MONETARY BULLETIN

2015•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 4 November 2015

The Monetary Policy Committee (MPC) of the Central Bank of Iceland has decided to raise the Bank's interest rates by 0.25 percentage points. The Bank's key interest rate – the rate on seven-day term deposits – will therefore be 5.75%.

GDP is projected to grow at 4.6% this year, about ½ a percentage point more than the Bank forecast in August, and the medium-term GDP growth outlook has improved as well. GDP growth is driven mainly by domestic demand, which is projected to increase by more than 7% this year.

Inflation has been somewhat lower recently than was forecast in August and is still below the target, especially if the housing component of the CPI is excluded. This is due mainly to a continued decline in global oil and commodity prices and the appreciation of the króna, which has offset increased domestic inflationary pressures.

As a result, the short-term inflation outlook is considerably better than the Bank projected in August, although the longer-term outlook is broadly unchanged. It is still expected that large pay increases will cause inflation to rise above the target as 2016 progresses and the effects of low global inflation taper off. Inflation will not return to target until 2018. The forecast is based on the assumption that the monetary stance will be tightened as the positive output gap widens and inflation rises. It also takes account of the fact that the fiscal budget proposal for 2016 entails some fiscal easing after adjusting for the business cycle.

A stronger króna and more favourable global price developments have provided the scope to raise interest rates more slowly than was previously considered necessary. However, this does not change the need for a tighter monetary stance in the coming term, in view of growing domestic inflationary pressures. How much and how quickly the monetary stance must be tightened will depend on future developments and on how the current economic uncertainty plays out. There is, among other things, considerable uncertainty at present about the transmission of monetary policy as the effects of unusually low global interest rates have been felt increasingly in Iceland. Monetary policy formulation will also depend on developments in liquidity in connection with capital account liberalisation and whether other policy instruments are applied in order to contain demand-side pressures in the coming term.

Growing risk of overheating in the domestic economy

The global economic outlook has deteriorated once again, and uncertainty has mounted since the forecast in the August Monetary Bulletin. *The outlook for exports is broadly unchanged, however, owing to offsetting effects from the prospect of continued strong growth in services exports and diminishing growth in other exports. Revised figures from Statistics Iceland imply strong GDP growth in H1/2015 and 5.6% year-on-year growth in Q2, the highest single-quarter growth rate since the beginning of 2008. GDP growth for 2015 as a whole is projected at 4.6%, almost ½ a percentage point more than was forecast in August. As in the Bank's previous forecasts, GDP growth is assumed to ease in 2016, although the outlook for the forecast horizon as a whole has improved. GDP growth in 2015 and ever since the economic recovery began in mid-2010 has been reflected to a significant degree in strong job creation, with unemployment declining sharply in spite of a sizeable increase in labour participation. Productivity has therefore been virtually flat in the past five years and productivity growth will, according to the forecast, remain below both its historical average and the level seen in previous recoveries. Inflation was somewhat lower in Q3 than had been forecast in August, and because of a stronger initial position, a higher exchange rate, and lower commodity and oil prices, the near-term inflation outlook improves from the previous forecast. On the other hand, there is the prospect of greater domestic inflationary pressures, as can be seen in a more pronounced positive output gap and larger rises in unit labour costs. The inflation outlook for the latter half of the forecast horizon is therefore considered broadly unchanged since August, although uncertainty has risen.*

I Economic outlook and key uncertainties

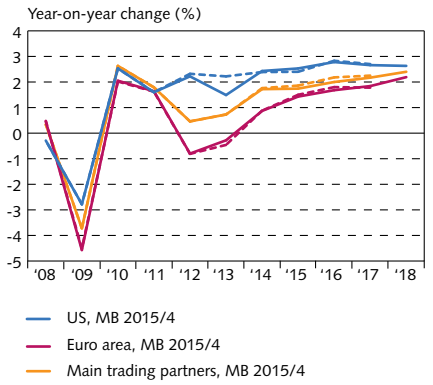
Central Bank baseline forecast[1]

Global economic outlook deteriorates again …

The International Monetary Fund's (IMF) most recent forecast provides for 3.1% global output growth this year, or 0.3 percentage points less than in 2014 and 0.2 percentage points below the Fund's summer forecast. The outlook has worsened for both developed and emerging countries – especially the latter – and if the forecast materialises, this will be the fifth consecutive year to see a year-on-year decline in emerging countries' GDP growth. The outlook has worsened in particular for commodity- and oil-exporting countries, which have lost revenues because of declining oil and commodity prices, and for countries with substantial US dollar-denominated debt, which have suffered from the appreciation of the dollar.

GDP growth among Iceland's main trading partners measured 1.9% in the first half of the year, slightly more than was forecast in the August *Monetary Bulletin*. The outlook for the year as a whole is slightly weaker than was forecast in August, however (Chart I-1). Trading partners' GDP growth is expected to be broadly unchanged year-on-year, at 1.7%, rising to 2% in 2016 and averaging 2¼% in 2017-2018. The GDP growth outlook for the forecast horizon as a whole has therefore deteriorated since August, and uncertainty about the global economy has increased again. Further discussion of the global economy can be found in Chapter II, and uncertainties in the global outlook are discussed later in this chapter.

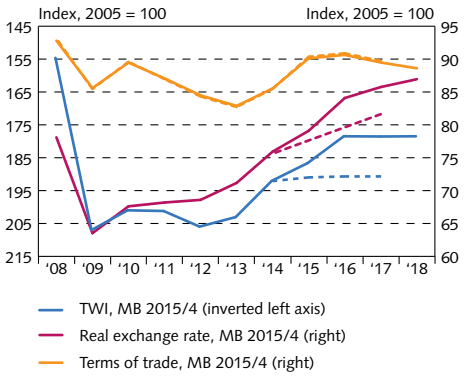
Chart I-1
Global output growth 2008-2018[1]



1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Macrobond, OECD, Statistics Iceland, Central Bank of Iceland.

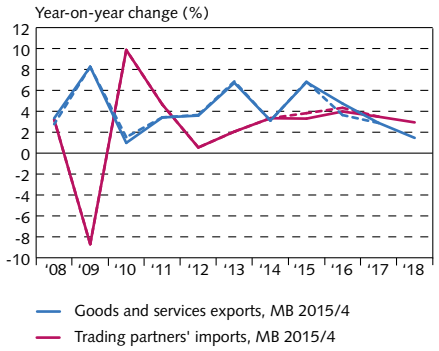
1. The analysis presented in this *Monetary Bulletin* is based on data available in early November.

Chart I-2
Exchange rate and terms of trade 2008-2018[1]



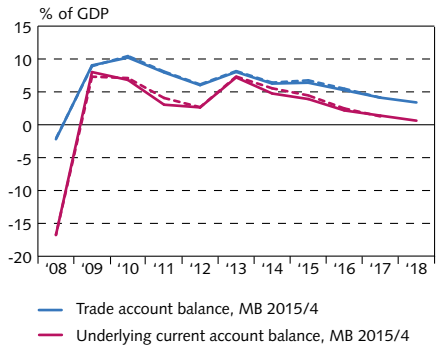
1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-3
Exports of goods and services 2008-2018[1]



1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Macrobond, Statistics Iceland, Central Bank of Iceland.

Chart I-4
Current account balance 2008-2018[1]



1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Statistics Iceland, Central Bank of Iceland.

… with export growth likely to weaken in coming years

In spite of significant foreign currency purchases by the Central Bank, the exchange rate of the króna has risen by almost 4½% in trade-weighted terms since the August *Monetary Bulletin*. As in the Bank's previous forecasts, it is assumed that the trade-weighted index (TWI) will remain broadly unchanged for the remainder of the forecast horizon; therefore, the current forecast is based on a higher exchange rate than the August forecast (Chart I-2). The real exchange rate has also risen with the nominal appreciation of the króna and increases in domestic costs in excess of the trading partner average. According to the forecast, the real exchange rate will continue to rise throughout the forecast horizon and will be some 3% above its thirty-year average by 2018; however, it will still be nearly 18% below its pre-crisis high.

Terms of trade improved by about 10½% year-on-year in the first half of 2015, following a 3% improvement in 2014. This strong improvement is due primarily to the decline in global oil and commodity prices and the rise in marine product prices. The recovery is projected to slow down in the second half, and terms of trade are expected to improve by just over 5% this year, about ½ a percentage point less than was forecast in August. The outlook for coming years is unchanged since August, however, although uncertainty has grown in tandem with increased uncertainty globally.

Services exports grew considerably more in H1 than was assumed in the August forecast, owing mainly to the burgeoning tourism sector and to substantial and unforeseen one-off revenues from patent applications. Although these one-time revenues probably do not reflect developments over the year as a whole, the outlook for 2015 is nonetheless for strong growth in services exports. Offsetting this, however, are weaker marine product exports, owing to reduced mackerel catches, the Russian import ban, and weak sales to Nigeria. Growth in goods and services exports is therefore estimated at 6.8% this year, as in the August forecast (Chart I-3). According to the forecast, export growth will slow down somewhat over the next three years, in line with the rising real exchange rate (see the discussion of the effects of exchange rate movements on external trade in Box 2). Goods exports are expected to be weaker next year than was projected in August, as the rise in the real exchange rate is larger and trading partner demand weaker than was forecast then. This is offset by the improved outlook for tourism, however.

As in the Bank's previous forecasts, it is assumed that the trade surplus will diminish somewhat in coming years, mainly due to strong imports, although this will be offset by the improvement in terms of trade that began last year and looks set to continue into 2016. The surplus on goods and services trade is forecast to shrink from 6½% of GDP in 2015 to about 3½% by 2018 (Chart I-4). The underlying current account surplus will narrow accordingly, from 4% of GDP this year to ½% by 2018. Further discussion of the real exchange rate and terms of trade can be found in Chapter II, and the external balance is discussed in Chapter IV.

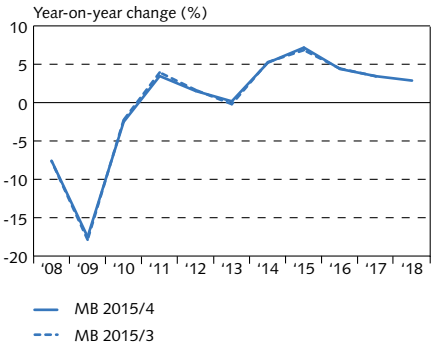
Strong domestic demand growth in 2014 and even more expected this year

According to preliminary figures from Statistics Iceland, private consumption grew by about 4.4% year-on-year in the first half of 2015, owing to a number of factors: a significant rise in real disposable income stemming from large wage increases, increased employment, and relatively low inflation, and improvements in household equity stemming from rising asset prices and reduced debt. The outlook is for this to continue and to be augmented by proposed tax cuts, which will stimulate household demand still further. Private consumption is projected to grow by 4.6% this year, somewhat more than was forecast in August, and by about 4% per year over the next three years. Although this is a significant growth rate, it is well below growth in real disposable income; therefore, household saving is forecast to increase over the forecast horizon.

Investment also grew markedly in the first half of the year. Total investment was up 21% year-on-year, including a 38% rise in business investment. These figures are affected somewhat by strong investment in ships and aircraft, but even if these items are excluded, there is a considerable amount of investment activity, and the Bank's recent investment survey indicates that it is likely to continue. Total investment is projected to grow by nearly 21% this year and another 11½% in 2016, and the investment-to-GDP ratio is expected to rise from last year's 16.7% to nearly 20% by 2018.

On the whole, domestic demand is forecast to grow by 7.2% this year, after a growth rate of 5% in 2014 (Chart I-5). As was forecast in August, the pace of growth will ease somewhat in coming years but will remain robust. Further discussion of private and public sector demand can be found in Chapter IV.

Chart I-5
Domestic demand 2008-2018[1]



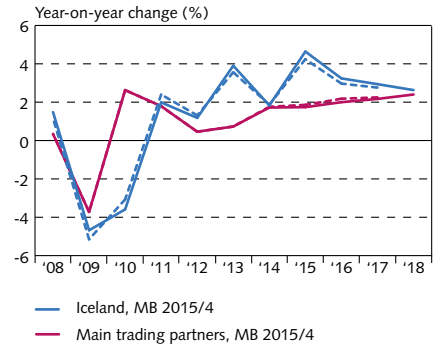
1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

GDP growth robust in 2015 but projected to taper off gradually

According to preliminary figures from Statistics Iceland, GDP growth measured 5.6% in Q2, the strongest single-quarter measurement since the beginning of 2008. Statistics Iceland also revised previously published figures and now estimates Q1 GDP growth at 4.8% instead of the previous 2.9%. H1 GDP growth is now estimated at 5.2%, well above the 3% projected in the Bank's August forecast. Statistics Iceland's current assessment is much closer to the Bank's May forecast of 4.8%, which was prepared before the first preliminary figures for Q1 were available. Although strong GDP growth in the first half reflects in part the above-mentioned one-off effects from services exports, the outlook for the year as a whole has been revised upwards since the August forecast, with 2015 GDP growth now forecast at 4.6%. This is 0.4 percentage points above the August forecast but in line with the forecast from May. The improved outlook reflects both strong growth in domestic demand and a slightly more positive contribution from net trade.

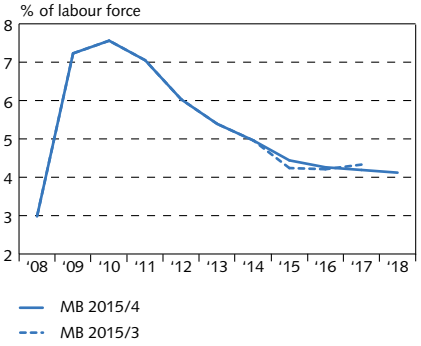
As in the August forecast, GDP growth is assumed to ease in coming years, although it is still expected to remain above its long-term average for the majority of the forecast horizon. It is projected at 3.2% in 2016, 3% in 2017, and 2½% in 2018. To some extent,

Chart I-6
GDP growth in Iceland and trading partners 2008-2018[1]



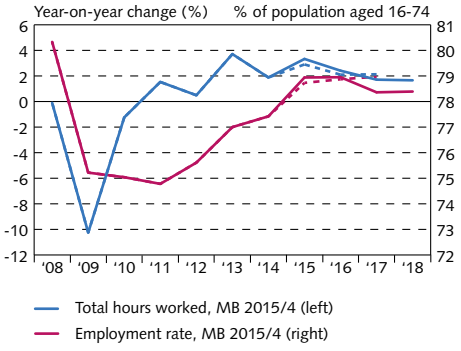
1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Macrobond, Statistics Iceland, Central Bank of Iceland.

Chart I-7
Unemployment 2008-2018[1]



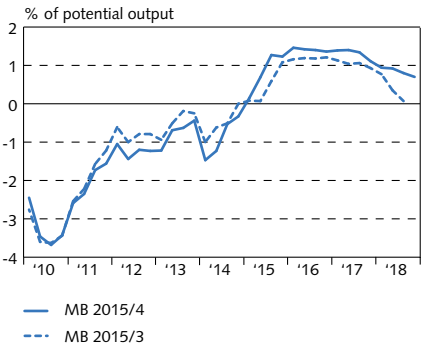
1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-8
Total hours worked and employment rate 2008-2018[1]



1. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-9
Output gap[1]
Q1/2010 - Q4/2018



1. Central Bank baseline forecast Q3/2015-Q4/2018.
Source: Central Bank of Iceland.

this year's strong output growth reflects the unusually rapid rise in tourism, but it also bears witness to the temporary stimulative impact of large wage increases and Government policy actions, such as household debt relief measures, which fuel private consumption. As the forecast horizon progresses, the effects of these will taper off, and dwindling export growth and sluggish productivity growth will weigh more heavily. Further discussion of developments in GDP growth can be found in Chapter IV.

Job creation continues, but low productivity growth gives cause for concern

Seasonally adjusted unemployment measured 4% in Q3/2015, having declined by ½ a percentage point year-on-year and more than 4 percentage points from its post-crisis high. Declining unemployment is due to job creation; however, the participation rate has also risen markedly. The seasonally adjusted labour participation rate is now 3 percentage points above the post-crisis trough from Q4/2011 and is closing in on its peak from early 2007. The employment rate has risen as well and was up 1½ percentage points year-on-year in Q3. Other indicators from the labour market point in the same direction.

As in the Bank's previous forecasts, the recovery of the labour market is projected to continue, with declining unemployment and an increase in the number of jobs and total hours worked. The recovery is forecast to be somewhat weaker than was assumed in August, however, due to the expectation of larger rises in unit labour costs. Unemployment will fall from its 4.4% average for this year to about 4% in 2018 (Chart I-7), and total hours worked will increase, on average, by just over 2% per year (Chart I-8). The employment rate will therefore taper off slightly from the current high.

Productivity has been virtually flat for five years in a row but is expected to pick up a bit this year, growing about 1¼%, as in the August forecast (see Chart I-10 below). Productivity is expected to grow by approximately 1% per year over the forecast horizon, broadly in line with the average of the past ten years but somewhat below both the long-term average and the growth rate seen in previous recoveries. Further discussion of the labour market can be found in Chapter IV.

Outlook for a wider positive output gap than previously forecast

In line with Statistics Iceland's revision of historical GDP growth figures, the slack in the economy between 2011 and 2014 is now considered to have been just under ½ a percentage point per year larger than previous figures indicated. As in August, however, the spare capacity is considered to have disappeared early this year, and owing to stronger GDP growth both in 2015 and over the forecast horizon as a whole, the outlook is for a somewhat wider positive output gap than was previously projected. It is forecast to peak at 1½% of potential output early in 2016 and to remain at about that level until mid-2017 before narrowing once again (Chart I-9). According to the forecast, a slight positive gap will nonetheless remain at the end of the forecast horizon, owing to robust economic activity during the period.

As always, the assessment of the output gap is highly uncertain. A discussion of the main uncertainties in the assessment is below, and a discussion of factor utilisation can be found in Chapter IV.

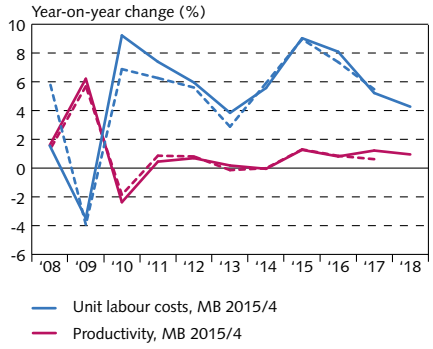
Inflation outlook improved for the near term but unchanged further ahead

Inflation measured 1.8% in October and only 0.3% excluding the housing component of the CPI. By that measure and according to various measures of underlying inflation, it has risen slightly since the beginning of the year. The same is true of most measures of inflation expectations, although it is unusually difficult to interpret developments in measures of inflation expectations in the bond market because of capital inflows that have suppressed the long end of the yield curve (see Chapter III and Box 1).

Inflation averaged 2% in the third quarter of the year, 0.4 percentage points below the forecast in the August *Monetary Bulletin*. The deviation is due primarily to a stronger króna and steeper declines in global oil and commodity prices than in the August forecast. Furthermore, the inflationary effects of the recent wage settlements appear to be more modest than was assumed then, probably due in part to the appreciation of the króna and the improvement in terms of trade in recent months. It is still too early to determine the ultimate effect of the large pay increases provided for in the wage settlements, however, and it is likely that the arbitration panel ruling in August will entail larger pay hikes during the forecast horizon than was assumed in the August forecast. Although offset by somewhat more rapid productivity growth in the latter half of the forecast horizon, unit labour costs are still projected to rise steeply, or by 9% this year and 8% in 2016. If the forecast materialises, the increase in 2015 and the ensuing three years will average 6.7% per year, far in excess of the level compatible with medium-term price stability (Chart I-10).

The near-term inflation forecast has improved markedly from the August forecast, although significant and growing domestic inflationary pressures remain and could take hold once the effects of a stronger króna and lower import prices begin to taper off. In Q4/2015, inflation is projected to be at 2.3%, 1½ percentage points less than was forecast in August (Chart I-11). According to the forecast, it will continue to inch upwards, albeit somewhat more slowly than was forecast in August. As was projected then, it is expected to be at or above 4% from the end of 2016 into H2/2017 and then begin to taper off again. In comparison with the August forecast, inflation will therefore be 1-1½ percentage points lower until the second half of 2016, owing primarily to a better initial position, a stronger króna, and lower oil and commodity prices. Offsetting this is the prospect of stronger domestic inflationary pressures, as is reflected in a wider output gap and larger increases in unit labour costs. The inflation outlook is highly uncertain at present, however. The uncertainties in the inflation forecast are discussed below, and developments in global prices and domestic inflation and inflation expectations are discussed in Chapters II and V.

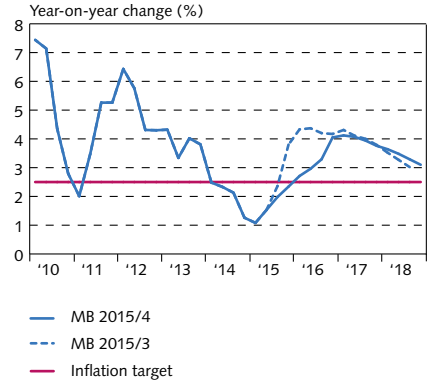
Chart I-10
Unit labour costs and productivity 2008-2018[1]



1. Productivity measured as the ratio of GDP to total hours worked. Central Bank baseline forecast 2015-2018. Broken lines show forecast from MB 2015/3.

Sources: Statistics Iceland, Central Bank of Iceland.

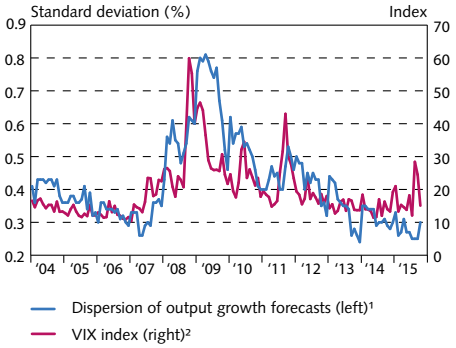
Chart I-11
Inflation[1]
Q1/2010 - Q4/2018



1. Central Bank baseline forecast Q4/2015-Q4/2018.

Sources: Statistics Iceland, Central Bank of Iceland.

Chart I-12
Dispersion of output growth forecasts and implied stock price volatility
January 2004 - October 2015



1. Weighted average of standard deviation in output growth forecasts compiled by Consensus Forecasts for the G7 (weighted with PPP-adjusted GDP). 2. Chicago Board Options Exchange S&P 500 Implied Volatility Index (VIX).

Sources: Consensus Forecasts, Macrobond.

Key uncertainties

The baseline forecast reflects an assessment of the most likely economic developments over the next three years. It is based on forecasts and assumptions concerning developments in the external environment of the Icelandic economy, as well as assessments of the effectiveness of specific markets and on the transmission of monetary policy to the real economy. All of these factors are subject to uncertainty. The following is a discussion of several important uncertainties in the forecast.

Growing uncertainty about the global economy

Uncertainty about the global economy appears to have risen again, primarily concerning the outlook in emerging market economies, including China and oil- and commodity-exporting countries (Chart I-12). The appreciation of the US dollar has tested balance sheets in many such countries, particularly in those where financial imbalances have accumulated in recent years, and has exacerbated the situation resulting from falling oil and commodity prices. By the same token, expectations of a policy rate hike in the US have significantly reduced capital flows to these countries and have increased the risk of a setback in an already fragile economic recovery, particularly if interest rate hikes go hand-in-hand with further appreciation of the dollar. Some geopolitical uncertainty remains, and while it has probably subsided on the whole over the past year, the heavy streams of refugees from the bottom of the Mediterranean have created new points of friction. Further ahead, difficulties in bringing inflation up to target and unfavourable age demographics in many advanced economies could indicate that the global GDP growth outlook is too optimistic. Global GDP growth could also turn out stronger than the baseline forecast indicates if, for instance, the decline in oil and commodity prices affects demand in industrialised countries more than is currently assumed or if the European Central Bank's (ECB) recent stimulative measures prove more effective than has been suggested. As before, with respect to the global economic outlook, the risk in the baseline forecast is tilted to the downside.

Exchange rate developments uncertain

As before, the baseline forecast assumes that the exchange rate of the króna will remain stable throughout the forecast horizon. There is some uncertainty about this, however. The króna could weaken, for example, if terms of trade deteriorate. Strong increases in domestic wage costs following the recent wage settlements will also lead to a rise in the real exchange rate, thereby creating growing downward pressure on the nominal exchange rate, particularly in the longer term.

On the other hand, the exchange rate could rise from the level assumed in the baseline forecast. The recent appreciation of the króna stems in part from more favourable economic developments in Iceland than in neighbouring countries, and the possibility that this will continue cannot be excluded. The króna could also appreciate if there is an increase in inflows of capital in search of better returns or if

Iceland's terms of trade improve more than is assumed in the baseline forecast.

Uncertainty could increase temporarily upon settlement of the failed banks' estates

The settlement of the failed banks' estates lies ahead, in connection with liberalisation of the capital controls. The forecast assumes that settlement will take place through, among other things, the payment of a stability contribution, which could affect domestic balance sheets during the settlement process.[2] The objective is to use market operations so as to prevent settlement from affecting the liquidity supply or the money stock so it would not cause the monetary stance to diverge from the Monetary Policy Committee's (MPC) objectives. The transformations could prove so pronounced, however, that attempts to counteract them will not be entirely successful. There is therefore the risk that settlement will cause a temporary disturbance in liquidity and the monetary stance, which could exacerbate uncertainty for a time, although this risk is less than it would be if the settlement were to take place through the stability tax.

Difficulties in monetary policy transmission

Until recently, changes in Central Bank interest rates have been transmitted more or less smoothly along the yield curve and to the interest rates offered to households and businesses. Now, however, it appears that the transmission of monetary policy to other interest rates has been weakened. Domestic long-term bond interest rates have fallen considerably in the recent term (Chart I-13), and although the effects of this can be seen only to a limited extent in households' and businesses' interest rate terms, it is not unlikely that this drop in long-term rates will gradually spread to the terms offered to households and businesses. As is discussed in Chapter III and Box 1, this reduction in long-term rates is linked to increased capital inflows, which have lowered term premia in the bond market. This development is not unique to Iceland, and there are numerous examples of similar trends elsewhere, even in large economies like the US. This does not change the fact that it makes it more difficult for monetary policy to affect domestic interest rates to the intended degree. Under such conditions, market interest rates and rates offered to borrowers could decline during an attempt at monetary tightening. The monetary policy transmission mechanism therefore shifts from domestic interest rates to the exchange rate, which is unfortunate, as the exchange rate channel of monetary policy is less reliable. In view of this, the MPC has been examining ways to use other policy instruments in addition to interest rates.

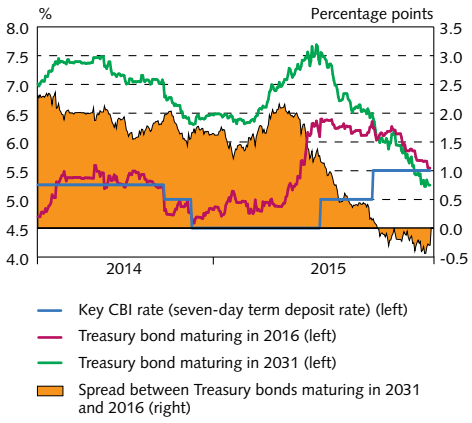
Increased uncertainty about the monetary and fiscal policy mix

According to the baseline forecast, the new fiscal budget proposal represents an easing of fiscal policy of about 1½% of GDP in 2015

Chart I-13

Key Central Bank rate and nominal Treasury bond yields

Daily data 21 May 2014 - 30 October 2015

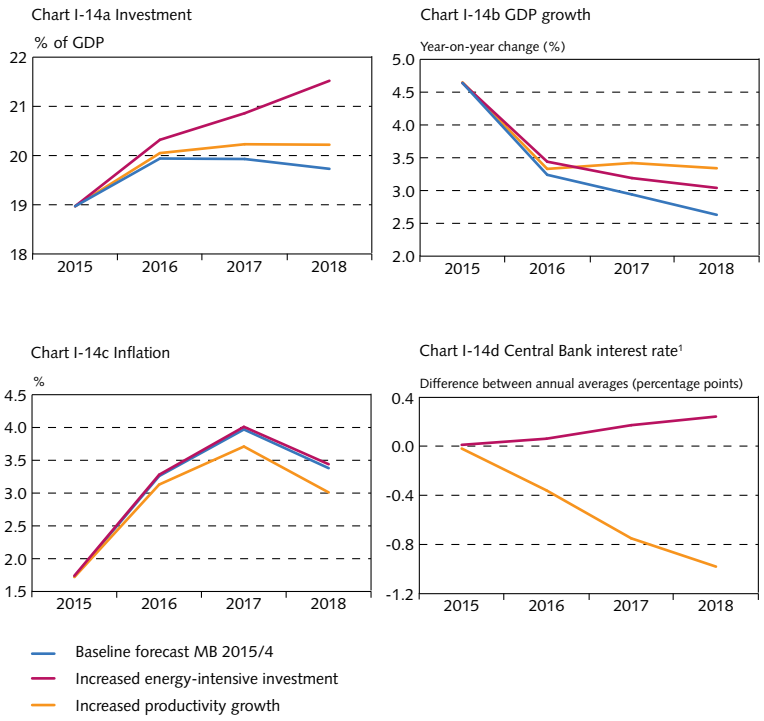


Source: Central Bank of Iceland.

2. See, for instance, Thorvardur Tjörvi Ólafsson (2015), "Economic analysis of capital account liberalisation in Iceland". Central Bank of Iceland *Special Publication* (forthcoming).

and 2016 (see Chapter IV and Box 3). This easing not only calls for a tighter monetary stance but also increases the risk of negative side effects of a suboptimal policy mix. The budget proposal and the medium-term fiscal plan are based on expenditure assumptions that in some cases appear fragile; for instance, as regards public employees' pay increases and estimated expenditures for operations and infrastructure investments. Therefore, there is the risk that the operating surplus will be smaller than is assumed unless further consolidation is achieved elsewhere. On the other hand, the revenue assumptions could underestimate cyclical revenues in view of increased strength in the economy. If this materialises, it is important to avoid relinquishing these revenues with further tax cuts unless countervailing measures on the expenditures side are imposed to offset them. This applies in particular to potential revenues reverting to the authorities upon the settlement of the failed banks' estates. It is vital that those revenues not be allocated so as to exacerbate the expansion of the economy, either through increased spending or through tax cuts. Such a scenario would require an even tighter monetary stance and create an even less optimal monetary and fiscal policy mix.

