2023|2

FINANCIAL STABILITY

SEÐLABANKI ÍSLANDS

Financial stability means that the financial system is equipped to withstand shocks to the economy and financial markets, to mediate credit and payments, and to redistribute risks appropriately.

The purpose of the Central Bank of Iceland's *Financial Stability* report is:

- to promote informed dialogue on financial stability; i.e., its strengths and weaknesses, the macroeconomic and operational risks that it may face, and efforts to strengthen its resilience;
- to provide an analysis that is useful for financial market participants in their own risk management;
- to focus the Central Bank's work and contingency planning;
- to explain how the Central Bank carries out the mandatory tasks assigned to it with respect to an effective and sound financial system.

Symbols:

*	Preliminary or estimated data.
0	Less than half of the unit used.
-	Nil.
...	Not available.
.	Not applicable.

Icelandic letters:

ð/Ð (pronounced like th in English this)
þ/Þ (pronounced like th in English think)
In this report, ð is transliterated as d and þ as th in personal names, for consistency with international references, but otherwise the Icelandic letters are retained.

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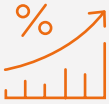
Financial Stability in a nutshell

The monetary stance has been tightened further in the recent term, both in Iceland and abroad, in a bid to combat persistent inflation. This tightening has slowed economic activity worldwide, as can be seen, for instance, in falling asset prices. GDP growth in Iceland has subsided as well, although it is still robust, as demand for Iceland's key exports remains strong. The GDP growth outlook has deteriorated, and forecasts indicate that growth will lose momentum in H2/2023.



Inflation and rising interest rates have pushed households' and businesses' debt service higher. Private sector debt is historically low, however, and equity is strong. Furthermore, a high employment level, rising nominal wages, and economic growth have supported households' and businesses' debt service capacity. The heavier burden has therefore not resulted in increased arrears, although it could certainly do so sooner or later. In order to prevent financial distress and arrears, it is important that borrowers unable to cover higher debt service consult with their lenders about the options available to them.

Housing market activity has eased considerably. The supply of available homes has risen, the time-to-sale has grown longer, and turnover has shrunk. Financing is more difficult to obtain than before, as interest rates are higher and borrower-based measures tighter. Market prices are still high by most measures, even though imbalances have receded. The deviation of house prices from long-term trend has also narrowed somewhat, as nominal prices have held virtually flat and real prices have therefore fallen. Furthermore, demand for rental housing has grown, owing to a persistently tight labour market and the associated importation of labour.

The large commercial banks' financial position are strong. Their capital ratios are high, returns on regular operations are sound, and private sector arrears are at a low level. The banks have mitigated their foreign refinancing risk in recent months by issuing bonds in foreign credit markets. Stress tests carried out by the Central Bank and the International Monetary Fund (IMF) show that the banks are highly resilient against shocks to the economy. Impairment is expected to increase in coming months on both household and business loans, as debt service burdens have increased, but the banks are strong enough to address the situation.

Operational risk in domestic payment intermediation is on the rise, as it is in many other countries, partly because of innovation in payment equipment, an increase in the number of payment instruments, and war. A stress test of the domestic interbank payment system shows its resilience and how participants of the system would be well able to cover their intraday payment obligations even if one participant were unable to remit payments. Nevertheless, it is vital to continue shoring up resilience by strengthening possible substitute channels for domestic payment intermediation, both with cash and with an independent domestic retail payment solution.

Cyberattacks, cyberfraud, and attempts at both are continually increasing. In order to ensure business continuity and guarantee the security of financial market infrastructure, it is vital to bolster preparedness for cyberthreats. Coordinated action plans play a key role in this preparedness. It is important to ensure harmonised responses and communications among official cybersecurity entities, particularly during emergencies, so as to delineate clearly the division of tasks, responsibilities, and – no less important – authorisations. Continued active dialogue among all relevant parties is necessary.

Financial Stability: Developments and prospects

I

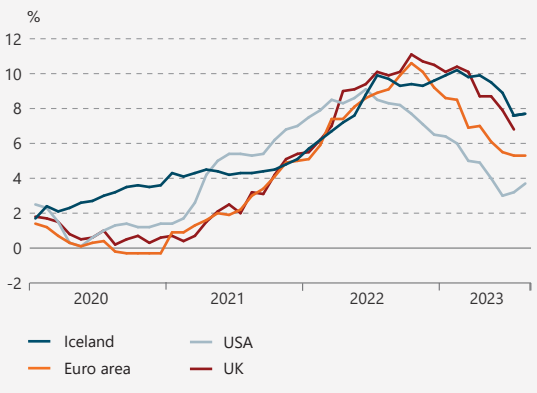
Inflation is subsiding ...

Central banks around the world have tightened their monetary stance even further in recent months, in response to stronger economic activity, a still-tight labour market, and persistent underlying inflation. Real disposable income has shrunk, dampening private sector demand. This has been mitigated by a high employment level and accumulated savings. According to the International Monetary Fund's (IMF) most recent forecast, published in July, global GDP growth is projected to measure 3.0% in 2023 and broadly the same in 2024. The forecast for industrialised countries is much more pessimistic, however, with GDP growth projected at 1.5% in 2023 and tapering slightly to 1.4% in 2024. On the other hand, a tighter policy stance will push inflation downwards, as global inflation is forecast to measure 6.8% this year and ease to 5.2% in 2024. The IMF notes that the near-term GDP growth outlook is highly uncertain. Financial market unrest could escalate again as markets adjust to a tighter policy stance. The economic recovery in China could prove fragile, the war in Ukraine and its implications are very uncertain, and climate change could cause even further unforeseen disruption.

Chart I-1

Annual inflation

January 2020 - August 2023



Sources: Statistics Iceland, OECD, Refinitiv Eikon.

GDP growth has lost pace somewhat in Iceland. Updated figures from Statistics Iceland suggest that it measured 7.2% in 2022, while in 2023 it was 7.1% in Q1 and 4.5% in Q2. Private consumption growth has slowed markedly although exports have gained ground, particularly in the tourism industry. Alongside weaker GDP growth, inflation has subsided, measuring 7.7% in August. According to the Central Bank's most recent macroeconomic forecast, published in *Monetary Bulletin* 2023/3, GDP growth is projected to continue slowing, to 3.5% for the year as a whole, followed by 2.6% in 2024. The forecast assumes that inflation will keep falling as well, to an average of 4.6% in 2024. The labour market remains tight, however. Unemployment is at its lowest since 2017, and well below equilibrium. The tension in the labour market has been accompanied by wage drift, and the general wage index was up nearly 11% year-on-year at the end of July. Terms of trade for goods and services have deteriorated this year, owing in particular to falling aluminium prices, and higher oil prices. On the other hand, the króna has appreciated, and marine product prices have climbed somewhat higher.

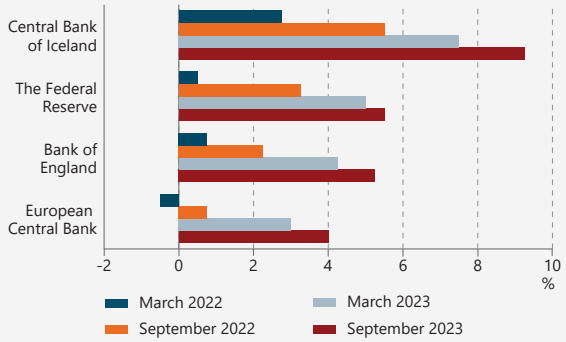
... but the policy stance has been tightened further

Forward yield curves in the bond market suggest that market agents think central bank interest rates in major advanced economies have either peaked already or will

do so soon. The Bank of England (BoE), like the Central Bank of Iceland, has raised its policy rate 14 times in a row. The BoE's Bank Rate is now 5.25% and has been increased by a total of 1.25 percentage points in the past six months. The European Central Bank's (ECB) key interest rate is 4.00%, and the US Federal Reserve's is 5.50%, after implemented a total of 1.00 and 0.75 percentage points rate hikes over the past six months. The Central Bank of Iceland's key rate is now 9.25% following the rate hike in August and has been raised by a total of 2.75 percentage points since the publication of the March 2023 issue of *Financial Stability*.

Chart I-2

Central bank interest rates[1]



1. US interest rates are the upper bound of the US Federal Reserve Bank's interest rate corridor, and rates for the euro area are the European Central Bank's deposit facility rate.

Sources: Bank of England, European Central Bank, the Federal Reserve, Central Bank of Iceland.

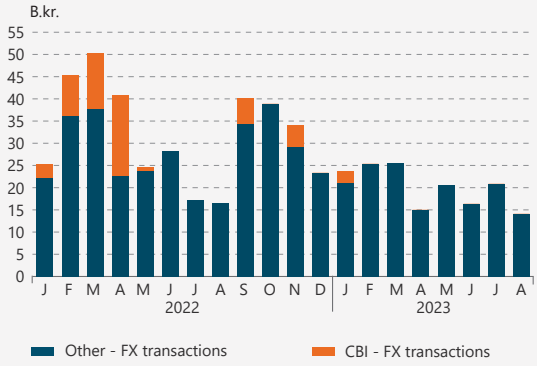
The authorities in several European countries have tightened financial institutions' capital requirements in recent months. Finland and Malta have introduced systemic risk buffers of 1% and 1.5%, respectively. Furthermore, countercyclical capital buffer (CCyB) rates have been increased in Ireland, the Netherlands, Hungary, and Croatia in the past several months. These decisions have been explained in part as a response to growing systemic risk relating to increased private sector indebtedness and surging residential and commercial property prices.

Foreign exchange market stable

The foreign exchange market has been stable in recent months, and the Central Bank has not intervened in it since January. Interbank market turnover has been moderate, and flows within each bank appear to be well balanced. Furthermore, volatility in the exchange rate of the króna diminished by more than half between the turn of the year and the end of August, as the 7.6% appreciation of the króna over that period has been relatively steady.

Chart I-3

Turnover in the FX interbank market



Source: Central Bank of Iceland.

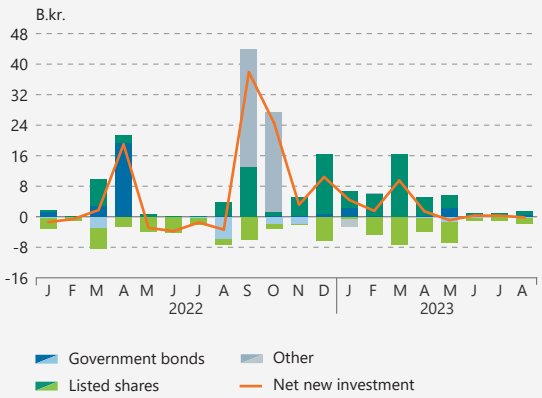
Non-resident investors home in on equities

Net new investment was positive by 15 b.kr. in the first eight months of the year.[1] Foreign investors' portfolio transactions have centred mainly on listed equities, with inflows peaking in March, when the third and last phase of the Icelandic market's promotion to secondary emerging market status with FTSE Russell was implemented.

Combined gross capital inflows for new investment in listed equities were substantial during the three days when the weights of Icelandic companies were increased in FTSE indices, totalling some 40 b.kr.[2]

Chart I-4

Registered new investment[1]



1. Data on new investments represent inflows of foreign currency converted to Icelandic krónur for investment in Iceland. Total investment, new investment, and reinvestment. Inflows in dark colours; outflows in light colours.

Source: Central Bank of Iceland.

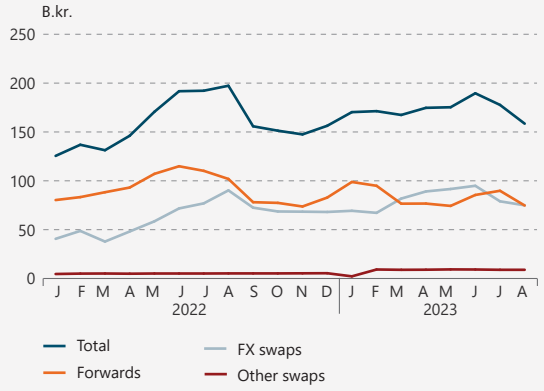
1. New investment statistics apply only to capital transactions in which foreign currency is converted to Icelandic krónur.
2. The weights of Icelandic equities were increased on 19 September, 19 December 2022, and on 20 March 2023. It should be noted that inflows grew somewhat during the run-up to each phase, as some foreign investors bought shares for the sole purpose of selling them to index funds on the date of the upgrade. As a result, net inflows were lower on the upgrade dates.

If Icelandic shares are also promoted by index provider MSCI, inflows could increase even more, as MSCI indices are accompanied by more capital than those from FTSE. MSCI classified the Icelandic stock market as a frontier market two years after FTSE did so.

The sale of all share capital in Icelandic biotech firm Kerecis to foreign investors was announced at the beginning of July, causing the króna to appreciate slightly. Based on the stated selling price (175 b.kr., or 4.4% of GDP) and the fact that the company had been largely owned by residents before the sale, the transaction could boost the exchange rate further, either through spot trades taking place after the end-August settlement or in the form of factor income in the future. The foreign exchange market was tranquil on the settlement date, however, and future flows will probably be determined by economic developments in Iceland and abroad, as well as expectations about interest rates.

Chart I-5

Commercial banks' net forward foreign exchange position involving the króna against foreign currency



Source: Central Bank of Iceland.

The commercial banks' net forward foreign currency position (excluding currency swaps) increased by over 15 b.kr. in June and July, which explains part of the appreciation of the króna during that period.[3] The banks' combined forward foreign currency position increased less, or by just over 2 b.kr., but indicates that customers had expected the króna to appreciate – at least in the short run – owing to the strong tourist season and news of potential capital inflows. It dropped sharply in August, however, falling by 19 b.kr., as the number of forward contracts involving the króna declined month-on-month from 881 to 723.

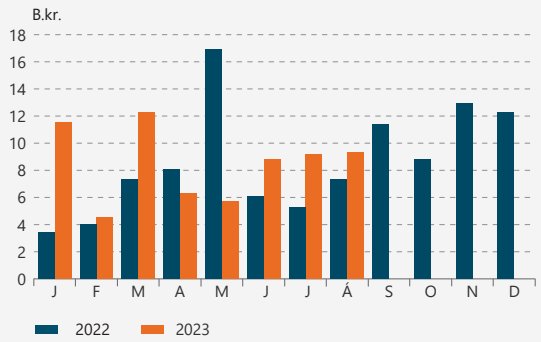
3. In order to avoid either skewing their foreign exchange balance or taking positions with or against the króna, banks buy (or sell) krónur in spot transactions and simultaneously enter into forward contracts with the króna.

Pension funds keep broadly the same pace as in 2022

The pension funds' net accumulated foreign currency purchases during the first eight months of the year totalled 68 b.kr., about 10 b.kr. more than over the same period in 2022. Trading was strongest in January and March.

Chart I-6

Pension funds' net foreign currency transactions



Source: Central Bank of Iceland.

With a March 2023 amendment to the Act on Mandatory Insurance of Pension Rights and on Activities of Pension Funds, no. 129/1997, the pension funds' maximum ratio of foreign currency assets to total assets increased from 50% to 65%. The ratio will rise in stages, by 1.5 percentage points per year for the first four years and by 1 percentage point per year thereafter. Furthermore, the pension funds are now authorised by law to exceed the maximum if the breach occurs because of price or exchange rate movements in the asset portfolio. On the other hand, they are prohibited from increasing their foreign exchange risk while they remain above the maximum.

The pension funds' scope for currency purchases has therefore increased somewhat, particularly in the case of funds that have been approaching their internal caps on foreign currency assets. In general, this greater scope for foreign investment should enable them to diversify risk more effectively and reduce the probability that they will have a crowding-out effect on the domestic securities markets in the future.

Although their scope for foreign currency purchases has increased, it is uncertain what effect this will have on the pension funds' foreign exchange transactions in both short and long term. Most pension funds are still well below their internal caps on foreign currency assets relative to total assets. With the authorisation to breach the maximum, however, the pension funds could opt to raise their internal benchmarks

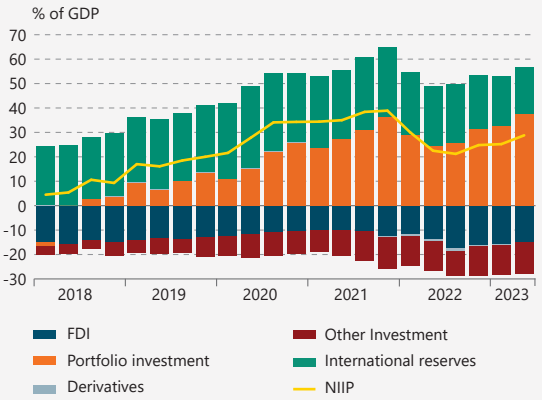
closer to the statutory limit. Pension funds submit their investment strategies to the Central Bank at the beginning of December each year.[4] As of mid-2023, eight of the 21 pension funds had reached their internal benchmarks or were within 2 percentage points of them, including half of Iceland's eight largest funds.

NIIP improves, but international reserves have declined

Iceland's net international investment position (NIIP) improved by 4% of GDP in H1/2023, owing mainly to an increase in the foreign securities position by 6% of GDP. The spike in the securities position is due primarily to a surge in foreign securities prices, as the MSCI index rose by 14% while the OMXI10 fell 6.5%.

Chart I-7

Net international investment position



Source: Central Bank of Iceland.

The Central Bank's international reserves equalled 19% of GDP as of end-August. This represents a decrease of 9% of GDP since year-end 2021. Nearly half of the decline is due to nominal growth in GDP, while much of the remainder is due to instalment payments and buybacks of foreign-denominated Treasury bonds. The international reserves have also shrunk in krónur terms because of the appreciation of the króna.

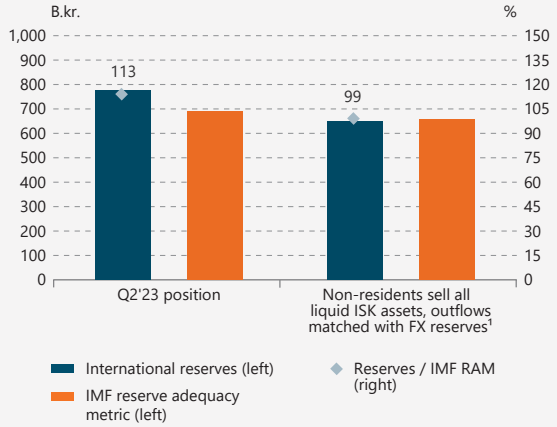
Stronger activity in the economy has increased certain reserve adequacy criteria in the recent term, such as growth in external trade and money supply. The ratio of the international reserves to the International Monetary Fund's (IMF) reserve adequacy metric (RAM) was 113% at mid-year (down from 143% at the end of 2021), and the reserves amounted to 139% of short-term debt. Iceland's short-term debt amounted to 14% of GDP and have declined markedly since mid-2022, mainly because instalments on foreign bonds maturing in the next twelve months have decreased in recent quarters.

The reserves are still above key benchmarks, but if foreign investors should sell all of their highly liquid króna-denominated assets in Iceland, which total about 3.2% of GDP, and the international reserves are used to cover the outflows so as to mitigate foreign exchange market volatility, they would fall slightly below the IMF's lower reserve adequacy limit.

Chart I-8

International reserves / IMF reserve adequacy metric

Sensitivity analysis



1. Government bonds and bills, deposits, and Central Bank certificates of deposit (CBI 2016) held by non-residents.

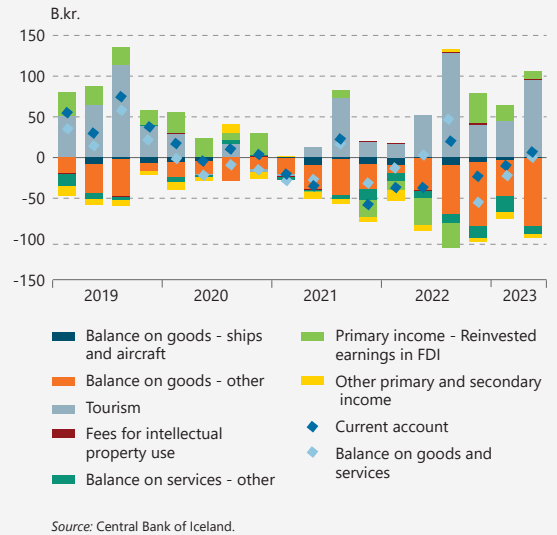
Source: Central Bank of Iceland.

Current account deficit in H1

The current account balance was negative by 0.2% of GDP in H1/2023. The tourism industry appears to have

Chart I-9

Current account balance



Source: Central Bank of Iceland.

4. Most pension funds set medium-term benchmarks for the ratio of foreign currency assets to total assets.

recovered fully after the COVID-era restrictions, and the balance on services trade was positive by 5.6% of GDP during the period. Goods imports have been strong in recent years, however, and the goods account showed a deficit of 6.5% of GDP for the half-year. The balance on combined goods and services trade was slightly more negative than for the previous year.

However, the balance on income was positive by 0.7% of GDP in H1/2023, whereas it was negative by 3.6% of GDP in H1/2022. The year-on-year difference is due largely to increased losses by foreign-owned domestic subsidiaries.

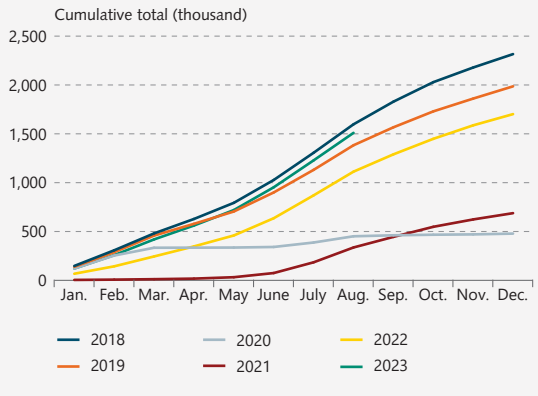
According to the Central Bank's most recent macroeconomic forecast, published in the August *Monetary Bulletin*, the current account can be expected to show a deficit of roughly 1% of GDP over the next few years.[5]

Tourism shows strong growth

The past few months have seen abundant flight offerings to and from Iceland and a smaller share of transit passengers than before. The number of tourists visiting Iceland has therefore increased, and tallies from Keflavík Airport indicate that visitor numbers in the first eight months of 2023 were on a par with the record year 2018. Both of Iceland's domestic airlines, Icelandair and Play, have increased their seat capacity, but foreign airlines' offerings have changed little relative to previous years. As has been typical during the summer, tourists from the US have comprised the largest group, accounting for some 36% of total departures from Iceland during the May-August period. This is a slightly larger share than before the pandemic, when US nationals generally comprised one-third of summer visitors.

Chart I-10

Foreign nationals' departures via Keflavík Airport



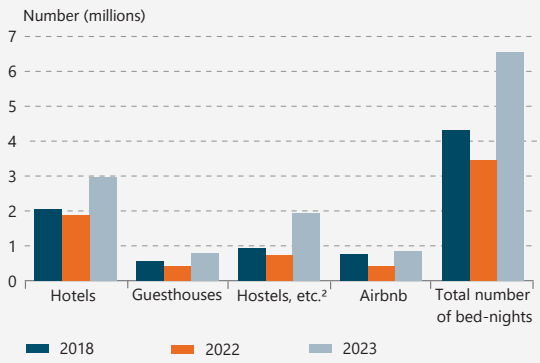
Sources: Icelandic Tourist Board, Isavia.

The outlook for the coming winter is for flight offerings to and from Iceland to continue increasing relative to last winter. Q4 will probably be more or less comparable to 2018, and seat capacity in January and February 2024 currently looks set to be slightly more than in the same months of 2018.[6]

Overnight stays are up strongly this year. Total bed-nights increased by nearly 21% year-on-year over the first seven months of 2023, topping the 7m/2018 total by 18%. In addition, bed-nights at listed accommodations and overnight stays in private homes increased by 11% relative to 2018; however, while hotel bed-nights are up, the number of unlisted bed-nights booked through online providers such as Airbnb is still somewhat lower than in 2018, although it has increased markedly since 2022. This year's increase in bed-nights relative to 2018 can be attributed to the past few years' surge in Icelanders' domestic travel, although foreign tourists are also staying longer in the country.

Chart I-11

Number of bed-nights[1]



1. Bed-nights in the first seven months of the year. 2. Hostels, apartments, and campgrounds.

Sources: Statistics Iceland, Central Bank of Iceland.

Tangible crowding-out effect from tourism

The tourism industry has been rebounding strongly ever since the pandemic ended, and construction and development are taking place throughout much of the country, in both guest accommodation and other tourist services. The sector has contributed to an improving current account balance in the recent past, as is noted in the section on risks relating to the external position and currency flows, and accounted for nearly 30% of export revenues in H1/2023. That percentage will probably rise significantly in Q3 with the increase in tourist numbers. The rapid growth of tourism has

5 For further discussion, see *Monetary Bulletin* 2023/3.

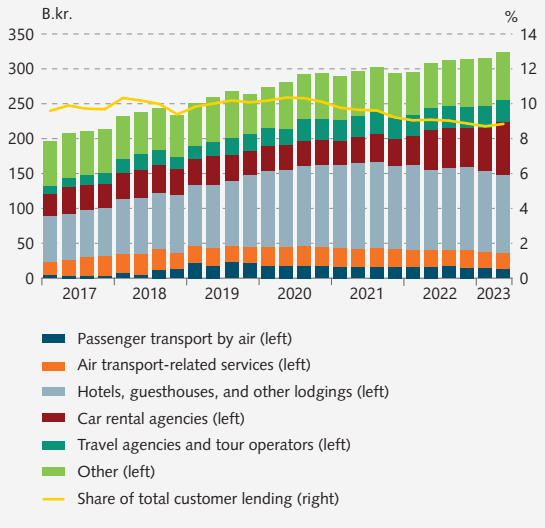
6. Offerings several months ahead are uncertain, however, as airlines could end up cancelling some of their flights as the time approaches.

given rise to discussion of the crowding-out effect from the sector and whether the increase in tourist numbers should be limited with higher fees and taxation. At the end of June 2023, the number of persons employed in tourism-related sectors had increased by nearly 13,000 in the previous two years. Furthermore, tourism accounted for around half of job growth in the Icelandic labour market over the same two-year period. The tourism boom has therefore contributed to low unemployment and put considerable pressure on other infrastructure, including the housing market, as a majority of tourism employees are foreign immigrants.

Limited growth in lending to tourism operators other than car rental agencies

The domestic systemically important banks' (D-SIB) total lending to tourism companies amounted to 324 b.kr. at the end of Q2/2023, an increase of 5.4% year-on-year. Lending to car rental agencies surged in Q2, as it did in Q2/2022. Since year-end 2020, loans to car rental companies have more than doubled in nominal terms, while other lending to tourism operators has contracted by 4%. Car rental agencies have greatly expanded their fleet of cars recently, in line with the increase in tourist numbers, and at the beginning of July, the number of rental vehicles in operation had risen by nearly 28% between years. The banks' recognised impairment of loans to tourism operators has continued to decline and is now broadly back to the pre-pandemic level, around 3.5% of the claim value of the loan portfolio, after peaking at 9% at the end of Q1/2021. This suggests that tourism companies' financial position is improving and that arrears have declined.

Chart I-12
D-SIB lending to the tourism industry



Source: Central Bank of Iceland.

Chart I-13
Ratio of impairment to claim value of tourism industry loans

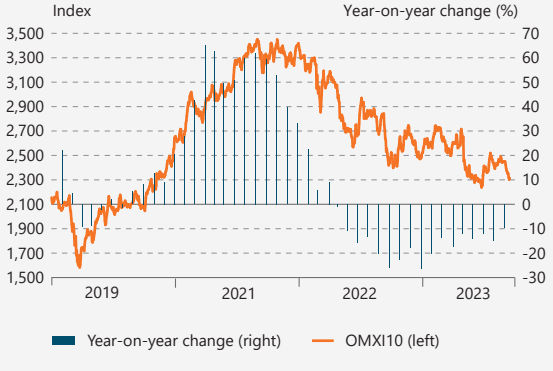
Source: Central Bank of Iceland.

Equity markets rebound

Equity securities markets around the world have gained momentum in 2023, as inflation is on the wane in most economies and it is widely expected that policy interest rates have peaked or are about to. The European Euro Stoxx 50 index has risen by over 11%, and in the US, the S&P 500 is up more than 15% and the Nasdaq Composite by a full 30%. It is worth noting, though, that the surge in the Nasdaq index is driven by a few large companies' rising stock prices. At the same time, the markets in Shanghai and London have been virtually flat. Market volatility as measured by the VIX implied volatility index receded noticeably this summer, after a turbulent winter characterised by difficulties in the US and Swiss banking systems.

The Nasdaq Iceland OMXI10 index has declined by 7% year-to-date, possibly because the policy interest rate has risen swiftly this year, and more than in

Chart I-14
OMXI10 index
2 January 2020 - 15 September 2023



Source: Refinitiv Eikon.

most other countries. In all, four companies' share prices have risen in 2023, while eighteen have seen their prices fall. One company, Hampiðjan, has been admitted for trading on the Nasdaq Iceland Main Market since the March 2023 issue of *Financial Stability*. The company had previously been listed on the Nasdaq Iceland growth market. Stock market turnover on the exchange has contracted between years. For the first eight months of 2023, it was just over 520 b.kr., more than one-fourth below the total for the same period in 2022. The total trade count has also contracted year-on-year, by 25%.

Breakeven inflation rate falls

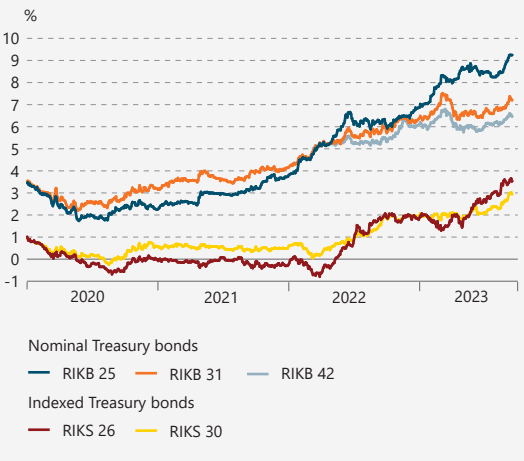
Bond market yields have risen in 2023, in tandem with higher interest rates in Iceland and abroad. Ten-year government bond yields are up year-to-date by 0.3 percentage points in France and Germany, just over 0.5 percentage points in the US, and around 0.7 percentage points in the UK.

The breakeven inflation rate in the domestic bond market – the spread between yields on indexed and non-indexed bonds with the same residual maturity – has fallen somewhat after peaking in May, particularly on shorter maturities. It is still above the Central Bank's inflation target, however. The five-year breakeven rate is close to 4,5%, and the two-year breakeven rate is around 5,5%. Thus far in 2023, nominal bond yields have held more or less unchanged at the long end of the yield curve but have risen on shorter maturities, in line with Central Bank interest rate hikes. Indexed bond yields have risen across the yield curve, particularly in recent weeks. As with the nominal yield curve, the increase in the indexed yield curve has been more pronounced at the short end. The yield on RIKS 26, an indexed bond maturing in 2026, has risen by nearly 1.5 percentage points, and the yield on RIKS 30, an indexed bond maturing in 2030, has increased by 0.85 percentage points. Both nominal and indexed yield curves are downward-sloping, as yields are higher at the short end than at the long end. A downward-sloping yield curve could reflect investors' expectations of a forthcoming economic contraction. Bond market turnover totalled around 1.200 b.kr. over the first eight months of the year, increasing by 40% year-on-year.

