MONETARY BULLETIN

2017•4

Contents

The objective of the Central Bank of Iceland's monetary policy is to contribute to general economic well-being in Iceland. The Central Bank does so by promoting price stability, which is its main objective. In the joint declaration made by the Government of Iceland and Central Bank of Iceland on 27 March 2001, this is defined as aiming at an average rate of inflation, measured as the 12-month increase in the CPI, of as close to 2½% as possible.

Professional analysis and transparency are prerequisites for credible monetary policy. In publishing *Monetary Bulletin* four times a year, the Central Bank aims to fulfil these principles.

Monetary Bulletin includes a detailed analysis of economic developments and prospects, on which the Monetary Policy Committee's interest rate decisions are based. It also represents a vehicle for the Bank's accountability towards Government authorities and the public.

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Icelandic letters:

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

Statement of the Monetary Policy Committee 15 November 2017

The Monetary Policy Committee (MPC) of the Central Bank of Iceland has decided to keep the Bank's interest rates unchanged. The Bank's key interest rate – the rate on seven-day term deposits – will therefore remain 4.25%.

According to the Central Bank's new macroeconomic forecast, published in *Monetary Bulletin* 2017/4, GDP growth will slow significantly this year, and more than the Bank projected in August. It is forecast at 3.7%, down from last year's GDP growth rate of 7.4%, as a result of a slowdown in export growth, after several strong years, and a pickup in import growth.

The outlook is for inflation to align with the target in mid-2018 and stay close to target for the remainder of the forecast horizon. House price inflation has eased, which will contribute to lower headline inflation if the trend continues. Counteracting this are the diminishing effects of a strong króna. The króna has appreciated since the last MPC meeting, and exchange rate volatility has eased in recent months. Inflation expectations are well in line with the target, and fluctuations in the exchange rate during the year have had limited impact on inflation and inflation expectations.

There are indications that the output gap may have peaked. Significant demand pressures remain, however, which calls for a tight monetary stance so as to ensure medium-term price stability. Reduced demand pressures and an improved inflation outlook are consistent with the MPC's expectations in October, and the Bank's real rate is broadly as it was after the October interest rate decision. The current monetary stance appears sufficient at present to keep inflation broadly at target. Whether this turns out to be the case in the coming term will depend on economic developments, including fiscal policy and the results of wage settlements.

Faster adjustment of GDP growth to its long-term trend rate

The global economic recovery has gained further momentum and now extends to more countries than before. There is increased optimism about the global outlook, although the effects of geopolitical uncertainty can still be felt. Even though the global economic recovery has picked up, Iceland's export growth has eased, following a surge in H2/2016. It appears that it has taken longer to make up the production loss in the fishing industry following the fishermen's strike at the beginning of the year and that growth in service exports has subsided more quickly than was assumed in the August *Monetary Bulletin*. Furthermore, there are signs that marine product prices, the main source of the past few years' improvement in terms of trade, fell in Q3 and that terms of trade will improve somewhat less this year than previously forecast. As a result, the outlook is for the current account surplus to shrink more rapidly than previously assumed.

A slowdown in export growth changes the 2017 GDP growth outlook from the Bank's previous forecast. GDP growth measured 4.3% in H1/2017, down from over 10% in H2/2016. The H1 growth rate is below expectations, and for the year as a whole, GDP growth is now forecast at 3.7% instead of the 5.2% projected in August. Growth in domestic demand looks set to remain broadly unchanged, however. It is forecast to increase by 6.3% year-on-year, supported by fiscal easing and hefty rises in disposable income. The GDP growth outlook for the next two years is largely unchanged from the previous forecast, however. Growth is expected to continue broadly at this year's pace in 2018 and then ease still further towards its long-term trend rate as the forecast horizon progresses. It will nevertheless be robust over most of the forecast horizon and well above both historical and trading partner averages.

There are signs that the output gap that opened up early in 2015 has peaked. Because of the strong GDP growth in recent years and over the majority of the forecast horizon, the output gap will not disappear entirely until very late in the forecast period. Inflation measured 1.9% in October and has been at or below target for almost four years. There are signs that long-term inflation expectations are more firmly anchored to the target than before. The outlook is for inflation to remain below target until mid-2018 and to be at target, on average, over the forecast horizon as a whole. Inflation is projected to be somewhat below the August forecast for most of the forecast horizon, mainly because of weaker demand pressures in the economy and smaller increases in unit labour costs than forecast in August.

I Economic outlook, key assumptions, and main uncertainties

Central Bank baseline forecast[1]

Global GDP growth gains momentum and spreads to more countries

Global GDP growth measured 3.2% in 2016, the weakest in the post-crisis period and nearly ½ a percentage point below its historical average. Indications of a recovery have grown clearer as 2017 has progressed, however. GDP growth also appears to be picking up and spreading to more countries. The International Monetary Fund (IMF) forecasts that global GDP growth will reach its long-term average this year and that output will grow by 3.6% year-on-year. According to the Fund's forecast, global GDP growth will gain pace in the next few years, averaging 3.7% per year. This is an improvement from the IMF's previous forecast and the second time in a row that the Fund has revised its forecast upwards, a change from its previous pattern of systematically overestimating the global GDP growth outlook.

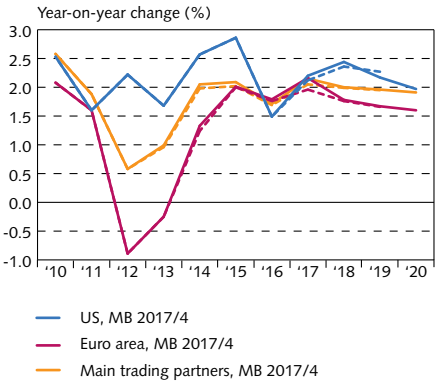
According to the baseline forecast, GDP growth among Iceland's main trading partners will measure 2.2% this year, a marginal improvement from the August forecast (Chart I-1). The most important factor is the strong economic recovery in the eurozone, although the GDP growth outlook in the US is considered slightly improved. On the other hand, indicators suggest that GDP growth in the UK will be weaker than previously forecast. As in August, output growth among Iceland's trading partners is expected to weaken slightly next year, to an annual average of 2% over the next three years. Further discussion of the global economy can be found in Chapter II, and uncertainties in the global outlook are discussed later in this chapter.

Terms of trade weaker this year than previously forecast, while the exchange rate outlook is largely unchanged

Terms of trade for goods and services improved substantially in 2014-2015, owing primarily to a decline in global oil and commodity prices and favourable developments in marine product prices (see Box 1 in *Monetary Bulletin* 2016/2). In 2016, however, foreign currency prices of marine products were unchanged, and terms of trade for goods deteriorated by over 2%, even though terms of trade improved overall (Chart I-2). This trend looks set to continue this year: terms of trade for goods will deteriorate by another 2%, while terms of trade overall will improve by nearly 1%. This is a less favourable than was forecast in August and is due primarily to much lower marine product prices in Q3/2017, plus a more rapid rise in oil and commodity prices, although more favourable developments in aluminium prices pull in the opposite direction. According to the forecast, terms of trade for goods will continue to weaken in the next few years, while for goods and services combined they will remain broadly unchanged.

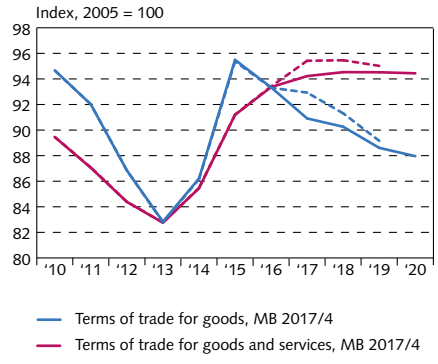
1. The analysis presented in this *Monetary Bulletin* is based on data available in mid-November.

Chart I-1
Global output growth 2010-2020[1]



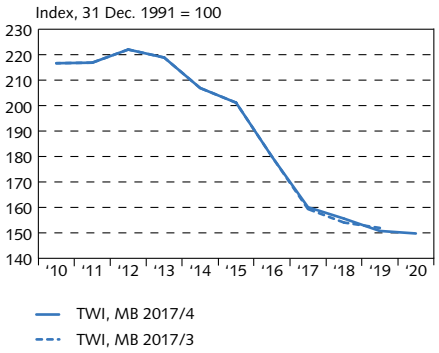
1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: OECD, Thomson Reuters, Central Bank of Iceland.

Chart I-2
Terms of trade 2010-2020[1]



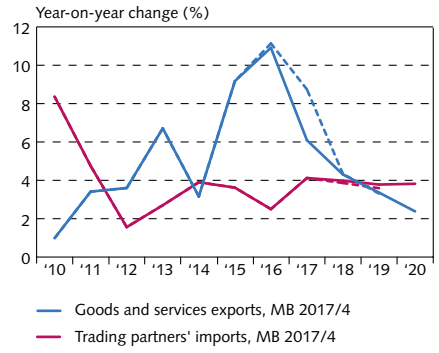
1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-3
Exchange rate 2010-2020[1]



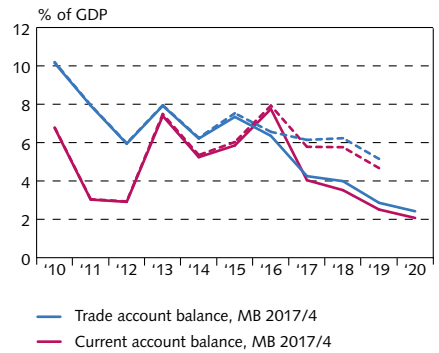
1. Central Bank baseline forecast 2017-2020. Narrow trade basket.
Source: Central Bank of Iceland.

Chart I-4
Exports and global demand 2010-2020[1]



1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Thomson Reuters, Central Bank of Iceland.

Chart I-5
Current account balance 2010-2020[1]



1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3. Current account balance based on estimated underlying balance 2008-2015.
Sources: Statistics Iceland, Central Bank of Iceland.

Fluctuations in the exchange rate of the króna increased during the summer but have subsided again as the foreign exchange market has adjusted to the new environment of free movement of capital.[2] The króna depreciated in trade-weighted terms by just over 5% quarter-on-quarter in Q3, broadly as was forecast in the August *Monetary Bulletin*. Nevertheless, the króna was a full 8% stronger, on average, against the average of other currencies than it was in Q3/2016. As in August, the exchange rate is expected to rise in the near term, but much less than in the past year (Chart I-3). As before, the increase will be driven by a rise in the equilibrium real exchange rate. The equilibrium rate is expected to rise somewhat less than previously assumed, in line with a poorer outlook for terms of trade and a forecast of a smaller external trade surplus, as is discussed below. Both the outlook and the estimate of the equilibrium real exchange rate are always subject to some uncertainty, however. Further discussion of this uncertainty can be found later in this chapter, and terms of trade and the exchange rate are discussed in Chapters II and III.

Weaker export growth this year and prospect of a more rapid contraction in the current account surplus than previously assumed

One of the main drivers of the economic recovery in recent years has been the extraordinary rise of the Icelandic tourism industry, which has been the main source of the 10% average export growth in the past two years. As 2017 has progressed, however, there have been signs that the rate of growth is easing. In H1, exports of goods and services grew by just over 6% year-on-year, and the outlook is for broadly similar growth for the year as a whole. This is still a handsome growth rate, however, particularly given that growth in trading partner demand has averaged roughly 3% in recent years (Chart I-4). It is somewhat below the August forecast, however, because services exports grew less in H1 than previously assumed and are expected to grow less strongly for the remainder of the year. The other main reason for the poorer outlook for exports in 2017 is that marine product exports appear to have grown much less in Q3 than was previously assumed, and interviews with fishing company executives suggest that it took longer than expected to make up the production losses from the fishermen's strike early in the year. In addition, silicon exports are expected to be weaker this year than previously estimated. As in the Bank's previous forecast, export growth is expected to slow down still further in the next few years.

Because of the combined effect of weaker export growth and a more modest improvement in terms of trade, the surplus on goods and services trade is forecast to be smaller this year than previously assumed. According to the August forecast, the trade surplus was estimated at 6% of GDP, whereas it is now projected at 4.2%, with three-fourths of the difference due to weaker export growth (Chart I-5). The surplus will also shrink more rapidly next year because of

2. A discussion of exchange rate fluctuations in historical and international context can be found in Box 1. Box 2 discusses the special reserve requirement used by the Central Bank to temper capital inflows.

the additional impact of faster growth in services imports. The trade surplus is forecast to measure 4% in 2018 and is expected to narrow to 2½% by 2020. The current account balance will develop similarly: the surplus measured nearly 8% of GDP in 2016 and will contract to 4% this year and 2% by 2020. Further discussion of exports and the external balance can be found in Chapter IV.

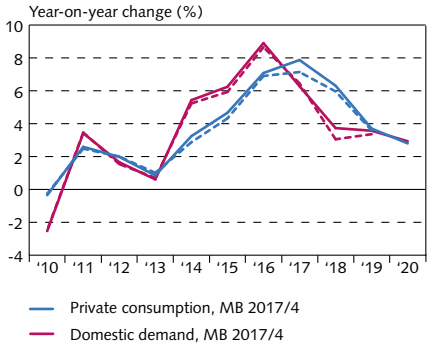
Strong growth in domestic demand and signs of more rapid private consumption growth than forecast in August

Real disposable income has risen by over 9% per year in the past two years and is expected to increase by nearly 8% this year. It has therefore grown by more than a third in four years and has now overtaken its pre-crisis peak. At the same time, households' real net wealth has increased by nearly one-fourth per year. Households' financial conditions have therefore improved substantially, as is reflected in strong growth in private consumption, which increased by over 7% in 2016 and by 8.3% in H1/2017, according to preliminary figures from Statistics Iceland. The Bank has therefore revised its forecast for year-2017 private consumption growth upwards to 7.9%, from 7.1% in August (Chart I-6). The pace of private consumption growth is expected to ease slightly as the forecast horizon progresses. In spite of a large increase in consumption spending, households have been able to build up significant savings, as disposable income has grown even more rapidly. It is estimated that households saved 10½% of their disposable income in 2016, and the saving rate is expected to remain broadly steady for the remainder of the forecast horizon.

Investment activity has also picked up strongly in recent years. In 2016, business investment increased by over 26%, on the back of nearly 30% growth in 2015. Residential investment was strong as well, growing by nearly a third in 2016. Total investment therefore grew by nearly 23% last year, and the investment-to-GDP ratio was slightly above 21%, the highest since 2008 and almost 1 percentage point above the twenty-five-year average. It was foreseen that the surge would subside this year, yet the pace of growth will remain robust, at nearly 9%. As in the Bank's August forecast, total investment is projected to contract slightly in 2018, owing to a downturn in business investment. This reflects a reduction in investment in energy-intensive industry and in ships and aircraft. Other business investment will continue to grow by nearly 10%, however. If the forecast materialises, the investment-to-GDP ratio will hold steady at just over 21% throughout the forecast horizon (Chart I-7).

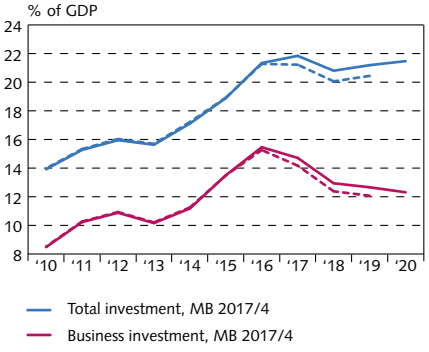
Consumption and investment spending grew by 6.1% in H1/2017. This was offset by a contraction in inventories, particularly in the fishing sector; therefore, domestic demand grew at a slower rate, or 5.4%. Growth in domestic demand is projected at 6.3% for 2017 as a whole, on the heels of 8.9% in 2016 and an average of nearly 7% over the past three years (Chart I-6). It is estimated to measure 3½% per year over the next two years and then taper off to about 3% in 2020. Further discussion of private and public sector demand can be found in Chapter IV.

Chart I-6
Private consumption and domestic demand 2010-2020[1]



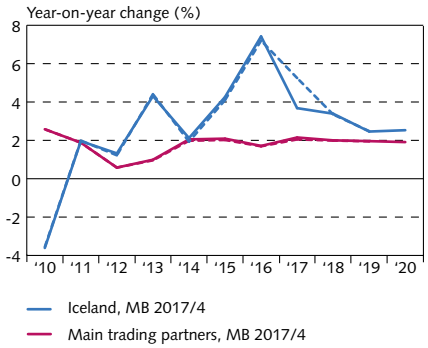
1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-7
Investment 2010-2020[1]



1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-8
GDP growth in Iceland and trading partners 2010-2020[1]



1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Thomson Reuters, Central Bank of Iceland.

GDP growth subsides faster than previously forecast

GDP growth measured 10.4% in H2/2016, but preliminary figures from Statistics Iceland indicate that it slowed markedly in H1/2017. It measured 5.2% in Q1 and then subsided still further in Q2, to 3.4%. This decline in GDP growth was foreseeable to an extent, as the rapid growth in services exports in H2/2016 was expected to ease and it was known that H1/2017 exports and inventories would be affected by the fishermen's strike. Even so, the fall was steeper than was assumed in the August forecast, which provided for 5.6% GDP growth in H1/2017, whereas Statistics Iceland's preliminary figures indicate a growth rate of 4.3%. The outlook for Q3 is also poorer, in view of indications that export growth has weakened more rapidly than previously forecast. GDP growth is now forecast at just over 1% for Q3 and just over 3% for H2, as opposed to almost 5% in the August forecast. For the year as a whole, output growth will therefore be markedly weaker than was projected in August, or 3.7% instead of the previously forecasted 5.2% (Chart I-8). The outlook for the next two years is broadly unchanged, however: GDP growth is forecast to measure 3.4% in 2018, which is similar to this year's growth rate, and then ease towards long-term trend growth and measure approximately 2.5% per year in 2019 and 2020.[3]

As in the Bank's previous forecasts, GDP growth will be above the trading partner average for the entire forecast horizon, and if this forecast materialises, the current growth phase will span a decade, the longest episode of GDP growth per capita since measurements began. Further discussion of developments in GDP growth can be found in Chapter IV.

Signs that labour demand growth is easing and the output gap has peaked

Further indications that growth in economic activity is moderating can be found in the labour market, where job creation has slowed markedly, according to the Statistics Iceland labour force survey (LFS). The number of jobs rose by 1.8% in Q2 but stood still in Q3. Because of a reduction in average hours worked, total hours contracted in Q3, for the first time since 2012. This is surprising because the number of foreign nationals migrating to Iceland is still rising fast, as is the working-age population. It is likely that this reflects to some extent measurement problems in the LFS, which appears to capture the number of foreign workers in Iceland poorly or with a time lag (see Chapter V). Although the LFS results should be interpreted with some caution, it does appear that growth in labour demand has subsided. According to a recent Gallup survey, the share of firms planning to add on staff net of the share planning to downsize has fallen somewhat, and the same can be said of the share of firms considering themselves understaffed or operating at or above full capacity. These ratios are still high

3. As is discussed in Box 3, the Bank also uses forecasts from its DSGE model as a cross-check for the Bank's baseline forecast. The DSGE model forecasts stronger GDP growth in 2018 but a lower growth rate for 2019. For the forecast period as a whole, the growth outlook is almost identical, however. The inflation outlook is also broadly similar, reflecting the offsetting effects of a lower exchange rate and smaller wage increases according to the DSGE model than are assumed in the baseline forecast.

in international and historical context, however, and a considerably larger number of companies are planning further recruiting than are interested in laying off staff. Unemployment is still falling, to a seasonally adjusted rate of 2.3% in Q3.

For the remainder of the year, total hours are expected to rise broadly as they have in 2017 to date. The year-on-year increase will therefore be slightly more than 1%, considerably below the August forecast (Chart I-9). As a result, the employment rate will be almost 1 percentage point lower this year than previously estimated, a difference that will remain for the rest of the forecast horizon. Unemployment is forecast to average 2.6% this year, a reduction of 0.4 percentage points year-on-year and almost 6 percentage points from its 2010 peak. Large-scale importation of labour is expected to hold back wage increases, and the equilibrium unemployment rate is therefore lower than previously thought. As a result, measured unemployment will rise more slowly in coming years than previously forecast, to just over 3% by the end of the forecast horizon (Chart I-10).

Because of Statistics Iceland's revision of GDP growth figures for the past few years, the output gap is estimated to have been larger at year-end 2016 than was assumed in the Bank's August forecast.[4] The prospect of weaker GDP growth this year means that the output gap is expected to be smaller, however. It is estimated to measure just under 2% of potential output by the end of the year, down by about 1 percentage point from the August forecast (Chart I-10). As was the case in August, it is expected to narrow further and virtually disappear by end-2020.

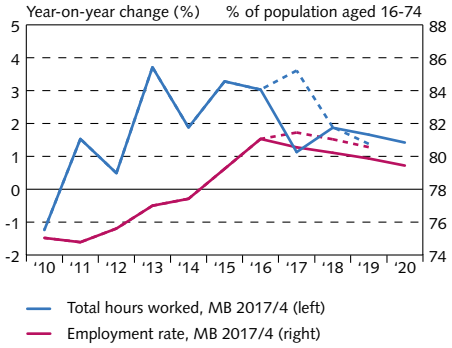
As was discussed in *Monetary Bulletin* 2017/2, current estimates of the output gap are based on the assumption that potential output has increased rapidly in recent years, and well in excess of its long-term trend. This is due to strong importation of labour and production equipment. Growth in potential output is expected to ease towards its long-term rate over the forecast horizon, as is GDP growth. It should be borne in mind that the assessment of potential output and growth in potential output, including the output gap itself, is always subject to uncertainty. Further discussion of the labour market and factor utilisation can be found in Chapter V.

Inflation to rise as 2018 progresses but remain close to target over the forecast horizon

Inflation measured 1.7% in Q3 and was unchanged from the previous quarter. It has fluctuated within a 1½-2% range since Q2/2015 and has been at or below the inflation target for nearly four years. It rose in October, to 1.9%, after having fallen to 1.4% in September. As before, inflation excluding the effects of housing costs was considerably lower. The CPI excluding housing had fallen by 2.3% year-on-year in October, and in September the HICP had fallen 2.7% year-on-year.

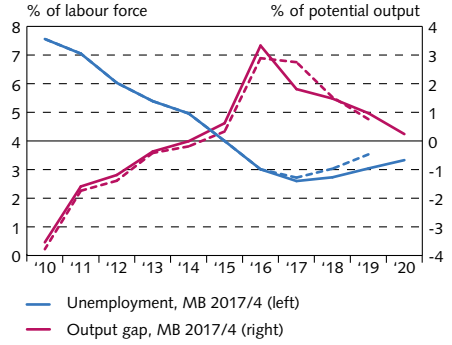
Inflation expectations appear well in line with the target. They seem to be more firmly anchored than before, as can be seen in the

Chart I-9
Total hours worked and employment rate 2010-2020[1]



1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-10
Unemployment and output gap 2010-2020[1]



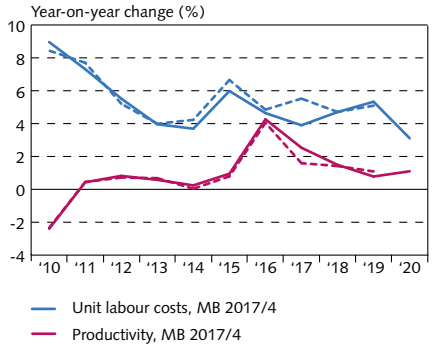
1. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

4. Statistics Iceland has revised its GDP growth figures back to 1997. For the past three years, GDP growth has been revised upwards by 0.2 percentage points each year, and the year-2016 GDP level has been revised upwards by 1½% (see Box 4).

relatively limited impact of last summer's depreciation of the króna on long-term expectations. As is discussed in a recently published Central Bank report, this is a change from previous years, when long-term inflation expectations seemed more sensitive to unexpected economic events.[5]

The Statistics Iceland wage index rose by 7.4% year-on-year in Q3, and wage costs are expected to rise by an average of just over 6% this year, in the wake of an increase of more than 9% in 2016 and about 17% over the past two years. These steep pay rises have mitigated the deflationary effects of imported deflation and the appreciation of the króna. Increased labour productivity also counteracts the effects of wage increases on inflation, as official Statistics Iceland figures indicate unusually strong productivity growth in 2016, or over 4%. This is most likely an overestimation that can be attributed to an underestimation of the increase in the number of foreign workers in the labour market. This has probably affected productivity growth estimates for 2017 as well. It is also likely that the rise in unit labour costs – 4½% in 2016 and nearly 4% this year – is underestimated. Labour productivity is forecast to increase by 1-1½% per year in the next two years and unit labour costs to increase by approximately 5% per year. This is significantly above the rate consistent with the 2.5% inflation target over the medium term, but by 2020 the rise in wage costs is expected to be better aligned with the target. The outlook is for unit labour costs to rise less in 2017 than was forecast in August, in addition to the revision of historical figures indicating that they also rose less in the past three years (Chart I-11). The outlook for the next few years is broadly in line with the August forecast, however.

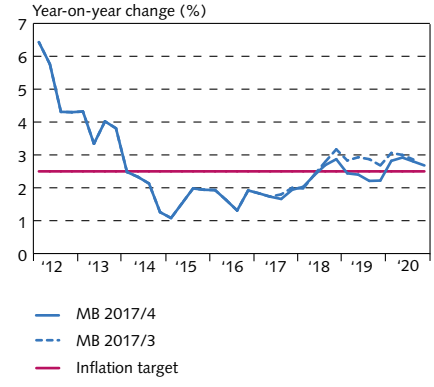
Chart I-11
Unit labour costs and productivity 2010-2020[1]



1. Productivity measured as GDP per total hours worked. Central Bank baseline forecast 2017-2020. Broken lines show forecast from MB 2017/3.
Sources: Statistics Iceland, Central Bank of Iceland.

According to the baseline forecast, inflation will rise to 1.9% in Q4/2017. If the forecast materialises, inflation will average 1.8% over the year as a whole and 2017 will be the fourth consecutive year with average inflation measuring 2% or less. This is the longest episode of such low and stable inflation since the economic crisis of the early 1990s. The baseline forecast assumes that inflation will inch upwards toward the target over the course of next year and will be close to target for the bulk of the forecast horizon. As is discussed in Box 5, the fiscal budget proposal provides for several changes in indirect taxes that will affect measured inflation in coming years. Chief among them is the reduction in the upper value-added tax bracket at the beginning of 2019, which explains the drop in headline inflation from the first quarter of that year until the effects of the tax cut disappear from twelve-month inflation measurements a year later (Chart I-12). Excluding the effects of the tax cut, inflation will remain relatively stable at just above the target from Q4/2018 onwards but ease back towards the target near the end of the forecast horizon (Chart I-13). The outlook is for inflation to be lower than was forecast in August for most of

Chart I-12
Inflation[1]
Q1/2012 - Q4/2020



1. Central Bank baseline forecast Q4/2017 - Q4/2020.
Sources: Statistics Iceland, Central Bank of Iceland.

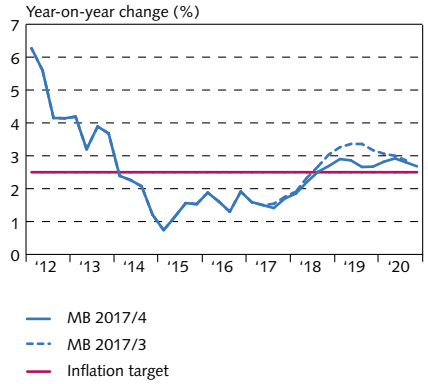
5. The report also states that deviations of inflation from target have grown much smaller in recent years and large deviations from target occur much less frequently than before. Furthermore, fluctuations in inflation and inflation expectations have grown smaller. Because of this, fluctuations in long-term real interest rates have grown smaller as well, which has mitigated volatility in economic activity and the exchange rate of the króna. See Central Bank of Iceland (2017), "Monetary policy based on inflation targeting: experience since 2001 and post-crisis changes", *Special Publication* no. 11.

the forecast horizon, mainly because the output gap is expected to be smaller and unit labour costs to rise less than previously thought. The uncertainties in the inflation forecast are discussed below. Developments in global prices are discussed in Chapter II, and domestic inflation and inflation expectations are discussed in Chapter VI.

Key assumptions and main uncertainties

The baseline forecast reflects the assessment of the most likely economic developments during the forecast horizon. It is based on forecasts and assumptions concerning domestic economic policy and Iceland's external environment. It is also based on an assessment of activities in individual markets and how monetary policy is transmitted to the real economy. All of these factors are subject to uncertainty. The discussion below explains the assumptions about domestic economic policy. It also lists several important risks to the forecast and explains how changes in key assumptions could lead to developments different from those provided for in the baseline forecast.

Chart I-13
Inflation excluding effects of indirect taxes[1]
Q1/2012 - Q4/2020



1. Central Bank baseline forecast Q4/2017 - Q4/2020.
Sources: Statistics Iceland, Central Bank of Iceland.

Fiscal and monetary policies

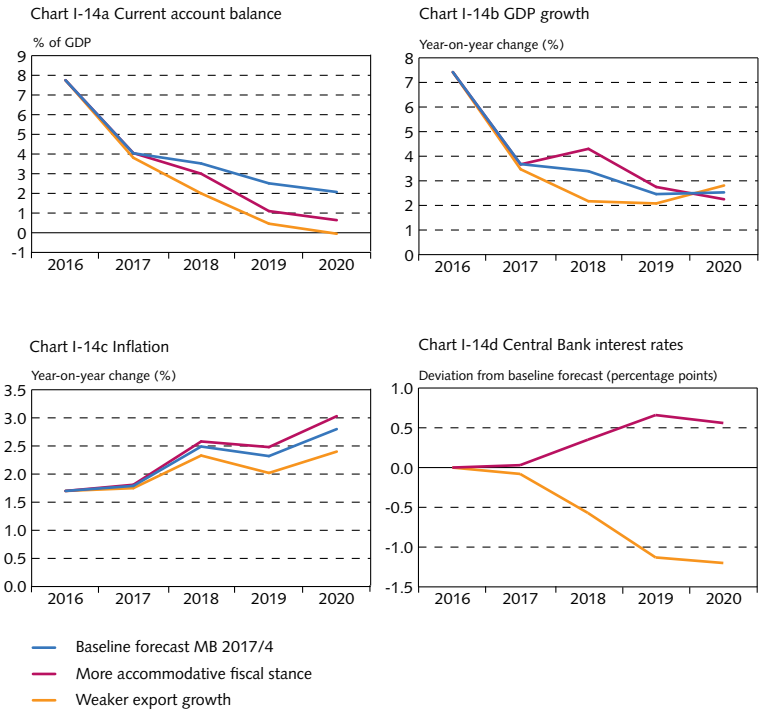
According to the baseline forecast, the fiscal stance will ease significantly this year. The cyclically adjusted primary surplus will narrow by 1.5% of GDP, adding to a similar easing in 2015-2016 (see also Chapter IV and Box 5). According to the current fiscal budget proposal, however, the fiscal stance will be tighter next year. This is similar to the outlook described in the May issue of *Monetary Bulletin*.

The Central Bank's nominal interest rates have fallen in the past year, in line with indications of firmer anchoring of inflation expectations to the inflation target. Before the publication of this *Monetary Bulletin*, the Central Bank's key interest rate was 4.25%, having declined by 1 percentage point year-on-year and 1.5 percentage points since August 2016 (see Chapter III). The baseline forecast is based on the assumption that, during the forecast horizon, the key rate will develop in line with the monetary policy rule in the Bank's QMM, which ensures that inflation will be broadly at target over the medium term.

Government spending could turn out more than is assumed in the baseline forecast

There is some uncertainty about the fate of the fiscal budget proposal and the state of public sector finances following the fall of the Government and candidates' statements during the run-up to the recent elections. The budget proposal entails tighter fiscal policy next year, as the cyclically adjusted primary balance will improve. During the campaign, however, various ideas entailing increased spending or tax cuts were aired, but in many cases without its being clear whether the changes were funded or not or to what extent those changes were to be implemented in 2018 or later in the electoral term. In this context, it is important to remember that even though GDP growth is weaker than it was in 2016, it remains robust. The economy is running at full capacity, and an output gap remains and is expected to remain for most of the forecast horizon. A more accommodative fiscal stance will

Chart I-14
Alternative scenario



Sources: Statistics Iceland, Central Bank of Iceland.

inevitably cause interest rates and the exchange rate of the króna to be higher than they would be otherwise.

