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Iceland: Selected Issues

INTERNATIONAL MONETARY FUND

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ICELAND

SELECTED ISSUES

July 2024

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ICELAND

SELECTED ISSUES

June 24, 2024

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INTEGRATED POLICY FRAMEWORK—ICELAND PILOT STUDY

Iceland is an advanced economy pilot under the Integrated Policy Framework (IPF). The IPF helps assess the appropriate policy responses to shocks for economies vulnerable to capital flow volatility, allowing for some market frictions. Shallow FX markets is the main friction identified for Iceland under the IPF. An estimation of the Q-IPF model for Iceland suggests some benefits of foreign exchange intervention at times of stress, in line with the overall strategy pursued by the CBI.

A. Introduction

1. The Integrated Policy Framework (IPF) helps assess the appropriate policy responses to shocks for economies vulnerable to capital flow volatility. Cross-border capital flows provide significant benefits but may also generate or amplify shocks. The challenges are particularly pronounced in emerging market and developing economies, although also relevant for small open advanced economies. Some of these countries can have "frictions" identified under the IPF framework, such as shallow FX markets, balance-sheet FX mismatches, and weakly-anchored inflation expectations. In such cases, complementary policies, including pre-emptive capital flow management measures (CFMs), macroprudential measures (MPMs), and Foreign Exchange Intervention (FXI), could in certain circumstances mitigate the costs from relying solely on standard monetary policy tools to respond to shocks.

2. Iceland is an advanced economy pilot under the IPF with some of the frictions identified under the IPF framework. Iceland is a small open economy with a floating exchange rate and an inflation targeting monetary policy regime. Shallow FX markets for the Icelandic króna (ISK) is identified as the key friction under the IPF pilot study, implying a potential use of FXI and CFMs under the IPF framework. The rest of this paper is organized as follows: Section B outlines the key conceptual ideas of the IPF framework and its interrelation with other Fund policies. Section C empirically assess the IPF frictions for Iceland. Section D provides the results of the IMF's quantitative IPF (QIPF) model estimated for Iceland, while section E concludes.

B. The IPF Framework Within the Fund's Overall Policies

3. The IPF supports the IMF's and the authorities' thinking about policy responses to shocks. The IPF considers jointly the role of monetary, exchange rate (including foreign exchange intervention), macroprudential and capital flow management policies, and their interactions with each other and other policies. It aims to clarify the conditions under which the use of these instruments is appropriate, and it guides the deployment of multiple tools in concert to achieve macroeconomic and financial stability objectives. The concepts of the IPF framework is documented in a series of papers with (IMF 2020a) laying out the key concepts, and (IMF 2020b, IMF 2020c, IMF 2021, IMF 2023a IMF 2023b, and IMF 2024) providing the main conceptual and quantitative modelling frameworks for assessing policies under the IPF. (IMF 2023c) provides principles for the

use of FXI under the IPF framework, focusing largely on countries with flexible exchange rates. This Iceland pilot study follows a set of other pilot studies, documenting country experiences assessed against the IPF framework.[1]

4. The IPF incorporates market frictions and imperfections to inform policymakers on policy tradeoffs. In the standard workhorse macroeconomic model dating back to Mundell-Fleming (1962, 1963), countries with flexible exchange rates should allow its free adjustment in response to shocks. The IPF framework introduces a set of frictions that may arise in practice and hinder the appropriate macroeconomic adjustments to shocks, while amplifying undesirable macroeconomic destabilization. The framework also introduces additional instruments that can help policymakers improve policy tradeoffs. In particular, the IPF framework can help inform policymakers on the costs and benefits related to the joint use of FXI, MPMs, and CFMs. Three important potential frictions (or country characteristics) emerge from the conceptual and quantitative models developed so far for the IPF: the depth of the foreign exchange market, the stock of unhedged debt in foreign currency, and the degree of anchoring of inflation expectations. All these frictions can amplify an adverse exchange rate shock, and the associated frictions can under certain circumstances be mitigated through the use of FXI, MPMs, and CFMs. Some countries may have one or more of these potential frictions, and some countries may have none.

- **Shallow or temporarily illiquid FX markets can amplify a capital flow shock.** Shallow FX markets can amplify exchange rate developments after financial shocks at times of stress as the FX market cannot absorb the capital flow, leading to an interest rate premium on local currency debt via a deviation from the Uncovered Interest Parity (UIP). This premium can cause excessive borrowing or deleveraging that can generate macroeconomic destabilization, as well as exchange rate overshooting (larger depreciation than what would be the case in normal circumstances).

- **Currency mismatches on borrowers' balance sheets are a key source of financial fragility.** The stock of unhedged foreign currency (FX) debt increases the risk of costly capital account reversals due to the increased cost of debt servicing or debt-rollover of unhedged foreign currency denominated debt.

- **De-anchoring of inflation expectations can influence the magnitude and duration of the economic impact.** De-anchoring of inflation expectations due to a large exchange rate pass-through may necessitate a larger monetary policy response in economies. Such an outcome may be more likely when a capital flow shock is amplified in cases with shallow FX markets.

5. The IPF is consistent with existing Fund policies on FXI, CFMs and MPMs. 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

[1] See e.g., Staff Reports for the Article IV consultation with Thailand 2022, Philippines 2022 & 2023 (SIP), Peru 2023, Colombia 2023, India 2023, Indonesia 2023, Malaysia 2023, Mexico 2023, South Africa 2023, Romania 2023, Albania 2023, Angola 2023, Costa Rica 2023.

use of FXI. 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. IPF guidance on when foreign exchange intervention could be useful complements existing Fund policies, including provisions under the Integrated Surveillance Decision (ISD), which note that "A member should intervene in the exchange market if necessary to counter disorderly market conditions, which may be characterized inter alia by disruptive short-term movements in the exchange rate".[2]

C. An Empirical Assessment of IPF Frictions for Iceland

Institutional Setup

6. The Central Bank of Iceland (CBI) implements an inflation targeting regime with the possibility of currency intervention within its mandate. The CBI has since 2001 implemented an inflation targeting regime with an annual inflation target rate of 2.5 percent. The CBI implements monetary policy through standard monetary policy tools such as the seven-day term deposits, steered by the CBI policy rate, secondary market sovereign bond purchases, and reserve requirements. The CBI may also conduct transactions with market makers in the interbank foreign exchange market in order to mitigate exchange rate volatility, to deepen the market, or to improve market efficiency. [3] The CBI generally has a high degree of credibility in its monetary policy framework and operations given two decades of successful inflation targeting.

