

By the beginning of 2011, the Central Bank of Iceland's collateralised lending rate had fallen by almost 14 percentage points, to 4.75%, from its peak at year-end 2008. Since then, it has risen back to 6%, whereas the Bank's effective policy rate – i.e., the rate determining market interest rates at any given time – is somewhat lower, or about 5.4%, down from 15% (using the simple average of the Bank's current account rate and the maximum rate on 28-day certificates of deposit).¹

In spite of this dramatic decline, the Central Bank of Iceland's interest rates are still somewhat higher than those in Iceland's main trading partners. As Chart 1 shows, policy rates in other industrialised countries currently range between 0.125% and 1.5% and have not risen since mid-2011, when the Central Bank of Iceland began raising rates again. This Box explores the reasons why the policy rate is not as low in Iceland as in neighbouring countries.²

High interest rates are caused by persistent inflation and inflation expectations ...

In the wake of the global financial crisis and the ensuing economic crisis, inflation has remained low in most industrialised countries. Headline inflation has sometimes spiked following increases in commodity and oil prices, but underlying inflation has stayed very low. This is shown clearly in Charts 2 and 3, which illustrate headline CPI inflation, on the one hand, and core inflation, on the other, which excludes volatile items and items that reflect supply shocks (such as oil prices and direct tax effects). Since the beginning of 2009, the twelve-month change in the price level has fluctuated from 1½% deflation to 3½% inflation in the vast majority of the countries. According to the median value, measured inflation is currently about 1%, with the range extending from 1% deflation to 3% inflation. Core inflation, however, has fluctuated within a much narrower range of ½-2% for most of the countries.

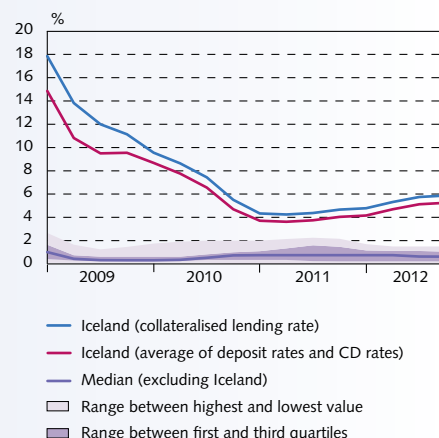
Developments in Iceland have differed for most of the period, however. Unlike in other countries, inflation rose sharply in the wake of the financial crisis, owing to a steep depreciation of the króna, and peaked at nearly 19% in early 2009. It then declined steadily, with headline inflation falling to just under 2% by the beginning of 2011 and core inflation to 1% (according to core index 3; i.e., the CPI excluding the effects of volatile food items, petrol, the price of public services, real mortgage interest expense and direct taxes). It rose again thereafter, following private sector hefty wage increases negotiated in the summer of 2011, and measured about 4% in terms of headline inflation and 4½% in terms of core inflation by the end of 2012.

1. The effective policy rate reflects rates on the Bank's deposit accounts as financial system liquidity has been abundant in the wake of the crisis and demand for collateralised loans from the Bank has been accordingly limited. The opposite was true before the crisis, when the system was faced with a persistent liquidity shortage. It is more common that a financial system operates in a liquidity shortage and that a central bank's lending rates are the indicator of its effective policy rate. This is not always the case, however. In Norway, for instance, financial system liquidity is persistently ample, and Norges Bank's effective policy rate is therefore its deposit rate.
2. A comparison of Chart 1 and other charts in this Box shows central bank rates in the US, the UK, the euro area, Canada, Japan, Norway, Switzerland, and Sweden. The median rate and the difference between the highest and lowest rates in the comparison group are shown. Also shown is the difference between the first and third quartiles; that is, the distribution of 75% of the countries around the median. Denmark is omitted from the comparison because its central bank rates broadly follow the rates of the European Central Bank, as the Danish currency is pegged to the euro. In order to give further focus to the comparison between Iceland and other industrialised countries, Australia and New Zealand are omitted as well, as they have weathered the financial crisis more successfully and their policy rates have been closer to Iceland's.

