employ the Z-score as a robustness check. The Z-score serves as an inverse proxy for default risk by combining profitability, leverage, and volatility. The World Bank (nd) computes the z-score as follows:

$$\text{Z-score} = \frac{\text{ROA} + \frac{\text{Equity}}{\text{Assets}}}{\text{Standard Deviation of ROA}} \tag{3}$$

4.3 Econometric Approach

This study uses an unbalanced of country-level observation across currencies and time. A panel framework controls for time-variant country effects and common year shocks. The model includes standard control variables. These capture key drivers of systemic risk.They include GDP growth, market returns, and stock volatility. They also include banking variables such as noninterest income, banking sector size, and market concentration. Prior studies identify these as important determinants of systemic risk (Engle, 2016; Brunnermeier et al., 2020; Engle et al., 2014; Karolyi et al., 2023). Their inclusion helps isolate the effect of external funding while accounting for country-specific risk factors.

USD-denominated flows are excluded. It is therefore necessary to control for the global role of the US dollar. To capture this effect, the VIX index is included as a proxy for global risk aversion and financial tightening. The VIX, derived from US equity options, is a widely used indicator of the global financial cycle (Bruno and Shin, 2015b; Rey, 2015). Evidence also shows that the global financial cycle is closely tied to the dollar (Jiang et al., 2024). Including the VIX ensures that estimates are not biased by global dollar liquidity conditions.

Before presenting results, Table 3 reports the expected signs of key variables based on the hypotheses in Section 3. These provide a benchmark for interpreting the findings.

4.4 Model Specification

We test our hypotheses on the currency–systemic risk relationship using panel data on cross-border bank flows denominated in major reserve currencies. Our objective is to examine whether currency-specific net claims affect systemic risk during normal periods and whether these effects intensify or mitigate during crisis episodes. To this end, we estimate a set of fixed-effects panel regressions that relate lagged currency-denominated net claims to subsequent changes in systemic risk. In particular, all independent variables except the crisis dummy are lagged by a period. This reflects the logical sequencing of financial developments, where balance sheet exposures and macro-financial conditions typically influence systemic risk with a delay. The lag structure also serves to mitigate potential simultaneity and reverse causality concerns.

Our baseline model is defined as follows:

$$\begin{aligned} \text{SRISK}_{i,t} = {} & \alpha_i + \delta_t + \beta_1 \cdot \text{NetClaims}_{i,t-1} + \beta_2 \cdot (\text{NetClaims}_{i,t} \times \text{Crisis}_{i,t})_{i,t-1} \\ & + \beta_3 \cdot X^{\text{Bank}}_{i,t-1} + \beta_4 \cdot X^{\text{Market}}_{i,t-1} + \beta_5 \cdot X^{\text{Macro}}_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

In Equation 4, $\text{SRISK}_{i,t}$ denotes systemic risk for country i at time t. $\text{NetClaims}_{i,t-1}$ represents lagged net cross-border claims denominated in a particular currency (CHF, JPY,

Table 3: Expected Signs of All Explanatory Variables on SRISK

Variable	**Exp. Sign**	**Period**	**Rationale**
Swiss Franc (CHF)			
Net_Claims_Chf	0 / −	Normal	H1a: (No) effect in stable periods.
CHFxCrisis	−	Crisis	H2a: Traditional safe haven.
Japanese Yen (JPY)			
Net_Claims_JPY	0	Normal	H1b: No effect in normal periods.
JPYxCrisis	− (weak)	Crisis	H2b: Conditional safe haven.
Euro (EUR)			
Net_Claims_Eur	0	Normal	H1c: No reduction outside crises.
EURxCrisis	−	Crisis	H2c: Conditional safe haven (non-EU).
British Pound (GBP)			
net_Claims_GBP	0 / ±	Normal	H1d: Limited or ambiguous.
GBPxCrisis	− (cond.)	Crisis	H2d: Possible safe-haven in crises.
Bank Controls			
noninterest	−	All	More diversification lowers risk.
log_CBTA	−	All	Liquidity support stabilises system.
Concentration	±	All	Concentration effect ambiguous.
Market Controls			
spv	+	All	Volatility increases risk.
smr	−	All	Higher returns reduce risk.
vix	+	All	Global uncertainty raises risk.
Macroeconomic Controls			
gdpg	−	All	Growth reduces risk.
inflation	±	All	Effect unclear in theory.
crisisdummy	+	Crisis	Crises increase systemic risk.

Note: "−" = expected reduction in SRISK; "+" = expected increase; "0" = no effect; "±" = ambiguous; "cond" = effect expected only under specific conditions (e.g., crises, regions).

EUR, or GBP). The interaction term $(\text{NetClaims} \times \text{Crisis})_{i,t-1}$ captures the differential effect of currency flows during global crisis episodes. A negative coefficient on this interaction term indicates that flows in that currency reduce systemic risk more strongly during crises, consistent with safe-haven behaviour. Country fixed effects (α_i) absorb time-invariant structural differences across countries, while time fixed effects (δ_t) control for global shocks common to all units.

Interaction with Market Concentration

$$\begin{aligned}\text{SRISK}_{i,t} = & \alpha_i + \delta_t + \beta_1 \cdot (\text{NetClaims}_{i,t} \times \text{MC}_{i,t})_{i,t-1} + \beta_2 \cdot (\text{NetClaims}_{i,t} \times \text{MC}_{i,t} \times \text{Crisis}_{i,t})_{i,t-1} \\ & + \beta_3 \cdot X^{\text{Bank}}_{i,t-1} + \beta_4 \cdot X^{\text{Market}}_{i,t-1} + \beta_5 \cdot X^{\text{Macro}}_{i,t-1} + \varepsilon_{i,t} \qquad (5)\end{aligned}$$

In this specification (Equation 5), $\text{MC}_{i,t}$ denotes market concentration in country i. The coefficients on the interaction terms indicate whether the effect of currency flows varies with the level of market concentration and whether this conditional effect becomes stronger during crisis periods.

4.5 Estimation Strategy

We begin with Ordinary Least Squares (OLS) regressions including country and year fixed effects to control for unobserved heterogeneity and common time shocks. Both fixed- and random-effects models are estimated, with the Hausman test favouring fixed effects (see Appendix A). This provides the baseline framework for analysing the relationship between cross-border bank flows and systemic risk across the four currencies. We also employ the Generalised Method of Moments (GMM), using lagged variables as instruments with country-clustered errors. The xtivreg2 estimator addresses endogeneity in currency-denominated CBBFs and their crisis interactions, arising from reverse causality or omitted variables such as regulatory changes or market sentiment. Lagged endogenous variables are used as instruments. GMM is preferred as it accounts for heteroskedasticity and within-country autocorrelation, and a two-step estimator ensures consistency. We also employ deeper internal instruments, including higher-order lags and their interactions, to strengthen identification and reduce weak-instrument bias. This follows standard panel data assumptions that lagged variables are valid instruments in the absence of serial correlation (Arellano and Bond, 1991; Blundell and Bond, 1998). Overall, this framework captures both average and conditional effects of foreign currency-denominated bank flows on systemic risk under normal and crisis conditions.

