



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.

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# Statement of the Financial Stability Committee 28 September 2022

The global economic outlook has deteriorated recently, which would adversely affect the Icelandic economy. Trading partner inflation is at its highest in decades, and central banks have resorted to steep policy rate hikes. Furthermore, the war in Ukraine has pushed energy prices upwards in Europe and, along with other factors, has exacerbated uncertainty. Risks to financial stability in Iceland have increased because of worsening external conditions, and the balance of risk is tilted to the downside.

The systemically important banks are highly resilient. Their capital and liquidity are strong. The Central Bank of Iceland's stress test for 2022 shows that the banks are well prepared to respond to external shocks and simultaneously support households and businesses.

Icelandic real estate prices have soared and have deviated widely from fundamentals. The rise has largely been equity-driven, and household debt levels have kept pace with incomes in recent years. More stringent borrower-based measures in the housing market has reduced issuance of new high-risk loans, contributed to an increase in homeowners' equity ratio, and safeguarded new borrowers' debt service capacity. These measures, together with interest rate hikes, have eased tensions in the market.

Increased external uncertainty highlights the importance of maintaining the resilience of the Icelandic financial system. Iceland is better positioned than many of its trading partners, but vigilance is required to preserve financial stability.

The Financial Stability Committee decided to hold the countercyclical capital buffer unchanged. The decision taken in September 2021 to increase the buffer from 0% to 2% will take effect tomorrow, 29 September 2022.

The Committee stresses the importance of bolstering security in domestic payment intermediation so as to guarantee business continuity, partly in view of growing cyber threats. Steps have been taken towards the development of an independent domestic retail payment solution, which is highly important in the current situation.

The Financial Stability Committee will continue to apply the policy instruments at its disposal so as to preserve financial stability, thereby enabling the financial system to mediate credit and payments and redistribute risks appropriately.

**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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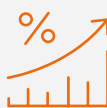
## Financial Stability in a nutshell



The global economic outlook has deteriorated in recent months, in part because of the war in Ukraine, continuing pandemic-related public health measures, and high inflation, which has cut into households' purchasing power. Governments have scaled down pandemic support measures for households and businesses, central banks have responded to stubborn inflation by raising interest rates, and the macroprudential stance has been tightened. These actions combine to slow down the global economic recovery, as can be seen in asset prices, among other things. Iceland has not been spared the surge in global inflation, although the effects of higher energy prices are far weaker here than in most other countries. Iceland's GDP growth outlook for 2022 is still good, although growth is expected to lose momentum in 2023.



House prices are high by virtually all measures. The first signs of cooling in the housing market have begun to emerge. The number of homes for sale has risen, fewer purchase agreements are concluded, and the average time-to-sale has grown longer. The past several months' steep rise in house prices over and above fundamentals indicates imbalances in the market, and the likelihood of a correction has increased. At the same time, rent prices have fallen in real terms, and increased demand for rental housing can be expected to push rent upwards in the coming term.



Households took advantage of low interest rates during the pandemic to refinance existing debt and invest in real estate and motor vehicles. Real growth in household debt peaked at nearly 7% year-on-year in Q2 and Q3/2021. The growth rate has now slowed markedly and was marginally negative in July. Nevertheless, the ratio of household indebtedness to either disposable income or GDP is historically low. The debt burden should therefore be manageable for most households. It is clear, though, that higher interest rates and inflation add to that debt burden, and arrears can be expected to increase.



The three large commercial banks are strong. Their returns on regular income have increased, their cost-to-income ratios are down, and household and corporate arrears have declined. The banks' asset quality is improving, reflecting this year's rapid economic rebound. Their capital ratios are high. The Central Bank stress test for 2022 shows that the banks are highly resilient, well prepared to respond to external economic shocks, and able to support corporate and household borrowers to withstand such shocks.



The three large commercial banks' liquidity ratios have fallen in recent months and are now broadly where they were before the pandemic struck. Their liquidity is somewhat above regulatory minimum. Competition for deposits has picked up, and market conditions for bond issuance in Iceland and abroad have been challenging in recent months. Credit spreads on the banks' foreign market funding have been on the rise and their foreign refinancing risk is increasing.



Cyberattacks and attempted cyberattacks are continually increasing. In order to provide for business continuity and guarantee system security, financial institutions and operators of financial market infrastructure must shore up their contingency measures against such attacks. Coordinated action plans play a key role in this preparedness. Simultaneously, it is vital to work quickly and securely on alternate routes that can be used if the need arises. This work requires the participation of financial institutions, financial market infrastructure operators, the Central Bank, and the Government.

# Financial Stability: Developments and prospects



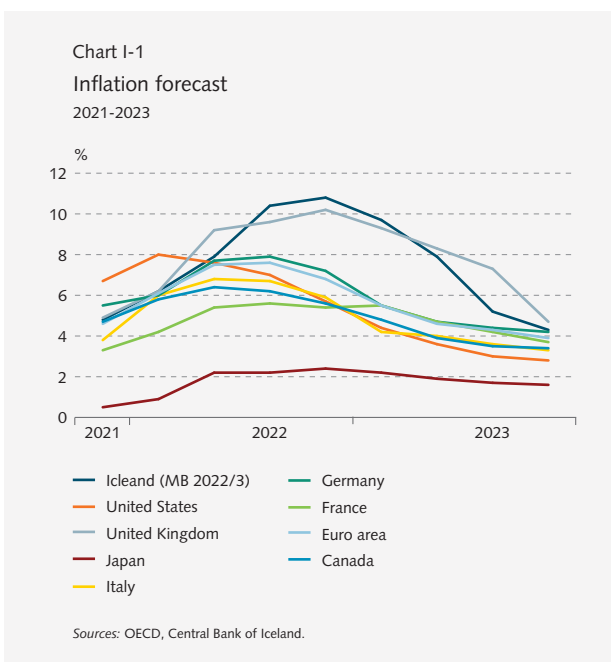
## The inflation outlook has deteriorated worldwide

The war in Ukraine has exacerbated global economic uncertainty. The inflation outlook has deteriorated markedly the world over, owing in part to higher energy and food prices. Inflation among Iceland's main trading partners is at a forty-year peak, and the price of natural gas in Europe has hit an all-time high. As a result, European households' cost of living has soared in recent months. To some extent, however, the rise in oil prices has reversed because of the bleaker global economic outlook. According to the International Monetary Fund's (IMF) July forecast, the global GDP growth outlook has worsened since April, when the Fund issued its previous forecast. The July forecast assumes that global

GDP growth will measure 3.2% this year, as compared with 3.6% in April. The poorer outlook stems in part from weaker-than-expected output growth in the US in H1/2022, as households' purchasing power contracted and the monetary stance has been tightened. Furthermore, in China the contraction was more severe than expected, owing to protracted public health measures and deepening real estate crisis in the real estate market. In Europe, the continuing repercussions of the war in Ukraine and a tighter monetary stance have eroded the GDP growth outlook.

## For Iceland the economic outlook has improved

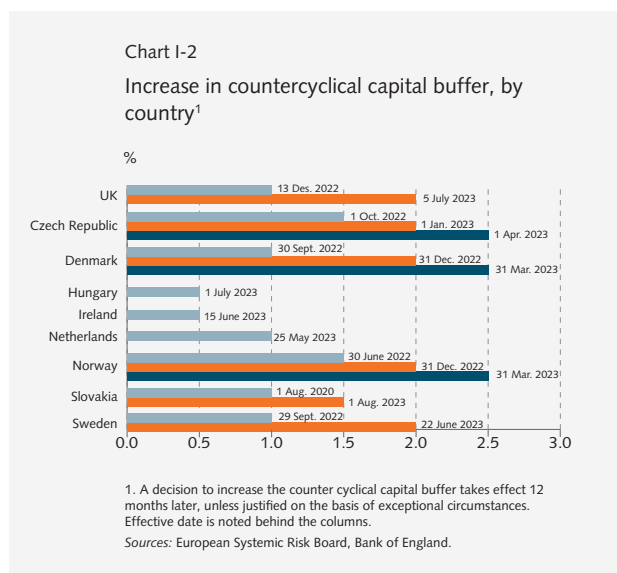
In spite of the bleaker global economic outlook, Iceland's GDP growth prospects have improved. According to the Central Bank's most recent macroeconomic forecast, published in August, GDP growth looks set to measure nearly 6% this year, some 1.3 percentage points above the May forecast, owing to more robust private consumption growth and a more rapid rebound in tourism than was projected then. On the other hand, the inflation remains high even though it declined by 0.2 percentage points month-on-month, to 9.7% in August, according to Statistics Iceland measurements. The labour market is very tight, unemployment continues to fall, and the share of firms considering themselves understaffed has seldom been higher. Terms of trade for goods and services have improved with rising exported goods prices, particularly marine products and generic goods. Conversely, imported goods prices have risen as well.<sup>1</sup>



<sup>1</sup> Further discussion of the Bank's macroeconomic forecast can be found in *Monetary Bulletin 2022/3*.

### Increed use of macroprudential tools

Private sector debt surged widely in the low-interest environment brought on by the pandemic, and asset prices rose in most markets. Many countries have applied macroprudential tools in greater measure in response to increased systemic risk. In Denmark and Norway, the countercyclical capital buffer has been raised to 2.5%, both in response to elevated uncertainty and in a bid to counteract risk, and in the UK, the buffer has been raised to 2% for the same reasons. In Norway, reference was also made to the rise in residential and commercial property prices alongside increased credit growth – the same rationale as Sweden used in raising its countercyclical capital buffer to 2%. Moreover, the Netherlands, the Czech Republic, Hungary, Ireland, and Slovakia have announced increases to the buffer in recent months, as can be seen in Chart 1-2.



Slovenia decided in April to lower the debt service-to-income (DSTI) ratio, at the same time it lowered the loan-to-value (LTV) ratio on non-primary properties. Portugal has taken action to link the maximum mortgage loan term to the borrower's age.

The Central Bank of Iceland Financial Stability Committee (FSN) decided in June to lower the maximum LTV ratio for first-time buyers from 90% to 85%. For other buyers, the maximum LTV ratio was held unchanged at 80%. At that time, the Committee also set new rules on the calculation of the maximum DSTI ratio. Further discussion of the Committee's decision can be found later in the chapter.

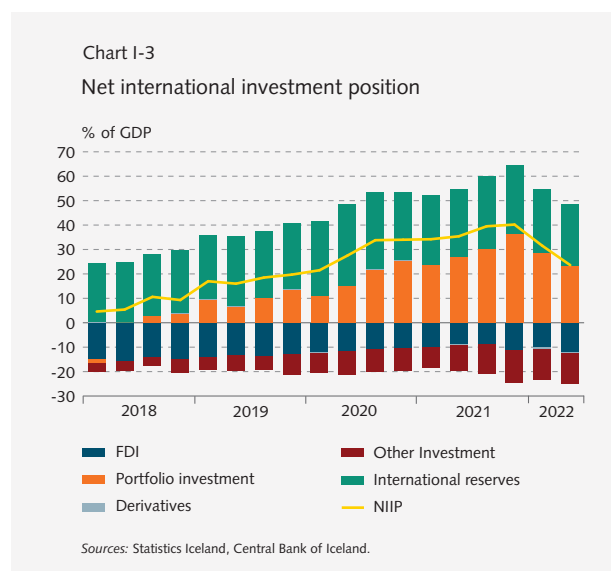
### Monetary stance tightened

Many central banks have responded to higher inflation by tightening their monetary stance, raising interest rates

and signalling further rate hikes in coming months. The US Federal Reserve has raised rates five times in 2022 to date, from 0-0.25% at the beginning of the year to 3-3,25% by September. The European Central Bank has raised its key interest rate<sup>2</sup> twice over the same period, to 0.75% as of mid-September, and the Bank of England has raised its Bank Rate six times year-to-date, to 2,25% in September. Over this same period, the Central Bank of Iceland has raised its key interest rate four times, to the current 5.5%.

### External position affected by price and exchange rate movements

Iceland's net international investment position (NIIP) was positive by nearly 24% of GDP at the end of Q2/2022 but deteriorated markedly during the first half of the year. At the end of 2021 it was positive by 40% of GDP, the most favourable NIIP in Iceland's history, after having improved by a full 700 b.kr. during the pandemic and the associated low-interest environment. About 4/5 of this marked change in the NIIP in H1 is attributable to price and exchange rate movements, as the MSCI World Index fell by 21% during the half. Because of the pension funds' large-scale investments in foreign securities in recent years, the NIIP is more susceptible to price movements in foreign asset markets than it was previously.



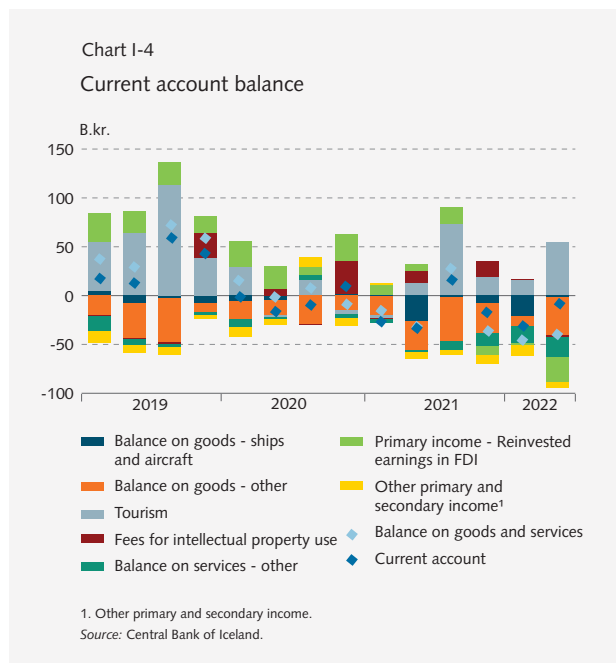
### Current account deficit in H1

Iceland's current account showed a deficit of 84 b.kr., or 4.8% of GDP, in H1/2022. For the year as a whole, the outlook is for the second deficit in a row; however, figures on foreign tourist arrivals in Q3 give cause to expect

<sup>2</sup> Deposit facility rate.



a turnaround in services exports in H2. The Central Bank's most recent macroeconomic forecast, published in August, provides for a continuing deficit in coming years.<sup>3</sup>

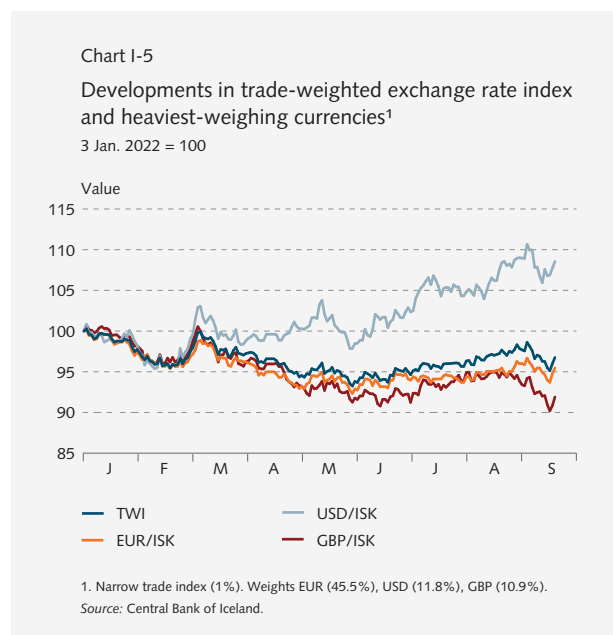


Goods prices have risen because of pandemic-related supply chain bottlenecks and the war in Ukraine. Commodity prices have affected not only goods imports but also factor income. For instance, higher commodity prices have greatly strengthened operational foundations in the energy-intensive industrial sector, and the companies' profits are deducted from factor income, irrespective of whether they are reinvested or distributed to foreign owners as dividends. Companies in the sector have not paid dividends thus far in 2022, but their outstanding loan balances have declined as returns have increased. These profits explain, for instance, why the balance on primary income, at -22 b.kr., was so strongly negative in Q2. This was offset by a re-evaluation of primary income during the quarter, which caused revenues from foreign unit shares, owned primarily by the pension funds, to increase retroactively. The impact on the current account balance in recent years was positive by an average of just over 6 b.kr. per quarter.

### Foreign exchange market stable over the summer

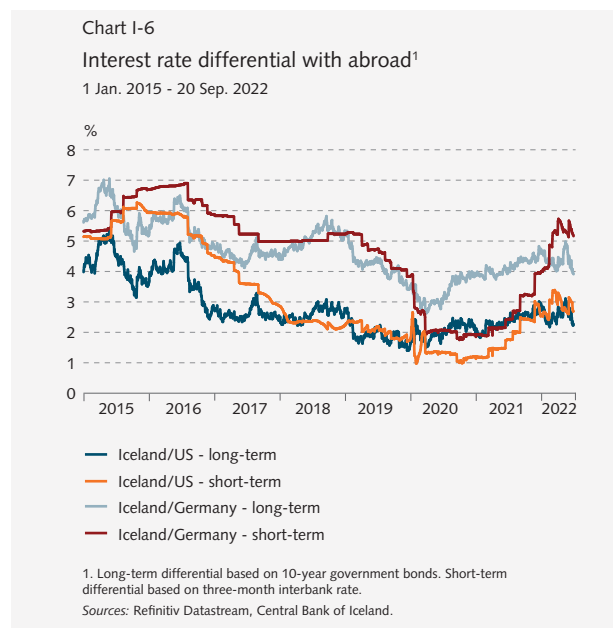
The foreign exchange market was stable over the summer. The króna held relatively steady versus the euro, and this summer's decline in the trade-weighted exchange rate is due primarily to the appreciation of the US dollar. Exchange rate volatility was modest, and the

Bank did not intervene in the market. Volatility increased marginally in September, however, and the Bank intervened twice in the market, selling foreign currency for a total of 6 b.kr. month-to-date. Turnover in the interbank foreign currency market was broadly in line with the monthly average for 2019 at the beginning of the year but then increased somewhat in the wake of the war in Ukraine. It declined again during the summer, however.



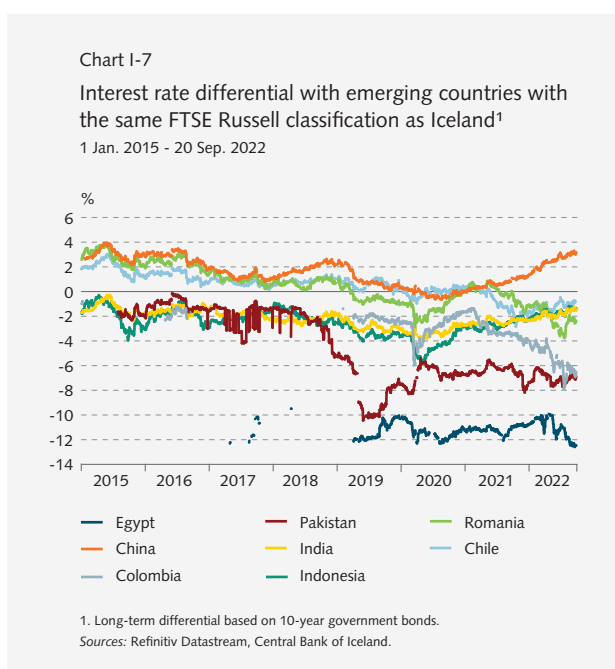
### Widening interest rate differential with abroad

The Central Bank's key interest rate has been raised by 3.5 percentage points in 2022 to date, somewhat more than the policy rates in the US and the euro area. The interest rate differential with abroad has therefore widened, at least for the short term.



<sup>3</sup> For further discussion, see *Monetary Bulletin* 2022/3.

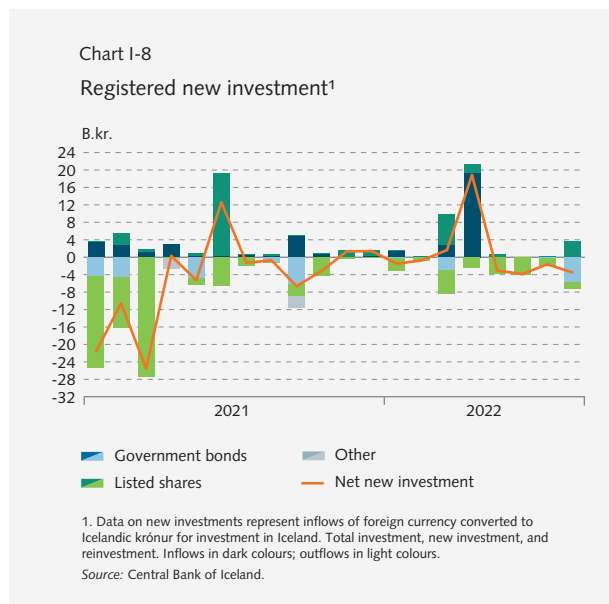
The wider interest rate spread since mid-2020 has not led to significant carry trade-related capital inflows as yet, but the likelihood of such inflows has increased. In comparison with other countries in the secondary emerging market according to FTSE Russell classification, Iceland's interest rate spread is negative in most cases. In 2015 and 2016, when foreign currency inflows were strong, the interest rate differential between Iceland and the aforementioned secondary emerging market countries was close to zero or slightly positive. A usual, developments further ahead will probably be governed to a large degree by expectations concerning short- and long-term developments in interest rates and the exchange rate of the króna.



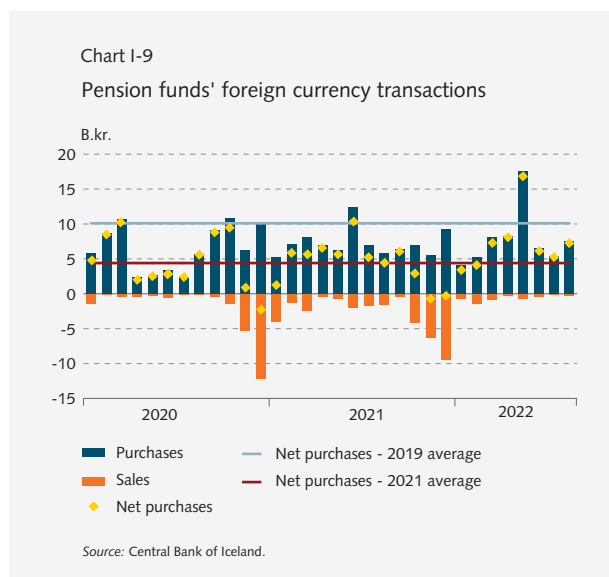
Non-residents invested in Treasury bonds for 18 b.kr. in April, which is somewhat high in historical context. As a result, net new investment was positive by 6 b.kr. over the first eight months of the year. Non-residents have mainly sold listed equities in 2022 to date, but as yet, the inclusion of 15 Icelandic companies in FTSE Russell's secondary emerging market index has affected data on foreign nationals' new investment in Iceland only to a limited degree. Non-residents' net inflows for investment in listed securities totalled 2.2 b.kr. in August.

### Pension funds' scope for foreign investment is increasing

This summer, the pension funds bought slightly more foreign currency than in the past two years, owing mainly to unusually large purchases in May. The share

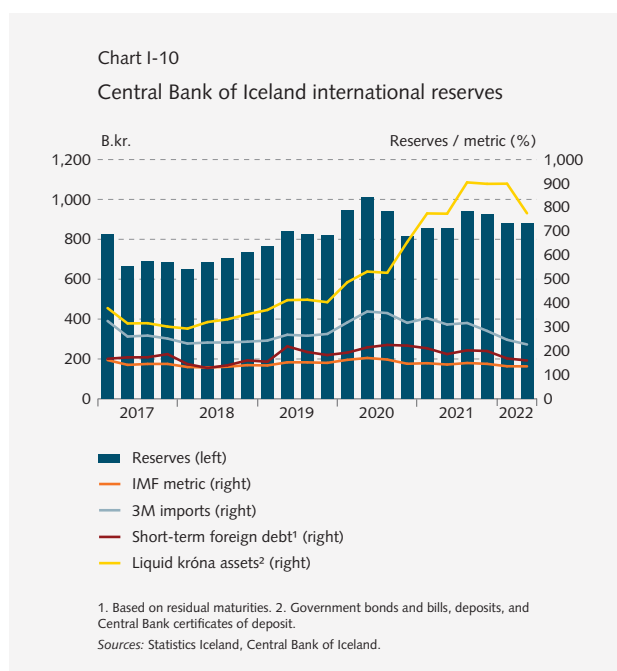


of foreign-denominated assets to total assets fell rapidly in H1/2022, due to falling prices in foreign markets and the appreciation of the króna. It peaked at nearly 38% at the end of 2021 but had fallen to 35% by end-July. As a result, the funds' scope to invest abroad for risk diversification purposes has increased relative to the statutory limit of 50%. Currently before Parliament is a bill of legislation raising the ratio incrementally to 65% in coming years and authorising the funds to exceed the maximum in cases of price and exchange rate movements. If it is passed into law, the funds' scope for foreign investment will increase still further. The funds' gross foreign currency sales have contracted since the bill was introduced this past March.



## Reserve adequacy ratio has fallen but is highly susceptible to exchange rate movements

The ratio of the Central Bank's international reserves to the International Monetary Fund's (IMF) reserve adequacy metric (RAM) was 136% at the end of Q2, or 15 percentage points lower than at year-end 2019. This ratio is relatively sensitive to exchange rate movements, but the recent decline is also attributable to the increase in foreign debt during the pandemic. Even though it has fallen, the international reserves are ample in terms of key reserve adequacy metrics.

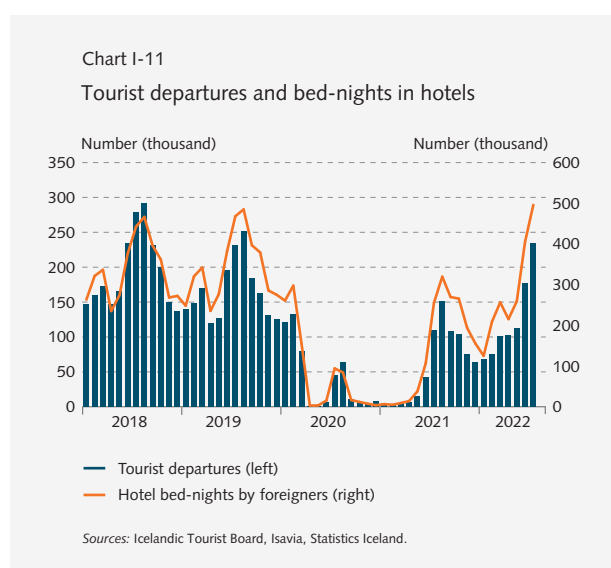


## Buoyant summer tourist season

The tourism industry has rebounded more rapidly in recent months than was expected at the beginning of the year. The outlook is for visitor numbers in 2022 as a whole to exceed the forecasts prepared this spring. According to the Central Bank's most recent macroeconomic forecast, some 1.7 million tourists will visit Iceland this year despite the war in Ukraine.<sup>4</sup> Between May and August, foreign nationals' departures via Keflavík Airport came to 95% of the total for the same period in 2019. Flight offerings over the summer months were comparable to those in 2019, and according to currently available schedules from the airlines that fly to Iceland, flight availability could well overtake 2019 by late 2022 and early 2023.

In spite of the large number of available seats, tourist numbers over the coming winter remain uncer-

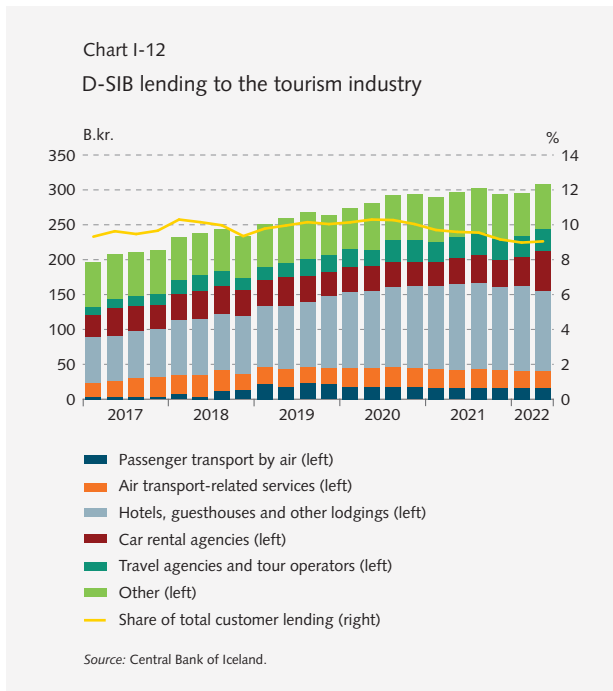
tain. Reduced household purchasing power in foreign countries and a darkening economic outlook in the wake of high inflation will probably dilute consumers' appetite for travel, potentially affecting the number of tourists visiting Iceland in coming months. For instance, the inflation outlook has worsened rapidly in the UK, which usually accounts for the largest nationality group among winter visitors to Iceland. It is also uncertain when public health measures will be lifted in Asia, and when Asian tourists will resume travel to Iceland in greater numbers.