Chart I-15

Treasury bond yields

2 January 2020 - 15 September 2023

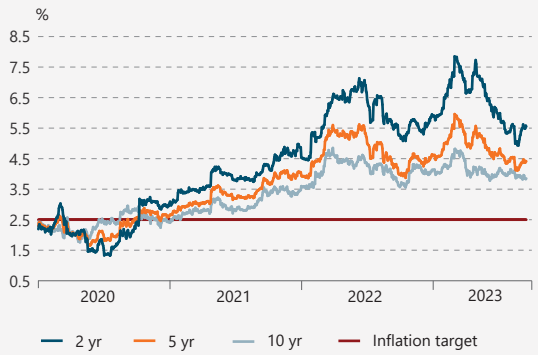


Source: Nasdaq Iceland.

Chart I-16

Breakeven inflation rate

2 January 2020 - 15 September 2023



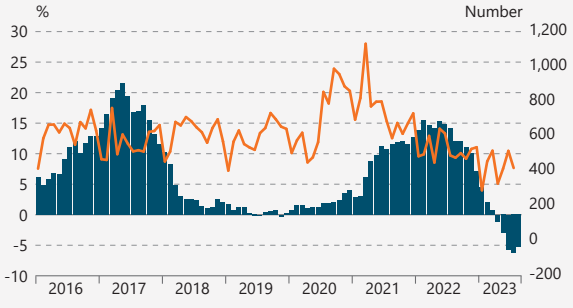
Sources: Nasdaq Iceland, Central Bank of Iceland.

Housing market activity down sharply

Tighter borrower-based measures and rising financing costs have dampened housing market activity in 2023 to date. After rising steeply in greater Reykjavík from 2021 through mid-2022, house prices have tapered off

Chart I-17

Real house prices and number of purchase agreements in greater Reykjavík



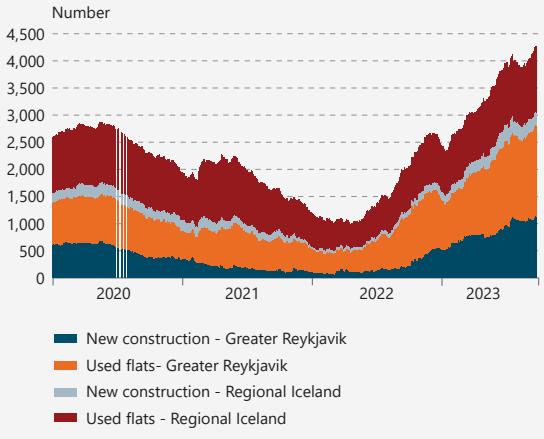
Sources: Housing and Construction Authority, Statistics Iceland, Central Bank of Iceland.

in recent months, and the nominal increase measured 2% year-on-year in August. Over the same period, prices in greater Reykjavík fell year-on-year in real terms by 5.3%.

Thus far in 2023, housing market turnover has been well below last year's level, and the number of homes advertised for sale has risen rapidly. In the first seven months of the year, an average of 420 home purchase contracts per month were concluded in the capital area, some 22% below the monthly average of 540 over the same period in 2022. Reduced activity has caused a significant increase in the number of properties for sale, and the average time-to-sale has grown longer. In mid-September, over 4,200 homes were advertised for sale nationwide, including slightly less than 2,800 in greater Reykjavík. The supply of newly constructed properties in greater Reykjavík has more than doubled in 2023 to date, and nearly 1,100 new homes were on the market in mid-September. Outside the capital area, the supply of newly constructed properties has grown as well, from 150 to 250, an increase of more than 70% over the same period. The average time-to-sale is now around six months, up from slightly more than three months at the turn of the year.

Chart I-18

Number of listed properties for sale

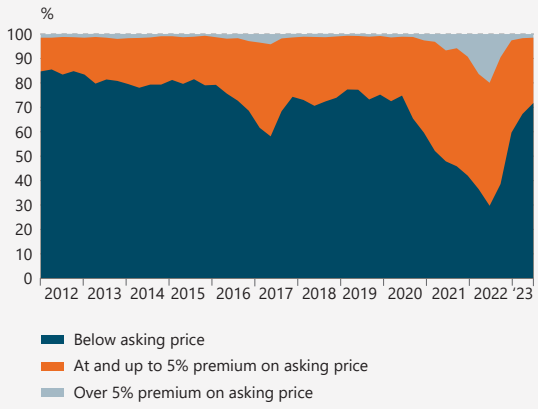


Source: mbl.is real estate website.

The share of homes sold at or above the asking price has continued to fall, to 28% in Q2, well below the 70% seen in 2022. These are clear signs that supply and demand in the market are now better balanced. During periods since 2012 when house prices have been reasonably well balanced, about 15-30% of properties have sold at the asking price or at a premium.

Chart I-19

Distribution of house purchase prices relative to asking prices[1]



1. Based on purchase agreements that can be connected to the asking price of the flat and covers about three fourths of purchase agreements during the period.

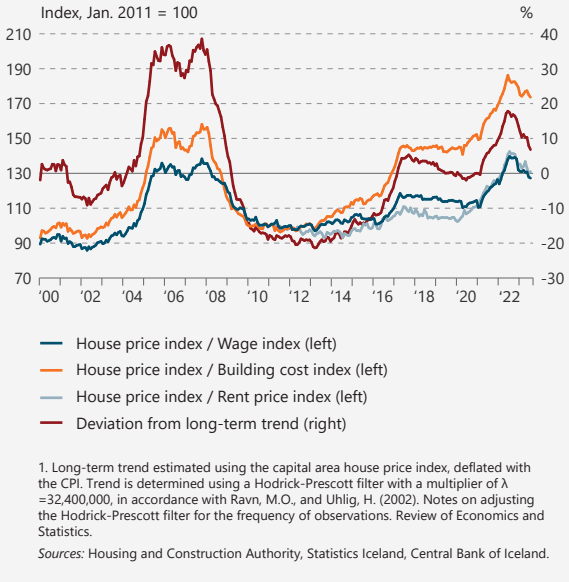
Sources: Fasteignir.is, Housing and Construction Authority, Central Bank of Iceland.

House prices moving towards equilibrium

House prices have continued to decline relative to fundamentals. The general wage index has risen in excess of house prices in the recent term, as the last wage agreements yielded considerable nominal pay rises. The wage index was up nearly 11% year-on-year at the end of July, roughly 10% over and above the rise in the capital area house price index. The labour market has been very tight recently, and wages could well rise faster than house prices this coming winter. A significant mismatch developed between house prices and rent prices during the pandemic, as rent declined and house prices surged. This mismatch has corrected itself to a

Chart I-20

Capital area house prices and their determinants[1]



1. Long-term trend estimated using the capital area house price index, deflated with the CPI. Trend is determined using a Hodrick-Prescott filter with a multiplier of λ =32,400,000, in accordance with Ravn, M.O., and Uhlig, H. (2002). Notes on adjusting the Hodrick-Prescott filter for the frequency of observations. Review of Economics and Statistics.

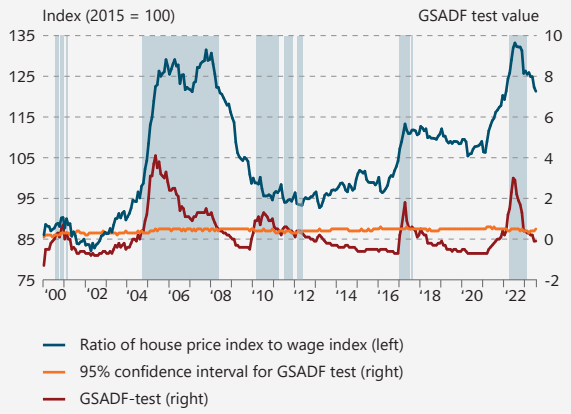
Sources: Housing and Construction Authority, Statistics Iceland, Central Bank of Iceland.

degree, and by July, the ratio of house prices to rent had fallen by over 8% year-on-year. In July, rent prices were up by nearly 10% year-on-year in nominal terms and by just under 2% in real terms. Rent has therefore moved more or less in line with the general price level in the past year. Similarly, the deviation of house prices from their long-term trend has narrowed, from 17.4% in July 2022 to 6.8% in July 2023. Furthermore, the ratio of house prices to construction costs was 5.2% lower in July than in the same month of 2022.

In addition, the generalised supremum augmented Dickey-Fuller (GSADF) test for the ratio of capital area house prices to the general wage index suggests that market imbalances have subsided considerably. The GSADF test, which is designed to pinpoint bubble formation in asset markets, no longer shows signs of a housing bubble in the greater Reykjavík property market.

Chart I-21

Ratio of house prices to wage index[1]



1. The generalised supremum augmented Dickey–Fuller (GSADF) test is a unilateral unit root test [Phillips, Shi, and J. Yu (2015)] that seeks an explosive root in asset prices. Tolerance levels are determined using Monte Carlo simulation. The shaded areas indicates periods when it is is not possible to reject the explosive root hypothesis. Seasonally adjusted figures.

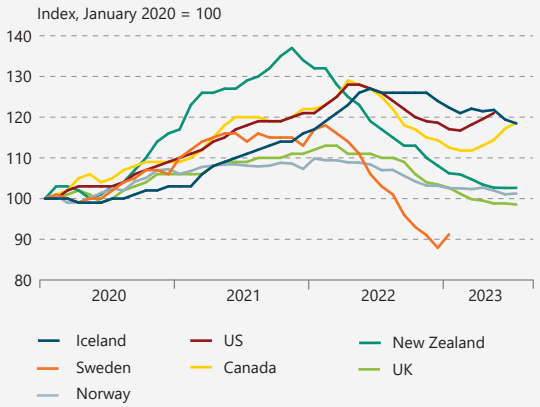
Sources: Housing and Construction Authority, P. C. B. Phillips, S. Shi, and J. Yu (2015), "Testing for multiple bubbles: Historical episodes of exuberance and collapse in the S&P 500", International Economic Review, 56, 1043-1078, Statistics Iceland, Central Bank of Iceland.

In other countries, real house prices in the US and Canada fell markedly in 2022 but have begun to rise again in the past few months. Swedish house prices have decreased steadily in real terms since February 2022 after rising steeply before then. A recent forecast from Sweden's central bank predicts further declines into next fall. In the UK and Norway, the decline in real prices has lost pace in recent months.

Even though imbalances in the housing market have receded, prices remain relatively high. They are especially high relative to the wage index. Even though the ratio of house prices to the wage index has

Chat I-22

Real house prices in chosen countries[1]



1. Indices for US and Canada measure changes in single-family home prices and are Case-Shiller indices. The CPI for New Zealand is published quarterly; therefore the CPI is linearly interpolated where values are missing. Comparability between indices from different countries cannot be guaranteed.

Sources: Macrobond, Nationwide, Real Estate Norway, Statistics Iceland, S&P Global, Teranet, Valueguard, Central Bank of Iceland.

declined significantly in the past year, it has not been this high since 2006-2008, if the most recent values are excluded. Therefore, the house price correction is probably still underway.

Construction market activity remains brisk

The construction market remains quite active. The number of fully finished homes put on the market could rise slightly year-on-year in 2023, given the figures until mid-September this year. Furthermore, construction industry turnover increased by 18% between years in H1/2023.

Chart I-23

Fully finished flats in the whole country[1]

1. Fully finished housing units are those in construction stages 7 and 8.

Sources: Housing and Construction Authority, Central Bank of Iceland.

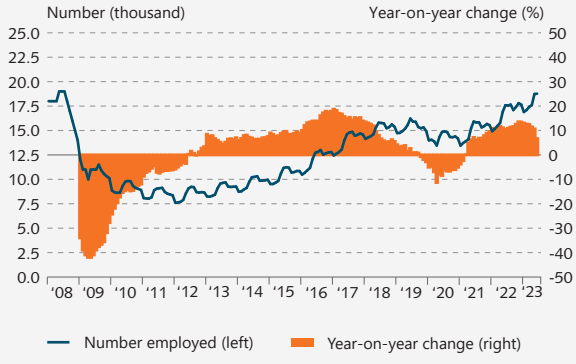
Staffing in the sector has continued to increase, with nearly 19,000 employees in July, the largest num-

ber since mid-2008. By the same token, the share of job vacancies in the industry was still high in Q2, at nearly 7%, and just under 90% of construction companies considered themselves to be operating at full capacity in June. There are some indications that activity could ease in the coming term, however. In recent months, sales of cement have contracted slightly relative to the same period in 2022, and imports of construction materials have declined in comparison with last year's record figures. The surge in construction materials imports in 2022 can be attributed in part to increased inventories, particularly of reinforcing steel, probably the result of uncertainty stemming from Russia's invasion of Ukraine.

Based on the data currently available, it is unclear whether the number of new homes put on the market will decline in the near future, as the Housing and Construction Authority (HMS) projects it will. If a steady increase in the supply of new homes on the market is assumed, the total for this year could reach roughly 3,200, some 400 above the HMS forecast. Other indicators also suggest that construction market activity has not yet begun to slow down.

Chart I-24

Number of employed in the construction sector

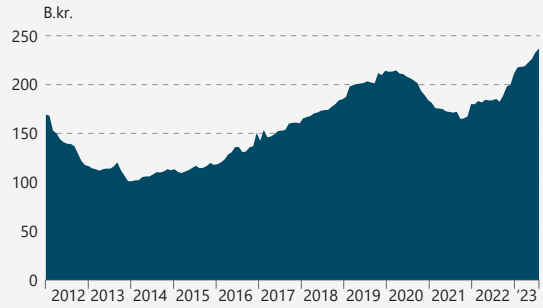


Sources: Statistics Iceland, Central Bank of Iceland.

Conditions in the market have changed somewhat in the recent past, as can be seen in the longer time-to-sale for new homes. The stock of construction sector debt to the D-SIBs totalled nearly 250 b.kr. at the end of July, after growing in the previous twelve months by 68 b.kr., or 28% in real terms. More sluggish asset sales push construction companies' debt higher, as weaker sales mean that loans are paid more slowly than they would be otherwise. Increased debt and higher interest rates push financing costs upwards. The weighted average interest rate on non-indexed D-SIB loans to construction companies was just over 10% at the end of July, an increase of roughly 2 percentage points since the turn of the year. Almost 90% of construction company debt is in the form of non-indexed variable-rate loans, and a tighter monetary stance is therefore transmitted quickly to the sector. The stock of indexed loans has grown somewhat in recent months, however.[7] Despite more onerous financing costs, construction company arrears have not yet started to rise.

Chart I-25

D-SIB: Real credit to the construction sector[1]



1. Debtors in NACE-2008 categories 41-43. Fixed December 2022 prices, CPI-deflated.

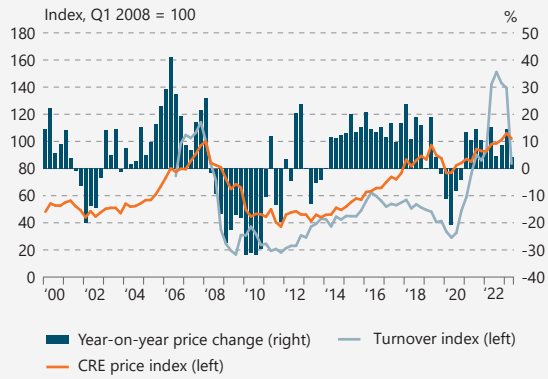
Source: Central Bank of Iceland.

Commercial property prices still high

The commercial real estate (CRE) price index, which measures real commercial property prices in greater Reykjavík, was up 4.1% year-on-year at the end of

Chart I-26

Capital area commercial real estate: real prices and turnover[1]



1. CRE price index, deflated with the CPI. The index shows a weighted average of industrial, retail, and office property prices. The most recent observation is preliminary. The turnover index shows a four-quarter moving average, deflated with the CPI.

Sources: Housing and Construction Authority, Statistics Iceland, Central Bank of Iceland.

7. This is due to refinancing of a small number of larger loans rather than a steep increase in the number of new indexed loans issued. The rules on minimum maturities for indexed loans were revoked at the beginning of June, which could stimulate construction company de Chart for indexed financing.

Q2/2023. It declined marginally in Q2 but was still high in historical context, at almost 15% above its estimated long-term trend. CRE prices are also high relative to the building cost index and measures of economic activity. Turnover in registered commercial property transactions in greater Reykjavík increased sharply in 2022 but has contracted noticeably in 2023 to date. Over the first seven months of the year, it totalled just under 27 b.kr., around 65% less in real terms than over the same period in 2022.

Most measures suggest that demand for commercial property is strong at present. The economy has been buoyant, and the number of employed persons has been rising swiftly ever since the end of the pandemic.

Commercial property under construction on the increase after a long hiatus

The nationwide CRE stock grew by 1% in the first seven months of 2023, after growing 1.6% in 2022. Since year-end 2020, CRE construction has focused mainly on industrial space, whereas less new office space has been built. Growth in the stock of fully finished commercial property has been slow ever since the 2008 financial crisis, and contractors appear to have been focusing more on residential development, as is discussed in *Financial Stability 2023/1*. Commercial property in construction has increased somewhat in the past few years, however. About 735,000 square meters of commercial property are now under construction nationwide, the largest total since year-end 2011.[8] The ratio of property under construction to the CRE stock was 5.5% at the end of August, up from the trough of 3.6% at the end of 2016. The same ratio hit a peak of nearly 9% at year-end 2008.

Real estate company debt has increased and interest rate terms worsened

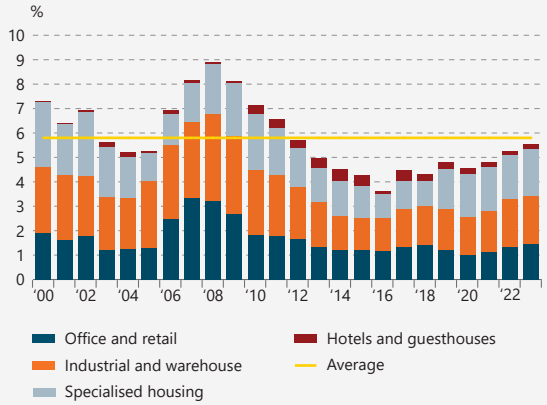
The real estate companies' debt to the D-SIBs totalled 423 b.kr. at the end of July, after increasing by 8.4% year-on-year in real terms. About ¾ of this total stems from companies that lease commercial property. Financing costs in the sector have soared in the recent term, in line with the tightening of the monetary stance, as 64% of CRE companies' debt to the D-SIBs is non-indexed. Nevertheless, arrears on the D-SIBs' loans to real estate companies declined in H1/2023, from 2.8% at the end of 2022 to 2.1% at the end of June. The sector's debt to the pension funds has also grown, to 258 b.kr. as of end-June, an increase of 5.8% year-on-year in real terms.[9]

Positive asset value adjustment three times net leasing income

The large CRE firms – Eik, Reginn, and Reitir – had a strong operating performance in H1/2023. Their rental income rose in real terms by 4.5% between years, and a large proportion of investment assets are leased out. Returns on investment assets measured 5.6% in H1, a slight increase year-on-year. Risk-free returns rose considerably over the same period, however. Risk premia has therefore declined, from 4.7% in H1/2022 to 3.5%

Chart I-27

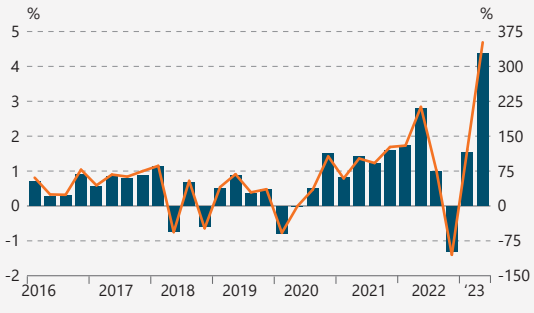
Commercial real estate under construction as a share of fully constructed property[1]



1. Commercial real estate in construction stages 1-6 as a share of property in construction stages 7-8. Contribution from each housing type.
Sources: Housing and Construction Authority, Central Bank of Iceland.

Chart I-28

Value adjustment of investment assets[1]



1. Combined ratios for commercial property firms Eik, Reginn, and Reitir. Value adjustment according to profit and loss account, divided by, on the one hand, the book value of investment assets, and on the other hand, net operating income; i.e., rental income net of operating expenses of investment assets.
Sources: Annual and interim financial statements from Eik, Reginn, and Reitir, Central Bank of Iceland.

8. This includes the new Landspítali hospital, around 70,000 square metres.

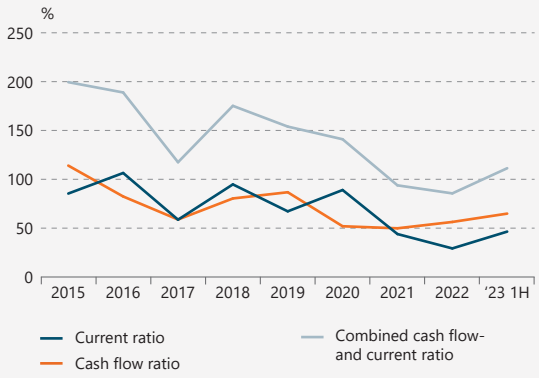
9. Most of the CRE sector's debt to pension funds takes the form of marketable bonds issued by listed real estate firms.

in H1/2023. Lower risk premia could put downward presure on real CRE prices, and the CRE price index did indeed fall marginally in Q2. The assessed value of investment assets surged in the first half of the year, particularly in Q2, after falling in Q4/2022. The combined positive valuation adjustment of investment assets in Q2 was roughly three times higher than the companies' net operating income during the quarter and nearly 5% of the book value of the assets at the beginning of the quarter. The majority of the positive valuation adjustment is due to inflation during the period, but new leases and smaller-than-expected rises in next year's official property valuations have also had a positive impact on asset values.[10] The CRE companies' financing costs – largely due to indexation on indexed loans – also rose year-on-year in 1H.[11] In recent years, the companies have refinanced a large share of their interest-bearing debt.

The CRE companies' liquidity ratios increased slightly in H1/2023, after falling somewhat in recent years. Their combined current assets have been lower than their short-term liabilities ever since 2016, but companies with stable revenues are generally able to maintain a lower current ratio and use cash from operations to pay short-term debt. When a company has both a low current ratio and a low cash flow ratio over a long period of time, it can indicate elevated risk.[12] The three large CRE firms' combined cash flow ratio and current ratio was less than 1 in 2021 and 2022 but increased in H1/2023. The decline in their liquidity ratios over the past two years is due largely to the fact that the repayment profile of their interest-bearing debt grew shorter and a larger share of that debt was scheduled to mature within one year.[13] This entailed increased liquidity risk for the companies. The large CRE firms' interest coverage ratios have also been on the decline recently, following the increase in their net financing costs. As is noted above, most of the rise in financing costs is due to increased indexation, which is added to the principal of indexed debt. If indexation is excluded from the calculation, however, the interest coverage ratio would have increased, as can be seen in Chart I-30.[14]

Chart I-29

Leading CRE firms' cash flow solvency[1]

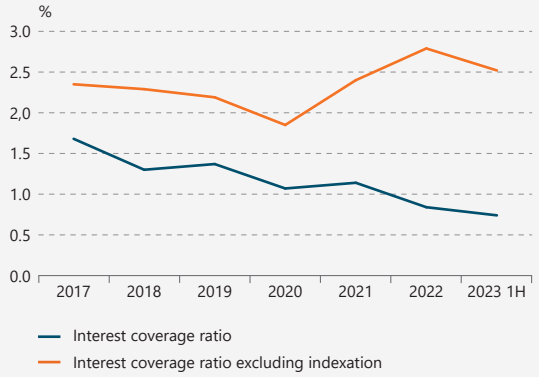


1. Combined ratios for commercial real estate firms Eik, Reginn, and Reitir. The current ratio is the ratio of current assets to current liabilities. The cash flow ratio is the ratio of annualised free cash flow from operations to current liabilities.

Sources: Annual and interim financial statements from Eik, Reginn, and Reitir, Central Bank of Iceland.

Chart I-30

Leading CRE firms' interest coverage ratio[1]



1. Combined ratios for commercial real estate firms Eik, Reginn, and Reitir. The interest coverage ratio is the ratio of net operating income to net capital expense.

Sources: Annual and interim financial statements from Eik, Reginn, and Reitir, Central Bank of Iceland.

The large CRE firms' financial position appears strong overall. Their combined equity ratio was 32.3% and their leverage ratio 62.4% at the end of Q2/2023. Even though their financing costs have increased with rising interest rates and higher inflation, their leasing income has risen as well, thereby boosting the value of their investment assets. Demand for leased commercial property has been strong recently, owing to the vibrant domestic economy. It is important that they continue to safeguard their resilience. CRE prices are high rela-

10. Property taxes are determined by official property valuations. A lower official valuation therefore means lower property taxes.
11. Most of the large CRE companies' debt is indexed. The large companies generally have easier access to indexed financing than smaller firms do.
12. The current ratio indicates how much liquid assets are available to pay off debt maturing within a year, while the cash flow ratio indicates how well cash from operations covers the same debt.
13. Instalments on interest-bearing loans maturing within one year are considered short-term liabilities. The shorter repayment profile is due partly to the fact that the share of nominal bonds issued rose in the wake of pandemic-era interest rate cuts. The companies' nominal issues generally have shorter maturities than their indexed issues.
14. Unlike conventional interest expense, indexation is added to the principal of indexed loans and is not paid immediately. As a result, it can be argued that indexation should be excluded from the calculation of the interest coverage ratio.

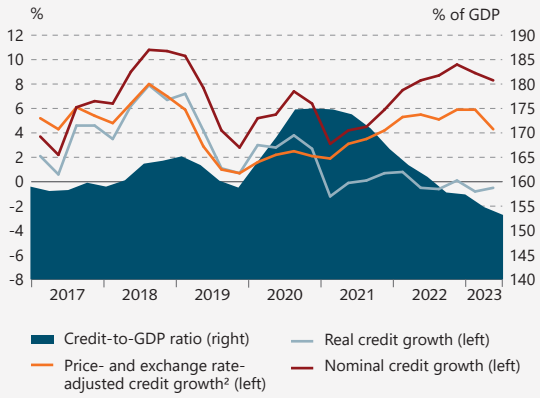
tive to fundamentals, and the companies must be prepared for a potential slowdown in demand, continued high interest rates, and lower property prices.

Private sector debt contracts in real terms

Growth in debt has eased year-to-date and demand for credit has subsided, as financing costs have risen. At the end of Q2, private sector debt had contracted in real terms by 0.5% year-on-year but had grown by 8.3% in nominal terms.[15] The depreciation of the króna during the period pushed the growth rate higher, to 4.3% in price- and exchange rate-adjusted terms. Private sector debt amounted to 153.2% of GDP at the end of Q2, after declining by 6.9 percentage points of GDP between years.

Chart I-31

Private sector credit growth[1]



1. Lines show annual growth rates. 2. CPI-indexed credit at constant prices and foreign-denominated credit at constant exchange rates.

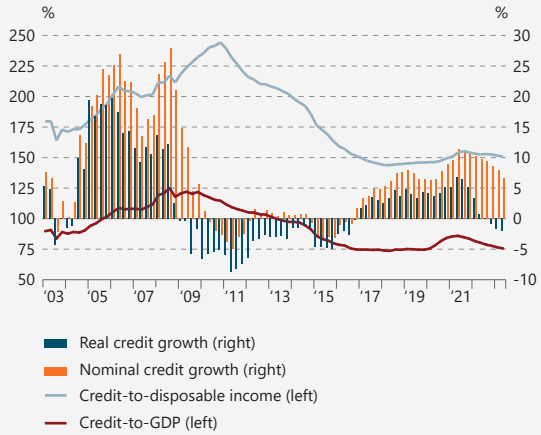
Sources: Statistics Iceland, Central Bank of Iceland.

Growth in household debt loses pace

Household debt has contracted in real terms this year. Real growth in household debt was negative by 0.8% at the end of July, whereas nominal growth was positive by 6.8%. Indexation on indexed loans is one of the main drivers of nominal growth, whereas growth adjusted for indexation measures 3.2%. New lending to households slowed markedly in 2023, with net new mortgage lending totalling just over 58 b.kr. during the first seven months of the year, down from 111 b.kr. in the same period in 2022. The household debt-to-GDP ratio is falling as well, measuring 75.6% at the end of Q2. The ratio of household debt to disposable income has developed similarly, falling nearly 2 percentage points in one year, to 150.6% as of end-Q2. Households' financial conditions have deteriorated this year, and growth in debt is unlikely to resume in the near future. The results of the Central Bank's recent lending survey suggest that the banks expect little change in household demand for credit in coming months.[16]

Chart I-32

Developments in household credit[1]



1. Debt owed by households to domestic financial undertakings. Central Bank estimates for disposable income from Q1 2021.

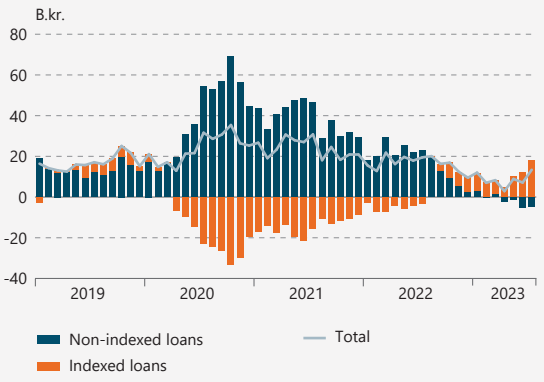
Sources: Statistics Iceland, Central Bank of Iceland.

Indexed mortgages in greater demand

Interest rates on non-indexed mortgages have risen sharply during the year, in tandem with the rise in the Central Bank's key interest rate. Higher interest rates combined with tighter lending conditions have restricted households' access to new non-indexed credit financing, and the debt service burden on outstanding non-indexed variable-rate loans has risen significantly. In recent months, there has been a discernible increase

Chart I-33

Net new household mortgages[1]



1. New loans less loan retirement and loan prepayments in excess of contractual requirements. Fixed prices. Figures include loans issued by deposit institutions, pension funds, the ÍL Fund, and the Housing Fund.

Source: Central Bank of Iceland.

15. The private sector includes households and non-financial corporations.

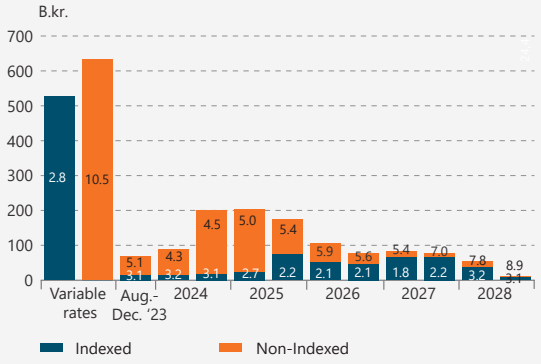
16. The survey was conducted in July and August.

in retirement of non-indexed variable-rate debt, in tandem with growth in indexed loan issuance. This indicates that households are increasingly seeking out indexed mortgages, both for new real estate transactions and to refinance existing debt, as indexed loans have a lower debt service burden early in the loan term than comparable non-indexed loans do.

A fair share of the outstanding non-indexed loans issued in 2020 and 2021 had fixed-interest-rate periods of either three or five years, and the interest rates themselves were much lower than those available today. As Chart I-34 indicates, the fixed-rate periods on these loans have started to expire and will continue to do so in the coming term. If interest rates remain high, households can be expected – all else being equal – to refinance some of these loans with indexed debt in order to avoid a surge in debt service. Based on end-July figures, the stock of non-indexed fixed-rate mortgages whose fixed-rate clauses expire in the last five months of 2023 totals 53 b.kr., or 2% of outstanding household mortgage debt. This amount will rise considerably in 2024 and H1/2025 before declining again. As of end-July, indexed loans accounted for slightly less than 47% of the outstanding household mortgage stock. This share has been growing slowly in recent months. It can be expected to keep rising gradually in the near term but is still far below the pre-pandemic level of 70% of all outstanding household mortgages.