5 Descriptive Analysis

5.1 Descriptive Statistics

Table 4 reports descriptive statistics for the main variables. Currency-denominated cross-border net flows (CHF, JPY, GBP, EUR) and systemic risk measures are log-transformed and scaled by central bank total assets (CBTA). SRISK is right-skewed, with most observations between 0.5 and 1.0. A mass at zero reflects periods with no systemic capital shortfall. The long right tail indicates episodes of high systemic risk. This pattern is typical of SRISK, especially during crises. The Z-score is more concentrated, with a mean of 2.73 and standard deviation

Table 4: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
SRISK / CBTA	572	0.74	0.35	0.00	1.87
Log Z-Score	572	2.73	0.51	-0.21	4.07
CHF_Claims	572	0.02	0.14	-0.76	0.84
JPY_Claims	572	0.01	0.12	-0.43	0.64
GBP_Claims	572	0.04	0.11	-0.77	0.77
EUR_Claims	572	0.02	0.08	-0.26	0.91
Non-Interest Income	567	41.11	14.60	11.48	78.21
Market Volatility	572	21.07	8.75	7.56	64.33
GDP Growth	572	2.18	3.59	-10.94	24.62
Market Return	572	5.18	20.05	-74.56	149.62
Inflation	572	2.77	4.45	-4.45	54.92
Log CBTA	572	11.84	1.84	4.26	15.73
Concentration	567	79.18	16.29	37.95	100.00
Crisis Dummy	572	0.12	0.32	0.00	1.00
VIX	572	19.61	6.22	11.09	32.69
USD Index(log)	468	4.64	.099	4.50	4.78

of 0.51. Cross-border flows in safe haven currencies remain small. CHF and JPY average 2% and 1% of CBTA. EUR and GBP flows are larger, at 4% and 2%. This shows variation in currency composition across countries and time, supporting a disaggregated approach. For controls, noninterest income accounts for 41.1% on average. Market volatility averages 21.1% and ranges from 7.6% to above 64%. Market returns are highly dispersed, with a mean of 5.2% and values from –74.6% to 149.6%. The VIX ranges from 11.09 to 32.69, reflecting shifts in global risk. In contrast, the USD index (log) remains relatively stable(mean: 4.64).

On the macroeconomic side, GDP growth averages 2.2% with notable variation. Inflation is low at 2.8% on average. The log of central bank assets (in millions) has a mean of 11.84 and ranges from 4.26 to 15.73, showing strong heterogeneity. Market concentration[§] averages 79.2%, ranging from 38% to 100%, which indicates structural differences across banking systems. Finally, 12% of observations fall in crisis periods, based on a binary crisis dummy. This allows comparison between normal and stressed conditions

5.2 Matrix of correlations

The correlation matrix in **Table 5** shows expected relationships. SRISK and Z-score are weakly and negatively correlated. CHF and JPY flows are positively correlated, while GBP and EUR flows show moderate correlation. Better economic conditions (GDP growth, inflation, market returns, central bank assets) are linked to lower systemic risk. In contrast, market concentration, volatility, and crises increase risk. No strong multicollinearity is detected, as correlations and VIF values remain within acceptable limits (see Appendix A).

[§]Following the rule of thumb of the Federal Reserve Bank of St. Louis, markets where the top five firms hold more than 60% share are classified as highly concentrated (Hennerich, 2023). Accordingly, we construct a binary indicator for high market concentration.

Table 5: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) SRISK / CBTA	1.00														
(2) Log Z-Score	-0.10	1.00													
(3) CHF Claims / CBTA	0.06	-0.00	1.00												
(4) JPY Claims / CBTA	0.24	-0.01	0.33	1.00											
(5) GBP Claims / CBTA	0.04	-0.05	0.30	0.00	1.00										
(6) EUR Claims / CBTA	0.05	0.08	0.24	0.15	0.42	1.00									
(7) Non-Interest Income	0.07	0.29	0.06	0.21	-0.12	-0.02	1.00								
(8) Market Volatility	0.04	-0.15	0.17	0.03	0.07	0.12	-0.18	1.00							
(9) GDP Growth	-0.22	0.10	-0.05	0.00	-0.04	-0.07	0.04	-0.28	1.00						
(10) Market Return	-0.29	0.17	-0.03	-0.08	-0.02	-0.01	0.04	-0.28	0.47	1.00					
(11) Inflation	-0.22	-0.16	-0.03	-0.20	0.06	-0.02	-0.24	0.27	0.15	0.19	1.00				
(12) Log CB Assets (M)	-0.10	0.19	-0.02	-0.13	-0.22	-0.08	0.02	-0.07	-0.09	0.09	-0.06	1.00			
(13) Concentration	0.10	-0.35	-0.14	0.10	-0.11	-0.12	0.08	0.07	-0.16	-0.04	-0.08	-0.24	1.00		
(14) Crisis Dummy	0.14	-0.27	0.06	-0.02	-0.05	-0.05	-0.12	0.39	-0.32	-0.36	0.06	-0.05	0.07	1.00	
(15) vix	0.11	-0.01	-0.01	0.01	0.07	-0.12	0.51	-0.41	-0.47	0.04	0.01	0.04	0.47	1.00	

6 Empirical Results and Discussions

6.1 CHF-Denominated Bank Flows

Table 6 reports results on CHF-denominated net cross-border bank flows and systemic risk.In M4, the baseline CHF coefficient is negative but insignificant, supporting H1a that flows have no meaningful effect on SRISK in normal periods. The crisis interaction is negative and significant at the 5% level. This strongly supports H2a that CHF flows reduce SRISK during crises, consistent with traditional safe haven behaviour. A one standard deviation increase in CHF claims during crises reduces SRISK by 12%[¶] relative to its mean. M1–M3 appear significant only because they pool crisis and non-crisis periods without separation. M5 confirms robustness.

In general, these results reinforce the interpretation of the Swiss franc as a traditional safe haven currency. The consistent and strengthening negative relationship between CHF-denominated flows and systemic risk during financial distress is in line with earlier evidence (Grisse and Nitschka, 2015; Hossfeld and MacDonald, 2015). However, this study contributes to the literature by demonstrating that CHF-denominated bank flows, not just exchange rates, mitigate systemic financial risk during crises. In addition to the risk-reducing effect, it highlights a new channel through which safe-haven flows operate. This flow-based perspective offers a fresh contribution to understanding how CHF stabilises banking systems under stress. Overall, CHF flows are generally stabilising; their hedging capacity becomes particularly obvious in times of crisis.

These results also align with Ranaldo and Söderlind (2010), who finds that the CHF appreciates significantly in periods of equity market stress, bond price surges, and heightened FX volatility. Their study, along with others such as Campbell et al. (2010) and Kugler and Weder (2004), frames the CHF as a traditional safe haven. Our findings extend this narrative to the banking sector, which indicates that CHF flows serve as a buffer against systemic fragility in financial sector. Additional support for CHF's robust safe haven status comes from Hossfeld and MacDonald (2015), who show that the franc not only behaves as a haven during crises (negatively correlating with global stock market returns under stress) but also as a hedge in average conditions. This dual role strengthens our interpretation that CHF-denominated banking flows offer consistent protection against systemic risk, regardless of financial stress levels. Therefore, the Swiss franc shows its strong safe-haven behaviour in the financial industry as well. This qualification is in line with the conclusions of Cho and Han (2021); Fatum and Yamamoto (2016); Ranaldo and Söderlind (2010), and Wong and Fong (2018).