Hotel bed-nights have increased markedly in recent months, concurrent with the rise in tourist arrivals. In July, bed-nights totalled nearly 600,000 (18% more than in July 2019), the largest single-month total since measurements began. The nationwide hotel occupancy rate was 88.9% in July. Occupancy rates have risen swiftly and were higher than in July 2019 in all regions of the country except the Suðurnes peninsula. Among Icelandic nationals, the number of hotel bed-nights was far higher than before the pandemic, and among foreign nationals the average has increased since 2019, according to border surveys taken by the Icelandic Tourist Board and Statistics Iceland.

The number of persons employed in tourism-related sectors has surged in 2022 to date. In May, some 29,000 people had tourism-related jobs, about 62% more than in May 2021. Despite the sharp increase in employee numbers in recent months, 53% of companies in transport, transit, and tourism considered themselves understaffed in June, according to Gallup's corporate survey.

<sup>4</sup> See Monetary Bulletin 2022/3.



### Growth in lending to tourism companies eases

Growth in the domestic systemically important banks' (D-SIB) lending to tourism companies has slowed markedly. Over the period from 2016 through 2019, lending to the sector grew in nominal terms by an average of nearly 18% per year, whereas in June 2022, year-on-year growth measured 3.7% (5.8% at constant exchange rates), but the modest appreciation of the króna over the period lowered the growth rate somewhat. At the end of June, the total amount of loans to the sector came to 308 b.kr., or 9.1% of the D-SIBs' total lending to customers and 20.2% of their corporate lending. Lending growth in the past few months is attributable to loans to car rental agencies, which have expanded their fleets again in response to rising tourist numbers.<sup>5</sup> Investment was limited in the tourism industry after the pandemic struck, apart from hotel construction projects that were already well underway. If the rapid rebound in the sector continues, investment could increase again – and lending growth likewise. Companies that accumulated debt throughout the pandemic could have difficulty taking on additional debt, however, particularly now that interest rates have risen.

### Aluminium prices softening

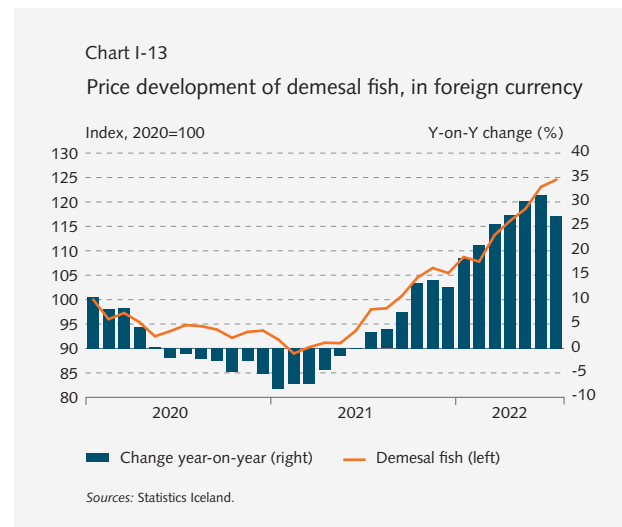
The global price of aluminium, like that of other commodities, rose steeply after the war broke out in Ukraine, but then sagged in Q2 as the global economic outlook

<sup>5</sup> Figures from the Icelandic Transport Authority indicate that as of the beginning of September, the rental car fleet had expanded by over 30% year-to-date.

deteriorated. The export price of aluminium products surged 61% year-on-year in H1/2022. Futures prices suggest that the pace of the year-on-year rise will ease further in H2 and that export prices will fall in 2023.

### Icelandic marine product prices up sharply in 2022 to date

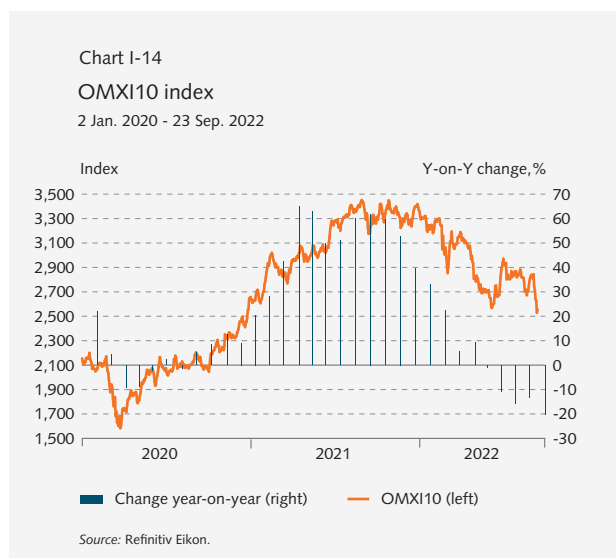
The price of Icelandic marine products, demersal fish in particular, has risen markedly in the recent term. In H1/2022, marine product prices in foreign currency rose by 21% relative to the same period in 2021. Russia was an important exporter of demersal fish, and restrictions on its access to the markets has boosted demand for Icelandic marine products. Demand appears to have weakened this summer, however, and prices are not expected to keep rising in the coming term. Although this year's sizeable capelin quota offsets the reduced total allowable catch (TAC) for cod, the outlook is for marine product exports to shrink in 2023, owing to a further contraction in cod fishing.



### Share prices continue to tumble

Global share prices have fallen widely thus far in 2022, in the wake of higher inflation, monetary tightening, and a bleaker economic outlook. The Euro Stoxx 50 index has fallen by 22.1% year-to-date. The US market has seen a similar trend, with the S&P 500 down 22.5% and Nasdaq down 25.1%. According to the VIX implied market volatility index, market volatility receded between June and mid-August but has picked up again since then.

Share prices of companies listed on the Nasdaq Iceland exchange have not been spared the effects of these global trends. The OMX110 has fallen nearly 25% year-to-date. The largest drop has been in the price of Marel shares, which are down 45% year-to-date. In



all, thirteen companies have seen their share prices fall this year, while nine have seen them rise, including four whose shares are up more than 10%: Ölgerðin, 21,3%; Síldarvinnslan, 18,2%; Brim, 14,2%; and Skeljungur, 13,1%

Hagar was replaced by Vátryggingafélag Íslands (VÍS) in the OMXI10 as of 1 July 2022, which comprises the ten companies with the highest turnover on the exchange. Three new companies have been listed on

Table I-1 Share price movements, companies listed on Nasdaq Iceland<sup>1</sup>

	Year-to-date	Year-on-year change, %
Eik	6.8	18.4
Reitir	5.3	25.2
Skeljungur	13.1	25.5
SVN	18.2	75.5
Sjóvá	-16.3	-9.7
Reginn	-9.3	10.9
Icelandair	-0.7	23.8
VÍS	-5.6	10.1
Brim	14.2	62.0
Hagar	3.0	11.2
Sýn	-8.4	50.0
Síminn	-7.8	2.4
Eimskip	4.6	24.0
Festi	-11.0	1.1
Íslandsbanki	3.2	12.1
Arion bank	-5.9	10.6
Kvika bank	-31.7	-18.3
Origo	-9.0	11.0
Marel	-44.8	-45.3
Iceland Seafood	-43.6	-50.9
Nova	-11.0	-11.0
Ölgerðin	21.3	21.3

1. Share prices are adjusted for dividend payments and share capital reductions.

Source: Kodiak Excel.

the market since the last *Financial Stability* report was published: Ölgerðin and Nova on the Main Market and Alvotech on the First North growth market. In Alvotech's case, the company is listed both in Iceland and on Nasdaq in New York.

Trading has increased on the Nasdaq Iceland exchange. In the first eight months of 2022, turnover totalled 719.4 b.kr., about 10.1% more than over the same period in 2021. The total trade count has also risen year-on-year, by 21.5%. Direct pledging of equity securities in the Icelandic market has increased as well. At the end of June, direct pledging totalled 13.2%, an increase of 2.5 percentage points year-to-date.<sup>6</sup> The pension funds hold about 33% of listed Icelandic companies in terms of market value. The assets are not pledged. As a result, direct pledging of shares held by owners other than the pension funds totals 25%, up from 17% at the end of 2021.<sup>7</sup>

### Icelandic equity market moved to FTSE Russell secondary emerging market category

Index company FTSE Russell decided in April to move Iceland to the secondary emerging market category from its frontier market category, where it had been since September 2019. The reclassification, which took effect on 19 September, could attract foreign capital to the Icelandic equity market, as far more funds invest according to secondary emerging market indices than frontier market indices. Fifteen companies on the Nasdaq Iceland Main Market were added to the FTSE Global All Cap index at the same time. In August, the company announced the reclassification of Icelandic companies as large-cap, mid-cap, small-cap, and micro-cap companies. Many of them were moved up to the next size classification. Arion Bank, Íslandsbanki, and Marel were moved up to the large-cap category, whereas previously no Icelandic firms had been in that category. Seven companies are classified as mid-cap firms, three as small-cap, and two as micro-cap.

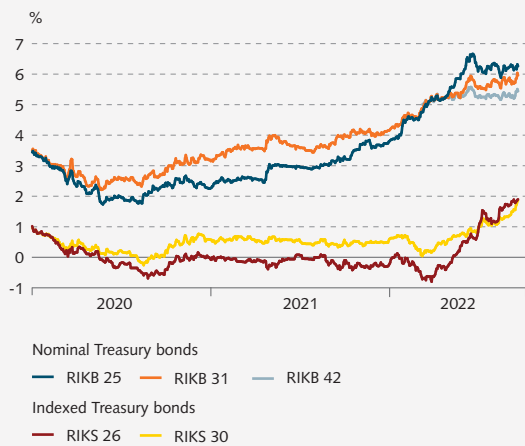
### Breakeven inflation rate falls

In general, domestic bond yields have risen since the last *Financial Stability* report was published in March, broadly in line with the tightening of the monetary stance. Other factors have also made an impact, including outflows

6 When direct pledges are considered; no account is given to general collateral in shares or indirect collateralisation via derivatives contracts. There are many signs that leverage in the market is somewhat higher, with pledging through forward contracts and short-term loans.

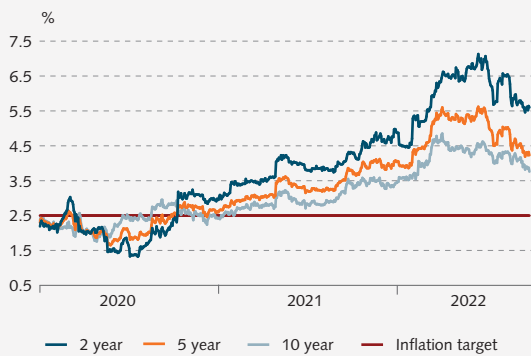
7 Direct pledging is the average percentage of pledged shares for all listed equities on both the Main List and the First North market, based on the relative market value of each company.

Chart I-15  
Treasury bond yields  
2 Jan. 2020 - 23 Sep. 2022



Source: Nasdaq Iceland.

Chart I-16  
Breakeven inflation rate  
2 Jan. 2020 - 23 Sept. 2022



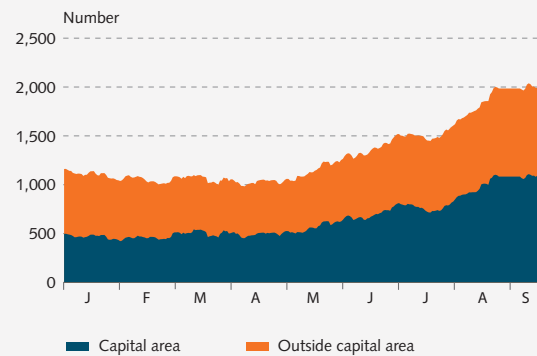
Source: Central bank of Iceland.

from UCITS funds. Nominal Treasury bond yields rose rapidly early in the year but have remained relatively stable since the Central Bank's June interest rate decision. Yields on indexed Treasury bonds have continued to rise, however, particularly on short-term bonds, which have overtaken long-term yields. The breakeven inflation rate in the bond market has therefore fallen in recent months. This may reflect investors' belief that monetary tightening has begun to make an impact, including on the real estate market, which has begun to settle down. As of mid-September, the two-year breakeven rate was 5,5% and had fallen by 1,5% since mid-June, and the five-year breakeven rate was 4,2% and had fallen by 1,3% over the same period. Bond market turnover totalled 842.3 b.kr. over the first eight months of 2022, an increase of 14% year-on-year. However it has contracted by 29% relative to the same period in 2020

### Housing market showing first signs of cooling ...

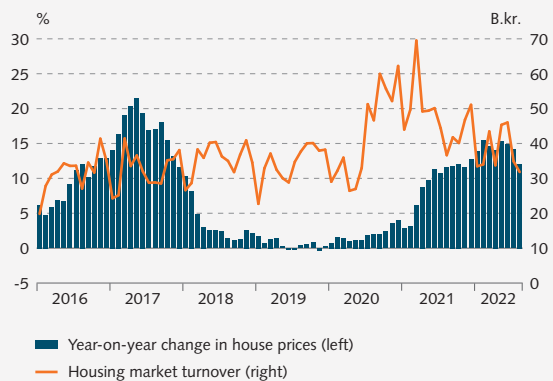
After a period of surging prices dating to the beginning of 2021, the first signs of cooling in the housing market have begun to emerge. Prices are high by nearly all measures, and access to credit has tightened with more stringent borrower-based measures and higher interest rates. The number of homes advertised for sale has risen markedly in the recent term, from about 1,000 nationwide in spring 2022 to more than 2,000 by mid-September. At the same time, the number of purchase contracts for residential property has fallen. The average time-to-sale has grown longer, measuring 57 days for capital area properties in August, after having bottomed out at 25 days in March. In regional Iceland, the trend is broadly similar, with the average time-to-sale measuring 76 days in August, up from 39 days in May.<sup>8</sup> The share

Chart I-17  
Number of listed properties for sale  
2022



Source: mbl.is real estate website.

Chart I-18  
Real house prices and housing market turnover in greater Reykjavík<sup>1</sup>



1. Housing market turnover, at constant December 2021 prices.

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

8 The average time-to-sale is calculated as the average number of homes advertised for sale each month divided by the number of purchase contracts in the same month.

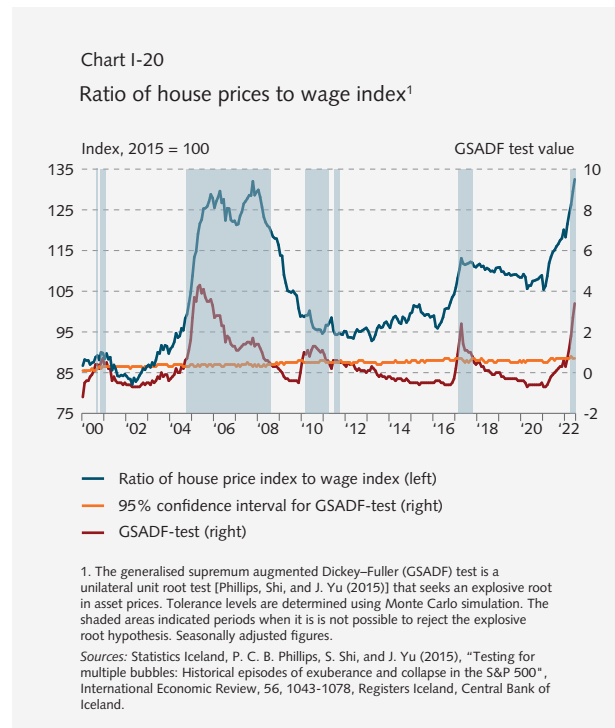
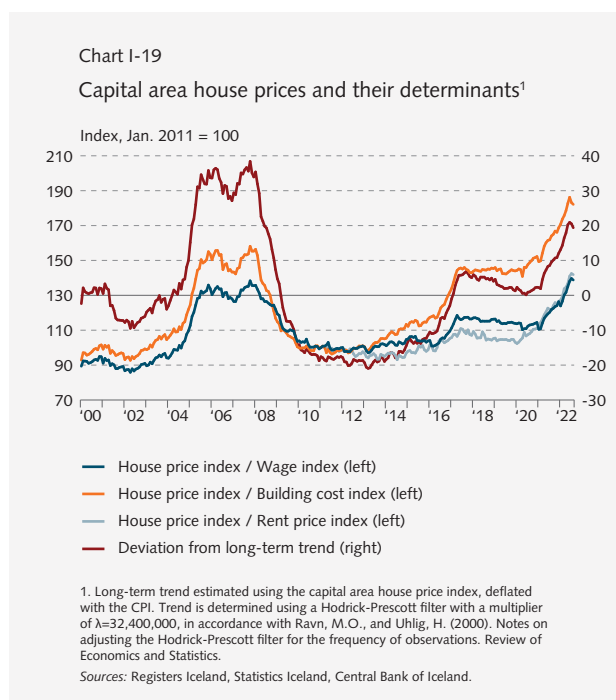


of homes that sold at a premium on the asking prices surged beginning in H2/2020, from about 10% to a peak of 65% in March 2022. It has been falling since then. In the same vein, the share of properties selling at more than 5% above the asking price has been falling rapidly. All of this indicates that tension in the housing market has eased after 18 months of soaring prices.

The year-on-year rise in the house price index measured 12.1% in real terms (23% in nominal terms) in August. The index has risen by 22.3% in real terms since year-end 2020, but fell slightly between months in August. It should be borne in mind that although the index is published on a monthly basis, each measurement is based on purchase agreements concluded in the previous three months; therefore, changes in house prices are not fully captured by the index in a single month. Despite a contraction relative to the previous year, housing market turnover has been historically high. In the first eight months of 2022, turnover in the capital area contracted in real terms by nearly one-fourth year-on-year. The number of purchase contracts declined by 33% over the same period.

### ... and the likelihood of a correction has increased

In H1/2022, the house price index continued to rise in excess of fundamentals. The ratio of house prices to the wage index had risen by over 16% year-on-year at the end of July and is at its highest since the turn of the century. The ratio of house prices to combined national disposable income has also been on the rise recently, particularly in terms of disposable income relative to the number of



working-age persons. Furthermore, house prices have risen far in excess of construction costs since H2/2020.

Imbalances between purchase prices and rent prices have grown significantly, as rent has fallen in real terms over the past few years. The ratio of house prices to rent prices has risen nearly 17% year-on-year in August, and nearly 40% since the beginning of 2020. Higher financing costs, increased short-term rental to tourists, inward migration, and other factors that stimulate demand for rental housing will probably put greater upward pressure on rent prices in the coming term.

The deviation in the capital area house price index from its long-term trend measured about 19% in August. This is a marginal decline relative to previous months, but at that time the deviation from trend was at its largest since the 2008 financial collapse. The deviation has grown by more than 17 percentage points since the beginning of 2021. The GSADF test is another common method used to determine whether assets are overpriced relative to fundamentals.<sup>9</sup> Since March 2022, the GSADF test for the ratio of house prices to the wage index has indicated bubble formation in the residential property market.

9 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. The test is carried out on a time series considered descriptive for the asset prices in question and, all else being equal, should fluctuate around a given equilibrium value. Tolerance levels for the test are determined using Monte Carlo simulation. If the GSADF test value is above the tolerance level, it is not possible to reject the explosive unit root hypothesis based on a given tolerance level.

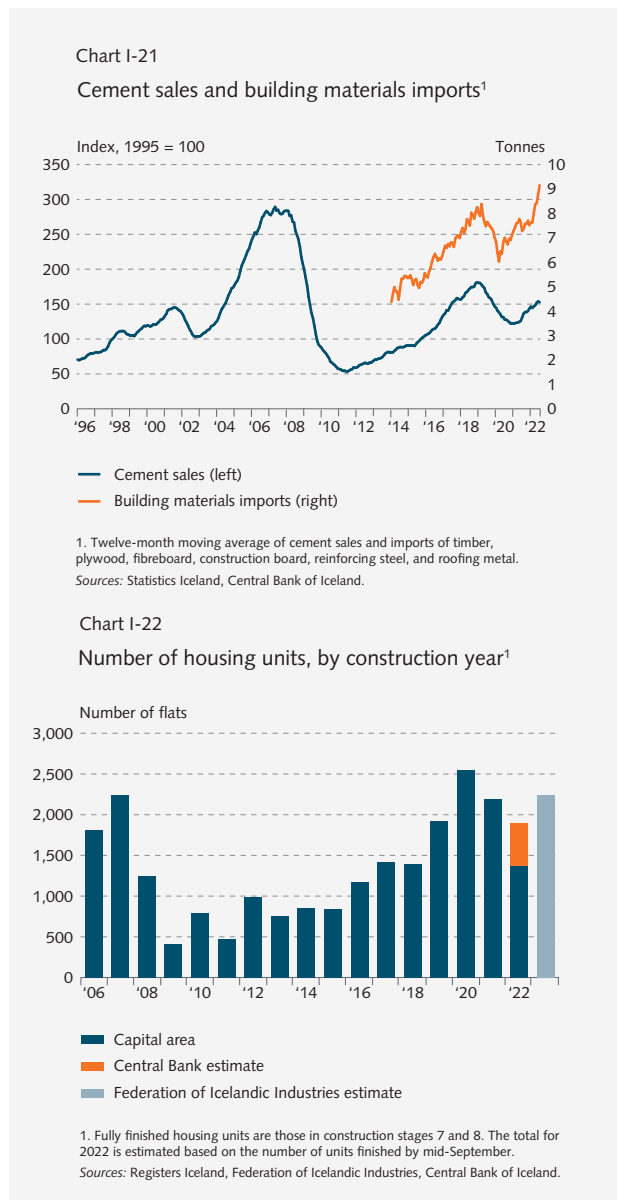
The past several months' steep rise in house prices over and above fundamentals indicates severe imbalances in the market. The likelihood of a correction in the housing market has increased even further since the March *Financial Stability* report. As is noted above, the first signs of cooling have begun to emerge. It is difficult to predict whether a potential correction will be relatively rapid, with falling nominal prices, or whether nominal prices will remain flat and real prices will fall until the market has rebalanced.

### Brisk activity in the construction sector

Construction industry turnover has increased significantly since the beginning of 2021, and the market appears relatively strained, in line with strong demand for residential housing. Over the first six months of 2022, turnover grew by nearly one-fifth year-on-year in real terms.

Steeply rising input prices and supply chain bottlenecks following Russia's invasion of Ukraine may have delayed residential construction, but even so, imports of building materials are very strong. Furthermore, unemployment in the construction sector is very low, and there are signs of persistent labour shortages.<sup>10</sup>

The number of fully finished homes will probably contract in 2022 as compared with previous years. Based on the number of new homes in the first nine months of the year, it can be assumed that nearly 1,900 housing units will be placed on the market in greater Reykjavik this year, as compared with just under 2,200 in 2021. Even though this represents a decline between years, the number remains somewhat above its ten-year average. According to the tally carried out by the Federation of Icelandic Industries in February and March, first-time buyers number of homes in early stages of construction has increased markedly since the September 2021 tally. As a result, the number of new, fully finished housing units in greater Reykjavik can be expected to rise again in 2023.



### Elevated housing market risk has called for a response from the Financial Stability Committee

According to the minutes of the Financial Stability Committee's (FSN) June meeting, the real estate market situation gave cause for concern, and the Committee was of the view that stagnation or a correction of real prices had grown more likely. The FSN was also of the opinion that signs of bubble formation in the residential housing market had come to the fore. The position of first-time buyers was cause for particular concern. Rapidly rising house prices had proven onerous for this group of buyers, whose average loan-to-value (LTV) and debt service-to-income (DSTI) ratios had risen. In order to counteract increased systemic risk and safeguard resilience, the FSN therefore decided to lower the maximum LTV ratio for first-time buyers from 90% to 85%.<sup>11</sup>

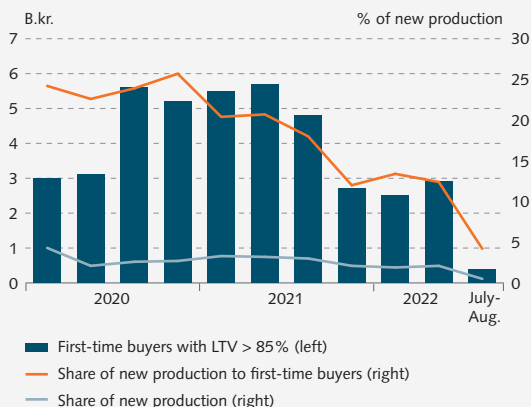
The FSN also decided at its June meeting to refine the recently introduced Rules on Maximum Debt Service-to-Income Ratios on Consumer Mortgages. Interest on indexed loans had fallen at the same time as non-indexed interest rates had risen, widening the differ-

10 A recent survey among executives from large Icelandic construction firms, carFederation of Icelandic Industries estimate, indicated that tonnes every three companies in the sector consider worker shortages a hindrance to their company's growth. A shortage of lots for new construction has also had a dampening effect on residential construction, according to the survey.

11 For further information, see the minutes of the FSN meeting, published on [the Central Bank website on 1 July 2022](#).



Chart I-23  
New consumer mortgages to FTBs with high LTV<sup>1</sup>



1. All new mortgage loans issued by systemically important banks and Housing and Construction Authority. The nine largest pension funds are included from August 2020 onwards. Latest data is preliminary.  
Sources: Central Bank of Iceland.

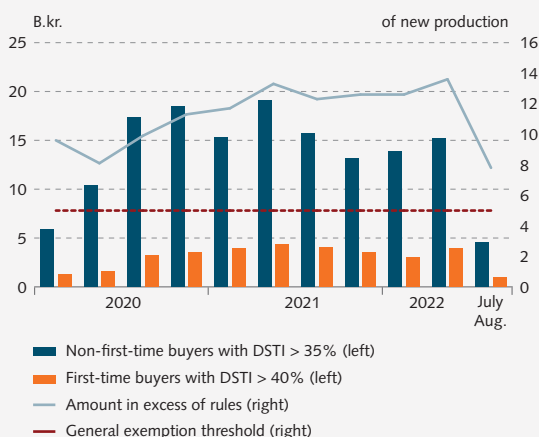
ence between debt service on different loan types at the beginning of the loan period. The Committee therefore considered it necessary to amend the rules and introduce an interest rate reference so as to equalise the minimum requirements for these loan types. According to the amendment, in calculating debt service, the reference interest rate is subject to a minimum of 3% for indexed loans and 5.5% for non-indexed loans. If the contractual interest rate is higher, it shall be used as the reference. Furthermore, for the purpose of calculating debt service, the maximum permissible maturity for indexed loans was

shortened from 30 years to 25. When the amendments were announced, it was strongly emphasised that they were intended both to enhance borrowers' awareness of the risk attached to indexed loans and to safeguard borrowers' resilience against rising debt service over the term of the loan.

In order to estimate the impact of the amendments on access to credit, it is possible to examine the effect they would have had if they had been introduced earlier. From mid-2020 until Q3/2021, about 20-25% of the face value of loans to first-time buyers had an LTV ratio over 85%. From then on the proportion declined to 12-15% from Q4/2021 until Q2/2022. Preliminary data for June and August 2022 indicate that the ratio fell rapidly after the new rules took effect.<sup>12</sup>

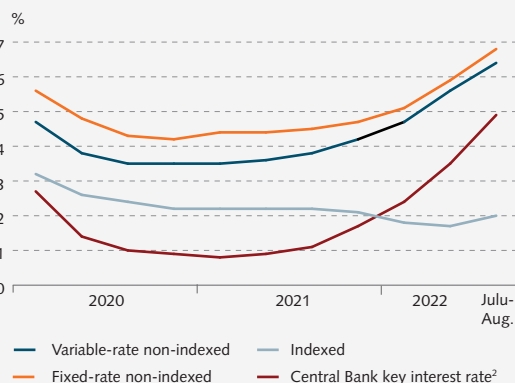
If the amended rules on DSTI calculation had been in place over the past year, they would have affected about 10-12% of loans granted. In the rules, however, lenders are granted a general exemption that allows them to bypass the restrictions for up to 5% of the combined face value of all new loans issued in each quarter. As a result, it is likely that the amendment would have affected roughly 5-7% of the past year's issued loans. The most recent data, from July and August, indicate that the share of loans with a high DSTI is falling rapidly. In this respect, the rules are affecting the market with very little time lag.

Chart I-24  
Effects of DSTI rules<sup>1</sup>



1. All new mortgage loans issued by systemically important banks and Housing and Construction Authority. The nine largest pension funds are included from August 2020 onwards. Debt service of borrowers based on arithmetic allowances according to Rules no. 701/2022 on Debt-Service-to-Income. Latest data are preliminary.  
Source: Central Bank of Iceland.

