# CHALLENGES AND OPTIONS IN MANAGING CAPITAL FLOWS FOR SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

The South East Asian Central Banks (SEACEN)
Research and Training Centre

The SEACEN Centre

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**Challenges and Options in Managing Capital Flows for Small, Open, and Financially Integrated Economies**

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This research publication, prepared by The SEACEN Centre, does not necessarily reflect the views and policies of the SEACEN member central banks and monetary authorities.

*Notes:*

- The SEACEN Centre recognises "China" as People's Republic of China; "Hong Kong" as Hong Kong SAR, China; and "Korea" as Republic of Korea.
- USD and US$ refer to U.S. dollar.



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## PART 2: Background Papers on Managing Capital Flows in Small, Open, and Financially Integrated Economies

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ASEAN | Association of Southeast Asian Nations |
| BIS | Bank for International Settlements |
| BoP | Balance of payments |
| CFMs | Capital flows management measures |
| CGFS | Committee on Global Financial System |
| COVID-19 | Coronavirus disease-2019 |
| DNDFs | Domestic non-deliverable forwards |
| EMs | Emerging markets |
| ESG | Environmental, social, and governance |
| ETFs | Exchange traded funds |
| FDI | Foreign direct investments |
| FX | Foreign exchange |
| FXI | Foreign exchange intervention |
| GDP | Gross domestic product |
| GFC | Great financial crisis |
| IMF | International Monetary Fund |
| LCY | Local currency |
| LTV | Loan-to-value ratio |
| MNEs | Multinational enterprises |
| MPMs | Macroprudential policy measures |
| MSBFs | Multi-sector bond funds |
| NBFIs | Non-bank financial institutions |
| NDFs | Non-deliverable forwards |
| NFCs | Non-financial corporations |
| OECD | Organisation for Economic Co-operation and Development |
| OTC | Over-the-counter |
| QE | Quantitative easing |
| SEACEN | South East Asian Central Banks Research and Training Centre |
| SOFIEs | Small, open, financially integrated economies |
| TRS | Total return swaps |
| VIX | Chicago Board of Exchange Volatility Index |
| ZLB | Zero lower bound |

# PREFACE

This publication was prepared by The SEACEN Centre with the aim of assessing and providing a policy framework for the evolving trends and impact of capital flows, particularly portfolio flows, to SEACEN member economies. More importantly, it offers policy insights on managing volatile capital inflows in the broader context of monetary policy objectives and other considerations for small, open, and financially integrated economies. The origin of this research endeavour dates to the policy discussions during the SEACEN Board of Governors Meeting in 2018. In this regard, this SEACEN publication titled: *Challenges and Options in Managing Capital Flows for Small, Open, and Financially Integrated Economies* was prepared to better understand the evolving complexities of international financial systems and structures; vulnerabilities and risks that arise from volatile financial flows; as well as the rationale for a more robust policy framework. It promulgates the use of a wider set of policy tools to address inherent risks and vulnerabilities of capital flows.

This book publication consists of two parts. The first part discusses the main institutional report on capital flows while the second part provides two background studies. The first part is comprised of four sections. The first section discusses the evolving nature and patterns of capital inflows to emerging economies, including SEACEN members, particularly those that are considered small, open, and financially integrated economies. It discusses the dynamics between portfolio inflows and financial market participants during risk-on and risk-off episodes. The second section provides an assessment of tail-risk effects of a sudden change in global investor risk perception. The empirical analysis was done using the “capital flows at risk” framework and the findings provide empirical support for using a broad range of pre-emptive policy measures. The third section considers policy measures that address the macro-financial implications of volatile capital flows as well as theoretical justifications for using broader policy tools in managing capital flows in the context of SEACEN member economies.

The last section discusses The SEACEN Centre's perspective on a policy framework and offers suggestions on how to operationalise an expanded policy framework to include capital flows management. The second part of this book includes two background papers which were commissioned for this publication. Each study provides detailed discussions on some of the key points which were discussed in the first part of this book.

We hope that this book publication will contribute to a better understanding of the challenges in managing capital flows to SEACEN member economies as well as the need to use a wider set of pre-emptive policy tools in addressing the adverse impact and inherent risks brought about by large and volatile capital flows.

**Mangal Goswami**
Executive Director
The SEACEN Centre

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Centre also thanks the SEG Co-Chairs Senior Assistant Governor Illuminada Sicat (Bangko Sentral ng Pilipinas) and Assistant Governor Fraziali Ismail (Bank Negara Malaysia); past SEG co-chairs former Deputy Governor Diwa Guinigundo (Bangko Sentral ng Pilipinas) and Deputy Governor Omar Marzunisham (Bank Negara Malaysia); Laura Kodres; as well as the thirteen SEACEN member central banks/monetary authorities who provided useful comments and suggestions on various versions of this publication.

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# PART 1

## CHALLENGES AND OPTIONS IN MANAGING CAPITAL FLOWS FOR SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

# HIGHLIGHTS

# CHALLENGES AND OPTIONS IN MANAGING CAPITAL FLOWS FOR SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

## *Context*

Emerging Markets (EM) capital flows are volatile, procyclical, risk sensitive, tail-dependent, and have asymmetric outcomes with changing global financial conditions. The evolving nature of capital flows, notably with a shift towards market-based financing intermediated by the non-bank financial sector since the Great Financial Crisis (GFC) of 2008-09, has contributed significantly to the tail-dependence and risk-sensitivity of such flows. These dynamics have been driven by the institutionalisation of the EM asset class by global investors seeking higher risk-adjusted returns. At the same time, the trend deepening of the financial markets in EMs has also ushered higher leverage and risk taking, amplifying shocks during risk-off.

Managing macro-financial stability risks from such tail-dependent and risk-sensitive flows as well as its procyclicality requires looking beyond the traditional banking sector intermediation with a better mapping of the risk transmission channels through the following lens:

- Understanding the architecture of the global investor base who invest in EM markets and the behavioural pattern of different types of investors can provide useful insights into the macro-financial linkages, particularly during risk-on and risk-off periods
- The growing importance of investment funds, notably open-ended bond funds, that give rise to vulnerabilities from liquidity mismatches, short-term investment horizon, and risk amplification through herd behaviour by benchmark driven investors
- The use of embedded leverage and foreign exchange risk taking by active investors (e.g., using Multi-Sector Bond Funds) to seek higher returns from EM assets that can face significant redemption pressures during tail events

- The dominance of the US dollar funding market, both for global investors and EM issuers, as a source of macro-financial risk amplification including the foreign exchange market through the financial channel (e.g., EM corporates built up much larger US dollar liabilities post-GFC, exposing them to currency risk)
- The development of deep local currency government bond markets brings significant benefits but increased foreign investor holdings of unhedged local currency debt has proven to be destabilising during periods of stress as bond prices decline and the exchange rate depreciates in tandem

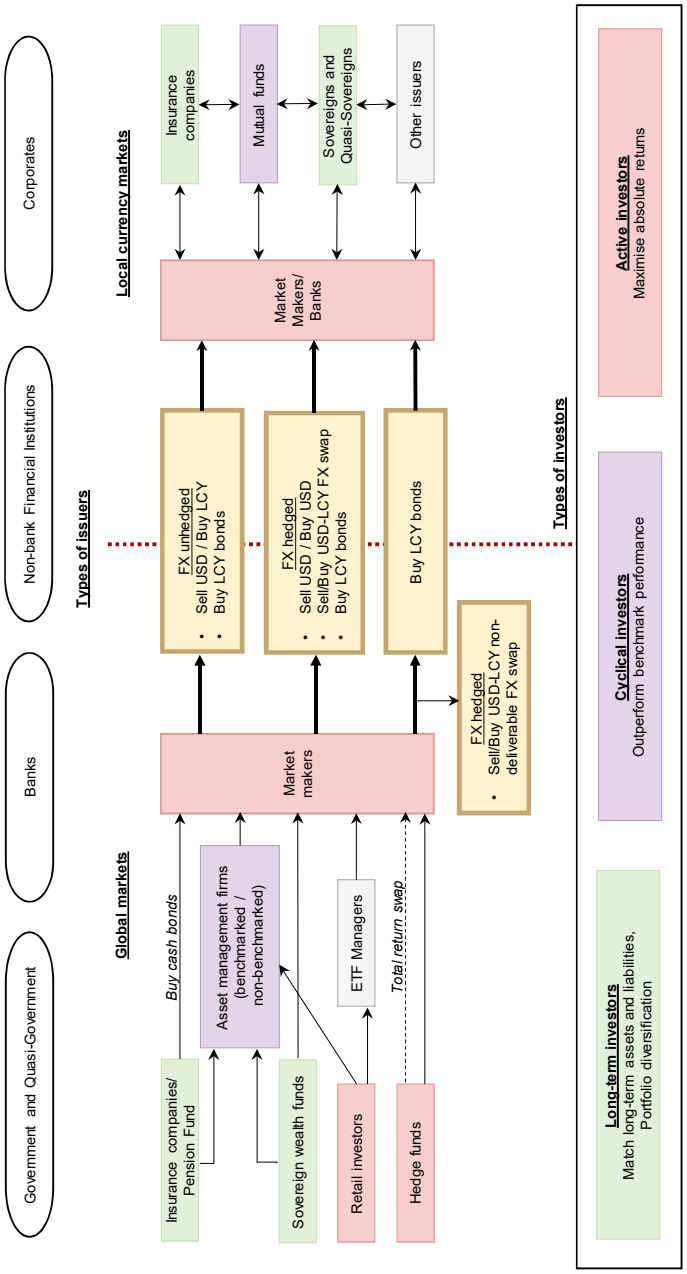
### *Analysis of EM Small Open Financially Integrated Economies*

This study focuses on EMs and EM Asia Small, Open, and Financial Integrated Economies (SOFIEs) specifically. First, the availability of more detailed high frequency data on portfolio flows aids central banks in refining their risk analysis of capital flows to get a clearer and timelier assessment of macro-financial risks, especially given their inherent volatility and reallocation in a very short period. Second, we use analytical techniques that go beyond the mean or central tendency by exploring the characteristics of the entire distribution of "capital flows at risk" to capture the asymmetry and tail risks of portfolio flows to explain how "good" capital flows can turn "bad." Indeed, the shape of the distribution for capital flows can change dramatically during times of high financial stress such as during the onset of the COVID-19 pandemic and episodes of tightening monetary policy by global central banks.

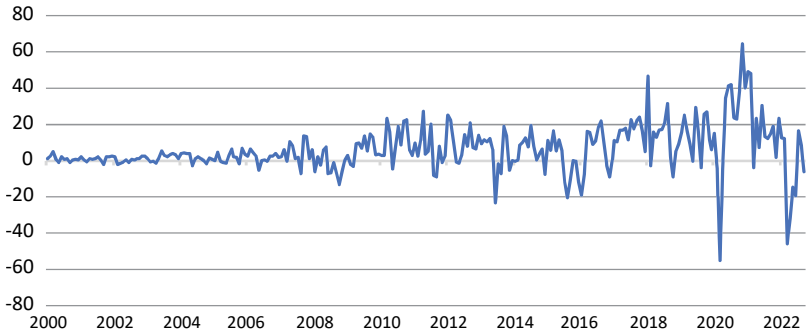
The sensitivity of portfolio capital flows to global financial conditions has increased and become more time-varying. This study finds that non-resident portfolio debt and equity flow to EMs and EM Asia SOFIEs since the GFC are better characterised by time-varying tail dependence with a skewed distribution towards the left-tail that is strongly affected by changes in global financial risk conditions as measured by investor risk aversion.

- Both debt and equity portfolio flow to EMs exhibit strong elements of time-varying tail dependence with global shocks and having fat tails during times of stress.
- When global financial conditions deteriorate, the near-term risk of heavy outflows increases.

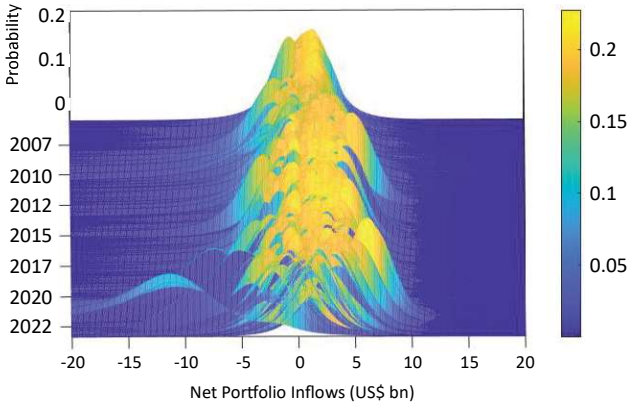
*The financial market architecture illustrates the complexities of managing volatile capital flows particularly during episodes of financial stress*



*Non-resident portfolio inflows, including equities and bonds, to SEACEN economies remain volatile and highly sensitive to global financial conditions and investor risk appetite.*




*The distributional impact of heightened global risk aversion on capital inflows calls for pre-emptive policy measures.*



- A global shock that leads to tighter US dollar funding conditions, including the appreciation of the US dollar, can have a relatively large impact on the tails of the predicted distribution of capital flows.
- In addition, portfolio debt and equity flows also tend to co-move during global shocks, compounding the impact on interest rates, asset prices and the exchange rate *via* the financial channel through amplification and persistence.

We trace how the risk transmission and amplification mechanisms are influenced by the behaviour of different investors, with particular attention to cyclical investors including retail investors and absolute return investors like hedge funds. A better understanding of the probability of adverse outcomes and systemic risk can help policymakers better manage the risks from capital flows, while at the same time, reaping the benefits that emanate from these flows.

## *Policy Frameworks*

All these developments highlight the case for raising the prominence of capital flows in macro-financial policy frameworks, notably for SOFIEs. In particular, the non-normal distribution of high-frequency non-resident portfolio inflows to EM and EM Asia SOFIEs adds further complexity to policymaking. For SOFIEs in EM Asia with an inflation targeting framework, interest rate policies have proven to be inadequate in managing the procyclicality of capital flows, while inflation and the credit cycle have proven to be interlinked. Therefore, tools for price stability and financial stability have often been jointly determined and used.

At the highest level of the contours of public policy making, the rationale for anchoring the framework on more welfare theoretic arguments is in line with the pivot towards sustainability and the paradigm shift to environmental, social, and governance (ESG) considerations. Public policy intervention to internalise externalities, to further promote welfare-enhancing policies, to manage trade-offs, and to adopt more flexible approaches in building resilience will be an integral part of any overarching policy frameworks going forward, not least for the purpose of managing capital flows to emerging and developing economies. It reinforces the notion of mitigating the social costs from financial crises and output losses from sudden stops of capital inflows.

The fast-evolving landscape of capital flows calls for a more robust and innovative framework of integrated policy, whereby monetary policy should be combined with other policy measures, such as macroprudential measures, foreign exchange intervention and capital flow management measures.

- Holistic policy framework - Pervasive financial market constraints and imperfections in emerging and developing economies can amplify macro-financial cycles requiring insurance against the risk of capital flow volatility, reversals, as well as its distributional impact. The current policy framework is evolving further to consider broader economic and social outcomes, with monetary and financial stability implications.

- Foreign exchange intervention (FXI) - Exchange rates are also financial variables and sensitive to imbalances in financial markets and can be shock amplifiers. FX intervention policies are likely to be more effective and welfare enhancing if used appropriately, under imperfect markets. On the policy front, the financial-frictions view offers a different take on exchange rates compared to their traditional role as shock absorbers.

- Macroprudential measures (MPMs) - Macroprudential measures aim to contain systemic risk by dampening the amplitude of financial cycles and inhibiting credit and asset booms before they threaten public and financial sector balance sheets and the economy at large. However, by their very nature, systemic threats are “tail events,” and represent an agglomeration of risks from a variety of channels. Operationalising a policy that is both time-varying and rules-based is likely to be unachievable, due to the difficulty of quantifying systemic risk.

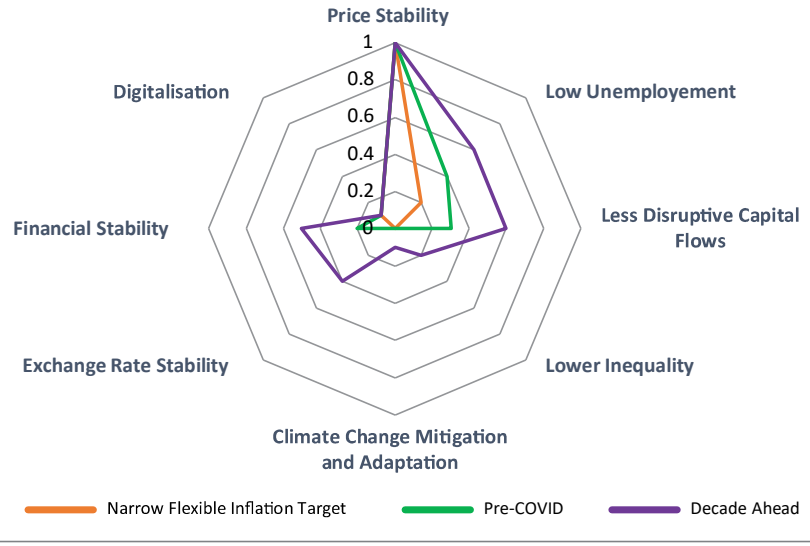
- Capital flow measures (CFMs) - CFMs should be part of the broader policy toolkit as purely domestic macroprudential measures cannot adequately substitute for CFMs since CFMs better target the root of the problem coming from the volatility in international capital flows. As with all macroprudential measures, the pre-emptive use of capital controls is critical when there is a risk of large capital inflows. Indeed, systemic risk often builds up in tandem with increasing cross-border interconnectedness and spillovers. FXI cannot either adequately substitute for CFMs in all situations. FX reserves put limits on FXI during outflows and they can become costly during inflows. However, the effectiveness of FXI can be increased by the presence of CFMs as part of the broader toolkit. A combination of tools like MP, MPMs, FXI and CFMs makes it easier to achieve multiple goals such as price stability, financial stability, and a sustainable external position; and to deal with the complex trade-offs involved.

## *The SEACEN Centre's Perspective in Conceptualisation of the Policy Framework*

One possible way of conceptualising the framework is by considering the evolution of central banks' expanding mandates and considerations with potential future implications. To this end, the broader structural trends with monetary and financial stability implications certainly increase the complexity of central banking in EM SOFIEs.

A way to operationalise the framework is by integrating capital flow risk management into the policy framework using a variation of the Taylor-type rule. A possible approach could be where central banks may want to respond systematically to capital flow tail risks when setting the stance of monetary

*Central banks require a broader policy toolkit in managing volatile capital flows, amidst ongoing structural changes and current concerns with monetary and financial policy implications.*



policy by directly leaning against tail risks before they materialise. This will go along with the emphasis on assessing the inflation gap and the output gap with its dependence on the exchange rate as well as assessing the gap between the actual and the equilibrium exchange rate:

$$h(R, FXI) = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) + \lambda(e - e^*) + \mu(CFtailrisk).$$

## *The Bottomline*

Evolving EM SOFIEs' frameworks for monetary and financial stability in a more complex world and with inherent financial market imperfections and financial channels of risk transmission may require the balance of multiple objectives, considerations, and trade-offs. Taking a more multifaceted approach and incorporating the following features could be helpful:

- Holistic, pragmatic, and flexible (less rules-based) with a broader framework;
- Putting a premium on resilience, having policy buffers to build resilience to tail risks;
- Having the ability to be pre-emptive such as having ex-ante prevention mechanisms in place;
- Incorporating the role of exchange rate as a stabiliser under certain conditions;
- Hard-wiring prudential rules and macro-financial stability considerations;
- Having the ability to implement countercyclical safeguard measures along the MPM/CFM spectrum; and,
- Ability to act as a "dealer of last resort".

# SECTION 1

# THE NATURE AND PATTERNS OF CAPITAL INFLOWS IN EMERGING ECONOMIES (EMs)

Since SEACEN's foundation, member central banks/monetary authorities have faced an environment of volatile capital flows.[1] These flows drove economic activity and exchange rates which made it difficult to achieve price stability. The flows also elevated financial stability concerns, especially during the Great Financial Crisis, the Taper Tantrum, COVID-19 pandemic period, and current high inflation and high interest rate period. Through it all, however, SEACEN central banks have managed the volatility well. Indeed, SEACEN central banks' successes in addressing capital flow challenges are now helping to forge a new international consensus on how central banks can best confront an environment of volatile capital flows.

The current rethinking of how to deal with capital flows in the conduct of monetary and financial stability policies has come at a critical time. Capital flows are inherently volatile. Indeed, recent trends point to the spectre of even more destabilising flows than in the past. Bond and equity portfolio flows remain increasingly vulnerable to the whims of growing assets under management of global investors who invest in EMs. Record global government and private debts accumulated over the past decade need to be refinanced periodically from pools of savings from around the globe. In this context of an over-extended financial system, the global central banking community appears to be on the cusp of ushering in a new period of asynchronous monetary policy, much higher interest rates, and shrinking central bank balance sheets. The extent of the asynchronicity could accelerate sharply in

[1] The SEACEN member central banks/monetary authorities include Brunei Darussalam Central Bank; National Bank of Cambodia; People's Bank of China; Reserve Bank of India; Hong Kong Monetary Authority; Bank Indonesia; Bank of Korea; Bank of the Lao PDR; Bank Negara Malaysia; Bank of Mongolia; Central Bank of Myanmar; Nepal Rastra Bank; Bank of Papua New Guinea; Bangko Sentral ng Pilipinas; Monetary Authority of Singapore; Central Bank, Chinese Taipei; Central Bank of Sri Lanka; Bank of Thailand; and State Bank of Vietnam. Throughout this publication, SEACEN member economies refer to the economies of the 19-member central banks/monetary authorities whenever data are available.

the near term as some central banks find themselves falling far behind the curve in their efforts to control inflation. And, with the ongoing monetary policy tightening in the major advanced economies, such as the Federal Reserve in the United States, powerful global monetary policy spillovers to the region will remain a significant force influencing capital flows along with the expected gyrations in financial markets.

SEACEN central banks in many respects are better prepared to address these challenges than they previously were. Access to more detailed capital flow data than in the past opens opportunities to refine central bank risk analyses of capital flows (CGFS, 2021; and SEACEN, 2020). With more detailed capital flow data across time and across countries, better methods are being built to assess capital flow developments. These could give central bankers a clearer and timelier picture of financial flow risks.

The central bankers are also benefiting from a more nuanced understanding of the forces driving the new capital flow environment. Recent advances in macro-financial research offer new insights into important domestic and international mechanisms that help to explain how “good” capital flows can turn “bad.” These empirical and theoretical advances help to explain why past policy actions were ineffective at times and point to the economic and financial conditions when policies are likely to be effective.

Along with better data and an enhanced understanding of capital flow drivers, central bankers are more open to proactively respond to capital flows. In part, many central banks have been questioning the effectiveness of the narrow inflation-targeting frameworks for monetary policy. In this context, it is not surprising that active consideration is being given to broadening policy frameworks aimed at preserving macroeconomic and financial stability by more explicitly addressing capital flow volatility and using more tools like a wider array of interest rate and balance sheet tools for monetary policy, macroprudential policy measures, foreign exchange intervention as well as capital flows management measures. How far should central banks, financial regulators and supervisors go towards considering and/or adopting broader, more holistic monetary policy and financial stability frameworks? What role should capital flows play in such a framework, and what additional tools can be deployed as preventive measures when capital flow risks rise and as countercyclical measures after destabilising capital flows materialise?

At the same time, international financial institutions have been taking a more tolerant attitude toward pro-active policies to rein in capital flow threats, especially those arising from shifts in global financial conditions (BIS, 2020; and IMF, 2020). This is in stark contrast to past advice that was often very critical of such policies. The criticisms tended to suppress productive dialogue about the prerogatives that developing and small, open advanced and emerging economies have when confronting particularly challenging capital flow episodes.

All these developments highlight the case for raising the prominence of capital flows in SEACEN frameworks for preserving macroeconomic and financial stability. The rest of this part discusses these issues and their implications for the conduct of monetary and financial stability policies.

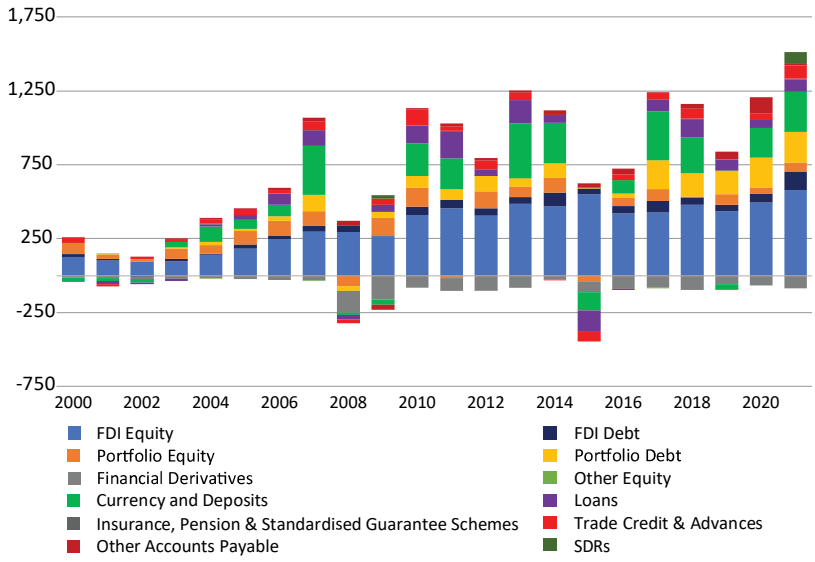
## A. Changing Patterns of Capital Inflows to SEACEN Economies

**Foreign capital inflows to SEACEN member economies, as a group, have more than doubled in the last decade, although the region has remained a net capital exporter.** Total gross non-resident capital inflows more than doubled over the past twenty years, from average annual inflows of around US$400 billion in 2000-2010 to over US$900 billion in 2011-2021 (**Figure 1.1**). The growth in non-resident capital inflows in SEACEN economies suggests the region's attractiveness as a major foreign investment destination. But it implies a greater potential for adverse impact of capital flow reversals (ADB, 2022). As a percent of GDP, the size of gross capital inflows to SEACEN economies declined from 6.0% of GDP in 2000-2010 to 4.9% of GDP in 2011-2021. Likewise, resident capital flows have also grown from an annual average of US$400 billion in 2000-2010 to a little less than US$1.0 trillion in 2011 to 2021 (**Figure 1.2**). Consequently, net resident capital flows have mostly been positive in the last two decades, suggesting that SEACEN economies, as a whole, have been a net capital exporter.

**With the increase in non-resident capital flows to the region, there are noticeable changes in the composition and patterns of inflows.** First, non-financial corporates (NFCs), particularly multinational enterprises (MNEs) including those in SEACEN economies have significantly increased their cross-border financial investments in the past decade using various instruments. Non-financial MNEs have provided within-company credit to their parent or subsidiaries located in other jurisdictions. This transaction is reported as

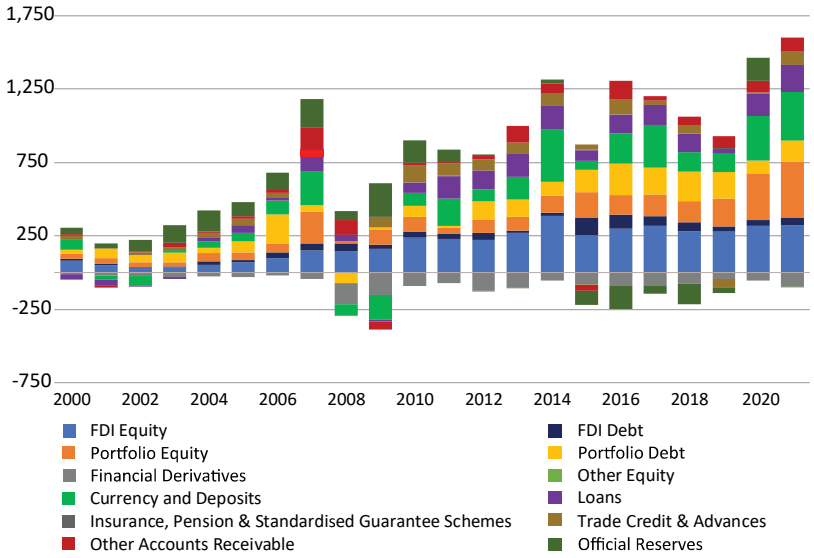
foreign direct investment (FDI) debt flows in the Balance of Payments (BoP) Statistics. For SEACEN economies as a whole, FDI debt has almost tripled from an average annual value of US$22 billion in 2000-2010 to US$63 billion in 2011- 2021. Non-financial MNEs have also provided trade credits and/ or loans to other unrelated companies, and have made cross-border bank deposits. These financial flows are recorded as increases in cross-border currency and deposits as well as loans, which grew from an average annual value of US$65 billion and US$28 billion in 2000-2010 to US$165 billion and US$64 billion in 2011-2021, respectively. These financial transactions of non-financial MNEs may underestimate the real cross-border exposures of MNEs who borrowed overseas through their affiliates (ADB, 2022; and Avdjiev et al., 2014). This could give rise to financial stability concerns in the future if these flows lead to more financial operations rather than channelled to real economic activities (Avdjiev et al., 2014).

**Figure 1.1: Non-Resident Capital Flows – SEACEN Economies**
(US$ billion)




*Notes:* Values refer to financial liabilities. The sample includes Cambodia; China; Hong Kong, China; India; Indonesia; Korea; Malaysia; Nepal; Philippines; Singapore; Chinese Taipei; and, Thailand.
*Source:* SEACEN staff calculations using data from IMF's Balance of Payments Statistics accessed through CEIC (July 2022).

**Figure 1.2: Resident Capital Flows – SEACEN Economies**
(US$ billion)

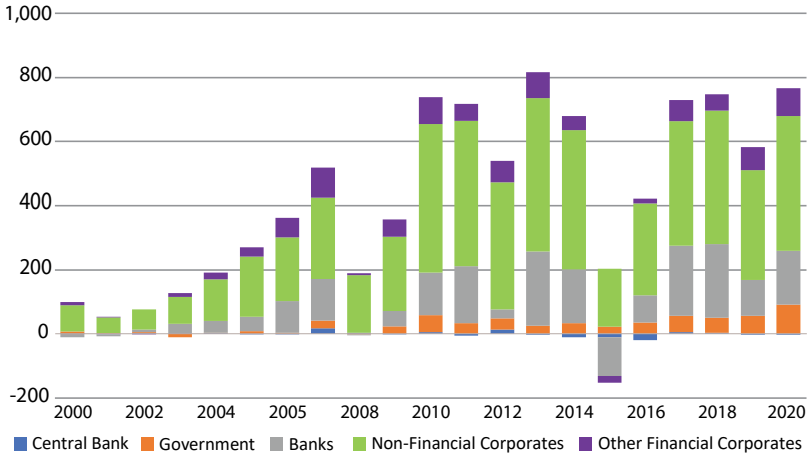



*Notes:* Values refer to financial assets. The sample includes Cambodia; China; Hong Kong, China; India; Indonesia; Korea; Malaysia; Nepal; Philippines; Singapore; Chinese Taipei; and, Thailand.
*Source:* SEACEN staff calculations using data from IMF's Balance of Payments Statistics accessed through CEIC (July 2022).

Second, non-financial corporates (NFCs) were the largest recipient of non-resident capital inflows to SEACEN economies (**Figure 1.3**). This pattern is expected given that the region attracts a large share of global FDI and the region's non-financial MNEs are increasing their cross-border financial transactions (ADB, 2022). The banking sector was the second largest recipient of non-resident capital flows, followed by other financial corporates (OFCs) or non-bank financial institutions (NBFIs), which include investment funds, insurance corporations, pension funds and other financial intermediaries and auxiliaries. OFCs reported a substantial increase in inflows over the last decade from an annual average of around US$35 billion in 2000-2010 to around US$50 billion in 2011-2020. This suggests that although the banking sector still plays a dominant role in cross-border financial intermediation, the role of other financial corporations has grown over the last decade. These evolving patterns of sectoral non-resident capital inflows highlight sectoral differences across drivers, cyclicality, and sensitivities to policy measures of capital inflows (Lepers and Mercado, 2021).

Third, the period of 2011 to 2021 witnessed the significant rise of non-resident bond inflows, coinciding with the increase in debt issuance in Asia and the Pacific region from US$2.3 trillion to US$7.2 trillion over the period (ADB, 2022). The rise in portfolio debt inflows marks the move towards market-based finance focusing on emerging market debt securities, known as the second wave of global liquidity (Shin, 2013). In addition, most of the bond inflows have gone to the government sector, implying the rising importance of the public sector as a large cross-border borrower (CGFS, 2021).

**Figure 1.3: Sectoral Non-Resident Capital Flows – Selected SEACEN Economies**
(US$ billion)




*Note:* The sample includes China; India; Indonesia; Korea; Malaysia; Mongolia, Philippines; and Thailand.
*Source:* Lepers and Mercado (2021).

Fourth, although most capital inflows into SEACEN economies have gone to China, the same evolving patterns mostly hold for ASEAN-4 economies, which include Indonesia, Malaysia, Philippines, and Thailand. In fact, average annual capital inflows to ASEAN-4 economies tripled from around US$25 billion in 2000-2010 to US$74 billion in 2011-2021, with bond inflows growing from around US$8 billion to US$25 billion in the same period. Non-financial corporates received the largest inflows, followed by the government sector which received capital mostly through bond inflows. It is worth noting that banking sector inflows have declined since 2014, while

other financial corporate inflows remain relatively small compared to the SEACEN aggregate.

Fifth, the volatility of capital inflows into SEACEN economies declined from 2000-2010 to 2011-2021. The coefficient of variation of SEACEN's aggregate capital inflows in percent of GDP fell from 0.6 to 0.4. But there are differences across investment types. Although volatilities for most types of investments have gone down, the variability of portfolio equity and trade credit and advances flows rose. For ASEAN-4 as a group (Indonesia, Malaysia, Philippines, and Thailand), the volatility of aggregate capital flows has also decreased but the volatilities of portfolio equity, currency and deposits, loans, and other accounts payable have increased.

**The changing patterns of foreign capital inflows into SEACEN economies reflect the varying significance of global (push) and domestic (pull) factors during financial risk-on/risk-off episodes.** Existing studies document the relevance of push and pull factors in driving capital inflows.[2] For pull or domestic factors, strong output growth, lower macroeconomic risks (low domestic inflation), trade and financial openness, better governance and greater financial depth are associated with larger non-resident capital flows. For push or global factors, higher global growth is significantly correlated with higher inflows to emerging economies, while higher global or US interest rate strongly covaries with lower capital inflows. In addition, higher global risk aversion leads to lower capital inflows or even capital flow reversals. Other studies have identified additional factors driving gross capital inflows. CGFS (2021) highlighted the significance of the institutional infrastructure of the global financial system through which capital flows are funnelled into recipient economies, known as "pipes", as another important determinant of capital inflows.

**The composition, patterns, and volume of non-resident capital inflows into SEACEN economies suggest the degree to which the economies are financially integrated with non-regional and regional economies.** The level of international financial integration of selected SEACEN member economies continued to grow from 2007, at the height of large cross-border financial flows, up to 2019, before the COVID-19 pandemic (Guðmundsson,

[2] See ADB, 2022; Ahmed and Zlate, 2014; Byrne and Fiess, 2016; Fratzscher, 2012; Giordani et al., 2017; Ghosh et al., 2014; Li et al., 2018; Mercado, 2018; and Mercado and Park, 2011.

2023). In addition, the increase in the magnitude of cross-border financial inflows to SEACEN economies over the past two decades also reflects the region's pursuit of capital account liberalisation, financial development, and steady economic growth.[3]

**The changes in capital flow "pipes" have become the most important driver of capital flows patterns in the post-GFC period.** The CGFS 2021 report also finds that the impact of global risk aversion, proxied by the VIX, has declined in the post-GFC period for portfolio inflows to emerging economies. In contrast, the significance of domestic cyclical factors, such as domestic GDP growth, have increased, suggesting that investors have increasingly been selective in assessing investment opportunities.