6.2 JPY-Denominated Bank Flows

Table 7 presents the regression results for Japanese yen (JPY)-denominated net bank flows and their impact on banking systemic crisis. Across all fixed effects (FE) specifications, the coefficient on JPY claims remains statistically insignificant. These results support Hypothesis H1b, which posits that JPY flows do not significantly affect SRISK in stable times. Similarly, the JPY flows with the crisis intersection are positive (M4) and do not show statistical

[¶]Effect = (Coef × Std. Dev. of var) / Mean of dep var × 100: $-0.635 \times 0.14/0.74 \times 100 = -12.0\%$

Table 6: CHF-Denominated Bank Flows and SRISK

	OLS				**IV (2-Step GMM)**
SRISK-CBTA	(M1)	(M2)	(M3)	(M4)	(M5)
CHF_Claim$_{t-1}$	-0.1990^{**}	-0.1651^{**}	-0.1463^{*}	-0.1173	-0.1189
	(0.0864)	(0.0822)	(0.0819)	(0.0824)	(0.2338)
CHF_Claim × Crisis$_{t-1}$				-0.6347^{**}	-1.9886^{**}
				(0.2585)	(0.9000)
Non_Int_Inc$_{t-1}$		-0.0036^{***}	-0.0030^{***}	-0.0030^{***}	-0.0029^{**}
		(0.0009)	(0.0009)	(0.0009)	(0.0013)
Volatility$_{t-1}$		0.0019	0.0009	0.0013	0.0004
		0.0016)	(0.0017)	(0.0017)	(0.0022)
Market_Return$_{t-1}$		-0.0017^{***}	-0.0015^{**}	-0.0016^{**}	-0.0030^{***}
		(0.0006)	(0.0007)	(0.0007)	(0.0010)
CBTA$_{t-1}$		-0.1566^{***}	-0.1650^{***}	-0.1660^{***}	-0.1169^{***}
		(0.0209)	(0.0213)	(0.0212)	(0.0444)
Concentration$_{t-1}$		-0.0021	-0.0021	-0.0021	-0.0020
		(0.0014)	(0.0014)	(0.0014)	(0.0023)
vix$_{t-1}$		0.1058^{***}	0.1031^{***}	0.0972^{***}	-0.0035
		(0.0131)	(0.0143)	(0.0144)	(0.0044)
GDPg$_{t-1}$			-0.0052	-0.0076^{*}	-0.0096^{*}
			(0.0042)	(0.0043)	(0.0056)
Inflation$_{t-1}$			-0.0009	-0.0007	0.0010
			(0.0028)	(0.0028)	(0.0032)
CrisisDummy$_{t}$			0.0949^{***}	0.1169^{***}	0.1505^{***}
			(0.0361)	(0.0370)	(0.0522)
Observations	539	534	534	534	502
No. of Countries	33	33	33	33	33
R-squared	0.1943	0.3138	0.3269	0.3354	0.2246
Country FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Note: The dependent variable is ***SRISK-CBTA***. All control variables are lagged by one period except for the crisis event. M1-M4 report OLS, and M5 reports two-step GMM IV estimates.All models include country and year fixed effects. In the IV specification, CHF-denominated flows and their interaction with the crisis are treated as endogenous, with internal instruments constructed from their own second lags. **Instrument validity diagnostics**: *Cragg–Donald Wald F = 61.435; Kleibergen–Paap rk Wald F = 147.087 (exceeds Stock–Yogo critical value of 7.03).*. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7: JPY-Denominated Bank Flows and SRISK

	OLS				IV (2-Step GMM)
SRISK-CBTA	(M1)	(M2)	(M3)	(M4)	(M5)
JPY_Claim$_{t-1}$	-0.0028	0.0032	0.0159	0.0144	0.0754
	(0.0993)	(0.0932)	(0.0938)	(0.098)	(0.2208)
JPY_Claim $\times$ Crisis$_{t-1}$				0.0134	-0.3233
				(0.2405)	(1.3549)
Non_Int_Inc$_{t-1}$		-0.0038^{***}	-0.0031^{***}	-0.0031^{***}	-0.0031^{**}
		(0.0009)	(0.0009)	(0.0009)	(0.0013)
Volatility$_{t-1}$		0.0016	0.0006	0.0006	-0.0009
		(0.0016)	(0.0017)	(0.0017)	(0.0035)
Market_Return$_{t-1}$		-0.0019^{***}	-0.0016^{**}	-0.0016^{**}	-0.0025^{**}
		(0.0006)	(0.0007)	(0.0007)	(0.0010)
CBTA$_{t-1}$		-0.1559^{***}	-0.1649^{***}	-0.1650^{***}	-0.1192^{***}
		(0.0210)	(0.0214)	(0.0214)	(0.0388)
Concentration$_{t-1}$		-0.0020	-0.0020	-0.0020	-0.0020
		(0.0014)	(0.0014)	(0.0014)	(0.0027)
vix$_{t-1}$		0.1027^{***}	0.0999^{***}	0.1000^{***}	-0.0001
		(0.0132)	(0.0142)	(0.0143)	(0.0040)
GDPg$_{t-1}$			-0.0057	-0.0057	-0.0034
			(0.0042)	(0.0042)	(0.0043)
Inflation$_{t-1}$			-0.0009	-0.0009	0.0001
			(0.0028)	(0.0029)	(0.0067)
CrisisDummy$_t$			0.0981^{***}	0.0979^{***}	0.1107^{**}
			(0.0362)	(0.0364)	(0.0502)
Observations	539	534	534	534	502
Number of Countries	33	33	33	33	33
R-squared	0.186	0.308	0.322	0.322	0.258
Country FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

*Note:*This table presents the results for JPY-denominated flows. The dependent variable is ***SRISK-CBTA***. All control variables are lagged by one period except for the crisis event, which is a dummy variable. Columns report OLS and two-step GMM IV estimates. In the IV specification, JPY-denominated flows and their interaction with the crisis dummy are treated as endogenous, with internal instruments constructed from their own second and third lags. **Instrument validity diagnostics**: *Cragg–Donald Wald F = 22.457; Kleibergen–Paap rk Wald F = 11.857 (exceeds Stock–Yogo critical value of 7.03).*. Standard errors are reported in parentheses. *******, ******, and ***** denote statistical significance at the 1%, 5%, and 10% levels, respectively.

significance. Therefore, results provide no strong evidence of a risk-mitigating effect during periods of financial distress, at least in the setting of cross-border banking activities. Overall, the results do not support H2b also.

The yen shows a more mixed profile. Cheng et al. (2021) and Ranaldo and Söderlind (2010) highlight its safe-haven role during the global financial crisis, especially through appreciation in periods of falling equity markets and rising bond yields. In contrast, our results show that JPY-denominated bank flows are weakly or not stabilising in cross-border banking. In some cases, they appear procyclical or risk-amplifying, particularly in emerging markets (Table 18) and during high volatility (Appendix B). This difference may reflect the role of the yen as a funding currency in carry trades. Hossfeld and MacDonald (2015) do not classify the yen as a classic safe haven but as a carry funding currency. Its appreciation during crises is often linked to the unwinding of carry trades rather than safe-haven demand. Brunnermeier et al. (2008) show that such trades can reverse sharply during financial stress. Recent evidence also suggests that the yen's safe-haven role depends on the type of crisis. Park and Fang (2025) show that while the yen was seen as a strong safe haven during the 2007–09 crisis, it did not play the same role during the Ukraine war. In that case, Japan's energy dependence weakened confidence in the currency. Overall, our findings are consistent with this view. The yen may act as a stabiliser in some periods, but its effect on systemic crises is not consistent or robust.