Chart I-25  
Weighted interest rates on new consumer mortgages<sup>1</sup>



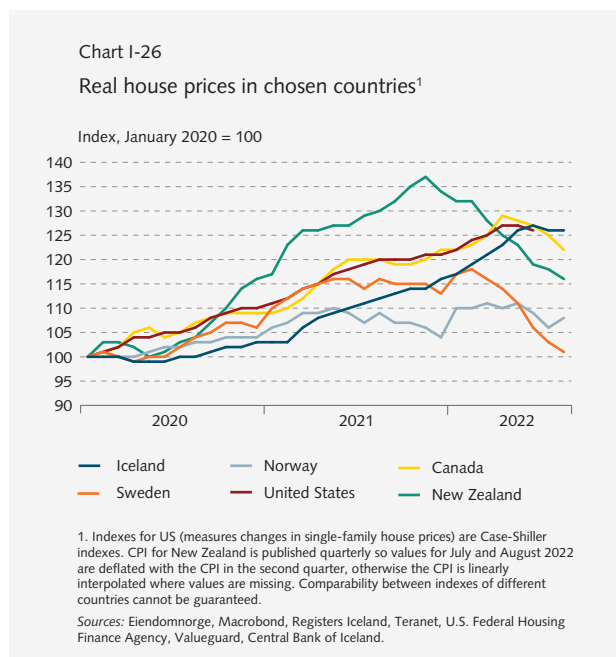
1. All new mortgage loans issued by systemically important banks and Housing and Construction Authority. The nine largest pension funds are included from August 2020 onwards. 2. Average key interest rate for each quarter.  
Source: Central Bank of Iceland.

<sup>12</sup> Lenders were allowed to complete applications already in progress without regard to the rules; therefore, the ratio did not fall to 0% after the rules took effect.

In addition to these measures, the Central Bank has raised its key interest rate. This has led to rising non-indexed mortgage rates and has tightened access to such loans. The weighted average interest rate on new non-indexed mortgages with fixed interest rates was 5.9% in Q2/2022, as compared with 5.1% in Q1.<sup>13</sup> Variable rates on new non-indexed mortgages also rose markedly between quarters, or by 0.9 percentage points. Non-indexed rates have continued to rise in Q3, in line with Central Bank rate hikes, according to preliminary data for July and August. Indexed interest rates have fallen in the recent term, however. The weighted average interest rate on new indexed mortgages was 1.7% in Q2 and had fallen by 0.1 percentage points between quarters. This trend has reversed in the past few months, and the lowest listed fixed rates on indexed mortgages from the D-SIBs have risen somewhat since June.

### House prices have fallen in some countries

House prices have surged in many parts of the world since the beginning of 2020. But in some countries, the trend has reversed and nominal prices have started to drop. The handiest examples are Norway and Sweden. In Norway, the house price index has fallen by 2% in real terms (0.1% in nominal terms) since May, while in Sweden it has fallen by 14.5% in real terms (8.7% in nominal terms) since February. House prices in New Zealand have fallen as well: real prices are down 15% and nominal prices by 12% since November 2021.



<sup>13</sup> The weighted average interest rate is calculated based on the rate on new loans issued each quarter and weighted using the face value of each loan.

House prices soared in New Zealand after the pandemic reached the country, particularly after the Reserve Bank of New Zealand lowered its key interest rate from 1% to 0.25% and introduced quantitative easing and other measures to support the economy during the pandemic. House prices in New Zealand peaked in November 2021 but at that time prices had risen 20% between years in real terms. The Reserve Bank began hiking interest rates in autumn 2021 and has now raised them by a total of 2.75 percentage points. The tighter monetary stance appears to have had a strong impact on the housing market in New Zealand.

In many ways, developments in these three countries have resembled those in Iceland in the past few months: mortgage lending rates have risen and housing market activity has eased. The US and Canada are also showing signs of a turning point, with house price inflation losing momentum and turnover falling in recent months. This is due in part to interest rate hikes. In the US, mortgage lending rates had risen to 6% by August, from 3.5% at the turn of the year, while in Canada they were 4.4% in June, up from 1.9% at the beginning of the year.<sup>14</sup> It is likely, however, that an uncertain economic outlook and declining real wages have also contributed to the trend.

### Commercial property prices high, turnover rising

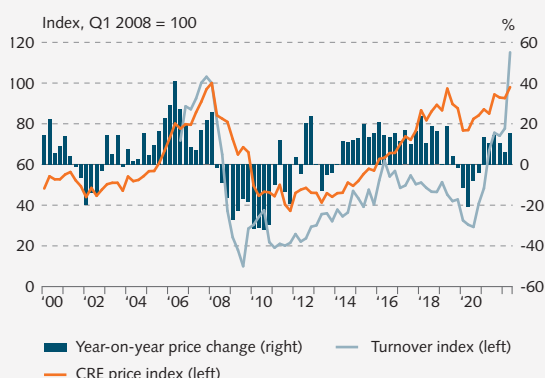
The capital area commercial real estate (CRE) price index was up 15.3% year-on-year at the end of Q2/2022.<sup>15</sup> It is now close to its highest level since the beginning of 2008 and is 17.7% above its long-term trend. In H1, it had risen considerably relative to construction costs and GDP as a share of the size of the housing stock, and the ratios were well above their 21st-century average. The rise in the index still appears to be driven by demand, partly as a result of increased corporate revenues and lower interest rates during the pandemic. Recent interest rate hikes should keep further price increases in check, however. Turnover in registered CRE transactions nearly doubled year-on-year over the first seven months of 2022, and at the end of Q2, real twelve-month turnover was at its highest since measurements began. Turnover in regional Iceland has also increased relative to previous years.

<sup>14</sup> For the US, the rate in question is the 30-year fixed mortgage rate from the Federal Home Loan Mortgage Association (Freddie Mac): 30-Year Fixed-Rate Mortgage Average in the United States [MORTGAGE30US], retrieved from the Federal Reserve Bank of St. Louis' FRED database on 22 September 2022. The rate for Canada is the five-year fixed mortgage rate as shown in Chart 1-A; see *Financial System Review* (2022), Bank of Canada.

<sup>15</sup> The most recent CRE price index value is preliminary and could change if purchase contracts are registered late.

Chart I-27

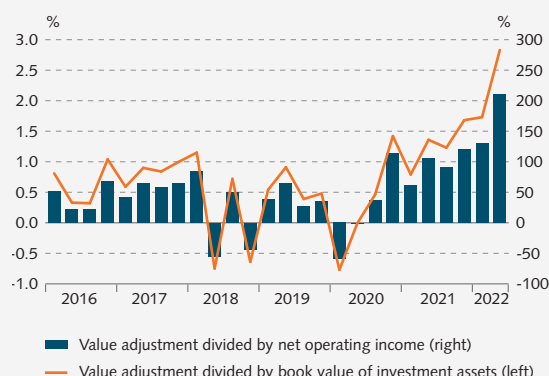
Capital area commercial real estate: real prices and turnover<sup>1</sup>



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

Chart I-28

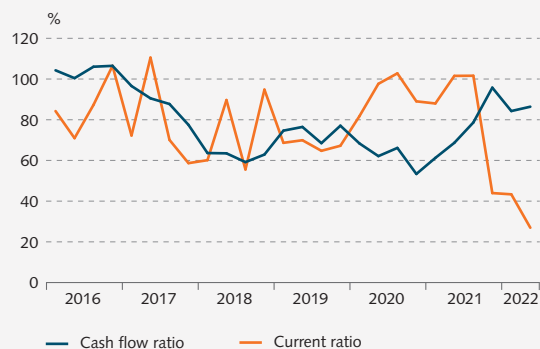
Value adjustment of investment assets<sup>1</sup>



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.

Chart I-29

Measures of main CRE-firms' liquidity position<sup>1</sup>



1. Combined ratios for CRE-firms Eik, Reginn and Reitir. The current asset ratio is the ratio of current assets over current liabilities. The cash flow ratio is the ratio of annualised free cash flow from operations over current liabilities. For the cash flow ratio, a four quarter moving average is shown.  
Sources: Annual and interim financial statements from Eik, Reginn, and Reitir, Central Bank of Iceland.

The nationwide CRE stock grew by just under 1% over the first eight months of the year. The number of square metres under construction (in construction stages 1-6) has increased somewhat since the beginning of the year, as more office and retail, industrial and warehouse space is being built. The number of square metres of hotel space under construction has continued to fall after surging in recent years.

**Large CRE firms well positioned, but liquidity position is deteriorating**

Operations at the large CRE firms (Eik, Reginn, and Reitir) indicate a relatively favourable outlook for the commercial property market. The companies' return on investment assets measured 5.3% in H1, and their return on equity was historically high. In H1, they continued to capitalise upward valuation adjustments of investment assets, which stem from the rising general price level year-to-date.<sup>16</sup> The share of vacant investment assets is low in historical context, and the companies have stepped up their investment during the year.

The large CRE firms refinanced a large share of their debt between mid-2020 and end-2021, but their bond issuance has been limited in 2022, as interest rate terms in the market have worsened. In addition to bolstering the book value of investment assets, higher inflation in 2022 has pushed the companies' cost of capital higher, particularly because of higher indexation on indexed debt. The three firms' combined equity ratio declined

marginally in Q2, mainly because of dividend payments and share buybacks, and hypothecation of their asset portfolios has also fallen slightly. Their liquidity position deteriorated in H1, as higher instalments on long-term debt maturing within twelve months have lowered their current ratios and cash flow ratios.

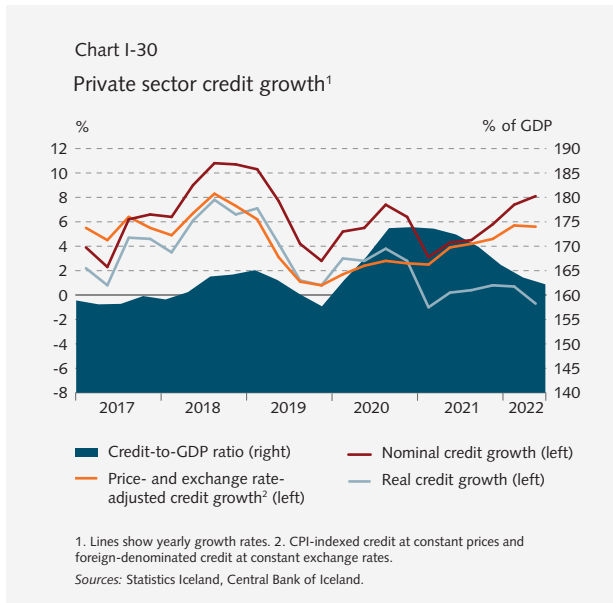
**Changes in private sector credit developments**

Private sector debt contracted in real terms by 0.8% year-on-year in Q2/2022. Developments in household and corporate debt have changed, with household credit growth losing pace as real estate market activity eases, while corporate credit growth has picked up, after having been negligible since 2019.

Private sector debt totalled 162% of GDP at the end of Q2, after a decline of over 10 percentage points

<sup>16</sup> Nearly all of the large CRE firms' leases are price-indexed; therefore, higher inflation boosts their future leasing revenues in krónur terms.

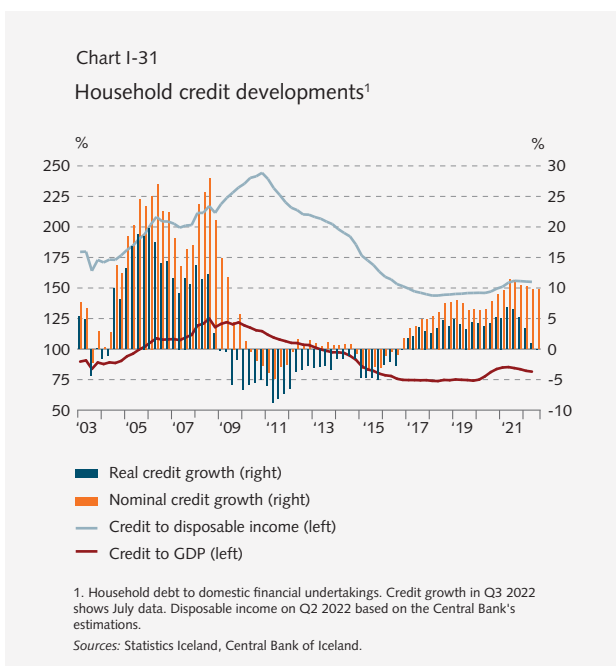
year-on-year, as nominal GDP grew faster than the nominal value of the debt.



### Household credit growth has eased

Household debt measured 81.5% of GDP at the end of Q2, nearly 4 percentage points lower than at the same time in 2021. The ratio of household debt to disposable income was 155%, which is low in historical context and marginally lower than at the time of the spring *Financial Stability* report.

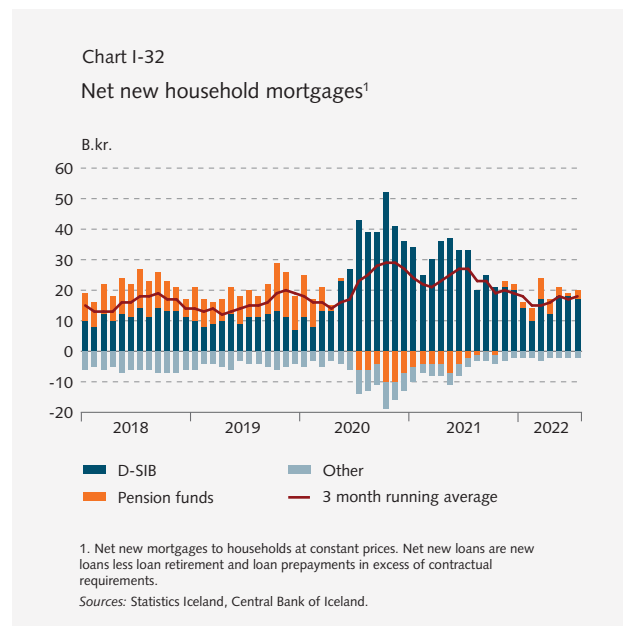
The pace of household credit growth has eased in the wake of interest rate hikes and tightened borrower-based mortgage loan measures. The year-on-year change in debt owed by households to domestic financial institutions measured -0.1% in real terms at the end



of July, as opposed to 5.1% at the beginning of the year. Nevertheless, nominal household debt is rising rapidly, owing in part to higher inflation, as 46% of household debt is indexed to the CPI.

New lending to households has contracted sharply after peaking in H2/2020. Net new mortgage loans issued to households totalled 18.5 b.kr. in July, as compared with nearly 33 b.kr. in October 2020.<sup>17</sup> In recent months, developments in the mortgage lending market have been similar to those during the pre-pandemic period. Other household debt – such as student loans, car loans, and overdraft loans – has increased only a little. There are signs of an uptick in overdraft loans this summer, however, as well as an increase in car loans.<sup>18</sup>

Household credit growth is likely to contract still further in coming months. The Central Bank's key interest rate was raised in August, and the impact of that rate hike has not yet shown in full in the data. Furthermore, the results of the Bank's lending survey, taken in August, indicate that demand for household mortgages could decline in the near future.



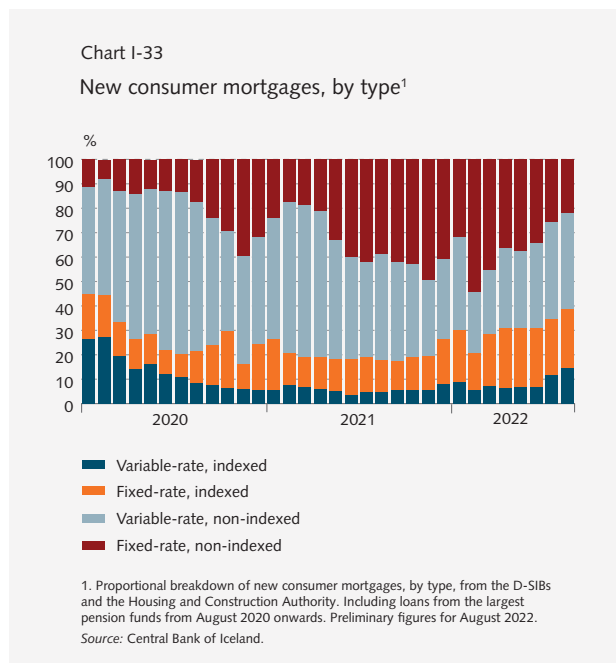
### Non-indexed lending rates rise

Interest rates on new non-indexed mortgages have risen markedly in 2022, and in July, the weighted average rate on new non-indexed loans from the domestic systemi-

<sup>17</sup> Net new loans are new loans less debt retirement and prepayments in excess of contractual requirements.

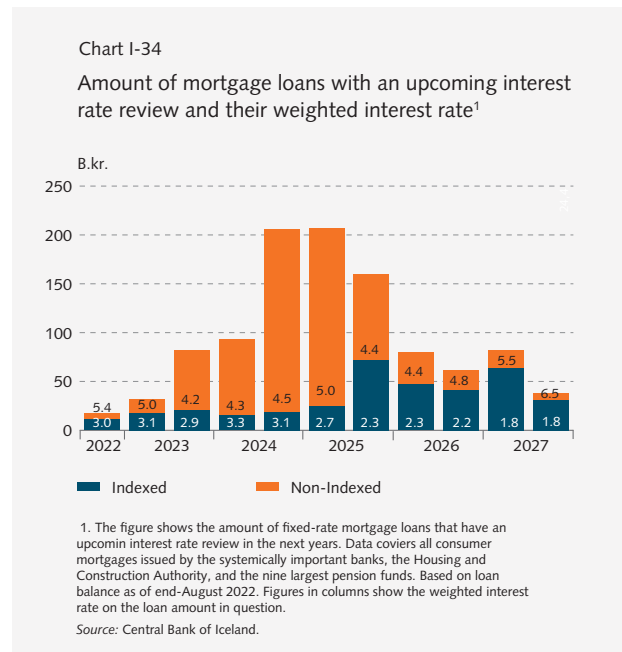
<sup>18</sup> Data on the Bank's website on new banking system lending show a significant increase in car loans to households since the beginning of 2021. This is due in large part to the merger of Kvika and Lykill in March 2021. Prior to the merger, Lykill had not been included in the dataset, as it was not a deposit-taking institution and therefore not part of the banking system.

cally important banks (D-SIB) was higher than in March 2020, at the onset of the pandemic. Interest rates on indexed loans have behaved very differently, however. The weighted average rate on new fixed-rate indexed loans bottomed out in June and then rose marginally in July. Various lenders have announced a further increase in indexed lending rates in recent weeks, however. Household demand for indexed mortgages has grown in recent months, particularly among first-time buyers. Retirement of indexed loans still exceeded new lending in July, however.



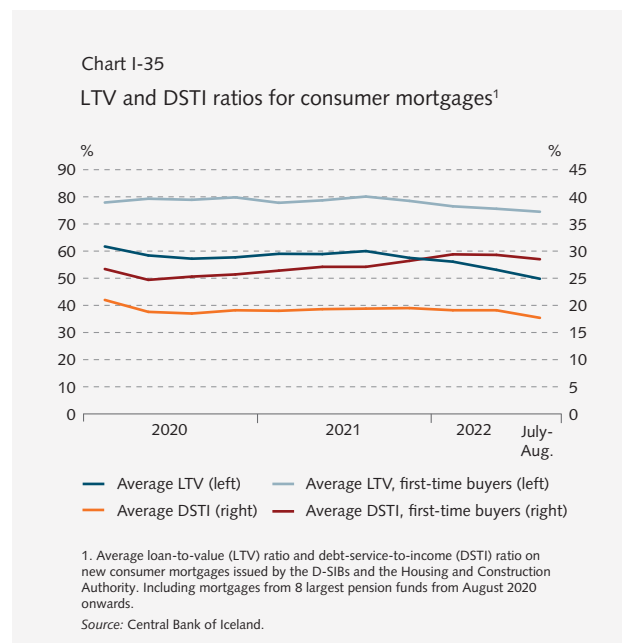
Non-indexed loans increased as a share of new mortgages in 2020, and many households took advantage of low interest rates to take additional debt, including for real estate purchases, or to refinance existing debt, some of it indexed. Non-indexed mortgages typically bear variable interest or have a fixed-interest period of either three or five years. Non-indexed interest rates on loans granted during that period will be up for review in the next few years. Chart I.34 shows that the outstanding stock of non-indexed mortgages up for interest rate review in 2023 and 2024 will total just over 340 b.kr., including nearly 190 b.kr. in H2/2024. Another 250 b.kr. will be up for review in 2025. These loans were issued on considerably more favourable terms than are currently offered for comparable loans. All else being equal, households carrying this debt will have to take on an increased debt service burden when the interest rate review takes place. Otherwise, they will have to take other action where possible so as to lower debt service; i.e., by lengthening their loan maturities or

amending the loan terms in some other way. This could prompt an increased number of households to shift to indexed loans, which have a lower debt service burden in the early part of the loan period than comparable non-indexed loans do.



### Quality of new loans have improved

The average loan-to-value (LTV) ratio on new mortgage loans has been on the decline in the recent term, in tandem with reductions in the maximum permissible LTV ratio. This applies both to all new loans combined and to those issued to first-time buyers. The average debt service-to-income (DSTI) ratio on all new mortgages com-





bined had held virtually unchanged over the past two years up until Q2 this year but has lowered somewhat in the most recent months, measuring 17.7% in August. For first-time buyers, however, the DSTI ratio rose more or less steadily, in line with rising house prices, until Q2, but has declined since. The combination of tighter rules on maximum DSTI ratios, developments in the property market, and rising interest rates has contributed to a decline in the average DSTI for first-time buyers in recent months. The impact of more stringent borrower-based measures is discussed in greater detail earlier in this chapter, in the section on the residential housing market.

### Banks gained mortgage lending market share during the pandemic

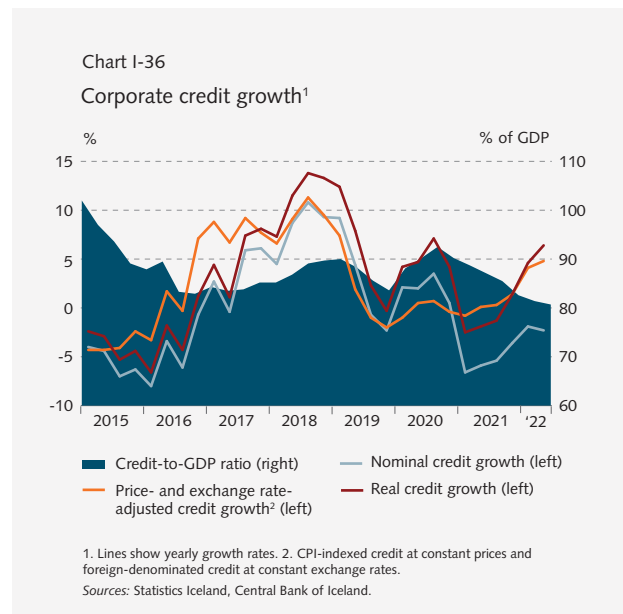
The commercial banks' share of the mortgage lending market has increased substantially in recent years, to 72% of the outstanding mortgage stock as of end-July. At that time, the pension funds' market share was just over 22%, some 8 percentage points below its 2020 peak. Pension funds' lending has been on the rise in recent months, and many funds now offer terms that are comparable to or better than those offered by the banks. Nevertheless, according to the Central Bank's lending survey, conducted in August, the banks do not expect increased competition in the mortgage lending market in coming months.

### Surge in D-SIBs' corporate lending

Corporate debt shrank by 2.4% year-on-year in real terms at the end of Q2.<sup>19</sup> In price- and exchange rate-adjusted terms, however, it grew by 4.8%. Just over a third of total corporate debt is in foreign currencies. Of that third, 53% is denominated in euros, 43% in US dollars, and 4% in other currencies. Divergent developments in the exchange rate of the euro and the US dollar versus the króna over this period mitigated the impact of exchange rate movements on measured credit growth. Corporate debt came to 80.5% of GDP at the end of Q2, or 6.6 percentage points lower than at the same time in 2021. This is Iceland's lowest corporate debt-to-GDP ratio since 1998.

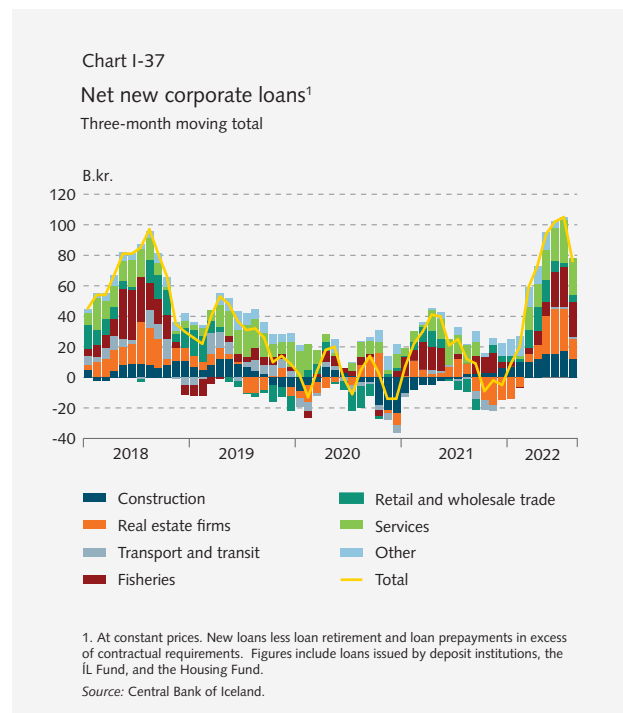
Demand for corporate loans picked up strongly at the beginning of 2022, and the commercial banks have responded by stepping up lending in recent months, particularly to small and medium-sized enterprises (SME). Cumulative net new loans issued to businesses in 2022 totalled 191 b.kr. as of August, as compared with only 60 b.kr. in 2021 as a whole. The trend extends to all key

<sup>19</sup> Debt owed by non-financial companies to domestic and foreign financial institutions, and issued marketable bonds.



segments of the economy, although it is most prominent in the construction, real estate, and services sectors. The pace of new corporate lending in 2022 to date is somewhat brisker than in 2017 and 2018, when it was considered relatively strong. According to the Central Bank's lending survey from August, the commercial banks do not expect demand for corporate loans to contract in coming months.

Corporate bond issuance in 2022 totalled just over



30 b.kr. in July, which is on a par with the same period in 2021. Real estate firms and fisheries are the most active bond issuers thus far in 2022. Growth in corporate lend-

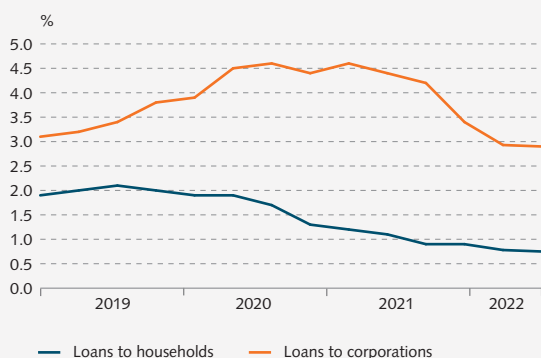
ing by institutional investment funds has been moderate year-to-date, at just over 6% in nominal terms.

### Private sector debt moderate, arrears limited ...

Households and businesses are resilient, on the whole. The domestic systemically important banks' (D-SIB) non-performing household loan (NPL) ratio was below 0.8% at the end of Q2/2022, after having fallen marginally between quarters. The D-SIBs' corporate NPL ratio declined as well, to just under 2.9%, which is rather modest in historical terms. Corporate arrears were generally low, apart from the accommodation and food service sector, where the NPL ratio was 8.6%. The NPL ratio in the sector has, however, fallen rapidly from 15.1% in Q2/2021.

Chart I-38

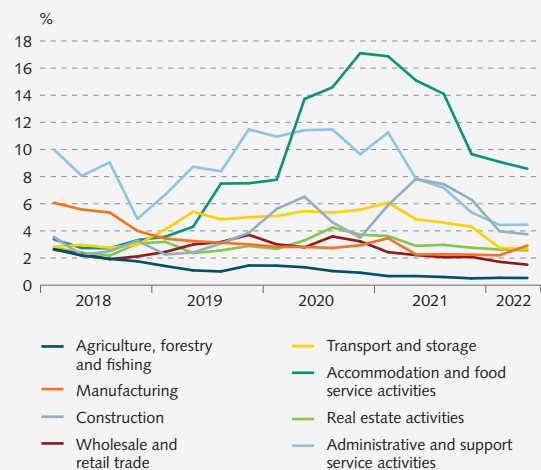
Non-performing loan ratios on D-SIBs' loans to households and non-financial corporations<sup>1</sup>



1. Consolidated figures for D-SIBs. NPL ratio according to EBA standards. Source: Central Bank of Iceland.

Chart I-39

Non-performing loan ratios on D-SIBs' loans to non-financial corporations by sector<sup>1</sup>



1. Consolidated figures for D-SIBs. NPL ratio according to EBA standards. NACE sector classification. Source: Central Bank of Iceland.

Wages have risen considerably, and in June the general wage index was up 8.1% year-on-year in nominal terms. Households have stepped up their consumption spending significantly, and year-on-year private consumption growth measured 13.5% at the end of Q2. Furthermore, the labour market situation is favourable for households. Unemployment is low and has been falling, with registered unemployment measuring only 3.2% at the end of July.