Box I-1

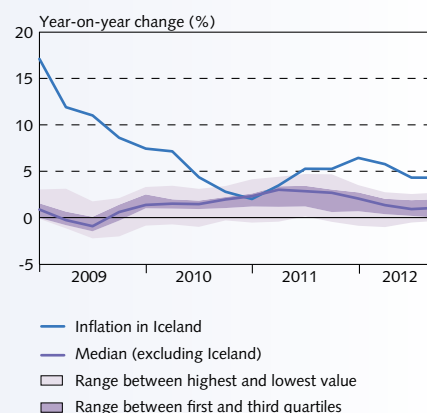
Why is the policy rate higher in Iceland than in other developed countries?

Chart 1
Central bank interest rates in Iceland and selected industrialised countries 2009-2012



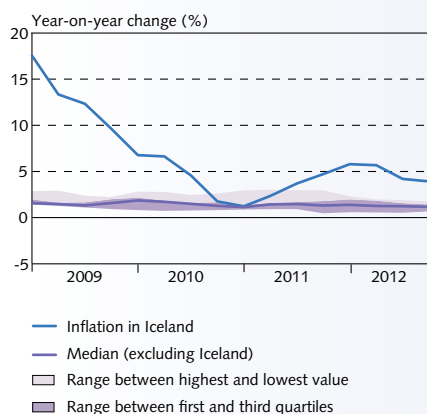
Sources: Macrobond, Central Bank of Iceland.

Chart 2
Inflation in Iceland and selected industrialised countries 2009-2012



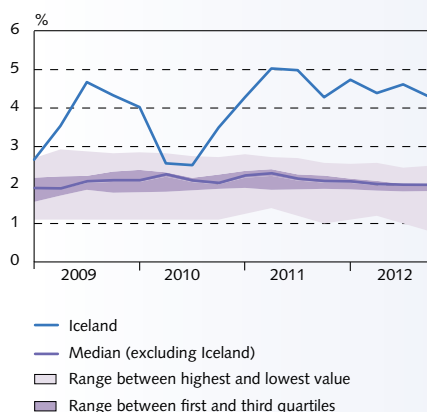
Sources: OECD, Central Bank of Iceland.

Chart 3
Core inflation in Iceland and selected industrialised countries 2009-2012



Sources: Macrobond, Norges Bank, Central Bank of Iceland.

Chart 4
Long-term inflation expectations in Iceland and selected industrialised countries 2009-2012¹



1. Iceland (5-yr expectations 5 yrs ahead, bond market), US (30 yrs ahead, bond market), UK (3 yrs ahead, analysts' forecasts), euro area (3-4 yrs ahead, analysts' forecasts), Japan (6- to 10-yr expectations, Consensus Forecasts), Canada (long-term, bond market), Norway (5 yrs ahead, analysts' forecasts), Switzerland (6- to 10-yr expectations, Consensus Forecasts), and Sweden (5 yrs ahead, analysts' forecasts). Sources: Consensus Forecasts, Macrobond, Central Bank of Iceland, applicable central banks.

Post-crisis inflation has therefore been considerably higher in Iceland than in other industrialised countries, with the exception of a short period from end-2010 to mid-2011. In addition, long-term inflation expectations have been considerably higher in Iceland than in other industrialised countries. As Chart 4 shows, inflation expectations 5-10 years ahead have ranged between 4% and 5% in Iceland for the majority of the period, as opposed to about 2% in the other countries.³ In Iceland, inflation expectations have therefore been about 2 percentage points above the Central Bank's inflation target, whereas they have been close to target in other industrialised countries even though measured inflation rose above target temporarily.⁴ The fact that long-term inflation expectations are persistently higher in Iceland than in neighbouring countries is an important explanation of inflation persistence in Iceland. For instance, if wage earners expect persistent 4-5% inflation for the next decade, they are likely to demand wage increases in line with those expectations. If wages increase over and above productivity growth, firms will pass the increases through to prices, thus maintaining inflation. In the same vein, firms are willing to agree to such pay increases, as they assume they will be able to raise their prices in line with the rise in the general price level. Expectations of higher inflation in Iceland than in neighbouring countries also implies expectations that the króna will depreciate against other currencies in the long run, which also entails higher inflation.⁵ High long-term inflation expectations can therefore cause high inflation to become entrenched due to persistent pressure on the exchange rate.

