Box 1

Capital flows and the Central Bank's new capital flow management measure

In early June, the Central Bank of Iceland adopted a new policy instrument, a capital flow management measure (CFM), designed to temper and affect the composition of capital flows to Iceland. The CFM is based on the Rules on Special Reserve Requirements for New Foreign Currency Inflows, which were adopted in accordance with a new Temporary Provision of the Foreign Exchange Act, no. 87/1992.[1] It is therefore intended to reduce temporary risk accompanying excessive capital inflows, support other aspects of domestic economic policy, and thereby contribute to macroeconomic and financial stability. Since the CFM was activated, capital flows into the domestic bond market have slowed markedly, and indicators of disturbances in the transmission of monetary policy through the interest rate channel have subsided. Although the CFM is based on the current regulatory framework for foreign exchange, work on the final version of the measure and its long-term legal framework is underway.

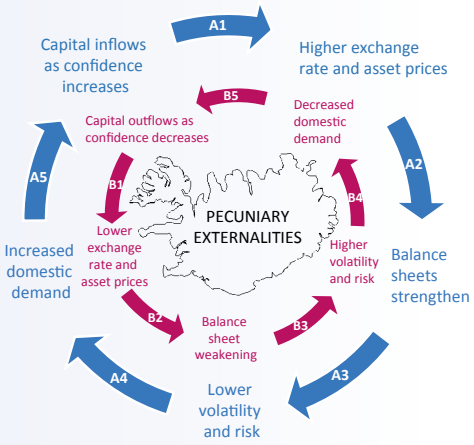
Freedom of capital movements has long fluctuated in line with changes in perceived risk and reward

The scope and volatility of global capital flows have changed over time and are determined in part by the degree of liberalisation prevailing at any given time. This, in turn, stems from changing views on the risks and rewards accompanying capital flows (Reinhart *et al.*, 2008, 2016). Free movement of capital grew apace from the collapse of the Bretton Woods system in the 1970s until the onset of the global financial crisis in 2007. For the most part, frequent sudden stop crises in emerging market economies did not affect this development, as they were usually believed to stem primarily from a weak institutional framework and suboptimal economic policy in the countries concerned, and therefore to be less important for advanced economies (Obstfeld, 1998, Calvo *et al.*, 2006; see also Box IV-1 in *Monetary Bulletin* 2008/3). However, in emerging markets, the use of CFMs tended to increase in the wake of such crises.

In recent years, the pendulum has swung back somewhat and the focus has increasingly turned towards the risks that can accompany capital flows in spite of the well-known benefits associated with them. At the same time, there is increased agreement that under certain circumstances, policy authorities, even in advanced countries, may need temporarily to adopt special policy instruments so as to mitigate such risks (see, for example, IMF, 2011a, 2012).[2] This reflects, among other things, increased understanding of the risks entailed in the fact that during inflow surges, domestic balance sheets appear to strengthen because of the associated rise in exchange rate and asset prices. This tends to stimulate demand even further and feed risk appetite – until the weaknesses finally emerge, confidence collapses, inflows give way to outflows, and the economy contracts, perhaps resulting in a financial crisis (Chart 1).[3]

Chart 1

Self-reinforcing interaction of cross-border capital flows, risk appetite, and balance sheet expansions[1]