Chart I-34

Amount of mortgage loans with an upcoming interest rate review and their weighted interest rate[1]

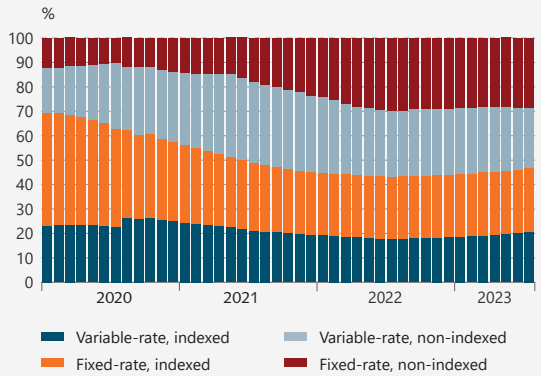


1. The figure shows the amount of variable-rate and fixed-rate mortgage loans that have an upcomin interest rate review in the next years. Data covers all consumer mortgages issued by the systemically important banks, the Housing and Construction Authority, and the nine largest pension funds. Based on loan balance as of end-July 2023. Figures in columns show the weighted interest rate on the loan amount in question.

Source: Central Bank of Iceland.

Chart I-35

Consumer mortgages, by type[1]



1. Proportional breakdown of consumer mortgages, by type, from the D-SIBs and the Housing and Construction Authority. Including loans from the largest pension funds from August 2020 onwards.

Source: Central Bank of Iceland.

Borrower-based measures curb excessive risk-taking

On the whole, the average loan-to-value (LTV) ratio on new consumer mortgages has been rather stable in 2023. For loans granted to first-time buyers, the average has risen slightly, doubtless due in part to rising property prices. Since the Central Bank rules capping debt service-to-income (DSTI) ratios were tightened in July 2022, the average ratio on new mortgages has held relatively stable, both on the whole and for loans issued to first-time buyers. By the same token, the share of loans granted with a high DSTI ratio (over 30%) has also remained stable. Before the rules were tightened, the ratio had been trending upwards, indicating increased risk-taking. The tightening of these borrower-based measures therefore appears to have delivered the desired results and counteracted excessive risk-taking in the housing market.

Increase in corporate debt

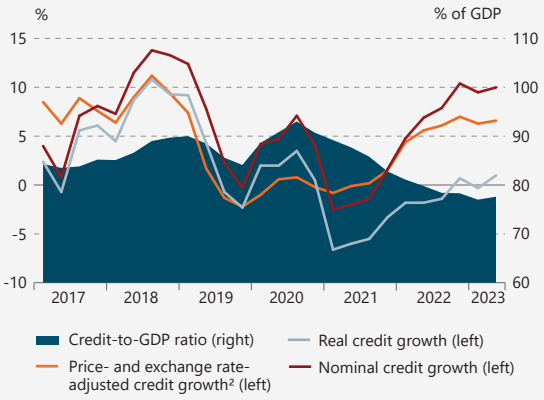
At the end of Q2, corporate debt had increased in real terms by 1% year-on-year. Demand for credit has been strong among companies this year, and most of that demand has been met by credit institutions, whereas corporate bond issuance has contracted relative to 2022. Corporate debt owed to foreign lenders has increased in krónur terms in 2023, despite a moderate appreciation of the króna in H1.[17] The corporate debt-to-GDP ratio stood at 77.6% in Q2/2023, after falling by 2.2 percentage points year-on-year but rising marginally between quarters.

By July, credit institution lending to companies had increased in nominal terms by 83 b.kr. year-to-date. Of that total, loans to construction companies were up by 39 b.kr. and loans to real estate firms by 40 b.kr. On the other hand, lending to fishing companies

17. Debt to foreign financial institutions and marketable bonds issued abroad.

Chart I-36

Corporate credit growth[1]



1. Lines show yearly growth rates. 2. CPI-indexed credit at constant prices and foreign-denominated credit at constant exchange rates.

Sources: Statistics Iceland, Central Bank of Iceland.

had contracted by nearly 40 b.kr., owing for the most part to the appreciation of the króna and to Brim hf.'s refinancing of domestic loans with a foreign syndicated loan in June. Lending to construction companies has grown proportionally more than lending to other sectors, increasing by nearly 28% in real terms as of end-July. As is noted in the discussion of the housing market, this growth is due largely to a rise in the number of unsold new properties. There are signs that growth in credit institutions' corporate lending has begun to ease, and the results of the Central Bank's recent lending survey, published in August, show that the banks' corporate loan supply has contracted in recent months.

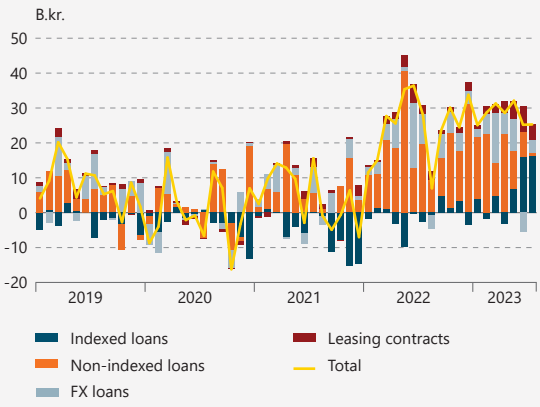
Increase in indexed corporate loan issuance

The majority of corporate debt takes the form of non-indexed loans and marketable bonds, either in Icelandic krónur or in foreign currencies. About 30% of corporate debt is indexed. In the past few months, there has been an increase in indexed corporate loan issuance, as can be seen in data on credit institutions' net new lending. As Chart I-37 shows, a majority of new loans granted to companies in June and July were indexed. However, this shift is due chiefly to a few loans taken by real estate companies and large construction firms.

The Central Bank's new Rules on Price Indexation of Savings and Loans took effect on 1 June 2023.[18] With their entry into effect, the provision requiring a minimum five-year term for indexed loans was revoked. It is possible that this amendment will boost the supply of indexed loans to companies and thereby expand the financing options available to them, particularly in the case of companies that rely on domestic short-term financing, such as construction firms.

Chart I-37

Net new corporate loans[1]



1. New loans less loan retirement and loan prepayments in excess of contractual requirements. Figures include loans issued by deposit institutions, the ÍL Fund, and the Housing Fund.

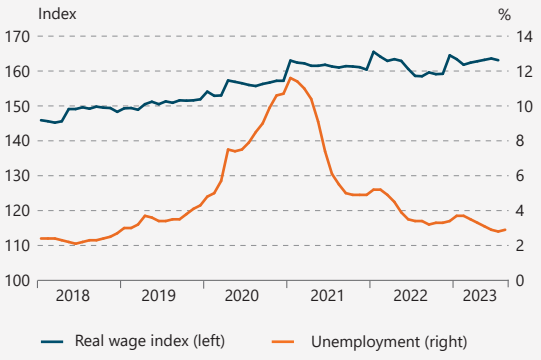
Source: Central Bank of Iceland.

Households' debt service burden grows heavier

Inflation and interest rate hikes have been onerous for many households. Interest rates have risen swiftly in recent months, and the full impact of the rate hikes probably has yet to emerge. The labour market is still very tight, unemployment is low, and real wages have risen despite inflation. Registered unemployment was only 2.8% in July, and the measured year-on-year increase in the real wage index was 1.8% at the end of that month. The outlook is for private consumption to grow this year, although indicators imply that the growth rate will subside more quickly than previously assumed.[19] According to the most recent national

Chart I-38

Real wages and unemployment[1]



1. Registered unemployment.

Sources: Directorate of Labour, Statistics Iceland, Central Bank of Iceland.

18. Rules no. 218/2023.

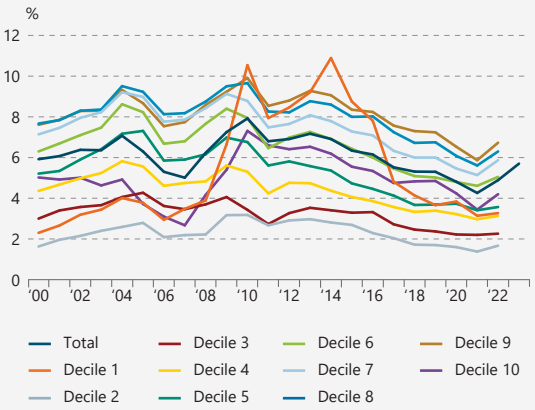
19. For further information, see *Monetary Bulletin* 2023/3.

accounts, private consumption per capita contracted by 2.8% in Q2. In spite of ambiguous indicators, however, statistics still imply that households are quite resilient, on average.

Figures from Statistics Iceland on household assets and liabilities, taken from income tax returns, suggest that, for all income deciles, households' mortgage interest burden was still historically low relative to disposable income at the end of 2022. The ratio had risen noticeably during the year, however, and continued to climb in H1/2023, according to the available data. Furthermore, the impact of interest rate hikes in H2/2023 has yet to surface.

Mynd I-39

Mortgage interest expense as a share of households' disposable income[1]

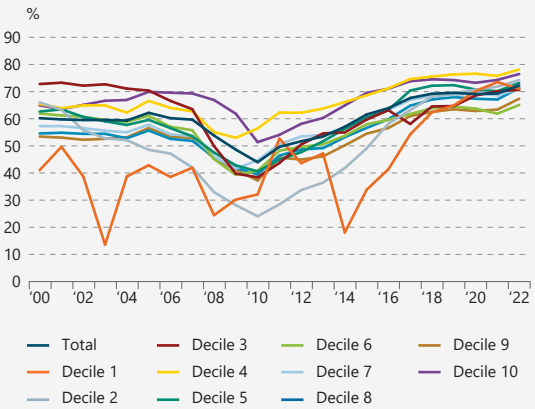


1. Household mortgage interest expense as a share of disposable income, by income deciles. Disposable income is income net of taxes. The value for 2023 is Q2 and a Central Bank estimate derived from data on developments in disposable income taken from the Bank's QMM database and interest payment data from the credit register.

Sources: Statistics Iceland, Central Bank of Iceland

Chart I-40

Households equity ratio[1]



1. The ratio of total equity of households within each decile to their disposable income. Disposable income is total income less taxes.

Sources: Statistics Iceland, Central Bank of Iceland

Statistics Iceland's figures also show that households' equity strengthened in 2022, reaching an overall high by the end of the year. This strong equity position is due in part to the rise in house prices over the past few years that was not driven by excessive debt taking. Nevertheless, if inflation persists and the general price level rises in excess of property prices, equity will be eroded, particularly for households with indexed mortgage loans, and financial distress will increase among households with non-indexed mortgages.

Household arrears still limited

Arrears on households' debt to the domestic systemically important banks (D-SIB) are still limited. The D-SIBs' facility-level non-performing household loan (NPL) ratio was just over 0.8% at the end of Q2/2023 and had only risen marginally between quarters.[20] As before, the ratio is low in both historical and international context. The cross-default NPL ratio, a broader metric that also captures frozen loans, was 2.2% at the end of July and had risen by nearly a percentage point year-on-year. The increase is due in particular to a rise in the number of frozen loans.[21] The increase in frozen loans during the period totals almost 14 b.kr., and the number of borrowers with frozen loans has risen from 550 to 760. This, in turn, is attributable in part to payment measures offered by the banks in connection with temporary reductions in borrowers' income.

Various debt service reduction measures available

The small increase in NPLs suggests that many households have responded to interest rate hikes by taking advantage of available debt service reduction measures. There are also signs that some households have cut back on consumption and drawn down their savings. In doing so, they have avoided financial distress and arrears. As is mentioned in the section on household debt, there are already signs that household demand for indexed mortgages is on the rise. By taking indexed loans to refinance non-indexed debt, borrowers can lower their debt service significantly, as payments on indexed loans are lower at the beginning of the loan term than they are on comparable non-indexed loans. It is currently common that lenders offer "mixed" loans featuring indexed and non-indexed tranches, and by

20. The facility-level NPL ratio is calculated in accordance with European Banking Authority (EBA) standards.
21. The cross-default NPL ratio refers to non-performing loans according to the cross-default method, according to which all of a borrower's loans are considered non-performing if one loan is frozen or in arrears by 90 days or more, or if the borrower is deemed unlikely to pay their obligations when due.

configuring the weight of the tranches, they can adapt the debt service burden to the borrower's needs and debt service capacity. Mixed loans can also be a way to diversify risk. Debt service on indexed loans is less susceptible to fluctuations in inflation and interest rates in the short run, for instance, and the monthly payment burden is therefore more stable and predictable over time. Variable interest rates on indexed loans have been on the rise since mid-2022, but they have increased far less than variable rates on non-indexed loans.

Lenders offer borrowers a number of options apart from indexation in order to lower their mortgage debt service. These include lengthening the maturity, converting equal-instalment loans to an annuity format, putting a cap on interest payments, and implementing a temporary payment moratorium or loan freeze. In cases where additional collateral capacity has been created due to previous loan payments or higher property prices, it may be possible to refinance supplemental loans and merge them with the base loan. Fixing non-indexed mortgage rates temporarily can also lower debt service, as fixed rates are currently lower than variable rates on new non-indexed mortgages from the banks.

As has been mentioned, fixed-rate clauses on a sizeable share of non-indexed mortgages are set to expire in the next few years. Because these loans were issued at considerably more favourable interest rates than are offered today, households can be expected to avail themselves of one or more measures to limit the impact of interest rate reviews on their monthly debt service burden. It is vital that borrowers who anticipate financial difficulties acquaint themselves in a timely manner with the available options for lowering their debt service.

Firms' interest expense has increased

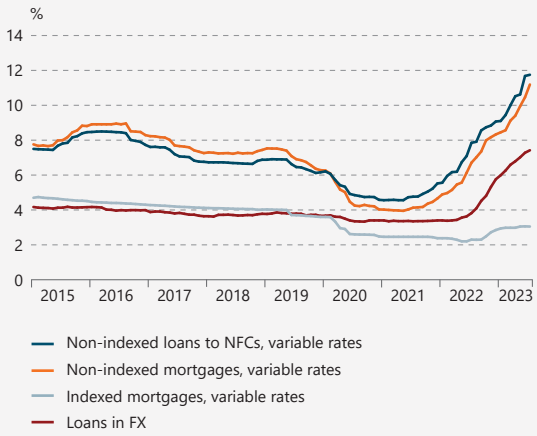
The weighted average interest rate on the D-SIBs' outstanding króna-denominated corporate loans stood at 11.8% as of end-July. It has risen somewhat in 2023 to date, in line with the increase in the Central Bank's key interest rate. By the same token, interest rates on foreign-denominated loans have risen in tandem with rate hikes abroad and the deterioration of Icelandic banks' funding terms in foreign markets. The majority of corporate debt is non-indexed and bears variable interest.

Interest rate hikes therefore affect companies strongly, and it is mainly large companies and those with foreign revenues that have access to diversified financing options. A persistently high interest rate level could prove onerous for highly leveraged companies and could lead to increased arrears. Other cost increases such as wage hikes and rising input prices have a detrimental impact as well. As yet, however, figures on company arrears do not indicate an increase in financial distress. The facility-level NPL ratio on the D-SIBs' corporate loans inched upwards by 0.1 percentage points in Q2, to 2.2%, which is somewhat below the European Economic Area (EEA) average. It remained highest among companies in the accommodation and food services sector, at 6%, although it subsided marginally between quarters in that sector.

As the discussion above suggests, the financial cycle is uncertain at present, as it is unclear whether it is

Chart I-41

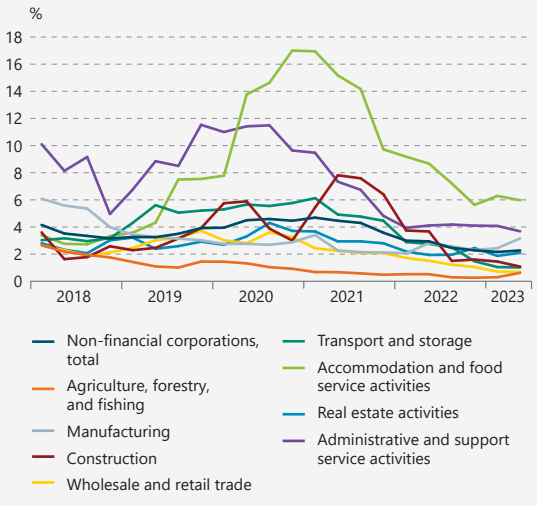
Weighted average rates on D-SIBs' loans



Source: Central Bank of Iceland.

Chart I-42

Non-performing loan ratios on D-SIBs' loans to non-financial corporations, by sector[1]



1. Consolidated figures for D-SIBs. NPL ratio according to EBA standards. NACE sector classification.

Source: Central Bank of Iceland.

still in an upward phase or has turned downwards. The key characteristics of a an upward financial cycle have not been in evidence in 2023 to date. Total private sector debt has contracted in real terms, and the real price of key asset classes has either fallen or remained flat. Furthermore, there are few signs of an excessive increase in risk appetite in the financial system, as is reflected in relatively stable loan quality on new mortgages and modest growth in unstable banking system funding.

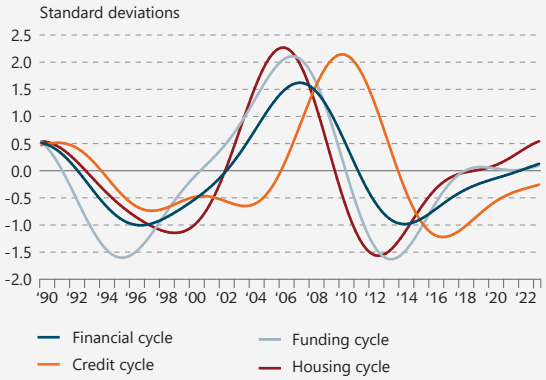
Financial cycle indicator still on the rise

Composite systemic risk indicators are useful for capturing and interpreting a variety of data simultaneously. Such indicators must always be examined closely and interpreted based on expert assessment, however. Because the financial cycle indicator is based on medium-term fluctuations in financial variables – i.e., a cycle ranging from eight to 30 years – it is not a given that a downturn like the recent one will show quickly in the indicator. On the other hand, it is best if the method used can identify a turnaround with as little time lag as possible. No method of integrating statistical data in real time is flawless, however. In the case of the financial cycle, using a band-pass filter on statistical data can be problematic, and the outcome can depend on how the process is carried out. The filter is usually applied to data that have been converted to percentage changes so as to ensure stationarity. This can increase the weight of measurement errors in the data, however, thereby skewing the results.[22] Sometimes, linear time trends are removed in order to ensure stationarity, but this can also cause spurious cycles if the data follow a non-linear trend rather than a linear one. Furthermore, it is possible to filter untreated data, but for technical reasons this is considered inadvisable.

When the financial cycle is estimated by calculating percentage changes before applying the filter, as is shown in Chart I-43, it does not indicate a turnaround, but rather a continuing upward cycle driven by all subcomponents.[23, 24] As is noted above, this outcome is out of line with developments in the data for 2023 to date – and in some instances, in the data from mid-2022 onwards. Even so, this need not be a "wrong" outcome, as the indicator is intended precisely to prevent short-term fluctuations from camouflaging longer-term movements. Nevertheless, it is better suited to analysing the direction and amplitude of the financial cycle with a time lag than to identifying turnarounds and extremes promptly. The latter task is achieved more effectively with other metrics such as domestic financial conditions, foreign market unrest, and various qualitative data. At present, there are signs that in spite of the indicator, the financial cycle may have stagnated or turned downwards.

Chart I-43

Financial cycle and subcycles[1]



1. The financial cycle itself, the blue line, is the simple average of the subcycles. Each subcycle is the simple average of cyclical components from variables related to credit, housing and bank funding, respectively. Cyclical components are obtained with a Christiano-Fitzgerald band-pass filter with a frequency band of 8-30 years.

Sources: Registers Iceland, Statistics Iceland, Central Bank of Iceland.

Declining private sector debt ratio

The debt of households and non-financial companies has been declining as a share of GDP since year-end 2020, as can be seen in Chart I-44. Actually, there is no similarity between such a development and a rising credit cycle in Chart I-43. When developments in the credit-to-GDP ratio over the past eight years are examined, it is impossible to assert with confidence that they contain a medium-term cyclical component. As a result, the possibility cannot be ruled out that the increase in the credit cycle towards zero stems not from a medium-term upward cycle but from the *lack* of a medium-term credit cycle in the data for recent years. Because the credit-to-GDP ratio is below its long-term trend, when the trend is calculated according to European Systemic Risk Board (ESRB) guidelines, the ESRB buffer guide indicates a 0% countercyclical capital buffer, as it has since 2011. Furthermore, the effects of the 2004-2015 credit cycle on trend calculations for Iceland,

22. Stationarity is discussed in Christiano and Fitzgerald. *The Band Pass Filter*. International Economic Review, Vol. 44, no. 2 (May 2003). A discussion of the potential drawbacks of calculating percentage changes before filtering can be found in den Haan (2009): https://tinyurl.com/bddaesmm.
23. The only change from previous presentations is that the percentage changes are now calculated between consecutive quarters, whereas they were previously calculated on an annual basis. This is done in an attempt to capture a turnaround earlier, if it has indeed occurred.
24. If linear time trends are removed prior to filtering instead of calculating percentage changes, the result is very similar to that shown here. If untreated data are filtered, the filter detects a false cycle; therefore, that outcome is not shown.

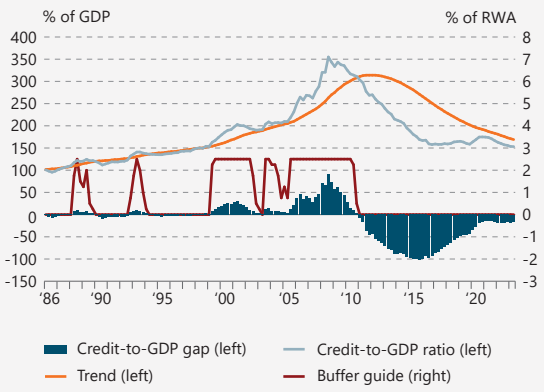
which have complicated the interpretation of this key ESRB indicator, will soon taper off and disappear.

Indication of declining cyclical systemic risk

The domestic systemic risk indicator (d-SRI) has fallen markedly in the recent term. It peaked in Q4/2021 but has fallen below its historical average in the year and a half since, thereby erasing just over half of the increase from end-2019 through end-2021. Because the d-SRI indicator is based in part on the same information as the financial cycle indicator, in addition to taking account of growth in underlying variables for up to three years, it resembles the financial cycle indicator in many ways. Thus the decisive drop in the d-SRI may indicate that a similar decline will show in the financial cycle indicator.

Chart I-44

Credit-to-GDP gap and buffer guide[1]



1. Total credit to the non-financial private sector over GDP for the last four quarters. Trend component is obtained with a one-sided HP-filter with λ=400.000. The buffer guide is a linear projection of the credit-to-gdp gap.

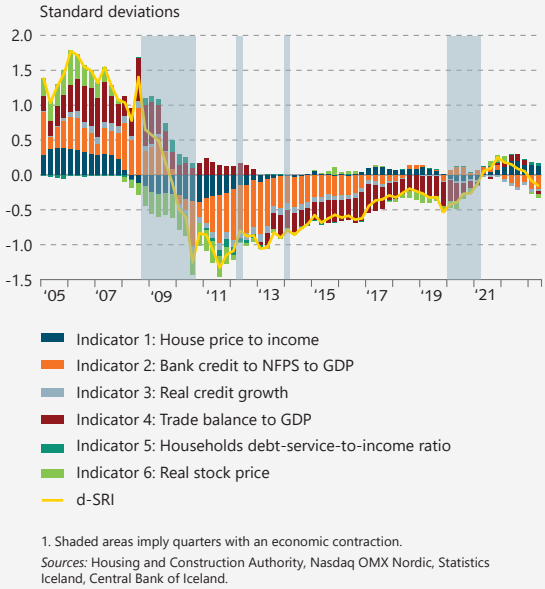
Sources: Statistics Iceland, Central Bank of Iceland.

The drop is driven largely by strong GDP growth, a falling private sector debt ratio, more favourable external trade, and declining share prices. Pulling in the other direction are, on the one hand, the increase in household debt service relative to disposable income, and on the other, the house price index, which is still high relative to the general wage index.[25]

25. The fifth sub-indicator in the d-SRI, the ratio of household debt service to disposable income, has been updated based on mortgage lending data. These data differ from the Central Bank's previous dataset on household debt service, which was based on issued monthly remittance slips. The new dataset does not include payments of student loans and consumer credit, but it does include more detailed information on each consumer mortgage issued by the banks, the ÍL Fund, and the nine largest pension funds. As an approach to the previous data, calculated debt service on household mortgages is scaled up in proportion to households' other debt. Sub-indicator no. 5 carries a weight of 5% in the d-SRI. The error stemming from this estimate has limited impact on the d-SRI.

Chart I-45

Domestic systemic risk indicator (d-SRI)[1]



1. Shaded areas imply quarters with an economic contraction.

Sources: Housing and Construction Authority, Nasdaq OMX Nordic, Statistics Iceland, Central Bank of Iceland.

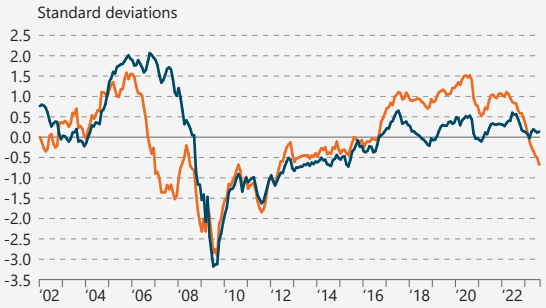
Tighter financial conditions

The financial conditions index, shown in Chart I-46, has also fallen significantly in the past year. The most important factor is the deterioration in housing market conditions, as falling real house prices reduce available collateral capacity. In addition, negative expectations about property market prices could affect demand for mortgages, thereby affecting lending growth as well. Moreover, conditions in the equity, credit, and foreign exchange markets were relatively tight in August.

The only offsetting factor in August was the money and bond market, where conditions were relatively favourable during the month – perhaps paradoxically, given the surge in interest rates. Most importantly in this context, the spread on 10-year Treasury bonds versus two-year Treasury bonds, both indexed and nominal, had fallen steeply since the spring. These two variables also weigh heaviest in the first three principal components in the dataset, which comprise the financial conditions index, and therefore push the index upwards. As a result, it is still above its historical average, as is shown in Chart I-46. It is debatable whether this gives an accurate representation when the yield curve is steeply downward-sloping, as it has been recently. A negative mathematical sign on a negative interest premium therefore causes the index to rise. This is an example of how interpreting composite indicators is frequently problematic and how no single version of such an indicator is the best fit under all conditions.

Chart I-46

Financial Conditions[1]



Financial conditions index

Financial conditions index with modified interest rate spread variables

1. The indicator is estimated by principal component analysis of 14 variables, covering the period from January 2002 to August 2023 with monthly observations. The latest value is preliminary.

Sources: Housing and Construction Authority, Nasdaq OMX Nordic, Statistics Iceland, Central Bank of Iceland.

Another possible approach is to interpret a small interest premium as a sign of tolerable or favourable conditions and a large premium (positive or negative) as a sign that conditions poorer, one way or the other. If the absolute value of the interest rate premium is included in the indicator with a negative mathematical sign, the outcome is very different from that described above. This version of the financial conditions index is also shown in Chart I-46. According to this version, financial conditions are currently at their tightest in over a decade, have declined to nearly one standard deviation below the historical mean, and are relatively tight in all markets. Also, they were considerably more accommodative in recent years, according to this definition.[26]

Although the financial conditions index is intended neither as a measure of the financial cycle nor as a measure of cyclical systemic risk, it can give an idea of where such indicators are headed. If financial conditions deteriorate abruptly, it can signal the initial stage of a downward financial cycle.

Downward financial cycle?

If interest rates remain high, financial conditions deteriorate further, and other macroeconomic and demographic factors do not call for financial growth, this will ultimately be manifested in a downward financial cycle. The effects of the systemic risk that accumulated during the pandemic – with strong growth in mortgage debt, declining quality of new loans, and an overstretched housing market – are not yet clear. This is reflected, for instance, in the fact that the bulk of the interest rate reviews on non-indexed mortgages will not occur until 2024 and 2025. It is important that the macroprudential policy stance take this into account.

Finally, it should be noted that even though research may show that key financial variables have been characterised in the past few decades by strong medium-term cycles that have correlated closely with financial crises, it is not a given that they will do so in the future. It is possible that this connection was severed after the global financial crisis as a result of regulatory amendments, effective macroprudential policy, and increased awareness of these medium-term cycles. According to Goodhart's law, when a measure becomes a target, it ceases to be a good measure.[27] It follows from this that when macroprudential policy is applied to medium-term fluctuations in debt, asset prices, and maturity mismatches, these cycles can lose their power to predict financial instability. Systemic risk can then build up differently than before – in ways that analysts do not take into account.

Goodhart's law is a necessary reminder that analysing systemic risk is easier said than done, particularly if attempts are made to manage it at the same time. No single risk indicator proves or disproves incontrovertibly that financial stability is under threat.

26. Furthermore, the weight of each variable in the indicator changes considerably. In particular, the spread on 10-year indexed Treasury bonds versus two-year indexed Treasury bonds falls from 19.3% to 12.6%, moving it from first place to sixth place in terms of its weight.

27 Charles A.E. Goodhart presented this idea, which resembles the Lucas critique, for the first time in connection with monetary policy in the UK in Goodhart, C.A.E. (1984). Problems of Monetary Management: The UK Experience. Chapter 3 in *Monetary Theory and Practice: The UK Experience.* Palgrave, London. He has since expressed the same idea in connection with systemic risk and financial stability. See Goodhart, C.A.E. *Risk, Uncertainty and Financial Stability.* 2008 Shackle Lecture. Financial Markets Group. London School of Economics.

The IMF's assessment of the Icelandic financial system

Last winter, the International Monetary Fund (IMF) conducted a comprehensive assessment of the Icelandic financial system under its Financial Sector Assessment Program (FSAP). The assessment was carried out at the request of the Icelandic authorities, with the aim of obtaining the IMF's professional evaluation of the state of the financial system and the reforms that have been implemented since the autumn 2008 financial crisis. Another objective was to obtain advice and recommendations on continuing development and further reforms.

In general, FSAP appraisals are based on an evaluation of three components

1. The source, probability, and potential impact of the main risks to macro-financial stability in the near term;
2. The country's financial stability and supervision policy framework;
3. The authorities' capacity to manage and resolve a financial crisis should the risks materialise.

The FSAP entailed a comprehensive assessment of the Icelandic financial system, as well as separate appraisals of specified parts of it. For the most part, the assessment took place during two visits by an IMF mission, with a focus on eight workstreams. The authorities answered detailed questionnaires on each of them and shared data with the Fund. A large number of meetings were held with Government officials and market agents in connection with the assessment. The results can be found in the Financial System Stability Assessment (FSSA) report on the IMF website, together with technical notes on each workstream, as follows:

1. Detailed assessment report on compliance with the Basel Core Principles
2. Financial safety net and crisis management
3. Cyber and operational resilience, supervision, and oversight
4. Pension fund oversight
5. Stress testing and systemic risk analysis
6. Macroprudential policies
7. Climate-related financial risks in the banking sector
8. Anti-money laundering/combating the financing of terrorism.