In order to illustrate the potential impact of increased fiscal easing on the economy, an alternative scenario is presented in which Government spending increases broadly in line with the apparent lower limit of the campaign promises made during the prelude to the election. It is assumed that public consumption spending will increase by approximately 16 b.kr. per year, transfers to households will rise by 6 b.kr., and investment spending will rise by 20 b.kr. These additional expenditures would increase the ratio of public spending to GDP more or less to the pre-crisis average. The total spending increase amounts to about 42 b.kr. per year, or 1.7% of year-2016 GDP. It is assumed that these plans will materialise beginning in 2018. In addition to this, it is assumed that plans to raise the value-added tax on tourism-related services to the upper tax bracket in 2019 will not materialise. This amounts to an additional 18 b.kr. in fiscal easing, the equivalent of 0.7% of 2016 GDP. Taken all together, these measures imply that the general government surplus assumed in the baseline forecast will disappear next year and a deficit will open up in 2019.

As Chart I-14 indicates, this additional fiscal easing entails an increase in aggregate demand, although the impact on GDP growth will be less than the spending increase, as some of the increased demand will be shifted to imported goods and services.[6] This additional fiscal

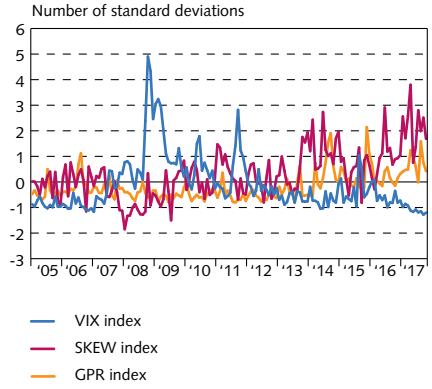
6. It should be borne in mind that although increased investment in infrastructure could boost long-term potential output, the short-term impact on aggregate demand is broadly the same as with other easing measures during a period when the economy is operating at full capacity. As a result, it is important that such projects be timed so as to have maximum benefit and minimum risk of contributing to the overheating of the economy.

easing will also be offset with tighter monetary policy, which will cut into private sector demand so as to create scope for increased public sector demand and will push the exchange rate of the króna upwards, shifting even more of the demand out of the economy. The current account surplus will therefore shrink more quickly and will have nearly disappeared by 2020. GDP growth will be about 1 percentage point more in 2018 and about 0.3 percentage points more in 2019, but over time the effects of the stimulative measures will taper off. Because GDP growth will be stronger than in the baseline forecast, a larger output gap will develop and inflation will therefore be somewhat higher. Offsetting this, however, the Central Bank's key rate will be roughly ½ a percentage point higher from 2018 onwards.

Global economic outlook improved, but uncertainty remains

Although the global economic outlook continues to improve and the short-term outlook gives cause for increased optimism, the uncertainties that have affected the global economy in the recent term are still present. Uncertainty in the euro area receded somewhat following the presidential election in France this spring, but it is still difficult to determine what the US government's policy is on a number of issues, and Brexit negotiations between the UK and the EU appear to be moving forward very slowly. In spite of these uncertainties, the global financial markets are relatively buoyant, and underlying stock price volatility is historically low. Nevertheless, the cost of hedging against major stock price declines using option markets has been rising steadily as global uncertainty has mounted (Chart I-15).[7]

Chart I-15
Global economic uncertainty[1]
January 2005 – October 2017



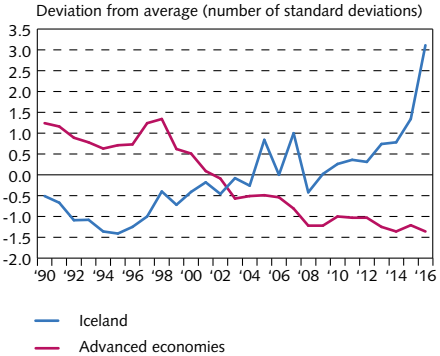
1. The VIX implied volatility index measures underlying share price volatility, while the SKEW index measures the cost of hedging against steep declines in share prices. Both VIX and SKEW are calculated from S&P 500 options prices. The GPR index measures geopolitical uncertainty. The chart shows deviations from January 2000-October 2017 average, measured in terms of the number of standard deviations.
Sources: D. Caldara and M. Iacoiello (2017), Thomson Reuters.

The outlook for exports could be overly optimistic

Services exports have grown very strongly in recent years, mainly because of the surge in tourism. On average, services exports have grown by nearly 11% per year in the last five years, whereas goods exports are up by only 3% per year. Because of the surge in services exports, Iceland's share in global services trade has grown rapidly in recent years, while other advanced economies' share has generally been on the decline (Chart I-16). There are signs that this growth has begun to ease, however, and that it will be weaker in the near future than previously projected in spite of a more favourable outlook for world trade and trading partner demand. Despite this, the baseline forecast assumes that services exports will grow more rapidly in Iceland than in other advanced economies for most of the forecast horizon, and that Iceland's share in world services trade will therefore keep rising.[8]

The forecast for export growth could turn out overly optimistic, however. Chart I-14 shows an alternative scenario in which Iceland's share in worldwide services trade remains broadly unchanged at the

Chart I-16
Share in services trade 1990-2016[1]



1. Weight in global services trade. Deviation from 30-year average (1987-2016), measured in terms of number of standard deviations.
Source: United Nations (UNCTAD).

7. The geopolitical risk (GPR) index is a measure of geopolitical uncertainty based on an electronic search of international media. See D. Caldara and M. Iacoviello, (2017), "Measuring geopolitical risk", Board of Governors of the Federal Reserve System, *Working Paper,* August 2017.

8. According to the World Tourism Organization, travel and transport are estimated to grow in developed countries by just over 2% annually in coming years (*UNWTO Tourism Highlights*, 2017). This should correspond to approximately 2% annual growth in services exports, as travel and transport weigh heavily in total services exports.

year-2016 level throughout the forecast horizon. This assumption has an impact as soon as Q4/2017, leading to weaker export growth in 2017 than is provided for in the baseline forecast. Export growth will be nearly 3 percentage points less in 2018 and almost 1½ percentage points less in 2019. The current account surplus will therefore shrink even faster than in the baseline forecast and will have disappeared by 2020. GDP growth is also considerably weaker in the next two years – by 1¼ percentage points in 2018 and about ½ a percentage point in 2019 – albeit offset by weaker imports than in the baseline forecast, owing to reduced domestic income and a decline in importation of inputs for export activities. Offsetting these negative GDP growth effects will be a depreciation of the króna, which will also mitigate the impact of a smaller output gap on inflation. In this scenario, a lower Central Bank key rate will pull in the same direction, as the key rate will be 1¼ percentage points lower than in the baseline forecast by 2020. The alternative scenario therefore highlights how independent monetary policy and a flexible exchange rate can offset the effects of a negative external shock.

Exchange rate outlook uncertain

According to the baseline forecast, the exchange rate of the króna will continue to rise early in the forecast horizon. This technical assumption concerning the exchange rate is affected, on the one hand, by the GDP growth outlook and the interest rate differential with abroad, and on the other, by the estimated equilibrium real exchange rate of the króna. All of these factors are highly uncertain.

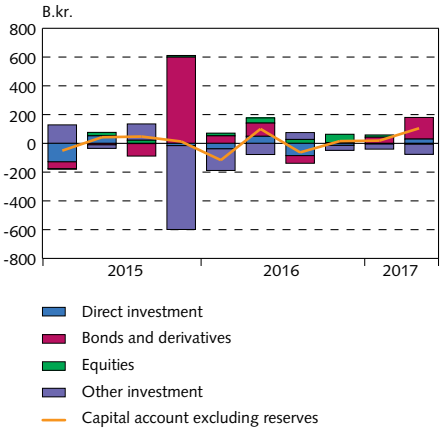
The equilibrium real exchange rate is likely to have risen in the recent term, owing primarily to improved terms of trade and rapid export growth, which supported the current account surplus and improved Iceland's external position (see, for example, Box 3 in *Monetary Bulletin* 2016/2). The revised estimate of the equilibrium real exchange rate suggests that the real exchange rate is close to equilibrium or perhaps slightly below it. But this assumption is also subject to considerable uncertainty. Furthermore, the equilibrium real exchange rate could fall again if the economy is hit by external shocks such as those described in the alternative scenario above, with a weaker outlook for exports.

In addition to these, there is also uncertainty about capital flows to and from Iceland, which could affect short-term exchange rate developments. Since the capital controls were liberalised earlier this year, there have not been any visible signs of large-scale capital outflows, although there were some indications of an uptick in Q2 (Chart I-17). It is not abnormal that investors – households, businesses, and pension funds – would seek to rebalance their asset portfolios to include more foreign assets, prompting an increase in outflows that would lower the exchange rate, other things being equal, at least in the short run.

Abrupt correction in house price unlikely unless in connection with an external economic shock

House prices have risen steeply in the recent term, but the pace of the increase has begun to ease. Since 2012, when house prices began

Chart I-17
Non-reserve capital flows[1]
Q1/2015 – Q2/2017



1. Capital account balance excluding changes in the Central Bank's foreign exchange reserves and net capital flows to foreign direct investment, portfolio investment (bonds, derivatives, and equities), and other investment. Large movements in Q4/2015 reflect the settlement of the failed banks' estates.
Source: Central Bank of Iceland.

rising, real house prices have increased by nearly 50%, broadly the same as in the period 2003-2007 but somewhat less if compared to the complete house price cycle from 2001 to 2007. As Chart I-18 indicates, the foundations for the current increase are entirely different from the earlier one. House prices are now rising alongside a steep rise in disposable income and without the rapid increase in debt that accompanied the earlier episode, when house prices rose well in excess of income. Another difference between the two episodes is that the rise in income in the past few years has been driven largely by positive external shocks, including an improvement in terms of trade (Chart I-19). During the former episode, the rise in disposable income was caused not by external shocks but by unsustainable increases financed with foreign credit.

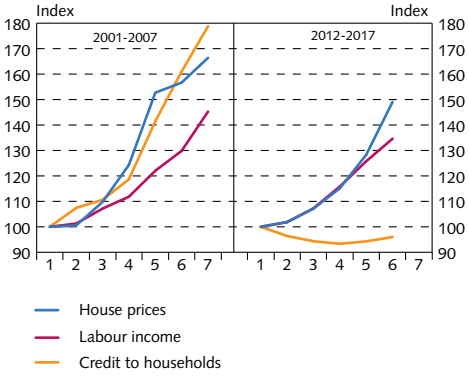
These differences in the interactions between house prices, disposable income, and mortgage lending will probably play a key role in house price developments in the coming term. It is difficult to envision that house prices will continue to rise at the same pace as they did earlier this year without a surge in borrowing, particularly because the outlook is for a marked increase in the supply of new housing and a slowdown in disposable income growth. By the same token, a sudden correction in the housing market like that taking place in the previous cycle is unlikely. In the absence of further external shocks, it is therefore most likely that the pace of house price inflation will continue to ease and the housing market to rebalance. This adjustment could be expedited by more pronounced slowdown in export growth such as that described above in the alternative scenario, or a deterioration in terms of trade (see the alternative scenario providing for poorer terms of trade in *Monetary Bulletin* 2016/4).

Key uncertainties in the inflation outlook are the same as before

The points discussed above emphasise that the inflation outlook over the next three years could easily differ from that described in the baseline forecast. It could be argued that inflation could rise higher than is provided for in the baseline example. Unemployment is very low, for instance, and many wage settlements are set to expire soon. As a result, contractual wage increases could turn out larger than is assumed in the baseline forecast, and wage drift could be underestimated. Because firms have at best limited scope for pay increases – particularly firms in the tradable sector – there is a risk that large wage rises will pass more quickly and more strongly through to prices than they did following the last wage settlements, when improved terms of trade gave companies greater ability to absorb cost increases. The assumptions in the baseline forecast concerning continued appreciation of the króna through 2018 and slower rises in house prices could also prove incorrect. Demand pressures in the economy could be underestimated, in part because of an overestimation of potential output growth, which is considered to have been well above its historical average in the recent term as a result of strong importation of production factors. Demand pressures could also prove to be underestimated if the fiscal stance eases more than is assumed in the baseline forecast. All of this could test the newly established anchor for inflation expectations.

Chart I-18

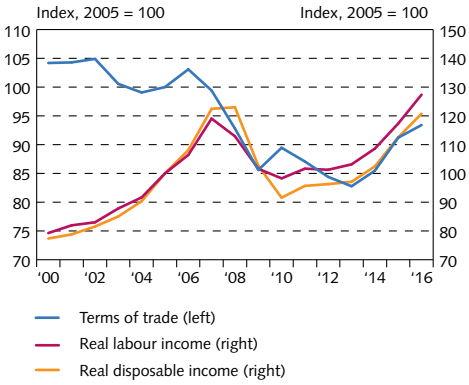
House prices, income, and credit in two house price cycles[1]



1. The chart shows house prices relative to the general price level, real labour income (disposable income excluding financial income) after taxes, and credit to households at constant prices (adjusted for the Government's debt relief measures from 2009 onwards). It shows two house price cycles and sets the first year of each episode (year 1) equal to 100. Figures for 2017 are based on the first three quarters of the year.
Sources: Statistics Iceland, Central Bank of Iceland.

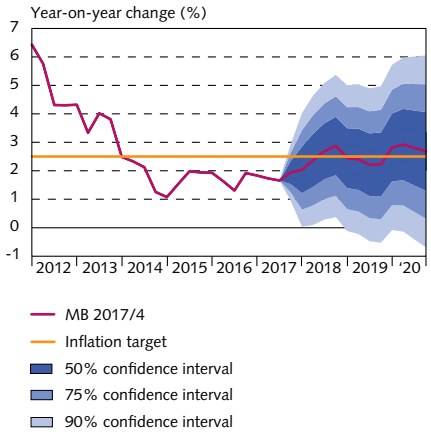
Chart I-19

Terms of trade and disposable household income 2000-2016[1]



1. Labour income is disposable income excluding financial income. Labour income and disposable income are after taxes.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-20
Inflation forecast and confidence intervals
Q1/2012 - Q4/2020



Sources: Statistics Iceland, Central Bank of Iceland.

Inflation could also turn out lower than is assumed in the baseline forecast. The króna could appreciate more strongly than forecast – if external conditions prove more favourable, for instance. Weaker global GDP growth and a weaker recovery of global oil and commodity prices could also dampen domestic economic activity and prolong the impact of imported deflation on domestic inflation. The rise in house prices could slow more abruptly than is assumed in the forecast. The impact of increased international competition on domestic retailers' scope to raise prices could also be underestimated. Although the baseline forecast attempts to account for the effects of strong factor importation, potential output could nevertheless be underestimated and the inflationary pressures based on the cyclical position of the economy could therefore be overestimated.

In order to capture these uncertainties, Chart I-20 illustrates the confidence intervals of the forecast; i.e., the range in which there is considered to be a 90% probability that inflation will lie over the next three years (the methodology is described in Appendix 3 in *Monetary Bulletin* 2005/1). The uncertainty about the inflation outlook is broadly unchanged since August. As was the case then, the probability distribution of the inflation forecast is broadly symmetrical. There is a roughly 50% probability that inflation will be in the 1¾-4% range in one year and in the 1⅓-4% range by the end of the forecast horizon.

II The global economy and terms of trade

The global economic outlook has brightened, and prospects for GDP growth among Iceland's main trading partners have improved slightly from the forecast in the August *Monetary Bulletin*. The uptick in investment is expected to continue in key advanced economies, and world trade is also expected to grow more strongly than previously assumed. Global inflation has picked up, concurrent with rising energy and commodity prices, although underlying inflation remains low in many economies. Iceland's terms of trade have improved markedly in the past two years, although marine product prices appear to have fallen in Q3 and terms of trade are therefore expected to improve less this year than previously forecast. The real exchange rate fell in Q3, after rising virtually uninterrupted since end-2013. Even so, it is higher than it was a year ago, and the recent increase is considered to reflect the adjustment of the economy to a higher equilibrium real exchange rate concurrent with Iceland's improved external position.

Global economy

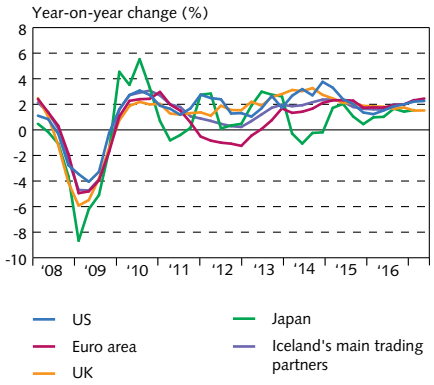
Trading partners' economic recovery gains pace ...

GDP growth among Iceland's main trading partners measured 2.2% in H1/2017, slightly outpacing the forecast in the August *Monetary Bulletin*. This is just over ½ a percentage point more than in the first half of 2016. Growth has picked up steadily since mid-2016, alongside increased activity on both sides of the Atlantic (Chart II-1). The recovery has been on a stronger footing in the euro area and the US than in the UK, where GDP growth has gradually receded. In H1/2017, the GDP growth rate in the UK was the weakest in six years, yet unemployment is at a forty-year low and job creation has exceeded expectations (Chart II-2). Conditions in the labour market have improved in many other economies. For example, unemployment has declined more than expected in both the euro area and the US, where it is at its lowest since 2001, as well as in Japan, where it is at a quarter-century low. GDP growth has also livened up in emerging market economies. In the Nordic countries, GDP growth has generally been solid, albeit least so in Norway, where the effects of a marked deterioration in terms of trade due to falling oil prices are still being felt.

... and indicators give cause to expect the recovery to continue

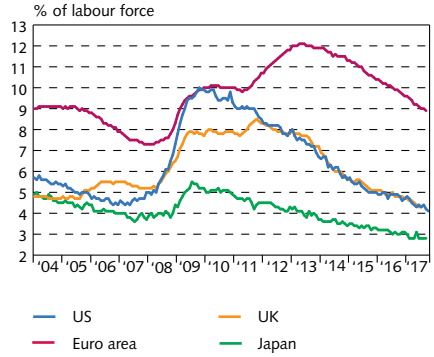
Since the publication of the August *Monetary Bulletin*, economic indicators for the euro area have exceeded expectations (Chart II-3), particularly those pertaining to manufacturing and the labour market. Indicators of consumer and corporate sentiment have risen steeply as a result and are at their highest since before the financial crisis. Growth in private sector credit has been recovering steadily since 2014 and has finally turned positive in all core countries in the region. The recovery of business and residential investment is expected to continue, and leading indicators of output growth imply that GDP growth will remain at the H1/2017 level, which was the strongest in two years (Chart II-4).

Chart II-1
Global GDP growth
Q1/2008 - Q3/2017



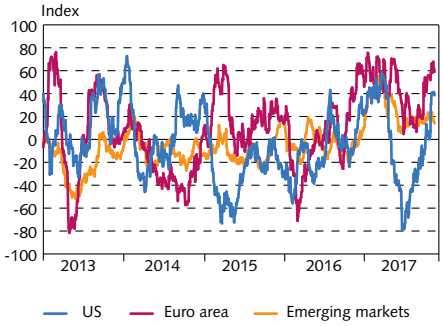
Sources: Thomson Reuters, Central Bank of Iceland.

Chart II-2
Unemployment rate[1]
January 2004 - October 2017



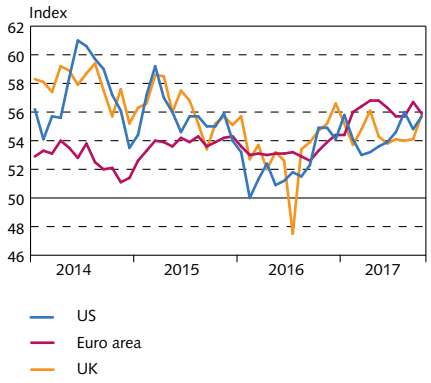
1. Seasonally adjusted data.
Source: Thomson Reuters.

Chart II-3
Economic surprise index[1]
Daily data 1 January 2010 - 10 November 2017



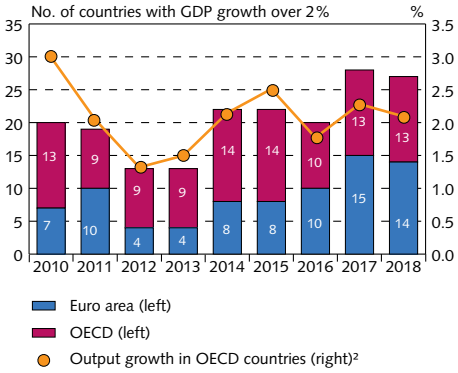
1. When the index is below 0, the indicators are worse than expected; when the index is above 0, the indicators are better than expected. The index does not imply that the indicators are positive or negative.
Source: Thomson Reuters.

Chart II-4
Leading indicators of GDP growth[1]
January 2014 - October 2017



1. Markit composite purchasing managers' index (PMI). The index is published monthly and is seasonally adjusted. An index value above 50 indicates month-on-month growth, and a value below 50 indicates a contraction.
Source: Thomson Reuters.

Chart II-5
Output growth in OECD countries[1]



1. Including Lithuania, Malta, and Cyprus, which belong to the euro area but not the OECD. 38 countries in all. 2. The 2017-18 values are based on the IMF forecast (*World Economic Outlook*, October 2017).
Sources: International Monetary Fund, OECD.

Leading indicators suggest that growth will accelerate in the US, and since the beginning of October indicators have slightly exceeded expectations. In the UK, however, households are more pessimistic about the economy than at any time since the Brexit referendum. Leading indicators of GDP growth suggest that growth in the UK will remain tepid, although increased exports will offset weaker private consumption growth to some extent.

Improved GDP growth outlook for advanced and emerging economies …

The International Monetary Fund's (IMF) October forecast assumes that global GDP growth will be somewhat stronger this year than the Fund had projected in the spring. This is due primarily to improvements in the outlook for Europe, Japan, Russia, and China, tempered slightly by prospects of weaker growth in India and the UK. The IMF has lowered its GDP growth forecast for the US, as it no longer expects as much fiscal slack. Global GDP growth is projected at 3.6% in 2017, up from only 3.2% in 2016, the weakest global growth rate since the 2009 recession. There is increased optimism about the short-term economic outlook, but the Fund is still of the view that the risk to the long-term GDP growth outlook is concentrated on the downside. The Fund expects global output growth to pick up to 3.7% in 2018, although growth will weaken in advanced economies and the number of countries with growth over 2% will fall slightly (Chart II-5). In particular, it will taper off in Japan and in the eurozone, where weak productivity growth and public and high private sector debt levels will cut into growth.

… and prospect of slightly stronger growth among Iceland's key trading partners in 2017

Among Iceland's main trading partners, GDP growth is projected to average 2.2% this year, or 0.1 percentage point more than was forecast in August, owing mainly to expectations of stronger growth in the eurozone, the US, and the Nordic region, whereas the outlook for the UK is poorer. For the next two years, however, the outlook is unchanged from the August forecast.

World trade has continued to pick up since mid-2016, alongside more robust investment growth in major industrialised economies. Trading partners' imports are expected to grow as well, and as in August, the growth rate for 2017 is forecast at 4.1%. The outlook is for broadly similar growth in the next few years.

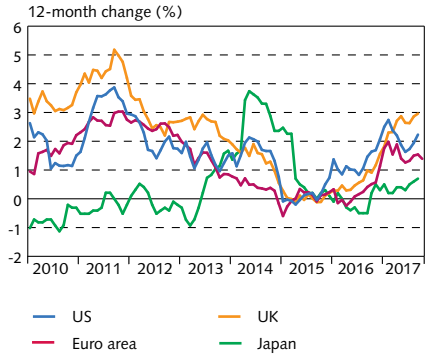
Inflation has risen less than forecast despite strong economic activity

Inflation has been slightly below expectations in major advanced economies. Growing economic activity and the recovery of the labour market have thus far made little impact on wage developments, which is the main reason underlying inflation is widely low.[1] That said, it has

1. See, for example, Chapter 2 of the International Monetary Fund's October 2017 *World Economic Outlook*.

begun to inch upwards in most trading partner countries. In the euro area, underlying inflation has risen in the past year, albeit less than in many other economies. It remains well below the European Central Bank's (ECB) 2% inflation target. In the US, it is rising towards the US Federal Reserve's target, whereas in the UK it is above the target set by the Bank of England. In September, underlying inflation measured 2.7% in the UK, the highest since 2012. In the Nordic countries, inflation has also been inching upwards, particularly in Sweden, where in Q3 it overtook the central bank's 2% inflation target for the first time since 2011. Even though underlying inflation is generally on the rise in trading partner countries, headline inflation has subsided as 2017 has progressed and the base effects of last year's increase in commodity and oil prices have dropped out of twelve-month inflation figures (Chart II-6). For the forecast horizon as a whole, the outlook among trading partners is for slightly lower inflation than was forecast in August, particularly in emerging market economies, although it is also down slightly in the euro area.

Chart II-6
Inflation in selected industrialised countries
January 2010 - October 2017

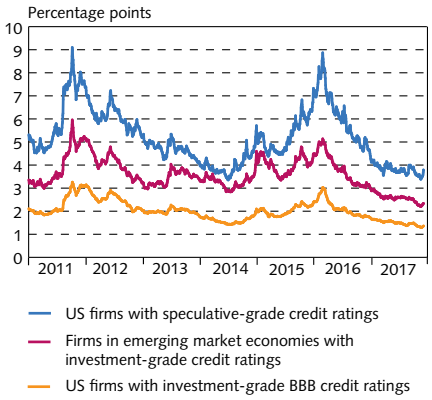


Source: Thomson Reuters.

Asset prices have continued to rise and financial conditions to improve …

In advanced economies, share prices have risen as the economic recovery has firmed up and optimism about the economic outlook has grown. Political uncertainty has affected asset prices in Spain, but in other respects asset prices have been relatively stable in the recent term, and financial conditions have improved. Evidence of this can be seen in interest premia on corporate bonds, which are at a post-crisis low (Chart II-7). Capital flows to riskier investments have increased as a result, as have capital inflows into emerging market economies. This stability in the asset markets could prove fleeting, however: increased geopolitical tensions or growing imbalances in the Chinese financial system could trigger a turnaround.

Chart II-7
Interest premia on corporate bonds[1]
Daily data 3 January 2011 - 10 November 2017



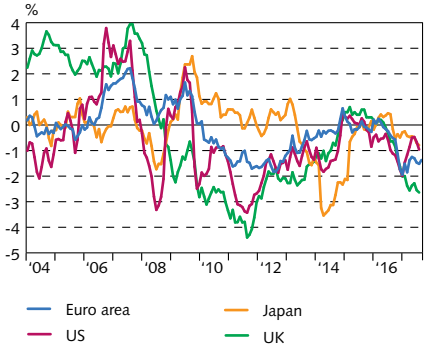
1. Bank of America Merrill Lynch bond indices.
Source: Federal Reserve Bank of St. Louis Federal Reserve Economic Data (FRED) database.

… and a gradual monetary tightening phase is expected among advanced economies

The ECB has kept its policy interest rate unchanged, and at the end of October it decided to extend its monthly bond purchase programme, which was set to conclude in December. The US Federal Reserve Bank has raised interest rates four times since December 2015, however, and the Bank of England and the Bank of Canada have also raised rates recently. Central banks in other advanced economies have kept the monetary stance unchanged since August, however. Central banks in several emerging market economies, including Brazil, Russia, and Indonesia, have lowered interest rates recently, in line with an improved inflation outlook. In most advanced economies, real rates are still very low, as a sizeable slack remains in most of them even though GDP growth has begun to pick up (Chart II-8).

Forward interest rates suggest that the ECB is expected to wait until 2019 before starting to raise rates (Chart II-9). Market participants expect the US Federal Reserve to raise rates again this December, but a gradual tightening phase is still expected thereafter. This has surfaced in a decline in long-term rates, which in early September were

Chart II-8
Real central bank interest rates
January 2004 - October 2017

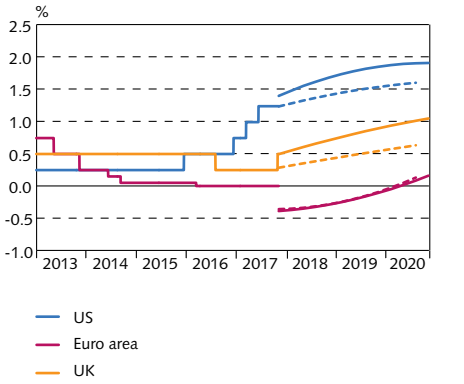


Source: Macrobond.

Chart II-9

Policy rates in selected industrialised economies[1]

January 2013 - December 2020



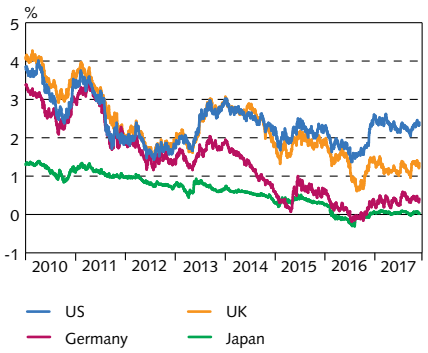
1. Daily data 1 January 2013 through 10 November 2017, and quarterly data Q4/2017 through Q4/2020. US interest rates are the upper bound of the US Federal Reserve bank's interest rate corridor, and rates for the euro area are the European Central Bank's key rate. Forward rates are based on six-month overnight index swaps (OIS) and the Euro Overnight Index Average (EONIA) for the euro area. Solid lines show forward curves from 10 November 2017 onwards and the broken lines from 18 August 2017 onwards.

Sources: Bloomberg, Macrobond.

Chart II-10

10-year government bond yields in selected industrialised countries

1 January 2010 - 10 November 2017



Source: Macrobond.

at their lowest since the November 2016 presidential election (Chart II-10). In recent weeks, however, they have begun to rise again with the publication of the president's proposals for broad-based corporate tax cuts. Long-term rates have risen in the UK as well, while in Germany and Japan they are virtually unchanged. Even though the interest rate spread versus the eurozone has widened in the US and the UK, the euro has appreciated against the dollar and the pound sterling. At the beginning of September, the exchange rate of the euro versus the US dollar rose above 1.2 for the first time in three years. The euro has appreciated steadily since the spring as economic conditions in the eurozone have improved, while the dollar has weakened due to expectations of a more gradual rise in US interest rates. The pound sterling has depreciated by 11% in trade-weighted terms since before the Brexit referendum in summer 2016.

Export prices and terms of trade

Outlook deteriorates for marine product prices but improves for aluminium prices

Favourable developments in marine product prices have been a significant driver of the past few years' marked improvement in terms of trade. In Q2, prices rose by more than 1% year-on-year in foreign currency terms and were up by over a fifth since mid-2013 (Chart II-11). Preliminary figures suggest, however, that prices gave way in Q3 instead of continuing to rise, as was assumed in the Bank's August forecast. This changes the outlook for marine product prices for 2017 as a whole, as prices are now projected to remain flat year-on-year instead of rising by 2.5%, as was forecast in August. For the next few years, however, the outlook for marine product prices is broadly in line with the August forecast.

Global aluminium prices have continued rising after a sudden jump in August, following the closure of several smelters in China. The smelter closures, an element in the Chinese authorities' attempts to reduce pollution, will result in a 10% reduction in Chinese aluminium production this year. This will have a major impact on global aluminium prices, as China is the largest producer in the world. The price of aluminium has been at or above 2,100 US dollars per tonne, a situation not seen in the global market since 2011. Futures prices and analysts' assessments imply that prices will keep rising. There is growing demand for aluminium produced using renewable energy sources, which generally sells at higher prices than other aluminium. This renewables-generated aluminium includes all of Iceland's production. The price paid to domestic aluminium manufacturers is projected to rise by nearly 19% this year and another 5% in 2018 (Chart II-11), somewhat outpacing the Bank's August forecast.

Petrol prices have risen in excess of the August forecast

Oil prices rose after hurricanes affected production in the US. They rose above 60 US dollars per barrel at the end of October, the highest Brent crude price in two years (Chart II-11). Oil inventories are down in key producer countries, and the projected surge in demand for petrol due to an improved global GDP growth outlook is expected to support

prices. The year-on-year rise in oil prices is projected at about 19%, somewhat more than was forecast in August. Both futures prices and market analysts' forecasts suggest that oil prices will rise by an average of just under 3% per year for the remainder of the forecast horizon.