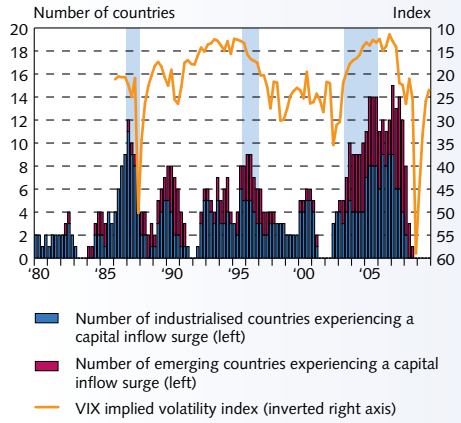


1. Based on Korinek (2011) and Bruno and Shin (2015).

1. Cf. Article 2 of Act no. 42/2016 amending the Foreign Exchange Act, the Act on the Treatment of Króna-Denominated Assets Subject to Special Restrictions, and the Act on a Special Tax on Financial Undertakings, which entered into force on 2 June 2016, and the Rules on Special Reserve Requirements for New Foreign Currency Inflows, no. 490/2016, which took effect on 4 June 2016 and were amended on 16 June and 31 October.
2. Because disruptive capital outflows and the associated economic contraction and even financial crisis often occur following inflow surges, it is generally considered preferable to respond to the inflows in a timely manner, such as by applying CFMs, instead of preventing outflows, although this could prove necessary, as in the case of Iceland (see also Jeanne and Korinek, 2013).
3. Developments of this type are examples of the pecuniary externalities that appear, for instance, in a tendency towards excessive accumulation of foreign debt, where market agents do not consider the systemic impact of their transactions on asset prices and exchange rates, which then causes financial harm to other parties not involved in the

Chart 2

Gross capital inflow surges[1]

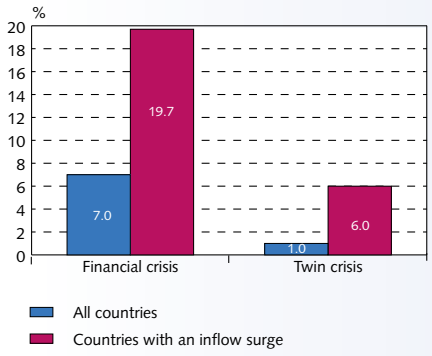


1. The figures shows the number of countries experiencing a gross capital inflow surge based on the definition in Forbes and Warnock (2012a). Shaded area show timing of inflow surges in Iceland. VIX index is a common measure of risk appetite and uncertainty in international financial markets.

Sources: Forbes and Warnock (2012a), Macrobond, Central Bank of Iceland.

Chart 3

Capital inflows and financial crises[1]

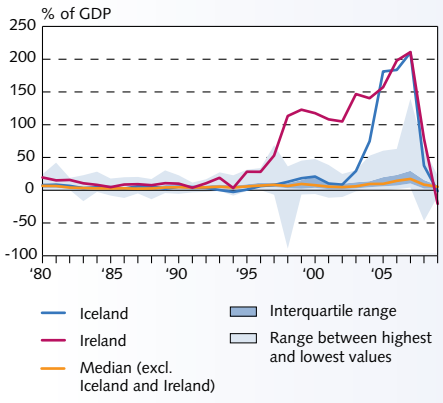


1. The chart shows the percentage of instances when a financial crisis occurred in 53 emerging countries over the period 1980-2014, both all instances and those preceded by a capital inflow surge.

Sources: Ghosh, Ostry, and Quereshi (2016); Central Bank of Iceland.

Chart 4

International comparison of capital inflows 1980-2009[1]



1. Capital inflows from abroad reflect non-residents' net purchases of domestic assets each year and show as increased claims against residents. Flows are estimated in US dollars and shown as a share of GDP in terms of its trend path as determined using an HP filter.

Source: Broner, Didier, and Schmukler (2013).

Inflow-related risks vary, depending on circumstances …

Capital inflows are associated with varying levels of risk. Such risk depends on circumstances and is determined in particular by the size and composition of the inflows and the use of the financing that they represent, as well as the resilience of domestic financial markets and balance sheets to the increased inflows and the volatility that can accompany them (Ostry *et al.*, 2011, IMF, 2011a). Inflow surges tend to come in waves (Chart 2) and are associated primarily with global financial conditions, or push factors, as well as domestic pull factors (Reinhart and Rogoff, 2008; Forbes and Warnock, 2012a; Broner *et al.*, 2013). Capital inflows also convey varying risks and rewards for the country receiving them, depending on the type of capital involved (Hogghart *et al.*, 2016). Foreign direct investment (FDI), for instance, is generally considered a desirable and low-risk form of inflow, as it tends to be based on a long-term business relationship and entails the exchange of technology and expertise.[4] Carry trade and other speculative flows, however, seem to be associated with negligible macroeconomic benefits but elevated risk, not least for economies with relatively illiquid markets and insufficiently resilient domestic balance sheets.