7. There are no major restrictions on foreign exchange transactions and cross-border payments and capital transfers, but there are rules governing derivatives exposure and pension funds' foreign asset share. Foreign exchange transactions in Iceland are unrestricted unless otherwise provided for by law. The same applies to cross-border payments and capital transfers. The capital account restrictions that had been imposed following the 2008 crisis were fully lifted in 2021.[4] The new Rules on Derivatives Transactions, no. 765/2021, expanded the authorizations for derivatives trading involving the ISK. These are no longer subject to restrictions relating to their purpose, nor do they require confirmation from the CBI. On the other hand, the Rules set limits on the total amount of such trading by domestic commercial banks in their derivatives books. The restrictions fall into two categories. First, commercial banks' forward foreign currency position versus each individual counterparty shall never at any time be positive or negative by more than 10 percent of their capital base. Second, commercial banks' gross forward position, which comprises the absolute value of all forward positions vis-à-vis customers at any given time,

[2] See IMF (2023c), IMF Policy Paper No. 2023/061, Box. 1. For an overview of the interlinkages of Fund policies related to FXI, and Fund policies on CFMs and MPMs.

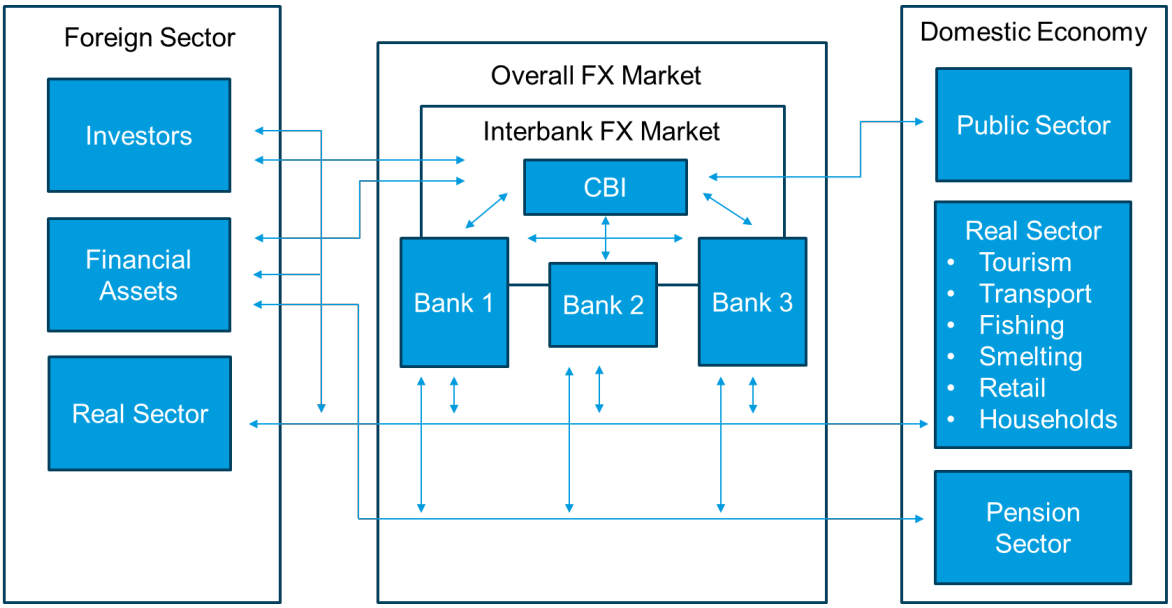
[3] See Pétursson, T. G. (2019). Post-crisis monetary policy reform: Learning the hard way. In *The 2008 Global Financial Crisis in Retrospect: Causes of the Crisis and National Regulatory Responses* (R. Alibert and G. Zoega, eds.), 371-394. London: Palgrave-MacMillan.

[4] See Central Bank of Iceland, Financial Stability Report, 2021:2, Box 4, for a comprehensive review of the statutory framework for foreign exchange and full removal of capital account restrictions.

may not exceed 50 percent of their capital base. These limits are intended to limit excessive speculation and position-taking in foreign exchange transactions that are generally conducive to undermining foreign exchange market stability. In other legislation, pension funds are subject to a cap on the share of foreign currency assets in their portfolio (see below).

8. The CBI does not intervene regularly, but when it does it can be a significant participant in the interbank foreign exchange market. The ISK exchange rate is determined in the interbank FX market. Three financial institutions are authorized to participate in the interbank foreign exchange market and are designated as market makers: Arion Bank, Íslandsbanki, and Landsbankin. The CBI may conduct transactions with market makers during the hours of operation in the interbank FX market, buying or selling ISK in exchange for euros. The CBI does not intervene on a regular basis. Since the pandemic when the CBI intervened more regularly, the CBI has only participated in the foreign exchange market on 17 days in 2022 and on 2 days only in 2023. When the CBI intervenes, it typically takes a significant share of the FX interbank market turnover on a given day, see Figure 2 and below.

Figure 1. Iceland: Flowchart of the Icelandic FX Market

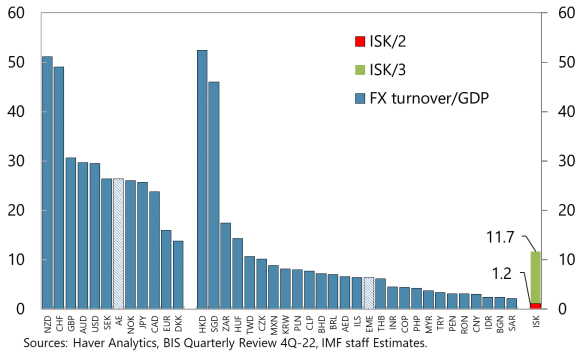


9. Banks try to match supply and demand for foreign exchange with clients in key sectors of the economy (see Figure 1). Several sectors in Iceland have significant revenue in foreign currency: the tourism sector, the transport sector, which includes mainly airlines with significant currency flows, the fishing industry including processing and exporting fish abroad, and the aluminum smelting industry. These industries generally have revenues in foreign currency from exports, while others are in demand of foreign currency, so they carry out FX liquidity management with the banks. In addition, foreign currency financial flows arise from portfolio allocation of foreign investors investing in Iceland, the build-up of foreign assets by the large Icelandic pension sector, as

well as transactions under the current account. Banks try to first match demand and supply internally and outside of the interbank FX market. Then, if they are uncomfortable with their net open currency position, they enter the interbank FX market to sell currency, or buy if they are short in foreign currency. Foreign investors also use the swap and forwards market to purchase only the risk of the underlying financial asset and avoid the currency risk.

