

# **Reassessing Iceland's Monetary Regime\***

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## **Executive Summary**

### *Introduction*

Iceland is an open economy which has been historically exposed to large shocks in the quantity and price of its major exports and, last decade, a major financial crisis. One result of these shocks has been a long history of exchange rate surges; these exchange rate movements have in turn been associated with inflation volatility.

The past fifteen years have been marked by a particularly wide fluctuation in key macroeconomic indicators both real (economic activity) and nominal (exchange rates; prices). The financial intermediation and property boom of the mid-2000s was succeeded by a systemic failure of the banking system, and a deep recession from 2008 with a sharp fall in output and employment. The exchange rate depreciated sharply in both nominal and real terms, helping to restore competitiveness and underpinning a recovery in employment from 2012. A vigorous expansion of tourism boosted the recovery, and helped turn a current account deficit in the balance of payments into a surplus. Exchange controls on capital movements, introduced soon after the initial collapse, insulated the economy from further capital flow pressures and high interest rates eventually underpinned a substantial recovery in the exchange rate. House prices recovered almost to their pre-bust levels. The net fiscal costs of the banking collapse had been largely eliminated (thanks in part to various taxes and “solidarity contributions” paid by foreign investors), and the public finances had been placed on a sound footing by 2017. The authorities chose to remove controls on capital outflows in early 2017.

The macroeconomic situation in Iceland at end-2017 looks more satisfactory than at any time in the past dozen years. Inflation, as measured by the consumer price index (CPI), is about in line with target. Unemployment has fallen below 3 per cent and the economy has been showing a vigorous growth in output. The fiscal position is comfortable.

Yet Iceland has not shaken-off its vulnerability to major shocks. Accordingly macroeconomic policy management needs to be maintained on a stability-oriented track.

With monetary policy now being operated once again without the protection of controls on outward capital movements, it is timely to review the goals, operating procedures and governance arrangements around macroeconomic stabilization policy.

### *Inflation in Iceland*

Looking back through the past three quarters of a century, Iceland’s inflation history is a chequered one. Average inflation has been high and there have been as many as a dozen episodes with double-digit inflation spikes. These spikes have most often been associated with recession triggered by supply shocks, whether in the form of export price or volume contractions, global oil price shocks, or, in the case of 2008, a sudden stop of capital flows. In effect, the nominal exchange rate depreciations, (although typically associated with a surge in inflation) acted to depreciate the real exchange rate, and that resulted in a compression of imports restoring a sufficient balance in international payments. These adjustments were

achieved with a much lower impact on unemployment than similar adjustments in most other countries, at least until the late 1980s, but at the cost of a seemingly ever-increasing amplitude of the inflationary response. (The needed adjustments of the real exchange rate entailed much larger adjustments in the nominal exchange rate and inflation.)

General public dissatisfaction with the high and volatile inflation led to the implementation of a tighter monetary and exchange rate policy that succeeded in stabilizing inflation from about 1991. Since then, large real exchange rate movements have been achieved with much less movement in inflation.

A formal inflation target regime was introduced in 2001. Although the macroeconomic record since then has been far from smooth, an assessment of alternative choices of monetary policy regime fails to suggest any better alternative type of regime. In particular, although the severe shock of 2008 made the inflation target temporarily unachievable, the surge in inflation which followed was much less than had resulted from smaller shocks in the past and the flexibility of the exchange rate facilitated a faster rebalancing of the economy than would have otherwise been achieved. The experience did not undermine the consensus view in Iceland that price stability should remain a key policy objective.

#### *The goals of monetary policy*

We share the widespread view in Iceland (as elsewhere) that the main objective of monetary policy should be price stability. Central Banks have additional goals, especially in times of crisis, when it is vital to maintain financial stability if overall economic performance is to be maintained.

That said, there could be different approaches to achieving price stability. One key issue is whether stabilizing the exchange rate should be a subsidiary goal or intermediate target for monetary policy, and if so to what extent.

Before the removal of most of the outward exchange controls, the Central Bank was, in the past few post-crisis years, intervening heavily to rebuild reserves. More recently, though, it seems to have moved to a much less active stance, confining itself to moderating high frequency volatility in the exchange rate.

It is true that the Icelandic economy is particularly prone to exchange rate volatility, and it has been suggested that this warrants more attention being paid to dampening exchange rate movements than has very recently become the case. We believe that this suggestion has some merit, but would caution strongly against this line of argument being pushed too far. For one thing, rather than always being sources of disturbance, exchange rate movements have often performed a vital adjustment mechanism to help insulate the economy from other shocks. A regime which induced the monetary authorities to block such corrective exchange rate movements would transfer the burden of adjustment to shocks onto wages and prices, which are less likely to respond quickly, resulting in unemployment and other imbalances.

Given the adoption of a common currency by 19 European countries, it is natural to consider whether there might a case for some form of fixed exchange rate regime for Iceland. It might

be argued that a perfect coordination of steady fiscal policy combined with rapid adjustability of nominal wages to absorb any shocks that hit the economy would make a fixed exchange rate acceptable by ensuring that the economy was able to speedily adjust to any shocks that might arise without resulting in unemployment or other imbalances. However, neither fiscal policy nor (despite the exceptionally high unionization rate of Iceland) wage setting can be safely relied upon to perform sufficiently smoothly to absorb all such shocks. Furthermore, the growth in the scale and speed of international capital flows in recent years means that few small advanced economies can be sure of the capacity to maintain a fixed exchange rate indefinitely in the face of determined speculative flows. Even the restrictions of a currency board arrangement are no guarantee in this regard. Current and, to some extent, prospective members of the euro area enjoy mutual arrangements which make stability of their currencies more secure. However, such arrangements could not be contemplated unless Iceland decided to pursue membership in the European Union.

Although a fixed exchange rate regime is inadvisable, there is something to be said for taking greater account of exchange rate movements in influencing the choice and tactical deployment of monetary policy tools, including foreign exchange market intervention and macroprudential measures affecting capital flows. The exchange rate strongly influences inflation as well as aggregate demand; policy tools that can act directly on it are useful complements to the main tool of monetary policy, namely the short-run interest rate. The Central Bank already uses intervention to smooth very high frequency exchange rate movements, and the capital inflow management measure that has been in effect since June 2016 can also be considered as an example of supplementary tools being used to stabilize exchange rates. Still, such “leaning against the wind” could usefully be employed more energetically with a view to ensuring that movements in exchange rates do not deviate too far from equilibrium trends.

#### *The impact of indexed mortgages*

Most residential mortgages in Iceland are currently CPI index-linked and carry a long-term fixed interest rate. The responsiveness of the mortgage rate to changes in the monetary policy rate, which is a short-term rate, is limited. This reduces the effectiveness with which monetary policy is transmitted to the economy, by comparison with other countries in which the influence of monetary policy actions on the residential property market is often the strongest transmission channel. That being so, the potential macroeconomic stabilization function of such macroprudential instruments as restrictions on high loan-to-value mortgages (among others) deserves special attention. Given the sizable role of pension funds in the mortgage market (both directly and through their acquisition of mortgage-backed bonds from other lenders), such measures would need to extend to the pension funds as well as to the banks if they are to be effective.

Indeed, while the operations of the pension funds are highly influential in setting the price and influencing the availability of mortgage finance, the activities of this concentrated sector do not seem to have been the subject of close attention from the point of view of efficiency and macroeconomic stability. A relaxation of the capital inflow restrictions, when

appropriate, could help increase competition in the market for long-term index-linked bonds. Direct intervention by the Central Bank in this market for the purpose of enhancing the effectiveness of monetary policy is not completely out of the question, but may not be easy to implement effectively, given the comparative lack of international experience with this somewhat idiosyncratic kind of market. Nevertheless, the activities of the pension funds should receive increased analytical attention with a view to informing any appropriate use of macroprudential measures.

#### *Definition of inflation target*

The Central Bank aims to achieve an annual inflation rate of about 2½ per cent, as measured by the CPI. The 2½ per cent goal is broadly in line with global practice among advanced economies and we do not find compelling reasons to modify it going forward. The adoption of the CPI for the purpose of inflation targeting aligns with the use of the same index as the basis for most residential mortgage contracts, and the CPI is also normally referenced in wage negotiations. However, the choice of index deserves further consideration, in particular given the importance of house price inflation in the index.

There is no general agreement among specialist statisticians worldwide on the best way of measuring the appropriate contribution of housing to consumer price developments. For this reason, the ECB uses an index which excludes housing for its measure of price stability. The method adopted in Iceland is within one of the three main standard approaches, but it is overly sensitive to short-term movements in house prices. The result is that periods of unusually low or (as recently) unusually high house price movements have a strong influence on the overall CPI.

Choosing to stabilize this measure of CPI could well have the effect of destabilizing the average price of non-housing goods and services. Given the recent rapid house inflation in the past few years, the stability of CPI inflation in Iceland has implied falling prices on average of other goods and services. Differences in readings of inflation measured with alternative indexes produced by Statistics Iceland have been large and economically meaningful. During 2017, while average inflation measured by the CPI was +1.8 per cent, inflation measured by an alternative index excluding housing (CPIXH) was -2.2 per cent. Had this alternative been targeted, more accommodative monetary policy might have been chosen in recent times.

Although its widespread use in mortgages and in wage negotiations (even though formal wage indexation is a thing of the past) means that any significant change in the index used for the inflation target needs to be carefully prepared if legitimate expectations are not to be undermined, there is a case for moving from the current definition of CPI to one which is less sensitive to short-term fluctuations in house prices, or even to CPIXH. As things stand, we recommend that CPIXH should also be tracked with a view to permitting a wider transitory overshoot of the CPI target whenever housing prices are rising unusually rapidly (and vice versa). This thinking also reinforces the argument for using macroprudential tools more

energetically to influence overheating in the housing market and contain the risk of recurrent boom-bust cycles.

### *Governance issues*

In implementing monetary policy, the Central Bank has been influenced by global best practice, adapted for the practicalities of a small institution in a small country. Governance around monetary policy, with decisions taken by a monetary policy committee comprising three internal members and two externals, seems generally satisfactory and removes over-dependence on one decisionmaker.

The Central Bank employs a macro-econometric model of the economy to guide its deliberations, but has wisely opted not to follow the forecasts of this model slavishly, instead recognizing its value only as one of many inputs and striving to pursue robust policies, accounting for the unavoidable uncertainties in macroeconomic analysis.

Communication around the Central Bank's deliberations and publication of its research findings displays good transparency. It is less clear whether the general public have a good awareness of the aims and tools of the Central Bank: of what it is doing and why it is doing it. This may reflect the challenges associated with restoring stability in the aftermath of the crisis, including the Central Bank's role in the management of capital controls. Going forward, the Central Bank's strategy for interest rate policy and exchange rate policy should be more straightforward to communicate.

Because of the strong influence of prudential policies on the functioning of the financial sector, and on the effectiveness of macroeconomic stability policy in general, it is vital that there be sufficient smooth and open communication between the Central Bank and the prudential financial regulator.

Indeed there are two formal committees designed to achieve such communication on macroprudential policy. One of these, the Systemic Risk Committee, which is chaired by the Governor, is more technical and can be considered as preparing material for the Financial Stability Council on which the Governor and the CEO of the prudential regulator FME both sit, and which is chaired by the Minister for Finance and Economic Affairs.

In such a small economy, there is much to be said for pooling the closely related expertise required for the monetary policy and prudential regulation functions, and bringing them together under the Central Bank, as has indeed been the trend in several other countries post-crisis. The case is strengthened by the potential importance of more active countercyclical use of macroprudential tools to augment the monetary policy toolkit. It might also be easier to achieve the enhancements proposed by other recent reviewers of Iceland's prudential regulation if this function was brought into an expanded Central Bank, for example with a new Deputy Governor at the Central Bank charged with oversight of financial supervision.

## *Conclusion*

Iceland has returned to a reasonable degree of macroeconomic stability. It is important to remain vigilant and for policymakers not to drop their guard against the re-emergence of unsustainable or destabilising behaviour, public or private. The existing institutional arrangements for securing macroeconomic stability, including monetary policy, seem generally fit for purpose. They will however, be tested in the coming years with budgetary decisions and wage negotiations (not least given that real wages are now on average well above the previous historic peak). Improvements in the objectives, tools and governance of monetary policy should be incremental rather than drastic. They should be accompanied by a strengthening of the frameworks and ambitions for macroprudential policies, including those addressed to the lending operations of the pension funds.

## 1. Introduction

Iceland's monetary history has been unusually eventful. Following a long period of high and volatile inflation, as well as sharp exchange rate movements, major economic reforms were implemented in the 1980s and 1990s. Iceland joined the European Economic Area (EEA) and adopted many elements of the institutional and regulatory framework of the European Union (EU). In 2001, the country adopted inflation targeting, and formalized price stability as the primary goal of the central bank. A financial boom during the mid-2000s was succeeded by a systemic failure of the banking system and a deep recession, coinciding with the Global Financial Crisis that plagued most advanced economies. Despite the inflation-targeting regime in place, and the imposition of exchange controls on capital movements, inflation rose sharply and the real and nominal exchange rate depreciated sharply. Since 2010, the Icelandic economy has experienced a remarkable recovery, and macroeconomic policy has been gradually normalized. With the removal of most controls on the outward movement of funds, the return to price stability and a general expectation for continued low inflation, and a strong rebound in the external value of the Icelandic króna, this is a good time for Iceland to review the framework and objectives of monetary policy.

This report responds to a request by the Government of Iceland to carry out a review of monetary policy covering three main areas. Our terms of reference are as follows:

First, evaluate the experience and the operation of the Central Bank's inflation targeting regime since 2001. This involves both assessing the respective processes concerning data analysis and forecasting within the Central Bank and the corresponding policy decisions, and subsequently evaluating the policy paths chosen considering economic outcomes.

Second, evaluate the operational challenges of conducting monetary policy in Iceland and the current use of policy instruments considering economic outcomes with suggestions of improvements or alternatives. Furthermore, identify any potential weakness in the current institutional framework of how monetary policy is conducted in Iceland both within the Central bank and in a broader setting, and suggest improvements within the framework of inflation targeting.

Third, evaluate other options concerning monetary policy than the current inflation targeting regime considering both structural characteristics of the Icelandic economy and historical experience. This evaluation entails both consideration to alternative targets of an independent monetary policy with a floating exchange rate as well fixing the exchange rate with e.g. a Currency Board.

A number of distinctive features of the Icelandic economy and financial system need to be taken into account in addressing these questions. As one of the smallest of the world's advanced economies, and one which has depended substantially on a relatively narrow range of sources of foreign exchange, the Icelandic economy is especially vulnerable to external shocks, often showing up in sizable exchange rate fluctuations. The long history of high and variable inflation, and the remaining legacy of the exceptionally severe financial crisis of

2008, mean that financial stability is inherently fragile in Iceland. The institutional structure of the financial system also has some rather unusual features, with a relatively large and concentrated pension fund sector with total assets larger than that of the banks, and an ownership structure of the banking system still evolving post-crisis. The heavy use of CPI-indexed contracts in the financial system is a particularly important feature for the conduct of monetary policy.

Iceland has been operating an inflation targeting (IT) regime of monetary policy since 2001, but with shifting emphases in practice and in governance.

At the time of writing, Iceland enjoys inflation within the target range, a rate of unemployment that is by international standards very low, a rapid rate of economic growth driven notably by an extraordinary expansion in tourism receipts, budgetary and current account balance. Yet nominal interest rates are much higher than in most other advanced economies at present, and the exchange rate appreciation, especially during 2016-7, has caused concerns about the dangers of a loss of competitiveness. Surveys signal a decline in business optimism during 2017.

Is there reason to revise the goals, operation or governance of monetary policy in Iceland? That is the topic of our report. It is arranged as follows. Section 2 discusses the long-term history of unusually high and volatile inflation, looking at the interaction between inflation and exchange rates, supply shocks and the nature of the monetary policy response. It notes that policy shifted in an anti-inflation direction towards the end of the 1980s: the adoption of IT in 2001 formalized this policy shift. Section 3 turns to the experience of IT, distinguishing between the disappointing record of its first decade and the more successful outcome since 2012. Section 4 assesses the current statutory powers and operational arrangements at the Central Bank for delivering an effective monetary policy to achieve the inflation target. The main alternative to IT that has been suggested as a potential anchor for monetary policy would involve an exchange rate peg. Section 5 reviews various forms of exchange rate pegs as to desirability for economic stability and growth and as to long-term feasibility. The conclusion drawn is that, for Iceland (outside the euro area), an inflation-targeting regime is likely to outperform any pegged exchange rate regime in most relevant dimensions. In Section 6 we look at three potential enhancements of the operating procedures of monetary policy within the IT regime. First, a more active role in intervention or macroprudential policies to reduce the amplitude of fluctuations in the exchange rate; second, the choice of price index for IT, especially in relation to housing costs; third, a more active use of macroprudential policy directed at the index-linked mortgage market to reduce the needed amplitude of policy interest rate movements. Section 7 presents a list of recommendations and section 8 concludes.

