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INTEGRATED POLICY FRAMEWORK—PRINCIPLES FOR THE USE OF FOREIGN EXCHANGE INTERVENTION

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INTEGRATED POLICY FRAMEWORK—PRINCIPLES FOR THE USE OF FOREIGN EXCHANGE INTERVENTION

EXECUTIVE SUMMARY

This note guides policy advice on the use of foreign exchange intervention (FXI) as part of the Integrated Policy Framework (IPF) in Fund surveillance. It brings together insights from the conceptual and quantitative IPF models (e.g., Basu and others, 2020, Adrian and others, 2021), with additional considerations from the empirical literature and the practical challenges faced by central banks. This framework allows for the advice to differ with country-specific shocks, frictions, and initial conditions, while ensuring consistency of approach in the surveillance of countries with floating exchange rates.

The IPF provides foundations for a structured approach to policy discussion and advice that is underpinned by an explicit analysis of the frictions that may give rise to financial stress and disruptive movements in the exchange rate. This starts by examining three "use cases" for FXI that are related to the IPF frictions. It also takes account of the costs of using FXI, including those that are outside the models, and explores how other policy tools should be adjusted to arrive at an efficient overall policy response.

The note outlines general principles to guide staff advice on FXI within the IPF as well as principles for the specific "use cases" tied to key IPF frictions: (A) to address destabilizing premia from arbitrage frictions in shallow FX markets; (B) to counter financial stability risks from FX mismatches; and (C) to help preserve price stability when exchange rate changes risk de-anchoring inflation expectations.

The note suggests indicators and analysis to help identify the strength of the friction relevant for each use case, drawing on metrics and other information available to Fund staff and the authorities. Such indicators should not be used mechanically, but to frame and structure the policy discussions. The note also outlines key institutional conditions that increase the likelihood of success of FXI, examines trade-offs in accumulating and spending reserves, and discusses how multilateral considerations can inform the advice.

The purpose of the note is to offer guidance that can put staff advice and policy decisions on FXI on a solid economic grounding, even as considerable judgment is required in deciding whether FXI is warranted in any given situation.

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CONTENTS

Glossary

ARA	Assessing Reserve Adequacy
CFMs	Capital Flow Management Measures
CIP	Covered Interest Parity
DMC	Disorderly Market Conditions
EBA	External Balance Assessment
EMDEs	Emerging Markets and Developing Economies
ELA	Emergency Liquidity Assistance
ESA	External Sector Assessment
FX	Foreign exchange
FXI	Foreign Exchange Intervention
IPF	Integrated Policy Framework
ISD	Integrated Surveillance Decision
IV	Institutional View on the Liberalization and Management of Capital Flows
LC	Local Currency
MCP	Multiple Currency Practices
MPMs	Macroprudential Measures
NBFIs	Non-Bank Financial Institutions
NDFs	Non-Deliverable Forwards
UIP	Uncovered Interest Parity

INTRODUCTION

1. This note guides the advice on the use of foreign exchange intervention (FXI) as part of the Integrated Policy Framework (IPF) in Fund surveillance. The note brings together insights from the conceptual and quantitative IPF models (e.g., Basu and others, 2020, 2023, Adrian and others, 2021), with additional considerations from the empirical literature and an understanding of the practical challenges faced by central banks. It distills principles for staff's advice on the use of FXI and suggests ways of operationalizing these principles to encourage the analysis of frictions and country characteristics, while also integrating the advice on FXI with that on other policy levers within the IPF, in line with IMF (2020b).

2. IPF insights provide the foundations for a structured, frictions-based approach to the advice on FXI. The IPF modernizes the IMF's thinking about policy responses to shocks. IPF models link FXI—and macroprudential measures (MPMs) and capital flow management measures (CFMs)—to underlying frictions and vulnerabilities and examine how they fit into the overall policy framework. In line with the IPF, this note covers the three main frictions—shallow or temporarily illiquid FX markets, unhedged currency exposure of balance sheets, and inflation expectations de-anchoring from high exchange rate pass-through—that may warrant the use of FXI to complement the policy toolkit. For each friction, the note articulates the principle summarizing the key conditions that may justify FXI and suggests indicators and metrics to assess whether these conditions are met. This gives rise to a policy framework rooted in guided discretion, based on indicators and analysis, and requiring judgment in developing the advice drawing on country circumstances.

3. The note also examines how advice on FXI under the IPF can be integrated into the overall policy mix and includes considerations that may caution against the use of FXI. For each friction, the note explores how FXI might complement or be weighed against other available policy options, such as monetary policy and fiscal policy, as well as MPMs, CFMs, and CFM/MPMs, to arrive at an integrated approach to policy advice. This takes account of insights from the available IPF models, as well as considerations outside those models. Finally, the note covers risks from using FXI in countries where there are concerns about central bank independence, credibility, and governance, and sets out how the discussion can be shaped by multilateral considerations based on the existing IMF policy frameworks.

4. The guidance provided in this note does not change existing Fund policies. Under the Integrated Surveillance Decision (ISD, see IMF, 2012b), members *"should intervene in the exchange market if necessary to counter disorderly [market] conditions (DMC),"* thereby taking into account the interests of other members in their intervention policies. The IPF does not replace the ISD, but rather complements it. Correspondingly, countries can—and should—continue to resort to FXI if necessary, in the context of disorderly market conditions. The IPF also sits in the context of other existing IMF policies that remain unchanged (see Box 1).

5. Current practice for the advice on FXI is to appeal to DMC but to interpret this concept flexibly. IMF advice on FXI for countries with inflation targeting regimes has typically leaned towards recommending interventions only in the case of DMC, while otherwise encouraging

Box 1. IMF Policies on FX Intervention

The IPF modernizes the analysis of FXI, but it does not alter the existing Fund policies. Unlike CFMs and CFM/MPMs, which are governed by the Institutional View on the Liberalization and Management of Capital Flows (IV), existing Fund policies impose relatively few restrictions on the use of FXI, which are summarized in this box.

- Article IV, Section 1 (iii) of the **Articles of Agreement** provides that members shall "*avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members*." This obligation limits how FXI and other policy tools can be used by Fund members and the ISD reiterates this (Principle A, Annex).
- The **Integrated Surveillance Decision** (**ISD)**, in its paragraph 21, specifies one condition in which FXI should be used: "*A member should intervene in the exchange market if necessary to counter disorderly conditions (DMC), which may be characterized inter alia by disruptive short-term movements in the exchange rate of its currency*" (principle B, see IMF, 2012b). Importantly, the ISD does not describe when FXI could be used more generally, nor does it preclude the use of FXI in situations other than DMC. Furthermore, the ISD establishes that members should take into account the interests of other members in their intervention policies (principle C), avoid exchange rate policies that result in balance of payments instability (principle D) and seek to avoid domestic economic and financial policies that give rise to domestic instability (principle E). While ISD principles B-E should guide staff policy advice, it is important to note that these principles constitute recommendations rather than obligations of members. A determination by the Fund that a member is not following one of these recommendations would not create a presumption that the member is in breach of its obligations under Article IV, Section 1.
- Article VIII, Section 3 of the Articles of Agreement prohibits members from engaging and allowing their fiscal agencies (as defined under the Articles) to engage in **multiple currency practices (MCPs)** except when approved by the Executive Board (IMF 2022e). Certain FX transactions by the authorities (central banks and governments) that segment the FX market and lead to excessive exchange rate spreads compared with other exchange rates will be assessed under the Fund's policy on multiple currency practices (IMF 2022e) and could give rise to MCPs. Currently MCPs that apply solely to capital transactions (as defined under the Articles) are not subject to Board approval. For the purposes of the MCP policy, FX transactions include the purchase and sale of FX on a spot or non-spot basis (e.g., forwards, options). Where the authorities directly purchase or sell FX, an MCP would only arise where there is FX market segmentation—i.e., where the relevant exchange rate is offered to certain selected market participants or for specific purposes. Other FX transactions by the authorities are outside the scope of the MCP policy.
- The **Institutional View on the Liberalization and Management of Capital Flows (IV)**, and its review (IMF 2012a and 2022a) do not provide broad recommendations on the use of FXI, rather only vis-à-vis the use of CFMs, in particular by specifying conditions under which members should favor other policy options, including FXI, before turning to CFMs. For example, the IV gives preference to reserve accumulation over inflow CFMs to respond to capital inflow surges in an overheating economy with an overvalued exchange rate as long as reserves are not yet adequate (see Figure 3 in IMF 2012a). The IV also notes that outflow CFMs may be used in imminent crisis situations, as can be indicated, *inter alia*, by a rapid decrease of international reserves. The review of the IV enables consideration of CFM/MPMs outside of inflow surges, i.e., preemptively, to address systemic risks from stock vulnerabilities, when MPMs alone are not sufficient and other conditions are met.
- Finally, staff reports under the Article IV consultation require an **external sector assessment (ESA)** informed by the External Balance Assessment (EBA) or EBA-lite methodologies to help evaluate if the external position is in line with medium-term fundamentals and desirable policies (see Guidance Note on Surveillance in Article IV Consultations, IMF 2022d). These assessments can provide context for the analysis of the policy mix under the IPF, such as by determining whether the real exchange rate is over- or undervalued and if the level of international reserves is adequate.

countries to reap the benefits of greater exchange rate flexibility. In practice, staff advice on FXI has interpreted this concept flexibly, however, and often incorporating country-specific conditions and concerns.

6. Both conceptually and in practice, there will therefore be overlap between the advice based on DMC and the advice based on the IPF, even as neither concept subsumes the other. Under each of the IPF use cases elaborated in this note (use cases A, B, and C), the conditions generated by the interaction of the relevant shocks and frictions can be severe enough to constitute disorderly market conditions, creating overlap between DMC and IPF, even as IPF advice does not require a diagnosis of DMC. Disorderly market conditions can also arise from frictions or circumstances that are not well described by the IPF frictions, and these conditions could still warrant FXI under the ISD.

7. Overall, the advice based on the IPF is expected to improve specificity and consistency of the policy advice. The IPF makes more explicit the conditions under which FXI can be useful by elaborating on the range of issues that are relevant to the advice (Box 2). In many cases, this would help substantiate existing policy advice, and could also help further nuance and refine such advice. In providing a structured approach, the framework can also be expected to lead to greater clarity and consistency of the advice across countries.

Box 2. Key Issues for the Advice Going Forward

The frictions-based approach that results from the key insights of the theoretical and quantitative IPF models, as well as other non-modeled considerations, requires asking a sequence of questions to guide the formulation of FXI policy advice. These questions go beyond "are market conditions disorderly?" They can be broadly categorized into questions regarding (i) shocks and frictions; (ii) the policy mix; and (iii) institutions and spillovers:

Shocks and Frictions:

- Does the country exhibit a friction that may warrant the use of FXI?
- Is the shock large enough for the interaction with frictions to cause significant risks to the central bank's price and financial stability objectives?
- Is the shock arising as a result of inappropriate domestic macroeconomic policies?

Policy Mix:

- Is FXI likely to be effective in supporting price and financial stability objectives?
- Are reserves sufficient? What tradeoffs arise in spending reserves?
- What other instruments—including monetary policy, fiscal policy, MPMs, CFMs, and CFM/MPMs— should be part of the policy mix?

Institutions and Spillovers:

- What do governance and communication challenges imply for the advice?
- What multilateral considerations should condition the advice?

Scope

8. This note is tailored to open economies that operate under a floating exchange rate, typically alongside inflation targeting. It assumes that the country's exchange rate is substantially market determined, thereby potentially creating a role for the use of FXI in the presence of frictions, irrespective of whether the economy is considered advanced, emerging, or low-income.[1] The main application is to countries that have an inflation target as the nominal anchor and use variation in policy interest rates to achieve that target, while also having access to other policy instruments to manage frictions, potentially including FXI, MPMs, CFMs, and CFM/MPMs.[2] The principles described in this note may also apply to countries outside of these criteria, but a careful analysis is generally required to understand the conditions and limitations of the case in question.

9. In this context, FXI refers to FX transactions by the central bank or government that affect private FX markets. FX transactions are those where one or more legs of the transaction are settled or denominated in foreign currency. For the purpose of the note, FXI refers to foreign exchange (FX) transactions between the central bank or government and the private sector that have the potential to affect conditions in FX markets.[3] This use (or "definition") of the term FXI does not require a policy intent or policy purpose. However, since the note examines the use of FXI under the IPF, the focus is on the use of FXI conducted for policy purposes. This can involve the outright sale or purchase of FX assets for local currency that affect conditions in FX spot markets, as well as forward and other derivatives transactions that reallocate exchange rate risk between the public and the private sector. It can also involve the temporary provision of FX liquidity to the private sector by way of a loan or swap contract. And it can include transactions by the central bank that aim at accumulating FX reserves buffers to prepare for a future use of FXI.[4]

10. The focus of the note is on sterilized intervention to maintain a distinction with monetary policy. Sterilized FXI avoids changes in short-term interest rates, such as by offsetting or

[1] This entails that the focus is on countries where the de facto exchange arrangement is either "floating" or "free floating" under the Fund's Classification system. Many countries that have a de jure floating arrangement may de facto be neither floating nor free floating.

[2] Although many countries under a floating exchange rate regime have adopted some form of an inflation targeting framework, the insights from this note may also apply to countries with other monetary policy frameworks, such as reserve money targeting that do not have the exchange rate as the nominal anchor.

[3] There is no universally accepted or established statistical definition of FXI. Therefore, this note needs to clarify the meaning of the term FXI for the purpose of the note. The concept offered here aligns with the scope of the IPF, which explores the use of FX transactions that have the potential to affect conditions in private FX markets. Other ways of defining the term FXI could be convenient in other contexts.

[4] While changes in FX reserves are often used as a crude proxy for FXI (Adler and others, 2021), a change in reserves is neither necessary nor sufficient for FXI under this note. For instance, a non-deliverable forward contract does not lead to a change in reserves but is a form of FXI as per the concepts in this note. Conversely, when the government or a state-owned enterprise borrows in FX or receives FX income, and FX proceeds are transferred to the central bank, this will increase its reserves, but does not give rise to FXI under the definition here, unless those reserves are sold by the central bank in private FX markets. The level and change in reserves from such transactions would nonetheless be subject to IMF surveillance, in the context of the External Sector Assessment (see Box 1).

remunerating changes in the monetary base that may be induced by the FXI.[5] Sterilized FX sales or purchases can be effective by temporarily creating a wedge in the uncovered interest parity (UIP) condition that is deemed desirable for policy purposes. Such effects can complement those from use of other policy levers (monetary policy, MPMs, CFMs, and CFM/MPMs) in pursuit of financial stability or price stability objectives.

11. Central banks may use FXI in ways outside of the scope of the IPF and thus this note. For example, in a fixed exchange rate regime, unsterilized intervention is driven by demand, and serves as a monetary policy operation aimed at maintaining the peg. In countries with stabilized arrangements, the central bank chooses to forego the benefits of exchange rate flexibility irrespective of the macroeconomic impact of specific shocks. Some countries at the effective lower bound have used FXI to achieve quantitative easing when employing unconventional monetary policy strategies. Moreover, in countries with less developed financial markets, central banks may intervene for market development or act as market makers by taking in and re-providing FX to the private sector, thereby directly transacting with exporters or importers.[6] They may also conduct agency transactions for the government, e.g., buying the FX the government receives from commodity exports, or from loans and grants, and selling this for the local currency in the local market. While such uses of FXI can be legitimate, they would typically be outside of the scope of the IPF.[7]

12. Modalities of FXI under the IPF can be tailored to frictions, markets, and country circumstances. FX markets can be divided into three segments: (i) the spot FX market; (ii) the derivatives FX market; and (iii) FX funding markets (borrowing and lending FX). These three segments are interconnected and developments in one can affect the others. FXI is often conducted in the spot market, then also directly impacting the size of the central banks' FX reserves. However, as derivative markets have grown in importance, many central banks have started using derivatives such as FX forwards, including non-deliverable forwards (NDFs) that are denominated but not settled in FX, and may then not have an impact on reserves.[8] Operations to support FX liquidity, such

[5] If interventions were not "sterilized," the level of bank reserves would change and this would, all else equal, lead to a change in the interbank rate. The exception is when central banks operate with a floor system, such that the policy rate equals the deposit facility as long as there are excess bank reserves. At the same time, sterilization may not fully offset the impact of FXI on the yield curve stemming from potential changes in risk premia.