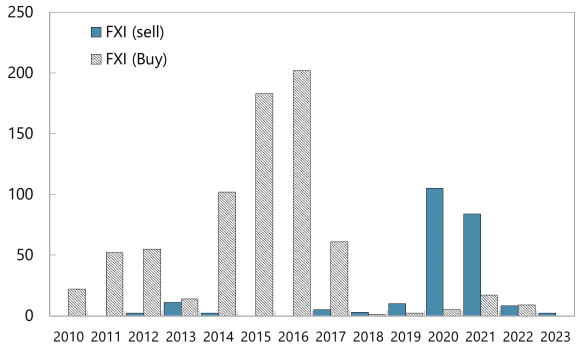
Figure 2. Iceland: FX Market and CBI Participation

FX Market Turnover
(Daily Average Turnover/GDP, Percent)



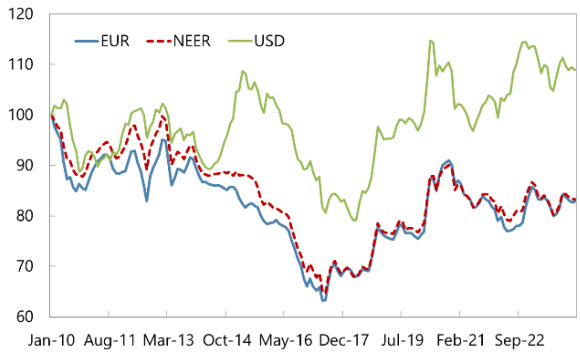
Sources: Haver Analytics, BIS Quarterly Review 4Q-22, IMF staff Estimates.
Note: BIS data for other countries includes FX spot and derivatives trading. ISK /2: Brendon, Petursson, Vitale (2021), ISK /3: Estimate assuming Interbank FX market is 10 percent of the total FX market.

Days of CBI FX Intervention
(Days)



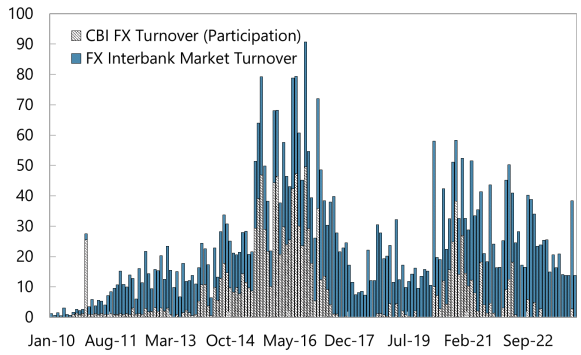
Sources: Central Bank of Iceland, IMF staff calculations.

ISK Against Euro, US Dollar and NEER
(Index, Jan. 2010 = 100)



Sources: Haver Analytics, Central Bank of Iceland, IMF staff calculations.

Interbank Market FX Turnover (2010–2023)
(ISK, billions)



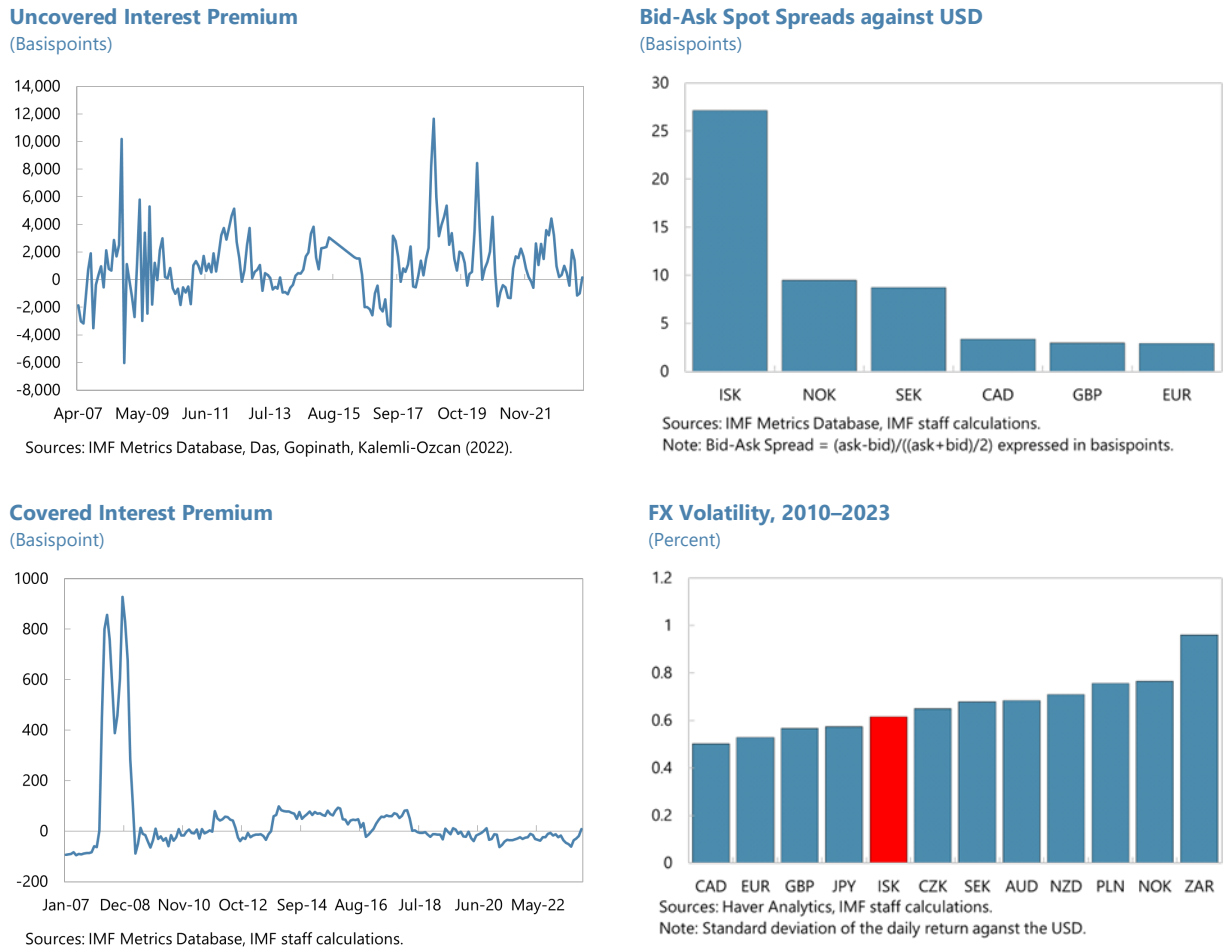
Sources: Central Bank of Iceland, Haver Analytics, IMF staff calculations.