Corporate executives have been somewhat optimistic, and despite rising interest rates, demand for credit has surged in recent months. Business investment excluding ships, aircraft, and energy-intensive industry and related sectors was up 23.4% year-on-year in real terms in Q2/2022, and as is mentioned in *Monetary Bulletin 2022/3*, the share of firms that consider themselves short-staffed and the share of firms operating at full capacity has seldom been higher.

### ... but price and interest rate hikes could test some groups' resilience

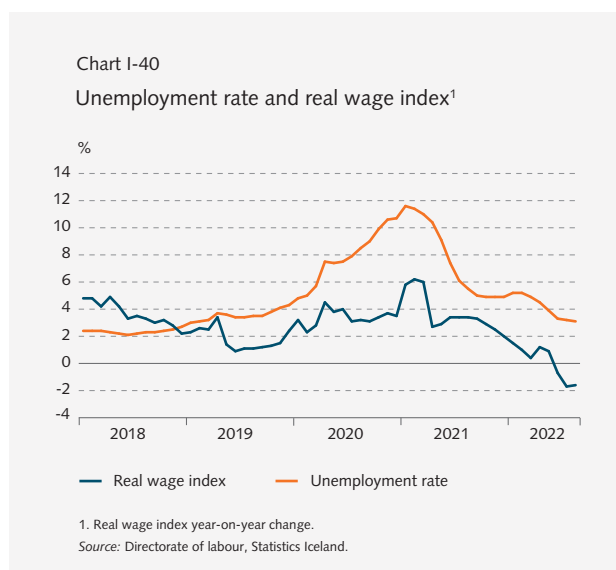
Even though numerous indicators suggest that households and businesses are generally well positioned, there are signs that resilience is under pressure. Interest rate hikes have pushed many households' and businesses' debt service higher, and it could rise further still. In addition, high inflation has increased households' expenses, and in June the real wage index declined year-on-year for the first time since May 2010. Furthermore, uncertainty about the economic outlook has grown, not least in foreign markets.

About 28% of outstanding mortgages are non-indexed floating-rate loans, and the interest burden on these loans has already risen sharply. For example, the weighted average interest rate on new residential mortgages issued by the banks was 3.7% in July 2021, whereas a year later it had risen to 6.6%. For a non-indexed variable-rate annuity loan with a 40-year maturity, such an increase in interest rates pushes monthly debt service upwards by 77,000 kr., or nearly 48% of the original debt service on the loan. As is noted earlier in this chapter, interest rate reviews are drawing closer for a number of non-indexed loans with a specified fixed-interest period. When that time comes, the debt service on these loans will presumably increase.

But it is worth remembering that a share of households have mixed mortgages that are composed of two or more loans with differing terms. For example, a mixed loan could include a non-indexed and an indexed component, and/or a fixed-rate and a variable-rate component. Mixing loan types can diversify risk and provide

a cushion against the impact of nominal interest rate hikes on debt service. Households with mixed mortgages are therefore protected to a degree from the effects of rate hikes, although such protection varies according to the loan components selected. It is also worth noting that many properties bought in recent years have risen steeply in value. Furthermore, real rates on non-indexed mortgages have been negative for quite some time. These two factors have laid the foundations for strong equity growth among home-owning households.

However, if inflation proves more persistent than is currently assumed and if the monetary stance must be tightened still further, there is the risk that certain groups of households and businesses could find themselves in financial distress, particularly if this goes hand-in-hand with weaker GDP growth and higher unemployment. Such a situation could lead to increased arrears in the banking system.



### The financial cycle and cyclical systemic risk

Developments in private sector debt and house prices, as well as in banking system funding (discussed in Chapter II), indicate that the financial cycle was still in an upward phase at the end of Q2. This conclusion accords with a graphic presentation of the financial cycle with a financial cycle indicator, as is shown in Chart I-41.

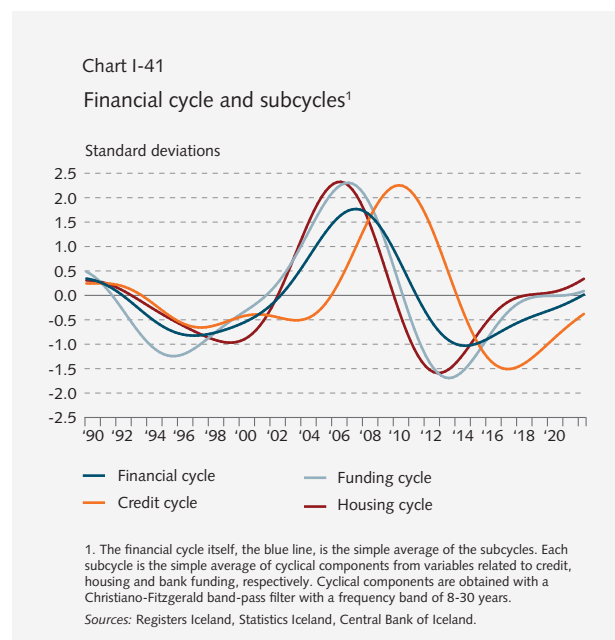
There is some uncertainty about whether the upward phase will continue in the near future. For example, share prices have been falling this year, the monetary stance has been tightened, macroprudential policy instruments and measures aimed at the mortgage lending market have been applied to a greater degree, the housing market has cooled, and the outlook is for modest total lending growth in coming months, partly

because of the worsening funding conditions facing the banking system.

Financial cycle analysis tends to ignore short-term fluctuations that may last from a few months to several years. The methods underlying the financial cycle indicator are designed to set aside both long-term trend and short-term volatility, so that only medium-term cycles remain. These are usually cycles of at least eight years' duration. As a result, there can sometimes be discrepancies between the most recent developments in the data, on the one hand, and developments in the indicator, on the other. This can complicate financial cycle analysis.

### Financial cycle above zero

At the end of Q2/2022, the financial cycle indicator had a positive value. This was noteworthy, as the indicator has been negative since 2011. It is also a sign of growing systemic risk. It should not be interpreted as an early warning sign of imminent financial instability, however, as the financial cycle is still very close to its historical average. Analysis of historical data indicates that an indicator of this type must remain above zero for some time and rise relatively high in order for the signals it sends about financial excess and imminent shocks to be considered serious and to give clear cause for a response.<sup>20</sup>

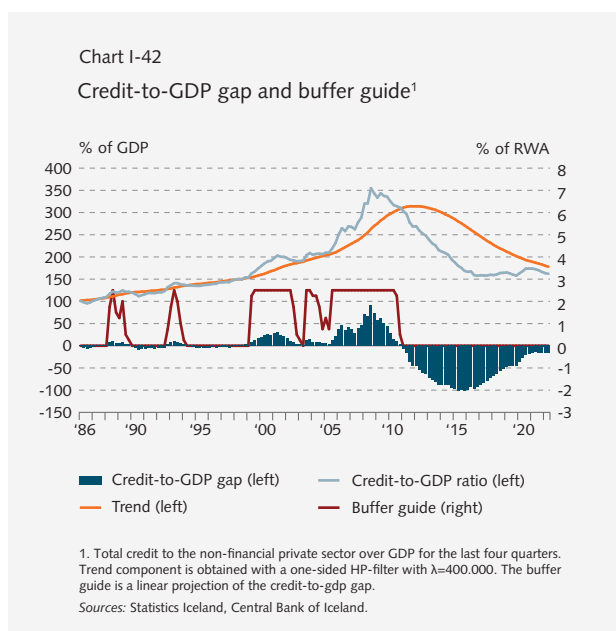


Around mid-2022, the upward financial cycle was driven by all sub-cycles; i.e., the debt cycle, the housing cycle, and the banking system funding cycle. At

<sup>20</sup> There are no absolutes in such matters, however. Signalling from indicators of this type is discussed further in Central Bank of Iceland *Working Papers* no. 72 and 80, which can be found on the Bank's website.



that time, the housing cycle was strongest. The dataset underlying the indicator is quarterly, and the most recent measurement is from the end of Q2. The data therefore capture the steep rise in house prices in H1, but not the dwindling pressures that were first discernible in late summer. Since the last publication, the shape of the housing cycle was also revised retroactively, with the result that in 2017-2019, the cycle was in a lower position than previously estimated. On the other hand, this re-estimation shows a much steeper upward phase over the past two years than was indicated by the previous estimation. As a result, the cycle is better aligned with underlying data than it was before.



The debt cycle is in a lower position than the housing cycle but is rising the fastest. It is now approaching its historical average at a fairly brisk pace but is still below zero. This indicates the private sector indebtedness is manageable despite the growth of the past few years.

The private sector debt-to-GDP ratio, often simply called the debt ratio, rose sharply at the beginning of the pandemic, mostly because of a contraction in GDP. By now, about three-fourths of that increase has reversed. The deviation of the debt ratio from trend, or the credit-to-GDP gap, is now negative by just over 10 percentage points. Furthermore, growth in total debt has been negligible in real terms over the past two years. The rise in the ratio of household debt to disposable income that occurred during the pandemic has not receded, however. These short-term movements in private sector debt during and after the pandemic cannot be seen in the debt cycle in Chart I-41, which focuses rather on medium-term movements that are still seeking equilib-

rium. This may primarily reflect difficulties with cyclical and trend analysis after the large debt cycle of 2005-2016, but only time will tell.

The debt cycle is a rough measure of leverage in the economy and thereby gives an approximation of the economy's loss tolerance. The housing cycle, on the other hand, is a rough measure of the probability that losses will materialise in the largest asset class in the economy; i.e., it gives an idea of the probability that house prices will fall, and if so, how much. As a result, the housing cycle and debt cycle together can be viewed as the simplest type of stress test. From this perspective, these two sub-cycles can be interpreted to mean that there is currently some risk of a price drop that could turn out reasonably large. On the other hand, the economy's tolerance for such a drop in prices is significant, as indebtedness is within acceptable limits.

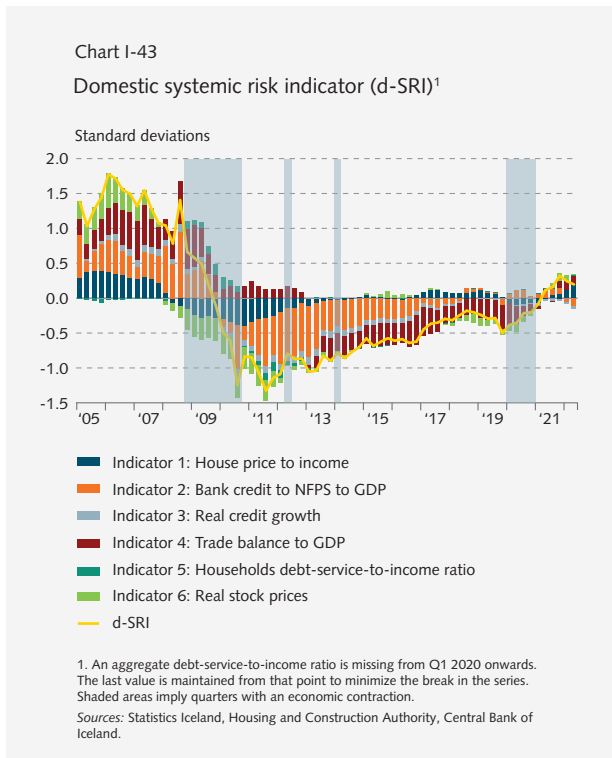
The third sub-cycle, the funding cycle, is based on developments in unstable banking system funding. It measures developments in maturity mismatches and liquidity risk in the system, thereby giving a rough idea of the risk lenders are taking, whereas the other sub-cycles focus on risk taken by debtors. The funding cycle is therefore a measure of the probability that the banking system's responses to shocks will be harmful rather than helpful.<sup>21</sup>

As with the other sub-cycles, the funding cycle is in an upward phase, albeit a modest one. The ratio of unstable funding to total banking system funding has fluctuated within a moderate band since 2012. The banking system has grown significantly, however, and unstable funding likewise, which shows as an upward cycle. In historical terms, the changes are minor, and the funding cycle reflects this.

### Cyclical systemic risk

The domestic systemic risk indicator (d-SRI) declined in Q2 and has now fallen two quarters in a row, after a continuous increase lasting two years. This time, the decline is driven mainly by falling equity securities prices and strong GDP growth alongside moderate credit growth. Pulling in the other direction are steeply rising house prices and a current account deficit. When all factors are considered together, the indicator suggests that cyclical systemic risk is marginally above its historical average. If the real estate market continues to cool and

<sup>21</sup> One example of a harmful response is a sudden, steep reduction in credit supply, which could exacerbate the effects of shocks on output and employment, amplify the decline in asset prices, and contribute to losses. Therefore, shocks that at first glance do not seem likely to jeopardise the public good could have profound and protracted repercussions if a weak banking system amplifies them.



the current account shows a surplus in Q3, the indicator could fall markedly.

Because the financial cycle is intended to reflect accumulated systemic risk, and because financial shocks are often accompanied by deep and protracted economic contractions, it can be expected that a higher financial cycle position will erode the short-term GDP growth outlook. In other words, the probability distribution of future GDP growth is skewed downwards when the financial cycle is high, even though the median of the distribution may be determined by other factors.

Chart I-44 shows the estimated probability distribution of average GDP growth two years ahead, as it was estimated at the end of 2019, 2020, and Q2/2022. Put differently, the chart shows the probability distribution just before, during, and after the pandemic.<sup>22</sup>

The median of the probability distribution is now very similar to that at year-end 2019, and tail risk is virtually unchanged. At both points in time, the 5% quantile of the distribution was close to a 1% contraction. This means that in the next two years, there is a 5% probability of an economic contraction measuring at least 1% of GDP. The threshold is called growth-at-risk, which

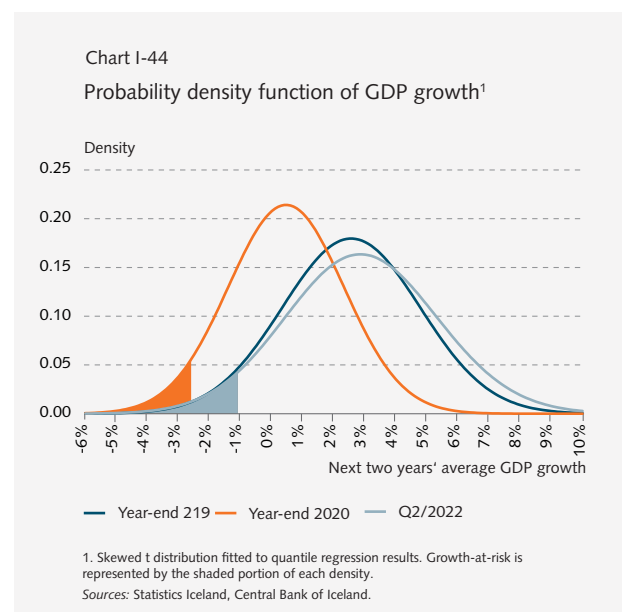
22 The probability distribution is estimated using a quantile regression. The method used is described in *Financial Stability 2022/1*. There are two explanatory variables: the financial cycle position at the time in question, and GDP growth in the previous twelve months. The analysis suggests that developments in the lower quantile of the probability analysis follows the financial cycle position, but that the median and upper quantile follow GDP growth in the previous twelve months.

is shown in the shaded area beneath each probability distribution in the chart. In this case, the shaded areas below the blue and grey probability distributions overlap almost entirely.

This is favourable, given that the entire probability distribution shifted significantly downwards during the pandemic; i.e., at year-end 2020. In the chart, this position is shown with the orange probability distribution. Tail risk increased, and the 5% quantile lay close to a 2.5% economic contraction. The shift in the probability distribution, first downwards and then upwards, is due mainly to developments in GDP growth and to the estimated autocorrelation of GDP in the model. The distribution is slightly flatter after the pandemic than beforehand, however, owing to a higher financial cycle position.

This suggests that despite soaring house prices and increased household indebtedness, cyclical systemic risk, as measured in terms of the risk it poses to GDP growth, has not increased discernibly in comparison with the pre-pandemic period even though it rose temporarily while the pandemic was ongoing. But as is the case with other composite indicators of cyclical systemic risk, this interpretation must be issued with a caveat.

The economic contraction in 2020 and 2021 was such that potential output was not significantly disrupted even though output contracted sharply for a period of time. The sectors hit hardest by public health measures more or less hibernated for a while, but when the situation improved, they revived quickly. Because the contraction was a sharp one, strong base effects and the re-emergence of these sectors pulled in the same direction and generated strong GDP growth thereafter.



Furthermore, in an extraordinarily short time, the economy has flipped from a sizeable slack to a situation featuring a positive output gap, a tight labour market, inflation well above the Central Bank's target, and increased monetary tightening.

Thus it is easily conceivable that the simple model on which growth-at-risk is based currently overestimates the probability of continued strong GDP growth. In other words, it is possible that the upward shift in the probability distribution between end-2020 and mid-2022, shown in Chart I-44, is more pronounced than is actually warranted. Nevertheless, growth-at-risk is a useful way to estimate the potential impact that developments in systemic risk could have on economic developments more broadly.

# The financial system



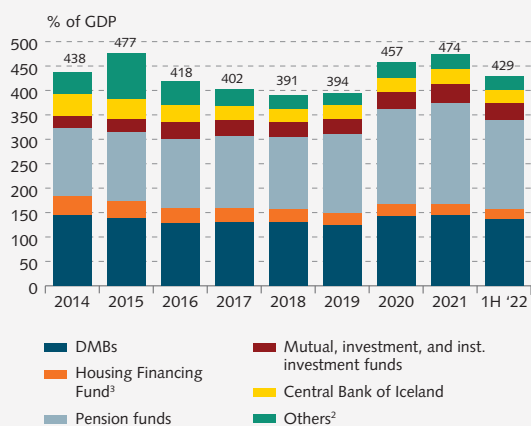
Financial system assets totalled 429% of GDP at the end of June 2022, after falling by 45 percentage points in the first half of the year, a substantial decline in so short a time. The reduction is due for the most part to a 7.6% increase in nominal GDP in H1, while financial system assets fell by 2.2% at the same time. In 2020, the ratio of financial system assets to GDP rose by 63 percentage points, mainly because of the contraction in GDP. It rose by another 17 percentage points in 2021, even though nominal GDP rose by 10.7% during the year.

As of end-June, deposit institutions' assets accounted for just under a third of total financial system assets. About 43% of total assets are owned by the pension

funds. This represents a decline of 1 percentage point since the turn of the year but is higher than before the pandemic. Deposit institution assets increased as a share of total assets in H1, while the share owned by other entities either remained flat or declined.

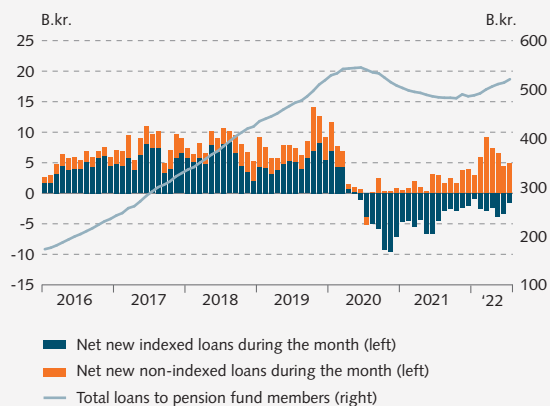
Pension fund assets totalled 6,386 b.kr. at the end of June, after falling by 361 b.kr. in H1, with 95% of the drop attributable to a contraction in the funds' foreign assets. Foreign assets accounted for 32.5% of total pension fund assets as of end-June, after falling by just over 3 percentage points in H1. Nearly 96% of the pension funds' foreign assets are equities and unit shares. Domestic equities and unit shares accounted for 16.6% of total assets at the end of June, about ½ a percentage

Chart II-1  
Financial system: Assets as % of GDP<sup>1</sup>



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. (ES) 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.

Chart II-2  
Loans to pension fund members<sup>1</sup>  
January 2016-July 2022



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.

point less than at the turn of the year. Offsetting these declines, marketable domestic bonds and bills increased by 2.7% as a share of total assets, to 37% as of end-June, and pension fund loans rose by 0.8%, to just over 8%.

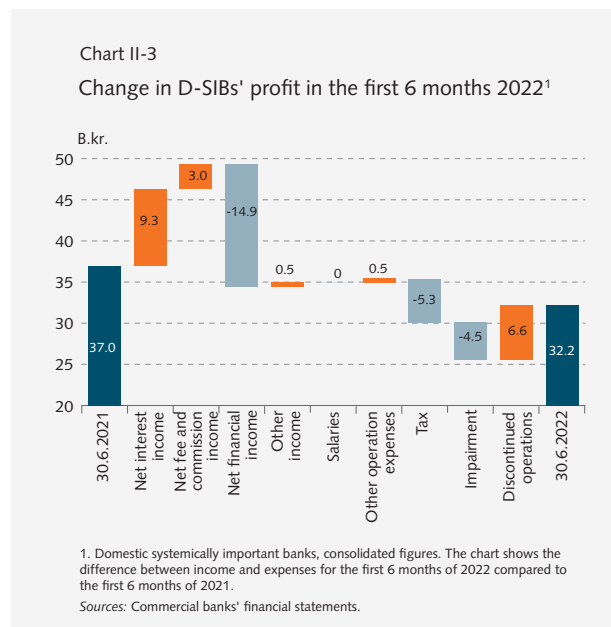
In 2021, the pension funds issued an average of just under 8.6 b.kr. per month in new loans to fund members, whereas retirement of pension fund loans averaged 10.7 b.kr. per month. The stock of pension fund loans to members shrank by 22 b.kr. in 2021, to a total of 486 b.kr. at the year-end. It developed differently in the first seven months of 2022, however, as the funds issued new loans for an average of 12.3 b.kr. per month, while retirement averaged 8.9 b.kr. At the end of July, the stock of pension fund loans totalled 521 b.kr., after growing by 35 b.kr. over the first seven months of the year. The supply of non-indexed pension fund loans on competitive terms was limited when mortgage rates were at their lowest. When rates began to rise in H2/2021, the pension funds' terms fell into line with those offered by the banks, and the stock of pension fund loans began to increase again. This trend has continued in 2022. For example, the stock of non-indexed pension fund loans was up 37% year-on-year at the end of July, while the stock of indexed loans contracted by 4% over the same period. Rising interest rates have bolstered the pension funds competitive position once again.

The pension funds are the largest investors in the Icelandic financial market. Not only are they direct mortgage lenders, they also fund the banks' mortgage lending by purchasing their bonds. Moreover, they finance businesses directly, through bond purchases, and indirectly, through investment funds. They are also the largest investors in the domestic equity market and are among the largest owners of two of Iceland's three systemically important banks. In addition, the pension funds' investment strategies assume that a large share of their asset portfolio will be invested abroad. Because of the funds' size, their strategies and conduct have an enormous impact on the market and the economy as a whole.

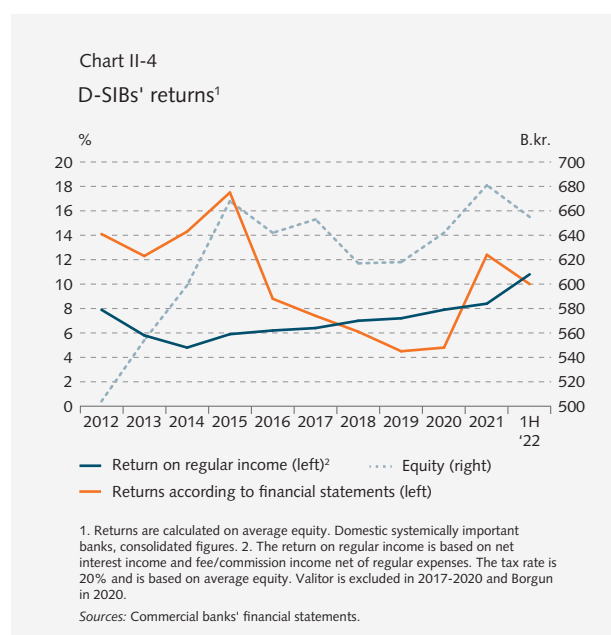
## Profitability

The domestic systemically important banks (D-SIB) recorded a profit of 32 b.kr. in H1/2022, as opposed to a profit of 37 b.kr. for the same period in 2021. Their return on equity was 10% in H1, a decline of 1.7 percentage points year-on-year. It can be said that all of the D-SIBs' core operations were strong in H1 but that because of adverse conditions in the financial markets, their overall profits and returns were weaker than in 2021. Their financial income varied somewhat from

one bank to another: Íslandsbanki recorded 0.1 b.kr. in net financial income in H1, while Arion Bank and Landsbankinn recorded losses of 2 b.kr. and 4.8 b.kr., respectively.



The return on equity from core operations, excluding one-off items, was 10.8% during the first half of 2022, its strongest since the banks were established in 2008. It measured 7.9% in H1/2021. The banks' core operations have improved steadily over the past eight years.<sup>1</sup>



1 This refers to 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.

The banks' interest rate spreads narrowed continuously from 2016 through end-2021. The trend has reversed thus far in 2022, however: the interest rate spread on the D-SIBs' total assets was 2.68% in H1, an increase of 0.24 percentage points year-on-year. In recent years, the banks' balance sheets have grown rapidly, with increased lending and higher interest rates leading to a steep rise in interest income and interest expense in 2022. Net interest income came to 60.2 b.kr. in H1, an increase of 9.3 b.kr. relative to H1/2021. Their interest rate spreads will probably keep widening in H2, as the Central Bank's key rate has been raised still further. The banks' interest income has grown significantly, including on liquid assets. Furthermore, Central Bank data on variable non-indexed deposit and lending rates, which extend through July 2022, suggest that interest rate spreads have widened, as deposit rates have risen less than lending rates have. Credit spreads have therefore widened, albeit less for individuals than for companies.

The composition of the D-SIBs' loan portfolio has changed markedly in recent years, as household loans accounted for 45% of total lending to households and businesses at the end of 2019 but had increased to 55% by end-June 2022. The vast majority of loans to households are residential mortgages, and average interest rates on household mortgages are lower than rates on corporate loans; therefore, all else being equal, the banks' interest rate spreads should narrow as the share of mortgages in their loan portfolios increases. It is unlikely that their interest rate spreads will return to previous levels unless premia increase.

In April 2021, the Central Bank's key rate was 0.75%, after having been lowered by 3.75 percentage

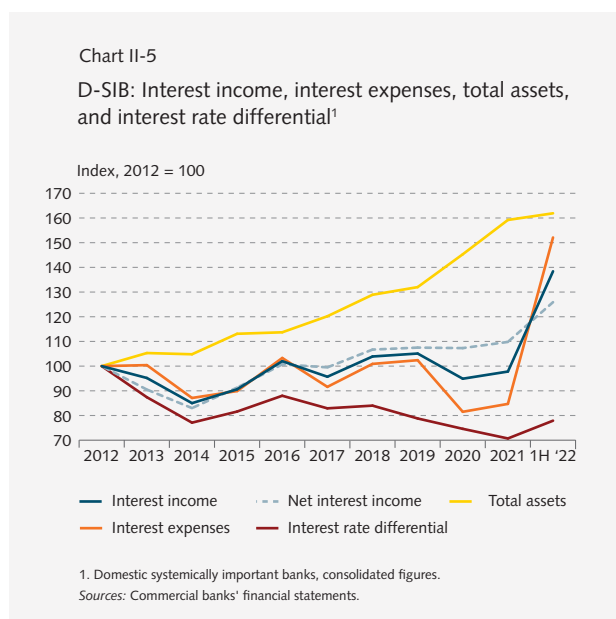
points since April 2019. According to the D-SIBs' interest rate tables, the reduction in variable rates on non-indexed mortgages amounted to 75% of the decline in the key rate, and the reduction in rates fixed for a period of three years equalled 73% of the decline in the key rate. From May 2021 through June 2022, the Central Bank's key rate was raised by a total of 4 percentage points. According to the banks' interest rate tables, variable rates on non-indexed mortgages increased by 78% of the rise in the key rate, and rates fixed for a period of three years increased by 83% of the rise in the key rate. It can be difficult to compare fixed interest rates between periods, as expected developments in inflation and interest rates affect interest rate premia, thereby affecting the rate actually charged. Based on variable non-indexed mortgage lending rates, however, it can be said that the transmission of the Bank's key rate to the aforementioned rates was broadly similar in both the easing phase and the tightening phase.

Net fee and commission income totalled 20 b.kr. in H1/2022, an increase of 18% relative to H1/2021 and 41% relative to H1/2020. All of the banks' fee and commission income increased, with positive developments across all units: asset management, payment intermediation, investment banking and securities trading, lending and guarantees, and collections and payment services.

Although financial income varied somewhat from one bank to another, as is noted above, the D-SIBs' total income from financial activities was negative by 6.7 b.kr., a significant reversal from the same period in 2021, when it was positive by 8.2 b.kr. Negative income from financial activities is due primarily to share price movements. Other operating income came to 3.3 b.kr. in the first half and was virtually unchanged year-on-year. Finally, returns on discontinued operations were positive by 6.9 b.kr., owing entirely to Arion Bank's Q2 sale of its subsidiary Valitor for 14.6 b.kr., which improved returns on discontinued operations by 6.7 b.kr.