Non-oil commodity prices have also risen more than expected

Non-oil commodity prices rose more than expected in Q3/2017. The increase was driven by metals prices, whereas food prices remained flat quarter-on-quarter. The uptick has reversed in part in recent weeks, however, and food prices have fallen slightly once again. Non-oil commodities had risen in price by 9% year-on-year in Q3, although prices are still much lower than they were before the downturn started in mid-2014 (Chart II-11). Prices are projected to rise by more than 8% this year, a full 2 percentage points more than was forecast in August.

Terms of trade have improved markedly in the past three years but look set to remain unchanged in the near future

Terms of trade have improved virtually without interruption since the beginning of 2014. Preliminary figures from Statistics Iceland indicate that they improved by 3.8% year-on-year in Q2/2017, just over ½ a percentage point more than was assumed in the last *Monetary Bulletin* (Chart II-11). The improvement since the beginning of 2014 is therefore close to 17%. There are signs that terms of trade deteriorated in Q3, however, as a result of the aforementioned decline in marine product prices. The improvement for the year as a whole will therefore measure just under 1%, or 1.3 percentage points less than was forecast in August, owing to the combined effect of unfavourable developments in marine product prices and higher imported petrol and commodity prices, versus the rise in aluminium prices. The outlook for the next few years is broadly unchanged, however.

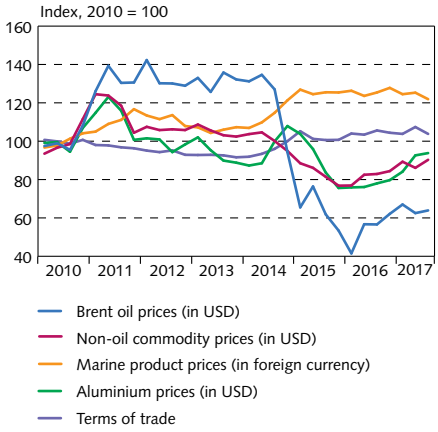
Real exchange rate declined between quarters in Q3 …

The real exchange rate in terms of relative consumer prices declined between quarters in Q3, after rising virtually unchecked since the end of 2013. However, it was up 3% year-on-year in October and about 17% above its twenty-five year average (Chart II-12). As has been discussed in previous issues of *Monetary Bulletin*, this steep rise in the real exchange rate reflects a higher equilibrium real exchange rate; i.e., the real exchange rate that is consistent with the economy's internal and external balance (see, for instance, Box 3 in *Monetary Bulletin* 2016/2). Indications of a rise in the equilibrium real exchange rate can be seen, for example, in a large and persistent current account surplus despite steep rises in the real exchange rate. The prospect of a less pronounced improvement in terms of trade and a more rapid narrowing of the current account surplus (see also Chapter IV) suggests, however, that the equilibrium real exchange rate will not be as high in the coming term as previously assumed.

… with an erosion of Iceland's competitive position

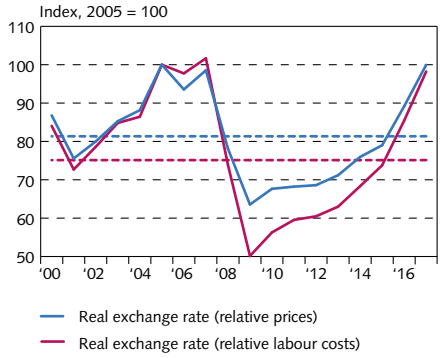
If the forecast in this *Monetary Bulletin* materialises, the real exchange rate will rise by a full 12% this year in terms of relative unit prices and

Chart II-11
Commodity prices and terms of trade[1]
Q1/2010 - Q3/2017



1. Foreign currency prices of marine products are calculated by dividing marine product prices in Icelandic krónur by the trade-weighted exchange rate index. USD prices of aluminium products are calculated by dividing aluminium prices in Icelandic krónur by the exchange rate of the USD. Terms of trade in Q3/2017 are based on the MB 2017/4 baseline forecast.
Sources: IMF, Statistics Iceland, Central Bank of Iceland.

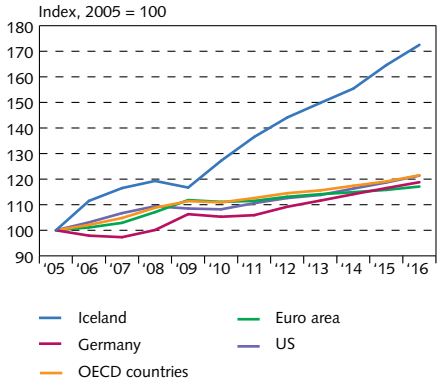
Chart II-12
Real exchange rate 2000-2017[1]



1. Central Bank of Iceland baseline forecast 2017. Broken lines show 25-year average (1992-2016).
Source: Central Bank of Iceland.

by even more, or over 16%, in terms of relative unit labour costs. Firms' wage costs have risen much more in Iceland than in competitor countries in recent years, and the competitive position of companies in the tradable sector has therefore deteriorated (Chart II-13).

Chart II-13
Unit labour costs in developed countries
2005-2016



Sources: Macrobond, Central Bank of Iceland.

III Monetary policy and domestic financial markets

The Central Bank's key interest rate has been lowered since the August *Monetary Bulletin* and has only once been lower since the inflation target was adopted in 2001. The Bank's real rate has fallen as well, and the monetary stance is similar to that in mid-2015. In general, other market rates have fallen in line with Central Bank rates, and the interest rate differential with abroad has narrowed. Capital inflows into the domestic bond market have continued since April but are still relatively modest. The risk premium on Treasury obligations is broadly unchanged and is at its lowest since 2008. The exchange rate of the króna has risen slightly since year-end 2016, and exchange rate volatility has subsided after an increase following the liberalisation of the capital controls. Growth in broad money has remained strong, and credit growth has picked up, albeit from a low level. House prices have risen steeply, although the pace of the increase has eased since the beginning of summer. At the same time, share prices have fallen. Households' and businesses' equity position has continued to improve, as have private sector financial conditions.

Monetary policy

The Central Bank's nominal interest rates have declined ...

The Central Bank Monetary Policy Committee (MPC) decided at its August meeting to keep the Bank's interest rates unchanged but lowered them by 0.25 percentage points at the October meeting. Prior to the publication of this *Monetary Bulletin*, the Bank's key interest rate – the rate on seven-day term deposits – was 4.25%. Interest rates have been lowered by 1.5 percentage points since August 2016, to their second-lowest since the adoption of the inflation target in 2001 (Chart III-1). Accepted rates in auctions of bills issued by the Treasury and the banks have developed in line with the Bank's key rate, as have rates in the interbank market for krónur. Interbank market turnover has increased year-to-date, and the share of seven-day loans has increased at the expense of overnight transactions.

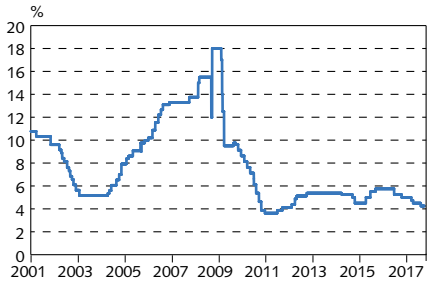
... as has the Bank's real rate

The monetary stance has eased in the recent term, alongside the decline in the key rate. Short-term inflation expectations have inched upwards, although they still appear well aligned with the Bank's inflation target (for further discussion, see Chapter VI). The Bank's real rate in terms of the average of various measures of inflation and inflation expectations is now 1.8% (Table III-1), the lowest in approximately two years. It has fallen by 0.5 percentage points since August and by 1.4 percentage points since August 2016. The Bank's real rate has also fallen in terms of current twelve-month inflation. It is now 2.3%, the lowest since February 2014, and has fallen by half since August 2016. In the main, this decline in the Bank's real rate has been transmitted to real market rates (Chart III-2). As is discussed below, it has been transmitted least to credit institutions' indexed lending rates, although rates on indexed variable-rate loans offered by many of the pension

Chart III-1

Central Bank of Iceland key interest rate[1]

Daily data 3 January 2001 - 10 November 2017

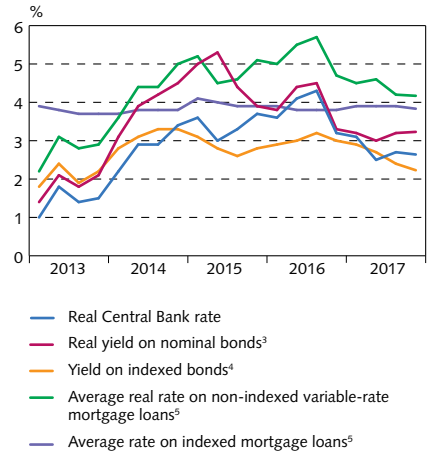


1. The Central Bank's key interest rate is defined as follows: the 7-day collateralised lending rate (until 31 March 2009), the rate on deposit institutions' current accounts with the Central Bank (1 April 2009 - 30 September 2009), the average of the current account rate and the rate on 28-day certificates of deposit (1 October 2009 - 20 May 2014), and the rate on 7-day term deposits (from 21 May 2014 onwards).
Source: Central Bank of Iceland.

Chart III-2

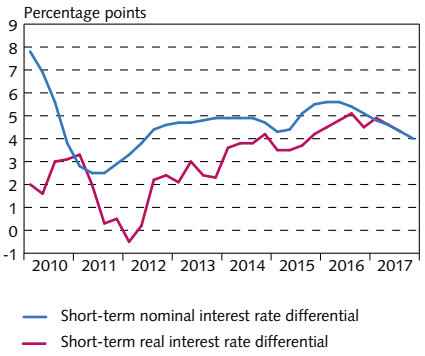
Real Central Bank interest rate and real market rates[1]

Q1/2013 - Q4/2017[2]



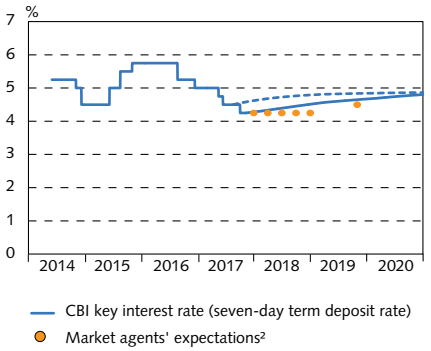
1. In terms of twelve-month inflation. 2. Based on data until 10 November 2017. 3. Five-year rate from the estimated nominal yield curve. 4. Five-year rate from the estimated real yield curve. 5. Simple average lowest lending rates from the three largest commercial banks. Fixed-rate period of five years or more on indexed mortgage loans.
Source: Central Bank of Iceland.

Chart III-3
Interest rate differential with main trading partners[1]
Q1/2010 - Q4/2017[2]



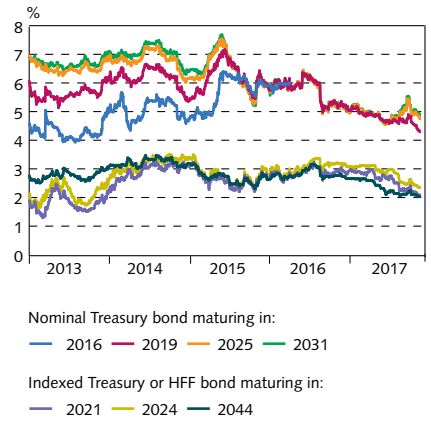
1. The difference between the Central Bank of Iceland's key interest rate and the weighted average key rate in Iceland's main trading partner countries. Real rates are based on twelve-month inflation. 2. Based on data until 10 November 2017
Sources: Thomson Reuters, Central Bank of Iceland.

Chart III-4
Central Bank of Iceland key interest rate and expected developments[1]
Daily data 1 June 2014 - 31 December 2020



1. The Central Bank's key interest rate and Treasury bond yields were used to estimate the yield curve. Broken lines show forward market interest rates prior to MB 2017/3. 2. Estimated from the median response in the Central Bank's survey of market agents' expectations concerning the collateralised lending rate. The survey was carried out during the period 30 October - 1 November 2017.
Source: Central Bank of Iceland.

Chart III-5
Nominal and indexed bond yields
Daily data 2 January 2013 - 10 November 2017



Source: Central Bank of Iceland.

funds have fallen. It therefore appears that the transmission mechanism of monetary policy along the interest rate channel is functioning normally.

Interest rate differential with abroad has narrowed still further

The nominal interest rate differential between Iceland and its main trading partners has narrowed in the recent term, in line with the decline in the Bank's key rate. It is now roughly where it was when Iceland's economic recovery began to firm up and its growth path began to diverge from that in trading partner countries (Chart III-3). The real interest rate spread in terms of current twelve-month inflation has also narrowed and is now similar to that in Q4/2015. The monetary stance therefore remains much tighter in Iceland than in other advanced economies, owing – as before – to different cyclical positions. Even though it appears that GDP growth has eased and the output gap narrowed this year, the output gap is still considerably larger in Iceland than in other developed countries. In Iceland, demand growth and wage increases have also been considerably stronger and unemployment lower.

Table III-1 The monetary stance (%)

Real interest rate in terms of:[1]	*Current stance (10 Nov. '17)*	*Change from MB 2017/3 (18 Aug. '17)*	*Change from MB 2016/4 (11 Nov. '16)*
Twelve-month inflation	2.3	-0.4	-1.1
Business inflation expectations (one-year)	1.8	-0.9	-1.4
Household inflation expectations (one-year)	1.2	-0.8	-1.5
Market inflation expectations (one-year)[2]	1.7	-0.4	-1.3
One-year breakeven inflation rate[3]	2.0	-0.3	-0.9
Central Bank inflation forecast[4]	1.5	-0.6	-1.3
Average	1.8	-0.5	-1.2

1. The nominal rate on financial institutions' seven-day term deposits with the Central Bank. 2. Based on survey of market participants' expectations. 3. The one-year breakeven inflation rate based on the difference between the nominal and indexed yield curves (five-day moving average). 4. The Central Bank forecast of twelve-month inflation four quarters ahead.
Source: Central Bank of Iceland.

Market agents expect unchanged interest rates

According to the Central Bank's quarterly market expectations survey, carried out in early November, respondents expect the Bank's key interest rate to remain unchanged at 4.25% through next year (Chart III-4). In two years' time they expect the key rate to be 4.5%. Forward interest rates suggest comparable results.

Market interest rates and risk premia

Bond market yields have fluctuated recently

Bond market yields are now somewhat lower than they were just before the publication of the August *Monetary Bulletin* (Chart III-5) but have fluctuated somewhat in the interim.[1] Yields on nominal Treasury bonds

1. The yield on the nominal Treasury bond maturing in 2019 has fallen more, however, and the interest rate differential versus other Treasury bonds has widened. Differing developments between the 2019 bond and other short-term Treasury bonds are likely due to changed market expectations stemming from the Treasury's plan to buy back the bond and the impact of that plan on the bond's pricing.

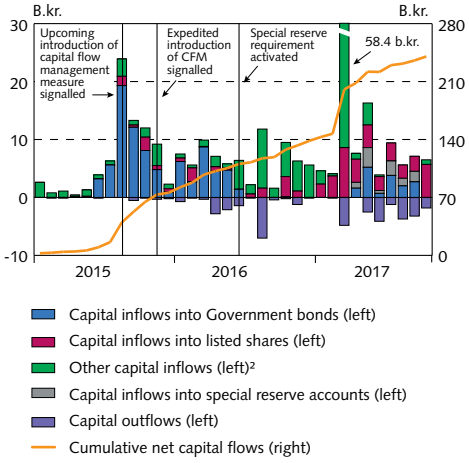
had risen by as much as 0.6 percentage points since mid-September 2017, apparently due in large part to the fall of the Government on 14 September. The increase was greatest at the long end of the yield curve, and the spread between long and short Treasury bonds widened by up to 0.5 percentage points. The rise reversed in part after the publication of the CPI in late September and further still after the Central Bank's rate cut in early October. The spread between short and long nominal Treasury bonds also reversed course, and the yield curve on the bonds is relatively flat once again. Yields on indexed Treasury and Housing Financing Fund (HFF) bonds fluctuated less markedly. The five- and ten-year breakeven inflation rate in the bond market therefore rose temporarily but is now 2½-3%, as it was in August. Yields on the commercial banks' covered bonds have developed similarly since August.

These movements in the bond market are probably due in large part to the temporary spike in the risk premium brought on by increased uncertainty following the fall of the Government, as well as to market agents' expectations that political uncertainty would prompt the MPC to keep the Bank's key rate higher than would otherwise be needed. It is also possible that inflation expectations have risen, but if they have, the Bank's recent survey among market agents indicates that the rise was temporary (see Chapter VI).

Chart III-6

Capital flows due to registered new investments[1]

January 2015 - October 2017



1. Investment commencing after 31 October 2009 and based on new inflows of foreign currency that is converted to domestic currency at a financial institution in Iceland. For further information, see the Foreign Exchange Act, no. 87/1992. 2. Other inflows in March 2017 derive almost entirely from non-residents' acquisition of a holding in a domestic commercial bank.

Source: Central Bank of Iceland.

Capital inflows into the domestic bond market have continued but are still relatively modest

New inflows of foreign currency for new investment in the domestic bond market have been relatively stable since they resumed in April and are still less than before the Bank's capital flow management measure was activated in June 2016 (Chart III-6).[2] Inflows due to investments in the market total 26.4 b.kr. since April, including 15.8 b.kr. invested in Treasury bonds and 10.6 b.kr. deposited to special reserve accounts. At the same time, there has been an increase in outflows of capital previously invested in the bond market, to a total of 8.4 b.kr. Net inflows into domestic bonds have therefore totalled only 7.4 b.kr. since April (see Table 1 in Box 2). Inflows of capital into listed equity securities, which are not subject to the special reserve requirement, have remained broadly unchanged in the recent term, and inflows into other assets have declined.

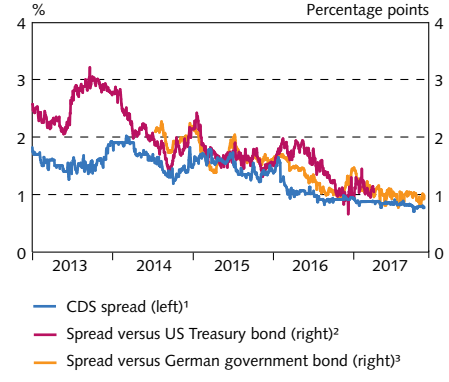
Risk premium on Treasury obligations broadly unchanged

Measures of the risk premium on Treasury foreign obligations declined in the first half of the year, after Standard & Poor's upgraded the sovereign, to their lowest since the beginning of 2008 (Chart III-7). Since then, they have remained broadly unchanged even though Fitch Ratings upgraded the sovereign from BBB+ to A- in July, with a positive outlook. With this, all three agencies that assign credit ratings to the Republic of Iceland have given it A-level ratings. Interest rate premia on the domestic commercial banks' international bond issues have also declined during the year. Standard & Poor's recent upgrade of the three large commercial banks' ratings from BBB to BBB+, with a stable outlook, will probably tend to lower risk premia still further.

Chart III-7

Risk premia on Icelandic Treasury obligations

Daily data 2 January 2013 - 10 November 2017



1. Five-year USD obligations. 2. USD bonds maturing in 2022. 3. Eurobonds maturing in 2020.

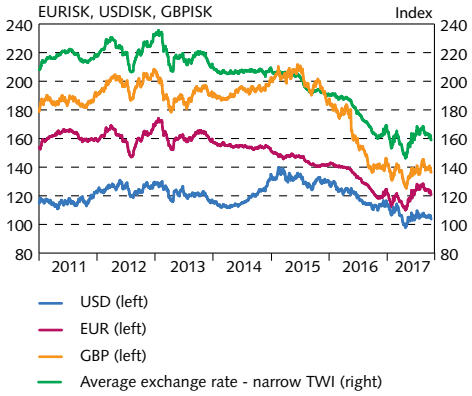
Source: Bloomberg.

2. The capital flow management measure and its effects are discussed in Box 2.

Chart III-8

Exchange rate of foreign currencies against the króna

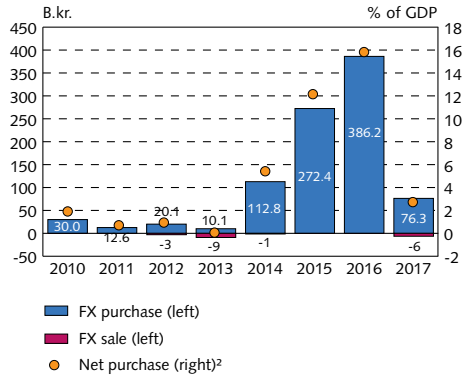
Daily data 3 January 2011 - 10 November 2017



Source: Central Bank of Iceland.

Chart III-9

Central Bank transactions in the Icelandic interbank foreign exchange market 2010-2017[1]



1. Based on data until 10 November 2017. 2. Central bank forecast for year-2017 GDP.
Sources: Statistics Iceland, Central Bank of Iceland.

Exchange rate of the króna

The króna has broadly stabilised after depreciating during the summer …

The exchange rate of the króna fell by 5.5% between quarters in Q3/2017. The current account surplus has narrowed in comparison with last year, and net outflows of non-reserve capital have increased, largely because of foreign debt reduction and an increase in foreign securities holdings, particularly by the pension funds.[3]

The exchange rate has risen by 1.8% year-to-date but is 4.5% higher in trade-weighted terms than it was just before the publication of the August *Monetary Bulletin* (Chart III-8). In the past few months, turnover in the foreign exchange market has been down slightly compared with the first half of the year, partly because the Central Bank's foreign currency purchases have been negligible since the beginning of summer. This is in line with the Bank's declared objective of discontinuing regular foreign currency purchases and intervening mainly to mitigate short-term exchange rate volatility. The Bank's net purchases totalled 69.9 b.kr. in the first ten months of the year, just over a fifth of its purchases over the same period in 2016 (Chart III-9). Exchange rate volatility increased somewhat at the beginning of this year, and further still after most of the capital controls were lifted this past March, but it has eased again (see Box 1).

… and market agents appear to expect an unchanged exchange rate in the near future

According to the Central Bank's quarterly survey of market agents' expectations, respondents expect the exchange rate of the króna to be virtually unchanged in one year's time. This is a slight change from the previous survey, conducted in August, whereas in the surveys carried out previously, respondents had assumed a further appreciation.

Money holdings and lending

Deposit institutions' excess reserves have contracted marginally …

Banknotes and coin in circulation have increased in line with growth in nominal GDP, and the ratio has held stable at 2½-3% since 2010. Deposit institutions' excess reserves – that is, the balance on their current accounts with the Central Bank in excess of required reserves – have contracted marginally in recent months, however.

… but growth in broad money remains strong

Annual growth in broad money (M3) measured 8.3% in Q3 after adjusting for deposits held by the failed financial institutions, an annual growth rate similar to that in Q2. Furthermore, this was the third consecutive quarter to see growth in M3 exceed nominal GDP growth.

3. It should be borne in mind that foreign currency flows need not fully reflect movements in the financial account, owing to time lags between the foreign currency flows and offsetting transactions; for example, exporters can decide when export-related currency inflows take place. Furthermore, foreign exchange market transactions can take place between resident entities, in which case they do not appear in the financial account, which measures transactions between residents and non-residents. It is also possible that residents and non-residents settle transactions in krónur.

Growth in money holdings is more broadly based than before, as it is no longer due almost exclusively to increased household deposits, although they still weigh heavily in the annual increase in M3 (Chart III-10).

Lending to resident borrowers has picked up ...

Even though GDP growth has gained pace in recent years, lending to households and businesses has grown only modestly, while deposits have grown apace. It is possible that post-crisis debt restructuring and increased equity-based corporate financing play a part in this. Now, however, credit growth appears to be developing more in line with growth in deposits. Nominal credit system lending to domestic borrowers increased year-on-year by 5½% in Q3/2017, after adjusting for the Government's debt relief measures, as compared with about 3½% in the first two quarters of the year. The year-on-year increase was somewhat larger in Q3, or 6½%, if the stock of loans denominated in foreign currency is calculated at constant exchange rates (Chart III-11).

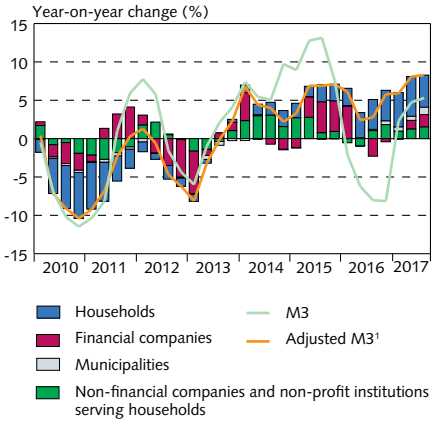
... corporate lending in particular ...

As before, credit growth during the year is due mainly to increased lending to households and non-financial companies. In nominal terms, credit system lending to non-financial companies grew by almost 7% year-on-year in Q3, the strongest growth rate since just after the financial crisis, and by 9½% if the stock of foreign-denominated loans is calculated at constant exchange rates. As in recent months, credit growth has been concentrated in loans to construction, real estate companies and tourism-related companies, where investment activity is greatest (see Chapter IV). Lending to the tourism industry has grown apace in recent years, and the sector's weight in the banks' loan portfolios now equals that of the fishing industry.

... but also lending to households

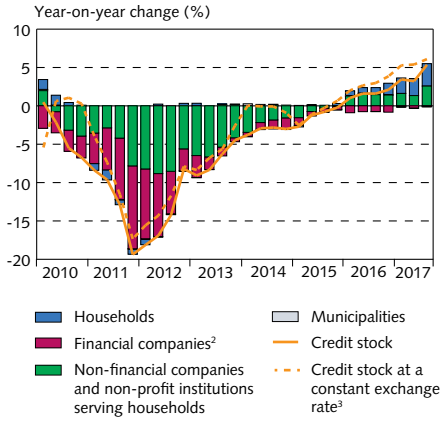
Lending to households has grown in the past year, led by the pension funds. After adjusting for the Government's debt reduction measures, the stock of credit system loans to households grew by almost 5½% year-on-year in Q3. Indexed loans remain the most common type of new lending to households; however, non-indexed loans from the commercial banks have increased in the past few months. Even though the pension funds have granted most of new loans in recent months, they only account for roughly 15% of the total stock of credit system lending to households. As is discussed in *Monetary Bulletin* 2016/4, the pension funds' loans to fund members constitute a relatively small share of their net assets in historical terms. At the same time that the pension funds are stepping up their foreign investment, issued loans to fund members have probably weighed heavily in many funds' cash flow. Loans to pension fund members, HFF bonds, and the pension funds' purchases of the commercial banks' covered bonds can be used as a measure of the funds' exposure to risk relating to residential housing. These loans now account for about a third of the pension funds' net assets, close to the average over the past ten years (Chart

Chart III-10
Money holdings
Q1/2010 - Q3/2017



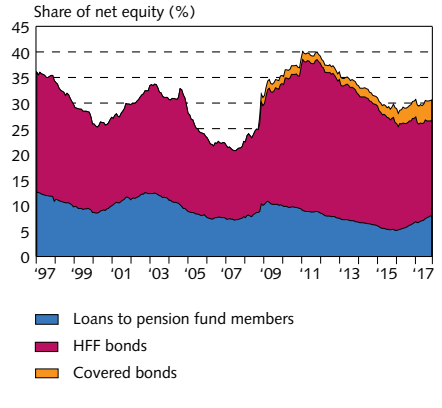
1. Adjusted for deposits of failed financial institutions.
Source: Central Bank of Iceland.

Chart III-11
Credit system lending to resident borrowers and sectoral contribution¹
Q1/2010 - Q3/2017



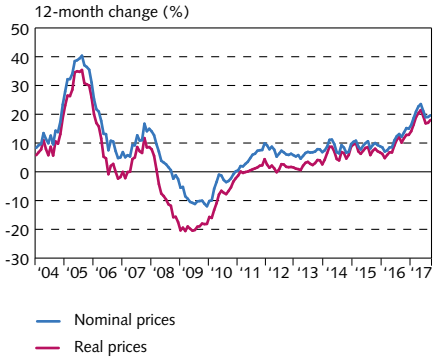
1. Credit stock adjusted for reclassification and Government debt relief measures. Only loans to pension fund members are included with pension funds. 2. Excluding loans to deposit institutions and failed financial institutions. 3. The foreign-denominated credit stock is calculated using the September 2017 trade-weighted exchange rate index value.
Source: Central Bank of Iceland.

Chart III-12
Pension fund financing in the housing market
January 1997 - September 2017



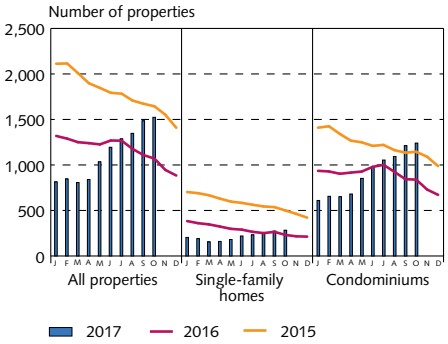
Source: Central Bank of Iceland.

Chart III-13
Capital area house prices
January 2004 - September 2017



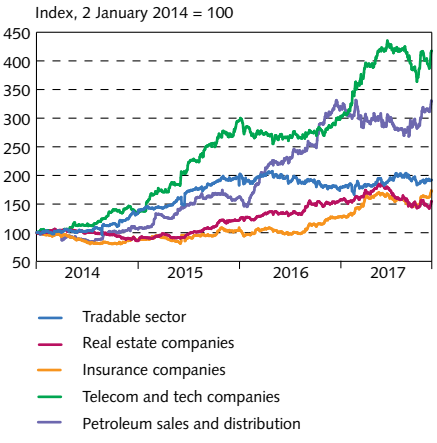
Sources: Registers Iceland, Statistics Iceland.

Chart III-14
Residential properties for sale in the capital area[1]
January 2015 - October 2017



1. Monthly average of advertisements on Morgunblaðið real estate website. The count is carried out by property code so as to avoid a repeat count of the same property.
Source: Morgunblaðið real estate website.

Chart III-15
Share prices by sector[1]
Daily data 2 January 2014 - 10 November 2017



1. Average change in share price of listed companies in selected sectors, adjusted for dividend payments and share capital reductions.
Source: Nasdaq Iceland.

III-12). The position of individual funds differs, however, and some of them have already tightened their borrowing terms.

Asset prices and financial conditions

House price inflation starting to ease …

House prices in the greater Reykjavík area were up 19.6% year-on-year in September, and rent rose by nearly 14%, according to figures from Registers Iceland. A limited supply of smaller flats coupled with increased demand, supported by higher real wages and job creation, fuelled a surge beginning in H2/2016, with the twelve-month increase peaking in May at 23.5% (Chart III-13). The number of properties for sale in the capital area has risen considerably since April, and there are signs that some newly built homes and smaller flats previously rented out to tourists are now on the market (Chart III-14). The increased number of properties for sale may also be due to a drop in demand, as the number of purchase agreements registered in the first nine months of 2017 was down by almost 12% year-on-year. The average time-to-sale for flats in the capital area was just over three months in September, after nearly doubling in a year. In comparison, the average time-to-sale was 19 months in 2010. These indicators imply that the rise in house prices could slow down in the near future.

As house prices have risen in the recent term, there have been growing imbalances between prices and their economic fundamentals. For example, real house prices are up by almost 50% since 2012, but as is discussed in Chapter I, the current upswing is in many ways unlike the one in 2001-2007. Labour income rose by similar amounts in the two periods, whereas credit growth differed greatly: the pre-crisis rise in house prices went hand-in-hand with a steep increase in household borrowing. This has not been the case in the current upswing, however: this time, households appear to have used their improved position to pay down debt.

… share prices have fallen in the recent term, after rising somewhat in H1/2017

The OMXI8 index is now 1.6% lower than it was when the August *Monetary Bulletin* was published. Share prices rose somewhat in H1 but began to fall in late summer, after the publication of Q2 earnings reports that were in line with or below market agents' expectations. They fell still further after the Government fell in September, although that decline reversed in part after the Central Bank lowered interest rates in October. Share prices in the tradable sector have fallen in recent months, while insurance and oil companies' shares have risen the most. Real estate companies' share prices rose after earnings reports were published in November but had fallen somewhat in the months beforehand, in the wake of indications of a slowdown in house price inflation (Chart III-15). Most newly published earnings reports for Q3 were largely in line with or slightly below market expectations.