**SEACEN economies have used various policy tools to address the adverse impacts of capital flows.** Although capital inflows have provided benefits, they have also carried risks which posed challenges to policy makers. In particular, the changing patterns and varying significance of domestic and global factors require a deeper understanding of the dynamics and evolution of foreign capital inflows (ADB, 2022). Moreover, capital flow surges and sudden stops led to either improving or deteriorating macroeconomic and financial conditions, thereby warranting pre-emptive policy responses. The survey results of the IMF in 2016 on capital flow management provide valuable insights on the concerns of policy makers, including those from SEACEN economies (IMF, 2016). The report revealed that most emerging and developing economies expressed concerns about capital flows due to their volatility as well as volume. In terms of the impact of capital flows, policy makers were mostly concerned with their impact on exchange rate volatility as well as financial stability (IMF, 2016). In this regard, emerging and developing economies, including SEACEN economies, used an array of policy tools to address the adverse impacts of large and volatile capital flows, which include capital flow management measures, foreign exchange interventions and macroprudential measures. Over the past two decades, most of these measures were adjusted based on various objectives. CFMs on non-resident capital inflows were mostly loosened in line with the trend towards greater capital account liberalisation; while MPMs were mostly tightened, more so in the past decade, to manage systemic risks from capital flows (ADB, 2022). This corroborates with the IMF's (2016)

[3] See Guðmundsson (2023) for detailed discussion on the link between cross-border financial integration and the magnitudes and volatilities of capital flows.

report, which showed that most emerging and developing economies used greater exchange rate flexibility, while others relied on foreign exchange intervention and macroprudential measures.

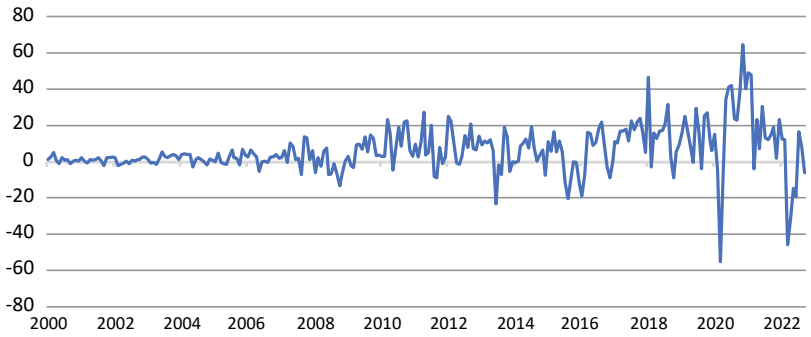
## B. Implications of the Growing Importance of Foreign Portfolio Inflows to EMs and EM Asia Small, Open, and Financially Integrated Economies (SOFIEs)

### *(i) Broader trends and evolving patterns of capital inflows underscore the need to adjust policy frameworks*

**Capital flows to EMs including SOFIEs have become more sensitive to global financial conditions and global liquidity.**[4] The dependence of capital flows to EMs on risk-on, risk-off swings in global financial conditions have been well-established (Forbes and Warnock, 2012; and Milesi-Ferretti and Tille, 2011). This sensitivity varies across EM economies, depending on such local factors as macroeconomic policy, the depth of local financial markets relative to the scale of flows and the quality of financial regulation and oversight. Nevertheless, exceptionally low interest rates (long- as well as short-term rates) in the advanced economies, for so many years, have driven non-resident portfolio inflows to EMs with investors mostly in a risk-on mode (**Figure 1.4**). In addition, foreign investors are more dependent on global mutual funds that tend to be more sensitive to global push factors (CGFS, 2021, and Cerutti et al., 2019). Consequently, as shown in **Figures 1.1 and 1.4**, portfolio flows were highly prone to surges and reversals, which are mostly driven by external factors such as global risk appetite (ADB, 2022). For these reasons, this study focuses on high-frequency portfolio flows data from SOFIEs in EMs and EM Asia to show that changes in global financial conditions and risk sentiment affect the tails of the distributions of portfolio flows in the near term. The impact is larger for downside tail risk than for the median outcome and for upside tail risk.

[4] The term SOFIEs or small, open, and financially integrated economies emphasise the importance of cross-border financial integration as a key driver of capital flows volatility particularly for small open economies (SOEs). It should, however, be noted that not all SOEs are financially integrated as some may have relatively closed capital accounts and underdeveloped financial markets (Guðmundsson, 2023).

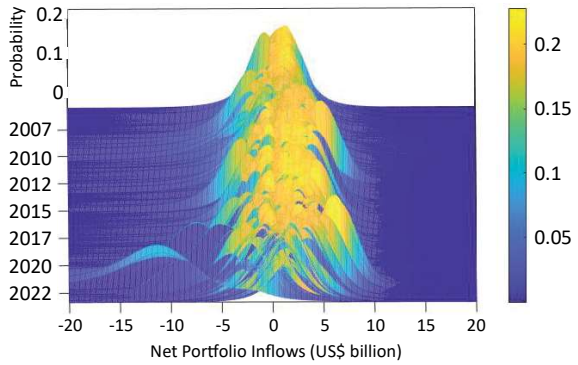
**Figure 1.4: Net Non-Resident Portfolio Flows – Selected SEACEN Economies**
(US$ billion)




*Notes:* Values refer to net non-resident inflows of EM equities and bonds. SEACEN economies include China; India; Indonesia; Korea; Malaysia; Philippines; and Thailand.
*Source:* SEACEN staff calculations using data from IIF Monthly EM Portfolio Database (October 2022).

**EM central banks and monetary authorities have been increasingly taking account of the financial stability consequences of global shifts in risk aversion and uncertainty in their policy frameworks.** The impact of changes in global risk sentiment on EM capital flows is asymmetric and time-varying. Outflows of non-resident portfolio capital when global markets become more risk averse increase more sharply than the rise in inflows when global markets boom. Such tail dependence is also asymmetric, with higher outflows during distress compared to the surges during a capital flow bonanza. **Figure 1.5** shows that changes in global risk sentiment can have an asymmetric impact on the left tails of the distribution of debt portfolio flows to EM Asia during episodes of global shocks (see Section 2 for more discussion). Indeed, in EMs, the negative price effects from sell-offs tend to be larger than the positive price effects from purchases, especially when global risk aversion is high.

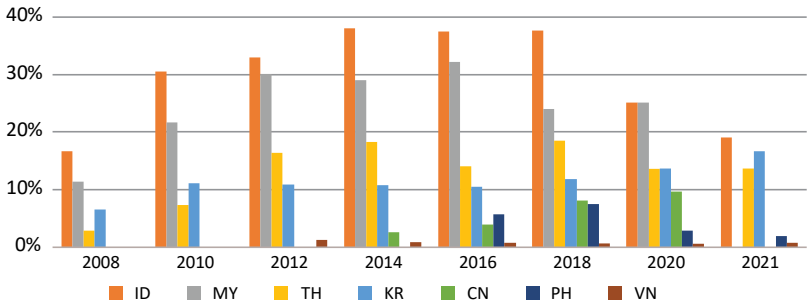
**Figure 1.5: Distribution of Portfolio Flows in EM Economies During High VIX Periods**




*Notes:* X-axis refers to weekly net portfolio inflows, y-axis refers to time, and z-axis refers to probability of distribution conditional on VIX and current portfolio flows. Weekly net portfolio inflows refer to weekly net non-resident inflows of EM equities and bonds. EM economies include Indonesia; India; Korea; Thailand; South Africa; Brazil; Philippines; Vietnam; Chinese Taipei; China; Turkey; Qatar; Sri Lanka; Pakistan; Saudi Arabia; Hungary; Mexico; Poland; Ukraine; and Colombia.
*Source:* SEACEN staff calculations using data from IIF Weekly EM Portfolio Database (July 2022).

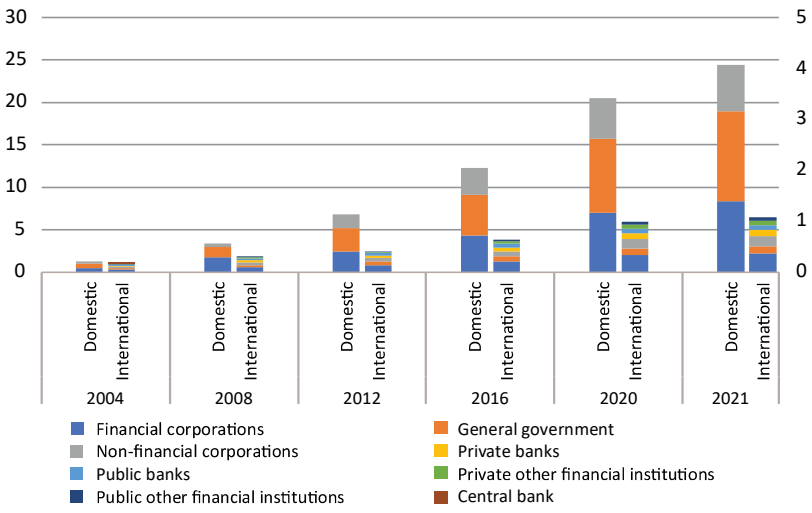
**During the past decade, strong global investor demand for long-term US dollar assets and abundant US dollar liquidity were accompanied by a shift towards market-based financing intermediated by the non-bank financial sector, creating new risks which continue to evolve.** The US dollar remains the dominant funding currency for non-US global financial and non-financial institutions. According to BIS data, over the past five years, a significant share of the increase in international US dollar funding has taken the form of marketable debt securities rather than bank lending. The broader shift in US dollar funding from cross-border bank loans to investment in international debt securities has been described as "the second wave of global liquidity" by Shin (2013) (**Figures 1.6a, 1.6b, and 1.6c**). As yields on core, safe US dollar assets fell (reflecting fiscal policy, quantitative easing, and regulation in the advanced economies), global asset managers had to seek other assets to satisfy the increasing investor demand for higher yielding dollar bonds. This gave emerging and frontier market issuers much easier access to long-term dollar financing, making them less vulnerable to refinancing pressures. Easy external finance also spilled over to domestic markets as ample global liquidity pushed funds into EM local currency (LCY) government bond markets (Lu and Yakovlev, 2018).

**Figure 1.6a: Foreign Holdings of EM Debt Securities – Selected SEACEN Economies**
(Percent)



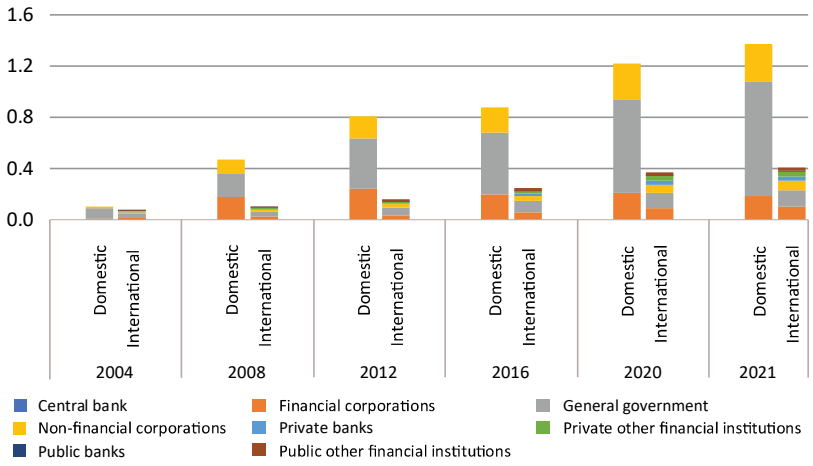

*Notes:* Percentage of foreign holdings in LCY bonds refers to debt securities held by foreign investors relative to the amount of LCY government bonds outstanding. CH = China; ID = Indonesia; KR = Korea; MY = Malaysia; PH = Philippines; TH= Thailand; and VN = Vietnam. Vietnam has missing values for more than five periods.
*Source:* SEACEN staff calculations using data from Asian Bonds Online (July 2022).

**Figure 1.6b: Debt Securities – Selected SEACEN Economies**
(Amount of debt securities outstanding, US$ trillion)




*Notes:* Domestic market values refer to the left-hand side (LHS); and international market values are those on the right-hand axis (RHS). Debt securities outstanding is calculated by residence and sector of issuer. Sample includes China; India; Indonesia; Korea; Malaysia; Philippines; and Thailand.
*Source:* SEACEN staff calculations using data from Bank of International Settlements (July 2022).

**Figure 1.6c: Debt securities - ASEAN4**
(Amount of debt securities outstanding, US$ trillion)



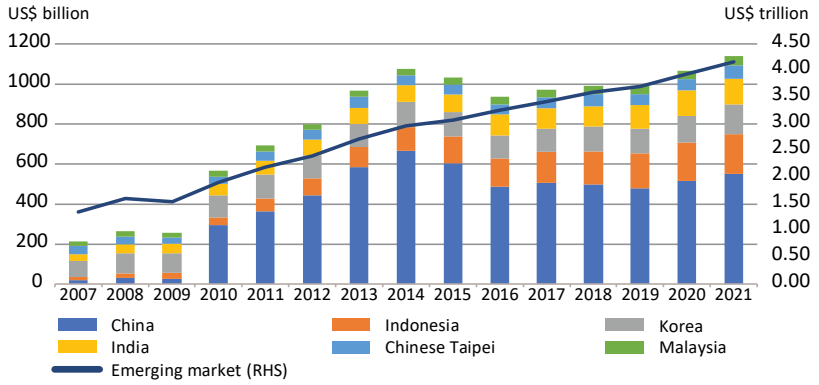

*Notes:* Debt securities outstanding is calculated by residence and sector of issuer. ASEAN4 includes Indonesia; Malaysia; Philippines; and Thailand.
*Source:* SEACEN staff calculations using data from Bank of International Settlements, Debt Securities Statistics (July 2022).

### *(ii) Structural changes in EM asset class creating new sources of financial stability risks*

**Structural changes have resulted in the rapid development of the EM asset class, bringing new opportunities and challenges with respect to dealing with capital flows.** The importance of EM economies in global GDP and trade has grown in the last 20 years. This trend was accompanied by major financial deepening such that the ratio of total credit to the private sector to GDP in emerging economies grew much closer to that observed in advanced economies. Of great significance was the expansion of credit through corporate bond markets open to international investors, particularly denominated in the US dollar. Non-financial companies increasingly used the especially favourable conditions in international markets to borrow more than needed for new spending or for refinancing maturing bonds (**Figure 1.7**). Their treasury operations became more significant both in earning profits and in generating financial risk exposures not directly related to their core businesses. This reflects the growing financialisation of MNE cross-border transactions, as discussed in Section 1A. In fact, some corporate Treasuries saw profitable "carry trade" opportunities for gains (Bruno and Shin, 2015).

These short-term gains posed risks when highly leveraged companies took such speculative positions, making their financial soundness more vulnerable to a range of shocks (slow growth, sudden increases in risk premia in global markets, dollar appreciation, among others). Other financial corporates or non-bank financial institutions (NBFIs) have also become increasingly important as issuers of debt securities as post-GFC banking regulations have encouraged some activities to migrate outside the banking sector.

**Figure 1.7: Credit to Non-Bank Borrower – EM and Selected SEACEN Economies**
(US$ billion LHS; US$ trillion RHS)




*Notes:* Emerging markets aggregate shown in RHS. Credit to non-bank borrower refers to bank loans and debt securities issues by residence of non-bank borrower. Emerging market includes Argentina; Brazil; Chile; China; India; Indonesia; Korea; Malaysia; Mexico; Russia; Saudi Arabia; South Africa; Chinese Taipei; and Turkey.
*Source:* SEACEN staff calculations using data from Bank for International Settlements, Global Liquidity Indicators Statistics (accessed in July 2022).

**The institutionalisation of the EM asset class by global asset managers, notably through portfolio debt funds, exacerbates the volatility of capital flows and raises financial stability concerns**. The way global investors and asset managers decide on their investment decisions, hedging strategies and so on, have a major impact on the asset markets of small open economies. Since the GFC, EM portfolio flows were increasingly channelled through funds managed by asset managers. This is important because a significant share of the global investors in EMs and EM Asia SOFIEs are cyclical investors, notably asset managers using collective investment vehicles such as mutual funds. This trend has given rise to several new risks. The first is that of liquidity illusion. Bond funds allow investors to build more diversified portfolios

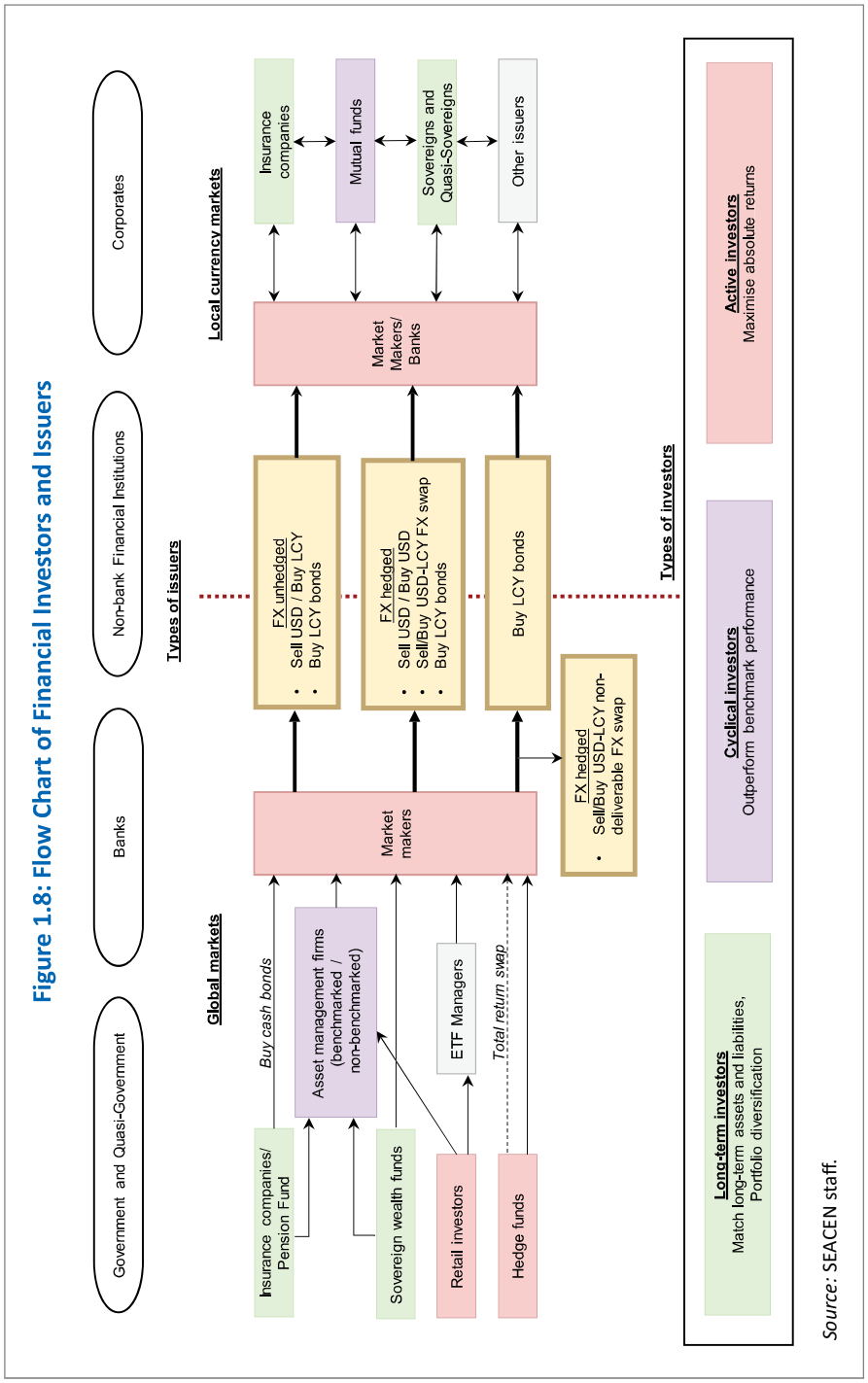
based on illiquid individual bond issues that they may not understand. Because investors demand liquidity, open-end funds (mutual funds) offer a daily price even when the underlying assets are illiquid. Several episodes of severe dysfunction of even core bond markets including those of March 2020 and February 2021, have given new urgency to tackling this issue at the international level.[5]

A second risk is that the shorter investment horizons of some foreign investors can exacerbate the volatility of capital flows. Such investors (including hedge funds) are usually net sellers during risk-off periods. A third risk is that benchmarking practices may indiscriminately spread contagion across quite different borrowers. Many EM bond mutual funds, due to their concentration of investor holdings and the rush-to-exit risk during market stress, can exhibit mismatches between the redemption risk to the debt funds and market liquidity of the funds' underlying assets. With growing assets under management of cyclical investors, the outflows from their benchmark-driven funds in response to shocks can be more significant than before the GFC. Retail funds such as mutual funds can be more fickle and often see outflows from the funds during stress periods, resulting in portfolio managers selling these assets and putting downward pressure on EM asset prices. The flight from EM funds in March 2020 is the latest illustration. This is borne out in the Emerging Portfolio Fund Research historic data that tend to show redemptions of mutual funds during stress periods.

**The behavioural pattern of particular classes of global investors affects market volatility in different ways. Both retail investors and hedge funds can aggravate market volatility in periods of stress. Figure 1.8** presents a schematic diagram of EM portfolio flows issuers and investors. Retail investors tend to seek exposure through indirect access *via* local banks or global banks active in these markets or through passive investment vehicles such as exchange traded funds (ETFs). Retail investors holding ETFs have increasingly contributed to the selling pressure during periods of stress. Sales by end-investors induce ETF managers to sell the underlying assets. During tail events, selling pressure is amplified by hedge funds and other leveraged investors. Sharp declines in the price of the underlying instrument (actual or expected) can induce hedge funds to unwind the total return swaps (TRS) that many have customarily used to gain (leveraged) exposure to these assets.

[5] The Financial Stability Board has accessed mutual funds and non-bank financial intermediation more generally.

**Figure 1.8: Flow Chart of Financial Investors and Issuers**




*Source:* SEACEN staff.

**We find that the tail dependence and asymmetry from sudden stops of EM portfolio flows in reaction to global financial shocks reflect various market factors:**

- *Benchmark-driven investors in the EM universe tend to be more sensitive to changes in global financial conditions.*
- *Both investors and issuers seek greater leverage when it is cheap.*
- *The complexity and sophistication of portfolio exposures of investors built up during normal times leads to an under-pricing of risk.*
- *The exchange rate can amplify external financial shocks: investors and issuers have unhedged FX exposures and risk-off sentiment in financial markets tends to curtail US dollar funding.*

**The herd behaviour of benchmark-driven investors is more intense during capital outflows than in periods of inflows.** Inclusion in a benchmark index brings larger non-resident capital inflows and gives access to more diversified external financing. But indices also serve as a source of risk to financial stability. For instance, benchmark-driven flows are a growing share of overall portfolio flows to EMs. Market estimates indicate that about 70% of country allocations by investment funds are driven by benchmark indices. Total assets benchmarked to the JP Morgan EM suite of indices are approaching US$1 trillion, while those benchmarked to EM Local Currency Bonds have reached more than US$250 billion. Benchmark-driven foreign investors tend to be more sensitive to changes in global financial conditions than other investors (IMF, 2019). Consequently, inclusion in EM benchmark indices may reinforce the volatility of capital flows.[6] Adverse shocks in foreign exchange markets can drive foreign institutional investors through their risk limits, both on duration and FX amount. Where FX hedging markets are thin, they can protect themselves only by selling local currency bonds. During shocks, the recipient country gets hit both in its FX market and in its bond market. Managers of funds with the bonds of many countries in the same region all get hit – the common creditor effect. Large-scale sales by funds could

[6] China's inclusion in JP Morgan GBI-EM Global Bond Index in February 2020 coincided with a noticeable increase in the coefficient of variation of monthly portfolio debt inflows from the pre-inclusion (January 2019 – January 2020) to post-inclusion (January 2021 – January 2022) period. The same observation is, likewise, noted for other emerging economies, like Romania, which was included in 2014. See Arslanalp et al. (2020) for further discussion.

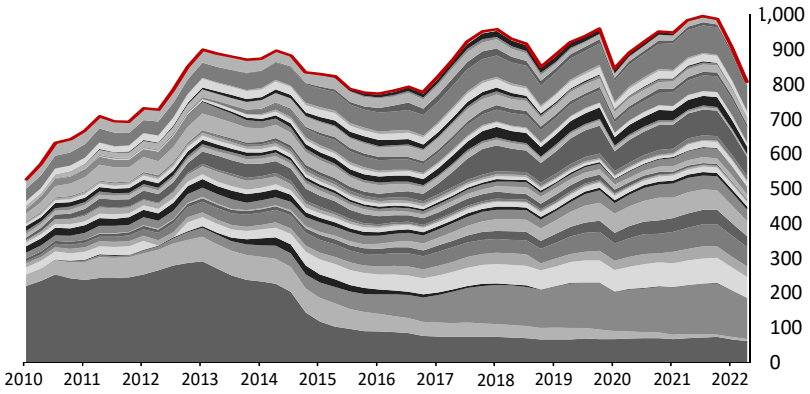
depress the entire market, perpetuate sharp currency depreciation, and trigger adverse feedback loops with broader macro-financial consequences. EM assets, thus, seem to offer limited diversification benefits during such episodes of systemic stress from global shocks. In summary, the use of common benchmarks by many EM funds and correlation between their benchmarks can lead asset managers to adopt similar allocation strategies. These funds are likely to move in a herd-like fashion as they react in similar ways when they face EM-related shocks.

**The growth in index-based investing and the rise of ETFs has helped democratise access for retail investors, but at the price of accentuating market volatility.** Assets under management in exchange traded funds (ETFs) have been rising steadily as investors have been attracted by their low cost, the diversification benefits they offer and the perception that they are relatively liquid. The share of passively managed funds (such as ETFs), popular with retail investors, has even been growing faster relative to actively managed funds. Such funds have become a major vehicle for non-resident investment in EM local currency government bonds. Amplifications can arise as more money from retail investors crowds into ETFs with a limited universe of liquid EM assets. Notably, mutual funds and ETFs investing in EM assets tend to have less diverse benchmarks than those investing in advanced economy assets, in part because there are fewer benchmark indices available. While EM fixed-income ETFs can be invested in assets where the underlying bonds can quickly become illiquid, the offer of daily redemption on demand according to the net asset value may falsely reassure investors, creating a dangerous illusion of liquidity.

**Institutional investors, as an increasingly important channel for international capital flows, have amplified the transmission of global risk shocks to EMs.** Among the range of institutional investors, active investors typically do not track any benchmarks *per se*, but their mandate is to maximise absolute returns. In this investor class, an important area of cross-border capital flows to EMs has been the growth of Multi-Sector Bond Funds (MSBF) since the GFC, which have built up large positions in certain EM economies. These are considered to be cross-over investors who opportunistically invest in emerging markets. MSBFs are mostly open-ended funds where investors tend to display more opportunistic behaviour relative to cyclical investors, often reducing their exposures more aggressively within very short time spans. The main risk transmission channels from MSBFs

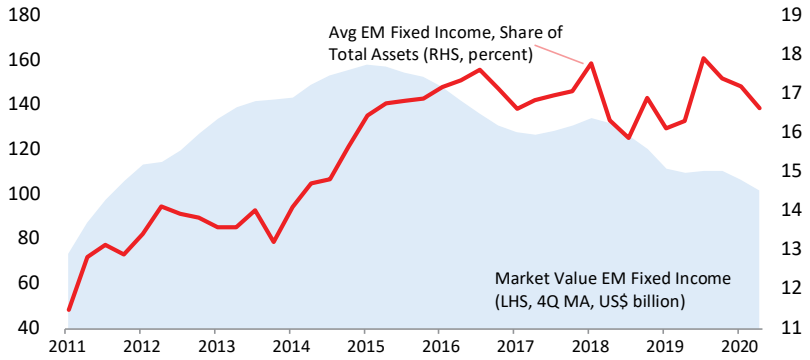
are twofold. First, they are highly concentrated – both in their positions and in their decision-making, posing risks to financial stability (Cortes and Sanfilippo, 2020; and IMF, 2021). Second, the underlying instruments often use embedded leverage through derivative structures that can amplify the risk during macro-financial shocks, in particular during tail events of inflows and outflows such as the COVID-19 crisis. As a result, these funds tend to be associated with a high degree of co-movement with global financial conditions especially during crises. Redemptions (inflows) by end-investors in which fund flows originate and investment fund managers' sales (purchases) tend to amplify each other, generating large reallocations and increased volatility of EM capital flows. As a result, investment fund behaviour tends to be pro-cyclical especially during crises (Cortes and Sanfilippo, 2020; and IMF, 2021). The data on MSBFs indicates that there were large redemptions to raise a large proportion of cash in a few specific local currency bond markets during the COVID-19 shock (**Figures 1.9a and 1.9b**). This may have contributed to exacerbating the relative underperformance of these local currency bond markets to broader emerging market indices. Indeed, relative bond funds have themselves become systemic given their phenomenal growth in recent years.

**Figure 1.9a: MSBFs Asset under Management**
(US$ billion)




*Notes:* The sample comprises 40 large MSBFs, domiciled in the United States and Europe from the fourth quarter of 2009 to the second quarter of 2020. MSBF = multi-sector bond fund; RHS = right-hand scale; USD = US dollar. Different shades indicate different funds.
*Source:* Cortes and Sanfilippo (2021) using data from Bloomberg Finances L.P. (accessed in June 2022).

**Figure 1.9b: MSBFs Total Emerging Market Fixed Income Exposure**
(LHS: US$ billion, RHS: Percentage)




*Notes:* Total fixed income includes local and foreign currency holdings. EM = emerging market; LHS= left-hand scale; MA = moving average; MSBF = multi-sector bond fund; RHS = right-hand scale; USD = US dollar.
*Source:* Cortes and Sanfilippo (2021) using data from Bloomberg Finances L.P.

**Leverage, a key amplifier of financial shocks, has risen since the GFC for EM issuers as well as global investors in EM assets.** Easy financial conditions in the aftermath of the GFC in 2008–09 and the strong demand of global investors for assets in dynamic EM economies have supported a substantial rise in leverage. The greater participation of active investors such as hedge funds, with the mandate to maximise absolute returns, mainly rely on leverage as they seek access to EM markets indirectly and through unfunded investment vehicles (where the investor uses margin) including derivatives. Most hedge funds use Prime Brokerages from banks to seek leverage and typically invest through instruments like total return swaps. Hedge funds also use offshore derivatives such as the non-deliverable forward (NDF) market to gain exposure to EM markets. While such offshore derivatives may not directly contribute to capital flows, they are often a source of pressure during global shocks and tend to be transmitted to onshore FX markets and into broader domestic financial markets. Investments in EM bond funds and ETFs can also be leveraged, which can compound downward spirals during distress as leveraged investors need to meet margin calls as the value of the underlying asset and the value of pledged collateral can decline in falling markets. Lack of access to bank credit lines during a crisis can trigger destabilising fire sales of assets. In addition, low rates on US dollar bonds have stimulated non-US companies to issue dollar bonds on an unprecedented scale, resulting in the simultaneous increase of both

corporate currency mismatches and corporate leverage (Chui et al., 2016). Even before the COVID-19 crisis, leverage in the nonfinancial private sector — comprising households and nonfinancial firms — had been increasing steadily in many countries. EM and EM Asia SOFIEs have also accumulated significant sovereign debt, mostly in local currency issuance.

**Global investors have increasingly used more complex and opaque products to access emerging and frontier market assets, often leading to the under-pricing of risk.** Various regulatory restrictions onshore (custody account requirements, settlement in local currency, and others) and the greater ease of adding derivative overlays in offshore markets condition how foreign investors seek exposure to EM assets. Investors in EM assets often seek indirect exposure through structured notes, over-the-counter (OTC) derivatives, and total return swaps and the like, which may reduce transparency. This raises prudential concerns, especially if it leads to an under-pricing of risk which suddenly becomes apparent during stress and magnifies the volatility of capital flows. Exposures in such instruments has grown rapidly. For instance, real money investors can have investments in so-called absolute return funds, which try to generate steady returns through the ups and downs in the market, and their more complex investment strategies can amplify market swings. As such, an absolute return fund can invest in an EM local currency bond while also taking a view on the exchange rate, and creating complex interactions during tail events.

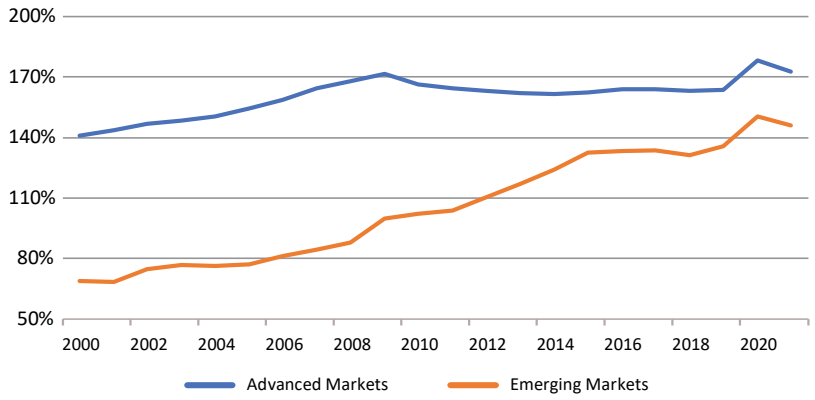
Active fund strategies in LCY bond markets have increasingly invested in EM credit (mainly local currency bonds) where they separate the FX exposure from the duration (interest rate) exposure. For instance, say a benchmark investor invests in Indonesian rupiah (IDR) LCY bonds, which is part of GBI-EM-Diversified with a 9% weight, and decides to reduce its exposure to interest rate risk. But given the outlook for rising policy rate and taking a neutral view of the FX, the investor may decide to reduce the duration by lowering allocation to, say, a 6% weight on the LCY government bond, but increase exposure by allocation through a long position in FX, which could be through NDF markets or domestic forward markets. Such exchange rate overlays can result in the amplification through the exchange rate channel while the interest rate outlook can lead to lower inflows in the bond market. These strategies and investments through the derivatives markets make it difficult for EM policymakers to gauge the degree of leverage in domestic markets and the pressures from offshore markets. While country authorities can, in principle, track direct foreign ownership of government bonds, they

often do not know the proportion held by the domestic financial sector on behalf of foreign investors through derivative structures. Also, the leverage that underlies such complex structures of access instruments can be an important driver of market volatility.

**The complexity of the risk exposures through indirect access instruments can increase tail dependence of capital flows to global shocks.** The use of total return swaps by hedge funds can amplify the impact of shocks on prices and yields. Banks (prime brokerages), the primary source of leverage for hedge funds, are also impacted. Even cyclical investors often use more complex investment strategies, combining many different instruments (from cash bonds to derivatives) to maximise returns given their expectations of interest rate and FX developments. During periods of heightened global risk aversion, such exposures can transmit market volatility across markets, including the bond market, the interest rate market, and the FX swap market. Fund managers may seek to preserve their own liquidity by selling assets ahead of expected investor redemptions (Aramonte et al., 2021). This has been evident in bond funds investing in EM government bonds. In addition, leveraged foreign investors relying on US dollar funding are hit by US dollar shortages.

**However, there has been a trend towards the deepening of the financial system in EMs during the past twenty years.** Twenty years ago, business, and residential investments in many EMs were held back by underdeveloped domestic financial systems. Companies and governments were too dependent on short-term dollar borrowing from foreign banks. Better macroeconomic policies and financial reforms have transformed this situation. Total credit to the private sector as a share of GDP is now very close to that prevailing in the advanced economies (**Figure 1.10**). Part of the increase in corporate leverage can be attributed to desirable financial deepening. Domestic financial markets have also grown relative to GDP. The development of deep local currency government bond markets, with extensive long-dated issuance, has reduced currency mismatches and eased refinancing risks. The domestic investor base, including domestic banks and institutional investors, is broader and deeper (Gagnon and Turner, 2019). As will be discussed further in the policy section (Section 3), this gives central banks greater scope to use their balance sheets to forestall unwarranted tightening of domestic financial conditions when global market sentiment takes a marked risk-off turn.