Key recommendations

The FSAP results indicate that the Icelandic financial system is resilient enough to withstand severe shocks; however, the Fund identified a number of opportunities for improvement. The solvency stress test of the systemically important banks confirmed the sector's resilience to severe but plausible macroeconomic shocks. The liquidity stress test showed that the banks' liquidity was adequate but that their foreign funding could be a potential vulnerability. This vulnerability was mitigated, however, by the investment capacity of domestic institutional investors with sizeable foreign assets and by the Central Bank's ample international reserves. On the whole, the regulatory and supervisory framework was deemed satisfactory. Nevertheless, the Fund recommended strengthening the regulatory framework for pension funds and thought it necessary to provide the banks with further guidance tailored to the specific risk environment.

The macroprudential policy stance was considered sufficient, but the Financial Stability Commitee should be prepared to tighten it if systemic risk should grow. Tighter borrower-based measures and the increase in the countercyclical capital buffer have bolstered the financial system's resilience against housing market corrections and tighter financial conditions. Developments should be monitored closely in the commercial real estate (CRE) market, which is sensitive to interest rate hikes, as the banks have loaned substantial amounts to the CRE sector. The authorities should also consider imposing minimum risk weights on financial institutions' CRE-backed exposures and expand the Central Bank's powers to include applying borrower-based measures to CRE financing.

According to the FSAP assessment, the financial system could be strengthened by taking the following measures:

- Bolster the independence of the Financial Supervision Committee and reduce potential conflicts of interests. The implementation of a formal delegation of authority for supervision-related decision-making within the Central Bank would ensure better accountability and operational efficacy.
- Safeguard the Central Bank's independence and efficacy in financial market supervision by implementing a new, independent process for setting supervisory fees, thereby ensuring that financial needs relating to supervision are always met.
- Increase staffing to improve risk-oriented supervision in several key risk areas, including operational risk, cybersecurity risk, and climate-related financial risk.

- Improve pension fund governance and expand supervision of the pension funds due to their systemic importance in the financial market, strengthen still further the regulatory framework for pension funds' administrative structure and internal controls, and expand the Central Bank's supervisory and sanctioning powers vis-à-vis the pension funds.
- Develop and improve liquidity management in the monetary system, including by developing a collateral-based repo market.
- Strengthen the Icelandic Financial Institutions' Guarantee Fund (TIF) to accord with the International Association of Deposit Insurers (IADI) Core Principles, including requiring disbursement of deposit insurance within seven business days.
- Strengthen the implementation of Resolution Authority decisions by setting up a coordination body between the Central Bank and the Ministry of Finance and Economic Affairs, while preserving the Resolution Authority's independence. The framework for crisis management, safety nets, and resolution could be improved.
- The Central Bank and the Ministry of Finance and Economic Affairs should work together to create a cyber security policy for the financial system, where the roles and responsibilities of each party are laid down explicitly.
- Develop an independent domestic retail payment intermediation solution so as to reduce the risk of financial instability in the event of disruption of payment system activity.

The IMF's recommendations will be used for continuing reforms and improvements aimed at strengthening still further the resilience of the financial system, regulatory framework, and supervision.

Box 2

Financial stability and anti-money laundering measures

Several serious money laundering cases have emerged at Nordic commercial banks in recent years. The most prominent of them involved Danske Bank, which was fined heavily for its part in widespread money laundering taking place through its Estonian branches and subsidiaries.

As a result, the Nordic-Baltic Constituency at the International Monetary Fund (IMF) requested that the fund analyse the money laundering-related threats and vulnerabilities facing the Nordic-Baltic countries and issue recommendations for mitigating the risks involved. The preparation for the project, which is considered part of the IMF's technical assistance to member countries, began in November 2020 and formally concluded on 4 September 2023, with the communication of the results at a press conference in Stockholm. A report on the regional assessment along with summaries from reports for each of the countries concerned have now been published.[1]

Capital flows

The regional assessment project has three main components. First, IMF staff carried out an analysis of financial flows within the Nordic-Baltic region and beyond it. The Fund used information on cross-border payments through the SWIFT system and compared then against information from other areas, such as the scope of portfolio investment and direct investment, information on the balance of payments, and how well the countries have implemented the Financial Action Task Force's (FATF) anti-money laundering recommendations. One method used was a type of unsupervised machine learning approach called an isolation forest model, which was used to identify instances where cross-border flows do not appear to align fully with the above-mentioned economic fundamentals.

The results of the analysis show that the Icelandic commercial banks' activities involving foreign payments are rather limited geographically. Furthermore, they are easily explained in terms of the economic fundamentals covered by the appraisal. Moreover, Iceland's payments to and from high-risk and uncooperative countries are minimal, and outlier payment activity – i.e., payment flows that are far out of line with underlying economic fundamentals – is insignificant according to the machine learning model. This is considered to indicate that money laundering-related risk in Iceland is relatively limited in this context. It is noted, however, that flows between Iceland and international financial centres (IFCs) have accelerated in recent years.

1. https://www.sedlabanki.is/utgefid-efni/frettir-og-tilkynningar/fretta safn/frett/2023/09/04/Svaedisbundin-uttekt-vardandi-adgerdir-gegn-peningathvaetti/

Supervision of banks and virtual asset service providers

The report also covered the Nordic-Baltic countries' anti-money laundering and terrorist financing supervision. The implementation of the FATF Recommendations was reviewed, as was the efficacy of cooperation and exchange of information within and among the countries concerned. The execution of risk assessments and risk-oriented supervision of financial market entities was covered as well, including some discussion of virtual assets and virtual asset service providers.

In this context, it was pointed out that ongoing monitoring of cross-border flows, together with regional exchange of information, would be beneficial. In order to strengthen risk-oriented supervision, the report calls for increased collection of cross-border data and complementary investments in advanced data analytic tools, as well as coordinated supervisory action for the highest-risk banks. The Central Bank of Iceland is well positioned in this arena, as it has long experience with gathering data on cross-border payments.

The impact of money laundering-related shocks on financial stability

The third segment of the project involved assessing the impact that shocks caused by money laundering would have on financial stability, particularly on the banks' valuations, funding costs, and liquidity. This part of the project was based on six incidents taking place in 2018-2019, when anti-money laundering defences failed at ABLV Bank (Latvia), Danske Bank (Denmark and Estonia), Swedbank (Sweden), and Nordea (Finland). Developments in bank share prices in the region (not only the specified banks) were examined, as were movements in CDS spreads and deposits in the wake of the incidents. One objective of this segment was to develop stress tests and other methods of incorporating money laundering-related reputational risk into financial stability risk assessments. Given that Arion Bank was listed on the stock exchange in mid-2018 (the first Icelandic bank to be listed since 2008), this part of the project did not examine Icelandic banks.

Conclusion

The Central Bank considers the analysis and results of the regional assessment project useful and hopes that the publication of the report will provide important lessons that the private sector and other countries could learn from experience and good practice in the Nordic region. The Central Bank of Iceland works continuously on improving its supervision of measures targeting money laundering and terrorist financing, and its action plan is in line with IMF recommendations. This includes further development of risk assessments and risk-oriented supervision, use of information on capital flows in the risk assessment process, and further analysis of information on cross-border capital flows.

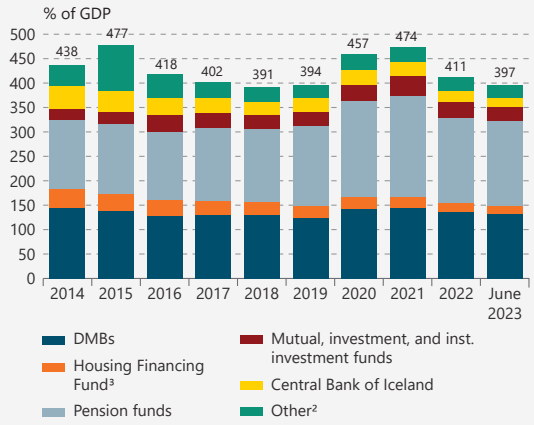
The financial system

II

Financial system assets amounted to 397% of GDP as of end-June 2023, after falling 14 percentage points during the first half of the year. The decline is due to stronger growth in GDP than in financial system assets. Since year-end 2021, the ratio has fallen by 77 percentage points, even though financial system assets have increased by 4 percentage points over the same period, but nominal GDP has surged recently, driven by strong output growth and high inflation.

Chart II-1

Financial system: Assets as % of GDP[1]



1. Parent companies. 2. Other: Failed financial institutions that have undergone composition are included with other financial institutions as of the time their composition agreements were approved. The Central Bank of Iceland Holding Company ehf. (ESÍ) is also included with other financial institutions from its establishment in December 2009 until its dissolution in February 2019. 3. The Housing Financing Fund (HFF) merged with the Iceland Construction Authority on 1 January 2020. HFF assets from 2020 onwards are the assets of the ÍL Fund, which took over the processing of the HFF's assets and liabilities.

Sources: Statistics Iceland, Central Bank of Iceland.

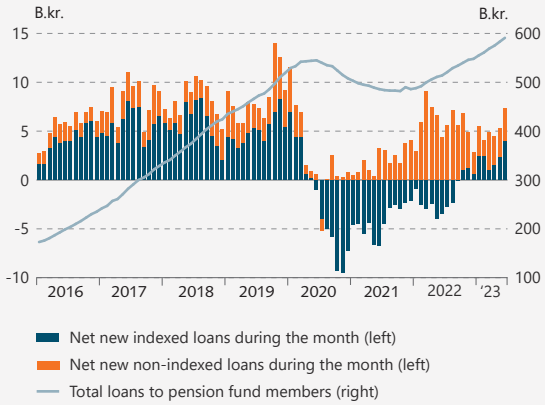
Deposit institutions' assets accounted for just under a third of total financial system assets at the end of June, after remaining unchanged in H1/2023. The pension funds own nearly 44% of total assets, almost a percentage point more than at the turn of the year. The share held by other entities either remained unchanged or declined.

Pension fund assets amounted to 6,950 b.kr. at the end of June, after increasing by 324 b.kr., or about 5%, in H1/2023. In krónur terms, two-thirds of this increase was due to foreign assets. Foreign assets accounted for 36.4% of total pension fund assets as of end-June, having increased by just over 1.5 percentage points in H1. The share of foreign assets held by the pension funds reached an all-time high in June. Nearly 97% of the funds' foreign assets are in foreign equities and unit shares, an increase of 9.1% in these assets in the first half of the year. Domestic equities and unit shares accounted for 14.2% of total assets at the end

Chart II-2

Loans to pension fund members[1]

January 2016 - June 2023



1. Figures are based on balance sheet summaries submitted to the Central Bank by the pension funds. Net new loans are new loans less loan retirement and loan prepayments in excess of contractual requirements.

Source: Central Bank of Iceland.

of June, about 1.4 percentage points less than at the turn of the year. Offsetting these declines, marketable domestic bonds and bills increased by 0.2% as a share of total assets, to 35.3% as of end-June, and pension fund loans rose by 0.2%, to 8.6%.

In many cases, the pension funds' mortgage lending rates have been more favourable in the recent term than those offered by the banks, particularly in the case of non-indexed mortgages. This has caused the pension fund loan stock to begin growing again. In 2021, issued loans averaged 8.6 b.kr. per month and loan retirement 10.7 b.kr. per month. This pattern reversed in 2022, when the pension funds issued an average of 11.9 b.kr. per month in new loans to fund members, whereas retirement of pension fund loans averaged 7.8 b.kr. per month. The trend from 2022 has continued in 2023: the funds have issued new loans to their members in the average amount of 11.4 b.kr. per month, while loan retirement has kept declining, to a monthly average of 6.1 b.kr. At the end of June, the stock of pension fund loans totalled 591 b.kr., after growing by 43 b.kr. over the first half of the year. Rising interest rates have therefore strengthened the pension funds' competitive position in the mortgage lending market.

Profitability

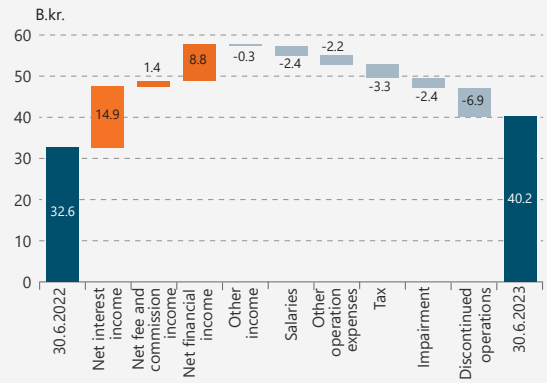
The domestic systemically important banks' (D-SIB) operations were strong in H1/2023, with a profit of just over 40 b.kr., as opposed to a profit of 32.6 b.kr. for the same period in 2022. Their return on equity was 12% in H1, an increase of 2 percentage points year-on-year. The increase in profits in H1 is due mainly to a steep rise in interest income and a turnaround in financial income despite challenging market conditions.

All of the D-SIBs' core operations were strong in H1/2023. Their return on equity from underlying operations (excluding one-off items) was 13.7%, up from 11.1% in H1/2022. Their underlying returns have increased by 9 percentage points since 2014 and are at their highest since the banks were established in 2008.[1]

Net interest income came to 75 b.kr. in H1, an increase of 14.9 b.kr. year-on-year. The rise in net interest income can be attributed to balance sheet growth, on the one hand, and a wider interest rate differential, on the other. The D-SIBs' total assets came to 5,008 b.kr. at the end of June, an increase of 460 b.kr. between years. The interest rate differential on their total assets was 3.05% in H1/2023, some 0.38 percentage points more than in H1/2022. The interest rate spread was at its narrowest, 2.36%, in Q1/2021. Since then, it has widened in tandem with rising central bank policy rates in Iceland and abroad, and in Q2/2023 it was 3.12% The D-SIBs' interest rate spreads were last this wide in 2017.

Chart II-3

Change in D-SIBs' profit in the first 6M 2023[1]

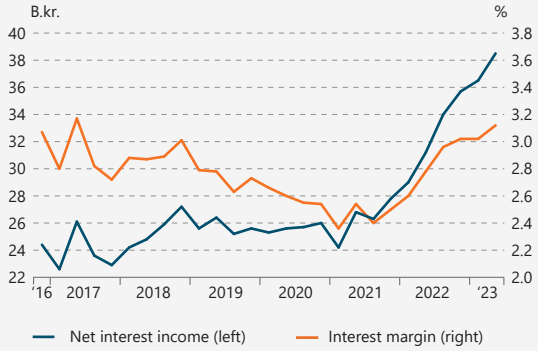


1. Domestic systemically important banks, consolidated figures. The chart shows the difference between income and expenses for the first 6 months of 2023 compared to the first 6 months of 2022.

Sources: Commercial banks' financial statements.

Chart II-4

D-SIB: Net interest income and interest rate differential[1]



1. Domestic systemically important banks, consolidated figures. Interest rate differential is for each quarter and based on total assets.

Sources: Commercial banks' financial statements.

The interest rate differential will probably keep widening in H2, as central bank rates have continued to rise. Lending growth and higher interest rates push both interest income and interest expense upwards. Chart II-5 gives a rough idea of how net interest income developed in H1/2023 relative to the previous year, assuming that loans are funded with deposit or bond issues. On average, 83% of the banks' assets took the form of loans in 2022, and the same share

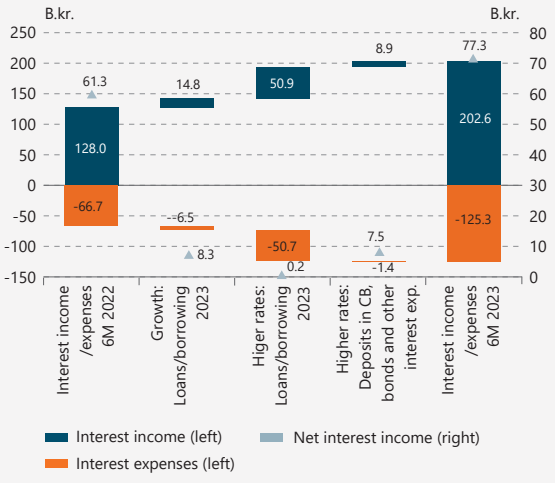
1. Underlying returns are defined here as returns on regular income, which are based on net interest income and net fees and commissions, less regular expenses apart from one-off cost items. The tax rate of 20% is based on the average balance of capital.

stemmed from borrowings through deposits and bond issues. Other key assets (apart from loans) are liquid assets such as bonds and deposits with the Central Bank. These assets are offset on the D-SIBs' balance sheet by capital (nearly 14%) and other liabilities (3.5%), such as public levies or debts due to trade settlement. Interest-bearing assets always somewhat exceed interest-bearing liabilities.

Earlier in the chapter net interest income was reported. Not all of the D-SIBs recognise interest income on marketable bonds at fair value as interest income, however; some recognise it as financial income. If this income is recognised as interest income, the D-SIBs' net interest income for H1/2023 totals 77.3 b.kr., some 16 b.kr. higher than in H1/2022. About 8.3 b.kr. can be attributed to an increase in lending, another 7.5 b.kr. to higher interest income on liquid assets, and only 0.2 b.kr. to a wider interest rate differential between borrowings and loans issued. The wider interest rate spread and higher interest income in H1 can be attributed almost entirely to balance sheet growth and higher returns on liquid assets.

Chart II-5

D-SIB: Changes in net interest income in the first 6M 2023[1]



1. Domestic systemically important banks, consolidated figures. The chart shows the difference between interest income and expenses for the first 6 months of 2023 compared to the first 6 months of 2022. Borrowing consist of deposits and issued bonds of the banks in ISK and foreign currencies. Interest income of marketable securities at fair value are partly estimated.

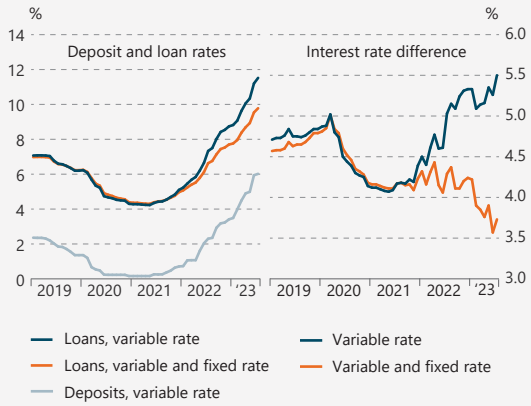
Sources: Commercial banks' financial statements.

The interest rate spread on loans and funding has therefore not been widening, at least not in H1/2023. This does not indicate whether credit spreads are generally unchanged, however, as a share of loans and funding bear fixed interest rates. Chart II-6 shows that variable rates on non-indexed króna-denominated loans to households and businesses have increased more than variable rates on non-indexed deposits owned by the same parties. The spread between these loans and deposits has widened by more than a percentage point since the pandemic and is wider than it was during the pre-pandemic period. Credit spreads have therefore widened, albeit less for individuals than for companies. At the end of July 2023, 30% of the D-SIBs' loans to households, or 603 b.kr., were non-indexed mortgages bearing fixed interest rates. These loans bore an average interest rate of 5.1%, whereas variable rates on non-indexed household loans were 11.2%. When these loans and households' and businesses' other fixed-rate loans and deposits are added to the variable-rate stock of loans and deposits, however, developments in the interest rate differential change markedly. The spread narrows by 0.5 percentage points relative to the pandemic period and around one percentage point relative to the pre-pandemic period. It is appropriate to reiterate, however, that this examination includes only non-indexed loans and deposits denominated in krónur. In general, foreign market-based financing terms have deteriorated in recent years, and yields on covered bonds have risen. When adjustments are made for these factors and for foreign and indexed loans/financing, credit spreads are unchanged, as has been noted.

Chart II-6

D-SIB: Interest rates on deposits and loans to households and corporates[1]

January 2019 - July 2023



1. Total stock and weighted average interest rates. Domestic systemically important banks. Only a small part of deposits have a fixed interest rate. The interest rate curve for deposits with variable and fixed rates is almost the same as the interest rate curve for variable rates and is therefore not shown.

Source: Central Bank of Iceland.

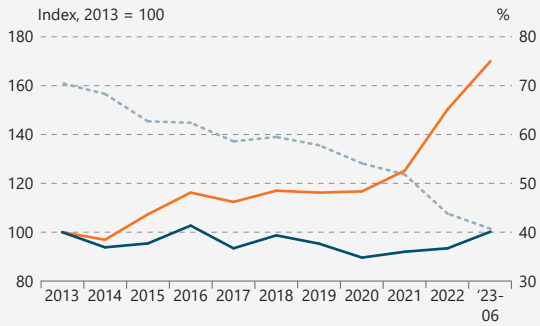
Fixed-rate mortgages have only been funded in part with covered bonds or fixed-rate deposits. All else being equal, then, the D-SIBs' interest income will increase when the fixed-rate periods on non-indexed mortgages expire. If all non-indexed fixed-rate loans had borne variable interest in H1/2023, the banks'

interest income would have increased by 11 b.kr. during that period, and the interest rate differential would have been 0.45 percentage points wider. Roughly 20 b.kr. in fixed-rate non-indexed mortgages underwent interest rate reviews in the first seven months of 2023, and another 53 b.kr. are scheduled for review in the last five months of the year. Interest rate reviews of loans amounting to 256 b.kr. and 280 b.kr., respectively, are set for 2024 and 2025.

Net fee and commission income totalled 21.5 b.kr. in H1/2023, an increase of 1.4 b.kr. year-on-year. All of the banks saw their income from fees and commissions rise, and it can be said that growth in income from payment intermediation due to increased payment card turnover is the main reason for the rise, as net income from payment intermediation grew by 1.6 b.kr., or 45%, relative to H1/2022.

Chart II-7

D-SIB: Regular income and cost-ratios[1]



1. Domestic systemically important banks, consolidated figures. Regular income is net interest income and net fee and commission income.

Sources: Commercial banks' financial statements.

The D-SIBs' regular income – i.e., net interest income and fees and commissions – totalled 96.4 b.kr. in H1/2023, a year-on-year increase of 16.3 b.kr., or just over 20%. Regular income constituted approximately 95% of the D-SIBs' total income during the half.

Net income from financial activities was positive by 2.3 b.kr., which represents a turnaround of 8.8 b.kr. relative to the prior year. This is due largely to Landsbankinn, whose net financial income totalled 2.5 b.kr., an improvement of 7.3 b.kr. between years. Arion Bank's net financial income was negative by 0.2 b.kr., and Íslandsbanki's financial income and expense were in balance. Overall, conditions in the financial market have been challenging in 2023 to date.

Other operating income totalled 2.6 b.kr. in H1/2023, including 0.8 b.kr. in net exchange rate gains. In all, net operating revenue was 1 b.kr. more than in H1/2022. In H1/2022, Arion Bank sold its subsidiary Valitor, and the D-SIBs' income from discontinued operations was positive by 6.9 b.kr. In H1/2023, it was positive by 33 m.kr. This represents a reversal in the amount of 6.9 b.kr., which should be borne in mind in comparisons of profits and returns in 2023 and 2022.

Costs rising again

Streamlining and cost controls have led to a significant reduction in the D-SIBs' expenses in the past 6-7 years. In H1/2023, for example, the banks' expenses were 31% lower in real terms than in 2016. This year has seen a reversal, however: in H1/2023, the D-SIBs' combined operating expenses were up year-on-year by 13% in nominal terms and 3.8% in real terms. In all, operating expenses were 40.1 b.kr., an increase of 4.6 b.kr. year-on-year. After adjusting for the settlement between Íslandsbanki and the Central Bank due to Íslandsbanki's handling of the sale of a 22.5% stake previously owned by the Government – with 860 m.kr. of the 1,160 m.kr. settlement payment expensed in Q2/2023 – the D-SIBs' expenses rose in real terms by 1.6% in H1/2023. Real wage costs rose 2.6% year-on-year, and the number of full-time position equivalents increased by 42, to 2,314 by the end of June. The D-SIBs employed just over 3,400 staff members at the end of 2016, and their numbers have therefore declined by a third since then.

Their H1 cost ratio was 39.6% and declined by 6.8 percentage points year-on-year, as income grew more than expenses. Their ratio of costs to regular income declined 5.7 percentage points between years, to 40.7%, and has fallen by 30 percentage points in the past decade, which is a substantial reduction. As is noted above, regular income is likely to increase even further, as interest rates are still rising; however, developments in the ratio of costs to regular income will depend largely on near-term developments in wage costs and inflation.

Decline in foreign-denominated lending

The D-SIBs' loans to households and businesses increased by just under 4% in the seven months of 2023, to a total of 3,675 b.kr. at the end of July but the increase was 7.4% for the same period last year. Growth in lending to private sector borrowers has lost pace due to the tightening of the monetary and macroprudential stance. Lending to companies totalled 1,688 b.kr. as of end-July, an increase of 5.2% year-on-year, somewhat more than lending to households, which rose 2.8%. In recent months, growth in lending to private

sector borrowers has been limited almost entirely to indexed loans, whereas the stock of non-indexed loans in krónur has been unchanged. Foreign-denominated lending to companies declined in June by 35 b.kr., or 6.6%, owing in large part to Brim hf.'s 33 b.kr. refinancing of older debt. The new financing was provided by foreign banks, while the previous loans belonged to domestic banks. If Brim had not refinanced its debt, the foreign-denominated loan stock would have increased by 5% at constant exchange rates over the first seven months of the year instead of declining by just over 1%. Discussions with bank executives have indicated that it is likely that more companies with foreign-denominated loans will seek out financing abroad in the coming term. Isavia's August bond issue in the amount of 175 million euros suggests that this is indeed the case. Less favourable terms on the D-SIBs' foreign funding erodes their competitive position.

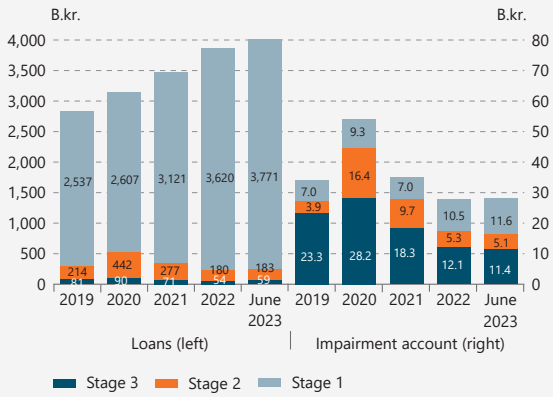
High inflation and increased demand for indexed loans caused the D-SIBs' indexation imbalance – the difference between indexed assets and liabilities – to more than double in H1/2023. The indexation imbalance was 106 b.kr. at the end of June, as compared with 51 b.kr. at the turn of the year. The three- and five-year minimum term for indexed deposits and loans was discontinued in June. That same month, the banks introduced new indexed deposit accounts with a commitment period of 90 days or 12 months, and by August, there were about 15 b.kr. in these accounts. This change will strengthen the funding of indexed loans, particularly of variable-rate loans.

Loan impairment increases

The Icelandic economy has been very resilient, as is evidence by robust growth in domestic demand. The tourism industry has recovered rapidly, and more strongly than previously expected. Most borrowers who needed support measures have seen their situation improve markedly. Despite the sharp rise in interest rates, the corporate non-performing loan (NPL) ratio was unchanged year-to-date in June, at 2.3%, but was 0.6 percentage points lower than at the same time in 2022. In terms of nominal amounts, however, corporate NPLs increased in the first half of the year. The household NPL ratio rose from 0.7% to 0.8% in H1.[2] The share of frozen household loans has also risen somewhat this year. It is likely that households' and businesses' arrears have reached a turning point and will trend upwards in the coming term. It is appropriate to bear in mind that households' and businesses' NPLs are at their lowest since the 2008 financial crisis and would have to rise significantly to return to pre-pandemic levels.

Chart II-8

D-SIB: Loans and impairment account[1]



1. Domestic systemically important banks, consolidated figures. IFRS-9 classification of loans to individuals and corporates.

Sources: Commercial banks' financial statements.

In most cases, loans to borrowers who took advantage of pandemic-related measures are classified as forborne and performing. At the end of June, 3.8% of the D-SIBs' loans to companies (71 b.kr.) were forborne and performing, as compared with 7.3% at the turn of the year and 10.3% in June 2022. About 1.1% of loans to individuals (23 b.kr.) were forborne and performing. This is the same as at the turn of the year but 0.4 percentage points less than in June 2022. On the whole, the share of forborne loans has fallen significantly, and it is likely to keep doing so.

The improvement in borrowers' position can also be seen in the change in IFRS-9 classification. At the end of 2020, 14.1% of loans were classified as Stage 2, but by June 2023 that share had fallen to 4.6%.[3] This is also true of Stage 3 loans, which can be viewed as non-performing: at the end of 2019, 2.9% of loans were in Stage 3, but by the end of June 2023, that share had fallen to 1.5%. Stage 3 loans have increased in 2023 to date, which accords with the discussion above.

Capital ratio rises

The D-SIBs' capital totalled 687 b.kr. at the end of June and was unchanged since the turn of the year;

2. This refers to non-performing loans as defined by the European Banking Authority (EBA).

3. Loans are moved from Stage 1 to Stage 2 if credit risk has increased significantly relative to the initial position. Loans are moved to Stage 3 if they are in serious default and impairment can be expected. Impairment must be based on expected credit losses over the lifetime of the loan.

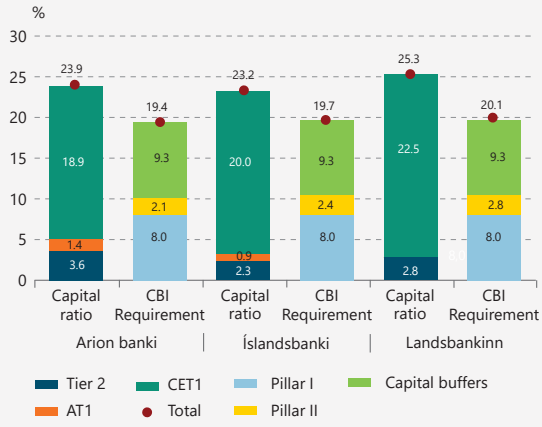
however, it was nearly 5% higher than in June 2022. The banks' combined capital ratio was 24.2% at the end of June, 0.5 percentage points higher than at the turn of the year and 1 percentage point higher than in June 2022. Proposed dividend payments have been deducted from these figures, but if the dividends are added to the capital base, the capital ratio is 25% as of end-Q2/2023 and 25.4% as of year-end 2022. Profits increased the capital ratio by 1.3 percentage points in H1 and capital instruments increased it by another 0.3 percentage points, but dividend payments and share buybacks lowered it by 1.1 percentage points. Furthermore, the increase in risk-weighted assets in H1 lowered the ratio by 0.9 percentage points.

The D-SIBs' minimum overall capital ratio according to Central Bank rules ranges between 19.4% and 20.1%, based on the status of the banks at the end of 2022. At the end of June 2023, their capital ratios were 3.5-5.2 percentage points above the required level, after adjusting for dividends to be paid on profits in 2023. In March 2023, the Financial Stability Committee decided to increase the countercyclical capital buffer rate from 2% to 2.5% of the domestic risk base, effective in March 2024. The three banks' capital ratios including the management buffer and the increase in the countercyclical capital buffer were 1-2.7 percentage points above Central Bank requirements.[4] It is possible to increase the D-SIBs' capital base by issuing additional Tier 1 equity instruments and Tier 2 subordinated bonds. The scope for issuance is greater for additional Tier 1 capital, as it has only been partially utilised. As a result, the banks have some latitude to steer their capital base, particularly because their underlying returns are strong.

The D-SIBs' leverage ratio was 12.9% at the end of Q2. It was unchanged relative to year-end 2022 and June 2022. Individual banks' leverage ratios ranged between 11.7% and 13.9%.[5]

Chart II-9

D-SIB capital requirements and capital adequacy ratios at the end of June 2023[1]



1. Domestic systemically Systemically important banks, consolidated figures. In calculating the capital ratio, the portion of first half 2023 profit to be paid as a dividend in 2024 has been deducted from the capital base.