Turnover in the Nasdaq Iceland main market totalled approximately 550 b.kr. over the first ten months of the year, about 13% more than over the same period in 2016. Foreign capital inflows into the

domestic equity market have increased markedly this year (see Chart III-6), totalling nearly 40 b.kr. in the first ten months of 2017, as opposed to 11 b.kr. in 2016 as a whole.

Private sector debt ratio broadly unchanged in the recent term …

The corporate debt-to-GDP ratio has remained relatively stable at 83% since the beginning of 2016 (Chart III-16). In mid-2017, the household debt ratio was also broadly unchanged from 2016, at about 76%, although nominal household debt increased by 3.7% year-on-year in Q2. Private sector debt equalled 159% of estimated year-2017 GDP at mid-year, about 1 percentage point less than at the end of 2016.

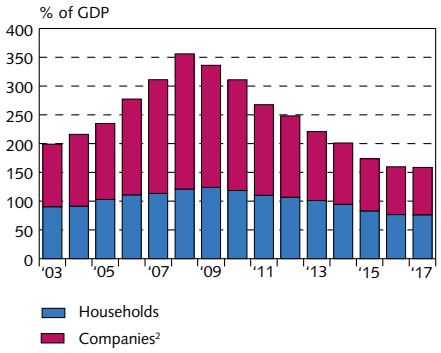
… but private sector equity ratios continued to rise last year and have overtaken their pre-crisis peak

According to recently published figures from Statistics Iceland and figures from the Nasdaq CSD Iceland, household assets relative to GDP fell slightly in 2016, to 383% at the end of the year (207% excluding pension assets). Household net wealth – i.e., assets net of debt – continued to rise year-on-year, however, measuring 305% of GDP at the end of 2016. Households' equity ratio had therefore continue to rise, and by end-2016 it was about 3 percentage points above its pre-crisis peak (Chart III-17). The number of households with negative housing equity also declined in 2016, as did the number of households with an onerous debt position (Chart III-18). The number of households in such difficulties has fallen markedly from the 2010 peak and is now close to the 2005-2006 level. Firms' equity position has also improved recently, although the rise in their equity ratio eased slightly in 2016. According to figures from Statistics Iceland, firms' equity ratio was 42% at the end of 2016, up from 40% at year-end 2015, after having risen by an average of 4 percentage points per year since 2009. The ratio is now a full 11 percentage points above its pre-crisis peak and the improved equity position includes most sectors of the economy.

Households' non-performing loan ratio continues to fall, and corporate insolvencies are on the decline

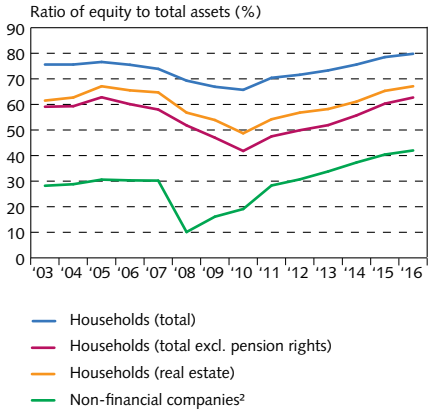
The share of non-performing household loans from the three largest commercial banks and the HFF has fallen still further in recent months, to 3.2% of total loans at the end of September, down from 5.3% at the same time a year earlier. Furthermore, the number of individuals on the CreditInfo default register declined by 5% year-on-year in October. The share of corporate loans in arrears to credit institutions was 8.9% in September, however, and has been relatively stable between 8% and 9% over the past year. The number of firms on the default register fell by 5% year-on-year in October. The number of corporate insolvencies declined steeply year-on-year in the first three quarters, after having been unusually high in 2016 because of delayed registration caused by the 2015 strike among capital area Commissioners' employees (Chart III-19). Corporate insolvencies have also declined in comparison with previous years, however. New company registrations have declined slightly year-on-year as well.

Chart III-16
Household and non-financial corporate debt 2003-2017[1]



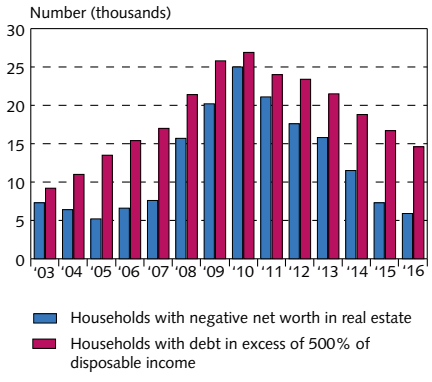
1. Debt owed to financial undertakings and market bonds issued. The 2017 figure is the end-June 2017 debt position as a share of year-2017 GDP as forecasted by the Central Bank. 2. Excluding financial institutions (which includes holding companies).
Sources: Statistics Iceland, Central Bank of Iceland.

Chart III-17
Household and corporate equity ratios 2003-2016[1]



1. According to income tax returns, apart from households' pension rights and securities assets other than equity, which are taken from Statistics Iceland's sectoral accounts. Equity assets are taken from Nasdaq CSD Iceland. 2. Companies excluding pharmaceuticals, financial, and insurance firms.
Sources: Statistics Iceland, Nasdaq CSD Iceland.

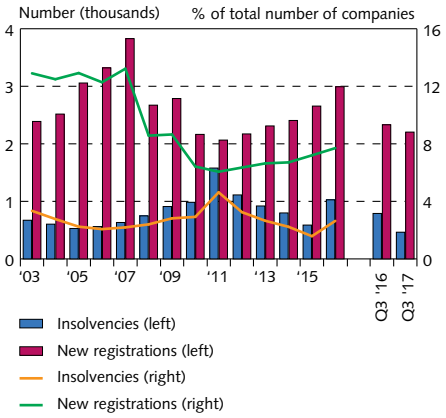
Chart III-18
Households with negative net worth in real estate and high debt 2003-2016



Source: Statistics Iceland.

Chart III-19

Corporate insolvencies and new company registrations 2003-2017

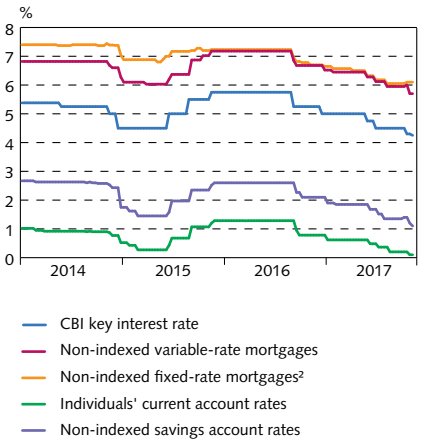


Source: Statistics Iceland.

Chart III-20

Central Bank of Iceland key interest rate and commercial banks' rates[1]

1 January 2014 - 1 November 2017



1. Simple average of the lowest mortgage rates from Arion Bank, Íslandsbanki, Landsbankinn. 2. Rates are fixed for 3-5 years.
Sources: Arion Bank, Íslandsbanki, Landsbankinn, Central Bank of Iceland.

Non-indexed lending rates have fallen in line with Central Bank rates

Overall, credit institutions' non-indexed deposit and lending rates have fallen in line with the Central Bank's rate cuts since August 2016 (Chart III-20). Interest rates on comparable indexed loans have remained unchanged in the recent term, however, apart from variable rates on some of the pension funds' loans to members, which have fallen by as much as 1 percentage point since August 2016. As before, pension fund loans bear somewhat lower interest rates than comparable loans from the commercial banks. Some of the pension funds have tightened their lending rules slightly in the recent past, including lowering maximum loan-to-value ratios and setting more stringent collateral requirements in cases involving refinancing of older loans.

IV Demand and GDP growth

GDP growth looks set to ease in 2017, after rapid growth in the past two years. The contribution of two key drivers of growth in recent years – business investment and services exports – will moderate this year, but household demand will increase substantially. Services export growth has slowed down while imports have surged, and the contribution from net trade to output growth will therefore be negative. To some extent, the sharp rise in imports reflects the rapid growth in household income and favourable developments in household balance sheets in the recent term, but the reduction in import prices caused by the appreciation of the króna is also a factor. Households' strong position also has a major impact on demand for residential housing and residential investment, which will underpin the bulk of investment growth in the near future. The fiscal stance has eased somewhat this year – for the third year in a row – but the fiscal outlook is more uncertain than before.

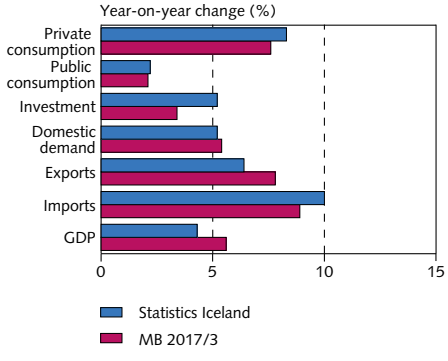
GDP growth and domestic private sector demand

GDP growth subsides faster than expected

GDP growth lost pace in H1/2017 after a strong 2016, according to preliminary figures from Statistics Iceland,[1] measuring 4.3%, down from 10.4% in H2/2016. As before, it was driven mainly by private consumption and services exports. The slowdown in GDP growth was due primarily to a decline in business investment growth and weaker growth in exports. Consumption and investment spending grew by a total of 6.1% year-on-year in H1/2017, but because of a negative contribution from inventory changes stemming largely from the effects of the fishermen's strike early in the year, growth in domestic demand was nearly 1 percentage point less, or 5.2%. In H1, export growth was characterised by weaker growth in tourism exports, the effects of the fishermen's strike, and less favourable developments in other services exports than had been expected. Imports grew well in excess of exports, and the contribution of net trade to GDP growth was therefore negative by nearly 1½ percentage points.

The forecast in the August *Monetary Bulletin* projected GDP growth for H1 at 5.6%, more than 1 percentage point above Statistics Iceland's current estimate (Chart IV-1). The deviation in the forecast is attributable mainly to the expectation of better utilisation of unused fishing quotas, which would have led to a more favourable contribution from inventory changes, and to weaker-than-expected exports of other services. This was offset somewhat by private consumption and business investment, which were stronger than previously forecast. Overall growth in domestic demand was well in line with the August forecast, however.

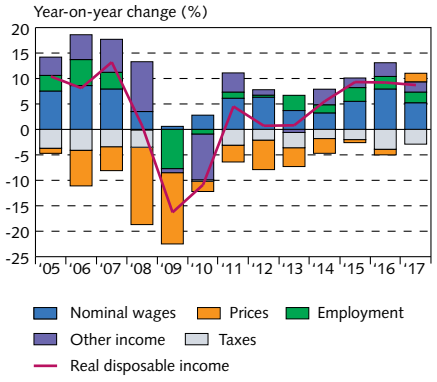
Chart IV-1
National accounts H1/2017



Sources: Statistics Iceland, Central Bank of Iceland.

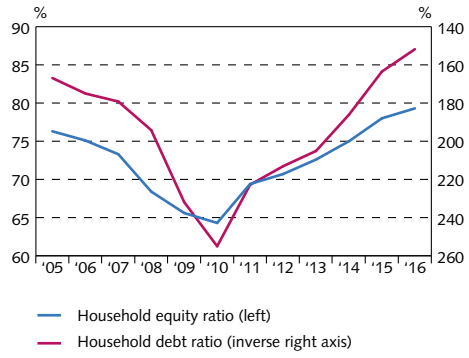
1. The national accounts were also revised back to 1997 (see Box 4).

Chart IV-2
Real disposable income and its main components 2005-2017[1]



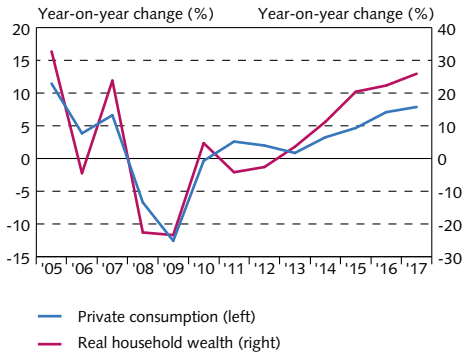
1. Central Bank baseline forecast 2017. The contribution of the main underlying components in annual changes in real disposable income is calculated based on each component's weight in disposable income. The combined contribution of underlying components does not add up to the total change due to rounding and incomplete income accounts for households from Statistics Iceland.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-3
Household equity and debt ratio 2005-2016



Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-4
Private consumption and household net worth 2005-2017[1]



1. Central Bank baseline forecast 2017. Net wealth is the sum of households' housing and financial wealth (excluding pension rights), net of household debt (year-end figures).
Sources: Statistics Iceland, Central Bank of Iceland.

Households' disposable income has risen by a third since the economic recovery began

According to recent figures from Statistics Iceland, households' disposable income has increased markedly in the past few years. In real terms, it has risen by about a third from the post-crisis trough, and private consumption has grown by just over a fifth over the same period. Household saving has therefore increased, measuring 10.5% of disposable income in 2016. In real terms, disposable income grew by 9.2% last year, virtually the same as in 2015 (Chart IV-2). The surge is due to steep wage rises supported by strong job creation. Other income – for example, investment income – has grown as well, but weighs less heavily in the rise in disposable income than it did before the financial crisis. These same factors also explain this year's surge in real disposable income, although the year-on-year decline in consumer goods prices pulls in the same direction, with the private consumption deflator in H1/2017 falling 1.8% between years.

Households' equity position has strengthened markedly

Households' equity position has improved markedly in recent years, after deteriorating significantly in the wake of the financial crisis. In real terms, household equity grew by over a fifth in 2016 and has increased by more than 50% since bottoming out in 2010.[2] This rapid rise in net household wealth reflects the surge in house prices in recent years, as well as a considerable reduction in household debt and strong growth in disposable income (Chart IV-3). Owing to the continued steep increase in house prices this year, net wealth is expected to rise as much in real terms as it did in 2016.

Improved financial position and rising household income fuel private consumption growth

Private consumption increased 8.3% year-on-year in H1/2017, continuing the steady upward trend in private consumption growth since H2/2015. This trend is driven in large part by the above-described developments in households' income and net wealth (Chart IV-4). Private consumption has exceeded the Bank's last forecasts for 2017. The deviation is due in large part to a larger-than-projected increase in disposable income in 2016.

Leading indicators of developments in private consumption suggest that developments in Q3 were broadly similar to those in H1/2017. According to the August forecast, private consumption growth was expected to ease in H2, but in view of the most recent indicators and data on household income, the slowdown is now forecast to be less pronounced and private consumption projected to grow by 7.9% over the year as a whole (Chart IV-5). The ratio of private consumption to GDP will then rise from just over 49% last year to 51% this year, yet it remains well below its historical average. In spite of this robust rate of private consumption growth, household saving looks set to hold broadly unchanged at just over 10% of disposable income.

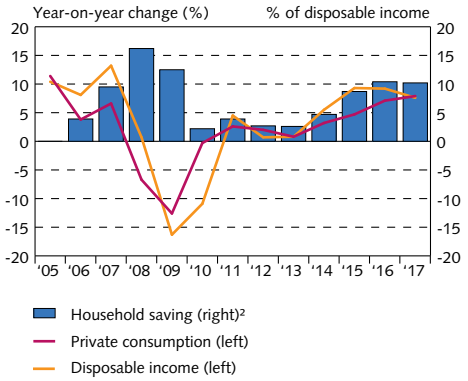
2. Based on Central Bank data, which differ from Statistics Iceland data in that the Bank calculates securities holdings in terms of market value whereas Statistics Iceland uses nominal value.

Business investment growth has slowed down

Business investment growth has slowed down after a strong three years. In H1/2017, the increase measured just over 1%, slightly more than was forecast in the August *Monetary Bulletin*. This modest growth rate is affected by a 4% contraction in investment in ships and aircraft, on the one hand, and in the energy-intensive sector, on the other. Other business investment grew by 4%, however, somewhat more than was indicated in the investment survey carried out by the Central Bank in May. The survey only covers roughly 100 of Iceland's largest firms, however, and the deviation could indicate relatively more investment spending by smaller firms than their larger counterparts. Even so, developments this year accord with the Bank's survey and other indications; i.e., that business investment growth has begun to ease after having measured about one-fifth annually in the past three years.

Chart IV-5

Private consumption, real disposable income, and household saving 2005-2017[1]



1. Central Bank baseline forecast 2017. 2. There is some uncertainty about Statistics Iceland's figures on households' actual income levels, as disposable income accounts are not based on consolidated income accounts and balance sheets. The saving ratio is calculated based on the Central Bank's disposable income estimates, as Statistics Iceland figures are rescaled to reflect households' estimated expenses over a long period.
Sources: Statistics Iceland, Central Bank of Iceland.

Firms expect broadly unchanged investment this year compared to 2016 but an increase in 2018 ...

The Bank's most recent investment survey indicates, as the spring survey did, that firms generally expect investment spending to remain broadly unchanged year-on-year in 2017 (Table IV-1). There were several changes within specific sectors since the last survey, however. The most pronounced change was in tourism and transport, where investment is expected to grow by just over 4% year-on-year, as opposed to 18% in the spring survey. Furthermore, fishing companies expect less of a contraction than they did in the spring. According to this survey, investment will grow by the largest proportion in the financial and insurance sector, although significant growth is expected among manufacturing firms as well. Investment is expected to decline in other sectors.

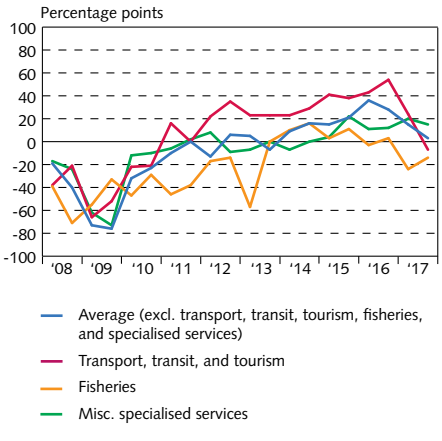
In the survey, participants are also asked about their investment plans for 2018, and their responses indicate that an increase is in the offing. The main difference is among companies in tourism and transport, where investment spending is projected to grow by 10% between 2017 and 2018. Fishing companies expect to continue reducing investment spending, whereas the largest proportional increase will

Table IV-1 Survey of corporate investment plans (excluding ships and aircraft)[1, 2]

Largest 101 firms *Amounts in ISK billions*	*2016*	*2017*	*2018*	*Change between 2016 and 2017 (%) (last survey)*	*Change between 2017 and 2018 (%) (last survey)*
Fisheries (17)	15.4	13.6	10.5	-11.7 (-42.9)	-22.9
Manufacturing (16)	4.6	5.1	7.9	9.3 (7.4)	56.8
Wholesale and retail sale (22)	8.0	7.2	6.5	-9.2 (-12.5)	-10.4
Transport and tourism (8)	44.0	45.8	50.6	4.1 (18.0)	10.3
Finance/Insurance (9)	3.7	5.3	6.3	42.3 (38.7)	18.1
Media and IT (7)	7.5	7.4	7.4	-2.1 (2.5)	0.1
Services and other (22)	18.1	15.8	15.4	-12.3 (-1.2)	-2.7
Total 101 (102)	101.4	100.3	104.5	-1.1 (1.8)	4.2

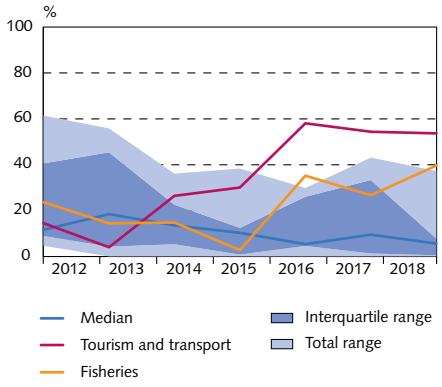
1. In parentheses are figures from the last survey, in which respondents from 102 firms were asked about investment plans for 2016-2017 (*Monetary Bulletin* 2017/2). A paired comparison between years is presented, but because the sample could change between surveys, this could affect the results. 2. Spare parts for ships and aircraft have been included.
Source: Central Bank of Iceland.

Chart IV-6
Investment: balance of opinion, by sector[1]



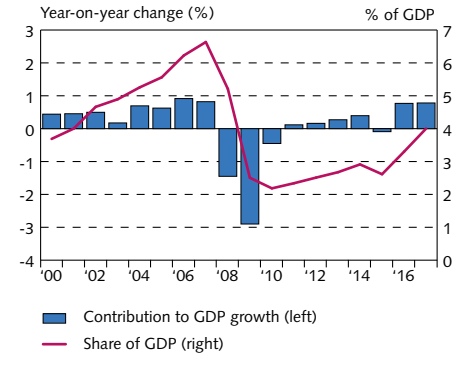
1. Balance of opinion is the share who expect investment to increase between years less the share who expect it to decrease.
Source: Gallup.

Chart IV-7
Credit-financed corporate investment 2012-2018[1]



1. Survey of corporate investment plans, excluding ships and aircraft. Median and ranges exclude transport, tourism, and fisheries.
Source: Central Bank of Iceland.

Chart IV-8
Residential investment 2000-2017[1]



1. Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

be among manufacturing firms. On the whole, the survey indicates that businesses' investment spending will increase by just over 4% year-on-year.

Similar results were obtained from the Gallup survey of the current situation and future plans, carried out among Iceland's largest 400 firms. According to the Gallup survey, the number of firms expecting investment to be stronger this year than in 2016 was roughly equal to the number expecting the reverse. The most pronounced change was among executives in the transport, transit, and tourism sector, where respondents expecting a downturn in investment outnumbered those expecting an increase (Chart IV-6). Among companies in specialised services, however, the Gallup results differed somewhat from the Central Bank survey results. According to Gallup, services firms planning to step up investment during the year considerably outnumbered those planning to scale it down.

...and they project that the share of credit-financed investment will be broadly unchanged in 2018

The investment survey indicates that firms expect to finance nearly 40% of their investment spending with credit this year. This is similar to the ratio in 2016, and survey participants expect it to remain roughly the same in 2018 as well. Credit financing now constitutes a considerably larger share of investment financing than in the period up to 2016, when the ratio lay in the 20-30% range. As before, the share is highest in the transport and tourism sector, although it increased signi-ficantly among firms in other services and among construction firms. In the fishing industry, credit financing has been less this year than was suggested in the last survey (Chart IV-7).

Business investment to grow modestly this year but contract in 2018

Business investment is expected to grow by just over 3% this year. The outlook is for relatively weak growth in the energy-intensive sector, and investment in ships and aircraft is expected to contract by a fifth. General business investment will increase by a full 8%, however. This is slightly below the August forecast, with stronger growth in 2017 to date offset by indications of reduced investment spending according to the Bank's investment survey. There are also signs of increased construction company investment in commercial property, which is not covered by the Bank's survey. For 2018, the outlook is for a nearly 7% contraction in business investment, owing to investment in the energy-intensive sector and ships and aircraft. General business investment will continue to grow, however, by nearly 10% year-on-year.

Surge in residential investment

Robust household demand and price developments in the real estate market have fuelled residential investment in the recent term. Residential investment grew by nearly 30% in 2016, and its contribution to the year's GDP was close to that during the pre-crisis construction boom. It continued growing in H1/2017, by nearly 29%, in line with the August forecast. The outlook for 2017 as a whole is therefore

broadly unchanged. Residential investment is forecast to increase by nearly a fourth year-on-year, and its share in GDP is expected to rise to the 4% long-term average (Chart IV-8). It is expected to grow strongly in 2018 as well, or by more than 18% year-on-year, which is well in line with the August forecast.

Investment-to-GDP ratio expected to remain broadly constant over the forecast horizon

Total investment has grown significantly in the recent term. The average growth rate exceeds 19% per year over the past three years, with investment up by two-thirds since 2012, leading to a 5½ percentage point rise in the investment-to-GDP ratio over the same period. Total investment growth eased in H1/2017, although it was still over 5%. The outlook for 2017 as a whole is largely unchanged from the August forecast, with growth projected at nearly 9% (Chart IV-9). Investment is then expected to remain flat next year, and if the forecast materialises, the investment-to-GDP ratio will fall from almost 22% to roughly 21% in 2018 and remain broadly unchanged over the remainder of the forecast horizon.

GDP growth to ease in 2017 despite increased household demand

As is discussed above, GDP growth measured 4.3% in H1 and is expected to be considerably less in 2017 as a whole than in 2016. Last year, investment contributed over 4 percentage points to GDP growth, and the contribution from net trade was negative by less than 1 percentage point. Changes in these two components explain the lion's share of the reduction in GDP growth from last year's 7.4% to this year's projected 3.7%. The contribution from investment will be cut in half, and the contribution from net trade will be negative by more than 2 percentage points (Chart IV-10). The projected GDP growth rate is 1½ percentage points below the August forecast, primarily because the outlook is for a more pronounced slowdown in tourism growth and because this year's fishermen's strike appears likely to have a longer-lasting impact on marine product exports and fishing industry inventories than previously thought. On the other hand, private consumption is expected to grow more rapidly than previously anticipated. The GDP growth outlook for the next few years is broadly in line with the August forecast, however, with growth projected at 3.4% in 2018 and 2.5% from 2019 onwards.

Public sector

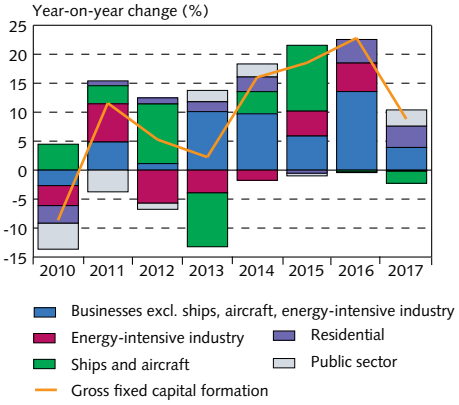
Public consumption growth expected to remain modest

In the first half of the year, public consumption grew by 2.2%, which is in line with the August forecast and slightly above the growth rate of the past few years. Growth is expected to ease in H2, measuring 1½% for the year as a whole. Central and local government consumption is expected to continue in this vein throughout the forecast horizon, although spending will grow faster at the local government level.

Public investment grew by 5.6% in H1, slightly less than projected. It is expected to pick up strongly in H2, owing to a historically

Chart IV-9

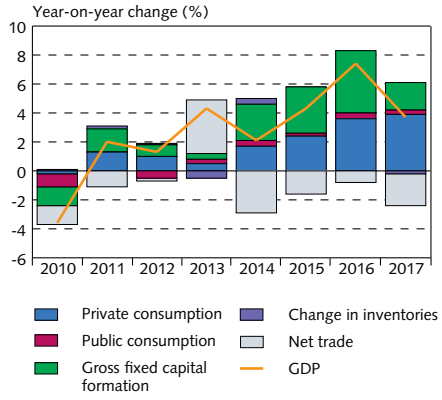
Gross fixed capital formation and contribution of main components 2010-2017[1]



1. Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-10

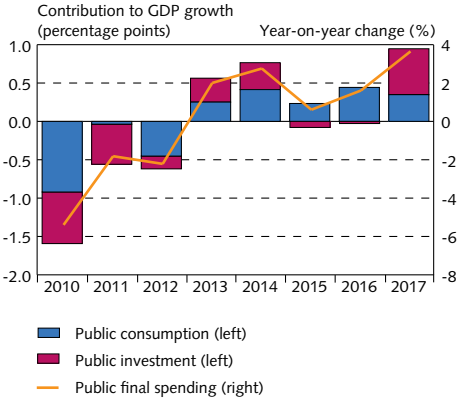
GDP growth and contribution of underlying components 2010-2017[1]



1. Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

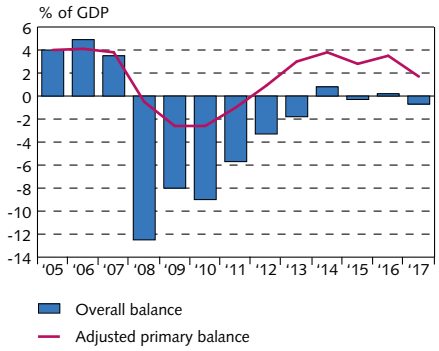
Chart IV-11

Public consumption and investment 2010-2017[1]



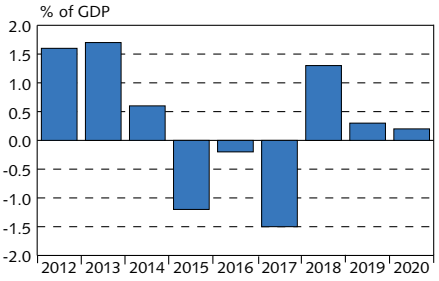
1. Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-12
Treasury balance 2005-2017[1]



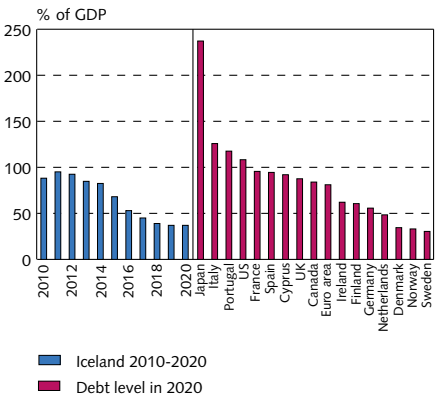
1. The primary balance is adjusted for one-off revenues and expenditures (e.g., stability contributions from the settlement of the failed financial institutions, accelerated write-downs of indexed mortgage loans, and dividend payments). In 2016 and 2017, the overall balance is adjusted for one-off items; i.e., the effects of the stability contributions, dividends in excess of the National Budget, and accelerated write-downs of indexed mortgage loans. Central Bank baseline forecast 2017.
Sources: Ministry of Finance and Economic Affairs, Statistics Iceland, Central Bank of Iceland.

Chart IV-13
Change in central government cyclically adjusted primary balance 2012-2020[1]



1. Central Bank baseline forecast 2017-2020. Primary balance is adjusted for one-off revenues and expenditures (e.g., dividends and accelerated write-downs of indexed mortgage loans).
Sources: Ministry of Finance and Economic Affairs, Statistics Iceland, Central Bank of Iceland.

Chart IV-14
General government gross debt



Sources: International Monetary Fund, Ministry of Finance and Economic Affairs, Statistics Iceland, Central Bank of Iceland.

low investment level in H1 and to the floods in East Iceland, which necessitated increased investment in Q3. If these projections materialise, the growth rate for the year will be nearly 23%. Investment spending accounts for the vast majority of the nearly 4% growth in government final spending this year (Chart IV-11). Public investment measured 3.2% of GDP last year. It is expected to increase slightly this year and reach 3.4% by the end of the forecast horizon, about 0.7 percentage points below its twenty-five-year average.

Treasury outcome broadly unchanged from the previous estimate
The 2017 National Budget was approved with a 25 b.kr. surplus. Treasury spending has turned out 20 b.kr. more than previously expected; however, the dividends paid by the State-owned commercial banks have been increased to a total of 35 b.kr., more than 20 b.kr. over and above the Budget. The outcome for 2017 is therefore likely to be similar to that originally presented in the National Budget for the year (Chart IV-12)

Continued fiscal easing this year, followed by tightening in 2018
In assessing whether the fiscal stance is growing more or less accommodative, it is necessary to consider how the Treasury outcome is developing after adjusting for cyclical effects and excluding one-off items such as the aforementioned additional dividend payments (see Box 5). The fiscal stance has eased in the past two years, due to increased expenditures and reduced revenues. This easing is expected to continue this year and to measure about 1.5 of GDP (Chart IV-13). The total easing for all three years therefore equals 2.9% of GDP. In 2018, this will reverse in part, and the fiscal stance will tighten by 1.3% of GDP, and the current fiscal plan suggests that the fiscal stance will be broadly neutral in 2019 and 2020. This is broadly in line with the outlook described in *Monetary Bulletin* 2017/2, which is the last time the Bank made an assessment of the fiscal stance.

Increased uncertainty about general government debt
The assessment of developments in general government debt is based mainly on the outgoing Government's fiscal plan, which placed strong emphasis on rapid debt reduction. According to that plan, general government debt is to decline from 53% of GDP in 2016 to 37% of GDP by 2020 (Chart IV-14). But until the new Government issues a new medium-term fiscal plan, this will remain uncertain, as the reduction specified in the outgoing Government's plan exceeds that specified in the fiscal rule according to the Act on Public Finances, which states that debt shall not exceed 30% of GDP and, if it does, it shall be reduced by 5% of the excess amount each year until it reaches that limit.