**Figure 1.10: Total Credit to the Private Non-Financial Sector**
(Percent of GDP)



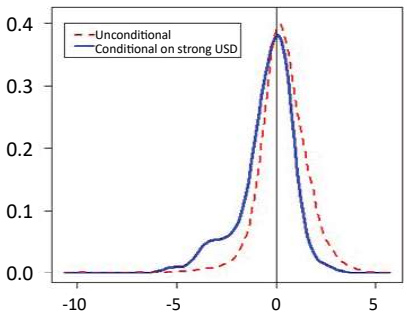

*Notes:* The private non-financial sector includes non-financial corporations (both private-owned and public-owned), households and non-profit institutions serving households as defined in the System of National Accounts 2008. In terms of financial instruments, credit covers loans and debt securities. Advanced and emerging economies refer to those included in the BIS Credit Database.
*Source:* SEACEN staff calculations using data from World Bank Data (accessed in July 2022).

### *(iii) The dominant role of the US dollar as a funding currency for investors and issuers is a source of risk transmission with macro-financial stability implications.*

**The US dollar tends to rise when global markets go into risk-off mode and has, therefore, often been a barometer of global risk sentiment.** Increased unhedged dollar borrowing over the past decade or so means that a stronger dollar implies new risks for EM economies and capital flows to them. Flexible exchange rate regimes normally mitigate the domestic impact of adverse external shocks. Currency depreciation supports domestic output when export earnings fall. This standard effect, however, can be offset (or even reversed) if unhedged foreign exchange exposures on EM balance sheets become large – which has been the case for several EMs during the past decade. Our study shows that in such circumstances, net non-resident debt flows to EMs can be subject to a higher tail risk when the US dollar rises strongly against the domestic EM currency **(Figures 1.11a and 1.11b)**. This empirical evidence of the exchange rate as an amplifier also holds for net non-resident debt and equity flows to EMs, especially with anecdotal evidence showing limited hedging being a prevailing practice in LCY bond investments

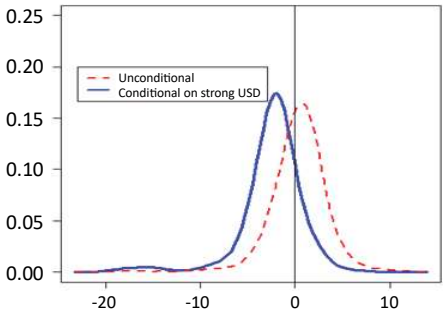
by non-residents. In addition, increased foreign investment in local currency bond markets is another source of capital flight when markets become more pessimistic. A stronger US dollar due to a flight to safety from rising investor risk aversion tends to be followed by a weakening of portfolio capital inflows. A deterioration in global financial conditions can reduce capital flows to economies with heavy US dollar debts and/or those where the foreign ownership of domestic debt is high. US dollar strength/EM domestic currency

**Figure 1.11a: Distribution of Weekly Emerging Market Portfolio Debt Flows**




*Notes:* Y-axis refers to the probability and x-axis pertains to standard deviations. Portfolio debt flows refer to net non-resident purchases of EM bonds.
*Source:* SEACEN staff calculations using data from IIF Weekly EM Portfolio Database (accessed July 2022).

**Figure 1.11b: Distribution of Weekly Emerging Market Portfolio Equity Flows**

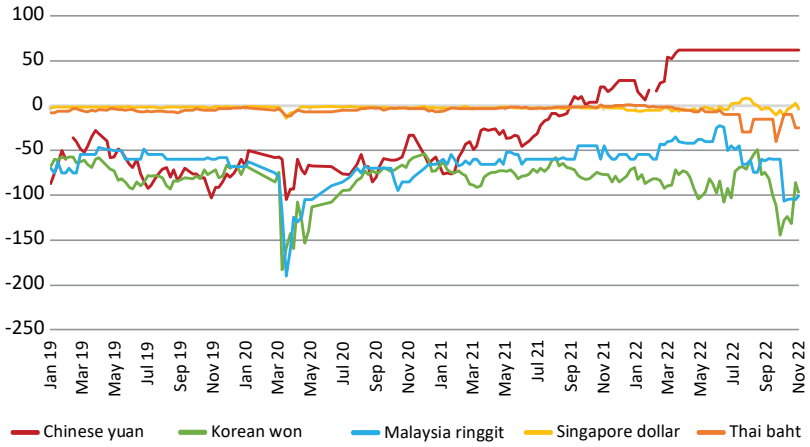



*Notes:* Y-axis refers to the probability and x-axis pertains to standard deviations. Portfolio equity flows refer to net non-resident purchases of EM equities.
*Source:* SEACEN staff calculations using data from IIF Weekly EM Portfolio Database (accessed July 2022).

weakness also leads to a contraction of domestic credit for EMs, especially where local banks borrow dollars to lend at home. A decline in the net worth of US dollar-indebted corporates and the reduced supply of credit can lower business investment, exports, and GDP growth (CGFS, 2020).

**The US dollar dominates as a funding currency for investors in local currency assets and as the issuance currency of EM companies.** US dollar shortages during periods of financial stress have wide implications for FX liquidity. FX swap markets for EM currencies have grown enormously since the mid-2000s. Yet liquidity in such markets can deteriorate in periods of stress, and those who are short dollars can find the price of hedging turning against them (Kalemli-Özcan, 2019). Such tightening of US dollar liquidity can be seen through the widening of the dollar-EM domestic currency basis spread, contributing to the increased volatility of such exposures. **Figure 1.12** shows the cross-currency basis spread which measures tightness in the US dollar funding market, i.e., the direct cost of US dollar funding vs. the synthetic cost of USD funding in the interbank (LIBOR-OIS spread) and derivative markets (such as the FX swap market) became more negative (Barajas et al., 2020).

**Figure 1.12: Cross Currency Basis Swap Against the US Dollar**
(Basis points)




*Note:* 3-month cross currency basis swap for the ringgit and yuan; 6 months for baht; and 3 months won versus 6 months US dollar.
*Source:* SEACEN staff calculations using data from Refinitiv Swap Database (November 2022).

**Funding risks from mismatches can amplify the foreign exchange risks through the financial channel.** Understanding the transmission mechanism is important for policymakers. Active investors including retail investors that invest in dedicated EM bond funds and ETFs are primarily investing over a shorter-term, typically take a view on the foreign exchange rate and do not hedge FX risk as they seek a higher return. Other cyclical investors (trading desks of banks and hedge funds) also tend to not hedge FX risk. Such dynamics are reflected in the rise in transactions in the FX swap market for EM currencies as demand for US dollars come from asset managers/hedge funds investing in local currency bonds, say for carry trade investors. Some of these asset managers also hedge their FX risk in the swap market. During a period of stress, which is typically correlated with a stronger US dollar from a flight to safety, there is a rush to hedge their exposures and/or to roll over the existing hedges – putting upward pressure on hedging costs. Investors often resort to selling their LCY holdings, putting pressure on the exchange rate. Such dynamics are further amplified by banks and non-banks in EMs that have borrowed in US dollars. On the other hand, institutional investors (including pension funds, insurance companies, and sovereign wealth funds) who take a longer-term view and are more inclined to hedging, can provide some support to such market volatility.

**Market imperfections in EMs tend to make unhedged carry trades attractive during periods of low global rates and low volatility in FX markets.** Under the "forward premium puzzle", uncovered interest rate parity (UIP) and covered interest rate parity fail to hold in the short-run, implying that investors can earn higher returns from unhedged FX exposures.[7] However, a sudden reversal of expectations can reverse such carry trades, perhaps disrupting local financial markets and damaging local banks (Forni and Turner, 2021). As a result, the post-GFC period of low volatility and low funding costs in the US dollar resulted in a significant build-up of carry trades leading to higher vulnerabilities in EMs. The current shift in Federal Reserve interest rates combined with higher volatility is leading to significant capital outflows from EMs.

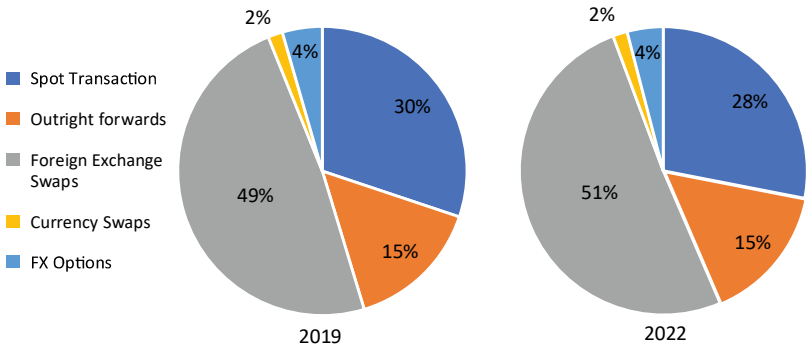
[7] The forward premium puzzle or the failure of UIP to hold, has been frequently documented, and this reality means currencies with low (high) interest rates tend to appreciate (depreciate) less than implied by UIP, and could be a reason to hedge a smaller share (larger share) of foreign investments (Goldman Sachs, 2018).

## C. Capital Flows and their Impact on EM Financial Markets since the Global Financial Crisis

**Larger currency exposures to EM LCY assets have led to greater dependence on foreign exchange markets including derivatives markets.** FX flows as measured by cross-border equity and fixed income fund flows to EM Asia have been rising. Growth in EM FX derivatives markets such as FX swaps and forwards (including non-deliverable forwards (NDFs) and domestic non-deliverable forwards (DNDFs)) is notable. Trading in FX swaps continued to gain in market share in 2022 (**Figure 1.13a**). Turnover in FX swaps, the most heavily traded instrument, which is primarily used by market participants for the management of funding liquidity and hedging of currency risk, rose by almost a fifth between 2019 and 2022 to US$3.8 trillion per day and accounted for half of global FX trading. In terms of currency, the US dollar continued to dominate FX swap transactions in 2022, followed by the euro (**Figure 1.13b**). The bulk of turnover in FX swaps was in short-maturity instruments (overnight up to seven days) in April 2019, although trading in longer tenors expanded between 2016 and 2019 (BIS, 2019).

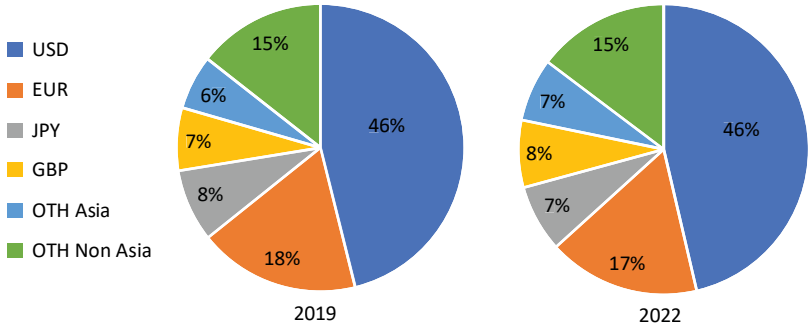
**There has been a significant increase in trading of EM currencies, but the ability of FX markets to absorb global shocks remains somewhat limited as proven during the onset of the COVID-19 pandemic.** The size and turnover of capital flows can often be significant compared to the size of domestic financial markets in EM and EM SOFIEs. The global share of EM currencies rose by about 4 percentage points to 25% of total FX turnover in April 2019, continuing the trend observed in previous surveys (BIS, 2019). Several other Asia-Pacific currencies gained market share. There has been a noticeable deepening of domestic financial markets (sovereign credit markets, interest rate/FX markets, and swap markets), particularly from more active foreign and domestic investor base. The onset of COVID-19 in early 2020 raised the question whether such trend improvements in EM markets have provided shock absorbing capacity, especially when global asset managers react to such shocks.

**Figure 1.13a: OTC Foreign Exchange Turnover for 2019 and 2022 - by Instrument**
(Percent of total)




*Notes:* Net-net basis refers to the values that are adjusted for local and cross-border inter dealer double-counting. Values are daily averages in April 2019 and computed as percentage of total. Refer to BIS Triennial Survey for definitions.
*Source:* SEACEN staff calculations using data from BIS Triennial Central Bank Survey 2019 and 2022 (accessed in October 2022).

**Figure 1.13b: Foreign Exchange Swaps Turnover for 2019 and 2022 - by Currency**
(Percent of total)




*Notes:* Net-net basis refers to the values that are adjusted for local and cross-border inter dealer double-counting. OTH Asia includes Chinese yuan, Hong Kong dollar, Korean won, Chinese Taipei dollar, Indian rupee, and Singapore dollar.
*Source:* SEACEN staff calculations using data from Triennial Central Bank Survey 2019 (accessed in October 2022).

**Another important trend has been the growth of offshore derivatives markets such as NDFs, which can become a source of risk transmission in domestic markets.** Non-deliverable forward currency markets provide access for those seeking exposure to EM assets, both for hedging and for speculating. Asian NDF markets are among the largest globally, with the Korean won and the Indian rupee the most traded NDF currencies (Schmittmann and Teng, 2020). Asian NDF volumes often exceed onshore trading volumes. This market has grown significantly in turnover, particularly for the Indian rupee, Indonesian rupiah, and Korean won. Spillovers from the offshore to the onshore market from arbitrage between onshore forward and NDF market (forward exchange gap) can widen significantly during periods of stress, providing information content as a leading indicator of pressures building on the currency. Cross-border investors typically rely on offshore hedging and funding markets due to restrictions in the onshore hedging and funding markets.[8]

**The development of the domestic institutional investors base and domestic hedging markets have been an important risk mitigant.** The rise of the domestic institutional investor base has helped to deepen financial markets. The demand for securities has come from institutional investors including long-term investors like pension funds, insurance companies, and sovereign wealth funds. Nevertheless, there is no clear empirical nor anecdotal evidence suggesting that the domestic institutional investor backstop has been able to fully counter the sell-offs under financial stress as seen during the COVID-19 capital outflow episode.

[8] In India, several initiatives were undertaken to reduce NDF market impact on domestic market. They include, among others: (i) the onshore foreign exchange market is allowed to function round-the-clock; (ii) banks which operate International Financial Services Centre Banking Units (IBUs) are allowed to participate in the NDF market; (iii) revisions in interest rate derivative guidelines to enable easier access to non-residents; and, (iv) introduction of the Voluntary Retention Route (VRR) to attract portfolio investors with longer investment horizons and Fully Accessible Route (FAR) which allow non-residents to increase their exposure to the sovereign debt securities, have increased local currency exposures and hedging needs.

**Box 1: Market Perspective on Investing in EM Asset Class** [1/]
*(The SEACEN Centre)*

- The broad guidelines and asset allocation decisions are undertaken by the Investment Committee. Changes to the investment mandates are generally based on differentiation between countries, regions, and asset classes.
- Investors typically invest in EM markets by (i) seeking credit exposure to the government or corporate bond market; and (ii) seeking exposure through the interest rate market and FX markets, both onshore and offshore.
- Asset managers seek exposure to the local currency bond markets to not only earn the carry difference in interest rates but also to potentially gain from the domestic FX appreciation.
- With imperfect markets, hedging costs can often offset the potential gains from the carry while the prospect of domestic FX appreciation enhances expected returns. As a result, asset managers typically do not hedge, unless they are mandated to.
- In addition, hedging the tail risk through the options market is difficult because of the lack of depth and liquidity in such markets. Rapid exits from EMs during tail events such as the drying up of global liquidity can magnify the outflows.
- Pull factors driving investments in EM asset class include; macro stability and fundamentals, availability of buffers and tools including macroprudential policies, growth potential, quality, and credibility of institutions.
- Push factors such as the low interest rate environment and quantitative easing in advanced economies has driven a lot of money to EMs.
- Market liquidity (the ability to get out of a position) is paramount in making investment decisions.
- Market participants reported that the Volcker Rule had impacted market making as financial institutions have not been allowed to hold much inventory post-GFC.

- The presence of both domestic markets for hedging and a domestic institutional investor base are important considerations.
- Investors regard economies that have a deep local institutional investor base as better able to manage capital flows, as they provide the backstop and represent the most obvious other side of the trade when foreigner investors leave the market.
- While the local institutional backstop could be helpful, it is not clear how it would behave under stress.
- In the case where an economy has a small weighting in a price index, has low yields and has bad economic fundamentals, they become the easiest ones to fall under the sell category during stressful times.

/1 Based on meetings with global investors/asset managers in Singapore (March 2020) and other ongoing discussions with market participants.

SECTION 2

# MACRO-FINANCIAL RISKS AND VULNERABILITIES ARISING FROM VOLATILE CAPITAL INFLOWS

## A. Analysis of Volatile Capital Flows to Emerging Markets

### *(i) Distribution analysis of portfolio debt and equity flows*

**Tails matter for portfolio flows to EMs and EM Asia SOFIEs.** Portfolio debt and equity flows are volatile and very sensitive to risk-on, risk-off swings in global markets **(Table 2.1)**. Earlier financial crises have highlighted the need to understand how a skewed fat-tailed distribution of likely outcomes can track systemic risks. Co-movements between capital flows and other macro-financial variables are time-varying, increasing during periods of tightening global financial conditions. A summary of an empirical analysis carried out with portfolio flow data from EMs and EM Asia SOFIEs indicate:

- Capital flows to EMs, encompassing both debt and equity flows, exhibit statistical behaviour consistent with a fat-tailed non-normal distribution.
- Both debt and equity portfolio flow to EMs exhibit strong elements of time-varying tail dependence, having fatter tails during times of stress.
- When global financial conditions deteriorate, the near-term risk of heavy outflows increases.
- A global shock that leads to tighter US dollar funding conditions tends to result in fatter tails of the predicted distribution of capital flows.
- Furthermore, the relationship between different types of portfolio flows (debt and equity) and the exchange rate is also amplified during such turbulent times.

**Table 2.1: Descriptive Statistics of Portfolio Flows**

| Variable | Mean (US$ mn) | Variance | Kurtosis | Skewness |
|---|---|---|---|---|
| Brazil | 1,119.8 | 16.7 | 7.8 | -0.2 |
| China | 8,893.6 | 192.5 | 4.4 | 0.1 |
| India | 1,001.3 | 9.7 | 7.4 | -0.7 |
| Indonesia | 405.2 | 1.9 | 8.6 | -1.3 |
| Korea | 1,436.5 | 12.6 | 3.0 | 0.1 |
| Malaysia | 380.4 | 5.4 | 4.2 | 0.1 |
| Mexico | 948.8 | 8.6 | 3.6 | 0.4 |
| Philippines | 126.9 | 0.8 | 3.7 | 0.6 |
| South Africa | 291.2 | 1.4 | 4.8 | -0.5 |
| Thailand | 600.4 | 3.2 | 4.3 | 0.6 |
| Turkey | 618.1 | 4.1 | 4.3 | 0.5 |

*Notes:* Mean values of portfolio flows are in US$ millions. Values refer to net non-resident inflows of EM equities and bonds.
*Source:* SEACEN staff calculations using data from IIF Monthly EM Portfolio Database (accessed in October 2022).

**The distribution of high-frequency non-resident portfolio inflows to EMs and EM Asia SOFIEs is non-normal, adding complexity to policies to deal with capital flows.** The in-depth analysis of weekly net capital inflows provides the following insights:

- The unconditional distributions of weekly non-resident equity and debt inflows to all selected EMs and EM Asia SOFIEs have fat tails. The shape of these tails, however, is heterogeneous across countries and types of flows.
- Debt flows to Thailand show positive skewness, i.e., long right tails suggest the higher probability of capital flow surges during boom periods.
- The unconditional distribution for equity flows to Korea and Thailand as well as for debt flows to India exhibit negative skewness, i.e., long left tails imply a higher probability of very large capital outflows.
- Higher moments of the distribution, notably kurtosis or the measure of "peakedness" or "flatness" of the distribution is prevalent across EM and EM Asia SOFIEs, with significantly positive values indicating heavy tails, suggesting a high probability of outflows and surges relative to a normal distribution.

- The heterogeneity of portfolio flows distributions warrants a differentiated policy mix across countries.

**Overall, risks to portfolio flows show more asymmetry on the downside and react more to changes in global risk aversion compared to normal times.** The shape of the distribution for capital flows can change dramatically during times of high financial stress such as during the onset of the COVID-19 pandemic in March to April 2020, as shown in **Figure 1.5**. Moreover, the distribution of portfolio flows in EM economies during high VIX episodes indicates several key features.

- The entire distribution, and not just the central tendency, changes over time. Policy responses will have to focus on shifting the entire distribution to the right.
- Times of high uncertainty and financial stress are associated with fat left-tails, indicating an elevated probability of outflows.
- In times of stability, however, the conditional distribution is more like a normal distribution which argues for symmetric policy responses to inflows and outflows.
- The upper tails of the conditional probability distributions appear to be more stable than the lower tails.
- The left tail of the distribution exhibits much more variation. This asymmetry in the changing nature of conditional distributions of future portfolio flows conditional on a variable like the VIX suggests that downside risks are much more variable and dramatic during stress periods.

**The sensitivity of portfolio capital flows to global financial conditions has increased and become more time-varying.** Conditional portfolio distributions during episodes of high financial stress provide evidence that shocks such as the drying up of global liquidity are more likely to be accompanied by sudden stops in portfolio capital flows to EMs **(Figure 1.5)**. High frequency data for portfolio debt and equity flows also indicate that during risk-off episodes, portfolio debt and equity outflows become more highly correlated for EM and EM Asia SOFIEs. Such high correlation between debt and equity portfolio flows weakens the portfolio diversification benefits for cross-border investors holding different investment classes. The strong positive co-movement between these two types of flows in times of major risk-off periods exacerbates the problem of outflows for EMs.

**Policy responses to sudden and synchronised reversals of non-resident debt and equity flows, as in March 2020, are usually multifaceted.** The combination of a negative demand shock, sharp currency depreciation and a flight from domestic assets confronts central banks with a classic dilemma. How to ease monetary policy without adding to downward pressure on the exchange rate? During the onset of the COVID-19 pandemic in 2020, many emerging market central banks combined cutting policy rates with foreign exchange intervention and/or easing macroprudential measures (Nier and Olafsson, 2020). Second, central banks provided extra liquidity by extending existing facilities or setting up new ones and by broadening eligible collateral for repo operations (Hofmann et al., 2020). Third, and this represented an innovation, many central banks took advantage of deep local currency government bond markets to implement measures of quantitative easing. By buying local currency bonds while keeping the policy rate well above zero (to limit currency depreciation), central banks helped to reverse the sharp initial falls in bond prices. By encouraging foreign investors to return, such actions may also have supported the exchange rate (CGD-IADB, 2020; Forni and Turner, 2021; and Arslan et al. 2020).

### *(ii) Intra-regional connectedness*

**Capital flow interconnections across EM regions tend to rise during booms and busts.**[9] The degree of connectedness at the lower and upper tails of the distribution exceeds that of the median value. The wider trading of EM assets and underlying currencies as well as the greater role played by passive benchmark investing have led investors to increasingly allocate investments to an EM region as a group, such as EM Asia. The growth of dedicated regional funds has reinforced this. While 'capital flows-at-risk' analysis mainly focuses on sudden stops and the lower tail of the capital flow distribution, the methodology in this study also assesses the right tail of the distribution during inflow bonanzas, which can also be disruptive in creating credit and asset bubbles. Policy responses to address each extreme distribution may differ. Inflow booms, for instance, may argue for stronger macroprudential policies and accumulation of FX reserves to build resilience. But large outflows may require monetary easing and selective market support to minimise the domestic effects of large external shocks. In addition, and in response to growing interconnectedness of EM regions, regional financial surveillance and safety nets through regional cooperation is vital in enhancing policy responses to common external drivers of capital flow reversals and surges.

[9] This finding is discussed in Goswami et al. (2022).

### *(iii) Capital flows and the role of the foreign exchange rate in Emerging Markets*

**The channels of transmission of global financial shocks to EMs have a common thread: they tend to reduce GDP.** A shift to risk-off mode in global markets leads simultaneously to a sharp drop in the currency against the US dollar; tighter domestic financial conditions; and weaker balance sheets of non-financial companies and local banks. Abundant dollar liquidity and lower interest rates reduce tail risks in the bank's loan book and relax its Value-at-Risk (VaR) constraint. The supply of bank credit expands, often through increased leverage and greater tolerance of currency mismatches (including indirectly via their customers). This is reversed when global markets go into risk-off mode. The currency falls against the dollar, capital inflows decline with non-residents selling local debt securities, and local banks find it harder to borrow dollars in wholesale markets. The balance sheets of companies with unhedged dollar liabilities deteriorate, with a significant contractionary impact on business investment. The currency falls against the dollar, capital inflows decline with non-residents selling local debt securities and local banks find it harder to borrow dollars in wholesale markets.

**Several financial channels amplify the negative effects of a currency depreciation against the dollar.**

- The first arises from currency mismatches. The substantial rise in US dollar debts of EM corporates without commensurate dollar earnings has made the balance sheets of many EM companies vulnerable to dollar appreciation. In addition, many companies have borrowed dollars to finance investments in local financial markets: in consequence, corporate financial stress can be transmitted to local banks and markets.

- The second channel is that any shift from risk-on to risk-off in global markets will hamper the ability of banks to borrow dollars abroad to on-lend to local firms and households (Kalemli-Özcan, 2019). In addition, pricing in the foreign exchange swap markets used by banks which on-lend in local currency tends to turn against them when dollar markets go into risk-off mode.

- The third channel is related to the stronger linkages between the exchange rate and local currency bond markets in periods of financial stress. Foreign investors, doubly exposed if bond prices fall just when the currency depreciates, are more likely to flee. The widening of the domestic investor base in recent years, however, and the greater credibility of macroeconomic policies offer central banks and governments more policy options.

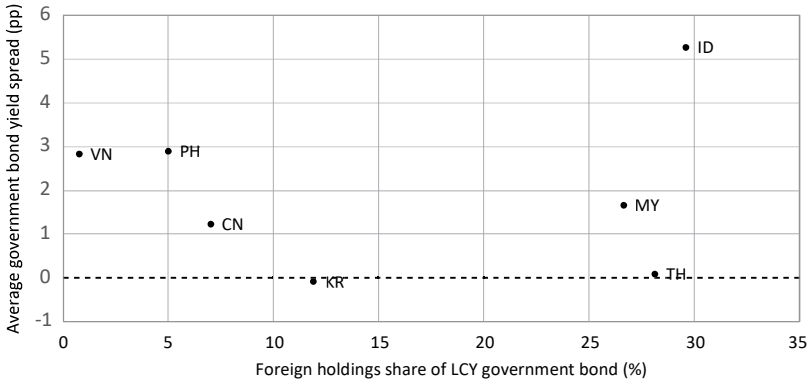
Our empirical analysis examined the joint responses of capital flows and exchange rates to a risk-off shock in global markets and show that an unexpected increase in the VIX leads to sharp and deep portfolio capital outflows **(Figure 1.5)**. Although net inflows returned to zero within a month and a half, the cumulative outflows could be substantial. The impact on capital flows is short-lived, while the impact on the exchange rate is more persistent (in the case of Korea, Indonesia, and Thailand). The persistent nature of the exchange rate response is important from a policy perspective. It means that the exchange rate appears to be a shock amplifier for those sectors with significant foreign currency debts.

### *(iv) Local currency government bond markets and macro-financial vulnerabilities*

**The development of deep local currency bond markets with sizeable foreign exchange reserves has brought significant macro-financial benefits.** Borrowing by issuing long-term local currency bonds has helped to ensure that the government's balance sheet improves when the currency depreciates. The net foreign currency position of most EMs has remained positive since the early-2000s. EM sovereign bond issuance in local currency has also had the added macro-financial advantage of avoiding the refinancing risks from short-term dollar borrowing from banks. This market, and its substantial domestic investor base, has added an important new instrument to the monetary policy toolkit of the central bank (World Bank, 2021). Better macroeconomic policies and the modernisation of local market infrastructure have attracted foreign investors as country risk premia have declined. Despite strong ups-and-downs related to changes in risk aversion in global financial markets, foreign holdings of EM Asia local currency bonds are likely to remain high **(Figure 1.6a)**.

**Local currency bond prices and the exchange rate, however, tend to decline together in periods of financial stress, amplifying pressures on unhedged foreign investors.**[10] Currency mismatches on the balance sheets of unhedged foreign lenders – a phenomenon dubbed "original sin redux" by Carstens and Shin (2019) – can create a destabilising feedback loop. Foreign investor flight from the local bond market adds to downward pressure on the exchange rate leading to further non-resident outflows. When returns on LCY bonds are more correlated with those of other risk assets, which happens during risk-off periods, local currency bonds become less attractive as a means of diversifying international portfolios **(Figure 2.1)**. Central bank or government policies to support bond markets under stress, notably by backing increased holdings by local banks and other investors, played a significant role after March 2020 in restoring foreign confidence in local bond markets.

**Figure 2.1 Foreign Holdings of Emerging Asia Local Currency Bonds and Average Bond Yield Spreads**




*Notes:* Y-axis refers to the average spread of 10-year government local currency bond yield and the US government bond yield from 2016 to 2020. X-axis refers to the average share of foreign holdings in the LCY government bonds as a percentage of the total from 2016 to 2020. CN = China, ID = Indonesia, KR = Korea, MY = Malaysia, PH = Philippines, TH = Thailand, and VN = Vietnam.
*Sources:* SEACEN staff calculations using data from Refinitiv and Asian Bonds Online (July 2022).

[10] This was especially evident during the "taper tantrum" in 2013 (Turner, 2014; and Hofmann et al., 2020).

**Non-residents face challenges in hedging their foreign exchange exposures from EM local currency bonds, a significant contributor to tail risk as observed during the COVID-19 pandemic outflows.** Investors, notably retail/real money and leveraged investors, typically only partially hedge FX risk during normal times when volatility-adjusted carry-trade returns are high. The expectation of EM FX appreciation often reinforces this calculation. But a sudden rise in volatility can quickly eliminate these prospective returns. Attempts by investors to hedge their portfolios during a market sell-off can be impeded by the shallowness of FX forward, swap and other hedging markets. In periods of financial stress, when the demand for US dollar rises, the terms of such hedges tend to turn against those investors which are short dollars. Sudden changes in pricing, or even the disappearance of foreign exchange hedging instruments for some currencies, can add further instability. One indication of such pressures is movement in the implicit spreads (the cross-currency basis) in foreign exchange swaps markets.[11]

## B. International Credit and Exchange Rate Risk

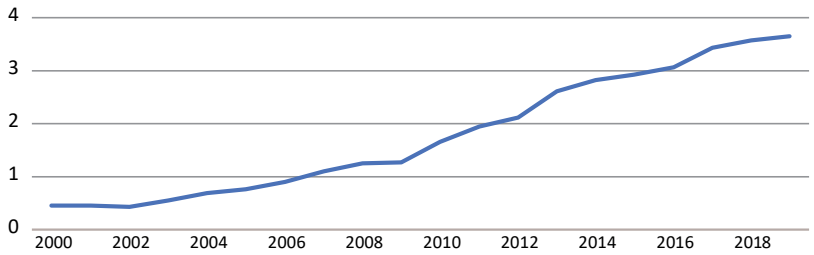
### *(i) International credit to the non-bank or non-financial sector*

**Much larger US dollar liabilities of non-financial companies of EMs in Asia have significantly increased their exposures to exchange rate risk.** Exceptionally low dollar interest rates for so long have helped to increase the dollar debt of EM Asia to around US$3.6 trillion as of end-2019, equivalent to about two-thirds of exports, compared with less than 40% of exports before the GFC of 2008-09 **(Figures 2.2a and 2.2b)**. Governments, which have increasingly financed themselves by issuing local currency bonds, have been replaced by corporations, including state-owned firms, as the main EM borrowers in international markets. The bulk of the increase since the GFC took place between 2012 and 2016. Within SEACEN, the most significant increase over the past decade has been in Indonesia – from around 25% of exports at the time of the GFC to 146% of exports at the end of 2019. Since then, the issuance of dollar debt has remained high, reacting to volatile movements in global financial conditions. Nonetheless, for selected SEACEN

[11] An IMF calculation of the median cross-currency basis swap spreads of 22 currencies serves as a good proxy for global foreign exchange hedging pressures (Barajas et al., 2020). Before 2007, this median was close to zero indicating that the covered interest parity condition was generally fulfilled.

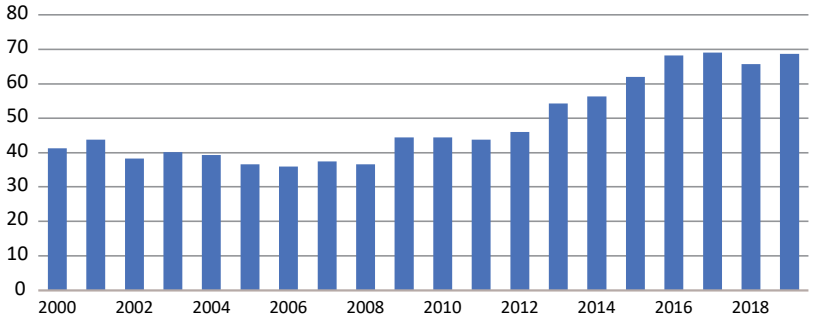
member economies in 2010-2021, only 8% of non-bank and non-sovereign foreign debt liabilities (bonds and loans) have short-term maturity, while most are long-term foreign debt.

**Figure 2.2a: USD Denominated Debt – Selected SEACEN Economies**
(US$ trillion)




*Notes:* Values are USD-denominated outstanding debt. The outstanding debt refers to claims excluding debt securities of international active banks plus outstanding debt securities liabilities.
*Sources:* Pradhan (2021) using data from BIS Locational Banking Statistics and BIS International Debt Statistics.

**Figure 2.2b: US Denominated Debt – Selected SEACEN Economies**
(Percent of Exports)




*Note:* Y-axis refers to USD-denominated debt as share of international exports (in %).
*Sources:* Pradhan (2021) using data from BIS Locational Banking Statistics, BIS International Debt Statistics and UN COMTRADE.

**The international financing of companies has shifted toward US dollar bond issuance (overtaking dollar bank loans) and more non-financial companies have taken substantial financial positions not related to their core businesses.** Most of the increase in US dollar debt has come from the issuance of medium- or long-term bonds, rather than from short-term bank loans. This shift – shared by most EMs – has made borrowers less vulnerable to the short-term funding pressures which had triggered so many sudden financing crises in the past. It has also enabled companies to take advantage of episodes of particularly favourable borrowing conditions in international markets to borrow more than needed for new spending or for refinancing maturing bonds. This seems to have happened in the second half of 2020, when a sharp and ultimately short-lived decline in global bond yields led to increased EM bond issuance. The treasury operations of non-financial companies active in international bond markets have, therefore, become more significant, both in earning profits and in generating financial risk exposures not directly related to their core businesses. Bruno and Shin (2020), for instance, have noted a tendency to invest in higher-yielding local currency assets. This has increased the risk of contagion from financial stress affecting non-financial corporations to local bond and wholesale banking markets.