Sources: Commercial banks' financial statements and other published materials.

MREL

The Act on Resolution of Credit Institutions and Investment Firms, no. 70/2020, authorises the Central Bank of Iceland's Resolution Authority to determine minimum requirements for financial undertakings' own funds and eligible liabilities. These requirements, generally referred to as MREL, represent the own funds and eligible liabilities a financial undertaking must hold so as to ensure that it can absorb unforeseen losses and recapitalise its activities without Government support if it should be deemed failing or likely to fail.[6] According to the Resolution Authority's most recent MREL requirements, financial undertakings' own funds and eligible liabilities shall equal at least double the minimum own funds requirement (i.e., two times Pillar I and Pillar II). These institutions must also satisfy a combined capital buffer requirement. At the end of June, the three systemically important banks' MREL lay between 30.5% and 32.4% of their risk-weighted assets. The banks' MREL funding ranged between 35.5% and 42% of their risk-weighted assets.

Liquidity and funding

The banks' liquidity is strong

The domestic systemically important banks' (D-SIB) liquidity has improved in 2023 to date and has been stable in the past few months. Their liquidity coverage ratios (LCR) increased with foreign bond issues this past spring. At the end of July, the D-SIBs' combined liquidity ratio in all currencies was 204%, well above the 100% minimum required under Central Bank rules. The liquidity ratio in foreign currencies was 429% at the end of August, whereas the ratio in Icelandic krónur was 131%. The liquidity ratio in euros was 804% at the end of July but varies from bank to bank. An 80% minimum liquidity ratio in euros was introduced on

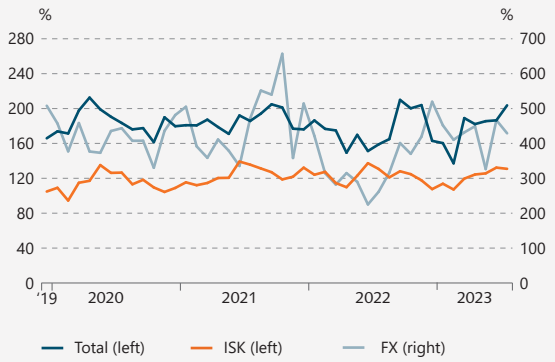
4. The management buffer is an internal prudential buffer defined by the banks themselves.

5. The leverage ratio, computed in accordance with the Act on Financial Undertakings, no. 161/2002, is calculated as Tier 1 capital divided by exposures. The minimum leverage ratio is 3%.

6. MREL stands for minimum requirement for own funds and eligible liabilities. Further discussion of the Central Bank of Iceland's MREL policy can be found in Box 9 of *Financial Stability* 2022/1.

1 January 2023.[7] The liquidity ratio in all foreign currencies combined has been relatively stable in recent months. There is no longer a required minimum ratio for all foreign currencies combined, but the situation is monitored regularly.

Chart II-10
D-SIB liquidity coverage ratio[1]



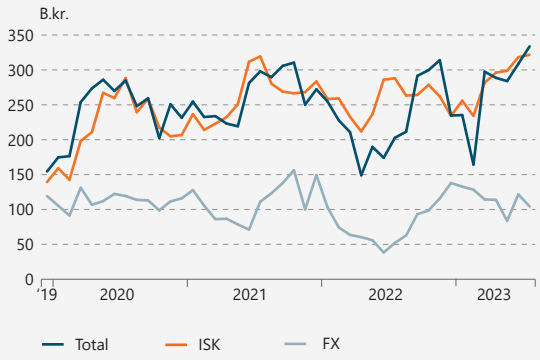
1. Consolidated figures.
Source: Central Bank of Iceland.

At the end of July 2023, the banks' disposable liquid assets were 334 b.kr. above the minimum required for all currencies combined under Central Bank rules. Liquid assets over and above requirements have increased by 130 b.kr. in the past twelve months. As before, the banks' internal criteria determine the scope they have for disposition of liquid assets. Based on a 120% minimum liquidity ratio, for example, the banks' excess liquidity amounted to 270 b.kr. at the end of July. The more liquidity the banks hold, the more scope they have to grant loans, cover unforeseen withdrawals of deposits, pay dividends, and buy back their own shares.

The banks' liquid assets consist mainly of government bonds, government bills, and deposits with the Central Bank. At the end of July, the banks held 598 b.kr. in high-quality liquid assets in all currencies combined, and their liquid assets had increased by over 39 b.kr. year-to-date. Just over half of their liquid assets are in government bonds and bills. The banks' liquid assets in Icelandic krónur amounted to 463 b.kr. at the end of July, an increase of 74 b.kr. since the turn of the year. Their liquid assets in foreign currencies contracted by 35 b.kr. over the same period. The ratio of liquid assets to total assets is 18% and has risen slightly in recent months.

7. Minimum liquidity ratio in euros for credit institutions whose euro-denominated liabilities equal 10% or more of their total liabilities

Chart II-11
D-SIB liquidity in excess of requirements[1]



1. Parent companies.
Source: Central Bank of Iceland.

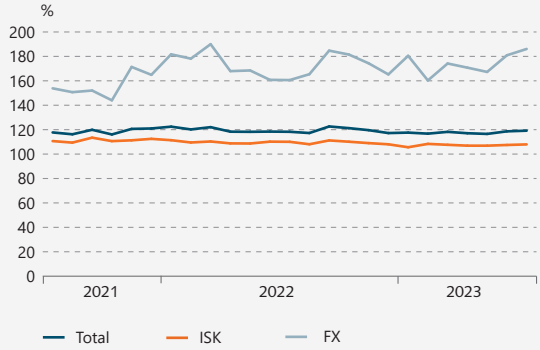
Market funding in krónur remains limited

As before, the majority of the banks' funding is in the form of deposits and marketable bonds. Deposits, which account for about half of their funding, have increased by 135 b.kr., or 5%, in 2023 to date. The largest increase, 73 b.kr., or 6%, was in deposits owned by individuals, followed by large companies' deposits, which grew by 37 b.kr., or 7%. Deposits held by pension funds and customers in the financial market contracted, however. The banks' domestic funding in Icelandic krónur is still mainly in the form of deposits.

On the whole, the banks still have enough liquidity to intermediate credit to households and businesses. If the composition of the deposit portfolio changes – for instance, if individuals move their savings to other investments – it could adversely affect the banks' liquidity. It is therefore important to keep close track of developments in banking system deposits.

The D-SIBs' net stable funding ratio (NSFR) for all currencies combined was 119% at the end of July

Chart II-12
D-SIB Net stable funding ratio[1]



1. Consolidated figures.
Source: Central Bank of Iceland.

and therefore well above the minimum required under Central Bank rules. At that time, the funding ratio in all foreign currencies combined was 186%, whereas the ratio in Icelandic krónur was 108%. The total ratio has risen marginally in recent months, particularly the ratio in foreign currencies.

The banks' króna-denominated bond issues have been limited thus far in 2023, apart from covered bonds. In 2023 to date, the stock of outstanding covered bonds in Icelandic krónur has grown by 53 b.kr., but Íslandsbanki and Landsbankinn have large maturities (80 b.kr.) in Q4, and the outstanding stock can therefore be expected to shrink over the year as a whole. As before, demand for covered bonds in krónur is limited and buyers are few. In comparison with króna-denominated covered bonds, the banks' net new lending to households increased by 27 b.kr. over the first seven months of the year.[8]

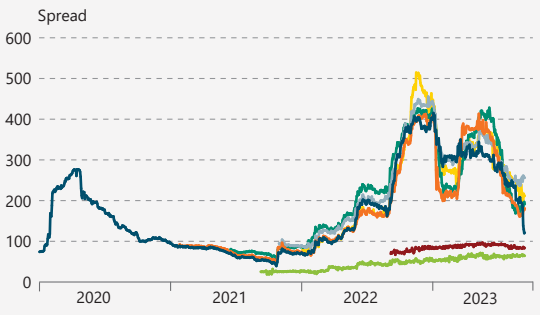
The banks have continued to issue subordinated bonds in krónur. The issues have not been large, but when subordinated issues in foreign currencies have been called in, the banks have issued króna-denominated subordinated bonds. If the banks do not succeed in boosting their króna-denominated funding further, their liquidity could shrink.

Credit spreads on foreign issues have fallen

Credit spreads on the domestic banks' foreign bond issues rose markedly in 2022. By December, secondary market spreads were higher than they were in 2015, when the banks issued their first foreign bonds after the 2008 financial crisis, and far above the peak at the onset of the pandemic. At the beginning of 2023, spreads began to fall, but in the wake of the uncertainty in foreign markets in March and the failure of a few banks in the US and Switzerland, they started to rise again. They have fallen significantly since the beginning of summer and are now broadly back to the level seen at the beginning of the pandemic.

Chart II-13

D-SIB: Spread on listed foreign bonds, EUR



Source: Refinitiv Datastream.

The Icelandic banks are not the only issuers affected by higher credit spreads in foreign markets. Funding conditions have generally worsened in Europe. The difference between Icelandic and European banks' spreads can be explained in part by the size of the bond issues, as Icelandic bonds are very small in European context and issued less frequently, and therefore relatively illiquid. Other reasons include the Icelandic banks' credit ratings and the small size of the investor group. This difference between spreads exists despite the fact that the Icelandic banks are very strong in comparison with their European counterparts. Furthermore, secondary market turnover with the banks' foreign-denominated bonds has been limited and price formation therefore weak. In addition to this, the supply of euro-denominated liquidity in the euro area has been shrinking this year, owing to rising interest rates and the European Central Bank's (ECB) balance sheet downsizing by means of bond sales starting in March. As a result, there are generally fewer euros available for bond issues in the euro area.

Recently, Moody's Investors Service upgraded Íslandsbanki's and Arion Bank's credit rating to A3 with a stable outlook.

The banks scaled back their foreign bond issuance as uncertainty mounted in foreign credit markets in 2022 and H1/2023. In March 2023, Landsbankinn issued its first euro-denominated covered bond, using the proceeds to refinance a euro issue that matured in May.

Then, in May, Arion Bank and Íslandsbanki issued unsecured eurobonds in the amount of 300 million euros each, to refinance their euro-denominated maturities in 2023 and 2024. The new bonds were three-year maturities, Arion's bearing a premium of 407 basis points over the interbank rate in euros and Íslandsbanki's bearing a premium of 421 points over the euro interbank rate. They were the banks' first unsecured euro-denominated issues since autumn 2022. In September 2023, Landsbankinn issued its third euro-denominated green bond, a 3.5-year maturity totalling 300 million euros. A portion of the proceeds will be used to refinance the bank's year-2024 euro maturities. The Landsbankinn bond was issued at a

8. Net new loans are defined as new loans less debt retirement and prepayments in excess of contractual requirements.

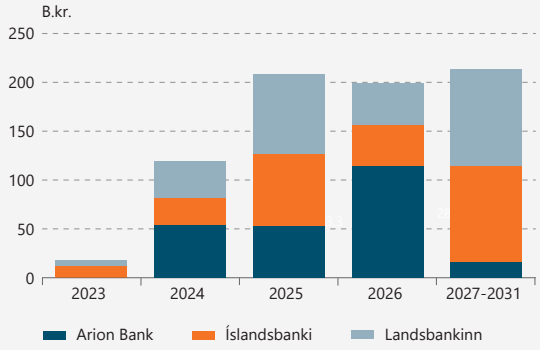
premium of 313 basis points above the mid-swap market rates. Thus far in 2023, the banks have issued foreign-denominated bonds for a total of 190 b.kr., as compared with 130 b.kr. over the same period in 2022.

In all, the D-SIBs have sold covered eurobonds for a total of 1,100 million euros in recent years, but they have also issued covered bonds for their own use. Mostly, the banks have used these issues for refinancing and to strengthen their foreign liquidity.

Their outstanding foreign-denominated maturities for the remainder of 2023 total about 18 b.kr. If the call provisions on the bonds are exercised at the earliest opportunity, this total will increase to 44 b.kr. All three banks also have large eurobond maturities next year, as well as smaller maturities in Nordic currencies, for a total of roughly 120 b.kr.

Chart II-14

D-SIB: Foreign bonds by maturity[1]



1. At 25.8.2023 exchange rate. AT1 issues from the banks are missing from the graph.

Source: Nasdaq Ísland.

The banks' foreign liquidity is very strong at present, and they have enough liquid assets to pay all of their 2023 and 2024 foreign bond maturities without violating the Central Bank's liquidity rules. Their refinancing risk has therefore diminished sharply. Because of minimum requirements for own funds and eligible liabilities (MREL), the banks must issue bonds that satisfy specified conditions pursuant to Article 17, Paragraph 2 of the Act on Resolution of Credit Institutions and Investment Firms, no. 70/2020. Their unsecured bond issues in foreign currency fulfill this requirement. Unsecured bonds in krónur do so as well, but at present the market for such issues is virtually non-existent; therefore, the banks must rely on foreign bond issues at the moment. Bonds maturing within one year do not satisfy these conditions, and the minimum requirement therefore puts greater pressure on the banks to refinance earlier than before.

The banks must continue to maintain strong liquidity

Stress tests of the banks' liquidity and funding are carried out on a regular basis. At the end of August 2023, all of the banks had enough high-quality liquid assets to cover withdrawals by their largest depositors; i.e., large firms, financial institutions, pension funds, and non-residents. This is a departure from the situation at the turn of the year, as the banks' liquidity has improved in 2023.

The need for market funding will not diminish in the coming term. Foreign-denominated issues have been limited as a result of challenging conditions in foreign funding markets in the past two years. With interest rates on the decline, however, there is the hope that the banks can issue more foreign bonds in the near future.

Strong lending growth, dividend payments, and share buybacks during challenging conditions in domestic and foreign markets can cause the D-SIBs' liquidity to shrink. The banks must therefore continue to monitor their liquidity closely.

Central Bank stress test 2023

III

The Central Bank assesses the systemically important banks' resilience by carrying out annual stress tests. The stress scenario for 2023 was designed so as to test all of the foundations of banking operations following a period of high inflation and rising interest rates. In the scenario, the banks' interest rate spreads come under pressure in that the spread between short- and long-term rates narrows. Losses on corporate and household loans increase, as the price of all major asset classes falls markedly, and prospects for key economic sectors and workers deteriorate. At the same time, the banks' risk-weighted assets grow in nominal terms due to inflation, a weaker króna, and credit growth.

Since autumn 2022, when the scenario was created, some of the assumptions contained in it have materialised, albeit in generally milder form than the scenario provided for. The Treasury yield curve has shifted upwards and become inverted, with long-term yields lower than short ones, which is the reverse of the typical pattern. Furthermore, returns on securities have been weak. Nevertheless, the banks have performed well to date, as other factors have developed favourably for them. The nominal price of real estate, the largest single asset class in the banks' collateral portfolio, has not fallen as yet. Furthermore, unemployment has remained very low in historical context. In addition, the banks' managers have considerable scope overall to take a variety of measures to work with borrowers to prevent loan losses, but it is prohibited to allow for such management measures in the stress test.

All of the three large systemically important banks (D-SIB) satisfy the overall capital requirement, as well as the common equity Tier 1 (CET1) capital requirement provided for in the stress test. On the whole, the results of the stress test indicate that the banks are resilient enough to continue supporting the economy with an unchanged supply of credit, even if external conditions deteriorate.

Purpose and assumptions

The Central Bank of Iceland conducts its system-wide stress test each year. In the test, individual banks' resilience against shocks is assessed, as is the resilience of the banking system as a whole. Participants in the stress test are the three systemically important banks, which accounted for nearly 95% of deposit institutions' total assets as of end-2022. The scenarios used in the test are based on an analysis of the key risks and challenges that are considered potential threats to financial stability in the coming term. In general, the Bank uses cyclical stress scenarios, which entails that the stress scenarios become more severe as measures of cyclical systemic risk increase.

The commercial banks have grown relatively quickly in recent years, and strong capital and liquidity ratios have enabled them to grant debt moratoria and supplemental loans as well as responding to other demand for credit, which is necessary for the economy to function normally. When preparations for the 2023 system-wide stress test began with scenario design, the economy had largely regained its former strength, but there was uncertainty due to persistent inflation and the upcoming interest rate reviews that would affect a large share of the banks' loans to households. One of the objectives of the stress test was therefore to assess the impact on the banks in the event that interest rates rose and inflation climbed even higher than expected, and whether the banks were resilient

enough to support the economy even if conditions deteriorated.

The stress test is carried out in cooperation with the D-SIBs, but the results published here, which are estimated by the Central Bank, give an indication of how the banks' operations, balance sheets, and capital ratios could develop in the stress scenario. Whether or not banks deduct approved dividend payments from the capital base in their annual accounts varies from one bank to another. In the interest of comparability, all approved dividends are deducted for the purpose of the stress test. The results do not assume that any management measures will be taken. This means that the relative composition of loan portfolios or funding was not adjusted, no operational streamlining was assumed, and no equity instruments were issued to boost the banks' capital ratios.[1]

Scenario

The stress scenario is based on an analysis of key risks and challenges to financial stability; however, it does not represent a forecast of expected developments in economic aggregates or other variables. When the severity of the stress scenario and desirable developments in key variables have been selected, continuous and consistant time series are obtained with a run through the Bank's macroeconomic model (QMM).

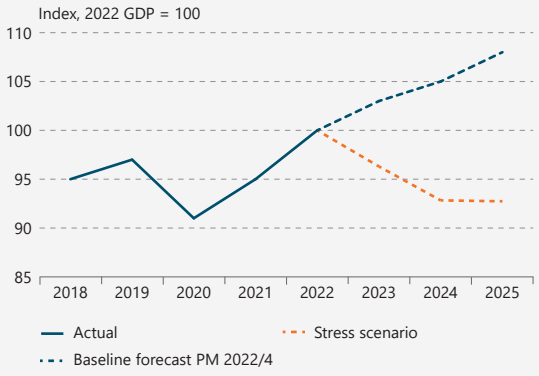
As is discussed in *Financial Stability* 2022/2 and *Monetary Bulletin* 2022/4, the main challenges at that time centred on increased inflation and interest rate hikes in Iceland and abroad. As a result, it was decided that in addition to a conventional economic contraction, the core of the stress scenario would entail high inflation, high interest rates, and a steep drop in asset prices.

The stress scenario, which covers a horizon from 2023 through 2025, assumes a major setback in the demand side of the global economy, with inflation rising more than expected and central banks forced to raise interest rates at a faster rate than previously anticipated. Global GDP growth in 2023 is a full 3 percentage points below previous forecasts, and financial conditions deteriorate markedly. The economic contraction and interest rate hikes cause foreign equity securities prices to fall below the already diminished year-end 2022 levels. Aggregate demand contracts and lessens demand for Icelandic goods and services.

1. A more detailed description of the Central Bank stress test and the methodology used can be found in the report entitled *The Central Bank of Iceland's approach to stress testing the Icelandic banking system*.

Chart III-1

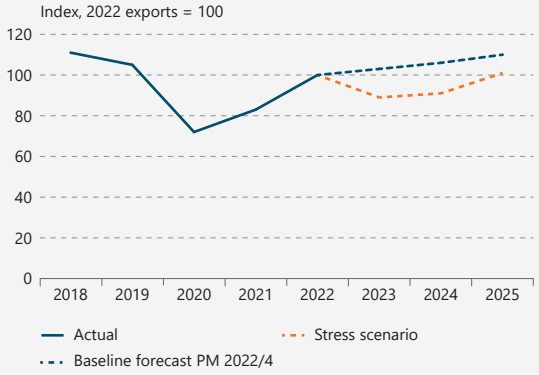
Gross domestic product



Sources: Statistics Iceland, Central Bank of Iceland.

Chart III-2

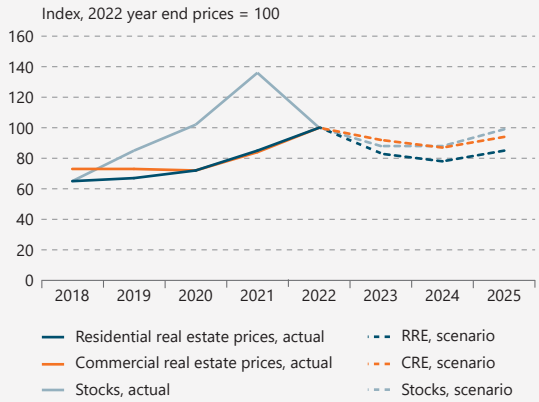
Export volume of goods and services



Sources: Statistics Iceland, Central Bank of Iceland.

Chart III-3

Nominal prices of main asset classes



Sources: Statistics Iceland, NASDAQ OMX iceland, Central Bank of Iceland, Registers Iceland.

Foreign commodity prices become detrimental to Iceland's terms of trade. Key exported goods prices fall, while oil prices rise. During the first two years of the scenario combined, aluminium prices as measured in foreign currency plunge by two-thirds and the foreign currency price of marine products falls by nearly a third. Furthermore, catch quotas are assumed to decline and tourist numbers to contract. The contraction in services exports over the first year of the scenario measures 13%. Total exports of goods and services contract by 11% in 2023, and goods exports are assumed to shrink by 9.5% during the year. Imports contract as well, but by less than exports during the first year. However, the drop in imports is more persistent than the contraction in exports and continues into the second year of the stress scenario, while export growth resumes in year 2, positively affecting GDP growth and the nominal exchange rate.

The trade-weighted exchange rate index falls by nearly 13% in year 1 of the stress scenario, as inflation is higher in Iceland than in other countries. Higher interest rates abroad lure capital out of Iceland, and foreign currency inflows taper off due to reduced exports. In the second year, however, the rise in the exchange rate reverses for the most part, as by this time inflation is as high abroad as in Iceland and exports are growing, although the contraction in imports continues. The drop in the real exchange rate in year 1 reverses more or less entirely in year 2. Inflation is high and persistent in the first two years but then eases markedly in the third.

As in other countries, prices fall sharply in all key asset markets: domestic share prices drop nearly 27% in real terms in the first year, house price fall by 30% in years 1 and 2 combined, and CRE prices plunge 35% in years 1 and 2 combined.

Higher financing costs and a bleaker economic outlook cause investment to shrink by almost 22% over the entire period, with residential investment contracting the most, although public and business investment decline as well. The impact of the scenario extends to all sectors, causing higher unemployment across a broad group of workers. Unemployment peaks at 7.1% in 2024 and averages 6.3% over the entire horizon. Furthermore, real disposable income is assumed to contract by nearly 20% in the first two years of the scenario, largely due to high inflation, and then begin to recover in year 3. Private consumption shrinks substantially as a result, declining by a total of 14% over the three-year period.

GDP contracts somewhat, albeit less than might be assumed given the decline in private consumption and investment, with the downturn driven mainly by reduced imports. GDP shrinks by 3.7% in year 1 and 3.6% in year 2, and then remains broadly flat (0.1% contraction) in year 3.

The scenario also assumes that risk premia on the banks' bond issues will rise. Interest premia charged to Icelandic banks and firms on top of base rates rise by 150 basis points for domestic funding and about 600 points for external funding.

Table III-1 Key variables in the stress scenario[1]

%	2023	2024	2025
Private consumption	-3.8	-8.2	-2.8
Exports of goods and services	-11.1	2.2	11.5
Imports of goods and services	-8.8	-5.8	5.6
GDP growth	-3.7	-3.6	-0.1
Unemployment (average for the year)	6.0	7.1	5.8
Inflation (average for the year)	14.7	8.1	3.0
Nominal house prices (year-end values)	-5.4	-10.7	8.2
Nominal CRE prices (year-end values)	-17.3	-5.2	8.2
Change in short-term interest rates (percentage points)	3.5	0.0	-2.0
Change in five-year nominal interest rates (percentage points)	2.5	0.0	-1.0

1. Change from prior year (%) unless otherwise specified.

Source: Central Bank of Iceland.

Results

Because the stress test is conducted from a macroprudential perspective, a possible spiral between the banking system and the real economy is given particular attention. If the banking system withstands the shock entailed in the stress scenario without cutting back on lending to profitable projects, no negative spiral will develop. As a result, credit growth is assumed to be positive during all years of the scenario, the path of which is estimated using a statistical analysis of borrowing needs assuming given developments in other economic variables. By the same token, the scenario provides for high inflation and a depreciation of the króna, which causes the nominal value of indexed and exchange rate-linked debt to rise accordingly. The banks' loan portfolio therefore grows on average by a relatively brisk 5.8% in the scenario, as compared with the actual growth rate of 11.6% in 2022.

Although rising interest rates generally have a positive effect on the banks' interest rate spreads, a flatter yield curve offsets that effect because the banks' funding is short-term to a large extent, while their assets bear interest that follows the long end of the yield curve. In 2022, the D-SIBs' net interest income equalled 2.8% of their average total assets. In the stress

scenario, it holds very stable around that level in the first two years but then declines to 2.3% in year 3.

Net interest income is one of the key variables in this year's stress test, and it is interesting to see how it develops in an environment of rapidly changing interest rates. It increases by 7.5 b.kr. in the first year, owing to asset portfolio growth, but does not retain its value in real terms. The Central Bank therefore considers it unlikely that the banks' funding costs will increase faster than their interest income in a scenario like this one. Profitable underlying operations help the banks to withstand the shock.

The probability of default in the scenario is based primarily on unfavourable financing terms for borrowers, together with elevated unemployment and reduced exports. It is not assumed that the banks will grant moratoria on payment or offer other measures to work with debtors, although they would certainly do so in the event of an actual shock. The scenario therefore assumes that banks' loan losses will be significant, totalling 157 b.kr. for all three banks combined during the first two years of the scenario.

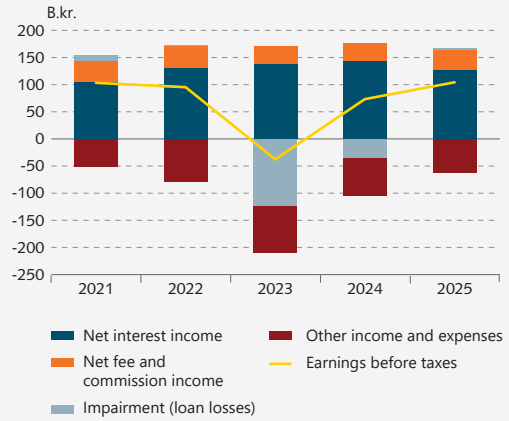
Other revenues and expenses are negative by 87 b.kr. in the first year of the scenario, a slight deterioration relative to previous years, mainly because of higher operating expenses, which rise in line with wages and the general price level, and because of reduced income from fees and commissions and losses on securities holdings.

The operating loss in the first year of the scenario comes to just under 38 b.kr. before taxes, so that the banks' capital base contracts by that amount plus the bank tax, which is estimated at 6.3 b.kr. for the year. Because risk-weighted assets increase at the same time, the D-SIBs' weighted average capital ratio falls from 23.7% at the beginning of the period to 21.4% by the end of 2023. It bottoms out at 21.3% a year later but then begins to rise. The weighted average CET1 ratio (the ratio of common equity Tier 1 capital to risk-weighted assets) hits bottom during the first year of the scenario, falling from 20.4% at the beginning of the horizon to 18.0% by year-end 2023.

At the beginning of the scenario, the three large commercial banks' mandatory overall capital ratio according to Central Bank requirements ranged between 19.9% and 20.8% (weighted average 20.5%). Each of the banks satisfies the requirement throughout the horizon of the stress test. In year 2, when capital ratios are at their lowest, they are 0.0-1.7 percentage points above the overall requirement. The required CET1 ratio was 15.3-15.8% at the beginning of the

Chart III-4

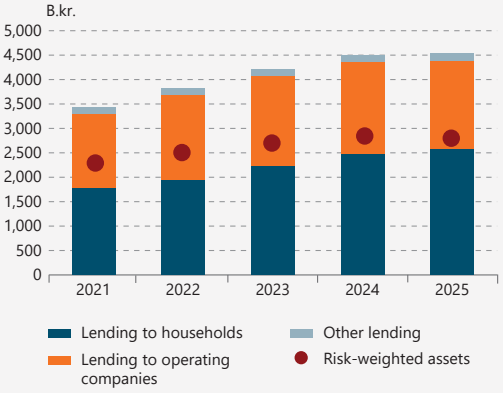
Stress scenario: D-SIB's income and expenses



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

Chart III-5

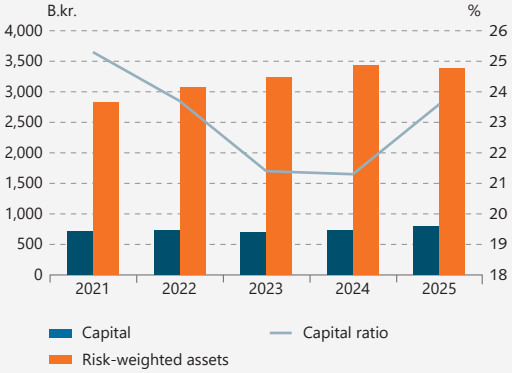
Stress scenario: D-SIB's lending



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

Chart III-6

Stress scenario: D-SIB's capital and equity base



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

scenario (weighted average 15.6%), and when the ratios bottom out during the horizon they are 0.2-4.7 percentage points above the required level.

The reference value of the overall capital requirement is the position at the end of 2022, when a 2 percentage point increase in the countercyclical capital buffer (CCyB) rate had just taken effect. The CCyB was increased again in March 2023, to 2.5%, effective in March 2024. In the scenario, however, it is likely that the buffer will be set at zero, because asset prices fall concurrent with the shock to the real economy. The banks' capital in excess of requirements would increase by about percentage points as a result, in terms of both the capital ratio and the CET1 ratio.

Chart III-9 shows a breakdown of developments in the CET1 ratio from year-end 2022 until the trough according to the scenario, which occurs at the end of 2023. The first three items (net interest income, net commission and fee income, and operating expenses) are the mainstay of the banks' day-to-day operations, and they increase the CET1 ratio; however, loan losses lower the ratio by 4 percentage points, and an increase in risk-weighted assets (due to credit growth and slightly higher risk weights) lowers it by an additional 1 percentage point. The credit growth that materialises is based not only on supply but also on demand for credit, which could also prove weak in such a scenario. If credit growth is weak or non-existent, it can therefore be assumed that the CET1 ratio will fall by only 1.4 percentage points instead of 2.4 points.

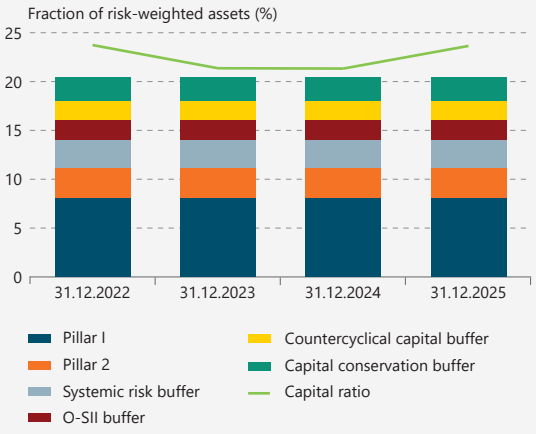
Lessons

In the Central Bank's communications with the commercial banks during the stress testing process, a number of points emerged that can serve as lessons. One of these pertains to the interaction between the timing of loan losses and the trough of capital ratios. One aspiration of the IFRS-9 framework is that loan losses are recognised as soon as possible, but in practice, the speed at which the banks' models respond to them can vary. For a given loan loss, the impact on the capital ratio can be greater if it emerges quickly than if it is spread over a longer period of time. In the Central Bank's assessment, it is assumed that loan losses are identified and recognised very quickly, and the lowest capital ratio value is therefore a cautious estimate.