[6] If FX transactions are made to accommodate current account transactions, they are less relevant for the IPF. However, these transactions could give rise to MCPs, e.g., if the rate offered is not equally available to all market participants. MCPs can arise more broadly whenever FX is provided for earmarked purposes (regardless of whether it is for current or capital transactions) or not available under the same conditions to all market participants, and thus segments the FX market. See further Box 1.

[7] When an agency sale by the central bank of FX received from the government or a state-owned enterprise is timed to affect conditions in the FX market, such a sale can also contribute to policy purposes and would then be relevant under the IPF. If the FX proceeds received are not sold, and instead lead to an increase in reserves at the central bank, this would not constitute FXI, but can be subject to scrutiny under the ESA (see also Box 1) and inform the multilateral considerations for FXI set out in this note.

[8] See Drehmann and Sushko (2022) and Caballero and others (2022), for a description of global trends in the size and structure of FX markets. For a detailed discussion of the differences between FXI in spot and forward markets, see Chapter 5 in Chamon and others (2019) and Stone and others (2009).

as FX swaps or the provision of emergency liquidity assistance (ELA) in FX, may not involve a transfer of local currency assets for FX assets, since they typically involve a provision of FX assets against a promise to repay that FX at a later date. These operations are nonetheless useful tools in the management of FX liquidity pressures in FX funding and derivatives markets. Such operations may also affect the exchange rate when they relieve FX shortages in these markets.

General Principles

13. Several general principles for the advice on FXI under the IPF are useful to set out upfront. These principles are relevant to all use cases for FXI within the IPF and as such should guide staff's assessment of vulnerabilities as well as the formulation of policy advice on FXI.

Principle 1. Under the IPF, FXI is warranted only in the presence of well-identified frictions that limit the benefits of exchange rate flexibility for macroeconomic adjustment.

14. FXI should only be considered when exchange rate flexibility is associated with costly frictions which can dominate the economic benefits of expenditure switching. These frictions can be time-invariant or emerge temporarily, for example, when liquid markets in normal times turn shallow as liquidity dries up. In the absence of the IPF frictions that are set out in this note (shallow FX markets, FX mismatches, and inflation expectations formation), it will typically be optimal to reap the benefits of exchange rate flexibility. Such flexibility allows for the stabilization of aggregate demand in the face of external shocks via expenditure switching between imports and home-produced goods. These benefits can be larger for economies with excessive current account positions, where a real adjustment to restore external balance may be costly and slow in the absence of exchange rate adjustment. However, when a shock interacts with well-identified domestic frictions to generate economically costly destabilization instead of stabilization, there can be a case in favor of FXI to counter the effect of the shock.

Principle 2. In view of costs from FXI, FXI should be used only if shocks are large, posing significant risks to central bank objectives, and if FXI can be effective in supporting these objectives.

15. In addition to sterilization costs from purchasing and holding FX assets, costs can derive from potentially endogenous reactions of domestic and international agents to the use of FXI by the central bank. It is worth noting that costs from such endogenous reactions are not present in the IPF models (Adrian and others, 2021, Basu and others, 2020, 2023). As a result, the overall costs of FXI may exceed its benefits even in the presence of frictions.

- First, frequent FXI may hinder the development of FX and hedging markets. If the central bank frequently takes positions to fill excess demand or supply in FX, this can reduce private entry into the market, reducing liquidity in the spot market. If the central bank removes two-way variation in the exchange rate, the incentives for the private sector to develop markets to take and hedge exchange rate risk are also reduced.

- Second, the use of FXI to provide insurance against exchange rate risk can create moral hazard, as agents have incentives to expand their FX exposures and to rely on the central bank to mitigate any losses. For instance, the literature finds that following periods of intense FXI, the share of FX debt tends to increase (Kim and others, 2020), while countries with more flexible exchange rate regimes tend to see reductions in FX debt (Csonto and Gudmundsson, 2020).

- Third, the inclusion of frequent FXI in the operational framework can lead to a loss of clarity regarding the primary objective of monetary policy and create confusion regarding the nominal anchor. The potential for a loss of credibility from using FXI may be especially salient when the inflation targeting regime is still young, or the central bank's capacity to communicate is weak. FX purchases may also be read as a signal that the central bank puts weight on competitiveness concerns, or is under political pressure, undermining confidence in its commitment to price stability.

- Fourth, FXI to support exchange rates far from fundamental levels can lead to speculative attacks if reserves are insufficient. FXI generally invites speculative countervailing flows, which can become large when the intervention is seen by market participants as unsustainable.

- Fifth, the use of FXI could invite lobbying and political pressure. When the central bank is seen by the public as engaging in FXI, this can expose the central bank to lobbying on the part of business interests, or political pressure to lean against exchange rate changes even in the absence of frictions.

16. Managing these costs suggests that FXI should be used only when shocks are assessed as large enough to approach the tails of the distribution. Specifically, FXI should be used sparingly and be confined to cases where in the absence of the intervention, shocks cause significant risks to the central bank's price and financial stability objectives. This requires that the shock, such as a widening of uncovered interest parity (UIP) premia or a sharp change in the exchange rate, lies towards the tails of the distribution, thereby triggering frictions in a manner that is likely to cause significant risks to central bank objectives, including adverse macroeconomic impacts, unless appropriate policy actions are taken.

Principle 3. FXI should not substitute for a warranted adjustment of macroeconomic policies.

17. FXI should not be used as a substitute for warranted adjustment of macroeconomic (monetary and fiscal) policies. Where the shock is assessed as being caused primarily by inappropriate domestic policy settings, policy advice should focus first on correcting those domestic policies and thereby restore investor confidence. Correcting those domestic policies may render FXI (and MPMs, CFMs, and CFM/MPMs) no longer necessary to preserve financial sector and price stability. When there is a commitment to such policy correction, but its enactment requires time to be completed, the use of FXI can be a complementary part of the policy package designed to regain confidence. Inappropriate domestic policy settings may arise in several contexts, including the following examples.

- Excessive current account positions, as measured by the ESA. In the absence of exchange rate flexibility or other macro adjustment, the use of FXI may result in adverse FX reserves dynamics while leaving the source of the imbalances unaddressed. The maintenance of an excessively large current account surplus is "beggar-thy-neighbor" and can generate excessively large FX reserves, while the maintenance of an excessively large deficit can deplete reserves and trigger a speculative attack. Policy advice should focus on reducing any domestic policy gaps which account for the excessive current account position, e.g., fiscal expansion and exchange rate appreciation to address an excessively large current account surplus, or fiscal contraction and exchange rate depreciation to reduce an excessive deficit.

- Monetary policy which does not stabilize inflation expectations. FXI should not be used to undo the effects of inappropriate interest rate setting. Instead, policy advice should focus on adjusting the policy rate and, if necessary, repairing monetary transmission mechanisms and designing the appropriate unconventional policies at the zero lower bound.

- Unsustainable public deficits which endanger fiscal sustainability. Instead of addressing the associated foreign investor outflows by depleting FX reserves, policy advice should focus on the fiscal policy adjustments and the reforms of the medium-term fiscal frameworks that are deemed necessary to restore the credibility of the public finances and reduce default risks.

Principle 4. FXI should be integrated within the overall policy response.

18. Even when a case for FXI can be made based on the analysis of frictions, advice should consider the contribution of other policy levers to achieving domestic and external stability. Such levers include adjustments to monetary and fiscal policies as well as MPMs, CFMs, and CFM/MPMs. MPMs and CFM/MPMs may also be appropriate ahead of adverse shocks, either preemptively or in the context of inflow surges. Deploying ex ante policies to reduce vulnerabilities would diminish the need for ex-post FXI. For example, the use of MPMs to contain the buildup of FX mismatches would lessen the frequency and size of FXI needed for financial stability purposes. The IPF advice on the policy mix will depend on the types of frictions that are thought to be important in the given country context, and this can also include structural policies, such as to develop FX and local currency markets—as set out further below. The appropriate use of CFMs and CFM/MPMs is laid out in the IV (IMF 2012a and 2022).

Principle 5. Strong central bank governance and communications are necessary to ensure the success of FXI under the IPF.

19. The benefits of FXI are likely to outweigh the costs only when specific institutional conditions are satisfied. In particular, the operationalization of FXI would require strong central bank governance to ensure legal, decisional, and operational autonomy as regards intervention policies. Moreover, the use of FXI may lead to confusion about the role of the exchange rate and requires the ability to communicate effectively about the use of multiple instruments. On the other hand, the IPF itself can provide the foundations for a strengthening of governance and communication, by helping to elaborate a policy strategy that can both rationalize and constrain the

use of FXI within the overall framework.[9] If the assessment suggests that institutional conditions cannot be met, staff should be more cautious in advising the use of FXI under the IPF.

Principle 6. Countries should consider intertemporal trade-offs in spending and accumulating FX reserves.

20. Since available FX reserves are generally limited, spending reserves today may reduce the ability to respond to shocks in the future. This trade-off arises because it is often difficult to replenish reserves quickly without affecting the exchange rate, while a sufficient level of reserves is needed for FXI to be effective. To address this trade-off, the amount of FX reserves held by central banks should balance country-specific benefits and costs. FX reserve accumulation can boost the credibility of FXI by providing an important signal to the market that the central bank can reach the announced objectives. At the same time, holding FX reserves involves sterilization costs and exposes the central bank to valuation losses. Clear communication of objectives can increase effectiveness of FXI and reduce the reserves that need to be deployed to meet these objectives.

Principle 7. The advice on FXI under the IPF needs to consider its multilateral effects.

21. To ensure consistency with current IMF policy, operationalizing the IPF requires consideration of multilateral spillovers. Countries may engage in FX purchases in part to maintain an undervalued exchange rate and to strengthen the country's international competitive position. Such "beggar-thy-neighbor" policies generate adverse spillovers to other countries and can lead the way to currency wars. To guard against this, staff advice should caution against further reserve accumulation if the following three conditions are met: (i) a country's external position is stronger than the level implied by medium-term fundamentals and desirable policies; (ii) such effects are caused by the country's policies; and (iii) the country is already beyond the assessing reserves adequacy (ARA) metric.

Use Cases and Crosscutting Issues

22. The following sections elaborate on the use of FXI in the presence of each of the IPF frictions, thereby articulating three "use cases" for FXI. These use cases include the use of FXI to counter destabilizing premia from FX market frictions (use case A), to counter financial stability risks from FX mismatches (use case B), and to prevent a potential de-anchoring of inflation expectations (use case C). For each use case, the note presents and explains a principle, suggests appropriate indicators and further analyses, and examines policy interactions. These use cases have commonalities, in that they each improve trade-offs that would otherwise arise when only monetary

[9] For an example of a monetary policy strategy that envisages the use of FXI under specific conditions, see the Bank of Chile's strategy document.

policy was available to deal with shocks ex post.[10] The use cases also differ on important dimensions, however, as summarized in Table 1.

23. Staff should establish the relevance of each use case both ex ante and ex post. Drawing on metrics databases and other information available to Fund staff and provided by the authorities, staff should examine a set of indicators to identify the strength of the friction relevant for each use case before the onset of shocks. Across use cases, exploring nonlinearities and asymmetries in the impact of shocks ex ante can help frame a judgment as to what shocks are large enough to pose risks to central bank price and financial stability objectives.

- For FX premia, assessing FX market shallowness and the sensitivity of credit markets to changes in these premia can help establish the case for FXI. Ex ante, staff should establish benchmarks for financing and hedging premia, monitor structural liquidity measures, foreign investor share in local debt markets, and balance sheet strength of market participants. Ex post, monitoring premia in FX and LC bond markets (such as UIP, CIP, and FX onshore-offshore spreads) and high-frequency capital flows, as well as judging the appropriateness of monetary and fiscal policy settings, will help identify large and potentially inefficient changes in premia.

- Evaluating the FX-mismatch-related financial stability case for FXI should begin by assessing unhedged FX exposures and the extent to which they increase financial stability risks via amplification mechanisms in credit markets (as also discussed in IMF, 2022c). At the onset of the shock, forward-looking indicators—such as credit and funding spreads—can complement an assessment of exchange rate developments in determining whether FXI is needed. The potential for FXI to lead to greater FX exposure (moral hazard) argues for constraining this use case to manage tail risks only.

- To evaluate the case for FXI to support price stability, staff should examine the sensitivity of inflation and inflation expectations to exchange rate movements, including how pass-through may strengthen beyond certain thresholds or may be state dependent. This should be complemented by examining the co-movement between exchange rates and output and output gaps. Staff should also judge the appropriateness of monetary and fiscal policy settings and assess whether the de-anchoring is related to a lack of credibility of the inflation targeting

[10] All the use cases are based on the notion that owing to a combination of specific external shocks and frictions, monetary policy alone cannot stabilize both inflation and output, while FXI can better address the frictions. In the standard New Keynesian framework, where financial frictions are absent and exports are priced in domestic currency, monetary policy can stabilize inflation and the output gap simultaneously (e.g., Gali and Monacelli, 2005). Even before monetary policy is adjusted, an outflow shock (to take an example) may be expansionary if the exchange rate depreciation sufficiently stimulates exports. However, in the presence of financial frictions or adaptive inflation expectations highlighted by use cases A to C, monetary policy alone may not be able to avoid a contractionary depreciation after an outflow shock (e.g., the conceptual and quantitative IPF papers), creating trade-offs close to those that arise from supply shocks in standard models. In case A, the shock is associated with higher FX market premia which curtail external borrowing; in case B, the depreciation causes external constraints to bind which also reduce external borrowing; and in case C, the depreciation de-anchors inflation expectations and necessitates a sharp monetary policy tightening. In these cases, tightening monetary policy to stabilize the exchange rate without resorting to other instruments may increase borrowing costs excessively, causing a deeper economic contraction. By contrast, for the specific frictions highlighted in the use cases, FXI may help to alleviate the policy trade-off because it can more directly address the external shock.

regime. Under this use case, FXI should be considered only when the cost of using monetary policy alone is high, e.g., when this creates severe trade-offs across central bank objectives, and when the cost of including FXI in the policy mix is assessed as low.

24. For each of these cases, FXI should be undertaken only when there is clear evidence that risks have become elevated. Advice in favor of FXI should be based on clear evidence that a shock is raising risks to elevated levels. To guide this, the note identifies contemporaneous indicators that staff should monitor regularly to assess the level of risks associated with specific frictions. For instance, staff may base their advice on observing an increase in the UIP premium, an unusually sharp change in the exchange rate, or incipient signs of inflation expectations' de-anchoring. While decisions and advice on FXI should thus be based on evidence, the advice needs also guard against waiting until material macroeconomic costs have already accrued. The appropriate timing of intervention can therefore be subject to judgment.