## **2. Monetary policy in the century since independence**

### *High and volatile inflation before 1990s*

For most of the century since becoming an independent state on 1 December 1918, Iceland has experienced high and volatile inflation. Although it never succumbed to hyperinflation,

its recurrent bouts of currency depreciation and inflation marked Iceland out by the 1970s as one of most inflation-prone of the advanced economies (Figure 1).<sup>1</sup> The post-war decades were punctuated by repeated episodes of very large devaluations, with the ISK losing 50 per cent or more of its value against the USD in 1949-50; 1960 and 1983, along with several other smaller adjustments (Figure 2). With an inevitable pass-through of import costs into domestic prices, these devaluations were associated with surges in inflation. Average annual inflation was over 25 per cent for three decades before stabilization began around 1990.

Historical analyses identify a variety of triggers for the devaluation episodes (Andersen and Guðmundsson 1998). Sometimes inflation preceded exchange rate depreciation, sometimes it followed. But the common feature in most of the episodes is the role of commodity exports, especially fisheries. When supply or price of exports was strong, the exchange rate could be stable even as wages and overall prices rose; when export receipts weakened, the exchange rate would have to be depreciated.

This experience reveals that, regardless of policy statements, price stability had a low priority in Iceland's macroeconomic policy during those decades. Any policy commitment to exchange rate stability was only for the short-term and was readily abandoned in the face of adverse shocks; positive shocks did not usually lead to nominal exchange rate appreciation.

Policymakers generally put greater weight on accommodating adjustment to adverse external shocks, maintaining the profitability of the export sector and defending high employment in the short-run without much regard to any longer-term consequences of high and volatile inflation.

Both in the 1940s and in the 1970s and 1980s, recurrent episodes can be identified when high domestic inflation was tolerated for a time, with the nominal exchange rate pegged and nominal interest rates kept too low to rein in price increases. The resulting appreciation of the real exchange rate would eventually prove unsustainable and lead to a crisis, forcing a devaluation and abrupt correction (Figure 2). The pernicious cycles of inflation and devaluation continued until the 1980s when a rethinking of the macroeconomic policy framework led to fundamental changes and eventually succeeded in stabilizing inflation.

### *Role of government in monetary policy*

Until 2001, Iceland's monetary affairs were mainly controlled by the Government. In the first few decades following independence, central bank functions were performed by the state-owned Landsbanki Íslands (National Bank of Iceland), which was also Iceland's main commercial bank. The Central Bank of Iceland, Seðlabanki Íslands, was established by an Act of Parliament in 1961. At the outset, the new entity was in effect created by separating Landsbanki's central banking department from the rest of the bank, forming an autonomous Central Bank. The Central Bank was given a "dual" mandate that was conventional at the

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<sup>1</sup> The data in this and other figures is drawn from official sources, i.e. Central Bank of Iceland, Statistics Iceland, the IMF and the OECD, as available at end-2017 and, for the earlier years, Jónsson and Magnússon (1997).

time the Bank was established. Article 3(a) of the Central Bank of Iceland Act in effect before the adoption of inflation targeting, instructed the Bank:

to issue bank notes, to mint and issue coins, and to endeavour to maintain a supply of money and credit appropriate for a stable price level and for full and efficient utilization of the productive capacity of the economy. (Central Bank of Iceland, 1986, p. 1.)

However, the Central Bank lacked the independence necessary to pursue monetary policy and monetary affairs continued to be controlled by the Government well into the 1990s. Even though Article 1 of the Central Bank Act indicated that the Bank was an “independent institution,” operational independence was only given to the Bank by Parliament in 2001, with the introduction of the inflation targeting regime. Before then, the Central Bank was obligated to implement “such policy as the Government ultimately lays down.” Specifically, according to Article 4 of the Central Bank of Iceland Act in effect prior to the adoption of inflation targeting:

The Central Bank shall in all its activities maintain close co-operation with the Government and present its views on policy in economic affairs and the implementation thereof. In the event of significant disagreement with the Government the Board of Governors of the Central Bank may state so publicly and explain its views. It shall, nevertheless, consider it as one of its main objectives to endeavour to implement such policy as the Government ultimately lays down. (Central Bank of Iceland, 1986, p. 2.)

Interest rates were set by the Central Bank subject to Government approval, which resulted in “opportunistic political intervention” and monetary instability (Jónsson, 1999, p. 6). Rates on commercial and housing loans were kept below clearing market levels (ex post real interest rates tended to be negative), generating an excess demand for loans and the need for regulation of the supply through credit controls. The discount rate was kept below the inflation rate for most of the high inflation period. It was not until the 1980s that the Central Bank was allowed to create positive real policy interest rates to control credit growth (Figure 3). Before then, attempts to control credit expansion were ineffective as the Central Bank was unable to effectively control the degree of monetary accommodation and did not have full control of its balance sheet. For example, by the late 1970s, an important factor contributing to excessive accommodation was the automatic rediscounting of export produce bills, which in effect provided credit to exporting sectors, fisheries in particular, at negative real interest rates (OECD, 1979). In addition to using the Central Bank to provide subsidized credit to industry, during the 1970s and 1980s the Government also relied on the Central Bank to finance part of its deficits (OECD, 1991).

Despite this chequered record of inflation, the Government’s interventionist policies in the post-World War era managed to maintain relatively high employment and growth. On average, real GDP per person has been growing at a pace comparable to that of other Nordic countries. In light of the economy’s exposure to real external shocks, however, policy could not protect the economy from overall economic instability (Figure 4). The real exchange rate

(Figure 5) has fluctuated considerably, even in periods when the Central Bank attempted to calibrate the depreciation of the currency to limit the divergence of the real exchange rate from estimates of its equilibrium level.

### *Introduction of indexation*

The pervasiveness and volatility of inflation in Iceland had long been associated with wage indexation. Gradually, indexation of financial contracts became more prevalent, starting in the 1950s, but not fully developed until the 1980s. For example just 40 per cent of mortgage loans outstanding in 1978 were partially indexed, but this had risen to 94 per cent by 1982; fully indexed housing loans dominate today, complicating (as we will see) the monetary policy transmission mechanism and monetary control.

Legislation enacted in 1979 put in place a comprehensive indexation system which provided for certain financial contracts to be linked to a price index. Where approved, loans could be indexed to a special “credit terms index” (CTI) which was established in 1979 for that purpose. At the starting point, the CTI combined the cost of living index, with a weight of two thirds, and the building cost index, with a weight of one third. The precise calculation of the CTI was subject to changes during the 1980s and 1990s and in 1995 it was replaced by the consumer price index (Jónsson, 1999).

Despite the move to indexed financial contracts, the rate of inflation spiked to its highest level in 1983, with year-on-year inflation readings exceeding 100 per cent for a few months. Against this background, the Government embarked on a program of financial reform (including deregulation of interest rates) and structural change (including suspension of wage indexation) which helped reduce inflation, though it remained in high double-digits until 1989.

### *Liberalization and monetary policy reform*

Monetary reform proceeded in several steps. Starting in 1984, depository institutions were permitted to set interest rates and by 1986 interest rates were virtually fully deregulated. These changes helped contain the excessive nominal credit growth that prevailed at the peak years of inflation and facilitated the disinflation process. In 1985, the Government abolished the rediscounting system that the Central Bank had used to provide subsidized credit to industry.

The liberalization of the financial sector continued in the late 1980s and early 1990s, reflecting, in large part, the formation of the European Economic Area and the requirements for harmonization of legislation in Iceland with prevailing regulations in the European Community and the European Union that succeeded it. Starting in 1990, capital controls were gradually relaxed and subsequently eliminated. Banking and securities markets legislation was changed in 1993 in line with EC directives. Following an agreement between the Government and the Central Bank in 1992, the practice of using a Treasury overdraft facility in the Central Bank to finance part of the Government deficit was discontinued. A market for trading Government debt was developed and the Government began issuing

Treasury bills in auctions. These changes gradually ended the Central Bank's role as a market-maker for Government securities.

In 1998, the Central Bank of Iceland implemented changes in its monetary instruments to bring them in line with the practices anticipated to be followed by the European Central Bank following the introduction of the euro. The changes were meant to "harmonize as far as possible the operating environment of the domestic credit institutions with that prevailing in the European Economic Area" (Gunnarsson, 1999, p. 7). Together with the harmonization of bank regulation to European Union law, which had already taken place, these changes were designed to allow Icelandic banks to operate in a similar environment to that of banks elsewhere in Europe. Starting in 1999, bank supervision was moved from the Central Bank of Iceland to the Financial Supervisory Authority (FME), in line with the prevailing fashion in other Nordic countries and in the UK and indeed in much of the European Union.

The reforms of the late 1980s and early 1990s allowed the Central Bank to implement monetary policy more effectively and succeeded in stabilizing inflation since about 1992 (Figure 6). Lacking full operational independence, however, the Central Bank was not in a position to tighten monetary policy promptly and sufficiently to maintain low inflation and an inflationary bias remained in place. This became an issue by the end of the decade when the failure to tighten policy sufficiently to contain the economic boom of the late 1990s led to rapid credit growth, an overheated economy and a current account deficit that undermined the stability of the currency that was still used as a monetary anchor. Under these circumstances, and reflecting the evolution of central bank practice in other countries, the Government of Iceland embarked on a review of the framework governing the operations of the Central Bank and monetary policy. The outcome of this review was the formal adoption of inflation targeting (IT) as the main goal of monetary policy in March 2001. This was embodied in new legislation governing the Central Bank in May 2001; this legislation remains largely in effect to date.

### **3. Inflation targeting in practice**

*2001-12*

Although Iceland's inflation has in recent times been lower and more stable than in earlier decades, the period of greater price stability actually began a decade before the 2001 adoption of IT, when dissatisfaction with the repeated surges of high inflation led to a reform package which included a disciplined centralised wage settlement and the announcement of a stable exchange rate regime. Despite two moderate depreciations during the ERM crisis of 1992-3, that regime did provide a credible anti-inflation anchor (Andersen and Guðmundsson 1998).

Indeed, as the Central Bank itself has acknowledged, inflation during the IT period has not been satisfactory and has been worse than was hoped for when IT was introduced. In its own evaluations, the Central Bank has concluded that IT has performed "poorly" in Iceland compared to other countries (Central Bank of Iceland 2012; 2017a). According to the Central Bank, the difference can be attributed to structural factors that make policy more challenging in Iceland relative to larger and more diversified economies.

It is not only in the inflation record that Iceland's macroeconomic performance in the period of formal inflation targeting has been disappointing. In addition to the wide fluctuations in inflation and the swings in nominal exchange rates, the period has been marked by a particularly wide fluctuation in economic activity, this time triggered not so much by fluctuations in supply or prices of export commodities but by the financial intermediation and property boom of the mid-2000s succeeded by systemic failure of the banking system, and sudden stop of capital inflows in 2008. The deep recession that followed was marked by a sharp fall in output and employment. Despite the imposition of exchange controls, the sudden stop meant that the nominal exchange rate depreciated sharply during 2008. This resulted in a surge in inflation during 2008-9 to levels that had not been seen since the 1980s.

Although the crisis of 2008-10 inevitably dominates discussion of overall economic performance as well as inflationary trends in the IT period, it is worth noting that, before the crisis, the IT regime had not been very successful in stabilizing inflation. Even setting aside the teething troubles, attributed by Guðmundsson et al (2000) to having begun IT with an overvalued exchange rate, it is noteworthy that inflation did not stay close to target for long. After falling slightly below target in 2002-3, inflation started to rise from around 2 per cent in 2004 to around 8 per cent by mid-2006 (Figure 7). It seems clear that monetary policy action to restrain inflation was inadequate during the boom.

This is not the place for reviewing the causes of that crisis, which had important specific features that are unlikely to recur and that have little to do with monetary policy. Still, although not the main cause of the banking excesses and subsequent crash, lax monetary policy in 2004-5 was likely a contributory factor. However, this reflected not so much interest rate policy but rather the challenge of controlling an exuberant environment with interest rate policy.<sup>2</sup> As inflation was rising, the Central Bank responded with increases of its key policy rate, from just over 5 per cent in 2004 to over 13 per cent by end-2006 (Figure 8). By August 2007 (when the turbulences associated with the Global Financial Crisis started) the significant increase in real-interest rates had brought CPI inflation down to under 3.5 per cent. Using an alternative measure of inflation that excludes the housing component, CPIXH, inflation was reduced to just 0.5 per cent (Figure 7).<sup>3</sup> The resulting high interest rates, however, also invited unwelcome additional inflows in the form of a carry trade that contributed to the external imbalance of the country. The current account, which was in surplus in 2002, deteriorated rapidly in subsequent years, reaching a record deficit of 23 per cent of GDP in 2006.

On the other hand, when it came, the collapse of investor confidence leading to a sharp currency depreciation at the end of 2008 was an event which the normal tools of monetary policy could not effectively combat, and a surge of inflation followed with two years of double digit inflation 2008-9. Indeed, it would have been a mistake for monetary policy to try to combat the inflation surge more vigorously.

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<sup>2</sup> As we discuss later on, supplementing interest rate policy with macroprudential tools could ameliorate this vulnerability.

<sup>3</sup> We further discuss the discrepancy in alternative price indexes later on.

A monetary policy framework, however well designed, cannot on its own ensure economic and financial stability in any country. Overall stability requires a sound fiscal policy framework and a robust framework for supervision and regulation of the financial sector. In the case of Iceland, most of the vulnerabilities that led to the crisis could be attributed to factors other than monetary policy, and should not be attributed to the existence of an IT regime.

The development of an overextended financial sector, with large cross border exposures, can be identified as one of the key vulnerabilities that led to the crisis. This can be attributed to the weaknesses in the supervisory framework in place before the crisis. Tighter bank supervision could have contained the pre-crisis banking boom, at least to some extent. As discussed in numerous post-crisis analyses (e.g. Benediktsdottir et al. 2011; 2017), the failures of bank management and bank supervision in Iceland were similar in character to a number of failures elsewhere in the pre-crisis financial boom. But they were quantitatively much more widespread and extreme relative to the size of the Icelandic economy.

In the aftermath of the crisis, a somewhat delayed return to the inflation target likely facilitated the macroeconomic adjustment that took place. The inflation of 2008-9 did not fully offset the nominal exchange rate movement, so that there was a real depreciation and a reduction in real wages, helping to restore competitiveness and underpinning a recovery in employment from 2012.

The record of IT in Iceland 2001-12 is thus a very mixed one. It cannot be credited with bringing the very high inflation rates of previous decades under control, as that had been achieved by the early 1990s; it was not operated with any sustained success in its first six years 2001-7; it was in abeyance in the crisis years.

#### *Since 2012*

While we do not attempt to evaluate current monetary policy decisions, the IT record since 2012 seems much more positive. With the main elements of the necessary immediate post-crisis macroeconomic adjustment accomplished, the IT framework resumed its role of providing a long-run anchor that led to a return to price stability within a few years at a smaller economic cost than would have materialized had the exchange rate not been allowed to adjust in the crisis environment.

Inflation has been close to target for four years. Expectations for future inflation, whether measured by surveys or by the difference between the yields on indexed and non-indexed bonds have also converged on the target. The Central Bank's 2017 self-assessment on the effectiveness of IT also points to a number of other indications that the dynamics of inflation are much better under control than was the case pre-crisis. Furthermore, it is not just a favourable situation on the inflation front. The economy is showing strong growth in output and employment; unemployment is returning to low levels despite strong immigration. House prices have recovered almost to their pre-bust levels. The authorities chose to remove controls on capital outflows in early 2017.