External trade and the current account balance

Export growth slows more than previously forecast
After two years of 10% annual growth, export growth has eased this year. It measured 6.4% in H1, somewhat less than was forecast in the August *Monetary Bulletin*. Goods exports developed in line with that forecast, while growth in services was weaker, owing to a contraction

in other services exports (for example, film companies' exports and exports of other specialised services). Data from Statistics Iceland show that the past few years' swift growth in the travel component has lost pace, and spending per tourist was down year-on-year in H1 (Chart IV-15). The weaker growth in the travel component is in line with the Bank's August forecast, however.

The outlook is for services exports to grow more slowly in H2 than was assumed in August, owing mainly to items classified as "other services exports". The travel and transport components of services exports are broadly unchanged from the previous forecast, however, with the year-on-year growth rate projected to ease but remain robust. Goods exports are also expected to grow more slowly this year than previously estimated. This is due mainly to the persistent effects of the fishermen's strike, which had been expected to reverse in full within the year. It now appears that it will take longer to make up the production loss from the strike, and at the end of last season fisheries had some unused quotas that they have transferred to the current fishing year, which began in September 2017. At present, it is not assumed that these quotas will be fully used this year. As a result, the outlook for growth in goods export in 2017 – and for inventory changes as well – is poorer than in previous forecasts. Other goods exports will also grow considerably more slowly than previously forecast, primarily because of setbacks in production by silicon manufacturer United Silicon.

On the whole, exports look set to grow rather strongly this year, although the outlook is for a slower rate of growth than was forecast in August. Growth is now projected at just above 6%, or 2½ percentage points less than in the August forecast (Chart IV-16). Goods exports look set to grow at a slower rate next year, while growth in services exports will remain robust, as the country's two largest airlines plan to increase their passenger seat capacity by over a fourth. Growth in total exports is projected to measure about 4% and then ease over the remainder of the forecast horizon.

Robust import growth driven by strong domestic demand …

Rapid growth in domestic demand and the high exchange rate of the króna have supported import growth. In H1, imports were up by an unexpected 10% year-on-year, driven mainly by a nearly 19% increase in services imports, which have grown strongly in the recent term.

Growth in domestic demand is assumed to have peaked last year and is expected to subside gradually over the remainder of the forecast horizon. This is reflected in the forecast for imports, which are expected to increase by over 12% and then ease to slightly more than 5% in 2018. To some extent, the sharp slowdown in import growth is due to weaker imports of ships and aircraft next year. Imports excluding ships and aircraft will grow by more than 8% next year and 3-4% annually in the years thereafter.

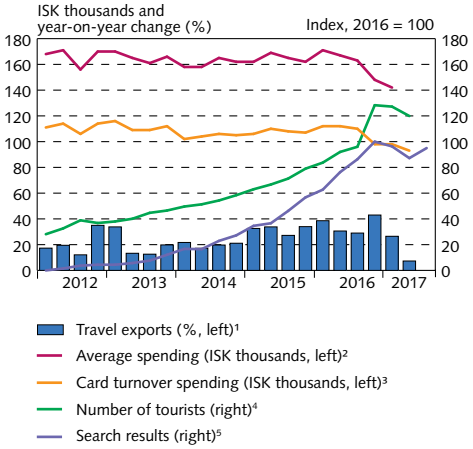
… and a sizable negative contribution from net trade to GDP growth in 2017

Since 2013, the contribution from net trade has been negative in spite of burgeoning export growth, as imports have grown even faster. In

Chart IV-15

Indicators of tourism sector activity

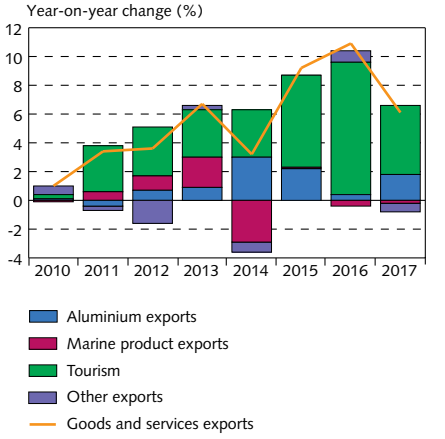
Q1/2012 - Q3/2017



1. Year-on-year change of travel exports, at constant prices. 2. Seasonally adjusted average spending per tourist in Iceland, according to services export data. 3. Seasonally adjusted payment card turnover spending per tourist (excluding international airfares and public levies). 4. Seasonally adjusted passenger departures via Keflavík Airport. 5. A principal component model combining the frequency of five different Google search strings relating to travel to Iceland (seasonally adjusted).
Sources: Centre for Retail Studies, Google Trends, Isavia, Statistics Iceland, Central Bank of Iceland.

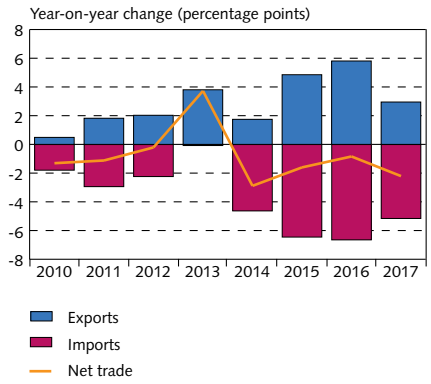
Chart IV-16

Exports and contribution of subcomponents 2010-2017[1]



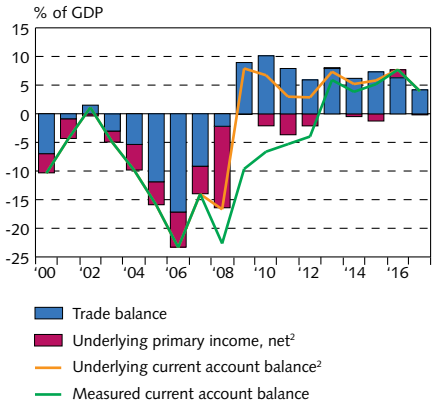
1. Aluminium exports as defined in the national accounts. Tourism is the sum of "travel" and "passenger transport by air". Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-17
Contribution of net trade to GDP growth 2010-2017[1]



1. Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-18
Current account balance 2000-2017[1]



1. Including secondary income. Central Bank baseline forecast 2017.
2. Excluding the effect of the failed financial institutions (2008-2015) and the pharmaceuticals company Actavis (2009-2012) on primary income. Also adjusted for the failed financial institutions' financial intermediation services indirectly measured (FISIM).
Sources: Statistics Iceland, Central Bank of Iceland.

H1, it was negative by 1½ percentage points, and for the year as a whole it is projected to be negative by 2.2 percentage points (Chart IV-17). This is a considerably more negative contribution than was assumed in the Bank's August forecast and is the main reason for downward revision in this year GDP growth forecast. The contribution from net trade will remain negative in the next few years, a development also more unfavourable than previously forecast.

Prospect of a smaller current account surplus than was forecast in August

The surplus on goods and services trade measured 1.7% in H1, slightly less than was forecast in August. At the same time in 2016, it measured 2.4% of GDP, and for the year as a whole it was 6.3%. This year's services account surplus is expected to be broadly equal to last year's, whereas the goods account is expected to show a sizeable deficit. The surplus as a whole will be 4.2% of GDP, nearly 2 percentage points less than was assumed in August. The change in outlook is due mainly to weaker export growth, supported by poorer terms of trade (see Chapter II). The surplus also looks set to contract somewhat faster later in the forecast horizon than was projected in August, primarily due to stronger import growth in 2018. It is forecast to measure 2.4% of GDP in 2020.

The current account balance was positive by 190 b.kr., or 7.8% of GDP, in 2016. Only once before has Iceland recorded a larger current account surplus – in 2009, when it measured 8% of GDP (Chart IV-18). In H1/2017, the primary income balance deteriorated year-on-year, although developments in Q2 were more favourable than expected because of one-off profits on a domestic company's foreign direct investment. Despite a better-than-expected outcome in H1, the forecast for this year's balance on primary income is unchanged since August. The surplus on primary income is expected to shrink next year even though interest premia on domestic firms' foreign financial obligations have fallen and external debt has declined still further. Updated primary income data show that the surplus on the wage item, which consists of Icelanders' wages abroad net of foreign nationals' wages in Iceland, has contracted more rapidly since 2015 than previously expected, owing to the appreciation of the króna and the increased number of foreign workers in Iceland. The outlook is for the current account surplus to measure 4% of GDP this year, down from 5.8% in the August forecast, and then narrow to just over 2% by 2020 (Chart IV-18). If the forecast materialises, national saving will fall from over 29% of GDP in 2016 to just under 26% this year and then continue declining over the forecast horizon, to 23½% of GDP by 2020.

V Labour market and factor utilisation

Most labour market indicators imply that growth in labour demand has peaked but will remain strong. Total hours work contracted in Q3/2017, whereas the forecast in the August *Monetary Bulletin* provided for a continuing increase. Other indicators still imply a continued increase in demand for labour. Unemployment is still declining, and nearly a fifth of survey respondents from the corporate sector are still planning to recruit rather than lay off staff. Furthermore, the share of firms considering themselves short-staffed has remained broadly unchanged over the past year and a half, in spite of significant importation of labour. It is likely that some of the foreign workers who migrate to Iceland for temporary jobs are not included or show up with a time lag in official figures; therefore, the official figures probably underestimate job creation. This also causes an overestimation of productivity growth. Demand pressures in the labour market and in the economy as a whole remain strong. The output gap appears to have peaked, however.

Labour market

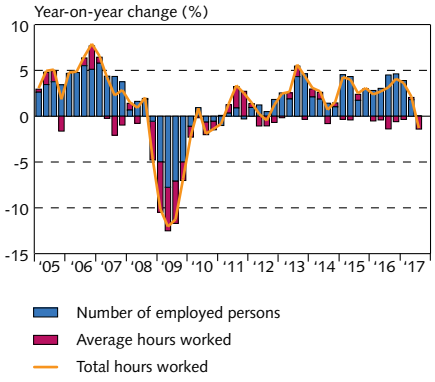
Labour force survey suggests that job creation has stalled …

According to the Statistics Iceland labour force survey (LFS), growth in total hours worked eased in Q2, after robust growth in the quarters beforehand (Chart V-1). In Q3, the LFS showed a 1.3% year-on-year reduction in total hours worked, as the number of employed persons remained unchanged and the average work week grew shorter. This is the first time since Q3/2012 that total hours worked have declined. It is a sizeable deviation from the forecast in the August *Monetary Bulletin*, which provided for an increase of over 3%.

The labour participation rate declined year-on-year in Q2 and Q3/2017, after rising steadily since H2/2014 and reaching its pre-crisis peak at the end of 2016. The employment rate also declined, after increasing continuously since Q4/2011.

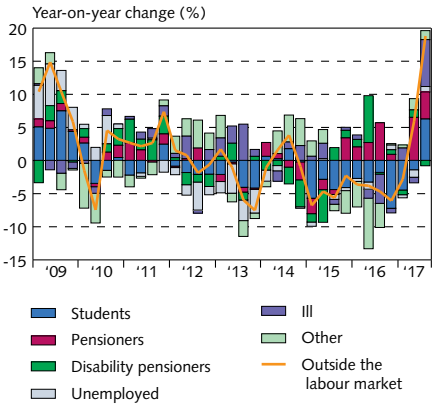
These results are somewhat at odds with other labour market indicators, all of which suggest, as is discussed below, that labour demand is still growing but at a slower rate than before. This likely reflects to some extent the fact that the LFS does not adequately cover the large number of foreign workers that come to Iceland. The increase in the population aged 16-74 was about 2.5% during the quarter, or about 6,000 persons, which is well in line with National Registry figures on the rise in foreign nationals. Over the same period, however, the number of working persons was unchanged year-on-year. Given that the labour participation rate among foreigners has generally been very high, it is likely that the majority of foreign nationals who come to Iceland are working. In addition, the LFS suggests that the number of people outside the labour market rose by almost 19% year-on-year, considerably more than during the aftermath of the financial crisis. An examination of which groups outside the labour market grew most reveals that nearly half of the increase stems from a 75% rise in the number of workers who say they have left the labour market due to

Chart V-1
Employment and hours worked[1]
Q1/2005 - Q3/2017



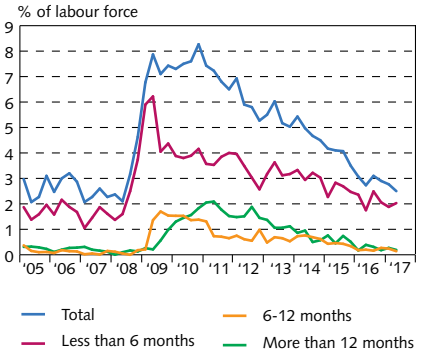
1. Quarterly averages of monthly figures.
Source: Statistics Iceland.

Chart V-2
Persons outside the labour market and breakdown by group
Q1/2009 – Q3/2017



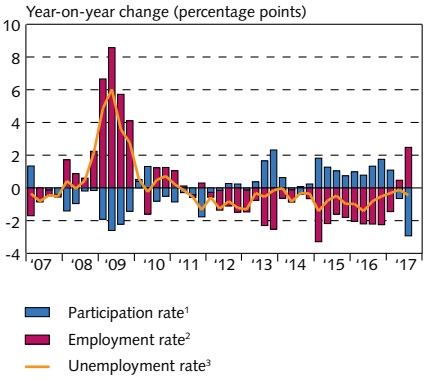
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-3
Unemployment by duration[1]
Q1/2005 - Q3/2017



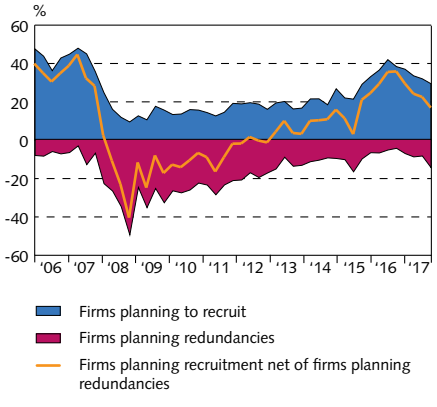
1. Seasonally adjusted data.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-4
Contribution to changes in unemployment rate
Q1/2007 - Q3/2017



1. Persons in the labour market as percentage of population aged 16-74. 2. Employed persons as percentage of population aged 16-74. An increase in the employment rate shows as a negative contribution to changes in unemployment. 3. Unemployed persons as percentage of labour force. May not equal the sum of its components due to rounding.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-5
Firms planning to change staffing levels within 6 months[1]
Q1/2006 - Q3/2017



1. Seasonally adjusted data.
Source: Gallup.

illness (Chart V-2). Both of these factors – a larger increase in the number of persons outside the labour market than in the post-crisis period and a steep rise in the number who report leaving the job market due to illness – are implausible, and they suggest a sampling error in the LFS.

… but unemployment continues to fall

Unemployment has continued to fall to a seasonally adjusted rate of 2.3% in Q3/2017, some 0.4 percentage points less than in Q2 and 0.7 percentage points less than in Q3/2016 (Chart V-3). Unemployment fell in spite of a drop in the employment rate because the labour participation rate fell even further (Chart V-4). Short-term unemployment has also declined, and long-term unemployment has virtually disappeared.

Indicators of continued growth in labour demand

According to Gallup's autumn survey of Iceland's 400 largest firms, labour demand looks set to keep growing, as respondents planning to add on staff outnumbered those planning redundancies by 17 percentage points, after adjusting for seasonality. However, growth in labour demand will probably continue to ease, as the share of firms planning to recruit net of the share planning to lay off staff declined by nearly 6 percentage points from the summer survey. The ratio had risen rapidly from mid-2015 through mid-2016 before beginning to subside again (Chart V-5), but it was still almost 10 percentage points above its historical average.

Growth in labour demand appears to be slowing down in nearly all sectors, compared to both the summer 2017 survey and the autumn 2016 survey. In the tourism industry, however, about 40 percentage points more firms are planning to add on staff than are planning to downsize according to the autumn survey – an increase of 17 percentage points since the summer survey. Unlike the summer survey, however, there was discernible pessimism in the fishing industry, with 15 percentage points more firms interested in laying off staff than are planning to hire. Furthermore, construction companies' need to add on staff has eased markedly, probably because firms have tried to address worker shortages with imported labour.

Indicators of factor utilisation

Labour shortage still substantial …

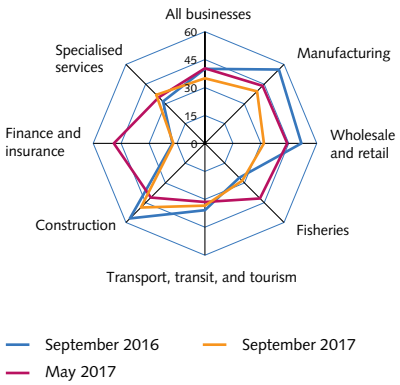
Although fewer construction companies now consider themselves in need of additional workers, the shortage of labour remains strongest in that sector, according to Gallup's autumn survey. Nearly half of construction company executives considered themselves understaffed, as opposed to just over one in three in the survey as a whole, only a slightly lower percentage than in the past year and a half (Chart V-6). In other sectors, this ratio lay in the 17-40% range.

… despite significant importation of labour

The share of firms considering themselves understaffed has remained broadly unchanged in the recent term, in spite of large-scale importa-

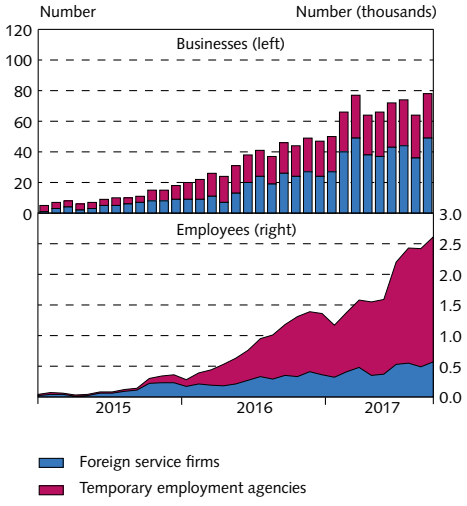
tion of foreign workers. Migration figures indicate a continued rise in the number of foreign workers in Iceland, although the pace of the increase has eased since Q2/2017. The number of foreign nationals aged 20-59 rose by 1.2% of the total population in the same age group in Q3, whereas the increase in the first three quarters of 2017 was 3.4%, as opposed to 1.8% over the same period in 2016. Furthermore, figures from the Directorate of Labour (DoL) show continued growth in the number of people working on behalf of temporary employment agencies and foreign services firms (Chart V-7). According to DoL figures for Q3, the number of workers who came to Iceland through these companies rose by just over 700 between quarters, to 1¼% of the number of employed, up from slightly less than 1% in the previous quarter.

Chart V-6
Firms considering themselves short-staffed[1]
Share of businesses (%)



1. Seasonally adjusted data.
Sources: Gallup, Central Bank of Iceland.

Chart V-7
Temporary employment agencies and foreign service firms and their employees
January 2015 - September 2017



Source: Directorate of Labour.

Official figures probably underestimate job creation and overestimate productivity growth

As is discussed above and in *Monetary Bulletin* 2017/2, the LFS probably underestimates the size of the foreign labour force in Iceland. The survey sample extends only to individuals who are in the National Register and therefore have a legal address in Iceland. Workers who move to Iceland temporarily are not listed in the National Register, however. Furthermore, it is likely that foreign nationals show up in the LFS sample with a time lag – or not at all – once they have registered an address in Iceland, which could explain why the number of employed persons has not increased in line with population growth. This underestimation has probably increased in the past two years, in line with the rapid rise in the number of foreign workers.

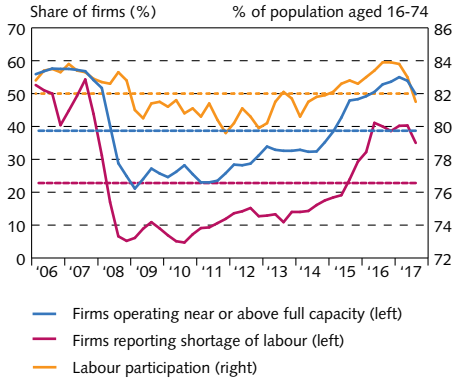
Estimates of productivity growth are based on the growth rate of GDP per hour worked. If growth in total hours is underestimated in the LFS, this implies that productivity growth is overestimated (for further discussion, see *Monetary Bulletin* 2017/2). According to Statistics Iceland's figures, labour productivity grew by 4.3% in 2016, whereas it was quite weak for several years before then (see *Monetary Bulletin* 2016/2). Underestimating this year's increase in total hours worked leads to an overestimation of productivity growth for this year. Productivity growth is currently estimated at 2½%, which is 1 percentage point more than was assumed in the Bank's August forecast.

Production factors will continue to be tested in spite of weaker growth in economic activity

According to Gallup's autumn survey among executives, about half of respondents indicated that their firms would have difficulty responding to an unexpected surge in demand (Chart V-8). Although this is a somewhat smaller percentage than in the previous survey and the one conducted a year ago, it is still high, at a full 10 percentage points above its historical average.

Most indications suggest that production factors will continue to be put to the test, even though growth in economic activity has eased. Strong importation of labour and other production factors ease demand pressures in the economy. The output gap is estimated to have been somewhat larger in 2016 than was previously thought, reflecting

Chart V-8
Factor utilisation and labour participation[1]
Q1/2006 - Q3/2017



1. Indicators of factor utilisation are from the Gallup Sentiment Survey conducted among Iceland's 400 largest companies, and labour participation data are from Statistics Iceland's labour force survey. All data are seasonally adjusted. Broken lines show period averages.
Sources: Gallup, Statistics Iceland, Central Bank of Iceland.

Statistics Iceland's revision of previous years' GDP growth figures (see Box 4). On the other hand, the outlook is for considerably weaker GDP growth this year than was forecast in August (see Chapter IV). Furthermore, the equilibrium unemployment rate is estimated to have fallen somewhat more than previously assumed, owing to strong labour importation. As a result, the output gap is estimated to have peaked already and is expected to measure just under 2% of potential output at the end of 2017, about 1 percentage point less than was assumed in the August forecast.

VI Inflation

Inflation measured 1.7% in Q3/2017, slightly less than was forecast in August. It has been driven mainly by rising house prices, although the pace of the increase has eased in recent months. The exchange rate of the króna has fallen since the beginning of June, following a significant appreciation earlier this year. The effect of the depreciation on prices seems to have been limited thus far. This could be due in part to firmer anchoring of inflation expectations, which reduces the pass-through of short-term exchange rate fluctuations to the price level. Increased competition in the retail market may be a factor as well. Although the rise in wages has slowed down year-to-date, wage inflation remains high. Inflation expectations have risen by several measures since August, although they are broadly in line with the inflation target.

Recent developments in inflation

Inflation below target for nearly four years

Inflation measured 1.7% in Q3, slightly below the August forecast of 1.8%. The rise in house prices was the main determinant of developments in the CPI during the quarter, with reduced airfares and imported goods prices pulling in the other direction.

The CPI rose by 0.5% month-on-month in October, and twelve-month inflation measured 1.9% (Chart VI-1).[1] Inflation is marginally higher than at the time of the last *Monetary Bulletin*. It has ranged between 1½% and 2% for a year and has been at or below the Bank's inflation target for nearly four years. The main factor in the CPI rise in October was a surge in food prices. House prices fell marginally between months – the first month-on-month decline in over two years. As before, inflation according to measures excluding housing costs was significantly lower than CPI inflation. The CPI excluding the housing component had declined by 2.3% year-on-year in October. In September, the HICP, which also excludes costs related to housing, had fallen 2.7% between years.

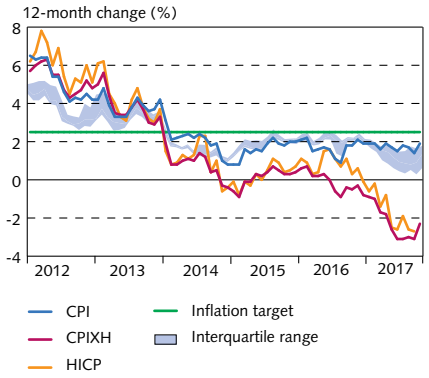
Underlying inflation and other indicators of inflationary pressures

House price inflation has eased ...

By most measures apart from core index 3 excluding tax effects, underlying inflation has risen since the last *Monetary Bulletin*. Core 3 inflation measured 2.1% in October, some 0.3 percentage points less than in July.[2] It has measured 2½% or less for three years. Most statistical measures suggest that underlying inflation lies between ½% and 2% and has risen by an average of 0.3 percentage points since July

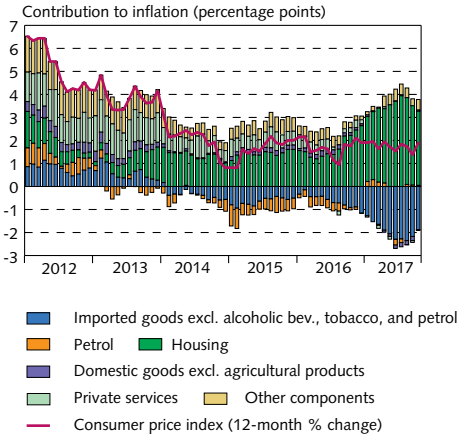
1. In September 2017, a year had passed since Statistics Iceland corrected the error it made in calculating the CPI during the period from March through August 2016, which caused an underestimation of inflation over that period and an overestimation for the same period in 2017. As a result, that error no longer affects twelve-month inflation figures, which exaggerated the disinflation between August and September 2017.
2. Core index 3 excluding tax effects excludes the effects of indirect taxes, volatile food items, petrol, public services, and real mortgage interest expense.

Chart VI-1
Headline and underlying inflation[1]
January 2012 - October 2017



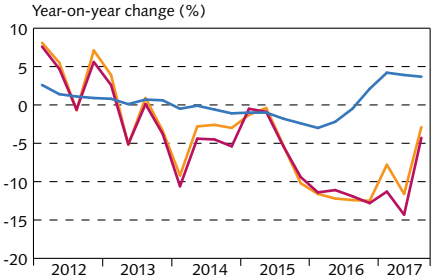
1. The shaded area includes the interquartile range of estimates of underlying inflation as measured using core indices that exclude the effects of indirect taxes, volatile food items, petrol, public services, and owner-equivalent rent; and using statistical measures such as the weighted median, the trimmed mean, and a dynamic factor model.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart VI-2
Components of CPI inflation
January 2012 - October 2017



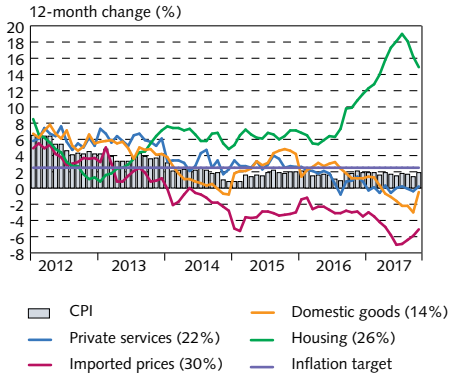
Source: Statistics Iceland.

Chart VI-3
Import prices and international export prices[1]
Q1/2012 - Q3/2017



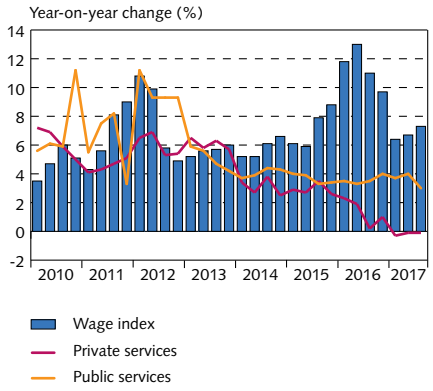
1. Central Bank baseline forecast Q3/2017.
Sources: Statistics Iceland, Thomson Reuters, Central Bank of Iceland.

Chart VI-4
Imported and domestic inflation[1]
January 2012 - October 2017



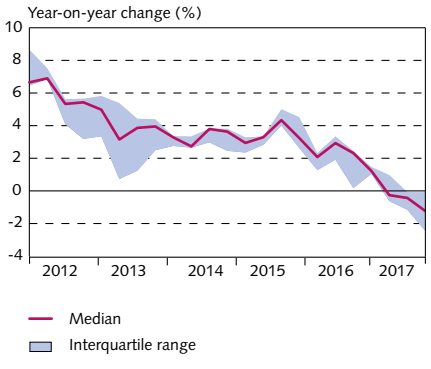
1. Imported inflation is estimated using imported food and beverages and the price of new motor vehicles and spare parts, petrol, and other imported goods. The figures in parentheses show the current weight of these items in the CPI.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart VI-5
Wages and services prices
Q1/2010 - Q3/2017



Source: Statistics Iceland.

Chart VI-6
Domestic inflationary pressures[1]
Q1/2012 - Q3/2017



1. The shaded area includes five indicators of domestic inflationary pressures. The indicators are unit labour costs (moving average), the GDP price deflator, prices of private services and domestic goods, and producer prices of goods sold domestically. Central Bank baseline forecast Q3/2017 for the GDP price deflator and for unit labour costs.
Sources: Statistics Iceland, Central Bank of Iceland.

(Chart VI-1). It appears, then, that underlying inflationary pressures are growing, although the signs are not unequivocal.

In the recent past, inflation has been driven mainly by rising house prices (Chart VI-2). The twelve-month rise in the housing component of the CPI measured almost 15% in October, after peaking at 19% this past summer. There are signs that the pace of the increase will slow still further in the coming term, as real house prices are at a historical high, housing market turnover has eased, and the supply of residential property is on the rise (see Chapter III).

… and firmer anchoring of inflation expectations and increased competition mitigate the effects of the currency depreciation

In the past three years, a persistent decline in the local currency price of imported goods stemming from the appreciation of the króna and low global inflation has counteracted the rise in house prices and the domestic cost pressures from pay rises. However, the króna has fluctuated somewhat thus far in 2017. When it peaked in early June, it had appreciated by 10½% year-to-date, but just before this *Monetary Bulletin* went to press, it had weakened again but was still 1.8% higher than at year-end 2016. Concurrent with this, the decline in imported goods and services prices has eased – to just under 3% year-on-year in Q3, as opposed to a twelve-month decline of more than 12% in Q3/2016 (Chart VI-3). The price of imported goods in the CPI had fallen by just over 5% year-on-year in October, as compared with nearly 7% in July (Chart VI-4).

The depreciation of the króna since June came in the wake of a significant appreciation earlier this year. There are signs that firmer anchoring of inflation expectations at target and increased competition from online shopping and from the entry of international retail giants into the local market have mitigated the inflationary effects of the depreciation of the króna.[3] For example, prices of various imported goods, including clothing, footwear, and furniture, have fallen since June, in spite of the weaker króna. Food prices only rose by 1.4% over the same period, and electronics prices by 0.5%. The steep rise in October of both domestic and imported goods prices indicates, however, that the exchange rate pass-through effect is emerging more strongly and that the impact of increased competition is receding. It is also possible that the increase in exchange rate fluctuations has prompted companies to wait longer before changing their goods and services prices.

Domestic inflationary pressures have been modest …

Domestic inflationary pressures have been modest in the recent term, in spite of a sizeable increase in unit labour costs (Charts VI-5 and VI-6). The price of domestic goods in the CPI has fallen by 0.5% in the past twelve months, and private services prices have risen by only 0.2%. Moreover, these subcomponents of the index have fallen since the publication of the last *Monetary Bulletin*. Producer prices of goods

3. According to a press release issued by Statistics Iceland on 11 September 2017, the impact on the CPI of changes in households' purchasing patterns as a result of new retail stores is under evaluation. If it is deemed warranted, these changes will affect the December 2017 CPI.

sold domestically have also declined markedly in the past year. The decline in prices of domestic goods is due largely to favourable exchange rate developments, as the cost of imported inputs has fallen. Competition has made an impact as well – not only on domestic retail goods prices but also on factors such as airfares, which have fallen steeply as a result of increased competition in passenger transport to and from Iceland.

According to Gallup's autumn survey of Iceland's 400 largest firms, the share of respondents who considered it necessary to raise their prices in the next six months rose slightly from the spring survey, to just over one-third (Chart VI-7). Responses concerning input prices changed much more markedly between surveys, as over half of executives expected input prices to rise in the next six months, up from 38% in the last survey. The share of respondents expecting an increase in input prices is approaching its historical average. The depreciation of the króna in the past few months is probably a factor. In view of this, it is noteworthy that about 60% of survey participants cited wage costs as the most important factor in their own price increases, while 15% cited input prices. Furthermore, a fourth of executives cited input prices as the second-strongest factor in their price increases (Chart VI-8).