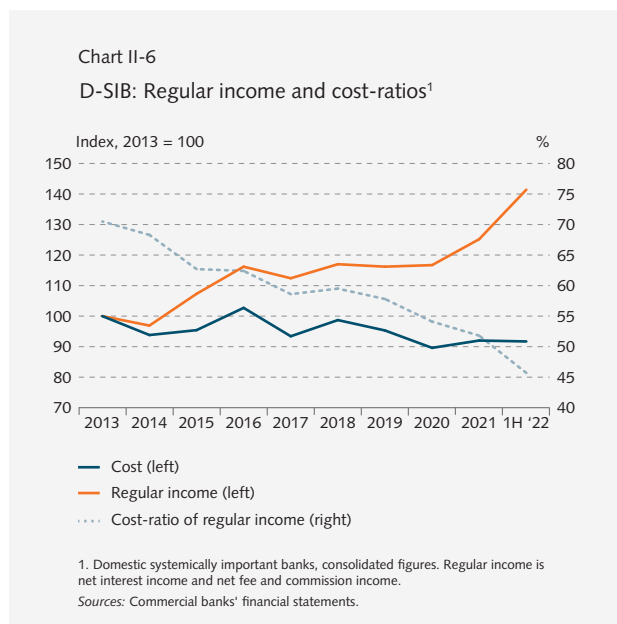
### Costs continue to fall

The D-SIBs' combined operating expenses totalled 36.7 b.kr. in H1/2022, a decline of 0.4 b.kr. between years. Costs developed favourably, particularly in view of the fact that inflation measured close to 9% at the end of June and the twelve-month rise in the general wage index was 8.1%. Costs declined by 9.1%, as wages fell by 7.9% and other operating expenses by 10.7% – all in real terms. At the end of June, there were 2,272 full-time position equivalents at the D-SIBs, 30 fewer than at the turn of the year and 81 fewer than in June 2021. Employee numbers are expected to keep falling,





albeit more slowly than before, as there is less scope for downsizing. The D-SIBs employed just over 3,400 staff members at the end of 2016, and their numbers have therefore declined by a third in five-and-a-half years.



The cost-to-income ratio in H1/2022 was 47.5%, an increase of 0.7 percentage points year-on-year, as income fell more between years than costs did. The financial markets have been turbulent since the pandemic struck in 2020. Net income from financial activities has variously been strongly positive or strongly negative, which has affected total income. The unrest in the markets has therefore affected measured cost-to-income ratio. Focusing on regular income instead of total income makes it easier to estimate how the ratio of expenses to income has developed in recent years (Chart II-6). This ratio has fallen steadily since 2013, and never as steeply as in 2022 to date, as it measured 45.7% at the end of June. From 2018 through 2020, the ratio of costs to regular income declined, as costs fell while income remained broadly flat. Since 2020, it has fallen by 8.4 percentage points, almost entirely because of income growth. With rising interest rates, regular income is likely to grow still further; therefore, the cost-to-income ratio can be expected to keep falling, provided that costs do not increase.

### Mortgage lending growth loses pace

The D-SIBs' loans to households and businesses rose by 7.5% in the first half of 2022, to a total of 3,420 b.kr. at the end of June. In terms of the amount loaned, the increase is broadly the same for households and businesses. In 2021, household lending growth measured

just under 14% over the first seven months of the year and 21% for the year as a whole, while corporate lending was unchanged throughout the year. As a result, household lending growth – i.e., growth in mortgage loan issuance – has lost pace, as 87% of the D-SIBs' loans to households are residential mortgages. This trend accords with the reduction in housing market turnover and the number of purchase agreements made, which in turn is due to the tighter monetary and macroprudential policy stance. Furthermore, mortgage refinancing has grown far less common as interest rates have risen. For companies, however, the reverse has happened: demand for credit has grown considerably, particularly among small and medium-sized enterprises (SME). That this should occur despite rising interest rates is a sign of how strongly the economy has picked up this year.

Since the beginning of 2020, the stock of non-indexed D-SIB loans to private sector borrowers has grown by 945 b.kr., while the indexed loan stock has contracted by 201 b.kr. over the same period. This change has strongly affected the D-SIBs' indexation imbalance; i.e., the difference between indexed assets and indexed liabilities. At the end of June, the indexation mismatch was positive by 35 b.kr., whereas it was positive by 233 b.kr. at the end of 2019. Nevertheless, it was 13 b.kr. larger at the end of June than at the turn of the year, which indicates that the banks can control their imbalances; i.e., by buying indexed assets such as indexed Treasury bonds.

### Loan impairment declines

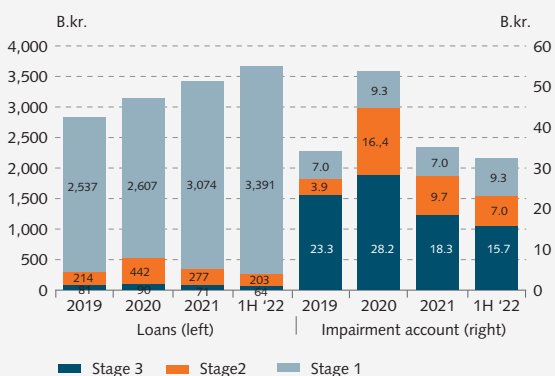
The domestic economy is buoyant, and the GDP growth outlook has improved in recent months. Private consumption growth has been strong, and the tourism industry has recovered more rapidly than previously expected. The Government and the Central Bank introduced broad-based mitigating measures in order to support households and businesses when the pandemic struck. Furthermore, financial institutions provided shelter to borrowers by offering payment moratoria, loan freezes, and debt restructuring. Some borrowers have managed to eliminate arrears altogether by refinancing, and most who needed support are far better positioned than before. For instance, corporate default declined by one-third from the Q1/2021 peak through end-June 2022, when non-performing loan ratio was 2.9%. Household default has fallen by more than half from its peak at the beginning of the pandemic. The non-performing loan ratio was 0.8% at the end of June.<sup>2</sup>

<sup>2</sup> This refers to default as defined by the European Banking Authority (EBA).

Chart II-7  
D-SIB: Non performing loans, moratoria and forbearance<sup>1</sup>



Chart II-8  
D-SIB: Loans and impairment account<sup>1</sup>



In most cases, loans to borrowers who have taken advantage of these measures are classified as forborne and performing (i.e., not in arrears). At the end of June, 10.3% of the D-SIBs' corporate loans (171 b.kr.) and 1.5% of loans to individuals (27 b.kr.) were forborne and performing. The share of forborne loans has been declining. This is mainly because the minimum length of time a loan can be classified as forborne is 24 months, and in order for a loan to be reclassified as not forborne, one requirement is that regular payments of principal and/or interest must have been made for more than half of the time the loan has been classified as forborne.

At present, a large share of bank customers with forborne loans have already begun to make full or partial payments on them. This autumn, the first forborne loans

will be eligible for reclassification, provided that they satisfy the relevant requirements. The banks assume that as of year-end 2022, a large share of forborne loans will be reclassified as non-forborne performing loans. As a result, it is very likely that the impact of the pandemic on loan classification will be negligible by next year.

The improvement in borrowers' position can also be seen in the change in IFRS-9 classification. The amount of D-SIB loans in Stage 2 more than doubled between 2019 and 2020, and at the end of 2020 some 14.1% of loans were in Stage 2. A large share of the loans moved to Stage 2 were to tourism companies, and furthermore, frozen loans were usually classified as Stage 2.<sup>3</sup> Because of the improvement in borrowers' situation, the amount of Stage 2 loans had fallen below the pre-pandemic level by end-June, even though total D-SIB lending to households and businesses increased by nearly 830 b.kr. over the same period. 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 2022, that share had fallen to 1.7%. By the same token, the impairment account was smaller at the end of June than at the beginning of the pandemic, or 32 b.kr. (0.9%) as of end-June, as compared with 34 b.kr. (1.2%) at year-end 2019. The composition of the impairment account according to IFRS-9 has changed somewhat: in 2019, 32% of impairment was due to loans in Stages 1 and 2, as opposed to 52% in June 2022.

### Capital ratio declines

The D-SIBs' capital amounted to 654 b.kr. at the end of June, after declining by just over 26 b.kr. since year-end 2021. It was virtually unchanged relative to June 2021, however. The banks' combined capital ratio was 23.3% at the end of June, 2.1 percentage points lower than at the turn of the year and 1.7 percentage points lower than at the end of June 2021.<sup>4</sup> Profits increased the capital ratio by 1.1 percentage points in H1, but dividend payments and share buybacks in the amount of 59 b.kr. lowered it by 2 percentage points. Furthermore, the increase in risk-weighted assets in H1 lowered the ratio by 1.4 percentage points.

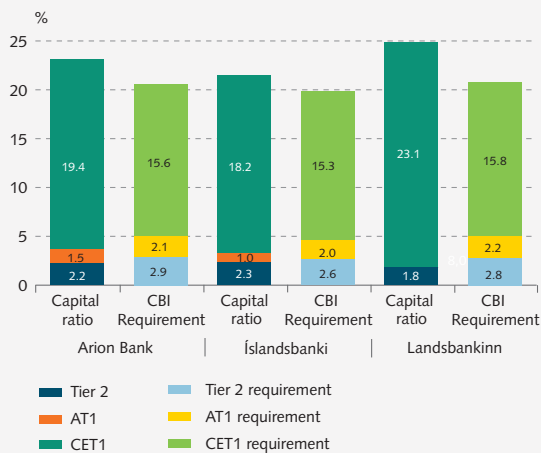
<sup>3</sup> Loans are moved from Stage 1 to Stage 2 if credit risk has increased significantly relative to the initial position. Loans are moved to Stage 3 if they are in serious default and impairment can be expected. Impairment shall be based on expected credit losses over the lifetime of the loan.

<sup>4</sup> According to the D-SIBs' interim earnings reports for Q2/2022, planned dividends in the amount of 31 b.kr. have been deducted from their capital base, and this has been done here. If proposed dividend payments are added to the capital base, however, the capital ratio comes to 24.3% as of end-Q2, or half a percentage point higher than at the turn of the year.



Chart II-9

D-SIB capital requirements and capital adequacy ratios at the end of June 2022<sup>1</sup>



1. Domestic systemically important banks, consolidated figures. In calculating the capital ratio, the portion of 2022 profit to be paid as a dividend in 2023 has been deducted from the capital base. The capital requirement includes the increase of the countercyclical capital buffer from 0% to 2%.

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

The D-SIBs' minimum overall capital ratio according to Central Bank rules ranges between 19.9% and 20.8%, based on the status of the banks at the end of 2021. At the end of June, their capital ratios were 1.5-4 percentage points above the required level, after adjusting for dividends to be paid on profits in 2022. Including the management buffer, the three banks' capital ratios were 0-2 percentage points above Central Bank requirements.<sup>5</sup> It is possible to increase the D-SIBs' capital base by issuing additional Tier 1 equity instruments and Tier 2 subordinated bonds, as the scope for such issuance has not been fully utilised. As a result, the banks have considerable latitude to steer their capital base, particularly because their underlying returns are strong.

Since year-end 2020, the D-SIBs' capital ratio has fallen by 1.6 percentage points, partly because they have paid out or bought back their own shares in the amount of 100 b.kr. The 8% increase in risk-weighted assets over the same period has also lowered the capital ratio. The Icelandic banks' capital position is strong, particularly in view of the fact that all of them use the standardised approach to assess credit risk, whereas large banks abroad typically use the internal ratings-based (IRB) approach. The IRB approach generally leads to lower risk weights and hence lower required reserves.<sup>6</sup> The effects show clearly when the banks' capital is examined

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

6 See, for example, Box III-2 in *Financial Stability* 2015/1.

relative to total assets – i.e., the leverage ratio – as the Icelandic banks have the highest ratios in the European Economic Area.

The banks' leverage ratio declined by 0.7 percentage points in H1/2022, to 13.2% at the end of Q2. Individual leverage ratios ranged between 12.5% and 14.1% and fell by 0-1 percentage points during the first half of the year. The decline in the leverage ratio is due to both an increase in total exposures and a reduction in Tier 1 capital.<sup>7</sup> Although the ratio fell in H1/2022, it is still well above the 3% required minimum.

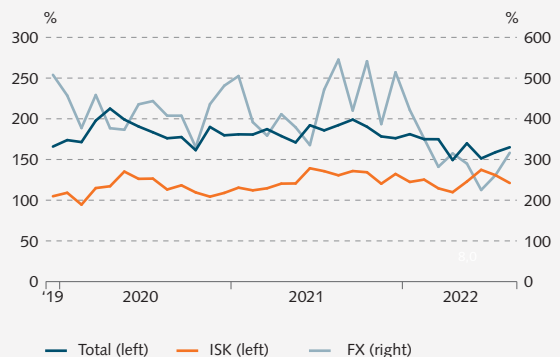
## Liquidity and funding

### D-SIBs' liquidity has deteriorated

The domestic important banks' (D-SIB) liquidity position has deteriorated during the year but remains well above the Central Bank minimum. The decline in liquidity ratios is due mainly to lending growth, bond maturities, dividend payments, and movements in deposits. At the end of August, the D-SIBs' combined liquidity ratio in all currencies was 165%, far above the 100% minimum required under Central Bank rules. The ratio varies from bank to bank, however. The liquidity ratio in foreign currencies was 316% at the end of August, whereas the ratio in Icelandic krónur was 121%. Among individual currencies, the highest ratios were in euros (337%) and US dollars (192%). Terms available to domestic and foreign banks in foreign credit markets have grown tighter, leading to higher credit spreads on the Icelandic banks' foreign bond issues. As a result, the banks have issued

Chart II-10

D-SIB liquidity coverage ratio<sup>1</sup>



1. Consolidated figures.

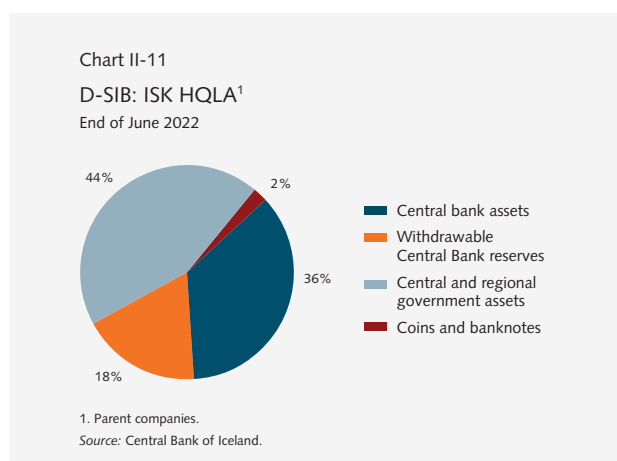
Source: Central Bank of Iceland.

7 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%.

little foreign-denominated debt in recent months, and their liquidity ratios in foreign currencies have declined somewhat.

Their disposable liquid assets were 213 b.kr. above the minimum required for all currencies combined according to Central Bank rules. Liquid assets over and above requirements have fallen by 81 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 148 b.kr. at the end of August. With reduced liquidity, they have less scope for lending, dividend payments, and share buybacks.

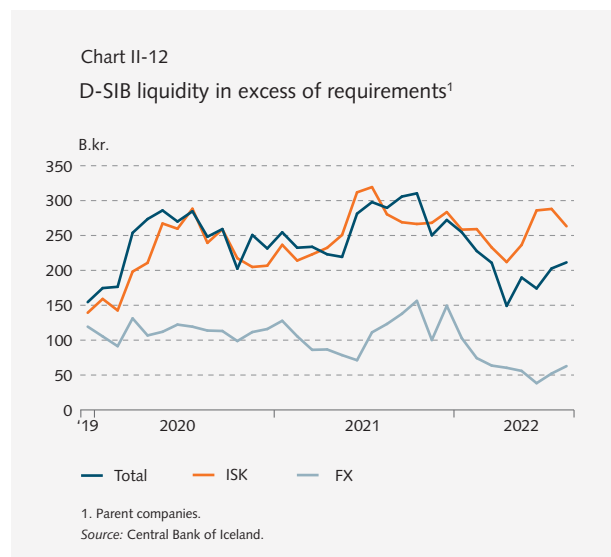
The banks' liquid assets consist mainly of government bonds, government bills, and deposits with the Central Bank. At the end of August, the banks held 488 b.kr. in high-quality liquid assets in all currencies combined; however, their liquid assets have contracted by over 117 b.kr. since year-end 2021. About half of their liquid assets are in government bonds and bills. Their liquid assets in Icelandic krónur totalled 396 b.kr. as of end-August, after declining by 24 b.kr. since the turn of the year; however, liquid assets in foreign currencies have contracted much more. The vast majority of foreign-denominated liquid assets are in the form of government bonds. The ratio of liquid assets to total assets has fallen somewhat in recent months, to 16% at the end of August, after peaking at 20% in mid-2020.



### Lending growth erodes the liquidity position

Lending to households and businesses has increased in the recent term, siphoning off some of the banks' liquidity at a time when market funding has grown tighter. The banks still have enough liquid assets to intermediate credit to households and businesses, but if lending growth continues at the current pace, they will have to step up market issuance in both krónur and foreign

currencies. If the composition of the deposit portfolio changes – if customers invest their savings elsewhere, for instance – the banks' liquidity position will be adversely affected. It is therefore important to keep close track of developments in banking system deposits. The banks' excess liquidity grew markedly during the pandemic but is now back to its pre-pandemic level.



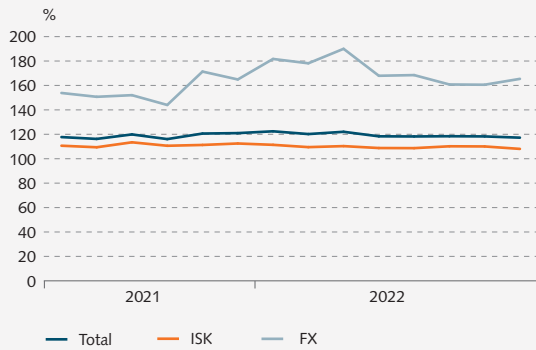
Stress tests of the banks' liquidity and funding are carried out on a regular basis. They show, for instance, that the banks would have enough liquid assets to cover withdrawals of the largest deposits held by large firms, financial institutions, pension funds, and non-residents. Their liquidity ratio would fall below the threshold provided for in the Central Bank's liquidity rules, however, as such withdrawals would generate substantial outflows.

### Access to credit markets has tightened

The D-SIBs' funding ratio for all currencies combined was 117% at the end of August and therefore well above the minimum required under the Central Bank's liquidity rules. At that time, the funding ratio in foreign currencies was 165%, whereas the ratio in Icelandic krónur was 108%. The foreign currency funding ratio can be expected to fall next year, as the banks' large eurobond issues draw closer to maturity.

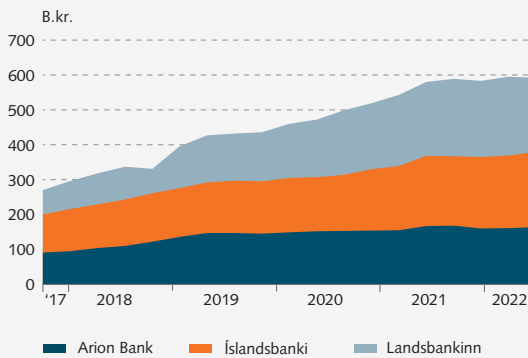
As before, the majority of the banks' funding is in the form of deposits and marketable bonds. At the end of June, deposits comprised about half of their funding. Deposits have increased by 7%, or 150 b.kr., in 2022 to date, driven mainly by individuals' deposits, which rose by 45 b.kr., and large companies' deposits, which grew by 77 b.kr. The commitment period on financial institutions' term deposits has been growing shorter, however, which has had an adverse effect on measured liquidity

Chart II-13  
D-SIB Net stable funding ratio<sup>1</sup>



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

Chart II-14  
D-SIB: Listed covered bonds<sup>1</sup>



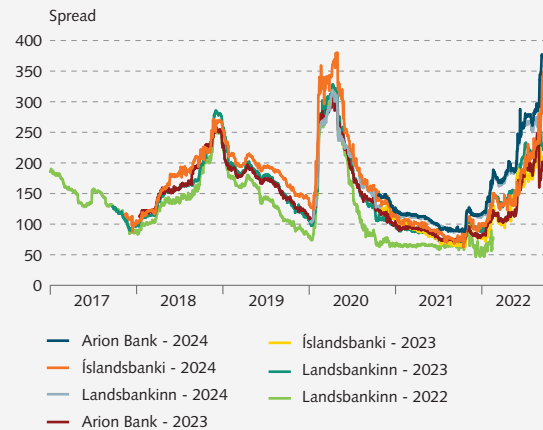
1. In Icelandic kronur.  
Source: Central Bank of Iceland.

ratios. The banks' domestic funding in Icelandic krónur is mainly in the form of deposits, which explains the low funding costs in domestic currency.

The banks' króna-denominated bond issues have been limited, apart from covered bonds. In the first eight months of the year, their króna-denominated covered bond issues came to just over 50 b.kr. Since the turn of the year, the stock of outstanding króna-denominated covered bonds has grown by just over 9 b.kr., although part of the issue was for the banks' own use. In September, two covered bonds matured in the amount of 42 b.kr. The banks' net covered issuance is therefore negative thus far in 2022. Demand for the bonds has been limited and, as before, buyers are few. At the same time, the banks' net new lending to households totalled 98 b.kr.<sup>8</sup> Next year's covered bond maturities will total around 90 b.kr. Given the conditions currently prevailing in the

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

Chart II-15  
D-SIB: Spread on listed foreign bonds, EUR<sup>1</sup>  
Mars 2017 - September 2022

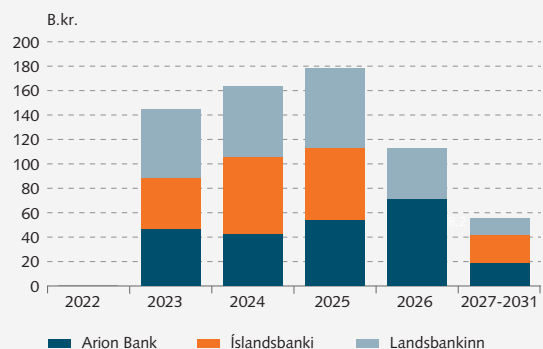


1. Spread on Euro benchmark curve.

domestic market, it could prove difficult for the banks to maintain the stock of outstanding covered bonds.

Credit spreads on new foreign issues have risen sharply this year. They surged at the beginning of the pandemic but then tapered off gradually and remained broadly stable until the end of 2021, when COVID case numbers jumped. They rose abruptly in March 2022, after the Russians invaded Ukraine. They have been easing upwards in recent months and are now close to the peak seen early in the pandemic.

Chart II-16  
D-SIB: Foreign bonds by maturity<sup>1</sup>



1. At 31.8.2022 exchange rate.  
Source: Nasdaq Ísland.

The banks scaled down their foreign-denominated bond issues as spreads widened in H1. In September, however, they issued two large eurobonds. Íslandsbanki sold a covered bond in the amount of 300 million euros, and Arion Bank issued a green bond, also for 300 million euros. The credit spread on Arion's bond was somewhat

larger than on previous issues from the Icelandic banks. The banks' bond issues in Swedish and Norwegian currency have also borne higher premia than comparable bonds issued in 2021. Thus far in 2022, the banks have issued foreign-denominated bonds for the equivalent of nearly 214 b.kr.

In autumn 2021, Arion became the first Icelandic bank to issue a covered bond in foreign currency, with a 300 million euro issue. In 2022, it issued an additional covered bond for 200 million euros. This summer, Íslandsbanki also received authorisation to issue covered bonds in euros and followed with a 300 million euro issue, as well as selling another 300 million euro issue in September, as is mentioned above. Credit spreads on the banks' covered eurobonds are considerably narrower and much more stable than spreads on the banks' unsecured foreign issues. Table 8 in Appendix 1 gives a summary of all of the banks' issues in the past twelve months.

None of their outstanding foreign bonds will mature in 2022. Next year, however, all three banks have large eurobond maturities, as well as smaller maturities in Nordic currencies, for a total of 140 b.kr. Even though the banks' foreign liquidity is ample, they will not be able to pay all of next year's foreign maturities without refinancing. Their refinancing risk has increased this year, with rising spreads on their foreign bond issues.

#### **Increased market funding would be favourable**

Strong lending growth, dividend payments, and share buybacks during challenging conditions in domestic and foreign markets have caused the D-SIBs' liquidity to shrink in recent months. Further ahead, the banks must step up their market funding in krónur and foreign currencies and should give consideration to term deposits so as to shore up their liquidity position. Sooner or later, continued lending growth without a simultaneous increase in marked funding will jeopardise their liquidity.

# Central Bank stress test 2022



The Central Bank assesses the systemically important banks' resilience by carrying out annual stress tests. The stress scenario for 2022 was designed so as to test all of the foundations of banking operations. In the scenario, the banks' interest rate spreads come under pressure in that the spread between short- and long-term rates narrows. The price of all major asset classes falls markedly, generating increased losses on corporate and household loans, and prospects for key economic sectors and employees 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 2021, 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 risen, and yields are now virtually flat, irrespective of maturity; securities prices have fallen somewhat, and inflation has risen steeply. Nevertheless, the banks have performed well in 2022 to date, as other factors have developed favourably for them. The price of real estate, the largest single asset class in the banks' collateral portfolio, has continued to rise. Unemployment has fallen sharply and is quite low. Furthermore, the banks' managers have taken a variety of measures to safeguard their interest rate spreads and have worked 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 satisfy the overall capital requirement, as well as the common equity Tier 1 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 con-

tinue supporting the economy with an unchanged supply of credit, even if 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 (D-SIB), which accounted for 95% of deposit institutions' total assets as of end-2021. The stress scenario 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 whose severity increases when cyclical systemic risk is considered to accumulate.

The commercial banks have supported the economy since the pandemic began: strong capital and liquidity ratios have enabled them to grant debt moratoria and supplemental loans and to respond to other demand for credit, which is necessary for the economy to function normally. When preparation of the 2022 stress test began with scenario design, the pandemic was receding, but significant uncertainty remained about the expected economic recovery. Therefore, one of the objectives of the stress test was to assess whether the banks were resilient enough to continue supporting the economy even if conditions should deteriorate.

The stress test is carried out in cooperation with the D-SIBs, but the results published here, which are from 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 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.<sup>1</sup>

Table III-1: Key variables in the stress scenario<sup>1</sup>

%	2022	2023	2024
Private consumption	-1.2	-5.1	0.6
Services exports	23.4	11.6	9.9
GDP growth	-0.4	0.2	2.2
Unemployment (average for the year)	8.1	8.4	6.8
Inflation (average for the year)	6.5	5.2	3.4
Nominal house prices	-4.5	-16.0	-0.7
Nominal commercial property prices	-15.5	-21.2	-3.0
Change in short-term interest rates (percentage points)	4.4	0.1	-1.7
Change in five-year nominal interest rates (percentage points)	2.8	0.3	-0.4

<sup>1</sup> Change from prior year (%) unless otherwise specified.

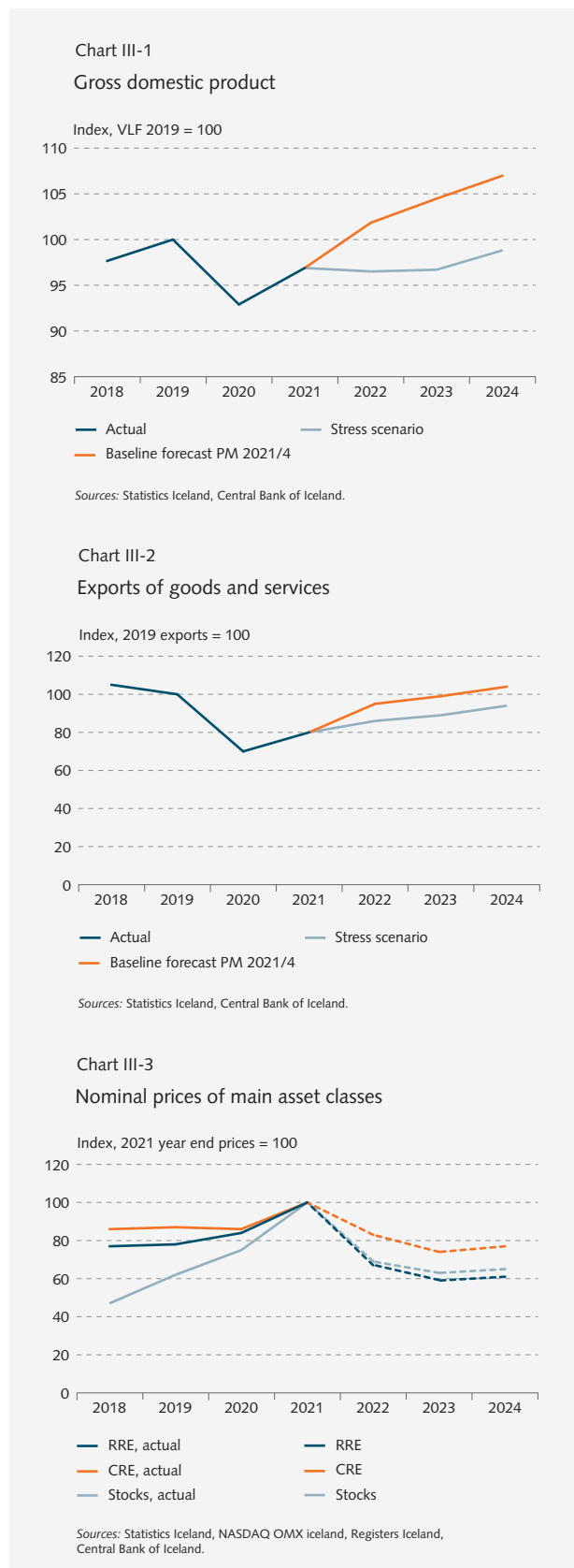
Sources: Statistics Iceland, Central Bank of Iceland.