... even after accounting for the deeper contraction in Iceland

In comparing Iceland's Central Bank interest rates with those in other industrialised countries, it is also necessary to bear in mind that although inflation and inflation expectations are higher in Iceland, its post-crisis economic contraction was deeper. From the pre-crisis peak in 2008 to the post-crisis trough, GDP contracted by more than 12% in Iceland, as opposed to about 5% in comparison countries. Unemployment also rose much more steeply in Iceland, or by over 5 percentage points (in terms of the OECD's harmonised measure of unemployment), as compared with just under 3 percentage points in other industrialised countries. Higher inflation and a deeper economic contraction therefore offset one another in a comparison of monetary policy in Iceland and other countries.

A simple way to weight together the effects of these factors on monetary policy formation is to study the interest rate path generated by the Taylor rule. The Taylor rule is commonly referenced in general and academic discussion of monetary policy. Most central

- Long-term inflation expectations are determined from surveys among experts or from the spread between indexed and nominal Treasury bonds. For Japan and Switzerland, the median values from the Consensus Forecasts inflation forecasts 6-10 years ahead are used. Because those forecasts are only published semi-annually, quarterly data are obtained by linear interpolation.
- The inflation target of the Bank of England, the Bank of Canada, and Sveriges Riksbank is 2%, while the Norwegian inflation target is 2.5%. At the beginning of 2012, the US Federal Reserve Bank formally adopted a 2% inflation target, which is used as a reference for the entire period. The Bank of Japan had set a 1% inflation goal at the beginning of 2012 but adopted a formal 2% target in January 2013. This Box uses the 1% target as a reference, as the data period extends only until year-end 2012. The European and Swiss central banks do not have a formal numerical inflation target but have declared price stability their primary objective. The European Central Bank defines price stability as inflation "below but close to" 2%, while the Swiss National Bank defines it as inflation in the 0-2% range. As a result, their targets are generally assumed to be 2% and 1%, respectively, which is the assumption in this Box.
- The real exchange rate should reverse towards its equilibrium value over time, irrespective of developments in domestic inflation. If inflation is higher in Iceland than abroad, the nominal exchange rate of the króna must therefore fall over time by an amount roughly equal to the difference between domestic and foreign inflation.

banks use it as a reference for decision-making, although none follow it mechanically.⁶

According to the Taylor rule, the central bank interest rate is determined from the deviation of inflation from target and the deviation of output from potential, or the output gap (sometimes the deviation of unemployment from its equilibrium level is used instead of the output gap), and in its simplest form, it assigns equal weight to each factor:

$$i = (r^* + \pi^T) + 0,5 (\pi - \pi^T) + 0,5x$$

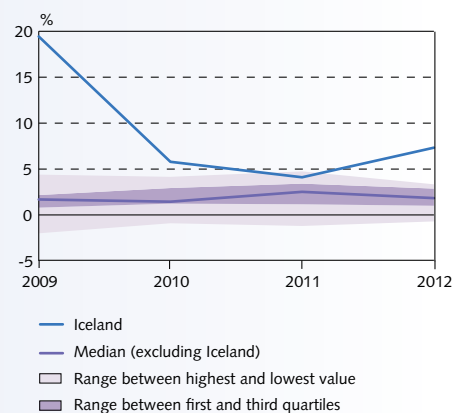
where i is the central bank interest rate, r^* is what is called the neutral real rate,⁷ π is inflation, π^T is the inflation target, and x is the output slack or gap. As the Taylor rule implies, at equilibrium (where inflation is at target and there is neither an output slack nor an output gap), the central bank rate is given as $(r^* + \pi^T)$, which corresponds to the neutral nominal rate. If inflation is above target and factor utilisation exceeds capacity, however, central bank rates should be above the neutral level, and vice versa if inflation is below target and there is a slack in the economy. The situation becomes more complicated if inflation is above target in spite of an output slack, as the interest rate level is determined by the relative size of each gap.