Chart I-14
Alternative scenarios



1. Deviation from baseline forecast.
Source: Central Bank of Iceland.

Energy-intensive investment could prove stronger than in the baseline forecast

According to the baseline forecast, investment in the energy-intensive sector will increase markedly in coming years, in part due to the construction of three silicon plants. There are also plans to build a fourth silicon plant of roughly the same size as the other three combined. If

these plans come to fruition, investment in the energy-intensive sector could prove to be even stronger during the forecast horizon than is assumed in the baseline forecast. Chart I-14 shows the potential impact of building the fourth silicon plant, with construction estimated to begin in mid-2016 and production to start in 2019. As the chart shows, investment would grow somewhat more strongly than in the baseline forecast, and the investment-to-GDP ratio could turn out nearly 2 percentage points higher by 2018 than is assumed in the baseline scenario. GDP growth could be ¼ of a percentage point stronger in the next two years and almost ½ a percentage point more in 2018. Increased economic activity fuels domestic inflationary pressures, but this is offset by the appreciation of the króna, partly because of increased inflows of foreign capital in connection with the project but also because domestic interest rates will be higher than they would otherwise, and Central Bank rates will be about ¼ of a percentage point higher in 2018.

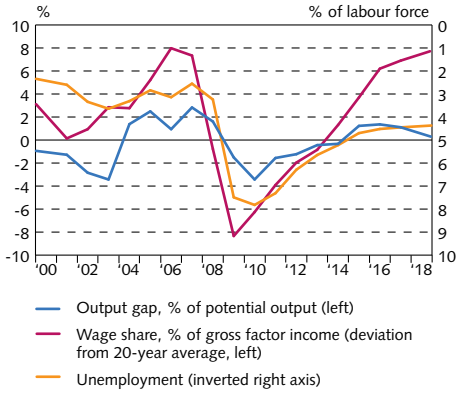
Increased productivity growth could offset large wage rises

According to figures from Statistics Iceland, labour productivity has been broadly unchanged for the past five years and has grown by less than 1% per year, on average, since the financial crisis struck in autumn 2008. This is considerably below productivity growth in previous recoveries and far below the thirty-year average. According to the baseline forecast, productivity growth will remain around 1% per year throughout the forecast horizon. Such weak productivity growth over such a long period of time is cause for concern, although similar developments can be seen among most other developed countries (the possible reasons for this are discussed in Chapter IV of *Monetary Bulletin* 2015/2), as productivity growth is one of the fundamentals that determine an economy's long-term potential output and one of the most important determinants of how rapidly an economy can grow without increased inflationary pressures. If productivity growth returns to its historical average beginning in 2016, potential output will increase accordingly and inflationary pressures will be reduced. Interest rates could therefore be lower than would otherwise be required, further supporting domestic demand and GDP growth. As can be seen in Chart I-14, the ratio of investment to GDP will be as much as 1 percentage point higher in 2018 than in the baseline forecast, and GDP growth will be just over ½ a percentage point more per year from 2017 onwards. Inflation will also be about ½ a percentage point less than in the baseline forecast, and Central Bank interest rates will be about 1 percentage point lower by 2018.

The impact of wage negotiations on demand and inflation possibly underestimated

The recently concluded private sector wage agreements have dramatically increased domestic inflationary pressures. Following the arbitration panel ruling on pay rises for university-educated public employees, labour market unrest has escalated yet again, and it is likely that the ruling will lead to even larger pay rises early next year, owing to the review clauses in the private sector contracts. The baseline

Chart I-15
Output gap, unemployment, and wage share 2000-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

forecast takes account of these factors, but there is still considerable uncertainty about the ultimate effect of the original wage agreements and the turmoil caused by the arbitration panel ruling (see also Box 4). Inflation has certainly risen more slowly than the Bank had previously assumed, both in its analysis last spring of the impact of wage settlements (see Chapter I in *Monetary Bulletin* 2015/2) and in its August forecast. But only a short time has passed, and as yet there are no clear signs that firms are absorbing the cost increases with additional streamlining, at least not if recent developments in employment and recruitment plans are reliable indicators. At all events, the rapid rise in the wage share indicates the risk that the baseline forecast represents an underestimation of the economic imbalances that could result from these wage settlements and that demand growth will turn out even stronger and economic imbalances will develop more rapidly than in the baseline scenario (Chart I-15).

Therefore, the uncertainties discussed in Chapter I of *Monetary Bulletin* 2015/2 still apply. Fiscal targets could be jeopardised, for instance, which could increase risk premia on domestic financial assets, raising domestic borrowers' financing costs and possibly undermining the capital account liberalisation strategy. This uncertainty and the poorer competitive position that accompanies steep rises in domestic costs (see Box 2) could also put additional pressure on the exchange rate of the króna, which increases the risk that the impact of wage rises on inflation is underestimated in the baseline forecast.

Increased uncertainty about the inflation outlook, with risk concentrated on the upside

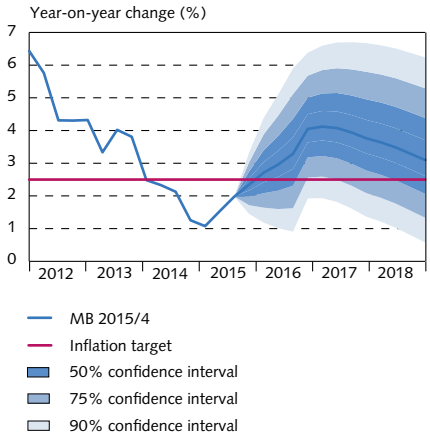
The uncertainties described above show clearly that the inflation outlook for the next three years could easily deviate from the scenario presented in the baseline forecast. Inflationary pressures could be underestimated, which (other things being equal) would call for higher interest rates than are implied in the baseline forecast in order to keep inflation at target if, for instance, firms pass the cost increases from the recent wage settlements through to price levels to a greater extent than is assumed in the baseline scenario or if the impact on private consumption of the strong temporary rise in real disposable income is underestimated.[3] Inflation could also prove more persistent than is forecast if these hefty pay increases de-anchor inflation expectations still further. The same applies if the króna proves weaker over the forecast horizon than is assumed in the baseline forecast or if the tension in the economy is more pronounced; for instance, if activity in the energy-intensive sector is greater than forecast, or if there is more slack in fiscal policy. The recent weakening of the monetary policy transmission mechanism could also make it more difficult for monetary policy to contain domestic demand, which could lead to higher inflation than is forecast, other things being equal. On the other hand, inflation could prove lower than is forecast if the global economic outlook worsens or global oil and commodity prices fall still

3. The baseline forecast is based on the assumption that monetary policy will be applied so as to ensure that inflation remains close to target throughout the business cycle.

further. The króna could also turn out stronger than is assumed in the baseline forecast, and firms could respond to the steep rise in wage costs by cutting their own profit margins or with increased streamlining. Productivity growth could also prove stronger than in the baseline forecast, which would counteract to a greater degree the inflationary pressures from the labour market.

Chart I-16 illustrates the above-mentioned uncertainties in the inflation forecast by showing the inflation outlook according to the baseline forecast together with the confidence intervals for the forecast; i.e., the range in which there is considered to be a 50%-90% probability that inflation will lie over the next three years (the methodology is described in Appendix 3 in *Monetary Bulletin* 2005/1). Uncertainty about the inflation outlook is considered to have grown since August, in part due to increased tension in the labour market and greater uncertainty about the global economy. As in August, the risk to the inflation forecast is tilted to the upside throughout the forecast horizon. There is a roughly 50% probability that inflation will be in the 3¼-5% range in one year and in the 2-4½% range by the end of the forecast horizon.

Chart I-16
Inflation forecast and confidence intervals
Q1/2012 - Q4/2018



Sources: Statistics Iceland, Central Bank of Iceland.

II The global economy and terms of trade

The global economic outlook is facing headwinds. The recovery has lost momentum so far this year, the financial markets were beset by considerable unrest in late summer, and the turmoil has made its mark on terms of trade and currency exchange rates. The outlook for GDP growth and demand among Iceland's main trading partners has deteriorated and uncertainty has mounted, after trading partners' economic recovery had gradually gained momentum from 2013 through mid-2015. On the whole, the global inflation outlook is virtually unchanged from the forecast in the August *Monetary Bulletin*. The outlook for Iceland's terms of trade is slightly poorer and more ambiguous than in August. The real exchange rate has risen sharply and appears set to continue doing so, with the associated erosion of Iceland's competitive position.

Global economy

Trading partners' GDP growth has gradually firmed up in the past two years …

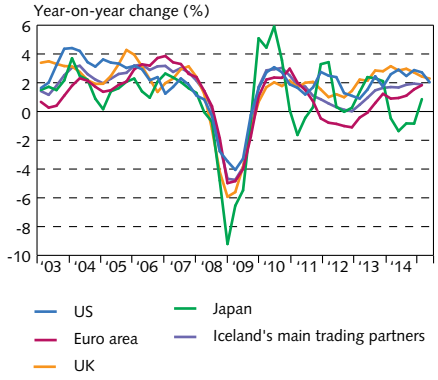
GDP growth in Iceland's trading partner countries measured 1.9% in H1/2015, slightly exceeding the Bank's August forecast. Trading partners' GDP growth has gained ground over the past two years, since the end of the contraction in the euro area. As before, the economic recovery has proven sturdier in the US and the UK than in the eurozone, although it has gradually firmed up there as well (Chart II-1). The recovery is uneven in the Nordic region: the long-standing contraction in Finland has yet to come to an end and the outlook for Norway has deteriorated in the wake of the plunge in oil prices, while Denmark and Sweden have seen gradually increasing GDP growth.

… but indicators imply that the recovery has begun to weaken

On the whole, economic indicators for the euro area have turned out better than market agents had expected (Chart II-2). They suggest a continued slow recovery resulting partly from measures taken by the European Central Bank (ECB), declining oil prices, the depreciation of the euro, and increased success in battling Greece's debt problems. Domestic demand has rallied somewhat in the euro area, with increased purchasing power and improving financial conditions, but exports have been somewhat weaker than anticipated. Leading indicators imply that GDP growth continues but at a slower pace, in line with the weaker global economic outlook (Chart II-3).

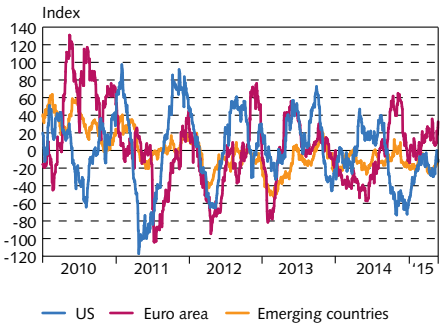
Economic indicators for the US have been weaker than expected since the time of the last *Monetary Bulletin*. After the recovery stalled due to temporary factors in the first quarter, it resumed in Q2, even though the appreciation of the dollar cut into the contribution from net trade. In the recent term, however, job creation and the decline in unemployment have slowed down, and investment in energy-related projects has contracted in the wake of the steep drop in energy prices. Nevertheless, the recovery in the US is projected to outpace that in most other major industrialised countries, and the US Federal Reserve

Chart II-1
Global GDP growth
Q1/2003 - Q3/2015



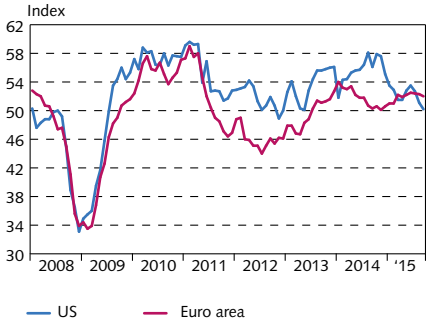
Sources: Macrobond, Central Bank of Iceland.

Chart II-2
Economic surprise index[1]
Daily data 4 January 2010 - 30 October 2015



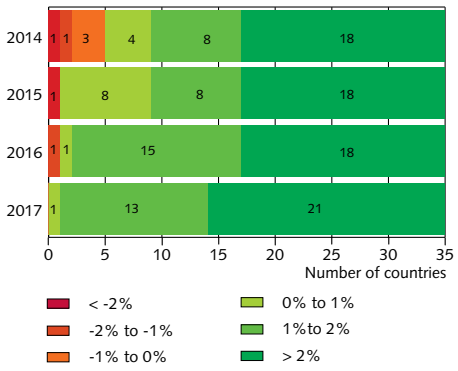
1. When the index is lower than 0, the indicators are more negative than expected; when the index is higher than 0, the indicators are more positive than expected. The index does not imply that the indicators are positive or negative.
Source: Macrobond.

Chart II-3
Leading indicators of GDP growth[1]
January 2008 - September 2015



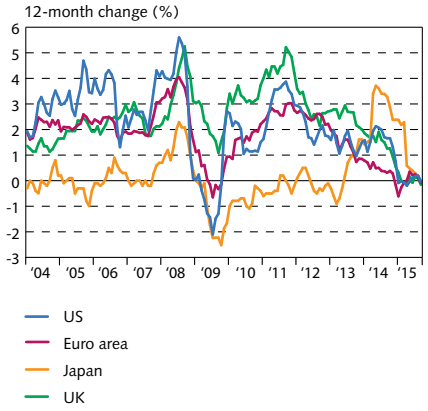
1. In the US and the euro area, the seasonally adjusted Manufacturing Purchasing Managers' Index (PMI) is published monthly. An index value above 50 indicates month-on-month growth, and a value below 50 indicates a contraction.
Sources: Bloomberg, Macrobond.

Chart II-4
Distribution of GDP growth among 35 industrialised countries



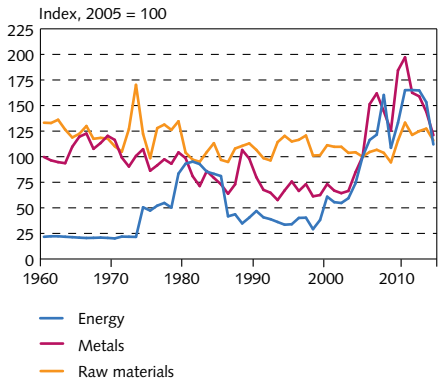
Source: IMF.

Chart II-5
Inflation in selected industrialised countries
January 2004 - September 2015



Source: Macrobond.

Chart II-6
Real commodity prices 1960-2015[1]



1. The 2015 value is based on first-half figures. The real price index for a commodity group is the trade-weighted average of the global U.S. prices of the commodities in the group deflated by the average economy manufacturing price index.
Source: IMF.

Bank is widely expected to raise interest rates late this year or early in 2016.

Global output growth outlook worsening …

According to the most recent GDP growth forecast from the International Monetary Fund (IMF), growth is expected to contract year-on-year in 2015, falling to only 3.1%, well below the thirty-year average. The IMF forecast is affected by a number of factors: the adjustment to weaker output growth in China and a general realignment of the drivers of growth, the steep decline in oil and commodity prices, volatility of cross-border capital flows, the expected policy rate hike in the US, and tighter financial conditions in emerging markets. The deterioration in the GDP growth forecast is greatest in the near term. The Fund expects global growth to pick up in 2016, measuring 3.6%, which is below its previous forecasts. Compared to the Fund's April forecast, the increase in the number of developed economies with GDP growth exceeding 2% is more moderate (Chart II-4). At the same time, the IMF is of the view that the risks to the baseline forecast are tilted to the downside, particularly among emerging and developing countries.

Although the lion's share of global GDP growth has been borne by emerging countries in recent years, 2015 will be the fifth consecutive year to see a year-on-year decline in GDP growth among emerging economies if the IMF forecast materialises. At the same time, the Fund has reduced its GDP growth forecast for industrialised countries. Prospects have deteriorated in particular for oil and commodity exporters, for instance Australia, Brazil, and Canada.

… as is reflected in poorer prospects for Iceland's trading partners

Year-2015 GDP growth among Iceland's main trading partner countries is projected to remain unchanged year-on-year, at 1.7%. The Bank's forecasts from earlier this year have assumed, however, that the economic recovery would solidify in comparison with 2014. The output growth outlook for the next two years has also deteriorated in comparison with the August forecast, and the downside risks to the baseline forecast have risen.

Growth in world trade and trading partner demand has slipped year-to-date

The outlook for world trade and trading partner demand has also deteriorated from the Bank's August forecast. As is described in the new IMF forecast, it is difficult to assess the extent to which growth in world trade slowed down in the first half because of fluctuations in terms of trade and currency exchange rates. National accounts indicate, for instance, that growth in world trade has slowed somewhat, and various international indicators of trade volumes point unequivocally to a contraction. The IMF's world trade forecast for 2015 has therefore been revised downwards by nearly a percentage point since July – to 3.2% – and the 2016 forecast has been reduced as well. The Fund anticipates somewhat more sluggish import growth in industrialised countries and noticeably weaker growth in emerging and

developing countries. As a result, imports among Iceland's main trading partners are projected to be weaker than in the August forecast. They are forecast to grow by 3.3% this year, roughly ½ a percentage point less than in August.

Inflation remains low in developed economies

As before, inflation is low in developed economies, and the main task of most of their central banks is to stimulate inflation so as to avoid deflation and an excessive drop in inflation expectations. Modest deflation was measured in the euro area and the UK in September (Chart II-5). Steep declines in oil and commodity prices (Chart II-6) have pulled in the same direction as the slack in output, reducing inflation once again, whereas inflation has risen in some oil- and commodity-exporting economies, with currency depreciation exacerbating imported inflation. Overall, the inflation outlook among Iceland's trading partners is virtually unchanged since the last forecast, although inflation is expected to be more uneven because of differences in the impact of the drop in oil and commodity prices.

Significant turmoil in global markets

Six years after the deepest financial crisis since the 1930s ended and the global economic recovery began, the recovery remains sluggish and fragile. Economic growth in emerging and developing countries is losing momentum, not least in China, where private consumption and services must increasingly supplant investment and production as the main drivers of output growth. Concerns about a hard landing in China escalated this summer, causing severe turbulence in global markets, with commodity prices plummeting, capital flows to emerging economies tapering off, risk premia rising, and emerging countries' currencies depreciating against the US dollar (Charts II-6 and II-7). This situation differs from that prevailing late in 2014, when a steep drop in oil prices made relatively little impact on global financial markets (Chart II-8) and a number of major industrialised countries' currencies fell against the dollar. This time, however, metals prices, which typically react even more to global activity than oil prices, have also fallen sharply, which they did not do last year. Market agents still anticipate that interest rates will rise earlier in the US and UK than in most other industrialised countries, although the first rate hikes are now expected to take place somewhat later than previously thought. Uncertainty has increased, however, about how well prepared emerging countries are for a rate hike – particularly commodity-exporting countries with significant debt in US dollars (Chart II-9).[1]

Export prices and terms of trade

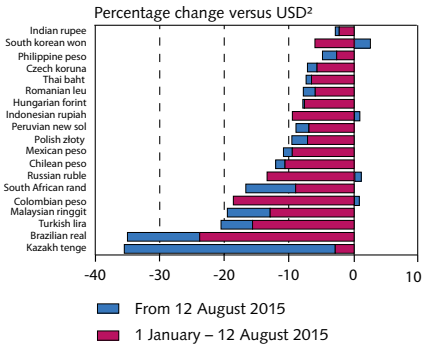
Marine product prices continue to rise, while aluminium prices fall

Foreign currency prices of marine products have risen virtually without interruption since February 2014. They increased by over 17%

1. See, for example, Chapter 3 of International Monetary Fund (2015). *Global Financial Stability Report*, October.

Chart II-7

Developments in emerging countries' currencies before and after the depreciation of the renminbi[1]

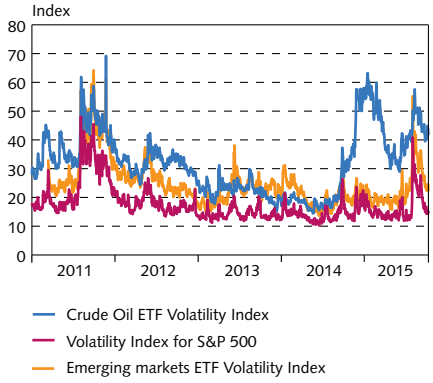


1. On 11 August, the People's Bank of China announced increased flexibility in the listing of the Chinese renminbi. 2. A reduction indicates a depreciation against the US dollar.
Sources: IMF, Macrobond.

Chart II-8

Global market volatility[1]

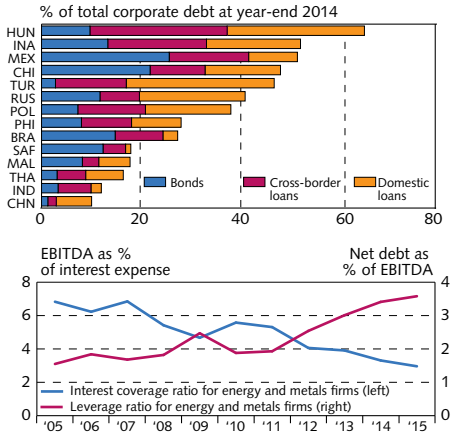
Daily data 3 January 2011 - 30 October 2015



1. The VIX index indicates the implied volatility of financial products.
Source: Federal Reserve Bank of St. Louis, Federal Reserve Economic Data (FRED).

Chart II-9

Foreign-denominated corporate debt in emerging countries[1]

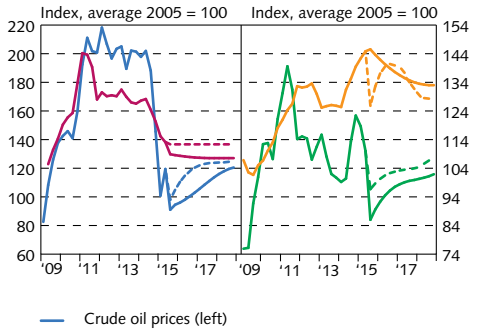


1. HUN: Hungary, INA: Indonesia, MEX: Mexico, CHI: Chile, TUR: Turkey, RUS: Russia, POL: Poland, PHI: Philippines, BRA: Brazil, SAF: South Africa, MAL: Malaysia, THA: Thailand, IND: India, CHN: China.
Source: IMF.

Chart II-10

Prices of marine products, aluminium, oil, and commodities[1]

Q1/2009 - Q4/2018

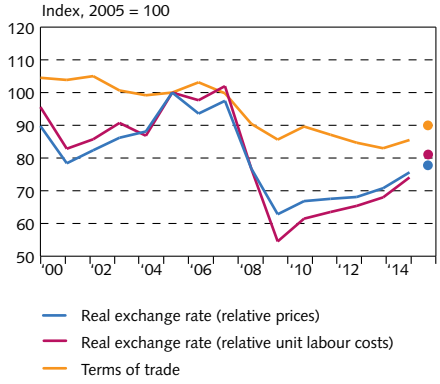


1. Central Bank baseline forecast Q4/2015-Q4/2018. Broken lines show forecast from MB 2015/3. 2. Non-oil commodity prices in USD. 3. Foreign currency prices of marine products are calculated by dividing marine product prices in Icelandic krónur by the export-weighted trade basket. 4. Foreign currency prices of aluminium products are calculated by dividing aluminium prices in Icelandic krónur by the exchange rate of the USD.

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

Chart II-11

Real exchange rate and terms of trade 2000-2015[1]



1. Dots show terms of trade and real exchange rate based on relative prices in 2015 according to Central Bank baseline forecast and real exchange rate based on relative unit labour costs according to the OECD forecast of unit labour cost developments for Iceland's largest trading partners in 2015.

Sources: OECD, Central Bank of Iceland.

year-on-year in Q1/2015 but have risen somewhat more slowly since then. They are expected to rise by about 8½% year-on-year in 2015, as was assumed in the August forecast (Chart II-10). The outlook is more ambiguous than in August, however, owing to the worsening economic outlook, uncertainty about the effects of the Russian import ban and economic difficulties in Nigeria. The price of fishmeal and fish oil is likely to rise in the near future, however, as a result of production cuts in Chile and Peru caused by El Niño.

Aluminium prices fell by 7% year-on-year over the first three quarters of 2015. Global metals prices have tumbled, not least because of reduced economic activity and the changing composition of growth in China, by far the world's largest purchaser of metals. A portion of the decline in prices to domestic aluminium producers is due to a drop in the premium paid to them, which had previously risen significantly, according to figures from Statistics Iceland. Prices are projected to continue falling, and the outlook has deteriorated since August. The price to domestic producers is projected to fall by over 7% this year, some 4½ percentage points more than was forecast in August, followed by a 5½% drop in 2016 (Chart II-10).

Oil prices plunged in late summer and are expected to remain low longer than previously anticipated

Crude oil prices have been falling year-to-date, with a particularly steep drop in Q3, to about half of Q3/2014 prices. It appears that the oil markets will take longer than previously thought to adjust to the glut of supply. Major forecasters' price projections and futures prices both indicate that crude oil prices will remain low for longer than was anticipated in August (Chart II-10).

Non-oil commodity prices fall more than previously assumed

US dollar prices of non-oil commodities have fallen continuously since Q2/2013. Increased supplies and reduced demand have caused food prices to fall 12% year-on-year, and metals prices are at their lowest since 2010. Non-oil commodities are now projected to fall in price by 17% year-on-year in 2015 and another 5% in 2016 – much more than was assumed in August.

Outlook for terms of trade somewhat weaker

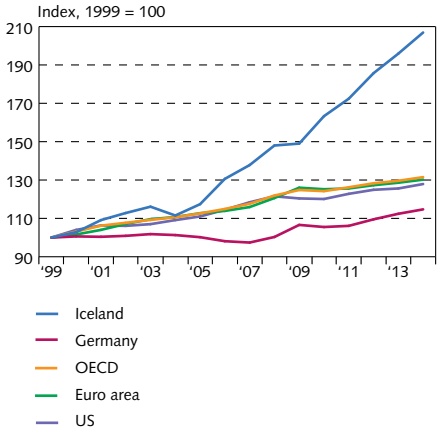
The improvement in terms of trade began in Q2/2014 and accelerated until the first quarter of 2015. Statistics Iceland's preliminary figures now indicate that terms of trade improved by 7.7% year-on-year in Q2, which is broadly in line with the forecast in the August *Monetary Bulletin*. The recovery is expected to lose pace in the latter half of the year, measuring just over 5% for 2015 as a whole, some ½ a percentage point less than in the August forecast (Chart II-11). The difference is due almost entirely to a smaller rise in export prices, which in turn is due to a larger decline in aluminium prices than was forecast in August. The outlook for terms of trade in 2016 is broadly unchanged since August, although uncertainty has grown.

Large pay rises lead to a sharp erosion in competitiveness

In Q3/2015, the real exchange rate of the króna rose to its highest value since mid-2008. It rose by 5.5% year-on-year due to an increase of 4% in the nominal exchange rate and because inflation in Iceland was 1.4 percentage points above the trading partner average. In spite of this increase, the real exchange rate in terms of relative consumer prices is still about 5.6% below its thirty-year average.

If the Bank's forecast materialises, the outlook is for the real exchange rate in terms of relative consumer prices to be, on average, more than 4% higher in 2015 than in 2014 (Chart II-11). Furthermore, given the substantial pay increases provided for in recent wage settlements, the real exchange rate in terms of relative unit labour costs will rise this year by even more – over 10%, if the forecast materialises. This increase comes on the heels of a protracted period of much larger rises in wage costs in Iceland than in competitor countries (Chart II-12). Given the prospects for wage developments in coming years, it is highly likely that Iceland's competitive position will continue to deteriorate. As is discussed in Box 2, this will have an appreciable effect on Iceland's external trade, other things being equal.

Chart II-12
Unit labour costs in developed countries



Sources: Macrobond, Central Bank of Iceland.

III Monetary policy and domestic financial markets

The Central Bank's key interest rate has risen and the monetary stance tightened since the publication of the August *Monetary Bulletin*. Real market rates have not followed suit, however, indicating a weakening of monetary policy transmission across the yield curve. Instead, transmission of monetary policy appears increasingly to be taking place through the exchange rate channel, as the króna has appreciated somewhat since August. Market agents appear to expect smaller interest rate hikes by the year-end than they did in August. Even though their pessimism about the inflation outlook seems to have abated somewhat, it is likely that the steep drop in long-term bond interest stems mainly from increased capital inflows in connection with new investment by non-residents. This is also one of the main reasons for the weakening of monetary policy transmission through the interest rate channel. Growth in the money stock has picked up again after a temporary slowdown in 2014 and early 2015, and there has been an increase in lending to households and businesses. Asset prices have risen and debt ratios declined. Access to credit has opened up, and some of the pension funds' mortgage lending rates have fallen. Private sector financial conditions have therefore improved.

Monetary policy

Nominal Central Bank rates have risen

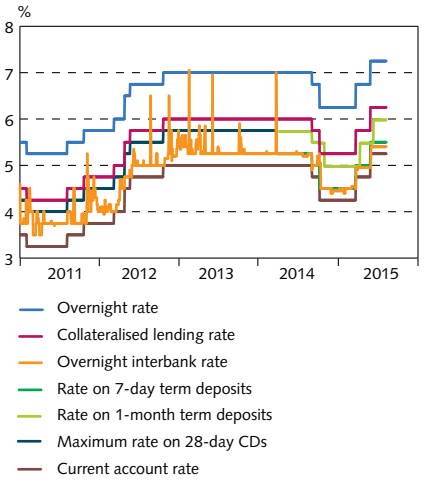
The Central Bank Monetary Policy Committee (MPC) decided to raise the Bank's interest rates by 0.5 percentage points at its August meeting but kept them unchanged at the September meeting. Prior to the publication of this *Monetary Bulletin*, the Bank's key interest rate – the rate on financial institutions' seven-day term deposits with the Bank – was 5.5%, after rising by 1 percentage point since mid-June. At the September meeting, the MPC also decided to increase deposit institutions' reserve requirements from 2% to 4% as of 21 October. The aim of this measure is not to affect the monetary stance but to strengthen the Bank's liquidity management in the wake of its sizeable foreign currency purchases in the recent term and to shore up financial institutions' liquidity in the run-up to the settlement of the failed banks' estates and the planned auction of offshore krónur.