… and can be macroeconomic and/or financial in nature

The risks accompanying capital inflows tend to fall into two main categories, based on their impact on the recipient country's economy and financial system. These risks can be macroeconomic – such as domestic currency overvaluation; unsustainable growth in domestic demand, with the associated current account deficit; excessive and distorting shift of production factors between sectors; or increasingly constrained domestic economic policy. They can also be financial in nature when inflows are large enough to contribute to credit and asset price bubbles or to foster unsustainable developments in the size and composition of the economy's external balance sheet, with systemic risk that jeopardises financial stability (IMF, 2011a; Ostry *et al.*, 2011; and Ahrend *et al*., 2012). Finally, the risks associated with inflows can be simultaneously macroeconomic and financial in nature. Ghosh *et al.* (2016) found that, in about one-fifth of cases over the past few decades, inflow surges to emerging market economies ended with a financial crisis, which could indicate that the likelihood of a financial crisis is nearly three times greater in countries experiencing inflow surges (Chart 3).

Virtually unprecedented capital flows played a pivotal role in Iceland's last financial crisis …

During the run-up to the last financial crisis, Iceland experienced financial flows (Chart 4 shows the inflows) that were virtually unprecedented in scope and fuelled significant macroeconomic and financial imbalances. They also undermined monetary policy by jamming the interest rate channel (Chart 5), shifting policy transmission to the more unpredictable exchange rate channel and encouraging accumulation of foreign-denominated debt. This chain of events resulted in the severest financial crisis in Iceland's history and the introduction of comprehensive capital controls (see Einarsson *et al.*, 2015, 2016a, 2016b, for a discussion of, among other things, the strong

transactions (perhaps including the general public). The existence of such externalities can be used as an argument for economic policy intervention to correct for these types of market imperfections (Korinek, 2011).

4. When an investor in one country owns more than 10% of equity in a company in another country, this is referred to as FDI. However, a recent paper by Blanchard and Acalin (2016) points out measurement difficulties that could cause the inclusion of short-term capital flows with FDI.

spillovers from global financial conditions to the domestic economy and financial system over a period spanning more than a century).

… and inflow-related challenges arose again following the publication of the authorities' capital account liberalisation strategy in 2015

During the slightly more than eight years since the collapse of the Icelandic banking system, the above-mentioned imbalances have been unwound, various economic policy reforms have been introduced, and the domestic economic recovery has gained momentum.[5] At the same time, the most important obstacles to capital account liberalisation – i.e., those related to the settlement of the failed banks' estates and the outstanding stock of offshore krónur – have been either eliminated or isolated, making the large steps already taken towards liberalisation and the steps scheduled at the end of the year possible. Immediately after the presentation of the authorities' revised liberalisation strategy in June 2015, inflows to the domestic bond market increased, causing long-term interest rates and term premia to decline (Chart 6 and Chart 12 below) in spite of Central Bank rate hikes (see Box 1 in *Monetary Bulletin* 2015/4). The interest rate channel appeared to have become clogged again, shifting monetary policy transmission increasingly towards the uncertain and volatile exchange rate channel. Inflows, which had been largely unrestricted since 2009, therefore created challenges again before controls on outflows had been lifted to any significant degree. This came somewhat as a surprise, and work on the Bank's new CFM was therefore expedited.[6]

Development of the CFM was based largely on guidelines from the IMF, …

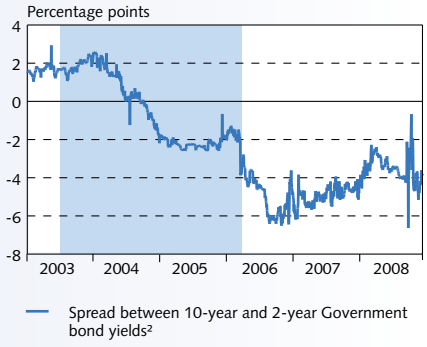
The development of the Bank's CFM was based on guidelines from the IMF, the experience of other countries, and domestic economic conditions. In 2012, the Fund issued its first institutional view on how to respond to rapid changes in capital flows and carry out capital account liberalisation. According to the IMF view, it can be advisable to apply CFMs under certain conditions; for example, when an inflow surge is ongoing, macroeconomic or financial risk is building up, and conventional economic policy response in the form of, for instance, monetary and/or fiscal tightening is constrained. The IMF emphasises that the use of CFMs is not intended as a substitute for traditional policy responses but rather as a complement when conditions require it (Chart 7). Finally, the Fund emphasises that the design and application of CFMs should be characterised by transparency, efficiency, and as limited discrimination as possible; in addition, CFMs should be temporary so that they can be unwound as soon as circumstances permit, due to their potential negative side effects (IMF, 2012).