FX Market Depth

10. The size of the FX market in Iceland is limited relative to other advanced economies. There are official statistics for FX interbank market turnover published by CBI. This data suggests a very small FX market (relative to GDP) in comparison to other small open advanced economies. However, according to unofficial data collected by the CBI, the overall FX market turnover, for which there are no official statistics, may be about 10 times the interbank FX market turnover. This suggest that CBI interventions, while large in the FX interbank market where the exchange rate is

determined, are less important when compared to the overall FX market. Nevertheless, even assuming, as suggested by market participants and informal data, that the FX market is 10 times larger than the FX interbank market, the turnover in the overall FX market is still small relative to other comparable advanced economies.

Figure 3. Iceland: FX Market Shallowness and Liquidity Indicators



11. The FX market in Iceland is assessed to be shallower than in other advanced economies, especially around episodes of global economic and financial stress. The IPF framework assesses the shallowness of the FX market using several indicators. While these The overall impression is that the FX market in Iceland is shallower than other comparable advanced economies, especially at times of stress. Bid-ask spreads are on average higher, see figure 2. The rules on FX interbank market do not stipulate any fixed spread on bid/ask quotes.[5] The banks,

[5] See Rules on the Foreign Exchange Market (Rules_600_2020)

however, seem to have an informal agreement of a bid/ask spread of 0.2 ISK against the euro. This spread against the euro in principle sets a benchmark for the spread outside of the interbank FX market but, in reality, the spread outside of the interbank FX market and against other currencies is larger. The deviation from Uncovered Interest Parity (UIP), the so-called UIP Premium, can widen significantly at times of stress and is more volatile than for other advanced economies. Deviations from Covered Interest Parity (CIP) are less volatile, but also experiencing sustained deviations from the parity. Meanwhile, ISK FX volatility is not larger than in other open advanced economies, and has declined in recent years.

Foreign Currency Balance Sheet Mismatches

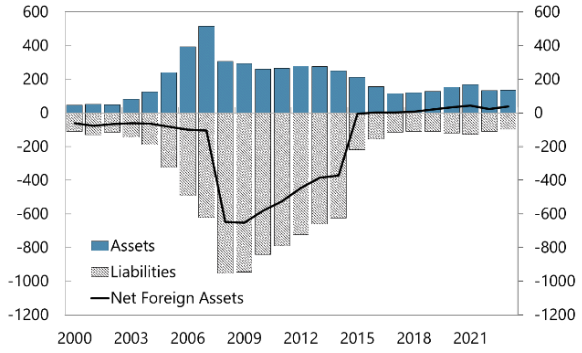
12. There are no significant foreign currency balance sheet mismatches at the aggregate level. Iceland had a positive net foreign asset position of 37.7 percent of GDP in 2023. Foreign assets mainly comprise the portfolio assets of the pension sector, some outward direct investments of the non-financial corporate sector, and foreign reserve holdings of the central bank. On the liability side, liabilities are mainly FX funding for the banking sector, government issuance, including FX issuance, and inward direct investments in the non-financial corporate sector. Banks use a significant share of their FX funding for FX loans to the non-financial corporate sector with natural FX hedges.

13. Foreign currency assets are mainly due to portfolio allocation of the large pension sector. Pillar II pension funds foreign currency denominated investments were previously capped at 50 percent of total assets, but are now projected to slowly increase to 65 percent by 2036 as a result of recent legislative changes.[6] Although the new legislation provides some flexibility when the ratio is breached due to exchange rate changes, the FX investment cap, could act as an offsetting factor to curb FX liquidity outflows from the system. In other words, it could act as a stabilizer for the exchange rate. Pension fund are not particularly vulnerable to temporary currency fluctuations due to the long-term nature of their liabilities. Meanwhile, the pension sector does not have significant foreign currency liabilities.

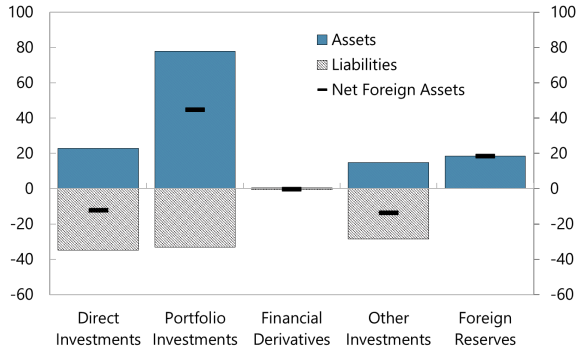
14. Banks use foreign currency liabilities to finance FX loans for companies with a natural hedge. Foreign funding, mainly from unsecured debt securities and nonresident deposits, accounts for about 25 percent of total funding and is mainly used to finance FX denominated corporate loans. There are also internal guidelines and limits on FX lending which ensure that FX loans are mainly granted to companies that have a natural hedge in the form of FX denominated income. The 2023 FSAP found that the FX funding of the banking sector is significant and elevated demand for FX liquidity could emerge in times of market stress, but also that the level of foreign reserves serve as a likely sufficient backstop.

[6] See March 2023 amendment to the Act on Mandatory Insurance of Pension Rights and on Activities of Pension Funds, no. 129/1997.

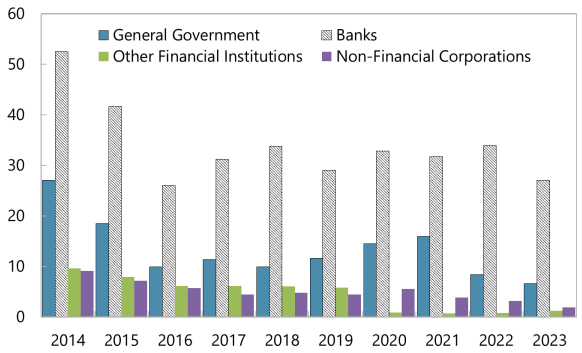
Figure 4. Iceland: Foreign Assets and Liabilities



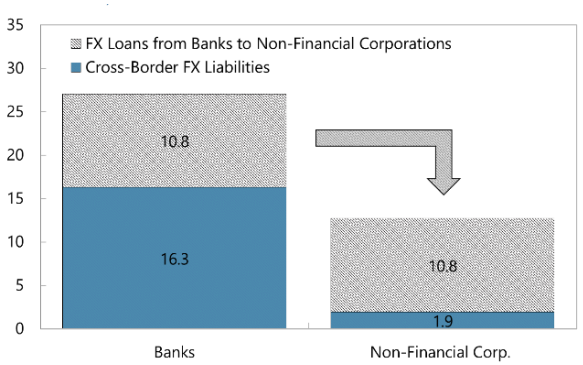
Sources: Haver Analytics, Central Bank of Iceland, IMF staff calculations.