Chart 5 illustrates interest rate developments in Iceland and other industrialised countries, based on the Taylor rule. It uses core inflation and the Central Bank's assessment of the output gap for Iceland and the OECD estimate of the output gap for other countries. The neutral real rate is assumed to be 2% in all countries, as is commonly done in calculating the interest rate path using the Taylor rule. The neutral level after the financial crisis is subject to debate, however, and it can be argued that it has fallen. On the other hand, Central Bank research indicates that the neutral real rate was somewhat above 2% in Iceland until the crisis struck, as has been the experience in other small countries with a low level of saving and high debt levels; therefore, it could be above 2% after the crisis, although it is probably below the pre-crisis level.⁸ As can be seen, the Taylor rule suggests that rates in other developed countries should have been about 1½-2%, on average, from 2009 onwards, and about 1-3½% in most of them. The Taylor rule suggest that Iceland's policy rate should have been nearly 20% in 2009 and then fallen to about 4% by 2011, before rising back to just over 7% in 2012. The rule therefore implies that, even though the economic contraction was deeper in Iceland, a somewhat higher policy rate would have been needed here than in the other industrialised countries, owing to much more persistent inflation in the post-crisis period.

When inflation expectations are considered sufficiently anchored, it is generally considered safe to ignore temporary fluctuations in inflation during monetary policy formulation. In addition, the effects of interest rate decisions only emerge over time, so that monetary policy must be forward-looking. Therefore, it can also be interesting to examine interest rate paths generated by the Taylor rule using long-term inflation expectations instead of current inflation (see Chart 6). In this instance, the Taylor rule gives interest rates

Chart 5

Central bank interest rates in Iceland and selected industrialised countries according to the Taylor rule¹

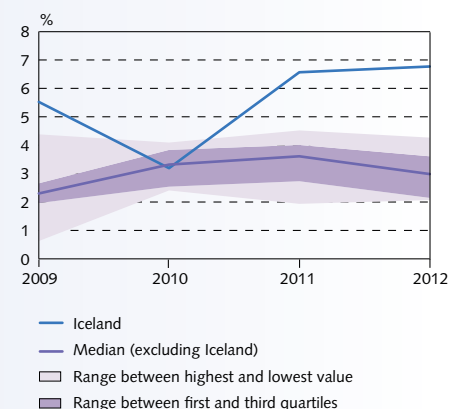


1. Taylor rule based on deviation of core inflation from target and output gap (OECD estimate for countries other than Iceland), with a weight of 0.5 on each. Assuming that the neutral real rate is 2% in all countries throughout the period.

Sources: Macrobond, Central Bank of Iceland.

Chart 6

Central bank interest rates in Iceland and selected industrialised countries according to the Taylor rule¹



1. Taylor rule based on deviation of long-term inflation expectations from target and output gap (OECD estimate for countries other than Iceland), with a weight of 0.5 on each. Assuming that the neutral real rate is 2% in all countries throughout the period.

Sources: Macrobond, Central Bank of Iceland.

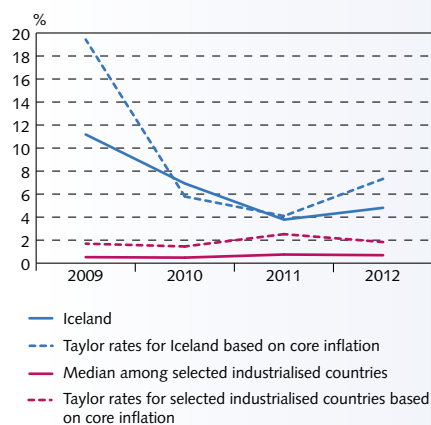
6. For a detailed discussion of the Taylor rule and an empirical evaluation of it during various periods in Iceland, see Chapter 3 of "Iceland's Currency and Exchange Rate Policy Options", Central Bank of Iceland *Special Publication* no. 7, September 2012. The Taylor rule is also discussed in Boxes in *Monetary Bulletin* 2002/2 and 2007/3.