Overnight interbank interest rates have risen in line with the Bank's key rate and, as before, have remained below the centre of the interest rate corridor, close to the Bank's key rate (Chart III-1). The accepted rate in commercial banks' bill auctions has also risen in line with the key rate, unlike the rate in Treasury bill auctions, which is now as much as 2 percentage points below the floor of the interest rate corridor. In all likelihood, this is due to increased demand from owners of offshore krónur, whose investment options were restricted in March to Treasury bills, in preparation for capital account liberalisation.

Chart III-1

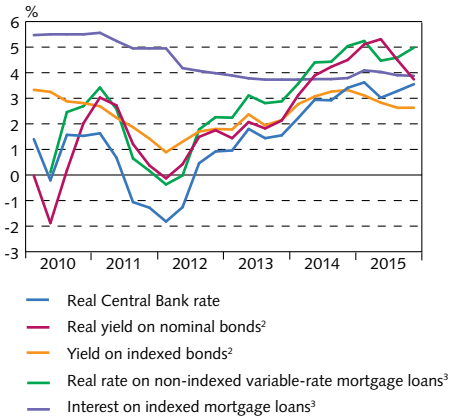
Central Bank of Iceland interest rates and short-term market rates

Daily data 3 January 2011 - 30 October 2015



Source: Central Bank of Iceland.

Chart III-2
Real Central Bank interest rate and real market rates
Q1/2010 - Q4/2015[1]



1. Based on data until 30 October 2015. 2. Five-year rate from the estimated nominal and real yield curves. 3. 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.

The Central Bank's real rate has also risen ...

The monetary stance as measured by the Central Bank's real rate has tightened since the August *Monetary Bulletin*. In terms of past inflation, the Bank's real rate has risen by about ½ a percentage point, to about 3½%, and in terms of the average of various measures of inflation and inflation expectations it has risen by nearly a percentage point, to 2.2% (Table III-1). This average, however, is about ¼ of a percentage point lower than in October 2014, as inflation expectations have risen in excess of the Bank's nominal interest rates.

Table III-1 The monetary stance (%)

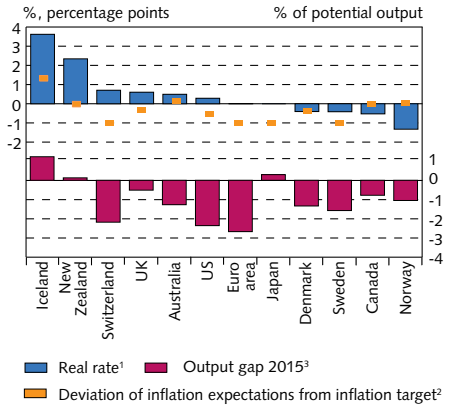
Real interest rates based on:[1]	*Current stance (30 Oct. '15)*	*Change from MB 2015/3 (14 Aug. '15)*	*Change from MB 2014/4 (31 Oct. '14)*
Twelve-month inflation	3.6	0.5	0.4
Business inflation expectations (one-year)	1.9	1.0	-0.3
Household inflation expectations (one-year)	1.4	0.5	0.2
Market inflation expectations (one-year)[2]	1.6	0.6	-0.7
One-year breakeven inflation rate[3]	2.3	1.1	-0.8
Central Bank inflation forecast[4]	2.1	1.6	-0.5
Average	2.2	0.9	-0.3

1. With the seven-day term deposit rate as the Central Bank's key rate. 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 rolling average). 4. The Central Bank forecast of annual inflation four quarters ahead.
Source: Central Bank of Iceland.

...but in some instances other market rates have fallen

The transmission of Central Bank rates to other interest rates has been broadly smooth in the recent term. However, the recent rise in the real rate appears not to have been transmitted fully to other market rates, some of which have even fallen (Chart III-2). This could be a sign of a weakening of monetary policy transmission through the interest rate channel. Bond market yields have declined in spite of the MPC's rate hikes and signals of further rate hikes to come. This is particularly the case for long nominal Treasury bonds, whose yields have been broadly in line with the Bank's key rate in the recent term (see below). The decline in bond market yields has had a downward impact on the mortgage lending rates offered by some of the pension funds. Even though mortgage rates offered by the commercial banks have broadly followed the key Central Bank rate, signs of spillover effects to bank mortgage rates have also started to emerge.

Chart III-3
Real rate, output gap, and deviation of inflation expectations from target in selected industrialised economies



1. In terms of current 12-month inflation. 2. Inflation expectations one year ahead based on surveys of market agents and analysts. 3. For countries other than Iceland, the output gap is based on OECD estimates.
Sources: Consensus Forecasts, Macrobond, OECD, websites of the relevant central banks, Central Bank of Iceland.

The Bank's real rate is still higher than in most other developed economies

The Central Bank's real rate is higher than that in most other developed countries, and Iceland is the only advanced economy to see a policy rate increase in the recent term (Chart III-3). As before, this is attributable to the differences in economic developments and outlook in Iceland, as can be seen in significantly smaller spare capacity, more robust output growth, higher inflation, and much stronger growth in nominal expenditure and wages. In addition, inflation expectations appear to be less firmly anchored in Iceland, which gives cause for concern that they could rise rapidly, thereby necessitating a tighter monetary stance than would otherwise be needed. This differs from conditions in most other industrialised countries, where concerns cen-

tre on the possibility of an excessive decline in inflation expectations. As is discussed in the May *Monetary Bulletin*, the Bank's interest rates are closer to those in several emerging market economies whose economic conditions are in many ways similar to those in Iceland.

Market agents expect a rise in Central Bank nominal rates

According to the Bank's survey of market agents' expectations, carried out in late October, respondents expect the Bank's key rate to be held at 5.5% until the end of this year (Chart III-4). This is about 0.25 percentage points lower than in a comparable survey in August. However, the current survey indicates, as in August, that market agents expect the Bank's key rate to be 6.25% at mid-year 2016. Indications from forward interest rates also imply that market agents expect rates to be higher in mid-2016. But in a departure from the survey findings, forward rates indicate that market agents expect the Bank's rates to decline once again in the latter half of 2016, falling to 5% by the end of the forecast horizon. As is discussed below, the recent plunge in long-term nominal interest rates is probably due in large part to factors not related to expectations of future developments in short-term rates.[1]

Market interest rates and risk premia

Nominal Treasury bond yields have fallen significantly

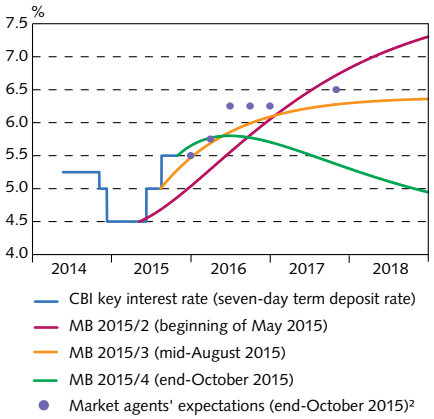
Since early June, when the capital account liberalisation strategy was introduced, nominal Treasury bond yields have fallen by as much as 2.2 percentage points, with the decline concentrated in the longest bonds. As much as 1.2 percentage points of it has taken place since the publication of the August *Monetary Bulletin* (Chart III-5). The yield curve is now downward-sloping, which at first glance would indicate that market agents expect a reduction in short-term interest rates in the coming term, due to factors such as expectations of weaker economic activity and declining inflation. Reduced fears of an inflation spurt in the wake of wage settlements could explain this development to some extent (see Chapter V). The steep drop in long nominal bond interest rates could also be owing to increased optimism about the Treasury's position following the publication of the capital account liberalisation strategy, which is expected to bring about a reduction in Treasury debt with the payment of stability contributions and/or taxes by the failed banks' estates. This, together with the new fiscal budget proposal, may also have fuelled expectations of reduced Treasury bond issuance. If this were a viable explanation of the decline in nominal bond interest rates, indexed rates should have fallen in a similar manner, but they have fallen considerably less. To some extent, this may be in response to the limited liquidity of indexed bonds. It may also explain the smaller reduction in yields on short Treasury bonds, the majority of which are held by non-residents whose assets are locked in by the capital controls.

1. In addition, measurement problems at the short end of the yield curve introduce a measure of uncertainty into the indications provided by the yield curve. For further discussion, see Box III-1 in *Monetary Bulletin* 2013/4.

Chart III-4

Central Bank of Iceland key interest rate, forward market interest rates, and market agents' expectations concerning the CB key rate[1]

Daily data 21 May 2014 - 31 December 2018

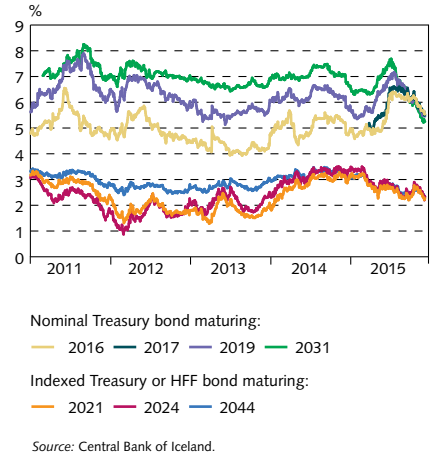


1. Interbank interest rates and Treasury bonds were used to estimate the yield curve. 2. Estimated from the median response in the Central Bank's survey of market agents' expectations of collateralised lending rates. The survey was carried out during the period 29 Oct. - 2 Nov. 2015.
Source: Central Bank of Iceland.

Chart III-5

Nominal and indexed bond yields

Daily data 3 January 2011 - 30 October 2015

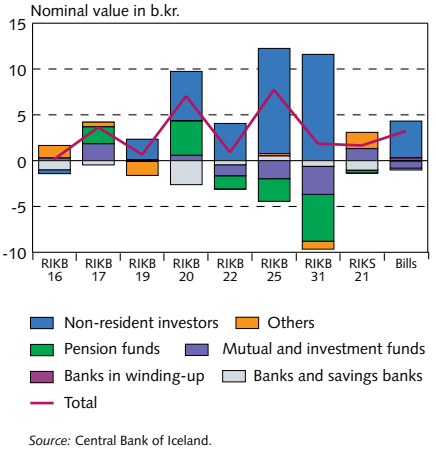


Source: Central Bank of Iceland.

Chart III-6

Changes in ownership of Treasury securities

31 May 2015 - 30 September 2015



Source: Central Bank of Iceland.

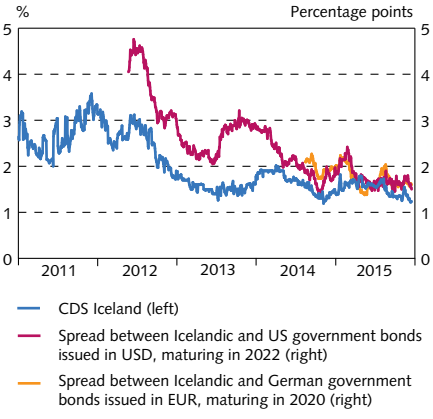
Most likely, though, the marked drop in long-term nominal rates in the recent past is due to the increase in non-residents' new investment in long nominal Treasury bonds starting in mid-June. This new investment has amounted to just under 49 b.kr. since end-May, and demand from these investors has pushed term premia on long-term bond interest downwards (Chart III-6). To a large extent, this probably reflects the combination of international investors' increasing confidence in Iceland, which is among other things reflected in a rising credit rating, and the spillover effects from quantitative easing measures by central banks in major advanced economies. These measures have pushed down the term premia in those countries and prompted investors in long-term government bonds to seek higher yields in other countries (see Box 1). Therefore, the decline in long-term bond interest probably reflects lower inflation expectations and expectations of a reduction in Central Bank rates only to a limited degree. Interpreting the yield curve is more difficult as a result.

Risk premia on Treasury obligations has declined

Late in 2014 and again in mid-2015, risk premia on the Treasury's foreign obligations rose by most measures (Chart III-7). Unrest in global financial markets was probably a factor in this development. They declined again this past summer, most likely due to expectations of an improved Treasury position following the introduction of the capital account liberalisation strategy, as can be seen in Iceland's improved sovereign credit ratings from all three major rating agencies that assign the Republic of Iceland a sovereign credit rating. The CDS spread on five-year Treasury obligations is now just over 1.2%, or slightly lower than in August, but ½ a percentage point below the summer 2015 peak. The spread between the Icelandic Treasury's long-term foreign-denominated bonds and comparable government bonds issued by the US and Germany has also fallen over this same period, to about 1½ percentage points.

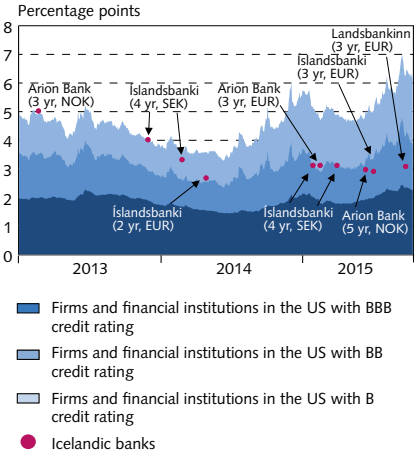
Icelandic bank's borrowing terms in foreign markets have risen slightly since the summer, however, in spite of improvements in their credit ratings (Chart III-8). The terms were probably affected by temporary unrest in the financial markets at the time the issue took place – unrest relating, among other things, to worries about a hard landing in China and growing concern about emerging market economies (see also Chapter II). This unrest also led to a rise in risk premia on US firms' and financial institutions' local currency obligations.

Chart III-7
Risk premia on Icelandic Treasury obligations
Daily data 3 January 2011 - 30 October 2015



Source: Bloomberg.

Chart III-8
Risk premia on US firms and financial institutions and Icelandic banks[1]
Daily data 2 January 2013 - 30 October 2015



1. Credit spreads on bonds issues in USD for firms and financial institutions in the US. Credit spreads at issuance of bonds in foreign currency for Icelandic banks.
Sources: Arion Bank, Íslandsbanki, Landsbankinn, Macrobond, Federal Reserve Bank of St. Louis.

Exchange rate of the króna

Nominal exchange rate rises ...

The króna has appreciated by just under 4½% in trade-weighted terms since the publication of the August *Monetary Bulletin*, and the index now measures about 193 points (Chart III-9). Over the same period, the króna has appreciated by about 3½% against the euro and the US dollar and over 5½% against the pound sterling. The exchange rate has been supported by the surplus on goods and services trade, which is due in part to improved terms of trade, and by the increased foreign currency inflows stemming from new investment by non-

residents. Furthermore, GDP growth has been stronger in Iceland than in neighbouring countries and appears likely to remain so in the near term. As a result, the currency appreciation is probably rooted largely in favourable developments in economic fundamentals and the expectation that interest rates will remain higher in Iceland than in other industrialised countries. It therefore reflects both the adjustment of the exchange rate to stronger fundamentals and to the transmission of a tighter domestic monetary stance through the exchange rate channel at a time when transmission through the interest rate channel has clogged up, as is mentioned above.

… in spite of sizeable foreign currency purchases by the Central Bank

For some time, the Central Bank has leaned against the appreciation of the króna by buying currency in the foreign exchange market, although without entirely preventing a rise in the exchange rate. This is in line with the declared objective of the intervention strategy, which is to smooth exchange rate volatility and build up foreign exchange reserves, and not to target a given exchange rate level. The Bank's net foreign currency purchases amounted to just under 115 b.kr. in Q3/2015 and have totalled 218 b.kr. year-to-date, or the equivalent of 11% of year-2014 GDP (Chart III-10).

Money holdings and lending

Growth in money holdings accelerates again

M3 grew by 7% year-on-year in Q3, when adjusted for deposits of the financial institutions in winding-up proceedings (Chart III-11).[2] The rise is due for the most part to an increase in deposits held by non-deposit-taking financial institutions and households. There is also a marginal increase in non-financial companies' deposits. Growth in M3 has therefore begun to pick up again after a slowdown from late 2014 into Q1/2015.

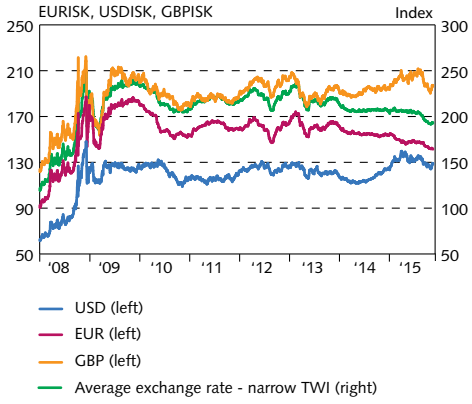
Base money has also picked up year-to-date. Annual growth in terms of a twelve-month moving average measured 11.9% in September and about 3.2% including term deposits (which gives a more accurate view of the Central Bank's contribution to changes in liquidity in circulation). The increase in base money in recent years is attributable for the most part to an increase in deposit institutions' deposits with the Central Bank, although banknotes and coin issued by the bank have increased slightly as well (Chart III-12).[3]

Increased lending to household and businesses

The exchange rate- and price-adjusted stock of DMB loans to households increased by ½% in the first nine months of the year but contracted by nearly 5% if loans from the Housing Financing Fund (HFF) are included. If adjustments are made for the Government's debt

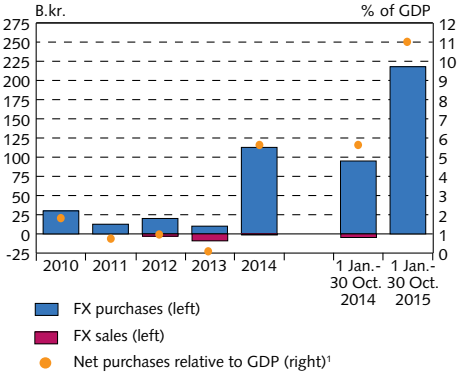
2. Adjusted M3 gives a more accurate view of money holders' spending capacity than unadjusted M3 does.
3. Credit institutions' deposits with the Central Bank fluctuate widely; therefore, it could make a difference which day of the week the month-end falls on, as auctions of seven-day term deposits are held once a week and one-month deposits are auctioned once a month.

Chart III-9
Exchange rate of foreign currencies against the króna
Daily data 3 January 2008 - 30 October 2015



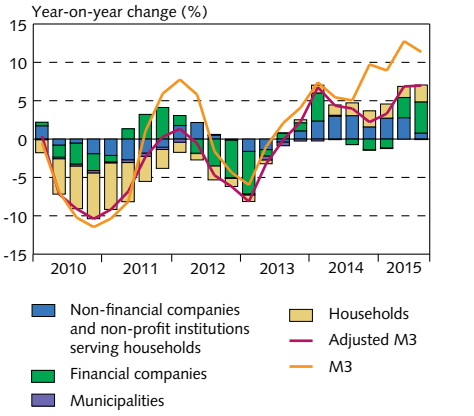
Source: Central Bank of Iceland.

Chart III-10
Central Bank transactions in the Icelandic interbank foreign exchange market 2010-2015



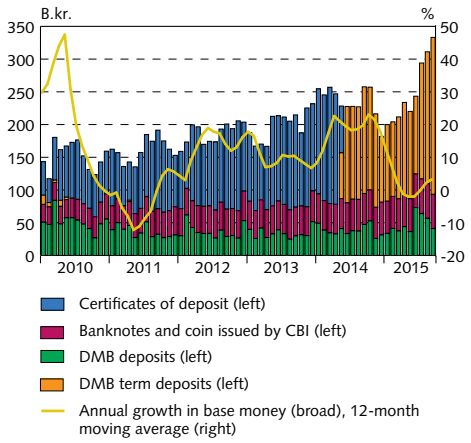
1. Year-2014 GDP used for 2015.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart III-11
Components of money holdings - Adjusted M3[1]
Q1/2010 - Q3/2015



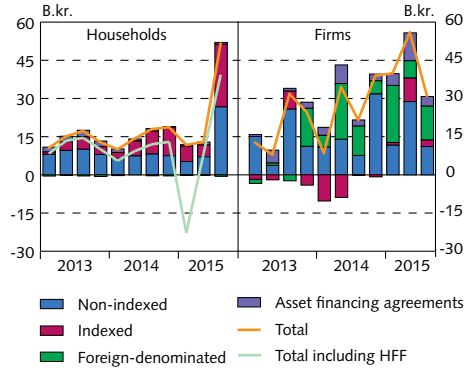
1. Adjusted for deposits held by failed banks' winding-up boards.
Source: Central Bank of Iceland.

Chart III-12
Components of broad base money[1]
January 2010 - September 2015



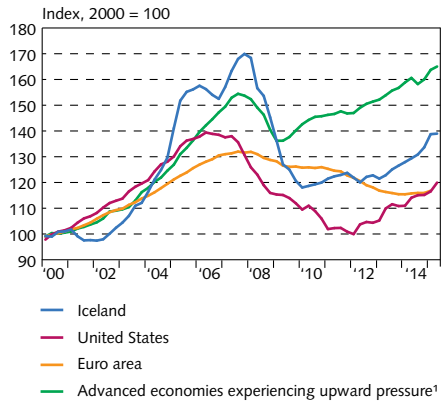
1. Base money including term deposits and certificates of deposit.
Source: Central Bank of Iceland.

Chart III-13
Net new lending from DMBs to households and firms[1]
Q1/2013 - Q3/2015



1. New loans net of prepayments. Excluding holding companies.
Source: Central Bank of Iceland.

Chart III-14
Real house prices in advanced economies
Q1/2000 - Q2/2015



1. Upward-pressure countries are those with a residential real estate vulnerability index above the median for advanced economies (AEs): Australia, Austria, Belgium, Canada, France, Hong Kong, Israel, Luxembourg, New Zealand, Norway, Portugal, Spain, Sweden and United Kingdom.
Sources: IMF, Central Bank of Iceland.

relief measures, the credit stock contracted by approximately 1%. This development is somewhat uncertain, however, and appears inconsistent with other indicators from the credit market. In the first nine months of the year, net new loans granted to households by deposit institutions and the HFF – i.e., new loans less prepayments of older loans – totalled 24 b.kr., but excluding the effects of the Government's debt relief programme, the increase is estimated at roughly 70 b.kr. (Chart III-13).[4] This is a substantial increase in comparison with the past two years, as lending has been low in historical context. Since this spring, new non-indexed loans have exceeded new indexed loans, and the majority of them have featured fixed interest for a period of three to five years. Expectations of rising inflation during the early months of the year, during the run-up to wage negotiations, doubtless played a part in borrowers' increased interest in such loans. In addition, household debt service burdens declined as a result of the Government's debt relief measures, and borrowers have probably considered their debt service capacity to have increased with the pay rises provided for in the most recent wage settlements.

Borrowing by the non-financial business sector has also increased during the year. The adjusted stock of bank loans to the business sector had risen by just under 4% year-to-date by the end of September, compared to a decline of roughly 1½% during the same period in 2014. Net new lending from deposit institutions to the non-financial business sector totalled just over 126 b.kr. in the first nine months of 2015, a significant increase year-on-year. This rise in credit growth is in line with increased business investment so far this year and a growing share of external financing of investment expense, with the latest Bank survey suggesting that the share of internal financing has fallen from above 80% in 2014 to roughly 70% (see also Chapter IV).

Asset prices and financial conditions

House prices have risen somewhat year-to-date …

Capital area house prices have risen by over 9% year-on-year so far in 2015. Over the same period, the number of purchase agreements in the greater Reykjavík area has risen by more than 10%, rent prices by just over 6%, and the Statistics Iceland wage index by almost 7%.

… and look set to continue

The rise in house prices over the first three quarters of 2015 is broadly in line with the Bank's August forecast, reflecting strong growth in underlying economic fundamentals, including rising disposable income and improved household equity. The recent increase in real house prices has far outpaced that in the euro area but is similar to that in the US and other countries that have seen strong increases (Chart III-14). According to the Bank's current baseline forecast, the recent rise in house prices is expected to continue at broadly the same pace in coming years.

4. The difference between changes in the total stock of credit and net new lending primarily reflects regular repayments of loans.

Share prices have continued to rise

The Nasdaq Iceland exchange's OMXI8 index has risen by 18.2% since the last *Monetary Bulletin* and 40.8% so far this year (or 46.3% adjusted for dividend payments). Turnover in the NASDAQ Iceland main market totalled 263 b.kr. over the first nine months of the year, about 43% more than over the same period in 2014. The number of companies listed on the market rose in October, when Síminn completed its initial public offering. In spite of non-residents' increased investment in the bond market, new investment in the equity market appears limited thus far; however, it is difficult to assess whether derived effects from new bond market investment have made an impact on the stock market.

Private sector debt has declined year-to-date

Credit institutions' direct accumulated reduction in mortgage principal as a result of the Government's debt relief measures totalled 53.5 b.kr. in July, as opposed to about 9 b.kr. for the third-pillar pension savings option in June.[5] The Government's contribution to the reduction of principal was expedited, and those who have already approved their reduction have received about ¾ of it. It is assumed that the reductions will be paid in full by next January.

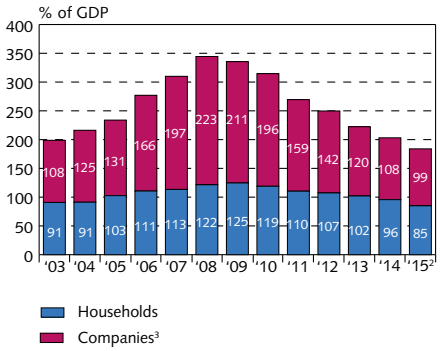
In the wake of the measures, household debt declined markedly at the beginning of the year. It rose slightly once again in Q2/2015, to about 85% of estimated year-2015 GDP (Chart III-15), about the level seen in mid-2004. The debt-to-GDP ratio is now about 10½ percentage points lower than at year-end 2014 and 40 percentage points below its 2009 peak. The ratio of corporate debt to GDP has declined as well. At mid-year, it was about 8½ percentage points lower than at year-end 2014 and is now at its lowest since 2003. The debt ratio of the private sector as a whole is at its lowest since year-end 2003.

Access to credit has eased, and some of the pension funds' lending rates have fallen

Nominal interest rates on non-indexed mortgage loans offered by the three large commercial banks rose in line with the Central Bank's rate hikes in June and August, as did non-indexed deposit rates (Chart III-16), but comparable rates on the banks' indexed deposits and loans remained broadly unchanged over this period (Chart III-17). Interest rates on some of the pension funds' indexed loans to fund members have fallen in line with declining bond market yields and are now about ½ a percentage point below comparable rates offered by the commercial banks. In addition, some of the funds have raised their loan-to-value ratios to 75% and lowered borrowing costs for new loans. Although the commercial banks have not responded to the same extent, the recent rate reduction by one of the large banks suggests that this might change.

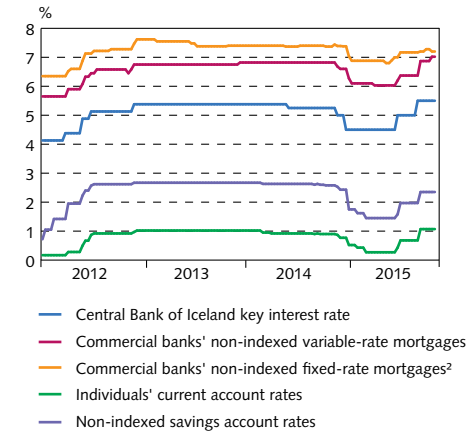
5. Far fewer borrowers have taken advantage of the third-pillar pension savings option than the authorities projected at first. In June, only 34,000 individuals had done so. No information is available about those who do not own real estate and will be able to use their third-pillar savings in connection with a purchase later on. When these measures were announced in November 2013, it was assumed that the third-pillar option would lead to a 67 b.kr. reduction in mortgage principal over three years' time.

Chart III-15
Household and non-financial corporate debt[1]



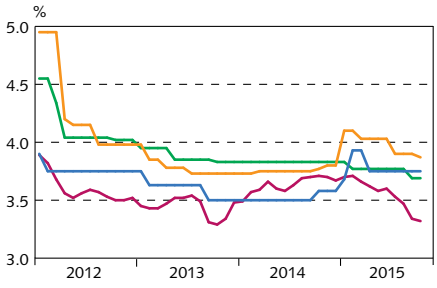
1. Debt owed to financial undertakings and market bonds issued. 2. End-June 2015. Central Bank estimate for GDP in 2015. 3. Excluding financial institutions (which includes holding companies).
Sources: Statistics Iceland, Central Bank of Iceland.

Chart III-16
Central Bank of Iceland key interest rate and commercial banks' rates[1]
1 January 2012 - 21 October 2015



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

Chart III-17
Commercial banks' and pension funds' mortgage lending rates[1]
January 2012 - October 2015



1. Simple average of the lowest rates. 2. Rates are fixed for a period ranging from 5 years to the entire loan period.
Sources: Almenni Pension Fund, Arion Bank, Festa Pension Fund, Gildi Pension Fund, Íslandsbanki, Landsbankinn, LSR, Pension Fund of Commerce, Central Bank of Iceland.

IV The domestic real economy

Seasonally adjusted GDP has gained momentum steadily since bottoming out in the wake of the 2008 financial crisis and is now above its 2007 peak. During this recovery phase, GDP growth has been driven by a strong increase in exports, business investment, and private consumption – the last of these supported by households' improving position, particularly in the past two years. This year, GDP growth is projected to be at its strongest since 2007, owing mainly to robust growth in the same factors that have led the recovery. Strong growth in domestic demand is also reflected in a narrowing trade surplus in spite of robust export growth. The recovery of the labour market continues as well, with a noticeable increase in jobs and falling unemployment. Productivity growth has been weak, however, much more so than in previous recoveries. The slack that has characterised the domestic economy in recent years has turned around into a positive output gap, reflecting the adjustment and recovery that have taken place in the past few years. The fiscal stance has eased at the same time.