Of course not all of the improvement is attributable to monetary policy. A vigorous expansion of tourism, perhaps in part supported at first by the improved price competitiveness, has boosted the recovery, and helped eliminate the current account deficit in the balance of payments. The net fiscal costs of the banking collapse have been largely eliminated (thanks in part to various taxes and “solidarity contributions” paid by the foreign investors including the estates of the failed banks); the public finances had been placed on a sound footing by 2017.

With inflation on target and apparent balance in the main macroeconomic indicators, the main questions that are raised now in relation to monetary policy relate to side-effects: high interest rates and a currency that appreciated rapidly during 2013-7, producing a real exchange rate approaching levels that were previously associated with overvaluation crises. These two elements are not unrelated: high interest rates underpinned the substantial recovery in the exchange rate.

It is possible to look at the last few years’ developments in interest and exchange rates and inflation from a different perspective to that of straightforward IT. Indeed, financial developments in the past few years have also been influenced by the arduous process of negotiating settlements around frozen foreign holdings of Icelandic assets and the liberalization of capital controls. In this context high interest rates served a separate function, additional to their monetary policy role under IT, to help rebuild official foreign exchange reserves and to guard against renewed currency weakness when controls were removed. From this perspective, the high interest rates and currency appreciation could be seen as side-effects of the policy tools being used to ensure an orderly removal of controls. The dampening effect of currency appreciation on inflation could, from that point of view, be seen as a helpful side-effect.

In reality both policy objectives, IT and safe removal of controls, converged on the same choice for policy instruments; it does not much matter now which goal was dominant.

What does matter is that the IT framework retains credibility, as is inferred from market expectations about future inflation, and that the Central Bank has the tools to implement it.

The current and future environment for monetary policy differs significantly from that which prevailed during 2012-2016 inasmuch as the exchange controls are largely removed. This makes the Icelandic economy more vulnerable to short-term fluctuations in international flows, but it does not per se call for a different institutional approach to monetary policy. Indeed, the arrangements currently in place largely parallel what is in place in most other inflation-targeting countries open to capital flows.

#### **4. The current institutional arrangements for monetary policy**

On 27 March 2001, the Government of Iceland and the Central Bank of Iceland decided to change the framework on monetary policy and issued a declaration that transformed Iceland to an inflation targeting country. The primary objective of monetary policy would be price

stability, defined as an annual inflation rate of about 2 ½ per cent. The Government granted full authority to the Central Bank to use its instruments to attain the inflation target.

In May 2001, the Parliament enacted a new Central Bank Act that incorporated these changes and formalized the new framework. Two critical changes in the law were the clarification that the Central Bank's primary objective would be price stability and the operational independence given to the Central Bank. According to Article 3 of the 2001 Act:

The main objective of the Central Bank of Iceland is to promote price stability. By agreement with the Prime Minister, the Central Bank can declare a numerical target for inflation.

The Central Bank shall promote the implementation of the economic policy of the Government as long as it does not regard it to be inconsistent with its main objective as described in Paragraph 1 above. (Central Bank of Iceland, 2001. p. 40.)

The change from the multiple-objective language of Article 3 of the 1986 Act reflected the global consensus that had emerged during the second half the 20th century that monetary policy can best contribute to overall economic well-being by preserving price stability over time. While the importance of other policy goals is recognized, these are to be pursued without compromising price stability.<sup>4</sup>

The most important change in the law was the granting of operational independence to the Central Bank. Crucially, the clause in Article 4 of the 1986 Act which directed the Bank “to implement such policy as the Government ultimately lays down” was removed. In addition, the risk of monetary financing was removed. According to Article 16 of the new Act: “The Central Bank of Iceland may not grant credit to the State Treasury, municipalities or Government institutions other than credit institutions.”

In principle, the Central Bank of Iceland could have adopted IT on its own even without a change in Article 3 of the Central Bank Act, as long as it was granted operational independence.<sup>5</sup> Nonetheless, changing Article 3 was a positive step. The additional clarity and accountability provided by acknowledging the primacy of price stability as a monetary goal is a more robust framework for ensuring monetary stability.

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<sup>4</sup> The priority given to price stability in the mandates of most central banks today reflects two key considerations: first, the evidence, informed especially by the experience of the 1960s and 1970s, that long-term growth rates cannot be successfully manipulated by activist monetary policy; second, the desirability of having a measurable goal to help ensure accountability of an independent monetary authority. But in order to achieve price stability, central banks all pay close attention to employment and output developments. The fact that the statutory objectives of the US Federal Reserve are maximum employment and moderate long-term interest rates as well as stable prices likely does not differentiate its approach to policy deliberations and decisions much in practice from those of IT central banks.

<sup>5</sup> For example, the Reserve Bank of Australia (RBA) adopted inflation targeting in the early 1990s even though its mandate, as formulated in the Reserve Bank Act of 1959, was similar to that of the Central Bank of Iceland before 2001: It instructed the RBA to “best contribute to: (a) the stability of the currency of Australia; (b) the maintenance of full employment in Australia; and (c) the economic prosperity and welfare of the people of Australia” (Government of Australia, 2015). The key difference was the independence of the central bank.

The Central Bank Act of 2001 harmonized the framework governing the operations of the Central Bank of Iceland to that prevailing at the time in other Nordic countries and more generally in Europe. The two main changes in the law—operational independence and the recognition of price stability as the primary mandate of the central bank—coincided with key provisions of the 1992 Maastricht Treaty of the European Union that had already been adopted by all member states of the European Union. Among Nordic countries, the legal framework for central banks in Sweden, Denmark and Finland reflected these key elements as all three were members of the European Union. Norway, like Iceland a member of the EEA but not the EU, adopted inflation targeting in March 2001, the same month as Iceland.

The inflation target adopted with the March 2001 declaration—an annual rate of inflation of 2½ per cent, as measured using the consumer price index—was similar to the actual and implied inflation objectives of the central banks of other advanced economy IT countries and has remained unchanged. The declaration also provided guidance regarding the limits of flexibility that could be applied in attaining the inflation target. Policy could be more flexible as long as inflation moved within a range from 1 per cent to 4 per cent (also not dissimilar to ranges chosen by other countries). If inflation deviated by more than 1½ percentage points from the target, the Central Bank would be obliged to bring it back to the range “as quickly as possible.” It would also submit a report to the Government explaining the reasons for the deviation and the Bank’s plans for action.

The Central Bank Act was amended in 2009, creating a Monetary Policy Committee (MPC), responsible for monetary policy decisions. The five member committee is chaired by the Governor and has two additional “internal” (i.e. senior Central Bank staff) members, one of whom is the Deputy Governor. The other two members are external experts in the fields of economic and monetary policy, appointed by the Government for five-year terms. There are no Government representatives, again in line with what is nowadays generally considered good practice. As to size, about a quarter of MPCs around the world have five or fewer members; about two-thirds have between 6 and 10. Accordingly Iceland’s MPC is on the small side, but not out of line with international practice, especially considering the size of the economy.<sup>6</sup>

The MPC meets 8 times a year (the modal frequency among leading IT central banks). Decisions are taken by majority vote. The MPC has the authority to take decisions on all monetary policy instruments, including especially short-term money market interest rates as well as foreign exchange market transactions intended to influence the exchange rate. Minutes of decisions are published two weeks after each interest rate decision and include the rationale for MPC decisions. However, according to the Act, the MPC may decide not to give account of decisions on foreign exchange market transactions; in practice this has resulted in a lot less transparency on the MPC’s policy on foreign exchange market intervention than on interest rates. The votes of individual Committee members are made

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<sup>6</sup> International institutional practice is reviewed by Hammond (2011). Blinder (2009) reviews the literature on the performance of monetary policy committees.

public in the Bank's Annual Report. Press conferences are held when monetary policy decisions are announced.

MPC decisions are taken following an in-depth analysis of economic and monetary developments and an assessment of risks to the outlook for inflation and the macroeconomy. Macroeconomic forecasts are prepared by Central Bank staff four times a year. The forecasts are judgmental but incorporate information from the Bank's Quarterly Macroeconomic Model which is also employed for the evaluation of alternative risk scenarios. The model follows a conventional approach. It appears to be used by the MPC mainly as a way of checking the overall consistency of the policy stance; its predictions are not followed slavishly.<sup>7</sup> A variety of supplementary analytical approaches to selecting the optimal interest rate path are also considered, consistent with an effort to pursue robust policies, accounting for the unavoidable uncertainties in macroeconomic analysis. The underlying modelling is described in some detail in a number of Central Bank publications (e.g. Danielsson et al. 2015, 2016. See also Seneca 2010).

The macroeconomic forecasts and, to a considerable degree, the additional information upon which the MPC's discussions and decisions are based, are published in the Bank's Monetary Bulletin. Thus the MPC is briefed on a wide range of relevant economic and financial data related to the global and Icelandic economies. This includes data on recent developments in actual and forecast output growth and in risk premia in global financial markets; in Icelandic tourism and other export sector output and the terms of trade; in the exchange rate for the ISK and other currencies; house prices and household finances; the fiscal situation; sectoral output growth; employment and unemployment trends and prospects; and then inflation and its main components including wage costs, import and housing prices; inflation expectations.

The current framework for implementing inflation targeting is broadly consistent with the basic practices of other IT central banks in advanced countries. The Central Bank has a clear goal and the independence to employ the necessary instruments to achieve that goal. The Governor and Deputy Governor and other members of the monetary policy committee have sufficient security of tenure to enable them to pursue the policy mandate free of short-termist political pressures. Individual votes are made public, albeit with a notable lag as this is done in the Bank's Annual Report. It is noteworthy that, as in other countries where voting is made public, dissent by internal committee members is not uncommon: individual responsibility is evidently assumed.

In recent years it has not frequently happened that external MPC members dissented from the Governor's proposal, but we have seen no indication of any reluctance out of deference on their part to differ from the Governor. There have been suggestions that a larger time commitment might be expected from the external members (compensated by additional payment) and the provision of independent staff support to them. While such suggestions

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<sup>7</sup> As in most central banks, versions of the Taylor rule are also used as background guidance to the MPC's decisions, mainly serving as a cross-check.

find their parallel in the arrangements that are in place in the Bank of England, on the whole we do not see the need for a move in this direction, taking into account the scale of Iceland.

Nonetheless, the individual accountability of MPC members could be reinforced, and possible differences of views among committee members made more transparent by disclosing the identity of individual votes more promptly than is presently the case. This could be achieved, for example, by providing the individual votes in the Minutes following each MPC meeting. The Minutes could also include a brief explanation of the rationale for any dissenting votes.

The Central Bank has a research and analytical capacity appropriate to the task and the flow of information and analysis to the committee appears to be sufficient. The Central Bank is transparent in its communications on interest rate policy with regular press conferences when the monetary policy decision is announced.<sup>8</sup> There is much less transparency on policy on foreign exchange market intervention—a point to which we return below.

One dimension in which the MPC has not followed recent trends is in the use of “forward guidance”, i.e. making relatively specific predictions about where the policy interest rate is likely (or intended) to be in the future. The usefulness of forward guidance and the potential risks to credibility that it can convey have been widely debated internationally. Early uses of forward guidance in New Zealand (as early as 1997), Norway and Sweden did seem to have been somewhat influential in affecting market expectations and long-term rates. Iceland has also made some use forward guidance, albeit typically couched in broad qualitative terms. Nothing in legislation prevents the Central Bank of Iceland from adopting forward guidance as and when it seems necessary to influence rates but we do not see clear benefits from changing the Bank’s current practice in this regard.

As has been demonstrated by numerous central banks in the aftermath of the crisis, it is at the lower bound of interest rates (never approached by Iceland) that the potential usefulness of forward guidance, including as a partial commitment device, could come into its own. It was only at or near the lower bound that the Fed, the ECB, the Bank of England, the Bank of Japan and the Bank of Canada have made use of it. While forward guidance at the lower bound proved useful in providing additional accommodation by compressing longer-term interest rates, in several of these cases, apparent commitments to future policy rates were not delivered, showing that use of forward guidance has the potential to weaken the credibility of central banks that use it, but later resile from their stated intentions.

With the exception of instances when policy rates may be constrained by the lower bound, quantitative forward guidance in the form of explicit interest paths several years out may be misleading and counterproductive as policymakers cannot know in real time the equilibrium real interest rate that is necessary to formulate a useful interest rate path. Indeed, real-time uncertainty about the equilibrium real interest rate as well as related concepts, such as the

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<sup>8</sup> It is suggested that the Central Bank’s policy intentions have been difficult for market participants to predict in the period since 2011, but this is probably attributable to the volatile and fraught conditions generated by the bank failures and by the exceptional legislative measures introduced during the crisis.

equilibrium real exchange rate and the equilibrium unemployment rate, is why successful implementation of inflation targeting requires attention to robustness (Orphanides and Williams, 2007). Inflation targeting can be robustly implemented by establishing and maintaining well-anchored inflation expectations around a clearly communicated inflation target. This can be achieved with a strategy that is based on a forward-looking, systematic policy response to economic developments that aims to control inflation in line with the goal in the medium term. It does not require explicit forward guidance beyond what is embedded in the central bank's systematic policy response to economic developments.

Following the adjustment period after the crisis, in the past few years the Central Bank of Iceland has been reasonably successful in anchoring inflation expectations in line with its inflation goal. Sufficient analysis is provided by the Bank so that market participants and policy experts should be in a position to understand its actions.

It is less obvious that the general public have a good awareness of the aims and tools of the Central Bank: of what it is doing and why it is doing it. This, less technical, aspect of communications may deserve further attention.

While there is broad agreement internationally about how some elements of monetary policy governance should be arranged – including clarity of the goal, security of tenure for a period of several (often 5 or more) years for the decisionmakers, instrument independence – there is considerable international variation of institutional details. The institutional arrangements for monetary policy in Iceland are well within the range of variation seen in successful central banking arrangements in other advanced economies.

For example, one dimension for which there are significant differences among countries is in the degree to which decisionmaking power is concentrated in the governor or in an inner group of full-time staff members of the central bank, relative to external members of a decision-making committee. At one end of the spectrum is New Zealand, a pioneer in IT, where the monetary policy decisions are taken by the Governor, albeit following an intensive process of discussion within an advisory policy committee of staff members (of the RBNZ, New Zealand's central bank). In Sweden, the decisions are taken by the six-person Executive Board of the Riksbank, with the Governor having a casting vote; the arrangement in Canada is numerically similar. In the US, the members of the Board of Governors, when fully staffed, outnumber the voting presidents of the regional reserve banks on the Federal Open Market Committee; but vacancies in the Board have been frequent. In contrast, at the ECB, the six Executive Board members are outnumbered in monetary policy discussions on the Governing Council by 15 national central bank governors. In Norway, it is an eight-person Executive Board that decides on monetary policy actions, though in this case five of the eight are external members, not staff of the Norges Bank. The Icelandic regime is closest to that of the Bank of England, where five staff members of the Monetary Policy Committee (the Governor, the Deputy Governors and the Chief Economist) outnumber the four external

members.<sup>9</sup> There is thus scope for variation but few compelling arguments that would demand structural change in Iceland.

## 5. Exchange rate vs inflation targeting

The central bank's inflation target anchors nominal price developments. While many alternative formulations can be imagined, such as a target for nominal income growth, or for the price level, the main competitor as a monetary policy anchor could be the exchange rate.

There is a vast literature considering the implications of different choices of exchange rate regime for countries of different types. How sustainable will a given choice prove to be? How likely is it to support sustained national economic growth and prosperity?<sup>10</sup> What is the likely long-term impact on price stability? The fact that the world is almost equally divided between countries that peg and countries that float is consistent with the fact that empirical evidence on these questions is ambiguous and inconclusive—particularly on growth effects.

Our view on the realistic choices currently facing Iceland is that there is little to be gained, and potentially quite a lot to be lost for the country as a whole, from switching from the current IT regime to a fixed exchange rate regime as providing the basis of monetary policy.<sup>11</sup>

In the International Monetary Fund's current list of the exchange regimes and monetary policy frameworks employed by its members, Iceland is categorized as having an inflation targeting framework with a floating currency regime. This is a categorization which it shares with 25 other countries; a further 10 inflation targeting countries (including Norway and Sweden) are seen as having a *freely* floating exchange rate – a distinction which recognizes that Iceland has employed foreign exchange market intervention quite extensively in recent times. Overall, leaving aside the 19 members of the euro area, which conduct a *joint free-float*, exactly one half of the remaining 164 countries employ an exchange rate anchor – the remainder using a variety of indicators to guide monetary policy.