25. It is important to establish that FXI can have traction in responding to shocks (see Annex). For FXI to gain traction through the portfolio balance channel, it is necessary that FX market depth is limited because of imperfect substitutability between domestic and foreign assets. Price impact and price reversal measures provide empirical measures of market illiquidity that can support the assessment of pre-shock FX market depth (Vayanos and Wang, 2012). If a time series of UIP premia is available, its variation in response to global shocks and its correlation with capital flows would suggest markets are somewhat shallow. Other measures such as transaction volume, bid-ask spreads, and market turnover can be useful supplements. Staff should also assess whether FX market liquidity may be time-varying and state-contingent, potentially allowing FXI to develop greater traction in responding to larger shocks (GFSR, IMF 2015; Chen and others, 2023).

26. The effectiveness of FXI can depend also on the extent to which it is part of an integrated policy response. FXI can also gain traction when FXI signals to market participants new information about the future stance of monetary policy. Thus, when FXI is deployed in a manner consistent with the central bank's price stability objectives, a signaling channel can boost the effectiveness of the overall policy response to a shock (Annex). Conversely, the effectiveness of FXI may be weak if the FX sales or purchases are at odds with the central bank's stated objectives—the net effect of FXI on the currency would then likely be small, notwithstanding some transient initial effects.

27. Effective FXI requires sufficient reserves, strong central bank governance, and clear communication that links FXI to central bank price and financial stability objectives. A sufficient level of reserves is required for FXI to be credible. Moreover, intertemporal tradeoffs arise, since spending reserves today reduces the ability to respond to future shocks, including by curtailing the capacity in future to provide FX liquidity to preserve financial stability. Use of FXI can also open the door to political pressures and lobbying and strong governance is needed to shield against them. The use of FXI could also introduce challenges in communicating how policy actions relate to objectives. The IPF itself has the potential to clarify the policy framework and enable more effective communication. Nevertheless, challenges in these areas call for caution in the use of FXI under the IPF.

Table 1. Use Cases for FXI Under the IPF

	A. FXI to Smooth Destabilizing Premia	B. FXI to Counter Risks from FX Mismatch	C. FXI to Address Risks to Price Stability
Type of shock	• Inefficient financing or hedging premia from private capital flow shocks.	• Sharp exchange rate depreciation from real or financial shocks.	• Sharp exchange rate depreciation from real or financial shocks; persistent appreciation.
Frictions	• Arbitrage frictions from foreign investors' balance sheet constraints.	• Unhedged FX liabilities in the private sector (households, firms, financial sector).	• Nominal frictions that generate non-linear effects from exchange rate to inflation expectations.
Other policy instruments	• CFMs and CFM/MPMs to counter "surges", in line with IV • Structural policies to deepen FX and LC bond markets.	• MPMs and "preemptive" CFM/MPMs. • Structural policies to develop hedging markets.	• Monetary policy is the first line of defense. • CFMs in the appreciation case, in line with IV.
Key challenges	• Identify premia, and judge inefficient movements in premia, in real time (see Box 3). • Target FXI to the market that is experiencing the frictions. • Identify whether change in premia is due to inappropriate monetary and fiscal policies.	• Identify size and distribution of FX mismatches and assess the impact of shocks on financial stability (see Box 4). • Assess trade-off between using FXI to reduce default risks by limiting depreciation, versus providing FX liquidity to sectors with binding financial constraints."	• Identify de-anchoring of inflation expectations due to exchange rate movements (see Box 5). • Identify situations where trade-offs for monetary policy are sharp enough to warrant FXI. • Identify whether the de-anchoring of inflation expectations is due to inappropriate monetary and fiscal policies.
Main drawback	• Reduction in private trading volume, and market development.	• Moral hazard from use of FXI or provision of FX liquidity.	• Risk of confusion regarding the nominal anchor.

28. Staff advice should consider the range of these elements to formulate advice on FXI under the IPF. Drawing on country-specific circumstances and based on a dialogue with country authorities, the staff should lay out under what conditions the use of FXI can be considered as part of the overall policy response in the event of shocks, also considering the contribution of other policy instruments. In deciding whether FXI is warranted in any given situation, considerable judgment will be required based on the flow of data and information available to the authorities and staff. Even as supporting indicators and analysis should be presented in the staff's report, IPF considerations should then inform the overall policy advice under the baseline and under risk scenarios, and not be considered as separate from that core advice.

USE CASES

A. FXI to Smooth Destabilizing Premia

Principle: FXI may be appropriate to smooth large changes in hedging and financing premia that generate risks to macroeconomic and financial stability, and that arise even though domestic policy settings are appropriate.

Explanations

29. Capital flow shocks may generate sharp changes in premia. Deviations in these premia can destabilize macroeconomic activity and endanger financial stability. If they do not quickly self-correct, they can lead to an underpricing of risk, unduly loosening financial conditions, or they can lead to an overpricing of risk, leading to inefficiently tight financial conditions. The effects depend on the nature of the premia that are destabilized:

- *UIP premia and other local currency (LC) premia.* Owing to currency risk, non-residents may only be willing to absorb LC debt at a premium over riskless FX debt. Deviations in these premia may indicate temporary relaxation or tightening of non-residents' portfolio constraints in the absorption of LC debt (see Basu and others, 2020, and Adrian and others, 2021 for a theoretical treatment and Das and others, 2022 for measurement). After a shock that generates an inflow surge into LC debt, premia may be excessively low or negative, which may stimulate excessive borrowing by the private sector, leading to macroeconomic overheating and a build-up of financial stability risks.[11] During an outflow episode from LC debt, premia may rise excessively, which may force private deleveraging and lead to a rapid growth slowdown, possibly compounded by fire sales in LC assets. In practice, the inflow surge may be prolonged, while the outflow episode may be more rapid.

- *Covered interest parity (CIP) premia*. CIP premia should be close to zero if financial intermediaries have sufficient risk-bearing capacity and there is perfect arbitrage across spot and forward markets. The premia may widen on a structural basis owing to regulations (i.e., MPMs, CFMs, or

[11] The premia on public and private LC debt are typically related. For example, a compression of yields on LC public debt, owing to non-resident purchases, would likely be transmitted into lower yields on LC private debt as well.

CFM/MPMs) imposed on these intermediaries, or to a gradual shift in investor composition towards intermediaries with lower risk-bearing capacity. Sudden deviations in these premia indicate that arbitrage has broken down in the FX hedging market, perhaps owing to an abrupt shift in investor composition or the portfolio constraints of existing intermediaries. Such deviations can lead to an increase in the cost of hedging for FX borrowers. They may respond by deleveraging and depressing growth, or in some cases by continuing to borrow without FX hedges, increasing uncovered exposures and financial instability risks. On the other hand, an excessive decrease in the cost of hedging may encourage FX borrowing and expose the financial sector to rollover risk, risking a future disorderly unwinding of positions in case of a change in market sentiment.

- *Premia between onshore and offshore FX financing*. Such premia may arise from counterparty or credit risks, as well as structural impediments to arbitrage. Deviations in these premia indicate problems in the creditworthiness or arbitrage capacity of domestic FX borrowers relative to foreign ones. If these premia are large, the rollover of FX debt on domestic funding markets may become difficult. FX borrowers may be forced into deleveraging despite strong fundamentals, generating fire sales that spread from domestically issued FX assets to LC assets.

- *Spillovers between FX markets*. Disruptions in the forward market and in the FX financing market can have adverse spillovers onto the spot FX market, adding to exchange rate volatility and increasing the risk of exchange rate overshooting. If so, current and capital transactions on FX markets may be hampered, hurting economic activity, and generating FX shortfalls that endanger financial stability.

30. FXI can be desirable to mitigate the changes in premia that arise from external investors' portfolio shifts despite appropriate domestic monetary and fiscal settings. Such premia deviations may arise owing to global monetary policy or risk aversion shocks (Miranda-Agrippino and Rey, 2020), and in some cases owing to unexpected domestic developments that increase currency risk even if monetary and fiscal fundamentals remain strong. In addition, foreign investors' risk appetite and risk-taking capacity may in certain cases be worsened by a sharp exchange rate movement (Hofmann and others, 2022). These mechanisms can also lead to inefficiently low premia and an underpricing of risk in the event of a "risk-on" shock. Such effects can be larger where foreign participation in LC debt markets is greater and local participation in these markets is less developed (CGFS 2019, IMF 2014c), and they can arise even when monetary and fiscal policies are at appropriate settings.

31. In episodes of large inflows and outflows, the objective of FXI would be to ensure that markets continue to function appropriately. Smoothing of premia, including measures of premia which enter pricing decisions, would ensure that the private sector's borrowing and deleveraging decisions are not adversely affected by volatile investor portfolio shifts. As a result, the monetary authority has more autonomy to focus on internal stabilization objectives.[12] If domestic sources of

[12] Smoothing of the premia can also reduce their steady state level by boosting demand for exposure to the LC by foreign investors (Hassan and others, 2019).

price pressures remain unchanged during the episode and fiscal sustainability remains robust, there is no need to alter monetary or fiscal policies in response to the premia deviations.

32. FXI would not be recommended if the premia arise in response to inappropriate domestic policy settings. Staff need to assess whether domestic policy settings are appropriate. If deviations in premia arise owing to inappropriate policy settings for monetary or fiscal policies, FXI would not be the appropriate tool.[13] Instead, the monetary and fiscal policy settings should be corrected. FXI should not substitute for the warranted adjustment in monetary and fiscal policies, but as mentioned above (in ¶17), FXI can complement the adjustment package if deemed necessary.[14]

33. FXI should mitigate only large changes in premia. The rationale for focusing on large, rather than small, changes is as follows. First, while there is no exact measurement of the point beyond which a change in premia is affecting the economy, it is likely that small movements in premia would not lead to material adverse effects. Second, in normal circumstances, the appropriate level of premia may not be clear to the central bank. Third, since the market, not the central bank, is expected to provide exchange rate hedging and FX funding, a minimum level of volatility may be necessary for price formation. The central bank should not over-smooth it, because doing so would reduce market volume (i.e., replacing the market with the central bank). Finally, if all small changes in premia were smoothed, FXI would need to be frequent, which could exacerbate moral hazard problems in the private sector, leading to an endogenous increase in FX borrowing (Kim and others 2020, Eichengreen and Hausmann, 1999).

34. Ideally, only inefficient premia should give rise to policy intervention, but decomposing premia is difficult in practice. Conceptually, FXI should tackle premia deviations arising from temporary shocks to arbitrage conditions in FX markets, and it should not seek to offset premia that arise owing to well-designed regulations, structural factors, or the efficient functioning of markets in response to changes in domestic policy settings. Given the difficulty of decomposing premia in real time, staff may look for corroborating evidence across a range of indicators, coupled with staff judgment about the cause of the premia deviations. It is also important to keep re-evaluating the case for FXI when shocks turn out to be persistent. On the one hand, persistent changes are more likely to have significant macroeconomic effects, arguing for the use of FXI. On the other hand, persistent deviations in premia may reflect incorrect domestic policy settings, such as increases in term premia from overly loose fiscal policy, and an attempt to smooth those can lead to reserves depletion.

[13] This includes cases when inappropriate monetary and fiscal policy settings generate exchange rate risk, e.g., the risk that there will be a disorderly depreciation in the future, and convertibility risk, e.g., the risk that CFMs will be imposed on financial intermediaries in the future.

[14] For instance, during the episode of social unrest in Chile in 2019, the central bank undertook FXI to reduce premia that had widened in FX markets thereby bridging the time it took the authorities to agree on constitutional reform that was needed to reduce premia in a lasting manner.

35. FXI should be undertaken in the market where it would be most effective, with minimal distortions. It should target the deviations in premia while attempting to minimize adverse spillovers to premia in other markets. For example, if the spot FX market is destabilized owing to premia deviations originating in the hedging (forward) or funding (swaps) markets, it may be more effective and less distortive to intervene on the latter markets instead of on the spot market.

36. For this use case, FXI should target the premia, not the movement in the exchange rate per se. Premia shocks may strike alongside fundamental shocks. Some exchange rate adjustment may be necessary to absorb the fundamental component of the shocks while FXI addresses the excessive deviations in premia. As a result, FXI under this use case should target premia instead of the change in the exchange rate. The use of FXI to relax arbitrage constraints in the FX markets would alter the exchange rate to some extent as it reduces premia, but the FXI would stop being appropriate once premia are stabilized, rather than when the change or level of the exchange rate is stabilized. However, the exchange rate path could be an input into staff judgment regarding the nature of the shock. Increased exchange rate volatility could be a sign of deviations from the appropriate premia, given the well-established relationship between FX funding and hedging markets on the one hand, and the spot FX market on the other. In other use cases described later in this document, FXI may be used to target the change of the exchange rate in the short term.

Indicators and Analysis

37. To assess whether one or more segments of the FX market is subject to frictions, staff should consider a range of potential indicator variables. The structure of FX markets varies greatly across countries, and the FXI strategy would depend on the importance of each of those markets within the jurisdiction. Moreover, data availability varies across countries. Correspondingly, close consultation between staff and the authorities is needed to judge which specific markets to monitor and which measures to use (see Box 3). This section provides some guidance that could be applicable across many different country contexts.

38. Staff and country authorities would ideally take the following steps to assess the functioning of FX markets ex ante—ahead of inflow or outflow shocks:

- Prepare high-frequency reference benchmarks for premia and volume in the FX markets that are most important for monetary policy transmission and macro-financial stability, especially those markets used for financing and hedging. These markets could include the spot market, FX forward markets, FX swap markets, and FX and LC financing markets at various maturities.

- Assess whether premia in any of these markets have historically been volatile and co-moved negatively with capital inflows and outflows (i.e., increased when inflows declined) in the past. This could help establish whether potentially destabilizing FX premia are an issue for the country.

- Staff should be mindful that FX markets can appear deep in normal times, but that market liquidity can be state dependent, and dry up in times of financial stress. The available models

capture this case by the potential for a time-varying "Gamma" (Γ) in the balance sheet constraints of financial intermediaries. Such time-varying FX market liquidity can also be allowed for when estimating the quantitative model, by allowing the parameter Γ governing market depth to vary between a low (deep markets) and a high (shallow markets) value (see further Chen and others, 2023).

- Staff should also bear in mind that the country's policies, e.g., FXI and CFMs, influence the collected series. Staff should therefore assess market depth by making a judgment on how premia would have moved in the absence of the use of such instruments. Such analysis can be aided by an application of the quantitative model, which is estimated based on the historical evolution of several country-specific variables, including the volume of FXI undertaken by the country. Such analysis would also help judge the effectiveness of the policies that were used.

39. Assessing the structure of LC or FX debt markets can also help determine the likelihood and impact of movements in premia ex ante.

- A higher share of foreign investors in LC or FX debt markets increases the likelihood that premia in FX markets emerge as a result of changes in their risk appetite (e.g., IMF 2020c). On the other hand, the potential for premia to emerge and to become amplified through the local economy would likely be reduced if local participants, including both banks and non-bank financial institutions (NBFIs), have the capacity to absorb flows at the onset of the shock. Thus, information about market structure can help inform priors about the sensitivity of credit markets to changes in premia.

- Measuring and monitoring balance sheet vulnerabilities for the key players in local debt markets can help assess the likelihood of stressed deleveraging. For instance, where cross-border flows are intermediated by open-ended mutual funds that are subject to liquidity mismatch, there is greater scope for fire sales in the event of a change in risk sentiment (e.g., Pascual and others 2021, Bertaut, Bruno, and Shin, 2023). Conversely, cross-border investments by non-resident insurance companies, pension funds, and even banks can be relatively more stable. The scope for destabilizing outflows from resident NBFIs' outward investment should also be assessed.

40. When shocks arise staff and country authorities would ideally monitor data on premia and capital flows to identify large and potentially destabilizing changes in premia.

- Staff should monitor premia in the markets identified above if such data are available. The IPF metrics dataset available to staff includes a cross-country series on UIP premia, while LC, CIP, and onshore-offshore FX financing premia should be selected and collected according to the country context. Some of the measures may be available in real time, while others rely on data which are captured at lower frequencies.