Another point centres on the banks' funding, as it can take a long time to adjust funding to current needs. For instance, the banks' indexation balance could increase during a shock such as that presented here, but if inflation subsides faster than expected at

Chart III-7

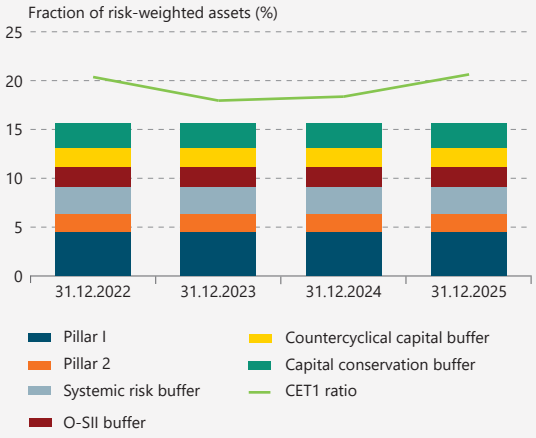
Stress scenario: D-SIB's capital ratio and requirements



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

Chart III-8

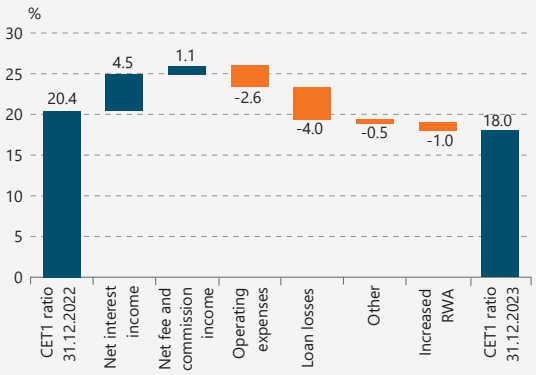
Stress scenario: D-SIB's CET1 ratio and requirements



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

Chart III-9

Stress scenario: Disaggregated development of D-SIB's CET1 ratio



Sources: Arion bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

the end of the scenario, a positive indexation balance could have a negative impact on the banks' interest rate spreads.

The final point focuses on credit growth, as there are differences in how the banks would adapt their credit supply to a scenario like this one: some might take advantage of the situation and bolster their market share, while others might hold back and reduce their lending activity. If all of the banks should cut back on lending, it would trigger a negative spiral between the financial system and the real economy, exacerbating the severity of the shock.

Substantial resilience

The banks' balance sheet is well able to tolerate shocks such as the one described here. Furthermore, a number of developments that have taken place since the stress test was carried out have made the banks better prepared to face shocks. Large foreign bonds have been refinanced, for instance, somewhat reducing the banks' sensitivity to premia in foreign markets. Their capital ratios and CET1 ratios have risen marginally, partly because the banks scaled down the extraordinary dividends and share buybacks that were planned at the end of 2022.

The results of the stress test show that the banking system is highly resilient and well able to support the economy even if shocks strike. Their strong capital position gives them scope to maintain lending growth even in the face of an economic contraction and a surge in arrears, thereby supporting investment during a downturn. Furthermore, management measures are excluded from the stress test, but the banks' managers would doubtless take a range of actions to support borrowers and protect their own interests if a shock like that described in the stress scenario should materialise. This would cushion their balance sheets even further from the effects of the shock.

Financial market infrastructure

IV

Among other legally mandated tasks, the Central Bank of Iceland is required to promote financial stability and sound and secure financial activities and to promote an active and secure financial system, including domestic and cross-border payment intermediation.[1] The financial system and its infrastructure play a key role in the economy and provide the foundations for nearly all transactions carried out by Iceland's households, businesses, and public sector. In order to ensure stability in the financial system, it is important that financial market infrastructure be effective, secure, and efficient in operation, that it be open to those with the required operating licences, and that it satisfy the requirements made of it.

The Central Bank's role in this falls into four categories:

1. As owner and operator of the interbank system, which has been designated by the Financial Stability Committee as a systemically important financial market infrastructure component.
2. As overseer of developments, operations, and operational security of financial market infrastructure.
3. As a catalyst for further development of infrastructure and the financial market.
4. As supervisor of financial activities.[2]

In order for the Central Bank to perform its function, it exerts influence on and supervises the operations and activities of financial market infrastructure, which is particularly important in the case of systemically important infrastructure elements. The discussion that follows explains the Bank's key tasks in this area.

1. cf. Article 2, Paragraph 1 of the Act on the Central Bank of Iceland, no. 92/2019.
2. Each year, the Central Bank issues a *Financial Supervision* report outlining the supervisory tasks entrusted to the Bank by law.

Box 3

The interbank payment system

The Central Bank of Iceland is the owner of the interbank payment system, where all payments made between domestic financial institutions in Icelandic krónur are settled; therefore, it is not involved in payments made between customers within a single financial institution. The system is the only one of its kind in Iceland and is subject to Rules no. 1030/2020. It is divided into two components, the gross settlement component (RTGS) and the retail component (EXP). The RTGS component handles the settlement of payment orders amounting to 10 m.kr. or more and involving two different financial institutions, or transactions between financial institutions and the Central Bank. The cash leg of the securities transactions are also settled in the RTGS component of the system. Payments between financial institutions in amounts less than 10 m.kr. are routed through the retail component of the system and settled twice a day in the RTGS component. There are currently twelve interbank system participants: the Central Bank, the commercial banks, the savings banks, and the foreign securities settlement entities Euroclear and Clearstream. The interbank system was brought into use in October 2020, replacing the older interbank payment system. In general, central banks operate RTGS systems in their own currency areas, while retail payment systems are often owned and operated by private entities.

Assessment with respect to international standards

Because of its systemic importance, it is important that the interbank system operations be uninterrupted, that settlement take place in a predetermined manner, and that the security of transactions be ensured. Predictability of interbank system operations supports financial stability and the Central Bank's goal of ensuring that intermediation of funds is always possible and that households, businesses, and the public sector can conduct trade in goods and services, pay invoices, and carry out market transactions. In order to promote uninterrupted system operations and appropriate oversight, the Central Bank complies with the Principles for Financial Market Infrastructures (PFMI). The PFMI are issued by the Committee on Payment and Market Infrastructure (CPMI) and the International Organization of Securities Commissions (IOSCO).[3] The PFMI are an international benchmark that is deemed essential to guaranteeing best practice in the operation of systemically important systems. Systemically important systems are those that are deemed to have broad impact on other systems if they do not function properly. The PFMI are designed as a reference, and it is possible to impose more stringent requirements than are laid down in them. The principles fall into several categories, all of which are essential to guaranteeing the operation of important infrastructure: Organisation and governance, settlement, risk management, efficiency, collateral, transparency, and settlement in case of default. The system operator reviews the principles and conducts a self-assessment against the benchmarks therein, with the assistance of others involved in system operations; i.e., other departments within the Central Bank, and RB data center. The self-assessment is then reviewed by the Bank's Financial Market Infrastructure Oversight unit, which makes comments and recommends improvements if applicable and then ensures that they are implemented. Furthermore, the CPMI/IOSCO Guidance on Cyber Resilience for Financial Market Infrastructures shall be observed in connection with the interbank system.[4]

The previous interbank payment system was assessed against the PFMI in 2015 and 2016. With the adoption of the new system, significant changes were made in procedures, but the core activities are unchanged. It is vital to ensure that the new interbank system is in compliance with the PFMI, and the Guidance on Cyber Resilience must be followed in the new system and in connection with other changes made to the payment intermediation environment in recent years. Preparation for an assessment of the interbank system against the PFMI began in spring 2023. The assessment and the ensuing review are expected to take roughly one-and-a-half years. The Central Bank aims to satisfy the criteria laid down in the PFMI at all times; therefore, they must always be considered when changes are made to the financial market infrastructure environment.

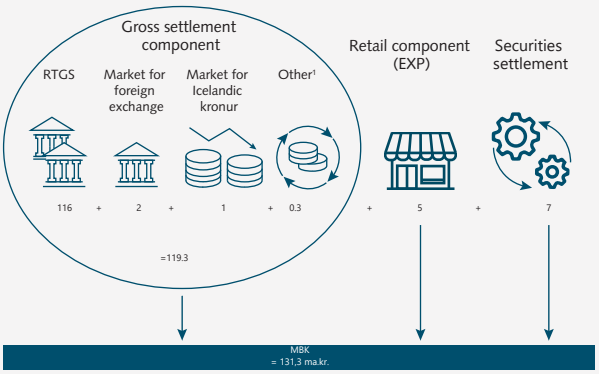
Developments and prospects

Payment outflows in domestic financial market infrastructure

Digital transfers between domestic bank accounts averaged about 1,000 b.kr. per business day in 2022, or roughly one-fourth of GDP.[5] Of that total, 316 b.kr. changed hands; i.e., households, businesses, financial institutions, and public entities withdrew funds from their own accounts and transferred them to accounts owned by others. Of this latter amount, an average of 185 b.kr., or 60%, was settled in deposit institutions' internal payment systems, and the other 40%, or 131 b.kr., was routed through the interbank system.

Chart IV-1

Payments of interbank system settlement, average per business day in 2022



Other: Interest payments to participants from the Central bank and fees paid for participation in the Interbank system. Transactions proccessed between deposits accounts owned by the same participant are not included. That part averaged 12.4 b.kr. per business day.

Sources: RB, Central Bank of Iceland.

Transfers between bank accounts

The vast majority of Icelanders – more than 99% of those aged 15 and over – have a bank account with

3. See the Principles for Financial Market Infrastructures (PFMI) (bis.org). The PFMI have been discussed in the Bank's *Financial Stability* reports from 2020 onwards.
4. Guidance on cyber resilience for financial market infrastructures (bis.org) (June 2016). See also the Central Bank's *Financial Market Infrastructure* reports from 2015 and 2016.
5. This amount represents all transfers taking place in the banking system, between banks, and between accounts within the same bank and branch.

Icelandic deposit institutions. This is comparable to the share in the other Nordic countries. At the end of 2022, Icelanders held a total of 1,260 b.kr. in bank accounts that they used to invest their funds and make digital transfers to other accounts, either their own or those owned by companies or other individuals. An estimated 70% of individuals aged 18-80 use online banking services to transfer funds, and about 60% use banking apps in smart devices. In 2021, 52% of individuals used banking apps. In the same year, an estimate 42 b.kr. per day were transferred via online bank and 3 b. kr. per day via smart device.

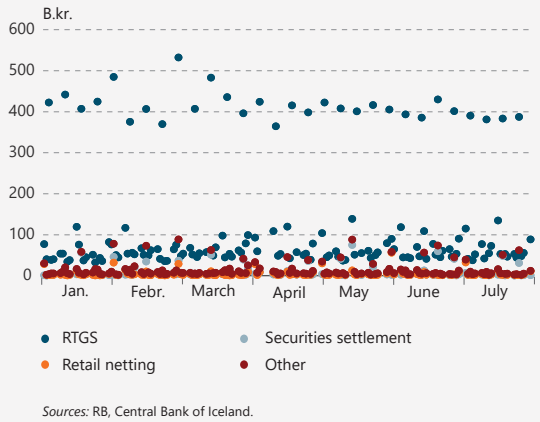
Payment intermediation in the interbank system

In the first seven months of 2023, an average of 650 transactions per day were routed through the interbank system, and turnover averaged 162 b.kr. This represents an increase of 16% relative to the same period in 2022, when the total value of payment orders amounted to 140 b.kr. Turnover in final settlement of retail payments and securities transactions in the interbank system increased as well, by a combined 9%. RTGS figures include the Central Bank's market transactions, which take place on Wednesdays, with the participation of commercial banks and savings banks. As Chart IV-2 shows, turnover spikes on Wednesdays but is relatively stable on other weekdays when the RTGS component of the interbank system is open.

Chart IV-2

Breakdown of interbank system settlement

Daily turnover, 2023



Sources: RB, Central Bank of Iceland.

Gross settlement (RTGS) component

In the first seven months of 2023, an average of 599 transactions per day were routed through the RTGS component of the interbank system, and turnover averaged 134.5 b.kr. Turnover grew 18% relative to the same period in 2022, and the number of transactions rose by 23%, owing to higher inflation and increased economic activity.

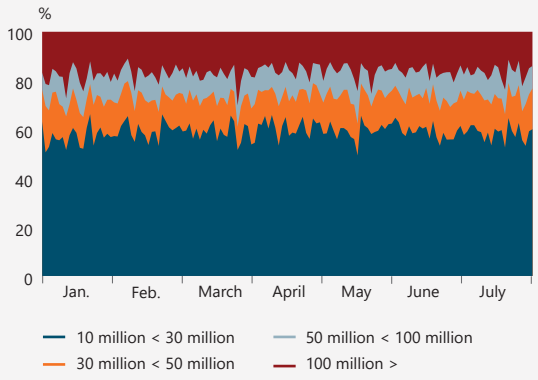
Just over half of transactions settled between RTGS component participants ranged between 10 m.kr. and 30 m.kr., and one-fifth were for amounts equalling or exceeding 100 m.kr.

Strain on the system peaks at regular intervals, including when taxes, interest, and bond principal are paid. Transaction numbers also tend to increase on the days just before and after holidays. The busiest day in 2023 to date was 15 May, when 1,717 transactions were routed through the system, whereas turnover peaked at 532 b.kr. on 1 March.

Chart IV-3

Breakdown of interbank system payments, by amount

Daily turnover, 2023[1]



1. Share of total RTGS payments between participants.

Sources: RB, Central Bank of Iceland.

Intraday RTGS settlement

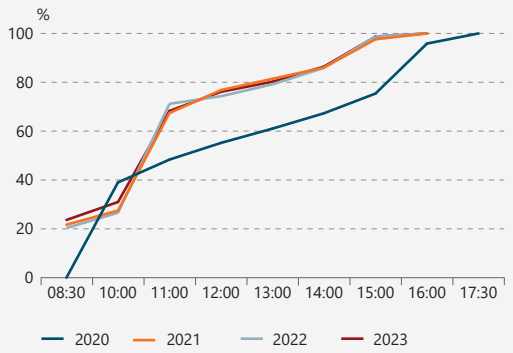
The Central Bank urges interbank system participants to settle as many transactions and amounts as possible early in the day, particularly in the RTGS component, as RTGS payments are often classified as time-critical.[6] Settling more transactions early reduces strain on payment systems if a serious incident occurs during the day, in addition to reducing the likelihood that overnight loans will be needed at the end of the day.

In the first seven months of the year, RTGS participants had completed settlement of an average of 23% of their payments (in terms of daily turnover) before 10:00 hrs. and over 80% by 13:00 hrs. A slightly larger share of payments were completed early in the day than over the same period in the previous two years, which is a positive development. Nevertheless, some large payments are sent for settlement in the last hour

6. Time-critical payments.

before the interbank system closes, creating a certain amount of operational and liquidity risk.

Chart IV-4
Interbank system RTGS, banks and saving banks
Average daily turnover, January through July

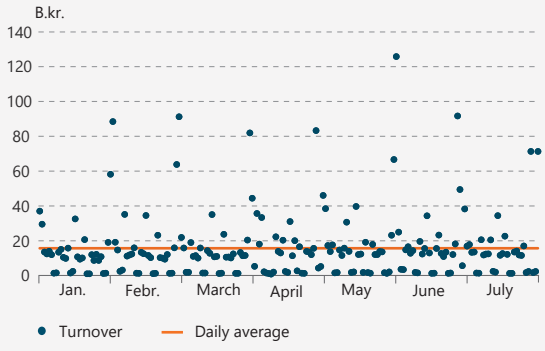


Sources: RB, Central Bank of Iceland.

Retail component

In the first seven months of 2023, an average of 122,000 transactions per day were settled in the interbank system. This is 12% more than over the same period in 2022. The turnover represented by these transactions averaged 15.5 b.kr. per day, an increase of 13.5%. Higher inflation, a larger number of transfers, and increased payment card use are the main reason for the increase. The average amount per transaction rose by 14,000 kr. between the first seven months in 2022 and the same period in 2023, or from 115,000 kr. to 129,000 kr.

Chart IV-5
Interbank system settlement, retail payments
Daily turnover, 2023



Source: Central Bank of Iceland.

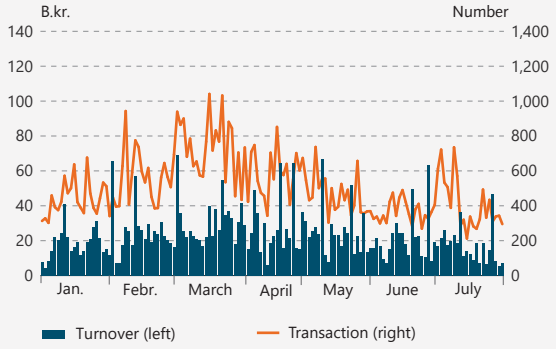
In retail payment intermediation, strain is usually greatest around the turn of the month, when wages and public benefits are deposited to individuals' bank accounts. Loan payments and household bills are often due at that time, and consumers usually do more shopping around the turn of the month. The peak day in 2023 to date was 1 June, when turnover totalled 125 b.kr., and the number of transactions exceeded one million.

When payment orders have been reconciled and it has been confirmed that the payers concerned sufficient funds in their payment accounts, the transactions are sent in batches for final settlement in the RTGS component of the system.

Securities settlement

Transactions with securities issued in Icelandic krónur are routed through the settlement systems at Nasdaq CSD SE or the VBM central securities depository, which commenced operation in H2/2022.

Chart IV-6
Securities settlement systems
Average daily turnover, 2023



Sources: Nasdaq Iceland, VBM (Central securities depository), Central Bank of Iceland.

In the first seven months of 2023, securities turnover averaged 23.7 b.kr. per day, up from 19.7 b.kr. per day over the same period in 2022. The turnover figure derived from an average of 510 transactions per day, as compared with 455 a year earlier. Turnover rose by 20% year-on-year and the number of transactions by 14%. The rise is due in large part to increased bond market turnover, especially with Treasury bonds.

The greatest strain on the settlement system thus far in 2023 was on 15 March, when 1,041 transactions

Table IV-1 Settlement of trades, by securities type[1]

B.kr.	Bond market	Thereof treasury bonds	Equities	Funds/other transactions
Year-2022	15.5	13.3	7.6	0.4
January-July 2022	13.2	11.3	6.2	0.3
January-July 2023	17.9	15.6	5.4	0.3

1. Average daily turnover

Sources: Nasdaq Iceland, VBM (Central securities depository), Central Bank of Iceland.

were settled, and turnover peaked at 69 b.kr. on 1 March.

All transactions from the securities settlement systems are sent to the interbank system for final settlement when the buyer and seller have accounts with different deposit institutions.

Liquidity problems associated with margin calls

Since the 2008 financial crisis, all of the world's key market have introduced central clearing and special margining requirements for over-the-counter (OTC) derivatives.[7] The aim is to mitigate counterparty risk, as market participants have found themselves in liquidity difficulties as a result of margin calls in recent years. Figures from the Bank for International Settlements (BIS) for H2/2022 indicate that the global notional value of OTC derivatives totalled some 618 trillion US dollars, or 83 quadrillion Icelandic krónur. As a result, countries around the world have tried to address the challenges associated with these derivatives. For instance, the Swedish government was forced to guarantee loans taken by energy producers in order to cover margin calls on energy derivatives in the wake of Russia's invasion of Ukraine. The guarantee scheme was introduced in September 2022 and was to expire in March 2023 but has been extended through the end of September 2023. The Finnish government adopted similar measures, but the Norwegians decided to monitor the situation without taking special action.

The execution and settlement of derivatives trades can be extremely complex, and virtually without exception, margin is required, and the margin requirement recalculated to accord with changes in the market value of the underlying asset. When asset values change radically, margin calls can surge. Central counterparties commonly demand and collect additional collateral within the business day in response to volatility in markets for derivatives that are out of the money and then reimburse excess collateral from positive positions the day after. When this happens, liquid assets that could be put to use elsewhere in the system remain in the central counterparty's account while markets are closed.

No central counterparty is authorised to operate in Iceland or provide such services in the Icelandic market. In Iceland, OTC derivatives are usually traded bilaterally, without the involvement of a central counterparty. Under this arrangement, each party bears the risk associated with the other, versus eligible collateral that is intended to cover most of the loss incurred in the event of default. The liquidity problems faced by many parties abroad in connection with margin calls on derivatives trades therefore do not apply in Iceland. Counterparty risk does exist in bilateral derivatives trades, however, and Article 11 of the EMIR Regulation provides for methods to mitigate it.

Increased operational risk

Until now, financial market unrest in Iceland has not affected the operations of domestic payment systems, and financial market infrastructure has withstood shocks such as the 2008 financial crisis and the COVID-19 pandemic. Risk always exists, however, and in general, international institutions forecast that it will increase in coming years, particularly risk associated with cyberthreats including intermediation of payments.

Deposit institutions and other payment service providers could be faced directly or indirectly with operational risk in their own system or in systems relating to their services and settlement. If such risk materialises – for example, if a severe cyberattack causes an interruption in service – not only does it interrupt service for the victim of the attack, but it can also trigger widespread liquidity problems in the system, undermining public confidence in the security and reliability of financial market infrastructure. The Principles for Financial Market Infrastructures (PFMI), which apply to oversight and monitoring of the interbank system, place strong emphasis on risk management in payment intermediation, including operational risk (Principle 17) and liquidity risk (Principle 7).[8] This applies both to the interbank system, which is owned by the Central Bank of Iceland, and to the internal payment systems of commercial and savings banks.

Operational incidents

One measurement that sheds light on operational risk in payment intermediation is the number and type of incidents (operational deviations) that occur.[9] In 2022, a total of 42 incidents were recorded in interbank system

7. See, for instance, Regulation (EU) no. 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories: https://www.althingi.is/lagasafn/pdf/151b/i32012R0648.pdf

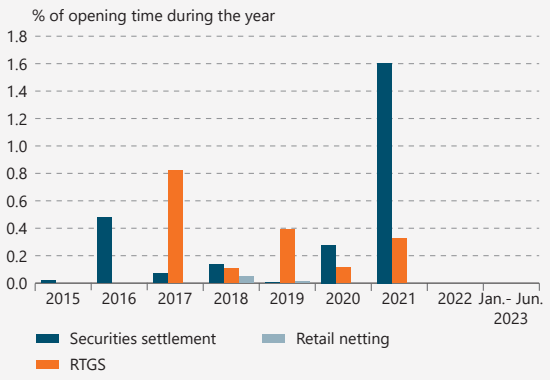
8. The main thrust of Principle 17 is to identify internal and external factors that could potentially give rise to operational risk, with an eye to preventing or minimising operational disruption. In this context, the appropriate strategies and systemic structure, measures, procedures, and monitoring shall be applied. According to Principle 7, liquidity risk exists in payment intermediation when the payer has insufficient funds at the time the payment obligation falls due. The funds may be on hand, but not in the form needed to cover the obligation within the business day.

9. The terms *incident and operational deviation* are used in particular to refer to unexpected disruptions in operations or service, reduced quality, or deficiencies that have not yet made an impact but could do so in the future.

operations, down from 69 in 2021. Of the 2022 total, one was given the highest severity rating, as compared with four in 2021.

Chart IV-7

Interruptions in interbank system operations[1]



1. Zero percent indicates that the systems operated without interruption during the year. If the operation of a given system was interrupted within the year, the duration of the interruption was calculated as a percentage of the total number of minutes that system was open during that year. The RTGS component of the interbank system is open from 09:00-16:30 hrs. on weekdays. The securities settlement system is open from 09:15-15:20 hrs. on weekdays (with settlement taken place five times throughout the day), and the retail netting component of the interbank system is open 24 hours a day.

Source: Central Bank of Iceland.

In the first six months of 2023, there were 31 operational incidents, two of which received a high severity rating. The incidents did not disrupt market transactions, although one of them delayed intraday settlement of retail payments. The incidents were due to human error and equipment malfunction. No severe incidents occurred in securities settlement systems during the aforementioned period, but one severe incident took place in monetary settlement in 2022. Chart IV-7 shows the amount of time service was disrupted each year, from the beginning of 2015 through Q2/2023.[10] The system has operated without disruption in 2023 to date.

Liquidity risk in the interbank system

Payments between interbank system participants are settled instantly and finally in real time, provided that a participant has enough liquidity to meet its financial obligations as and when expected. Payment orders that would cause participants to exceed their intraday credit limits are automatically rejected. This significantly reduces the risk of default. On the other hand, real-time settlement increases the participant's need for liquidity.

Interbank system participants can generally rely on three sources of funds to settle their payment obligation within the business day: 1) Incoming payments from other interbank system participants; 2) their account balance at the Central Bank; and 3) intraday credit granted by the Central Bank against sufficient collateral.

Payments do not flow at the same pace throughout the day, and flows seldom occur at a 1-to-1 ratio. As a result, liquidity risk can materialise in the interbank system; for example, when a participant delays payment while it has insufficient funds to settle the payment obligation when due, or when a participant is unable to submit payment because of an interruption in the operation of its own payment systems or related systems. It is therefore important to manage intraday payment flows effectively so as to minimise risks if incidents should occur in the system.

Over the first seven months of 2023, participants financed an average of 71% of their system activity by using their own account balance and just under 28% with inflows from other participants. They used intraday credit for about 1% of their financing.

Participants' combined end-of-day account balance fell year-on-year by nearly 6%, from an average of 75.5 b.kr. to 71.4 b.kr.[11] The spread between the amount of payment obligations and intraday liquidity has also narrowed in the past two years. Participants' intraday liquidity in the interbank system remains good, however. Naturally, there is greater risk on days when interbank system payment flows are heavy, as participants rely more on incoming payments and overdrafts at those times.

Collateral and overnight loans in the interbank system

In order to guarantee payment intermediation and facilitate normal flows of funds, the banks and savings banks are authorised to overdraw their accounts during the day. The Central Bank never loans money without collateral, and it therefore makes a bilateral agreement with each interbank system participant in which it specifies the participant's intraday credit limit.[12] The limit is a minimum authorisation, and participants may decide to add to it unilaterally by providing additional collateral. The Central Bank assesses the value of participants' collateral on a daily basis. Participants themselves determine the composition of the collateral they provide, as long as it accords with the Bank's list of eligible collateral. If the market value of underlying collateral falls below a participant's credit limit, additional collateral is requested immediately. If a participant's collateral does

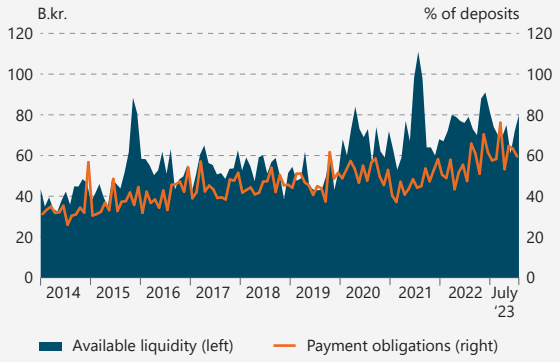
10. Because of changes in incident recording in 2021, the number of incidents is not entirely comparable from one year to another.

11. The balance is estimated for Arion Bank, Íslandsbanki, Landsbankinn, Kvika, and the savings banks.

12. The credit limit is frequently referred to as the intraday limit or intraday authorisation.

not cover the credit limit, the Central Bank is authorised to lower the limit, but this has not yet occurred.

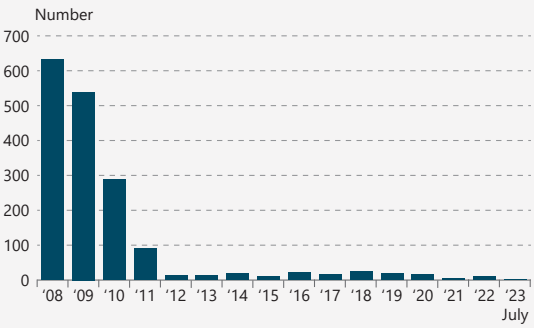
Chart IV-8
Available intraday liquidity and payment obligations[1]



1. Monthly data: Arion Bank, Íslandsbanki, Landsbankinn, Kvika and savings banks.
Sources: RB, Central Bank of Iceland.

Overnight loans are interest-bearing collateralised loans maturing on the following business day. They occur when the end-of-day balance on a participant's account is negative. Overnight lending terms are unfavourable, and participants generally try to finance their activity by other means if possible. In recent years, demand for overnight loans has been limited relative to the period during the financial crisis. Currently, participants take overnight loans mainly because they have underestimated their intraday account balance or their payment obligations, or because of an unexpected large-value payment made just before the system closes. Effective management of intraday payment flows in connection with liquidity is therefore very important in minimising risk, as is discussed above.

Chart IV-9
Number of overnight loans



Source: Central Bank of Iceland.

Interbank system participants pass stress tests

The Central Bank conducts regular stress tests of payment intermediation among interbank system participants. The aim of the test is to measure the resilience of payment systems with respect to participants' intraday liquidity and ability to cover their payment obligations in the event of a disruption of payment system operations such as a cyberattack. The last stress test was carried out in August 2023. The test was conducted based on actual transaction numbers and turnover data for settlement of all payments made by four banks in the RTGS component of the system on business days from 2 January through 30 June 2023.[13]

Four scenarios were presented, one for each bank, so as to determine the resilience level of the bank in question. The test assumed that a disruption occurred at the beginning of the day and the bank affected was unable to regain control of its payment intermediation before the following day. In order to test the system's tolerance limits, it was assumed that other banks continued to send payments to the affected bank. This caused liquidity to accumulate at that bank instead of being redistributed to other payment system participants (a liquidity sink effect). The stress test results showed that participants were able to provide sufficient liquidity (including their credit limits) to respond the shock, provided that their collateral did not fall in value at the same time. On average, each bank was able to settle 99.7% of its payment obligations, although one participant fell short.

Retail payments

Payment card use

The vast majority of households use payment cards to pay for goods and services in the domestic retail market, either directly, with a physical card, or indirectly, by using a smart device to which a payment card has been linked. Iceland continues to stand out relative to neighbouring countries in terms of credit card use, even though credit cards are generally more expensive to use than debit cards. On the other hand, credit cards frequently offer various perks, including loyalty points, additional services at airports, and guaranteed reimbursement if needed.

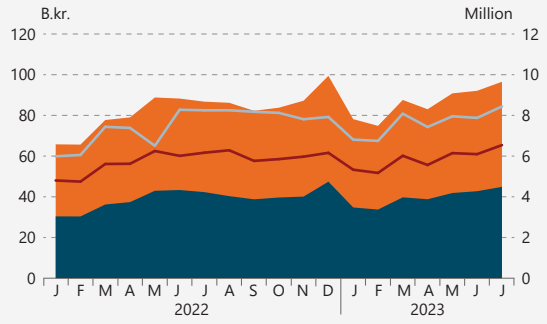
Domestic payment card turnover and transaction numbers rose year-on-year in the first seven months of 2023. The average amount per household debit card transaction was 5,300 kr., and the average credit card transaction was 8,000 kr. To pay for goods and services, each individual used a debit card an average of 25 times per month and used a debit card 21 times per month.

13. The data are based on the RTGS component of the interbank system. Participants' transfers between their own accounts in the Central Bank were excluded from the test, as was final settlement of retail payments and securities transactions.

Chart IV-10

Domestic payment card use

Cards issued in Iceland



Source: Central Bank of Iceland.