The fact that so many countries use an exchange rate anchor means that this alternative does need to be considered. Closer examination of the nature of these “pegged exchange rate countries” weakens the case. To begin with, fourteen do not have a currency of their own at all. Then, of the 31 US dollar peggers, fifteen are small states in the Caribbean or Central America with close economic ties with the US and, with two exceptions, GDP levels a fraction of that of Iceland. A further eight are in the Middle East, with its long tradition of currency stability and the consideration that the international price of the major export product—oil—is quoted in US dollars. Discarding historically poor performers leaves only Hong Kong as an attractive model jurisdiction for Iceland among the US dollar peggers, and it is a special case of limited sovereignty. As for the 22 euro peggers, setting aside the fourteen members of the two African CFA franc zones and three tiny island economies, we

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<sup>9</sup> External members of the Bank of England's Monetary Policy Committee are assigned specific support staff.

<sup>10</sup> Different sectors, or political groupings, within a country may have different preferences over exchange rate regimes.

<sup>11</sup> A similar conclusion for Iceland was drawn in different circumstances by Krugman (1991a), Buitert (2000), and Stiglitz (2001), as well as by Guðmundsson et al (2000).

are left only with EU members Bulgaria, Croatia and Denmark, and a couple of other countries in the Balkans. (Nine countries have chosen other currencies to peg to: three neighbours of South Africa chose the Rand; Bhutan and Nepal use the Indian rupee and Brunei the Ringitt. Nine countries use a basket peg of some sort.)

All in all, there is only a limited number of countries with successful economic and social systems which could be considered as suitable models for Iceland to emulate. Interestingly statistical analysis running back over a quarter century suggests that the one consistent characteristic that predicts that a country will peg (apart from those pegging to a former colonial power) is lack of democracy (Klein and Shambaugh 2012, p.87).

Against this background, should Iceland consider shifting back to an exchange rate anchor, such as it employed before the formal adoption of inflation targeting in 2001? After all, inflation had already been brought under control during the previous decade, during which Iceland had a pegged exchange regime, albeit one allowing wide margins of fluctuation.

Several decades ago economists studied the relative advantages of fixed and floating exchange rate as ways of insulating a country's economic performance against shocks. The conclusion generally depended on which markets were most likely to experience the most severe shocks, and which prices were less likely to adjust quickly to clear markets. (For example, if wages are sticky, and if a major adverse shock to exports occurs, the fall in real wages that may be needed to restore macroeconomic equilibrium and maintain full employment can more easily be attained if there is some flexibility in the nominal exchange rate. Other types of shock, especially those affecting asset markets, could be handled better with a fixed exchange rate.)

Subsequently, however, the experience of the turbulent 1970s and later shifted attention to the feasibility of maintaining an exchange rate peg in the face of large capital movements. It became clear that any given exchange rate peg is not forever. Just as, even in the days of the post-war Bretton Woods system 1946-71, occasional realignments occurred, pegs tended to hold for a while before speculation about a realignment created turbulence; even if the speculation was successfully resisted for a while, it was generally associated with high interest rates which damaged economic activity. Exchange controls could be used to limit the volume and speed of capital movements, but financial innovation and communications technology increasingly eroded the effectiveness of such controls. The narrow-band ERM 1979-93 experienced almost one realignment per annum on average. Even long-standing pegs, such as that of the African CFA zones (with the French franc), which survived for over thirty years, ended with a drastic devaluation.

While the peg lasts, a fixed exchange rate regime provides an anchor against inflation, but this can come at the cost of having to use the interest rate to defend the peg, rather than to promote stability of the economy's growth path.<sup>12</sup> A peg does tend to stabilize the real

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<sup>12</sup> This is an example of what is called the open economy policy trilemma, according to which there is an inherent trade-off between having an open capital market, a fixed exchange rate and the ability to move interest rates to stabilize the domestic economy.

exchange rate while it is in effect, but that effect wears off after the peg has been abandoned. And the duration of the peg must be considered to be finite. Indeed, empirically, the average duration of a peg is about five years, and the median duration is just two years.<sup>13</sup>

If the remainder of the economy – fiscal policy, wage-formation, supply shocks – evolves in a stable manner, the duration and stability of an exchange rate peg can be prolonged, and as mentioned this has been the experience of a few countries, most of them in the Middle East.

Several authors have promoted the advantages of a specific form of fixed exchange rate known as a currency board. Currency board regimes were introduced first in colonial jurisdictions as a way ensuring that the colonial administration could earn seigniorage by exchanging local currency notes backed by government securities in the metropole. The rules of the currency board (albeit sometimes relaxed) prevented note issue exceeding the currency board's reserves, thereby guaranteeing the value of the local currency notes. The currency board arrangement does not however address issues of bank solvency; accordingly it does not provide any mechanism for countering a run on local bank deposits. This can make the currency board fragile, as Argentina found in 1991. However, the successful transition of the Baltic countries into the euro after a period of currency board operation, and the continued experience of Bulgaria, which introduced its currency board vis-à-vis the DM in 1997, and which may eventually join the euro area, show that it can work at least for some time, when there is a firm political commitment to continued currency stability. Nevertheless, it would be unwise to assume that a currency board arrangement ensures a permanent currency peg.

From one point of view, the euro area can be considered as the limiting form of a currency peg, with the euro itself operating as a kind of joint float against other currencies. But there are important differences between the situation of a country in the euro area and that of a country with an independent currency pegged to the euro. Euro area countries use the euro as the unit of account; there is no local currency and accordingly no way of changing the peg of the local currency. The central banking system of the euro area has the capacity to provide lender of last resort facilities in unlimited quantities, which is what cannot be done by a pegging central bank without putting the peg at risk.

These seemingly powerful assurances against exchange rate risk delivered convergence of interest rates across the euro zone money and government bond markets in the first decade of its operation. Still, the severity of the financial crisis highlighted the dependence of this equilibrium on the willingness of the remainder of the system to support stressed sovereigns and banks in some member states. With this willingness placed in doubt, the risk of the re-introduction of national currencies, albeit not envisaged in the European Union Treaty, began to be priced-in.

Joining the euro area is not an option for Iceland, as membership is limited to European Union members. A couple of small countries (Kosovo, Montenegro) and a couple of micro states (San Marino, Vatican City) facing special geographical and historical conditions have adopted the euro as their currency; they do not have a central bank, nor do they earn

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<sup>13</sup> Klein and Shambaugh 2012, based on all pegging spells for 125 countries 1973-2004.

seigniorage on the currency in circulation. They can be considered as annexes to the euro area.

If Iceland were to adopt a peg, the pattern of its trade suggests that pegging to the euro would clearly be the best single currency choice. In 2016 some 43 per cent of Iceland's merchandise trade was with the euro area, a percentage which is higher than that enjoyed by some euro area countries themselves (including Finland and Greece).<sup>14</sup> (Only about 9 per cent of trade is with the US). As far as tourism is concerned, some indication can be obtained from the fact that more than one-in-three passengers departing Keflavik in the summer season 2017 were from the euro area (about the same as from the United States). To be sure, more comprehensive calculations can be made to confirm that the ISK-EUR pair would indeed have the potential to deliver maximum insulation from exchange rate shocks, but the advantage of the euro is unlikely to be eliminated by such calculations.

Looking at the other four Nordic countries – all of them with considerably larger economies than that of Iceland, it is interesting to note that each has made a different choice in regard to its relation with the euro area. Finland is in the euro area; Denmark, a member of the EU, has a formal opt-out, but has pursued a policy of closing tracking the euro without deviation since the system began; Sweden, also an EU member, should eventually join, but for the present operates a freely floating regime; Norway, not an EU member, also has a freely-floating currency. The proportion of each of these countries' merchandise trade that is with the euro area is broadly similar, ranging from 40 to 46 per cent.

Denmark's choice, to peg to the euro, is seen as an important reference point. It can best be explained in terms of geography, and a firm political conviction that a fixed relation to the euro is and must remain the best choice for the country.

The Danish peg predates the euro, going back to 1982 when Danish authorities decided to peg the Danish krone against the D-mark, the currency of its largest neighbour. Given that Denmark is a much larger (though still small) and more diversified economy than Iceland and may be assumed to be more closely integrated in euro area supply chains, it may also be less vulnerable to idiosyncratic shocks in the value of its exports than is Iceland. If so, the equilibrium real exchange rate of Denmark may be less volatile than that of Iceland, making it easier for Denmark to retain a balanced economic development.

In contrast, the exposure of Iceland to sudden and large changes in its export and other international earnings due to supply shocks, in the fishing industry, in aluminium smelting or demand shocks in the tourism sector, may call for a change in the real exchange rate: that is not easily delivered if negotiated wages are slow to adjust. Accordingly, maintaining low unemployment may depend on having some flexibility in the nominal exchange rate.

More to the point, Denmark's fixed exchange rate regime was forged in the very different circumstances of the 1980s, as Danish policymakers sought to escape from the previous failed regime of fiscal and monetary laxity. The exchange rate peg became the symbolic core

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<sup>14</sup> Indeed, adding the trade with Denmark, whose currency tracks the euro, brings the total to over 47 per cent.

of the new and highly successful policy. By now the Danish peg is an undisputed anchor of their country's macroeconomic policy. But getting to that point was not costless: it took more than 5 years (1982-87) before the Danish krone finally landed on a permanent peg with the DM (and later the euro) and even thereafter there were several attacks on the peg (most recently in 2008) which had to be fought with interest rates that were far higher than needed to maintain full employment at the time (despite the access of Denmark in 2008 to swap arrangements with the ECB).

Furthermore, unless Iceland decided to pursue membership in the European Union, it could not count on mutual arrangements available to Denmark which make stability of its currency more secure.

It might be argued for Iceland that a perfect coordination of steady fiscal policy combined with rapid adjustability of nominal wages to absorb any shocks that might hit the economy would make a fixed exchange rate acceptable by ensuring that the economy was able to speedily adjust to any shocks that might arise without resulting in unemployment or other imbalances. In principle, a coordinated nation-wide wage agreement could deal with this situation (cf. Holden 2016). However, neither fiscal policy nor (despite the exceptionally high unionization rate of Iceland) wage setting can be safely relied upon to perform sufficiently smoothly to absorb all such shocks (cf. Sila 2017). (Wage negotiations and budgetary initiatives are of considerable current importance given the recent strength of the economy.)

Furthermore, the growth in the scale and speed of international capital flows in recent years means that few small advanced economies can be sure of the capacity to maintain a fixed exchange rate indefinitely in the face of determined speculative flows. Even the restrictions of a currency board arrangement are no guarantee in this regard.

All in all, the difficulty of maintaining a fixed exchange rate in the face of investor scepticism (even in a currency board arrangement), and the advantages of retaining the possibility of nominal exchange rate adjustment to help preserve full employment argue against a return to a pegged regime.

## **6. Potential modifications to targets, instruments and governance**

This section addresses potential modifications to the operating procedures of monetary policy within the inflation targeting regime.

### ***6.1 Exchange rate management***

To reject the alternative of a fixed exchange rate regime is not to imply that the exchange rate is irrelevant to monetary policy. Far from it. Pass-through of inflation from exchange rate changes to import prices to consumer prices appears to be substantial and relatively rapid (Petursson 2017). A surge or collapse in the international value of the Icelandic króna can be expected to have a strong and fairly rapid impact on Icelandic inflation even if interest rates and monetary conditions generally remain unchanged.

Indeed, the pass-through from exchange rate movements over the past decade has been a strongly influential channel both in increasing inflation immediately after the crisis broke, and in restraining inflation more recently. Relatively high interest rates, a recovery in investor confidence and the fillip to export earnings from the tourist boom have all contributed to a very rapid appreciation in the exchange rate after 2012, though there was a fall back from mid-2017. The movements were large. Against the USD, the ISK appreciated by 57 per cent from early 2012 to mid-2017; by 30 per cent from early 2016 to mid-2017 (and even by 26 per cent from early 2016 to early 2017). Then it fell back by 16 per cent in just 10 weeks.

What has the role of the central bank been in influencing exchange rate movements, and should there be any change in this role? Three mechanisms can immediately be identified. Interest rates influence portfolio flows and the gap between the equilibrium spot and expected future exchange rates. The influence of the overall monetary policy stance on exchange rate expectations also influences such flows. Finally, exchange market intervention by the central bank can have a direct effect on the spot exchange rate. All three factors have been relevant during the period of currency appreciation 2012-7. Interest rates have been held at relatively high levels; on the other hand the CBI bought sizable volumes of foreign exchange. And investor confidence in the future path of monetary policy (and economic policy in general) may also have strengthened (as is argued by Petursson 2017).

Since the removal of controls on outward capital movements in early 2017 the CBI appears to have stepped back from its previous active and largely one-way intervention strategy. Inasmuch as that intervention was designed to build foreign exchange reserves in advance of the liberalization, it may be assumed that the CBI is satisfied with the results and sees no ongoing need to continue such action, thereby ending the downward pressure which the purchase of FX was having on the value of ISK. Instead it is understood that the CBI's current exchange market intervention policy is limited to smoothing very high frequency volatility in the exchange rate of the order of a few days.

But should it do more, within an overall inflation targeting regime? If the ISK is appreciating at a time when inflation is above target, the currency movement can be considered helpful for getting back to the inflation target (and conversely if a depreciation is accompanying below target inflation). But if, for example, the ISK is appreciating at a time when inflation is below target, should the central bank step in to buy FX? Conversely, when the ISK is depreciating at a time when inflation is high, should the central bank be using reserves to strengthen the ISK?

We believe that there is something to be said for a strategy that reinforces interest rate policy through direct exchange market intervention in this way. But any approach to intervention must recognize and take account of the inherent asymmetry in the central bank's ability to execute. The CB can be sure of its ability to buy FX in as large quantities as necessary, because the local currency can in principle be created without limit. But the scale of intervention to support the local currency is limited by the central bank's reserves. Embarking on an over-energetic attempt to limit depreciation of the ISK could exhaust the

reserves and end with a sharper depreciation than would otherwise have occurred, a general loss of investor confidence and a limited scope for future intervention even to smooth high-frequency movements. Indeed, a market perception that the central bank is supporting an implicit peg can increase the risk of a speculative attack. It follows that intervention to dampen appreciation of the ISK is a lot safer than intervention in the other direction.

As a complement or alternative to exchange market intervention, the authorities could consider other forms of capital flow management to be adopted on a temporary basis when needed. Indeed, the current rules requiring interest-free deposits to be placed with the Central Bank by any foreign investor purchasing certain types of asset can be thought of as an example of such capital flow management. Administrative regulations concerning foreign currency instruments and mismatches can also be envisaged. Administrative measures of this type are not subject to the same asymmetry as exchange market intervention, but they have their own limitations. For example, re-introducing restrictions on outflows (even if for defensible macroeconomic management reasons) risks creating a loss of investor confidence far greater than warranted by the actual measures introduced. Administrative measures are also prone to loopholes and various forms of evasion (as is already seen with the existing restrictions).

Given the fact that destabilising capital flows are an ever-present risk, there might be an additional desire to limit large exchange rate movements that are not expected to be permanent because of their destabilizing impact on the profitability of trade. Dampening fluctuations in the real exchange rate around its equilibrium value is a different type of motivation for intervention or other measures to influence the nominal exchange rate. It can be a viable objective, even within a regime primarily driven by an inflation target.<sup>15</sup> The main challenge in implementing such a goal is the difficulty of knowing where the equilibrium real exchange rate lies at any given time, especially following the kinds of large shock, positive and negative, that have been experienced by Iceland in recent years. If policy prevents the nominal exchange rate from bringing the real rate to its true new equilibrium, the consequence will likely be to distort inflation, and create either over-heating or recession.

A more limited and preferable strategy in this respect could be to intervene to limit rapid nominal exchange rate *changes* (over a period of, say, several months) in one direction or another, without targeting a particular *level*. Such a policy would slow real exchange rate movements without preventing a gradual move to a new equilibrium. It is similar to our understanding of the current policy, albeit addressed to lower frequency/longer term movements: months rather than days. As already mentioned, such a policy should focus

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<sup>15</sup> This is similar to adding an exchange rate term to a Taylor rule. In the early 1990s, following Krugman (1991b) scholars have discussed the idea of a formal soft-margins “target zone” approach to exchange rate intervention. But few if any countries now pursue a formal or mechanical system of this type. The Reserve Bank of New Zealand (RBNZ) announced in 2004 a currency intervention policy (which they referred to as a traffic lights approach) which can be seen as loose version of this. In practice however, this is a highly discretionary system in which the RBNZ may intervene based on broad criteria; for example the intervention in 2014 was justified by reference to an exchange rate level which the RBNZ regarded as “unsustainable and unjustified”.

primarily on limiting currency appreciations, accounting for the asymmetry in the risks of leaning against a weakening currency.