7. This is the interest rate that reflects the internal and external balance of the economy; it is determined by economic factors beyond the scope of monetary policy, such as productivity of capital, the propensity to save, and the long-term growth potential of the economy.

8. See Chapter 3 of "Iceland's Currency and Exchange Rate Policy Options", Central Bank of Iceland *Special Publication* no. 7, September 2012.

Chart 7

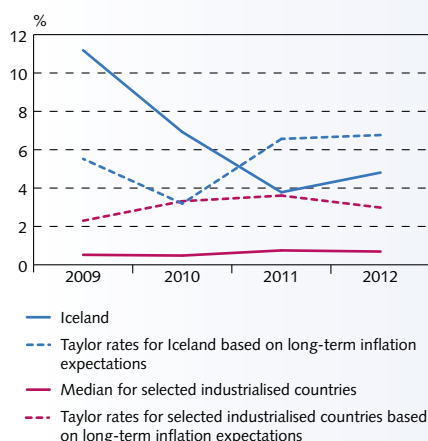
Comparison of policy rates and Taylor rates in Iceland and selected industrialised countries¹



1. Taylor rule based on current core inflation and output gap.
Sources: Macrobond, Central Bank of Iceland.

Chart 8

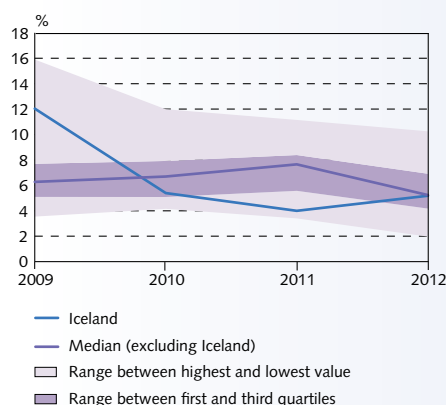
Comparison of central bank rates and Taylor rates in Iceland and selected industrialised countries¹



1. Taylor rule based on long-term inflation expectations and output gap.
Sources: Macrobond, Central Bank of Iceland.

Chart 9

Inflation in Iceland and 15 other countries, 2009-2012¹



1. The countries are Argentina, Armenia, Brazil, India, Indonesia, Kazakhstan, Mexico, Rumania, Russia, Serbia, South Africa, Turkey, Hungary, Ukraine and Uruguay.
Sources: IMF, Macrobond.

in the 2-3½% range in comparison countries and in the 3-7% range in Iceland, implying that considerably higher rates would have been needed here than in the other countries for the majority of the period.⁹

Finally, Charts 7 and 8 show central bank rates in Iceland and the other countries in comparison with the interest rate paths derived from the Taylor rule based on core inflation, on the one hand, and inflation expectations, on the other.¹⁰ As can be seen, the Taylor rule indicates that, based on core inflation, interest rates would have needed to be considerably higher in 2009 than they in fact were, which reflects the benefits of the capital controls imposed in late 2008.¹¹ The Central Bank rate was then broadly in line with the Taylor rate in 2010-11 but rose less in 2012, when it averaged 2½ percentage points below the Taylor rate. In contrast, interest rates in the other industrialised countries are similar to their corresponding Taylor rates, although they are somewhat below the rates implied by the Taylor rule throughout the period. Based on long-term inflation expectations, however, interest rates fell too slowly in Iceland in 2009-10 but have been too low since 2011. As in Chart 7, interest rates in the other countries are below Taylor rates, although the difference is greater using inflation expectations than using current inflation.

In comparing interest rates, it is more appropriate to consider countries with similar inflation rates

As the interest rate comparison above suggests, it should be borne in mind that inflation has been much more persistent in Iceland than in other industrialised countries. In such a comparison, it can therefore be more instructive to consider other countries whose inflation rates are more in line with developments in Iceland. Chart 9 gives a comparison of inflation in Iceland and in 15 relatively developed emerging economies where inflation has fluctuated in a range similar to that in Iceland (that is, within one standard deviation from average inflation in Iceland in 2009-12). Inflation was somewhat higher in Iceland than in most of the other countries in 2009, while it was lower in 2010-11 and broadly similar in 2012. In Chart 10, which shows central bank interest rates in the same countries, it can be seen that interest rates in Iceland have been much more in line with those in the other countries, although the policy rate has fallen somewhat more in Iceland than in the comparison countries in the past two years.