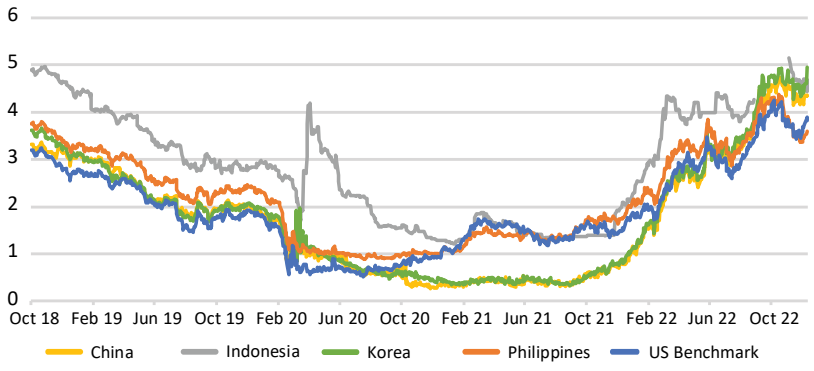
**The impact on local banks can become systemic when financial conditions tighten.** When large firms find it harder to borrow dollars abroad, they may react in ways that put pressure on local banks. They may activate under-priced credit lines and squeeze out other borrowers. They might also reverse the carry-trade borrowing dollars and cut their wholesale local bank deposits. In addition, domestic banks continue to channel cheap and abundant dollars to local small and medium enterprises (SMEs) – often stimulating a boom in domestic credit in the process. BIS statistics show that the foreign currency liabilities of banks in the SEACEN-4 exceeded US$100 billion by end-2019, twice the level a decade earlier. When international financial conditions tighten, as in 2008, banks may find it harder to borrow US dollars. They may also find it more expensive to swap US dollar for local currency liabilities when their business strategy is to on-lend in local currency. These forces illustrate how banks are forced to reduce lending just when the export markets of their clients are shrinking (Kalemli-Özcan, 2019).

**External finance for EMs from the issuance of long-term US dollar bonds has shifted liquidity risks from borrowers to foreign investors, who also face currency exposures.** This can alter market dynamics especially in moments of stress, with strong potential feedback effects on borrowers. A major trend has been the greater use of bond funds by investors and asset

managers in order to build more diversified and liquid portfolios based on individual bond issues that may be illiquid. Open-end funds (mutual funds), which offer a daily price even when the underlying assets are illiquid, have grown because they attract investors who demand liquidity. But this notion of liquidity can become an illusion ("built on a lie" was the expression of Mark Carney (2019)). Several recent episodes have demonstrated how easily such liquidity can evaporate, leaving investors with large losses and creating new uncertainty for borrowers. Repeated episodes of bond and derivative market turbulence during the period of March 2020 to February 2021 point to serious gaps in the international regulatory framework covering bond markets.

**The combination of tighter rules governing international bond markets and higher benchmark long-term interest rates would mark a significant tightening in global financial conditions for EM companies seeking to borrow dollars.** Addressing regulatory gaps in international capital markets is now high on the international policy agenda. But market conditions have changed. In the first half of 2022, benchmark dollar bond yields have risen substantially, with the term premium becoming positive **(Figure 2.3)**. Moreover, rising policy rates to contain inflationary pressures in 2022-2023 would, likewise, raise the cost of borrowing for EM companies, particularly those borrowing in US dollar.

**Figure 2.3: Benchmark U.S. Dollar Bond Yields and EM Dollar Bond Yields**
(Percent per annum)



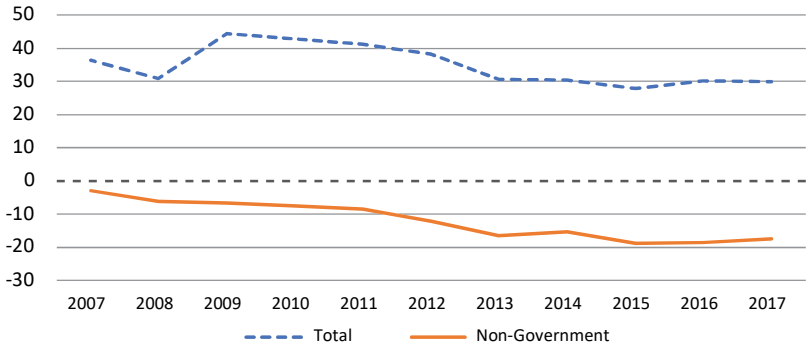

*Note:* Bond yields refer to 10-year investment-government bonds, except for China which is 5-year government bonds.
*Source:* Refinitiv (accessed September 2022).

### *(ii) Currency mismatches*

**The financial stability threat from increased foreign currency borrowing by EM corporates depends on the size of their currency mismatches.** It is not enough to look only at aggregate international foreign currency liabilities as they represent an incomplete measure of currency mismatches. Account also needs to be taken of (i) foreign currency assets which have also risen strongly, (ii) any offsetting reductions in other forms of foreign currency liabilities (such as domestic bank loans), (iii) foreign currency earnings (exports), and (iv) currency hedging. In the absence of corporate sector data, Chui et al. (2016) calculated currency mismatches for the *non-official sector* (including state-owned companies). The net foreign currency debt of this sector has increased, reaching 17% of exports by end-2017. Corporations, including state-owned companies, have become large borrowers on international capital markets, creating new vulnerabilities as discussed in Section 1. In contrast, the *official sector* has a large positive net foreign currency asset position, thanks to sizable foreign exchange reserves. In addition, sovereign borrowing now generally takes the form of local currency rather than US dollar bonds, albeit with a significant share held by non-residents. The blue dotted line in **Figure 2.4** shows a positive total (official plus non-official) for the four countries in aggregate. The only negative values in the sample occur for Indonesia post-2013. The significance of a positive country aggregate, rather than the negative one in the late 1990s, is that a currency depreciation improves the local currency value of a country's external balance sheet – and so reinforces the stabilising competitiveness effects of currency depreciation on the current account. This gives macroeconomic policy greater room to manoeuvre in the face of external financial shocks. Sectoral currency mismatches could still pose financial stability risks that warrant a regulatory response.

**Larger currency exposures have led to a greater dependence on FX derivatives.** Companies tend to hedge their long-term dollar debts imperfectly using short-term instruments, such as three-month swaps, counting on being able to renew them easily. But in periods of financial stress, when the demand for dollars surges, the terms of such hedges could turn against firms with short US dollar positions (Kalemli-Özcan, 2019). Sudden changes in pricing, or even the disappearance of foreign exchange hedging instruments for some currencies, can destabilise indebted companies. An additional concern is that currency-related corporate stress can be quickly transmitted to local banks which are often their counterparty in

**Figure 2.4: Net Foreign Currency Assets – Selected SEACEN Economies**
(Percent of Exports)




*Notes:* Net foreign assets of depository corporations (excluding central bank) plus non-bank foreign currency cross-border assets with BIS reporting banks less non-bank foreign currency cross-border liabilities (excluding debt securities) to BIS reporting banks less international debt securities outstanding of non-bank and non-government sectors in foreign currency; outstanding positions of year-end. Exports refers to the national account's definition. The sample includes Indonesia, Malaysia, Philippines, and Thailand.
*Source:* Turner (2021) using data from Bank of International Settlements.

foreign exchange derivative contracts. Liquidity strains in foreign exchange derivative markets have become more frequent. One indication of such strains is widening spreads in foreign exchange swaps markets. Before 2007, this median was close to zero, indicating that covered interest parity was generally satisfied. Since the GFC crisis, however, the dollar cross-currency bases of many currencies have become more volatile. The median widened in March 2020 at the onset of the COVID-19 pandemic. A US dollar liquidity crisis was averted only by the rapid activation of the Fed's dollar swap lines with selected other central banks. Barajas et al. (2020) estimate that this action narrowed the cross-currency basis for the currencies of swap line countries, but not for those who were not the recipient of the swap lines. In addition, international reserve buffers as well as the health of the banks (e.g., liquidity and capital buffers) can be risk mitigants during stress periods. To this end, regulatory reforms under Basel III have played an important role in building resilience of the financial system.

**The risk of destabilising foreign exchange market dynamics can emerge due to unhedged dollar liabilities.** Many firms without commensurate US dollar revenues had borrowed dollars without fully hedging their foreign exchange exposures (Alfaro et al., 2019; and Chui et al., 2016). The fragility

this creates is often magnified by leverage. Indeed, many firms do not fully invest the dollars they had borrowed in expanding their foreign business but rather in acquiring other financial assets. Companies with unhedged dollar debts tend to buy dollars (directly or by purchasing hedges) whenever the local currency comes under pressure in foreign exchange markets. This can set off a destabilising market dynamic: a drop in the exchange rate makes their dollar debts even harder to service inducing further dollar purchases and thus a still weaker currency. This can have macroeconomic consequences as leveraged firms with dollar debts cut business investment that can more generally negatively impact aggregate demand (Avdjiev et al., 2019).

# SECTION 3

# POLICY MEASURES AND FRAMEWORK IN ADDRESSING MACRO-FINANCIAL IMPLICATIONS OF VOLATILE CAPITAL FLOWS

## A. Macro-Financial Vulnerability Challenges of Volatile Capital Flows

**The rapid growth of bond funds that reflects higher corporate dollar debt issuance since the GFC has also been accompanied by bouts of market turbulence. The severe dysfunction of even core bond markets in March 2020 seems to have given new urgency at the international level to tackling the issue of less regulated institutions intermediating cross-border capital.** Central banks from larger EMs have been active in these policy deliberations at the Financial Stability Board. One specific topic of particular interest is the development of new macroprudential tools to discourage the risky borrowing strategies of non-financial companies, notably in the issuance of dollar bonds in international markets. A related issue concerns the risks taken by local institutional investors which seek to boost returns on their dollar portfolios by investing in EM corporate debt including state-owned firms.

**Policy frameworks need to take the procyclicality of regulation into account.** The capital and liquidity ratios imposed by regulation on banks need to consider the risk that global financial conditions could deteriorate more than expected – especially if new international rules on bond funds are introduced when US dollar yields in benchmark markets are rising. US dollar borrowing by state-owned companies requires particular attention. Corporate reports of private but listed companies need to include details of the exposures arising from their financing operations, particularly in terms of maturity or currency mismatches, off-balance-sheet exposures and so on.

**The perimeter of macroprudential policies to address currency and maturity mismatches will have to be extended to capital market finance.** Indeed, macroprudential policies in borrowing countries have had much success in limiting the foreign exchange exposures of domestic banks.

In principle, US dollar lending by banks to firms which do not have commensurate US dollar earnings has been discouraged by regulators. The big gap in macroprudential policies worldwide, however, is that they do not cover the risks from excessive leverage as well as currency and maturity mismatches created by capital market finance. This shortcoming has concerned policy makers for some time. A former Vice-President of the European Central Bank, for instance, warned some years ago that new financial crises would be inevitable unless macroprudential policies covered capital markets more effectively (Constâncio, 2017). New macroprudential measures, such as countercyclical liquidity buffers, and a comprehensive adjustment of existing tools could bolster the resilience of the bond fund sector (Lewrick and Claessens, 2021).

**Repeated turbulence in international bond markets accentuates monetary policy dilemmas.** At the onset of the pandemic in 2020, many EMs faced the classic quandary of how to ease monetary policy to counter a recession without triggering a large currency depreciation which might cripple companies with foreign currency debts. Cutting the policy rate beyond a certain point in such circumstances might be contractionary because of the damage done to corporate balance sheets. This is akin to the reversal rate of Brunnermeier and Koby (2019) whereby ever lower or negative short-term rates damage the earnings of banks and thus nullify the desired expansionary effect.

**Policy responses in EMs during COVID-19 have broadened to interventions in domestic bond markets.** The drawback is that the greater importance of EMs local currency bonds in the portfolios of foreign investors has also increased the foreign exchange market/bond market feedbacks, magnifying the domestic consequences of external financial shocks. Foreign investors learnt from the 2013 taper tantrum that an EMs currency crisis often goes together with a bond market crisis (Carstens and Shin, 2019). Foreign investors without foreign exchange hedges are thus doubly exposed. The strategy followed by several central banks including Indonesia and the Philippines was not to lower the policy rate in order to protect the currency, but rather to buy government bonds at the same time. In some countries, new legal charters were introduced to allow the central bank to buy public and private securities in secondary markets. Many central banks used quantitative easing (QE) without reaching the zero lower-bound on interest rates. This change in monetary policy implementation has favoured more government borrowing (Forni, 2020). The remarkable development of

local financial markets, often with a deeper local investor base, has given EM central banks new possibilities for balance sheet policies. Foreign investor demand for government bonds denominated in local currency was stimulated by a decade of low yields on advanced economy government bonds.

**Measures to remove the tail risk of a bond market collapse promotes resilience in the domestic financial system because bonds serve as a safe asset for banks and as reliable collateral for borrowing.** The larger stock of government bonds and other financial assets which were traded in open markets, nonetheless, means that central bank asset purchases can be more ambitious. In addition, credit easing can be supported by official measures, such as regulatory relaxation— offering investors hedges which put a floor under future bond prices, to encourage local banks and other domestic investors to buy government bonds that foreigners were selling. They also reassure foreign investors, and so support the exchange rate. This challenges the orthodox view that QE tends to weaken the exchange rate. The sharp rises in EMs bond spreads in March 2020 was decisively reversed, exchange rates appreciated, and many corporates took advantage of favourable financing conditions to issue more dollar bonds. How well QE works in practice depends on the quality of domestic macroeconomic policies. The underlying fiscal position is key. Also important is confidence that a credible central bank will keep inflation well anchored. For EMs that implemented QE measures during the onset of COVID-19 pandemic in March 2020, assessing the effectiveness of QE should, likewise, consider the impact of large-scale quantitative easing in major advanced economies (Rhee, 2022).

## B. Exchange Rate Amplification and Foreign Exchange Intervention[12]

**The role of the exchange rate in EM SOFIEs as an amplifier in the face of capital outflows is an important consideration towards a policy of exchange rate intervention to limit excess exchange rate volatility and to smooth**

[12] Foreign exchange intervention (henceforth FXI) is any financial operation of the central bank entailing a purchase (sale) of a foreign currency denominated asset and a sale (purchase) of a local currency asset (Adler and Mano, 2021). In line with previous studies and given the limited availability of public FXI data for SEACEN economies, this section relies on a proxy based on changes in end-of-period net foreign asset (NFA) position, the data of which is made available by Adler and Mano (2021).

**the impact on currency mismatches on balance sheets.** Such balance sheet mismatches and financial amplification effects are due to the behaviour of market participants (both investors and borrowers in foreign currency) who do not internalise such risks that may, on aggregate, become systemic. In particular, actions by individual investors to unwind their positions during the crisis can have a significant amplifying impact on the exchange rate, worsening the balance sheet pressures.

**Building FX reserves during good times, when capital inflows are strong, and drawing them down to lean against depreciation pressures during capital flow reversals can serve as an important macroeconomic management tool for EM SOFIEs.** Overvalued exchange rates during cyclical booms increase the risk of a financial crisis and intervening to counter large currency misalignments can therefore reduce financial risks. This can help cushion the impact of capital flows on the exchange rate, especially when FX spot and derivatives markets are not very deep and liquid, while depreciation pressures on the exchange rate from spillovers during global risk-off sentiment can be mitigated by having adequate reserve buffers, whereby the central bank may act as a *lender of last resort* to banks with US dollar debts — to the extent that its foreign reserves are adequate to cover such drains. Combining such an FX intervention policy along with exchange rate flexibility is consistent with any necessary adjustment of the real exchange rate. In addition, preserving exchange rate flexibility serves to remind the private sector of the need to manage FX risks. This can go against incentives to unhedged borrowing in FX, while limiting currency mismatches.

**The orthodox view is that FXI in the face of inflows is justifiable to accumulate foreign reserves if reserves are not adequate, the exchange rate is overvalued, and FXI can limit excessive exchange rate volatility.** However, strictly adhering to such a rulebook can pose several practical challenges for policymakers. The depth and breadth of EM SOFIEs' FX markets, despite having seen rapid development, remain relatively shallow compared to the scale and leverage embedded in the capital flows from a diverse set of investors, issuers, and instruments. EM Asia SOFIE central banks often intervene during inflow surges to counteract speculative capital inflows from cyclical investors which are only loosely connected to economic fundamentals and are much more likely to lead to sudden stops or even reversals. Indeed, the financial channel of amplification through sudden stops and unwinding of unhedged exposures during periods of financial

stress, both from investors and issuers, can lead to significant volatility and sizeable depreciation of the exchange rate. Therefore, the adequacy of buffers can be easily put to the test.

**FX interventions in EMs Asia are often used as part of the policy mix.** The main motivation is to build FX reserves as a buffer against shocks and to manage exchange rate volatility from global factors, given shallow FX markets. Some central banks highlight that they participate in the foreign exchange market only to ensure orderly market conditions and reduce excessive short-term volatility of the exchange rate. But traditional monetary policy tools may prove to be less effective during stress periods when tail risk materialises in the form of capital flight, including selling pressures from foreign investors who may want to exit the domestic bond market, notably through redemptions in the bond funds.

There are several potential explanations for the frequent use of FXIs among EM SOFIEs, which are:

- To build FX reserves as well as to manage exchange rate volatility from global factors;
- To counter the pass-through effects of exchange rate movements to inflation or deflation;
- To counteract speculative capital inflows which are only loosely connected to economic fundamentals and are much more likely to lead to sudden stops or even reversals;
- To mitigate exchange rate volatility, notably during times of depreciation pressures;
- To prevent a spiral of currency depreciation and expectations of further depreciation;
- To mitigate amplification from balance-sheet mismatches (i.e., currency and maturity mismatches) of the corporate sector by countering sharp movements in the exchange rate, particularly those that involve sharp depreciations; and,
- To provide liquidity to shallow FX markets.

While the debate on the effectiveness of FXI is far from settled,[13] cross-country studies and our research work have mostly found that FXIs have transitory effect on the exchange rate. In this regard, Box 2 below provides evidence on the effect of FXI in an ASEAN economy using the case of Thailand. Other stylised facts on FXIs in ASEAN based on FXI proxy data include:

- Foreign exchange intervention has a transitory effect;
- FXIs are also driven by the objective of monetary, exchange rate and financial stability;
- FXIs are often used as part of the policy mix;
- FX currency purchases are frequent and often take place in clusters;
- Motivations could include building FX reserves as well as managing exchange rate volatility from global factors;
- While the average volume of FXI is about US$2.3 billion,[14] there is wide variation across the spectrum of countries within SEACEN economies – countries with more liquid and deeper financial markets tend to be at the higher end of the spectrum; and,
- The degree of sophistication and development of the FX market may determine the volume of FX interventions.

**The benefits of FXI need to be weighed by the corresponding fiscal costs.** The greater the wedge driven by the substitutability between domestic financial assets in SEACEN economies relative to financial assets sold in global financial markets because of capital flow management measures (e.g., residency and currency-based FX measures), the greater the inherent fiscal costs as investors will demand a higher premium for holding financial assets issued in SEACEN economies.

[13] Varying results on the impacts and effectiveness of FXI intervention can be attributed to different empirical specifications including variables considered, methodologies, data sources as well as sources of shocks and country-specific characteristics.

[14] Based on calculations using the FXI proxy data of Adler and Mano (2021).

**Box 2: Effectiveness of Foreign Exchange Intervention (FXI) in Thailand**

*(Victor Pontines, The SEACEN Centre)*

While the Bank of Thailand does not disclose data on its FXI operations, to the best of our knowledge, Thailand is the only ASEAN economy that makes their high frequency (i.e., weekly) data on foreign currency reserves publicly available (with a short lag). This provides us with an opportunity to empirically approximate, on a high-frequency basis, the effectiveness of FXI in Thailand using a proxy, which is the change in weekly foreign currency reserves. This comes with the caveat that the proxy will likely have a certain degree of noise mainly from valuation changes.

In conducting this exercise, we rely on the method proposed by Barnichon and Brownlees (2019), which they refer to as smooth local projections (LP). The method aims to improve the accuracy of impulse responses coming from a regular LP that was earlier introduced by Jorda (2005). As pointed out by Barnichon and Brownlees (2019), impulse responses estimated by regular LPs often have large variability. In their work, the smoothing is done using a statistical technique called B-spline base matrix, and the smoothed impulse responses are obtained using generalised ridge regression.

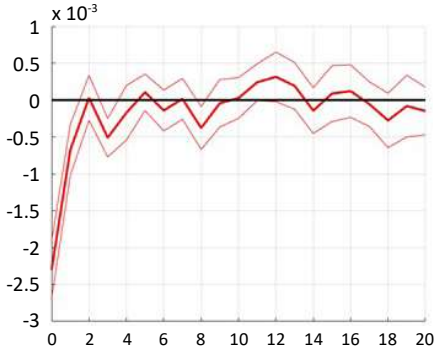
To proceed, a three-variable structural vector autoregression (SVAR) comprising of the movements in the Thai baht/US dollar exchange rate, our proxy for FXI and the policy rate was estimated in this particular ordering with the shocks identified by timing restrictions using the Cholesky decomposition, which is in line with the original proposal by Jorda (2005). The period of estimation was from 31 May 2000 to 22 January 2021. The weekly data were sourced from CEIC.

***The result suggests that a significant and temporary effect of FXI on the changes in the exchange rate lasts for up to two weeks.***[15] Figure B2 presented below depicts the responses of the change in the Thai baht/ USD exchange rate to a shock in FXI over a trading horizon of 20 weeks.

[15] We do not examine here the effects of FXI on the volatility of the Thai baht/USD exchange rate.

This finding of a temporary appreciating effect is not new. In those studies that found a significant effect of FXIs on the exchange rate for individual Latin American countries, the presence of temporary effects that last for several weeks was also found (Chamon et al., 2019). Similar findings were obtained by Pontines et al. (2021) and Pontines (2018). Because our estimates are linear, FX currency purchases (to depreciate the domestic currency) have the same mirror-image effect compared to FX currency sales (to appreciate the domestic currency). Moreover, the estimated impulse responses are stable in view of their convergence to the zero line. This evidence is robust to alternative orderings of the SVAR.

**Figure B2: Impulse Responses of Changes in Thai baht/US Dollar Exchange Rate**




*Note:* The light solid red lines denote the 90% confidence interval.
*Source:* Author's estimates.

## C. Anchoring the Policy Framework and Tools on Welfare Theoretical Arguments

**The pivot towards sustainability and the paradigm shift to environmental, social, and governance (ESG) considerations is reshaping the contours of public policy making as much as it is driving global capital allocation.** In the context of capital flow volatility, it reinforces the notion of mitigating the social costs from financial crises and output losses from sudden stops of capital inflows. Such dynamics are likely to reshape the debate over policy frameworks that involve capital flows, especially in emerging and developing markets whereby theory indicates that lack of actions by individuals in internalising externalities (e.g., excessive borrowing) can result in macro-financial vulnerabilities that often lead to financial crises and steep output losses. The lack of internalising externalities risks undermining support to the market system.

**Public policy intervention to internalise externalities, to further promote welfare-enhancing policies, to manage trade-offs, and to adopt more flexible approaches in building resilience will likely be an integral part of overarching policy frameworks going forward, not least for the purpose of managing capital flows to emerging and developing economies.** Negative externalities from such external shocks leading to crises can provide a natural rationale for countercyclical policies that lean against boom and busts cycles in international capital flows. The enormous magnitudes of output losses suggest that the non-internalised social costs of free capital flows are enormous and that countries that receive capital inflows may face stark trade-offs. These trade-offs can nevertheless be managed. In this regard, capital flows management measures (CFMs) can help mitigate the trade-offs by ushering in more flexibility to domestic policies in the face of external shocks, such as by enabling domestic interest rate policy or exchange rate intervention to address demand management and financial stability concerns.

Anchoring the policy framework on welfare-theoretic arguments leads to the following high-level thesis that may be validated by practice from policy implementation:

- Pervasive financial market constraints and imperfections in emerging and developing economies can amplify macro-financial cycles requiring insurance against the risk of capital flow volatility as well as its distributional impact [Box 3].

- It is important to incorporate social effects of capital flows in shaping policy frameworks along with clear-headed risk management that account for the magnitude of the externalities arising from capital flows and the type of capital flow management measures to be used [Box 3].

- Exchange rates are also financial variables and sensitive to imbalances in financial markets and can be shock amplifiers [Box 4].

- FX intervention policies are likely to be more effective and welfare enhancing, if used appropriately, under imperfect markets [Box 4].

- A combination of tools like macroprudential measures (MPMs) and CFMs make it easier to achieve multiple goals such as price stability, financial stability, macro-financial stability, and sustainable external position; and deal with the complex trade-offs involved [Box 5].[16] Central banks in the region mentioned that one practical benefit of macroprudential measures is to keep monetary policy focused on its primary objective of maintaining price stability.

- The efficacy of managing capital flows lies squarely in an integrated perspective on monetary policy, macroprudential policy, capital flow measures, and foreign exchange intervention. But these policy measures have their associated costs [Box 6].[17]

- Moreover, the efficacy and conditions of using various policy measures, in the context of volatile capital flows, depend on prevailing global and domestic conditions, country circumstances, and origins of shocks.

**Economies may face challenges on which policy tools to use and when to use them, given their commitment to capital account liberalisation and/ or free capital movement.** For instance, European Union (EU) economies are required to adhere to free capital movement within the EU single market, which extends to other European economies through the Treaty of the European Economic Area. Another example is the Organisation for

[16] Box 5 focuses mostly on the institutional set-up in using macroprudential measures. Refer to Batini and Durand (2020) for additional discussion on the policy toolkit for EM SOFIEs in managing capital flows.

[17] Box 6 provides a literature survey on the costs associated with FXI, MPMs, and CFMs. Future studies can include a cost-benefit analysis of each type of policies in short-, medium-, and long-term.

Economic Co-operation and Development (OECD) Code for Liberalisation of Capital Movements (OECD, 2022). Nonetheless, multilateral treaties that aim at free movement of capital tend to have escape clauses that allow exemptions under certain conditions, such as having a Balance of Payment crisis (Guðmundsson, 2023).

**In this regard, dialogue between international organisations and their member economies remain important and often lead to insightful discussions in terms of improving policies aimed at preserving macroeconomic and financial stability given capital flow surges or reversals.** However, confusions may arise when conditions are proposed as to when and for what purpose policy tools can be used as policy makers are confronted with their country specific conditions, challenges, and objectives. For instance, a view would be to accept the use of CFMs when a capital flow surge has been identified (not pre-emptive) and other more traditional instruments such as policy interest rate, exchange rate flexibility and FXI are unavailable. Such a view underscores that CFMs should not be used as substitute for warranted economic adjustment and policies. These conditions are deemed inflexible and incompatible with a truly integrated policy framework (Guðmundsson, 2023).[18] In this regard, a key proposed change, among others, now pertains to the inclusion of a preventive use of CFMs even in the absence of capital flow surges, but under certain conditions such as when capital inflows lead to a build-up of currency mismatches, which conventional policy instruments may not effectively address during reversals.[19]

[18] Refer to Guðmundsson (2023) and references therein.

[19] See Guðmundsson (2023) for further discussions.

**Box 3: Externalities, Capital Flow Management, and a Safer Global Financial System**
*(Anton Korinek, University of Virginia)*

## *The dangers of free capital flows*

To motivate capital flow management, it is useful to start with the problems that excessive international capital flows may give rise to:

- Capital flows exert pressure on a country's exchange rate, driving it up or down according to the conditions in international financial markets. The exchange rate is not a purely financial variable but also determines the prices at which a country imports and exports real goods. Appreciations make it harder for domestic producers of traded goods to compete, and depreciations make it harder to afford imported goods.

- Capital flows also drive domestic financial conditions and lead to booms and busts in domestic credit creation.

- Capital flows generate aggregate demand pressures. Inflows tend to feed aggregate demand by stimulating domestic investment and consumption, and outflows depress demand.

- These financial risks translate into fluctuations in the real economy. Moreover, when outflows trigger financial crises and output collapses, the effects often leave long-lasting scars in the form of permanent output losses.

Capital flows amplify and, frequently, drive the financial and business cycles in emerging and developing market economies. It is difficult for monetary policymakers to counteract the booms and busts generated by capital flows when capital markets are fully liberalised – for example, an interest rate increase in the face of excessive capital flows raises the returns that can be earned in the country and triggers further inflows that may stimulate even more demand.

In traditional textbook models of the economy, none of these effects would matter. Exchange rate adjustments would simply be a benign equilibrating force that restores economic efficiency; demand pressures would be resolved

*via* instant price adjustments; financial conditions would not matter. But real-world economies do not behave like simplistic textbook models, and this is nowhere clearer than in emerging market economies where financial market constraints exist, and markets to insure against the significant risks faced by most economic actors are largely absent. And this is true even more for the poorest members of society. For example, whereas the rich and educated typically have access to a large menu of financial services, the poor are frequently left out.

Capital market liberalisation increases inequality since it is associated with greater risk of financial instability, and because booms and busts in financial markets and real economic activity hit the poorest members of society the hardest (Korinek, 2016; and Furceri et al., 2019). Moreover, emergency measures such as bailouts during financial crises often generate large redistributions of wealth that benefit the elites at the expense of the average citizen.

As policymakers around the world are increasingly paying attention to ESG metrics, it is important to include the social effects of capital flows in shaping capital flow policy. Moreover, when economic policies such as capital market liberalisation benefit global and local elites but destabilise the livelihoods of the masses, they also risk chipping away at the social contract that underlies our societies, undermining support for our system of market economies and creating future governance challenges.

### *The theory of capital controls*

Proponents of capital market liberalisation based their case on the First Fundamental Theorem of Welfare Economics, which states that perfect markets achieve the most efficient outcome when there is no government intervention. However, markets in the real world are not perfect, and the most efficient outcome is not the most desirable when social considerations such as inequality are at stake. This provides two complementary rationales for managing capital flows:

- to correct the inefficiencies stemming from market imperfections; and,
- to facilitate a more equitable distribution of resources.

With regards to market imperfections, economic research over the past decade has shown that the booms and busts in exchange rates, credit markets, and real economic activity generated by swings in capital flows are not only costly but also inefficient. When international investors flood emerging economies with capital, and when they pull it out again, they do not internalise that their actions affect credit market conditions and aggregate demand in the recipient countries, just like individual polluters do not internalise that their actions impose pollution externalities on others. The first welfare theorem breaks down because in addition to their traditional role of signalling scarcity, market prices interact with the financial imperfections that exist in the real world, generating so-called pecuniary externalities. Moreover, the demand effects that arise in the context of booms and busts generate so-called aggregate demand externalities. **Just like environmental regulations internalises pollution externalities, capital flow regulation can mitigate these externalities from capital flows.**

The redistributive effects of capital flows provide a complementary reason for managing capital flows. In a society that cares about inequality and that spends resources on policies to curtail inequality, for example *via* a social safety net or by providing resources to the poor, policies such as capital flow liberalisation that actively exacerbate inequality are undesirable on their own (Korinek, 2016; and Furceri et al., 2019). Moreover, they also increase the cost of the social safety net, generating adverse fiscal effects.

Our newfound understanding of the externalities of capital flows as well as their adverse distributive implications suggest that the liberalisation of capital flows in recent decades has been excessive, and that **it is desirable for emerging and developing economies to re-impose regulations to manage capital flows in a way that they internalise their negative externalities and are aligned with our broader social objectives.**

The economics of capital flows offers several important lessons:

- Although capital controls are part of a broader toolkit of sensible macroprudential regulation, purely domestic macroprudential measures cannot adequately substitute for capital controls since capital controls better target the root of the problem when booms and busts are caused by volatility in international capital flows.

- Like with all macroprudential measures, the pre-emptive use of capital controls is critical when there is a risk of large capital inflows. One of the reasons is that a framework for pre-emptive capital controls provides policymakers with more experience and makes them better able to deal with excessive inflows when they arise, strengthening their credibility.
- A one-size-fits-all approach that specifies that there are only specific circumstances in which capital controls may be used by some international organisations, is too rigid and unnecessarily constrains countries' policy space and their ability to pursue domestic policy objectives.
- International capital flows – as well as the management of capital flows – by definition affect at least two countries. However, if their behaviour is driven by domestic-oriented objectives and not by beggar-thy-neighbour motives, countries should have the liberty to manage their own affairs when it comes to policies to manage capital flows. This may, at times, generate spillovers or spillbacks, but the same is true whenever we regulate externalities – for example, when environmental regulations hurt oil-exporting countries – and this should not be a reason for countries to refrain from managing capital flows.

### *Implementing capital controls*

A crucial first step in the implementation of capital controls is to determine the magnitude of the externalities arising from capital flows. The academic literature on the topic offers some reassuring guidance on magnitudes, finding that the externalities of capital flows can reach double-digit percentages, but it involves economic models that can be quite sensitive to parameter choices (Korinek, 2017). A good practical guide is to look at the damage that unrestrained capital flows have inflicted in past financial crises: for example, during the East Asian crises of 1997/98, countries experienced output collapses of up to 12%, followed by declines in subsequent growth rates that lasted for many years and compounded the damage. Most of the resulting costs were borne not by the economic actors who borrowed from abroad but by society at large, so they represented externalities. These enormous magnitudes suggest that the uninternalised social costs of free capital flows are enormous and that countries that receive capital inflows may face stark trade-offs.

A way to simplify the trade-offs of capital flows is to differentiate capital flows by their risk-sharing and by liquidity/maturity risk. Greenfield FDI investments do not expose recipient countries to any material risks – when the sentiment of international investors turns, they cannot undo such investments – and may, in fact, provide substantial positive learning spillovers. Other types of FDI and equity inflows do carry the risk of reversal but leave all valuation risk in the hands of international investors; they are therefore relatively benign. When it comes to debt inflows, the two main characteristics that matter are their currency denomination and their maturity. Long-term local currency-denominated debts or CPI-indexed debts do not involve rollover risks and leave the risks of currency depreciations in the hands of international investors. Conversely, short-term foreign currency-denominated debts expose countries to the risk of rollover crises and pernicious feedback loops of falling exchange rates and collapsing economies that characterises emerging market financial crises, including the East Asian crises. This suggests a clear pecking order for which types of capital flows policymakers should focus their regulations on. It also suggests that it is crucial for policymakers to develop the institutional capacity to distinguish between different types of flows and to keep up with attempts at circumvention by mis-categorising flows. International institutions can play an important role in building these capacities and sharing best practices between countries.

Over time, the externalities of capital flows ebb and flow with the booms and busts of global and local financial cycles. They are smallest when risk appetite is modest and rise as risk-taking increases. Frequently, they are at their highest when everything looks perfect in an economy, and when it seems like a little more short-term dollar debt can do no harm. Even financial regulators are not immune to the cyclicality of risk appetite when a long-lasting boom defies all predictions of collapse and just goes on and on. But nothing continues forever, and those are precisely the times when clear-headed risk management is the most important. Policymakers may be concerned about prematurely ending a boom by imposing capital flow regulations, but if they focus regulations on the types of flows that come with significant externalities and allow for long-term flows with benign risk characteristics, they should not be. If international investors only offer short-term dollar debt and are not willing to provide safer forms of capital such as equity or local currency debt, then there is probably a good reason, and the bargain is not in the interest of the recipient country once all externalities have been considered.

When policymakers decide to manage international capital flows, an important question is what type of regulations to impose – to mention just a few: bans, taxes, ratios, reserve requirements or others? Some types of flows, for example derivatives that increase the currency risk exposure of a country, may best be banned. In other cases, it may be useful to start from the existing regulatory institutions and framework, building on the expertise of financial regulators. For example, if a country has significant experience employing reserve requirements, it may be useful to build on that experience.

It is also important to consider the conceptual benefits and disadvantages of different regulatory measures. Two important dimensions are their selection effects and how regulations affect the distribution of surplus. An instrument has desirable selection effects if it is more costly for hot money than for long-term investors – for example, a reserve requirement that ties up funds may be more costly to meet for hedge funds than for FDI investors with a longer horizon. The way regulation is imposed also affects how the surplus arising from the regulation is distributed. This is most obvious in the case of taxes that financial regulators impose, which visibly generate revenue. More generally, if quantity regulations or ratios are imposed on international investors, for example in the style of Basel capital adequacy requirements, then the investors earn the surplus that is generated – just as they would earn the surplus if they restricted the supply of credit for monopolistic reasons. Conversely, if regulations are imposed on domestic borrowers, for example by imposing ratios or bans on domestic agents accessing international credit, then the extra surplus is kept in the country. From a distributive perspective, it is thus desirable to impose measures that directly raise revenue or that target domestic agents.

The best path forward for our global financial system is to ensure that international capital flows are safe and benefit all. **Asian central banks have long brought a unique perspective to the management of capital flows, frequently eschewing excessively ideological approaches in favour of practical policy frameworks that balance the risks of financial integration with pragmatic interventions that are conducive to creating a stable environment for their economies to flourish. They have not been afraid to intervene when necessary**. Among the many solutions that were successfully deployed are taxes, fees, reserve requirements and minimum holding periods for inflows; limits, reserves, increased risk weights for foreign currency positions, limits or bans on derivatives, and many more.