- To the extent possible, staff should complement the information on premia with information on capital flows, i.e., both non-resident and resident debt inflows and outflows. For countries with

shallow markets, risk-off shocks would generally be associated with spikes in premia as inflows decline and turn into outflows, while risk-on shocks would be associated with compressed yields as inflows surge.

- In the future, staff could develop methods to filter the range of available data on premia, capital flows, and global variables to assess whether movements in premia are large. An empirical model could be developed to identify whether a particular capital flow episode is large in historical perspective, and provide forward-looking trigger points based on the estimation of the distribution of premia or exchange rates (e.g., building on Lafarguette and Veyrune, 2021).

Box 3. Indicators for Use Case A—Shallow FX Markets

Ex ante assessments

For each of the most important FX markets, key variables of interest include:

- High-frequency benchmarks for UIP, CIP, LC (e.g., short-term rates and term premia) and onshore/offshore financing premia
- Transaction volumes
- Levels and changes in market depth—structural liquidity measures, volatility of premia, co-movement of premia with capital flows.

An assessment of vulnerability could include:

- Foreign investor share in local debt and equity markets
- Balance sheet strength and liquidity measures for key market participants.

There can also be an assessment of the impact of change in premia:

- Sensitivity of credit markets (spreads, volumes) to changes in premia.

Contemporaneous assessment

At the onset of the shock, staff should evaluate movements in the above premia and monitor capital flows:

- Non-resident and resident debt and equity inflows and outflows
- If data on premia and capital flows are limited, staff should form an assessment based on:
  - Exchange rate volatility
  - FX reserve pressure
  - Anecdotal evidence on external creditor portfolio constraints
  - Prior judgment on FX market shallowness.

41. Such assessments need to be cognizant of the country's data availability constraints.

- Information on capital flows would be most helpful if it is available at high frequency, as it could be matched better to the information on premia. However, it is likely that the flows data is of lower frequency and as a result needs to be combined with staff's priors on market shallowness. If data on premia are not available and the staff's assessment is that the market is shallow,

capital flows data alone may be useful in identifying abrupt changes in flows that may reflect foreign investors' portfolio frictions.

- If data on premia and capital flows is limited, staff should form judgments about the cause and magnitude of premia movements using all information that is available. In this case, volatility in exchange rate movements and pressure on FX reserves, coupled with anecdotal information on external creditors' portfolio constraints and a prior judgment that the country has historically had shallow FX markets, may be considered as evidence in support of destabilized premia.

- If data on FXI and CFMs is limited, staff should use proxies (e.g., Adler and others, 2021, for FXI data) and other information, including anecdotal and administrative information about FX market participants, to understand how the observed premia and capital flows may have been influenced by the policies. In practice, such proxies have often been used in the estimation and calibration of the quantitative model to back out parameters, such as market depth, that are important to assess frictions as well as traction of FXI.

- Where premia are available only at relatively long frequencies, the volatility of movements of the exchange rate at shorter horizons, such as intraday, can be an early indicator of liquidity conditions in spot markets, which may in turn be driven by stress in other market segments (such as FX borrowing and hedging markets). The monitoring of exchange rate volatility at short horizons can therefore be useful and form part of the surveillance of a suite of early warning indicators, such that a spike in volatility should trigger further analysis of financial stresses that may ultimately motivate the use of FXI.

42. If there is a large and potentially inefficient change in premia, the next step would be for staff to judge whether monetary and fiscal policies are at appropriate settings. As part of Article IV surveillance, staff use a range of inputs to form judgments about whether macroeconomic policy settings are appropriate. Those assessments should be related to the contemporaneous changes in premia. As described in ¶18–19, the appropriateness of FXI depends on this assessment.

Policy Mix

Ex ante: Ahead of Inflow or Outflow Shocks

43. Countries should engage in structural reforms to deepen their FX and local currency debt markets, thereby reducing the sensitivity of premia to external developments. Ex ante policies to develop markets, e.g., develop local intermediaries such as pension funds who can absorb LC debt if non-residents exit, would help build resilience (CGFS, 2019, IMF 2014c). Taking steps to liberalize the capital account, in line with the IV, and to develop the legal framework for FX markets could also help deepen FX markets and increase their resilience to external developments.

44. If FXI is constrained—for instance, because of limited reserves—consideration can also be given to preemptive CFM/MPMs to contain stock vulnerabilities, as laid out in the review

of the IV (IMF 2022a). [15] If the country has shallow markets, a future spike in LC and FX premia may cause fire sales in domestically issued LC and FX assets. In the presence of accumulated stock vulnerabilities, such fire sales may be expected to become amplified to generate a severe economic downturn, i.e., there may be elevated systemic financial risks. In such cases, CFM/MPMs may be appropriate to reduce lending intermediated from abroad, provided that all the conditions outlined in the IV are satisfied. Outside of an inflow surge, CFM/MPMs on FX debt inflows to address FX mismatches are more likely to be appropriate than those on LC debt inflows. The latter measures could, however, be appropriate outside of an inflow surge—i.e., preemptively—when ex post policy instruments such as FXI are not available or constrained, and other conditions set out in IMF 2022a are met.

Ex post: During Shocks

45. If monetary and fiscal policies are at inappropriate settings, staff advice should focus on adjusting them, and outline how this adjustment would reduce or eliminate the need for FXI. In such a case, the adjustment of monetary and fiscal policies would be preferred to FXI (or MPMs, CFMs, and CFM/MPMs). Nevertheless, if the authorities commit to a plan to adjust monetary and fiscal policies gradually over time because immediate adjustment would be too disruptive, FXI and other instruments may be appropriate in the interim to prevent excessive macroeconomic and financial destabilization.

46. The policy mix between FXI and CFMs is governed by the IV. As the IV suggests, CFMs should not substitute for warranted macroeconomic adjustment, but they may be useful alongside FXI to address the shocks.

- *Inflow surge that threatens macroeconomic stability*. If there is overheating and overvaluation while FX reserves are already adequate, inflow CFMs may be appropriate under the IV. [16] However, they should be transparent, targeted, temporary, and preferably non-discriminatory. The precise policy mix depends on the costs of FXI, the country-specific costs and effectiveness of CFMs, and institutional characteristics that affect how easily FXI and CFMs can be implemented, adjusted and adequately enforced (see further Pasricha and Nier, 2022).

- *Inflow surge that threatens financial stability*. If there are excessively low premia, excessive borrowing, and a build-up of financial stability risks, FXI can be complemented by MPMs, which can seek to reduce domestic credit in the market segments where premia are most compressed, and increase resilience to future outflows (IMF 2017). In the context of such a surge, targeted, transparent, and temporary CFM/MPMs to reduce credit that is intermediated from abroad could also be appropriate. under the IV. Such CFM/MPMs should be tailored to the relevant

[15] Preemptive CFM/MPMs, that is, CFM/MPMs taken outside of a capital flow surge, may be appropriate if the accumulated stock vulnerabilities in the aftermath of the surge are generating elevated financial stability risks and the other conditions set out in the IV for their appropriate use are fulfilled (IMF 2022a).

[16] CFMs may also be useful in the context of inflow surges when the needed policy steps require time, or when the macroeconomic adjustments require time to take effect (see IV, IMF 2022a).

markets, e.g., unremunerated reserve requirements for short-term external debt inflows may be appropriate to mitigate compressions in short-term debt premia, while restrictions on corporate external debt may help prevent excessive cross-border borrowing by agents outside the macroprudential perimeter.

- *Outflows.* Under the IV, capital outflows should be handled primarily with macroeconomic, structural, and financial sector policies, in preference to CFMs. The macroeconomic policy response should address the domestic triggers and implications of outflows and foster orderly external adjustment, if warranted, through exchange rate depreciation, monetary policy, and possible FXI. Relaxing inflow CFMs that were previously introduced or tightened to address inflow surges could be useful in some circumstances, such as when a policy response is warranted but FX reserves are relatively low. However, in crisis or imminent crisis circumstances, which may be signaled by a sharp exchange rate depreciation coupled with rapidly falling FX reserves and tightening of financial conditions, the easing of inflow CFMs would likely be insufficient, and comprehensive outflow CFMs may be needed.

47. The effectiveness of FXI should be judged against alternative intervention in the domestic markets. Premia arise in LC markets as well as FX markets, and the former could experience disruptions as much as the latter. As previously mentioned, the central bank should determine which markets matter the most for the formation of the premium and intervene preferentially in those markets. Depending on the specific LC market, the central bank may have specific additional instruments, such as asset purchases aimed at preserving LC market functioning, which could be more effective than FXI, or complement FXI, in certain circumstances.[17] As with FXI, these instruments should target premia rather than the exchange rate, and they should not alter domestic monetary conditions in the case that monetary policy is already at an appropriate setting.

B. FXI to Address Financial Stability Risks from FX Mismatches

Principle: If a large depreciation increases financial stability risks from FX mismatches (e.g., private sector defaults), FXI can be provided to help prevent adverse financial amplification, provided that reserves are sufficient.

Explanations

48. An unusually large and unexpected depreciation of the exchange rate can lead to the realization of default risks if there are large unhedged FX exposures. When LC assets are funded by unhedged FX liabilities, an exchange rate depreciation increases the value of FX liabilities in LC, while the value of assets remains the same, putting pressure on solvency (Cooper, 1971; Calvo, 2000; Mishkin, 1999a; Mishkin, 1999b). As the depreciation increases the debt service costs of unhedged borrowers in the short and medium run, agents may default on both FX and LC debt.

[17] Examples of such programs are the early corporate bond program by the ECB, bank bond purchases by the Central Bank of Chile, and the program of purchasing private and public bonds by Central Bank of Colombia (Banco de la República) to preserve LC market functioning.

Widespread defaults in turn can lead to broader macro-financial feedback effects, e.g., through decreased expenditure and investment (Aguiar, 2005; Kearns and Patel, 2016; Du and Schreger, 2022; Kalemli-Ozcan and others 2021; IMF, 2022c).

49. Depreciation shocks can then put stress on the banking system via credit and market losses, valuation effects and funding pressures. The materialization of credit risk in the form of household and corporate defaults resulting from a large depreciation could lead to losses for banks and deplete bank capital. Banks could also suffer losses on marketable securities if stock and other asset market returns decline with the domestic currency depreciation (Fang and Miller, 2002). Moreover, banks with an open net short FX position may suffer a valuation loss and hit to capital from a large and unexpected depreciation.[18] As a result of, or in anticipation of these effects, wholesale and retail investors may demand a higher risk premium, increasing funding costs for banks and leading to tighter financial conditions for borrowers, amplifying systemic stress (Mishkin, 1999a).

50. Higher private sector default risk resulting from the large depreciation could also trigger a reversal of FX debt inflows and reduce the foreign supply of credit to the domestic economy (Carstens and Shin, 2019). Irrespective of whether the source of the initial shock to the exchange rate is real (such as a change in terms of trade) or financial (such as capital inflows or outflows), valuation effects on the FX liabilities of banks and non-banks can tighten domestic financial conditions (Kearns and Patel, 2016). When a depreciation becomes large enough to increase credit risk of domestic borrowers and tighten financing constraints, this could lead to a "sudden stop" as foreign investors withdraw funding. This can further worsen financing difficulties if agents are exposed to rollover risk via short-maturity FX-denominated liabilities (He and Xiong, 2012). Moreover, as foreign investors withdraw from domestic debt markets, this drains foreign exchange from the local market and puts additional pressure on the exchange rate, thus amplifying the original depreciation and increasing default risk.

51. The use of FXI as part of an integrated policy response can mitigate these heightened risks and support macro-financial stability. Using FXI to lean against a large depreciation can reduce solvency and liquidity risks from large preexisting unhedged FX debt. FX sales by the central bank would prevent the LC value of FX debt obligations and associated debt service costs from rising as high as they would otherwise, and thus the FXI would abate repayment pressures. This could also reduce the risk of fire sales of LC assets to meet FX repayment obligations. In reducing these risks, an early and effective intervention in FX markets can help reduce the extent of adverse macro-financial feedback loops that might result from a reduced credit provision by domestic and external creditors. In line with this, Davis and others (2022) show how intervention to avoid a binding collateral constraint can prevent a sudden stop, as long as FXI has some traction away from the binding constraint, e.g., through the portfolio balance channel. Empirically, Gelos and others (2022) show that FX sales mitigate downside risks to portfolio outflows that stem from changes in

[18] Many countries limit banks' net open FX position by regulation, though, and capital requirements for market risk also lean against risks from balance sheet mismatch, so this channel may not be material in those countries.

global financial conditions, presumably by signaling a policy commitment from the authorities that keeps foreign investors from pulling out.

52. When FXI is used to counter financial amplification, it should be used only to smooth severe depreciations. First, the non-linear impacts of a depreciation of the exchange rate on consumption and output via FX mismatches and financial amplification mechanisms will arise only if the shock is large (Culiuc, 2020). This is because borrowers are likely to be able to absorb smaller shocks to debt-servicing capacity, without such shocks causing defaults (Nier and others 2019). Second, restricting the use of FXI in the support of financial stability to large shocks mitigates moral hazard—where private agents increase their unhedged exposure to FX risk given exchange rate rigidity (Hofman and others, 2020; Ghosh and others, 2016; Ye and others, 2014) and in the expectation of policy support (Kim and others, 2020). Such costs are less concerning when the FXI only takes away tail-risks and private borrowers would still have to insure against risks from smaller changes in the exchange rate. Moreover, by removing tail risks, FXI may even help lower hedging costs, and could then help foster the development of private hedging markets (e.g., Lafarguette and Veyrune, 2021). Overall, this implies that FXI would not be warranted unless the risk of moving into the tail of the distribution is elevated.

53. Such FXI should not prevent warranted macroeconomic adjustment but should counter welfare losses from inefficient amplification. In the absence of financial frictions, full exchange rate flexibility supports warranted macroeconomic adjustment, such as by inducing expenditure switching effects. However, and irrespective of whether the source of the initial shock is real or financial, there is a role for FXI when the shock becomes large, and would, in the absence of FXI, induce endogenous amplification—such that an initial shock leads to changes in foreign appetite, induces systemic financial risk, or leads to a sudden stop. Such amplification would typically drive the exchange rate away from its long-run fundamental value, reducing the benefit of exchange rate flexibility for macro adjustment. In the presence of financial frictions, and when the shock is sufficiently large, the use of FXI to prevent amplification can then lead to macroeconomic benefits of the FXI exceeding its costs. Importantly, the use of FXI should not discourage the adoption of pre-shock policies aimed at reducing financial vulnerabilities from FX debt stocks.

Indicators and Analysis

54. Evaluating this case for FXI should begin by assessing unhedged FX exposures and the extent to which they increase financial stability risks (IV Background Note IMF 2022c**).** The financial stability risks from a sharp depreciation are larger the greater the extent of unhedged FX exposures. This applies to both FX balance sheet mismatches—where the currency denomination of borrower liabilities differs from that of assets—and FX maturity mismatch—where there is an FX financing gap. An assessment of such mismatches can be conducted for each of the financial sector, the non-financial corporate sector, and the household sector. The use of the IPF metrics data available to staff can be complemented by more detailed information available to the authorities that may enable a more granular analysis.

55. Such assessments should take account of any amplifying factors. Risks from FX mismatches can be amplified by leverage—households, corporates, and banks with smaller equity

cushions are less able to absorb the valuation and funding effects of a large depreciation and more likely to decrease consumption, operations, and lending respectively. A large presence of foreign investors in LC debt markets can strengthen the case for policy action, as these investors' flows might be particularly sensitive to exchange rate movements.