GDP growth and domestic private sector demand

H1/2015 output growth in line with the May forecast

According to the Q2/2015 national accounts, published by Statistics Iceland in September, year-on-year GDP growth measured 5.6% during the quarter, the strongest single quarter since Q1/2008. GDP growth measured 5.2% in the first half of the year, whereas the Bank's August forecast assumed just over 3% (Chart IV-1). A large portion of the forecasting error was due to the revision of older Statistics Iceland figures, and in addition, the contribution from net trade was considerably more positive than had been assumed in August. H1 GDP growth was therefore much closer to the Bank's May forecast, which was prepared before the preliminary national accounts figures for Q1 were available. Closer examination of the composition of GDP growth reveals offsetting effects from robust domestic demand and the contribution from net trade, which – in spite of booming services exports – was negative in the first six months of the year because of the strong imports that usually accompany growing investment and private consumption.

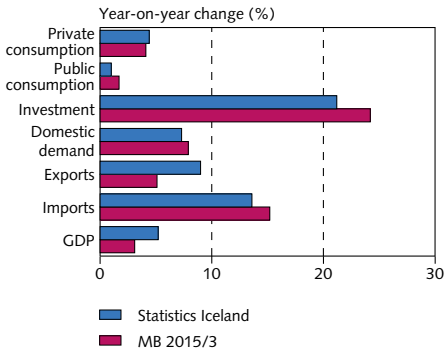
GDP per capita approaches its pre-crisis peak

In Q2, GDP was about 3.3% above its Q4/2007 peak in terms of seasonally adjusted Central Bank figures. Population growth was significant over this period, however, and GDP per capita was therefore about 2½% lower (in terms of Statistics Iceland's population estimate). From its pre-crisis peak, GDP contracted by some 11.2% before beginning to grow again in mid-2010. From that time onwards, it has grown by 16.1%, with the recovery driven mainly by private consumption, services exports, and business investment (Chart IV-2).

Iceland's post-crisis contraction was deeper than in most trading partner countries, and growth was weaker early in the recovery (Chart

Chart IV-1

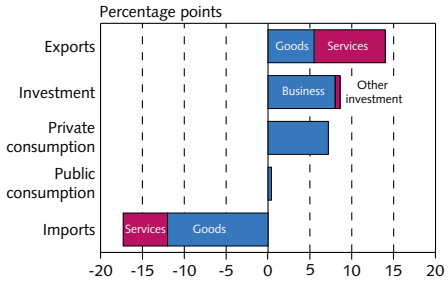
National accounts for H1/2015 and Central Bank estimate



Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-2

Contribution of GDP components to economic recovery[1]

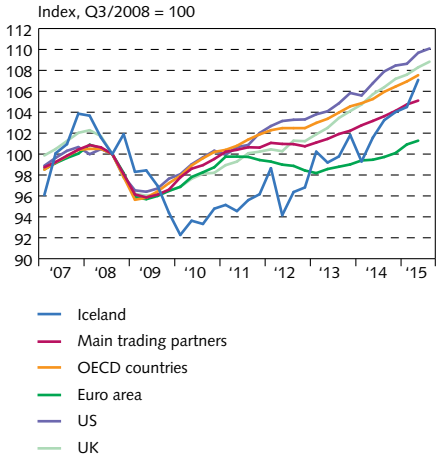


1. From H1/2010 - H1/2015.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-3

Post-crisis developments in GDP[1]

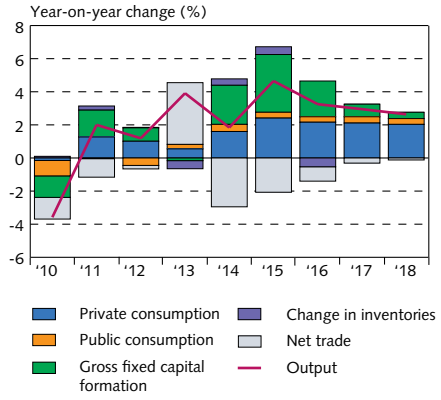
Q1/2007 - Q3/2015



1. Seasonally adjusted data for Iceland are from the Central Bank of Iceland.
Sources: Macrobond, OECD, Central Bank of Iceland.

Chart IV-4

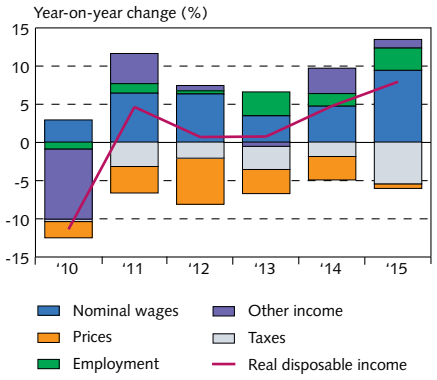
GDP growth and contribution of underlying components 2010-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-5

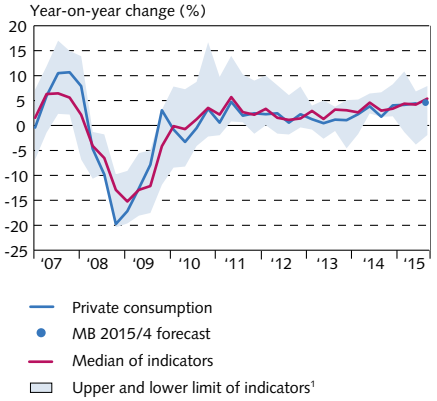
Developments in real disposable income and its main components 2010-2015[1]



1. Central Bank baseline forecast 2015. The contribution of the main underlying factors in the yearly changes in real disposable income is calculated based on each factor's weight in disposable income. The combined contribution of underlying factors does not add up to the total change due to rounding and incomplete income accounts for households from Statistics Iceland.
Sources: Statistic Iceland, Central Bank of Iceland.

Chart IV-6

Indicators of private consumption
Q1/2007 - Q3/2015



1. Indicators are payment card turnover, groceries turnover, share prices, housing prices, consumer goods imports, new motor vehicle registrations, wages, and unemployment. The indicators are rescaled so that their average and standard deviation are the same as those for private consumption.
Sources: Centre for Retail Studies, Statistics Iceland, Central Bank of Iceland.

IV-3). In the recent term, however, GDP growth has been much stronger in Iceland than in trading partner countries (see Chapter II).

Outlook for stronger GDP growth in 2015 than previously projected

A more favourable contribution from net trade, owing to unexpectedly strong services exports, is the main reason H1/2015 GDP growth outperformed the August forecast. In the latter half of the year, however, growth is projected to moderate, as the surge in services growth was due in part to one-off revenues related to patents (see below). Domestic demand growth is expected to be in line with recent developments, however, and GDP growth for the year is estimated at 4.6%. This is 0.4 percentage points above the Bank's August forecast and well above the projected trading partner average. As in the August forecast, it is assumed that GDP growth will ease in coming years but remain relatively robust, averaging just under 3% per year. As in previous Central Bank forecasts, growth is driven to a great extent by robust growth in domestic private sector demand (Chart IV-4).

Households' financial situation continues to improve …

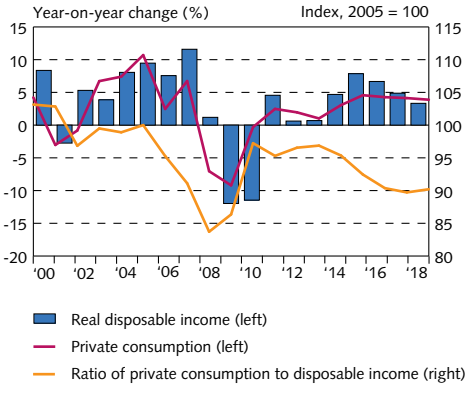
According to figures from Statistics Iceland, households' real disposable income grew by a full 4.7% in 2014 (deflated by the private consumption deflator). This is mainly a reflection of increased wage income, although there were positive contributions from investment income as well (Chart IV-5). This was somewhat weaker growth in purchasing power than was assumed in August, however, because wage income was lower than forecast and tax payments slightly higher. Households' equity position improved markedly in 2014 because of both deleveraging and higher asset values (see the discussion of financial conditions in Chapter III). Households' income and equity position suffered greatly in the wake of the financial crisis, but from 2010 through 2014, real disposable income rose by 10.9% and real household equity by 39.2%. In view of the continued rise in real wages and asset prices and the increase in employment year-to-date, it can be assumed that these items will support household demand, both this year and in the near future. The announced reduction in income tax will further stimulate purchasing power and household demand.

… supporting household demand

Private consumption grew by 4.4% in the first half of 2015, and developments during the year appear to be in line with recent forecasts in *Monetary Bulletin*, which have assumed that the impact of the Government's debt relief measures would show most clearly in private consumption growth this year. Indicators of developments in private consumption during the third quarter show rather unequivocally that the trend from the first half will continue and, if anything, gain momentum (Chart IV-6). Presumably, the effects of the debt relief measures can be seen in the real estate market as well; for instance, according to the Gallup big-ticket index, the percentage of households considering a home purchase in the next twelve months

is at its highest since late 2007. Rising property prices and reduced debt make it easier for households to undertake such investments. Furthermore, some credit institutions have eased access to credit by raising loan-to-value ratios and lowering interest rates and borrowing charges (see Chapter III). Private consumption growth for this year is forecast at 4.6%, somewhat more than was projected in August, reflecting stronger-than-expected growth in real wages, which is due largely to low inflation during the period. Private consumption is expected to be the one of the mainstays of GDP growth during the forecast horizon, supported by real wage growth and further improvements in households' equity position (Chart IV-7).

Chart IV-7
Private consumption and real disposable income 2000-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

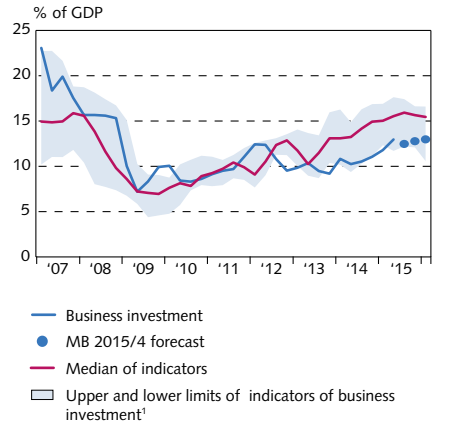
Business investment-to-GDP ratio at historical average

Following a strong post-crisis contraction, investment has been on the rise, and in the first half of 2015 business investment was the component of domestic demand that contributed most to GDP growth for the period. Over the first half, business investment grew 38% year-on-year. The main difference was in investments in ships and aircraft, although investment excluding energy-intensive industry, ships, and aircraft grew significantly as well. The ratio of business investment to GDP was at its long-term average of 13% during the first half of the year. In spite of this, total investment was somewhat below its long-term average, mainly due to weak public and residential investment.

Business investment growth to gain pace in 2015

Most indicators of business investment in the coming term suggest that investment will continue to increase (Chart IV-8). The Central Bank survey of nearly 100 firms showed a marked year-on-year increase in planned investment, both in 2015 and in 2016 (see Table IV-1). According to the survey findings, companies in the fishing industry plan the largest increase in investment this year, or almost 50%. Firms in travel and transport also expect modest growth, whereas industrial firms project a contraction of about a fifth. Firms in travel and transport, on the one hand, and finance and insurance, on the other, project the largest increase in 2016, or over a third, and retail companies also forecast a considerable increase. The Gallup survey among Iceland's 400 largest firms also indicates that companies'

Chart IV-8
Indicators of business investment
Q1/2007 - Q1/2016



1. The indicators are imports of investment goods at constant prices and responses to four questions from the Gallup survey of Iceland's 400 largest companies. The questions centre on executives' assessment of (a) the economic outlook six months ahead, (b) how they expect domestic demand for their goods or services to develop in the next six months, (c) whether they expect their company's investment to increase year-on-year in the current year, and (d) whether they expect their margins to increase year-on-year. In assessing the range, all variables are rescaled so that their average and standard deviation are the same as those for business investment. Two-quarter moving averages. Investment indicators are lagged by two quarters.
Sources: Gallup, Statistics Iceland, Central Bank of Iceland.

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

Largest 98 firms *Amounts in ISK billions*	*2014*	*2015*	*2016*	*Change 2014 and 2015, % (prev. survey)*	*Change between 2015 and 2016,(%)*
Fisheries (16)	5.9	8.9	9.0	49.3 (50.5)	1.7
Industry (18)	4.8	3.8	3.8	-20.4 (-20.3)	-0.8
Wholesale and retail sale (22)	5.1	6.3	7.3	24.1 (17.2)	16.7
Transport and tourism (7)	13.8	20.1	27.8	45.3 (78.1)	38.1
Finance/Insurance (9)	5.1	4.7	6.2	-8.5 (8.7)	32.5
Media and IT (7)	7.3	7.1	7.4	-2.9 (-4.5)	3.3
Services and other (19)	14.6	15.1	14.4	3.5 (-15.5)	-4.5
Total (98)	56.6	65.9	75.8	16.4 (20.4)	15.0

1. In parentheses is a comparison with the last survey, in which respondents from 99 firms were asked about investment plans for 2014-2015 (*Monetary Bulletin* 2015/2).
Source: Central Bank of Iceland.

investment plans are on the rise, with a growing share of respondents projecting increased investment expenditure in the coming term.

The above-mentioned indications of investment activity in 2015 are well in line with developments in investment goods imports. As before, the Bank's investment survey indicates that firms are to a large extent financing investment internally but that external credit financing is gaining ground, which accords with indicators of increased corporate lending (see Chapter III). In comparison with the August forecast, the outlook is for somewhat stronger growth in business investment excluding energy-intensive industry, ships, and aircraft, but as was assumed in August, total business investment is projected to grow by nearly a third year-on-year in 2015.

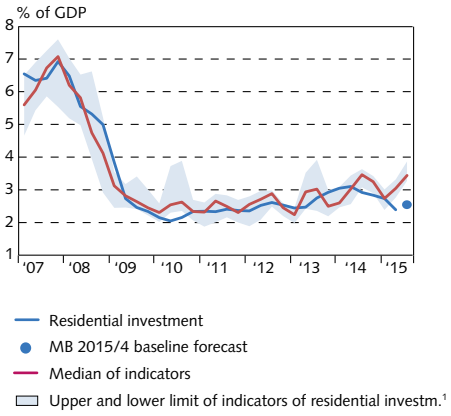
Residential investment growth in 2015 weaker than was forecast in August

In the first half of this year, residential investment contracted by over 13% year-on-year, according to preliminary figures from Statistics Iceland, whereas the forecast in the last *Monetary Bulletin* assumed an increase of 5%. This is somewhat at odds with both the Bank's forecast and projections from other forecasters, as well as with the indicators generally consulted in an assessment of residential investment activity (Chart IV-9). So far in 2015, both cement sales for construction outside the energy-intensive sector and imports of reinforcing steel have increased somewhat year-on-year. These indicators are well in line with the Federation of Icelandic Industries' (SI) assessment that there had been a large number of new residential housing starts during the year. Furthermore, figures from construction firms' value-added tax returns and new registrations of construction cranes indicate a marked increase year-on-year, lending further support to SI's estimates. Although these figures do not allow for a breakdown between residential and commercial housing, it appears likely that Statistics Iceland's residential investment figures will rise upon revision. According to the forecast, residential investment will increase by nearly 12% this year, which is still 6 percentage points less than in the August forecast. It is also assumed that rising house prices, which have been well in excess of the rise in construction costs in the recent past, and the improvement in households' financial position will support residential investment during the forecast horizon.

Strongest investment growth since 2006

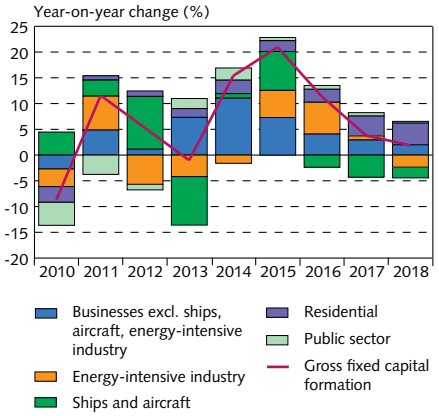
The need to expand firms' production capacity has increased in response to growing household demand and the recent surge in exports. Increased business investment has been the key driver of the pick-up in investment activity, which is unsurprising, given that the output slack is considered fully absorbed and a positive output gap is developing. This year, it is estimated that business investment will account for the lion's share of growth in total investment, which is estimated at more than one-fifth (Chart IV-10). If the forecast materialises, this will be the strongest growth rate in a single year since the peak of the Kárahnjúkar Power Station construction project in 2006. According to the current forecast, energy-intensive investment

Chart IV-9
Indicators of residential investment
Q1/2007 - Q3/2015



1. The indicators are imports of reinforcing steel, imports of other construction materials, and cement sales to buyers other than energy-intensive firms. In assessing the range, the variables are rescaled so that their average and standard deviation are the same as those for measured residential investment. The chart shows a two-quarter moving average.
Sources: Aalborg Portland Iceland, Sementsverksmiðjan ehf., Statistics Iceland, Central Bank of Iceland.

Chart IV-10
Gross fixed capital formation and contribution of its main components 2010-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

will be slightly less this year than was forecast in August and slightly more next year. Over the forecast horizon as a whole, the outlook is for slightly more energy-intensive investment than was provided for in the August forecast. If this projection is borne out, the investment-to-GDP ratio will be just under 20% in 2018, or about 1 percentage point below the thirty-year average.

Public sector

The baseline forecast assumes modest growth in government expenditure

Fiscal consolidation is discernible on the expenditures side, with real public consumption growth measuring about 1% in the first half of 2015, according to preliminary figures from Statistics Iceland. Over the same period, public investment contracted slightly in real terms. Public consumption and investment are both forecast to grow slowly and steadily in real terms over the forecast horizon. An important factor here is the steep rise in expenses due to pay increases, which, in the absence of changes in planned nominal expenditure, holds back real growth in public consumption at both the state and the municipal levels. For example, several municipalities have already announced that they will have to resort to layoffs if negotiated wage increases are comparable to those provided for in the recent arbitration panel ruling.

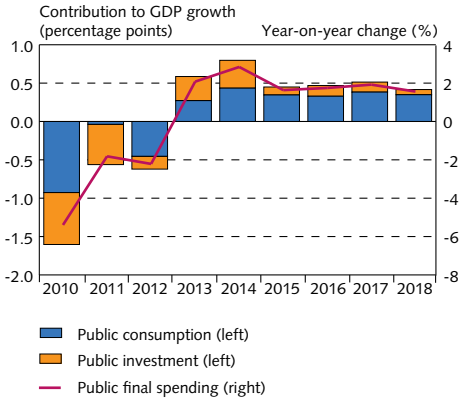
Public consumption is projected to grow by about 1½% per year during the forecast horizon, and as in Ministry of Finance and Economic Affairs estimates, the ratio of public investment to GDP is expected to hold unchanged throughout the forecast horizon at about 3%. If the forecast materialises, this will mark a turning point in these economic variables during the business cycle, just as several years' contraction in public consumption and investment did in the wake of the financial crisis. The contribution of public expenditure to GDP growth will therefore be modest in coming years, at about ½ a percentage point per year (Chart IV-11). On the other hand, there is the risk that expenditure targets will not be met, owing to large cost increases like those provided for in public employees' wage settlements.

Outlook for a relatively stable surplus on the primary Treasury balance

According to the spring fiscal plan, prepared in April, the primary Treasury balance was assumed to improve by 0.4 percentage points of GDP between 2016 and 2019.[1] In the recently presented fiscal budget proposal, however, this improvement is cut in half; therefore, the fiscal policy response to the recent wage settlements, as measured in changes to the primary balance, is limited. Over the same period, it is assumed that the deficit in the financial balance will narrow significantly because of deleveraging, which means that the overall surplus will grow slightly over the period (Chart IV-12).

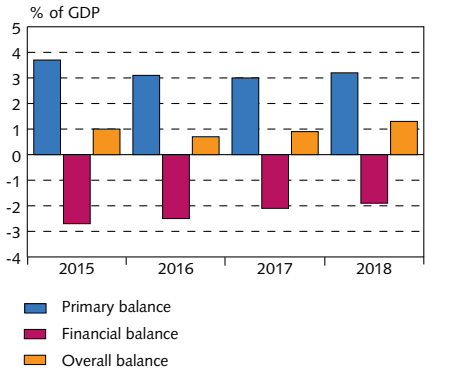
1. The primary balance for 2017 is adjusted for the accelerated write-down of indexed mortgage loans.

Chart IV-11
Public consumption and investment 2010-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

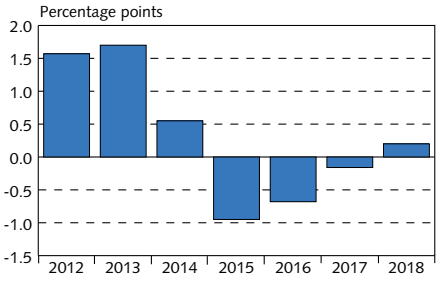
Chart IV-12
Central government balances 2015-2018[1]



1. National account basis.
Sources: Ministry of Finance and Economic Affairs, Central Bank of Iceland.

The accumulated reduction in revenues due to systemic changes on the revenues side since autumn 2013, excluding the bank levy, totals 1.6% of GDP in 2016. Substantial tax revenues have been relinquished at a time of consolidation on the expenditures side. Therefore, the easing of the fiscal stance stems primarily from changes on the revenues side. The declared objective in the fiscal budget proposal – that the ratio of primary revenue to GDP must not rise during the period 2016-2019 – therefore appears to be at odds with the objective of allowing automatic fiscal stabilisers to work, which would entail permitting the ratio to rise during an upward cycle. Primary expenditure relative to GDP declines at the same time, however, according to the budget proposal, as is generally the case during an economic recovery (see the discussion of the 2016 fiscal budget proposal in Box 3). According to the Central Bank forecast, real growth in primary expenditure will be outpaced by GDP growth; therefore, the primary expenditure-to-GDP ratio excluding irregular items will decline by just over 1% of GDP during the period. These assumptions are somewhat uncertain, however, particularly in view of possible expenditure pressures related to an increase in the Treasury's special revenues concurrent with capital account liberalisation (see also the discussion of uncertainties in Chapter I).

Chart IV-13
Change in central government cyclically adjusted primary balance 2012-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Financial Management Authority, IMF, Central Bank of Iceland.

Fiscal stance to ease until 2017

The fiscal stance is reflected in the cyclically adjusted primary balance (see the discussion of the output gap later in this chapter). Measured in terms of changes in the cyclically adjusted primary balance, the Treasury outcome will deteriorate by a total of 1.6 percentage points during the period 2015-2018. The easing is greatest in 2015 and 2016, at 0.9 and 0.7 percentage points, respectively (Chart IV-13). The fiscal stance therefore eases in spite of the improvement in the overall balance, as the primary surplus does not increase, whereas spare capacity disappears and a positive output gap develops at the same time. This is also slightly more slack than was assumed in the May forecast, which is the Bank's most recent assessment of the fiscal stance.

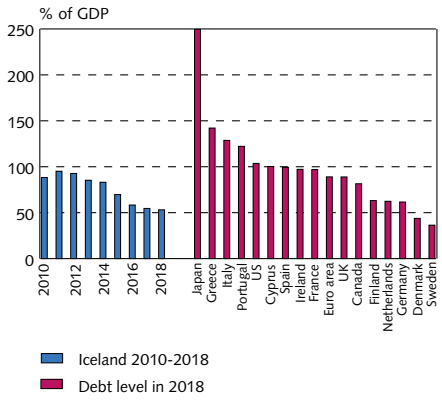
Treasury debt falls rapidly

The fiscal budget proposal for 2016 provides for rapid reduction of Treasury debt, although account has not been taken of the impact of the capital account liberalisation strategy on central government finances, except that the Central Bank bond will be paid off by the Treasury in the first half of the year.[2] This debt payment amounts to about 6% of GDP. Another extraordinary debt reduction measure is expected in connection with the sale of the Treasury's 30% stake in Landsbankinn. The ratio of Treasury debt to GDP was 75% at year-end 2014 and will decline to 62% by the end of 2015, according to the plan accompanying the budget proposal. With the above-mentioned extraordinary deleveraging measures, the ratio will fall still further, to just under 50% of GDP by the end of 2016, whereas the forecast in *Monetary Bulletin* 2015/2 assumed 61%. The change from that

2. The Government strengthened the Central Bank's capital position with a special bond issue.

forecast is due equally to the retirement of the Central Bank bond and the Treasury's buyback of the outstanding US dollar bonds it issued in 2011 to expand the foreign exchange reserves. The buybacks reduced gross Treasury debt by about 2.7% of GDP. In addition to those bonds, the Avens bond and the loans taken in connection with the Stand-By Arrangement between the authorities and the International Monetary Fund (IMF) have been paid off.[3] Treasury financing of the foreign exchange reserves has therefore been reduced. According to the forecast, the gross debt of the Treasury and the general government will amount to 45% and 53% of GDP, respectively, by year-end 2018. This would be in compliance with the fiscal rule concerning indebtedness that is set to take effect with the new legislation on public sector finances, and it means that Iceland's general government debt ratio would be similar to Germany's (Chart IV-14).

Chart IV-14
General government gross debt



Sources: IMF, Central Bank of Iceland.

External trade and the current account balance

Growth in total exports driven by services in 2015

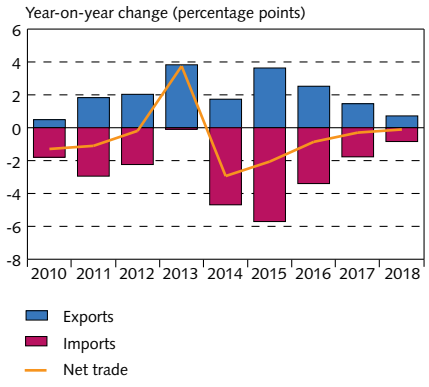
Exports of goods and services were up 9% year-on-year in the first half of 2015, with growth driven primarily by a 15% increase in services exports. Services exports grew considerably more than was projected in August, whereas goods exports were broadly in line with that forecast. Growth in services exports is due principally to booming tourism and sizeable one-off revenues from intellectual property patents in Q2. Although this handsome growth will probably not reflect developments over the year as a whole, it is likely that all components of services exports will exceed the projections in the August forecast. The travel component weighs heaviest here, with the number of passengers travelling to Iceland up more than a fourth year-on-year so far in 2015. This is a larger increase than was recorded at the same time in 2014, and the country's two largest airlines have already increased their seat offerings by a considerable margin. As a result, stronger growth in services exports is expected this year, although the outlook is for somewhat weaker goods exports. The outlook for goods exports is due somewhat to weaker growth in marine product exports, which in turn stems from reduced mackerel catches, the Russian import ban, and poor sales to Nigeria. In spite of relatively unfavourable developments in external conditions, total exports are forecast to grow by nearly 7% this year, which is broadly in line with the forecast in the August *Monetary Bulletin*. The outlook for the next two years has deteriorated, however, in line with a weakening competitive position and poorer prospects for trading partner demand (see Chapter II and Box 2).

Import growth at its strongest since H1/2006

In the first half of 2015, goods and services imports grew by nearly 14% year-on-year, the strongest growth rate since H1/2006, owing mainly to substantial aircraft imports in the first quarter. Even exclud-

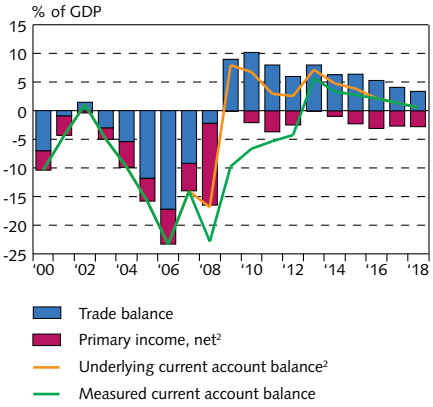
3. The Avens bond was due to the Treasury's purchase of asset-backed bonds issued by Avens B.V., a company owned by the old Landsbanki Íslands. In summer 2008, the bank had received a facility from the European Central Bank (ECB) in Luxembourg against collateral in Avens B.V. bonds. Avens' assets consisted primarily of Icelandic bonds, and the company became the largest single owner of ISK assets outside Iceland.

Chart IV-15
Contribution of net trade to GDP growth 2010-2018[1]



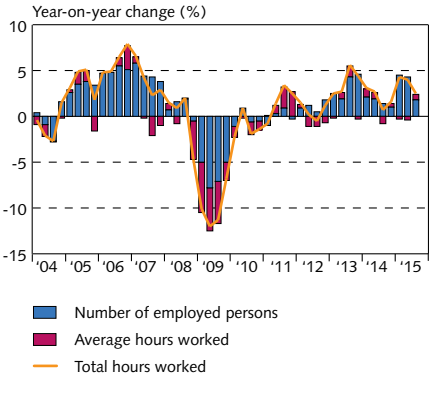
1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-16
Current account balance 2000-2018[1]



1. Including secondary income. Central Bank baseline forecast 2015-2018.
2. Excluding the calculated income and expenses of DMBs in winding-up proceedings but including the estimated effects of the settlement of their estates, and excluding the effects of pharmaceuticals company Actavis on the balance on income until 2012. Also adjusted for the failed DMBs' financial intermediation services indirectly measured (FISIM).
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-17
Changes in employment and hours worked
Q1/2004 - Q3/2015



Source: Statistics Iceland.

ing ships and aircraft, import growth is at its highest since H1/2006: without them, imports were up 9% year-on-year, outpacing domestic demand growth over the same period. The rise in the real exchange rate could partly explain the rise in imports, but strong domestic demand for consumer goods and for commodities and operational imports is a factor as well. Indications from Statistics Iceland's external trade figures suggest that growth in goods imports has eased as the year has progressed but continues to be consumer-driven to a large degree. Icelandic Tourist Board figures on Icelanders' departures via Keflavík International Airport and the Gallup survey of overseas travel plans indicate that tourism imports are also growing markedly between years, in line with Icelanders' increased purchasing power. On the whole, import growth excluding ships and aircraft is assumed to remain about the same for 2015 as a whole as it was in H1. Imports of all goods and services will grow somewhat more, however, or about 12%, slightly less than was forecast in August.