Sources: Haver Analytics, Central Bank of Iceland, IMF staff calculations.



Sources: BIS International Debt Securities, IMF staff calculations.



Sources: BIS International Debt Securities, Central Bank of Iceland, IMF staff calc.

Inflation Expectations – Well-Anchored or De-Anchored?[7]

15. The pass-through of an exchange rate shock to domestic prices is high in Iceland as expected in a small open advanced economy. Staff's analysis points to a pass-through of 0.2 in Iceland within the first 12-months following a 1 percent increase in the NEER, which is relatively large in comparison to other countries. The cumulative amount of pass-through is broadly in line with other advanced economies at 0.4 after 36 months. [8] The exchange rate pass-through for Iceland, while high, is in line with the expected pass-through for other small open advanced economies. Recent analysis suggests the pass-through has declined over time. [9]

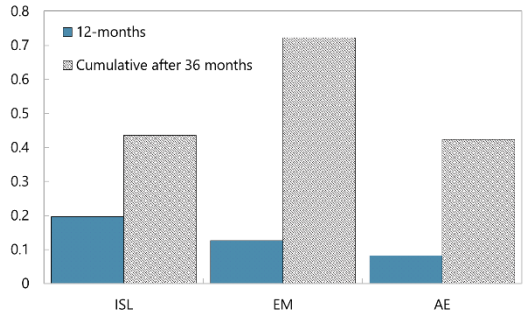
[7] Mahir Binici (EUR) provided inputs to this section.

[8] Estimated using a local projections framework also controlling for the business cycle and global commodity prices.

[9] See Pétursson (2020).

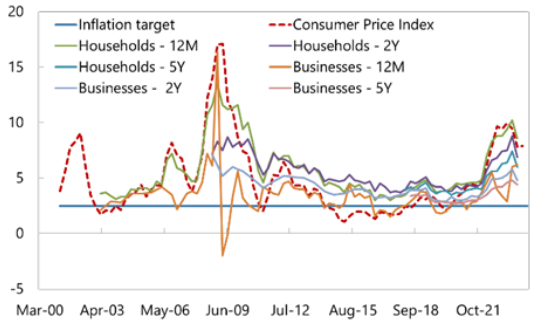
Figure 5. Iceland: Exchange Rate Pass-Through and Inflation Expectations

Pass-Through of the NEER on Consumer Prices
(Share of unit value)



Sources: IMF Metrics Database, IMF staff calculations.

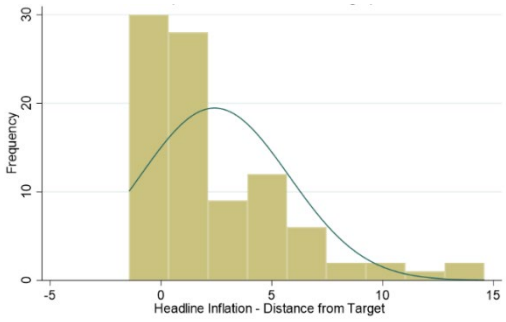
Inflation and Inflation Expectations (Survey Based)
(Percent, annual)



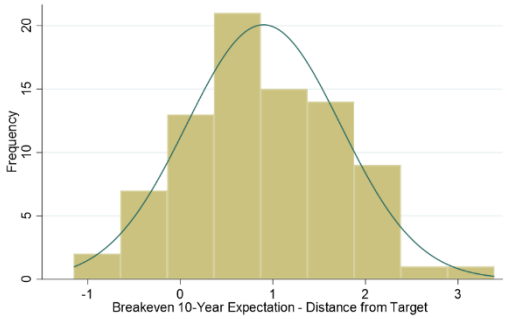
Sources: Central Bank of Iceland, Haver Analytics, IMF staff calculations.

Figure 6. Iceland: Descriptive Characteristics of Inflation and Inflation Expectations

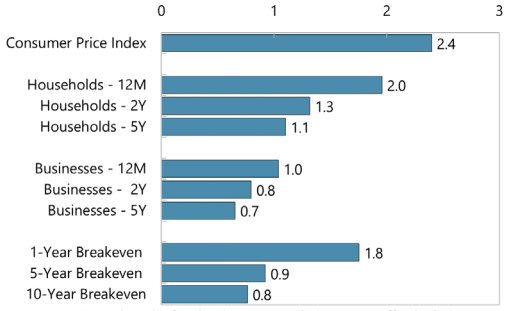
Headline Inflation
(Deviation from inflation target)



Breakeven 10-Year Inflation Expectation
(Deviation from inflation target)

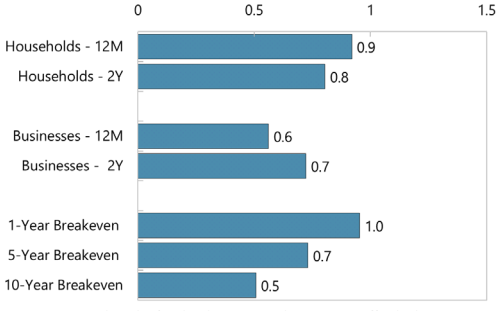


Inflation and Expectations - Standard Deviation, 2010-23
(Standard Deviation)



Sources: Central Bank of Iceland, Haver Analytics, IMF staff calculations.
Note: 5Y Survey-based Expectations is 2018-2023.

Inflation and Expectations - Correlation, 2010-23
(Correlation Coefficient)



Sources: Central Bank of Iceland, Haver Analytics, IMF staff calculations.
Note: 5-Year survey based comparison is excluded due to limited data.

16. Evidence regarding the anchoring of inflation expectations is mixed. Headline inflation has on average been higher than the 2.5 percent inflation target since 2003, see Figure 6. Inflation expectations have also been higher than the inflation target on average over the last two decades.