… although wage inflation is still high

According to figures from Statistics Iceland, wages per hour rose by over 9% in 2016, which is in line with the Bank's August forecast. Pay rises in 2014-2015 were slightly smaller than previously estimated, however.[4] Thus far in 2017, the pace of wage rises has eased, although it remains brisk. For example, the Statistics Iceland wage index rose in Q3 by 2.1% quarter-on-quarter and 7.4% year-on-year. The pay increases provided for in the most recent wage agreements have shown in the wage index, in line with the August forecast, and wage drift has been somewhat more than was projected at that time.

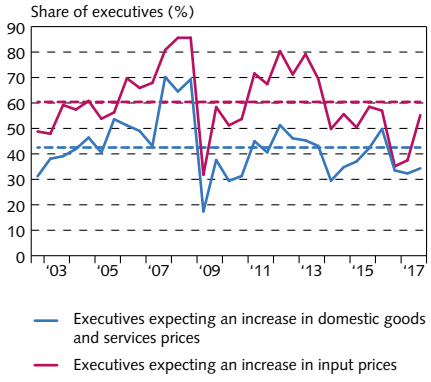
Although wage agreements for most State-employed university-educated workers have expired, negotiations have stalled since the Government coalition fell in September. As a result, no changes have been made to the assessment of wage developments in 2017 or over the forecast horizon. As before, it is assumed that agreements made will be accommodated within the SALEK agreement and will not trigger a review of private sector wage settlements in 2018.

Wages and related expenses are expected to rise by just over 6% this year, or 0.7 percentage points less than was assumed in August. Productivity growth pulls in the same direction, as it is expected to be about 1 percentage point more than previously forecast, owing to a slower increase in total hours worked; therefore, unit labour costs are projected to rise by just under 4% year-on-year, which is 1½ percentage points less than previously assumed (Chart VI-9). As is discussed

4. Statistics Iceland has revised its previous estimate of developments in wages and related expenses back to 1997. The Central Bank has relied on Statistics Iceland's figures through 2014 but used its own estimates for 2015, as it was of the opinion that Statistics Iceland's figures underestimated the actual wage increases for that year. Statistics Iceland has revised its previous figures for 2015 and now estimates the increase in wages and related expenses at 7% instead of the previous 6.5%. This is much closer to the 7.2% rise in the wage index for the year and to the Bank's previous estimate of a 7.5% increase.

Chart VI-7

Corporate expectations of input and product prices 6 months ahead 2002-2017[1]

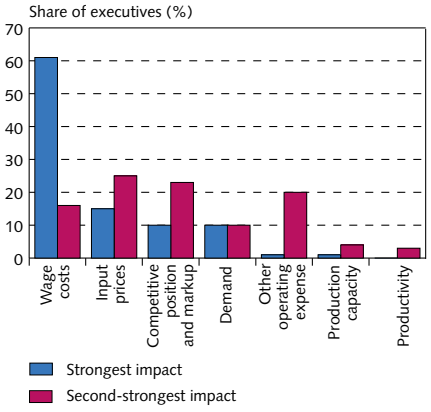


1. Broken lines show averages from 2002.
Source: Gallup.

Chart VI-8

Firms' price-setting decisions[1]

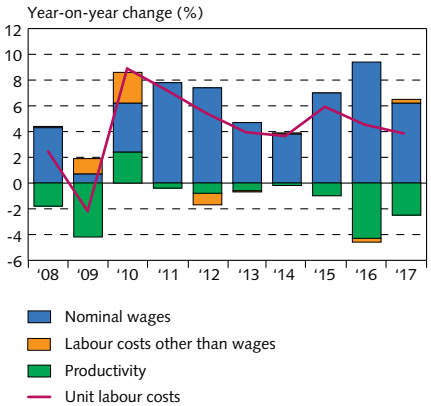
September 2017



1. Executives were asked which of these factors would have the strongest and second-strongest impact on their firms' decision to raise the price of their goods or services over the coming six months.
Source: Gallup.

Chart VI-9

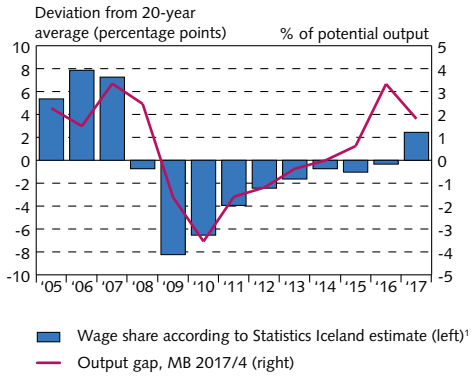
Unit labour costs and contribution of underlying components 2008-2017[1]



1. Labour productivity growth is shown as a negative contribution to an increase in unit labour costs.
Sources: Statistics Iceland, Central Bank of Iceland.

in Chapter V, productivity growth is probably overestimated for both 2016 and 2017; therefore, the rise in unit labour costs is probably underestimated. Forecasts of wage increases in 2017 indicate that the wage share will continue to rise, to 63.5% this year, some 2½ percentage points above its historical average (Chart VI-10).

Chart VI-10
Wage share and output gap 2005-2017



1. Wages and related expenses as a share of gross factor income. The 20-year average is 61% (1997-2016, base 1997). Central Bank baseline forecast 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

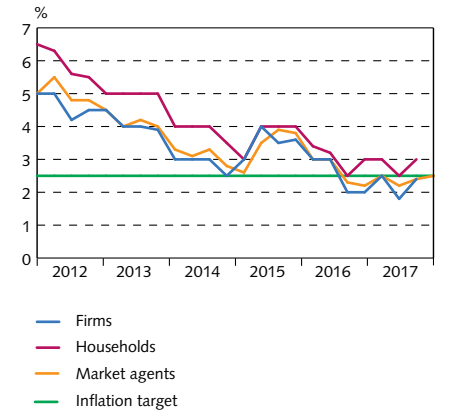
Inflation expectations

Short-term inflation expectations have risen …

One- and two-year inflation expectations have risen by several measures since the last *Monetary Bulletin* (Chart VI-11). According to Gallup's autumn survey, corporate executives expect inflation to measure 2.4% in one year, an increase of 0.6 percentage points from the summer survey. On the other hand, two-year inflation expectations were unchanged at 3%. Households' inflation expectations one year ahead measured 3% and had risen by 0.5 percentage points, and their expectations two years ahead had risen as well, to 3.2%.

Market agents' inflation expectations have remained broadly unchanged, however. According to the survey carried out by the Central Bank in early November, market agents expected inflation to measure 2.5% both one and two years ahead. The two-year breakeven inflation rate in the bond market, as calculated from the spread between interest on indexed and non-indexed bonds, averaged just over 2% in October and was unchanged since August.[5]

Chart VI-11
Inflation expectations 1 year ahead
Q1/2012 - Q4/2017

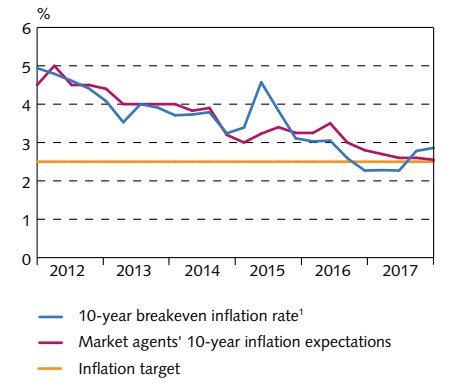


Sources: Gallup, Central Bank of Iceland.

… but appear well aligned with the inflation target, as do long-term expectations

Although short-term inflation expectations have risen by several measures, they are generally well aligned with the inflation target. The same seems to apply to long-term inflation expectations. According to the Bank's November survey, market agents expect inflation to average 2.5% over the next five and ten years. Respondents' expectations have therefore remained broadly unchanged since easing towards the target late in 2016, and therefore appear to have withstood the depreciation of the króna during the summer.[6] The breakeven inflation rate in the bond market spiked in September, however, but as is discussed in Chapter III, this may well have reflected a temporary surge in bond market risk premia. The rise in the breakeven rate has reversed in part since then, and the ten-year rate has averaged 2.9% in Q4 to date (Chart VI-12).

Chart VI-12
Long-term inflation expectations
Q1/2012 - Q4/2017



1. The value for Q4/2017 is the Q4 average to date.
Source: Central Bank of Iceland.

5. Breakeven rates should be interpreted with caution, however, as they also include a liquidity risk premium and an inflation risk premium.

6. The signs that inflation expectations are more securely anchored are discussed in Central Bank of Iceland (2017), "Monetary Policy based on inflation targeting: Iceland's experience since 2001 and post-crisis changes", *Special Publication* no. 11.

Box 1

Fluctuations in the ISK exchange rate in international context

It is often argued that the Icelandic króna is much more volatile than the currencies of other advanced economies. The Icelandic foreign exchange market is certainly small, and there have been periods of wide fluctuations. Fluctuations were large, for instance, during the run-up to the financial crisis, when there were marked imbalances in the domestic economy, and they increased significantly during the crisis, when the króna collapsed. During periods of reasonable macroeconomic balance, exchange rate movements appear to be broadly similar to movements in the currencies of other advanced economies, and long exchange rate cycles like the recent appreciation episode in Iceland are well known in other countries. Furthermore, it appears that the króna's shock-absorbing capabilities have strengthened in the past few years.

Exchange rate volatility grew following capital account liberalisation but has subsided again

As Chart 1 shows, daily fluctuations in the exchange rate of the króna have increased year-to-date. The standard deviation of daily changes in the trade-weighted exchange rate index (TWI) averaged 0.2% in 2015 and 2016 but began to rise at the beginning of 2017, and volatility grew still further after most of the capital controls were lifted on 14 March. The thirty-day standard deviation of daily exchange rate movements peaked at nearly 1.5% this past summer, but it has been tapering off again in recent months and by the end of October had fallen to 0.5%, similar to that of the pound sterling and the New Zealand dollar, for example. The ninety-day standard deviation remains higher than it has been in recent years, but it, too, has begun to decline, albeit more slowly than the thirty-day standard deviation, as expected.

Fluctuations in the exchange rate of the króna in international context

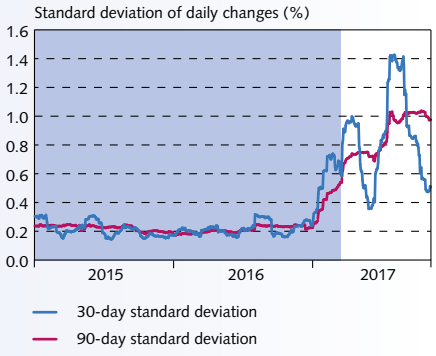
Chart 2 shows fluctuations in the TWI from 1995 onwards, together with a comparison with other advanced economies' nominal effective exchange rates. It shows the thirty-day standard deviation, but the ninety-day deviation tells the same story. As is shown in the chart, fluctuations similar to movements in the Icelandic króna have been seen in other currencies, and they generally increase in connection with major global economic shocks such as the Asian crisis and the global financial crisis, but also in connection with other types of unrest, including the eurozone debt crisis and the Brexit referendum.

As can be expected, the króna fluctuated somewhat less than other currencies before 2001 – i.e., when the króna was pegged – and it was relatively stable while the capital controls were in effect. Volatility was more pronounced during the floating exchange rate period before the capital controls were introduced. However, it appears to have been affected primarily by the build-up to the financial crisis, a period of sizeable imbalances in the domestic economy and wide swings in all asset prices. There is no evidence that exchange rate volatility in Iceland was significantly greater than in other countries during the first years of inflation-targeting. This can be seen more clearly in Chart 3, which gives a comparison of exchange rate movements in Iceland with those in Norway and Sweden, both of which base their monetary policy on an inflation target. Until 2005, exchange rate fluctuations in the three countries were quite similar, but as 2005 progressed, the volatility of the Icelandic króna began to increase compared to the other two Nordic currencies. During the capital controls period, the Icelandic króna was less volatile, on average, than the Norwegian or Swedish currencies, but that pattern reversed after most of the controls were lifted. In the recent term,

Chart 1

Fluctuations in the ISK exchange rate[1]

1 January 2015 - 30 October 2017



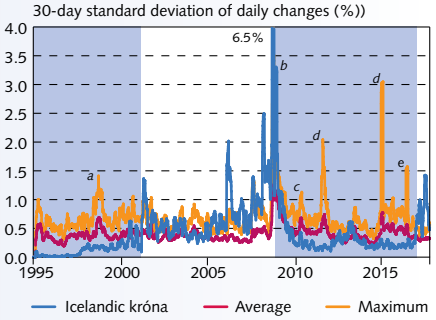
1. Exchange rate of the króna in terms of the trade-weighted exchange rate index. The shaded area shows the period while the capital controls were in effect.

Source: Central Bank of Iceland.

Chart 2

Exchange rate flutuations: industrialised countries[1]

1 January 1995 - 30 October 2017



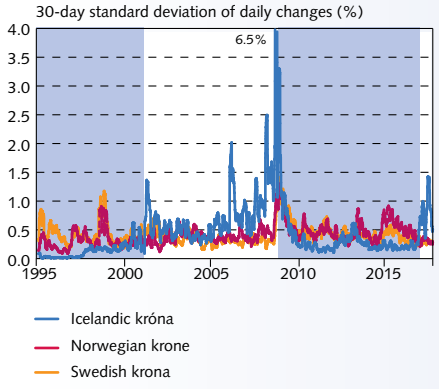
1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). Average and maximum fluctuations in the AUD, CAD, CHF, DKK, EUR (ECU before 1999), GBP, JPY, NOK, NZD, SEK, and USD. The first shaded area shows the pegged exchange rate period, and the latter shows the period while the capital controls were in effect. Several periods of greater volatility are indicated on the chart: *a*. Asian crisis. *b*. Global financial crisis *c*. Euro area debt crisis. *d*. Wide fluctuations in connection with the beginning and end of the Swiss central bank's attempts to limit the appreciation of the Swiss franc. *e*. Brexit referendum.

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 3

Exchange rate fluctuations: Nordic region[1]

1 January 1995 - 30 October 2017



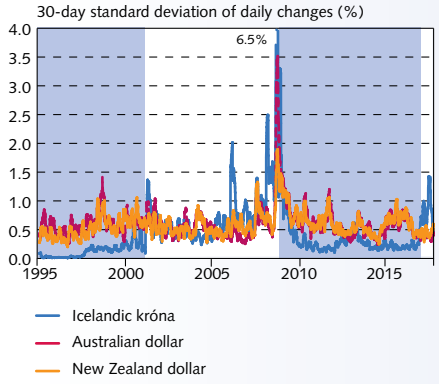
1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). The first shaded area shows the pegged exchange rate period, and the latter shows the period while the capital controls were in effect.

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 4

Exchange rate fluctuations: commodity-exporting countries[1]

1 January 1995 - 30 October 2017

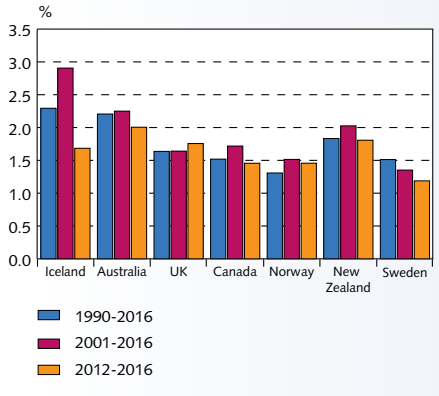


1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). The first shaded area shows the pegged exchange rate period, and the latter shows the period while the capital controls were in effect.

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 5

Fluctuations in the real exchange rate 1990-2016[1]



1. Standard deviation of monthly changes in the real exchange rate (relative consumer prices).

Sources: Bank for International Settlements, Central Bank of Iceland.

however, fluctuations have been broadly similar for all three. A comparison with other commodity exporters such as Australia and New Zealand tells a similar tale: exchange rate fluctuations have long been similar in size to those in Iceland (Chart 4). Comparing fluctuations in real exchange rates in six small, advanced open economies that pursue the same type of monetary policy as Iceland also gives similar results. As Chart 5 shows, fluctuations in monthly changes in the real exchange rate are greater in Iceland over the entire period from 2001, but that period is strongly affected by the collapse of the króna during the financial crisis. In the past five years, fluctuations in Iceland have been similar to those in the other six countries.

Long real exchange rate cycles are quite common …

Discussions of exchange rate movements focusing only on short-term fluctuations – within a day or within a month, for instance – fail to capture the full picture. Currency exchange rates also have a tendency to rise or fall over long periods, and these exchange rate cycles are no less important – for exporters planning to move into new markets, for example. From 1995 to the present, three such cycles can be identified for the króna (see Central Bank of Iceland, 2017): from November 2001 through November 2005, when the real exchange rate rose by over 45%; from October 2007 through August 2009, when it fell by more than 41%; and most recently, from August 2009 through June 2017, when it rose by almost 70%. As Chart 6 indicates, such large and protracted movements in the real exchange rate are also known in other advanced economies. This can be seen even more clearly in Chart 7, which compares developments in the real exchange rate during the two appreciation episodes in Iceland with developments in several other countries.

Chart 7a shows the appreciation during the pre-crisis period at the beginning of this century. As the chart indicates, the rise in the real exchange rate in Iceland resembled that taking place over the same period in Canada and New Zealand. It was also very similar to that in Ireland, a member of the eurozone. Chart 7b shows that during the most recent appreciation episode after the financial crisis, the real exchange rate rose significantly in other countries as well. This is particularly the case for commodity-exporting countries such as Australia and New Zealand, yet even Hong Kong, which follows a currency board, was faced with sizeable increases in its real exchange rate, albeit not as steep as in Iceland. To an extent, the substantial increase in Iceland's real exchange rate reflects the economy's emergence from a deep post-crisis recession. It is not uncommon for a real exchange rate that falls sharply during a currency crisis (such as in Iceland) to rise markedly afterwards. This can be seen in Chart 7c, which compares the most recent appreciation episode with that in South Korea following the twin banking and currency crisis of the late 1990s.[1] In South Korea, the real exchange rate rose by just over 80% in slightly more than eight years, and in Iceland it rose by roughly 70% over a period just shy of eight years.

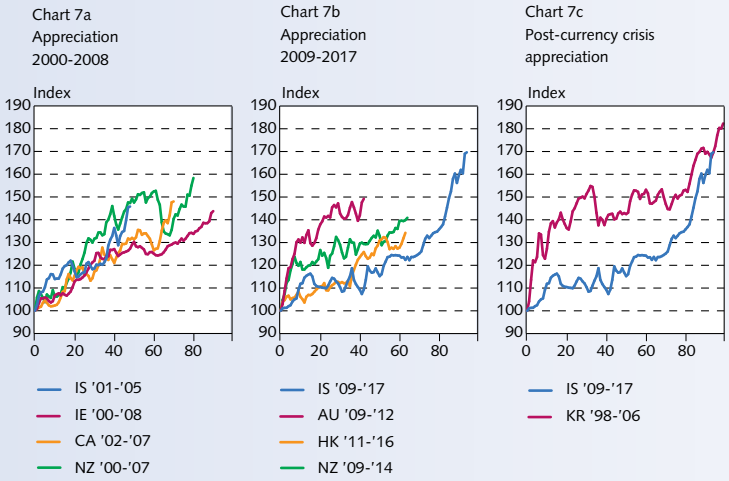
… and can be a necessary part of an economy's adjustment to shocks

It is important that discussions of exchange rate fluctuations distinguish between exchange rate movements that reflect changes in relative underlying economic fundamentals, and exchange rate movements over and above those changes. The latter tend to exacerbate business cycle volatility, while the former are actually a desirable part of an economy's adjustment to economic shocks. Examples

1. In both countries, the real exchange rate had fallen by 40% during the crisis.

of negative external shocks include catch failures or a deterioration in terms of trade. In the wake of such shocks, the exchange rate of the króna should fall, other things being equal, which will cause the price of domestic production to decline relative to comparable foreign production. This works to offset the contractionary effects of the economic shock and mitigates its impact on employment and domestic economic activity. In addition, a currency depreciation lowers domestic real wages, improving the economy's competitive position and providing the economy with a cushion of resilience in the wake of the shock. Furthermore, imported goods and services become more expensive, shifting a larger share of domestic demand towards domestic production and supporting the economic recovery. The same thing happens when economic activity increases in the wake of a positive external shock such as an improvement in terms of trade and a surge in exports, or following stimulative economic policy actions such as fiscal easing. In this instance, the exchange rate should rise, all else being equal, thereby offsetting the increased economic activity by slowing down exports and boosting demand for imported goods and services, thereby shifting a portion of the economic recovery out of the domestic economy.[2] This interaction between the exchange rate and the business cycle in the past few years can be seen clearly in Chart 8, which shows how the exchange rate fell in the wake of the financial crisis, mitigating the contraction and supporting the economic recovery. With the robust GDP growth of the past two years, Iceland's economic recovery has picked up strongly in comparison with that in trading partner countries, and the real exchange rate has risen steeply so as to counteract these effects, thereby slowing the recovery and moving the economy towards a sustainable long-term growth path.

Chart 7
Long periods of real exchange rate appreciation in selected advanced economies[1]



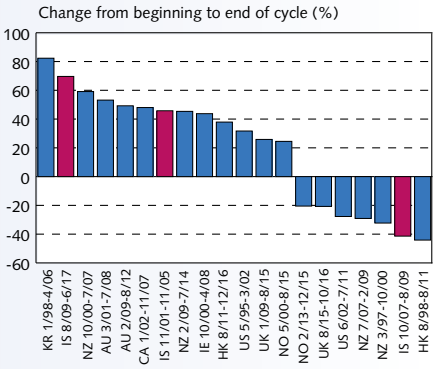
1. The charts show developments in the real exchange rate from the beginning to the end of the appreciation period (first month = 0) in selected industrialised countries: Iceland (Nov. 2001 - Nov. 2005 and Aug. 2009 - Jun. 2017), Australia (Feb. 2009 - Aug. 2012), Hong Kong (Aug. 2011 - Dec. 2016), Ireland (Oct. 2000 - Apr. 2008), Canada (Jan. 2002 - Nov. 2007), New Zealand (Oct. 2000 - Jul. 2007 and Feb. 2009 - Jul. 2014), and South Korea (Jan. 1998 - Apr. 2006).
Sources: Bank for International Settlements, Central Bank of Iceland.

Exchange rate movements in recent years have acted as shock absorbers rather than a source of shocks

It can therefore be argued that the exchange rate movements of the past few years have served as shock absorbers and have there-

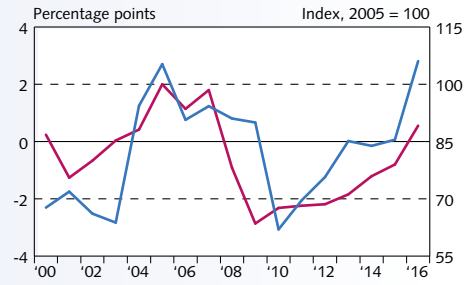
2. See, for example, the alternative scenario in *Monetary Bulletin* 2017/2, which describes the important role of a higher exchange rate in the economy's adjustment to the positive shocks of the past few years.

Chart 6
20 exchange rate cycles in advanced economies since 1995[1]



1. Changes in the real exchange rate from peak (trough) to trough (peak). The countries are Australia (AU), United States (US), United Kingdom (UK), Hong Kong (HK), Ireland (IE), Iceland (IS), Canada (CA), Norway (NO), New Zealand (NZ), and South Korea (KR).
Sources: Bank for International Settlements, Central Bank of Iceland.

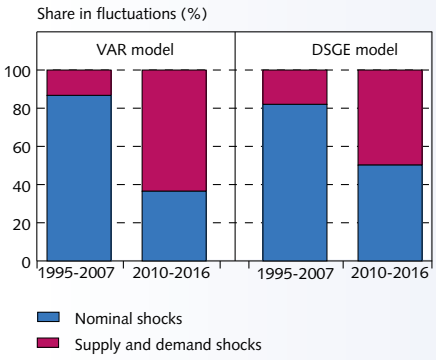
Chart 8
The business cycle and the real exchange rate 2000-2016[1]



1. Difference between output gap in Iceland and main trading partners.
Source: Central Bank of Iceland (2017).

Chart 9

Variance decomposition of exchange rate fluctuations[1]



1. The underlying structural shocks are estimated using a VAR model, on the one hand, and the Bank's DSGE model, on the other. This is explained in the main text.
Source: Central Bank of Iceland (2017).

fore been favourable, even though they have tested the resilience of firms and sectors faced with changes in external conditions. It has not always been thus, however: exchange rate movements have sometimes been a source of shocks (see Central Bank of Iceland, 2012, Chapter 13). But this appears to be changing (Central Bank of Iceland, 2017): until 2007, fluctuations in the exchange rate were attributable largely to nominal shocks, such as shocks to monetary policy and money velocity and shocks that can be attributed to the exchange rate itself (e.g., fluctuations in risk premia on the króna) and were due only to a limited degree to shocks to aggregate demand and supply (Chart 9).[3] This seems to have changed in the past few years. Aggregate demand and supply shocks now explain a much larger share of exchange rate fluctuations than before; therefore, the shock-absorbing capacity of the exchange rate appears to have increased. The sample period is short, however, and it is therefore appropriate to exercise caution when drawing conclusions about the findings. It is also appropriate to bear in mind that the capital controls were in place during this period, mitigating speculation-driven exchange rate movements. As a result, the possibility cannot be excluded that the weight of such speculation-generated fluctuations will increase now that the capital controls have been lifted.

Summary

Short-term fluctuations in the exchange rate of the króna increased somewhat after the capital controls were lifted earlier this year, but they have subsided again and are now similar to those in the first half of the 2000s, when the economy was well balanced internally and externally. They are also similar to the fluctuations in the currencies of other advanced economies. Longer exchange rate cycles, with the real exchange rate rising or falling steadily over a protracted period, are also typical in other countries. Three such cycles can be identified in Icelandic data from 1995 onwards, and similar patterns can also be seen in the real exchange rates of other advanced economies, particularly commodity exporters or those that have recovered from twin banking and currency crises. The currency appreciation of the past few years appears in large part to reflect Iceland's rapid economic recovery relative to its main trading partners, and it seems that the exchange rate performs its shock-absorbing role more effectively now than in the past.

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Central Bank of Iceland (2017), "Monetary policy based on inflation targeting: experience since 2001 and post-crisis changes", *Special Publication* no. 11.

3. Structural shocks are estimated using a VAR model, on the one hand, and the Central Bank's DSGE model, on the other (for further explanation, see Central Bank of Iceland, 2017). A three-dimensional structural VAR model containing GDP and public consumption (both variables relative to the eurozone) was used, together with the EURISK exchange rate. In order to identify structural shocks, it is assumed that supply shocks have a long-run effect on all three variables, that demand shocks have a long-run effect on public consumption and the exchange rate of the króna, and that nominal shocks only have a long-run effect on the exchange rate. In the DSGE model, nominal shocks are the sum of shocks to global inflation, domestic monetary policy, and risk premia on the króna; demand shocks are the sum of shocks to global demand, public sector demand, domestic consumers' preferences, and investment technology; and supply shocks are the sum of shocks to domestic and international pricing and domestic and international technological shocks.

Box 2

Special reserve requirement on capital inflows

Box 1 in *Monetary Bulletin* 2016/4 discusses the Central Bank's new capital flow management measure (CFM), which was introduced in June 2016. The CFM entails a special reserve requirement on a portion of new inflows of foreign currency to Iceland. The implementation of the special reserve requirement is based on the Foreign Exchange Act, no. 87/1992, and the statutory authorisation can be found in Temporary Provision III of that Act. With the Rules on Special Reserve Requirements for New Foreign Currency Inflows, no. 490/2016, which took effect on 4 June 2016, the Central Bank's authorisation to impose the special reserve requirement was exercised, but not to the full extent provided for in the Act.[1] According to the current Rules, 40% of new foreign currency inflows for investment in registered bonds and bills issued in krónur, as well as inflows into high-yielding deposits, must be held in a non-interest-bearing account with the Central Bank for one year.

Objectives

The objectives of introducing the special reserve requirement were to mitigate the risk that can accompany large-scale capital inflows and to promote more effective monetary policy transmission by attempting to temper cross-border inflows and affect their composition. The CFM is designed to mitigate the risk potentially associated with inflows related to carry trade; i.e., transactions undertaken in order to profit on the interest rate differential between Iceland and other countries. Inflows of this type can impede normal monetary policy transmission along the interest rate channel and have a detrimental impact on the exchange rate of the króna, thereby undermining monetary and financial stability. Tying up a portion of inflows for one year in a non-interest-bearing account cuts into the profit on such carry trade – the shorter the investment horizon, the stronger the effect. At the time the special reserve requirement was introduced, there was a wide interest rate differential between Iceland and other countries and therefore a strong incentive for carry trade. Trading of this type surged following the authorities' June 2015 announcement of their capital account liberalisation strategy (Chart 1 and Table 1). The associated capital inflows led, among other things, to a decline in long-term interest rates in spite of increased GDP growth and expectations of rising Central Bank interest rates at the time.

Impact

In the main, the special reserve requirement delivered the intended results. Inflows of capital for new investments in the domestic Treasury bond market virtually halted, and total inflows diminished. Inflows into assets not affected by the special reserve requirement increased after mid-2016, however, particularly foreign direct investment (FDI). The reserve requirement has probably had a negligible effect on FDI, however, as the lion's share of the increase stemmed from large long-term projects that had been decided upon before the CFM was introduced. It may have had some effect on inflows into the domestic stock market, which have increased this year, although this is not a given, as investment in stocks is different in nature than investment in Treasury bonds.

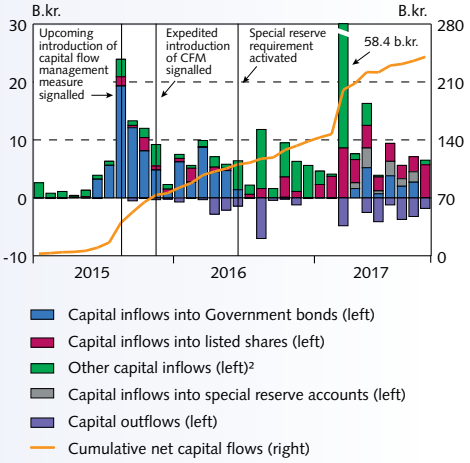
Furthermore, the transmission of monetary policy along the interest rate channel normalised after the measure was introduced, and changes in Central Bank interest rates are transmitted to the domestic Treasury bond market once again, unlike the situation in

1. Rules no. 490/2016 were amended on 16 June 2016, 1 November 2016, and 13 March 2017.

Chart 1

Capital flows due to registered new investments[1]

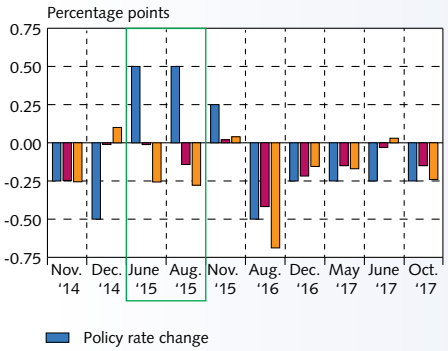
January 2015 - October 2017



1. Investment commencing after 31 October 2009 and based on new inflows of foreign currency that is converted to domestic currency at a financial institution in Iceland. For further information, see the Foreign Exchange Act, no. 87/1992. 2. Other inflows in March 2017 derive almost entirely from non-residents' acquisition of a holding in a domestic commercial bank.

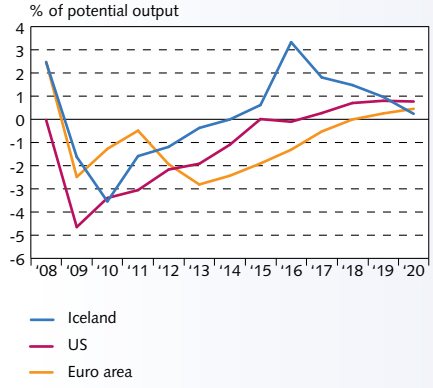
Source: Central Bank of Iceland.