Negative contribution of net trade to GDP growth despite robust export growth

Imports are forecast to grow in excess of exports this year; therefore, the contribution of net trade to GDP growth will be strongly negative for the second year in a row (Chart IV-15). According to figures from Statistics Iceland, this was the case in the first half, in spite of strong export growth. The forecast assumes that the contribution from net trade will be somewhat more negative in H2 than in H1, in part because the surge in patent revenues in Q2 is not expected to continue unabated. The contribution of net trade to GDP growth is forecast to be negative by 2 percentage points over 2015 as a whole, on the heels of a 3-point negative contribution in 2014.

Surplus on combined goods and services trade set to shrink

Last year the surplus on goods and services trade amounted to nearly 6½% of GDP. H1/2015 showed a surplus comparable to that in 2014, and the outlook for the year as a whole is similar as well. The surplus is projected at just over 6%, slightly less than was forecast in August. As in the previous forecast, the surplus is expected to narrow in coming years, to about 5% in 2016 and 3% by 2018 (Chart IV-16).

Current account surplus to shrink accordingly

The underlying deficit on primary income including secondary income totalled 23 b.kr. in H1/2015, a slightly larger deficit than was assumed in the August forecast, as the preliminary estimate of primary income for Q1 was revised downwards. The underlying current account surplus totalled 40 b.kr. in H1, or just under 4% of GDP. As is the case for the goods and services accounts, the outlook is for a somewhat smaller underlying current account surplus in 2015 than was forecast in August. Prospects for coming years are broadly unchanged, however. The underlying current account surplus is projected to continue shrinking, to about ½% of GDP by 2018 (Chart IV-16). If this forecast materialises, national saving will remain above 20% of GDP during the forecast horizon.

Labour market

Swifter rise in total hours worked than was forecast in August

The forecast in the August *Monetary Bulletin* assumed that the impact of the cost increases provided for in the recent wage settlements would be reflected to some extent in reduced labour demand. There are few signs of this as yet, although it is difficult to assess how strong demand would have been without these large cost increases. According to the Statistics Iceland labour force survey (LFS), labour demand did grow somewhat more slowly in Q3 than in the first half, albeit somewhat more strongly than had been forecast. Total hours worked rose by 2.4%, whereas the forecast assumed an increase of just under 2%. So far this year, total hours have increased by 3.5%, but unlike the first half of the year, the increase in Q3 is due both to a rise in the number of employed persons and average hours worked (Chart IV-17). However, as is discussed in the May issue of *Monetary Bulletin*, average hours worked have grown slowly since 2011, and in Q3 they were still somewhat below the third-quarter average in 2003-2015 and well below the pre-crisis average.

According to the LFS, the labour participation rate and the employment rate also rose somewhat between years, and the number of persons outside the labour market continued to fall. Seasonally adjusted unemployment measured 4% in Q3, having declined by 0.2 percentage points quarter-on-quarter.[4] The fall in the unemployment rate was smaller than the rise in the employment rate, however, as the participation rate increased considerably (Chart IV-18).

Increased optimism about the employment outlook

According to the Gallup survey carried out in August and September among Iceland's 400 largest firms, respondents are considerably more upbeat about staff recruitment than they were in the spring survey, which was conducted around the time wage settlements were being finalised (Chart IV-19). According to the autumn survey, firms interested in recruiting staff in the next six months outnumbered those planning redundancies by just over 17 percentage points. More companies are planning to recruit now than according to the summer survey, and fewer are planning to reduce staffing. Executives in all sectors except tourism were more optimistic about recruitment than in the summer survey. The public also seems quite optimistic about the employment outlook and, according to the Gallup Consumer Sentiment Index in October, expectations towards the employment situation have not measured higher since October 2007.

Increased labour use rather than productivity growth during the economic recovery

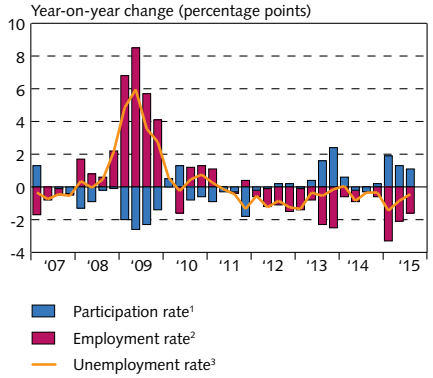
As is stated above, the total hours have risen markedly this year. In the first half, GDP growth exceeded the increase in total hours, resulting in an increase in labour productivity, which has remained virtually

4. Unemployment as registered by the Directorate of Labour (DoL) was less, or 3%, in Q3, after adjusting for seasonality. It had declined very slightly between quarters and by just over ½ a percentage point between years.

Chart IV-18

Contribution to changes in unemployment rate

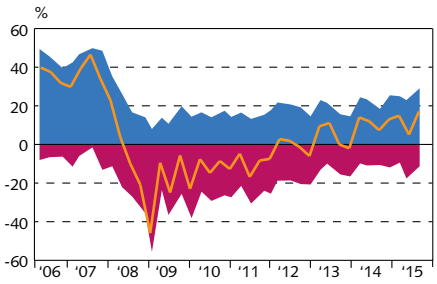
Q1/2007 - Q3/2015



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 IV-19

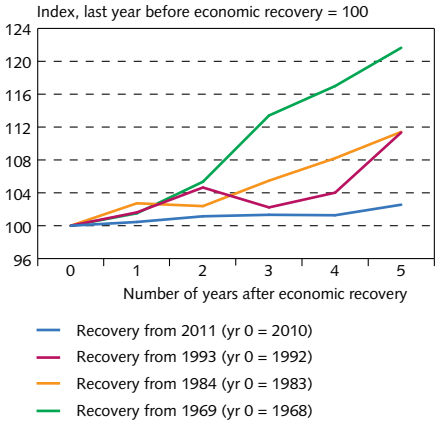
Companies planning to change staffing levels within 6 months



Source: Gallup.

Chart IV-20

Post-crisis labour productivity¹

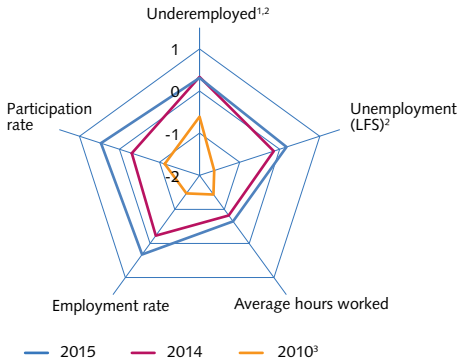


1. From 1991, the ratio of GDP to total hours worked; before 1991, the ratio of GDP to man-years. Data for 2015 are based on the forecast in *Monetary Bulletin* 2015/4. The four contractions are periods featuring a significant contraction in measured GDP.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-21

Indicators of labour market tension in the third quarter of the year

Deviation from third-quarter average in 2003-2015 (number of standard deviations)



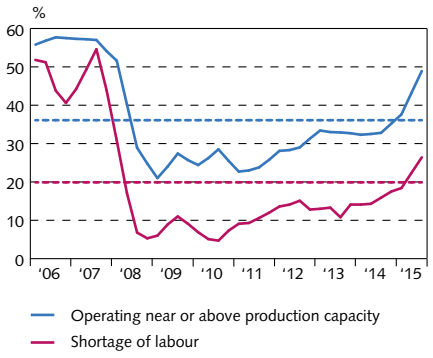
1. Number of underemployed part-time workers as a percentage of population. 2. Multiplied by -1 so that a negative deviation from the average indicates tension. 3. The year when labour market recovery began.

Sources: Statistics Iceland, Central Bank of Iceland.

Chart IV-22

Indicators of factor utilisation[1]

Q1/2006 - Q3/2015

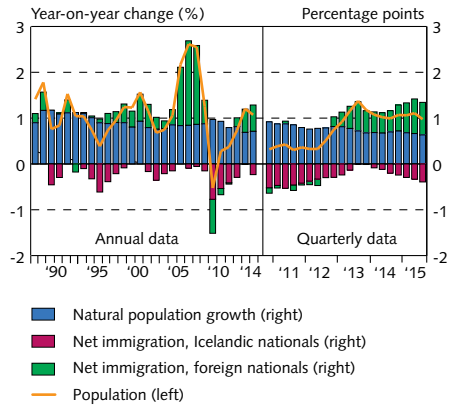


1. According to Gallup Sentiment Survey among Iceland's 400 largest firms. Seasonally adjusted data. Twice a year respondents are asked if their production is near or above capacity; therefore, a linear interpolation is used to generate quarterly data. Broken lines show period averages.

Sources: Gallup, Central Bank of Iceland.

Chart IV-23

Contribution to population changes[1]



1. Population figures are annual for 1987-2014 and quarterly from Q4/2010 onwards.

Sources: Statistics Iceland, Central Bank of Iceland.

flat for the past five years. The current recovery is therefore quite dissimilar to previous recoveries as regards the slow improvement in productivity (Chart IV-20). This development is in line with those in many developed economies in recent years however (see Chapter IV in *Monetary Bulletin* 2015/2). Productivity growth is projected at just over 1% year-on-year in 2015, and if the forecast materialises, the next few years will be broadly similar. The pick-up in productivity is slightly greater than in the last forecast, as GDP growth is projected to be stronger, but it is well below the average of the past three decades, which is close to 2% per year.

Indicators of factor utilisation

Far more firms consider themselves understaffed

The slack in the labour market appears to have been considerably smaller in Q3 as compared with the third quarter of previous years, owing to strong labour demand in the first half (Chart IV-21). In terms of the deviation of unemployment, the labour participation rate, the employment rate, and the underemployed from the 2003-2015 average, the slack had already disappeared, but average hours worked were still below their historical average.[5] In view of how slowly average hours worked have increased, however, there still may be some scope to satisfy increased labour demand without creating additional wage pressures. The share of firms considering themselves short-staffed rose by about 7 percentage points between Gallup's summer and autumn surveys. In the autumn survey, about a fourth of respondents considered themselves understaffed (Chart IV-22). Because this information extends only back to 2006, however, the average for the period (43%) is probably not a good indicator of normal factor utilisation.

The results of the autumn survey also give rise to the question whether it is now more difficult for firms to address staffing problems with imported labour, but net immigration of foreign nationals has been considerable in recent years (Chart IV-23). This applies in particular to the assessment by firms in the construction sector, which has relied most heavily on imported labour to address staffing shortages. According to Gallup's autumn survey, about ⅔ of construction firms considered themselves understaffed, and over 70% were interested in recruiting. In the tourism sector, which also uses foreign workers to address staffing shortages, some 40% of firms considered themselves understaffed.

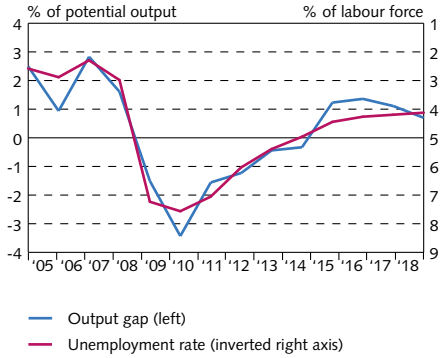
Positive output gap has developed

Since the post-crisis economic recovery began, the margin of spare capacity in the economy has narrowed steadily. Increased use of the capital stock and declining unemployment in recent years are signs of this. Indications from surveys suggest strongly that the positive

5. Statistics Iceland published recently a detailed breakdown of the labour force, which includes a potential addition to the labour market. There are three groups: those that are employed part-time and want to work more (underemployed) and those who are outside the labour market and are (a) seeking work but cannot begin work within two weeks or (b) could begin work within two weeks but are not looking for work (see Box 3 in *Monetary Bulletin* 2015/2).

output gap has widened over the course of the year. According to the Gallup survey conducted this autumn, the number of firms considering themselves understaffed had risen sharply, as did the number that would have difficulty responding to a sudden increase in demand (Chart IV-22). The slack in the economy is considered to have virtually disappeared in 2014, and this year GDP is expected to grow in excess of potential output, giving rise to an output gap of nearly 1½% of potential output (Chart IV-24), somewhat more than was assumed in the Bank's August forecast.

Chart IV-24
Output gap and unemployment 2005-2018[1]



1. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

V Inflation

Inflation measured 2% in Q3/2015, somewhat below the projection in the August *Monetary Bulletin*. In recent months, however, it has risen in comparison with the first half of the year, owing mainly to increased house prices and domestic goods and services prices. The decline in global oil prices has lowered headline inflation markedly, however. Domestic inflationary pressures have increased in the wake of the recent wage agreements, although the appreciation of the króna and the decline in global goods prices have pulled in the opposite direction. It is not clear how persistent these effects will be, however, and near-term developments in wage costs are highly uncertain, owing to the possibility of a review of wage settlements. By most measures, inflation expectations are above the Bank's inflation target, although recent developments in inflation expectations have been somewhat ambiguous.

Recent developments in inflation

Inflation has been lower than expected

Inflation has been below the Bank's target since the beginning of 2014. It measured 2% in the third quarter of this year, somewhat less than was forecast in the August *Monetary Bulletin*. Excluding housing, prices were up by only 0.6% year-on-year in Q3. The deviation from the previous forecast is due mainly to the recent appreciation of the króna, as well as to a larger-than-expected drop in global oil prices. The decline in domestic petrol prices had a marked effect on the CPI during the quarter. Furthermore, the inflationary effects of the recent wage settlements appear thus far to be more modest than was assumed in the August forecast, probably due in part to the appreciation of the króna and the improvement in terms of trade in recent months.

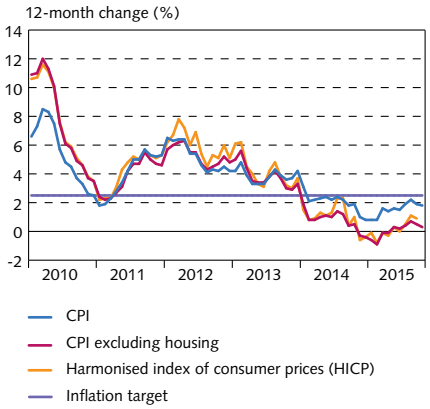
The CPI rose by 0.07% month-on-month in October, after falling by 0.4% in September. The unexpected decline in September was due mainly to a steep drop in airfares. In October, the main driver was rising house prices. Twelve-month inflation measured 1.8%, roughly unchanged since just before the publication of the August *Monetary Bulletin* (Chart V-1). Twelve-month inflation excluding housing has declined slightly since then, measuring 0.3% in October. Inflation in terms of the HICP (which also excludes housing costs) has been somewhat higher in recent months, with the twelve-month increase measuring 0.9% in September, up from 0.5% in July 2015.

Underlying inflation and other indicators of inflationary pressures

Domestic factors the main drivers of inflation

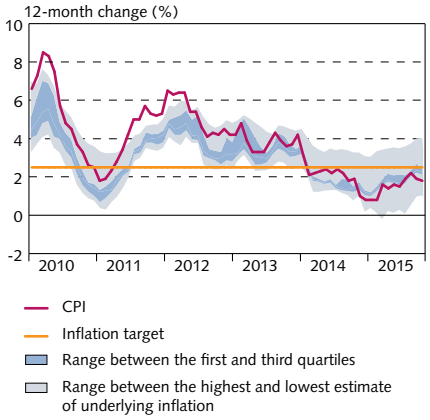
Underlying inflation has also risen since the beginning of the year, although it is still low by most measures. Underlying twelve-month inflation in terms of core index 3 (which excludes the effects of indirect taxes, volatile food items, petrol, public services, and real mort-

Chart V-1
Various measures of inflation
January 2010 - October 2015



Sources: Statistics Iceland, Central Bank of Iceland.

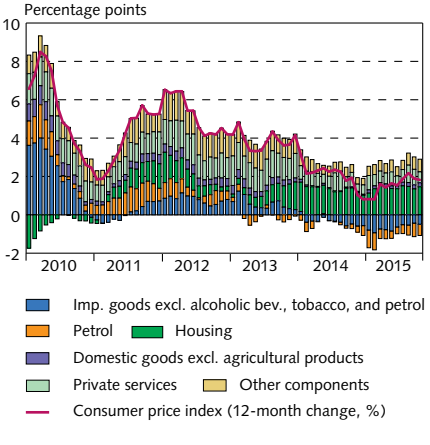
Chart V-2
Headline and underlying inflation[1]
January 2010 - October 2015



1. The shaded area includes different measures of underlying inflation; core indices that exclude the effects of volatile food items, petrol, public services and owner-equivalent rent and statistical measures such as the weighted median, the trimmed mean and a dynamic factor model.

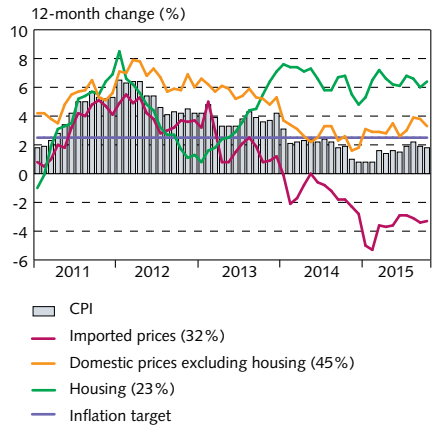
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-3
Components of CPI inflation
Contribution to inflation January 2010 - October 2015



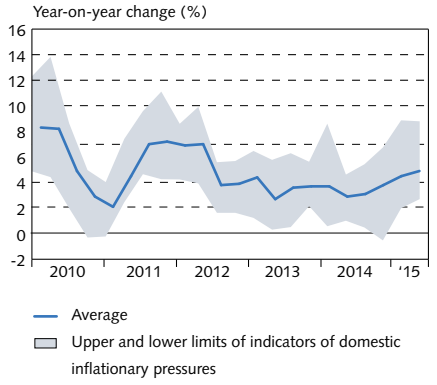
Source: Statistics Iceland.

Chart V-4
Imported and domestic inflation[1]
January 2011 - October 2015



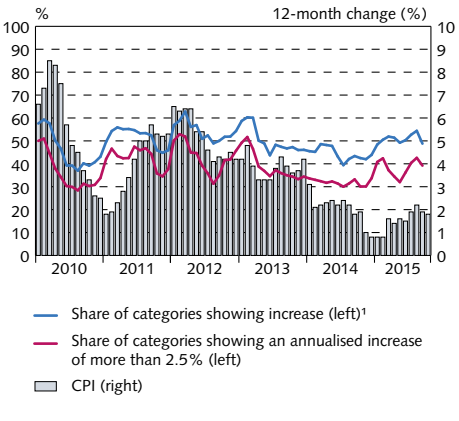
1. Imported inflation is estimated using imported food and beverages and the price of new motor vehicles and spare parts, petrol, and other imported goods. Domestic inflation is estimated using the price of domestic goods and the price of private and public services. The figures in parentheses show the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

Chart V-5
Domestic inflationary pressures[1]
Q1/2010 - Q2/2015



1. Upper and lower limits of five indicators of domestic inflationary pressures. The indicators are unit labour costs, the GDP price deflator, prices of private services and domestic goods, and producer prices of goods sold domestically.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-6
Distribution of price increases in the CPI
January 2010 - October 2015



1. The share of goods categories that rise in price is a 3-month centred average.
Source: Statistics Iceland.

gage interest expense) measured 1.9% in October and, if the market price of housing is also excluded, about 0.6%. Statistical measures of underlying inflation suggest that it lies in the 2-4% range and is unchanged, on average, since July (Chart V-2).

The main drivers of rising inflation year-to-date have been domestic price increases in, for instance, housing, private services, and domestic goods. Higher house prices explained more than ¾ of twelve-month inflation in October and increased prices of private services and domestic goods about ⅔, whereas falling prices of imported goods, oil in particular, have pulled strongly in the opposite direction (Chart V-3). Domestic inflationary pressures appear to have increased somewhat in recent months, as domestic inflation (excluding housing) was 3.3% in October, as opposed to 3% in July. On the other hand, imported goods prices had fallen by 3.3% year-on-year in October. By this measure, the difference between domestic and imported inflation has widened (Chart V-4). Chart V-5 also shows that, in terms of the average of several different factors reflecting domestic costs, domestic inflationary pressures had increased steadily from mid-2014 through Q2/2015. Closer scrutiny of the distribution of price increases across CPI components reveals similar developments: even though inflation is still low, on average, more than half of CPI components have risen every month so far this year, as was the case in 2013, when average inflation was much higher, or 3.9% (Chart V-6).

Other indicators also imply that cost pressures have increased. Producer prices of goods sold domestically rose 4.3% year-on-year in Q3, as opposed to 3.3% in Q2. According to the results of Gallup's autumn survey, carried out in August and September, about 42% of corporate executives expected their goods and services prices to increase in the upcoming six months, as opposed to 37% in the spring survey, conducted in March. By the same token, nearly 60% of firms expected input prices to rise in the next six months, as compared with 50% in March (Chart V-7).

Króna appreciation and falling global goods prices offset increased cost pressures

Increased domestic inflationary pressures can be attributed in large part to the pay increases negotiated in the recent wage settlements. Thus far, however, the appreciation of the króna in recent months and the drop in imported goods prices seem to have offset most of the inflationary effects of these cost increases. It is possible that the appreciation currently passes through to the price level more strongly than often before, as it is based largely on economic fundamentals and occurs in spite of the Central Bank's sizeable foreign currency purchases (see Chapter III). In view of this, firms could consider the appreciation more persistent than those occurring in previous upswings.

The composition of inflation is reminiscent of the situation in 2003-2005, however, when headline inflation was low partly because the króna had appreciated and imported inflation was low at a time of strong domestic inflationary pressures, which emerged, among other things, in steeply rising house prices. When the exchange rate gave

way in 2006, inflation rose rapidly. In view of the significant inflationary pressures deriving from the labour market at present and the widening positive output gap, it is relatively likely that headline inflation does not fully reflect the existing underlying inflationary pressures. The outlook is for inflation to rise again once the effects of reduced global goods prices taper off (see the discussion of the risk profile for the inflation forecast in Chapter I).

Wage costs probably underestimated

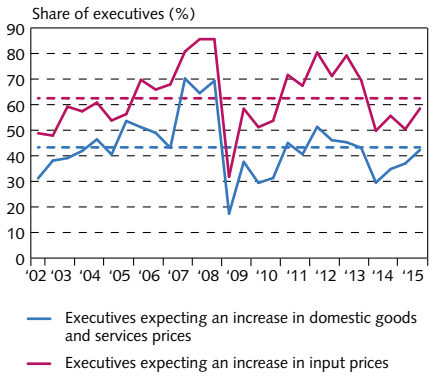
In September, Statistics Iceland published revised wage cost figures based on the national accounts for 2007-2014. National accounts figures for wages and related expenses usually change somewhat with each revision (Chart V-8). The most recent revision shows that, on average, wages per man-year were somewhat higher than previously estimated during the period in question, but the impact of the revision varies from year to year. The wage share (wages and related expenses relative to gross factor income) was 62.2% in 2014, an increase of more than 2 percentage points year-on-year (Chart V-9). It was then 1.3 percentage points above its twenty-year average, and if the baseline forecast materialises, by 2018 it will be broadly in line with the pre-crisis peak from 2006-2007.

The pay increases provided for in the recently concluded wage agreements have surfaced in the wage index, as was assumed in the last forecast, and wage drift has been broadly as projected (for further information on the assessment of wage developments, see Box 4). The wage index rose in Q3/2015 by 3.5% quarter-on-quarter and by 7.9% year-on-year.

The arbitration panel ruling that applied to most members of the Association of Academics and the Icelandic Nurses' Association entailed pay increases much larger than those provided for in the private sector wage agreements from previous months, which were nonetheless sizeable. The cost increases deriving from the contracts reached with large public sector unions in late October are similar to those provided for in the arbitration panel ruling. The review clause in the wage agreements might therefore be triggered, as one of the premises for those agreements was that the wage policy provided for would serve as a guideline for other collective bargaining negotiations. The social partners have therefore been engaged in discussions in an attempt to reach an agreement on changes in wages and rights, thereby forestalling early termination of wage agreements next February, when the review clause is to be invoked. An agreement has been signed concerning a change in the procedure for wage settlements, but a final conclusion has not been reached concerning how the contract review next February will be handled. All ideas on this topic that have been discussed entail a larger rise in wage costs than was assumed in the August forecast, and the assumptions in the current forecast take account of some of these ideas. Furthermore, the pay rises in public sector wage agreements are larger than was assumed in the last forecast, owing to the arbitration panel ruling and the agreements reached with State employees in late October.

Chart V-7

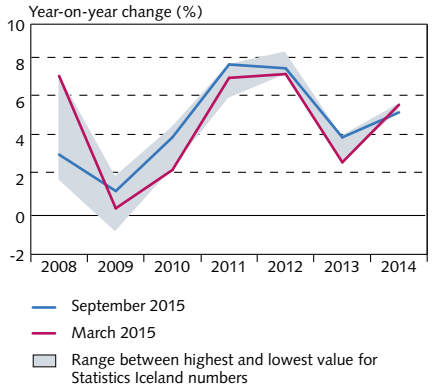
Corporate expectations of input and product prices six months ahead 2002-2015[1]



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

Chart V-8

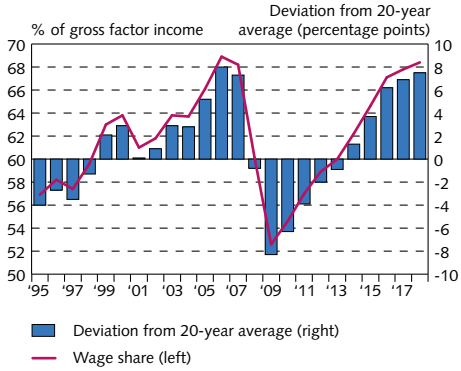
Wages per man-year



Sources: Statistics Iceland, Central Bank of Iceland.

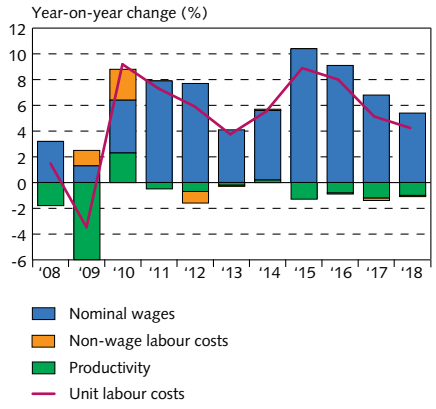
Chart V-9

Wage share 1995-2018[1]



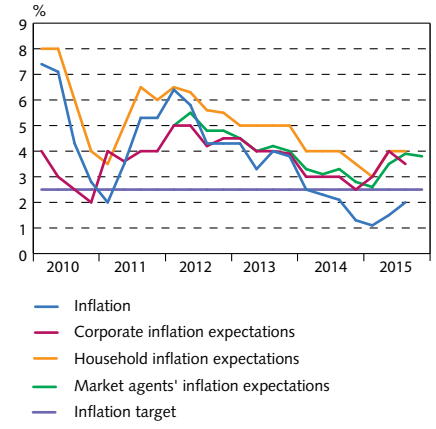
1. The 20-year average is 60.9% (base 1997). Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-10
Unit labour costs and contribution of underlying components 2008-2018[1]



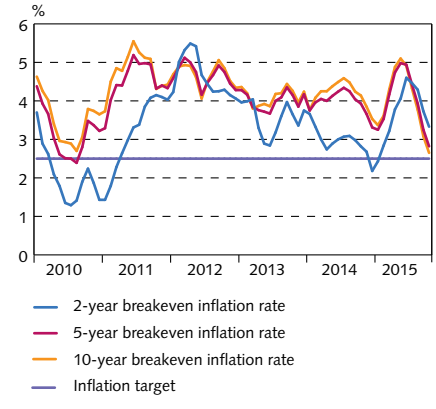
1. Labour productivity growth is shown as a negative contribution to an increase in unit labour costs. Central Bank baseline forecast 2015-2018.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart V-11
Inflation and inflation expectations one year ahead
Q1/2010 - Q4/2015



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

Chart V-12
Breakeven inflation rate[1]
January 2010 - October 2015



1. Forward breakeven inflation rate based on nominal and indexed yield curves (monthly averages). The breakeven rate indicates the expected annual inflation rate in two, five, and ten years.
Source: Central Bank of Iceland.

As in the August forecast, it is assumed that the pay rises will be retroactive to the beginning of May. Therefore, wages will rise more during the contract period than was forecast in August. On the other hand, if the agreements reached are in line with the ideas discussed by the social partners, they will entail larger pay hikes than are provided for in the current forecast. Given the tension that appears to be developing in the labour market, wage drift could also be underestimated in the forecast. Although wages will rise somewhat more in 2015 than was projected in August, the increase between annual averages is broadly in line with that forecast, as new figures from Statistics Iceland show that wages were higher, on average, in 2014 than earlier figures had indicated. Unit labour costs are therefore expected to increase by 9% this year, as in August, and by 8.1% next year instead of the previously forecasted 7.4% (see Chapter IV and Chart V-10).

Inflation expectations

Developments in inflation expectations highly uncertain

Inflation expectations had risen considerably by most measures at the time the August *Monetary Bulletin* was published. Developments since then have been somewhat ambiguous, however, possibly due to increased uncertainty about domestic price developments. The breakeven inflation rate in the bond market, as calculated from the difference between interest rates on indexed and non-indexed bonds, has fallen since August. Although the decline probably reflects to some extent the appreciation of the króna, low global inflation, and reduced pessimism about inflation in comparison with the period prior to the wage settlements, it is difficult to interpret developments in the breakeven rate, as it is also affected by the recent surge of capital inflows, which has led to a marked decline in yields on long nominal Treasury bonds (see Chapter III and Box 1). The breakeven inflation rate two years ahead averaged 3.3% in October, having declined by 1 percentage point since August. The same does not apply to market agents' short-term inflation expectations. According to the Bank's late-October survey of market agents' inflation expectations, conducted just before the publication of this *Monetary Bulletin*, respondents expected inflation to measure 3.8% one year ahead, which is 0.1 percentage points less than in the August survey (Chart V-11). Their inflation expectations two years ahead measured 4% or ½ a percentage point higher than in August. These results therefore indicate that only a small part of the decline in the breakeven rate can be contributed to a real decline in inflation expectations.

