Box 1

Fluctuations in the ISK exchange rate in international context

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

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

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

Fluctuations in the exchange rate of the króna in international context

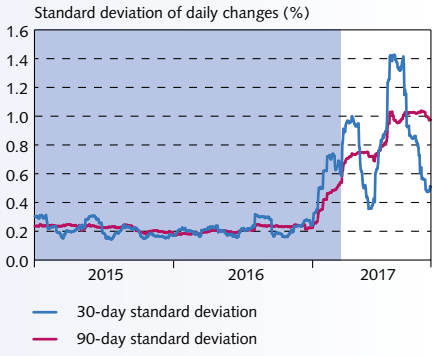
Chart 2 shows fluctuations in the TWI from 1995 onwards, together with a comparison with other advanced economies' nominal effective exchange rates. It shows the thirty-day standard deviation, but the ninety-day deviation tells the same story. As is shown in the chart, fluctuations similar to movements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

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

Chart 1

Fluctuations in the ISK exchange rate[1]

1 January 2015 - 30 October 2017



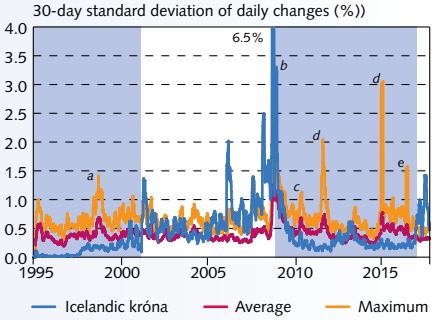
1. Exchange rate of the króna in terms of the trade-weighted exchange rate index. The shaded area shows the period while the capital controls were in effect.

Source: Central Bank of Iceland.

Chart 2

Exchange rate flutuations: industrialised countries[1]

1 January 1995 - 30 October 2017



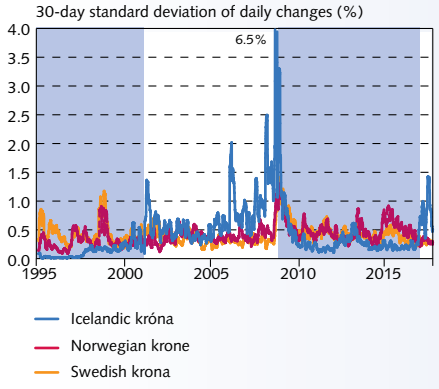
1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). Average and maximum fluctuations in the AUD, CAD, CHF, DKK, EUR (ECU before 1999), GBP, JPY, NOK, NZD, SEK, and USD. The first shaded area shows the pegged exchange rate period,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

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 3

Exchange rate fluctuations: Nordic region[1]

1 January 1995 - 30 October 2017



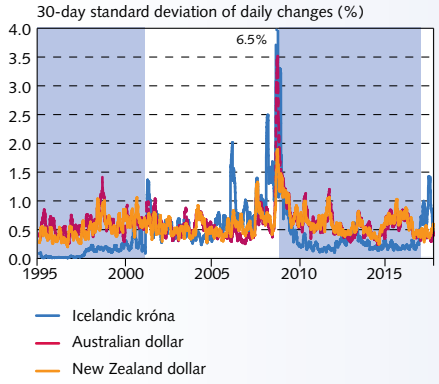
1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). The first shaded area shows the pegged exchange rate period, and the latter shows the period while the capital controls were in effect.

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 4

Exchange rate fluctuations: commodity-exporting countries[1]

1 January 1995 - 30 October 2017

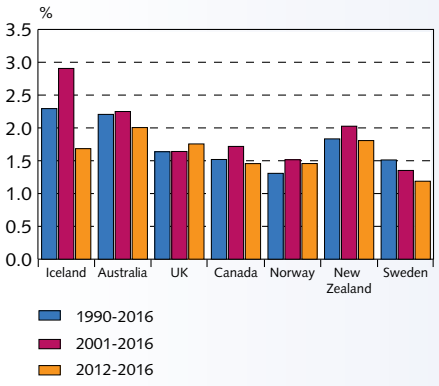


1. Exchange rate in terms of trade-weighted exchange rate index (from JP Morgan for currencies other than the Icelandic króna). The first shaded area shows the pegged exchange rate period, and the latter shows the period while the capital controls were in effect.