This would suggest that inflation expectations are unanchored.[10] There have also been several episodes of inflation spikes over the same period, which have impacted inflation expectations, see Figure 5. Near-term inflation expectations are closely linked with actual inflation both in terms of their standard deviation and correlation, see Figure 6.[11] However, long-term inflation expectations are less closely tied to actual inflation, with lower standard deviation and weaker correlation with actual inflation. This suggest that while long-term inflation expectations may deviate from the 2.5 inflation target, they are not particularly sensitive to movements in actual inflation. This points to some degree of anchoring of long-term inflation expectations.

Table 1. Iceland: Inflation Expectations: NEER Impact and Decay Rate

	(1)	(2)	(3)	(4)	(5)	(6)
	Household (HH) Inflation Expectations			Market-Derived Breakeven Inflation Expectations		
	1-Year	2-Year	5-Year	1-Year	5-Year	10-Year
Inflation (t-1)	0.146	0.112**	0.322***	-0.185	-0.046	-0.034
	(0.100)	(0.049)	(0.090)	(0.156)	(0.038)	(0.028)
NEER Growth Rate (t)	-0.030*	-0.003	-0.001	-0.045**	-0.021	-0.013
	(0.017)	(0.009)	(0.012)	(0.021)	(0.013)	(0.011)
HH Infl. Exp. 1-Year (t-1)	0.667***					
	(0.094)					
HH Infl. Exp. 2-Year (t-1)		0.676***				
		(0.077)				
HH Infl. Exp. 5-Year (t-1)			0.223			
			(0.221)			
Breakeven 1-Year (t-1)				1.015***		
				(0.175)		
Breakeven 5-Year (t-1)					0.752***	
					(0.097)	
Breakeven 10-Year (t-1)						0.769***
						(0.104)
Constant	1.236***	1.278***	2.106***	0.819**	1.077**	0.939**
	(0.308)	(0.299)	(0.623)	(0.324)	(0.426)	(0.430)
Observations	83	61	23	82	82	82

Standard errors in parentheses (Newey-West Standard Errors, lags 4)

*** p<0.01, ** p<0.05, * p<0.1

[10] Petursson (2024) confirms that inflation expectations have been above the inflation target on average over the last two decades, but also that the inflation risk and liquidity risk premia can be large and time varying, and hence advices caution when interpreting the breakeven rate as a direct measure of inflation expectations.

[11] Central Bank of Iceland, Monetary Bulletin, November 2022, Box 2, find evidence of recent de-anchoring of inflation expectations, and that inflation surprises have a significant effect on inflation expectations.

17. The Nominal Effective Exchange Rate (NEER) has only a minor effect on inflation expectations. Staff's analysis suggests developments in the NEER have a minor impact on 1-year inflation expectations and do not seem to significantly impact inflation expectations at longer horizons, see Table 1. Also, changes in the NEER do not have a significant impact on inflation expectations at longer expectation horizons. Staffs' analysis also suggest that inflation expectations typically have a substantial decay rate, and that shocks to inflation expectations from movements in the NEER mostly disappear within 4-6 quarters, suggesting the impact of the NEER on inflation expectations is transitory.

18. In summary, shallow FX markets is the main friction under the IPF identified for Iceland. The empirical assessment suggests the degree of shallowness could be time varying with lower liquidity at times of stress. Meanwhile, balance sheet mismatches do not pose a significant risk in Iceland. While inflation expectations are not well anchored when assessed against the inflation target, long-term inflation expectations are not particularly sensitive to movements in actual inflation, pointing to a degree of anchoring. Movements in the NEER also don't have a large impact on longer-term Inflation expectations and the impact tends to be transitory.

D. Policy Tradeoffs Using the IMF's QIPF Model

The IMF's QIPF—Estimated for Iceland

19. The model—key characteristics. The QIPF model is a New Keynesian open economy model tailored to capture key features of AE and EMEs (see also Adrian et al. 2020, 2021). The estimated model for Iceland is a linearized version of the Adrian et al. (2021) IPF model following Chen et al. (2023), extended to include a supply side of the economy. The assumption that FX traders have limited risk-bearing capacity (which follows Gabaix and Maggiori, 2015) helps generate realistic exchange rate volatility, implies that sterilized FX interventions have real effects, and creates a role for policy interventions by generating inefficient fluctuations in the UIP risk premium.

20. Estimation to Iceland—model properties. The model is estimated on quarterly Iceland data 2000-2023 with Bayesian likelihood techniques. The estimated model indicates that exchange rate pass-through is substantial but that medium-term inflation expectations are well-anchored because the CBI pursues an active interest rate policy. The model's impulse responses (IRFs) to major shocks and policy instruments are broadly consistent with existing evidence for Iceland and has been discussed with CBI staff.

21. The estimated QIPF model suggests that Iceland's FX market depth could be time varying. Estimation of the model with Bayesian likelihood methods suggests that the ISK FX market is often well functioning and deep, but can occasionally be under stress and shallow, consistent with the measured UIP premium in Figure 3.

Simulation of Shocks

22. Selected shock scenarios for Iceland in line with the IMF's current Global Risk Matrix.

- **Scenario 1—Global demand softens more than currently envisioned, driven by geopolitical conflicts.** Inflation pressures recede slower than currently projected as a result of slower productivity. Despite somewhat stronger inflationary pressures, the relatively larger fall in economic activity causes central banks in major advanced economies to ease financial conditions by lowering their policy rates more than anticipated in the baseline. Domestic demand in Iceland is also assumed to be adversely affected, but less than how much global demand is affected. Absent financial market spillovers to currency risk-premium, these developments lead to only a modest appreciation of the ISK.

- **Scenario 2—Global supply disruptions and disorderly tightening of financial conditions.** At the global level, this scenario assumes larger supply disruptions which drive up near-term inflation and precipitate a tightening of policy rates by major foreign central banks. Tighter global financial conditions are assumed to lead to FX market turbulence and capital outflows from Iceland. As a result, the ISK depreciates sharply, putting upward pressure on import prices and core CPI inflation which forces the CBI to tighten its policy stance materially. As a result, domestic output declines due to both negative spillovers from weaker foreign demand and tighter monetary policy and financial conditions. **Policy options in Scenario 2:** The impact of the shocks can be mitigated through two policy options: i) interest rate policy only (IR only) allows adjustment in the policy rate and ii) Interest rate policy and FXI (IR+FXI) complements interest rate policy with a foreign exchange intervention.