Similar developments can be seen in Gallup's autumn survey among corporate executives, who projected inflation at 3.5% one year ahead, a decline of ½ a percentage point since this summer. Their inflation expectations two years ahead rose slightly, however, and also measured 3.5%. Households appear to expect slightly higher inflation in the coming term. According to the survey carried out in September, their inflation expectations one and two years ahead were unchanged since last summer, at 4%.

Market agents' long-term inflation expectations are broadly unchanged

Indications of long-term inflation expectations are also somewhat ambiguous. Market agents expect inflation to average just under 3½% in the next ten years, which is broadly similar to their response in August. On the other hand, the ten-year breakeven inflation rate in the bond market has declined, averaging 2.7% in October, just over 1 percentage point lower than in August (Chart V-12). The above-mentioned effects of foreign capital inflows into the domestic bond market are also a factor here. In addition, it is possible that the short-term factors that have caused inflation to turn out lower than expected have spread to long-term inflation expectations to some extent.

Box 1

Recent turbulence in the domestic bond market: capital inflows and reduction of nominal long-term interest rates

The breakeven inflation rate in the bond market rose sharply in the first half of the year, apparently reflecting to a large extent rising market inflation expectations and increased uncertainty about the inflationary effects of the wage settlements then pending (see Box 2 in *Monetary Bulletin* 2015/2). Early in the summer, however, it began to decline again (Chart 1). Wage settlements for most of the private sector had recently been approved, and they provided for sizeable pay increases, albeit smaller than many had feared, given the steep wage demands that had been made. Uncertainty about the inflation outlook was therefore considered to have subsided, and the Central Bank's Monetary Policy Committee (MPC) had already responded to increased inflationary pressures by raising interest rates and signalling further rate hikes in the future. Even though the breakeven inflation rate declined during the summer, it remained elevated, particularly at the long end of the yield curve.

In recent weeks, however, it has fallen still further. The breakeven rate on long bonds is currently lower than it was at the beginning of the year, and long-term Treasury bond interest rates are now at a similar level as the Central Bank's key rate (Chart 2). As a result, the yield curve has become inverted (Charts 3 and 4). What is the reason for this sudden drop in nominal bond yields and the resulting decline in the breakeven inflation rate? And what impact can a development like this have on monetary policy conduct and transmission?

Determinants of nominal bond yields

Yields on nominal Treasury bonds consist of three main components: expectations concerning developments in short-term real rates over the lifetime of the bond, inflation expectations over the same period, and a risk premium. Changes in yields can therefore reflect changes in one or more of these factors. Breaking down bond yields into their components is not simple, nor is interpreting changes in them. This applies particularly to the risk premium, which actually covers a number of different premia, including inflation risk premium, a credit risk premium, and a liquidity premium. The risk premium can also vary depending on the duration of the bonds and is generally higher for long-term bonds because of greater uncertainty about future developments in the underlying factors, such as inflation, economic activity, and interest rates. Yields on longer bonds therefore include what is called a term premium, which is the additional return demanded by investors for investing in long-term bonds as opposed to rolling over shorter bonds from the same issuer. The term premium is generally positive; therefore, the yield curve is usually upward-sloping. However, this can change if, for instance, investors' assessment of the risk attached to long bonds changes, or if there are changes in demand for long bonds for a given level of bond supply.

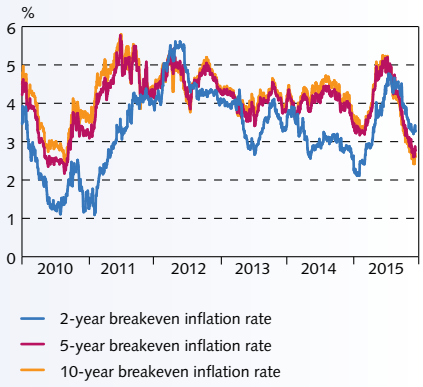
Inflation expectations have probably fallen …

An inverted yield curve because of the aforementioned decline in nominal bond yields could to some extent reflect expectations that short-term real rates will be somewhat lower in coming years than was expected earlier in 2015. It is unlikely, though, that this factor has weighed heavily in the fall in longer bond yields, as strong GDP growth and increased absorption of spare capacity in the economy are still generally expected, even though recent developments in inflation have been more favourable than previously anticipated. Also, according to the Central Bank's recent survey of market agent's expectations, respondents do not expect short-term real rates to be much lower in the long run than in the previous survey.

Chart 1

Breakeven inflation rates[1]

Daily data 4 January 2010 - 30 October 2015

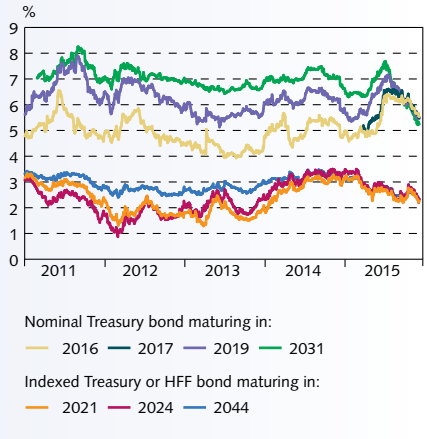


1. Forward breakeven inflation rate based on nominal and indexed yield curves. The breakeven rate indicates the expected annual inflation rate in two, five, and ten years.
Source: Central Bank of Iceland.

Chart 2

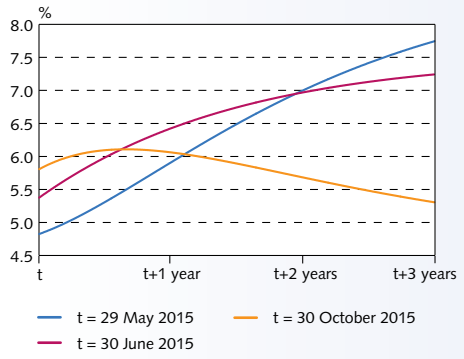
Nominal and indexed bond yields

Daily data 3 January 2011 - 30 October 2015



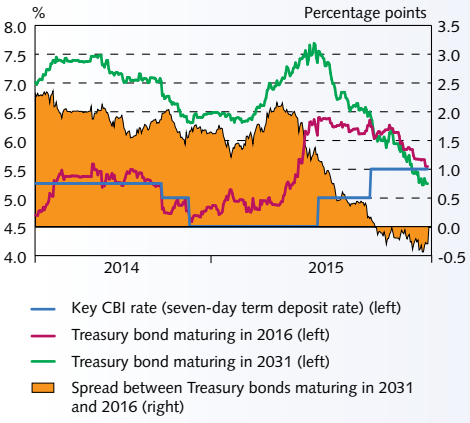
Source: Central Bank of Iceland.

Chart 3
Forward market interest rates[1]



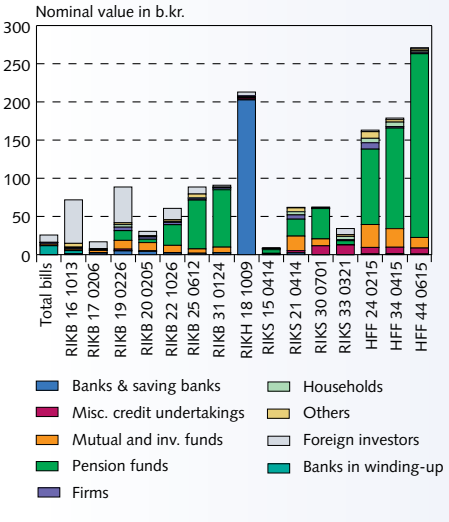
1. Interbank interest rates and Treasury bond yields were used to estimate the yield curve.
Source: Central Bank of Iceland.

Chart 4
Key Central Bank rate and nominal Treasury bond yields
Daily data 21 May 2014 - 30 October 2015



Source: Central Bank of Iceland.

Chart 5
Owners of Government securities and HFF bonds
As of 31 May 2015



Source: Central Bank of Iceland.

Another explanation for the reduction in long-term bond yields could be the decline in market agents' long-term inflation expectations, as investors' concerns about increased inflation following the wage settlements appear to have abated because inflation has turned out lower than forecasts (including the Bank's) had indicated. The Bank's market expectations survey also showed signs that respondents expect slightly lower near-term inflation than they did previously. However, the survey results indicate that they expect higher inflation in two years' time and that their long-term inflation expectations are broadly unchanged. As a result, it is difficult to see how changes in investors' expectations concerning developments in short-term real rates or long-term inflation expectations can play a leading role in the recent plunge in long-term interest rates. It is more likely that the explanation lies in changes in the risk premium on long nominal rates.

… but the decline in yields is probably due in large part to lower term premia …

It is difficult to see that uncertainty about the long-term inflation outlook has subsided much since early 2015; therefore, the decline in the inflation risk premium does not appear to be a major cause of the steep decline in long-term nominal Treasury bond yields. On the other hand, it could be due in part to a reduction in credit risk, owing to increased optimism about the Treasury's position following the publication of the capital account liberalisation strategy in early June and the ensuing upgrade in Iceland's sovereign credit ratings. The liberalisation of the capital controls is expected to entail a reduction in Treasury debt concurrent with the payment of stability contributions and/or taxes by the failed banks' estates, which, together with the new fiscal budget proposal, may well have fuelled expectations of reduced Treasury bond issuance. If a reduction in credit risk were an important explanation of the decline in long-term nominal bond yields, however, it could be expected to have a less pronounced impact on the slope of the yield curve than has been the case; furthermore, indexed bond interest should also have declined in a similar manner, whereas it has fallen considerably less since June. The stronger impact on long-term nominal bonds could however reflect their greater supply and liquidity as compared with similar indexed bonds (see Box 1 in *Monetary Bulletin* 2015/2); furthermore, it could be due to the fact that the vast majority of short nominal bonds are owned by non-residents with assets that are locked in by the capital controls. Such investors are likely to want to hold their Treasury bonds following the tightening of the controls in March which restricted their securities investments to Treasury bills only (Chart 5).

In view of all this, the steep drop in long-term interest rates appears to be due primarily to an increase in foreign investors' demand for long-term nominal Treasury bonds since late summer, which has pushed their term premia downwards.[1] Non-residents' new investment in long nominal Treasury bonds has amounted to nearly 49 b.kr. since end-May, as the risk-adjusted interest rate differential with abroad has seldom been wider (Charts 6 and 7). Iceland's interest rates are higher, and economic activity is stronger than in most other developed countries; furthermore, the exchange

1. This is also in line with the opinion of a majority of participants in the Central Bank survey, who were asked what they considered the main underlying reason for the decline in long-term breakeven inflation rates in the bond market since mid-summer. The greater impact on nominal rates than on indexed rates is therefore probably also a reflection of less interest by foreign investors in the latter bonds, as there is less of a tradition for such bonds abroad (indexed bond markets are still relatively small abroad, although indexed issuance has been on the rise). Issues relating to the Government guarantee of the Housing Financing Fund's indexed bonds could also have reduced investors' interest.

rate has been relatively stable and the credit ratings of the sovereign have improved. Foreign residents' purchases of long Government bonds have therefore been sizeable. The limited liquidity in the domestic bond market could have exaggerated the price effects, and domestic investors' demand may have increased afterwards, due to expectations of continued new investment by non-residents at a time of reduced Treasury borrowing need concurrent with the liberalisation of the capital controls.[2]

One of the main manifestations of foreign investors' increased demand for Treasury bonds and the expectation of reduced supply is therefore the reduction in the term premium on nominal bonds, which causes the yield curve to flatten out and even become inverted in spite of a general expectation of further short-term interest rate hikes in the coming term. This development complicates monetary policy transmission via the interest rate channel and shunts it increasingly to the exchange rate channel. This channel is in many ways less reliable as the exchange rate has a tendency to rise excessively with the associated risk of a sharp correction as occurred in Iceland prior to the financial crisis.[3] The weaker transmission through the interest rate channel also complicates the assessment of market agents' inflation expectations based on developments in bond market interest rates.

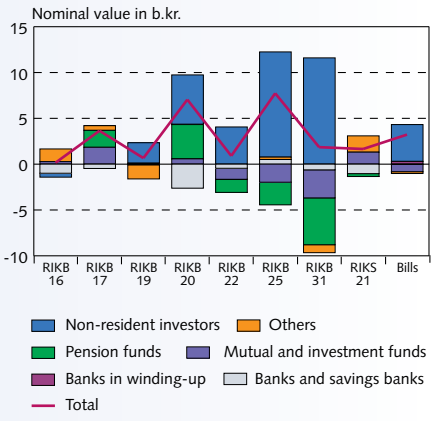
...which probably reflects spillovers from other countries

This situation is not unique to Iceland, however, and term premia in the global bond markets have been at record lows in the recent term, in part due to quantitative easing programmes undertaken by developed economies' central banks in order to lower medium- to long-term market interest rates after short-term rates have been reduced to their assessed lower bound.[4] Although the reasons for the reduction in term premia differ from those in Iceland, it is likely that the effects of these measures undertaken abroad started spreading to the domestic bond market when the domestic situation started to improve. This can be seen, for example, in an improving Government debt position and rising credit rating, as foreign institutional investors in long-term bonds look to Iceland for better returns than are available in other industrialised countries.[5] For this reason, the Central Bank is analysing how other policy tools can be used in addition to the interest rate tool in order to ensure economic stability and inflation in line with the target.[6]

Chart 6

Changes in ownership of Treasury securities

31 May 2015 - 30 September 2015

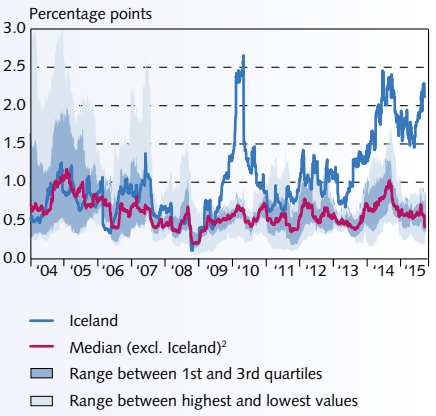


Source: Central Bank of Iceland.

Chart 7

Risk-adjusted interest rate spreads of Iceland and selected other high-yielding currencies against the euro area[1]

Daily data 1 January 2004 - 30 October 2015



1. Ratio of interest rate spread on 3-month interbank rates to 3-month standard deviation of daily exchange rate movements. 2. Brazil, New Zealand, South Africa, and Turkey.

Sources: Macrobond, Central Bank of Iceland.

2. The sharp drop in yields into mid-August could also stem in part from reluctance by pension funds, the largest owners of long Treasury bonds, to sell at yields higher than 6.1%, as this would weaken their actuarial position. By the same token, the supply of the bonds may have increased when yields fell below 6.1%, which reduces downward pressure on yields.
3. See Már Gudmundsson (2015), "Financial integration and central bank policies in small, open economies: what are the lessons from the crisis?", speech given at the *Singapore Economic Review* Conference, August 2015. More detail on the theoretical background and empirical analysis can be found in Már Gudmundsson (2008), "Financial globalisation: key trends and implications for the transmission mechanism of monetary policy", BIS *Papers*, no. 39.
4. A reduction in the term premium in these countries therefore pulls in the same direction as monetary policy, in contributing to the economic recovery and bringing inflation up to target, although premium adjustment could raise difficulties later on. As in Iceland, assessing inflation expectations will become more difficult (see M. Ciccarelli and J. A. Garcia, 2015, "International spillovers in inflation expectations", ECB *Working Paper Series*, no. 1857).
5. See, for instance, the discussion of the impact of major central banks' policy measures on small developed countries and emerging market countries in Hofmann, B. and E. Takáts (2015), "International monetary spillovers", BIS *Quarterly Review*, September 2015, 105-118.
6. See, for example, Central Bank of Iceland (2010), "Monetary policy after capital controls", *Special Publication*, no. 4, Central Bank of Iceland (2012), "Prudential rules following capital controls", *Special Publication*, no. 6, and the previously cited speech by Már Gudmundsson.

Box 2

Impact of exchange rate movements on external trade and terms of trade

The real exchange rate has risen in the recent term and appears likely to continue doing so once the effects of recently concluded wage settlements have emerged in full. In terms of relative unit labour costs, the average rise in the real exchange rate could therefore be roughly 10% this year, largely because the increase in domestic wage costs is well above the average for Iceland's main trading partners. The Central Bank has repeatedly discussed the impact of such large pay rises on domestic inflation and the monetary policy response needed to ensure price stability over the medium term.

There has been less discussion, however, of the impact of such large cost increases on Iceland's competitive position and external trade. Other things being equal, the rise in the real exchange rate is likely to undermine Iceland's competitiveness and reduce exports. At the same time, it will lower import prices and erode the trade surplus, although terms of trade will improve. This Box attempts to estimate how strong the impact of the above-described increase in the real exchange rate could become, based on the historical relationship between external trade and exchange rate movements.

Theoretical background

In order to assess the impact of a higher real exchange rate on external trade, it is necessary to examine both how exchange rate movements affect import and export prices and how those price changes affect import and export volumes. A conventional theoretical trade model derived from Krugman (1987) is used to assess this effect. According to this model, exporters (both Icelandic exporters that sell abroad and foreign producers that sell to Iceland) can sell their products at different prices in different market areas. This is referred to as *pricing to market*. In pricing to market, exporters maximise their profit by choosing product prices subject to competitors' prices in the same market and to overall demand conditions in that market. Product prices in foreign currency relative to prices in trading partner countries are therefore determined by Iceland's real exchange rate vis-à-vis trading partners and domestic production costs, which can be described in their simplest form with the following equation (in this equation and those that follow, lower-case letters represent the natural logs of the variables concerned):

$$(1)\ (px + e - wp) = \beta(p + e - wp) + \eta(ulc - p)$$

where px is the export price in ISK, e is the exchange rate of the króna (measured as the price of one króna in foreign currency), wp is the general price level in trading partner countries, p is the general price level in Iceland, and ulc denotes unit labour costs in Iceland. Therefore, $px + e = pxf$ is export prices in foreign currency and $p + e - wp$ is the real exchange rate in terms of relative consumer prices. β therefore measures the exchange rate pass-through of export prices; i.e., the impact of changes in the exchange rate on export prices.

In the same manner, export volumes reflect the demand side of the export market, which is determined by the relative price of exports (i.e., the real exchange rate) and general demand in Iceland's trading partner countries:

$$(2)\ x = \phi(px + e - wp) + \sigma wd$$

where x denotes exports and wd is foreign demand. Therefore, ϕ measures the price elasticity of exports; i.e., the impact of changes in relative export prices in foreign currency on demand for Iceland's exported goods.

The imports side of external trade may be derived in exactly the same manner, as imports to Iceland are the mirror image of trad-

ing partners' exports to the country. Import prices relative to the domestic price level are therefore determined by the real exchange rate and domestic demand:

$$(3)\ (pm - p) = \alpha(p + e - wpx) + \delta d$$

where *pm* represents import prices in krónur, *wpx* is export prices in Iceland's trading partners, and *d* is domestic demand. Therefore, α measures the exchange rate pass-through of import prices. Finally, import volumes are determined by the relative price of imports and domestic demand:

$$(4)\ m = \gamma(pm - p) + \mu d$$

where *m* denotes imports. γ therefore measures the price elasticity of imports; that is, the impact of changes in relative import prices in krónur on demand for exported goods from Iceland's trading partners.

Estimating trade elasticities

The above-described trade elasticities are estimated using quarterly data from Q1/1990 through Q4/2014.[1] Because the data are non-stationary, it is not possible to use conventional regression analysis to estimate the parameters and their standard deviations. Instead, the fully modified least squares method (FM-OLS) developed by Phillips and Hansen (1990) is used. The estimation of the equation also contains constants and seasonal dummies. The results are summarised in Table 1.

Table 1 Estimation of trade elasticities

Variable	*Parameter estimation*	*Standard deviation*
Impact of exchange rate on export prices (β)	0.129	0.057
Impact of wage costs on export prices (η)	0.411	0.090
Impact of export prices on exports (ϕ)	-0.929	0.266
Impact of external demand on exports (σ)	0.912	0.041
Impact of exchange rate on import prices (α)	-1.103	0.040
Impact of domestic demand on import prices (δ)	0.621	0.019
Impact of import prices on imports (γ)	-0.442	0.089
Impact of domestic demand on imports (μ)	0.966	0.102

The parameters are all statistically significant from zero, and their signs and size are as expected. Here, however, the primary focus is on the impact of exchange rate movements on import and export prices and volumes. According to the parameter estimation in Table 1, a permanent 1% currency appreciation will cause import prices to fall by 1.1% (= $dpm/de = \alpha$). The appreciation therefore has a roughly one-to-one effect on import prices, and exchange rate

1. Using the database for the Central Bank's quarterly macroeconomic model, QMM (see Daníelsson *et al.*, 2015). For the export equations (Equations 1 and 2), *x* is measured with the volume of goods and services exports, *px* with the price deflator for goods and services exports, *e* with the trade-weighted exchange rate index (measured as the price in foreign currencies of one króna), *wp* with the trade-weighted consumer price index in Iceland's main trading partner countries, *wd* with trade-weighted GDP in Iceland's main trading partner countries, *p* with the Icelandic consumer price index, and *ulc* with wage costs over productivity. For the import equations (Equations 3 and 4), *m* is measured with goods and services imports, *pm* with the price deflator of goods and services imports, and *wpx* with trading partners' trade-weighted export prices. Finally, the best outcome was obtained by measuring *d* with domestic demand in Equation (3) and with GDP in Equation (4). This is also in line with what is done in the IMF study (2015). In the import equation, the ratio of world trade to global output is added as a proxy for the impact of increasing specialisation in world trade (see Daníelsson *et al.*, 2015).

pass-through to import prices is therefore nearly complete. The effect of a currency appreciation on export prices is smaller, however. Foreign currency prices of exports rise by 0.13% (= $dpxf/de = \beta$) whereas in krónur they fall by 0.87% (= $dpx/de = \beta - 1$). As a result, exporters are able to pass a portion of the currency appreciation on to foreign buyers, but for the most part, they must absorb it through reduced earnings. The exchange rate pass-through of domestic export prices is therefore less than complete.

Pricing decisions for imports therefore seem to be based on producer currency pricing; i.e., exporters to Iceland determine the price of the goods they sell to Iceland in their own currencies, and the price in krónur therefore reflects exchange rate movements in full. However, Icelandic export prices are more appropriately approximated by local currency pricing; i.e., Icelandic producers price their exported goods by and large in the currency of the importing economy, thereby absorbing changes in the exchange rate of the króna themselves. The parameter estimates suggest, though, that some export pricing is based on producer currency pricing.

These results are perhaps unsurprising in view of the small size of the Icelandic economy: it may be relatively costly for foreign exporters to analyse Icelandic market conditions; furthermore, imported goods often compete not with comparable domestic-made goods but with other imports that are similarly affected by exchange rate movements (see, for instance, Section 3 in Central Bank of Iceland, 2012). Because of the small size of the Icelandic economy, Icelandic exporters are often price-takers in foreign markets and have little scope to change their foreign currency prices in response to exchange rate movements.

The parameter estimates in Table 1 show that the impact of exchange rate movements on import and export prices differs; therefore, a currency appreciation affects terms of trade (i.e., relative import and export prices). According to the parameter estimates, a permanent 1% rise in the exchange rate causes Iceland's terms of trade to improve by 0.23% (= $\beta - 1 - \alpha$). On the other hand, a rise in the exchange rate cuts into exports and makes imports less expensive. The estimates in Table 1 suggest that a permanent 1% rise in the exchange rate causes a 0.12% contraction in exports (= $dx/de = \phi\beta$) and a 0.49% increase in imports (= $dm/de = \alpha\gamma$). These effects are broadly similar to the results obtained by the International Monetary Fund (IMF) (2015) in a recent analysis of trade elasticities for 60 countries over the period 1980-2014. According to the IMF's estimates, the price elasticity of imports is similar to that obtained for Iceland (γ is -0.30 instead of -0.44), whereas the price elasticity of exports is somewhat smaller (ϕ is -0.32 instead of -0.93). On the other hand, the IMF's results indicate somewhat more exchange rate pass-through, on average, to export prices (β is 0.55 instead of 0.13) and somewhat less pass-through to import prices (α is -0.61 instead of -1.10). The effect of a currency appreciation on terms of trade is therefore similar (0.16% instead of 0.23%). The empirical estimates are also similar to those obtained with the Central Bank's QMM for the trade components that are endogenous in the model (for instance, forecasts of marine product exports are based on information on total allowable catches, which are determined independently of the economic variables in Equation 2).

Impact of a 10% rise in the real exchange rate on external trade

The estimated trade elasticities from above can be used to assess the impact of the 10% rise in the real exchange rate expected to occur this year on import and export prices and volumes, and therefore on terms of trade and the trade balance. In the simulation, it is assumed

that the rise in the real exchange rate will consist of a 2.5% nominal appreciation of the króna and a 7.5% rise in domestic costs relative to foreign costs.[2] According to the parameter estimates in Table 1, this will lead to a 3.5% decline in import prices and a 1.3% rise in foreign currency prices of exports. In krónur terms, export prices will therefore fall by 1.2% and terms of trade will improve by 2.3%. However, the rise in the real exchange rate also causes exports to contract by 1.2% and imports to increase by 4.9%. Although terms of trade improve, external trade will therefore be somewhat less favourable, and the trade balance will deteriorate by 1.5 percentage points of nominal GDP. The impact on real net exports is greater, with net exports deteriorating by an equivalent of 2 percentage points of real GDP.[3]

These are the long-term effects of a change in the real exchange rate, however. In the short run, they could be greater or smaller. In order to assess the short-term effects and estimate the time it takes for the long-term effects to emerge, it is possible to estimate the trade equations using a so-called error correction form.[4] Chart 1 shows the effects of a rise in the real exchange rate over a fifteen-year period. As can be seen, the long-term effects have largely come to the fore two years after the shock. There are also indications of overshooting in the effect on volumes and foreign currency prices of exports, as well as in terms of trade.

Have exports developed as expected in the wake of the financial crisis?

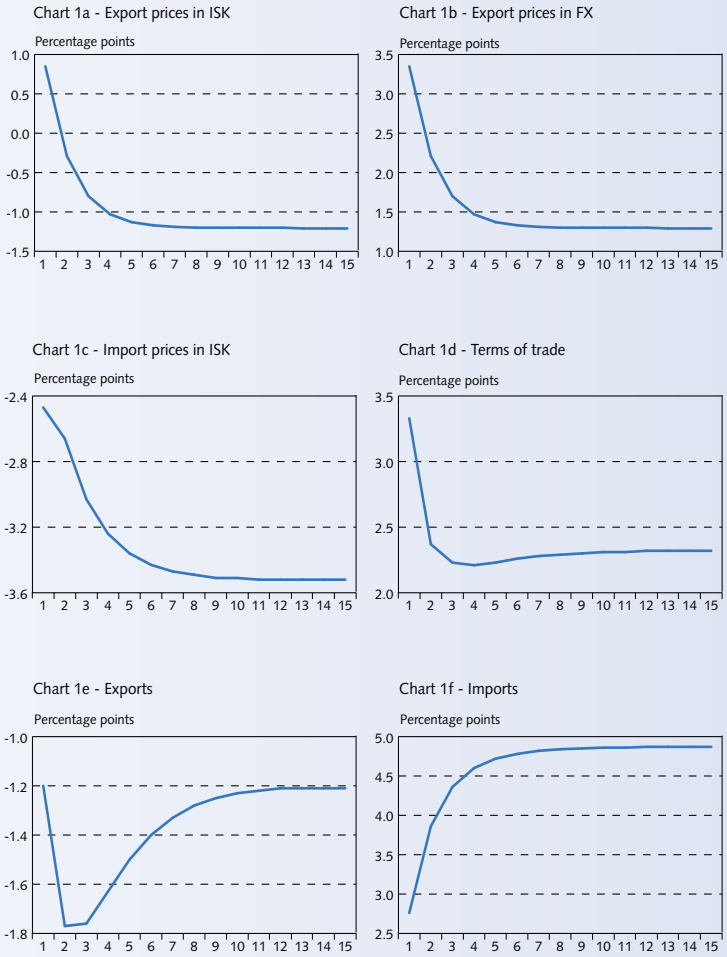
The global economy was thrown into turmoil by the global financial crisis that began in 2007 and struck Iceland with a vengeance a year later. World trade contracted sharply thereafter: trade-weighted demand among Iceland's main trading partners fell by 14% from mid-2008 to mid-2009, and relative prices of Iceland's exports fell more than 20% over the same period. The steep decline in the real exchange rate mitigated the negative impact of reduced global demand on Icelandic exporters by making domestic exports more competitive, thereby cushioning against the contractionary effects of the crisis, as well as supporting their earnings and offsetting the effects of the price declines in foreign markets.

2. Only the direct effects of exchange rate movements on external trade are discussed here; therefore, the potential indirect effects on domestic demand and revenues are not included.

3. It is possible to show that the impact of exchange rate movements on the trade balance is $[-1 + \beta(1 + \phi)]h_x - \alpha(1 + \gamma)h_m$ where h_x and h_m are the share of nominal exports and imports in nominal GDP (using the average for 1990-2014). The impact on net export volumes is correspondingly obtained using real instead of nominal trade shares. From this, it is also possible to derive the Marshall-Lerner condition, which describes the conditions under which the trade elasticities ensure that an exchange rate increase leads to a deteriorating trade balance; that is, that $\beta(1 + \phi) - \alpha(1 + \gamma) - 1 < 0$ which assumes that the trade shares are approximately equal in steady state). Using the parameter estimates in Table 1 gives a value of -0.38; therefore, the Marshall-Lerner condition is satisfied. If it is assumed that there is full exchange rate pass-through to import and export prices ($\beta = 1$ og $\alpha = -1$), the condition is obtained in its simple and better-known version: $\phi + \gamma + 1 < 0$.