All in all, direct action on the exchange rate, whether in the form of exchange market intervention or temporary capital flow management, can be justified as a supplementary measure to speed achievement of the inflation target and to slow over-rapid real exchange changes.<sup>16</sup> Calibrating such measures requires tracking how fast and how complete pass-through of exchange rate movements are to the domestic inflation: with the rapidly changing structure of the Icelandic economy and financial sector, these parameters are likely to be changing over time.

Such measures are safer when they aim at restraining overvaluation. Care must be taken to ensure that the measures are sustainable in terms of use of the limited stock of reserves, and that they do not push too strongly against needed changes towards a new equilibrium real exchange rate.

Whereas under the present policy (of very limited exchange market intervention to counter only high frequency movements) decisions are currently taken by the Governor under delegation from the MPC, a more active and ambitious policy for smoothing exchange rate movements would, of course, entail a more active involvement of the MPC. The new policy would also need to be communicated in a more transparent manner, though without offering hostages to market speculation.

## ***6.2 Definition of inflation target***

The housing component in the Iceland CPI is strongly influenced by movements in the sale price of houses. Indeed, the sizable component of the index that represents the price of housing for owner-occupiers closely tracks the sale price of houses.

The treatment of owner-occupier housing in national CPIs is a highly controversial topic among specialists in index number theory. There are wide differences in national practice and not much indication of convergence. The key issues arise because houses represent both an important asset and a source of important consumption services. The price of the consumption services is clearly something that is appropriate to be included in the CPI, but doing so without bringing in some aspects of capital gain or loss is not something that can be done easily or without ambiguity.

The other source of disagreement comes from the fact that CPIs have multiple uses. They are often used as an approximation to the change in the “cost of living” for a typical household. Such indices can also be used as the basis for compensation in the periodic adjustment of wages or social benefits. They may be part of the contract for index-linked bonds. And, as a weighted average of the prices of consumer goods and services, they may simply be used as a general purpose deflator of nominal prices.

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<sup>16</sup> It should be borne in mind, though, that (as the IMF never tires of repeating) capital flow management tools cannot be a substitute for balance in the remainder of a country’s macroeconomic policies.

Owner-occupiers generally hold their houses for many years. How should the change in the cost of the shelter being “consumed” by such households be measured as part of the CPI? One approach, the one used by Iceland, is to focus on the opportunity cost or “user cost” of the funds tied up in the housing asset.<sup>17</sup> The main alternative is to focus instead on the rental cost of equivalent or at least comparable properties.<sup>18</sup>

A different tack is adopted in the “net acquisitions” approach which is based on looking at the change in the outlays required to acquire new housing.<sup>19</sup>

Statistical offices in most countries have experienced many severe practical problems of collecting the various elements of any given formula.

The net result is that countries have adopted widely different approaches to their CPIs. And the choice of CPI measurement for housing has led to many actual and proposed changes in several countries.

As a result, the European Union has not yet included housing services at all in its main Harmonized Index of Consumer Prices (HICP), which is used, for example, by the ECB in calibrating its monetary policy. The ECB’s objective of keeping inflation “below but close to 2 per cent in the medium term” refers to the HICP.

In the case of Iceland, differences in measures of inflation due to the inclusion of housing services have been large (Figure 7) with meaningful consequences for the proper calibration of monetary policy.

Leaving out housing services altogether, as with the HICP, does neglect a huge fraction of the expenditures of households, and this is a fraction that can change considerably over time, and has changed considerably over time in many countries not least because of long-term upward trends in housing prices, as in Iceland.

Furthermore, the alternative of assuming that the rental market gives a sufficient guide to the cost of housing services to owner-occupiers can be challenged even in economies where the rental market is deep. For example, it was argued that the scale of housing construction in the US during the housing boom of the early 2000s – driven in part by expectations of continuing price increases, had depressed rentals to a considerable extent (cf. Diewert and Nakamura 2009) giving a misleading impression of actual trends in the cost of owner-occupier housing.

Since about 80 per cent of Icelanders live in owner-occupied houses, the rental market is thin, and so Statistics Iceland does not extrapolate from that market to impute a rental-equivalent

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<sup>17</sup> And by Canada and Sweden.

<sup>18</sup> As is done by the US and UK, though the latter also computes acquisitions and payments based housing price measures (Office of National Statistics 2017).

<sup>19</sup> Yet another measure, the “payments approach” tries to include all of the payments related to the ownership of owner-occupier houses, including mortgage interest payments (Diewert and Nakamura 2009).

cost of housing.<sup>20</sup> Instead, Statistics Iceland has employed an alternative method which, however, has been indicating substantial differences in the inflation rates of actual housing rentals and imputed housing rentals (top panel, Figure 9).

As indicated, the user-cost approach employed by Statistics Iceland since 1992 (Guðnasson and Jonsdottir 2009) is one of the standard methods used worldwide. However, some particular features of the Icelandic approach make the resulting rate of inflation for imputed housing rentals very similar to the growth rate of residential property market prices (bottom panel, Figure 9). Two of these features are as follows. First, since long-term index-linked mortgages are the standard way of financing housing, the expenditure on housing is taken by Statistics Iceland to be influenced by the rate of return (smoothed over a 12 month period) on indexed mortgage bonds applied to the capital cost of housing. (To be precise, it is assumed that a proportion is equity financed and that this component has a constant 3 per cent cost.) A consequence is that no attempt is made to deduct expected capital gains arising from deviations between house price inflation and the inflation of other goods and services. Second, the capital cost is updated to the average price for the latest available three months. Averaging over a longer-term period (as is done in other countries using this general approach) would dampen the impact of short-term movements in real house prices.<sup>21</sup>

All-in-all, the approach used by Statistics Iceland can be expected to provide a reasonable approach to measuring housing service costs when averaged over a number of years.

On the other hand, brief periods of surging or falling house prices are quickly transmitted to the Icelandic CPI even though they do not immediately impact the outlay of existing homeowners. Thus, for example, because of a rapid bounce-back in Icelandic house prices, by more than 35 per cent in the 26 month period since August 2015, the CPI as measured increased by 3 per cent, not far below target (which for that period would have been 5½ per cent), even though other prices fell by fully 4 per cent in the same period. In other words, existing owners of houses experienced falling prices, even though the index showed an increase.

The implications for monetary policy are potentially important. If monetary policy ensures that Icelandic CPI tracks the 2½ per cent inflation rate closely at times when house prices are rising relative to the prices of other goods and services, the result will be to depress the price trend in non-housing well below 2½ per cent. During 2017, while average inflation measured by the CPI was +1.8 per cent, inflation measured by an alternative index excluding housing (CPIXH) was -2.2 per cent. Had this alternative been targeted, more accommodative monetary policy would likely have been chosen in recent times.

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<sup>20</sup> And to the extent that growth in the size of the rental market is skewed towards short-term visitor rentals (e.g. through AirBnB) the usefulness of a rental equivalence approach may continue to be limited.

<sup>21</sup> The negative correlation between the surge of goods and services inflation in 2008-9 and the collapse in house prices at that time has had the effect, however, that the average volatility of Iceland's CPI over the past thirty years was actually less than it would have been had the averaging of house price movements been done over a long period.

To the extent that such a surge in relative house prices is very unlikely to be sustained, it may be a mistake for monetary policy to try to push down the price level of other goods simply in order to stay on track for the total CPI index. When house price inflation slows, they will have to change course in order to bring an end to the declining trend in other prices. In other words, if house prices are seen as particularly volatile, there is a case to be made for targeting an index which is free of such volatile components.

More generally, targeting a measure of inflation which includes a large component which is essentially an asset price runs against the consensus among monetary economists that argues that interest rates should not be the primary instrument used to restrain asset price bubbles (Turner 2017 provides references). Even if some degree of leaning-against-the wind of an asset-price bubble can be considered appropriate and useful for monetary policy (a point which is clearly relevant to our discussion of the relevance of the exchange rate to monetary policy formulation), it is not clear that this is best achieved through the definition of the inflation concept used for IT.

The same type of argument can be made in favour of focusing more than is done at present on a core-inflation concept removing, for example, the impact of other volatile components such as energy prices. Several other central banks pay a lot of attention to core inflation measures as an input into their forecast of the likely medium-term trend in overall CPI inflation.

Although its widespread use in mortgages and in wage negotiations (even though formal wage indexation is a thing of the past) means that any significant change in the index used for the inflation target needs to be carefully prepared if legitimate expectations are not to be undermined, there is a case for moving from the current definition of CPI to one which is less sensitive to short-term fluctuations in house prices, or even to CPIXH. As things stand, we recommend that CPIXH should also be tracked by the Central Bank with a view to permitting a wider transitory overshoot of the CPI target whenever housing prices are rising unusually rapidly (and vice versa). There are several ways of formalizing such an idea.<sup>22</sup> Although the Central Bank does not ignore various core inflation measures in its deliberations, we are suggesting much greater attention and public communication, in particular about the Bank's willingness to see transitory overshooting (and undershooting) of its target induced by unusual house price movements. However, we do not suggest the formal adoption of a policy rule; instead deviations of the CPIXH from CPI should be evaluated with a view to moderating the speed at which the MPC chooses to bring CPI close to target. Careful public communication about the policy strategy in this area will be important.

This is not to preclude the use of other policy measures to restrain house price bubbles, as discussed below.

### ***6.3 The indexed bond market and residential mortgages***

The wave of high inflation which swept through most countries in the 1970s led to the introduction in many countries of index-linked bonds and loans. These had coupon and

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<sup>22</sup> Including the inclusion of a house price term in the Taylor rule.

principal amount linked to movements in some index of prices and/or wages. Index-linked bonds have indeed become an established feature of the government bond market in the largest advanced economies, including the US, UK, Germany and France, as well as in several others. They are attractive to insurance and pension funds with long-term obligations that are themselves indexed.

A number of countries created special financial institutions to intermediate indexed funds for housing and other specific sectors. Indexed mortgages have attractions for both borrowers and lenders when inflation is high and uncertain. A particular attraction for the borrower is the way in which it avoids the fact that a conventional fixed nominal amortisation payment implies a strongly front-loaded real stream of payments when inflation expectations – and therefore nominal interest rates – are high. (A tendency for home-buyers to opt for the contract with the lowest initial monthly outlay, even at some cost in expected value terms, has been noticed around the world and indexed mortgages will often qualify as the lowest when inflation rates are high.) The attraction for the lender is the insulation from inflation-induced fluctuations in wealth.

As already noted above, Iceland's extreme inflation experience ensured that it too began to use indexation in financial contracts. Interestingly, this really took hold at roughly the same time as indexation was being removed from wage contracts, namely in the early 1980s, indeed shortly before inflation was starting to come under control.<sup>23</sup>

In most countries, the demand for index-linked mortgages diminished with the decline in inflation from the mid-1980s. In this respect, Iceland is an exception, with almost 80 per cent of the stock of household debt currently indexed. Indeed, during 2016 and the first half of 2017 the flow of net new mortgages was almost all indexed. About a half of corporate debt also is indexed, or exchange rate-linked (though a good deal of this relates to export-oriented firms) (Figure 10).<sup>24</sup>

Although there is some correlation, the real rate of return on index-linked mortgages, loans and bonds, is not reliably linked to the central bank's (nominal) policy rate.<sup>25</sup> As a result, the predominance of index-linking in mortgages and other instruments reduces the effectiveness of conventional monetary policy measures in influencing aggregate demand (Figure 8). The extent to which this is a problem can be debated. But, considering how important the mortgage market is in transmitting monetary policy in most countries, this institutional feature is of considerable importance in designing the optimal set of monetary policy instruments. After all, the main instrument used by the Central Bank to influence aggregate

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<sup>23</sup> Jónsson (1999) suggests that the introduction of indexed financial contracts removed government's incentive to engineer inflation.

<sup>24</sup> Overall at mid-2017, 40 per cent of the stock of banks' loans are indexed, with a further 17 per cent denominated in, or linked to, foreign exchange. (Central Bank of Iceland 2017b Charts III-3; III-4; V-1 and V-3). The loans issued by the state-owned Housing Finance Fund (which is the other main financier of house purchase and construction) are all indexed.

<sup>25</sup> In 2008, the general rate on indexed loans reached its peak of 6.3 per cent, just 280 basis points above its lowest level; whereas the rate on non-indexed loans peaked at 21 per cent, more than 1500 basis points above its lowest level. For more than five years now, the general indexed rate has varied only between 3.50 and 3.75 per cent, whereas that on non-indexed loans has varied between 5.6 and 6.4 per cent.

demand and thus inflation is the policy interest rate. In most countries an increase in the policy interest rate passes through to the interest rates charged on new mortgages and other loans; in Iceland, the transmission is weak. (In theory there will normally be some influence inasmuch as the financial markets for indexed and non-indexed instruments are linked, but the effect is small in both theory and practice.) As a result, larger changes in the policy interest rate are likely to be needed to keep inflation on track when the transmission mechanism is weakened in this way.<sup>26</sup>

Supplementing the interest rate tool with other measures directed specifically at reducing/or increasing the volume on new mortgage lending can enable the Central Bank to stay on target with less amplitude of policy interest rates. The kinds of policy tool that can be effective overlap with those classified as “macroprudential” including additional capital requirements, constraints on loan-to-value and loan (or debt)-to-income ratios and the like. Indeed, it is not altogether possible to assess the stance of monetary policy without considering the stance of macroprudential policy.

Because they are the main buyers of mortgage backed index-linked bonds, the operations of the pension funds are highly influential in setting the price and influencing the availability of mortgage finance. They also are important sources of direct mortgage lending to pension fund members. This is a very large and concentrated sector.<sup>27</sup> The total assets of the pension funds are greater than those of the banks; indeed as a percentage of GDP Icelandic pension funds are among the largest in the world. The pension funds hold about half of the equity in Icelandic listed companies. Relative to its size, the Icelandic pension fund sector does not seem to have been the subject of sufficiently close attention from the point of view of efficiency and macroeconomic stability.

A relaxation of the capital inflow restrictions, when appropriate, could help increase competition in the market for long-term index-linked bonds.<sup>28</sup>

Direct intervention by the Central Bank in this market for the purpose of enhancing the effectiveness of monetary policy is not completely out of the question, but may not be easy to implement effectively, given the comparative lack of international experience with this somewhat idiosyncratic market. Nevertheless, the activities of the pension funds should receive increased analytical attention with a view to informing any appropriate extension of the use of macroprudential measures to these entities.

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<sup>26</sup> In Chile, an interesting comparator as it is another IT country with a high proportion of indexation in the financial system and a large pension fund sector, the Central Bank has operated in the markets for both nominal and index-linked securities, though (since 2001) its policy rate is the nominal rate.

<sup>27</sup> The three largest pension funds account for more than half of the total assets of the sector. The banking sector is even more concentrated with the three banks designated as systemically important (Arion, Íslandsbanki and Landsbankinn) accounting for over 95 per cent of the total assets of the deposit money banks. Íslandsbanki and Landsbankinn are almost fully state-owned.

<sup>28</sup> Clearly there can be a tension between the desirability (on the one hand) of removing controls to improve efficiency and competitiveness of the bond market and (on the other hand) our recommended potential use of macroprudential tools to dampen undue appreciation of the exchange rate from excessive capital inflows.

#### ***6.4 Governance of macroprudential policy***

We believe that the prevalence of index-linked mortgages provides a strong reason for augmenting the toolbox of monetary policy with the use of macroprudential tools.

This being so, consideration would need to be given to the governance around the use of such tools. After all, macroprudential tools are used in order to protect the system from intermediary failure which is a related, but far from identical, concern to those of monetary policy. The micro-prudential regulator clearly must have a central role in deliberations on such tools. Are the existing institutional arrangements between the monetary policy committee and the microprudential regulator for shared deliberations and decision-making sufficient to ensure that these tools are being used most effectively in both spheres? We think not.