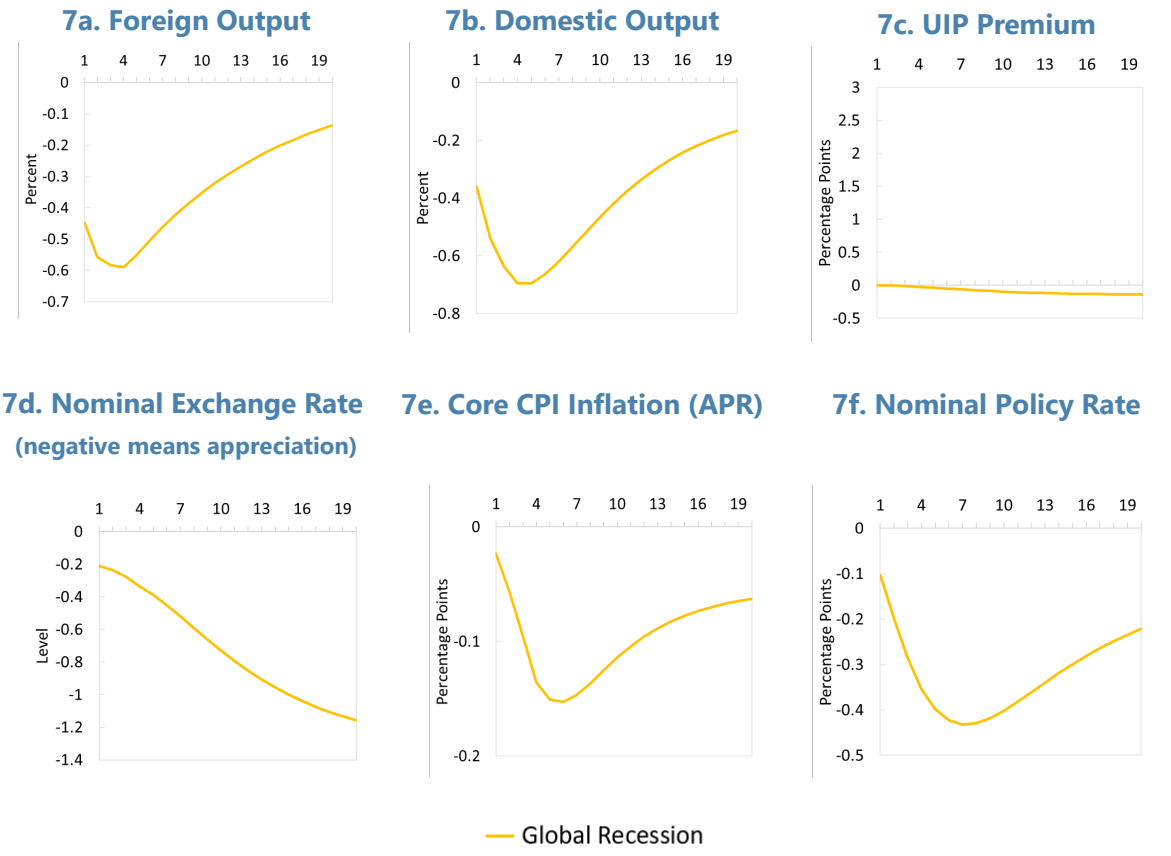
Results of Shock Simulations Using QIPF

23. Under adverse scenario 1, the UIP premium moves little, the nominal exchange rate appreciates moderately, and interest rate policy suffices for macroeconomic stabilization. Figure 7 reports the results in the first scenario for a selected set of variables. The model simulations show that the adverse external shocks in the form of weaker external demand (panel 7a) and stronger external price pressures (not shown) in Iceland's most important foreign trading partners can lower domestic demand and lead to an appreciation of the nominal exchange rate when financial markets remain well functioning and the UIP premium is little affected (panel 7c). Without any financial market turbulence and significant capital outflows from Iceland, higher global price pressures imply that Iceland net exports rise, and its net foreign asset position improves, which strengthens the Icelandic ISK (panel 7d) although the CBI lowers its policy rate (panel 7f) more than major foreign central banks as core CPI inflation falls (panel 7e).

24. Under the IPF guidelines, FXI is not warranted to manage this adverse shock as the FX market remains deep without adverse currency risk-off shocks. Policymakers do not face a tradeoff between output and inflation stabilization and hence a less tight policy rate path suffices to bring inflation to target and eventually offset the adverse impact on economic activity. Over the medium term, inflation will gradually converge to the inflation target while a negative output gap

will gradually improve. The use of FXI does not provide additional benefits of stemming exchange rate appreciation, for the following three reasons. First, the UIP premium does not move much as shown in panel 7c. Second, FX markets are well functioning, so intervention would need to be very large to have a meaningful impact. Third, and finally, as both output and inflation fall in the scenario (panels 7b and 7d), interest rate policy suffices; if it is eased more aggressively, both output and inflation can be better stabilized.

Figure 7. Iceland: Scenario 1—Weaker Global Demand Without Financial Market Stress