5. Among new policy instruments are liquidity rules and rules on funding ratios in foreign currency, which are intended to strengthen the resilience of financial institutions vis-à-vis liquidity shocks and to limit their ability to take excessive foreign currency and exchange rate risk. Although they affect capital flows, they can hardly be considered CFMs according to IMF criteria except when the inflows are considered a major source of systemic risk that requires a response. Another policy instrument that has been used increasingly is foreign exchange market intervention, which can lessen the impact of inflows on the exchange rate.
6. The future development of such a policy instrument was announced, among other things, in Central Bank of Iceland (2010, 2012). As was stated in the Governor's speech at the Central Bank's Annual General Meeting in March 2016, it would be desirable to have the statutory framework for such a tool in place before the planned offshore króna auction took place.

Chart 5

Slope of the yield curve during periods of debt inflow surges in Iceland[1]

Daily data 3 January 2003 - 30 December 2008

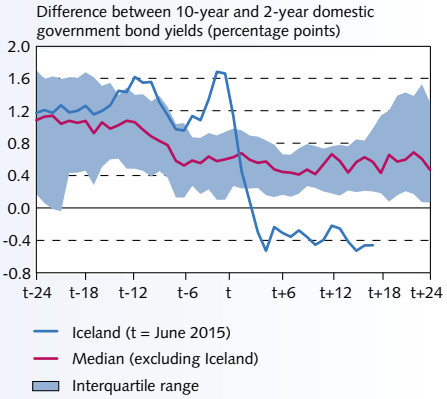


1. The shaded area shows periods featuring a surge in debt inflows from non-residents to Iceland. 2. Based on the estimated nominal yield curve. The estimate is based on interbank market rates and Treasury bond rates.

Sources: Forbes and Warnock (2012b), Macrobond, Central Bank of Iceland.

Chart 6

Slope of the domestic yield curve during periods of debt inflow surges in small, open advanced economies[1]

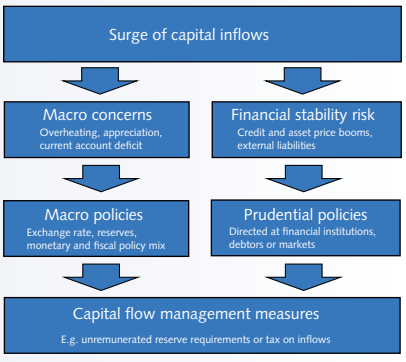


1. Based on Forbes and Warnock's (2012b) assessment of debt-led capital inflow surges. The first month of the surge period is denoted by t. The sample include 22 episodes of debt inflows where countries were in a policy tightening phase as the surge started.

Source: Forbes and Warnock (2012b), Macrobond, Central Bank of Iceland.

Chart 7

Use of CFMs in response to macro or financial instability



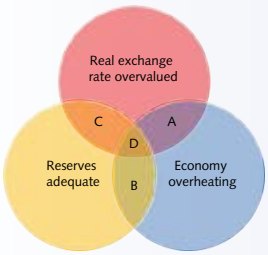
Sources: Ostry *et al.* (2011), Central Bank of Iceland.

Chart 8
CFM by country

Tax on inflows	Reserve requirements
· Brazil 1993-1997, 2009-2013 · South Korea 2010- · Thailand 2010-	· Chile 1991-1998 · Colombia 1993-1998, 2007-2008 · Thailand 1995-1996, 2006-2008 · Croatia 2004-2008 · Indonesia 2010- · Turkey 2010-

Source: Central Bank of Iceland.

Chart 9
Coping with macroeconomic concerns due to capital inflows: Policy considerations



A: Conditions to respond to inflows with sterile intervention in the FX market to strengthen foreign reserves and decrease currency appreciation pressures.
B: Conditions to respond to inflows by allowing the real exchange rate to rise towards equilibrium, thus decreasing the expansionary impact of inflows.
C: Conditions to respond to inflows by lowering interest rates to decrease the interest rate differential to abroad.
D: Conditions where there is limited flexibility for conventional monetary policy responses: overvalued real exchange rate, overheating economy and abundant FX reserves.