Summary

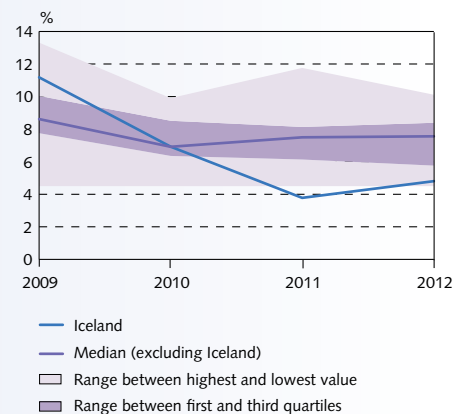
Since the financial crisis struck in the autumn of 2008, the Central Bank's policy rate has been higher in Iceland than policy rates in other industrialised countries for the simple reason that inflation and long-term inflation expectations have been higher in Iceland. This reflects Iceland's lack of success in controlling inflation before the cri-

9. Very similar results are obtained using the deviation in measured unemployment from the equilibrium unemployment rate (i.e., the NAIRU estimated by the Central Bank for Iceland but by the OECD for the other countries).
10. The previously mentioned uncertainty concerning the exact level of the real neutral rate should be kept in mind, however.
11. The capital controls enabled the Central Bank to lower interest rates much more rapidly than would otherwise have been possible, as there was less need for concern that a reduction in interest rates would push the exchange rate even lower. This can be seen clearly, for instance, when interest rate developments in Iceland are compared with those in South Korea in the wake of the latter's currency and financial crisis in 1997. The decline in the real exchange rate from peak to trough in the two crises was of similar magnitude (58% in Iceland and 45% in South Korea). In South Korea, the short-term real interest rate rose by nearly 7 percentage points in three months following the crisis and was higher than at the beginning of the crisis for about half a year. In Iceland, however, the short-term real rate fell immediately after the crisis and, one year later, was almost 9 percentage points lower than at the beginning of the crisis (see, for example, <http://www.sedlabanki.is/library/Skráarsafn/Erindi/Lionsklúbbur%20feb13.pdf>).

sis, when inflation was above target for protracted periods of time. At the same time, central banks in other industrialised countries have been successful in keeping inflation at target. In this way, their monetary policy has garnered credibility, as is reflected in long-term inflation expectations that have remained close to target in spite of historically low interest rates, even though measured inflation has deviated somewhat from target at times. This has also enabled them to use monetary policy to support the real economy more decisively in the wake of the crisis than has been possible in Iceland, owing to the lack of a credible anchor for inflation expectations. If anything, the problem faced by many industrialised countries has been the risk of prolonged deflation, with the associated repercussions for economic activity, as Japan's experience shows so clearly. In order to offset this risk, the central banks in these countries have lowered interest rates as much as possible, as well as adopting a variety of stimulative measures such as quantitative easing. In most instances, attempts to avoid deflation have been successful, but it has proven more difficult to expedite economic recovery and ensure more favourable private sector financial conditions.

The problem faced by domestic monetary policy is far from unique, however. Other industrialised countries faced the same situation about 30 years ago, and even more recently a number of emerging economies managed to solve the same problem. In both cases, the countries concerned finally managed to control inflation and anchor inflation expectations securely. Although it required short-term sacrifices, the benefits were obvious during the financial crisis, as they were able to ease the monetary stance considerably in order to counteract the economic contraction. There is no reason to assume that such anchoring cannot be achieved in Iceland as well, but it will take time and perseverance.

Chart 10
Central bank rates in Iceland and
15 other countries, 2009-2012¹



1. The countries are Argentina, Armenia, Brazil, India, Indonesia, Kazakhstan, Mexico, Rumania, Russia, Serbia, South Africa, Turkey, Hungary, Ukraine and Uruguay.
Sources: IMF, Macrobond.