The behaviour of JPY is justified in our study as JPY does not show safe-haven-like behaviour, considering systemic financial crises. Because JPY does not always show this hedging behaviour. It varies from time to time, risk to risk, and regime to regime. For example, the results of Fatum and Yamamoto (2016) suggest that during the GFC, the JPY exhibited the most pronounced safe haven behaviour. This pattern shows its time-dependent behaviour, which aligns with our findings. For example, JPY flows show limited stabilising effects, particularly in emerging markets. Therefore, the role of Yen in cross-border banking appears more for short-term needs than for long-term investment decisions, driven by funding pressures rather than investor risk aversion.

6.3 EUR-Denominated Bank Flows

Table 8 reports the relation between EUR-denominated cross-border bank flows and the systemic risk contribution. The baseline fixed effects (FE) models yield no statistically significant effect of net claims in euros on SRISK in normal periods. The coefficients vary in sign across specifications. Therefore, euro-denominated flows do not reduce systemic risk during tranquil conditions. This is consistent with Hypothesis H1c, which posits a lack of SRISK-reducing behaviour in normal periods.

EUR-denominated claims show unstable effects. They shift from positive to negative and back across specifications. However, results are statistically insignificant with no support for H2c. These findings add to existing debates by showing that euro-denominated flows do not consistently reduce systemic risk, even during crisis periods. Unlike prior work that broadly classifies the euro as a conditional safe haven, our flow-based evidence highlights its limited stabilising power in cross-border banking.

However, in non-European economies(Table 17), we observe marginal evidence of a stabilising effect during crises. This mirrors Ranaldo and Söderlind (2010)'s classification of the euro as a "mixed case",where its safe haven role is neither robust nor uniformly present. While

Table 8: EUR-Denominated Bank Flows and SRISK

	OLS				IV (2-Step GMM)
SRISK-CBTA	(M1)	(M2)	(M3)	(M4)	(M5)
EUR_Claim$_{t-1}$	0.1363	−0.0033	0.0227	0.0225	−0.3986
	(0.1291)	(0.1240)	(0.1234)	(0.1237)	(1.0271)
EUR_Claim × Crisis$_{t-1}$				0.0144	−0.2907
				(0.5149)	(1.4300)
Non_Int_Inc$_{t-1}$		−0.0038***	−0.0031***	−0.0031***	−0.0035**
		(0.0009)	(0.0009)	(0.0009)	(0.0015)
Volatility$_{t-1}$		0.0016	0.0006	0.0006	−0.0005
		(0.0016)	(0.0017)	(0.0017)	(0.0037)
Market_Return$_{t-1}$		−0.0019***	−0.0016**	−0.0016**	−0.0026**
		(0.0006)	(0.0007)	(0.0007)	(0.0011)
CBTA$_{t-1}$		−0.1560***	−0.1644***	−0.1644***	−0.1309***
		(0.0211)	(0.0215)	(0.0216)	(0.0481)
Concentration$_{t-1}$		−0.0020	−0.0020	−0.0020	−0.0014
		(0.0014)	(0.0014)	(0.0014)	(0.0027)
vix$_{t-1}$		0.1028***	0.0999***	0.0999***	0.0004
		(0.0132)	(0.0142)	(0.0144)	(0.0041)
GDPg$_{t-1}$			−0.0057	−0.0056	−0.0029
			(0.0042)	(0.0042)	(0.0045)
Inflation$_{t-1}$			−0.0010	−0.0010	0.0008
			(0.0028)	(0.0028)	(0.0038)
CrisisDummy$_t$			0.0986***	0.0985***	0.0965
			(0.0363)	(0.0363)	(0.0646)
Observations	539	534	534	534	502
Number of Countries	33	33	33	33	33
R-squared	0.187	0.308	0.3224	0.3224	0.236
Country FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

*Note:*This table presents the regression results for EUR-denominated flows. The dependent variable is ***SRISK-CBTA***. All control variables are lagged by one period except for the crisis event, which is a dummy variable. Columns report OLS and two-step GMM IV estimates. In the IV specification, CHF-denominated flows and their interaction with the crisis dummy are treated as endogenous, with internal instruments constructed from their own second and third lags. **Instrument validity diagnostics**: *Cragg–Donald Wald F = 8.710; Kleibergen–Paap rk Wald F = 0.580 (below Stock–Yogo critical value of 7.03).* Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

the euro may offer relative stability within the eurozone, our findings suggest that its capacity to reduce banking sector risk via international flows is conditional and region-specific. It aligns with the euro's ambiguous behaviour(Hossfeld and MacDonald, 2015).

Despite all member countries operating under a single monetary authority, the European Central Bank, this divergence points to an underlying structural inconsistency(Habib and Stracca, 2012). For example, the fiscal policies of the PIIGS[‖] nations vary greatly from those of France and Germany. As a result, the euro lacks the clean, countercyclical behaviour typically associated with currencies like the Swiss franc. In our analysis, this uneven behaviour helps explain why the euro does not emerge as a clear-cut safe haven.

6.4 GBP-Denominated Bank Flows

Table 9 presents the results for GBP-denominated cross-border bank flows and systemic crisis. The fixed effects (FE) specifications indicate consistent directional evidence regarding the effect of GBP flows on systemic risk in normal times. Model 2 shows the risk-reducing role of GBP in CBBFs on average with statistical significance at the 10% level. Others remain insignificant but directionally unchanged. These inconsistencies align with Hypothesis H1d, which posits that GBP flows have limited or ambiguous effects on SRISK in tranquil periods. The variation in significance across models suggests that GBP's role in driving systemic risk may be context-sensitive or dependent on omitted macro-financial dynamics.

Marginally significant evidence emerges for crisis periods. The crisis interaction term is negative and statistically significant at the 10% level in the most complete model (Model 4)[**]. It means an increase of one standard deviation in GBP Claims during crisis periods corresponds to an 11.6% reduction in SRISK/CBTA compared to its average level. The M5 (IV) estimation further confirms this relation. These findings lend moderate support to Hypothesis H2d, which suggests that GBP flows reduce SRISK during crises, indicating an unexpected or conditional safe haven behaviour. While GBP is not classified as a traditional safe haven like CHF or JPY, emerging evidence suggests it can exhibit safe haven properties during market distress, with regional constraints (Ciner et al., 2013; Wong and Fong, 2018).Thus, GBP flows appear to play a stabilising role under stress, even if their behaviour in normal times remains somewhat ambiguous.

Perhaps the most surprising result comes from GBP-denominated flows. This may seem unexpected, but it is consistent with the asymmetric patterns we have seen in safe haven dynamics in the past literature (Habib and Stracca, 2012). Our findings suggest that the British pound (GBP) acts as a risk-reducing currency in the context of cross-border bank flows and systemic banking risk. This is consistent with post-GFC evidence that GBP exhibits asymmetric behaviour in macro-financial relationships. For instance, Ciner et al. (2013) identify a structural shift in the relationship between oil prices and the British pound. While the correlation was negligible before the 2007–2008 financial crisis, a positive association emerged in the aftermath. A supplementary analysis focusing on the post-Brexit years (2016–2021) shows that sterling-denominated flows continue to reduce systemic risk. This reinforces the resilience of sterling's stabilising role in global banking during this period (see Table 22.)