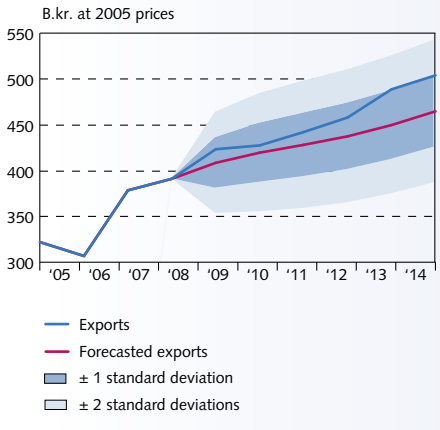
4. In its simplest form, the error correction model can be described as (Δ denotes the change in variables) $\Delta y_t = \rho_0 + \rho_1 \Delta y_{t-1} + \ldots + \rho_n \Delta y_{t-n} + \kappa_1 \Delta z_t + \ldots + \kappa_m \Delta z_{t-m} - \lambda(y_{t-1} - \pi z_{t-1})$, where y is the given endogenous variable (price or volume of imports or exports), and z represents the explanatory variables in Equations (1)-(4). The last component of the equation therefore contains the deviation from long-term equilibrium given by Equations (1)-(4), and λ describes how much of this deviation is "corrected" in each quarter. An equation in this form is estimated for the price and volume of imports and exports with the same variables as in the long-term relationships plus seasonal dummies. The equations for export prices and import volumes also contain a dummy variable that takes the value 1 in Q4/2008 but is otherwise zero. The import price equation contains a comparable dummy variable for Q1/2009. The explanatory power of the equations ranges from 65% (export prices) to 95% (import prices) for the price variables and from 75% (export volumes) to 83% (import volumes) for the volume variables.

Chart 1
Impact of a permanent 10% rise in the real exchange rate
The x-axis indicates the impact at the end of each year



Source: Central Bank of Iceland.

Chart 2
Goods and services exports 2005-2014



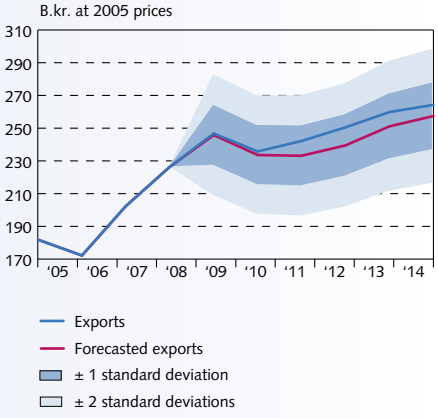
Sources: Statistics Iceland, Central Bank of Iceland.

In spite of the turbulence and the severe contraction in world trade, Iceland's exports continued to grow. It is interesting to examine, however, whether this growth was in line with what is implied by the historical relationship between exports and their determinants, or whether export growth was weaker than it would otherwise have been – for instance, because the banking crisis in Iceland and the associated disruption of cross-border payment intermediation undermined business relationships and made it harder for exporters to obtain trade credit (see, for example, IMF, 2015). In addition, it has often been asserted in domestic economic discourse that the capital controls imposed in Iceland in the wake of the crisis had caused similar problems and therefore reduced exports from the level that would otherwise have been achieved. In order to examine this more closely, the empirical model from above is used to forecast developments in goods and services exports from Q1/2009 through Q4/2014. Chart 2 shows the outcome and a comparison with actual developments. As can be seen, the exports equation underestimated post-crisis exports, although the difference is less than one standard deviation and is therefore not statistically significant.

Therefore, it cannot be seen that the banking crisis has undermined export growth in recent years. Neither is it possible to see

signs that the capital controls have done so, although it is impossible to project how export growth would have developed without them. This is not to say that the capital controls do no harm in the long run, but rather that the data do not suggest that they have reduced exports during the post-crisis period. This could be because the present discussion focuses on total exports, which are favourably affected by the surge in services exports stemming largely from Iceland's growing popularity as a travel destination. Chart 3 therefore shows the corresponding forecast for goods exports alone.[5] As the chart indicates, goods exports contracted somewhat in 2010 but have grown since then. The forecast from the beginning of 2009 has followed this trend well: developments in exports have actually been more favourable than the forecast indicates, although the difference is well within one standard deviation. Therefore, there is again no clear evidence that the banking crisis or the capital controls have undermined exports.

Chart 3
Goods exports 2005-2014



Sources: Statistics Iceland, Central Bank of Iceland.

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5. The equation for goods exports is estimated from 1997, but quarterly data prior to that time are not available in the QMM database. The estimation of the equation is very similar to what is obtained for total exports. A comparable result is obtained if only goods exports excluding aluminium, marine products, and ships and aircraft are considered.

Box 3

Fiscal budget proposal 2016

The medium-term fiscal plan included with the fiscal budget proposal for 2016 assumes a stable surplus on the primary balance through 2019. The primary balance is assumed to deteriorate in comparison with the 2015 budget proposal. At the same time, a smaller financial account deficit is expected, yielding a better overall outcome. The medium-term plan is summarised in Table 1. The budget proposal provides for an overall surplus amounting to 0.7% of GDP in 2016.

Table 1. Estimated Treasury performance through 2019

	Estimate			
ISK billions	*2016*	*2017*	*2018*	*2019*
Total revenues	696.3	731.0	748.8	787.4
Tax revenues	646.5	681.9	696.4	735.1
Total expenditures	681.0	689.2	714.7	739.6
Operating expenses	284.9	299.9	313.0	329.7
Cost of capital	74.4	68.4	68.7	62.9
Transfer outlays	265.7	278.7	289.7	302.0
Maintenance	10.1	10.5	10.7	10.7
Investment	45.9	31.7	32.7	34.3
Overall Treasury balance, w/expedited debt relief[1]	15.3	41.8	34.1	47.8
As % of GDP	0.7	1.7	1.3	1.7
Improvement from prior year	-0.3	1.0	-0.4	0.4
Overall Treasury balance, w/o expedited debt relief[1]	15.3	21.7	34.1	47.8
As % of GDP	0.7	0.9	1.3	1.7
Improvement from prior year	-0.3	0.2	0.4	0.4
Primary income	679.7	694.2	730.5	770.0
Primary expenditures	606.6	620.8	646.1	676.7
Primary Treasury balance, w/o expedited debt relief[1]	73.1	73.4	84.4	93.3
As % of GDP	3.1	3.0	3.2	3.3
Improvement from prior year	-0.6	-0.1	0.2	0.2
Interest income	16.6	16.6	18.2	17.4
Interest expense	74.4	68.4	68.7	62.9
Capital and financial account	-57.8	-51.8	-50.4	-45.5
As % of GDP	-2.5	-2.1	-1.9	-1.6

1. Because of expedited reduction of indexed household debt, expenditures were moved to 2014, while revenues are still collected in 2017, causing a mismatch between revenues and expenditures. In this table, the primary balance is shown excluding the expedited debt relief.

Source: Ministry of Finance and Economic Affairs.

According to the budget proposal, Treasury performance in 2015 will be somewhat stronger than was assumed in the National Budget for the year. The overall surplus for this year is now estimated at 1% of GDP instead of 0.2%, and the primary surplus is projected at 3.7% instead of 3.1%. Furthermore, cash from operating activities, an important measure of the Treasury's capacity to pay down debt, is estimated to be positive by 14.6 b.kr., whereas the plan accompanying the Budget estimated that it would be negative by 7.7 b.kr.

In many ways, economic developments have evolved differently than was assumed at the time the 2015 Budget was prepared. Domestic demand and wage changes are greater than expected. This has had a positive impact on revenue generation for the Treasury; for instance, in the first eight months, taxes on income and profits have risen by some 13% year-on-year on a payments basis. On an accrual basis, revenues are projected to be 4% above the revenue estimate in the Budget. The main economic assumptions underlying the new fiscal budget proposal are based on a macroeconomic forecast that allows for slightly weaker GDP growth than in the baseline forecast in this issue of *Monetary Bulletin*.

The estimates of Treasury debt contained in the budget proposal assume that developments will be more favourable than previously projected. The ratio of Treasury debt to GDP has fallen rapidly since peaking at 85% in 2011. Based on the assumptions in the budget proposal concerning Treasury debt, the debt ratio will also decline markedly in coming years. Treasury interest expense is projected to decline by almost 14 b.kr. through 2019. In the 2015 budget proposal, however, it was assumed that the financial balance would deteriorate, with the 60 b.kr. deficit from 2014 increasing to a 65-67 b.kr. deficit in 2015-2018. It is now assumed that the financial account deficit will total about 58 b.kr. this year and next year, and then decline by 6 b.kr. in 2017 and another 2 b.kr. in 2018. Because of the proposed sale of Landsbankinn shares, dividends from the bank will also decline, however.

The revenues side

There are changes from previous estimates on the revenues side, due to changes in the tax system and re-evaluation of tax revenues on the basis of the new macroeconomic forecast contained in the budget proposal. Estimated total revenues for 2016 increase by 31.2 b.kr. from the estimates in the 2015 fiscal budget proposal, to a total of 696.3 b.kr., including a 37.3 b.kr. increase in tax revenues. From autumn 2014 through autumn 2016, the general revaluation of tax bases has strengthened the revenues side by about 51.6 b.kr., whereas changes to the tax structure in 2015 and 2016 reduce revenues by over 7 b.kr. each year. The payroll tax will decline by 0.14 percentage points at the beginning of 2016, the last reduction currently planned. The personal income tax is lowered and the num-

Table 2. Summary of Treasury revenue estimates on an accrual basis, 2015-2019

% of GDP	*2015*	*2016*	*2017*	*2018*	*2019*
Total revenues	31.4	29.9	29.3	28.3	28.2
Tax revenues	28.4	27.7	27.4	26.3	26.4
Primary income	30.6	29.2	28.7	27.6	27.6
Interest income	0.8	0.7	0.7	0.7	0.6
Net of irregular items					
Total revenues	31.0	29.6	29.1	28.1	28.0
Tax revenues	28.0	27.5	27.2	26.1	26.2
Primary income	30.1	28.9	28.4	27.4	27.4

Source: Ministry of Finance and Economic Affairs.

Table 3. Summary of estimated revenue effects of tax system changes in autumn 2013 on the revenue estimate for 2015-2019

% of GDP	*2015*	*2016*	*2017*	*2018*	*2019*
Tax changes from autumn 2013					
Tax changes at 143rd legislative session	1.0	0.5	0.5	-0.4	-0.4
– increase in bank levy	1.5	1.1	1.0	0.1	0.1
Tax changes at 144th legislative session	-0.2	-0.2	-0.2	-0.2	-0.2
Tax changes in 2016 budget proposal	0.0	-0.3	-0.6	-0.6	-0.5
Total tax changes	0.8	0.0	-0.3	-1.2	-1.1
– increase in bank levy	1.5	1.1	1.0	0.1	0.1
– other	-0.7	-1.1	-1.3	-1.3	-1.2
Previous measures					
Expiry of older temporary provisions	-0.4	-0.5	-0.4	-0.4	-0.4
Tax changes and tax revocation combined	0.4	-0.4	-0.7	-1.6	-1.5
– other than bank levy	-1.1	-1.6	-1.8	-1.7	-1.6

Source: Ministry of Finance and Economic Affairs.

ber of tax brackets reduced by one, as was promised in connection with the spring 2015 wage settlements. This is estimated to cost 11 b.kr. per year beginning in 2017. At the same time, unit levies will be increased by a maximum of 2.5% at the turn of the year. The cancellation of import duties on clothing and footwear at the beginning of 2016 is estimated to lower the CPI by approximately 0.5%. When import duties on specialty products are also lowered at the turn of the year, the combined effect is expected to total about 1% if the reductions are passed through in full to prices. Tax revenues will increase by 5.2% between the 2015 plan and the 2016 budget proposal, or about 1.8% in real terms, although they will decline relative to GDP, falling from 28.4% to 28%. The revenue estimates are summarised in Table 2.

A number of systemic changes have been made since autumn 2013, during the tenure of the current Government. Excluding the bank levy, which was ear-marked for a specific function, the combined reduction in revenues as a result of these measures amounts to 1.6% of projected year-2016 GDP. As a share of GDP, the accumulated revenue effect in the years afterwards is similar. Revenues from the bank levy are estimated at 1.1% of GDP. Table 3 gives a clearer view of the itemised effect of the changes. The table shows the estimated impact of the measures on revenues each year. The reduction of unit levies in real terms is included. Older temporary provisions that expire include the wealth tax and the energy tax on electricity.

The expenditures side

There is some consolidation on the expenditures side. Most operational categories increase by 1% in real terms, although old-age pensions, pharmaceuticals, and pension obligations increase more. It is assumed that the consolidation targets in the expenditure framework for 2016 will be 0.5% for the school system and health care and nursing home institutions, and 0.75% for other institutions and functions. This reduces the level of consolidation from the spring plan by 3.3 b.kr., and in addition, the scope for spending is increased by about 3.5 b.kr., to 7.5 b.kr. Offsetting this, expenditures due to several irregular items are reduced by 5.1 b.kr. in comparison with the spring plan. Primary expenditures therefore increase by 13 b.kr. from the spring plan. Operating expense as a share of GDP declines by 0.5 percentage points, however. The same applies to operational and consumption transfers, which decline by 0.6 percentage points of GDP.

According to the budget proposal, central government wage costs will increase by 9.5% in 2016, which represents a reassessment of the wage assumptions in the 2015 Budget, primarily due to projected wage increases in H2/2015, which will affect annualised wage costs for 2016. In 2017-2019, wage costs are expected to rise by 3.7-4.7%, somewhat in excess of the inflation forecast. The assumption was made before the arbitration panel ruling in the cases involving nurses and university-educated public employees, and it can be expected to generate increased expenditure pressures. The results of the wage negotiations were highly uncertain. This was why a new budgetary allocation has been created so as to provide the scope to absorb deviations – particularly in the wage, exchange rate, and price assumptions in the budget proposal – and fulfil unforeseen obligations that may accrue each year. This allocation totals approximately 6 b.kr.

The target set in the spring plan, to maintain the investment level at 1.2% of GDP during the period, remains and has been extended. This provides the scope, from 2017 onwards, for new investment projects in place of those concluded during the period.

Table 4 provides a summary of the changes in the Treasury outcome in 2016, from the spring fiscal plan (prepared in April) to the 2016 budget proposal.

Table 4. Outlook for central government finances for 2016 – changes from the spring plan

Accrual basis	*B.kr.*
Treasury outcome in 2016, according to spring 2015 plan	
Primary balance	71.5
Interest balance	-60.5
Overall balance	11.0
Changes in Treasury outcome in 2016, as compared with spring 2015 fiscal plan	
Changes in primary income	
Individuals' personal income tax	0.9
Income tax on legal entities	7.8
Value-added tax	1.5
Alcoholic beverages tax	3.1
Payroll tax	2.8
Other changes in revenues	-1.5
Total changes in primary income	14.6
Changes in primary expenditure	
Scope for expenditures in excess of assumptions in spring plan	3.5
Reduced consolidation compared with assumptions in spring plan	3.3
Reassessment of wage costs and exchange rate assumptions	11.3
Contribution to the Housing Financing Fund	-1.0
Write-downs of indexed mortgage loans	-2.9
Other changes in expenditures	-1.2
Total changes in primary expenditure	13.0
Changes in interest balance	
Prepayment of loan to Central Bank of Iceland	4.0
Payments on foreign loans	3.7
Other changes in interest expense (higher interest rates, etc.)	-4.5
Reduced interest income on general loans granted	-1.2
Higher interest income on Treasury accounts with the Central Bank	1.2
Other changes in interest income	-0.2
Total changes in interest balance	3.0
Total changes in overall balance	4.6
Treasury performance in 2016 according to fiscal plan autumn 2015	
Primary balance	73.1
Interest balance	-57.8
Overall balance	15.3

Source: Ministry of Finance and Economic Affairs.

Box 4

Assumptions concerning wage developments in Central Bank forecasts

In preparing its macroeconomic forecasts, the Central Bank uses figures from Statistics Iceland's production accounts for wages and related expenses. As there is some lag in the production accounts, estimates for the most recent period are based on assessments made by Bank staff concerning wage developments using various measures, including the Statistics Iceland wage index. Wage developments during the forecast horizon are estimated by Bank staff using expected costs due to general wage drift and wage agreements in centralised negotiations in the labour market as a whole. Experience has shown that there are two factors in particular that cause errors in the Bank's estimates of historical wage developments: on the one hand, revisions of Statistics Iceland's national accounts data, which have been revised both upwards and downwards, therefore resulting in errors in both directions, and on the other hand, underestimation of wage drift.

National accounts figures

In estimating total wage costs, the Bank uses Statistics Iceland data on developments in wage costs from the production accounts. As these figures reflect total wage costs including related expenses, wages excluding related expenses are computed by adjusting Statistics Iceland figures using the Bank's estimate of developments in related expenses (primarily employers' share of pension fund contributions and payroll taxes). To derive wages as a price per unit of labour, wages are converted to man-years using data on the number of employed persons and average hours, which are taken from the Statistics Iceland labour force survey. Because the Statistics Iceland production accounts are only available on an annual basis, the wage series is divided into quarters using statistical methods which ensure that annualised developments in wages are consistent with Statistics Iceland data, but that developments within the year will follow changes in the wage index as closely as possible.[1]

The Central Bank uses wage data from the Statistics Iceland production accounts rather than using the wage index directly in its assessments of domestic wage developments. This is because the wage index only shows changes in regular wages (base wages for daytime work, shift differential, surcharges, reimbursements of cost outlays, and incentive-based bonuses calculated and disbursed each payroll period) for employees who are in the same job within the same company and in the same sector, but it does not take account of important factors that also affect firms' wage costs (such as overtime, piecework payments, irregular bonuses, and various other irregular payments), plus changes in the composition of the labour force. As can be seen in Chart 1, these measures of domestic wage developments can differ somewhat, reflecting the fact that they measure different things.

One drawback in using the production accounts is that historical national accounts figures can change each time a new revision takes place, as the first figures are only preliminary, and the final numbers are often not available until a few years have passed. Statistics Iceland publishes new figures on wages and related expenses each March, with the publication of the first national accounts figures for the previous year. Last year, they were revised in September, however, when a relatively extensive change in national accounts standards was implemented, and this year as well, due to new data. Statistics Iceland's most recent revision shows that wages and related expenses were 1.6% higher in 2014 than previous figures had indicated (Chart 2).

1. The result is a wage series that can always be found in the Bank's QMM database, which is published with each *Monetary Bulletin*.

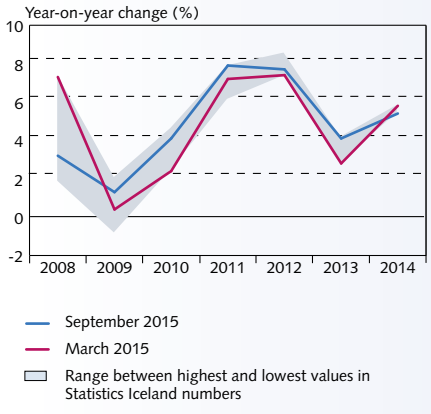
Chart 1

Various measures of wage developments

Sources: Statistics Iceland, Central Bank of Iceland.

Chart 2

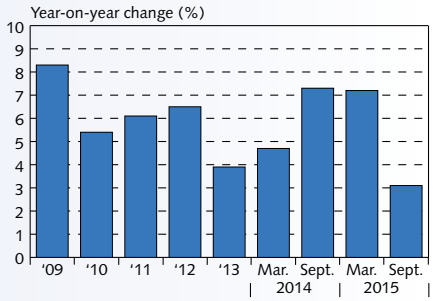
Wages per man-year



Sources: Statistics Iceland, Central Bank of Iceland.

Revisions of historical data are either upwards or downwards and do not display any clear pattern. For example, 2008 figures changed most radically when revised last September. The first figures for 2008 were published in March 2009 and showed an 8.3% year-on-year rise in wages and related expenses (Chart 3). In the more than six years that have passed since then, the estimates for 2008 have changed each time new data figures are published – often quite markedly. According to the most recent figures for 2008, wages and related expenses rose 3.1% year-on-year, or 5.2 percentage points less than in the first figures and 4.1 percentage points less than was estimated in March 2015. The difference between the figures used in the forecast published before the national accounts update and the most recent update is therefore the chief cause of the error in wage estimates for the current year.

Chart 3
Year-2008 wages and related expenses, by year of publication



Sources: Statistics Iceland, Central Bank of Iceland.

Wage estimates during the forecast horizon

In order to estimate wage developments in the recent past and during the forecast horizon, an assessment is made of contractual pay increases in the public and private sectors, pay rises in connection with contract implementation, and wage drift. The estimate of the cost effects of negotiated pay increases is based on the contracting parties' cost assessments, which can be said to provide a floor for the estimate. An assessment is then made of how the negotiated pay rises will emerge in connection with contract implementation in firms and institutions, through discussions with firms and institutions, as well as labour unions. For example, in the last wage settlements, it was agreed that the pay rises each employee had received since February 2014 would be deducted from this year's increase in base wages. It is likely, however, that some employers will implement the wage agreements differently. If, for example, an employee received a pay rise during the period because he or she took on increased work, it is likely that few employers would deduct such a pay rise from the employee's calculated wage increase.

In addition, an assessment is made of estimated wage drift during the forecast horizon. There is no single definition of exactly what is meant by the term *wage drift*. According to the Icelandic encyclopaedic dictionary, wage drift is defined as "an increase in wages in excess of contractual provisions, caused by overpayments." According to this definition, the phenomenon in the aforementioned example concerning the cost of contract implementation would be an example of wage drift. The Central Bank's assessment of wage drift during the forecast horizon also considers a variety of other factors that could affect wage developments, apart from contractual pay rises and contract implementation costs. Factors such as bonuses and other irregular payments are important here, but what is most important is whether there is a slack or tension in the labour market and, if so, how much.[2]

Differing results depending on the assumptions used

In order to explain further the process used in assessing wage developments, it is possible to examine the effect various assumptions have on pay increases between the annual averages for 2014 and 2015. The point of departure is the Bank's assessment of wage rises this year. In the forecast published with this issue of *Monetary Bulletin*, it is assumed that wages will rise by 10.4% between yearly averages. This is the same increase as was contained in the forecast published in August, even though it is now assumed that wages will

2. The Central Bank has tended to underestimate wage drift, which has caused errors in its forecasts.

rise more this year than was projected in August, as new Statistics Iceland numbers show that wages were higher on average, in 2014 than earlier figures had indicated. If Statistics Iceland figures as they were prior to September revision were used, however, the increase between yearly averages would be 10.9%, or 0.5 percentage points more than in the August forecast. If developments in the wage index in 2014 were used and not national accounts figures, the 2015 increase between yearly averages would be 10.1%.

Until 2014, it was virtually the rule that wage increases took effect in the month during which the contract was signed. In the wage settlements since then, however, pay rises have taken effect much earlier. They do not appear in the Statistics Iceland wage index, however, until the wage settlement has been approved and wage payments are made in accordance with it. When wage increases during the year are assessed, however, it is more exact to base the assessment on the date the increases take effect, not the date they appear in the wage index. This is done in the Bank's assessment. If the date the pay rises appear in the wage index were used, the increase between yearly averages would be 9% instead of 10.4%, but the increase between yearly averages in 2016 would be greater, or 11.1% instead of the 9.1% assumed in the current forecast.

Finally, it should be noted that in assessing pay increases during the year, it is not enough to consider the negotiated percentage pay rises in the new contracts; it is also necessary to keep in mind that wages have already risen somewhat during the year, whether due to implementation of previous wage agreements or to wage drift. For instance, the wage index had already risen 2.2% during the year (from December 2014 through May 2015) by June, when the first effects of the new wage settlements emerged in the wage index, and by 4.6% in comparison with the average for 2014.

Box 5

Updated Central Bank of Iceland macroeconomic model

The Central Bank's main forecasting and economic analysis tool is its quarterly macroeconomic model (QMM). The model is reviewed on an ongoing basis and is updated regularly to reflect new data and experience gained in forecasting and analysis. The new version of the QMM (Version 3.0) incorporates a number of changes from the previous version (Version 2.2), which was published in autumn 2011.[1] The principal changes in the model are summarised in this Box.

Changes in the new version

Macroeconomic models must be constantly revised and maintained, both to reflect advances in economic theory and econometric methods and because new data necessitate re-estimation of the economic relationships in the model concerned. The new version of the QMM uses data through Q4/2012, whereas the previous one used data through year-end 2006. In general, macroeconomic models should be revised more frequently, but in this instance, re-estimation would be based on data for a period during which a banking system with substantial foreign assets and liabilities collapsed and capital controls were imposed in order to shelter the domestic financial and monetary system in the wake of a severe financial crisis. The estimation of economic relationships usually improves if it is based on more extensive data. However, sudden occurrences that are unrelated to the underlying functioning of the economy under normal circumstances but strongly affect key variables at the time of the occurrence can affect the empirical estimates and reduce the forecasting ability of the model.

The re-estimation of the economic relationships in Version 3.0 is based on Statistics Iceland's most recent data on key economic variables. In the figures published by Statistics Iceland in September 2014, these data had changed radically due to changes in national accounts methodology.[2] So far, Statistics Iceland has published data based on the new methodology for 1997 onwards. This change alone would have necessitated a re-estimation of the model.

Another important change to the model pertains to the labour market. The new version of the QMM is based on the Statistics Iceland labour force survey definition of unemployment instead of the Directorate of Labour definition. It is also based on Statistics Iceland's measurements of the number of employed persons and the number of persons in the labour market. In addition, an equation has been added that forecasts developments in hours worked, and equilibrium unemployment is no longer an exogenous variable that remains largely constant.[3]

Other changes centre mainly on imports and exports. Some of them have been made in response to changes in Statistics Iceland methodology; for instance, concerning the registration of domestic activities as services when raw materials (such as aluminium) processed domestically are owned by the foreign buyer of the finished product. Another change worth mentioning is that imports are now explained in terms of weighted domestic demand, with the weight of individual components – private consumption, investment, and

1. The QMM Handbook, together with further information on the model and its database, can be found at http://www.cb.is/monetary-policy/central-bank-of-iceland-economic-forecasts/.
2. The changes in Statistics Iceland's methodology are described in Box 1 of *Monetary Bulletin* 2014/4.
3. The method used to estimate equilibrium unemployment is discussed in the paper by Bjarni G. Einarsson and Jósef Sigurdsson, "How "natural" is the natural rate? Unemployment and hysteresis in Iceland". Central Bank of Iceland *Working Paper* no. 64.

public consumption – determined by the estimated share of foreign inputs in their production. Other changes are minor in scope and nature.

Box 6

The Central Bank of Iceland forecasting record

Macroeconomic models are used to create simplified versions of the actual economy. If they are successful, their components describe the economic relationships that are most important; however, it is inevitable that they will omit many others of lesser significance. Data are also subject to measurement errors. When forecasts are prepared, they must be based on preliminary figures for the recent past, as data will not be available in their final form until perhaps several years later. It follows from this that macroeconomic forecasts will virtually always contain some errors. Studying past forecasting errors can provide some indication of the uncertainties in the current forecast. These can be used for further development of the Bank's economic models, their use in forecast preparation, and overall improvements in analysis and forecast presentation.

Macroeconomic and inflation forecasts

Four times a year, the Central Bank prepares macroeconomic and inflation forecasts covering a forecast horizon of three years. The forecasts are based on an in-depth analysis of the state of the economy at the time they are prepared. The assumptions concerning global economic developments are based, among other things, on international forecasts and the information implied by forward commodity prices. The national accounts provide the main foundation for the assessment of the state of the 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 evaluated using econometric methods. 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 the QMM.

Monetary policy performance during the forecast horizon is a key factor in the preparation of each forecast. In the QMM, monetary policy is set with a forward-looking monetary policy rule wherein the Central Bank policy interest rate is determined by the expected deviation of inflation from the inflation target and the current output gap. This rule ensures that the policy rate brings inflation back to target by the end of the forecast horizon if it is not already there. The monetary policy rule in the model was selected so as to minimise the sacrifice cost in ensuring that inflation is at target.[1]

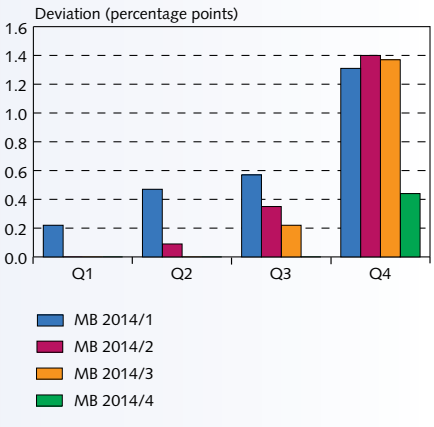
Central Bank inflation forecasts for 2014

Inflation subsided markedly year-on-year in 2014. Inflation averaged 2% for the year, down from 3.9% in 2013. Inflation excluding the effects of indirect taxes also measured 2%. As has been discussed in previous issues of *Monetary Bulletin*, inflation was driven mainly by rising house prices in 2014, while falling prices of imported goods and services, declining oil prices, and the appreciation of the króna pulled in the opposite direction.

Chart 1 illustrates the forecasting record for the inflation forecasts within the year. In all instances, twelve-month inflation for each quarter was overforecast. The deviation in the fourth quarter

Chart 1

Quarterly inflation 2014 and forecasts in *Monetary Bulletin*



Source: Central Bank of Iceland.

1. Further discussion of the QMM can be found in Box 5. See also Ásgeir Daníelsson, Bjarni G. Einarsson, Magnús F. Gudmundsson, Svava J. Haraldsdóttir, Thórarinn G. Pétursson, Signý Sigmundardóttir, Jósef Sigurdsson, and Rósa Sveinsdóttir (2015), "QMM: A quarterly macroeconomic model of the Icelandic economy – Version 3.0", Central Bank of Iceland, *Working Paper*, forthcoming.

was affected strongly by an unforeseen drop in oil prices late in the year: in the February *Monetary Bulletin*, oil prices were projected to fall by just over 6% year-on-year in Q4, whereas they actually fell by nearly 30%. Table 1 shows that average inflation for the year was overforecast in all four issues of *Monetary Bulletin*; however, the forecasts became more accurate as the year progressed and more information became available, although inflation was still overestimated by 0.2 percentage points in Q4.

Table 1 Inflation forecast for 2014

	Monetary Bulletin				*Final*
Change from prior year (%)	*2014/1*	*2014/2*	*2014/3*	*2014/4*	*result*
Inflation	2.7	2.5	2.4	2.2	2.0
Inflation excl. effects of indirect taxes	2.6	2.4	2.4	2.1	2.0

Errors in long-term inflation forecasts

In assessing long-term inflation forecasts, it is important to consider the mean forecast error and the root mean square error (RMSE) of the forecasts concerned. The mean forecast error shows the average deviation of the forecast from observed inflation. It gives an indication of whether inflation is being systematically over- or underforecast. The RMSE is a measure of the variability of the forecast error and therefore of the uncertainty in the forecast itself. The error can generally be expected to increase as forecasts extend further ahead in time.