E-commerce can increase risk in payment intermediation

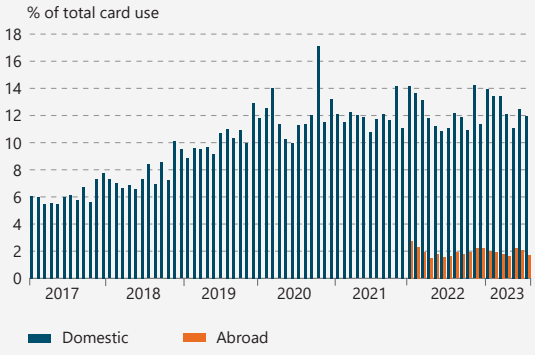
In recent years, households have stepped up their online shopping with both domestic and foreign merchants. E-commerce spiked during the pandemic, peaking in November 2020 at 17% of total domestic payment card use. Turnover was strongest on days such as Black Friday and Singles' Day, when merchants offered special deals.

In the first six months of 2023, e-commerce turnover totalled 96 b.kr., including 14.5 b.kr. due to shopping with foreign online merchants. Domestic e-commerce accounted for a monthly average of 12% of total turnover using payment cards issued in Iceland, and foreign e-commerce accounted for another 1.9%.

Chart IV-11

Payment card-based e-commerce

Cards issued in Iceland



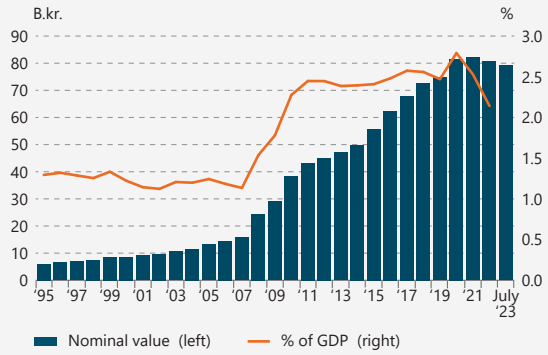
Sources: Icelandic Centre for Retail Studies, Central Bank of Iceland.

Changes in acquiring

The acquiring market has changed considerably. Landsbankinn launched an acquiring service this spring, and Kvika's subsidiary Straumur has followed suit. The latter company purchased a stake in Valitor's acquiring contracts in 2022, when Valitor was sold to Rapyd. A new acquiring company, Fjárflæði, began implementing its service in Iceland in 2019. The first merchants were set up on a trial basis in Fjárflæði's system in 2022, and general sales to Icelandic merchants commenced at the beginning of 2023. Furthermore, the card company Saltpay changed its name to Teya.

Chart IV-12

Cash in circulation



Source: Central Bank of Iceland.

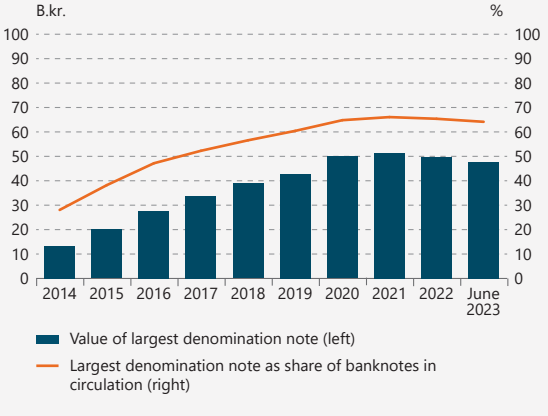
Cash in circulation decreases

Cash in circulation equalled 2.1% of GDP at the end of 2022, down from 2.5% at the end of 2021. This is a relatively small percentage in international context. At the end of 2022, the value of banknotes and coin in circulation came to just over 80 b.kr., after falling by nearly 2 b.kr. year-on-year. Demand for the 10,000 kr. banknote, the highest denomination issued, contracted by 1% between years.

Foreign institutions' demand for Icelandic krónur is limited, and the value of banknotes owned by these

Chart IV-13

Demand for largest banknote denomination



Source: Central bank of Iceland.

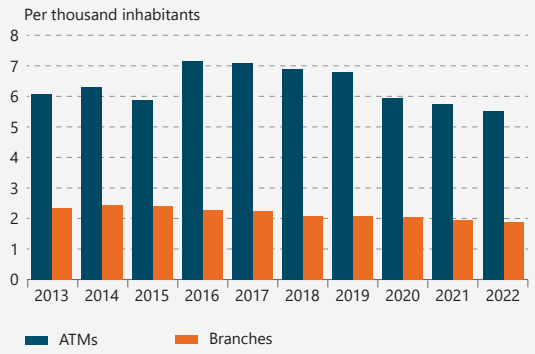
entities totalled 2 b.kr. in the first six months of 2023. Nevertheless, demand was up 38% relative to the same period in 2022.

Access to cash services

Concurrent with declining use of cash, banks have streamlined by cutting back on their cash services. This streamlining is positive from a cost control point of view, but it can hinder the use of cash as an alternate solution and can limit the options available to those who for any reason cannot use digital payment instruments.

Chart IV-14

ATMs and bank branches



Source: Central bank of Iceland.

The cutback in cash services has been most pronounced in sparsely populated parts of regional Iceland.

A similar trend is taking place in the other Nordic countries, and in Sweden some banks have stopped offering bank teller services.[14] In addition, Íslandsbanki announced in September that it had stopped selling banknotes from the other Nordic countries, as the countries in question have announced plans to accept less cash starting in 2024. However, the central banks in the Nordic region have emphasised that cash will remain available to the public and that access to cash services will be guaranteed. The Swedish and Norwegian legislatures have intervened in the situation: in Sweden, a statutory provision requiring specified large credit institutions and branches of foreign credit institutions to offer cash services entered into force, and a similar amendment was made to Norwegian law in 2022.[15]

14. Sveriges Riksbank: Payments report (2022): https://www.riksbank.se/globalassets/media/rapporter/betalningsrapport/2022/engelsk/payments-report-2022.pdf
15. See also https://www.riksbank.se/en-gb/payments--cash/notes--coins/obligation-for-major-banks-to-provide-certain-cash-services/ and https://www.norges-bank.no/contentassets/1af9f294a4724f2faa9e6759c3516d36/f1_2023_eng_0106.pdf?v=06/02/2023122604

Merchants not obliged to accept cash

Even though banknotes and coin issued by the Central Bank of Iceland are legal tender in Iceland, this does not imply unequivocally that debtors can always, and without prior notice, meet their financial obligations by offering legal tender as payment. The Central Bank of Iceland is of the opinion that there is nothing to prohibit merchants from requiring that payment be remitted in a specific way, either in cash or by digital means.[16] It would be considered reasonable, however, that the merchant inform customers of such requirements clearly and explicitly; i.e., that merchants announce in advance which payment methods they accept, so that customers will be able to consent to it before deciding to shop there or go somewhere else. On the other hand, the Central Bank is obliged to accept from deposit institutions the banknotes and coin it issues, albeit with limits that follow from regulatory provisions, particularly those on banknotes that are torn and unfit for use. Furthermore, banks and savings banks are also obliged to accept banknotes and coin, as is emphasised in Article 6 of Act no. 22/1968,[17] pertaining to acceptance of coins, given that such acceptance of cash accords in other respects with Icelandic regulatory provisions.

Cash during an interruption of service

If payment card infrastructure service were interrupted today – if Iceland's overseas internet connections were severed, for instance – a large share of Icelanders would have to withdraw cash, either from ATMs that offer authentication via e-ID or from a bank teller, with the inevitable chaos this would entail.[18] As the Central Bank has discussed repeatedly, domestic payment cards rely on foreign card infrastructure – and therefore on overseas internet connections. At present, there is one payment app available, Netgíró, that is independent of card infrastructure. On the other hand, the app is not widely used, and it is not a given that it works for all potential users. This could also create problems for

16. If merchants' freedom to decide which methods of payment they accept in their business is to be curtailed, it must be stipulated by law, but there are no explicit provisions to this effect in the Act on Iceland's Currency, no. 22/1968.
17. At the same time, banks and savings banks that accept banknotes and coin issued by the Central Bank of Iceland from their customers can trust that, upon depositing these banknotes and coin with the Central Bank, their account balances with the Bank will increase commensurably, which in turn obliges the banks and savings banks to increase their customers' balances.
18. In a survey carried out on behalf of the Central Bank in 2022, less than 2% of respondents regularly used cash to pay for goods and services. Nearly two-thirds of them said they had no cash in their possession. Of those who did report carrying cash, the majority had less than 2,500 kr. (for further information, see *Financial Stability 2022/2*.

merchants, as many of them carry a limited amount of cash for security reasons and would be unable to make change if customers paid in cash. As a result, cash is not necessarily the only acceptable solution in the event of an interruption in overseas internet connections. It is partly because of this that it is important to implement a domestic payment instrument that guarantees secure payment intermediation, either if internet connections go down or for other reasons.

In case of a protracted power outage, cash could turn out to be the only payment instrument that can be used to purchase necessary goods and services, provided that merchants and service providers have enough cash on hand, know their product prices, and have payment equipment that does not rely on electricity. During power outages, electronic payment intermediation could be unreliable, whereas the cash consumers have at home or in their wallets is secure and available.

What is important for retail payment intermediation resilience is that consumers and companies be offered a range of payment options that they can resort to during shocks involving payment intermediation systems.

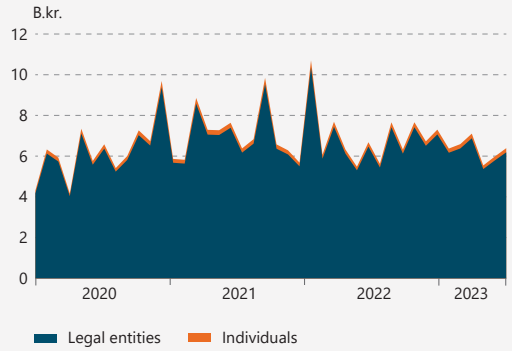
The Central Bank is currently leading an examination of centralised independent retail payment solutions.[19] The Bank also monitors the use of cash and ensures that it will remain possible to use banknotes and coin to purchase goods and services, including during shocks. Furthermore, the Bank is keeping a close watch on developments in the potential issuance of central bank digital currency (CBDC) by foreign central banks.

Cross-border payments

There are three main ways to conduct cross-border transfers of funds. Under the first method, the sender transfers money overseas from their own bank account to the recipient's bank account. The second method is to deliver Icelandic krónur (in cash or by debit card) to the service provider, whereupon the recipient receives payment in their own currency (in cash or by deposit to a card account or bank account). The third way is to transport physical cash overseas, but such physical cash transfers must be reported to the customs authorities if the amount involved equals or exceeds 10,000 euros; cf. Act no. 88/2005. Overseas use of payment cards issued in Iceland also falls under the category of cross-border payments.

In the first seven months of 2023, an average of 4.5 b.kr. per day were transferred overseas electronically. This is 11% less than over the same period in 2022. Transfers made by individuals accounted for 204 m.kr. of that total. The average amount per transaction was 22,000 kr., and money transfers averaged 410,000 kr. per day.

Chart IV-15
Cross-border payments, digital



Source: Central Bank of Iceland.

Cross-border payments can be costly

Cross-border payments can be expensive, no matter whether they are made by digital transfer or money transfer. The cost of sending payments overseas varies, depending on the type of payment instrument used and the destination country. According to the Central Bank's analysis of the cost of retail payment intermediation, each digital cross-border transfer of funds cost an average of 1,921 kr. in 2021, and each money transfer cost 3,242 kr.[20]

In November 2020, the G20 launched a five-year plan in cooperation with the Financial Stability Board (FSB), the Bank for International Settlements (BIS), and other international institutions, with an eye to lowering costs, reducing the time payments take, expanding access, and enhancing the transparency of cross-border payments. This contributes, among other things, to stronger GDP growth, increased world trade, and greater financial integration.

The Central Bank of Iceland and other central banks worldwide are keeping close track of the process, collecting data on developments, and communicating perspectives that could be useful in this work.

19. See also the Government consultation portal: https://samradsgatt.island.is/oll-mal/$Cases/Details/?id=3496.

20. Central Bank of Iceland (2023). The Cost of Retail Payments.

Cybersecurity in a changed environment

Cybersecurity has been a prominent topic of discussion and news coverage in the recent past. This is due not least to the changed global environment following Russia's invasion of Ukraine, which transformed the cybersecurity landscape and shows incontrovertibly that cyberattacks have become part of modern warfare. Cyberthreats are still growing, but cooperative efforts to protect against them have seldom been greater than they are now. This applies to various sectors of society, both domestically and internationally, as the war has put security, defence, and so-called hybrid threats in the spotlight in most countries.[21] Cybersecurity is vital not least in the financial sector. As a result, central banks worldwide have placed strong emphasis on the topic, as they are well aware that large-scale or repeated cyberattacks can disrupt or undermine financial stability.

Cyberattacks – fraud the most commonly reported incident

Cyberattacks or attempted cyberattacks are still rising in Iceland. According to a summary prepared by Iceland's Computer Emergency Response Team (CERT-IS), 700 cybersecurity incidents were reported in 2022, a significant increase relative to the years beforehand.[22] As in 2021, the most frequently reported incidents involved swindling or fraud; i.e., phishing in an attempt to obtain sensitive information such as payment card numbers or passwords. Of the 700 notifications received last year, 422 involved fraud. As is stated in the CERT-IS summary, there is no way to know for certain how often attempts are made to conduct cyberattacks on Icelandic companies or institutions, as there are various technological defence mechanisms in place to stop such attempts without their being noticed. Attempted break-ins often go undetected until the attacker has breached the first line of defence, and by that time, of course, a quick response needed to contain the damage and minimise contagion. In this context, it should be noted that Iceland's financial market infrastructure is highly interconnected, and concentration risk and contagion risk are therefore relatively high.[23]

Iceland is considered one of the most technologically advanced countries in the world: internet and smart device usage is widespread, e-commerce is growing apace, and financial services are now provided digitally to a substantial degree. This brings with it a high level of streamlining, but it also entails a number of risks. Cyberattacks and fraud directed at individuals and companies – or attempts at such fraud – are still on the rise in Iceland, and both financial institutions and CERT-IS have recently drawn attention to this trend and offered advice on defending against the threat. Furthermore, the greater Reykjavík police have warned the public about fraudulent e-mails sent in their name, involving attempts to extort money from the recipients.

Roles, responsibilities, and authorisations – active dialogue is necessary

Today, financial services in Iceland are provided to a large degree by digital means. Digital payment intermediation relies not only on financial market infrastructure but also on electricity, electronic communications, and the internet. Secure and effective financial market infrastructure certainly plays a key role, and in many jurisdictions the regulatory framework makes stringent demands on infrastructure operators; i.e., as regards risk management and contingency planning, including cogent business continuity plans, and so forth. The changed global environment that has developed and is discussed above has opened people's eyes even more to how important interactions between important infrastructure components are for activities in various sectors of society. It has also fostered greater understanding of the importance of broad cooperation, including on issues pertaining to the efficacy and security of digital payment intermediation. It is vital to pay close attention to the resilience of this infrastructure – for example, electricity and telecommunications infrastructure in the context discussed here – so as to ensure that they can withstand severe cyberattacks or cybersecurity incidents as successfully as possible. It is also crucial that important infrastructure and, as applicable, appropriate alternative solutions be under domestic management and supervision, partly to ensure that appropriate action can be taken rapidly and securely if the need arises. Effective information sharing and cooperation aimed at harmonising responses to severe incidents are also highly important for limiting, to the maximum extent possible, the damage that would otherwise occur. Roles, responsibilities, and authorisations must be explicit, and the parties entrusted with them must be clearly identified.

21. For more information on hybrid threats, see the May 2023 report from the National Commissioner of the Icelandic Police (in Icelandic): https://www.logreglan.is/skyrsla-greiningardeildar-um-fjolthattaognir/.
22. In 2021, there were 598 cybersecurity incidents reported to CERT-IS, and in 2020 there were 266.
23. CERT-IS annual summary for 2022 can be found here (in Icelandic): https://cert.is/.

Iceland's current cybersecurity strategy stipulates that effective coordination of official actors must be ensured and that accountability and division of tasks must be as explicit as possible. Priorities include coordinating more fully the organisational structure of public defence, including increased consultation across ministries and institutions through closer cooperation and exercises. Cybersecurity incidents can also result from natural occurrences.[24] It will be interesting to keep abreast of this work as it applies to the financial system, as the Civil Protection Act is intended, among other things, to provide for coordinated public defence responses to emergencies that could threaten assets owned by the general public. With a broad interpretation and with reference to developments in the financial market in recent years, it must be possible to argue that this includes financial assets owned by the general public, which to a steadily increasing degree are in digital form; for instance, in the case of a cybersecurity incident caused by a force of nature and posing a potential threat to these financial assets.

The Central Bank considers it vital that active dialogue take place among all relevant parties if the Government's objective of ensuring effective coordination among official cybersecurity actors, particularly in times of emergency, so as to delineate clearly the division of tasks, responsibilities, and – no less important – authorisations. The Bank has recommended that such dialogue commence as soon as possible and has declared its interest in participating in it. The Icelandic statutory framework relating in one way or another to security issues, including cybersecurity, has changed markedly in recent years, as roles and responsibilities have changed somewhat and some potential overlap seems to be present.[25] In this context, it is worth noting that according to the Government's five year cybersecurity action plan, which accompanies Iceland's cybersecurity strategy, it is assumed that the Government's administrative structure for cybersecurity will be reviewed and an analysis carried out of Government authorisations in connection with cyberattacks. This supports the Central Bank's contention that active dialogue among all stakeholders is necessary. According to the action plan, a comprehensive contingency exercise for cybersecurity in Iceland, called *Ísland ótengt (Iceland Disconnected)*, is to be carried out. The Central Bank plans to participate in it.[26]

In a recent appraisal of the Icelandic financial system conducted by the International Monetary Fund (IMF) (see Box 1), the status of cybersecurity issues is discussed and attention drawn to several improvements that could be made, particularly in strategy formulation and coordination. The appraisal notes the lack of a separate cybersecurity strategy for the financial system, with the roles and responsibilities of each party set forth explicitly. It also mentions the lack of clarity on who shall lead the response to a severe cyber or operational incident in the financial market. This further supports the Central Bank's opinion that further dialogue is needed. The IMF recommends that this shortcoming be remedied within one year of the publication of the Fund's appraisal report.

As is noted above, digital payment intermediation relies not only on financial market infrastructure but also on electricity, electronic communications, and the internet. Because of this, the Central Bank has made an agreement on the provision of a satellite connection to transmit trading orders currently routed between Iceland and other countries via submarine cable, both to reduce operational risk for the financial system and to function as an emergency route if current submarine cable-based internet connections should become non-functional.[27] It should be borne in mind in this context, however, that the systems of merchants who use point-of-sale (POS) devices to accept payments depend on cross-border connections. The above-mentioned satellite solution does not cover such retail payment intermediation. A task force working for the Payments Council, led by Greiðsluveitan, has been examining merchants' responses to interruptions in digital payment intermediation, such as those occurring during power outages or when network connections are down.

The Electronic Communications Office of Iceland's (ECOI) annual report for 2022 highlights the importance of ensuring security and boosting the shock

24. Iceland's cybersecurity strategy report for 2022-2037 can be found here: https://www.stjornarradid.is/library/04-Raduneytin/Haskola---idnadar--og-nyskopunarraduneytid/Icelandic%20National%20Cybersecurity%20Strategy%202022-2037.pdf.

25. Examples include the Act on the Electronic Communications Office of Iceland, no. 75/2021; the Act on telecommunications no. 70/2022; the Act on the Cyber and Data Security of Critical Infrastructure, no. 78/2019; and their links to the Civil Protection Act, no. 82/2008, with subsequent amendments; and the National Security Council Act, no. 98/2016. In addition, the implementation of EU regulatory instruments with relevance in Iceland is in preparation for example DORA and MiCA. Also worth mentioning is the so-called Network and Information Security Directive (NIS2): https://www.efta.int/eea-lex/32022L2555. Its predecessor, NIS1, was implemented in Iceland with Act no. 78/2019.

26. The action plan can be found here (in Icelandic): https://app.powerbi.com/view?r=eyJrIjoiZjE0ZDRkMWMtZjc5MC00OTYxLTgwNWUtZTMxNzJkMTNkZDZjIiwidCI6ImJjMTRhNDRlLWUwZmItNGUwYi1hNTM1LTEwMDU3OWQ0MWI2NSIsImMiOjh9.

27. The agreement was made with RB, with the involvement of an electronic communications service provider.

tolerance of Iceland's electronic communications infrastructure so as to prevent a failure of electronic communications services – in the event of a natural disaster, for instance, with widespread impact across many sectors of society. It is also important to bolster the shock tolerance of Icelandic electronic communications infrastructure in case of war. The ECOI is of the opinion that a number of actions need to be considered in this context. It recommends, for instance, that two separate but interconnected and secure basic networks be developed, with separate wiring systems spanning the entire country; that mobile network transmitters be connected to separate base networks using at least two separate wiring systems where applicable; that electronic communications networks – fixed and mobile networks, as applicable, be protected against operational shocks with active alternate equipment, including a reserve power supply and reserve connections; and that an independent high-speed electronic communications system for the Government and response personnel be developed. Such a system, or a portion of it, must function in emergencies if electricity and other electronic communications should fail. It will be interesting to keep abreast of how these recommendations from the ECOI fare, and how they connect with the financial system and digital payment intermediation during emergencies involving power outages and telecommunications failures. The ECOI recommendations provide further support for the Central Bank's assessment that active dialogue among all parties involved is needed.[28]

Finally, it is inevitable in a discussion of cybersecurity issues to mention the significant challenges relating to artificial intelligence (AI) and the use of quantum computing, which the European Agency for Cybersecurity (ENISA) has defined as key cybersecurity threats in coming years.[29] Governmental authorities, the academic community, central banks, global financial system entities, and the general public must keep abreast of developments in this area, as there is much at stake.

Digital financial services growing apace

Financial services have changed radically in recent years, and today they are provided digitally to a large extent. Technological advances, with the threats and opportunities they bring, have called for a new or amended regulatory framework in the field. To this end, the European Commission introduced a digital finance package in September 2020.[30] It includes recommendations for a future retail payments strategy[31] and a digital finance strategy[32] for the EU. Also presented are proposals for the adoption of three EU regulations that the European Parliament and the Council have now approved. This regulatory framework is to be incorporated into the EEA Agreement and implemented thereafter in Icelandic law. Some preparation for this has already begun. Below is a brief discussion of the regulatory framework in question.

Regulation (EU) 2022/2554 on digital operational resilience for the financial sector (DORA)[33]

The DORA regulation sets forth harmonised requirements concerning operational security of networks and information systems in the financial sector, which represents a change from the situation until now. *Digital operational resilience* is defined in the DORA regulation as a financial market entity's ability to build, assure, and review the operational integrity and reliability of all network and information systems used by each party, whether directly or indirectly through third-party service providers. This also applies in all respects to the technological capabilities needed to support the continued provision of financial services and their quality, including throughout disruptions.[34] It should be noted that the term operational risk entails not only potential technological problems that could stem from attacks on networks and information systems, but also a range of other causes, such as human error, understaffing, lack of relevant expertise, or even natural disasters.

28. See: Annual Report of the Electronic Communications Office of Iceland (ECOI) 2022, here: https://www.fjarskiptastofa.is/library?itemid=08954c43-fe5b-493a-9185-9e7399b1c8a1 including discussion of cyber- and information security and the work of CERT-IS.
29. See Iceland's cybersecurity strategy report, page 8: https://www.stjornarradid.is/library/04-Raduneytin/Haskola---idnadar--og-nyskopunarraduneytid/Icelandic%20National%20Cybersecurity%20Strategy%202022-2037.pdf. ENISA's most recent Threat Landscape Report (2022) can be found here: https://www.enisa.europa.eu/publications/enisa-threat-landscape-2022.
30. The digital finance package can be found here: https://ec.europa.eu/info/ publications/200924-digital-finance-proposals_en.
31. COM (2020) 592, here: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0592.
32. COM (2020) 591, here: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0591&from=EN.
33. Regulation (EU) 2022/2554 of the European Parliament and of the Council of 14 December 2022 on digital operational resilience for the financial sector and amending regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014, (EU) No 909/2014 and (EU) 2016/1011.
34. This definition of digital operational resilience is adapted from Article 3 (1) of the DORA regulation.

DORA is very broad in scope, covering the network and information system of nearly all companies operating in the financial market. It therefore represents an important step towards coordination, as the operational security requirements currently provided for in Iceland's financial market legislative framework vary from company to company. These requirements are based in large part on the framework from the EU, which will change to accord with the DORA regulation. It is worth noting in this context that in addition to DORA, a directive amending various current EU directives has been approved. This amending directive will also affect several Icelandic acts of law when it is implemented in Iceland as planned.[35]

DORA was passed in late 2022 but will be implemented in EU member states in January 2025. Plans for legislation implementing the DORA Regulation (EU) 2022/2554 and the DORA Directive (EU) 2022/2556 have been published for consultation purposes on the Government's consultation portal. According to the information on the consultation portal, there are plans for a new comprehensive bill of legislation, as well as amendments of current laws. The discussion in the consultation portal explores in some detail what is entailed in the planned acts of law, including a breakdown of key substantive components of DORA. Work on a bill of legislation incorporating DORA into Icelandic law is currently underway.

Regulation (EU) 2023/1114 on markets in crypto-assets (MiCA)[36] and Regulation (EU) 2022/858 on a pilot regime for market infrastructure based on distributed ledger technology (DLT)[37]

Both of these regulations concern digital assets, or crypto-assets, which are based on distributed ledger technology and blockchain technology.[38] This type of technology has emerged in the recent term, but until the advent of the regulatory instruments under discussion, the EEA has had no harmonised set of rules on crypto-assets or their service providers beyond that provided for in the EU's anti-money laundering and terrorist financing framework. A legislative vacuum has therefore been in existence, and it has long been considered important to address this. Financial supervisory bodies in the EU and EEA have issued repeated warnings about the risks associated with trading in crypto-assets, and the Central Bank of Iceland has drawn attention to these warnings.

The MiCA Regulation was passed at the end of May 2023 and will apply in EU member states from the end of 2024.[39] According to MiCA, a crypto-asset is defined as a digital presentation of value or rights that can be transferred and stored electronically through the use of distributed ledgers or comparable technology.[40] The regulation will apply to crypto-asset issuers and service providers within the EEA, whether they are individuals or legal entities. It does not apply to central banks, international institutions, and the like.[41] MiCA identifies three categories of crypto-assets: utility tokens, asset-referenced tokens, and e-money tokens. It also applies, however, to trading with other virtual assets within the EEA, such as Bitcoin and Ethereum. With the adoption of MiCA, a regulatory framework for market abuse comparable to that currently covering investment firms will apply throughout the EEA.[42]

The DLT Regulation was passed at the end of May 2022 and applies in EU member states from March 2023.[43] It established a temporary pilot project for DLT-based market infrastructure. The objectives are to give market agents the chance to test the infrastructure and create opportunities for the development of virtual assets that fall under the definition of financial instruments while guaranteeing consumer protection, market integrity, financial stability, and transparency. Market agents therefore have temporary flexibility to operate outside rules on financial instruments that they would otherwise be required to follow.[44] This gives them and supervisory bodies the opportunity to gain experience in the operation of this infrastructure and acquaint

35. Directive (EU) 2022/2556 of the European Parliament and of the Council of 14 December 2022 amending Directives 2009/65/EC, 2009/138/EC, 2011/61/EU, 2013/36/EU, 2014/59/EU, 2014/65/EU, (EU)2015/2366 and (EU) 2016/2341 as regards digital operational resilience for the financial sector.
36. Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937.
37. Regulation (EU) 2022/858 of the European Parliament and of the Council of 30 May 2022 on a pilot regime for market infrastructures based on distributed ledger technology, and amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU.
38. Digital assets of this kind are referred to by various names, including e-currencies, virtual assets, and virtual currencies, but because of their technological properties they can also be called crypto-assets.
39. Title III of MiCA, on asset-referenced tokens, and Title IV on e-money tokens shall apply earlier in EU member states, from 30 June 2024.
40. As defined in Article 3, Paragraph 1, Item 5 of the regulation. Item 1 of the same provision states that distributed ledger technology (DLT) is technology that enables the operation and use of distributed ledgers. The term *distributed ledger* is then defined in Item 2.
41. See also Article 2 of MiCA.
42 Cf. for instance, MiFID2, MiFIR, and MAR, which were implement. ed in Iceland with the Act on Markets in Financial instruments, no. 115/2021, and the Act on Measures to Combat Market Abuse, no. 60/2021.
43. See Article 19 of the Regulation.
44. Permits to operate DLT infrastructure under the pilot project may be granted for a term of six years.

themselves with the advantages and, as applicable, disadvantages of the technology. The future of the pilot project will be determined by the reporting and review provisions contained in Article 14 as regards the issuance of ESMA guidelines to the European Commission by 24 March 2026 and, on the basis of those guidelines and within three months, a report from the Commission to the European Parliament and the Council. According to the provision, the latter report shall discuss the following, with reference to a cost-benefit analysis:

a) Whether the pilot project shall be extended by three years;
b) Whether the regulation shall be expanded to cover other types of financial instruments that can be issued, registered, transferred, or stored using DLT;
c) Whether the regulation should be amended in some other respect;
d) Whether the regulation should be made permanent by means of amendments to the relevant EU financial services legislation; or
e) Whether the pilot project should be discontinued and all temporary permits issued thereunder revoked.

It is worth drawing attention here to a report from a task force appointed by the Prime Minister, which examines the threats and opportunities entailed in rapid developments in the areas of digital payment intermediation and DLT-based financial services. Included in the task force's report, which was published on the Government Offices website in May 2023, is a more detailed discussion of the MiCA and DLT regulations than is contained in the present report.[45]

Fora for cooperation in view of market developments

The Central Bank has taken the initiative recently to establish several cooperation fora in view of the very rapid developments in the financial market. Among them are the following fora operating under the leadership of Greiðsluveitan, a company owned by the Central Bank.

Strategic Forum for Financial Market Infrastructures (FMIs)

The role of the Strategic Forum for FMIs is to focus on a vision and priorities for the development of financial market infrastructure in Iceland. The Forum evaluates proposals for new cooperative endeavours in the area of financial market infrastructure and carries out a preliminary examination of them. This includes evaluating ideas for new cooperation where the small size of the domestic market could prevent advancements from being achieved in a sufficiently economic way.

The Forum is led by a Central Bank representative and includes members representing the Ministry of Finance and Economic Affairs, deposit institutions, and RB.

It generally meets once a month. In its first year of operation, the Forum received proposals on the execution of foreign payment orders, on joint operation of ATMs, and on centralised monitoring of money laundering. Work groups were established to examine the first two of these proposals. The Forum also has a policy-making role and, in accordance with this, has discussed and established a work group focusing on an independent domestic retail payment solution.

Payments Council

The Payments Council is a forum for Government authorities, market participants, and other stakeholders to discuss and exchange information on matters relating to payment intermediation and financial market infrastructure. The Council, which is chaired by the Governor of the Central Bank, includes representatives from the Ministry of Finance and Economic Affairs, the Fintech Cluster, the Ministry of Culture and Business Affairs, the Consumers' Union of Iceland, RB, the Icelandic Travel Industry Association, the Icelandic Financial Services Association, the Federation of Icelandic Industries, the Federation of Trade and Services, and the Icelandic Chamber of Commerce.

It generally meets twice a year. The Payments Council is authorised to establish work groups, and currently in operation is a work group focusing on merchants' and service providers' responses to an interruption in payment intermediation.

Rulebook Council

The Rulebook Council is chaired by Greiðsluveitan and includes representatives from deposit institutions, RB, and the Central Bank.