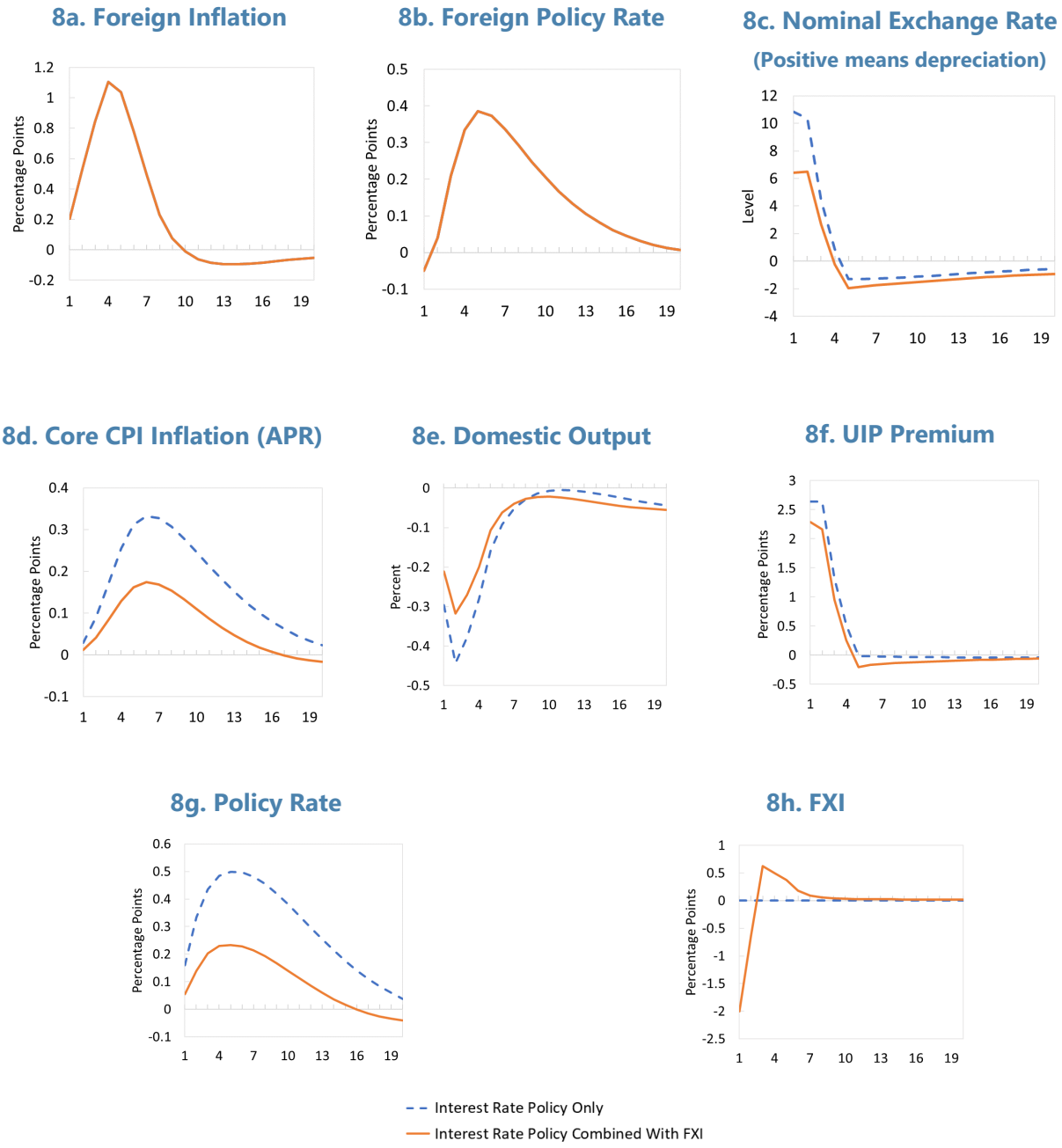


Source: IMF staff simulations.

25. Under Scenario 2, global supply disruptions and increased inflationary pressures result in policy rate hikes in the US and other key central banks, which leads to a risk-off episode with capital outflows and higher domestic risk premiums. Figure 8 reports the results in the second scenario for a selected set of variables. The large capital outflow shocks, if happening when the FX market is notably shallower, can cause significant exchange rate depreciation via increasing UIP risk premium. Model simulation suggests that the combination of capital outflow and shallow markets leads to a sharp depreciation of the nominal ISK exchange rate with over 10 percent at its peak as shown in panel 8c, assuming the CBI does not intervene in the FX market. Despite gaining competitiveness, Iceland's exports decline initially as foreign demand declines, but subsequently rise when the weaker ISK allow Iceland export firms to lower their export prices. Net exports, however,

improve persistently as imports fall. Nonetheless, the downturn in domestic demand outweighs the improvement in net trade, so Iceland's output is negatively impacted as shown in panel e. Even so, Iceland's core CPI inflation increases (panel 8d) for some time driven although long-term inflation expectations remain anchored close the central banks' target since the CBI tighten its policy rate notably (dotted line in panel 8g). So, these developments can result in an inflation-output tradeoff for CBI when relying exclusively on interest rates in its policy response.

Figure 8. Iceland: Scenario 2—Global Supply Disruptions with Financial Turbulence



Source: IMF staff simulations

26. When destabilizing capital outflows arise in shallow FX markets, as is the case in Scenario 2, FXI can ease the inflation-output tradeoff for policymakers. The scenario assumes that the large capital outflow shocks occur when Iceland's FX market turns shallower. In such a scenario, the use of FXI could provide better output-inflation outcomes as shown by the solid lines in Figure 8. In particular, an FX intervention of about 2 percent of annual GDP (panel 8h), which is around 10 percent of foreign reserves, will help moderate inflationary pressures and the decline in economic activity by reducing the UIP premium (panel 8f) and limiting the extent to which the ISK depreciates (from above 10 percent to around 6 percent at peak).[12] Core inflation will rise in the short- and medium-term, but by less compared to its rise under only IR policy and will converge close to the inflation target towards the end of the projection period (i.e. after 3 years). Furthermore, the use of FXI takes some pressure off the policy rate hike, which reduces the drag on domestic activity.

27. While FXI can be part of the policy toolkit in dealing with external shocks, it should only be used under certain circumstances. Our second simulation in Scenario 2 illustrates the benefits of FXI in helping to achieve macro and financial stability when adverse external shocks hit and FX markets are illiquid. Nonetheless, the scope for using FXI relies on its effectiveness in stabilizing the exchange rate risk premia. In some cases, having a meaningful impact may require credible use of large amounts of reserves, making FXI costly, and infeasible if reserves are limited. However, as discussed in the first scenario, FXI is notably less effective when the FX market is deeper, and our model estimations indicate that Iceland's FX market are often deep and well-functioning. Accordingly, the effectiveness of FXI in easing inflation--output trade-offs is likely to be limited in normal times when the FX markets are liquid.

E. Conclusion and Policy Considerations

28. Shallow foreign exchange markets create a risk of disruptive exchange movements during times of stress. Shallow FX markets is the main friction identified under the IPF framework for Iceland, which can amplify exchange rate developments after financial shocks at times of stress, and thus have a destabilizing effect. In these circumstances, foreign exchange intervention can reduce the burden on monetary policy and help cushion the impact of the shock.

29. The CBI should seek opportunities to increase reserves to strengthen its ability to prevent disruptive exchange rate movements. While foreign exchange reserves are adequate for precautionary purposes, the CBI should seek opportunities to increase reserves to strengthen its ability to prevent disruptive exchange rate movements.

30. The authorities should explore options to deepen the foreign currency derivatives market in a manner consistent with continued foreign exchange market stability. Iceland has a history of disruptive speculative foreign currency trading, which points to the need for moving

[12] The FXI intervention is in line with historical behavior of CBI given depreciation pressures on the ISK. For instance, during the second wave of the COVID pandemic (2020Q4) the ISK depreciated 9 percent amid an FX intervention by CBI by 1.9 percent of annualized GDP.

cautiously with reforms to deepening the FX derivatives market. Reforms that could be explored include reassessing the limits on commercial banks' derivative transactions. This would encourage greater participation of foreign investors in the domestic bond market and facilitate hedging of FX risk, thereby reducing the likelihood of disruptive exchange rate movements.

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