[‖] The PIIGS refers to Portugal, Italy, Ireland, Greece, and Spain—Eurozone countries that were significantly affected by the sovereign debt crisis following the 2008 global financial crisis.

[**] $-0.783 \times 0.11/0.74 \times 100 = -11.6\%$

Table 9: GBP-Denominated Bank Flows and SRISK

	OLS				IV (2-Step GMM)
SRISK-CBTA	(M1)	(M2)	(M3)	(M4)	(M5)
GBP_Claim$_{t-1}$	-0.0601	-0.2169^{*}	-0.1686	-0.1410	-0.2178
	(0.1197)	(0.1143)	0.1149)	(0.1155)	(0.3740)
GBP_Claim $\times$ Crisis$_{t-1}$				-0.7832^{*}	-1.6904^{*}
				(0.4155)	(0.9993)
Non_Int_Inc$_{t-1}$		-0.0038^{***}	-0.0032^{***}	-0.0032^{***}	-0.0033^{**}
		(0.0009)	(0.0009)	(0.0009)	(0.0012)
Volatility$_{t-1}$		0.0022	0.0011	0.0016	0.0009
		(0.0016)	(0.0017)	(0.0017)	(0.0030)
Market_Return$_{t-1}$		-0.0019^{***}	-0.0016^{**}	-0.0019^{***}	-0.0029^{**}
		(0.0006)	(0.0007)	(0.0007)	(0.0012)
CBTA$_{t-1}$		-0.1629^{***}	-0.1697^{***}	-0.1671^{***}	-0.1128^{***}
		(0.0212)	(0.0216)	(0.0216)	(0.0425)
Concentration$_{t-1}$		-0.0020	-0.0020	-0.0020	-0.0020
		(0.0014)	(0.0014)	(0.0014)	(0.0024)
vix$_{t-1}$		0.1067^{***}	0.1032^{***}	0.0983^{***}	-0.0017
		(0.0132)	(0.0143)	(0.0145)	(0.0037)
GDPg$_{t-1}$			-0.0054	-0.0065	-0.0047
			(0.0042)	(0.0042)	(0.0041)
Inflation$_{t-1}$			-0.0009	-0.0010	0.0029
			(0.0028)	(0.0028)	(0.0035)
CrisisDummy$_{t}$			0.0911^{**}	0.1017^{***}	0.1159^{**}
			(0.0364)	(0.0367)	(0.0539)
Observations	539	534	534	534	502
Number of Countries	33	33	33	33	33
R-squared	0.1860	0.3131	0.3255	0.3305	0.2664
Country FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

*Note:*This table presents the results of the base model described in Eq. (3). The dependent variable is ***SRISK-CBTA***. All control variables are lagged by one period except for the crisis event, which is a dummy variable. Columns report OLS and two-step GMM IV estimates. In the IV specification, GBP-denominated flows and their interaction with the crisis dummy are treated as endogenous, with internal instruments constructed from their own lags. **Instrument validity diagnostics**: *Kleibergen–Paap LM = 10.004 (p = 0.0016); KP rk Wald F = 6.208 (> Stock–Yogo critical value = 7.03 at 10% relative bias); Endogeneity test Chi-sq(2) = 0.716 (p = 0.6991).* Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Moreover, Ranaldo and Söderlind (2010) find the pound to be the least safe among major currencies in asset markets. This view was later complemented by (Grisse and Nitschka, 2015). However, it has shown strong safe-haven-like behaviour in our analysis that GBP flows can reduce banking risk during crises. Particularly, this risk-reducing behaviour is pronounced in emerging (Table 18) and non-EU countries (Table 17). This shift implies that GBP became more sensitive to global financial dynamics. Such time-varying sensitivity reinforces the idea that GBP adapts its global role depending on the prevailing economic regime, which may help explain its observed stabilising effect in international banking networks. Thus, the pound's stabilising role may manifest more through the liability and funding channel of global banks rather than through its asset price dynamics. It highlights the need to differentiate between currencies as safe havens in capital markets versus safe flows in international banking.

Building on this, several factors help explain GBP's stabilising effect in our study. First, it retains a quasi-reserve status and is actively used in global wholesale funding markets. This liquidity feature allows GBP-denominated exposures to remain serviceable even in turbulent conditions in the global banking sector. Second, the Bank of England's monetary credibility, supported by an inflation-targeting regime and operational independence, has historically anchored investor confidence on Pound Sterling during crisis periods (Benati, 2005; Park, 2023). Third, portfolio-based evidence from the Bank of England (Cenedese, 2015) shows that GBP offers asymmetric hedging benefits, behaving more like a stabiliser when global equity markets become stressed. This regime-switching behaviour is consistent with the asymmetric patterns we observe in banking risk. Finally, the UK's legal and institutional strength is complemented by London's central role in global finance, which accounts for nearly 43% of global FX turnover (Goodacre and Razak, 2019; Schrimpf and Sushko, 2019). The structural importance of London in global banking reinforces the institutional appeal of GBP-denominated assets, especially during periods of stress. In fact, many international banks manage a substantial share of their balance sheet operations through London-based subsidiaries, often using GBP as a settlement or funding currency. This further supports GBP's capacity to behave as a stabilising force in international banking, which is in line with the risk-reducing effects observed in our analysis.

6.5 Joint Significance of Currency Channels

Table 10 reports Wald tests. It examines the joint effect of currency flows and their crisis interactions. The results show a strong combined effect for CHF. This confirms that CHF flows, together with their crisis dynamics, play an important role in explaining systemic risk. For GBP, the joint effect is weaker and only marginally significant. This suggests limited evidence of a conditional GBP channel.In contrast, there is no joint significance for JPY and EUR.Overall, the results highlight the central role of CHF as a stabilising currency, provide weak support for GBP, and show no clear effects for JPY and EUR.

6.6 Crisis-Conditional Effects of Currency Flows Under Market Concentration

Table 11 presents the result for net cross-border bank flows denominated in major reserve currencies (CHF, JPY, EUR and GBP) influence on banking systemic crisis when the market is highly concentrated. This intersection with varying market structures reveals important asymmetries in how cross-border flows influence systemic risk. Net CHF-denominated claims

Table 10: Joint Significance Tests for Currency-Denominated Flows

Currency	Tested Coefficients	F-Statistic	p-value
CHF	CHF_Claim$_{t-1}$, CHF_Claim $\times$ Crisis$_{t-1}$	4.63	0.0102
JPY	JPY_Claim$_{t-1}$, JPY_Claim $\times$ Crisis$_{t-1}$	0.02	0.9843
EUR	EUR_Claim$_{t-1}$, EUR_Claim $\times$ Crisis$_{t-1}$	0.02	0.9829
GBP	GBP_Claim$_{t-1}$, GBP_Claim $\times$ Crisis$_{t-1}$	2.86	0.0583

tend to reduce systemic risk when the financial condition is calm, though this is statistically insignificant. The Swiss Franc acts as a stabilising force, particularly in concentrated banking systems, during episodes of market stress. It reveals its traditional haven role in crisis periods, which is statistically highly significant. A one standard deviation increase in CHF claims is associated with an 18.0% decrease in SRISK, considering high market concentration and crisis episodes[††]. In contrast, JPY- and EUR-denominated flows display no meaningful effect in either normal or crisis periods. Although the crisis interaction term is negative, it lacks statistical significance and points to an ambiguous role for both in mitigating systemic risk through the concentration channel.