Source: International Monetary Fund (2012).

… other countries' experience with CFMs …

Given the limited experience to date in application of CFMs, there is considerable uncertainty about how effective they are. In recent years, CFMs have been used primarily in South Asia and South America, where they have tended to take the form of special reserve requirements or taxes on capital inflows (Chart 8), but bilateral taxation treaties, among other things, often complicate implementation of the taxation approach. An attempt to summarise the main lessons from other countries' experience would include the following:[7] There is limited evidence that the use of CFMs has reduced inflows and thereby contained the appreciation of the domestic currency. On the other hand, there are clear indications that the use of CFMs changes the composition of inflows, thereby mitigating the associated risk, although strong credit growth and steep rises in asset prices have nonetheless occurred in some instances. There are some signs, albeit not unequivocal ones, that CFMs have given monetary policy broader scope to apply domestic interest rates. Furthermore, it appears that the use of CFMs is determined to a large extent by the authorities' ability to enforce them effectively and prevent circumvention. And finally, it should be borne in mind that due to differences in institutional framework and other conditions, caution should be taken in applying the lessons learned from one country's CFM to other countries.

… and domestic economic conditions

In developing the Central Bank's CFM, it was considered important that the design of the measure and decisions on its activation be based on a thorough analysis of domestic economic conditions. Of particular importance was to assess whether conditions warranted the use of such a tool and what type of tool would be best suited to the Icelandic economy and financial system. Four points were considered key factors in this context.

First of all, macroeconomic risk had already begun to accumulate after the authorities presented their capital account liberalisation strategy in mid-2015, as is mentioned above. This risk was first and foremost reflected in disturbances in monetary policy transmission through the interest rate channel. Inflow-generated systemic risk was still limited, as inflows were not large and there was still scope to tighten other prudential tools. It was clear, however, that circumstances could change rapidly – for instance, in connection with the offshore króna auction in mid-June.

Second, the scope for a conventional economic policy response to growing macroeconomic risk stemming from excessive inflows seemed to be rapidly diminishing over the course of 2016: demand pressures were on the rise, the real exchange rate was rising significantly, and the size of the foreign reserves was heading towards exceeding measures of adequate reserve size if large-scale (sterilised) intervention continued (Chart 9).[8]

Third, there were increasing incentives for carry trade, owing to the ever-widening gap between economic developments in Iceland and elsewhere. Conditions in the global financial markets have actually been unusual for some time, and the stock of foreign government bonds trading with negative yields has grown rapidly. Therefore, it was understandable that foreign investors should be interested in domestic bonds – and it was to be expected that this interest would increase if a tighter domestic monetary stance should be needed. The risk was therefore that speculation of this

7. See, for instance, IMF (2011a, b, 2012); Ostry *et al.* (2011); Habermeier *et al.* (2011); Baba and Kokenyne (2012); and Bruno *et al.* (2015).
8. Even though there was scope for further fiscal tightening, it did not appear that this would be forthcoming when work on the CFM was at its peak during the spring. On the contrary: it appeared as though further easing lay ahead (see Chapter IV in *Monetary Bulletin* 2016/2).

type would be extensive once again and overburden the domestic institutional framework.[9]

And finally, it was clear that consideration must be given to the fact that large steps towards capital account liberalisation lay ahead. As a result, a CFM could be needed to mitigate risk during the liberalisation process, not least in view of the offshore króna auction that then lay ahead, but also because of the possibility that a surge in speculative carry trade inflows could exacerbate the risk of even stronger outflows following further steps towards general liberalisation.

In view of all this, the Central Bank considered it necessary to have a CFM at hand and activate it immediately so as to temper inflows – particularly those related to carry trade involving bonds and lending – which would also mitigate potential disturbances in monetary policy transmission during the economic adjustment ahead and reduce the risk attached to upcoming steps towards capital account liberalisation. It seemed clear that passing legislation without activating the CFM could have boosted short-term inflows before the tool was activated.

CFM in the form of special reserve requirements for specified inflows ...