The Rulebook Council was established in response to the reorganisation of Iceland's financial market infrastructure, which has taken place in recent years. In view of this process, it was deemed important to issue Icelandic rulebooks for cooperation on financial market infrastructure that are comparable to those issued in Europe. The objectives of rulebook issuance are to

45. The report can be found here (in Icelandic): https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2023/05/22/Skyrsla-um-taekifaeri-og-ahaettur-a-svidi-stafraennar-fjarmalathjonustu/.

lay down provisions on financial market infrastructure participants' rights and responsibilities, set forth harmonised groundrules for them, standardise procedures, and enhance transparency in system operations. Rulebooks are binding upon participants and are intended to enhance the security and efficiency of the infrastructure concerned.

The Rulebook Council is tasked with discussing and making proposals for the issuance of rulebooks in Iceland, either foreign rulebooks such as those from the European Payments Council (EPC) or Icelandic ones. In any event, it is considered desirable that the presentation and contents of Icelandic rulebooks be as closely aligned as possible with foreign models. Until now, the Rulebook Council has focused primarily on implementing a rulebook for real-time payment intermediation, and the Governor has already approved the Council's proposal to work on such a rulebook, which would be based largely on the EPC's SCT Inst Rulebook. This work is currently underway, and the Council envisions completing it this autumn. In other words, it is assumed that the Icelandic real-time payment intermediation rulebook will be consistent with the EPC Rulebook to the extent possible.

Appendix

Tables

Table 1 Financial system assets[1]

Assets, b.kr	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023	Change from 31.12.2022, %
Central Bank of Iceland	840	844	964	875	812	-7,0
Deposit-taking corporations excluding the Central Bank	3,775	4,212	4,700	5,103	5,319	4,0
– Commercial banks	3,748	4,183	4,669	5,069	5,277	4,0
– Savings banks and other deposit-taking corporations	26	28	31	34	41	21,0
Money market funds	144	145	128	138	132	-4,0
Non-MMF investment funds[2]	766	846	1,125	1,071	1,046	-2,0
Other financial intermediaries[3, 4]	290	258	221	232	240	3,0
Treasury	936	1,064	1,064	1,048	1,064	2,0
– Housing Financing Fund	718	703	669	646	642	-1,0
Financial auxiliaries	25	54	59	56	56	0,0
Insurance corporations	259	290	320	314	325	4,0
Pension funds	4,975	5,732	6,747	6,626	6,950	5,0
Total assets	12,010	13,445	15,328	15,464	15,943	3,0

1. Including the old banks' holding companies from 31 December 2015 onwards.
2. Effective 31 December 2016, specialised investment companies are included with equity, investment, and institutional investment funds.
3. Effective 31 December 2015, after finalisation of composition agreements, the old banks' holding companies are classified as other financial corporations.
4. Beginning on 27 February 2019, Byr, ESÍ, the Framtíðin credit fund, and Sparisjóðabankinn (SPB) are classified among other financial institutions. Data are as follows: for Byr, from January 2016 onwards; for ESÍ, from December 2009 onwards; for Framtíðin, from May 2017 onwards; and for SPB, from February 2016 onwards.

Source: Central Bank of Iceland.

Table 2 DMB assets

Assets, m.kr.	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023	Change from 31.12.2022, %
Cash and deposits with Central Bank	329,923	213,003	281,653	279,738	281,551	1
Deposits in domestic deposit-taking corporations	633	1,736	3,627	3,141	4,652	48
Deposits in foreign deposit-taking corporations	63,887	85,059	80,358	120,225	83,880	-30
Domestic credit	2,784,748	3,070,639	3,409,643	3,817,885	3,983,741	4
Foreign credit	137,546	168,636	150,557	179,281	220,853	23
Domestic marketable bonds and bills	104,980	306,068	277,500	269,183	319,806	19
Foreign marketable bonds and bills	145,433	146,996	183,058	170,722	161,848	-5
Domestic equities and unit shares	121,132	123,347	191,208	141,481	117,078	-17
Foreign equities and unit shares	2,622	2,262	4,593	4,639	5,178	12
Other domestic assets	67,047	74,048	108,794	103,730	127,445	23
Other foreign assets	16,693	19,845	9,229	13,221	12,698	-4
Total	3,774,645	4,211,637	4,700,220	5,103,245	5,318,730	4

Source: Central Bank of Iceland.

Table 3 Other credit institutions' assets[1]

Assets, m.kr.	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023	Change from 31.12.2022, %
Cash and deposits with Central Bank	21,067	0	0	0	0	0
Deposits in domestic deposit-taking corporations	8,639	16,822	9,734	10,881	7,138	-34
Deposits in foreign deposit-taking corporations	28,597	24,927	15,945	3,887	2,240	-42
Domestic credit	154,903	178,680	162,245	176,866	186,517	5
Foreign credit	17,413	17,847	15,559	14,820	14,054	-5
Domestic marketable bonds and bills	1,430	5,037	9,818	12,373	15,380	24
Foreign marketable bonds and bills	0	350	268	335	329	-2
Domestic equities and unit shares	29,765	521	1,145	2,385	3,046	28
Foreign equities and unit shares	6,681	1,451	76	135	116	-14
Other domestic assets	18,126	8,849	3,599	4,155	3,932	-5
Other foreign assets	3,445	2,650	2,771	5,743	6,537	14
Total	290,065	257,136	221,159	231,580	239,288	3

1. Beginning on 27 February 2019, Byr, ESÍ, the Framtíðin credit fund, and Sparisjóðabankinn (SPB) are classified among other financial institutions. Data are as follows: for Byr, from January 2016 onwards; for ESÍ, from December 2009 onwards; for Framtíðin, from May 2017 onwards, and for SPB, from February 2016 onwards.

Source: Central Bank of Iceland.

Table 4 Pension fund assets

Assets, m.kr.	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023	Change from 31.12.2023, %
Deposits in domestic deposit-taking corporations	151,522	164,821	170,092	164,592	155,534	-6
Deposits in foreign deposit-taking corporations	24,174	34,230	22,717	13,418	9,598	-28
Domestic credit	522,485	511,516	491,083	553,909	596,719	8
Foreign credit	378	495	423	629	597	-5
Domestic marketable bonds and bills	1,970,450	2,105,645	2,305,830	2,324,959	2,453,688	6
Foreign marketable bonds and bills	8,516	8,568	7,578	20,226	18,134	-10
Domestic equities and unit shares	805,115	987,843	1,336,313	1,234,146	1,177,836	-5
Foreign equities and unit shares	1,465,596	1,887,539	2,384,949	2,287,003	2,507,202	10
Domestic insurance and pension assets	22,118	20,989	21,651	24,357	24,836	2
Foreign insurance and pension assets	48	50	30	62	35	-44
Other domestic assets	4,149	5,690	5,987	4,848	6,608	36
Other foreign assets	0	46	334	1,352	0	-100
Total	4,974,551	5,727,434	6,746,988	6,629,499	6,950,786	5

Source: Central Bank of Iceland.

Table 5 Insurance company assets

Assets, m.kr.	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023	Change from 31.12.2022, %
Cash and deposits with Central Bank	440	2,574	3,097	4,175	767	-82
Deposits in domestic deposit-taking corporations	10,166	6,985	6,441	8,823	9,184	4
Deposits in foreign deposit-taking corporations	48	28	0	0	0	0
Domestic credit	2,490	1,819	1,454	3,739	4,320	16
Foreign credit	0	0	0	0	0	0
Domestic marketable bonds and bills	112,194	137,759	151,058	145,202	157,286	8
Foreign marketable bonds and bills	23,770	24,601	25,815	26,287	26,106	-1
Domestic equities and unit shares	65,790	74,850	72,283	67,784	63,161	-7
Foreign equities and unit shares	10,200	12,168	14,590	13,652	14,703	8
Domestic insurance and pension assets	24,772	25,786	27,550	29,181	9,804	-66
Foreign insurance and pension assets	6,997	6,311	6,614	5,673	5,934	5
Other domestic assets	7,183	7,721	10,411	9,580	9,922	4
Other foreign assets	750	319	200	134	113	-16
Total	264,800	300,922	319,512	314,230	301,302	-4

Source: Central Bank of Iceland.

Table 6 D-SIB: Income and expenses

Income and expenses, m.kr.	30.6.2019	30.6.2020	30.6.2021	30.6.2022	30.6.2023	Change from 30.06.2022, %
Arion Bank hf.						
Operating income	23,928	23,039	28,101	27,774	32,883	18
Net interest income	15,242	15,110	15,358	19,332	22,420	16
Net fee and commission income	4,696	5,764	6,839	8,091	8,638	7
Other operating income	3,990	2,165	5,904	351	1,825	420
Operating expenses	13,480	12,602	12,420	12,850	12,479	-3
Change in loan values	2,069	3,778	-1,892	309	620	101
Income tax	3,331	2,983	3,959	6,000	6,419	7
Net after-tax gain from discontinued operations	-1,934	-934	241	6,915	17	-100
Profit	3,114	2,742	13,855	15,530	13,382	-14
Íslandsbanki hf.						
Operating income	23,400	20,040	23,717	26,639	32,431	22
Net interest income	16,341	16,808	16,607	19,463	25,035	29
Net fee and commission income	5,405	4,798	5,769	6,498	7,061	9
Other operating income	1,654	-1,566	1,341	678	335	-51
Operating expenses	12,943	12,038	12,684	11,992	14,593	22
Change in loan values	1,809	5,929	-622	-1,058	-570	-46
Income tax	3,736	1,646	2,666	4,636	6,074	31
Net after-tax gain from discontinued operations	-203	-558	57	-2	16	
Profit	4,709	-131	9,046	11,067	12,350	12
Landsbankinn hf.						
Operating income	30,272	22,710	27,485	22,789	36,068	58
Net interest income	20,459	18,939	18,958	21,418	27,535	29
Net fee and commission income	4,136	3,598	4,368	5,422	5,751	6
Other operating income	5,677	173	4,159	-4,051	2,782	
Operating expenses	12,231	12,282	12,010	11,856	13,038	10
Change in loan values	2,372	13,435	-2,782	-43	1,591	
Income tax	4,556	280	4,152	5,419	6,966	29
Net after-tax gain from discontinued operations	0	0	0	0	0	0
Profit	11,113	-3,287	14,105	5,557	14,473	160
D-SIB						
Operating income	77,600	65,789	79,303	77,202	101,382	31
Net interest income	52,042	50,857	50,923	60,213	74,990	25
Net fee and commission income	14,237	14,160	16,976	20,011	21,450	7
Other operating income	11,321	772	11,404	-3,022	4,942	
Operating expenses	38,654	36,922	37,114	36,698	40,110	9
Change in loan values	6,250	23,142	-5,296	-792	1,641	
Income tax	11,623	4,909	10,777	16,055	19,459	21
Net after-tax gain from discontinued operations	-2,137	-1,492	298	6,913	33	-100
Profit	18,936	-676	37,006	32,154	40,205	25

Source: Commercial banks' financial statements.

Table 7 D-SIB: Key ratios

%	31.12.2019	31.12.2020	31.12.2021	31.12.2022	30.6.2023
Return on equity	4.5	4.8	12.4	10.1	12.0
Return on assets	0.7	0.7	1.9	1.5	1.6
Expenses as a share of net interest and commission income	57.8	54.1	51.8	43.8	41.6
Expenses as a share of total assets	2.1	1.8	1.7	1.6	1.6
Net interest and commission income as a share of total income	88.2	91.8	86.8	103.3	95.1
Net interest income as a share of total assets	2.7	2.6	2.4	2.8	3.1
Capital ratio	24.2	24.9	25.4	23.7	24.2
Foreign exchange as a share of the capital base	2.1	0.3	0.1	0.7	0.3
Liquidity coverage ratio (LCR), total	165.9	179.7	176.1	163.0	186.0
Liquidity coverage ratio (LCR), FX	508	481.3	514.3	519.0	467
Net stable funding ratio (NSFR), total	117	118.7	121	117.0	118.6
Net stable funding ratio (NSFR), FX	141.2	147	118.4	165.0	181

Source: Central Bank of Iceland.

Table 8 Commercial banks' foreign bond issues, last 12 months (5 September 2022 - 5 September 2023)

Issuer	Date	Currency	Amount (b.kr.)	Maturity (years)	Premium on interbank rate[1] %
Arion Bank	sep.22	EUR	42.0	2.0	2.65
	mar.23	SEK	4.0	3.0	3.00
	mar.23	NOK	2.7	2.0	2.55
	may 23	EUR	44.7	3.0	4.07
Total			93.4		
Islandsbanki	sep.22	EUR[2]	42.0	5.0	0.7
	nov.22	SEK	10.3	2.0	4.25
	nov.22	NOK	18.6	2.0	4.75
	may23	EUR	44.7	3.0	4.21
Total			115.6		
	mar.23	EUR[2]	42.0	5.0	0.9
	aug.23	SEK	5.4	2.0	3.05
	aug.23	NOK	12.4	2.0	3.05
	sep.23	EUR	43.0	3.5	3.13
Total			102.8		

1. Interest premium on three-month interbank rate in the relevant currency unless otherwise specified.
2. Covered bond.

Source: Nasdaq Iceland.

Table 9 Capital buffers

Capital buffer	announcement[1]	FME decision/ Value %	Effective date
Systemic risk buffer, O-SII banks	8.4.2020	3	8.4.2020
Systemic risk buffer, other DMBs	8.4.2020	3	8.4.2020
Other Systemically Important Institutions buffer	8.4.2020	2	8.4.2020
Countercyclical capital buffer	29.9.2021	2	29.9.2022
Capital conservation buffer		2.5	1.1.2017

1. Effective 1 January 2020, the Central Bank of Iceland sets rules on capital buffers, other than capital conservation buffer, subject to prior approval from the Financial Stability Committee (FSC).

Sources: Financial Supervisory Authority, Ministry of Finance and Economic Affairs.

Table 10 Indicators pertaining to the international investment position

	Unit	Frequency	2018	2019	2020	2021	2022	1H 2023
Net IIP	% of GDP	Q	9.3	20.0	34.3	38.9	24.8	28.8
External debt[1]	% of GDP	Q	82.1	78.0	85.1	86.4	78.9	72.8
Net external debt[2]	% of GDP	Q	22.4	21.4	22.4	29.5	29.1	29.0
Short-term debt based on remaining maturity[3]	% of GDP	Q	17.3	13.9	11.3	15.3	13.0	13.9
Treasury FX debt as a share of total debt	%	M	14.9	21.1	20.1	23.9	20.0	16.4
Commercial banks' foreign-denominated bonds	% of GDP	Q	20.9	19.3	22.1	22.4	21.2	19.8
Current account balance[4]	% of GDP	Q	4.3	6.5	0.9	-3.0	-2.0	-0.2
International reserves	% of GDP	M	25.9	27.2	28.0	28.4	22.0	19.3
International reserves financed in krónur	% of GDP	M	20.8	20.2	18.5	15.1	12.9	11.9
International reserves/IMF RAM	%	Q	139.5	153.4	151.9	144.9	123.9	112.6
Terms of trade[5]	Value	Q	91.1	93.9	91.2	98.6	93.9	93.4
Nominal exchange rate[6]	Value	M	173.8	179.7	200.5	195.6	199.8	194.0
Real exchange rate[7]	Value	M	90.4	91.4	84.9	87.0	85.9	90.6
Treasury's highest credit rating	Rating	-	A2/A	A2/A	A2/A	A2/A	A2/A	A2/A

1. External liabilities with a known payment profile; i.e., excluding equity securities, unit shares, derivatives, and FDI in corporate equity.
2. External debt, net of comparable assets.
3. Short-term liabilities based on original maturity, plus foreign long-term loans and marketable bonds maturing within 12 months, and non-residents' holding in CBI2016 certificates of deposit, Treasury bonds, and Housing Financing Fund bonds maturing within 12 months.
4. Based on available current account data for relevant year relative to GDP for the same period.
5. Index. Q1/2000 = 100.
6. Trade-weighted exchange rate index – narrow trade basket (1%).
7. Index. March 2005 = 100. In terms of relative consumer prices.

Sources: Statistics Iceland, Central Bank of Iceland.

Definitions

Account information service:
A direct-line service that provides consolidated information on one or more payment accounts as a user of payment services either from another payment service provider or from more than one payment service provider; cf. the Payment Services Act, no. 114/2021.

Account-to account (A2A):
A retail payment solution based on electronic payments transferraed from the buyer's bank account to the seller's bank account.

Acquirer:
A provider of payment services that offers acquiring service; cf. the Payment Services Act, no. 114/2021.

Acquiring service:
One type of payment service described in the Payment Services Act, no. 114/2021.

Authorisation:
Approval for payment granted by an entity, usually a deposit institution or a third party acting on the institution's behalf. Even though a request for authorisation is approved, it does not necessarily confirm the legitimacy of the transfer.

Balance on goods:
The balance on goods (goods account balance) is the difference between the value of exported and imported goods.

Balance on income:
The balance on income (income account balance) is the difference between revenues and expenses due to primary income and secondary income.

Balance on services:
The balance on services (services account balance) is the difference between the value of exported and imported services.

BCBS:
Basel Committee on Banking Supervision.

Bill:
A debt instrument with a short maturity, generally less than one year.

BIS:
Bank for International Settlements.

Block chain:
Technology that administers digital accounting or distributed ledgers.

Blockchain technology:
A type of distributed ledger technology that records all changes in a ledger in so-called blocks, in chronological order.

Bond:
A written instrument acknowledging the issuer's unilateral and unconditional obligation to remit a specified monetary payment.

Book value of a loan
The nominal value or outstanding balance of a loan once haircuts or loan loss provisions have been deducted.

Buy-now-pay-later (BNPL):
A payment method allowing the buyer to pay at a later date, usually through a payment system that administers all claims for creditors.

Calculated return on equity:
The profit for a given period as a percentage of average equity over the same period.

Capital base:
The sum of Tier 1 and Tier 2 capital after adjusting for deductions according to the CRR; cf. the Act on Financial Undertakings, no. 161/2002.

Capital buffers:
Additional capital requirements that financial undertakings must satisfy in accordance with the Act on Financial Undertakings, no. 161/2002. The countercyclical capital buffer, the buffer for domestic systemically important banks (D-SIB buffer), and the systemic risk buffer are determined through Central Bank rules upon prior approval by the Financial Stability Committee. The capital conservation buffer applies to certain financial undertakings according to Act no. 161/2002.

Capital ratio:
The ratio of the capital base to risk-weighted assets (risk base).

Cash:
Physical currency; i.e., banknotes and coin issued by a central bank.

Central bank money:
A claim against a central bank, either in the form of cash (banknotes and coin) or as a deposit held in an account with a central bank.

Central securities depository:
A licensed and supervised entity according to the Act on Central Securities Depositories and Settlement and Electronic Registration of Financial Instruments, no. 7/2020. Central securities depositories own and operate securities registration and settlement systems.

Claim value of a loan:
The nominal value or outstanding balance of a loan.

Clearing:
Intermediation, netting and, in some instances, confirmation of payment orders before settlement takes place.

Commercial bank:
A credit institution that has been granted a licence to operate as a commercial bank according to the Act on Financial Undertakings, no. 161/2002.

Commercial bank money:
A claim against a commercial bank or savings bank in the form of a deposit held in an account with the institution concerned.

CPMI:
Committee on Payments and Market Infrastructures, located at the Bank for International Settlements (BIS).

Credit institution:
A financial undertaking (commercial bank, savings bank, or credit undertaking) that accepts deposits or other repayable funds from the public and grants loans on its own account.

Cross-default non-performing loans:
This refers to non-performing loans according to the cross-default method, according to which all of a borrower's loans are considered non-performing if one loan is frozen or in arrears by 90 days or more, or if the borrower is deemed unlikely to pay their obligations when due.

Cryptocurrencies:
Electronic or digital currencies have not been defined in a harmonised manner, but the terms *virtual currency(-ies)* and *virtual asset(s)* have been used in Icelandic law.

CSDR:
Regulation (EU) no. 909/2014 on improving securities settlement in the European Union and on central securities depositories; cf. the Act on Central Securities Depositories and Settlement and Electronic Registration of Financial Instruments, no. 7/2020.

Current account balance:
The sum of the goods, services, and income account balances.

Debt service-to-income (DSTI) ratio:
The ratio of all mortgage loans carried by a given consumer or consumers in accordance with credit scores and credit assessments to the same party's disposable monthly income; cf. Rules no. 701/2022.

Debt multiplier:
Debt as a percentage of the book value of capital.

Deposit institution:
A financial undertaking (commercial bank or savings bank) authorised to accept deposits.

Digital cash:
A digital claim against a central bank (i.e., central bank digital currency, CBDC), which, if issued, can function as a standard currency.

Digital wallet provider:
An individual or legal entity that offers custodial services relating to the storage of virtual currency owners' payment information, using software, systems, or other types of media to manage, store, or transfer virtual currency; cf. the Act on Measures against Money Laundering and Terrorist Financing, no. 140/2018.

Disposable income:
Expected permanent income net of direct taxes and levies in accordance with the Act on Mortgage Lending to Consumers, no. 118/2016.

Distributed ledger technology (DLT):
Technology that has emerged in recent years and is based on the idea that encrypted information is stored in a secure, traceable manner in a distributed system instead of a centralised database. It has been used, among other things, to

develop cryptocurrencies such as Bitcoin. The blockchain does not include information on owners, and despite its traceability properties, there are certain restrictions on access.

Block chain:
Technology that administers digital accounting or distributed ledgers.

Domestic systemically important banks (D-SIB):
Banks that, due to their size or the nature of their activities, could have a significant impact on the stability of the financial system and the general economy, in the opinion of the Central Bank of Iceland Financial Stability Committee. Currently, Arion Bank hf., Íslandsbanki hf., and Landsbankinn hf. are classified as D-SIBs in Iceland.

Electronic money (e-money):
Monetary value in the form of a claim against the issuer, which is stored in an electronic medium, issued in exchange for funds for the purpose of remitting payment, and approved as such by parties other than the issuer; cf. the Act on the Issuance and Treatment of Electronic Money, no. 17/2013.

Encumbrance ratio:
The percentage of a bank's assets that are hypothecated for funding.

Equity:
Assets net of liabilities.

European supervisory bodies:
European Banking Authority (EBA), European Insurance and Occupational Pensions Authority (EIOPA), European Securities and Markets Authority (ESMA), and European Systemic Risk Board (ESRB); cf. the Act on the European System of Financial Supervision, no. 24/2017.

Expense ratio:
The ratio of operating expense net of the largest irregular items to operating income, excluding loan valuation changes and discontinued operations.

Facility-level non-performing loans:
According to the facility-level non-performing loan ratio, a customer's loan is classified as non-performing if it is in arrears by 90 days or more.

Financial market infrastructure:
A multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, and/or other financial transactions; cf. the PFMI Core Principles.

Financial system:
Deposit institutions; miscellaneous credit undertakings (including the ÍL Fund); investment firms; pension funds; insurance companies; mutual, investment, and institutional investment funds; alternative investment funds; and State credit funds.

Financial technology (fintech):
Any type of innovation in financial services that is based on technology and can give rise to new business models, software, processes, or products in the area of payment services, and could affect the financial market, financial services, and the way in which financial services are provided.

Foreign exchange balance:
The Central Bank of Iceland has set the Rules on Foreign Exchange Balance, no. 784/2018. According to the rules, neither the overall foreign exchange balance nor the open position in individual currencies may be positive or negative by more than 10% of a systemically important bank's capital base. For other credit institution, the ratio is set at 15% of the capital base.

Foreign exchange imbalance:
A foreign exchange imbalance (or mismatch) is the difference between assets and liabilities in foreign currencies.

FSB:
Financial Stability Board.

Funding rules:
Funding rules according to the CRR (cf. the Act on Financial Undertakings, no. 161/2002) stipulate that credit institutions shall maintain a minimum net stable funding ratio (NSFR) of 100% in all currencies combined. The rules are based on international criteria developed by the BCBS. The rules on funding ratios are intended to restrict the degree to which the credit institutions can rely on unstable short-term funding to finance long-term foreign-denominated lending.

Holding company:
A company whose sole objective is to acquire stakes in other companies, administer them, and pay dividends from them without participating directly or indirectly, albeit with reservations concerning their rights as shareholders.

Indexation imbalance:
An indexation imbalance or mismatch is the difference between indexed assets and indexed liabilities.

Interbank market:
A market in which deposit institutions lend money to one another for a period ranging from one day to one year.

Interbank payment intermediation:
Payments routed between participants (financial undertakings) in interbank systems that are generally operated by central banks.

Internal payment system / In-house payment intermediation:
Payments between customers of a single payment service provider.

International investment position (IIP):
The value of residents' foreign assets and their debt to non-residents. The difference between assets and liabilities is the net international investment position (NIIP), also referred to as the net external position.

International reserves:
Foreign assets that are managed by monetary authorities and considered accessible if necessary.
Interest burden:
Interest payments as a percentage of disposable income.

Interest premium:
A premium on a base interest rate such as the interbank rate.

Intraday liquidity:
According to the BCBS definition, intraday liquidity refers to liquid assets that can be accessed during the business day, usually to enable banks to make payments in real time.

Key interest rate (policy rate):
The interest rate that is used by the Central Bank in its transactions with credit institutions and is the most important determinant of developments in short-term market interest rates. The rate that has the strongest effect on short-term market rates and is therefore considered the Central Bank's key rate may change from time to time.

Large exposure:
A financial institution's exposure to a given customer or group of related customers is considered a large exposure if it equals or exceeds 10% of the Tier 1 capital.

Legal tender:
Banknotes and coin that are issued by the Central Bank and must be accepted for all payments at full nominal value; cf. the Act on the Central Bank of Iceland, no. 92/2019, and the Act on Iceland's Currency, no. 22/1968.

Liquidity ratio (liquidity coverage ratio):
The ratio of high-quality liquid assets to potential outflows over a 30-day period under stressed conditions according to the Rules on Credit Institutions' Liquidity Ratios, no. 1520/2022; cf. Commission Delegated Regulation (EU) 2015/61.

Liquidity rules:
Rules no. 1520/2022 implement Commission Delegated Regulation (EU) 2015/61 on liquidity coverage requirements for credit institutions, which is based on international criteria developed by the BCBS. Credit institutions must maintain a 100% liquidity coverage ratio (LCR) in all currencies combined and must monitor ratios in significant currencies; i.e., individual currencies in which total obligations equal or exceed 5% of the institution's total liabilities. Furthermore, credit institutions shall satisfy a minimum 50% liquidity ratio in Icelandic krónur. They must also satisfy at least 80% of their liquidity ratio in euros if euro-denominated liabilities constitute 10% of more of their total liabilities.

Loan-to-value (LTV) ratio:
A debt as a percentage of the value of the underlying asset (for instance, mortgage debt as a percentage of the value of the underlying real estate); cf. Rules no. 550/2023.

Net stable funding ratio (NSFR):
The ratio of available stable funding to required stable funding according to the CRR; cf. the Act on Financial Undertakings, no. 161/2002.

Netting:
The process of forwarding, harmonising, and sometimes confirming payment instructions before settlement takes place, often by netting out obligations between parties without transferring funds between them.

Network interface:
A network termination point that is a physical connection point where a user is granted access to the network interface owner's computer system; for instance, a payment service provider's network interface.

Payment card turnover balance:
The difference between foreign nationals' payment card use in Iceland and Icelandic nationals' payment card use abroad.

Payment initiation:
Activation of payment instructions at the request of a user of payment services, as regards a payment account held with another payment services provider; cf. the Payment Services Act, no. 114/2021.

Payment institution:
A legal entity licensed to operate payment services in Iceland or another member state of the European Economic Area (EEA); cf. the Payment Services Act, no. 114/2021.

Payment instrument:
Equipment and/or procedures restricted to a named person on which a provider and user of payment services agree and which the user uses to give payment instructions; cf. the Payment Services Act, no. 114/2021.

Payment services:
Payment services are defined in Point 22 of Article 3of the Payment Services Act, no. 114/2021. They include deposits of cash to a payment account, electronic transfers of funds between payment accounts, issuance of a payment instrument, or execution of a money transfer. Also included is payment initiation, a new type of payment service.

Payment service provider:
A licensed and supervised entity that provides payment services according to the Payment Services Act, no. 114/2021.

PFMI:
The Principles for Financial Market Infrastructures, issued by CPMI/BIS and IOSCO.

PSD/PSD2:
The EU Payment Services Directive, implemented in Iceland with the Payment Services Act, no. 114/2021.

RB claim system:
The name given to a centralised database operated by RB hf. and administering all claims for creditors.

Real exchange rate:
Relative developments in prices or unit labour costs in the home country, on the one hand, and in trading partner countries, on the other, from a specified base year and measured in the same currency The real exchange rate is generally expressed as an index.

Real wage index:
An index showing changes in wages in excess of the price level. It is the ratio of the general wage index to the consumer price index (CPI).

Reserve adequacy metric (RAM):
The reserve adequacy metric (RAM) was developed by the International Monetary Fund (IMF) as a criterion for desirable size of international reserves, which can be determined with respect to a number of factors that affect a country's balance of payments and could provide indications of potential capital outflows. The RAM consists of four components: i. Export revenues: Reflect the risk of contraction in foreign currency accumulation. ii. Money holdings (broad money): Reflect potential capital flight in connection with liquid assets. iii. Foreign current (short-term) liabilities: Reflect the economy's refinancing risk. iv. Other foreign liabilities: Reflects outflows of portfolio assets. The RAM is the sum of 30% of foreign current liabilities, 15% of other foreign liabilities (20% for fixed exchange rate regimes), 5% of money holdings (10% for fixed exchange rate regimes), and 5% of export revenues (10% for fixed exchange rate regimes).

Risk-weighted assets:
Assets adjusted using risk weights according to the CRR; cf. the Act on Financial Undertakings, no. 161/2002.

Risk-weighted assets (risk base):
The sum of the weighted risks of financial undertakings (e.g., credit risk, market risk, operational risk, etc.), according to Regulation (EU) no. 575/2013 (the Capital Requirements Regulation, CRR); cf. the Act on Financial Undertakings, no. 161/2002.

Shadow bank:
Shadow banking is defined as credit intermediation involving entities and activities outside the regular banking system. Shadow banks include money market funds, bond and equity funds, investment funds, specialised investment companies, investment firms, brokers, specialised funds, and miscellaneous creditors. They do not include public financial institutions, pension funds, insurance companies, and financial auxiliaries.

Stablecoin:
A type of virtual asset whose value is pegged to the price of other assets or fiat currencies so as to prevent the price volatility that otherwise characterises virtual currency or cryptocurrency. Examples of types of stablecoin are Ether (pegged to the US dollar) and Diem (previously Libra), which Facebook is planning to launch.

Systemically important infrastructure:
Infrastructure that, according to a decision by the Central Bank Financial Stability Committee, is of such a nature that its operation could affect financial stability.

Terms of trade:
The price of goods and services imports as a percentage of the price of goods and services exports.

Trade-weighted exchange rate index (TWI):
The index measuring the average exchange rate in terms of average imports and exports based on the narrow trade basket.

Virtual assets (crypto-assets):
Any type of value held in digital form that can be used for payment or investment and can be transferred, but is not classified either as electronic money in the sense of Act no. 17/2013 or as currency issued by a central bank or other authority; cf. the Act on Measures to Prevent Money Laundering and Terrorist Financing, no. 140/2018. A virtual asset is an electronic representation of monetary value, issued by a party that is neither a central bank nor a supervised entity in the sense of the law, whose unit value is determined by the issuing party. The best-known virtual asset system is Bitcoin.

VIX implied volatility index:
The expected volatility of the S&P 500 index according to the pricing of options related to it. It gives an indication of investors' risk appetite or risk aversion.

Yield:
The annualised return that an investor requires on funds invested.

Yield curve:
A curve that plots financial market yields at set points in time.

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