56. For a given level of FX exposure, further analysis should be conducted to determine ex ante the strength of macro-financial feedback arising from a large depreciation.

- Where possible, solvency and liquidity stress tests should be performed to assess a given sector's resilience to large depreciation shocks (see also IV Background Note, IMF 2022c). These could be aided by satellite models that map individual or sectoral level distress probabilities to exchange rate movements (and other macro variables).

- Where possible, econometric analysis could determine the impact of exchange rate shocks on output and its components, as well as on non-performing loans and measures of distress probabilities. Specifications should permit nonlinearities in the impact of changes in exchange rates, distinguishing between small and large shocks, for the reasons identified above.

- If high frequency data on private credit risk premia—e.g., corporate/bank CDS spreads—are available, the strength of co-movements between exchange rate depreciations and such measures, which may be stronger past an estimated depreciation threshold, could be identified.

57. At the onset of the shock, a range of evidence should be monitored to determine whether FXI is needed. In addition to the change in the exchange rate itself, financial variables can be used to assess the emerging impact of the depreciation. The focus should be on forward-looking indicators—such as credit and funding spreads—to enable a timely policy response (see Box 4).

58. The prior analysis of ex ante relationships between changes in the exchange rate and such variables can frame an assessment of the contemporaneous evidence. Such prior analysis may help determine what is the size of the change in exchange rate that leads to a deterioration of financial variables, and ultimately output. A high degree of FX mismatch and evidence of sectoral vulnerabilities to these FX mismatches should serve as necessary conditions for the use of FXI to support financial stability under this use case.

59. The distribution of the FX vulnerability can inform the appropriate modality of FX interventions. Spot interventions may be needed to smooth severe exchange rate fluctuations, when unhedged FX exposures are widespread (Lafarguette and others, 2021), including outside the perimeter of central bank operations. If unhedged exposures are concentrated in a small number of known, and individually systemic institutions, a targeted provision of FX to those institutions may be preferable, as it limits market distortions and save reserves, provided such operations are permitted by the legal and operational framework.

60. While FX swaps do not transfer exchange rate risk to the central bank, they can play an important role in helping to alleviate liquidity squeezes. For example, a sharp increase in FX spreads over the USD rate may indicate a lack of FX liquidity which could prompt the central bank to offer FX swaps. FX swaps have proven useful as an immediate crisis-time response and can help

prevent a liquidity shortage spilling over into the wider economy. The provision of emergency lending in FX is a variant of this that is tailored to support individual institutions that face FX liquidity stress. In line with this, Cespedes and Chang (2020) stress the benefit of FX liquidity provision to alleviate binding financial constraints.

61. Other financial sector policies could also be considered when unhedged exposures are not market-wide but concentrated in a limited number of institutions. If the exposure—either short or long—is limited to a few systemic institutions or sectors, more targeted support measures such as a provision of capital or other fiscal measures could be considered as an alternative to FXI by the central bank. Market-wide FXI may then help gain time for such targeted measures to be implemented even as consideration should also be given to the need to preserve sufficient levels of reserves.

Box 4. Indicators for Use Case B—FX Mismatches

Ex ante assessments

To assess unhedged FX exposures, key variables of interest include:

- FX debt stocks at relevant maturities across households, non-financial corporations, banks, and non-bank financial institutions
- FX assets and hedges (natural or contractual) at the relevant maturities for these sectors.

To assess amplification channels, indicators include:

- Sectoral measures of leverage
- Foreign investor share of LC debt markets, as these investors' flows might be particularly sensitive to exchange rate movements.

For a given level of FX exposure, the strength of macro-financial feedback arising from a sharp depreciation can be assessed as follows:

- Solvency and liquidity stress tests of a given sector's resilience to large depreciation shocks.
  - Satellite models can help map individual or sectoral level distress probabilities to exchange rate movements (and other macro variables).
- Econometric analysis could determine the impact of exchange rate shocks on output, and its components, as well as on non-performing loans and measures of distress probabilities.
  - Specifications should permit nonlinearities in the impact of changes in exchange rates, distinguishing between small and large shocks.
- If high frequency data on private credit risk premia—e.g., corporate/bank CDS spreads—are available, the strength of co-movements between exchange rate depreciations and such measures, possibly past an estimated threshold, could be identified.

Contemporaneous assessment

At the onset of the shock, forward-looking indicators can be used to assess the emerging impact of the depreciation, including:

- Corporate and banking default spreads
- FX spreads over foreign interest rate, including spreads between onshore and offshore FX debt
- LC lending spread over the policy rate—as indication of a reduction in loan supply.

Policy Mix

Ex ante Policies

62. Ex ante policy advice should focus on reducing financial vulnerabilities from FX debt stocks, including by use of MPMs. Assessing the systemic financial risks from FX balance sheet and FX maturity mismatches should reveal potential areas of vulnerabilities, which can form the basis for advice on macroprudential tools—including MPMs and CFM/MPMs in line with the revised IV—to contain them (IMF, 2014a, 2022a). For instance, borrower-based measures, such as tighter DSTI limits on FX borrowing, can limit the buildup of FX mismatches by households and enhance their resilience to shocks, reducing credit risk in banks' loan portfolio. Broad-based tools, such as capital buffer requirements, force the banking sector to build additional buffers against shocks, including those stemming from depreciation. While both borrower- and broad-based tools aim to maintain solvency in the face of adverse shocks, liquidity measures, such as FX reserve requirements or the Liquidity coverage ratio (LCR), help protect the banking sector against rollover risks, including in the event of FX liquidity pressures, and can counter the potential for moral hazard in the banking sector from an expectation of ex post liquidity support by the central bank.

63. When MPMs alone are not sufficient to contain systemic risk from FX mismatches, preemptive CFM/MPMs can also be considered, subject to the revised IV. For instance, preemptive inflow CFM/MPMs could be used to restrict excessive external FX borrowing by the non-financial corporate sector when these FX debt inflows are contributing to stock vulnerabilities from unhedged FX exposures, and this cannot be addressed effectively by MPMs. The use of preemptive CFM/MPMs also needs to satisfy all other conditions for their appropriate use as set out under the revised IV (IMF 2022a).

64. However, fully eliminating financial stability risks from depreciations using ex ante policy may not be possible, or can be too costly, thereby leaving a role for ex post policies. Effective macroprudential policy should reduce the need to resort to FXI for financial stability purposes, effectively widening the range of depreciation shocks that can be absorbed in the absence of FXI. However, the costs of prudential measures can increase as constraints are tightened, making it prohibitive to fully insure against tail risks (see, e.g., IMF 2014a, IMF, 2014b). Borrower-based measures in particular can pose political economy challenges and can be operationally costly to implement. Even if effective, such measures normally only affect the flow of new credit and will therefore require time to significantly reduce stock vulnerabilities. Macroprudential policies are also prone to leakages (IMF 2014a, IMF 2014b), prompting credit provision to move to nonbank or foreign entities. And while CFM/MPMs can plug the hole in coverage in some cases, they can come with additional costs. In particular, the use of CFMs and CFM/MPMs can generate substantial enforcement costs, especially if targeted at non-financial firms that are not routinely part of the regulatory perimeter, as well as distortionary and reputational costs. They can also be associated with policy uncertainty and governance problems, and burden smaller firms disproportionately (IMF, 2022c).

65. Reducing financial stability risks is especially challenging in financially dollarized economies. In these countries, households often have a strong preference for FX deposits, usually rooted in distrust in the LC as a savings vehicle. Domestic banks then use their FX deposit base to lend in FX. [19] While the net open FX position of banks remains small and capital inflows may be limited, unhedged corporate or household borrowers are exposed to exchange rate risk, and the banks thereby ultimately to credit risk. Macroprudential measures can reduce financial stability risks from depreciations to some extent but would not usually be sufficient to address the forces that are driving dollarization. Even in cases where successful macroeconomic stabilization has bolstered the LC, financial dollarization can prove quite persistent (Kokenyne and others (2010), Levy-Yeyati (2006), Levy-Yeyati (2021), Georgia FSAP (IMF 2021), IMF (2014c)).

Ex post Policies

66. FXI can complement the broader ex post policy response, also including monetary or fiscal tightening. Without FXI, monetary policy may need to be relatively tighter to prevent large depreciations that threaten systemic financial stability (the interest rate defense). However, using only the policy rate to lean against a large depreciation can be costly. In particular, the interest rate defense can lead to a sudden increase in the debt servicing costs of those households and firms that borrowed in LC, thus potentially increasing their default risk, and causing output to contract. In shallow FX markets, sterilized FXI can temporarily lean against a large depreciation, allowing the policy rate to remain more accommodative than otherwise.

67. However, FXI, fiscal, and monetary policy need to be consistent, and FXI should not be used to substitute for warranted macroeconomic adjustment. If inappropriately loose fiscal or monetary policy themselves erode foreign investors' confidence, thereby causing the large depreciation, these policy settings need to be adjusted to regain investor confidence. FXI can then be provided on a temporary basis to complement such adjustment when adjusting policy settings takes time.

68. Ex post relaxation of MPMs and inflow CFM/MPMs may help to limit the depreciation, attract inflows, and stimulate credit, but is unlikely to replace FXI. In principle, to support financial stability and credit provision, relaxation of MPMs could be considered in conjunction with FXI. For instance, releasing FX liquidity buffers through lower reserve requirements in FX or a (temporary) reduction in required FX liquidity buffers can ease system-wide FX liquidity pressures (see IMF 2017, Box 4 for the experience in Croatia). Releasing capital buffers as was done by many countries during the COVID-19 crisis may also support bank lending (Nier and Olafsson, 2020). To what extent an easing of inflow restrictions (CFM/MPMs) could substitute for FXI is less clear. Although attracting new capital flows may help support the exchange rate and increase FX liquidity in principle, this benefit could be limited under widespread capital flight. Moreover, care needs to be

[19] High lending in FX can also be driven by "carry-trade" dollarization (see Geng, and others, 2018))

taken that the conditions for easing the CFMs safely are in place, such that the easing does not create new vulnerabilities in future, e.g., from volatile short-term flows (IMF, 2012a).[20]

69. In imminent crisis circumstances, outflow CFMs may help preserve FX reserves but effective implementation is typically more difficult than FXI. In an imminent crisis, countries may consider temporary outflow CFMs, especially if FX reserves are inadequate and therefore too low for effective FXI. A temporary use of outflow CFMs may prevent a free fall of the exchange rate, preserve FX reserves and financial sector liquidity, and provide breathing space while macro-financial policies are implemented and become effective (IMF, 2012a). However, in practice, CFMs often entail substantial enforcement costs, in particular if the infrastructure for a sufficiently comprehensive implementation is not in place, and poor design or leakages can risk exacerbating the economic damage. These operational challenges may suggest a more cautious use of outflow CFMs, relative to FXI, as set out in the IV. Nonetheless, longstanding capital account restrictions have been shown to complement FXI if they limit offsetting private flows and thereby lower the size of FXI needed for the central bank to prevent a sharp fall in the exchange rate in a crisis situation (Bayoumi and Saborowski, 2012).

C. FXI to Support Price Stability

Principle: FXI can support monetary policy when there is a risk that a large exchange rate depreciation may de-anchor inflation expectations, provided the costs of using monetary policy alone are high, reserves are sufficient for FXI to be effective, and the costs of including FXI are low. There can be a role for FXI also to lean against sustained appreciation.

Explanations

70. FXI can improve the policy trade-off faced by the central bank in the context of large exchange rate depreciations. In the presence of nominal frictions, such as backward-looking expectations formation and price and wage indexing, the second-round effects of exchange rate depreciations on inflation may be strong, threatening price stability by de-anchoring inflation expectations and requiring a strong monetary policy response. However, raising policy rates sharply to counteract the effects of the depreciation on inflation may induce a slowdown in economic activity and increase the cost of stabilizing prices. The quantitative IPF model (Adrian and others, 2021) shows that FXI may improve policy trade-offs for those economies where nominal frictions are severe and exchange rate depreciations are contractionary. FXI can limit the exchange rate depreciation and hence the pass-through to inflation and inflation expectations, complementing a monetary policy tightening, and thereby helping monetary policy meet challenges in containing such destabilizing effects.

71. While the IPF models point to the benefits of FXI in response to depreciations, other considerations would call for a sparing use of FXI. First, when inflation expectations are well

[20] In practice, several countries eased inflow CFM/MPMs as the COVID-19 shock hit (see IMF 2021a), mostly by adjusting parameters and sometimes only temporarily, but always as part of a broader policy package.

anchored, exchange rate flexibility may support a warranted macroeconomic adjustment through relative price movements that induce welcome expenditure switching effects.[21] The appropriate response is then to "see through" the depreciation shock, while use of FXI delays the macroeconomic adjustment and may call into question the central bank's commitment to a flexible exchange rate. Second, if exchange rate depreciations result in a simultaneous increase in output and inflation, monetary policy tightening alone can achieve the central bank's objectives, as there is no meaningful trade-off between stabilizing output and inflation. Third, if the output gap is assessed to be positive when the shock hits and this contributes to the de-anchoring of inflation expectations, the case for using FXI is weaker, as tighter monetary policy can mitigate inflationary pressures arising from the exchange rate depreciation as well as reduce the positive output gap.

72. Caution is warranted in particular where the use of FXI is not effective but would instead undermine central bank credibility. While this issue is not treated in the models, experience shows that where central bank credibility is weak, or there remain uncertainties about the nominal anchor, such as when a central bank attempts to transition away from a peg, it would be desirable for the central bank to rely on monetary policy alone, rather than FXI, to establish a credible commitment to the inflation target. Even where IT frameworks are well established, the credibility of the central bank could be eroded when the central bank starts to engage in FXI, and this is perceived as inconsistent with the framework. In particular, the systematic use of FXI by an inflation-targeting central bank can cause confusion regarding the primary objective of monetary policy and could signal a shift towards a nominal anchor other than inflation. This could, in turn, destabilize inflation expectations and worsen short-term trade-offs. When the use of FXI to support the price stability objective is considered, it is important to limit potential harm to credibility by establishing ex ante a clear monetary policy strategy that spells out under what conditions FXI would be used alongside other instruments (see next section for additional details), and to clearly communicate the rationale for the policy levers used.[22] Finally, when de-anchored inflation expectations are persistent and reflect deep problems of monetary credibility, they can be exacerbated by the use of FXI. The policy priority is then to establish or reestablish a credible monetary anchor.

73. FXI should be used to pursue price stability objectives only if the depreciation is large, for several reasons.

- First, only a large exchange rate depreciation is likely to set in motion amplification mechanisms that jeopardize the price stability objective, increasing the central bank's policy tradeoff. Empirical research finds that the pass-through to inflation of a change in the exchange rate is

[21] There is evidence that the anchoring of inflation expectations has firmed in several emerging market economies, see, e.g., BIS, 2019.

[22] As an example of monetary policy strategy that envisages the use of FXI under specific conditions, see the Bank of Chile's strategy document.

stronger for larger changes in the exchange rate.[23] One rationale behind such non-linearities is variable or fixed transaction costs, such as shipping or menu costs (Aron and others, 2014), and information acquisition costs (Sims, 2003). Another is nonlinearity in expectations formation, where agents overweight surprising data (Bordalo and others, 2018). In such situations, non-linearity arises because price adjustment may only begin once a particular exchange rate change threshold is reached, while small shocks are absorbed into profit margins or not fully considered in pricing decisions.

- Second, the use of FXI should be confined to large depreciations because the systematic use of FXI by inflation-targeting central banks may cause confusion regarding the primary objective of monetary policy. In countries where an inflation target is meant to serve as the nominal anchor, interventions in the FX markets even where the change in the exchange rate is small could confuse market participants who may perceive the intervention as signaling a shift towards a nominal anchor other than inflation. It is worth noting that such costs of using FXI for price stability are not incorporated in the models (Adrian and others, 2021, Basu and others, 2020, 2023).