One possible solution would be to integrate the FME into the Central Bank (from which banking supervision was, in effect, removed in 1999). This would ensure that policy decisions could be taken in a more integrated manner. The greater degree of policy and financial independence of the Central Bank could also help overcome some of the challenges outlined in the IMF's 2014 Report on Standards and Codes in relation to banking supervision. Merging the two could also help resolve tensions that can arise between the Central Bank and FME on liquidity regulation.

Such a move might be resisted on the grounds of it concentrating more power in the Central Bank. However, there is much to be gained from an enhanced efficiency of macro and micro-prudential regulation and supervision. The role of Government could be protected by continuing the operation of the Financial Stability Council, which is chaired by the Minister of Finance and Economic Affairs.<sup>29</sup> The legislation authorising general prudential powers could provide that proposed expansions in the macroprudential toolbox would be subject to a non-objection procedure in parliament. More generally, there would need to be assurance that accountability of the Central Bank in such an expanded role would be no less than that which applies now to FME.<sup>30</sup>

Designing appropriate governance structures within the Central Bank to deal effectively with the enlarged responsibilities needs care. Decision-making in prudential regulation and supervision differs in substance and style from monetary policy decision-making, as it involves far more detail relating to persons, models, transactions and procedures of individual regulated entities. Ensuring that there is a coherent distinct decision-making governance for these prudential matters, without creating a "silo" structure that impedes the flow of information within the enlarged central bank, is not straightforward. There would need to be

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<sup>29</sup> Consideration could also be given to reassigning ministerial responsibility for the Central Bank from the Prime Minister to the Minister for Finance and Economic Affairs, as is the practice in most countries.

<sup>30</sup> Consumer protection and market conduct are functions of the FME for which the arguments in favour of a move to the Central Bank are less strong. The current UK structure follows what is known as the "twin peaks" model by placing these functions in the Financial Conduct Authority (FCA), an entity separate from the Bank of England, whereas prudential supervision and financial stability are responsibilities of the Bank of England.

a Deputy Governor in charge of prudential matters in addition to one responsible for functions currently performed by the Central Bank.

## **7. Recommendations**

Drawing on the analysis presented above, the way forward for Icelandic monetary policy seems relatively clear. Much of what is in place remains appropriate for the future, even if the existing regime was last modified in very different circumstances almost a decade ago. Central Banking is a long game, and a degree of stability in institutional structures is desirable to ensure that policy is not derailed by short-termist perspectives that could derail the medium and long-term interests of Iceland. Nevertheless, policymakers need to be alert to changing circumstances, and to adapt tools and arrangements to cope with emerging issues.

Our recommendations are summarized in the following points:

- 1) There is little to be gained, and potentially quite a lot to be lost, for the country as a whole from switching from the current inflation targeting regime to a fixed exchange rate regime as providing the basis of monetary policy.

We consider the adoption of a fixed exchange rate peg in current conditions to be hazardous. Such pegs often offer a target which is all too easily attacked by speculators. The scale and speed of international speculative capital movements between advanced economies is such that they could easily overwhelm the defences available to the monetary authorities. Taking for granted that there is no desire to return to a regime of tight capital controls on international payments into and out of Iceland, the chances of retaining a peg for an extended period are small. A peg that is subject to disruptive speculative attack and periodic devaluations would not provide the hoped-for stable platform on which to build continued economic growth and prosperity.

The example of Denmark is often alluded to in this context. But, as explained, Denmark's fixed exchange rate regime was forged in very different circumstances, not easily replicated in Iceland today. Furthermore, its adoption was not costless. Unless Iceland decided to pursue membership in the European Union, it could not count on mutual arrangements available to Denmark which make stability of its currency more secure.

- 2) The 2½ per cent inflation goal is broadly in line with global practice among advanced economies (though 2 per cent is more common) and we do not find compelling reasons to modify it going forward.

While the restoration of financial and price level stability cannot solely be attributed to the pursuit of the inflation target over the past decade, the target nevertheless provided a clear and well-understood goal. Financial market participants, businesses and trade unions all understood what the path of inflation was intended to be on exit from the exceptional conditions (including notably the capital controls). This helped anchor expectations. Even if the authorities may have been a little fortunate in the way in which the confluence of external and internal conditions helped get inflation so close to target as the capital controls were

being removed, this does not mean that the target was irrelevant, nor that maintaining a path close to target will be more difficult in the future.

Viable alternatives to a 2½ per cent target are imaginable, but none offer significant advantages to Iceland at present, and moving to any of them would incur some cost of weakening the credibility of the existing target.

For example, recent international academic discussions contemplate whether a somewhat higher target, such as 4 per cent, if adopted more generally, might help make monetary policy more effective whenever there is an economic slump that has brought interest rates below zero to their lower bound. But few central banks are seriously entertaining such ideas. Given its troubled history with too-high inflation, Iceland should avoid being a first-mover in any such trend.

Another alternative is to couch the price stability goal in terms of a range (e.g. between 1 and 4 per cent) without mentioning a point target. Even if such a change might be thought to focus accountability of the central bank, it risks blurring the clarity of the goal and making inflation expectations less-well anchored, thereby leading to worse price stability and economic stability outcomes. The current framework, with a monitoring range specified in addition to the 2½ per cent inflation target is preferable.

All in all, we recommend no change in the inflation target (apart from what is implied in our discussion regarding housing prices in recommendation 7 below).

- 3) The composition and governance of the Monetary Policy Committee, including processes concerning economic analysis and forecasting, are satisfactory.

Following the pioneering example of the Bank of England, the inclusion of external, non-executive, members of monetary policy committees has become increasingly used in the central banks of advanced economies, though is still far from universal. A committee operating with individual accountability and external members reduces the danger of group think and can somewhat dilute the concentration of decision-making power in the Governor and full-time, internal, colleagues. Nevertheless, it is clear that agenda-setting and the main formulation of the policy thrust remain with the Governor and staff.

Possible variants on the precise model employed by Iceland could include (i) having one or two additional members; (ii) expecting a higher time commitment of external members than at present (accompanied naturally by correspondingly higher remuneration); (iii) provision of staff analytical resources to support each external member. These variants correspond to the British model. It is not clear what problem such suggestions are likely to solve. The main drawback of each of them is the risk of over-complicating the policy discussion in what is, after all, a much smaller and simpler economy and financial system than that of the UK. Overall, there has been no compelling reason for change, though we accept that any changes in the three directions mentioned would be unlikely to damage the quality of decision-making.

The enhanced importance and role of the Central Bank in the use of macroprudential tools as a means of stabilizing the macroeconomy could, however, lead to a wider agenda and additional complexity in the deliberations of the MPC. This could potentially warrant an increase in the number of members from 5 to 6, which would be closer to the global mode.

- 4) The identity of individual votes in MPC decisions, with a brief explanation of the rationale for dissenting votes, could be provided with the Minutes that are published following each MPC meeting.

At present, individual votes on MPC decisions are made public with considerable lag, in the Bank's Annual Report. Although we are satisfied that the conduct of the MPC discussions has been sufficiently open and accommodating of different opinions with the current practice, the individual accountability of MPC members could be reinforced, and the diversity of views among committee members made more transparent by disclosing the identity of individual votes, and the rationale for dissenting votes, more promptly than is presently the case.

Some central banks disclose this information in the announcement that accompanies MPC decisions and this possibility could also be considered for even greater transparency. On the other hand, the analysis and details regarding the discussion that is provided in the Minutes which are published two weeks after each MPC meeting provide a more complete context.

- 5) As monetary policy is fully normalized from the crisis, the central bank could direct more effort towards explaining its strategy for both interest rate as well as exchange rate policy to the general public.

Monetary policy actions are not always popular among the general public. It is therefore vital that communication is continuously maintained to maximise the degree to which the general public understand what the Central Bank is doing and why its actions are in the public interest.

Transparency of monetary policy in Iceland is good inasmuch as the underlying information used by the monetary policy committee and the policy decisions being made are communicated to technical specialists among the market participants in sufficient detail and in language that seems less complex than that employed by many other central banks. What is less clear to us is whether the general public are as well-informed as they might be about the nature of the decisions and operational goals of monetary policy and how they are intended to affect prosperity of the Icelandic people. It would be worthwhile to examine what more could be done to improve communications with the general public. For example, public concern about exchange rate movements during 2017 may not have been met with as much explanation as could have been helpful.

The nature of this task is different to what was needed as the authorities struggled to recover from the crisis. It might need an overhaul of the central bank's communications strategy, and might also require a more active engagement of the central bank with the public.

- 6) A strategy of direct exchange market intervention could complement interest rate policy towards dampening real exchange rate fluctuations while maintaining price stability, but any such approach must recognize and take account of the inherent asymmetry in the central bank's ability to execute. While it may be advisable to lean against currency appreciation by purchasing foreign reserves, the scope for limiting currency depreciation through interventions is much more limited.

Our suggestion on exchange rate policy is the most delicate of our recommendations. As already stressed, we are opposed to the idea of a fixed peg. At present, since the removal of most of the capital controls, exchange market intervention has been very limited and focused on removing only high-frequency surges. We acknowledge the danger that a more energetic exchange rate policy risks derailing the main focus on an inflation target. But we do not think that inflation targeting in a small economy need be accompanied by exchange rate fluctuations of the magnitudes seen in 2017.

While it may occasionally be appropriate to intervene to push against an exchange rate that has manifestly moved well outside any realistic equilibrium range, the main objective of exchange rate policy should be to reduce the short and medium term volatility of the exchange rate. The equilibrium real exchange rate varies over time and cannot be accurately known in real time so attempting to do more, for example use the level of the exchange rate as an implicit target, would likely prove counterproductive.

Designing a workable policy that leans against unnecessarily large exchange rate movements is not an exact science. Any precise formula risks inviting speculative attack just as a fixed peg does, especially if it is publicly announced. That is why countries that use policy to limit foreign exchange rate movements rarely publicize their exact goals or instruments.

Exchange market intervention is not the only policy that can be used to influence the exchange rate. Macprudential policies, including regulations governing foreign exchange positions of regulated entities, can also be effective.

At present the very limited short-term foreign exchange market interventions of the central bank are carried out on the instructions of the Governor operating under delegated powers from the monetary policy committee. If our more energetic strategy for dampening exchange rate fluctuations is to be pursued, its conduct should be regularly discussed as an agenda item of the monetary policy committee, ensuring that the committee's responsibility in this area is continuously exercised.

- 7) As currently constructed, the CPI appears to be overly sensitive to short-term movements in house prices. We recommend that CPIXH should also be tracked with a view to permitting a wider deviation of CPI inflation from target whenever housing price inflation registers unusual deviations from inflation of other prices.

The CPI index produced by Statistics Iceland is not out of line with accepted international standards and does not appear to embody any unusual medium-term bias. However it is constructed in such a way as to react very quickly to short-term movements in house prices.

Tracking this index closely may induce an unwanted degree of fluctuation in other prices, such as the exchange rate.

We believe that a price index that was less sensitive to short-term house price movements than Iceland's CPI would be better for many purposes and in particular as a target for monetary policy. CPIXH is one such index, but it errs on the other side by excluding housing prices altogether and that would have missed the considerable increase in the relative price of housing services over the past 15 years.

Consideration could be given to moving eventually to one of the alternative recognized approaches to including the cost of owner-occupation, such as rental equivalence or the acquisitions approach. But such a change would require careful statistical preparation. The rental equivalence approach was previously rejected in Iceland because of the thinness of the rental market.

Moving from one index to another will have distributional consequences because of the large stock of indexed mortgages and of index-linked bonds contracted on the basis of the existing CPI and against the background of a stated monetary policy target for CPI. Furthermore, although indexation of wages is long a thing of the past, CPI expectations are an important element of wage negotiations. Major changes in the target of monetary policy undermine the plans made by businesses and households on the basis of legitimate expectations; for that reason they should not be adopted lightly. (Still many drastic legislative and policy changes had to be made in recent years in Iceland, so the barrier to yet another change may not be as high as elsewhere).

Fortunately, even if there is no change in the index, monetary policy can take account of the excessive volatility of the housing component of CPI by focusing also on the net-of-house-prices CPIXH. Wider deviations from the medium term intended path of CPI inflation should be tolerated whenever CPIXH is deviating in the opposite direction. Thus, medium-term CPI inflation would still be the basis of the target, but monetary policy should attempt to see through the short-term house-price induced fluctuations in CPI. Operationalizing this recommendation would entail some complexity and should not be done in a mechanical way. As a result, it will tend to blur the clarity of the monetary policy objective, though not, in our view, in an unsurmountable way.

- 8) Macroprudential tools should be used more energetically and systematically to protect against overheating in the housing market and contain the risk of recurrent boom-bust cycles.

With house prices a significant component of the CPI, surges in house prices do lead to an interest rate response that could in principle have some dampening effect. However, the pervasive indexation of residential mortgages to the CPI means that short-term policy interest rates are less effective in dampening housing demand than in most countries. When there is a need to dampen aggregate economic activity, reliance on the policy rate alone is likely to be suboptimal. This elevates the importance of macroprudential tools for macroeconomic stabilization.

Borrower-related tools such as limits on the amount of high loan-to-value, loan-to-income and debt-to-income ratios should be part of the active toolkit. Countercyclical capital buffers should be set in close consultation with the monetary policy committee. Where necessary, additional tools, including regulations relating to foreign exchange-denominated instruments, should be deployed. Admittedly, such tools have not always proved to be effective, but the limited impact of the policy rate on mortgage market conditions means that they cannot be ignored. Design and effectiveness of macroprudential tools will have to be kept under constant review.

The kind of analysis currently underpinning monetary policy decisions will be an important input into the design and calibration of macroprudential tools. The Central Bank should therefore continue to be the main agenda setter for macroprudential decisions and its proposals (to the FSC – as discussed below) on these matters should be integrated with the MPC's discussions. Thus, even if the macroprudential instruments are not explicitly part of the MPC's toolbox, the Central Bank will have a strong influence on these instruments and its recommendations can be fully consistent with the MPC's policy strategy.

- 9) Monetary policy and the prudential regulation of financial firms should be more closely integrated. In practice, the most promising way of doing this would entail a merger of the Central Bank with the micro-prudential regulator.

Several considerations point in this direction. Because of the strong influence of micro prudential policies on the functioning of the financial sector, and on the effectiveness of macroeconomic stability policy in general, it is vital that there be sufficient smooth and open communication between the central bank and the micro-prudential financial regulator.

Besides, Iceland's institutional capacity to foresee and deal with emerging risks would be strengthened if the closely related expertise required for the monetary policy and prudential regulation functions were pooled.

The important role of the pension funds in the housing market and more widely in influencing macroeconomic and financial conditions implies that their activities deserve more attention from those charged with macroeconomic stability than currently appears to be the case. Integration of microprudential supervision of these firms in the central bank would assist in improving this dimension of policy.

While there are several traditional arguments for the retention of separate agencies for prudential supervision and monetary policy, including concerns that regulatory power might be too concentrated in an integrated agency, the experience of the financial crisis has shifted expert opinion towards integration in many of the countries which had previously separated these functions. The UK moved prudential regulation into the Bank of England and the euro area created the Single Supervisory Mechanism within the ECB for the prudential regulation of banks. The small size of the Icelandic financial sector and administrative structures suggest an even stronger case for integration here.

An integrated agency could be led by a Deputy Governor, charged with oversight of financial supervision with specific statutory microprudential powers, who could also become an additional member of the Monetary Policy Committee.

- 10) Governance of macroprudential policy should be strengthened by the inclusion of a requirement that recommendations by the Central Bank to the Financial Stability Council that are not adopted must be made public within a short time-frame.

If macroprudential policy is to be more actively used to support macroeconomic stability as a complement to monetary policy, its governance structures deserve special attention.

Inasmuch as many macroprudential policies entail significant political controversy, there is a constant danger of policy inertia. The key role of the Minister for Finance in the existing governance arrangements in Iceland (as in many other countries) provides some assurance of democratic legitimacy for the policy actions taken, but is also likely to be the source of any bias towards inertia. This could be alleviated by reinforcing the role of the Central Bank as agenda setter in this domain. A requirement to publicize the Central Bank's proposals could help counter such a bias.

An alternative governance arrangement which could also be effective in reducing the bias to inertia might be to assign responsibility for macroprudential policy to the Central Bank altogether (thus excluding the Minister from the decisions), while requiring it to submit any significant policy changes for a time-limited accept-or-reject decision by the Althing.