The type of CFM used by the Bank is based on a well-known method of tempering capital flows and on the assessment of economic conditions mentioned above.[10] Attempts were also made to ensure that the tool would be flexible, targeted, and efficient, thereby facilitating prompt response to changes in circumstances.

The statutory basis for the CFM can be found in a new temporary provision of the Foreign Exchange Act, no. 87/1992 (cf. Article 2 of Act no. 42/2016), which authorises the Central Bank to adopt rules on special reserve requirements for new foreign currency inflows in connection with specific types of capital, particularly to include bonds, bills, and deposits. The Bank's scope for designing the implementation of the CFM is therefore laid down in the law, while the actual form of the measure is determined by the Bank's rules, which must receive ministerial approval. Five key variables in the CFM determine its structure at any given time: special reserve base, holding period, and special reserve ratio (which specify the *type* of capital for which reserves must be held, the specified *period of time* and the *percentage* of new foreign currency inflows subject to the requirement), interest rate (applied to the special reserve amount), and settlement currency. According to the current rules, which do not fully utilise the scope in the statutory authorisations, the special reserve base is mainly specified as listed bonds and bills plus certain deposits; the holding period is one year, the special reserve ratio is 40%, the special reserve amount earns no interest, and settlement takes place in Icelandic krónur.

... to reduce the incentive for carry trade and promote more effective monetary policy transmission

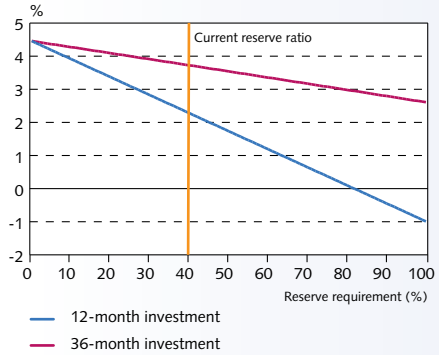
The CFM is designed to reduce the risk associated with carry trade-related inflows. Tying up a portion of inflows for one year in a non-

9. Carry trade-related inflows entail increased short-term obligations for the economy; therefore, it is preferable to respond by building up foreign reserves and tempering such inflows rather than encouraging increased outflows and letting short-term capital of this type fund increases in foreign long-term assets (by pension funds, for instance), as this would entail increased maturity mismatches on the economy's external balance sheet.

10. In general, CFMs can be classified based on whom or what they target (i.e., participants in capital transactions based on residence; specific flows based on currency denomination, type or duration; or financial markets or financial institutions) and the tempering that they entail (i.e., whether they are price- or quantity-based measures).

Chart 10

Interest rate differential per year for various reserve ratios and investment duration[1]

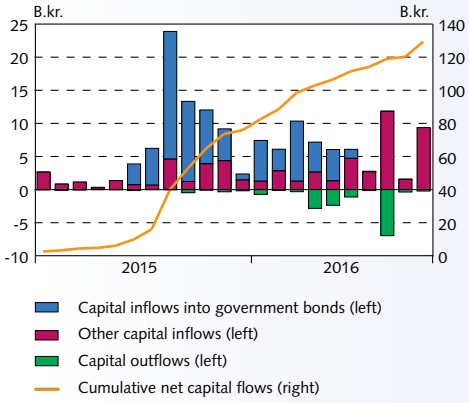


1. Based on the following assumptions: Holding period 1 year, domestic interest rates 5.5%, foreign interest rate 1%, interest rate on special reserve ratio 0%, risk premium 0%, unchanged exchange rate.
Source: Central Bank of Iceland.

Chart 11

Capital flows

January 2015 - October 2016

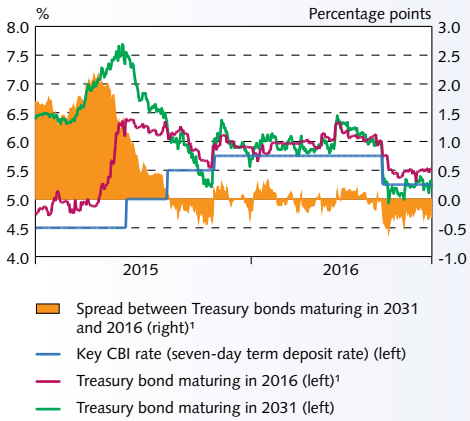


Source: Central Bank of Iceland.