**Box 4: New Thinking on Foreign Exchange Intervention (FXI)**
*(Matteo Maggiori, Stanford University)*

The last fifteen years have been dominated by three large crises: the global financial crisis of 2008-09, the European sovereign debt crisis of 2011-12, and the ongoing COVID-19 pandemic in 2020-21. In all these episodes, capital and asset prices moved abruptly, often with adverse consequences for the global economy. Traditional monetary policy quickly ran out of power due to the zero lower bound (ZLB) constraint, and policymakers resorted to alternate policies, such as quantitative easing, intervention in foreign exchange markets, and capital controls. **Understanding and improving the economics of these episodes requires a conceptual framework in which imperfections in financial markets are at the centre stage.**

On the economic theory front, this has required not only new models but also, in some cases, going back to older insights that had been largely forgotten, such as the portfolio balance theories in the 1970s. In models with imperfect financial intermediation, the exchange rate is pinned down by imbalances in the demand and supply of assets in different currencies and, crucially, by the limited risk-bearing capacity of financiers that absorb these imbalances. The demand for the assets, the resulting gross capital flows, or the financiers' risk-bearing capacity might only have a distant relation with macroeconomic fundamentals, thus contributing to generating a disconnect of exchange rates from other macroeconomic variables. By placing global portfolios at the centre stage, this line of research stresses the importance of better data to understand these financial forces and their impact on the real economy, which is an ongoing effort in the field.

**On the policy front, the financial-frictions view offers a different take on exchange rates compared to their traditional role as shock absorbers.**

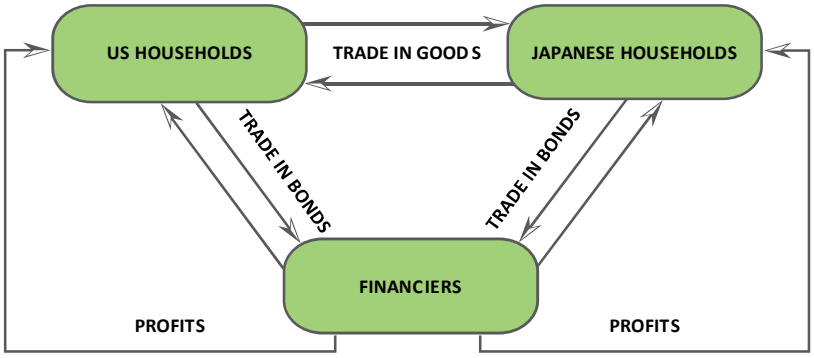
- Exchange rates are distorted by financial forces and can be a source of shocks to the real economy rather than a re-equilibrating mechanism.
- Quantitative easing and FX intervention, the purchase of domestic and foreign currency assets by the central bank, respectively, are ineffective in perfect markets but effective and, if used appropriately, welfare-enhancing under imperfect markets. Their ineffectiveness in perfect markets relies on

a combination of Modigliani-Miller logic applied to the balance sheet of the central bank and Ricardian equivalence. Under these conditions, if the central bank buys foreign currency assets while selling domestic currency assets (a sterilised foreign exchange intervention), agents in the economy simply take the opposite position since they understand that the central bank is trading on their behalf in an undesired way. Future losses or gains arising from the central bank position are passed through to the agents without distorting their actions.

- Limited financial intermediation breaks the Modigliani-Miller component because the intervention is a risk transfer between the central bank and constrained financial intermediaries. The presence of financial constraints, and/or imperfections in the goods market like sticky prices, are at the core not only of the effectiveness of interventions but also provide a deeper rationale for their optimal use. Private decisions in the presence of pecuniary and/or demand externalities are no longer optimal thus generating a role for government intervention even under the criterion of constrained Pareto optimality.

An intuitive way to visualise the conceptual difference of international macroeconomic models with segmented currency markets is illustrated in **Figure B4**, reproduced from Gabaix and Maggiori (2015). Consider a simple two country model, for concreteness, say the U.S. and Japan. These countries trade in the goods market with each other because they produce heterogeneous goods which they both enjoy consuming (in different proportions). Shocks across states of the world and time, including shocks to liquidity and asset demand, generate motives for gross and net trade in financial assets. The more traditional setup is to make these countries face each other in financial markets with a menu of assets that might be complete or incomplete. The financial intermediation view breaks this structure by introducing global financiers at the core of the model. Both countries trade in a limited set of assets, for concreteness say bonds in dollars and yen, against the financiers who absorb the currency imbalances arising from the countries' gross positions. Ultimately, the financiers are owned by the households in each country and receive the profits/losses of intermediation. If the financiers behaved optimally, then they would simply be a veil and the model would be much the same without them. The model, therefore, comes alive when financial frictions limit the ability of the financiers to take on positions.

**Figure B4: Basic Structure of a Segmented Currency Market Model**




*Source:* Gabaix and Maggiori (2015).

In this class of models, sterilised intervention is not only effective, in the positive sense that it moves the equilibrium exchange rate, but also a recommended policy tool from a normative perspective. The economic literature has highlighted several different foundations for the optimal use of FXI including: (i) the presence of sticky prices and demand externalities, (ii) constraints on monetary policy at the ZLB, and (iii) redistributive considerations among domestic households.

Large-scale currency interventions have been undertaken by the governments of Switzerland, Israel, and the Czech Republic, in addition to many emerging markets. These governments aimed to alleviate the appreciation of their currencies in the face of turmoil in financial markets. The policymakers at the respective institutions expressed the view that interventions successfully weakened the exchange rate and boosted the real economy. For example, Israel's central bank governor, Stanley Fischer remarked: "I have no doubt that the massive purchases [of foreign exchange] we made between July 2008 and into 2010 [...] had a serious effect on the exchange rate which I think is part of the reason that we succeeded in having a relatively short recession." Thomas Jordan, the governor of the Swiss National Bank, remarked in his 2020 Camdessus Lecture at the IMF that: "In Switzerland, the upward pressure on the [Swiss] franc was the main reason for at times very low inflation. Against this backdrop, for us, foreign exchange market interventions were and still are the most direct and thus the most effective instrument besides the negative interest rate."

Empirical evidence on the effectiveness of FX intervention is limited by the thorny issue of endogeneity. For example, if central banks intervene to stem appreciation, even successful interventions that prevent (further) appreciation might appear to be counterproductive in an analysis that does not account for the endogeneity. A further consideration is the size and duration of the intervention. Small interventions at high frequency might have very different outcomes from the protracted and large interventions observed in recent years by Switzerland and Israel as discussed above.

Ben Bernanke famously said of quantitative easing (QE) that "it works in practice, but not in theory." For FX intervention, a policy in many ways like QE, we can say that it works in theory, many policy makers are convinced it works in practice, but high-quality causal evidence is still missing.

There are many open areas for future work. On the empirical side, more policy evaluation that makes progress on endogeneity is a crucial endeavour. On the theoretical side, many features that are of important practical consideration are mostly absent from the current models. Two possible directions are discussed below.

The first is the Lucas Critique and FX market depth. As FX intervention becomes part of the policy toolkit and if interventions are predictably sustained over a long period of time, the structure of the FX market will adapt endogenously. One concern is that FX intervention disincentivises private institutions from building their capacity to deal with foreign exchange risk. This concern is particularly present in emerging and frontier economies where it could slow down the development of a local FX market. At the opposite end, one could imagine that central bank interventions that prevent market breakdowns might ensure the necessary conditions for private players to enter the market and deepen its liquidity.

Second, one particularly important area is the political economy of these new tools and the possibility that they might be abused by policymakers. One might conjecture that FX intervention is less likely to be abused than capital controls to generate fiscal revenue since the revenue is uncertain and might even turn out to be negative. The potential losses of FX intervention bring up the possibility that the central bank might lose its independence. Similarly, vast reserve accumulation and management come with issues on how they are allocated, and whether the allocation should include ethical considerations in addition to pure risk and return ones.

## Box 5: Macroprudential Policies and Capital Flow Measures*

*(Sunil Sharma, George Washington University; and Itai Agur, IMF)*

**Macroprudential policy frameworks have been developed with the aim of containing systemic risk by dampening the amplitude of financial cycles and inhibiting credit and asset booms before they threaten public and financial sector balance sheets and the economy at large.** However, by their very nature, systemic threats are "tail events," and represent an agglomeration of risks from a variety of channels. Therefore, both gathering adequate data and forming consistent views is likely to be demanding, as it involves diverse sources and agencies.

The origins of systemic risk can be both domestic and external in nature. Vulnerabilities in financial systems often build up with increasing cross-border connections and exposures, and can lead to trouble if markets seize up, capital flows reverse, and balance sheets unwind (Portes et al., 2020). In view of this, IMF (2020) lays out a conceptual framework for an integrated perspective on macroprudential policy, capital flow measures, and foreign exchange intervention to discuss conditions under which pre-emptive measures can form a useful part of the financial stability policy toolkit. However, given the links and interactions of the financial sector with other sectors of the economy, an even broader perspective may be required.

### 1. Macroprudential policy and systemic risk assessment

**Systemic risk is amorphous, arising in unexpected ways that are not necessarily informed by the experience of past crises.** This can be due to the non-linearity of effects in a complex, evolving economy (Bookstaber, 2017; Haldane and May, 2012; and White, 2019 and 2020a). Some ambiguous thresholds may be crossed, instigating a move away from a seemingly stable path towards a state of crisis. Uncertainty and threshold effects inhibit the proper quantification of systemic risk and hinder the construction of effective early warning systems that could inform pre-emptive action before risks materialise.

**Systemic risk quantification remains in need of a comprehensive operational characterisation.** While systemic risk metrics have made progress in recent years, they have not yet produced satisfactory measures,

despite the variety of models and methods used (Benoit et al., 2017; Brogi et al., 2021; Capponi and Jarrow, 2021; and, Engle, 2018).

## 2. From measurement challenges to implementation challenges

**The nature of systemic risk and the difficulties associated with measuring it influence the conduct of macroprudential policy** (Agur and Sharma, 2015; Borio, 2011; and Stellinga, 2021)**.** Take the construction of early warning systems as an example. Such systems must identify in advance what interventions will be taken when systemic risk rises to critical levels, otherwise policymakers have to defer decisions to when risks materialise and then determine the appropriate course of action. The latter option leaves full discretion in the hands of the regulators and depending on institutional and political structures, such discretion could open the door to resistance from the financial industry, politicians, and even the public.

**Operationalising a policy that is both time-varying and rules-based is likely to be unachievable, due to the difficulty of adequately quantifying systemic risk.** An effective rule must stipulate beforehand how policy will react when specific events transpire. However, in the realm of macroprudential policy such events refer to systemic risk crossing prespecified boundaries while the associated actions entail the initiation of macroprudential interventions. In view of the inherent challenges in the quantification and assessment of systemic risk and the design of appropriate macroprudential instruments, attempting to predetermine policy actions for rare events, and properly calibrating such tools based on relatively scant data, is problematic to execute and communicate. The hurdles faced in the implementation of macroprudential policy can be illustrated by a comparison with monetary policy measures aimed at containing inflation. First, the "event," inflation in goods and services, is well-defined, as is the "act" of raising short-term interest rates. Further, there is historical experience, data, and reasonably well-founded models that tell us how interest rates affect inflation.

Moreover, the inflation gauge is a relatively simple one, which is readily available and comprehensible to the public. Instead, macroprudential regulation is bound to systemic risk measurement, which cannot be suitably represented by simple indicators. A rule that ties a multitude of indicators to a variety of tools is hard to formulate, calibrate, and communicate.

This challenge is exacerbated by the relative paucity of data on past macroprudential actions and their impact on crisis prevention, and the necessity of forming a judgment relative to a counterfactual exercise that relies more on a priori arguments than firm evidence.

**In implementing macroprudential remedies, measurement problems interact with the political economy of policy formulation.** If a central bank moves to raise interest rates when it finds that inflationary pressures are building up, there is less scope for a lobby to counter that inflation is not being accurately measured and no incentive for any lobby to do so since no sector is singled out and the policy applies to the public at large. In contrast, as macroprudential policy tightening is based on systemic risk measures that are open to dispute, it allows special interest groups to oppose the policy decisions. Furthermore, it is more difficult to tell only a few of the proverbial partygoers to resist the punch bowl than to take the bowl out of the room. Moreover, the focus on a single sector that is particularly well-funded and powerful is likely to lead to intense pushback.

For instance, given the diversity of economic and institutional contexts in countries comprising the European Union (EU), measurement challenges are even more difficult to surmount as in addition EU policymakers must face the problems posed by the financial trilemma — trade-offs between financial stability, market integration, and national regulatory discretion (Schoenmaker, 2011). This has hampered the evolution of an EU-wide macroprudential policy framework since the use of macroprudential instruments has been constrained by procedural requirements and limits on their intensity and scope. While national authorities must justify discretionary regulatory actions to the EU, it is hard to do so in the absence of agreed norms for measuring and mitigating systemic risk (Stellinga, 2021).

### 3. Institutional structures and policy implementation are likely to be country and path dependent

**Some of the difficulties associated with the implementation may be alleviated by assigning central banks the mandate for macroprudential policy.** Such a mandate brings together systemic risk analysis, macroprudential decision making, and communication at the central bank. However, the exclusion of other agencies from the decision-making

process has the disadvantage that financial regulators who provide the key information on the health of markets and intermediaries and implement policy are not involved in the macroprudential decisions. Also, the provision of "soft supervisory information" for decision making that may be important and not easy to convey, may suffer in such an arrangement. Legally binding powers to make regulators enact the central bank's macroprudential decisions are challenging to formulate and this, in turn, risks eroding the credibility of macroprudential decisions and their communication (Agur and Sharma, 2015).

A joint committee where all the agencies have a say could prevent dogmatic thinking but adds to the complexity of decision making. Deliberations among officials with diverse backgrounds and experience should improve the design of policy and such a setup also limits conflict between agencies, enabling better policy. Attaining consensus on policy decisions, however, becomes more challenging and slows down the responsiveness of macroprudential policy to rapidly evolving events and may hamper coherent communication. Furthermore, the greater the diversity of agencies represented on the committee; the more entry points industry lobbies have to affect the committee's decisions. For example, certain agencies on the committee may not have the requisite budgetary and political independence (Fullenkamp and Sharma, 2012). The demand for interagency coordination may require a substantial overhaul of the existing institutions of financial oversight, not to mention a change in regulatory philosophy to manage the transition to a digital economy (Omarova, 2017).

**Since many of the potential problems in the implementation of macroprudential policy pertain to the interaction between separate agencies, it may seem attractive to unify monetary policy, bank regulation and macroprudential policy within one agency, namely the central bank.** Given the overlapping nature of policy transmission channels and complementarities between policies, a joint committee may be formed to provide recommendations for coherent monetary and financial stability policies. However, whether such an institutional setup would indeed make it easier to plan and manage macroprudential interventions depends on a country's size, history, and the evolution of its political and institutional structures (Edge and Liang, 2019). The objective of macroprudential policy is to limit systemic risk by finding ways to dampen the effects of business and

financial cycles, to handle interconnectedness and the build-up of common exposures by institutions and market players, and to catch credit and asset bubbles in their infancy rather than having to deal with them when they are considerably distended, and puncturing asset bubbles may lead to much economic and financial mayhem. But by their very nature, systemic threats are "tail events," and represent an agglomeration of risks from a variety of channels. Hence, collecting data and views to make assessments are difficult, since in most situations these are likely to involve a multiplicity of sources and agencies. While systemic risk measurement has made progress in recent years, it has not yet produced a satisfactory measure, despite the variety and complexity of models and methods used (Benoit et al., 2017; Brogi et al., 2021; Capponi and Jarrow, 2021). The measurement of systemic risk thus continues to proceed without a comprehensive operational definition.

**The creation of a super-agency with responsibilities for micro- and macroprudential regulation and monetary policy resolves the problems of inter-agency conflict.** But it creates an unwieldy institution with far-reaching powers that is outside the realm of democratic accountability. In democracies, such an institutional design may not be legitimate, or politically and socially acceptable (Tucker, 2018; and Shirakawa, 2021). Conflicts of interest may also be pervasive in the decision-making process of a super-agency. For instance, where the interests of monetary policy and newly endowed prudential powers collide, central banks may be tempted to give primacy to their longstanding monetary policy objectives. One example is reputational risk: if bank failures harm the reputation of the institution, including its monetary policy credibility, the policymaker may face stronger incentives for regulatory forbearance to prevent the revelation of problems in the banking sector (Agur, 2021). There is some evidence that policy decisions in the realm of bank supervision are affected by monetary policy considerations when a central bank holds sway over both (Ioannidou, 2005).

Additionally, getting the timing and intensity of macroprudential policy measures correct is particularly challenging due to the complications associated with the identification and quantification of systemic risk, the likely pushback from industry lobbies, and the need to apply such measures pre-emptively before risks become fully apparent. Given these obstacles, central banks facing complex economic and political trade-offs may choose to delay decisions. For instance, central banks might defer introducing or escalating

macroprudential measures, knowing that emergency lending and liquidity provision could be used to address financial and market turmoil should it arise. Recent history does not inspire confidence.

Macroprudential policy is the dynamic component of a financial stability regime whose purpose is to ensure that concerns about financial stability do not affect the functioning of the real economy. To this end, before assessment and policy formulation, financial authorities must seriously examine whether the baseline static regime – the component of financial stability policy that is not cycle dependent – is complete, clear, and incentive-compatible (Tucker, 2021; and White, 2020b). Time-varying macroprudential policy cannot counterbalance a weak baseline prudential regime and structural deficiencies in the financial system and may not be able to pre-empt the rise in systemic risks (Agur and Sharma, 2015; and Freixas et al., 2015). While banks may have performed better during the COVID-19 pandemic compared to the global financial crisis of 2008, market-based finance had to be bailed out again to prevent a financial system breakdown. Several aspects of non-bank finance need urgent attention, such as rising credit extension by the shadow banking system based on the creation of short-term money-like instruments, redemption risk in open-end funds and its interaction with illiquidity on derivatives and securities markets, and the systemic risks posed by the expanding asset management industry (Arner et al., 2019; Kohn, 2021; White, 2020b; and Wilmarth, 2020).

**Taming the credit cycle and containing rapid credit growth are key objectives if central banks and regulatory agencies are to pre-empt the build-up of risks, market distortions, and inequality** (Leonard, 2022; Petrou, 2021; and White, 2020b)**.** Recent crises have not been precipitated by rampant inflation, but by rising debt and resulting fragilities in financial intermediaries and markets, corporations, households, and governments. Time-varying macroprudential policy must negotiate the financial cycle and its interactions with the business and electoral cycles. To do this effectively, macroprudential, monetary, and fiscal policies will have to be employed in tandem so that they push in the same direction and are able to do so before the risks materialise (White, 2019).

## 4. Defining and evolving a panoptic perspective?

**The difficulties of calibrating and implementing macroprudential policy are amplified when the systemic fragilities extend beyond the financial system.** The financial sector is an intermediary in a complex evolving economy, and its health must be evaluated in conjunction with the health of the broader economy and the natural environment on which it surely depends (Alogoskoufis et al., 2021; Berner et al., 2021; Chenet et al., 2021; Florini and Sharma, 2020; and White, 2020c). More generally, for extended periods of time, macro-stabilisation and regulatory policies cannot be used as a substitute for addressing deep structural problems in financial, economic, and political systems (Sharma and White, 2022).

Systemic thinking will have to encompass the entire economy and the environment. An integrated perspective will have implications for the conduct of social, economic, and financial policies, including macroprudential policy, and the politics of democratic decision-making. Such an approach by its very nature requires a wider set of policy tools, action by many agencies at various levels of government, an international dimension, and faces more profound challenges in institutional design, operation, coordination, and public communication.

Today, financial technologies, new electronic payment systems, and the feasibility of introducing central bank digital currencies offer a singular opportunity for societies to re-examine fundamentally the nature of money, how it is created and distributed, and shape the institutional structure and functioning of the financial system and its regulation to produce greater systemic stability, efficiency, and equality (Auer et al., 2022; Gnan and Masciandaro, 2018; Kosse and Mattei, 2022; and Adrian and Mancini-Griffoli, 2019). How the system develops could transform the conduct of economic and financial policies and the institutional structure of surveillance and regulation.

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* The views expressed in this box are those of the authors and should not be attributed to the IMF, its Executive Board, or its management. An earlier version of this article was released as SUERF Policy Brief No. 362 https://www.suerf.org/suer-policy-brief/48243/on-implementing-macroprudential-policy

**Box 6: Costs of Capital Controls, Macroprudential Measures, and Foreign Exchange Intervention: An Empirical Survey**

*(Victor Pontines and Rogelio Mercado, Jr., The SEACEN Centre)*

The use of broader policy measures in mitigating the adverse impacts of volatile capital flows entail associated costs which must also be internalised and considered. This note surveys the empirical literature which quantify these costs.

On capital controls, Forbes (2005) conducted a meta-analysis based on anecdotal and empirical evidence documenting discrete impacts and distortions caused by capital controls for certain types of companies or groups of investors. Several findings are noteworthy. First, capital controls raise the cost of capital, lower the supply of credit, and increase financial constraints, particularly for small companies and firms without access to international capital markets. Second, capital controls encourage companies to engage in a variety of market-distorting behaviours designed to minimise the costs of the controls or to evade them altogether. Such measures include overstating import payments through import contracts and/or under-invoicing exports or exporting through offshore subsidiaries at significantly lower price. Third, capital controls can be difficult and costly to enforce. Once controls are placed, companies and individuals can find ways to evade the measures, thereby diminishing their effectiveness over the long-term. Consequently, further measures will be put in place to close loopholes, thereby increasing the costs of implementing control measures. Given Forbes' (2005) analysis, quantifying the findings remain a challenge. Nonetheless, recent papers provide some estimates on the costs of capital controls in the context of policy evasion or circumvention. For instance, Cerutti and Zhou (2018) find that local affiliate bond inflows increase by 1.60%, on average, when lenders impose bond outflow restrictions.

The cost for macroprudential policies is that these policies can have unintended consequences. According to Forbes (2019), one such consequence arises in the form of unintended leakages. These leakages are basically shifts in lending to other institutions or certain financial products in the same country that are not part of the regulatory perimeter of the macroprudential policy. One such case is that banks can avoid certain regulations by adjusting the type of loan, as in the case of Sweden where

banks responded to LTV limits on secured lending by increasing unsecured loans (Sveriges Riskbank, 2012; and Forbes, 2020). Aiyar et al. (2014) showed that the increased capital requirements on domestic banks in the UK caused a shift in lending whereby the lending by domestic banks in the UK fell, whereas the lending by foreign banks increased. The size of the leakage was estimated to be about one-third of the contraction in lending by domestic banks in the UK. Ahnert et al. (2021) showed that tighter FX bank borrowing rules caused companies to rely on FX debt issuance with the size of the leakage estimated to be about 10% of the initial reduction on companies' FX bank borrowings. Because there are various types of macroprudential policies, the size of these unintended leakages can vary across these instruments. In view of this, there is a need to assess the costs of this individual macroprudential tools, particularly for emerging economies.

With respect to the costs of FXI, Adler and Mano (2021) estimate the quasi-fiscal costs of FXI. For the authors, a more meaningful measure of these costs, and relevant for policy decisions, is given by the cost of FXI from an *ex-ante* perspective. This is the expected total cost conditional on the current FX position of the monetary authority/central bank, or the expected cost of carrying forward (or rolling over) the current FX position. Across 73 countries over the period 2002-13, on average, *ex-ante* total costs amounted to 0.3-0.9% of GDP per year. Countries that intervene heavily in the foreign exchange market incurred *ex-ante* total costs of about 0.3-1.2% of GDP per year, compared to 0.3-0.7% of GDP by light interveners. Overall, these estimates suggest that the fiscal costs of sustained FX intervention are not negligible, and thus should be considered when assessing the desirability of this intervention policy. We need to have further studies that quantify the cost of FXI at the individual country level.

**Box 7: Market Perspective on Policies for Dealing with Capital Flows in EMs** *

*(The SEACEN Centre)*

- A prominent trend has been more long-term asset allocation into Asia, primarily in interest rates, FX, and credit products.
- Fundamentals and macro-stability matter. Also, having reserve buffers and the availability of tools – notably macroprudential tools.
- Policy clarity and credibility along with clear communication of policies are very important signals for the market.
- Markets want to know why a situation is occurring, what the central bank is going to do about it and where economies are going.
- Do policymakers seem on top of things? Are there buffers in place against vulnerabilities? What is the overall policy response, and does it appear credible?
- Liquidity and the relationship between the riskiness of the market and the yield received for taking that risk relative to the same metric in other markets are very important.
- FX intervention and macroprudential measures to provide stability are becoming more widely accepted by markets. Exchange intervention on its own may not be enough, especially for small open economies. As a result, central banks have no choice but to implement additional capital flow measures.
- Investors react negatively to macroprudential measures that restrict market access in an otherwise open market. In particular, restrictions on markets with large foreign ownership were not well taken by the markets.
- The ability to get out of a position (and a country) was of paramount importance and on top of the list of variables. Investors panic when they cannot exit. Measures that inhibit market access in otherwise open markets are seen to be quite damaging for policy credibility.

- Market participants seem to agree that if some forms of restrictions were to be put in place, they should be more market based. Market-based measures such as taxes (or other price mechanisms) are more acceptable, while quotas (or other quantity mechanisms) are less so.
- Market participants believe that Asia has done a decent job in macroprudential and capital flows management measures since the Asian Financial Crisis/Great Financial Crisis.
- Market participants believe that over the medium- to long-term, the attractiveness of EM Asia will remain an important driver of capital flows to the region.

* Based on meetings with global investors/asset managers in Singapore (March 2020) and other ongoing discussions with market participants.

# SECTION 4

# THE SEACEN CENTRE'S PERSPECTIVE ON A POLICY FRAMEWORK AND ITS OPERATIONALISATION

**The post COVID-19 pandemic world and the fast-evolving landscape of capital flows call for a more robust and innovative framework of integrated policy, whereby monetary policy should be combined with other policy measures, such as macroprudential policies, foreign exchange intervention and capital flow management measures.** The design features of policies will have to ensure macro-financial stability of EM SOFIEs by making them less sensitive to the interplay of global factors of liquidity and risk sentiment. Furthermore, taking account of the pro-cyclicality between global and domestic financial cycles, the role of the US dollar in transmitting US economic conditions and policies to the rest of the world (as discussed in Section 1) warrants further considerations on appropriate policy measures along with greater global and regional co-operation through policy dialogue. To this end, the policy interest rate, while helping to achieve internal balance, may have its limitations in the global financial cycle contaminating the macro-financial balances of the domestic economy. For SOFIEs in EM Asia with an Inflation Targeting framework, interest rate policies were shown to be inadequate in managing the procyclicality of capital flows while inflation and the credit cycle have proven to be interlinked. Therefore, tools for price stability and financial stability have often been jointly determined and used.

The SEACEN perspective on the design of the policy framework for managing capital flows promulgates the following features:

- At the highest level of the contours of public policy making, the framework should be firmly based on more welfare theoretic arguments. This is consistent with the pivot towards sustainability and the paradigm shift to environmental, social, and governance (ESG) considerations.
- Pervasive financial market constraints and imperfections in emerging and developing economies can amplify macro-financial cycles, requiring insurance against the risk of capital flow volatility as well as its distributional impact.

- The current policy framework is evolving further to consider broader economic and social outcomes, with monetary and financial stability implications.
- Therefore, public policy intervention to internalise externalities, to further promote welfare-enhancing policies, to manage trade-offs, and to adopt more flexible approaches in building resilience will be an integral part of overarching policy frameworks going forward. It reinforces the notion of mitigating the social costs from financial crises and output losses from sudden stops of capital inflows.
- On the macro-financial policy front, the financial-frictions view offers a different take on exchange rates compared to their traditional role as shock absorbers. Exchange rates are also financial variables and sensitive to imbalances in financial markets and can be shock amplifiers. FXI policies are likely to be more effective and welfare enhancing, if used appropriately, under imperfect markets.
- On managing financial stability, the framework emphasises that systemic risk from financial cycles including credit and asset booms need to be managed before they threaten public and financial sector balance sheets and the economy at large. However, by their very nature, systemic threats are "tail events," and represent an agglomeration of risks from a variety of channels. Operationalising a policy that is both time-varying and rules-based is likely to be unachievable, due to the difficulty of quantifying systemic risk. Therefore, macroprudential policies have to be more proactive in managing the financial cycle.
- Capital Flow Measures (CFMs) should be a part of the broader policy toolkit as purely domestic macroprudential measures cannot adequately substitute for CFMs since CFMs better target the root of the problem of the volatility in international capital flows. As is the case with all macroprudential measures, the pre-emptive use of capital flow management tools is critical when there is a risk of large capital inflows. Indeed, systemic risk often builds up in tandem with increasing cross-border interconnectedness and spillovers.
- The effectiveness of FXI can be enhanced with the presence of CFMs as part of the broader toolkit. A combination of tools like MPMs and CFMs make it easier to achieve multiple goals such as price stability, financial stability, macro-financial stability, and sustainable external position; and, deal with the complex trade-offs involved.

- Such a framework has to be flexible enough without very specific policy rules to accommodate the uncertainty of fatter tails.
- The efficacy of managing capital flows squarely lies in an integrated perspective on monetary policy, macroprudential policy, capital flow measures, and foreign exchange intervention. But these policy measures have their associated costs.
- Moreover, the efficacy and conditions of using various policy measures, in the context of volatile capital flows, depend on prevailing global and domestic conditions, country circumstances, and the origins of shocks.
- In conclusion, The SEACEN Centre has provided its perspective on conceptualising the policy framework for integrating capital flow management, while offering some suggestions on operationalising the conceptual framework.

## A. Conceptualising the Policy Framework for Integrating Capital Flow Management: SEACEN Central Banks Leading the Way

**Central banks around the world are being asked to consider a broader range of non-traditional monetary policy mandates.** These requests reflect a desire by governments to use the economic and financial tools of the central bank to help target key public policy objectives, such as climate change risks, digitalisation, financial technologies, as well as income and wealth inequalities. This longer list of potential central bank mandates represents a new challenge for the decade ahead.

*The chief question being asked is: can central banks deliver on their core goal of price stability while considering other policy objectives; or would such new mandates result in a type of mission creep which in the past had led to volatile inflation outcomes, financial instability, and poor economic performance?*

**In many respects, the invitation for central banks to consider new responsibilities is a consequence of their success.** Over the past two decades, central bankers have achieved considerable success in delivering sound economic and financial stewardship. In most cases, the successes followed the adoption of monetary policy frameworks which elevated the role of the price stability mandate to the highest priority. For many SEACEN central

banks, this included the adoption of formal inflation-targeting frameworks. For other SEACEN central banks, this meant raising the prominence of price stability without adopting formal inflation targeting. Nearly all have been targeting inflation even if they did not adopt inflation targeting. Monetary policy contributed to periods of low inflation and sustained growth, with the GFC and the COVID-19 pandemic being exceptions. SEACEN central banks have performed rather well in terms of traditional measures of monetary policy success. Moreover, the requests to take on new responsibilities, likewise, reflect the vital role of banking and finance in pursuing other objectives that will address risks related to climate change, harness the full potential of financial technologies and innovations, and promote a more equitable distribution of welfare gains.

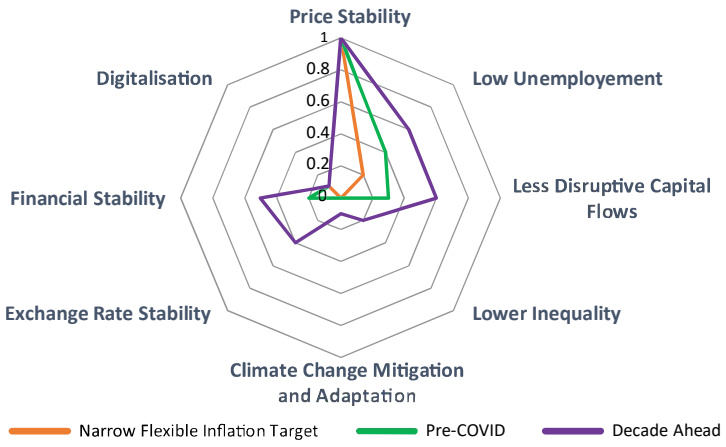
**But considering broader structural trends with monetary and financial stability implications certainly increases the complexity of central banking in the region.** Indeed, having multiple policy objectives can overburden monetary policy, reduce its coherence, and lead to a loss of credibility. Moreover, a central bank cannot consistently pursue and achieve multiple goals with only one policy instrument, such as the short-term interest rate. Overreliance on monetary policy may reduce its effectiveness when the appropriate policy involves other instruments or public institutions. To highlight these new challenges in a historical perspective, **Figure 4.1** shows the evolution of central banks expanding mandates and considerations with potential future implications. The orange line represents the phase in which small, open, advanced economies pioneered the adoption of narrow inflation-targeting regimes. In general, these early manifestations of inflation targeting put most weight in policy decisions on inflation concerns with some central banks still heeding short-run (over a year or so) developments in the real economy. The green line illustrates the broadening of monetary policy frameworks, with weights being put on concerns from, amongst other things, financial stability, exchange rates, and capital flows. Over time most flexible inflation-targeting central banks lengthened the target horizon of inflation and emphasised “over the medium-run.” Effectively, this allowed central banks to respond to a wider range of economic and financial developments of both domestic and global types in the short-run.

The proposed conceptual framework underscores that fact that operationally, the weight on capital flow developments was particularly large in SEACEN economies over the past decade. The weight appeared to vary systematically over time – low when capital flow developments were rather quiescent

and high when rather volatile. With detailed capital flow data becoming increasingly available and timelier, SEACEN central banks can use various analytical approaches to assess the vulnerabilities from capital flows. The data are now more granular which makes it possible to understand capital flow dynamics better. New methodologies to analyse these data are shedding more light on the time-varying risks. Armed with better data and more accurate assessments of the risks, monetary authorities may be interested in putting even more weight on capital flow developments. More research is called for to establish just how central banks might want to weight these mandates in the conduct of monetary policy. In addition, further research is needed to examine and assess the trade-offs between various policy objectives while giving considerations to provide practical guidance to SEACEN members.

One possible way of conceptualising the framework is by considering the evolution of central banks' expanding mandates and considerations with potential future implications. To this end, the broader structural trends with monetary and financial stability implications certainly increases the complexity of central banking in EM SOFIEs.

**Figure 4.1: Proposed SEACEN Central Banks Broader Framework and Considerations**




*Notes:* The weights on different mandates are normalised relative to the inflation goal. This graph illustrates the more complex weighting scheme required for trading off a wider range of mandates. Maximising the welfare of its country also factors in implications for credibility, accountability, and transparency.
*Source:* Andrew Filardo and The SEACEN Centre.

**The current policy framework is evolving further to consider broader economic and social outcomes, with monetary and financial stability implications.** The outer purple line indicates how policy mandates and other considerations are evolving rapidly reflecting the paradigm shift towards a more holistic approach, encompassing the social effects of capital flows such as financial crises with income and output losses. In addition, the balance sheet effects of exchange rate volatility warrant policy consideration. As such, FX intervention in imperfect markets to manage exchange rate amplification from financial imbalances can be welfare enhancing. The effectiveness of FXI can be increased by the presence of CFMs as part of the broader toolkit because systemic risk often builds up in tandem with increasing cross-border interconnectedness and spillovers. Putting even more weight on capital flow developments now while strengthening risk management tools is needed to design more effective CFMs that have the flexibility to be more pre-emptive. In this framework, CFMs should be a part of the broader policy toolkit as purely domestic macroprudential measures cannot adequately substitute for CFMs since CFMs better target the root of the problem of the volatility in international capital flows. Like with all macroprudential measures, the pre-emptive use of capital controls is critical when there is a risk of large capital inflows. In addition, it is important to also consider the holistic impact of structural policies on the domestic economy. In the long-run, when done right, these may complement central banks' expanded policy toolkits to manage external risks by mitigating the risks from capital flow fluctuations. Nonetheless, striking the right balance between policy tools given their short-, medium-, and long-term effects remains a critical challenge not only for SEACEN economies, but for many other economies as well.