## **8. Conclusion**

Following a tumultuous first decade in the 21st century, Iceland has returned to a reasonable degree of macroeconomic stability. It is important to remain vigilant and for policymakers not to drop their guard against the re-emergence of unsustainable or destabilising behaviour, public or private. Taking into account Iceland's membership in the EEA, the existing institutional arrangements for securing macroeconomic stability, including monetary policy, seem generally fit for purpose. However, the current framework will likely be tested in coming years, with budgetary decisions and wage negotiations in the face of a booming economy with real wages, housing prices, and the real exchange rate having recovered or surpassed their pre-crisis peaks. There is room for improvement towards a more robust handling of external shocks and domestic challenges. Improvements in the objectives, tools and governance of monetary policy should be incremental rather than drastic.

## References

- Aliber, Robert Z. and Gylfi Zoega, eds. 2012. *Preludes to the Icelandic Financial Crisis*. London: Palgrave Macmillan.
- Andersen, Palle S. and Már Guðmundsson. 1998. “Inflation and Disinflation in Iceland.” *Central Bank of Iceland Working Papers 1*.
- Australia, Government of. 2015. *Reserve Bank Act 1959*, Compilation No. 29, April. <https://www.legislation.gov.au/Details/C2015C00201>
- Baldursson, Fridrik Mar, Richard Portes and Eiríkur Elís Thorlaksson. 2016. “All’s Well That Ends Well? Resolving Iceland’s Failed Banks.” *CEPR Discussion Paper 11185*.
- Benediktsdóttir, Sigríður, Gauti B. Eggertsson, Eggert Thórarinnsson. 2017. “The Rise, the Fall, and the Resurrection of Iceland.” *Brookings Papers on Economic Activity* forthcoming.
- Benediktsdóttir, Sigríður, Jon Danielsson and Gylfi Zoega. 2011. “Lessons from a Collapse of a Financial System.” *Economic Policy*, 26(66), 183–235.
- Benes, Jaromir, Alexandre Chailloux, and Nathan Porter. 2012. “Strengthening the Monetary Policy Framework in Iceland.” In IMF Country Report No. 12/90
- Blinder, Alan S. 2009. “Making Monetary Policy by Committee.” *International Finance* 12(2): 171–194.
- Buiter, Willem. 2000. “Is Iceland an Optimal Currency Area?” *Central Bank of Iceland Working Paper 10*.
- Central Bank of Iceland. 1986. Central Bank of Iceland Act No. 36, May 1986. Translation from the Icelandic original by Hjortur Tofarson under the auspices of the Central Bank of Iceland, December.
- Central Bank of Iceland. 2001. New Central Bank Act. Monetary Bulletin 2001/3.
- Central Bank of Iceland. 2012. Iceland’s currency and exchange rate policy options. Special Publication no. 7.
- Central Bank of Iceland. 2017a. Monetary policy based on inflation targeting: Iceland’s experience since 2001 and post-crisis changes. Special Publication no. 11.
- Central Bank of Iceland. 2017b. Financial Stability Report 2017/2.

- Daniélsson, Ásgeir, Ólafur Sindri Helgason and Stefán Thórarinnsson. 2016. “Estimating the Natural Rate of Interest for Iceland: An Exploratory Study.” Central Bank of Iceland Working Paper 74.
- Daniélsson, Ásgeir, Bjarni G. Einarsson, Magnús F. Guðmundsson, 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 71.
- Diewert, W. Erwin and Alice O. Nakamura. 2009. “Accounting for Housing in a CPI.” In W.E. Diewert, B.M. Balk, D. Fixler, K.J. Fox and A.O. Nakamura, eds., *Price and Productivity Measurement* (Volume I – Housing). Trafford Press.
- Guðmundsson, Már, Thorarinn G. Petursson and Arnor Sighvatsson. 2000. “Optimal Exchange Rate Policy: The Case of Iceland.” *Central Bank of Iceland Working Paper 8*.
- Guðnasson, Rósmundur and Guðrun R. Jónsdóttir. 2009. “Owner Occupied Housing in the Icelandic CPI.” In W.E. Diewert, B.M. Balk, D. Fixler, K.J. Fox and A.O. Nakamura, eds., *Price and Productivity Measurement* (Volume I – Housing). Trafford Press.
- Gunnarsson, Birgil. 1999. Chairman’s address at the Annual Meeting of the Central Bank of Iceland. March 30.
- Hammond, Gill. 2011. “State of the Art Inflation Targeting.” A Centre for Central Banking Studies Handbook. London: Bank of England.
- Holden, Steinar. 2016. “A new model for wage formation in Iceland.” Report commissioned for the Salek Group. <http://folk.uio.no/sholden/wp/wage-formation-9Aug.pdf>.
- Jónsson, Bjarni Bragi. 1999. “Financial Indexation and Interest Rate Policy in Iceland.” Central Bank of Iceland Working Paper No. 5. October.
- Jónsson, Ásgeir and Hersir Sigurgeirsson. 2016. *The Icelandic Financial Crisis A Study into the World’s Smallest Currency Area and its Recovery from Total Banking Collapse*. London: Palgrave Macmillan.
- Jónsson, Guðmundur and Magnús S. Magnússon. 1997. *Icelandic Historical Statistics*. Reykjavik: Statistics Iceland.
- Klein, Michael W. and Jay C. Shambaugh. 2012. *Exchange Rate Regimes in the Modern Era* Cambridge, MA: MIT Press.
- Krugman, Paul. 1991a. “Iceland’s Exchange Rate Regime: Policy Options. Mimeo.

Krugman, Paul. 1991b. "Target Zones and Exchange Rate Dynamics." *Quarterly Journal of Economics* 106: 669-82.

OECD (various years). *Economic Surveys: Iceland*. Paris.

Office of National Statistics. 2017. "Understanding the Different Approaches of Measuring Owner Occupiers' Housing Costs." London.

<https://www.ons.gov.uk/releases/ukowneroccupiedhousingcostsoohnetacquisitionsapproachjulytosept2017>

Orphanides, Athanasios and John C. Williams. 2007. "Inflation Targeting under Imperfect Knowledge." In F. Mishkin and K. Schmidt-Hebbel, eds., *Monetary Policy under Inflation Targeting*. Santiago: Central Bank of Chile.

Pétursson, Thórarinn G. 2017. "Disinflation and Improved Anchoring of Long-term Inflation Expectations: The Icelandic Experience." Central Bank of Iceland. Working Paper 77.

Seneca, M. 2010. "A DSGE Model for Iceland." Central Bank of Iceland Working Paper 50.

Sila, Urban. 2017. "Labour Market and Collective Bargaining in Iceland: Sharing the Spoils without Spoiling the Shares." OECD Economics Department Working Papers, No. 1439, OECD Publishing, Paris. <http://dx.doi.org/10.1787/851fc29b-en>.

Stiglitz, Joseph E. 2001. "Monetary and Exchange Rate Policy in Small Open Economies: The Case of Iceland." Central Bank of Iceland Working Paper 15.

Turner, Philip. 2017. "Did Central Banks Cause the Last Financial Crisis? Will They Cause the Next?" London School of Economics Financial Market Group Special Paper 249.