However, GBP-denominated flows show a clear and significant pattern. While the main effect in normal periods is negative and not significant, the crisis interaction term is economically large, negative, and significant at 1% threshold. A one standard deviation rise in GBP claims, when market concentration is high and there is a crisis, leads to a 19.5% reduction in average risk[‡‡]. Overall, CHF and GBP show persistent behaviour in mitigating risk in this setting of cross-border bank flows and banking system-wide turmoil, taking different market conditions and structure into account.

To assess the full effect of currency flows in concentrated markets during crises, we compute total marginal effects by combining the main and interaction terms (Table 12). The results show that CHF and GBP flows reduce systemic risk in these conditions, with GBP showing a stronger effect. Overall, CHF and GBP flows are linked to lower banking risk during crises in highly concentrated markets. This supports H1e for CHF. The strong effect of GBP suggests it may act as a conditional safe haven in such systems, which partly challenges H2e. In contrast, EUR flows show no clear or consistent impact, in line with the ambiguous expectations in H2e.

In the financial stability literature, the role of market concentration is debated. This is known as the concentration–stability versus concentration–fragility view. Our results support the concentration–stability argument in cross-border banking. CHF and GBP flows reduce systemic risk during crises in concentrated systems. This shows that domestic financial structure shapes the impact of capital flows. This finding is in line with prior studies. Large banks tend to be more stable as they diversify risk and face less contagion (Chang et al., 2008; Beck et al., 2006). Concentration can also reduce excessive risk-taking by smaller banks. Calice et al. (2021) highlight three channels. Concentration raises bank profits, improves monitoring, and increases diversification. These factors support financial stability.

[††] $-0.949 \times 0.14/0.74 \times 100 = -18\%$
[‡‡] $-1.309 \times 0.11/0.74 \times 100 = -19.5\%$

Table 11: Currency Flow Effects in Crisis-Period Concentrated Systems

	Fixed Effects			
SRISK-CBTA	(M1)	(M2)	(M3)	(M4)
CHF_Claim × MC_{t-1}	-0.0819			
	(0.0794)			
CHF_Claim × MC × $Crisis_{t-1}$	-0.9487^{***}			
	(0.2678)			
JPY_Claim × MC_{t-1}		0.0463		
		(0.0997)		
JPY_Claim × MC × $Crisis_{t-1}$		-0.2403		
		(0.2454)		
EUR_Claim × MC_{t-1}			0.0104	
			(0.1254)	
EUR_Claim × MC × $Crisis_{t-1}$			-0.6714	
			(0.5575)	
GBP_Claim × MC_{t-1}				-0.1121
				(0.1128)
GBP_Claim × MC × $Crisis_{t-1}$				-1.3087^{***}
				(0.4313)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	534	534	534	534
Number of ID	33	33	33	33
R-squared	0.344	0.324	0.324	0.338

Note: This table reports fixed-effects regression results of SRISK/CBTA on currency-denominated flows, their interactions with market concentration (MC), and crisis-period concentration effects (Currency × Crisis × MC). All variables are lagged by one period, except the crisis dummy. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12: Total Effect of Currency Flows in Concentrated Banking Systems During Crisis Periods

Currency	**Total Effect**	**Standard Error**	**t-statistic**	**p-value**
CHF	-1.031	0.267	-3.86	0.000
JPY	-0.194	0.237	-0.82	0.412
EUR	-0.661	0.566	-1.17	0.243
GBP	-1.421	0.432	-3.29	0.001

7 Robustness Tests and Subsample Analyses

7.1 Robustness Check 1: Alternative Treatment of Time Effects

Our baseline model includes country and time fixed effects. Time effects remove shocks that affect all countries at the same time. This is useful, but it can hide important patterns. Safe-haven flows and systemic risk often move together during global stress. Time effects may remove this common variation. As noted by Brunnermeier et al. (2020), this can remove the key information needed to study risk build-up.

To address this, we re-estimate the model using only country fixed effects Table 13. We drop time effects and allow global variables, such as the VIX and crisis dummy, to capture common shocks. The results show that CHF and GBP flows remain similar to the baseline and become slightly stronger. JPY and EUR remain insignificant. This suggests that our main findings are not driven by time fixed effects.

Table 13: Alternative treatment of time effects

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims$_{t-1}$	-0.0536	-0.0344	0.1343	0.1264
	(0.0908)	(0.1046)	(0.1366)	(0.1253)
Net ClaimsxCrisis$_{t-1}$	-0.7191***	-0.1185	-0.5933	-1.0554**
	(0.2747)	(0.2601)	(0.5679)	(0.4316)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✗	✗	✗	✗
Observations	534	534	534	534
Number of ID	33	33	33	33
R-squared	0.1210	0.1081	0.1109	0.1191

Notes: This table reports fixed-effects regressions of SRISK-CBTA on lagged CHF-, JPY-, EUR-, and GBP-denominated cross-border bank flows. All specifications include country fixed effects only; time fixed effects are intentionally omitted in order to examine sensitivity to the treatment of common global shocks. All explanatory variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

7.2 Robustness Check 2: Alternative Dependent Variable –Z-score

To test robustness, we re-estimate the fixed effects models using the Z-score as an alternative dependent variable. Table 14 reports the results for each currency. The results differ from the SRISK estimates. For CHF flows, neither the main term nor the crisis interaction is significant. This suggests CHF flows may reduce forward-looking systemic risk, as seen with SRISK, but do not affect accounting-based solvency. This is consistent with Karolyi et al. (2023), who find that claims are not significant when using the Z-score.

In contrast, JPY and GBP flows show large and significant crisis interactions. Both are positive and significant at the 1% level. This indicates that during crises, these flows are linked to higher Z-scores and improved solvency. These results support the earlier SRISK findings and provide stronger evidence for H2b and H2d under an alternative risk measure.

Table 14: Currency Flow Effects on Alternative Variable – Z-score

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims_{t-1}	-0.0433	-0.1420	0.3125*	0.1542
	(0.1112)	(0.1294)	(0.1646)	(0.1530)
Net $\text{ClaimsxCrisis}_{t-1}$	0.0119	1.0374***	-0.9057	2.0072***
	(0.3491)	(0.3182)	(0.6852)	(0.5503)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	534	534	534	534
Number of ID	33	33	33	33
R-squared	0.363	0.377	0.370	0.383

Notes: This table presents results from fixed effects regressions of Z-score on CHF,JPY,EUR,GBP-denominated flows. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The results for EUR flows are weaker. Only The main effect is positive and marginally significant. This supports earlier findings that the euro is a weak or conditional safe-haven role (Ranaldo and Söderlind, 2010).

Overall, the Z-score results confirm the stabilising role of JPY and GBP during crises. CHF flows remain insignificant but show a similar direction. This suggests their effect is more visible in market-based measures such as SRISK. EUR remains unclear across both measures.

7.3 Robustness Check 3: Alternative Proxy for Global Financial Conditions

To assess whether these findings depend on the choice of global risk proxy, we replace the VIX with the Nominal Broad U.S. Dollar Index, which captures the dollar cycle and reflects the USD's role as the global numeraire currency. Given the dominant influence of the USD on this global financial landscape, the USD Index provides a complementary measure of USD-driven global financial conditions. Thus, this alternative specification provides a meaningful robustness check (Table 15). Under this specification, CHF remains the only currency with a statistically robust risk-reducing effect, whereas the marginal significance previously observed for GBP disappears. This suggests that the marginally significant stabilising effect of GBP is not independent of USD-driven global financial conditions. Consistent with the baseline results, JPY and EUR also remain statistically insignificant. This confirms that the safe-haven profile of CHF is stable across alternative global controls, while the apparent behaviour of GBP is not robust.