## B. Operationalising the Policy Framework for Integrating Capital Flow Management

One possible way of operationalising the framework is by integrating capital flow risk management into the policy framework using a variation of the Taylor-type rule whereby the central banks may want to respond systematically to capital flow tail risks when setting the stance of monetary policy by directly leaning against tail risks. Box 8 below provides various options in operationalising this framework.

**Box 8: Integrating Capital Flows Risk Management into the Policy Framework***

*(Andrew Filardo and The SEACEN Centre)*

Integrating capital flow risk management into the policy framework can be operationalised with three different perspectives using Taylor-type rules as helpful ways to motivate the main points of the discussion.

*Perspective 1*: Central banks have often addressed capital flow challenges with exchange rate intervention. The assumption underlying this perspective is that less volatile exchange rates result in a less volatile capital flow environment. One option, which is labelled as "Taylor-rule Plus," is a variant of a conventional Taylor rule:

$$R = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) \quad (1)$$

a) $$FXI = g(\sigma(e)), \quad (2a)$$

or

b) $$FXI = g(e - e^*) \quad (2b)$$

Equation (1) is a conventional Taylor-type rule for a closed economy which relates the setting of the policy rate, R, to the inflation gap, $(\pi(e) - \pi^*)$, and the output gap, $(y(e) - y^p)$; in this version the dependence of inflation and output on the exchange rate is emphasised.

Equations (2a) and (2b) offer two versions of an exchange rate intervention (FXI) rule. In other words, the policy interest rate is used primarily to achieve domestic equilibrium with respect to inflation and output; FXI is used primarily to smooth the exchange rate and hence reduce the volatility of capital flows associated with exchange rate developments.

Equation (2a) of the FXI equation emphasises a preference to reduce the standard deviation of exchange rates, $\sigma(e)$, while Equation (2b) is an alternative which focuses on the cyclical deviation of exchange rates from 'equilibrium' exchange rates, $(e - e^*)$. Both versions have their pros and cons which depend on the ability to assess the measures accurately and to establish a reliable link between the monetary policy response and the exchange rate.

*Perspective 2*: Alternatively, central banks may prefer to jointly determine the policy tool mix. The policy rate and FXI both influence output, inflation, and the exchange rate. Such a policy rule is Equation (3), labelled an "Extended Taylor-rule":

$$h(R, FXI) = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) + \lambda(e - e^*). \quad (3)$$

Such a rule requires a good understanding of the trade-offs between the interest rate and FXI in the policy mix. In principle, determining these trade-offs with a high degree of certainty would be helpful in achieving the policy goals of the central bank. However, establishing such a relationship is a challenge, especially for emerging market economies. These economies have had little experience of these tools being used systematically during stable economic and financial environments. Over time, it is possible that more experience in deploying the two tools systematically will provide useful data for acquainting policy makers with the trade-offs.

*Perspective 3*: A third alternative captures the possibility that central banks may want to respond systematically to capital flow tail risks when setting the stance of monetary policy:

$$h(R, FXI) = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) + \lambda(e - e^*) + \mu(CFtailrisk). \quad (4)$$

The tail risk term in Equation (4) represents a desire to directly lean against tail risks before they materialise. With better leading indicators of capital flow tail risks, this type of leaning becomes feasible. The higher the quality of the leading indicators, the greater the ability to prevent capital flows from disrupting economic stability.

Each one of these perspectives highlights the different ways a central bank may want to raise the prominence of capital flows in its policy meetings and hence policy decisions. The relevance of any one of these perspectives is an empirical issue.

* See Section 6 for more discussion.

**The Bottomline: Evolving EM SOFIEs' monetary policy frameworks in a more complex world and with inherent market imperfections and financial channels of risk transmission may need to balance multiple objectives, considerations, and trade-offs.** EM SOFIEs in Asia have been more closely integrated with global financial markets, not only as recipients of capital but also as a net exporter of capital. While they have reduced their external re-financing risks, eliminated currency mismatches at the national level and have widened their domestic investor base, new sources of risks can worsen the trade-offs. Therefore, taking a more multifaceted approach and incorporating the following features may be helpful:

- Holistic, pragmatic, and flexible (less rules-based) broader framework;
- Putting a premium on resilience and having policy buffers to build resilience to tail risks;
- Having the ability to be pre-emptive, such as having *ex-ante* prevention mechanisms in place;
- Incorporating the role of the exchange rate as a stabiliser under certain conditions;
- Hard-wiring macro-financial stability considerations;
- Having the ability to implement countercyclical safeguard measures along the MPM/CFM spectrum; and
- Acting as a "dealer of last resort" to provide some backstop to systemic risk emerging from market-based finance.

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# PART 2

## BACKGROUND PAPERS ON MANAGING CAPITAL FLOWS IN SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

# SECTION 5

# EVOLVING MONETARY POLICY FRAMEWORKS AND CAPITAL FLOWS: SEACEN CENTRAL BANKS LEADING THE WAY

Andrew Joseph Filardo[1]

## A. Introduction

Over the decades, SEACEN central bank/monetary authorities have faced an environment of volatile capital flows. These flows drove economic activity and exchange rates, making it difficult for central banks to achieve price stability. The flows also elevated financial stability concerns, especially during the Great Financial Crisis (GFC), the Taper Tantrum, and, more recently, during the COVID-19 period. Through it all, however, SEACEN central banks managed the volatility well. Indeed, SEACEN central banks' successes in addressing the capital flow challenges are now helping to forge a new international consensus on how central banks can best confront an environment of volatile capital flows.

The current rethinking of the role of capital flows in the conduct of monetary policy has come at a critical time. Volatile capital flows in the region are here to stay. Several factors driving recent trends point to the spectre of even more destabilising flows than in the past. Bond and equity portfolio flows in particular remain increasingly vulnerable to the whims of a growing number of global investors. Record global sovereign and private debts accumulated over the past decade will fuel debt flows as they need to be refinanced periodically from pools of savings from around the world. At the same time, the global central banking community appears to be on the cusp of ushering in a new period of asynchronous monetary policies, much higher interest rates, and shrinking central bank balance sheets. The extent of the asynchronicity has accelerated sharply recently as some central banks have found themselves falling far behind the curve in their efforts to control

[1] This background study was prepared for the SEACEN Capital Flows Research Project (2020-22). The views expressed in this paper are those of the author and do not necessarily reflect the views of The SEACEN Centre and its member central banks/ monetary authorities.

inflation which began in 2021. And, with monetary policy normalisation in the major advanced economies, powerful global monetary policy spillovers to the SEACEN member economies will remain a significant force influencing capital flows and gyrations in financial markets.

SEACEN central banks in many respects are better prepared to address these challenges than they previously were. Access to more detailed capital flow data than in the past opens up opportunities to refine central bank risk analyses of capital flows (SEACEN, 2020a; and CGFS, 2021). With more detailed capital flow data across time and across countries, better methods are being built to assess capital flow developments. These could give central bankers a clearer and more timely picture of financial flow risks.

Central bankers are also benefiting from a more nuanced understanding of the forces driving the new capital flow environment. Recent advances in macro-financial research offer new insights into important domestic and international mechanisms that help to explain how "good" capital flows can turn "bad". These empirical and theoretical advances help to explain why past policy actions were ineffective at times and point to the economic and financial conditions when policies are likely to be effective.

Armed with the better data and an enhanced understanding of capital flow drivers, central banks have become more open to proactively respond to capital flows. In part, many central banks have been questioning the effectiveness of the narrow inflation-targeting frameworks of the past in delivering economic and financial stability. Given the experience of the past two decades, it is not surprising that central banks are considering the broadening of monetary policy frameworks to address capital flow volatility more explicitly. How far should central banks go towards adopting broader, more holistic monetary policy frameworks? What role should capital flows play in such frameworks, especially given that over the past decade central banks have developed a wider array of interest rate and balance sheet tools that can be deployed – as preventive measures when capital flow risks rise and as countercyclical measures after destabilising capital flows materialise?

The re-evaluation of monetary policy frameworks comes at a fortuitous time as international financial institutions have been taking a far more tolerant attitude toward pro-active policies for reining in capital flow threats, especially those arising from exchange rate fluctuations (BIS, 2019b; and IMF, 2020b). This is in stark contrast to past advice that was often very critical of

such policies. The criticisms tended to suppress productive dialogue about the prerogatives that developing and small, open advanced central banks have when confronting particularly challenging capital flow episodes.

All these developments highlight the case for raising the prominence of capital flows in SEACEN monetary policy frameworks. The rest of this background study discusses the case and its implications for the conduct of monetary policy. Section B describes the evolution of monetary policy frameworks and how capital flow objectives can fit into a three-pillar approach to monetary policy in emerging market economies. Section C spells out conceptual options for integrating capital flow concerns into the conduct of monetary policy. Section D highlights practical considerations when integrating capital flows in broader monetary policy frameworks. Section E argues that central banks should take a leading role in efforts to improve the efficiency of the macro-financial environment so that an eventual return to narrow price-stability-oriented frameworks can ensure even better outcomes than the multi-pillar approaches of today. Section F addresses the challenges that non-traditional central bank mandates pose and their implications. Section G concludes.

## B. Evolving Monetary Policy Risk Management Approach for SEACEN Central Banks

It can be said that monetary policy in many SEACEN and other small, open economies is best characterised as having evolved into a three-pillar approach to monetary policy.[2] This is a more holistic perspective on monetary policy than, say, a narrow focus on inflation targeting. And, as such, the three-pillar approach calls for a more complex set of trade-offs to be considered when setting monetary policy.

### *(i) Multi-pillar approach to monetary policy*

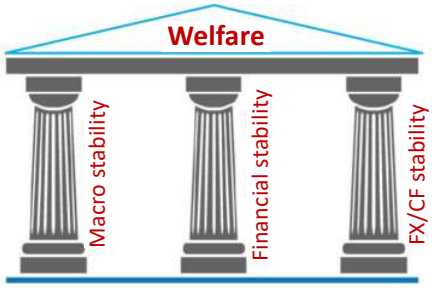
**Figure 5.1** provides a graphic view of the three-pillar approach. The first pillar represents the traditional short-term macroeconomic stability mandate of monetary policy. Price stability is the predominant focus for monetary policy. In many respects, stable economic activity is the key to keeping inflation on target. But there are times when inflation expectations are so well anchored

[2] For a more detailed discussion of the three-pillar approach, see Filardo et al. (2016).

that central banks may take the opportunity to nudge the economy back to its sustainable path. History also clearly shows that when central banks paid too much attention to stimulating output with little regard for inflation, both inflation and output volatility rose.

The second pillar addresses medium-term risks associated with, but not exclusively, domestic financial stability. Now, it is well accepted that central banks should play a key role in ensuring financial stability and many central banks have adopted financial stability mandates. The GFC drove home the lesson that, as White (2006) persuasively argued, price stability is not enough for overall economic and financial stability.

**Figure 5.1 New Frontier for Monetary Policy Frameworks? Evolving Three-Pillar Approach**




*Note:* Each of the three pillars represents key mandates for a monetary policy framework.
*Source:* Author's elaboration.

The third pillar addresses the special challenges arising from exchange rate and capital flow volatility. Clearly, exchange rates and capital flows have implications for price stability and financial stability. It is, however, additionally evident that the links between exchange rates and capital flows on the one hand, and price and financial stability on the other hand, is non-linear and uncertain. Given the complexities, external developments in the form of exchange rate misalignments (i.e., not consistent with macroeconomic fundamentals) and volatile capital flows arguably should receive special treatment in monetary policy decisions.

### *(ii) Evolution of monetary policy frameworks toward the three-pillar approach*

To better understand the evolution of SEACEN central bank monetary policy frameworks, this sub-section reviews, in broad strokes, how SEACEN central bank frameworks have fitted into global central bank trends since the early 1990s. It is important to note that the evolution over the decades was not so much theory-driven but was rather a pragmatic response to the shifting macro-financial landscape as economies became more open, both economically and financially.

The 1990s saw several small, open advanced economy central banks enshrining price stability as **the** overriding mandate of monetary policy frameworks. These central banks tended to adopt very narrow price stability mandates. Often the narrower frameworks went hand in hand with the strengthening of central bank independence and greater emphasis on central bank transparency, accountability, and credibility. Even though different economies chose different flavours of the price stability mandate, most central banks instituted some form of a formal inflation-targeting framework. Emerging market economies followed suit in opting for inflation targeting too, though SEACEN central banks typically paired the greater prominence of inflation targets with at least some consideration of external factors associated with capital flows and exchange rates. The major advanced economy central banks came late to the game in announcing explicit inflation targets.

Over the decades, nearly all central banks broadened the operational definition of price stability to be more flexible. Flexible inflation targeting emphasised the importance of keeping inflation rangebound **over the medium-term**. In such a scheme, central banks could allow some forbearance with respect to hitting the inflation target in response to short-run economic and financial market developments. The argument for this more flexible approach rested on the assumption that short-term discretionary monetary policy, if calibrated correctly, would improve overall economic and financial stability as long as inflation deviations from target were temporary and medium-term inflation expectations remained well anchored.

The “flexible” part of flexible inflation targeting has generally led central banks to place more weight on economic activity (as measured by output growth and unemployment rates) when setting policy rates than they had

done in the past. The Federal Reserve has always had its dual mandate in contrast to more dogmatic inflation-targeting frameworks. In recent years, other central banks have added explicit mandates for economic activity and labour market activity. Despite putting less weight on inflation relative to economic activity in the frameworks, central banks found that inflationary pressures were fairly quiescent and inflation expectations well-anchored in the pre-COVID-19 period. While central bankers and economists are still somewhat puzzled by the factors behind that favourable inflation performance, the fact that inflation was stable across a wide set of economies facing a diverse set of economic and financial environments has led some to wonder whether central bankers could do more to help out with non-inflation government objectives without seriously compromising their commitment to price stability (an issue which will be addressed in the next sub-section).[3]

The greater monetary policy flexibility also reflected central banks' experience in addressing the GFC of 2007-08. Since then, central banks have paid more attention to financial stability conditions when setting policy. This dramatic episode drove home the point that stable inflation is not a sufficient statistic to ensure overall economic and financial stability (White, 2006). Financial stability is now understood to be a prerequisite for inflation stability. Some central banks have relied heavily on macroprudential tools to protect against financial system risks. Others have augmented their monetary policy frameworks to incorporate domestic financial stability risks as part of the motivation for the setting of monetary policy.[4]

Policy makers in SEACEN central banks and other central banks in small, open economies have been leading the way in addressing concerns arising from volatile exchange rates and capital flows. Volatile capital flows have made it harder to achieve price stability but also harder to ensure domestic financial stability and ultimately price stability. As a consequence, these central banks have relied heavily on exchange rate intervention to smooth out destabilising volatility in exchange rates; in part, the motivation to use intervention arose because swings in exchange rates play an important

[3] The surge in global inflation since mid-2021 arguably has less to do with competing tradeoffs than with difficulties forecasting inflation during the rather unique circumstances arising during the COVID-19 period.

[4] See Box 3 in Part 1 for a discussion of the economic justification for integrating financial stability concerns into monetary policy frameworks arising from financial sector externalities; Box 4 and 5 of Part 1 of this publication address implementation issues.

role in carry trade dynamics which can then lead to sharp reversals in flighty capital flows. Traditionally, central banks intervened by buying and selling foreign exchange assets; in recent years, central banks have been extending their methods to include purchases and sales of exchange rate derivative contracts (BIS, 2019b). Policy rates have also been used for the purpose of promoting stability. Moreover, some central banks have leaned against persistent overvaluations of their currencies, which have had competitiveness implications.

Finally, any future role of monetary policy in addressing capital flows must be viewed in the context of a country's use of capital flow management tools and other macroprudential tools. SEACEN economies have demonstrated over time that systematic and **pre-emptive** deployment of capital flow management tools can improve financial stability conditions and provide more room for maneuvre with respect to a central bank's macroeconomic trade-offs. At the same time, there is a greater recognition of the fact that systematic monetary policy that responds to capital flow volatility (*via* the exchange rate channel or the gross flows channel) using exchange rate intervention can buttress efforts to achieve these goals. In other words, the different tools complement each other in the pursuit of economic and financial stability. Ongoing research is starting to make some progress toward a better understanding of the relationship between monetary policy and capital flow management measures, which is critical given that international institutions' views about the role of capital flow management tools is currently in flux (IMF, 2020a).

### *(iii) Prioritising mandates*

Operationalising the Three-Pillar Approach requires applying appropriate weights on the different policy objectives when making decisions. When there is only one objective – an inflation target – the monetary policy considerations are much simpler. If inflation is above target, use the policy instruments to nudge it down; if below target, nudge it up.[5]

[5] As mentioned above, early advocates of inflation-targeting regimes considered this narrow framework as critically important for achieving price stability and the inflation-fighting credibility of a central bank – especially for a central bank with a relatively checkered inflation record. Experience confirms that a sharp focus on inflation is key to achieving and maintaining price stability.

Three-pillar frameworks are more complex because they require the weighting of the different mandates, even if price stability remains the core mandate of the central bank. But how much weight should be placed on economic activity and financial stability concerns when making monetary policy decisions?

One attractive weighting scheme is referred to as lexicographic preferences. Lexicographic preferences put all the weight in decision making on inflation stability (over a particular time horizon) **if inflation deviates from target**. But, if inflation is roughly on target, the central bank can consider using its available tools to address its other objectives. Many central banks have chosen inflation objectives to be met over the medium-term horizon, even though the length of time in quarters and years is typically left vague. This ambiguity provides some wiggle room for central banks to address short-term developments (e.g., with respect to unemployment, financial stability, and capital flows) while keeping inflation on track over the medium-term and inflation expectations well-anchored. Some call this type of policy approach "constrained discretion".

Another weighting scheme allows a central bank to place a high, but not all, weight on inflation control. In this case, weight would be placed on all mandates. Under these preferences, if transitory inflation were to deviate **modestly** from target over the policy horizon, a central bank might still prefer to take account of worrisome domestic financial, exchange rate, and capital flow challenges. These preferences intuitively capture the desire of some central banks to have sufficient room for maneuvre to address key public policy goals in their purview even if the result is a modest loosening of control over inflation. As long as modest deviations from target are not deemed too costly in terms of economic welfare, a central bank may find that developments (e.g., capital flow volatility) are much more costly and hence deserve attention despite some slippage of inflation objectives over the medium-term.

Much more complex conditional weighting schemes are possible. However, the main takeaway is that central banks with multiple objectives need to consider how to best weigh the importance of their various mandates when making decisions. Communication issues with the public, especially financial markets, will be more difficult if the weighting schemes are too complex and discretionary. It is critical that the weighting scheme not appear vague and arbitrary.

### *(iv) Bottom line on multi-pillar frameworks*

The past 30 years have ushered in a global central banking era focused on price stability. However, over time central banks have realised that narrow inflation-targeting frameworks have not been sufficient to ensure a broader sense of welfare, i.e., economic and financial stability. This has especially been the case in emerging market economies.

The challenge going forward for all central banks, especially in light of the recent surge in inflation internationally, is whether broad, more holistic monetary policy frameworks can continue to deliver on the core mandate of price stability while addressing other, albeit subordinate policy objectives.[6] For SEACEN central banks, this issue is particularly relevant as the environment of volatile capital flows is likely to remain, if not intensify.

## C. Capital Flows and the Conduct of Monetary Policy

How might a SEACEN central bank translate an increased prominence of capital flows into its conduct of monetary policy on a meeting-to-meeting basis. This section offers three different perspectives using Taylor-type rules as helpful ways to motivate the main points of the discussion.[7]

*Perspective 1*: Central banks have often addressed capital flow challenges with foreign exchange rate intervention (FXI). The assumption underlying this perspective is that less volatile exchange rates lead to a less volatile

[6] One could interpret policy decisions in 2021-22 as suggesting that central banks fell behind the curve with respect to inflation. Even though inflation surged above target and was quite persistent, central banks around the globe initially kept real policy rates very low and, in many cases, negative. Concerns about COVID-19, disrupted supply chains, recession risks, and domestic and international financial conditions appear to have complicated the ability of central bankers and the private sector to forecast the surge in inflation.

[7] Note that the assumption behind this section is that various capital flow management and macroprudential tools have been implemented with an over-the-cycle policy focus. They may include automatic stabiliser-type properties, but it is assumed these tools are not used in a discretionary fashion in a way similar to monetary policy.

capital flow environment.[8] One option, which is labelled as "Taylor-rule Plus", is a variant of a conventional Taylor-rule which treats the two policy tools – policy rate (R) and FXI – separately:

$$R = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) \quad (1)$$

a) $$FXI = g(\sigma(e)), \quad (2a)$$

or

b) $$FXI = g(e - e^*) \quad (2b)$$

Equation (1) is a conventional Taylor-type rule for a closed economy which relates the setting of the policy rate, R, to the inflation gap, $(\pi(e) - \pi^*)$, and the output gap, $(y(e) - y^p)$, where $y^p$ denotes potential output. In this version, the dependence of inflation and output on the exchange rate ($e$) is emphasised.

Equations (2a) and (2b) offer two versions of a FXI rule. In other words, Equation (1) indicates that the policy interest rate is used primarily to achieve domestic equilibrium with respect to inflation and output; Equation (2) indicates that FXI is used primarily to smooth the exchange rate and hence reduce the volatility of capital flows associated with exchange rate developments.

Version A (Equation 2a) of the FXI equation emphasises a preference for reducing the standard deviation of exchange rate changes, $\sigma(e)$. Version B (Equation 2b) is an alternative which focuses on the cyclical deviation of the exchange rate from the "equilibrium" exchange rate, $(e - e^*)$.[9] Both versions have their advantages and disadvantages which largely depend on

[8] The implicit assumption here is that international financial frictions are significant. For example, carry trade dynamics and other exchange rate developments can drive disruptive gross capital flows. See Box 4 of Part 1 for a further discussion. Central banks also have reasons to smooth exchange rates other than the impact on capital flows, such as competitiveness concerns (BIS, 2019a).

[9] Filardo et al. (2022) argue that FXI effectiveness depends on the extent to which exchange rates diverge from cyclically adjusted swings in macroeconomic fundamentals. In particular, the $\lambda(e - e^*)$ term would be replaced by $\lambda(e - e^{*,h})$ where the superscript *h* reflects short-, medium-, and long-cycle exchange rate misalignments. Note here that these policy rules are symmetric and two-sided. Filardo and Siklos (2015) point out that persistent, one-sided FXI interventions to keep a currency undervalued have proved destabilising in the past.

the ability to assess the volatility measures accurately and to establish a reliable link between the monetary policy response and the exchange rate.

*Perspective 2*: Alternatively, central banks may prefer to jointly determine the policy tool mix. The policy rate and FXI both have influences on output, inflation, and the exchange rate. Such a policy rule is captured in Equation (3), labeled an "FXI Extended Taylor-rule":

$$h(R, FXI) = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) + \lambda(e - e^*). \quad (3)$$

Such a rule requires a good understanding of the trade-offs between the interest rate and FXI in the policy mix. In principle, determining these trade-offs with a high degree of precision is critical for achieving the policy goals of the central bank. However, establishing such a relationship is a challenge, especially for emerging market economies. These economies have generally had little experience of these tools being used systematically during stable economic and financial environments. Over time, more experience deploying the two tools systematically will provide useful data for acquainting policy makers with the trade-offs.

*Perspective 3*: A third alternative captures the possibility that central banks may want to respond systematically to capital flow tail risks when setting the stance of monetary policy:

$$h(R, FXI) = \alpha + \beta(\pi(e) - \pi^*) + \gamma(y(e) - y^p) + \lambda(e - e^*) + \mu(CF\ tail\ risk) \quad (4)$$

The tail risk term in Equation (4) represents a desire to directly lean against tail risks before destabilising capital flows materialise. With better leading indicators of capital flow tail risks, this type of leaning becomes feasible. Ideally, such pre-emptive actions would help prevent adverse outturns; if destabilising capital flows were to materialise, early policy actions would likely reduce the severity. Of course, reliable tail risk indicators are key. The higher the quality of the leading indicators, the greater the ability to prevent capital flows from disrupting economic and financial stability.

Each one of these perspectives highlights the different ways a central bank may want to raise the prominence of capital flows in its policy meetings and hence policy decisions. The relevance of any one of these perspectives is ultimately an empirical issue.

## D. Practical Challenges for SEACEN Central Banks Facing Capital Flow Volatility

Systematically responding to capital flows introduces many important considerations for a central bank: the conduct of monetary policy, tracking of policy-relevant capital flows, deploying policy tool options, intertemporal trade-offs, the policy tool mix, other central bank balance sheet policies, and political economy concerns. This section delves into each of these practical challenges.

### *(i) The conduct of monetary policy*

The alternative policy perspectives described in Equations (1)-(4) raise several interrelated issues. First, a word of caution. The Taylor-type rule approach is not meant to be used as a hard and fast formula that central banks need to follow precisely. But it is a succinct way to highlight the key factors that a central bank needs to focus on in making sound decisions. Also, the coefficients in the rules provide some guidance about how a central bank might weigh the economic and financial developments in pursuit of its policy goals. For example, the size of the coefficient on inflation is meant to capture how much of an inflation deviation from target dominates the policy stance relative to, say, capital flow developments.[10]

Second, the choice of a particular approach will depend on country specifics. As the new research on FXI effectiveness highlights, the capacity of the domestic financial system to accommodate gross capital flows will determine how important capital flow volatility is for achieving and maintaining economic and financial stability. When the absorptive capacity is high, the Taylor-type rule coefficients on exchange rates and capital flow tail risks are likely to be small; when low, the coefficients are likely to be significantly different from zero. In other words, financial frictions make the policy rate and FXI more effective at influencing the exchange rate, financial flows, and hence economic activity.

Third, success will depend in part on the ability of the central bank to influence private sector expectations. Clear, credible monetary policies are likely to have a bigger impact on private sector expectations than discretionary ones.

[10] To the extent that history can be used as a guide, Taylor-type rules can also capture past empirical regularities which help guard against “this time is different” decision making.

At both conceptual and practical levels, monetary policy "rules" for exchange rate can be effective ways to influence private sector expectations just as they are for domestic economic and financial stability (Filardo et al., 2022). SEACEN central banks have traditionally been less transparent about FXI than other emerging market central banks. While it is true that opaque FXI tactics tend to be more successful in surprising markets over short horizons, systematic use of FXI that is credible is more likely to have a more sustained impact at longer, policy-relevant horizons.

Finally, even though the rules can help to clarify how a central bank may want to calibrate its response to a particular set of circumstances, data availability from periods of relative stability limits the accuracy of such an approach. Judgment will always be an important feature of the monetary policy deliberative process. One could imagine more complex rules for trying to capture more features of the policy environment, but as pointed out in Cochrane et al. (2020), simple rules may outperform more complex rules when the more complex rules are inaccurately calibrated.

### *(ii) Tracking policy-relevant capital flows*

Empirically, distinguishing between "good" and "bad" capital flows has proved challenging but the situation is improving in at least two respects.[11] First, tracking cross-border flows from savers, through the complex international intermediation chain, to final borrowers has proven elusive and incomplete. However, in the past decade, various efforts have been made to improve the breadth and accuracy of cross-border financial statistics (e.g., the Bank for International Settlements International Banking and Financial Statistics) as well as detailed portfolio gross bond and equity flows.

Second, innovative econometric methods and models of financial frictions with financiers facing limited risk-bearing capacity offer new ways to identify periods of heightened risky capital flows. Converting these models into accurate leading indicators of "bad" capital flows is still a work in progress. But, as advances are made, tracking and interpreting capital flow risks becomes less of an art and more of a science. Indeed, recent researches, including

[11] Conceptually, capital flows are a two-edged sword. On the one hand, capital flows are a key feature of the modern global financial system. Financial integration and financial deepening have long been considered keys to raising national standards of living. On the other hand, history is replete with examples of destabilising capital flows, especially gross portfolio flows, which have been associated with severe downturns and crises.

Section 2 of this study and capital flows-at-risk (Gelos et al., 2022), offer a new surveillance methodology for identifying periods likely to experience sharp capital flow reversals, i.e., capital flow tail risks (SEACEN, 2022b) [see Part 1, Section 2]. This novel methodology holds out considerable promise for improving the ability for SEACEN central banks to forecast and hence prepare for periods turbulent capital flows.

### *(iii) Policy tool mix*

In principle, a central bank would like to know how best to calibrate its range of tools. It has several choices. A central bank has the option to choose the intensity with which it deploys its tools; this is called the **intensive** margin of the policy choice. A central bank can also determine the range of tools to use; this is the **extensive** margin.

To illustrate this extensive margin, consider the case of a business cycle upturn accompanied by strong capital inflows. A central bank could jack up policy rates to slow economic activity which, in turn, may dissuade foreign investors from investing. However, given that strong capital inflows are often accompanied by strong economic activity, higher inflation, and buoyant financial conditions, a higher policy rate response can prove counterproductive. In some circumstances, a higher policy interest rate would accelerate gross inflows. To boost policy effectiveness, a central bank may prefer to limit its policy rate increases and rely more on FX intervention and other discretionary capital flow measures.[12]

Calibrating such tools is not without its difficulties. Research has begun to try to establish a policy matrix that relates the tools of a central bank (such as the policy rate, central bank balance sheet tools, capital flow management tools, and macroprudential tools) and the associated impact elasticities for key policy variables (such as economic activity, inflation, and capital flows). So far, stable relationships have been difficult to pin down with a sufficient degree of empirical precision. In part, the reason is that the choice of various policy tools and their impacts depends on a range of factors, not least being the state of the business cycle, the volatility of capital flows, the level of financial deepening, the ability to hedge exchange risks, and others. Over

[12] Rey (2013) has highlighted evidence that global capital flows have undermined the independence of monetary policy in small, open economies (i.e., the dilemma versus trilemma debate).

time, experience may yield insights into a workable policy mix. Until then, further experimentation with a range of central bank policies will allow central banks to learn how to best deploy them.

### *(iv) Other balance sheet policies*

International experience with central bank balance sheet policies over the past decade has opened up new possibilities when responding to capital flow volatility. To the extent that the private sector has limited balance sheet capacity to absorb large adjustments in gross capital flows, central banks have demonstrated that they can step in decisively to serve as a buffer. In the case of sizable changes in the gross flows of local currency bonds, for example, SEACEN central banks could set up a securities facility that mimics the borrowing and lending facilities for reserves. In the case of gross equity flows, ETF facilities, like that established at the Bank of Japan, could provide opportunities to moderate the effects of boom-bust equity price dynamics associated with capital flows. The effectiveness of such facilities for smaller economies remains an open question. Also, central banks must carefully analyse the long-run consequences of such facilities in terms of the detrimental effect they can have on private sector financial system efficiency and resilience.

### *(v) Political economy constraints favor monetary policy leadership*

One policy challenge when dealing with capital flows is jurisdictional. Typically, responsibility for reducing capital flow volatility is split across different government agencies and departments. Some argue that central banks should adopt narrow mandates targeting inflation and rely on other government policies and market discipline to address capital flow risks. However, as noted above, central banks are being increasingly seen as possessing important tools and expertise to take on important policy objectives such as capital flow volatility and its consequences.

One underappreciated reason that central banks should play a more prominent role than in the past is that they typically have an important advantage over other government authorities – flexibility. When governments impose new regulations under the guise of capital flow management tools or financial stability tools, the ability to change the regulations in the future is very limited even after such regulations become obsolete or counterproductive. In large part, vested interests fight to keep

the existing regulatory regime, which leads to bureaucratic inertia and other issues (Taylor, 2019). Monetary policy frameworks, on the other hand, are much more flexible and can change more easily as the underlying domestic and global macro-financial systems evolve. Being able to reverse quickly and eliminate stop-gap regulations is important because the inability to do so results in complexities and opaqueness in a regulatory regime which can hold back an economy from reaching its potential. This aspect of policy flexibility argues for an enhanced leadership role for SEACEN central banks in addressing volatile capital flows rather than the subordinate role envisioned in the IMF's latest Integrated Policy Framework.

### *(vi) Dealing with global monetary policy spillovers*

Issues of global monetary policy spillovers *via* capital flows are nearly impossible for SEACEN central banks to address unilaterally. Without a doubt, the intensity and volatility of past capital flows has reflected the monetary policy decisions of major advanced central banks. While it is true that some of the spillovers were helpful during periods of synchronised global cycles, at other times the spillovers aggravated the domestic policy environment in emerging and small, open advanced economies (Chen et al., 2016). Dialogue in international and regional forums has increased the awareness of monetary policy spillovers and spillbacks, but the global central banking community has yet to forge a new consensus on how best to deal with them. Better modeling and the availability of cross-country data have facilitated a better understanding of the increasingly interconnected nature of the global economy but these global models are still wanting.

More needs to be done. Continued leadership by SEACEN central banks at international forums will remain essential for progress in addressing the problem of monetary policy spillovers from major central banks to emerging market economies. Over the past decade, Asian central bankers were on the front lines arguing for a change in the Washington Consensus, which largely rested on a commitment to a purely flexible exchange rate regime, unfettered capital flows, and narrow inflation targeting. The Asian experience demonstrated the flaws in the consensus and highlighted the need for a new global monetary system. Now, there is a much better global understanding of what is at stake and the direction of change.

### *(vii) Implications for research departments at central banks*

Multi-pillar frameworks which include a significant role for capital flows have several implications for the institutional design of both monetary policy briefings and the staff that supports the committees. Such frameworks put additional burdens on staff with respect to data needs, economic and financial sector surveillance, and analytical considerations. In terms of advising monetary policy committees, the staff has greater responsibilities for explaining the complex set of trade-offs and uncertainties to be assessed when setting monetary policy, relative to a narrow inflation targeting framework.

This more holistic perspective emphasises a risk-management approach to monetary policy and the consideration of the different types of uncertainties that a broader framework entails. The nature of the monetary policy uncertainties falls into three major buckets. There is uncertainty about the state of the economy (data uncertainty). There is uncertainty about the impact of policy (parameter uncertainty). There is uncertainty about the low-probability, worst-case scenarios (tail-risk uncertainty). This last category of risks is the most difficult to characterise but may be the most important to consider as central banks look out for developments which could derail an economy and financial system (Kay and King, 2020). Each type of uncertainty presents its own challenge for a research staff to analyse and monetary policy committees to judge. Specialised tools and talent are needed to perform the appropriate risk management assessments.

## E. Keeping One's Eye on the Prize – Aiming for Narrow Price Stability Frameworks

Raising the prominence of capital flows in monetary policy frameworks in the near term should not be interpreted as a permanent state of affairs. As noted earlier, the justification for boosting the prominence of capital flows is largely due to the current importance of financial market frictions and global monetary policy spillovers. Resolving these issues could eventually lead to narrower monetary policy frameworks focused on price stability delivering even better outcomes.

This perspective underscores the point that complexities in monetary policy often reflect the complexities of the macro-financial environment. Hence,

as the macro-financial environment becomes more efficient at absorbing potentially destabilising capital flows, central banks can aim at adopting simpler policy frameworks. A simpler framework focused more exclusively on inflation stability may, in this context, result in a new Great Moderation era, this time with a strong enough foundation to endure.

From this long-run time perspective, the integration of capital flow dynamics into monetary policy decisions should be seen as a stop-gap measure. Stop-gap measures are typically transitory solutions to challenging situations. In the case of monetary policy, central banks have a comparative advantage in addressing volatile gross capital flows with policy rates and central bank balance sheet policies. These policies can directly influence the push and pull drivers of capital flows. Another advantage is that these tools can be reversed much more easily than typical capital flow management and financial stability tools. Of course, the overall attractiveness of these monetary policy tools has to take account of the potential risks to price stability and central bank credibility.