Table 2 Central Bank of Iceland inflation forecast errors since Q1/1994

%	*One quarter*	*Two quarters*	*Three quarters*	*Four quarters*
Mean forecast error	0.0	-0.2	-0.6	-1.0
RMSE	0.6	1.6	2.2	2.5

Table 2 shows the mean forecast error and RMSE in the Bank's inflation forecasts up to four quarters ahead, from 1994 through August 2015 (81 forecasts). By this criterion, inflation has been underforecast two to four quarters ahead, to an increasing degree along the horizon. The mean deviation of the forecasts three and four quarters ahead proved to be statistically significant from zero based on a 5% threshold, which means that the forecasts were skewed to the downside. The forecast errors one and two quarters ahead were not significant from zero, however. The mean forecast error three and four quarters ahead has been strongly affected by the years 2008 and 2009. Excluding the forecasts prepared for those years reduces the mean error by 0.3 percentage points for the forecasts three quarters ahead and by 0.4 percentage points for the forecasts four quarters ahead. Furthermore, the mean forecast error for the forecasts three quarters ahead becomes statistically insignificant from zero based on a 5% threshold, although the mean error for the four-quarter forecasts is still significant.

After adopting the inflation target in March 2001, the Central Bank published inflation forecasts two years ahead, and since March

Table 3 Central Bank of Iceland inflation forecast errors since Q2/2001

	No. of measurements	*Mean forecast error (%)*	*RMSE (%)*
Four quarters ahead	52	-1.2	2.7
Eight quarters ahead	48	-2.1	3.9
Twelve quarters ahead	22	-1.1	2.1

2007, it has published forecasts over a horizon of three years. Table 3 shows the mean forecast error and the RMSE for the period since the Bank introduced inflation targeting. A comparison of the RMSE for the one-year forecasts (see Tables 2 and 3) shows that the RMSE has been greater since the Bank adopted the inflation target than it was for the entire period, as, until recently, fluctuations in inflation have been greater since the króna was floated than they were during the fixed exchange rate period of the 1990s.[2] It should also be borne in mind that the Bank did not begin using the QMM until the beginning of 2006, and it prepared no forecasts of the ISK exchange rate or Central Bank interest rates before 2007.[3] In recent years, the Bank's macroeconomic and inflation forecasts have been based on the assumption that the exchange rate of the króna will remain broadly unchanged over the forecast horizon. Experience shows that large errors in inflation forecasts in Iceland are usually related to exchange rate volatility, as can be seen in Chart 2, as the correlation between the mean absolute errors in inflation and exchange rate forecasts is 0.64.

The Bank's forecasts in recent years are compared in Chart 3. The RMSE averaged 0.5% in 2014, which indicates slightly less forecasting accuracy than in 2012 and 2013, when it was 0.4%. The forecasting errors three and four quarters ahead were considerably larger in 2014 than in the previous two years, owing to the unforeseen decline in oil prices in late 2014. The forecasting errors are noticeably larger for the forecasts for Q4/2014 and Q1/2015, when the impact of the drop in oil prices affected prices, resulting in an overestimation of inflation.

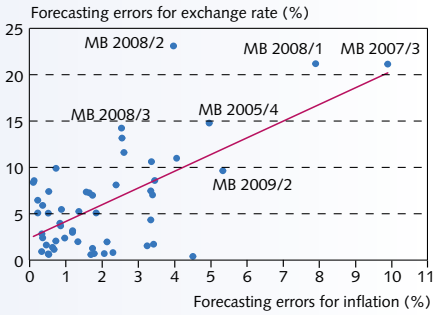
Comparison of selected inflation forecasting methods

Simple time series models that forecast inflation are also used in forecast preparation. It is possible to use them as cross-checks in preparing the forecast by comparing the Bank's forecasts to the results generated by such models (Chart 4).[4] Three ARIMA models, a simple cost-push model, a random walk, and a VEC model are used for the comparison.[5] In 2014, the Bank's forecasts were the most accurate three and four quarters ahead. For forecasts one quarter ahead, the cost-push model and the VEC model showed smaller errors, and for forecasts two quarters ahead, the cost-push model performed best. A comparison of forecasting errors for various periods

Chart 2

Forecasting errors for inflation in *Monetary Bulletin* and deviation of average exchange rate from forecast 2001-2014

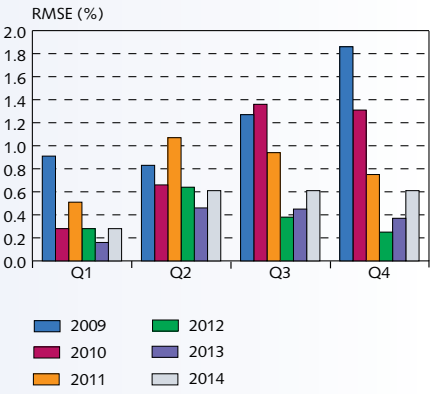
Forecast one year ahead



Source: Central Bank of Iceland.

Chart 3

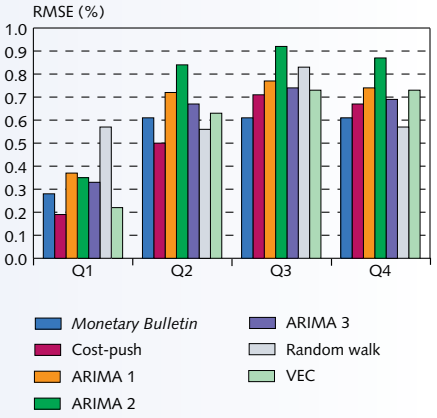
Forecasting errors for inflation in *Monetary Bulletin* 2009-2014[1]



1. Q1 is the quarter in which the report is published or the first quarter forecasted; Q2 is the quarter after the report has been published; Q3 is the following quarter.
Source: Central Bank of Iceland.

Chart 4

Forecasting errors for inflation in *Monetary Bulletin* and from simple models in 2014[1]



1. Q1 is the quarter in which the report is published or the first quarter forecasted; Q2 is the quarter after the report has been published; Q3 is the following quarter.
Source: Central Bank of Iceland.

2. See Central Bank reports "Monetary policy in Iceland after capital controls", *Special Publication* no. 4, and "Iceland's currency and exchange rate policy options", *Special Publication* no. 7 (Chapters 3, 4, and 12).
3. See Thorvardur Tjörvi Ólafsson (2007), "Publication of its own policy rate path boosts the effectiveness of central bank monetary policy", *Monetary Bulletin* 2007/1, pp. 71-86.
4. In all models, care is taken to ensure that they have the same information on inflation when the forecast is prepared. In comparing them, it should be borne in mind that the forecasts are not entirely impartial, as the Bank's final forecast each time frequently takes account of the results obtained with simple time series models, particularly for short-term forecasts.
5. According to the simple cost-push model, inflation is determined by historical developments in unit labour costs and the import price level in domestic currency. The ARIMA 1 model draws on forecasts for the principal subcomponents of the consumer price index and weights them together to create a single overall index. The twelve subcomponents of the consumer price index are as follows: agricultural products less vegetables, vegetables, other domestic food and beverages, other domestic goods, imported food and beverages, new cars and spare parts, petrol, other imported goods, alcohol and tobacco, housing, public services, and other services. ARIMA 2 forecasts the CPI directly, and ARIMA 3 forecasts the overall index excluding indirect taxes and then factors in the estimated tax effects. A discussion of the use of ARIMA models for inflation forecasting can be found in A. Meyler, G. Kenny, and T. Quinn (1998), „Forecasting Irish inflation using ARIMA models", Central Bank of Ireland, *Technical Paper*, no. 3/RT/98. The VEC (vector error correction) model is a multivariate time series model that takes account of developments in import prices, output gap, and wage costs.

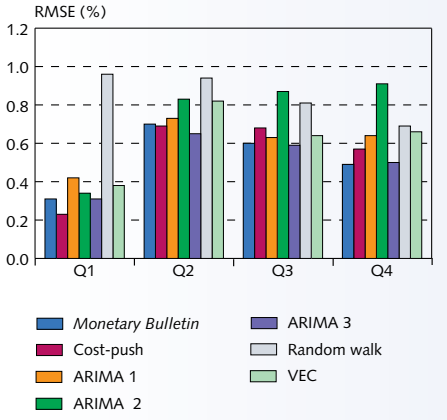
reveals that the error in the Bank's forecast is smallest one quarter ahead and broadly the same for the forecasts two to four quarters ahead. For the other forecasting models, the error grows greater further out the horizon.

It can also be informative to compare the forecasts with forecasts assuming that inflation in a given quarter will be the same as in the previous quarter throughout the forecast horizon. Such forecasts would generate the smallest errors if changes in inflation were a random variable with an expected value of zero; i.e., if inflation followed a so-called random walk pattern. Simple forecasting methods of this type are often used for reference in assessing forecast quality. A good forecast should be more accurate than a simple random walk forecast. For forecasts one quarter ahead, all of the models performed better than the random walk. This was not the case for the forecasts two quarters ahead, as only the cost-push model outperformed the random walk forecast. For three-quarter forecasts, almost all of the forecasts were more accurate than the random walk forecast. On the other hand, the random walk outperformed all of the other models for forecasts four quarters ahead. The accumulated error in the random walk forecasts was 2.1%, very similar to that for the Bank's forecast (2.2%).[6]

As has previously been stated, the forecasting errors in *Monetary Bulletin* were smallest in comparison with the other models for forecasts three and four quarters ahead. Chart 5 shows the average RMSE for forecasts from 2011 through 2014. The chart shows that over this period, the RMSE of *Monetary Bulletin* forecasts was smallest three and four quarters ahead, whereas in some instances the cost-push and ARIMA 3 models perform better for shorter-term forecasts. An examination of the recent performance of various models in one-quarter forecasting (Chart 6) indicates that, for all years shown, the cost-push model is more accurate than the *Monetary Bulletin* forecasts. This could indicate that greater consideration should be given to the cost-push model when forecasting one quarter ahead.

Chart 5

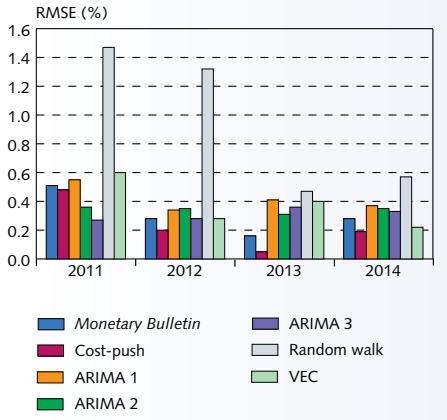
Forecasting errors for inflation in *Monetary Bulletin* and from simple models 2011-2014[1]



1. Q1 is the quarter in which the report is published or the first quarter forecasted; Q2 is the quarter after the report has been published; Q3 is the following quarter.
Source: Central Bank of Iceland.

Chart 6

Forecasting errors for inflation in *Monetary Bulletin* and from simple models for Q1[1]



1. Q1 is the quarter in which the report is published or the first quarter forecasted.
Source: Central Bank of Iceland.

Central Bank GDP growth forecasts for 2014

In order to obtain a clearer view of the Central Bank's success in inflation forecasting, it is necessary to examine its success in forecasting developments in the real economy. For example, the Bank is likely to underforecast inflation during periods when it underforecasts growth in demand and overestimates the slack in the economy.

New national accounts standards (ESA 2010) were adopted by Statistics Iceland in September 2014. Various changes in data compilation and methodology were implemented at the same time. These changes necessitated a review of historical data back to 1997. The changes in the standards are discussed in greater detail in Box 1 of *Monetary Bulletin* 2014/4. They led to major revisions of historical national accounts, which must be borne in mind in any comparison between forecasts older than *Monetary Bulletin* 2014/4 and Statistics Iceland's published national accounts from September 2014. Forecasts prepared for *Monetary Bulletin* 2014/4 were based on figures compiled using the previous standards, ESA 95, and it is appropriate to expect a systematic difference between them and the results obtained using the revised national accounts. The change in standards does not affect observed inflation, but GDP growth from 1997 onwards is now considered to have been stronger, on average, than before.

6. The accumulated forecasting error is the combined error for the period. In order to give an accurate view of the performance, the absolute value of the error in each period is used. Otherwise, underforecasted values would offset overforecasted values, resulting in an underestimation of the forecasting error.

Statistics Iceland publishes preliminary national accounts figures for each quarter about two months after each quarter-end. The first estimates for Q4/2014 and the full year 2014 were published in March 2015, 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 4. Statistics Iceland's preliminary national accounts figures for Q3/2013 were available in February 2014, when *Monetary Bulletin* 2014/1 was published. As a result, the Bank had to base its forecast for 2014 on the forecast for Q4/2013.

Table 4 *Monetary Bulletin* macroeconomic forecasts and Statistics Iceland data for 2014

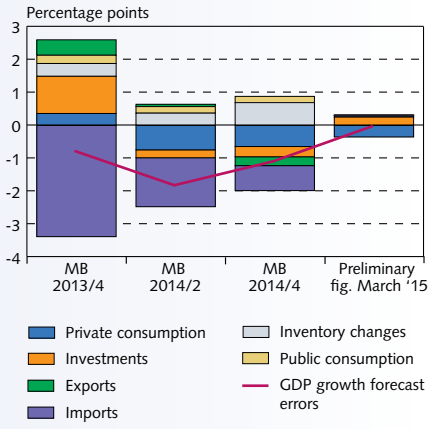
Forecast horizon from:	*2013/4*	*2014/1*	*2014/2*	*2014/3*	*2014/4*	*Prelim. figures (March 2015)*	*Revised figures (Sep. 2015)*
% change from prior year	*PM 2014/1*	*PM 2014/2*	*PM 2014/3*	*PM 2014/4*	*PM 2015/1*		
Private consumption	4.6	4.4	4.4	4.3	3.6	3.7	3.1
Public consumption	0.6	0.9	1.1	1.0	0.9	1.8	1.8
Investment	5.4	19.0	22.2	17.6	13.7	13.7	15.4
National expenditure	3.6	5.6	5.8	5.3	4.4	5.3	5.2
Exports	1.4	2.9	4.3	3.6	4.3	3.1	3.1
Imports	3.1	6.4	8.9	8.3	9.4	9.9	9.8
GDP growth	2.6	3.7	3.4	2.9	2.0	1.9	1.8

Statistics Iceland figures changed between the publication of the preliminary figures in March and the revision in September. Investment was revised markedly upwards, owing to an underestimation of public sector activity in the preliminary figures. On the other hand, private consumption was overestimated in the preliminary figures, which led to a downward revision of national expenditure. This revision resulted in a 0.1 percentage point decrease in GDP growth for 2014.

According to the most recent figures from Statistics Iceland, GDP growth for 2014 was considerably weaker than forecasts had indicated. The forecasts published in *Monetary Bulletin* in 2014/1 through 2014/3 overestimated GDP growth by 0.8-1.9 percentage points in comparison with the national accounts figures from September. It should be borne in mind, however, that this overestimation is due in part to the aforementioned change in standards, as these forecasts are based on data compiled according to the previous standards. In the forecasts in *Monetary Bulletin* 2014/4 through 2015/1, which are based on data compiled using the new standards, GDP growth is overestimated by 0.2-1.1 percentage points. This error is due in part to an overestimation of exports and an underestimation of imports. Chart 7 illustrates how errors in forecasts of expenditure items explain the errors in the GDP growth forecasts for 2014. The chart shows that the underestimation of imports is responsible for a large share of the error, while forecasts of exports were more accurate. Changes in inventories also proved to be underestimated in the Bank's forecasts. This was offset by the overestimation of private consumption in the forecasts in *Monetary Bulletin* 2014/2 and 2014/4, however, and the error in the GDP growth forecast was smaller as a result. The chart also shows the changes between Statistics Iceland's preliminary figures for 2014, published in March, and the revised figures from September. The revision of private consumption and investment led to the greatest changes.

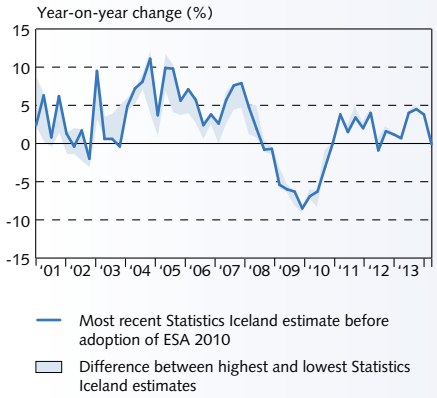
Chart 7

Contribution of expenditure items to forecast errors in GDP growth 2014[1]



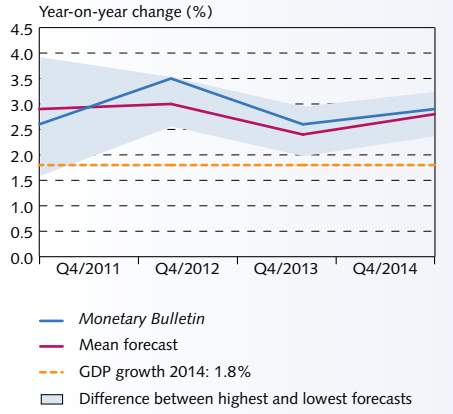
1. Based on real figures in September 2015.
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 8
Revision of GDP growth



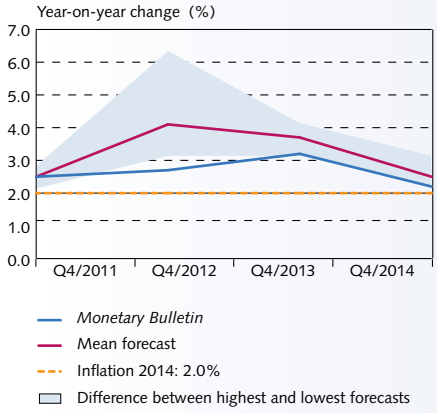
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 9
GDP growth forecast for 2014



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

Chart 10
Inflation forecasts for 2014



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

In Iceland and elsewhere, historical statistics are usually revised at regular intervals, and often the final results are often not available until several years later. In Iceland, the tendency seems to be that these figures are revised upwards rather than downwards.[7] For example, GDP growth during the period from 2001 through 2013 was revised by 1.8 percentage points, on average, from the first figures to the last. In over 60% of instances, the figures were revised upwards. Chart 8 shows developments in Statistics Iceland's GDP growth figures from Q1/2001 through Q1/2014. During the period from 2001 through 2009, GDP growth was revised by an average of 2.4 percentage points, and in 78% of instances the revision was upward. From 2010 onwards, GDP growth was revised by only 0.6 percentage points, on average, and only in one-fourth of instances was it revised upwards. The downward revision of private consumption during the 2010-2013 period could explain in part the difference in GDP growth revisions before and after 2010.

Central Bank forecasts in comparison with other forecasters' projections

Chart 9 gives a comparison of the Central Bank's output growth forecasts for 2014 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 2011-2014, and the mean is calculated from seven forecasts from the International Monetary Fund (IMF), the Icelandic Federation of Labour (ASÍ), Iceland's three large commercial banks, Statistics Iceland, and the European Commission. The range between the highest and lowest forecast values is indicated by the shaded area. In general, it widens during periods of marked uncertainty and further out the forecast horizon.

The Bank's output growth forecasts accord well with those of other forecasters. The GDP growth forecasts are well above Statistics Iceland's final figures for 2014. To some extent, this is because private consumption and investment in 2014 turned out weaker than had been forecast. There was also an error in the forecast of net exports, with exports overforecast and imports underforecast. As is mentioned above, Statistics Iceland has implemented new national accounts standards that were not taken into account during the preparation of the forecasts under examination here. A portion of the forecasting errors could be due to this.

Chart 10 gives a comparison of forecasted inflation for 2014. As can be seen, the Bank's forecasts turned out somewhat too high. The Bank's forecasts were below those of other forecasters and closer to the actual outcome from year-end 2012 onwards. The Central Bank projected year-2014 inflation at 2.7%, whereas the average of other forecasters was 4.2%. At year-end 2013, the Bank revised its inflation forecast upwards, while other forecasters lowered theirs. At the end of 2014, both the Bank and other forecasters lowered their inflation forecasts. On average, other forecasters estimated 2014 inflation at 2.5%, or 0.5 percentage points above its actual value, while the Central Bank forecast it at 2.2%. As is stated above, actual inflation for the year averaged 2%.

7. See, for instance, Ásgeir Daníelsson (2008), "Accuracy in forecasting macroeconomic variables in Iceland", Central Bank of Iceland *Working Paper*, no. 39.

Appendix 1

Forecast tables

Table 1 GDP and its main components[1]

	2014	2015	2016	2017	2018
Private consumption	3.1 (3.7)	4.6 (4.2)	4.3 (4.6)	4.1 (4.4)	3.9
Public consumption	1.8 (1.8)	1.4 (1.8)	1.4 (1.3)	1.6 (1.0)	1.5
Gross capital formation	15.4 (13.7)	20.9 (22.5)	11.4 (8.0)	3.8 (3.8)	1.9
Business investment	16.3 (15.1)	29.1 (29.1)	12.3 (7.2)	-0.9 (-0.1)	-3.8
Residential investment	14.8 (14.9)	11.8 (17.9)	15.5 (13.7)	22.2 (18.0)	20.3
Public investment	12.8 (7.5)	3.4 (4.6)	4.6 (5.5)	4.3 (4.7)	2.2
Domestic demand	5.2 (5.3)	7.2 (6.8)	4.4 (4.4)	3.4 (3.4)	2.9
Exports of goods and services	3.1 (3.1)	6.8 (6.8)	4.7 (3.6)	2.9 (2.9)	1.5
Imports of goods and services	9.8 (9.9)	12.1 (12.4)	7.3 (6.6)	3.9 (4.2)	1.9
Gross domestic product (GDP)	1.8 (1.9)	4.6 (4.2)	3.2 (3.0)	2.9 (2.8)	2.6
GDP at current price levels (ISK trillions)	2.0 (2.0)	2.2 (2.2)	2.4 (2.4)	2.5 (2.5)	2.7
Growth rate of nominal GDP	5.9 (6.0)	9.9 (10.6)	7.5 (8.2)	7.1 (6.6)	6.1
Total investment (% of GDP)	16.7 (16.6)	19.0 (19.1)	19.9 (19.6)	19.9 (19.8)	19.7
Business investment (% of GDP)	10.7 (10.9)	12.9 (13.0)	13.4 (13.2)	12.7 (12.7)	11.8
Underlying gross national saving (% of GDP)[2]	21.5 (20.9)	23.4 (23.6)	22.1 (22.2)	21.3 (21.1)	20.4
Contribution of net trade to GDP growth (percentage points)	-3.0 (-3.0)	-2.1 (-2.2)	-0.9 (-1.2)	-0.3 (-0.5)	-0.1

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3). 2. The sum of investment, inventory changes, and the underlying current account balance.

Sources: Statistics Iceland, Central Bank of Iceland.

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

	2014	2015	2016	2017	2018
Marine production for export	-12.1 (-12.1)	4.5 (6.8)	2.0 (3.0)	2.0 (2.0)	2.0
Aluminium production for export	1.8 (1.8)	4.0 (4.0)	2.0 (2.0)	2.0 (2.0)	2.0
Foreign currency prices of marine products	7.7 (7.7)	8.5 (8.5)	2.0 (2.0)	-3.0 (-2.9)	-1.0
Aluminium prices in USD[2]	2.1 (2.1)	-7.2 (-2.6)	-5.6 (-3.9)	3.9 (1.6)	2.1
Fuel prices in USD[3]	-7.5 (-7.5)	-44.7 (-44.0)	-0.4 (7.5)	8.6 (4.8)	8.8
Terms of trade for goods and services	3.2 (3.4)	5.3 (5.7)	0.6 (0.6)	-1.3 (-1.3)	-1.0
Inflation in main trading partners[4]	1.1 (1.1)	0.7 (0.7)	1.5 (1.6)	1.9 (1.9)	2.0
GDP growth in main trading partners[4]	1.7 (1.8)	1.7 (1.9)	2.0 (2.2)	2.2 (2.3)	2.4
Main trading partners' imports[4]	3.3 (3.3)	3.3 (3.8)	4.0 (4.3)	3.5 (3.5)	2.9
Short-term interest rates in main trading partners (%)[5]	0.5 (0.5)	0.2 (0.2)	0.4 (0.4)	1.1 (1.4)	1.9

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3). 2. Forecast based on aluminium futures and analysts' forecasts. 3. Forecast based on fuel futures and analysts' forecasts. 4. Forecast from Consensus Forecasts and Global Insight. 5. OECD forecast for three-month money market rates in Iceland's main trading partner countries.

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

Table 3 Current account balance and its subcomponents[1]

	2014	2015	2016	2017	2018
Trade balance	6.3 (6.4)	6.4 (6.7)	5.3 (5.5)	4.1 (4.1)	3.4
Headline balance on primary income[2]	-2.9 (-2.2)	-3.6 (-3.0)	-3.1 (-2.3)	-2.7 (-2.2)	-2.8
Underlying balance on primary income[3]	-1.0 (-0.4)	-2.3 (-2.0)	-3.1 (-2.9)	-2.7 (-2.8)	-2.8
Headline current account balance[2]	3.4 (4.2)	2.8 (3.2)	2.2 (2.5)	1.4 (1.3)	0.6
Underlying current account balance[3]	4.8 (5.5)	3.9 (4.5)	2.2 (2.5)	1.4 (1.3)	0.6

1. % of GDP (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3). 2. Calculated according to IMF standards. The sum of primary and secondary income. 3. Adjusted for the calculated revenues and expenses of the DMBs in winding-up proceedings. The services account balance is also adjusted for the failed DMBs' financial intermediation services indirectly measured (FISIM). From Q1/2016 onwards, the estimated effects of the settlement of the failed banks' estates are included.

Sources: Statistics Iceland, Central Bank of Iceland.

Table 4 Public sector finances[1]

	2014	2015	2016	2017	2018
Overall Treasury balance	0.9 (0.0)	0.4 (0.1)	0.3 (0.3)	1.2 (1.2)	0.7
Primary Treasury balance	4.4 (3.2)	3.4 (3.2)	2.7 (3.0)	3.3 (3.7)	2.6
Overall public sector balance	-0.1 (-0.2)	0.0 (-0.1)	0.2 (0.0)	0.6 (1.1)	0.4
Primary public sector balance	3.6 (3.1)	3.1 (3.1)	2.8 (2.8)	2.8 (3.7)	2.4
Total public sector debt	82 (82)	70 (74)	58 (69)	55 (64)	53
Net public sector debt[2]	56 (59)	52 (53)	38 (49)	35 (45)	35

1. % of GDP on an accrual basis (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/2). 2. 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]

	2014	2015	2016	2017	2018
Unemployment (% of labour force)	5.0 (5.0)	4.4 (4.2)	4.3 (4.2)	4.2 (4.3)	4.1
Employment rate (% of population aged 16-74)	77.4 (77.4)	78.9 (78.7)	79.0 (78.9)	78.4 (79.0)	78.4
Total hours worked	1.9 (1.9)	3.3 (2.9)	2.4 (2.1)	1.7 (2.1)	1.7
Labour productivity[2]	-0.1 (0.0)	1.3 (1.3)	0.8 (0.8)	1.2 (0.6)	1.0
Unit labour costs[3]	5.6 (5.9)	9.0 (9.0)	8.1 (7.4)	5.2 (5.5)	4.3
Real disposable income	4.7 (6.2)	7.9 (7.6)	6.7 (5.1)	4.9 (4.7)	3.3
Output gap (% of potential output)	-0.3 (0.0)	1.2 (1.1)	1.4 (1.2)	1.1 (0.9)	0.7

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3). 2. Output per total hours worked. 3. Wage costs over productivity.

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

Table 6 Exchange rate and inflation[1]

	2014	2015	2016	2017	2018
Trade-weighted exchange rate index[2]	206.9 (206.9)	201.0 (205.7)	192.2 (205.4)	192.2 (205.4)	192.2
Inflation (consumer price index, CPI)	2.0 (2.0)	1.7 (2.2)	3.3 (4.3)	4.0 (4.1)	3.4
Inflation (CPI excluding effects of indirect taxes)	2.0 (2.0)	1.3 (1.8)	3.1 (4.3)	4.0 (4.1)	3.4

1. Year-on-year change (%) unless otherwise specified (figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3). 2. Narrow trade basket.

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	
2014:4	1.3 (1.3)	1.2 (1.2)	-0.4 (-0.4)
2015:1	1.1 (1.1)	0.7 (0.7)	0.4 (0.4)
2015:2	1.5 (1.5)	1.1 (1.1)	5.4 (5.4)
2015:3	2.0 (2.4)	1.6 (1.9)	2.6 (4.2)
		Forecasted value	
2015:4	2.3 (3.8)	1.9 (3.4)	1.0 (5.3)
2016:1	2.7 (4.3)	2.6 (4.3)	1.9 (2.5)
2016:2	3.0 (4.4)	2.8 (4.4)	6.4 (5.5)
2016:3	3.3 (4.2)	3.1 (4.2)	3.9 (3.5)
2016:4	4.0 (4.2)	3.9 (4.2)	4.0 (5.2)
2017:1	4.1 (4.3)	4.1 (4.3)	2.2 (3.0)
2017:2	4.1 (4.1)	4.1 (4.1)	6.2 (4.7)
2017:3	3.9 (4.0)	3.9 (4.0)	3.4 (3.1)
2017:4	3.8 (3.8)	3.8 (3.8)	3.3 (4.3)
2018:1	3.6 (3.5)	3.6 (3.5)	1.7 (2.0)
2018:2	3.5 (3.3)	3.5 (3.3)	5.6 (3.7)
2018:3	3.3 (3.0)	3.3 (3.0)	2.6 (2.1)
2018:4	3.1	3.1	2.5

1. Figures in parentheses are from the forecast in *Monetary Bulletin* 2015/3.

Sources: Statistics Iceland, Central Bank of Iceland.