Table 15: USD Index as A Control for Dollar Cycle

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims_{t-1}	-0.1923**	0.1653	0.0281	-0.1281
	(0.0767)	(0.1176)	(0.1103)	(0.1091)
Net $\text{ClaimsxCrisis}_{t-1}$	-0.4276*	0.0192	0.4289	-0.5150
	(0.2376)	(0.2233)	(0.4819)	(0.4023)
Dollar Index_{t-1}	2.3320***	2.2540***	2.3751***	2.2979***
	(0.3521)	(0.3606)	(0.3537)	(0.3552)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	431	431	431	431
No. Country	33	33	33	33
R-squared	0.3272	0.3104	0.3074	0.3120

Notes: The USD Index: an alternative proxy for the global financial cycle and the U.S. dollar's role. All independent variables are lagged by one period ($t-1$), except for Crisis. The dependent variable: SRISK-CBTA.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

7.4 Subsample analyses 1: European vs Non-European Countries

To assess regional differences, we split the sample into EU (Table 16) and non-EU countries (Table 17) and re-estimate the SRISK models. The results show that safe-haven effects are mainly present in non-EU countries. For CHF, the crisis interaction is negative and significant only in the non-EU sample. This confirms its risk-reducing role outside the euro area. JPY flows are not significant in either region.

Stronger results appear for EUR and GBP. Neither currency shows stabilising effects in EU countries. In non-EU countries, both have negative and significant crisis interactions. GBP flows reduce SRISK in both normal and crisis periods. EUR flows reduce risk only during crises, supporting H2c that the euro acts as a conditional safe haven outside Europe. These results suggest that reserve currencies have stronger stabilising effects outside their home regions.

The weak results in the EU sample can be explained by two factors. First, European banking systems are highly diverse, with different structures and business models (Montagner, 2025). Second, Europe relies on complex cross-border intermediation, often involving non-bank institutions (Lane and Milesi-Ferretti, 2018; Lane, 2024). This may weaken clear patterns in how currency flows affect systemic risk.

Table 16: Currency Flow Effects and SRISK European Economies

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims_{t-1}	0.0410	-0.1187	0.7178	0.2757
	(0.1249)	(0.1409)	(0.4715)	(0.1925)
Net $\text{ClaimsxCrisis}_{t-1}$	-0.4333	0.0794	0.6634	-0.2240
	(0.3191)	(0.2848)	(0.7313)	(0.5380)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	269	269	269	269
Number of ID	15	15	15	15
R-squared	0.307	0.304	0.314	0.308

Notes: This table presents results from fixed effects regressions of SRISK-CBTA on currency-denominated flows and controls for European economies. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 17: Currency Flow Effects and SRISK non-European Economies

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims_{t-1}	-0.1538	0.1224	0.0857	-0.3087**
	(0.1171)	(0.1377)	(0.1260)	(0.1393)
Net $\text{ClaimsxCrisis}_{t-1}$	-1.0134**	-0.1055	-1.3322*	-1.5972**
	(0.4573)	(0.5288)	(0.7206)	(0.7180)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	265	265	265	265
Number of ID	18	18	18	18
R-squared	0.532	0.519	0.525	0.540

Notes: This table presents results from fixed effects regressions of SRISK-CBTA on currency-denominated flows and controls for non-European economies. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

7.5 Subsample analyses 2: Emerging Economies vs Advanced Economies

To further assess heterogeneity in the currency-risk relationship, we re-estimate the SRISK models using emerging and advanced economies. The results suggest that safe haven behaviour is far more pronounced and economically meaningful in these countries, particularly during crisis periods.

Table 18: Currency Flow Effects and SRISK Emerging Economies

	$SRISK_{CHF}$	$SRISK_{JPY}$	$SRISK_{EUR}$	$SRISK_{GBP}$
	(1)	(2)	(3)	(4)
Net $Claims_{t-1}$	-0.0005	0.1811	-0.2138	-0.1660
	(0.1736)	(0.1856)	(0.3249)	(0.2095)
Net $ClaimsxCrisis_{t-1}$	-5.3920	2.6326*	-30.6647	-4.0411*
	(3.3396)	(1.5824)	(18.4629)	(2.3296)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	126	126	126	126
Number of ID	9	9	9	9
R-squared	0.700	0.704	0.702	0.703

Notes: This table presents results from fixed effects regressions of SRISK-CBTA on currency-denominated flows and controls for emerging economies. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Across both crisis and stable periods, most currecny-denominated flows reduce risk in emerging economies, except JPY. However, only GBP flows remain statistically significant during crises. This pattern is consistent with Karolyi et al. (2023), who show that systemic risk declines more when funds come from stongly regu

On the contrary, the JPY reveals its unexpected procyclical or destabilising effect in crisis periods, such as the yen's role in global carry trade dynamics for emerging economies. The relation is positive and marginally significant[§§]. However, only the Swiss franc shows a statistically significant relation for the advanced economies, which is consistent with the safe haven narrative. Overall, the emerging economy subsample shows that international currencies play different roles in financial stability. CHF and GBP flows remain stabilising. JPY appears destabilising, while the euro shows mixed and uncertain effects. In contrast, in advanced economies, GBP no longer shows a stabilising effect, and JPY is no longer destabilising. This difference shows that the impact of currency flows depends on the financial structure of the holding country.

[§§] $2.633 \times 0.12/0.74 \times 100 = 42.7\%$

Table 19: Currency Flow Effects and SRISK Advanced Economies

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims_{t-1}	0.1051	0.1281	0.0474	0.0162
	(0.0970)	(0.11640)	(0.1263)	(0.1353)
Net $\text{ClaimsxCrisis}_{t-1}$	-0.5978**	-0.2830	-0.0602	-0.5205
	(0.2404)	(0.2344)	(0.4680)	(0.41711)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	408	408	408	408
Number of ID	24	24	24	24
R-squared	0.283	0.273	0.270	0.273

Notes: This table presents results from fixed effects regressions of SRISK-CBTA on currency-denominated flows and controls for advanced economies. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

8 Conclusion

This study investigates the link between cross-border bank flows and financial stability by assessing how cross-border bank flows denominated in the Swiss franc, the Japanese yen, the Euro, and the Pound sterling affect systemic banking risk. In particular, it aims to understand whether these flows carry stabilising or destabilising properties, and how market concentration and crisis periods condition their effects. Results demonstrate that the Swiss franc continues to act as a reliable safe haven, significantly reducing systemic risk during crises. In contrast, yen flows, also a traditional safe haven, show no consistent stabilising effect in a cross-border setting. Rather, it appears as a funding currency which is also region-contingent. The effects of the euro are largely ambiguous, which reflects its dual identity as both a regional reserve and a crisis-prone currency. Interestingly, the British pound emerges with stabilising properties. Moreover, its post-Brexit behaviour points to the evolving role of sterling in global banking networks.