74. Large changes in exchange rates are in practice often a combination between fundamental and financial shocks. Large exchange rate depreciations may be generated by financial shocks that may also cause a divergence between the response of inflation and output. For instance, in estimated standard open economy general equilibrium models (including IPF models) the bulk of variation in exchange rates are accounted for by risk appetite shocks (Justiniano and Preston, 2010). Even in the presence of fundamental shocks (e.g., commodity, productivity), large exchange rate movements could be driven, at least in part, by a "risk-off" shock which overlays the fundamental shocks via changes in risk sentiment and premia (Calvo and Mendoza, 2000; Hofmann and others, 2022). A large depreciation may then indicate that the country is facing, at least in part, a non-fundamental shock.

75. The case for using FXI to maintain price stability is stronger when exchange rate movements induce inflation and output to move in opposite directions. The empirical evidence suggests that exchange rate depreciations could be associated with a slowdown in economic activity in emerging markets and developing economies (EMDEs), but not in advanced economies (AEs) (Brandao and others, 2023)**.** This could be due to the expenditure-switching channel of the exchange rate being limited in EMDEs as well as a propensity in these countries for changes in exchange rates to generate changes in financial conditions, owing to shallow markets and/or FX mismatches. When economic activity contracts following a large depreciation, the central bank could exacerbate the economic slowdown if it raises the interest rate sharply to prevent inflation from rising. Conversely, if economic activity is expanding amid a persistent appreciation, lowering interest rates to remedy persistently low inflation could further boost output and credit, increasing risks in

[23] Caselli and Roitman (2019), for instance, document for a sample of 27 emerging markets that the exchange rate pass-through to prices becomes nonlinear when the exchange rate depreciates by more than 24 percent, while pass-through is proportional to the change in the exchange rate for changes below that threshold.

the medium term. In these cases, trade-offs arise for the use of the monetary policy, and there may then be a bigger benefit of using FXI in addition to monetary policy.

76. If the above frictions are severe, the central bank may not be able to look through a large change in the exchange rate. In countries where inflation expectations are well-anchored, the central bank can typically "look through" external shocks since they would impart only a one-off change to the price level and do not affect inflation. In countries where inflation expectations are subject to a risk of de-anchoring, there may be a need for a more active policy response. In the case of a large non-fundamental shock in particular, the policy response—potentially involving a combination of monetary policy and FXI—would aim to reduce large swings in the exchange rate around its equilibrium level, thereby reducing the pass-through to inflation and the need for abrupt adjustments in the policy rate. Such an approach can also be useful when the country, as would often be the case in practice, faces a sequence of multiple shocks, and there is uncertainty as to where the equilibrium value of the exchange rate may lie in future.

77. FXI may also slow the pace of the exchange rate response to real shocks, but this comes with costs and could be useful in only a narrow set of circumstances. In principle, where frictions affecting inflation dynamics are strong, a case for FXI can arise even where a sharp depreciation arises from a fundamental shock (such as a negative supply shock, a shock to commodity prices, or a shock to foreign interest rates). However, in the absence of additional risk-off shocks, there are also important drawbacks to using FXI in these situations: the exchange rate adjustment can help stabilize domestic aggregate demand and demand-driven price pressures after fundamental shocks. FXI would reduce the potential benefit of these mechanisms and distort intertemporal choices, leading to greater consumption of imported goods and higher levels of borrowing from abroad than would be optimal. Moreover, using FXI to keep the exchange rate away from equilibrium values may not be effective, and risks depleting reserves. Use of FXI could therefore be part of a "second-best" policy response in only a narrow set of circumstances:

- First, the judgment would need to be that both the first and second-round effects of the depreciation would be large in the absence of any policy response, arguing for slowing the pace of the change in the exchange rate—by hiking monetary policy, or combining this with FXI.
- Second, a strong monetary policy response faces trade-offs, such that it would lead output to contract sharply, or lead to adverse financial stability effects, or, alternatively, policy hikes lack effective transmission to inflation.
- Third, since the use of FXI to reduce exchange rate depreciation could boost domestic consumption through an income effect, and thus generate inflation, such distortions must be quantitively small enough to ensure that the overall impact of FXI is beneficial.
- Fourth, it should be judged that the use of FXI does not result in a depletion of reserves below adequate levels. In case the real shock is persistent, there should be a planned transition in the response, from FXI to other warranted macroeconomic adjustments.

- Fifth, FXI is judged to have traction because FX markets are shallow and/or because the use of FXI is part of an integrated response where the policy plan includes tighter monetary policy responses in future (Annex). Including FXI in the initial policy response may then allow a more gradual path of policy hikes.

78. Exchange rate depreciations can have larger and longer macroeconomic consequences than appreciations. In countries where the exchange rate is a significant determinant of inflation, large depreciations could have persistent effects on medium- and long-term inflation expectations and larger second-round effects on inflation outcomes than do large appreciations where the dampening effects on inflation are in practice more likely to be capped by downward rigidities (Adrian and others, 2020; Caselli and Roitman, 2019).

79. FXI could nonetheless be recommended when a sustained exchange rate appreciation yields persistently low inflation, and the resulting accommodative monetary policy response leads to an overheating economy. Long and persistent appreciations that reduce inflation and inflation expectations below the monetary policy target may induce the central bank to lower interest rates on a prolonged basis, causing the economy to overheat or fuel asset price bubbles. in an environment characterized by low inflation and low rates, FXI could be considered to reduce exchange rate appreciation over the medium term, allowing the central bank to pursue a less accommodative monetary policy, limiting the overheating of the economy and mitigating the fall of inflation (Cavallino, 2019). The costs to the central bank from accumulating additional reserves, as well as the multilateral implications of this policy should also be considered (see further separate sections below).

80. Monetary policy should be the primary policy lever to address shocks in the presence of the frictions under this use case, with FXI used in support only when trade-offs are severe. When the evidence points to the risk of de-anchoring of inflation expectations, monetary policy should be used as the first line of defense. In this case FXI could be used in addition to monetary policy only if (a) the cost of using monetary policy alone is high, and (b) the cost of including FXI is assessed as low (as further discussed below, ¶90 and ¶91). When the evidence instead suggests strong anchoring of inflation and inflation expectations, there is no need for any policy response under this use case, since monetary policy should then "see through" any swing in exchange rates. Any FXI used would then have to rest on an analysis of the other potential frictions (under use case A or B).

Indicators and Analysis

81. Assessing the sensitivity of inflation and inflation expectations to exchange rate movements is necessary to gauge how appropriate FXI is for this use case. Ex ante, it is critical to estimate the pass-through of the exchange rate to inflation over different horizons, possibly exploring non-linearities in terms of the size of the shock, interactions with the state of the economy, such as the level of uncertainty and the initial level of inflation, and asymmetries with respect to the sign (see also Caselli and Roitman (2019), Carriere-Swallow and others, 2023 for more details). The size of the likely first-round effects can be proxied with measures such as the share of

imported goods in final consumption. First-round effects can also be driven by indexation of prices (such as rents and prices for traded durable goods) to foreign currencies. Where first-round shocks are sizable, the persistence of the shock due to potential second-round effects (e.g., via wage-inflation spirals) is then a necessary condition for the appropriateness for FXI in this use case.

82. Although data on inflation expectations are useful to assess this use case, in their absence, staff can draw on other information. For instance, when estimating the pass-through of exchange rate movements to inflation, staff could assess the persistence of pass-through estimates on headline or core inflation over longer horizons as a proxy for the degree of anchoring of inflation expectations, as exchange rate shocks would move inflation in a more lasting manner in countries where inflation expectations are weakly anchored. Further, staff could explore the usefulness of information from other sources for forecasting future inflation and assessing the potential for de-anchoring. This could include survey information (such as Survey of Business Opinions or Purchasing Managers Index), or additional soft information from private or financial sector contacts. Finally, staff could encourage the authorities to survey the inflation expectations of professional observers. Such a survey can be run by the central bank itself because it covers a relatively small sample of observers (perhaps a dozen external economists chosen from the private sector and banks, university macroeconomists, and regional economists monitoring the country), in contrast to larger surveys typically run by statistical agencies.[24]

83. Prior analysis of exchange rate movements on real activity would be helpful for staff to assess the benefits of exchange rate flexibility for macro adjustment. The effect of exchange rate movements on real activity is determined by the relative strength of "trade" and "financial" channels of exchange rate changes. On the one hand, the trade or expenditure switching channel works via the relative price of imports and exports and implies that an appreciation is contractionary, while a depreciation is expansionary. As shown in the conceptual model, the force of this channel should be weaker in countries where exports are invoiced in a dominant currency (Basu and others, 2020). On the other hand, the financial channel can operate via a tightening (easing) of financial conditions following an exchange rate depreciation (appreciation). The intensity of the trade channel depends on the structure of international trade as well as production structures, while the intensity of the financial channel depends on the extent to which exchange rate movements affect domestic financial conditions.

84. When a shock materializes, staff should assess whether the shock is large enough over the relevant horizon to pose risks to price stability. For the shock to be considered large enough, the movement in the exchange rate should belong to the tails of the relevant distribution over a period long enough to potentially affect inflation expectations. While movements in the exchange rate that reverse over a short period, such as intraday, are unlikely to meet this test, the relevant horizon can depend on country-specific characteristics, such as the sensitivity of inflation expectations to realized inflation and price formation processes. The prior analysis of relationships

[24] See, for example, inflation expectations survey questions from the Czech National Bank, Reserve Bank of New Zealand, South African Reserve Bank, and Central Bank of the Republic of Türkiye.

described above (such as non-linear effects) should be helpful to determine whether the size of the exchange rate shock would justify the use of FXI. Staff should also monitor available measures of high-frequency price data as well as inflation expectations to assess the degree of pass-through to inflation. Several measures can inform about how well medium- to long-term inflation expectations remain anchored, capturing the expectations of professional forecasters, households, and firms, through surveys and markets indicators. A broad approach, looking at changes in all measures, as well as various moments of the distribution of inflation expectations for the survey data (see Box 5), should be taken to assess changes in anchoring, subject to data availability.

85. Contemporaneous analysis should also assess whether the exchange rate shock is causing a contractionary depreciation. The assessment should use real-time measures of output gap and economic slack and evaluate whether these move in opposite direction to current or expected inflation. To justify the use of FXI, the negative co-movement of inflation and economic activity should be strong enough to threaten the achievement of central bank objectives with monetary policy alone.

86. In the case of persistent appreciations, readings of inflation below the inflation target should be accompanied by indications of an overheating economy. The main indicator here is a large and widening output gap. Measures of overvaluation from the EBA and indicators pointing to allocative distortions could also be helpful. Staff and country authorities could also monitor indicators such as excess borrowing from local agents and credit-to-GDP gaps to provide supporting evidence for the appropriateness of FXI.

87. If there is evidence of de-anchoring of inflation expectations owing to a sharp exchange rate movement, the next step would be for staff to judge whether monetary and fiscal policies are at appropriate settings. As part of Article IV surveillance, staff use a range of inputs to form judgments about whether macroeconomic policy settings are appropriate. As described in the general principle #3 (¶17), the appropriateness of FXI depends on this assessment. If expectations are de-anchored because monetary policy is at an inappropriate setting, the policy rate should be adjusted instead of using FXI. If fiscal policy is not consistent with the monetary stance, and generates the potential for conflicts between the monetary and fiscal authorities, the risk of institutional tensions and eventual fiscal dominance may be high. To prevent this scenario, the advice should call for fiscal policy settings to be corrected.

Box 5. Indicators for Use Case C—Supporting Price Stability

Ex ante assessments

Using the indicators below, country teams should regularly assess risks to the pass-through of the exchange rate to inflation:

- Explore non-linearities in terms of the size of the shock, asymmetries with respect to the sign (see Caselli and Roitman (2019), as well as interactions with the pre-shock levels of inflation and uncertainty (Carriere-Swallow and others, 2023)
- Share of imported goods (and commodities such as oil) in total final consumption
- Degree of price indexation, such as rents and traded durable goods
- Characteristics of the labor market, such as the share of inflation-index or negotiated wages, could provide useful information on the risk of a wage-inflation spiral.

The following indicators and structural characteristics may be helpful in assessing the relative strength of the trade and financial channels of the exchange rate:

- Currency of invoicing and elasticity of export and imports to changes in the exchange rate
- Imported component in the production of consumption goods (e.g., share of intermediate and capital goods imports in total imports)
- FX mismatches in private and public balance sheets
- Large share of foreign investors in domestic debt markets.

Contemporaneous assessment

Following IMF (2018), the key metrics used to infer the degree of anchoring of inflation expectations are:[1]

- Absolute deviations in inflation expectations from the central bank target
- Variability of inflation expectations over time
- Dispersion of inflation expectations across individual forecasters or stakeholders
- Sensitivity of inflation expectations to surprises about current inflation.

To assess whether there is a stronger case for FXI, staff should assess whether the exchange rate shock is causing a contractionary depreciation or an expansionary appreciation.

- Contractionary depreciation
  - High-frequency price data as well as inflation expectations
  - Correlation of real-time measures of output gap and economic slack with current or expected inflation.
- Expansionary appreciation
  - Measures of overvaluation from EBA and indicators pointing to allocative distortions
  - Excess borrowing from local agents, credit to GDP gaps.

[1] While each measure has advantages and shortcomings, including in terms of data coverage, these four measures combined convey a consistent picture for each country. Bems and others (2021) construct a country-specific index of abovementioned metrics.

Policy Mix

Ex ante Policies

88. Pre-shock policy advice should focus on lowering the sensitivity of inflation and inflation expectations to movements in the exchange rate. Building central bank credibility is key in improving policy trade-offs. Strengthening the credibility of the monetary policy framework may firm inflation expectations and can help reduce pass-through of exchange rate changes (see Kabundi and Mlachila, 2019, and Carriere-Swallow and others, 2021).[25] In that regard, a high degree of central bank independence, a credible monetary policy framework, a coherent operational strategy, and clear communication would contribute to limit vulnerabilities emanating from exchange rate fluctuations, for example, by lowering the level of dollarization or indexation in the economy. Policy advice could also consider structural reforms aimed at improving monetary policy transmission, such as by developing and deepening LC markets and reducing the share of wages subject to indexation. Fiscal policy frameworks and settings should also be designed to minimize institutional conflicts between the fiscal and monetary authorities.

Ex post Policies

89. Under this use case, monetary policy adjustment needs to play the primary role in responding to shocks ex post. FXI should be used in support of price stability objectives only when monetary policy is used as the primary tool to lean against the shock. If the exchange rate depreciation is caused by relatively loose domestic monetary policy ex ante, the advice should first focus on adjusting the monetary policy stance. If an advanced country monetary policy tightening is moving interest rate differentials, monetary policy should be adjusted in the first instance to stabilize inflation expectations, as needed in the context of the ensuing depreciation. Staff should judge whether FXI could support monetary policy when the differential induces a large depreciation that triggers second-round effects.[26]

90. FXI should be used in support of price stability objective only if the cost of responding to the shock with monetary policy alone is assessed as high. First, under certain circumstances, using monetary policy alone could lead to adverse financial stability effects, or otherwise generate sharp trade-offs across central bank objectives. As noted above, for instance, raising policy rates

[25] For example, Kabundi and Mlachila (2019) argue that exchange rate pass-through in South Africa declined over time as a consequence of enhanced central bank credibility, which they relate to the level and volatility of inflation. Carriere-Swallow and others (2021) find that greater monetary policy credibility, as measured by better-anchored inflation expectations, has significantly reduced the exchange rate pass-through to consumer prices in a sample of 62 advanced and emerging economies.