Chart 2
Impact of changes in Central Bank interest rates on long-term Treasury bond yields



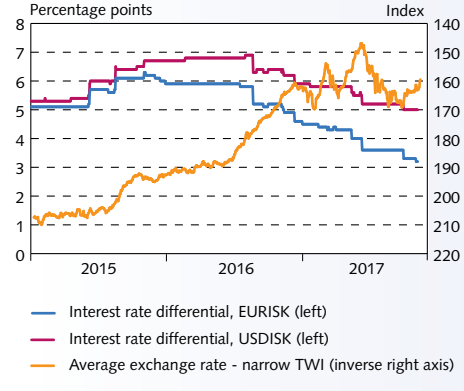
Source: Central Bank of Iceland.

Chart 3
Output gap 2008-2020[1]



1. Based on the Central Bank's *Monetary Bulletin* 2017/4 estimate for Iceland and the International Monetary Fund's estimate (*World Economic Outlook*, October 2017) for the US and the euro area.
Sources: International Monetary Fund, Central Bank of Iceland.

Chart 4
Short-term interest rate differential and ISK exchange rate[1]
2 January 2015 - 10 November 2017



1. The difference between 3-month interbank rates.
Sources: Thomson Reuters, Central Bank of Iceland.

2015 (Chart 2).[2] Inflows into the domestic Treasury bond market began to increase again in April 2017, after most of the capital controls were lifted, but have been less than they were before the CFM was introduced in June 2016. At the same time, there was an increase in outflows of capital previously invested in the domestic bond market, and net inflows into domestic Treasury bonds therefore totalled only 7.4 b.kr. over the first ten months of 2017. As yet, the increase in inflows does not appear to have weakened the transmission of monetary policy along the interest rate channel.

Future arrangements

The special reserve requirement has now been in effect for over a year, and it is necessary to maintain it for a while to come. The liberalisation of most of the capital controls took place only a short time ago, and it is important not to jeopardise the success of the process. There is still a need for higher interest rates in Iceland than in trading partner countries, owing to differences in the business cycle position. There is an output gap in Iceland but a slack in most other advanced economies (Chart 3), and it looks as though interest rates in key currency areas worldwide will remain unusually low for some time (see also Chapters II and III). As a consequence, it is likely that there will be a significant interest rate differential between Iceland and its trading partners in the coming term. Added to the impact of the interest rate differential are the recent upgrades in Iceland's sovereign credit ratings from all three of the large international rating agencies, which make Icelandic Treasury bonds an even more attractive option for foreign investors.

There is strong worldwide demand for assets that combine high yields and relatively moderate risk. Iceland's bond and foreign exchange markets are tiny in comparison with this demand. As a result, the investment of even a miniscule portion of global asset portfolios in low-risk Icelandic bonds could severely shake Iceland's thin bond and foreign exchange markets, disturb the monetary policy transmission mechanism, and cause wide fluctuations in the exchange rate of the króna, as was the case during the prelude to the 2008 financial crisis. The probability of large and volatile inflows of this type is therefore non-negligible. In addition to potentially derailing monetary and financial stability, such inflows could impede the transmission of monetary policy via the interest rate channel. Iceland's experience from the years prior to the collapse of the financial system and the introduction of the capital controls shows that this risk is genuine.

The spread between short- and long-term interest rates in Iceland and its trading partners has narrowed since the CFM was adopted (Charts 4 and 5). This is due to rate cuts in Iceland, rising rates abroad, and a decline in risk premia on Iceland. If forecasts of a narrowing output gap in Iceland in the near term and the closure of the output slack in trading partner countries materialise (Chart 3), this trend should continue, thereby strengthening the conditions for scaling back the special reserve requirement.

It is important to reduce the special reserve requirement in conditions-based increments. Scaling it back too quickly could erode stability and undermine the effectiveness of monetary policy. Another important factor is that it is unclear what benefit investments affected by the CFM would have for Iceland at present. The

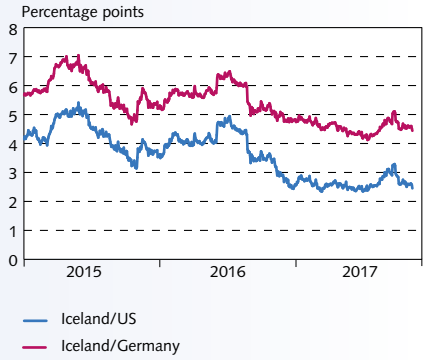
2. This is also consistent with information from the Central Bank's market expectations survey. According to the November 2015 survey, most respondents were of the opinion that the decline at the long end of the yield curve was related to capital inflows into the bond market. A year later, however, in the November 2016 survey, most participants considered the decline in bond rates in August 2016 related to reduced inflation expectations and expectations of lower Central Bank interest rates.

Treasury's borrowing need is limited in historical context, and strictly speaking, the Treasury does not need the funds generated by the bonds in question. If the special reserve requirement were not in effect, the Central Bank would probably have to hold larger foreign exchange reserves so as to mitigate the risk associated with carry trade-related inflows and the potential for sudden outflows. This would be quite costly, as global market returns on the reserves are unusually low at present. At the same time, foreign investors can expect attractive returns on Icelandic Treasury bonds – the more stable the króna is, the more attractive the returns will be. In order to reduce the risk-adjusted interest rate deferential, the Central Bank would therefore need to allow increased exchange rate fluctuations, which would also exacerbate the risk faced by residents. Under current conditions, it can even be argued that for the Icelandic economy, the net benefit of such inflows is negative.

Nevertheless, the aim is to lower the special reserve requirement to zero as soon as conditions warrant it and generally not apply it. However, the Central Bank considers it important to be able to activate it if the need arises. The special reserve requirement would then be a third line of defence, supplementing conventional macroeconomic policy and micro- and macroprudential tools.

In view of the above, it is necessary that the Central Bank retain the statutory authority to apply a special reserve requirement that could be activated at short notice to support monetary and macroprudential policies when there is elevated risk of excess carry trade-related capital inflows, with the associated risk to the domestic economy. In order for this to be possible after the capital controls have been lifted in full, a new statutory foundation (other than the Foreign Exchange Act) must be found for the special reserve requirement, which is primarily a monetary and macroprudential policy instrument. Furthermore, the efficacy of the special reserve requirement must be ensured once speculative derivatives trading in krónur has been re-authorised, as full liberalisation implies. The Central Bank is currently reviewing the technical foundations for the special reserve requirement and preparing proposals for statutory amendments pertaining to its application.

Chart 5
Long-term interest rate differential[1]
2 January 2015 - 10 November 2017



1. The difference between 10-year government bond yields.
Sources: Thomson Reuters, Central Bank of Iceland.

Table 1 Capital inflows (outflows) due to registered (sold) new investments (b.kr.)[1]

Quarter	*Treasury bonds*	*Special reserve accounts*[2]	*Listed shares*	*Unregistered equity*[3]	*Other*[4]	*Total*
2015:1	0.0 (0.0)		0.0 (0.1)	3.5 (0.0)	1.1 (0.0)	4.6 (0.1)
2015:2	3.2 (0.0)		0.2 (0.0)	1.7 (0.0)	0.4 (0.1)	5.6 (0.1)
2015:3	37.0 (0.3)		2.0 (0.0)	3.9 (0.0)	0.5 (0.1)	43.4 (0.5)
2015:4	13.8 (0.3)		3.6 (0.0)	4.2 (0.0)	1.9 (0.1)	23.5 (0.4)
2016:1	18.5 (0.7)		3.1 (0.0)	1.1 (0.0)	1.1 (0.1)	23.9 (0.9)
2016:2	10.3 (3.8)	0.0 (0.0)	1.5 (0.0)	5.4 (2.1)	2.1 (0.1)	19.3 (6.0)
2016:3	0.1 (7.0)	0.0 (0.0)	3.3 (0.0)	10.6 (0.0)	2.2 (0.0)	16.2 (7.1)
2016:4	0.0 (1.5)	0.1 (0.0)	4.7 (0.0)	12.5 (0.0)	4.1 (0.0)	21.3 (1.6)
2017:1	0.0 (2.4)	0.0 (0.0)	14.6 (2.4)	51.5 (0.0)	1.0 (0.0)	67.2 (4.9)
2017:2	7.4 (4.7)	4.9 (0.0)	10.2 (1.5)	4.6 (0.0)	0.4 (0.5)	22.7 (6.7)
2017:3	8.4 (3.7)	5.6 (0.0)	7.9 (3.5)	0.0 (0.8)	0.0 (0.0)	16.3 (8.1)
Total	98.8 (24.5)	10.7 (0.0)	51.2 (7.6)	98.9 (3.0)	15.0 (1.2)	264.0 (36.3)

1. New investment is investment undertaken in Iceland after 31 October 2009 and based on new inflows of foreign currency that is converted to domestic currency at a financial undertaking in Iceland. New investments and sales of such investments must be reported to the Central Bank of Iceland pursuant to the Foreign Exchange Act, no. 87/1992, and the Rules on Foreign Exchange, no. 200/2017. 2. According to Central Bank of Iceland Rules no. 490/2016, with subsequent amendments. 3. The majority of new investment in unlisted equity is foreign direct investment, apart from Q1/2017, when it was due almost entirely to non-residents' purchase of holdings in a domestic commercial bank. 4. Capital flows due to new investment in real estate, deposits, loans, funds, and other securities.
Source: Central Bank of Iceland.

Box 3

The baseline forecast compared to a forecast from the Bank's DSGE model

Monetary policy decisions must be grounded in an assessment of the economic situation and outlook, and such an assessment must rely on economic models. As a result, Central Bank staff devote considerable work to the development of models. The Bank's main modelling tool has been QMM (Quarterly Macroeconomic Model; see Daníelsson *et al.*, 2015), but in recent years a model called DYNIMO (Dynamic Model of the Icelandic Economy; Seneca, 2010) has also been under development. This Box gives a brief description of DYNIMO and compares the forecasts it generates with the Bank's baseline forecast.

DYNIMO and its background

DYNIMO is a dynamic stochastic general equilibrium (DSGE) model. The main characteristics of DSGE models are as follows:

1. They are dynamic, in that economic variables and the decisions made by individuals, firms, and economic policy-makers at any given time have an impact over time;
2. Deviations from equilibrium relationships between individual economic variables are determined by stochastic processes that are assumed to be known to individual agents in the model;
3. They are general equilibrium models where economic relationships are derived from profit and utilisation maximisation and where equilibrium is determined in all markets simultaneously.

The origins of DSGE models can be found in real business cycle models, which date from the 1970s and 1980s (see, for example, Kydland and Prescott, 1982). Models of this type assume that all prices are perfectly flexible and will therefore adjust immediately following an economic shock. As a result, nominal variables and monetary policy have no impact on real variables, which appears at odds with data and findings from a number of studies. DSGE models are based on the same basic methodology but differ from real business cycle models in that they assume that nominal variables (such as prices and wages) are sticky. Because of this, models like these are often referred to as New Keynesian models. In addition, they assume that key markets are monopolistic, that agents can face adjustment costs, and that risk aversion will give rise to risk premia that have a marked impact on interest rates and exchange rates.[1]

DYNIMO and a comparison with QMM

DSGE models have gained in popularity among central banks in recent years. The Central Bank of Iceland began developing one in 2008 and published the first version of it in Seneca (2010). The model has been under continuous development since then and is expected to play an increasing role in the Bank's analysis and forecasting, not least as a cross-check for the baseline forecast.

DYNIMO differs in important ways from the Bank's main forecasting model, QMM, although both models assume that agents are forward-looking; i.e., that they make decisions based on their expectations of future economic developments. QMM is essentially an empirically estimated macroeconomic model that does not account for various constraints that the underlying general equilibrium imposes on economic relations. Furthermore, unlike in QMM, all of the model's relations are estimated simultaneously in DYNIMO. Its parameters are based either directly on the findings from research into underlying behavioural relationships or indirectly,

1. An overview of DSGE models, including their characteristics and their use among central banks can be found in Sbordone *et al.* (2010).

by using such findings to select a prior distribution when estimating the model using Bayesian methods.

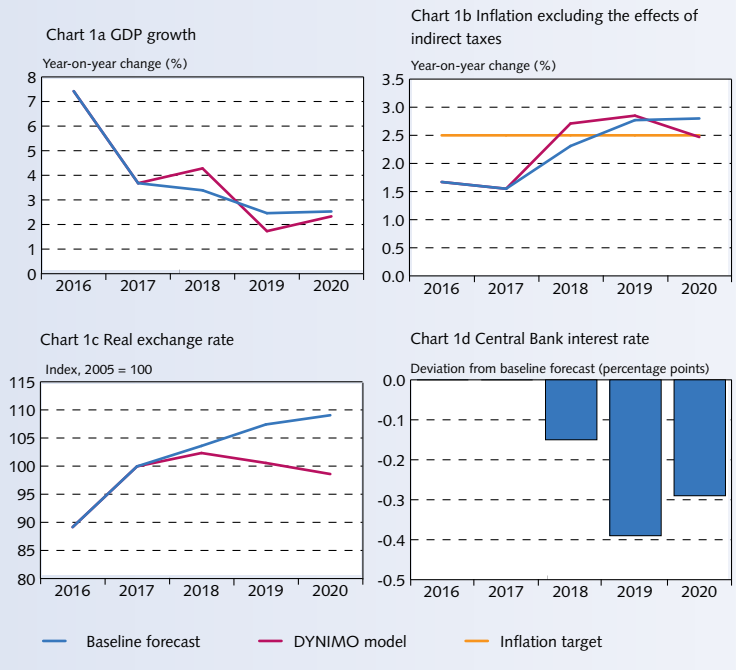
The Central Bank's baseline forecast is based on staff assessments and on the forecast generated by QMM. DYNIMO and QMM differ in that in DYNIMO, convergence is ensured by the underlying structure of the model, which is not the case with QMM. However, QMM allows the forecaster to use detailed information on the Icelandic economy and to design the equations in the model according to Icelandic conditions more easily and to a greater degree than with DYNIMO. In particular, it is possible to use information and assumptions concerning future developments in exogenous variables in order to guide forecasts: for instance, changes in the tax system, committed public development projects, or known large-scale business investment plans such as purchases of ships and aircraft or development in the energy-intensive sector. Estimating DYNIMO is also sensitive to changes in the structure of production sectors and in the equilibrium behaviour of the model, which generally assumes that equilibrium values are fixed over the estimation period. QMM, however, is estimated over historical periods that may not always be well suited to current conditions. It can therefore be sensitive to changes in underlying relationships and to the so-called Lucas critique (Lucas, 1976), as are other models of its type. Each model therefore has its strengths and weaknesses.

Comparison of DYNIMO forecast with the Bank's baseline forecast

Before *Monetary Bulletin* is published, both DYNIMO and QMM are simulated and the resulting forecasts compared. In the forecast published here, DYNIMO is conditioned upon the same information from Bank staff concerning the near-term outlook for individual sectors of the domestic economy and developments in the global economy as was used to prepare the baseline forecast in *Monetary Bulletin* 2017/4 using QMM. Chart 1 compares the baseline forecast and the forecast obtained with DYNIMO.

Chart 1

Comparison between baseline forecast and DYNIMO forecast



Sources: Statistics Iceland, Central Bank of Iceland.

As can be seen, DYNIMO forecasts stronger GDP growth in 2018 than is assumed in the baseline forecast (Chart 1a), mainly because the baseline forecast is more pessimistic as regards external trade and terms of trade. This situation reverses in 2019, however, when the baseline forecast assumes stronger GDP growth than DYNIMO does. The outlook for 2020 is broadly similar for both models, and over the forecast period as a whole the forecasts are virtually identical. As Chart 1b indicates, the inflation outlook according to both models is also very similar. However, DYNIMO does not assume as steep a rise in the real exchange rate as the baseline forecast does (Chart 1c), and it entails a slightly lower policy rate (Chart 1d). The reason why the inflation outlook according to DYNIMO is so similar to the one in the baseline forecast despite a smaller rise in the exchange rate is that wages rise less in 2019-2020 in the forecast from DYNIMO than in the baseline forecast, offsetting the lower exchange rate in the latter.[2] This also explains why inflation is not as persistent at the end of the forecast horizon and interest rates somewhat lower according to DYNIMO. Overall, however, the two forecasts are very similar.

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2. One of the key uncertainties in the baseline forecast pertains to medium-term wage developments and their potential impact on inflation. DYNIMO forecasts higher inflation than is assumed in the baseline forecast if both models are conditioned upon the same wage inflation path, suggesting that the baseline forecast could be underestimating the inflationary effects of the wage increases expected over the next few years. Interest rates would then have to be higher so as to raise the exchange rate of the króna and generate more slack in the economy so as to offset the increased inflationary pressures.

Box 4

Recent revision of the national accounts

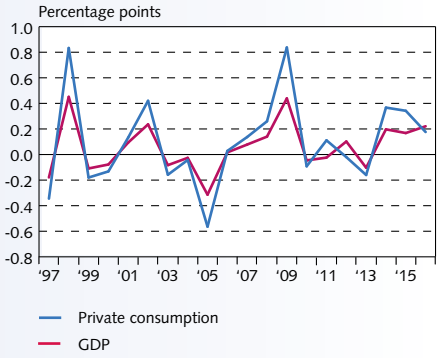
In September, Statistics Iceland published the national accounts for Q2/2017 and a revision of previous data vintages. In addition to the periodical review of recent national accounts figures, there was a much more extensive review of private consumption figures. The review was undertaken so as to employ improved methodology in calculating several subcomponents of private consumption. The component called "other financial services" was revised back to 1997, and insurance expenditure and additional items – i.e., Icelanders' spending abroad and non-residents' spending in Iceland – were revised back to 2013.

In the early part of the period, the effects of the revision are rather small, with private consumption measuring about 0.3% higher, on average, in 1997-2008 according to the revised data. In 2009 the revision is significantly larger, with the contraction following the financial crisis now estimated to have been 0.8 percentage points smaller than previous figures had indicated (Chart 1). Over the past three years, private consumption is also estimated to have grown faster than previously thought, by 0.2-0.4 percentage points per year. The cumulative effect is that 2016 private consumption was more than 2% stronger than previous figures had suggested, and the year-2016 ratio of private consumption to GDP rises from 49.0% to 49.5%.

The revision also has a direct impact on GDP growth over the period. In addition to the revision of private consumption, GDP growth in 2015 and 2016 is significantly affected by periodical revisions of the national accounts, investment and external trade in particular. For the past three years, GDP growth is now estimated to be 0.2 percentage points stronger than previous numbers suggested; therefore, 2016 GDP growth measured 7.4%, Iceland's third-highest growth rate in a quarter-century. The post-crisis contraction is also estimated to have been less pronounced than previously thought: it is now estimated that GDP contracted by 6.5% in 2009 and not 6.9%. The contraction in 2010 is unchanged at 3.6%, however. The aggregate effect of the revision of 2016 GDP is to increase real GDP by 1.2% relative to the previous figures (Chart 2).

Chart 1

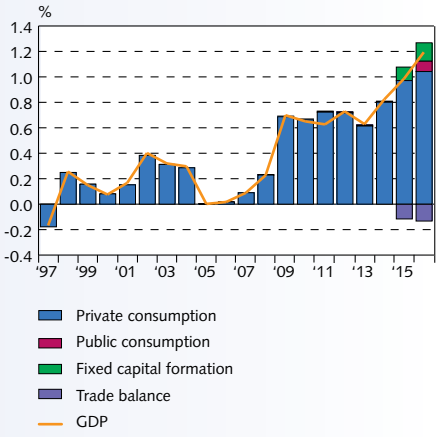
Effects of revision of growth in private consumption and output[1]



1. Measured as the difference between annual changes in new and older data.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 2

Change in GDP and effects of revision of components



Sources: Statistics Iceland, Central Bank of Iceland.

Box 5

Fiscal budget proposal 2018

The fiscal budget proposal for 2018 was presented by the outgoing Government last September. Deviations from the strategy laid down in the Government fiscal plan presented this past spring lie mainly in changed assumptions concerning macroeconomic developments. Table 1 shows the Statistics Iceland forecast used as a basis for the budget proposal, together with revisions from the previous Statistics Iceland forecast, which was used as a basis for the fiscal plan. For comparison, the forecast in *Monetary Bulletin* 2017/3, published at around the same time as the forecast used for the budget proposal, is shown as well. As can be seen, macroeconomic assumptions changed between the fiscal plan and the budget proposal. This warranted an upward revision of revenues from tax bases and, in total, a reduction in changes in wages, prices, and exchange rate in the 2018 fiscal budget proposal.

Table 1 Macroeconomic assumptions in the 2018 fiscal budget proposal

	2018 (%)	*Change since February (percentage points)*	*MB 2017/3 (%)*
Private consumption	5.2	1.3	6.0
Public consumption	1.3	-0.2	1.6
Gross capital formation	4.0	3.0	-0.7
Exports	4.1	-0.1	4.3
Imports	5.8	2.3	3.8
Gross domestic product	3.3	0.3	3.3
Consumer price index (CPI)	2.7	-0.5	2.6
Trade-weighted exchange rate index (TWI)	-3.1	-3.1	-3.3
Wage index	6.5	0.2	5.3

Source: Central Bank of Iceland.

Changes have also been made to various items relating to fiscal policy. The fiscal plan provided for an increase in value-added tax (VAT) on tourism-related activities as of 1 July 2018 and a reduction in the general VAT bracket from 24% to 22.5% as of 1 January 2019. The budget proposal, on the other hand, postpones the VAT hike on tourism until 1 January 2019, thereby reducing estimated 2018 revenues by nearly 9 b.kr. This special measure entails an easing of the fiscal stance. In spite of this change, revenues decline

Table 2 Impact of tax changes on Treasury revenues in 2018

Changes enshrined in law	*B.kr.*	*Effective date*
Support for first-time homebuyers	-0.7	1 Jul 17
Tax bracket sharing for jointly taxed individuals	-0.8	.
Cancellation of discount on excise tax for rental motor vehicles	2.0	1 Jan 18
Trebling of bed-night tax	1.0	1 Sep 17
Total	1.5	
Planned statutory amendments, autumn 2017 legislative session		
Doubling of carbon tax	3.2	1 Jan 18
VAT exemption for importation of new electric motor vehicles	-2.0	1 Jan 18
Equalisation of oil and petrol tax	1.4	1 Jan 18
Equalisation of alcohol tax on table wine and beer	0.4	1 Jan 18
Total	3.0	
Statutory amendments planned but set aside		
Increase in VAT on tourism to the general tax bracket	-8.9	
Total	-3.9	

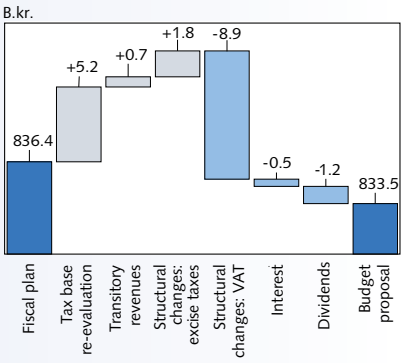
Source: Central Bank of Iceland.

overall by only 3 b.kr., according to the budget proposal (Chart 1). The difference lies in a 5.2 b.kr. revision of revenues from tax bases, although the estimate of other revenues has also been revised upwards, by 0.7 b.kr. Changes in excise taxes, another special measure, are expected to deliver an additional 1.8 b.kr. in revenues. Finally, interest and dividend income will decline by 1.7 b.kr. The effect of other changes in the tax system on 2018 revenues can be seen in Table 2, which shows that special tax system changes will lower net revenues by a total of 3.9 b.kr during the year.

The revision of estimated revenues for 2017 also affects the 2018 revenue estimate in the budget proposal. The revenue estimate in the 2017 National Budget, 776 b.kr., has been increased by nearly 25 .b.kr., or 3.2% (Chart 2). Of that total, revenues from tax bases rise by 2.5 b.kr., owing mainly to increased revenues from indirect taxes. Interest income is now estimated to be 400 m.kr. higher than in the 2017 Budget, but dividends paid by State-owned commercial banks account for 80% of the increase. Because the estimates in the fiscal budget proposal indicate that dividends and other revenues in 2017 will be higher than was assumed in the National Budget, the targeted outcome specified in the Budget will be achieved even though expenditures will exceed budgetary allocations.

Chart 1

Change in expected revenues between fiscal plan and 2018 budget proposal



Source: 2018 fiscal budget proposal.

Various assumptions in the 2018 fiscal budget proposal

Wage assumptions: The 2017 National Budget assumed a 3.3% weighted average wage increase this year, accounting for the fact that contractual public sector pay rises would not take effect until June. The actual increase turned out to be 5.1%, and this affects wage assumptions for 2018. Wage settlements involving a third of Government employees are up for review this year, and projected wage developments in 2018 are based on the projected results of those settlements. The fiscal budget proposal assumes that a 3% increase as a result of the wage settlements will take effect on 1 June 2018. This accords with provisions in private sector union contracts, which expire at the end of 2018. The weighted average wage increase for 2018 is estimated at 2.1%.

Price assumptions: The 2017 National Budget assumed that inflation would measure 2.4% during the year. Statistics Iceland has revised its forecast and now projects it at 1.9%. There is no precedent for lowering budgetary authorisations because of an overestimation of inflation in the Budget itself; instead, the overage is deducted from the next year's price level update. Statistics Iceland forecasts 2018 inflation at 2.7%, and the price level revision for other operating expenditures therefore amounts to 2.2%, after adjusting for the deduction. Operating expenditures generally total about 20-30% of institutions' operating turnover.

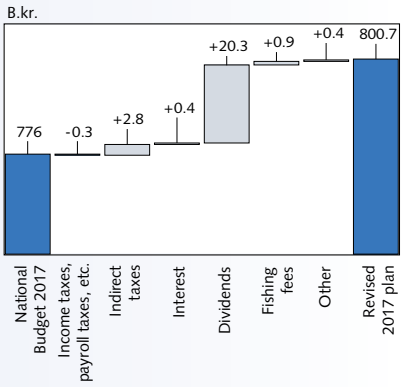
Exchange rate assumptions: In the 2018 fiscal budget proposal, foreign-denominated expenditures are calculated based on the average exchange rate in July 2017, which is 7.7% below the exchange rate on which the 2017 National Budget is based. This causes a 1.5% reduction in institutions' budgetary authorisations.

Unemployment and social security benefits: The budget proposal assumes that benefits will increase by 4.7% on 1 January 2018. Benefits paid to disability and old-age pensioners who live alone will rise by an additional 2.4%, to 300,000 kr., as of the same date. The total cost of these increases is 6.7 b.kr.

In all, the above-specified changes to budgetary authorisations in the 2018 budget proposal – changes in wages, prices, and exchange rates and increased unemployment and social security benefits – total nearly 18 b.kr. (see Table 3).

Chart 2

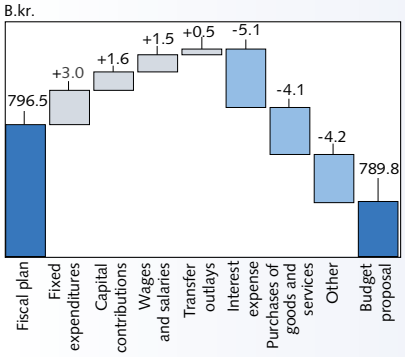
Revision of revenue plan from 2017 National Budget



Source: 2018 fiscal budget proposal.

Chart 3

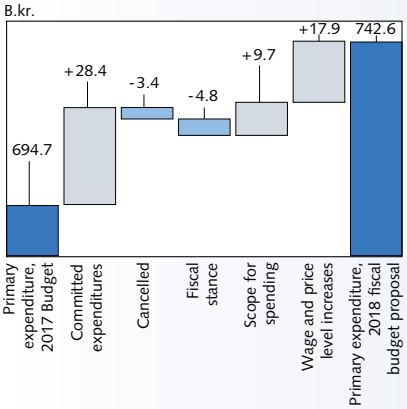
Change in expenditures between fiscal plan and 2018 budget proposal



Source: 2018 fiscal budget proposal.

Chart 4

Change in primary expenditure from 2017 National Budget



Source: 2018 fiscal budget proposal.

Table 3 Changes in wages, prices, and exchange rate in 2018

Accrual basis	*Expenditures in b.kr.*
Wage assumptions	
Revision of wage assumptions in 2017 National Budget	3.2
Projected wage increases in 2018	6.7
Special resolutions included in 2015 and 2016 wage settlements	0.1
Total wage increases	10.0
Unemployment and social security benefits	6.7
General price level assumptions	2.7
Exchange rate assumptions	-1.5
Total wage, price, and exchange rate changes in the 2018 fiscal budget proposal	17.9

Source: Central Bank of Iceland.

The reduction in total expenditures between the fiscal plan and the 2018 budget proposal amounts to 6.7 b.kr., and the outcome is therefore 3.3 b.kr. better than was assumed in the fiscal plan (Chart 3). Spending is reduced because of lower interest and transfer expense and less spending on goods and services purchases, although spending on fixed assets, grants and wages has been increased.

The increase in primary expenditure (i.e., total expenditure excluding interest expense) between the 2017 National Budget and the 2018 budget proposal totals 48 b.kr., or 7% in nominal terms and 4.3% in real terms. According to the 2018 proposal, primary expenditure totals 2.2 b.kr., about 0.3% more than was assumed in the fiscal plan. Interest expense falls by 11 b.kr. between years, and total expenditures are therefore less than previously estimated, or 36 b.kr., which corresponds to a 4.7% nominal increase and a 2.4% real increase. Chart 4 shows changes in primary expenditure between the 2017 Budget and the 2018 proposal, by major category.

How is the fiscal stance evaluated?

When the fiscal stance is evaluated, it is necessary to adjust for the effects of the business cycle on government revenues and expenditure. Taxes rise in line with income, thus boosting government revenues in an economic upswing. At the same time, there is reduced spending on various social welfare programmes such as unemployment benefits and subsidies; therefore, the fiscal outcome improves during an economic upswing and deteriorates during a downswing. Over the cycle, the primary balance adjusted for the effects of these automatic stabilisers should remain unchanged. If there are changes in the cyclically adjusted primary balance, this reflects changes in the fiscal stance.

Cyclical adjustment of the primary balance entails estimating what the outcome would be if the economy were in balance. This means that the cyclically adjusted primary balance is poorer than the unadjusted balance during a cyclical upswing and better during a downswing. A relaxation of cost restraints that leads to increased primary expenditure eases the fiscal stance even though the overall outcome may be held unchanged – for example, with extraordinary dividend payments from the commercial banks, which are not considered regular primary income. Increased primary expenditure boosts demand and demand pressures, which is justifiable during a recession but less so during an economic boom. An alternative scenario describing the effects of fiscal easing on demand, inflation, and interest rates can be found in Chapter I.

Box 6

The Central Bank of Iceland forecasting record

Economic developments often diverge in some respect from forecasts. The macroeconomic forecasts in *Monetary Bulletin* are based on models that present a simplified view of the economy. The equations in the model describe the economic relationships that are most important; however, it is inevitable that they will omit many others less significant. When forecasts are prepared, they must be based on preliminary figures for the recent past, data that in some instances will not be available in their final form until several years later. Furthermore, the data may be subject to measurement errors, and there are always unforeseen developments that are impossible to forecast. Studying errors in previous forecasts helps to identify the uncertainties in new forecasts and can be useful in further developing macroeconomic models, using them for forecast preparation, and improving the procedures used for analysis and forecast presentation.

Forecasts of the real economy and inflation

Four times a year, the Central Bank prepares forecasts for the real economy and inflation covering a forecast horizon of three years. The forecasts are based on a detailed analysis of the current state of the economy. The assumptions concerning global economic developments are based, among other things, on forecasts from international institutions and the information implied by key commodity futures. The national accounts are the primary source of data on the domestic economy. In addition, Bank staff prepare an independent assessment of the state of the economy through surveys; discussions with corporate executives, institutional directors, and labour market institutes; and statistical analysis of developments in key variables. The Central Bank's quarterly macroeconomic model (QMM) is the tool used to manage this information. Some of the equations in the model are accounting equations, while others are behavioural equations that are estimated using econometric methods. However, the Bank's forecast – particularly for the recent past and immediate future – is determined not least by staff assessments, various simple statistical models, and a variety of information not included in QMM. The Bank's DSGE model is also used in the forecasting exercise, not least as a cross-check on the baseline forecast (see Box 3).