Over time, progress will depend on the pace of financial domestic liberalisation and globalisation. Many reforms will be needed, not least being incentivising the development of robust hedging markets and well diversified financial sector balance sheets. SEACEN central banks have an important role to play during this gradual transition to a more stable, or antifragile (Taleb, 2012), capital flow environment, in large part because SEACEN economies will benefit by mitigating push and pull factors driving disruptive gross flows and worrisome capital flow tail risks. It will be important that central banks should not only have a seat at the table promoting domestic reforms that will improve financial system resiliency and the transmission of monetary policy, but should take an enhanced leadership role within governments. Efforts should strive for reducing capital flow tail risks by boosting domestic financial systems resiliency to absorb gross capital flows.

Having said this, it is important to note that getting one's own house in order is not sufficient. SEACEN central banks must continue to push for a new consensus on the rules of the global monetary system. Their aim should be reducing global monetary policy spillovers, especially from the major advanced economies. The reluctance of the major advanced economy central banks and key international financial institutions to take on this challenge is well known. So, forging a new international consensus will not be easy. In the near term, regional efforts may help. Building on past efforts to enhance

regional central bank cooperation – with The SEACEN Centre having played a pivotal role – SEACEN central banks should also continue to strengthen the preparedness of regional institutions, such as AMRO, to step in just in case there is a need.

In the end, success in accelerating the transition to a safer regional and global financial system will afford central banks the opportunity to adopt narrower frameworks over the long-run that are focused on price stability – the enduring core of monetary policy – which in turn will help secure higher economic growth and standards of living.

## F. Monetary Policy Risk Management Approach – The Challenges Ahead

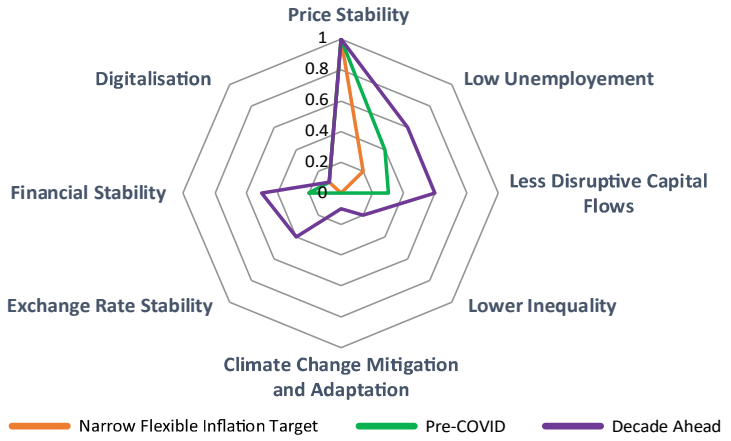
Central banks around the globe are currently being asked to consider a broader range of **non-traditional** monetary policy mandates. These requests reflect a desire by governments to use the economic and financial tools of the central bank to help target key government objectives and considerations, such as climate and inequality priorities. Prioritising this longer list of potential central bank considerations represents a new challenge for the decade ahead.

The chief question being asked is: can central banks deliver on their core goal of price stability while addressing other policy objectives? Put another way, would such new mandates result in a type of mission creep which in the past had led to volatile inflation outcomes, financial instability, and poor economic performance?

In many respects, the request for central banks to take on new responsibilities is a consequence of their past success. Over the past two decades, central bankers have achieved considerable success for delivering sound economic and financial stewardship. In most cases, the successes followed the adoption of monetary policy frameworks which elevated the role of the price stability mandate to the highest priority. For many SEACEN central banks, this included adoption of formal inflation-targeting frameworks. For other SEACEN central banks, this meant raising the prominence of price stability without adopting formal inflation targeting. Nearly all have been targeting inflation even if they did not adopt formal inflation targeting. SEACEN central banks have performed rather well in terms of traditional measures of monetary policy success.

Adding new mandates would certainly increase the complexity of central banking in the region. To highlight these new challenges in a historical perspective, **Figure 5.2** shows the evolution of the expanding mandates of the past with the potential mandates of the future. The orange line represents the phase in which small, open, advanced economies pioneered the adoption of narrow inflation-targeting regimes. In general, these early manifestations of inflation targeting put most weight in policy decisions on inflation developments with some central banks still heeding short-run (over a year or so) developments in the real economy.

**Figure 5.2: Should SEACEN Central Banks Broaden Frameworks? Prospects and Challenges**




*Notes:* The weights on different mandates are normalised relative to the inflation goal. This graph illustrates the more complex weighting scheme required for trading off a wider range of mandates. Maximising the welfare of its country also factors in implications for credibility, accountability, and transparency.
*Source:* Author's elaborations.

The green line illustrates the broadening of monetary policy frameworks and considerations in the pre-COVID-19 period, with weights being put on concerns from, amongst other things, financial stability, exchange rates, and capital flows. Over time most flexible inflation-targeting central banks lengthened the target horizon of inflation and emphasised an intentionally vague notion of "over the medium-run". Effectively, this allowed central banks to respond to a wider range of economic and financial developments

of both domestic and global types in the short-run. Operationally, the weight on capital flow developments was relatively large in SEACEN economies over the past decade. The weight appeared to vary systematically over time – low when capital flow developments were rather quiescent and high when rather volatile.

The purple line illustrates the implications for the weights if central banking trends continue and central bankers were to heed calls for integrating climate change and inequality issues in central bank frameworks and policy considerations. Two features stand out. First, central banks would be expected to depart from the narrow price stability mandates. Second, the addition of new mandates for climate and social issues would represent a sea of change in thinking about monetary policy frameworks. It is important to note that the new mandates and policy considerations, while admirable, go well beyond what have traditionally been the responsibilities of central banks. Juggling all these important societal goals will certainly be complex, resource intensive, and time consuming. Moreover, central banks are not well armed to take on these new mandates. Traditional monetary policy tools are blunt and are only tangentially related to the drivers of the key issues of climate change and inequality. These problems are shared among the new tools being considered: targeted lending, sectoral ETF and corporate bond purchases, green QE, special discount rates for banks investing in ESG priorities, and reduced use of QE tools that primarily benefit the wealthy.

In sum, **Figure 5.2** shows how central bank frameworks and other considerations may be broadened in the future. Many worry that this is evidence of mission creep and raises several critical policy questions that need to be answered before central banks take on new mandates. Will the expansion of monetary policy frameworks severely compromise the strength of the medium-term inflation anchor and, if compromised, will it be costly to secure it once again? Certainly, the surge in inflation in 2021-22 is a stark reminder that inflation control can be lost very quickly. Could the quasi-fiscal nature of the expansion lead to fiscal dominance and a loss of inflation-fighting credibility? Would the expansion of monetary policy frameworks be effective in addressing important governmental policy objectives? Would such efforts from central banks contribute to the overall national welfare sufficiently to make it worth taking the risk of compromising price stability? These are very important questions that central banks are just beginning to grapple with.

## G. Concluding Remarks

In the 2020s, SEACEN central banks will face a range of policy challenges and considerations. Important questions remain about the appropriate role of monetary policy. However, the emerging global consensus is that central banks in developing and small, open, advanced economies have reasons to be pro-active when addressing capital flow volatility.

The importance of elevating the prominence of capital flows in monetary policy decisions will undoubtably vary from country to country. There is no one-size-fits-all. Cross-sectional differences among SEACEN economies, not least being the state of the business and capital flow cycles, the level of financial deepening, the ability of each financial system to hedge exchange risks, and others, make it hard to take the experience of one country and apply it to another. Each economy's vulnerabilities to global monetary policy spillovers also matter.

Over time, however, there is good reason to believe that central banks eventually will be able to revert to narrower frameworks. However, that is likely to occur when, and if, the macro-financial environment becomes much more stable and resilient. For a time in the past, there was a belief that a central bank focused narrowly on price stability would result in broad economic and financial stability. That result did not materialise. History instead suggests that narrow price stability frameworks are the byproduct of having first achieved a sufficient level of economic and financial stability. Until then, constrained discretionary monetary policy within a multi-pillar monetary policy framework may be the best we can hope for.

As in the past, the SEACEN central banks and The SEACEN Centre will have an important role to play in this evolution. The region's monetary policy diversity is an important source of information in international policy debates. With SEACEN's impressive regional research and learning hub, it is important that the unique regional experiences and lessons learned be shared both inside the region and beyond.

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# SECTION 6

# PRESERVING MACROECONOMIC AND FINANCIAL STABILITY IN SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

Már Guðmundsson[1]

## A. Introduction

Prevailing views have, in recent decades, changed significantly on the nature and size of the challenges faced by small, open economies (SOEs) as they grew progressively more financially integrated with the rest of the world. With it has come a reassessment of the appropriate use of policy tools aimed at preserving macroeconomic and financial stability in these economies. The potential benefits from cross-border financial integration continue to be recognised, but there is a better understanding that for these economies, cross-border financial integration also comes with significant risks and can give rise to difficult trade-offs that call for the use of more policy tools than was deemed appropriate by the former prevailing orthodoxy.

This shift was underpinned by analytical advances on how to deal with volatile capital flows in emerging market economies (EMEs), and a better recognition that heterodox policy responses that had been used by many of them had some merits. Research at the International Monetary Fund (IMF) has played an important role in this reassessment.[2] This analytical work was reflected in the publication in 2012 of the IMF's Institutional View on the Liberalisation and Management of Capital Flows (IV), but only partly (IMF, 2012). With further analytical developments and policy experience in the years after the IV was adopted, the case for a revision grew. The IV was subsequently revised in March 2022 (IMF, 2022).

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[1] Governor, Central Bank of Iceland, 2009-2019. I would like to thank Hans Genberg, Mangal Goswami, Ole Rummel, Rogelio Mercado Jr., and Victor Pontines for helpful comments. This paper is a part of my contribution to the project of The SEACEN Centre in Kuala Lumpur on challenges and options in managing capital flows. It was prepared during and between my stays as a Visiting Scholar at The SEACEN Centre in early 2020 and late 2022. The views expressed in this paper are those of the author and do not necessarily reflect views of the institutions that the author has been associated with.

[2] See for instance Korinek (2011) and Ostry et al. (2011). Gosh et al. (2017) provide an overview on the state of play of IMF staff's research in this area.

The main aim of this background paper is to contribute from a former policymaker's perspective to the ongoing discussion about improved frameworks for preserving macroeconomic and financial stability in what I call small, open, and financially integrated economies, or SOFIEs.[3] By using this acronym, I want to highlight that cross-border financial integration is a key to the nature of the challenges that are analysed in the paper. Not all SOEs are financially integrated as they have relatively closed capital accounts and underdeveloped financial markets. It is, however, not necessary for economies to qualify as SOFIEs to have completely open capital accounts, only that they are sufficiently open so that global financial conditions, shaped by a few big countries, have a significant influence on financial conditions in the domestic economies. This definition of SOFIEs will include both advanced economies (AEs) and EMEs, but there are differences between them regarding the degree of cross-border financial integration and its effects on the domestic economy that have relevance when it comes to policy responses, as will be discussed further in the main sections of this study. The key point here is that economies with more developed financial markets and less financial vulnerabilities are more able than others to absorb capital flows without creating risks to financial stability.

The risks for SOFIEs from cross-border financial integration would be smaller if big reserve currency economies took the cross-border spillovers of their macroeconomic policies into account. They would, however, not disappear. Shifts in investor risk-appetite could, for instance, still generate volatile capital flows. These risks are also mitigated by a stronger global financial safety net (GFSN) and by international and regional arrangements on foreign exchange (FX) liquidity support. These issues are not covered in this paper that is on what SOFIEs can do in the absence of such reforms. International or regional restrictions on the use of some of the relevant instruments, such as capital flow management measures (CFMs), and the policy advice of international organisations on the use of such instruments is, however, discussed.

[3] The paper is motivated and informed by my role as Governor of the Central Bank of Iceland 2009-2019, my work on these issues at the Bank for International Settlements during the build-up and break-out of the Great Financial Crisis (GFC) and my recent involvement with the capital flows project of The SEACEN Centre, see Part 1 of this publication. For other key publications of mine in this field, see Guðmundsson (2008, 2017).

The rest of this paper is organised as follows. The next section analyses the effects of cross-border financial integration on SOFIEs with a special focus on those aspects that might call for policy responses. Section C discusses policy options of SOFIEs for dealing with the challenges created by cross-border financial integration. Section D discusses the role of multilateral treaties and organisations in this policy making, especially that of the IMF and the Organisation for Economic Co-operation and Development (OECD). Section E outlines the key elements of an integrated policy framework around instruments that belong to central banks and financial supervisors in SOFIEs that have flexible exchange rates and the aspiration to operate independent monetary policies. Section F provides some concluding remarks. The appendix presents estimates of cross-border financial integration for a selected group of SOFIEs.

## B. Stability Challenges from Cross-Border Financial Integration

### *(i) Effects of cross-border financial integration on financial prices*

Full financial integration implies that expected risk adjusted real returns on similar types of financial assets will be equal in any two or more fully integrated markets. To draw out the implication of this for SOFIEs, let us assume a world of one big economy that shapes global financial conditions (core rate-setter) and several SOFIEs that have individually no influence on global financial conditions. Let us further assume that both the inflation differential and the risk premiums on financial assets in each SOFIE are constant vis-à-vis those in the big economy. Then nominal returns on financial assets in SOFIEs are pegged to those in the big country. Their levels can vary but the correlation of changes in nominal returns will be one. This, of course, is an "unrealistic" theoretical simplification, but it gives a starting point for our analysis, and it indicates the direction we will be heading in if global financial integration progresses further.[4]

In the case of a significant, but not full, cross-border financial integration, the strength of the link between the expected real returns on financial assets in SOFIEs with those of the big economy will depend on the intensity of the

[4] This subsection is based on this author's previous work where the analytical statements are more fully explained (Guðmundsson, 2008, 2017).

integration.[5] This will, in turn, be translated into correlations in changes of nominal returns to the degree that depends on the fluctuations of inflation differentials and risks premiums. These correlations will be stronger at the longer end of the maturity spectrum.

SOFIEs that have their own currency, and flexible exchange rate regimes can still have independent monetary policies of a sort even if changes in their long-term nominal interest rates are mostly determined by conditions in the big economy. They can choose their own inflation targets and set their own short-term interest rates that would affect economic activity in the short-run and inflation in the long-run. In this case, the transmission of monetary policy shifts from the interest rate channel to the exchange rate channel as the effects of the policy rate on longer term interest rates becomes more limited.[6] If the exchange rate is "well behaved" in the sense that it moves smoothly in line with underlying economic conditions, then monetary transmission through the exchange rate channel can work reasonably well. However, there is a significant body of literature showing empirical evidence that exchange rates could be misaligned with underlying fundamentals for a protracted period. The existence of carry trade can be seen as evidence of this, as it involves betting that interest rate differentials are not fully compensated by exchange rate movements over the investment horizon. This is supported by evidence from several empirical studies that uncovered interest rate parity does not hold, except at long horizons, while the exchange rate can go through sharp and disorderly corrections in the short-term.[7]

[5] Full integration implies that the correlation of changes in expected real returns on financial assets in the SOFIE is one. The integration becomes significant when the correlation is positive and significant, and higher correlation indicates a stronger integration.

[6] To sharpen the focus on the effects of cross-border financial integration on financial prices, particularly those most relevant for the transmission of monetary policy, I ignore other transmission channels such as the credit and risk-taking channels. Those are not needed to pinpoint the main effects and there is less investigation on how they change with cross-border financial integration. Bruno and Shin (2013) analyse the relationship between capital flows and the risk-taking channel of monetary policy. In that context, it is the transmission of US monetary policy that matter, whereas I am focusing here on how the transmission of domestic monetary policy in SOFIEs is affected by cross-border financial integration.

[7] See for instance Plantin and Shin (2006) and Breedon et al. (2012).

Such disorderly exchange rate dynamics can potentially give rise to two concerns. The first is that excess volatility and misaligned exchange rates can have detrimental effects on the traded goods sector. The second is the potential adverse interaction with financial stability due to the presence of domestic financial vulnerabilities like currency and FX maturity mismatches in domestic balance sheets and income flows. In the case of a significant depreciation, such vulnerabilities will increase the debt burden in domestic currency terms. That, in turn, can undermine the stability of domestic financial institutions to the degree that they play a role in the intermediation of FX denominated credit to unhedged entities. In addition, the exchange rate could turn into a shock amplifier, for instance when the negative effects on domestic demand due to higher FX debt burden in domestic currency terms, are stronger than the traditional positive effects on net exports.

The close correlation of changes in long-term interest rates in SOFIEs with those of the big core rate setters does not in itself pose a stability challenge. However, it is the reliance of monetary transmission on exchange rate adjustment, especially for financially integrated economies, that may entail excessive volatility and under- or over- shooting from the equilibrium exchange rate. This scenario carries economic costs compared to the case of an orderly exchange rate adjustment and poses risks to financial stability as explained above.

### *(ii) Capital flows*

In the preceding subsection, the focus was on how cross-border financial integration affects financial prices. The duality of prices and quantities mean that the quantity of capital flows and balance sheet are equally relevant. Shifting the focus to quantities reveal further stability challenges due to potential large swings in capital flows that can significantly affect financial conditions in SOFIEs, sometimes in the opposite direction of what is needed for domestic economic stability. That, in turn, can contribute to economic and financial imbalances that pose risks to financial stability.

It is useful to make a distinction between what are called push and pull factors when analysing the drivers of capital flows. Push factors are those that are external to the economies receiving the flows, primarily global financial conditions. Pull factors are those that are internal to individual economies receiving capital flows, such as their business environment and

investment opportunities. Push factor driven flows are generally seen to have a bigger potential to adversely affect macroeconomic and financial stability in SOFIEs, whereas pull factor driven flows can be more benign as they are more likely to contribute to growth in economic potential in the receiving economies.

Several recent studies have provided rather convincing evidence that the US financial cycle is the main driver of global financial conditions.[8] This cycle creates synchronised swings in capital flows to SOFIEs, which are to a significant degree unrelated to their domestic conditions. These push factor driven capital flows can, therefore, cause unwarranted and unwanted changes in domestic financial conditions and give rise to stability challenges as discussed above.

Investors generally differentiate based on economic fundamentals when they invest in individual economies, while capital flows driven by pull factors can come with substantial benefits. These positive attributes, however, are not always problem free. One example of this is when the economic cycle in a SOFIE is out of sync with its major trading partners and there is a need to tighten monetary policy to keep inflation on target. Higher policy rates can induce carry trade flows that can divert monetary transmission towards the exchange rate channel, including through foreign exchange intervention, and result in the accumulation of investment holdings that could exit in a disorderly manner when investor sentiment towards SOFIEs change. This is then a case where cross-border financial integration reduces the scope for independent monetary policy. Another, but related example, is when foreign investors become overoptimistic about the economic prospects of an individual SOFIE. This can result in the build-up of economic and financial imbalances during the inflow phase such as an unsustainable current account deficit, strong credit growth and over-indebtedness. This, in turn, can lead to financial instability when foreign investors abruptly change their views and leave in a disorderly manner.

The degree to which significant swings in capital flows create stability challenges in an individual SOFIE depends on the level of development of its financial markets, the soundness of financial regulations, the quality of financial supervision and the resilience of systemic financial institutions. Relatively deep FX and domestic bond markets, availability of reasonably

[8] For some key contributions, see Rey (2013), and Obstfeld (2015, 2021).

priced hedges against FX risks, regulatory limits on currency mismatches and FX mismatches and effective supervision that is alert to the relevant risks increase the capacity of SOFIEs to absorb capital flows without too high a risk to financial stability.

### *(iii) Level of cross-border financial integration in AE and EME SOFIEs*

The stability challenges for individual SOFIEs will be bigger for economies with stronger financial integration, holding everything else constant. In general, we would expect AE SOFIEs to be more financially integrated with the rest of the world than EME SOFIEs. Because of the higher level of financial market development and institutional strength of AEs, we also expect them to be more able to absorb capital flows and deal with other negative effects of cross-border financial integration. How these factors counteract each other has relevance for the design of policy responses to the challenges created by cross-border financial integration. That will vary between AEs and EMEs and individual economies within these groups. The first step in that evaluation is to assess the level of cross-border financial integration in individual economies and look at its distribution within and between AEs and EMEs.

**Table 6A.1** in the appendix provides two indicators of the level of cross-border financial integration for fifteen SOEs, including seven AEs and eight EMEs. The first indicator is correlations of monthly changes in nominal long-term government bond rates with corresponding US rates for eight years before the GFC (2000-2007) and eleven years after (2009-2019). The second indicator is the sum of gross external assets and liabilities relative to GDP (gross IIP) in 2007 and 2019. The choice of SOEs, and the rationale and the construction of the indicators are explained in the appendix. Most of the SOEs have highly significant rate correlations in the post GFC period, which is consistent with a relatively high degree of cross-border financial integration. The same was mostly the case in the period before the GFC, but in some cases, the data was not available in the sources quoted. Three countries had insignificant rate correlations in the second period and when coupled with other information, it seems that their level of cross-border financial integration was insufficient to label them SOFIEs. They are, therefore, excluded in the analysis below. The gross IIP positions are more difficult to

interpret as there is no clear benchmark as in the case of rate correlations.[9] Higher gross IIP is expected to be associated with a higher degree of cross-border financial integration and country ranking is instructive. The numbers in **Table 6A.1** seem to broadly reflect this.

The numbers in **Table 6A.1** indicate that the differences between AEs and EMEs are indeed significant. The range of rate correlations in AE SOFIEs from 2009 to 2019 was from 0.5 to 0.8 and the GDP-weighted average was 0.7. Comparable figures for EMEs were 0.3-0.5 for the range and 0.4 for the weighted average. AE gross IIP ranged from 2 to 20 in 2019, and the weighted average was 7.4 compared to a range of 2-3 and a weighted average of 2 for EMEs. However, although the differences between AEs and EMEs SOFIEs as groups are, on average, highly significant for the rate correlations, there is no clear demarcation between them as can be seen from the result that the correlations in the period of 2009-2019 are almost the same for the highest EME as for the lowest AE. This partly explains significant variations in policy responses within the groups.

### *(iv) Developments in volume and volatility of capital flows*

Looking at several indicators, the big picture seems to be that cross-border financial integration peaked globally just prior to the GFC. It then reversed somewhat as capital flows turned back to the big rate-setting economies, cross-border banking partly retreated to home base, and restrictions on capital movements were in some cases reintroduced. It is, however, a mixed picture and varies between AEs and EMEs. As an example, capital account openness increased strongly among AEs in the 1990s and has since stayed mostly flat in spite of the GFC. Among EMEs, however, it continued to increase during the 2000s to reach a peak in 2008, although at a substantially lower level than in AEs. It then fell back and has remained at a lower level than before the GFC.[10] World gross capital flows also peaked before the GFC. They have since remained at a significantly lower level but have been more volatile (Obstfeld, 2021).

[9] These correlations need to be positive and significantly different from zero to indicate cross-border financial integration and the closer to the limit of one, the higher the degree of the integration is likely to be.

[10] This is based on the Chinn and Ito (2006) *de jure* index reported by Obstfeld (2021) for industrial, emerging market and less developed countries from 1970 to 2018.

There is some evidence indicating that the effects of the global financial cycle on SOFIEs have become stronger after the GFC. As an example, recent studies looking at the total distribution of capital flows suggest that push factors (global financial cycle) are affecting EMEs more strongly in recent years. This seems to be partly attributable to the increase in the role of market-based finance in capital flows.[11] EME fundamentals have, however, improved since before the GFC. It is against this background that Mark Carney wrote in 2019 that "fast reforming EMEs could be running to stand still in their quest for higher sustainable capital flows" (Carney, 2019).

### *(v) The case for policy interventions*

History has shown that the interaction of volatile capital flows and disorderly exchange rate dynamics with domestic financial vulnerabilities can result in a financial crisis if it is left to run its course in the absence of policy interventions. In a nutshell, the process in an individual economy starts from a surge in capital inflows that leads to the appreciation of the exchange rate, increases credit growth, and lifts asset prices. The process is reinforced by balance sheet amplification mechanisms and feedback loops. The result is the accumulation of systemic risk and macroeconomic imbalances that may become unsustainable but are initially not perceived to be problematic. Shifts in expectations caused by an external shock and/or the increasing visibility of financial fragility and macroeconomic imbalances can reverse the process with capital outflows and a currency depreciation that through amplification mechanisms and feedback loops, ends in a full-scale financial crisis followed by an economic recession. The case for policy responses that aim to avoid this scenario is, therefore, strong.

In the final analysis, the case for policy responses in this area is based on market failures where individual agents do not take the aggregate effect of their actions on macroeconomic and financial stability into account.[12] The implication is that all individual policy interventions and the overall policy mix should, in principle at least, meet the criteria of adding to net expected future welfare. The chosen policy package should ideally be the one that maximises net expected future social welfare. This, however, tends to take the form of risk management rather than explicit maximisation when uncertainty about the situation and the effects of policy instruments is high. The next section will discuss what these policy responses might be.

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[11] Refer to Part 1 of this report for discussions.

[12] Korinek (2011) provides a welfare economic rationale for capital controls.

## C. Policy Options

The optimal policy response to the stability challenges explored in this paper will vary between economies depending on the depth and level of development of their financial markets. It will also depend on the degree of those financial vulnerabilities that are particularly relevant in the case of cross-border financial integration and volatile capital flows. The optimal policy response will therefore vary between AE and EME SOFIEs and within these groups. For most EMEs and at least some AE SOFIEs this does not, however, undermine the validity of the statement that with completely free capital movements and a freely floating exchange rate, it is not sufficient to only use "old orthodoxy" (pre-GFC) instruments for preserving macroeconomic and financial stability. An adequate response to these challenges has to involve a departure from inflation targeting monetary policy with the policy interest rate as almost the only tool, micro-supervision and "let the markets do the rest". Furthermore, a floating exchange rate is not sufficient for "safe" monetary policy independence. This implies that more instruments and reformed policy frameworks are needed compared to the pre-GFC orthodoxy for SOFIEs to be better placed to deal with the shocks, the complexities and the difficult trade-offs involved.

It is useful in this connection to distinguish between three types of policy responses. The first is structural reforms and other measures aimed at increasing resilience to shocks, reducing domestic financial vulnerabilities, and increasing the capacity of economies to absorb capital flows without the need for short-term action by economic and financial authorities. The second is exchange rate arrangements. The third is the addition of tools and better use of existing tools for shorter-term management of macroeconomic and financial stability. The time dimensions of these three types of policy responses are different. Building resilience and absorptive capacity are longer-term measures, both because they take time to implement and because their effect is long lasting. Exchange rate arrangements are usually not changed frequently. Stabilisation tools, however, operate in a cyclical or higher frequency domain. These three types of policy responses are discussed in turn in the next three sub-sections.

### *(i) Structural reforms, resilience, and institutional strength*

Various factors that make macroeconomic management to be able to deal with capital flows and exchange rate volatility without putting financial

stability at risk, fall under the heading of this sub-section. Among those are measures to develop deeper and more efficient domestic financial markets, the accumulation of adequate buffers (e.g., FX, bank capital and liquidity), management of space for fiscal and monetary policies to mitigate adverse shocks, hard-wired prudential rules that limit financial vulnerabilities (e.g., limits on currency mismatches and maturity mismatches in FX), and robust micro-prudential rules. Institutional strength is also important for good management of the challenges arising from cross-border financial integration, in particular, independent and properly resourced central banks and financial supervisory institutions.

Developing local currency bond markets is a good example of a relevant structural reform. Deeper and more efficient markets have generally more capacity to facilitate the adjustment to shocks and are better in assessing, allocating and mitigating risk. In the case of financial markets, this will reduce systemic risk, increase the capacity to absorb capital flows and decrease currency mismatches. EMEs have therefore been advised to develop such markets. While such reforms are certainly a step forward, they are not a panacea. Unhedged foreign investments in local currency bonds can still create unwelcome swings in the exchange rate and in domestic financial conditions. Furthermore, there is an element of the double-edged sword in that deeper and faster moving markets could increase the volume and volatility of capital flows when there are sudden shifts in expectations.

There was significant progress on structural reforms and the building of resilience among EMEs after their crises of the 1990s and again after the GFC. However, structural reforms often take time to implement and deliver their benefits. Furthermore, EMEs cannot change themselves into AEs overnight and there are limits to how deep FX and other financial markets can be in small economies. The need to use additional macroeconomic and financial stability tools will therefore remain part of such reforms. There will still be a need for a multitude of higher frequency instruments and the development of policy frameworks around them.

### *(ii) Exchange rate arrangements*

Capital account liberalisation in the decades leading up to the GFC made it more difficult to maintain pegged exchange rates. As a result, there was a shift away from such pegs, mostly towards flexible exchange rates, but among EU

countries towards a monetary union.[13] The stability challenges from cross-border financial integration that are discussed in this paper give, however, a cause to revisit this issue. It is at least clear that a freely floating exchange rate might not be the best option for SOFIEs. A good case can be made that a better option, at least for most EMEs and some of the smaller and more vulnerable AE SOFIEs, would be a managed float where various policy tools are used with the aim to keep the exchange rate aligned with fundamentals and to avoid it becoming a shock amplifier. The optimal degree of exchange rate management will vary from time to time and between economies, depending among other things, on their size and the level of financial market development.

There are in principle alternative exchange rate arrangements for SOFIEs other than a flexible exchange rate in the free or managed form. These include an entry into a monetary union, unilateral adoption of another economy's currency, or pegging to such a currency. The pegs can take various forms that affect their credibility and the perceived risk that they could be discontinued. In that connection, it matters whether the pegs are unilateral or bilateral and whether there are enhanced commitment mechanisms attached to them or not.

From the vantage point of this paper, which is the macroeconomic and financial stability risks associated with cross-border financial integration and volatile capital flows, a monetary union is a better option than a peg due to its multilateral nature, common safety nets and higher probability of durability. There are, after all, several examples in relatively recent history where broken exchange rate pegs have been the trigger of a severe financial crisis. Unilateral adoption of another currency has been less frequent and so far, less tested, but the risks with having banking systems without a lender-of-last-resort can hardly be overlooked.

For a SOFIE that enters a monetary union that is at the same time its biggest trading partner, excess exchange rate volatility and currency mismatches will become much less critical. A monetary union has, however, wider pros and cons that will not be discussed here. Furthermore, apart from SOFIEs on the

[13] Some economies succeeded in maintaining their pegs, such as Denmark against the Deutsche mark and later the euro and the Hong Kong dollar against the US dollar, but required large FX reserves and in the case of Denmark, a special arrangement with the European Central Bank.

periphery of the euro area, most SOFIEs around the world do not currently have this as a realistic option within a reasonable time horizon.

For the reasons presented above, the case of a monetary union or various fixed exchange rate arrangements will not be considered further in this paper.

### *(iii) Stabilisation tools*

The tools considered here include those generally used for shorter-term stabilisation of the macroeconomy by minimising deviations of actual output from potential and inflation from target, and by minimising deviations from external equilibrium (exchange rate aligned with fundamentals and sustainable current and capital accounts of the balance of payments). This excludes measures taken to affect the supply side of the economy or income distribution. These are usually more long-term and have a less clear relationship with destabilising capital flows or adverse exchange rate dynamics that are the focus of this paper. Also included here are tools that are aimed at keeping deviations from financial stability at bay and tools that affect capital flows or the exchange rate more directly.

Stabilization tools for macroeconomic management include fiscal policy, monetary policy and macroprudential policy, along with the use of foreign exchange reserves and capital flow management measures. The first three are usually assigned to specified goals such as balanced growth with sustainable full employment in the case of fiscal policy, price stability in the case of monetary policy and financial stability in the case of macroprudential policy. The use of foreign exchange reserves and CFM can, depending on context, both be used for macroeconomic stabilisation and financial stability. In relation to the topic of this paper, what matters is the degree to which these tools could and should be used to deal with the stability challenges created by cross-border financial integration. We would generally expect that the best contribution of individual tools is to deliver on their primary goals. In special situations and/or due to the interactions of the tools, that might not always be the case. This, in turn, gives rise to the possibility of temporary diversions of tools from their primary goals. That can be justified if there is an overall net benefit from doing so and other tools are not available that can be used without putting important goals at risk. In what follows, we analyse how these tools could be used to limit deviations from assigned macroeconomic and financial stability goals and tackle the stability challenges from cross-border financial integration.

Both fiscal and monetary policies play key roles in macroeconomic stabilisation, each on their own and in their interactions. The mix of these two policies can, as such, have important effects on capital flows and macroeconomic stability, and it matters whether these two arms of macroeconomic management are pulling in the same direction or are in conflict.

An example of an inferior policy mix is when policy rates are raised to prevent inflation from increasing above target due to a positive output gap, and foreign investors interpret the higher interest rate differential as a profit opportunity rather than increased risk. This then leads to more capital inflows that put upward pressure on the exchange rate and downward pressure on market interest rates, which blunts the transmission of monetary policy across the yield curve. The exchange rate appreciation is helpful in holding inflation down in the short-term, but the risk is that it will be reversed in a disorderly process going forward when risk perceptions turn. This is an example of how cross-border financial integration can weaken monetary transmission through the interest rate channel, which blunts the intended effect of monetary policy. In this case, a better outcome is likely to be achieved if fiscal policy is used to lower aggregate demand, thus reducing the need to tighten monetary policy.

An outright policy conflict would arise if the fiscal policy stance was loosened at the same time as monetary policy needs to be tightened. In that case, monetary policy would need to do more than otherwise, and the process described above would become more pronounced and riskier. As a result, investor confidence may reverse down the road, with more serious consequences for macroeconomic and financial stability.

The above examples underline what history has repeatedly shown, that conflicts between fiscal and monetary policy can be risky. The problem is, however, that fiscal and monetary policies are, largely for good reasons, managed by separate governance mechanisms. Fiscal policy cannot therefore be easily included in an integrated policy framework where the use of all the relevant instruments is decided jointly. The stakes are, however, so high that it is important to try to avoid policy conflicts involving fiscal policy. This requires at least information sharing and policy dialogue.

Macroprudential policy is one of the additional instruments if compared with the pre-GFC prevailing orthodoxy. Several of its tools have, however, been

around for much longer and been used earlier by EMEs than even by AEs. The distinction between the macroprudential and microprudential spheres is not always sharp in small economies - for instance, the soundness of a few systemically important banks can be crucial for macro-financial stability, and flaws in key microprudential regulations can have macro-financial implications. Furthermore, there is a distinction between more permanent settings of certain macroprudential tools that are part of the resilience considered before in this section and macroprudential tools with variable setting that are considered here as part of stabilisation tools.

Good macroprudential policy will mitigate the risks from volatile capital flows and disorderly exchange rate dynamics by leaning against the financial cycle and preventing the accumulation of financial vulnerabilities. Examples of this are the use of macroprudential tools that indirectly reduce capital inflows and the tightening of variable prudential limits during a capital inflow surge. Macroprudential policy can also have a beneficial interaction with monetary policy, which, in turn, helps to deal with the stability challenges of cross-border financial integration. One example of this is a tightening of prudential limits in the housing market (e.g., debt service to income, debt to residential property value and debt to income ratios), which lowers house price increases that feed into inflation measures and therefore allows policy rates to be lower than otherwise. Macroprudential policy and monetary policy can, of course, pull in different directions, sometimes for good reasons.[14]

The use of foreign exchange reserves and CFMs are, like macroprudential policy, also part of the additional instruments when compared to the pre-GFC prevailing orthodoxy and also have a long history of being used by EMEs and before by AEs. As these are not strongly assigned to a particular goal and can be used in an on-off manner, they can be used to support other tools that have a primary assignment, mitigate the effect of policy conflicts and in the absence of other instruments to deal directly with capital flow surges and bad exchange rate dynamics.

[14] Bean (2015) provides the example of a beneficial supply shock where monetary policy needs to be loosened to balance aggregate supply and demand, and macroprudential policy tightened to lean against a potential credit boom.