### Scenario

The baseline forecast concerning developments in economic variables over the next few years is drawn from the Central Bank's macroeconomic forecast as published in Monetary Bulletin 2021/4. The stress scenario is derived from that forecast and is based on an analysis of key risks and challenges to financial stability; however, it does not represent a forecast of expected developments in macroeconomic variables or other variables. When the severity of the stress scenario and desirable developments in key variables have been selected, continuous time series are obtained with a run through the Bank's macroeconomic model (QMM).

As is mentioned in *Financial Stability 2021/2* and Monetary Bulletin 2021/4, the main challenges at that time centred on rapidly rising asset prices and a darkening inflation outlook. As a result, it was decided that the core of the stress scenario would entail a weaker economic recovery, high inflation, and a steep drop in asset prices.

The stress scenario, which covers a horizon from 2022 through 2024, provides for further supply chain disruptions, which cause global inflation to rise higher and become entrenched, prompting central banks to raise interest rates faster. As a result, global GDP growth



will fall short of forecasts by 2 percentage points and financial conditions will deteriorate. Dampened GDP growth expectations and interest rate hikes cause a sharp decline in asset prices. Global demand contracts, including demand for Iceland's key goods exports.

<sup>1</sup> 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*.



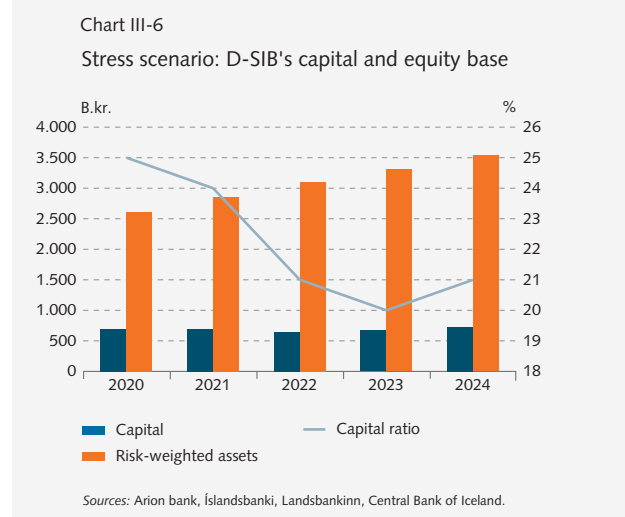
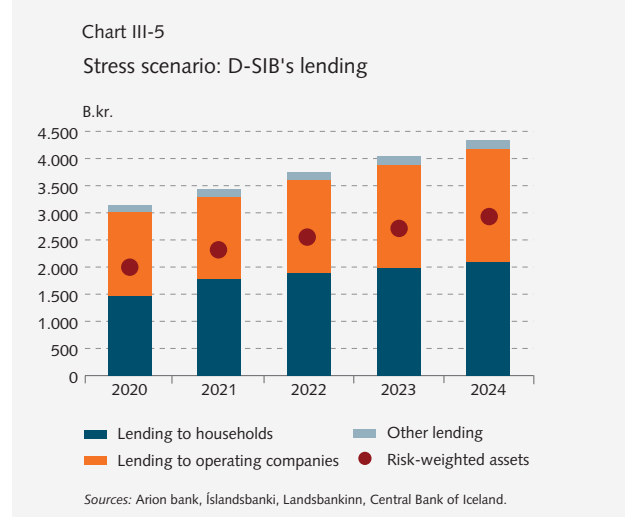
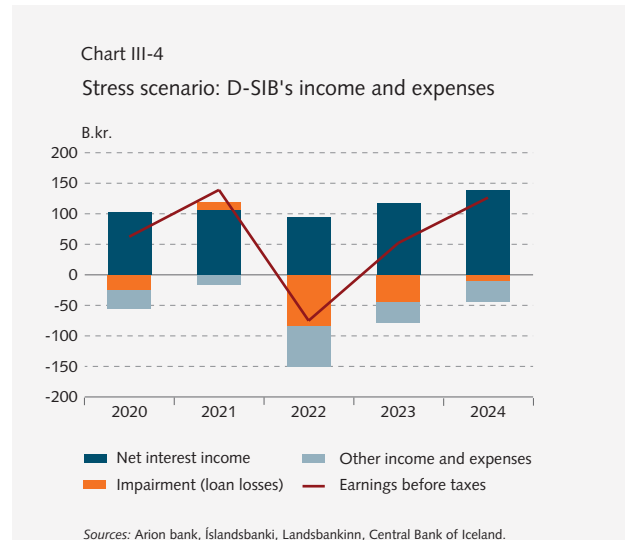
In the stress scenario, Iceland's terms of trade are eroded by developments in commodity prices; i.e., the price of aluminium and marine products, Iceland's key exported goods. Furthermore, the scenario assumes a 14% contraction in fish catches over the three-year horizon and a reduction of 300,000 per year in tourist arrivals relative to the baseline forecast. Because of base effects, however, services exports will still grow in 2022, but by 24% rather than the 42% assumed in the baseline. Combined goods and services exports grow by 8% instead of 19% in 2022, as goods exports are assumed to contract by 5% in the first two years of the stress scenario.

The trade-weighted exchange rate index rises by 32% in the stress scenario, as higher foreign interest rates lure capital from Iceland and tourism-generated foreign currency inflows turn out weaker than expected. Inflation measures 6.5% in 2022 despite a steep drop in house prices, and short-term interest rates move back towards the pre-pandemic level. As is common during crises, the Treasury yield curve is flat throughout the horizon, as the spread between short-term rates and five-year nominal rates narrows by 1.6 percentage points during the first year of the scenario.

All domestic asset prices fall sharply, as do asset prices abroad, as they have risen rapidly over a relatively short period of time. Among them are house prices, which fall by 20% in nominal terms over the three-year horizon, and share prices and commercial property prices, which fall by 35% during the first two years of the scenario. This is a much larger nominal decline in prices than in previous stress scenarios, but it is supported by the surge in asset prices in 2020 and 2021.

Higher financing costs and a poorer economic outlook cause business investment to shrink by 21% over the horizon, with the contraction extending equally to all sectors. In the scenario, unemployment rises among a broad group of workers, peaking at 8.4% in 2023 and averaging 7.8% over the horizon as a whole. Private consumption contracts by a total of 6% in the first two years, although GDP contracts by only 0.4% in the first year and is broadly flat (0.2% growth) in the second year. The modest contraction in GDP is due in large part to a sizeable economic slack at the outset. As a result, GDP does not return to its previous peak within the horizon of the scenario.

Access to credit markets tightens, terms on private sector bond issues and bank funding – in Iceland and abroad – deteriorate about as much as at the beginning of the pandemic, when uncertainty was at its most pronounced. Interest premia charged to Icelandic banks and



firms rise by 150 basis points for domestic funding and about 200 points for external funding. Icelandic Treasury bonds bear a premium of 100 points above the general interest rate level; however, it is assumed that premia on the Treasury's foreign bonds will be unchanged, on average.

## Results

Credit growth, which is estimated using the Central Bank's statistical analysis of borrowing needs assuming given developments in other economic variables, is assumed to be positive during all years of the scenario. 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 by a relatively brisk 8.1% in the scenario, as compared with an actual growth rate of 9.5% in 2021.

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 2021, the systemically important banks' net interest income equalled 2.4% of the average balance of total assets, while in the stress scenario it is just over 2% in

the first year but then rebalances in the second and third years.

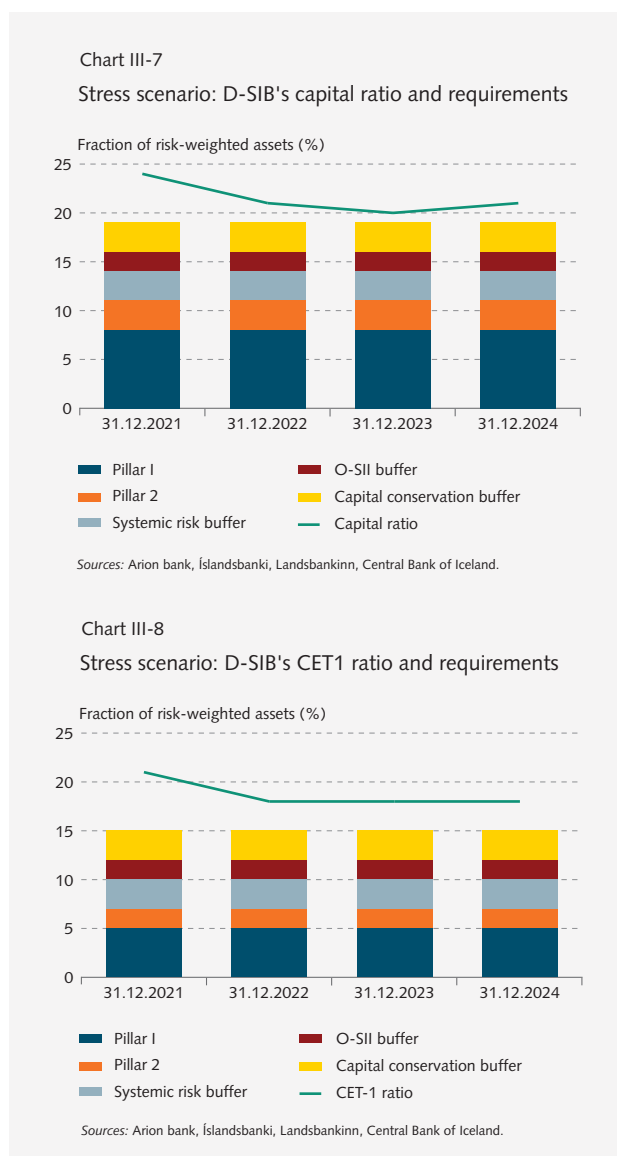
Net interest income contracts by 11.5 b.kr. in the first year, owing to narrower interest rate spreads and increased arrears, but later, as the interest rate spread widens again and the asset portfolio continues to grow, net interest income increases markedly.

Most loan losses due to the pandemic came to the fore in 2020, and they consisted largely of precautionary write-downs. They centred on loans to tourism companies, as household arrears declined steadily throughout the pandemic in spite of a temporary spike in unemployment. Reduced household arrears were due mainly to favourable financing conditions and debt moratoria granted by the banks. In the stress scenario, financing conditions deteriorate significantly and unemployment is protracted and widespread. Furthermore, the economic shock is less limited to certain sectors than the pandemic-induced shock was. The banks' loan losses are therefore estimated to be far greater than they were in 2020. On the whole, they total just over 125 b.kr. for all three banks combined in the first two years of the scenario.

Other revenues and expenses are negative by 70 b.kr. in the first year of the scenario, a considerable deterioration relative to previous years, caused by increased operating expenses, in line with the general price level, and losses on securities holdings.

The combined operating loss for the first year of the scenario comes to just over 50 b.kr. before tax, causing the capital base to contract commensurably. Because risk-weighted assets increase at the same time, the D-SIBs' weighted average capital ratio falls from 24.4% to 20.9%. It bottoms out at 20.3% the following year but then begins to rise. The CET1 ratio (the ratio of common equity Tier 1 capital to risk-weighted assets) develops similarly: its weighted average is 21.2% at the beginning of the scenario, drops to 17.9% in the first year, and then falls to its trough of 17.5% in the second year.

At the beginning of the scenario, the three large commercial banks' mandatory overall capital ratio according to Central Bank requirements ranged between 17.8% and 18.9% (weighted average 18.4%). Each of the banks satisfies the requirement throughout the horizon of the stress test. In the second year, when capital ratios are at their lowest, they are 1.4-2.2 percentage points above the overall requirement. The required CET1 ratio was 13.2-13.9% at the beginning of the scenario (weighted average 13.6%), and when they bottom out during the horizon they are 2.7-5.5 percentage points above the required level.





On 29 September 2021, it was announced that the countercyclical capital buffer would be increased by 2 percentage points, effective on the same date in 2022. If this increase were implemented in the stress scenario, the banks could breach the overall capital ratio requirement, but they would not breach the required CET1 ratio. It should be borne in mind, however, that the countercyclical capital buffer is conceived as a means of addressing shocks to the real economy concurrent with falling asset prices and solvency problems, which are precisely the focus of this scenario. As a result, it is likely that the buffer would be zeroed out rather than increased in the scenario, and that all of the banks would satisfy both overall capital requirements and CET1 requirements.

### **Substantial resilience**

In recent years, the banks have simplified their business models and taken systematic steps to reduce risk. Their securities holdings are limited, apart from bonds held for liquidity management purposes. The share of household mortgages relative to total lending has increased

somewhat. Their indexation and currency mismatches are insignificant. Subsidiaries in unrelated operations have been sold. The banks have reduced the number of branches in operation and lowered wage expense, among other actions. All of this has resulted in balance sheets that are better prepared than before to absorb shocks.

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' management 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



## Developments and prospects for payment intermediation

Banks and savings banks operate their own systems for payment intermediation, which can be referred to as *intra*bank systems. The Central Bank operates the interbank system, which processes and settles instructions for payments between financial institutions. In addition, Nasdaq operates the Nasdaq CSD SE securities settlement system, in which transactions are settled via the interbank system. Iceland's payment intermediation systems are interconnected in many ways, and contagion risk therefore exists. For instance, if Bank A's payment system suffers a disruption of service and payments are not routed to Bank B's account owners, this could easily spread to other payment systems. If this materialises, there is the risk that payment systems' liquidity lines will be put under strain, which will disrupt intermediation of capital in the economy and jeopardise financial stability.

### Intra

bank system transfers

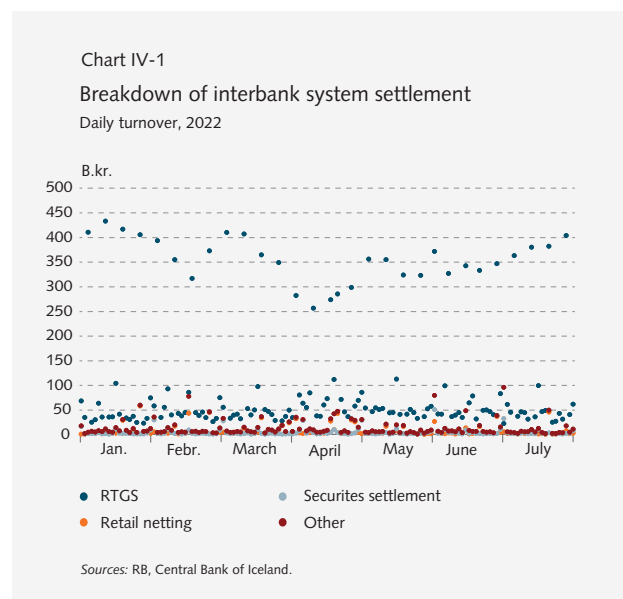
The vast majority of domestic payment intermediation takes place in the banks' and savings banks' intra

bank systems.<sup>1</sup> In the first six months of 2022, intrabank system turnover (outflows) averaged 618 b.kr. per day, or just over 81% of total payment intermediation. Net deposit account activity (deposits net of withdrawals) averaged -40.7 b.kr. per day, as compared with -38.6 b.kr. for the same period in 2021. The amount deposited to bank accounts therefore declined between periods by nearly 2 b.kr., perhaps because more depositors with-

drew cash or went less frequently to the bank to deposit it. Further discussion can be found in the section on cash in this chapter.

### Interbank system

The Central Bank interbank system is considered a systemically important infrastructure component.<sup>2</sup> Interbank system participants are the Central Bank (which also serves as commercial bank for the Treasury), the domestic commercial banks and savings banks, and two foreign financial institutions. In February 2022, the number of interbank system participants rose from 11 to 12 after the Central Bank of Iceland authorised Indo Service hf. to operate as a savings bank. According to current rules,



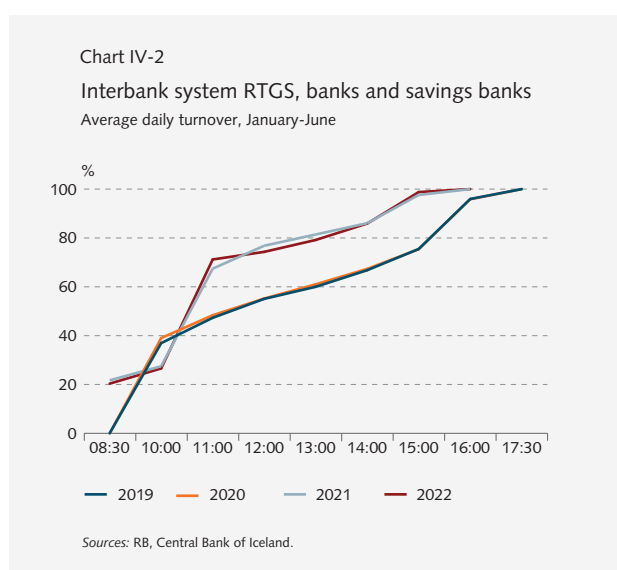
1 The intra

bank systems handle all payments between accounts within the same bank and its branches. The payments are settled using digital commercial bank money. Payment card transactions in which the payer and recipient use the same bank are also routed through intrabank systems.

2 Transfers between account owners who do business with different banks are settled in central bank money.

only these parties may hold current accounts with the Central Bank.

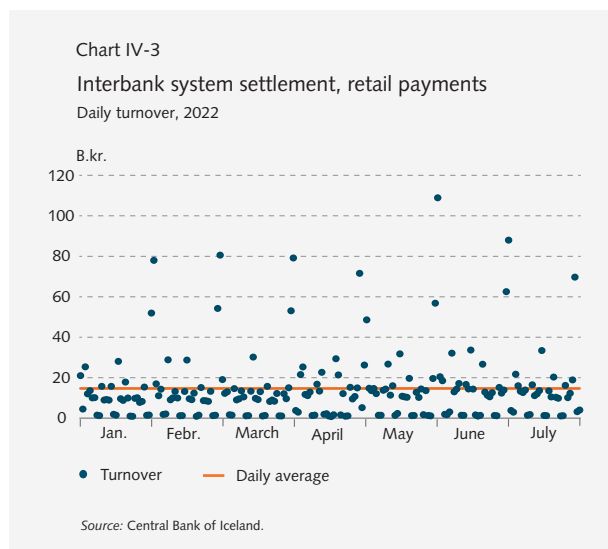
Over the first seven months of 2022, an average of nearly 140 b.kr. per day were transferred between interbank system participants, including 114 b.kr. in real-time gross settlement (RTGS) turnover.<sup>3</sup> Included in the large-value RTGS figures are the Central Bank's market transactions, which take place on Wednesdays, with the participation of commercial banks and savings banks. As Chart IV-1 shows, turnover spikes on Wednesdays but is relatively stable on other weekdays when the RTGS component of the interbank system is open.



### Settlement of large-value payments within time limits

More often than not, large-value payments settled between financial institutions are designated as time-critical payments. From the standpoint of operational security, it is very important that as many payments as possible be sent for settlement early in the day, so as to reduce strain on the payment system if a serious incident occurs during the day. In H1/2022, settlement of an average of 80% of RTGS component transactions was complete by 13:00 hrs. In 2021 and in 2022 to date, a larger share of payments were completed earlier in the day than over the same period in 2019 and 2020, a very favourable development.

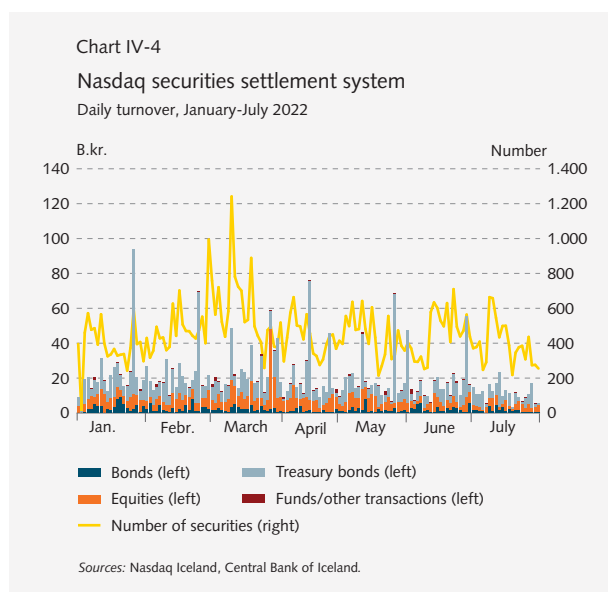
3 The daily average of 140 b.kr. (during the opening hours of the RTGS component of the system) reflects all interbank payments in the system, irrespective of payment type. For interbank payments other than those for securities settlement, settlement of retail payments, and payments of interest and levies, the daily average is 114 b.kr.



### Retail component payments rise in value

All transfers between deposit institutions in amounts under 10 m.kr. are routed through the retail component of the interbank system. An average of 120,000 transactions per day were routed through the retail component of the interbank system in the first seven months of 2022. This is a 15% contraction relative to the same period in 2021. The turnover represented by these transactions averaged 14 b.kr. per day, an increase of nearly 9% year-on-year, well above the change in the general price level. With fewer transactions and higher turnover, the average amount per transaction increased year-on-year from 88,000 kr. to 115,000 kr.

In retail payment intermediation, strain is usually greatest around the end of the month, when wages and public benefits are deposited to individuals' bank accounts. At that time, individuals also make loan pay-



ments and pay household bills; furthermore, as Chart IV-3 shows, they usually do more shopping around the turn of the month.

### Increased turnover in the securities settlement system

The Central Bank monitors payment flows relating to securities, as the Icelandic branch of the Nasdaq CSD SE securities settlement system is designated a systemically important infrastructure element. The total value of payment orders amounted to just under 2.8 t.kr. in the first seven months of 2022, or an average of 19.7 b.kr. per business day. The year-on-year increase, which measured 19%, was due largely to an increase in Treasury bond and equity securities trading. The turnover figure derived from an average of 455 transactions per day, as compared with 450 over the same period in 2021.

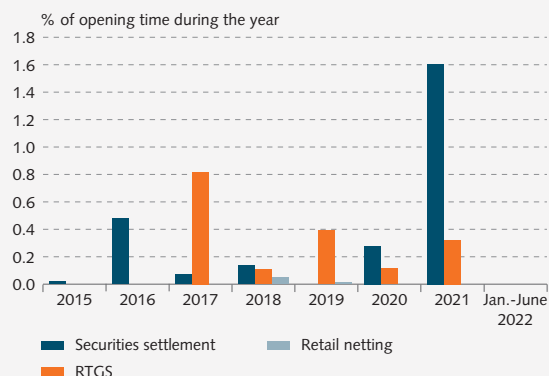
### Interbank system operated largely without incident

One measurement used by the Central Bank to shed light on operational risk in payment intermediation is the number and type of incidents (operational deviations) that occur.<sup>4</sup> In 2021, a total of 69 incidents occurred in interbank system operations. Of these, four were given the highest severity rating, as compared with three in 2020.<sup>5</sup> In H1/2022, a total of 21 incidents were recorded, none of them classified as severe. The incidents did not disrupt service to participants by delaying transactions within the same day. No incidents occurred in the Nasdaq securities settlement system during the first seven months of 2022, although one serious disruption took place in 2021.<sup>6</sup> Chart IV-5 shows the amount of time service was disrupted each year, from the beginning of 2015 through Q2/2022. In 2022 to date, interbank system up-time has been 100%, as compared with 98% over the same period in 2021.

### Deposit institutions' liquidity sufficient to cover intraday settlement

Intraday liquidity risk is always present in payment intermediation. Risk can develop if a participant does not have enough liquid assets to cover a payment obligation at the moment it falls due. One participant's liquidity problems can create problems for other participants,

Chart IV-5  
Interruptions in interbank system operations<sup>1</sup>



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.

which base their own liquidity management in part on expected payment flows. Naturally, risk is elevated on days when interbank payment flows are large and liquidity utilisation is greatest. In general, activity is heaviest on Wednesdays, when Central Bank facilities are offered.

In 2022 to date, the average amount of interbank system participants' payment obligations has increased relative to 2021, which is in line with overall developments in the economy. By the same token, the average balance of system participants' accounts with the Central Bank has increased, whereas the difference between payment obligation amounts and intraday liquidity has narrowed year-on-year. Participants' intraday liquidity remains good, however. The same applies to re-utilisation of capital inflows in the system for settlement vis-à-vis other financial institutions. The current situation therefore indicates that there is no significant risk that financial institutions will be unable to withstand a shock to payment intermediation.

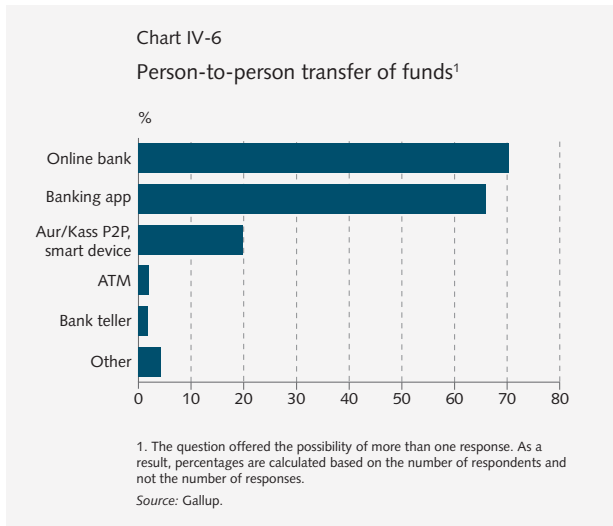
In 2021 as a whole, the Central Bank granted four overnight loans to participants. In the first seven months of 2022, the Bank granted five overnight loans, as compared with three over the same period in 2021.<sup>7</sup>

4 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.

5 The number of incidents is not entirely comparable from one year to another. Far fewer incidents occurred in 2021 and 2022 to date than in the years beforehand. The reduction is due largely to the fact that daily incidents stemming from known, monitored functioning are no longer recorded.

6 For further information, see *Financial Stability 2021/2*.

7 Overnight loans are loan facilities granted by the Central Bank to counterparties eligible for such facilities, against collateral in the form of securities or term deposits. They are granted until the next business day and are intended to ensure that settlement account balances are positive at the end of the day.



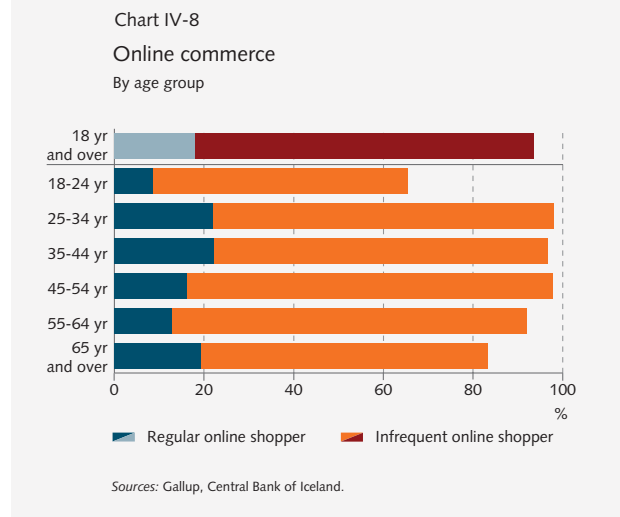
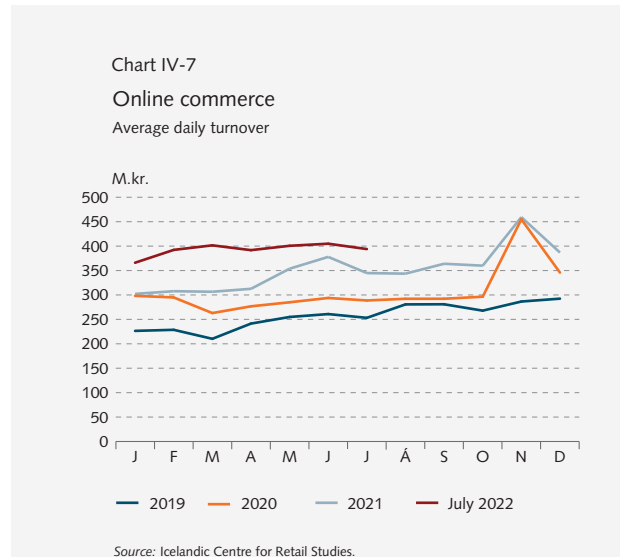
### Benefits and risks associated with electronic retail payment intermediation

In trade carried out in Iceland, electronic payments are generally executed in three ways: First, with a transfer of funds via online bank or payment app in a smart device; second, by payment card (either a physical card or a digital card stored in a smart device); and third, with an account-to-account payment via a buy-now-pay-later (BNPL) mechanism routed through the RB claim system and settled in Iceland.

