Box III-1

Post-crisis developments in money holdings

Money holdings grew strongly in Iceland during the economic upswing of the early 2000s, reaching an all-time high relative to GDP during the run-up to the financial crisis. They subsided again in the wake of the crisis but remain high in historical context. In Iceland, the contraction in money holdings during financial crises is greater than has been observed in other industrialised countries but appears to be well in line with the historical relationship between money demand and its main determinants.

Money holdings averaged less than half of GDP in the 20th century …

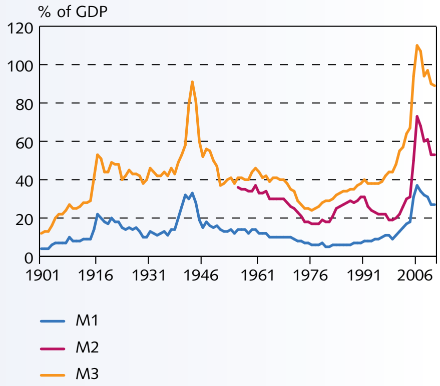
At the beginning of the 20th century, M3 in Iceland was only about 10% of GDP (Chart 1), reflecting the small size and shallowness of the domestic financial and banking system at that time.[1] The ratio of M3 to GDP began to rise in the first two decades of the century, following the increase in the number of domestic financial institutions and the development of the financial system, and approached 50% by the 1920s. Apart from a steep rise during World War II, it remained relatively steady, averaging 40-50% of GDP until the 1970s, when it began to fall in tandem with mounting inflation and negative real deposit interest rates, which reduced money demand and caused a shift to other asset classes, real estate in particular. It bottomed out at just under 25% towards the end of the 1970s and then began rising again – owing in part to the passage of general legislation on financial indexation in 1979, which triggered an increase in domestic saving – and reached about 40% of GDP in the 1990s.[2]

… surged during the boom in the 2000s …

Shortly after the turn of the century, money growth began to accelerate in tandem with the surge in credit institution lending. The ratio of M3 to GDP rose by nearly 70 percentage points from the turn of the century until end-2008, when it measured 110% of GDP. Narrow money also grew considerably. Strong growth in banking system credit and the associated rise in money holdings stem from a number of factors: events following the privatisation of the commercial banks, increased economic activity, rapid financial system development, banks' and firms' increased access to cheap foreign credit, elevated mortgage loan-to-value ratios, and an asset price bubble that increased households' wealth and expanded their collateral capacity for further borrowing (see also Box III-2 in *Monetary Bulletin* 2010/2). The monetary stance also appears to have been too loose at the time, as is discussed in Central Bank of Iceland (2012), with monetary policy ultimately constraining deposit money banks' (DMB) money creation through its control over the marginal cost of capital, in particular by setting the policy interest rate.[3] However, only a part of the banking system's credit growth was financed with money creation, which accords with developments internationally during this period. For instance, M3 was nearly 60% of the DMB loan stock in September 2003, but only 30% by the time the crisis struck in late September 2008 (Chart 2).

Chart 1

Monetary aggregates as a percentage of GDP 1901-2013

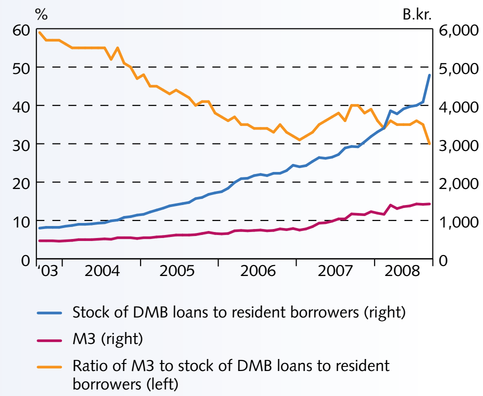


Sources: National Economic Institute, Statistics Iceland, Central Bank of Iceland.

Chart 2

M3 and DMB loan stock

September 2003 - September 2008

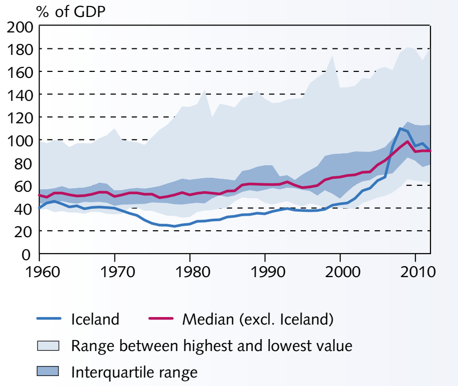


Source: Central Bank of Iceland.

1. The ratio of broad money to GDP is a conventional measure of domestic financial deepening. See, for example, Ólafsson and Pétursson (2011).
2. Discussions of developments in money holdings and an assessment of the determination of money demand in Iceland can be found in Eggertsson (1982), Gudmundsson (1986), Cornelius (1990), and Pétursson (1996, 2000). A recent estimation of a monetary demand equation for Iceland can be found in the Central Bank's quarterly macroeconomic model (QMM) (see Daníelsson *et al.*, 2009; an updated version of the model is forthcoming).
3. A discussion of how monetary policy restricts DMBs' money creation can be found, for instance, in McLeay *et al.* (2014).