The use of foreign exchange intervention includes the buying and selling in the FX market and operations with financial institutions that bypass the market in the first round. The former is traditional sterilised foreign exchange intervention (FXI) conducted to affect the exchange rate or address disorderly market conditions. The second can take various forms and is more likely to be implemented for financial stability reasons. An example of this is FX lender-of-last-resort (LOLR) lending by central banks to domestic banks that are unable to roll over their short-term FX liabilities during crises. FXI can be used to mitigate the effects of temporary balance of payments shocks, whereas the rule is to adjust to long lasting ones. FXI can mitigate the effects of capital flows on domestic financial conditions. Views on the use of FXI have shifted considerably in recent decades and it seems to have become widely accepted that it is one of the potential tools for managing the stability challenges from cross-border financial integration in SOFIEs. FXI has its limits, especially in the case of outflows. The same applies to FX lending to domestic banks. In both cases, the size of FX reserves and the ability to acquire FX through borrowing or swap lines will be a binding constraint.

CFMs are, in this paper, defined as measures that directly affect the volume or composition of capital flows, either through outright restrictions of particular flows or through influencing the expected payoff to investors in the case of inflows (e.g., taxes or non-remunerated reserve requirements).[15] CFMs can certainly be rather forceful interventions, especially on the outflow side. Targeted inflow CFMs can, however, be designed in relatively market friendly ways that make them far removed from full scale capital controls. That is probably more likely to be the case if they are price-based rather than quantity-based.[16] There will still be economic costs associated with such measures as with most other policy interventions. As with other public actions, particular CFMs should not be implemented except if the expected benefits outweigh the expected costs. The details of the design will matter in this regard, especially that the CFMs are well targeted at the particular problems they are meant to solve and are reversed when temporary ones are overcome. This does not exclude preventive and more permanent CFMs, subject to the same principle of assessment of expected net benefits.

[15] It depends on the forcefulness and design of CMFs as to what degree they affect the overall volume of capital flows versus the composition. Some studies suggest that targeted inflow CFMs affect mostly the composition, which can still be important in reducing financial stability risks from such inflows.

[16] Box 7 in Part 1 of this publication reports that market participants had expressed their preference for price-based rather than quantity-based CFMs.

The same applies to the alleged costs of CMFs, net benefits of capital account liberalisation and the costs of outright capital controls have been proven difficult to validate in empirical studies but they are generally perceived to be substantial. Furthermore, there are case studies suggesting net benefits in particular situations.[17] More work is needed in this area, but in the meantime, policy makers should not shy away from using such tools in situations where the case for net benefits is strong. But at the same time, we should be careful to ensure that such tools are not more intrusive than necessary.

Let us take two examples to demonstrate how FXI and CFM can help in dealing with the stability challenges of cross-border financial integration.

The first example is related to the one that was discussed before, where there is a need to restrain aggregate demand and fiscal policy is either not helping or is actively going in the other direction, with the additional concern that the exchange rate is becoming overvalued. There is of course the option of diverting monetary policy from its primary goal and that it is not tightened sufficiently to preserve internal equilibrium, but this is an inferior option for the reasons discussed earlier. In this case, FXI could be used to lean against further appreciation and mitigate the effects on domestic financial conditions that might otherwise result in increased systemic risk. CFM could, of course, also be used for this purpose or FXI and CFM could complement each other. Since FXI can be used at short notice, whereas CFMs often need designing or an activation process that might include other authorities than the central bank, then there is a case that FXI should be considered first. FXI, however, has its limits and can become costly in the case of inflows and with a positive interest rate differential with the rest of the world. Furthermore, going too far in facilitating through FXI and the entry and exit of carry trades, raises issues of moral hazard and social justice and can induce bigger flows in the future.

The second example is one where there is an inflow surge at the same time as the economy is at the risk of overheating, the exchange rate becoming overvalued, foreign exchange reserves are already ample and fiscal policy is already countercyclical. In this case, the policy rate should not be cut to deter inflows, exchange rate appreciation is risky and FXI too costly. Here CFMs could be helpful. This is the classical example of the IMF's Institutional View (2012) or IV1 on a case where the use of CMFs would be advisable.

[17] See case studies in Box 5.1 of Part 1 and Box 9.

This section has so far presented a menu of policy options to deal with the stability challenges of cross-border financial integration. In the next sub-section, we explore what has been picked from this menu by individual economies.

### *(iv) What options have been chosen?*

Most economies expanded their toolkit for preserving macroeconomic and financial stability after the GFC. The most significant part of that was due to the international effort to improve prudential regulation of the financial sector and develop macroprudential policies. This was largely driven by the need to heed the lessons from the financial crisis regarding how to regulate the banking system and manage the domestic financial cycle. These reforms help to deal with the stability challenges arising from cross-border financial integration by building resilience and containing systemic risk. Furthermore, economies that are more exposed to capital flows and FX risks have, under the umbrella of these reforms, introduced specific regulations pertaining to them (e.g., liquidity coverage ratios, or LCRs, and net stable funding ratios, or NSFRs, in FX, and limits on FX lending to unhedged borrowers).

The big picture of how individual economies deal with the stability challenges arising from cross-border financial integration varies in ways that are broadly consistent with their structural characteristics. Big AEs and several AE SOFIEs have opted to live with them by sticking mostly to freely floating exchange rates and abstaining from using CFMs. Some AE SOFIEs have, however, used FX interventions more actively in the recent period, but in some cases at least, that was intended to deliver their preferred monetary stance (e.g., Czech Republic and Switzerland) rather than due to concerns about the financial stability risks of large and volatile capital flows. EMEs have been more active in using FXI and CFMs. Let us look at that more closely.

In 2020, the BIS published a report by a working group on capital flows, exchange rates and policy frameworks in emerging Asia based on questionnaires to central banks.[18] In 2021, it published a similar report for Latin America, South Africa, and Turkey.[19] The reports show that central banks in EMEs are all reacting to the stability challenges arising from large and volatile capital flows and are using most of the tools surveyed in this section. All are using macroprudential tools, including in many cases those that are directed at FX related risks. Macroprudential policy tools are mostly assigned to financial stability. Most central banks have actively used FXI and stand ready to do so in the future. FXI is generally not intended to affect the level of the exchange rate but to mitigate excessive exchange rate volatility and preserve orderly market conditions. There is more variation when it comes to CFMs that are reported to have been more commonly used by Asian EMEs than EMEs in the other report.[20] The economies that are classified as AEs in these reports (Australia, Canada, and New Zealand) do not use CFMs and rarely intervene in foreign exchange markets.

A 2019 report by an ASEAN Working Committee on Capital Account Liberalisation described how four ASEAN economies (Indonesia, Philippines, Malaysia, and Thailand) had dealt with stability challenges arising from large and volatile capital flows. The report confirms in the case of these four economies, the readiness to use additional tools labelled as "conventional" (e.g., fiscal policy, monetary policy, exchange rate flexibility and FXI). This includes macroprudential measures and capital flow management measures.

[18] See BIS (2020). The monetary authorities represented in the working group were those of China; Hong Kong, China; India; Indonesia; Republic of Korea; Malaysia; Philippines; Singapore; and Thailand. Those of Australia, Japan, and New Zealand were observers representing the viewpoints of AEs. Five of those are included in Appendix 1 (Indonesia, Malaysia, New Zealand, Philippines, Singapore, and Thailand), but there Singapore is classified as an AE in line with IMF WEO classifications, and so is Republic of Korea (which is not included in Appendix 1).

[19] See BIS (2021). Central banks represented in the working group were those of Argentina, Brazil, Canada, Chile, Columbia, Mexico, Peru, South Africa, and Turkey. Three of those are included in Appendix 1, namely Chile, Columbia, and Peru.

[20] Three out of nine classified EMEs in the Asian report acknowledge using CFMs for managing external stability. Looking at the other six, one can see economies that still have not liberalised their capital account (China) and others that have used CFMs in the past. In the other report, only Argentina currently uses CFMs.

In this connection, the report is critical about the inflexibility of the IMF in this area.[21] That is what we turn to in the next section.

## D. The Role of Multilateral Treaties and Organisations

Economies might be restricted in using CFMs due to international or regional obligations that they have committed to. Examples of this is the free movement of capital rule in the European Union single market, which extends to a few other European countries through the Treaty of the European Economic Area, and the OECD Code for Liberalisation of Capital Movements (OECD, 2022). Multilateral treaties that aim at free movement of capital tend to have escape clauses that allow deviations from the rule under certain conditions, such as a balance of payment crisis. Usually, these deviations require the formal approval of the other partners to the treaty. The OECD Code is a partial exemption from this, as certain measures relating mainly to short-term capital movements can be taken immediately by the country involved but are required to be subject to a peer dialogue that provides transparency and accountability.

The IMF plays an important role as an economic adviser to its member countries. Free movement of capital, however, is not part of its Articles of Agreement (IMF, 2020a) and the members are, therefore, not under obligation to follow its advice in that area.[22] The exemption to that is if the use of CFMs is deemed to be in breach of other Articles that bind the members, such as on the unfair manipulation of exchanges rates.[23] But CFMs should not be special in this regard as the same should apply to other instruments that individually or in combination are used for such manipulation.

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[21] Refer to ASEAN (2019). Everaert and Genberg (2020) analyse IMF advice on capital flows and report on the views of policy makers in Korea and three ASEAN countries (Indonesia, Malaysia and Thailand). The application of the IMF's Institutional View (2012) is seen to be too inflexible and CFMs should become an integral part of the toolkit. AMRO (2022) provides a more recent assessment from the region and expresses similar views. All these reports were written before the review of the IMF's Institutional View at the end of March 2022.

[22] Article VI (3) states: "Members may exercise such controls as are necessary to regulate international capital movements."

[23] Article IV (1) states that "each member shall … avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain unfair competitive advantage over other members."

The dialogue between the IMF and its members is important and is often fruitful in terms of improving policies aimed at preserving macroeconomic and financial stability in individual countries. It matters in that connection that the countries receiving the advice generally see it as well grounded and helpful, even if they might disagree with individual proposals. It is, likewise, important that the entire membership feels that IMF advice is even handed, which means that truly similar cases are not treated differently.

These concerns were behind the 2012 adoption by the Board of the IMF of the Institutional View (IV) on the Liberalisation and Management of Capital Flows (IMF, 2012) at the same time as it, at least partly, reflected analytical advances regarding the stability challenges of capital flows and how to deal with them. In a nutshell, regarding capital inflows, the 2012 IV accepts the use of CFMs when an inflow surge has been identified (no prevention) and other more traditional instruments (policy interest rate, exchange rate and FXI) are not available. CFMs should not substitute for warranted economic adjustment and policies. It was also seen to be useful in certain situations to safeguard systemic financial stability or buy time for macroeconomic adjustment.

Although the 2012 IV was a step forward, it fell behind analytical developments in subsequent years and came under criticism for being too inflexible and incompatible with a truly integrated policy framework that the IMF has been working on.[24] It was also seen to be a bit problematic that IMF and OECD advice in this area were, in some cases, in conflict (see Box 9 for a case study). The IV was revised in March 2022 (IMF, 2022). The main changes are, again in a nutshell, that preventive use of CFMs is now accepted under certain conditions (e.g., debt inflows in the presence of currency mismatches) and the exclusion of certain measures that are related to international cooperation from IMF surveillance based on the IV.[25]

[24] Before the review of the IV, the Independent Evaluation Office of the IMF (2020) was critical regarding the compatibility of the IV and IPF. Honohan (p. 25, 2020) writes in a diplomatic language: "If the IV must thus be interpreted as indicating a lexicographical preference for other measures over capital controls, it will sit uneasily with advocates of a more integrated policy approach."

[25] National or international security, implementation of internationally agreed prudential frameworks, anti-money laundering (AML), countering financing of terrorism (CFT), and international tax cooperation.

The IMF's Institutional View in 2022 or IV2 (IMF, 2022) is certainly a step forward but time will tell how big and to what degree it deals adequately with the criticism that was directed at the IV1 (IMF, 2012). The issue about its compatibility with an integrated policy framework seems to remain, but the elements of such a framework are discussed in the next section. The bottom line is that critical analysis and policy advice of the IMF are very valuable, especially if they are based on the concrete situation and are helpful in the sense that truly better options are proposed when CFMs used by countries are criticised.

**Box 9: Special Reserve Requirement on Capital Inflows into Interest-Bearing Financial Assets in Iceland 2016-2019**[26]

*(Már Guðmundsson)*

The Central Bank of Iceland activated on 4 June 2016 a special reserve requirement (SRR) on capital inflows into domestic bonds, bills, and high yielding deposits. The SRR was 40%, un-renumerated and had a holding period of one year. This implied that expected returns on investments of foreign currency funds in Icelandic currency interest bearing financial assets were reduced, and significantly more so for investors with short horizons.[27]

The SRR was a currency-based capital flow management measure (CFM) and did not discriminate based on residency, although in practice it most probably affected foreign investors disproportionally. It applied to investments in domestic currency interest bearing assets of foreign currency funds that were exchanged to Icelandic krónur for this purpose at a domestic bank. Given the then capital control mechanism, this was the only way for such funds to be invested in domestic currency interest-bearing assets.

[26] For details on the SRR and analysis of its effects, see Central Bank of Iceland (2016) and Guðmundsson (forthcoming, 2023).

[27] In June 2016, the interest rate differential of 10-year Icelandic government bonds vis-à-vis a 50-50 weighted portfolio of US and German bonds of the same maturity was 5.4%. Over a one-year horizon, the SRR reduced the effective interest rate differential to 3.2%, but to only 4.9% over a five-year horizon.

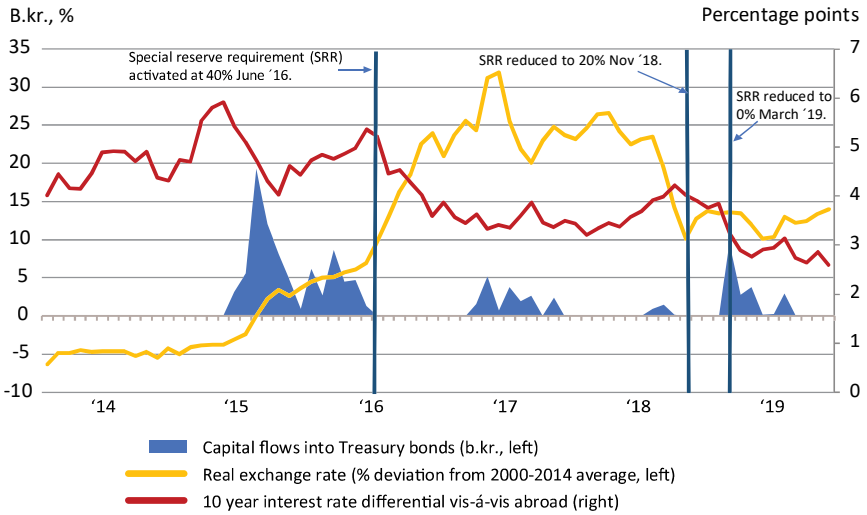
The main reason for activating the SRR at the time was the perceived risk to the orderly lifting of comprehensive capital controls, which were imposed in 2008 as part of the crisis measures under the IMF programme. The strategy of lifting capital controls had three stages. The first was dealing with potential capital outflows associated with the resolution of the estates of the failed banks. That was successfully carried out in 2015 and early 2016. The second was to reduce and release the big carry trade positions that had accumulated in Iceland prior to the financial crisis of 2008. Big measures on that front were implemented around the time of the activation of the SRR. The third step was to lift capital controls on domestic households and companies that was mostly carried out in the second half of 2016 and early 2017. New carry trade positions had begun to accumulate in late 2015. The concern was that it would upset the sequencing of the strategy that was based on the premise of reducing potentially volatile foreign positions in anticipation of the lifting of capital controls on residents. In addition, the SRR was helpful in dealing with the macroeconomic challenges at the time, which were the risks of overheating and an overvaluation of the exchange rate.

The SRR had a strong effect on the intended inflows and averted the risks to the capital flow liberalisation strategy. Furthermore, it strengthened the transmission of monetary policy through the interest rate channel, which helped to avoid the risks of overheating and overvaluation of the exchange rate. It was deactivated in two steps in late 2018 and early 2019 (**Figure B9**).

The management and staff of the IMF opposed the use of the SRR on the grounds that there was no capital inflow surge and the IV at the time did not accept preventive CFMs.[28] The Board of the IMF was less critical and the OECD in its surveys in Iceland was supportive. It clearly helped in that regard that the SRR did not substitute for warranted economic adjustment and policies but on the contrary facilitated them.

[28] Guðmundsson (forthcoming, 2023) argues that there actually was a capital inflow surge, and that the assessment of the IMF staff was flawed in the sense that it did not take structural breaks into account.

**Figure B9: Government Bond Market Inflows (Gross), Interest Rate Differential, Real Exchange Rate and the Special Reserve Requirement (January 2014 - December 2019)**




*Notes:* Interest rate differential is the spread of 10-year Treasury bonds for Iceland versus equally weighted Treasury bond yields for the US and Germany. Real exchange rate relative to consumer prices (15-year average, 2000-2014).
*Source:* Central Bank of Iceland.

## E. Elements of an Integrated Policy Framework

In this section, we discuss the elements of an integrated policy framework for SOFIEs that have a flexible exchange rate regime and aspire to have some degree of independent monetary policy. Except for the bigger AE SOFIEs, it is likely to be an important aspect of the framework that the exchange rate regime is a managed float where tools are used with the aim of limiting deviations of the exchange rate from the equilibrium rate.

The tools considered are those that are assigned to central banks and financial regulators and supervisors. This excludes fiscal policy, but its importance was discussed in Section D. The reason is our initial assumption that the tools are used as if they were in the hands of a single policy maker that attempts to combine the tools in an optimal way. That is not realistic if fiscal policy is part of the policy mix. In this case, the goals are, arguably, financial stability and

monetary stability rather than overall macroeconomic stability that would require the help of fiscal policy.

The relevant tools are those of monetary policy (policy interest rate, the use of the domestic currency part of central bank balance sheets and reserve requirements that are not CFMs), MPMs, FXI and CFMs. We take the structural characteristics of economies, the level of development of financial markets and microprudential regulation and supervision as given, but changes in these are likely to affect the optimal calibration and combination of tools as they affect the relevant financial vulnerabilities and systemic risk as discussed in Section D. We further assume that there are no legal impediments to the speedy use of these tools when they are needed. Such impediments are probably most likely in the case of CFMs. There might, therefore, be a case for those economies that are more likely to need such tools to have a few legally enabled CFMs on the shelves, which could be quickly activated.

In a fully integrated policy framework, there are no *a priori* restrictions on the use of individual tools. Calibration and the combination of tools depends on the context that is revealed by careful analysis of the concrete situation and the assessed efficacy, side effects and interaction of tools. There is, in principle, a contradiction between this approach and that of the IMF IV which restricts the use of CFMs to particular predetermined conditions.

Accumulated experience and research will inform the calibration and combination of tools in the integrated policy framework. We are, however, still far from having the knowledge to be able to formulate robust policy rules for the multitude of tools that can cover all contingencies.[29] This might argue for an institutional solution where goals are set, tools are assigned, policy committees are set-up, and analytical support is provided. Then there would be a learning curve to climb with dynamic interactions between domestic policy makers, international organisations, and the academia.

[29] Even within the past simple monetary policy frameworks that proved difficult as witnessed by the addition of quantitative easing and deviations from simple Taylor rules.

The IMF has done valuable analytical work in recent years to support the development of its Integrated Policy Framework around the toolset listed above. The main conclusions, based on a theoretical model, a quantitative model and case studies, are summarised in IMF (2020). The most relevant ones from the standpoint of this study are the following:

- Optimal policy combinations depend on the nature of shocks (e.g., real versus financial and temporary versus permanent); country characteristics such as currency mismatches and the depth of FX markets; and initial conditions such as the composition and level of debt.
- There are no *a priori* restrictions on the use of individual tools and their combinations.
- Policy combinations can, depending on conditions, be more effective than using a single tool.
- The appropriate use of MPMs, FXI and CFMs can create greater room for monetary policy to focus on price stability.
- MPMs and inflow CFMs used during normal times can prevent the build-up of risky liability structures.
- Precautionary CFMs on capital inflows can lower risks to financial stability in economies that are vulnerable to sudden stops.
- In a risk-off situation, economies with shallow FX markets should use FXI, CFMs and MPMs in a temporary fashion to stabilise interest rate premia.
- There is some evidence that FXI can encourage the build-up of unhedged FX liabilities.
- The models do not provide a rationale for the use of FXI and CFMs in AEs with deep FX markets and continuous market access.

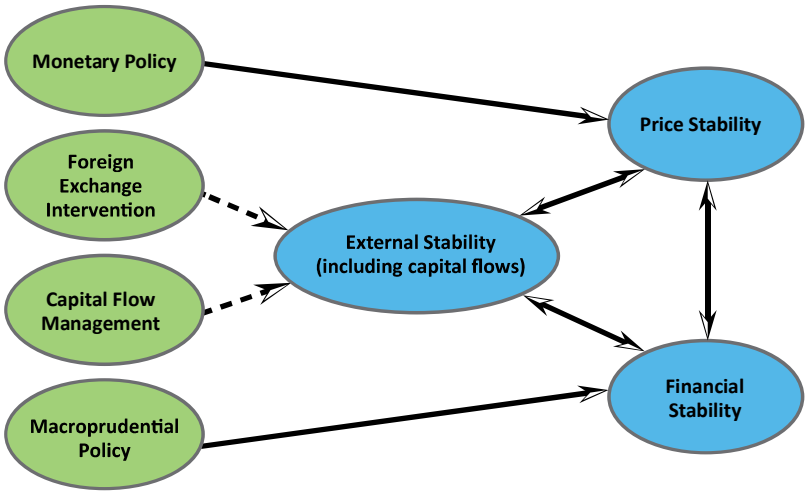
The results of the IMF research amount to a strong case for the use of FXI and CFMs as part of an IPF in EMEs and, possibly, also in smaller AEs with relatively shallow FX markets. There are, however, also words of warnings against the inappropriate use and negative side-effects of such tools in IMF (2022). They should not be a substitute for warranted macroeconomic adjustment or support a misaligned exchange rate. There is a risk that CMFs might become unnecessarily sticky. Communication may become more complicated, which can negatively affect credibility. It might be easier to

build and maintain central bank reputation and credibility when following a relatively simple and transparent approach. There is a need for safeguards against the inappropriate use of such tools.

These points are, as such, correct but in the context a bit misleading as these words of warnings apply to any tool, not only these. Monetary and fiscal policies should not be used as substitutes for warranted macroeconomic adjustment and no tool should be used to support a misaligned exchange rate. The whole point about the use of these additional tools in the context of preserving macroeconomic and financial stability is to try to avoid misaligned exchange rates from turning into shock amplifiers. The issue about a potential stickiness should not be used to deter the use of CFMs when they are highly appropriate. The solution is to counteract the alleged unnecessary stickiness that is avoidable as the case study in **Box 9** shows. The communication challenges are a real issue that needs to be given serious consideration (see below). A simpler framework that ignores the real-world complexities and difficult trade-offs involved is, however, not the solution. Shying away from using additional instruments when conditions require can, as history has shown, contribute to serious financial instability further down the road with long lasting negative consequences for central bank reputation and credibility.

Even if the principle of the IPF models is that there is no *a priori* assignment of individual tools to particular goals, it might still make sense to do so in practice. Some tools have more effect on particular goals than others and for this reason it is likely that the outcome of an unconstrained optimisation will in normal times be closer to the assignment of the type that is shown in **Figure 6.1**. The figure shows a case where monetary policy is assigned to price stability, MPMs to financial stability, and FXI and CFMs to external stability, which in turn feeds into both price stability and financial stability. The restrictions on the use of CFMs in the IV2 are not fully consistent with an IPF approach, but even they might, in many cases, not be binding in normal times. This assignment, however, might in an IPF perspective be somewhat flexible in special cases such as during strong capital inflows and accumulation of systemic risk or during intense risk-off episodes.

**Figure 6.1: Expected Primary Assignment of IPF Tools During Normal Times in SOFIEs with Flexible Exchange Rate**




*Note:* Broken lines for foreign exchange intervention and capital flows management indicate that these tools can be temporarily inactive.
*Source:* Author's elaborations.

This will make communication somewhat easier than would otherwise. The remaining challenges will have to be faced head-on which means that central banks and other relevant authorities should attempt to clearly explain the rationale of their actions, the uncertainties, and complexities they face. It remains a work in progress.

Finally, it should be mentioned that a new framework around an enhanced toolset might call for institutional reforms of central banks and financial supervisors that facilitate integrated policy making. Integrated policy making is more likely to work well if monetary policy, macroprudential policy and financial regulation and supervision are part of a single institution or other mechanisms are in place to ensure close coordination. The same can be said about analytical support and the operational aspects of implementing such policies.

## F. Concluding Remarks

Although cross-border financial integration comes with significant benefits, it is also associated with risks to macroeconomic and financial stability in SOFIEs. These risks have two related sources. The first is the interaction of a weakened transmission of monetary policy through the interest rate channel, a potentially disorderly exchange rate dynamic, and financial vulnerabilities. The second is large and volatile capital flows driven by the global financial cycle, shaped by big reserve currency economies (mainly the US). There is some evidence that these challenges have increased since the GFC, but emerging market fundamentals have at the same time improved.

History has shown that the interaction of volatile capital flows and disorderly exchange rate dynamics with domestic financial vulnerabilities can, in the limit, result in a financial crisis if it is left to run its course by the absence of policy interventions. The case for policy responses that aim to avoid this scenario is, therefore, strong.

The optimal policy response to the stability challenges created by cross-border financial integration will vary between economies depending on the depth and level of development of their financial markets, and the nature and size of their financial vulnerabilities. The optimal policy response will, therefore, vary between AE and EME SOFIEs and within these groups. For most EMEs and at least some AE SOFIEs, this does not, however, undermine the validity of the statement that with completely free capital movements and a freely floating exchange rate, it is not sufficient to only use “old orthodoxy” (pre-GFC) instruments for preserving macroeconomic and financial stability. An adequate response to these challenges will, therefore, have to involve a departure from inflation targeting monetary policy with the policy interest rate as almost the only tool, using only microprudential supervision while “letting the markets do the rest”. This implies that more instruments and reformed policy frameworks are needed for SOFIEs compared to the pre-GFC orthodoxy for economies to be better placed to deal with the shocks, the complexities and the difficult trade-offs involved.

Most economies expanded their toolkit for preserving macroeconomic and financial stability after the GFC, which varies in ways that are broadly consistent with their structural characteristics. Big AEs and several AE SOFIEs have opted to live with them by sticking mostly to freely floating exchange rates and abstaining from using CFMs. Some AE SOFIEs have, however, used

FXI interventions more actively in the recent period. EMEs have been more active in using FXI and CFMs.

The IMF work on IPF and its revision of the IV are welcome steps in the right direction that are based on major research contributions that IMF staff have made to this field since the GFC. It is, however, unclear to what degree the revised IV is flexible enough and consistent with a fully-fledged IPF.

The development of an IPF by the IMF and the authorities in individual economies, remains a work in progress. Furthermore, we are still far from being able to formulate robust policy rules for multiple tools that can cover all contingencies. This might argue for an institutional solution where goals are set, tools are assigned, policy committees are set-up, and analytical support is provided. Then there would be a learning curve to climb with dynamic interactions between domestic policy makers, international organisations, and the academia. It is an exciting task!

# APPENDIX

# PRESERVING MACROECONOMIC AND FINANCIAL STABILITY IN SMALL, OPEN, AND FINANCIALLY INTEGRATED ECONOMIES

## Appendix 1: Indicators of Cross-Border Financial Integration in Selected SOEs

This appendix provides two indicators of the level of cross-border financial integration for a selected group of 15 small, open economies (SOEs), seven advanced economies (AEs) and eight emerging market economies (EMEs). The indicators are correlations of changes in nominal long-term government bond rates with corresponding US rates and the sum of gross external assets and liabilities as a ratio of GDP.

Various indicators of cross border financial integration have been suggested in the literature. Some of them are based on how financial prices are expected to behave due to cross-border financial integration and others on how financial quantities might be expected to evolve. Still others, not used here, look at the degree to which theoretical predictions of the effects of cross-border financial integration show up in reduced home bias in domestic portfolios, lower correlation of domestic saving and investment or lower correlation of consumption and GDP. All these indicators are intended to reflect the degree of cross-border financial integration in the economics sense, which is the strength of the tendency to equalise expected real asset returns.

There are measures of capital account openness that are widely used in the discussion of external financial liberalisation. These are relevant in some context but less so for the topic of this paper. Abolishment of legal restrictions on capital flows is a precondition for almost full financial integration in the economic sense, but it requires in addition harmonisation of some aspects of legal systems and business practices along with a market driven process that over time increases the degree of actual cross-border financial integration.

Price-based indicators are founded on the theorem that full cross-border financial integration implies that expected risk adjusted real asset returns are equalised between any two or more fully integrated markets. The issue is to attempt to measure to what degree that is the case. That process is, however, subject to potentially significant measurement errors. One reason is that good measures of inflation expectations and relevant risk premiums are lacking. To cut corners, we tend to look at correlations of changes in nominal returns on assets with similar maturity and other characteristics, such as long-term government bonds. Volatility of interest rate differentials and country risk premiums will, however, bias this indicator as a measure of cross-border financial integration, but that can be mitigated as in **Table 6A.1** by averaging over longer periods. A potentially bigger problem is that we could, in principle, observe high correlations of changes in nominal long-term interest rates without cross-border financial integration being the main reason, for instance if business cycles are highly synchronised, inflation targets are the same and central banks use similar monetary policies. However, context and case studies can help to assess the plausibility of these correlations as reflections of the degree of cross-border financial integration. If we observe, as we have done on many occasions in recent decades, that business cycles in individual SOEs are not synchronised with the big rate-setting economies, they are at the same time trying their best to follow their own monetary policy, but long-term interest rates continue to be highly correlated and we observe the capital flows that bring that about, then we can be rather confident that the reason is cross-border financial integration.

Quantity-based indicators use the proposition that cross-border financial integration will be associated with higher cross-border capital flows and external assets and liabilities. The data shows that to generally be the case. The advantage of these kind of indicators is that they are more straight-forward to calculate and to interpret than price-based indicators. As an example, the quantity-based indicator in **Table 6A.1**, which is a simplified version of the widely used Lane and Milesi-Ferretti (2018) indicator, uses the ratio of available IIP and GDP. The problem with this and other quantity-based indicators is that there is no clear benchmark of what constitutes a high degree of cross-border financial integration as there is in the case of correlations of asset returns.

**Table 6A.1** shows the two indicators for the selected SOEs listed in alphabetical order. The selection might seem arbitrary, but it is composed of two groups of countries. The first is a group of SOEs (both AEs and EMEs)

that meets regularly at BIS bi-monthly meetings. The second is the ASEAN-5 countries.[30] All these countries had their own currencies during the period covered in the table. All the EMEs are middle-income economies according to IMF WEO classifications. Not all of them, however, were sufficiently financially integrated with the rest of the world to be labelled SOFIEs during the whole period. For example, Indonesia had an insignificant correlation of long-term rates with the US during the 2009-2019 period and a relatively low level of gross IIP. Another example is that Iceland stopped being a SOFIE after the financial crisis of 2008 due to comprehensive capital controls but became so again after they were mostly lifted in 2017. This shows up in the numbers in **Table 6A.1**, with significant correlation of rates in the period of 2000-2007 but none in the 2000-2019 period and with gross IIP relative to GDP collapsing from 11 in 2007 to 2.4 in 2019.

The numbers in **Table 6A.1** reflect the expected higher degree of cross-border financial integration of the AE SOFIEs than the EME SOFIEs. For AEs excluding Iceland, the rate correlation in the 2009-2019 period ranges from 0.5 to 0.8, with a GDP-weighted average of 0.7. The range for gross IIP for AEs in 2019 is 2-20, with a weighted average of 7.4. For EMEs, excluding Croatia and Indonesia, the interest rate correlation for the period 2009-2019 ranges from 0.3 to 0.5, with a weighted average of 0.4. The range for gross IIP for EMEs in 2019 is 2-3 with a weighted average of 2. Although the difference between AEs and EMEs is highly significant, it is more of degree than being qualitative. Thus, the interest rate correlations for the period of 2009-2019 are almost the same for the highest EME as for the lowest AE.

[30] This author was a member of the BIS group of governors from SOEs in the period of 2009-2019 and its chairman for the period of 2017-2019. The discussions in the group made it amply clear that risks associated with cross-border financial integration were not just an issue for EMEs. The ASEAN-5 countries are Indonesia, Malaysia, Philippines, Singapore, and Thailand. Some of these were, during this period, members of the BIS group of governors from SOEs. This author decided to include the whole group as it has sometimes acted together in the debate on how to manage volatile capital flows. See, for instance, ASEAN Working Committee on Capital Account Liberalisation (2019).

## Table 6A.1: Correlations of Long-Term Government Bond Rates with US Rates and Gross External Assets and Liabilities to GDP Ratio

| | Rate correlations | | Gross IIP/GDP | |
|---|---|---|---|---|
| | 2000-2007 | 2009-2019 | 2007 | 2019 |
| Chile[a] | N/A | 0.44** | 2.0 | 2.9 |
| Colombia[a] | N/A | 0.36** | 0.8 | 1.7 |
| Croatia[a] | N/A | -0.03 | 2.1 | 1.9 |
| Czech Republic[a] | 0.46** | 0.46** | 1.8 | 2.7 |
| Denmark | 0.80** | 0.69** | 4.7 | 6.5 |
| Iceland | 0.24** | 0.06 | 11.8 | 2.4 |
| Indonesia[a] | N/A | -0.01 | 0.8 | 1.0 |
| Israel | 0.07 | 0.61** | 2.1 | 2.0 |
| Malaysia[a] | 0.39** | 0.49** | 2.4 | 2.4 |
| New Zealand | 0.83** | 0.76** | 2.5 | 2.4 |
| Norway | 0.77** | 0.81** | 4.6 | 7.0 |
| Peru[a,b] | N/A | 0.28** | 1.2 | 1.5 |
| Philippines[a] | 0.02 | 0.37** | 1.2 | 1.1 |
| Singapore | 0.49** | 0.55** | 19.0 | 20.4 |
| Thailand[a] | 0.39** | 0.37** | 1.5 | 2.0 |

*Notes:* Bond rates: Correlation between monthly changes in 10-year government bond rates. ** = 95% significance. All other correlations are below 90% significance. N/A where datapoints are too few to meaningfully measure correlation with US rates. Gross international investment positions refer to the sum of total assets and liabilities recorded in the IIP in USD relative to current price GDP in USD (as ratio).

a) Starting point of the data set for bond rates is after December 1999: Chile: August 2004, Colombia: February 2003, Croatia: January 2006, Czech Republic: May 2000, Indonesia: September 2004, Malaysia: December 2001, Peru: June 20006, Philippines: August 2000, Thailand: March 2001.
b) 2006 data instead of 2007.

*Sources:* Bond rates: Central Reserve Bank of Peru (Peru), Global economy (Croatia), Investing.com (Indonesia, Malaysia, Philippines, Thailand), OECD (Chile, Colombia, Czech Republic, Denmark, Iceland, Israel, New Zealand, Norway, United States), Monetary Authority of Singapore (Singapore). IMF's International Investment Position access through CEIC Database for data on International Investment Assets and Liabilities and IMF's World Economic Outlook Database, October 2022, accessed February 2013, for nominal GDP in US dollars.

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## Challenges and Options in Managing Capital Flows for Small, Open, and Financially Integrated Economies

This book assesses the evolving trends and impacts of capital flows, particularly portfolio inflows, to SEACEN economies. More importantly, it offers policy insights on managing volatile capital inflows in the broader context of monetary policy objectives and other considerations of small, open, and financially integrated economies, including SEACEN economies. The discussions and empirical findings of this book also provide deeper insights on the evolving complexities of international financial systems and structures, vulnerabilities and risks that arise from volatile financial flows, as well as the rationale for a more robust policy framework. It promulgates the use of a wider set of policy tools to address inherent risks and vulnerabilities of capital flows.

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