In recent years, the number of available digital payment instruments has increased. The introduction of new payment intermediation solutions is a positive development. Such solutions can simplify trade, foster competition, and enhance the efficiency of payment instruments. But such new solutions generally bring not only various benefits but also additional risks. These include the risk of cyberattacks on payment systems, payment card fraud, and disruption of internet connections. Furthermore, for some time the Central Bank noted in its publications that nearly all debit and credit card transactions are routed through international payment card infrastructure, which limits the Icelandic authorities' scope to take action in order to safeguard domestic electronic retail payment intermediation. There is also risk attached to the use of cryptocurrency in business transactions (for further discussion, see *Financial Stability 2022/1*).

### Most payments linked to international payment card infrastructure

A survey conducted by Gallup for the Central Bank this spring revealed that 93% of respondents used electronic payment instruments for point-of-sale purchases of goods and services, and that 92% of that group used payment cards linked to international card infrastructure (i.e., VISA and Mastercard). Just over 1% of point-of-sale



transactions are carried out with BNPL solutions, Netgíró, or SíminnPay. Among those who use electronic payment instruments regularly (weekly or more often), the ratio is 98%, including 0.15% who use BNPL on a regular basis.

Nearly all individuals who responded to the survey transfer funds to other individuals by electronic means, and there are several options available. Most respondents (70%) transfer funds via online bank using a computer. About 66% use a banking app in a smart device, and one of every five use Aur and/or Kass (P2P, smart device). Fewer than 2% of respondents said they transfer funds via bank cashier.

In 2018, e-commerce accounted for around 8% of retail sales turnover, whereas today that ratio is 15%. Over the first seven months of 2022, turnover averaged 393 m.kr. per day.<sup>8</sup>

The aforementioned Gallup survey revealed that nearly 94% of respondents had shopped online at some

<sup>8</sup> Icelandic Centre for Retail Studies.

point. Fewer than 20% said they shop online regularly, and three out of every four do so on a less than weekly basis. Respondents in the 25-54 age group were the most active users of the internet to purchase goods and services.

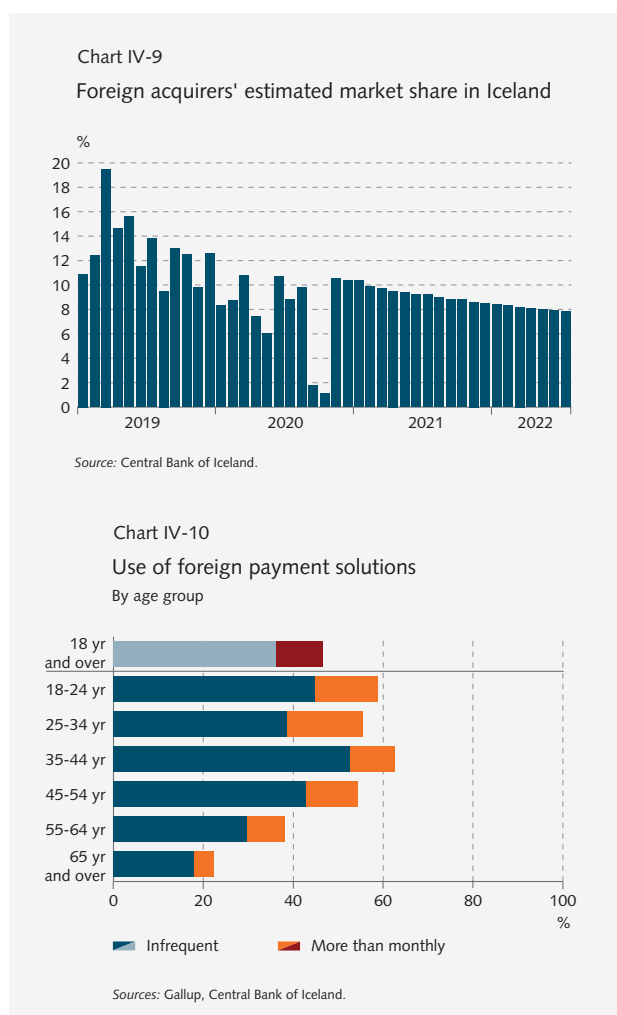
### Change in payment services ownership

The ownership structure of companies in the acquiring business has changed in the recent term. In 2020, the Brazilian payment intermediation company Salt Pay Co Ltd. purchased Borgun from Íslandsbanki and the holding company Borgun slf. In 2021, British fintech company Rapyd took over the operations of Korta ehf., and the Competition Authority recently approved the company's acquisition of Valitor hf. At the same time, Kvika purchased a share of Valitor's acquiring contracts.<sup>9</sup> Kvika has also acquired two fintech companies, Aur and Netgró, and merged them into a single company.

### Foreign payment service providers

Foreign payment service providers are authorised to provide service in Iceland, subject to prior notification from the financial supervisor in the service provider's home country. Several foreign acquirers with headquarters and operating licences in other EEA states have provided service in Iceland for some time, primarily within tourism-related sectors. Their market share was estimated at about 7.8% as of July 2022.

Foreign payment services such as Alipay, Revolut, and N26 also provide service in Iceland via the internet. The latter two of these are banks, and they issue online payment cards that can be loaded into smart devices. In addition, Western Union offers cross-border money transfer services. In the Gallup survey, individuals were asked whether they use foreign payment instruments such as PayPal, Alipay, and Revolut. Just under half said they had used such solutions at one time or another, but of that group, one out of three said they used them infrequently.



### Continuing decline in use of cash

Increased use of rapid, accessible, and user-friendly electronic payment options, including contactless payments via smart devices, has cut further into the use of cash in commercial transactions. According to a survey conducted by Gallup this spring, one of every three respondents said they used cash, a reduction of 6.5% relative to a comparable survey from 2020. Of the nearly 40% who said they use cash, the vast majority report using it for gifts and for person-to-person payments. About 7.5% use cash to pay for goods and services at the point of sale, down from 12.8% in 2018. Among households that shop at points of sale on a weekly basis or more often, as most households do, only 1.8% used cash as a means of payment. Between 2018 and 2022, the number of people who do not use cash at points of sale rose across all age groups, although the increase was greatest among those under age 40.

Cash turnover in point of sale payment intermediation is estimated to have equalled around 30 b.kr. in the first six months of 2022, or 6% of total turnover, down from 8% in 2020.<sup>10</sup>

About 27% of respondents said they had no cash in hand at the time the survey was taken. This is virtually unchanged from the survey taken in 2020, and slightly below the 30% reported in the 2018 survey. Furthermore, many respondents, irrespective of age,

<sup>9</sup> The Competition Authority conditioned its approval of the sale of Valitor on the sale of a share of its acquiring contracts to another eligible undertaking so as to prevent the concentration that would have resulted from the merger. For further information, see [here](#).

<sup>10</sup> Gallup and Central Bank of Iceland calculations.

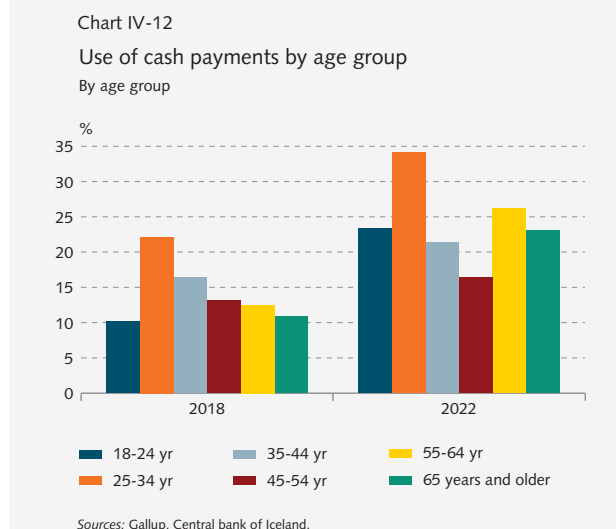
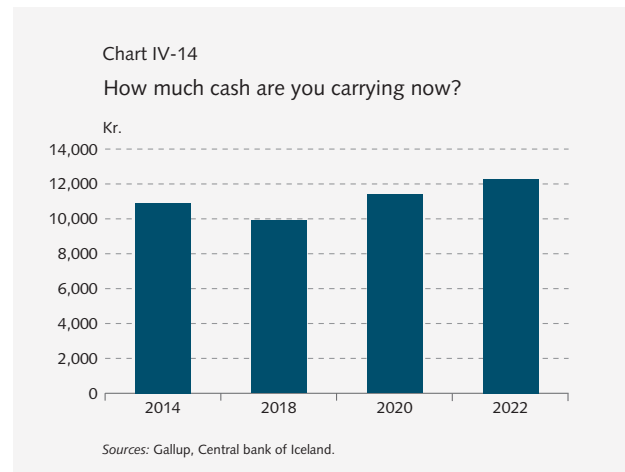
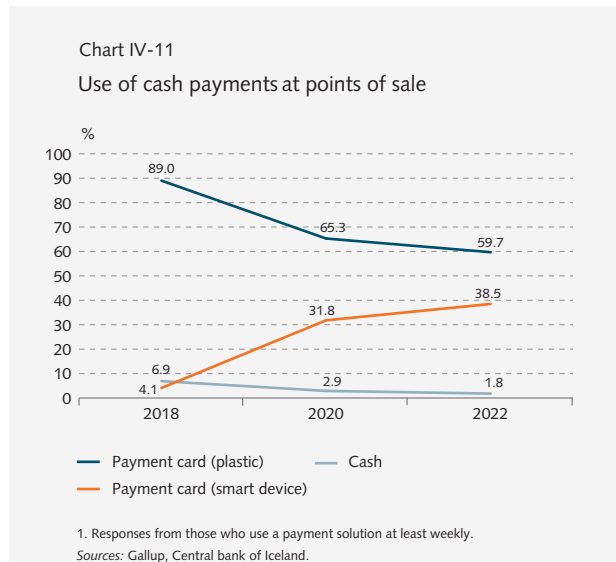


carried only small amounts of cash, or an average of 2,500 kr. or less. The average amount rose year-on-year, however, from 9,900 kr. in 2018 to 12,300 kr. in 2022. One reason a larger number of people carried cash, and

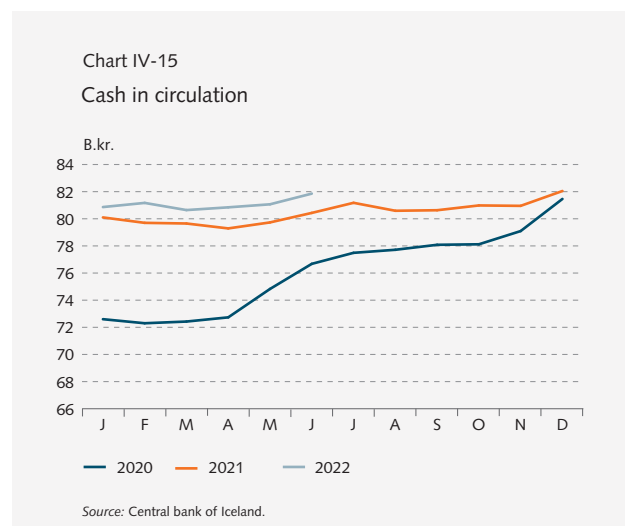
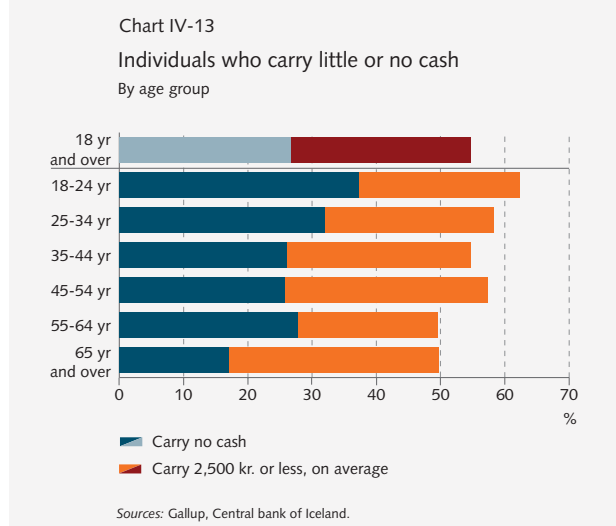
in larger amounts, could be that many were unable to use cash for payment during the COVID-19 pandemic. As a result, individuals had accumulated cash.

### Continued demand for cash

Cash in circulation in Iceland equals about 2.5% of



GDP. This is a relatively small percentage in international context. At the end of 2021, the value of banknotes and coin in circulation came to just over 82 b.kr., after increasing by just over 500 m.kr. year-on-year. At the same time, demand for cash as a payment instrument at points of sale has diminished, as is noted above. This trend is not unique to Iceland. There may be various reasons for it, and the reasons may differ from one country to another. Surveys of households' payment behaviour do not indicate that the number of people who store cash outside bank accounts has increased; on the contrary, the average amount of stored cash declined between 2018 and 2022. Demand for the highest-value banknote has not increased in the past two years, either, nor have cash withdrawals from ATMs or bank cashiers.



These figures can provide rough indications of the use of cash. Moreover, deposit institutions have not retained more banknotes and coin than before, and the root of the matter must therefore be sought elsewhere. Cash is

anonymous, and it could be that some of it is used for illegal activities such as money laundering, black market labour, and tax evasion.

### Changed conditions in electronic retail payment intermediation

Central banks are facing challenges in the area of retail payment intermediation. New digital solutions for payment intermediation are constantly being developed, but at the same time, the threat of cyberattacks targeting payment solutions and payment systems is increasing.<sup>11</sup>

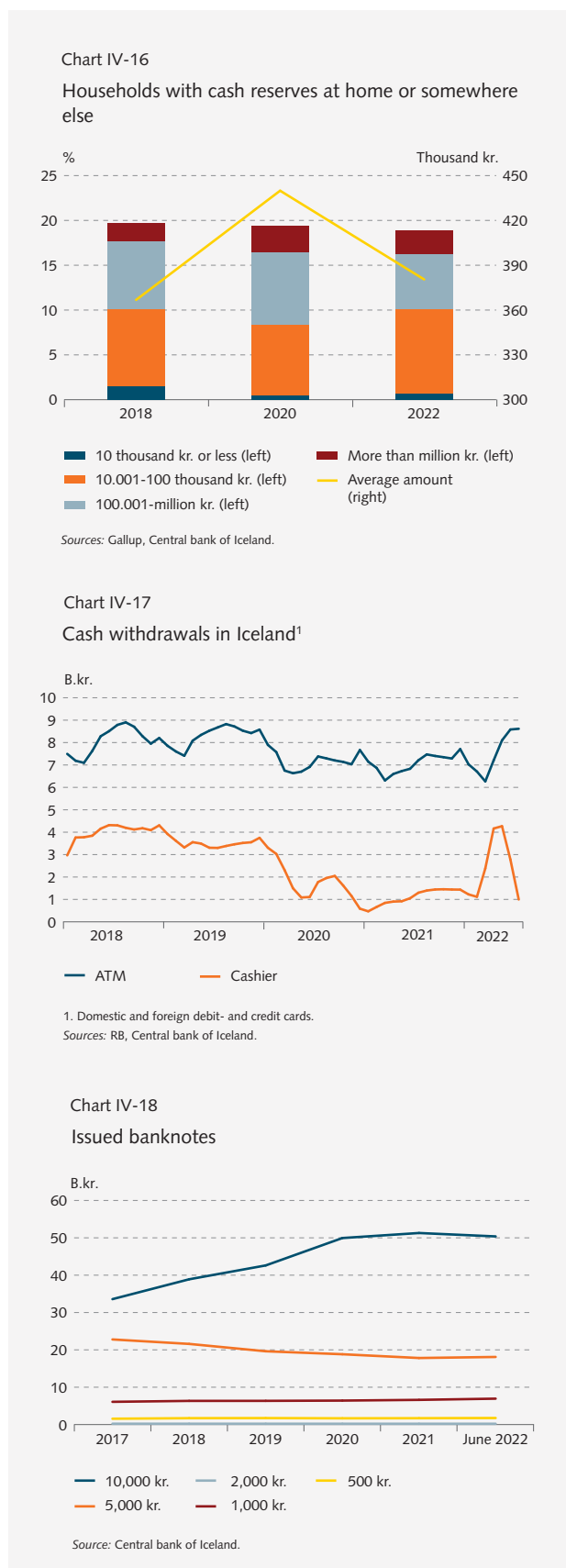
Serious cyberattacks on payment intermediation infrastructure could cause long-term interruption of service and disrupt the intermediation of capital in the economy. Other types of disruptions to domestic electronic payment intermediation could also do damage, including if international internet connections are disrupted or international payment card companies decide to block domestic debit and credit cards. Today some 99% of all payment card transactions are routed through VISA and Mastercard's card infrastructure. If electronic payment intermediation should be interrupted for a protracted period of time, it is crucial to guarantee that households can buy necessities such as food, fuel, and pharmaceuticals in some other way. Turnover in these goods categories averaged nearly 1 b.kr. per day in the first six months of 2022, or 30% of total payment card turnover in domestic retail sales.

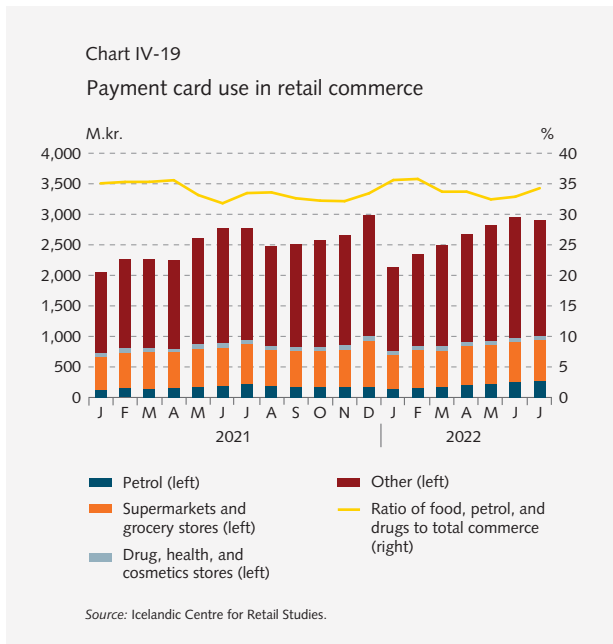
### Cash has a role to play in society

Although use of cash is generally limited, cash still has an important role to play in a digital world in order to foster secure and efficient payment intermediation. Cash prevents financial isolation because not everyone can use electronic payment instruments. Furthermore, by law, cash is legal tender for all payments, and it requires no electricity or internet connection.

It is vital to ensure that cash remains accessible to the public. The Central Bank has a large enough supply of banknotes and coin to cover a protracted period of uncertainty, and cash could be used to satisfy households' demand for necessities if electronic retail payment intermediation is interrupted. If internet connections go down, merchants, whose cash register systems are internet-reliant, could find themselves unable to give change back to customers who pay with banknotes of a higher denomination than is needed to pay for the goods or services purchased. By the same token, cash withdrawals at ATMs

<sup>11</sup> The Bank for International Settlements (BIS) has reported that the weight of cyber risk is growing steadily as economies and financial systems become more digitised.





and bank cashiers' desks require an internet connection. Domestic commercial banks are currently introducing a new ATM solution that does not require a payment card for cash withdrawals. Naturally, all digital payment instruments depend on electricity, and problems will inevitably ensue if a sustained power outage should occur.

### Contingency plan for disruption of payment intermediation

The Central Bank is currently evaluating possible ways to implement an independent domestic retail payment solution. Such a solution could be activated in the event of a disruption of service affecting payment cards routed through international card infrastructure. The Central Bank also emphasises the importance of having in place a contingency plan that includes the Bank; the RB banknote vault; and transportation of funds by security companies, commercial banks, and merchants; and that takes account of the size of emergency cash reserves, transaction speed, the responsibilities of the above-specified parties, and distribution channels.

### Central bank digital currency

Many central banks worldwide are examining, among other possibilities, the issuance of central bank digital currency (CBDC) concurrent with conventional physical currency, with the aim of being better able to carry out their role in payment intermediation.<sup>12</sup>

12 Further information on Icelandic digital currency, the *rafróna*, can be found in Central Bank of Iceland *Special Publication* no. 12: *Rafróna? Central bank digital currency – interim report*, published in 2018.

Deposit institutions already have access to CBDC through their deposits with the Central Bank deposits and via the Bank's payment systems. Wholesale CBDC would therefore change the characteristics of the current payment and settlement systems used by deposit institutions in interactions with central banks. The general public only has access to central bank money through banknotes and coin. Issuing CBDC to the public could therefore be a way to promote greater security in payment intermediation, as most electronic payments made today are settled by financial institutions using commercial bank money.

Four central banks have already begun issuing CBDC, and another 14 have launched pilot projects.<sup>13</sup> In Europe, Sveriges Riksbank, the European Central Bank, and the Bank of England have taken the lead in research and analysis of the topic. Sveriges Riksbank has already launched a pilot project, but no central bank in Europe has taken a formal decision on CBDC issuance.<sup>14</sup> The European Central Bank has thoroughly examined the impact and risks associated with issuance of the euro in the form of CBDC. Next year, the bank intends to take a position on whether to continue the project and take it to the next step with testing.<sup>15</sup> Many central banks have decided not to issue CBDC at the present time but have prepared contingency plans enabling them to begin issuance at short notice if conditions should change. The Central Bank will continue to follow these developments closely.

## Real-time payment intermediation, etc.

### Real-time payment intermediation in Iceland

Real-time payment intermediation in Iceland has a long history, and one that is unique in global context. For decades, RB hf. has administered real-time payment intermediation in Iceland. The company has been viewed as a critical service provider. The technical operation of the Central Bank's interbank system is outsourced to RB, which also monitors the system outside the opening hours of the system's gross settlement component. The interbank system and RB's payment intermediation systems form the core of real-time payment intermediation in Iceland.

The Central Bank's new interbank system was launched in October 2020,<sup>16</sup> following several years of

13 See, for instance, [the Atlantic Council website](#)

14 For further information, see [the Sveriges Riksbank website](#)

15 For further information, see [the European Central Bank website](#)

16 Supplants the older Central Bank/Greiðsluveitan interbank system for large-value payments and retail payments.

preparatory work. The same system is used by several other Nordic central banks.<sup>17</sup> Iceland's interbank system differs, however, in that a separate retail netting component was designed at the time the system was implemented, with the aim of retaining the real-time payment intermediation features the previous netting system had provided for since 2002.<sup>18</sup>

In addition to the above, Iceland has been engaged in a large-scale renewal and upgrade of its financial market infrastructure. In early 2022, the last of the country's deposit institutions finished implementing new SOPRA deposit systems, completing a process that had been underway for several years. In spite of these important milestones, it can be said that the renewal and reorganisation of financial market infrastructure is by nature a never-ending task. Tech innovations and new perspectives on security, efficacy, and efficiency in payment intermediation call for ongoing re-evaluation of the systems in place. In neighbouring countries, strong emphasis has been placed on real-time payment intermediation, i.e. how to introduce or execute it most effectively, and in the same vein, Iceland has focused on how best to maintain it.

### European real-time payment intermediation

The European Central Bank (ECB) operates a centralised real-time gross settlement system that provides for joint utilisation of services and ensures equal access to all market agents. Called TARGET2, short for Trans-European Automated Real-time Gross settlement Express Transfer system, it was launched in 2008.<sup>19</sup> Since then, the ECB has introduced new services for market agents, such as the multi-currency securities settlement system, TARGET2-Securities (T2S). Furthermore, in 2018 it introduced TARGET Instant Payment Settlement (TIPS), which enables payment service providers to offer their customers real-time transfers of funds 24 hours a day, year-round. TIPS, which is actually built on TARGET2, settles retail payments in central bank money. It originally settled in euros only but now offers other currencies as well. For the future, Nordic central banks have considered ECB systems, and some have even decided to use them.<sup>20</sup>

Danish securities transactions have been settled in euros in T2S ever since 2016, and since 2018 Danmarks

Nationalbank has also offered securities settlement in Danish kroner using central bank money, through a connection between T2S and Kronos2, the bank's real-time gross settlement system. In December 2020, the bank announced its decision to transfer all settlement in Danish kroner to ECB systems in 2024-2025. Large-scale preparatory work for the migration is still underway.<sup>21</sup>

In 2020, Sveriges Riksbank negotiated with the ECB for the use of TIPS for real-time settlement of retail payments in Swedish kronor. This will enable banks to use central bank money to settle such payments 24 hours a day, year-round. Sveriges Riksbank's real-time gross settlement system, RIX, now offers a new service for retail payments, called RIX-INST. The first phase, which entailed connecting RIX to TIPS, was completed earlier this year, but until that time TIPS could only settle payments in euros. In the second phase, scheduled for completion in H1/2023, Swedish financial market participants will test the TIPS system.<sup>22</sup>

Norges Bank is currently engaged in discussions with the ECB on possibly becoming a participant in TIPS. The bank's key objective is to foster the development of new real-time payment services for Norwegian consumers, as TIPS settles retail payments using central bank money. Norges Bank is examining technological factors, security, contingency plans, costs, etc. This work will form the foundations for the bank's decision about whether or not to become a participant in TIPS, with Norges Bank's requirements and stakeholders' interests as a guiding principle. It is not yet clear when such a decision will be made.<sup>23</sup>

The Central Bank of Iceland is keeping abreast of these developments. It has gathered information on and, to an extent, mapped out the ECB's Target services, with an eye to the potential interests of the Central Bank and the Icelandic market more broadly. It is possible that the Central Bank will apply for access to one or more Target services at some point in time.

### Rulebook Council

In connection with the reorganisation of Iceland's financial market infrastructure, it has been deemed important to consider introducing rulebooks covering domestic cooperation on such infrastructure, in accordance with developments in Europe, including the Nordic region.

Since 2021, there has been in operation, on the basis of a decision by the Governor, a Rulebook Council

17 SIA Perago (Nexi S.p.A.), used by Danmarks Nationalbank, Norges Bank, and Sveriges Riksbank.

18 Further information on the interbank payment system can be found [here](#)

19 In 2008, the system supplanted TARGET, which had been launched at the beginning of 1999, shortly after the adoption of the euro. It has been developed and is operated by three central banks – Bundesbank, Banque de France, and Banca d'Italia – on behalf of the Eurosystem.

20 From November 2022 onwards, [the ECB's Target services will be merged under a single name, T2](#).

21 The announcement can be found [here](#)

22 Further information on RIX-INST can be found [here](#)

23 For further information, see Norges Bank's [Financial infrastructure report 2022](#).

whose role is to discuss and decide whether to adopt foreign rulebooks to use in Iceland. The Rulebook Council is led by Greiðsluveitan ehf.,<sup>24</sup> and its members include representatives from the Central Bank, RB, and the systemically important commercial banks. Other deposit institutions also have a joint representative on the council.

The objectives of rulebook issuance are to lay down provisions on infrastructure participants' rights and responsibilities, set forth harmonised groundrules for payment system participants, standardise procedures, and enhance transparency in system operations.<sup>25</sup> The rulebooks, which are binding upon participants and are intended to increase security and efficacy in payment intermediation, contain information for example on the following:

- Governance practices.
- Management of changes to rulebooks.
- Handling of transfers/flows (i.e., payment orders, settlement, and reimbursements).
- Communications about solutions and about which technological standards define boundaries between parties.

Until now, the Rulebook Council has focused mainly on adoption of a rulebook for real-time payment intermediation. To this end, it has acquainted itself with the activities of both the Nordic Payments Council (NPC) and the European Payments Council (EPC) and their rulebooks on real-time transfers of funds.<sup>26</sup> The Governor recently agreed to the Council's proposal to aim at publishing a rulebook that would be based as much as possible on the EPC's SCT Inst rulebook.

### Payments Council

Reorganisation of financial market infrastructure aims to enhance operational security, efficacy, and efficiency and foster the development of joint financial infrastructure. In addition to the Rulebook Council, the Central Bank operates a Payments Council and the Forum for the Future, also under the leadership of Greiðsluveitan ehf. Sitting on the Payments Council are members from organisations representing the interests of the business community, including financial institutions, the

Consumers' Association of Iceland, RB, and public entities. The council gives stakeholders the opportunity to discuss and exchange information on matters relating to payment intermediation and to make their views known.

### Forum for the Future

The Forum for the Future, whose members include representatives from the Central Bank, deposit institutions, RB, and the Ministry of Finance and Economic Affairs, has the role of formulating a vision and priorities for the development of core financial market infrastructure in Iceland. It will also conduct a basic assessment of ideas and proposals for new cooperative projects in this area. The forum is guided by the public interest in its work.