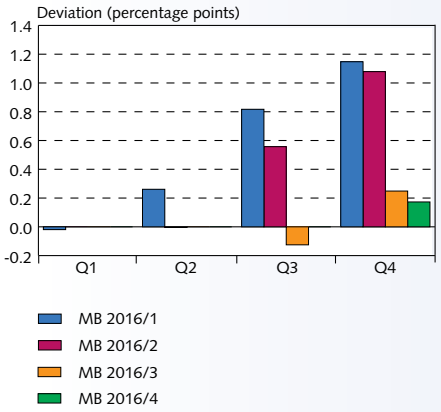
Monetary policy performance during the forecast horizon is a key factor in the preparation of each forecast. In QMM, monetary policy is set with a forward-looking monetary policy rule wherein Central Bank interest rates are determined by the expected deviation of inflation from the inflation target and the current output gap. This rule ensures that the Bank's interest rates bring inflation back to target by the end of the forecast horizon. The monetary policy rule in the model was selected so as to minimise the sacrifice cost in ensuring that inflation is at target.[1]

Central Bank inflation forecasts for 2016

Inflation rose slightly year-on-year in 2016, averaging 1.7% for the year, up from 1.6% in 2015. This was the third year of below-target inflation. Inflation excluding indirect tax effects also measured 1.7%. As has been discussed in previous issues of *Monetary Bulletin*, year-2016 inflation was driven mainly by rising house

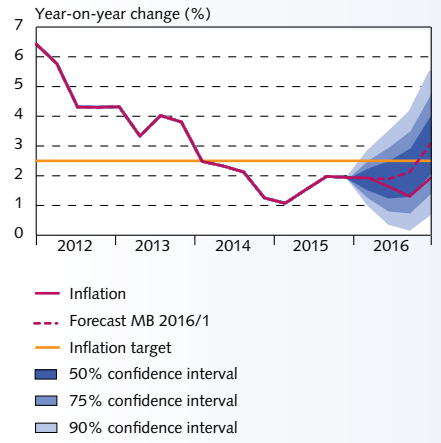
1. See Daníelsson, Á., B. G. Einarsson, M. F. Gudmundsson, S. J. Haraldsdóttir, T. G. Pétursson, S. Sigmundardóttir, J. Sigurdsson, and R. Sveinsdóttir (2015), "QMM: A quarterly macroeconomic model of the Icelandic economy – Version 3.0", Central Bank of Iceland, *Working Paper* no. 71. The most recent version of the handbook for the model can be found here: http://www.sedlabanki.is/library/Skraarsafn---EN/Working-Papers/WP_71_net_nytt.pdf.

Chart 1
Inflation forecasting errors in *Monetary Bulletin* in 2016



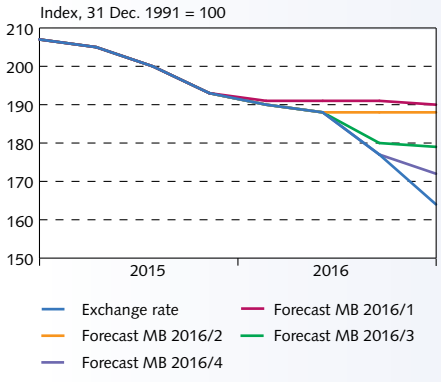
Source: Central Bank of Iceland.

Chart 2
Inflation forecast and confidence intervals, *Monetary Bulletin* 2016/1
Q1/2012 - Q4/2016



Sources: Statistics Iceland, Central Bank of Iceland.

Chart 3
Exchange rate forecasts in *Monetary Bulletin* 2016[1]



1. Narrow trade basket.
Source: Central Bank of Iceland.

prices, with the appreciation of the króna and low global inflation pulling in the opposite direction.

Chart 1 illustrates the forecasting record for the inflation forecasts within the year. The forecast in *Monetary Bulletin* in the first half of the year assumed that inflation would be higher in 2016 than proved to be the case. That forecast assumed that when the effects of the steep decline in import prices tapered off, inflation would rise concurrent with a widening output gap and large wage rises. As the year progressed, however, it became clear that the effects of imported deflation would be more persistent than previously thought; furthermore, the króna appreciated much more than previous forecasts had assumed. This can also be seen in Table 1, which shows that average inflation for the year was overpredicted at the beginning of the year, whereas the forecast in *Monetary Bulletin* 2016/3 proved accurate. Part of the forecasting error for 2016 was due to Statistics Iceland's error in calculating the CPI. Because of this, the rise in imputed rent in March was not included in the CPI calculation for that month but was included in the April calculation instead. The imputed rent component was therefore included in the CPI with a one-month time lag. Statistics Iceland discovered the error in September and corrected it by basing the September CPI calculation on the rise in imputed rent in both August and September. Inflation was therefore underestimated by 0.1-0.3 percentage points for the period from March through August, affecting Q3 figures the most. The Bank's overestimation of 2016 inflation would have been smaller had Statistics Iceland's error not occurred.

Table 1 Inflation forecast for 2016

	Monetary Bulletin				*Final*
Year-on-year change (%)	*2016/1*	*2016/2*	*2016/3*	*2016/4*	*result*
Inflation	2.3	2.1	1.7	1.7	1.7
Underlying inflation (excluding indirect tax effects)	2.2	2.1	1.7	1.7	1.7

Chart 2 shows the confidence interval for the inflation forecast in *Monetary Bulletin* 2016/1, together with actual inflation. At that time, the risks to the forecast were considered skewed to the upside, owing to recently finalised wage settlements and stimulative Government measures that could potentially have stronger demand-side effects than was assumed in the baseline forecast. However, it was also considered possible that inflation could be overestimated and could turn out lower than in the baseline forecast if the global economic outlook were to deteriorate still further, for instance, or if the króna should appreciate and firms' capacity to absorb cost increases were greater. This indeed turned out to be the case: the króna appreciated more than the forecast in *Monetary Bulletin* had assumed (Chart 3), offsetting the factors that could have led to an underprediction. As can be seen, inflation was within the 50% probability distribution of the forecast for most of the period. In other words, the developments in inflation over the course of 2016 had been deemed relatively likely at the beginning of the year.

Errors in inflation forecasts over longer periods

Chart 4 shows developments in errors in Central Bank inflation forecasts one, four, and eight quarters ahead, from Q1/2001 through Q3/2017. Forecasts two years ahead have been published since March 2001, when the inflation target was adopted. Inflation forecasts for the first quarter of the forecast horizon showed no tendency towards either over- or underpredicting. Forecasting errors can generally be expected to increase as forecasts extend further

ahead in time. One- and two-year forecasts tend to be underestimated rather than overestimated. The errors were greatest for 2008 and 2009, when inflation was significantly underestimated, owing largely to the steep depreciation of the króna during the financial crisis. Inflation forecasts during the period 2001-2013 underestimated inflation more often than they overestimated it. A change occurred in 2014, when overprediction became more common, partly due to lower oil prices, global deflation, and the appreciation of the króna.

Table 2 shows the mean deviation (which gives an indication of whether inflation is being systematically over- or underpredicted) and the root mean square error (RSME, which shows the uncertainty in the forecast) since the Bank began publishing inflation forecasts two years ahead. In March 2007, the Bank began publishing forecasts three years ahead. As is discussed above, the error was greatest for 2008 and 2009. Table 2 omits the forecasts carried out for those two years. According to the table, inflation was still underestimated three to twelve quarters ahead during this period. The underestimation in the forecasts three quarters ahead is too small to be statistically significant, but for the forecasts four and eight quarters ahead it is statistically significant and measures nearly 1 percentage point in the forecasts eight quarters ahead. There was no significant bias in the three-year forecasts, however.

Table 2 Central Bank of Iceland inflation forecast errors since Q2/2001

	One quarter	*Two quarters*	*Three quarters*	*Four quarters*	*Eight quarters*	*Twelve quarters*
No. of measurements	59	59	58	56	53	29
Mean forecast error (%)	0.0	0.0	-0.1	-0.5	-0.9	-0.3
RMSE (%)	0.3	1.1	1.7	2.0	2.1	1.7

It should also be borne in mind that the Bank did not begin using its quarterly macroeconomic model (QMM) until the beginning of 2006, and it prepared no forecasts of the exchange rate or Central Bank interest rates before 2007.[2] From the introduction of the capital controls and up to the *Monetary Bulletin* 2016/4 forecast, the Bank's macroeconomic and inflation forecasts had also been based on the technical assumption that the exchange rate of the króna would remain unchanged throughout the forecast horizon. Experience shows that large errors in inflation forecasts in Iceland are usually related to exchange rate volatility (Chart 5), as the correlation between the forecast errors for inflation and the exchange rate is 0.73. The chart shows that inflation was underestimated in those instances when the króna turned out weaker than the forecast had assumed. This is particularly the case for forecasts prepared during the financial crisis. In the instances when the króna proved stronger than the forecast had assumed, inflation was usually overpredicted. This applies in particular to 2016, when a large portion of the inflation forecasting errors can be traced to underestimation of the exchange rate, as is discussed above.

Central Bank GDP growth forecasts for 2016

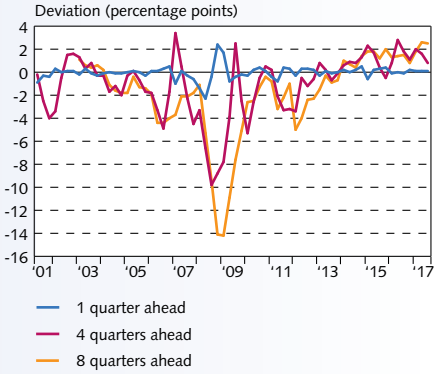
In order to obtain a clearer view of the Central Bank's success in inflation forecasting, it is necessary to examine its success in fore-

2. See Ólafsson, T. T. (2007), "Publication of its own policy rate path boosts the effectiveness of central bank monetary policy", *Monetary Bulletin* 2007/1, pp. 71-86.

Chart 4

Inflation forecasting errors in *Monetary Bulletin*[1]

Q2/2001 - Q3/2017



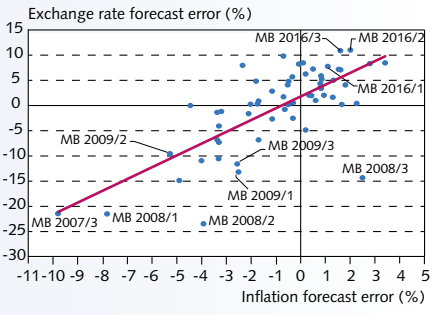
1. The first quarter is the quarter in which the report is published or the first quarter forecasted; 4 quarters ahead is three quarters after the report has been published; 8 quarters ahead is seven quarters after the report has been published.

Source: Central Bank of Iceland.

Chart 5

Inflation forecasting errors in *Monetary Bulletin* and deviation of average exchange rate from forecast 2001-2016

Forecast one year ahead



Source: Central Bank of Iceland.

casting developments in the real economy. It is likely that inflation will be underpredicted during periods when demand pressures or growth in demand is also underestimated.

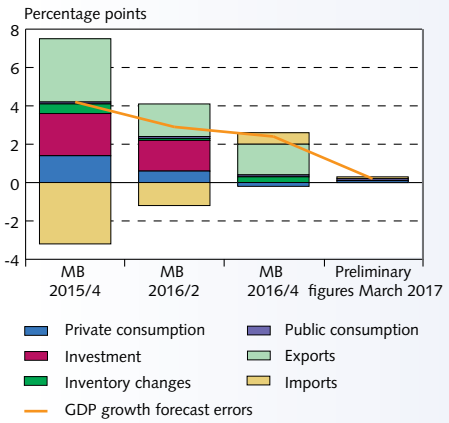
Statistics Iceland publishes preliminary national accounts figures for each quarter about two months after each quarter-end. The first estimates for Q4/2016 and the full year 2016 were published in March 2017, and revised figures were published in September. The *Monetary Bulletin* forecasts and Statistics Iceland's estimates of changes in key macroeconomic variables from the previous year can be seen in Table 3. In February 2016, when *Monetary Bulletin* 2016/1 was published, Statistics Iceland's preliminary national accounts figures were available only for Q3/2015. As a result, the Bank had to base its forecast for 2016 on the forecast for Q4/2015.

Statistics Iceland's figures for 2016 changed between the publication of the preliminary numbers in March 2017 and the revision in September. Domestic demand was underestimated in the preliminary figures; in particular, private consumption was underestimated by 0.2 percentage points, and the annual growth rate is at its highest since 2005. Alongside the release of the national accounts in September, the methodology used to calculate private consumption was revised, which generally entailed an increase in previous private consumption figures. Exports and imports were overestimated but tended to offset one another and therefore had little impact on the GDP growth figure for the year. GDP growth, according to Statistics Iceland's September figures, was therefore 7.4%, or 0.2 percentage points more than in the March figures.

Table 3 *Monetary Bulletin* macroeconomic forecasts and Statistics Iceland data for 2016

Forecast horizon from: *% change from prior year*	*2015/4* *MB 2016/1*	*2016/1* *MB 2016/2*	*2016/2* *MB 2016/3*	*2016/3* *MB 2016/4*	*2016/4* *MB 2017/1*	*Preliminary figures (March 2017)*	*Revised figures (Sept. 2017)*
Private consumption	5.3	6.0	6.7	7.6	6.2	6.9	7.1
Public consumption	1.4	1.5	1.4	1.6	1.2	1.5	1.9
Investment	12.4	14.1	18.2	22.5	23.2	22.7	22.8
Domestic demand	5.2	6.3	7.7	8.7	8.4	8.7	8.9
Exports	6.4	7.6	8.6	7.8	10.2	11.1	10.9
Imports	8.7	11.7	14.6	15.7	15.5	14.7	14.5
GDP growth	4.2	4.5	4.9	5.0	6.0	7.2	7.4

Chart 6
Contribution of expenditure items to forecast errors in GDP growth 2016[1]



1. Based on real figures in September 2017.
Sources: Statistics Iceland, Central Bank of Iceland.

GDP growth for the year turned out much stronger than had been forecast, as the GDP growth forecast was revised upwards in each *Monetary Bulletin* published in 2016. This substantial underestimation is due for the most part to exports, as the number of tourists visiting Iceland turned out far greater than previously projected. Pulling in the other direction were imports, which were underpredicted in the February and May 2016 issues of *Monetary Bulletin*. The GDP growth forecast in *Monetary Bulletin* 2016/1 was 3.2 percentage points below the actual outcome. This underprediction grew smaller as the year progressed: GDP growth was underestimated by 1.4 percentage points in *Monetary Bulletin* 2017/1, which was based on preliminary data for Q3/2016. Chart 6 illustrates how errors in forecasts of expenditure items explain the errors in the GDP growth forecasts for the year.

Private consumption growth, which was especially strong in 2016, was underestimated except in *Monetary Bulletin* 2016/4. The public consumption growth forecast in *Monetary Bulletin* was broadly in line with Statistics Iceland's preliminary figures, but when

the national accounts were revised in September, public consumption was revised upwards by 0.4 percentage points. It is unsurprising that the forecast error for investment was largest among the national accounts items. Investment is the most volatile national accounts component and the one that changes most upon revision.

Apart from investment, the largest error was in the forecast of external trade. In *Monetary Bulletin* 2015/4, both exports and imports were underpredicted. The errors were similar in size, however, and therefore had limited overall impact on the GDP growth forecast error. In *Monetary Bulletin* 2016/2, the underprediction of exports was larger than that of imports. This led to an underestimation in the GDP growth forecast over and above that attributable to domestic demand. In *Monetary Bulletin* 2016/4, however, exports were underpredicted, while the forecast for imports proved too optimistic. This explains nearly the entire error in that GDP growth forecast, as the forecast of domestic demand was quite accurate.

Central Bank forecasts over longer periods in comparison with other forecasters' projections

Chart 7 gives a comparison of the Central Bank's output growth forecasts for 2016 and the average of projections from others that publish regular forecasts concerning the Icelandic economy. The Bank's forecasts were all prepared in the fourth quarter of the year during the period 2013-2016, and the mean is calculated from each year's last forecast as prepared by the International Monetary Fund (IMF), Icelandic Federation of Labour, the three large commercial banks, Statistics Iceland, and the European Commission.[3] The range between the highest and lowest forecast values is indicated by the shaded area. In general, it widens during periods of marked uncertainty. Other things being equal, economic forecasts should become more consistent with one another as period covered by the forecast approaches and more information becomes available.

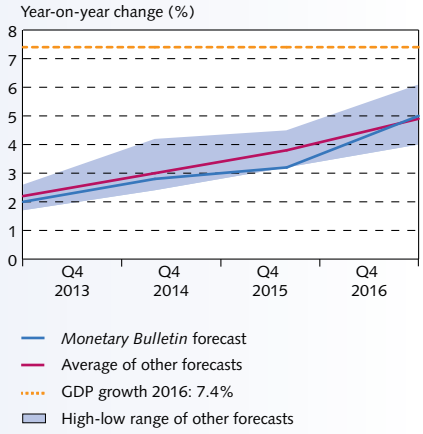
The forecasts in *Monetary Bulletin* accord well with the average from other forecasters, as all of them underpredicted GDP growth for the year. The errors in the Bank's forecasts were close to the average for the other forecasters, and the progression in the forecasts is broadly similar as well. However, the average for the other forecasters at the end of 2016 was 2.5 percentage points below actual GDP growth for the year.

Chart 8 gives the same comparison of inflation forecasts. The Central Bank's long-term inflation forecasts have a tendency to outperform other forecasters' projections. This has been the case in recent years, and 2016 was no exception: the Bank's forecasts are closer to the actual outcome than other forecasters' projections for the entire period.

The Central Bank's 2016 forecasts in international comparison

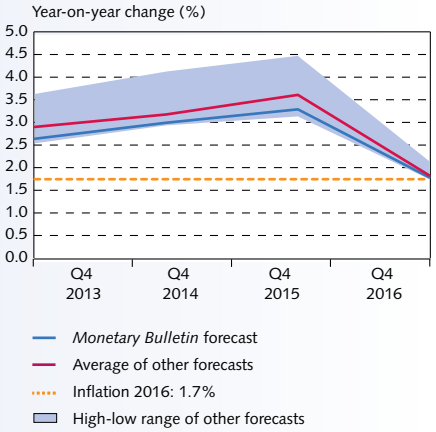
It can be useful to examine the Bank's forecasts in international context. Inflation has been very low for a long time in advanced economies, and it has remained so even though the global economic recovery has gained momentum. Overpredicting inflation has therefore had forecasters in a quandary for some time.[4] As

Chart 7
GDP growth forecast for 2016



Sources: Arion Bank, European Commission, Icelandic Confederation of Labour, IMF, Íslandsbanki, Landsbankinn, Statistics Iceland, Central Bank of Iceland.

Chart 8
Inflation forecast for 2016



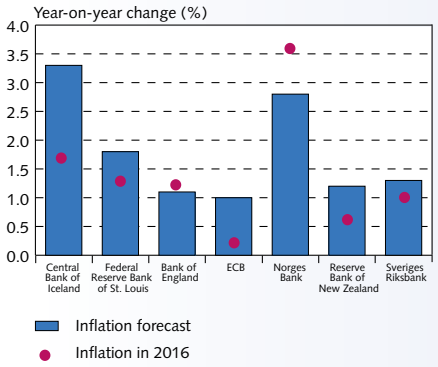
Sources: Arion Bank, European Commission, Icelandic Confederation of Labour, IMF, Íslandsbanki, Landsbankinn, Statistics Iceland, Central Bank of Iceland.

3. Not all of these forecasters prepare forecasts over a horizon of three years; therefore, the 2013 value in Chart 7 is based only on the forecasts from the IMF, Statistics Iceland, and Landsbankinn. This explains in part why the high-low range is smaller in 2013 than in 2014.

4. See, for example, International Monetary Fund, *World Economic Outlook*: "The dog that didn't bark: has inflation been muzzled or was it just sleeping" (April 2013, Chapter 3) and "Global disinflation in an era of constrained monetary policy" (October 2016, Chapter 3).

Chart 9

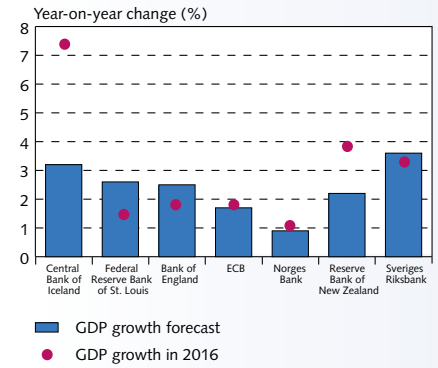
Inflation forecasts for 2016 in selected advanced economies[1]



1. Forecasts prepared at the end of 2015, apart from the Federal Reserve Bank forecast, which was prepared in July 2015. Bank of England forecast of year-on-year inflation in Q4.
Sources: Bank of England, ECB, Federal Reserve Bank of St. Louis, Norges Bank, Reserve Bank of New Zealand, Sveriges Riksbank, Thomson Reuters, Central Bank of Iceland.

Chart 10

2016 GDP growth forecasts for selected advanced economies[1]



1. Forecasts prepared at the end of 2015, apart from the Federal Reserve Bank forecast, which was prepared in July 2015.
Sources: Bank of England, ECB, Federal Reserve Bank of St. Louis, Norges Bank, Reserve Bank of New Zealand, Sveriges Riksbank, Thomson Reuters, Central Bank of Iceland.

Chart 9 indicates, year-2016 inflation turned out lower than had been forecast in most developed countries at the end of 2015. In the UK and Norway, it turned out higher, but this was due in part to a depreciation of both currencies. The Central Bank's overprediction was larger than that in other countries, mainly because of the unforeseen strong appreciation of the króna during the period, as is discussed above.

Chart 10 gives the same type of comparison of GDP growth forecasts. Year-2016 GDP growth was overestimated in the US, Sweden, and the UK but underpredicted in the other countries. The underestimation in Iceland was much greater than in the comparison countries, owing to the unusually strong positive shocks that affected the economy; i.e., the marked improvement in terms of trade and the enormous growth of the tourism sector.

Appendix 1

Forecast tables

Table 1 GDP and its main components[1]

	2016	*2017*	*2018*	*2019*	*2020*
Private consumption	7.1 (6.9)	7.9 (7.1)	6.3 (6.0)	3.7 (3.6)	2.8
Public consumption	1.9 (1.5)	1.5 (1.6)	1.6 (1.6)	1.5 (1.6)	1.8
Gross capital formation	22.8 (22.7)	8.8 (9.2)	-0.4 (-0.7)	5.5 (4.9)	4.5
Business investment	26.4 (24.7)	3.2 (4.8)	-6.8 (-6.2)	2.5 (1.7)	0.9
Residential investment	29.4 (33.7)	23.7 (25.3)	18.2 (17.9)	13.3 (12.6)	13.9
Public investment	-1.0 (2.5)	22.9 (19.0)	6.1 (3.6)	6.4 (8.5)	3.7
Domestic demand	8.9 (8.7)	6.3 (6.5)	3.7 (3.1)	3.6 (3.4)	2.9
Exports of goods and services	10.9 (11.1)	6.1 (8.7)	4.3 (4.3)	3.4 (3.3)	2.4
Imports of goods and services	14.5 (14.7)	12.2 (11.9)	5.2 (3.8)	5.9 (5.5)	3.3
Gross domestic product (GDP)	7.4 (7.2)	3.7 (5.2)	3.4 (3.3)	2.5 (2.5)	2.5
GDP at current prices (ISK billions)	2,449 (2,422)	2,523 (2,555)	2,647 (2,695)	2,777 (2,834)	2,923
GDP at current prices (growth rate)	9.7 (9.4)	3.0 (5.5)	4.9 (5.5)	4.9 (5.1)	5.2
Total investment (% of GDP)	21.3 (21.2)	21.9 (21.2)	20.8 (20.0)	21.2 (20.4)	21.4
Business investment (% of GDP)	15.4 (15.2)	14.7 (14.1)	12.9 (12.3)	12.6 (12.0)	12.2
Gross national saving (% of GDP)[2]	29.2 (29.3)	25.8 (27.3)	24.3 (25.8)	23.7 (25.1)	23.5
Contribution of net trade to GDP growth (percentage points)	-0.8 (-0.8)	-2.2 (-0.8)	-0.2 (0.5)	-1.0 (-0.7)	-0.3

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3). 2. The sum of investment, inventory changes, and the current account balance.

Sources: Statistics Iceland, Central Bank of Iceland.

Table 2 Global economy, external conditions, and exports[1]

	2016	*2017*	*2018*	*2019*	*2020*
Marine production for export	-2.0 (-2.0)	-0.9 (3.0)	2.0 (1.0)	1.7 (2.0)	2.0
Aluminium production for export[2]	-3.3 (-3.3)	6.5 (6.0)	1.1 (1.0)	1.4 (1.5)	1.5
Foreign currency prices of marine products	0.2 (0.2)	0.0 (2.5)	1.5 (1.0)	1.2 (1.0)	1.0
Aluminium prices in USD[3]	-13.7 (-13.7)	18.9 (16.0)	5.7 (2.0)	-0.3 (-1.0)	1.7
Fuel prices in USD[4]	-15.7 (-15.7)	19.0 (16.0)	3.3 (4.0)	3.1 (5.0)	1.7
Terms of trade for goods and services	2.4 (2.4)	0.9 (2.2)	0.3 (0.0)	0.0 (-0.5)	-0.1
Inflation in main trading partners[5]	1.0 (1.0)	1.7 (1.7)	1.7 (1.8)	1.9 (1.9)	1.9
GDP growth in main trading partners[5]	1.7 (1.7)	2.2 (2.1)	2.0 (2.0)	2.0 (2.0)	1.9
Main trading partners' imports[5]	2.5 (2.5)	4.1 (4.1)	4.0 (3.9)	3.8 (3.6)	3.8
Policy rates in main trading partners (%)[6]	0.1 (0.1)	0.2 (0.2)	0.4 (0.4)	0.5 (0.6)	0.7

1. Year-on-year changes (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3). 2. According to Statistics Iceland's external trade data. 3. Forecast based on aluminium futures and analysts' forecasts. 4. Forecast based on fuel futures and analysts' forecasts. 5. Forecast based on Consensus Forecasts, Global Insight, IMF and OECD. 6. Forecast based on main trading partners' forward policy rates.

Sources: Bloomberg, Consensus Forecasts, Global Insight, IMF, New York Mercantile Exchange, OECD, Statistics Iceland, Thomson Reuters, Central Bank of Iceland.

Table 3 Current account balance and its subcomponents[1]

	2016	*2017*	*2018*	*2019*	*2020*
Trade balance	6.3 (6.6)	4.2 (6.1)	4.0 (6.2)	2.9 (5.2)	2.4
Balance on primary income[2]	1.4 (1.4)	-0.2 (-0.4)	-0.5 (-0.5)	-0.4 (-0.5)	-0.3
Current account balance	7.8 (7.9)	4.0 (5.8)	3.5 (5.8)	2.5 (4.7)	2.1

1. % of GDP (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3). 2. Calculated according to IMF standards. The sum of primary and secondary income.

Sources: Statistics Iceland, Central Bank of Iceland.

Table 4 Public sector finances[1]

	2016	2017	2018	2019	2020
Overall Treasury balance	12.3 (17.2)	0.9 (0.9)	1.4 (1.0)	1.3 (0.8)	1.2
Primary Treasury balance	15.1 (20.3)	3.3 (3.3)	3.9 (3.4)	3.6 (3.0)	3.2
Primary Treasury balance excluding one-off items[2]	3.5 (3.3)	1.7 (2.5)	2.9 (3.1)	2.9 (2.8)	2.8
Overall general government balance	12.7 (17.2)	1.1 (1.2)	1.6 (1.3)	1.5 (1.1)	1.4
Primary general government balance	15.6 (20.4)	3.8 (3.9)	4.6 (3.9)	4.3 (3.6)	3.8
Total general government debt	53 (54)	45 (45)	39 (42)	37 (39)	37
Net general government debt[3]	41 (42)	35 (35)	29 (32)	28 (30)	27

1. % of GDP on an accrual basis (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/2). 2. One-off items are stability contributions, dividends, special payment to LSR-A division and accelerated write-down of indexed mortgage loans. 3. Net debt is defined here as total liabilities excluding pension obligations and accounts payable and net of cash and bank deposits.

Sources: Ministry of Finance and Economic Affairs, Statistics Iceland, Central Bank of Iceland.

Table 5 Labour market and factor utilisation[1]

	2016	2017	2018	2019	2020
Unemployment (% of labour force)	3.0 (3.0)	2.6 (2.7)	2.7 (3.0)	3.0 (3.5)	3.3
Employment rate (% of population aged 16-74)	81.1 (81.1)	80.6 (81.4)	80.2 (81.0)	79.9 (80.6)	79.4
Total hours worked	3.0 (3.0)	1.1 (3.6)	1.9 (1.9)	1.7 (1.4)	1.4
Labour productivity[2]	4.3 (4.1)	2.5 (1.6)	1.5 (1.4)	0.8 (1.1)	1.1
Unit labour costs[3]	4.6 (4.9)	3.9 (5.5)	4.7 (4.7)	5.3 (5.1)	3.1
Wage share (% of gross factor income)	60.7 (62.4)	63.5 (65.8)	65.5 (67.4)	67.4 (69.1)	67.7
Real disposable income	9.2 (7.3)	7.6 (11.7)	6.3 (5.3)	5.6 (4.6)	2.2
Output gap (% of potential output)	3.3 (2.9)	1.8 (2.8)	1.5 (1.5)	1.0 (0.8)	0.2

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3). 2. GDP per total hours worked. 3. Wage costs divided by productivity.

Sources: Statistics Iceland, Central Bank of Iceland.

Table 6 Exchange rate and inflation[1]

	2016	2017	2018	2019	2020
Trade-weighted exchange rate index[2]	179.9 (179.9)	160.1 (159.4)	155.6 (154.1)	150.8 (151.9)	149.8
Real exchange rate (relative consumer prices)[3]	89.2 (89.2)	100.0 (100.4)	103.6 (104.7)	107.4 (107.1)	109.0
Real exchange rate (relative unit labour costs)[3]	85.4 (87.1)	98.2 (102.1)	104.1 (109.0)	110.8 (113.7)	112.2
Inflation (consumer price index, CPI)	1.7 (1.7)	1.8 (1.8)	2.5 (2.6)	2.3 (2.8)	2.8
Inflation (CPI excluding effects of indirect taxes)	1.7 (1.7)	1.5 (1.6)	2.3 (2.5)	2.8 (3.3)	2.8

1. Year-on-year (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3). 2. Narrow trade-weighted basket (index, 31 December 1991 = 100). The index has been recalculated so that on 2 January 2009 it was assigned a value equivalent to that of the now-discontinued Exchange Rate Index. 3. Average 2005 = 100.

Sources: Statistics Iceland, Central Bank of Iceland.

Table 7 Quarterly inflation forecast (%)[1]

Quarter	*Inflation (year-on-year change)*	*Inflation excluding effects of indirect taxes (year-on-year change)*	*Inflation (annualised quarter-on-quarter change)*
		Measured value	
2016:4	1.9 (1.9)	1.9 (1.9)	1.9 (1.9)
2017:1	1.8 (1.8)	1.6 (1.6)	0.0 (0.0)
2017:2	1.7 (1.7)	1.5 (1.5)	3.7 (3.7)
2017:3	1.7 (1.8)	1.4 (1.5)	1.0 (1.6)
		Forecasted value	
2017:4	1.9 (2.0)	1.7 (1.8)	3.0 (2.7)
2018:1	2.0 (2.0)	1.9 (1.9)	0.4 (-0.1)
2018:2	2.4 (2.4)	2.2 (2.3)	5.1 (5.5)
2018:3	2.7 (2.8)	2.5 (2.7)	2.3 (3.1)
2018:4	2.9 (3.2)	2.7 (3.0)	3.7 (4.2)
2019:1	2.4 (2.8)	2.9 (3.3)	-1.3 (-1.3)
2019:2	2.4 (2.9)	2.9 (3.4)	5.0 (5.9)
2019:3	2.2 (2.9)	2.7 (3.4)	1.5 (2.9)
2019:4	2.2 (2.7)	2.7 (3.2)	3.8 (3.4)
2020:1	2.8 (3.1)	2.8 (3.1)	1.1 (0.1)
2020:2	2.9 (3.0)	2.9 (3.0)	5.4 (5.6)
2020:3	2.8 (2.9)	2.8 (2.9)	1.0 (2.3)
2020:4	2.7	2.7	3.3

1. Figures in parentheses are from the forecast in *Monetary Bulletin* 2017/3.

Sources: Statistics Iceland, Central Bank of Iceland.