[26] This advice on the use of FXI in response to world interest rate movements differs from the IPF conceptual model (Basu and others, 2020), which prescribes that FXI either should not be used or should accommodate a global interest rate shock rather than lean against it. The reason is that the model assumes that the central bank has sufficient monetary credibility to prevent the pass-through of the exchange rate depreciation from generating second-round effects and higher core inflation. If FXI is used with an objective to maintain price stability in an environment of significant second-round effects, it should aim to limit rather than amplify exchange rate movements triggered by changes in global interest rates.

sufficiently to lean against large depreciation shocks could trigger a sudden increase in the debt servicing costs and default risk of LC borrowers. This could in turn lead to systemic financial stresses, particularly where variable interest rate or inflation-indexed debt contracts prevail and leverage is high (Akinci and others, 2020).[27] Second, monetary policy could be constrained by an effective lower bound in responding to sustained exchange rate appreciations that persistently reduce inflation and inflation expectations. Using only the policy rate may then be insufficient to achieve the central bank's objective. Third, although in general, monetary policy transmission from short-term rates to the economy can work in emerging markets (Brandao-Marques and others, 2020), the transmission of policy rate changes along the yield curve could be structurally weak or temporarily clogged, thus increasing the odds of failing to achieve the inflation target when responding with monetary policy alone. In such cases, FXI can be considered to reduce the burden on monetary policy, provided the cost of using FXI is assessed to be low (Figure 1).

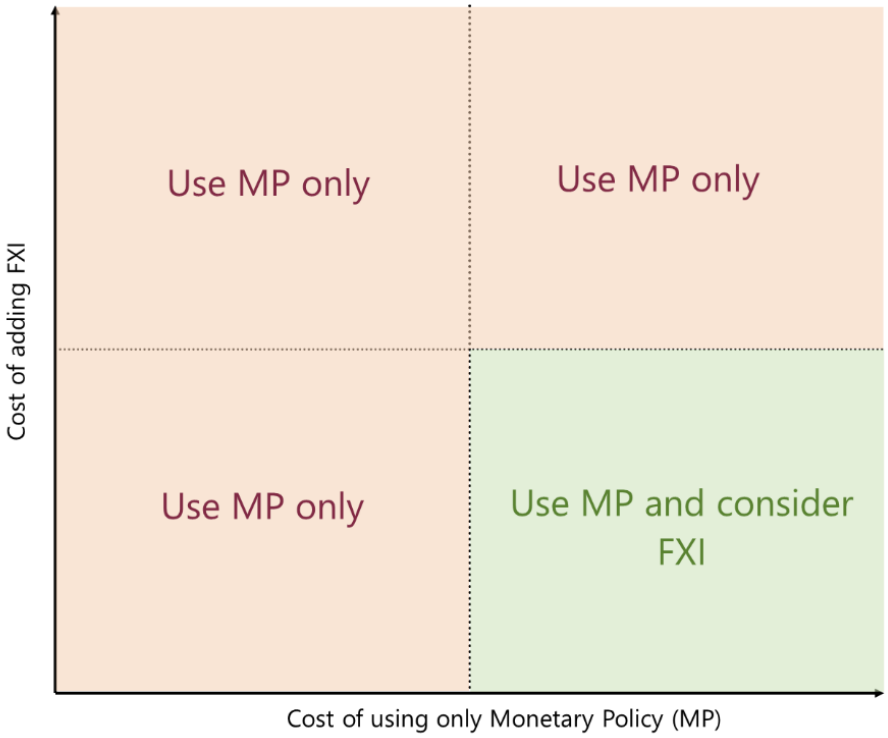
91. FXI should be used in support of price stability objectives only if the costs of including FXI in the policy response are assessed as low. First, the costs of spending reserves can be high if the likely traction of FXI in leaning against the sharp change in the exchange rate is assessed to be weak, based on the level of reserves, FX market liquidity, and potential signaling effects. Second, even where reserves are adequate and FXI could be effective, intertemporal trade-offs in accumulating and spending reserves may argue in favor of holding on to reserves when these could be needed for FX lending operations in response to a future FX liquidity squeeze (as discussed in the dedicated section further below). Third, in the absence of a well-defined and clearly communicated strategy outlining circumstances under which FXI is used to support price stability, the use of FXI to lean against the depreciation could undermine credibility in the monetary policy framework of the central bank and destabilize inflation expectations (as discussed in the next section). When such costs are assessed as high, the policy response should rely on monetary policy alone.

92. Beyond FXI, in the appreciation case, the use of inflow CFM could be appropriate in line with the IV, provided that reserves are assessed as already more than adequate. In the context of an inflow surge, CFMs would be appropriate if the exchange rate is overvalued, the economy is overheating and reserves have become ample (IMF 2012a). However, if it is difficult to adjust or implement CFMs, FXI may be preferred by the country.

93. Countercyclical fiscal policies may be useful complements to address overheating. Fiscal policy can play a role especially if the impact of the external shocks cannot be neutralized using IPF policy levers, such as when FXI, CFMs, and MPMs are ineffective, or the use of FXI and CFMs is constrained by multilateral considerations. However, fiscal policy could also exacerbate the policy tradeoff as tight fiscal policy could add to the appreciation pressures by lowering the country risk premium.

[27] Real policy rates might then be bounded above by a 'financial (in)stability interest rate', at which the economy teeters between financial tranquility and instability (Akinci and others, 2020). Akinci and others (2020) estimate the financial stability interest rate in a real environment absent nominal rigidities, thus abstracting from interactions between monetary policy and the rate above which the economy tilts into crisis.

Figure 1. IPF Policies in the Face of Large Exchange Rate Shocks—Use Case C



INSTITUTIONAL CONDITIONS

Principle: For all the use cases identified above, strong central bank governance and communications are necessary to ensure the success of FXI under the IPF. Where these elements are weak, staff should be more cautious in advising the use of FXI under the IPF.

Explanations

94. Even when warranted by policy goals and macroeconomic conditions, the benefits of FXI are likely to outweigh its costs only when specific conditions are satisfied. First, the operationalization of FXI would require strong central bank governance and transparency to ensure legal, decisional, and operational autonomy as regards intervention policies. Second, the use of FXI, may lead to confusion about the role of the exchange rate and increases the complexity of monetary policy communications. Where a central bank has a poor track record of communication and lacks credibility, these elements would need to be improved before there can be a fruitful dialogue on the use of FXI under the IPF. Although staff may need to provide recommendations even when these conditions are not met, such advice should be subject to greater caution.

95. Identifying winners and losers from exchange rate fluctuations is straightforward and may open the door to intense lobbying from interest groups when FXI is included in the policy toolkit. There are clear near-term winners and losers from exchange rate fluctuations. Exporters gain from depreciation episodes and from central bank FX purchases to reduce

appreciation, while importers lose from depreciation and gain from FX central bank sales to reduce it. Therefore, the explicit use of FXI to offset specific shocks may open the door to pressures from different interest groups that may lobby the central bank for a higher or lower exchange rate. The distributional effects of FXI can also invite political pressures for the central bank to take account of the interests of specific groups or businesses.

96. The use of FXI therefore requires strong central bank governance and transparency to ensure legal, decisional, and operational autonomy as regards intervention policies. While such prerequisites of an independent central bank are crucial to the adoption of other regimes, for instance inflation targeting, the degree of autonomy and governance strength required for a joint use of policy tools, including FXI, appears even greater given the wider range of possibilities for interest groups to lobby for policy actions. A separate set of issues could arise when institutional arrangements are such that the government is responsible for the use of FXI, reducing the prospects for an integrated use of FXI with the central bank's conduct of monetary and financial policies.

97. The use of multiple tools to pursue stability objectives can involve significant communication challenges and could weaken central bank credibility. A communication strategy is a key aspect of the soundness of the monetary policy framework. Communication in a canonical IT framework is simplified by the coexistence of one tool (i.e., the interest rate) and a decision-making framework where policy responds to changes in the outlook to achieve well-defined objectives (i.e., inflation and output gap). In contrast, designing and implementing a communication strategy with multiple tools is more challenging. If not properly addressed, these communication challenges could damage the credibility of central banks and ultimately weaken the effectiveness of monetary policy, especially for central banks whose track records are poor, or whose initial level of credibility is low.[28] Lack of capacity to communicate FXI can also magnify governance concerns.

98. In this context, the IPF itself can help mitigate concerns by clarifying policy frameworks and improving the central bank's communication capacity. The IPF provides a foundation for a sound governance structure as it provides the basis for a decision-making framework involving the use of multiple instruments (including monetary policy, macroprudential policy, CFMs and FXI) in response to a comprehensive array of shocks. Building on an analysis of the specific frictions prevailing in a country, a policy strategy could be developed that fits the given country context. Furthermore, particularly for countries where markets are shallow and where there may be a history of using FXI frequently, the IPF framework can help clarify the objectives and appropriate conditions for such use, thereby improving communication. A well-communicated policy strategy would in turn improve the effectiveness of FXI (Annex).

[28] For example, Kabundi and Mlachila (2019) argue that exchange rate pass-through in South Africa declined over time as a consequence of enhanced central bank credibility, which they relate to the level and volatility of inflation. Relatedly, some authors have suggested that heavy reliance on FXI in EMDEs may increase the likelihood of central banks to overshoot inflation targets (Adler and others, 2020), but evidence is not conclusive, and others do not confirm this effect on inflation outcomes (Hofman and others., 2020).

99. In the context of the IPF, and more generally, improvements can be sought to enhance governance and communication of FXI across several dimensions:

- An appropriate governance structure would include: (i) a well-articulated policy strategy for FXI; (ii) a preestablished decision-making process, including the method used to process the information supporting FXI decisions and the scope for judgment; (iii) an internal guideline on implementation of FXI; and (iv) an ex post assessment of FXI.

- To support good governance and enhance credibility, an appropriate level of transparency is important, and can be achieved by following best practices, including (from the CB transparency code):[29] (i) the disclosure of the overall policy strategy for FXI, avoiding vague or interpretable language; (ii) the disclosure of FXI decision-making processes and supporting analysis; (iii) transparency on the instruments utilized and on the selection of counterparties; and, (iv) accountability for outcomes through the publication of regular FXI assessment analyses.

- As regards content, central bank communication should cover three elements: (i) the policy regime and objectives, (ii) the policy strategy, explaining how policy decisions relate to objectives and data available to the policy maker, and (iii) policy decisions, including explanations for policy decisions taken. Communication should be clear and transparent and delivered regularly, messages tiered to target different audiences, and information made equally accessible to all target audiences in a timely manner. Consideration can be given to publishing information with a lag, where there are concerns about the market impact.

100. Nevertheless, policy advice should assess whether use of IPF tools could magnify pre-existing challenges. FXI can be an appropriate tool for central banks that have built a good track record in terms of both credibility and communication. These would tend to be countries where the inflation objective would have been broadly achieved on average, even if they are subject to IPF frictions. However, for central banks that face communication challenges; that have not been able to achieve their price stability mandate even absent major external shocks; or have recently transitioned to IT from a fixed exchange rate arrangement, initiating a use of FXI may magnify preexisting challenges. In these cases, capacity development could identify the main shortcomings in key areas and contribute to strengthen the policy framework.

Indicators and Analysis

101. The assessment of governance and communication for the use of FXI should be guided by staff judgment and by existing metrics to evaluate monetary policy frameworks. For instance, safeguards assessments and central bank transparency code reviews could provide indications about strengths, weaknesses, and potential areas for improvement in governance and communications. In addition, the toolkit developed by Unsal and others (2022) provides a comprehensive assessment of monetary policy frameworks across countries. The resulting data is granular and can be used flexibly to look at the relevant parts of the monetary framework. Where

[29] See further the IMF Central Bank Transparency Code.

these metrics are not available, capacity development could be provided to close the data gaps and allow for an adequate assessment of communications and governance.

102. The relevance of preconditions may be different depending on the use cases. For instance, in use case A, governance needs to be strong to prevent central bank from being pressured by stakeholders to maintain a specific level of exchange rate. In use case B, the central bank needs to exercise restraint in order not to generate moral hazard that could incentivize excessive borrowing. In use case C, an effective communication strategy by the central bank is paramount in helping to explain the conditions for the use of FXI as part of the inflation targeting framework.

ACCUMULATING AND SPENDING RESERVES

Principle: Advice should evaluate intertemporal trade-offs in spending and accumulating FX reserves.

Explanation

103. Intertemporal trade-offs can arise from three considerations. First, sufficient reserves are necessary for FX sales to be effective, since an expectation that the central bank will run out of reserves can lead to speculative attacks. Second, to enable ex post intervention, countries with the vulnerabilities outlined in use cases A, B, and C, should accumulate FX reserves in normal times, while also considering the costs of carrying reserves. Third, spending reserves today reduces the ability to use reserves in response to future shocks when replenishing reserves takes time.

104. Sufficient reserves are necessary for the credibility and effectiveness of FXI during outflow episodes.

- *Credibility*. FX reserve accumulation can boost the credibility of FXI, as the higher level of reserves can provide an important signal to the market that the central bank can reach the objectives set for the intervention. The extensive literature on global games following the seminal paper by Morris and Shin (1998) points to the level of FX reserves as a signal of resilience, as it provides central banks with ammunition to use FX sales to counter pressures. This, in turn, would reduce the probability of success of a speculative attack.

- *Effectiveness*. A higher level of FX reserves may increase the effectiveness of FXI by allowing the central bank to reach its objectives with smaller intervention amounts. In fact, an adequate level of FX reserves is a necessary condition to engage successfully in FX intervention during capital flow volatility or outflow episodes, partly because this increases the credibility of the intervention (see e.g., Basu and others, 2018).

- *Resilience building effects*. There is broad consensus more generally that FX reserves provide significant buffers for EMDEs, by reducing vulnerabilities and increasing policy space (see Frankel and Saravelos, 2012 for a survey, Eichengreen, Rose, and Wyplosz 1996, and Frankel and Rose 1996).

105. However, accumulating sizeable reserves entails considerable costs, warranting an evaluation of the trade-off between the benefits of accumulating higher levels of reserves and their costs. Countries that intend to use FXI as a policy tool may benefit from a larger amount of FX reserves than other countries. However, there are opportunity costs of holding reserves, as these resources could instead be used to pay down costly external debt. In addition, there are sterilization costs since the interest cost that the central bank must bear on its LC liabilities often far exceeds the return on the FX reserves assets. Moreover, when FX purchases lead to large increases in reserves, this can expose the central bank to risks from valuation losses in the event of a large appreciation of the LC since the accumulated FX reserves would lose value.

106. These benefits and costs suggest the existence of an optimal level of reserves for countries that utilize FXI as an IPF tool. The optimal level of reserves will need to be assessed on a case-by-case basis, depending on country characteristics and intention to use FXI as part of the IPF toolkit. In general, this involves evaluating the trade-offs between the benefits of accumulating and holding a higher level of reserves and its costs. For instance, where the capital account is fully open, and there are few FX market frictions, large amounts of reserves could be needed to affect the exchange rate, reducing the attractiveness of using FXI as a policy tool. In terms of costs, the interest rate differential on FX and LC assets, as well as other valuation risks, would need to be assessed in a country-specific context.

107. Such considerations are in line with current Fund policy on FX reserves, including the reserve adequacy range. The current policy of the Fund is to assess reserve adequacy for precautionary reasons using the ARA metric and apply a range of 100–150 percent (though for most LICs ARA is still based on months of imports), which could be complemented by scenario analysis in case of specific risks and vulnerabilities, as well as additional considerations which may require higher precautionary reserve holdings (IMF, 2011).