Chart 12

Key Central Bank rate and nominal Treasury bond yields

Daily data 2 January 2015 - 11 November 2016



1. From 14 April 2016, Treasury bond maturing in 2017 instead of 2016.
Source: Central Bank of Iceland.

interest-bearing account cuts into the profit on such carry trade – the shorter the investment horizon, the stronger the effect. For instance, approximately half of the expected interest rate differential on a one-year investment (disregarding potential exchange rate effects) is eliminated due to the reserve requirement (Chart 10). Profits on long-term investments will be affected much less, however, and inflows for portfolio equity investment and direct investment are fully exempted. In this way, the CFM is designed to promote a lower-risk composition of inflows while contributing to more effective transmission of monetary policy through the interest rate channel, thereby making it easier to maintain an interest rate different from that prevailing abroad if it is needed to keep inflation at target. Furthermore, the CFM is a temporary measure that can be dismantled with a simple amendment of the rules.

Inflows have subsided since the CFM was activated …

Since the CFM was activated in early June, inflows into the domestic bond market have virtually halted and total capital inflows subsided. However, inflows not subject to special reserve requirements have increased in comparison with the first half of the year (Chart 11), due mostly to larger FDI inflows, but also to portfolio equity investment.

The composition of the inflows has also changed, but it is too early to assess whether the change is a lasting one and what the ultimate contribution of the CFM will turn out to be. On the other hand, the aim of the measure was clearly to temper inflows, particularly inflows into the bond market, and to mitigate risk during the next steps towards capital account liberalisation. Inflows into the bond market have been negligible since the CFM was activated, the offshore króna auction has already taken place, and large steps have been taken towards general capital account liberalisation. It could therefore be appropriate to consider whether changes should be made to the CFM, in addition to those that must take place before the capital controls are fully lifted.[11] In this context, it is important to determine whether there has been a reduction in the macroeconomic risk that apparently emerged in the form of disturbances in monetary policy transmission via the interest rate channel.

… and there are fewer signs of problems in monetary policy transmission

It is difficult to assess the impact of the CFM on nominal Treasury bond yields, as important drivers of bond yields have changed in recent months, and it is hard to determine how yields would have developed without the CFM (see also Chapter III). Even though the CFM has been activated, the spread between short- and long-term Treasury bonds has remained narrow. Yields on longer Treasury bonds certainly rose just after the CFM was activated, but they reversed quickly and have fallen even further in the recent term (Chart 12).

Among the forces that may be at work here are the reduction in long-term inflation expectations and changed expectations about developments in Central Bank interest rates. In August, the Bank's Monetary Policy Committee (MPC) announced a rate cut and indicated that it appeared that it might be possible to keep inflation at target with a lower key interest rate than was previously thought necessary. The MPC also changed its message and allowed for the possibility that the key rate could rise or fall, whereas it had previ-

11. Some amendments were passed on 31 October, including a provision exempting individuals from the special reserve requirement, subject to a specified maximum amount.

ously considered it more likely that a further rate hike would be needed. To some extent, the reduction in bond market yields could also reflect the continuing improvement in Iceland's sovereign credit ratings and the reduction in risk premia on Treasury obligations. Therefore, unlike last year, it is likely that the decline in long-term bond yields is due primarily to changes in market expectations in response to the MPC's statements and to a change in the economic outlook as a result of more favourable developments than forecasts had indicated. As a consequence, there is less reason to doubt the efficiency of monetary policy transmission through the interest rate channel than there was a year ago, when bond market yields declined in spite of both a Central Bank rate increase and the MPC's signal of possible rate hikes in the future.

Future structure of the CFM

The current version of the CFM is based on the statutory authority provided for in a temporary provision of the Foreign Exchange Act, in connection with the capital controls. The authorities chose to utilise the existing framework for capital inflows, particularly on the basis of new investment that must be explicitly registered. This facilitates implementation of the special reserve requirement. After the capital controls have been fully lifted, however, a new and more permanent version of the CFM and its statutory framework must be laid down, presumably in the Act on the Central Bank of Iceland, no. 36/2001. Preparations for such a framework are already underway.

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