## Cybersecurity during challenging times

Cyberattacks or attempted cyberattacks are continually on the rise, both in Iceland and worldwide. The number of incidents reported to Iceland's Computer Emergency Response Team (CERT-IS) surged from 266 in 2020 to 598 in 2021.<sup>27</sup> The vast majority of them were reports of swindling or fraud, including phishing, which is an attempt to obtain sensitive information such as payment card numbers or passwords.<sup>28</sup>

The promulgation of ever more malicious or highly developed cyberattack methods makes it more difficult for companies, institutions, and the general public to guard against such attacks. A recent example from Iceland involved a fraudulent attempt to lure one of the large commercial banks' customers to a website that looked exactly like a genuine online bank login page but turned out to be fake.

It can be said that the cyberattack landscape has undergone radical change. In recent years, there have been numerous severe cyberattacks directed at, for instance, key governmental institutions and important infrastructure. Examples include cyberattacks targeting the Norwegian Parliament, Stortinget, in 2020 and 2021, and an attack on software owned by Colonial Pipeline in the US in 2021. The latter incident halted oil distribution for several days, with widespread impact on the east coast of the US. Another instance was the installation of malware into SolarWinds' Orion system, which is widely used by governmental institutions in

24 Greiðsluveitan is an independent private limited company owned by the Central Bank of Iceland. Further information can be found [here](#).

25 Concurrent with the Rulebook Council's work, a new project under the leadership of RB has been underway. Participants in the project, which is called *new real-time payment intermediation*, are Rulebook Council members.

26 Instant Credit Transfer Rulebook (NPC) and SEPA Instant Credit Transfer (EPC).

27 CERT-IS operates on the basis of the Act on Network and Information Security, no. 78/2019. According to the Act, an *incident* is defined as any occurrence that adversely affects network and information security; cf. Article 6, Item 1 of the Act.

28 See the CERT-IS summary for 2021, which can be found [here](#).



the US. The hack was not discovered until much later. A final example is the RagnarLocker ransomware that, according to a 2022 report by the US Federal Bureau of Investigation (FBI), has affected numerous companies that operate important infrastructure, including in the energy, financial, and information technology sectors.

In this context, it is unavoidable to mention Russia's invasion of Ukraine, as the ensuing war has been conducted not only with conventional weapons but also via cyberattacks, which often target governmental institutions and important infrastructure in an attempt to cause maximum social disruption.<sup>29</sup> This has called for a large-scale awakening among governmental authorities worldwide and prompted countries and organisations throughout the West to review their security and defence policies or make plans to do so in the near future, with an eye to vastly increased emphasis on national security. The sanctions imposed on Russia in the wake of the invasion have been directed at the country's financial institutions and central bank, among other entities. Under the sanctions, all of Russia's leading banks have been barred from using the SWIFT messaging system, which excludes them from sending or receiving cross-border payments routed through the system. In addition, the Russian central bank's foreign assets have been frozen.<sup>30</sup> These sanctions have led to a dramatic increase in the number of fully executed or threatened cyberattacks originating in Russia, including attacks targeting European financial institutions, which has prompted the European Central Bank (ECB) and others to issue warnings about them. It is clear that in these challenging times, central banks, financial supervisors, and the financial system as a whole will place greater emphasis on cybersecurity, including how to shore up defences still further and how to foster increased cooperation in this area – both domestically and across borders, and across sectors.<sup>31</sup>

### **The importance of contingency plans, including business continuity plans**

Central banks, including the Central Bank of Iceland, are keenly aware that major or repeated cyberattacks could disrupt or adversely affect financial stability, and as a result, they place strong emphasis on the topic. This

applies not least to cyberattacks targeting systemically important financial market infrastructure and/or systemically important supervised entities.<sup>32</sup> It also applies to critical service providers, but in Iceland RB has been viewed as such a provider. RB's payment intermediation system, together with the Central Bank's interbank payment system, forms the core of real-time payment intermediation in Iceland. Furthermore, technical operation of the interbank system has been outsourced to RB, and all of the country's systemically important supervised entities are interbank system participants. Because electronic payment intermediation in Iceland is highly interconnected, there is considerable contagion risk. As a result, a cyber-attack on one of these entities or its infrastructure could potentially pose a threat to financial stability.

Not only is payment intermediation in Iceland interconnected and highly centralised, it is also digitised to a very large degree. It is therefore vital to ensure that the underlying financial market infrastructure satisfies the strict operational security requirements made of such infrastructure, including requirements concerning cyberdefences. In the main, these requirements are laid down in the European regulatory framework that Iceland has implemented due to its membership of the European Economic Area, and market agents must satisfy them. Furthermore, the Central Bank owns the interbank payment system, the country's most systemically important financial market infrastructure component, and is obliged to comply with stringent requirements in this area. The Core Principles for Financial Market Infrastructures (PFMI), issued by the Bank for International Settlements (BIS) and the International Organization of Securities Commissions (IOSCO), apply to the operation and oversight of the interbank system. The BIS has developed separate cybersecurity guidance on the basis of the PFMI.<sup>33</sup> Chart IV-20 shows the key factors prioritised in the cybersecurity guidance; for instance, it must be possible to reboot the most important parts of the system within two hours of a disruption in service, even in the case of large-scale cyberattacks, so that same-day settlement can take place and financial stability maintained. According to this the bar is set high in this regard, and it is vital that contingency plans take this into account.

29 This is discussed briefly in Box 6 of the Central Bank's *Financial Stability 2022/1* report, which can be found [here](#).

30 The sanctions are described more fully [here](#).

31 In reports issued in recent years, the World Economic Forum (WEF) has stated that cyberattacks are among the most critical threats currently facing the world. Further discussion can be found in the WEF Global Risk reports, which can be found [here](#).

32 The Central Bank's interbank system and the Nasdaq CSD SE securities settlement system are designated systemically important infrastructure, and Arion Bank hf., Íslandsbanki hf., and Landsbankinn hf. are designated systemically important supervised entities; cf. Article 13, Item (d) of Act no. 92/2019.

33 The PFMI Core Principles (2012) and the Guidance on Cyber Resilience for Financial Market Infrastructures (2016) can be found on [the BIS website](#).

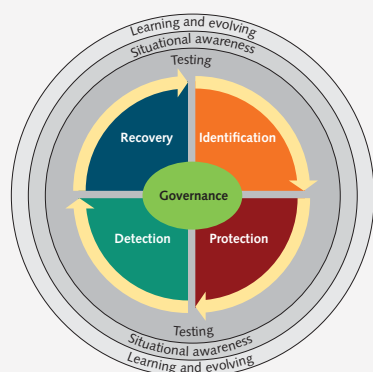


## Cybersecurity in the crosshairs

Cybersecurity is at the forefront of current issues. There is keen awareness of the importance of cooperation as a vehicle for improved performance in cybersecurity, including among central banks. The Central Bank of Iceland has strongly emphasised this, both as owner of the interbank system and in view of its legally mandated role, as well as its role as a catalyst in this area. Operating under the Central Bank's leadership is a cooperation forum on operational security of financial market infrastructure, known as SURF. Furthermore, the Bank has joined Nordic Financial CERT, as have Iceland's systemically important commercial banks and most of the other Nordic central banks.<sup>34</sup> Both of these endeavours have already proven their value. The Bank is also an auditing member of the Government's Cybersecurity Council and has a liaison on Iceland's National Security Council.<sup>35</sup>

It is necessary to strengthen even further the cooperation among all those with roles to play in bolstering cybersecurity, including contributing to increased public awareness of the risk that growing cyberthreats pose for all members of society. In addition to its importance to financial stability and national security, cybersecurity is a consumer issue that affects everyone. It is worth mentioning a project recently launched by the Confederation of Icelandic Employers, the Icelandic Financial Services Association, and the Consumers' Association of Iceland. Called "Take Two", it encourages the public to take two minutes to consider whether all is as it should be before paying for goods or services via computer or smart device. This is particularly important in view of the rapid pace of modern society and the growing problem stemming from cybercrime. It is vital that the authorities (including the Central Bank) and market agents join forces to achieve the above-described goals. The Central Bank recently published its *Supervisory Strategy* report for 2022-2024. Cybersecurity and IT security are at the top of its priorities.<sup>36</sup>

Chart IV-20  
Cyber resilience guidance components



Source: Guidance CPMI/IOSCO, page 7.

<sup>34</sup> For further discussion, see Box 6 of *Financial Stability 2022/1*, which can be found [here](#).

<sup>35</sup> Further information on Iceland's Cybersecurity Council, National Security Council, and other cybersecurity-related matters can be found [here](#).

<sup>36</sup> The report can be found [here](#).

# Appendix

## Tables

Table 1 Financial system assets<sup>1</sup>

Assets, b.kr	31.12.2018	31.12.2019	31.12.2020	31.12.2021	30.6.2022	Change from 31.12.2021, %
Central Bank of Iceland	755	840	844	964	920	-4.6
Deposit-taking corporations excluding the Central Bank	3.681	3.775	4.212	4.700	4.799	2.1
- Commercial banks	3.656	3.748	4.183	4.669	4.766	2.1
- Savings banks and other deposit-taking corporations	26	26	28	31	32	3.2
Money market funds	147	144	145	128	111	-13.3
Non-AWMF investment funds <sup>2</sup>	668	766	846	1.125	1.112	-1.2
Other financial intermediaries <sup>3, 4</sup>	397	290	258	221	227	2.7
Treasury	941	936	1.064	1.064	1.060	-0.4
- Housing Financing Fund	731	718	703	669	656	-1.9
Financial auxiliaries	25	25	54	59	59	0.0
Insurance corporations	232	259	290	320	320	0.0
Pension funds	4.245	4.975	5.732	6.747	6.386	-5.4
Total assets	11.091	12.010	13.445	15.328	14.993	-2.2

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, ESI, the Framtíðin credit fund, and Sparisjóðabankinn (SPB) are classified among other financial institutions. Data are as follows: for Byr, from January 2016 onwards; for ESI, 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, b.kr	31.12.2018	31.12.2019	31.12.2020	31.12.2021	30.6.2022	Change from 31.12.2021, %
Cash and deposits with Central Bank	293.870	329.923	213.003	281.653	244.957	-13
Deposits in domestic deposit-taking corporations	658	633	1.736	3.627	3.709	2
Deposits in foreign deposit-taking corporations	107.039	63.887	85.059	80.358	81.108	1
Domestic credit	2.708.062	2.784.748	3.070.639	3.409.643	3.612.051	6
Foreign credit	153.272	137.546	168.636	150.557	152.915	2
Domestic marketable bonds and bills	95.842	104.980	306.068	277.500	316.081	14
Foreign marketable bonds and bills	137.139	145.433	146.996	183.058	72.496	-60
Domestic equities and unit shares	101.026	121.132	123.347	191.208	177.682	-7
Foreign equities and unit shares	3.077	2.622	2.262	4.593	3.835	-17
Other domestic assets	68.435	67.047	74.048	108.794	126.027	16
Other foreign assets	13.068	16.693	19.845	9.229	7.775	-16
Total	3.681.488	3.774.645	4.211.637	4.700.220	4.798.636	2

Source: Central Bank of Iceland.

**Table 3 Other credit institutions' assets<sup>1</sup>**

<i>Assets, b.kr.</i>	<i>31.12.2018</i>	<i>31.12.2019</i>	<i>31.12.2020</i>	<i>31.12.2021</i>	<i>30.6.2022</i>	<i>Change from 31.12.2021, %</i>
Cash and deposits with Central Bank	29.493	21.067	0	0	0	0
Deposits in domestic deposit-taking corporations	20.511	8.639	16.822	9.559	10.851	14
Deposits in foreign deposit-taking corporations	36.088	28.597	24.927	15.945	10.357	-35
Domestic credit	137.595	154.903	178.680	162.245	167.114	3
Foreign credit	57.731	17.413	17.847	15.559	14.413	-7
Domestic marketable bonds and bills	258	1.430	5.387	10.079	10.701	6
Foreign marketable bonds and bills	266	0	0	7	7	-1
Domestic equities and unit shares	92.915	29.765	521	863	1.135	31
Foreign equities and unit shares	3.602	6.681	1.451	45	42	-7
Other domestic assets	12.068	18.126	8.849	3.553	3.007	-15
Other foreign assets	6.544	3.445	2.650	2.771	3.604	30
Total	397.071	290.065	257.136	220.627	221.231	0

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

<i>Assets, b.kr.</i>	<i>31.12.2018</i>	<i>31.12.2019</i>	<i>31.12.2020</i>	<i>31.12.2021</i>	<i>30.6.2022</i>	<i>Change from 31.12.2021, %</i>
Deposits in domestic deposit-taking corporations	142.872	151.522	164.821	170.092	159.584	-6
Deposits in foreign deposit-taking corporations	13.776	24.174	34.230	22.717	19.718	-13
Domestic credit	428.474	522.485	511.516	491.083	518.556	6
Foreign credit	309	378	495	423	596	41
Domestic marketable bonds and bills	1.909.858	1.970.450	2.105.645	2.305.830	2.353.207	2
Foreign marketable bonds and bills	3.980	8.516	8.568	7.578	10.126	34
Domestic equities and unit shares	647.835	805.115	987.843	1.336.313	1.252.416	-6
Foreign equities and unit shares	1.071.412	1.465.596	1.887.539	2.384.949	2.042.196	-14
Domestic insurance and pension assets	21.003	22.118	20.989	21.651	22.176	2
Foreign insurance and pension assets	69	48	50	30	34	14
Other domestic assets	5.083	4.149	5.690	5.987	5.038	-16
Other foreign assets	0	0	46	334	0	-100
Total	4.244.671	4.974.551	5.727.434	6.746.988	6.383.648	-5

Source: Central Bank of Iceland.

**Table 5 Insurance company assets**

<i>Assets, b.kr.</i>	<i>31.12.2018</i>	<i>31.12.2019</i>	<i>31.12.2020</i>	<i>31.12.2021</i>	<i>30.6.2022</i>	<i>Change from 31.12.2021, %</i>
Cash and deposits with Central Bank	1.563	440	2.574	3.097	4.167	35
Deposits in domestic deposit-taking corporations	6.589	10.166	6.985	6.441	7.126	11
Deposits in foreign deposit-taking corporations	75	48	28	0	0	0
Domestic credit	3.523	2.490	1.819	1.454	3.423	135
Foreign credit	0	0	0	0	0	0
Domestic marketable bonds and bills	98.628	112.194	137.759	151.058	146.688	-3
Foreign marketable bonds and bills	16.801	23.770	24.601	25.815	24.864	-4
Domestic equities and unit shares	61.159	65.790	74.850	72.283	68.763	-5
Foreign equities and unit shares	8.821	10.200	12.168	14.590	12.084	-17
Domestic insurance and pension assets	22.228	24.772	25.786	27.550	36.426	32
Foreign insurance and pension assets	6.310	6.997	6.311	6.614	6.088	-8
Other domestic assets	5.197	7.183	7.721	10.411	10.535	1
Other foreign assets	1.542	750	319	200	294	47
Total	232.436	264.800	300.922	319.512	320.459	0

Source: Central Bank of Iceland.

Table 6 D-SIB: Income and expenses

<i>Income and expenses, b.kr.</i>	30.6.2018	30.6.2019	30.6.2020	30.6.2021	30.6.2022	<i>Change from 30.06.2021,%</i>
Arion Bank hf.						
Operating income	23.315	23.928	23.039	28.101	27.774	-1
Net interest income	14.141	15.242	15.110	15.358	19.332	26
Net fee and commission income	4.917	4.696	5.764	6.839	8.091	18
Other operating income	4.257	3.990	2.165	5.904	351	-94
Operating expenses	13.686	13.480	12.602	12.420	12.850	3
Change in loan values	-301	2.069	3.778	-1.892	309	-116
Income tax	3.875	3.331	2.983	3.959	6.000	52
Net after-tax gain from discontinued operations	-442	-1.934	-934	241	6.915	2.769
Profit	5.011	3.114	2.742	13.855	15.530	12
Íslandsbanki hf.						
Operating income	22.780	23.400	20.040	23.717	26.639	12
Net interest income	15.342	16.341	16.808	16.607	19.463	17
Net fee and commission income	5.810	5.405	4.798	5.769	6.498	13
Other operating income	1.628	1.654	-1.566	1.341	678	-49
Operating expenses	14.301	12.943	12.038	12.684	11.992	-5
Change in loan values	1.934	1.809	5.929	-622	-1.058	70
Income tax	4.077	3.736	1.646	2.666	4.636	74
Net after-tax gain from discontinued operations	794	-203	-558	57	-2	-104
Profit	7.130	4.709	-131	9.046	11.067	22
Landsbankinn hf.						
Operating income	27.291	30.272	22.710	27.485	22.789	-17
Net interest income	19.476	20.459	18.939	18.958	21.418	13
Net fee and commission income	3.876	4.136	3.598	4.368	5.422	24
Other operating income	3.939	5.677	173	4.159	-4.051	-197
Operating expenses	12.154	12.231	12.282	12.010	11.856	-1
Change in loan values	-1.727	2.372	13.435	-2.782	-43	-98
Income tax	5.251	4.556	280	4.152	5.419	31
Net after-tax gain from discontinued operations	0	0	0	0	0	0
Profit	11.613	11.113	-3.287	14.105	5.557	-61
D-SIB						
Operating income	73.386	77.600	65.789	79.303	77.202	-3
Net interest income	48.959	52.042	50.857	50.923	60.213	18
Net fee and commission income	14.603	14.237	14.160	16.976	20.011	18
Other operating income	9.824	11.321	772	11.404	-3.022	-126
Operating expenses	40.141	38.654	36.922	37.114	36.698	-1
Change in loan values	-3.360	6.250	23.142	-5.296	-792	-85
Income tax	13.203	11.623	4.909	10.777	16.055	49
Net after-tax gain from discontinued operations	352	-2.137	-1.492	298	6.913	2.220
Profit	23.754	18.936	-676	37.006	32.154	-13

Source: Commercial banks' financial statements.

Table 7 D-SIB: Key ratios

%	31.12.2018	31.12.2019	31.12.2020	31.12.2021	30.6.2022
Return on equity	6,1	4,5	4,8	12,4	10,0
Return on assets	1,1	0,7	0,7	1,9	1,4
Expenses as a share of net interest and commission income	60,0	57,8	54,1	51,8	45,7
Expenses as a share of total assets	2,3	2,1	1,8	1,7	1,6
Net interest and commission income as a share of total income	92,4	88,2	91,8	86,8	103,9
Net interest income as a share of total assets	2,9	2,7	2,6	2,4	2,7
Capital ratio	23,2	24,2	24,9	25,4	23,3
Foreign exchange as a share of the capital base	0,3	2,1	0,3	0,1	0,4
Liquidity coverage ratio (LCR), total	166	165,9	179,7	176,1	151,3
Liquidity coverage ratio (LCR), FX	509,6	508	481,3	514,3	225,1
Net stable funding ratio (NSFR), total	117,9	117	118,7	121	164,9
Net stable funding ratio (NSFR), FX	159,8	141,2	147	118,4	160,8

Source: Central Bank of Iceland.

Table 8 Commercial banks' foreign bond issues, last 12 months (22 September 2021 - 22 September 2022)

Issuer	Date	Currency	Amount (b.kr.)	Maturity (years)	Premium on interbank rate <sup>1</sup> %
Arion bank	oct. 21	EUR <sup>2</sup>	44.0	4.0	0.27
	mar.22	EUR <sup>2</sup>	28.0	4.5	0.37
	aug.22	NOK	7.8	3.0	
	aug.22	SEK	3.1	3.0	3.71
	sep.22	EUR	42.0	2.0	2.65
Total			124.9		
Islandsbanki	jan.22	EUR	42.5	2.5	0.75 fixed
	sep.22	EUR <sup>2</sup>	42.0	5.0	0.7
Total			84.5		
Landsbankinn	jan.22	SEK	12.2	2.5	0.8
	jan.22	SEK	12.2	2.5	0.65
	jan.22	NOK	12.2	2.5	0.79
	aug.22	NOK	7.4	2.0	4.26
	aug.22	NOK	5.0	3.0	
Total			49.0		

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 <sup>1</sup>	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	1.1.20177

1. Effective 1 January 2020, the Central Bank of Iceland sets rules on capital buffers, 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

	<i>Unit</i>	<i>Frequency</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>M8 or Q2 2021</i>
Net IIP	% of GDP	Q	9.3	19.7	34.0	40.2	23.5
External debt <sup>1</sup>	% of GDP	Q	82.1	77.5	84.7	84.8	79.0
Net external debt <sup>2</sup>	% of GDP	Q	22.4	21.4	22.3	27.7	29.9
Short-term debt based on remaining maturity <sup>3</sup>	% of GDP	Q	17.3	13.9	11.3	15.3	15.7
Treasury FX debt as a share of total debt	%	M	14.9	21.1	20.1	23.9	20.5
Commercial banks' foreign-denominated bonds	% of GDP	Q	20.9	19.2	22.1	22.5	21.1
Current account balance <sup>4</sup>	% of GDP	Q	4.1	6.5	1.9	-1.6	-4.8
International reserves	% of GDP	M	25.9	27.0	27.8	28.4	25.7
International reserves financed in krónur	% of GDP	M	20.8	20.1	18.4	15.1	13.9
International reserves/IMF RAM	%	Q	139.5	153.4	151.9	144.9	135.8
Terms of trade <sup>5</sup>	Value	Q	91.2	94.2	92.0	98.4	99.2
Nominal exchange rate <sup>6</sup>	Value	M	173.8	179.7	200.5	195.6	191.2
Real exchange rate <sup>7</sup>	Value	M	90.3	91.3	84.8	86.6	90.0
Treasury's highest credit rating	Rating	-	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. Article 3 of Act no. 114/2021.

### **Acquirer**

A provider of payment services that offers acquiring; cf. Act no. 114/2021.

### **Acquiring**

One type of payment service described in the Payment Services Act, no. 114/2021; cf. Article 3, Item 22(e) of Act no. 114/2021.

### **Balance on goods**

The difference between the value of exported and imported goods.

### **Balance on income**

The difference between revenues and expenses due to primary income and secondary income.

### **Balance on services**

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.

### **Blockchain technology**

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. Blockchain technology has been used, among other things, to develop cryptocurrencies such as Bitcoin. The blockchain does not include information on owners, such as their names or identification numbers, and despite its traceability properties, there are certain restrictions on access.

### **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.

### **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; cf. Articles 84-85 of Act no. 161/2002.

### **Capital buffer**

Additional capital required by the Central Bank upon approval from the Financial Stability Committee. Capital buffers currently in effect are: capital conservation buffer, countercyclical capital buffer, capital buffer for systemically important institutions, and systemic risk buffer.

### **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 as described in Act 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 before deducting discounts or loan loss provisions.

### **Commercial bank**

A financial institution that has been granted an operating licence pursuant to Article 4, Paragraph 1, (1) of the Act on Financial Undertakings, no. 161/2002.

**Commercial bank money**

A claim against a commercial bank/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 (credit undertaking)**

A company whose business is to receive deposits or other repayable funds from the public and to grant credit on its own account.

**Cross-default nonperforming loans**

Based on the cross-default method, all of a given customer's loans are considered to be in default if one loan is 90 days past due, frozen, or deemed unlikely to be repaid.

**Cryptocurrencies**

Electronic or digital currencies have not been defined in a harmonised manner, but the term virtual currency(-ies) has been used in Icelandic law.

**CSDR**

Regulation (EU) no. 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories.

**Current account balance**

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

**Deposit institutions**

Commercial banks and savings banks licenced 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. Article 3 of Act no. 140/2018.

**Disposable income**

Income net of taxes.

**Distributed ledger technology (DLT)**

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 Financial Stability Council. Currently, D-SIBs in Iceland are Arion Bank hf., Íslandsbanki hf., and Landsbankinn hf. In addition, the Housing Financing Fund (HFF) is considered a systemically important supervised entity.

**Economic outlook index**

Corporate expectations concerning economic developments and prospects, based on the Gallup survey carried out among executives from Iceland's 400 largest firms.

**Electronic króna/krónur**

Digital cash that could potentially be issued by the Central Bank of Iceland, would be in digital form, and would be stored in a specific medium (such as cards or apps) or in an account with the Central Bank.

**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. Act no. 17/2013.

**Encumbrance ratio**

The proportion of a bank's assets that are hypothecated for funding.

**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. EU Regulations no. 1093/2010, 1094/2010 and 1095/2010, incorporated into Icelandic law with Act no. 24/2017; cf. Articles 2 and 3 of the Act.

**Equity**

Assets net of liabilities.

**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 default**

Based on the facility method, a given customer's loan is considered to be in default if it is past due 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 institutions (including the Housing Financing Fund, HFF); pension funds; insurance companies; mutual, investment, and institutional 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 sets rules on credit institutions' foreign exchange balance. 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 15% of the capital base.

**Foreign exchange imbalance**

Difference between assets and liabilities in foreign currencies.

**Foreign exchange reserves**

Foreign assets managed by monetary authorities and considered accessible for direct or indirect funding of an external balance of payments deficit.

**FSB**

Financial Stability Board.

**Funding rules**

The Central Bank of Iceland sets rules on foreign currency funding ratio. The rules are based on the net stable funding ratio (NSFR) developed by the BCBS. The rules are designed to limit the extent to which banks can rely on unstable, short-term foreign funding to finance long-term loans granted in foreign currency. The ratio is subject to a minimum of 100%.

**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 in their operations, albeit with reservations concerning their rights as shareholders.

**Indexation imbalance**

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 institutions) in interbank systems that are generally operated by central banks. PFMI

**Interest burden**

Interest payments as a percentage of disposable income.

**Interest premium**

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

**Internal payment system/In-house payment intermediation**

Payments between customers of a single payment service provider (financial institution).

**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.

**Key Central Bank of Iceland 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 interest 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.

**Legal tender**

Banknotes and coin issued by the Central Bank and accepted for all payments at full nominal value; cf. Acts no. 92/2019 and 22/1968.

**Liquidity coverage**

The ratio of high-quality liquid assets to potential net outflows over a 30-day period under ratio (LCR) stressed conditions; cf. the Rules on Liquidity Coverage Requirements for Credit Institutions no. 266/2017.

**Liquidity rules ratio (LCR)**

The Central Bank's liquidity rules are based on the liquidity coverage requirements developed by the Basel Committee on Banking Supervision (BCBS) and are largely harmonised with European Union liquidity rules. Credit institutions must always have sufficient high-quality assets to cover potential liquidity needs over the coming 30 days under stressed conditions. The LCR may not fall below 100% for all currencies combined or for all foreign currencies combined.

**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).

**Net stable funding (NSFR)**

The ratio of available stable funding to required stable funding; cf. the Rules on Funding ratio Ratios in Foreign Currencies, no. 1032/2014.

**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. Article 3 of Act no. 114/2021.

**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 wage index to the consumer price index (CPI).

**Risk-weighted assets**

Assets adjusted using risk weights; cf. Article 84(e) of Act no. 161/2002.

**Risk-weighted assets (risk base)**

The sum of the weighted risks of financial institutions (e.g., credit risk, market risk, operational risk, etc.), cf. Article 84(e) of Act no. 161/2002.

**Shadow bank**

Definition based on the methodology of the Financial Stability Board (FSB). Shadow banking is defined as credit intermediation involving entities and activities outside the regular banking system. Shadow banks include money market funds, bond funds, equity funds, investment funds, specialized investment companies, securities companies, brokers, specialized funds and other credit institutions. Government operated credit institutions, pension funds, insurance companies and financial auxiliaries are excluded. A detailed discussion on the methodology can be found in the Committee on Shadow Banking's March 2015 report to the Ministry of Finance and Economic Affairs.

**Stablecoin**

A type of virtual currency 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 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.

**The IMF's reserve adequacy metric (RAM)**

The reserve was developed by the International Monetary Fund (IMF) as a criterion for desirable size of foreign exchange 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 elements: i. Export revenues: Reflect the risk of contraction in foreign currency accumulation ii. Money holdings: Reflect potential capital flight in connection with liquid assets iii. Foreign short-term liabilities: Reflect the economy's refinancing risk iv. Other foreign debt: Reflects outflows of portfolio assets The RAM is the sum of 30% of current foreign short-term liabilities, 15% of other foreign debt (20% at constant exchange rates), 5% of money holdings (10% at constant exchange rates), and 5% of export revenues (10% at constant exchange rates).

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

PSD and PSD2

The EU Payment Services Directives.

**Trade-weighted exchange**

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

**Virtual currency**

Any type of digital money that is neither electronic money in the sense of the Act on Issuance and Treatment of Electronic Money nor a fiat currency; cf. Article 3 of Act no. 140/2018. Virtual currency 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 currency 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 aversion.

**Yield**

The annualised return that an investor requires on funds invested.

**Yield curve**

A curve that plots the interest rates, at a set point in time, of bonds with equal credit quality but differing maturity dates.