Chart 3

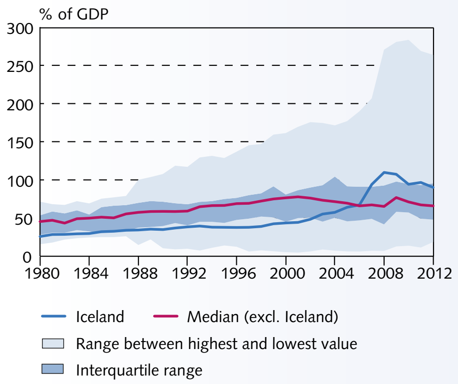
Ratio of broad money to GDP for Iceland and selected European countries 1960-2012[1]



1. Italy, Switzerland, Sweden, Denmark, United Kingdom, Netherlands, Finland, Norway, Germany, France, Portugal, and Spain. For some of the countries, data are not available for the entire period.
Sources: Macrobond, World Bank, Central Bank of Iceland.

Chart 4

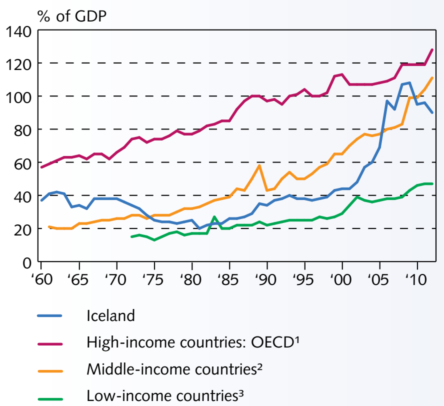
Ratio of broad money to GDP for Iceland and selected small countries 1980-2012[1]



1. Antigua and Bermuda, Aruba, Bahamas, Bahrain, Barbados, Brunei, Estonia, Grenada, Dutch Antilles, Qatar, Cyprus, Latvia, Malta, Mauritius, Equatorial Guinea, Oman, Federation of Saint Christopher and Nevis, Saint Lucia, Seychelles, Trinidad and Tobago. For some of the countries, data are not available for the entire period.
Sources: Macrobond, World Bank, Central Bank of Iceland.

Chart 5

Broad money as a share of GDP, by national income 1960-2012



1. National income per capita in 2012 USD 12,616 or more. 2. National income per capita in 2012 USD 1,036-12,165. 3. National income per capita in 2012 USD 1,035 or less.
Source: World Bank.

... and has declined as time has passed since the crisis

Money holdings continued to grow at the beginning of the crisis in late 2008, due in part to increased demand for money following structural shifts in saving behaviour: savings that had been invested in funds were transferred to deposit accounts, and the worsening economic outlook prompted savers to move their money to more liquid and less risky assets such as bank deposits, which were guaranteed in full, in accordance with the Government declaration of 6 October 2008. The reduction in the number of investment options also channelled savings into other avenues such as bank deposits. In addition, falling interest rates and reduced returns on other asset classes after the crisis stimulated money demand.

As time has passed since the financial crisis, however, the situation has turned around, and money holdings relative to GDP have declined again, to about 90% as of year-end 2013. The drop in the ratio is probably due to a number of factors. Money demand began to contract in line with falling household wealth, as some households used their savings to deleverage or to smooth out consumption spending due to shrinking real disposable income. Corporate indebtedness declined as well, as debt has been restructured, written off, and paid down. In addition, the vast majority of firms' investments have been financed from operations rather than through debt financing (see, for example, the results of the Central Bank's investment survey in Section IV). Furthermore, investment options increased, with the associated shift from deposits to other asset classes, and the commercial banks sold assets they took over in the wake of the crisis. Moreover, money demand may have contracted in the wake of rising asset prices, low real deposit rates, and higher returns on other types of investment, and households have become more willing to take risks as the composition of their asset portfolios normalises.

Although money holdings have more or less stopped contracting in the past two years, their share in GDP has continued to drop, particularly considering the effects of the post-crisis reclassification of deposits on the measured money holdings. Residents' deposits have increased, as the commercial banking licences of the failed banks' winding-up committees have been revoked and the companies reclassified as holding companies.[4] Furthermore, there has been an increase in deposits held by special purpose vehicles that, among other activities, invest in real estate mortgages, and this has affected measured money holdings even though these companies are wholly owned by the commercial banks.[5] Adjusting for these deposits, money holdings totalled just over 80% of GDP at year-end 2013, or just under 10 percentage points of GDP less than measured M3.

Developments in money holdings in comparison with other countries

Comparing developments in Iceland to those in selected other European countries during the period 1960-2012 reveals that money holdings relative to GDP were generally lower in Iceland until the turn of the century, and well below the median of the comparison group. As is mentioned above, this indicates that the domestic financial system had been relatively shallow (Chart 3). Just after the turn of the century, the comparison group's ratio rose, but Iceland's ratio rose more rapidly, which reflects the gradual catch-

4. Because money in circulation is defined as the banking system's obligations vis-à-vis the public, the measured money holdings increase when the classification of the winding-up committees' deposits is changed from financial institution deposits – and therefore one financial institution's debt to another – to a financial institution's debt to a non-financial institution, but without any actual increase in deposits.