This research contributes to the literature in three main ways. First, it shows that currency composition is an important factor in cross-border banking. Second, we look at classifications of safe-haven currencies through the currency channel in global banking. Third, by employing a panel framework with crisis interactions and market concentration dynamics, it demonstrates the importance of institutional structures in shaping how global flows translate into local vulnerabilities.

For regulators, these findings suggest that systemic risk assessments cannot treat cross-border flows as homogeneous. The currency denomination of these flows and the degree of concentration within domestic banking markets critically shape financial stability outcomes.

Policymakers should therefore consider valuation effects and safe haven dynamics when designing macroprudential frameworks.

This analysis is limited by its reliance on BIS locational banking statistics data, which covers a lot but does not show differences between individual banks. Furthermore, our study focuses primarily on banking flows, leaving aside the rapidly growing role of non-bank financial institutions. A further limitation is that the analysis takes the current hierarchy of reserve currencies as given. However, the role of reserve assets is not immutable: geopolitical shifts, financial innovation, and the advent of digital currencies may alter safe haven properties in ways future research will need to explore. Overall, the hedging properties of currencies are neither fixed nor universal. They evolve with global capital flows, domestic market structures, and risk-off episodes. Therefore, we need to crucially recognise this complexity if we are to safeguard stability in an increasingly interconnected financial system.

Appendix A

Table 20: Variance Inflation Factors across Currency Specifications appendixB

Variable (L1 unless stated)	**CHF**	**JPY**	**EUR**	**GBP**
GDPg	1.57	1.52	1.54	1.56
Volatility	1.72	1.57	1.60	1.67
Market_Return	1.57	1.55	1.56	1.65
Inflation	1.29	1.37	1.29	1.28
CBTA	1.21	1.17	1.16	1.26
Concentration	1.19	1.15	1.18	1.18
Non_Int_Inc	1.11	1.14	1.11	1.11
Crisisdummy	1.18	1.13	1.13	1.16
VIX	1.78	1.65	1.66	1.84
Net_Claim_Currency	1.15	1.20	1.10	1.15
Net_Claim × Crisis	1.37	1.19	1.10	1.36
Mean VIF	**1.38**	**1.33**	**1.31**	**1.38**

Note: This table reports Variance Inflation Factors (VIFs) for all explanatory variables in the CHF, JPY, EUR, and GBP regressions. All independent variables are lagged by one period ($t-1$), except for Crisis. The dependent variable in all models is SRISK-CBTA.

Appendix B

Table 21: Currency Flow Effects on Risk with Stock Price Volatility

	$\text{SRISK}_{\text{CHF}}$	$\text{SRISK}_{\text{JPY}}$	$\text{SRISK}_{\text{EUR}}$	$\text{SRISK}_{\text{GBP}}$
	(1)	(2)	(3)	(4)
Net Claims$_{t-1}$	0.5632***	-0.4536**	0.3845	0.2012
	((0.1778)	(0.2088)	(0.2774)	(0.2420)
Net ClaimsxCrisis$_{t-1}$	-0.0341***	0.0243**	-0.0154	-0.0164*
	(0.0076)	(0.0097)	(0.0106)	(0.0094)
Bank Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓
Macro Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Observations	534	534	534	534
Number of ID	33	33	33	33
R-squared	0.354	0.331	0.325	0.330

Notes: This table presents results from fixed effects regressions of SRISK-CBTA on currency-denominated flows, their interactions with stock price volatility, and controls. All variables are lagged by one period except the crisis dummy. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix C

(Acharya et al., 2014; Angelidis et al., 2023; Bats and Houben, 2020; Beber et al., 2021;

Berger and Sedunov, 2024; Caporin et al., 2021; Conrad and Engle, 2025; De Nard et al., 2024; Dewenter and Riddick, 2018; Dissem, 2019; Dissem and Lobez, 2020; dos Santos Mendes et al., 2022; Engle et al., 2024; Kleymenova and Tuna, 2021; Kozubovska, 2017; Langfield and Pagano, 2016; León et al., 2024; Lin et al., 2018; Lu et al., 2023; Marques and Alves, 2024; Stolbov and Shchepeleva, 2023; Strobl, 2016; Tsagkarakis et al., 2021).

Appendix D

Table 22: Regression Results Across Brexit Eras: GBP

SRISK-CBTA	(1) Pre-Brexit	(2) Post-Brexit
GBP_Claim$_{t-1}$	-0.2124	-0.4996**
	(0.1451)	(0.1947)
Non_Int_Inc$_{t-1}$	-0.0037**	-0.0007
	(0.0015)	(0.0017)
Volatility$_{t-1}$	0.0032	0.0038*
	(0.0024)	(0.0022)
Market_Return$_{t-1}$	-0.0012	-0.0010
	(0.0009)	(0.0007)
CBTA$_{t-1}$	0.0436	-0.2381***
	(0.0465)	(0.0187)
Concentration$_{t-1}$	-0.0045**	0.0005
	(0.0019)	(0.0030)
vix$_{t-1}$	-0.0302***	0.0080***
	(0.0110)	(0.0028)
GDPg$_{t-1}$	0.0003	-0.0014
	(0.0068)	(0.0034)
Inflation$_{t-1}$	0.0018	0.0058
	(0.0033)	(0.0067)
Country FE	✓	✓
Time FE	✓	✓
Observations	337	197
Number of ID	30	33
R-squared	0.2983	0.6371

Standard errors in parentheses
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

We examine sterling-denominated banking flows across both the pre- and post-Brexit periods. We omit a crisis interaction for the post-Brexit years (2016–2021) as the World Bank reported no banking crises. While net GBP flows become significantly negative post-Brexit, the overall evidence suggests sterling's position in global wholesale markets remained resilient, with flows continuing to stabilise systemic banking risk.

Appendix E

Table 23: List of Variables, Definitions, and Data Sources

Variable	Definition	Source
CHF_Claim	Log of net cross-border bank claims denominated in CHF, scaled by CBTA	BIS LBS
JPY_Claim	Log of net cross-border bank claims denominated in JPY, scaled by CBTA	BIS LBS
EUR_Claim	Log of net cross-border bank claims denominated in EUR, scaled by CBTA	BIS LBS
GBP_Claim	Log of net cross-border bank claims denominated in GBP, scaled by CBTA	BIS LBS
CBTA	Log of central bank total assets (proxy for monetary scale/intervention)	BIS
SRISK/CBTA	SRISK(log) scaled by CBTA means the amount of money (in millions) a country's financial system might lack or have extra during a severe stock market drop (bottom 5% of returns), adjusted by CBTA	NYU Stern V-Lab / Brownlees and Engle (2017)
Log Z-score	Log of Z-score (bank stability proxy measuring distance-to-default)	WBGFDD and FRED
Concentration	Market concentration: share of assets held by top 5 banks in each country	WBGFDD and FRED
Crisis Dummy	Crisis indicator (1 during banking crises, 0 otherwise)	WBGFDD
Non-Interest Income	Bank's income from noninterest activities as a percentage of total income (%)	WBGFDD and FRED
Market Volatility	Stock market volatility: Average yearly fluctuation in the national stock index over 360 days	WBGFDD and FRED
GDP Growth	The annual growth rate of real GDP	WBGFDD and FRED
Market Return	Stock market return is the yearly growth in the average value of the stock market index	WBGFDD and FRED
Inflation	Inflation is the yearly change in consumer prices	WBGFDD and FRED
VIX	Implied volatility of S&P 500 options, proxy for global risk aversion and market volatility	FRED

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