Sources: Thomson Reuters, Central Bank of Iceland.

Chart 5

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



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

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

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

Long real exchange rate cycles are quite common …

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

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

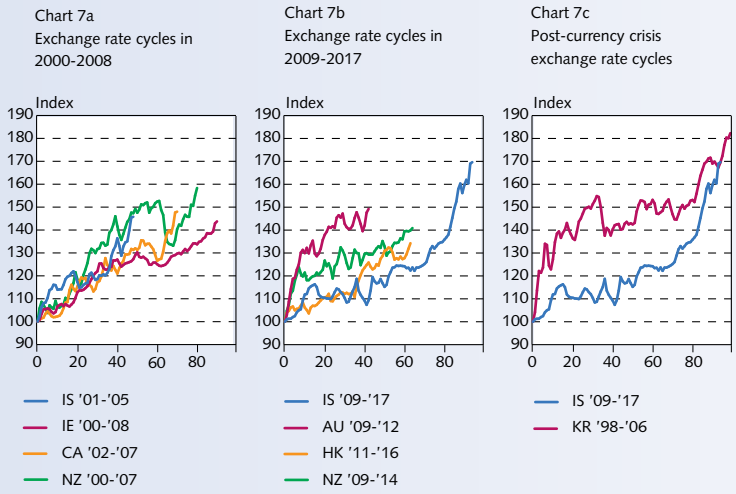
… and can be a necessary part of an economy's adjustment to shocks

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

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

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

Chart 7
Long real exchange rate cycles in selected advanced economies[1]



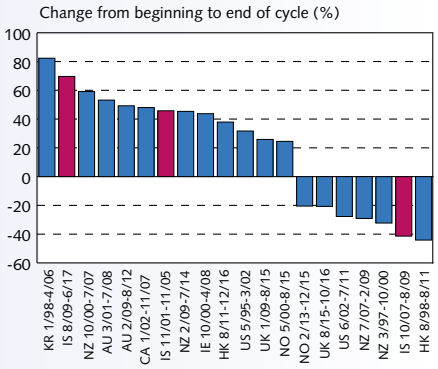
1. The charts show developments in the real exchange rate from the beginning to the end of the cycle (first month = 0) in selected industrialised countries: Iceland (Nov. 2001 - Nov. 2005 and Aug. 2009 - Jun. 2017), Australia (Feb. 2009 - Aug. 2012), Hong Kong (Aug. 2011 - Dec. 2016), Ireland (Oct. 2000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

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

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

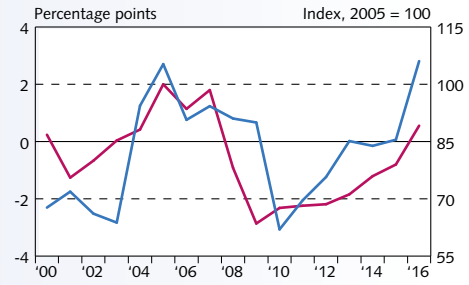
2. See, for example, the alternative scenario in *Monetary Bulletin* 2017/2, which describes the important role of a higher exchange rate in the economy's adjustment to the positive shocks of the past few years.

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



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

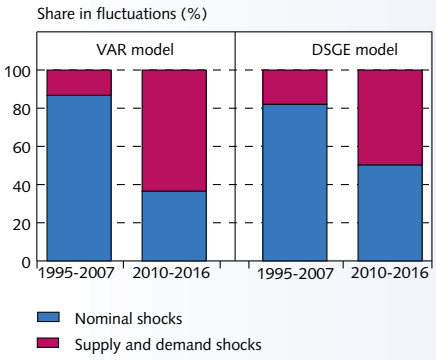
Chart 8
The business cycle and the real exchange rate 2000-2016[1]



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

Chart 9

Variance decomposition of exchange rate fluctuations[1]



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

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

Summary

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

References

Central Bank of Iceland (2012), "Iceland's currency and exchange rate policy options", Central Bank of Iceland *Special Publication* no. 7.

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

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