5. The Central Bank of Iceland is currently revising its definitions of money, including the position of special purpose vehicles. See also Burgess and Janssen (2007).

up of the domestic financial system with those in other European countries. In spite of the steep rise in Iceland's money stock relative to GDP, it had only reached the median level for the comparison group as a whole by end-2012. A similar trend can be seen in other small countries (Chart 4). Yet, in this international comparison, it is not possible to conclude that money holdings in Iceland are abnormally high at this juncture, even though they have grown strongly since the turn of the century. The ratio of money holdings to GDP can vary widely from one country to another, and there is no golden rule on what is considered normal. As Chart 5 indicates, however, it is generally higher in higher-income countries.

Post-crisis contraction in Iceland's money holdings larger than after crises in other developed countries ...

Since the financial crisis struck, M3 has contracted by over 20% in real terms. This is a considerably larger contraction than has generally been seen among industrialised countries in the wake of other economic and financial crises (Chart 6).[6] As could be expected, the contraction in money holdings is even greater and the turnaround in money growth slower in countries that suffer a financial crisis concurrent with a recession.

An examination of the comparison group shows that real money growth usually slows down following a crisis. In some cases, the money stock even contracts for 1-2 years after the crisis strikes – but only in rare instances are money holdings still contracting in real terms nearly four years after the crisis, as was the case in Iceland.

... reflecting the severity of the recession

Chart 6 shows that money holdings contracted much more in Iceland after the current crisis than they did in other OECD countries in the wake of other economic and financial crises. Furthermore, money holdings have been slower to recover in Iceland, perhaps reflecting stronger money stock growth in the run-up to the crisis. For example, M3 doubled in real terms in Iceland during the four years before the crisis but grew by an average of only 20% in other industrialised countries that subsequently suffered financial crises.

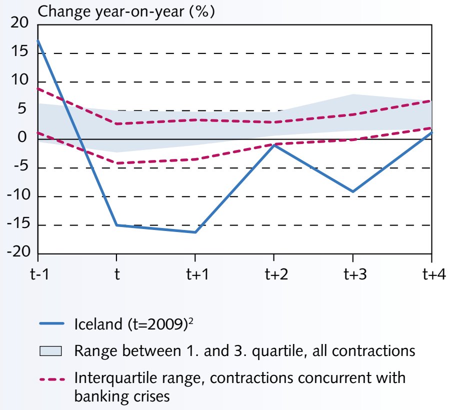
It may also be that the steep post-crisis contraction in Iceland's money stock was due in part to the magnitude of the economic crisis. In order to determine whether the post-crisis contraction in money holdings was in line with that implied by historical relationship between money demand and its economic determinants, it is possible to compare the actual contraction with that implied by a conventional money demand relationship. The equation used is the money demand equation in the Bank's quarterly macroeconomic model (QMM) (see Daníelsson *et al.*, 2009). As Chart 7 shows, the contraction is initially somewhat steeper than is implied by the model, but from 2011 onwards, it develops well in line with the conventional relationship between money demand and its macroeconomic determinants, particularly when the money stock is adjusted for the effects of deposits held by special purpose vehicles owned by the banks and the failed financial institutions that have lost their commercial banking licences. The chart also shows that the forecast is well within the 95% confidence bands throughout the period.

Although the post-crisis contraction in money holdings was larger than has been seen in other industrialised countries, post-crisis developments in the money stock appear to be well in line with what could have been expected given the severity of the reces-

6. The charts shows developments in broad money following 87 recessions (including 23 concurrent with financial crises) in 23 OECD countries during the period 1960-2013 (see European Central Bank, 2012).

Chart 6

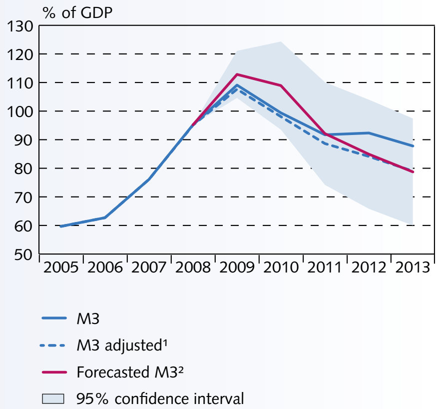
Developments in money stock following economic crisis[1]



1. Developments in money supply following economic and banking crises in 1960-2013 in 23 OECD countries (year t is the year of crisis onset). Based on broad money (M3 or M2) in real terms (deflated with HICP or CPI). 2. Adjusted for the effects of failed financial institutions and special purpose vehicles owned by financial institutions.
Sources: ECB, OECD, World Bank, Central Bank of Iceland.

Chart 7

Actual and forecasted developments in broad money 2005-2013



1. Adjusted for deposits held by winding-up committees of failed financial institutions that have lost their commercial banking licences and deposits held by special purpose vehicles owned by financial institutions. 2. Forecast for 2009-2013.
Sources: Statistics Iceland, Central Bank of Iceland.

sion and consistent with the historical relationship between money demand and its key determinants.

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