108. Several elements—frictions, indicators, and operational factors—must be considered in determining the appropriate FX reserves level for IPF use. As is current practice, when the level of recommended FX reserves goes beyond 150 percent of the ARA metric, the recommendation should be justified on precautionary grounds, building on indicators and metrics already discussed above for each of the use cases:

- *Use case A considerations (shallow FX markets)*: the level of reserves should be sufficient to allow for FXI to ensure markets continue to function efficiently in episodes of large inflows and outflows: indicators should include the size of the overall FX market, size of the markets that are not functioning efficiently, required intervention to affect premia/exchange rate levels, structural liquidity measures Vayanos and Wang, 2012), etc.

- *Use case B considerations (FX mismatches)*: indicators include the level and distribution of FX mismatches, the nature of cross-border debt contracts, stress tests; structural measures of illiquidity (for effectiveness of FXI). If necessary, higher reserves than 150 of ARA metric could be justified on precautionary grounds, given the direct link to financial and macroeconomic stability.

- *Use case C considerations (price stability)*: indicators include estimates of exchange rate pass-through, volatility of inflation expectations; structural measures of illiquidity (to gauge how much intervention may be needed). In certain cases and countries, higher reserves for use case C can also be justified on precautionary grounds, since large movements in ER could jeopardize macroeconomic stability when they de-anchor inflation expectations.

109. Advice on how to build and replenish reserves to the desired levels should draw on established principles. These principles imply that accumulation of reserves outside of the use cases discussed above should generally proceed in a manner that avoids impacts on the exchange rate. In this context, it will be useful to aim at strengthening communications with market participants, minimizing market disruptions, and increasing confidence. For example, the central bank could pre-announce purchases with predefined auction calendars and apply a fixed volume/variable price format.[30] While some central banks engage in opportunistic purchases to take advantage of capital inflows, such practice can entail costs.[31]

110. Trade-offs also arise in spending reserves during outflow episodes. In general, and in any multi-period setting, since the amount of available reserves is bounded, intertemporal trade-offs arise when spending reserves today reduces the ability to respond to shocks in the near future. While such trade-offs can arise for all countries to some extent, countries that find accumulating reserves difficult face greater intertemporal trade-offs in spending reserves. The experience is that central banks often find it difficult to replenish reserves quickly without affecting the exchange rate, and that this is particularly so for countries with limited FX inflows from exports and limited access to international capital markets.

111. Such trade-offs should lead to additional scrutiny of the case for FX sales. First, spending reserves may be followed by a period during which the central bank is below its reserve target, and unable to respond with similar efficiency should another shock materialize. Moreover, central banks may want to maintain some reserves for dedicated purposes, such as FX liquidity support—market-wide FX swaps or ELA in FX to support stricken borrowers. In countries where the assessment is that there may be a need for such operations, this should be borne in mind before spending reserves in outright sales.

112. Greater amounts of reserves may need to be spent where effectiveness of FXIs in achieving policy objectives is weaker. There is less "bang for the buck" from FXI in highly liquid FX markets, requiring the central bank to spend much larger amounts. Conversely, in the presence of arbitrage frictions that strengthen the portfolio balance channel and induce traction for FXI, central

[30] For pre-announced purchases, market participants might anticipate the purchase and artificially increase the price at which the CB conducts the auction. This applies especially to FX markets with dominant players/ risk of (implicit) collusion/ lack of competition.

[31] When CBs resort to opportunistic purchases, it might harm credibility (could be viewed as not allowing ER appreciation, rather than reaching an FX reserve target faster). It also opens the door for CBs to not accumulate reserves due to adverse market conditions, and wait for favorable market conditions, which again can harm credibility.

banks can achieve their policy objectives with smaller reductions in the stock of reserves, thus reducing the intertemporal trade-off they face in spending reserves.

113. Tradeoffs in spending reserves are mitigated if FXI objectives are credible and can be communicated clearly. Empirical research suggests that a strong policy framework that permits the central bank to communicate effectively about its objectives in conducting FXI can increase effectiveness of FXI (Annex). In particular, when policymakers can credibly signal a policy commitment to achieve a specific objective, the effect on market expectations can reduce the amount of reserves that needs to be spent in the intervention. For these announcements to be effective, the central bank must have a sufficiently high level of reserves for the intervention to be credible. In a situation of a high level of reserves coupled with clear communication regarding the central bank's specific objectives, the sufficient level of reserves could be lower.

114. Conversely, if reserves are low, the ability of a central bank to undertake FXI may be limited due to lack of credibility. Difficulty in accumulating reserves and a low level of reserves would reduce the ability of the central bank to credibly commit to its policy objectives by selling FXI. In more extreme cases, FX sales by central banks with difficulties accumulating reserves and with low reserves may trigger mechanisms that further reduce the effectiveness of FXI and may induce speculative attacks. Therefore, under these conditions, it is not advisable to recommend FXI, and countries should rely more on other IPF tools—e.g., macroprudential, monetary and fiscal policy, etc.— in their policy framework.

MULTILATERAL CONSIDERATIONS

Principle: Consistent with Fund policy, the advice on FXI under the IPF needs to consider its multilateral effects. Fund advice may caution against further reserves accumulation if all the following three conditions are met: (a) country's external position is stronger than the level implied by medium-term fundamentals and desirable policies; (b) such effects are caused by the country's policies; and (c) the country is already beyond the ARA metric.

Explanation

115. Advice on FXI needs to consider multilateral effects (as discussed in the Articles of Agreement, the ISD, and the External Sector Assessments of countries), including from "beggar-thy-neighbor" policies. Countries may engage in FXI in part to maintain an undervalued exchange rate and to strengthen the country's international competitive position. This type of policy clearly represents a negative externality for other countries, who may also react by undertaking their own FXI, leading the way to currency wars. In this respect, Article IV, Section 1 (iii) of the IMF Articles of Agreement stipulates that each member shall "avoid manipulating exchange rates in order to prevent effective balance of payments adjustment or to gain unfair competitive advantage over other members."

116. FX purchases in particular may give rise to multilateral tensions by exacerbating or prolonging a currency undervaluation. The Fund's policy is that, generally, each member country

team conducts an External Sector Assessment in its Article IV Staff report (or other relevant staff report), to judge the strength of the country's external position, and whether that strength is due to the member's own policies, or external factors. In addition, Fund policy generally recommends purchases to build up FX reserves for precautionary reasons, and for EM countries, this is generally interpreted as having reserves within the relevant ARA metric, unless there are specific systemic vulnerabilities which would warrant higher reserve coverage.

117. In this context, when operationalizing the IPF, an appropriate set of considerations on multilateral spillovers need to be in place to ensure consistency with current IMF policies. These considerations imply that Fund advice may caution against further reserve accumulation if the following three conditions are met:

- The member country is assessed as having an external position that is stronger than medium-term fundamentals and desirable policies.
- This assessment (stronger than medium-term fundamentals) is due to the member country's own domestic policies (or policy gaps),
- The member country seeks to accumulate reserves beyond the level recommended by the ARA metric.

118. In cases where these conditions are met, the Fund's advice on further accumulation of FX reserves would need to balance the multilateral considerations with the member country's need for higher reserves for use of FXI. In particular, the country team, jointly with MCM, RES, and SPR, would need to make a judgment call on whether the specific further use of FXI outweighs the multilateral considerations. Other considerations, for example, whether the authorities will take policy measures to reduce their domestic policy gaps, and thus reduce the strength of the external position, can also be considered when making this assessment.

119. In its multilateral surveillance, the Fund also examines spillovers arising from policies of members that may significantly influence the effective operation of the international monetary system. As outlined in the Integrated Surveillance Decision (ISD), in its multilateral surveillance, the Fund examines issues including global economic and financial developments, and significant spillovers from a member's policies (including exchange rate, monetary, fiscal, financial sector and capital flow management policies) that have important global effects directly or indirectly, for instance in combination with the spillover effects of other members' policies or through their regional impact. As a result, even if domestic policies do not give rise to domestic instability (and, accordingly, are not subject to bilateral surveillance), those policies will still be a relevant topic of multilateral surveillance to the extent that they may materially impact the effective operation of the international monetary system, e.g., by undermining global economic and financial stability.

120. Implications of the use of FXI for the international monetary system would be covered in the Fund's multilateral surveillance. Such effects may arise, for example, when a group of

countries that account for a considerable fraction of global GDP or FX reserves respond to an economic or financial shock simultaneously and in the same way. For instance, in the event of an outflow shock, when a group of members sell FX reserves simultaneously these sales may cause the yield on reserves assets to rise, potentially then exacerbating outflows for EMDEs as a whole. Even as the probability of such adverse effects arising has been argued to be low (Adrian and others, 2021), were such circumstances to arise, the multilateral effects of these actions could influence the international monetary system. Under such circumstances, and consistent with the ISD, the Fund may then also provide advice to these countries on how to achieve the same policy results with smaller multilateral spillovers.

Annex I. Effectiveness of Foreign Exchange Interventions

There is an extensive literature devoted to the effectiveness of sterilized FX interventions. Theoretical studies rationalize FXI effectiveness by relying on financial or informational frictions. Recent empirical studies for EMDEs generally find that interventions are effective in moving the exchange rate (and sometimes in managing capital flows), at least for a short period. FXI is found to be more effective when the capital account is less open, when the direction of interventions is consistent with the monetary policy stance, when interventions move the exchange rate closer to fundamentals, and when interventions are transparent and well communicated.

1. There is a large body of work on the effectiveness of sterilized FXI by central banks. In this literature, effectiveness is typically defined as the ability of FXI to move the exchange rate, although its impact on capital flows and the central bank's ability to control inflation have also been subject of research. Few studies have considered effectiveness explicitly in terms of reducing arbitrage frictions, which is an important caveat when interpreting findings in the context of the IPF.

2. This literature has analyzed both the theoretical channels through which FXI could be effective, as well as the empirical evidence. While findings in both dimensions have been mixed over time, progress has been made towards a better understanding of the conditions under which FXI can be effective. On the theory, the recent literature has conceptually singled out the kind of plausible market conditions and frictions where FXI would be effective, in contrast to the early studies that were more skeptical about effects from interventions. Similarly, empirical work in recent years has been documenting evidence in favor of FXI effectiveness, as more cross-country and higher frequency data has allowed better identification, mostly on the short-run horizon, which stands in contrast to earlier work on the subject. [1]

3. The main two channels that theoretical studies have postulated to rationalize the effectiveness of sterilized FXI are the portfolio balance and signaling channels. These channels, in turn, rely on the presence of financial and information frictions, respectively. In the former, the assumption of perfect substitutability between domestic and foreign assets is relaxed, implying that FXI alters the *composition* of agent's portfolios, since central banks buy (or sell) domestic assets in their sterilization operations. As this process takes place and agents try to rebalance their portfolios, the spot exchange rate should shift to affect the domestic value of foreign bonds and the expected value of holding them. In the latter, even if perfect substitutability holds, FXI may still be effective as it can signal information about the future stance of monetary policy. The exchange rate being a forward looking variable, such a signal on future variables affecting the exchange rate will affect the *current* level of the exchange rate. Implicit in this channel is the assumption that FXI provides markets with new information from authorities that are willing to convey this information through

[1] There is much less debate on the effectiveness of *unsterilized* FXI, which is widely regarded as effective owing to its impact on monetary aggregates, but unsterilized interventions play no role in the IPF and will not be covered in this Annex.

their actions in the foreign exchange market. Theoretical surveys that explore these two channels are Sarno and Taylor (2001), Evans (2005), Lyons (2006), Villamizar and Perez-Reyna (2015).

4. **While early theoretical studies cast doubt on the effectiveness of FXI (Backus and Kehoe, 1989), more recent studies have come to sharply different conclusions that favor FXI effectiveness.** Cavallino (2019) characterizes the optimal use of sterilized FXI to lean against the wind of exchange rate fluctuations driven by capital flows, within a New Keynesian small open economy model. Central to the mechanism in his model is the presence of financial frictions a la Gabaix and Maggiori (2015), who provide microfoundations for the imperfect substitutability of assets in the portfolio channel, where the exchange rate is determined by capital flows. A key element in this channel is the presence of limits to arbitrage by market participants. In the same spirit, Chang (2019) provides conditions under which FXI can be effective during financial crises, by relying on other kinds of financial frictions through occasionally binding borrowing constraints on the part of banks. In this setting, FXI can relax such tighter constraints in times of financial distress where FX liquidity dries out. Taken together, these theoretical findings lend support to the view that, through its effect on the exchange rate and capital flows, FXI could help central banks meet their inflation and financial stability goals.

5. **The empirical literature on the effects of FXI has also evolved over time, with more recent studies often finding evidence of effectiveness.** Early studies, focused primarily on advanced economies, were often inconclusive. Recent studies, however, have often found that FXI is effective. As more cross-country data on EMDEs became available, and at higher frequencies, more recent studies have been able to address the important identification challenges, focusing on the short-term effects of FXI, for which there is compelling evidence. Moreover, it has been documented that FXI is widely used as a policy instrument, including by inflation-targeting central banks with flexible exchange rates, and is widely *perceived* by central bankers as effective. Compilations of empirical findings are found in Dornbusch (1980), Meese and Rogoff (1988), Dominguez and Frankel (1993), Edison (1993), Dominguez (2003), Fatum and Hutchison (2003), Neely (2008), and Menkhoff (2013).

6. **Two key results surface from this newer empirical literature, as summarized by IMF (2020b).** First, the evidence from EMDEs over the past two decades suggests that FXI can affect the exchange rate, at least in the short term. Second, evidence also shows that FXI can help manage volatile capital flows and reduce financial market stress. Owing to the methodological challenges mentioned, these estimates refer to the short run, although Adler and others (2019) and Filardo and others (2022) also found some evidence for real effects at longer horizons. On the downside, there is evidence that FXI can encourage the buildup of unhedged FX liabilities (Kim and others, 2020), and that increases in FX reserves increase corporate leverage (Tong and Wei, 2021). However, there is limited evidence so far that its use reduces the credibility of central banks, which in turn is found to affect pass-through from exchange rates to domestic prices (Carriere-Swallow and others, 2021).

7. **Finally, recent empirical findings have also shed light on some of the modalities under which FXI has been found to be more effective.** In their cross-country study on Latin America, Chamon and others (2019) underscore two key central themes that emerge when assessing the

characteristics that have increased FXI effectiveness in this region: the importance of transparency and strong communication policies, as well as the benefits of rules-based intervention. Both elements, the authors argue, have helped central banks strengthen the effectiveness of interventions and preserve the credibility of their monetary policy regimes. This is echoed by Fratzscher and others (2019) who, using one of the most comprehensive cross-countries datasets on FXI, find that appropriate communication by the authorities can enhance effectiveness and that FXI is more effective if it is accompanied by oral intervention, even more so during turbulent times. In line with this, Arenas and Griffith-Jones (2023), using daily and intra-day data on the recent FXI in Chile in 2019 and 2022 find that these actions had significant effects and that announcements had greater effects compared to the interventions themselves. Fratzscher and others (2019) also find evidence that interventions tend to be more effective if they are large in size, are executed in line with the prior exchange rate trend, and go toward the longer run fundamental equilibrium. Likewise, IMF (2020b) argue that FXI is most effective when it is consistent with fundamentals and the monetary policy stance. Lastly, it has been found that FX sales are more effective than purchases; particularly in countries with less open capital accounts and shallower FX markets. Gelos and others (2022), for instance, presents evidence that FX sales are effective in reducing downside risks to portfolio flows and can improve the outlook for median flows as well, consistent with the finding that FXI can have a stabilizing effect on capital flows in earlier work by Ehlers and Takáts (2013). Similarly, Magud and Pienknagura (2023) find that, in response to VIX shocks, FXI has a greater impact in shallower FX markets.

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