Figure 1

**Inflation**

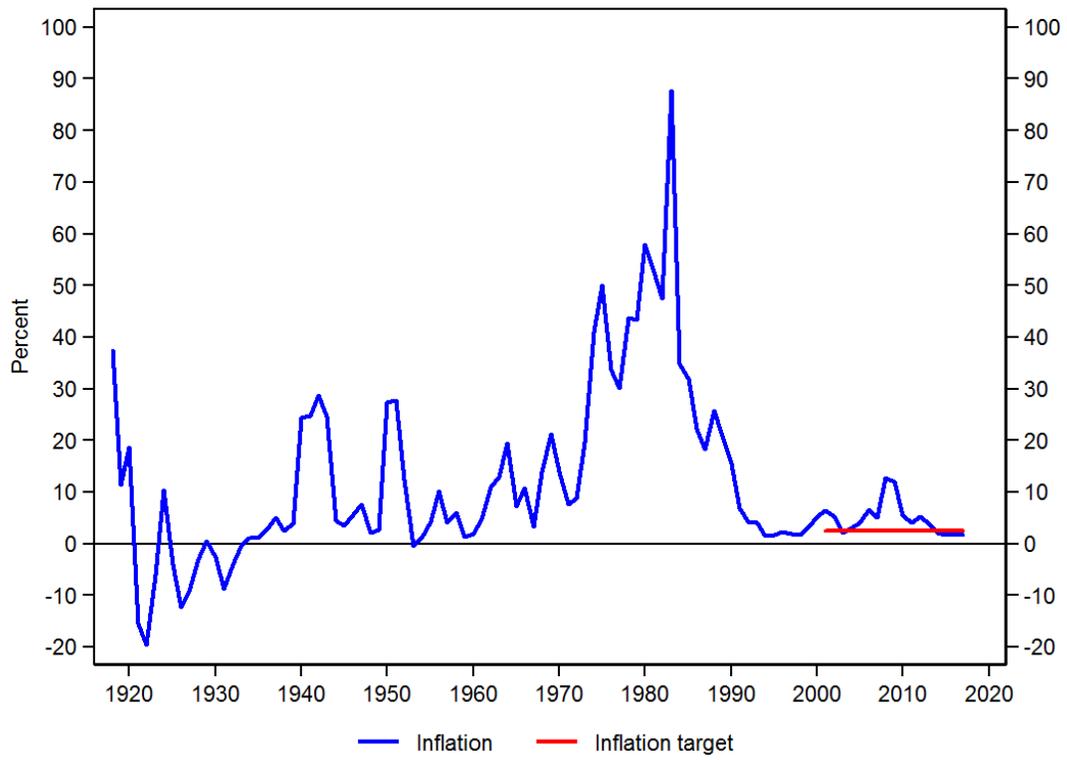


Figure 2

**Inflation and currency depreciation**

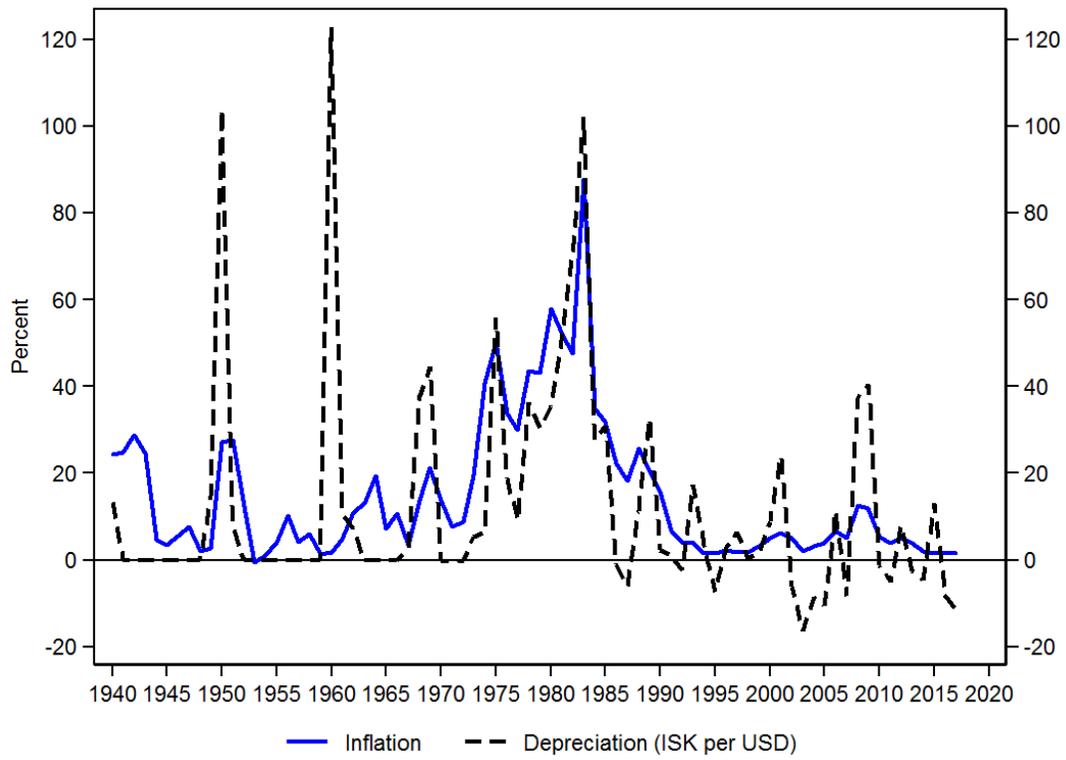


Figure 3

**Inflation and Central Bank policy interest rates**

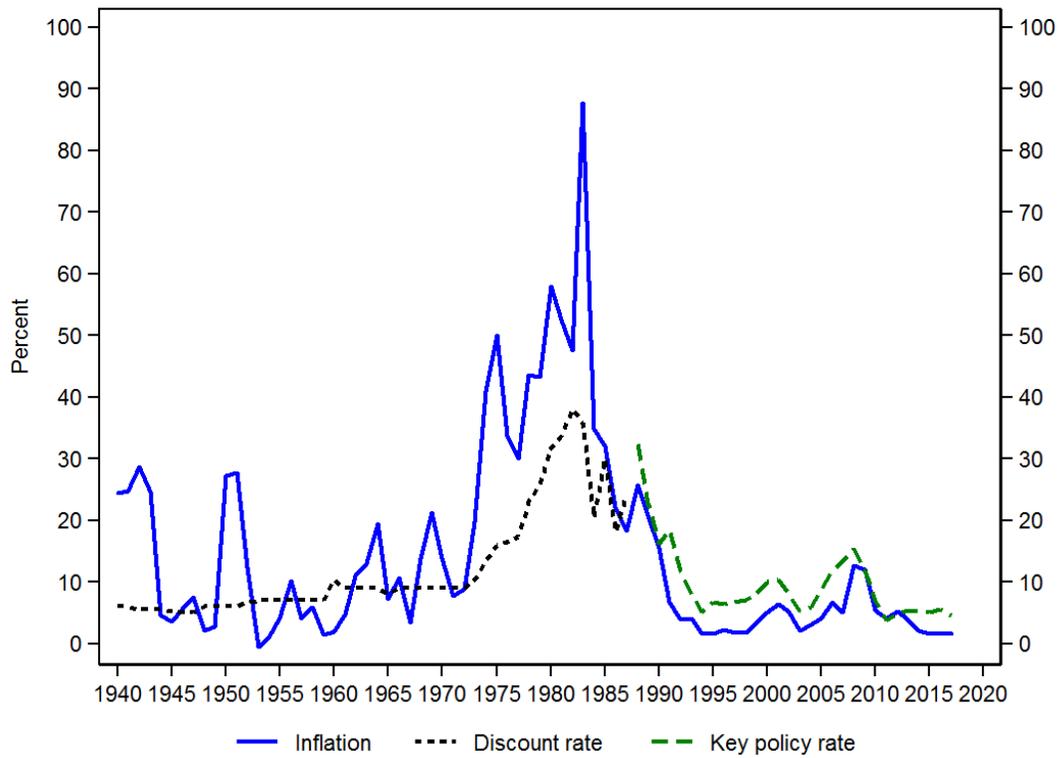


Figure 4

**Real GDP per capita and unemployment rate**

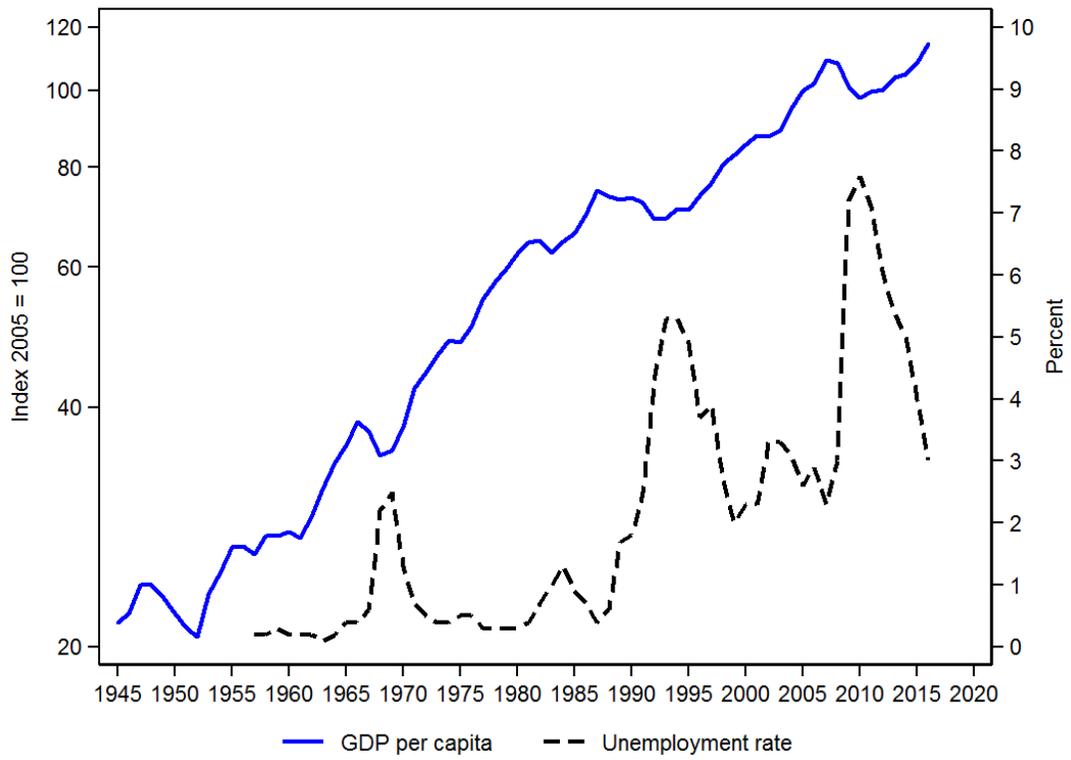


Figure 5

**Real exchange rate**

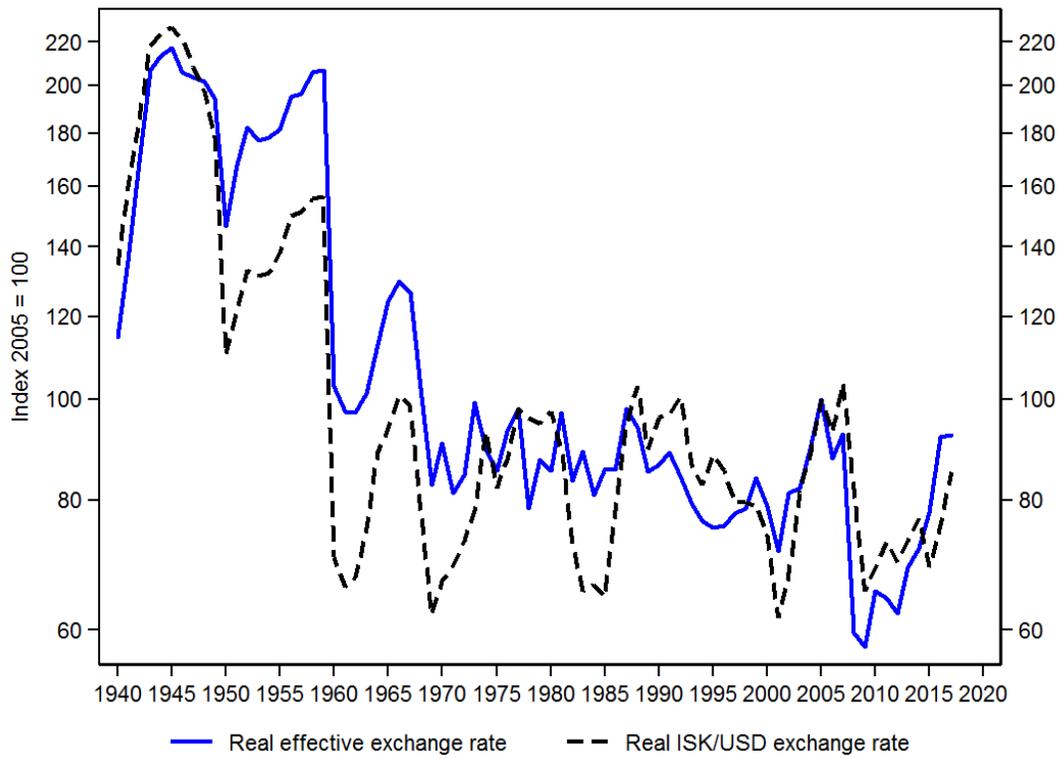


Figure 6

**Inflation and inflation target**

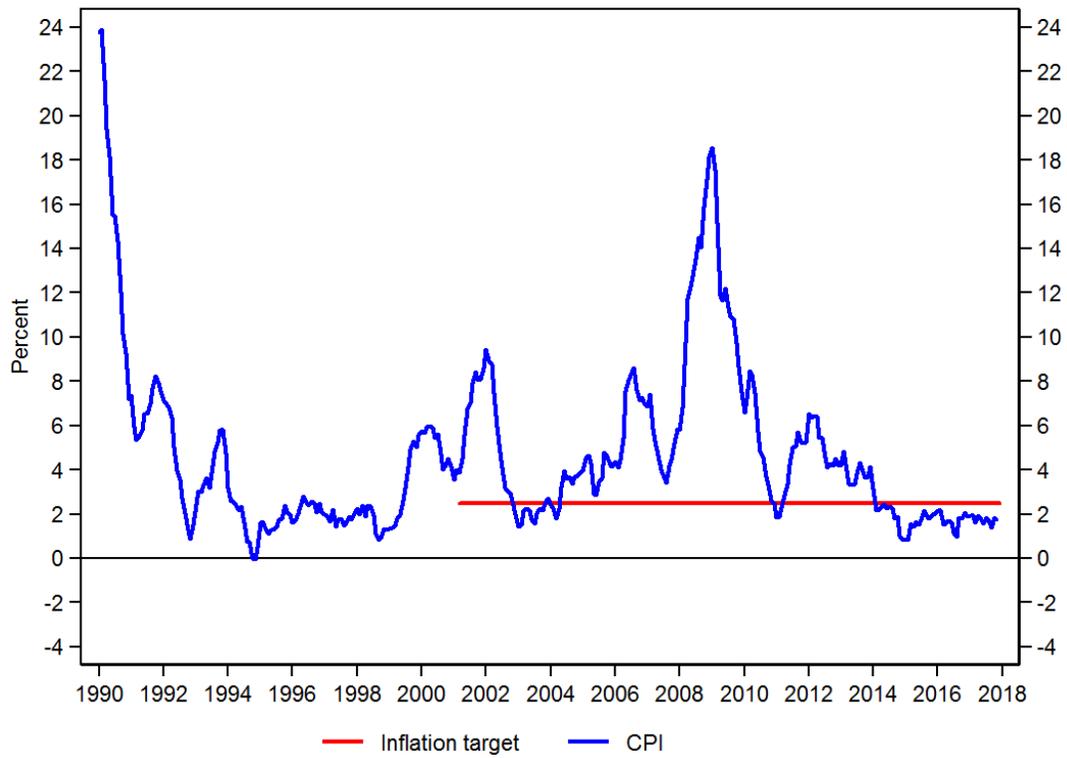


Figure 7

**Headline inflation and inflation excluding housing**

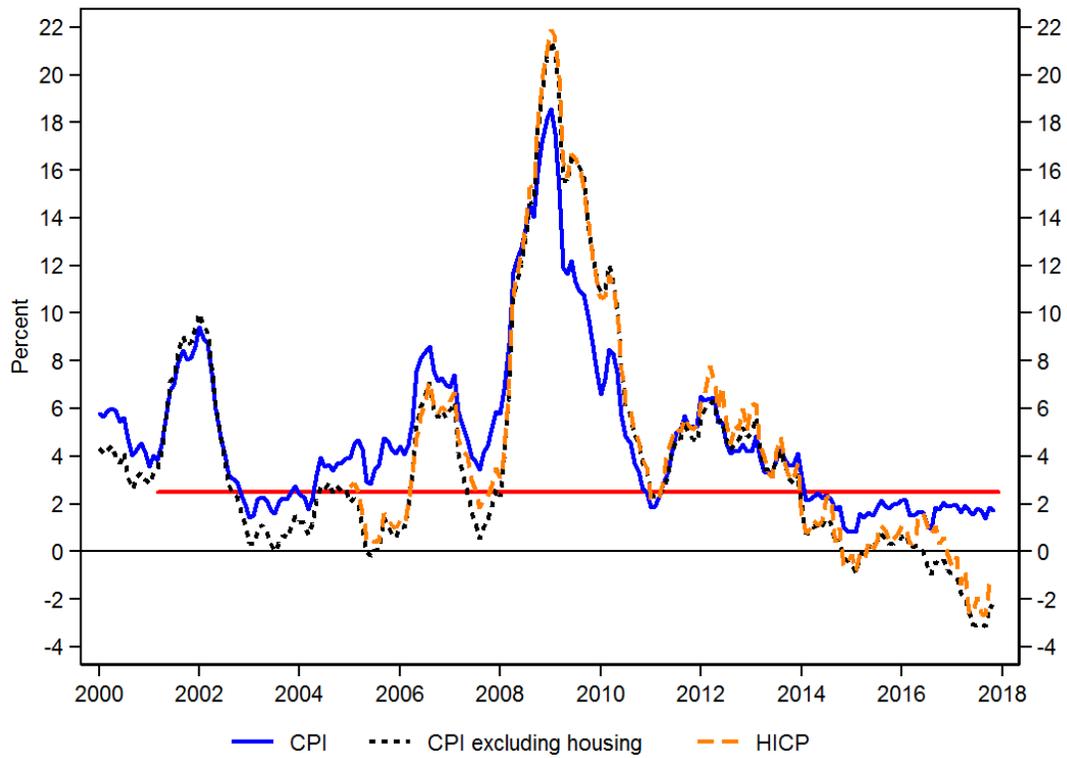
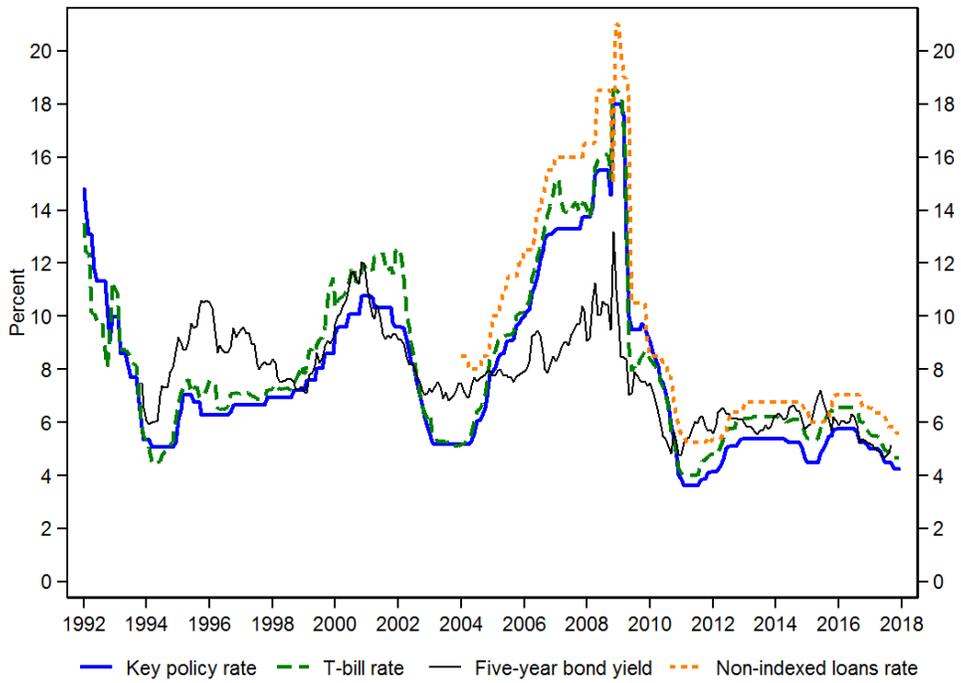


Figure 8

### Key policy rate and other nominal interest rates



### Key policy rate and indexed interest rates

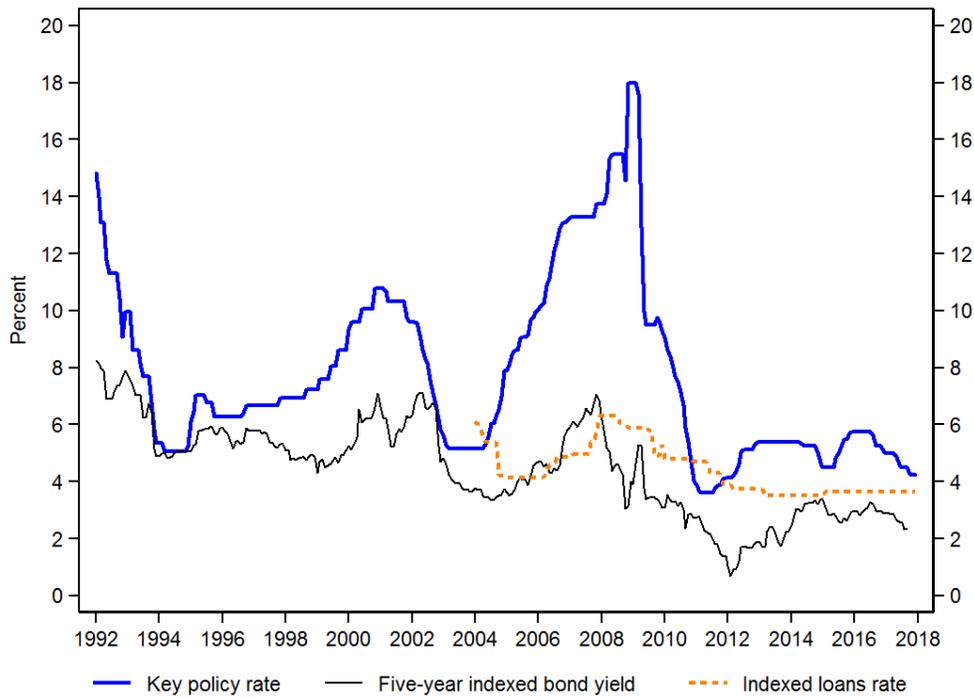
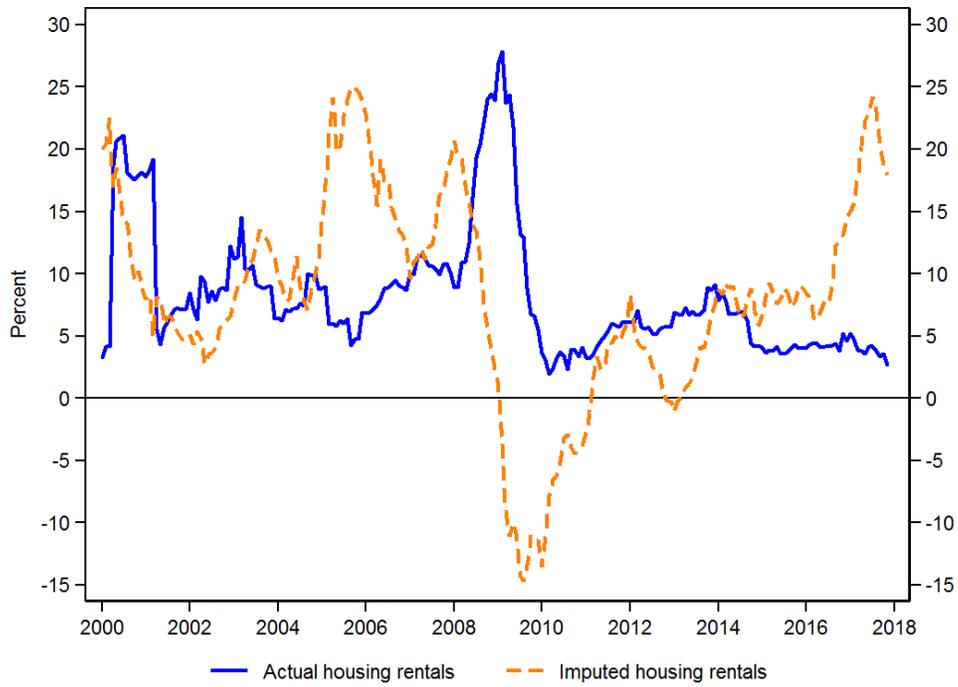


Figure 9

**Inflation of actual and imputed housing rentals**



**Imputed rentals inflation and residential property market price growth**

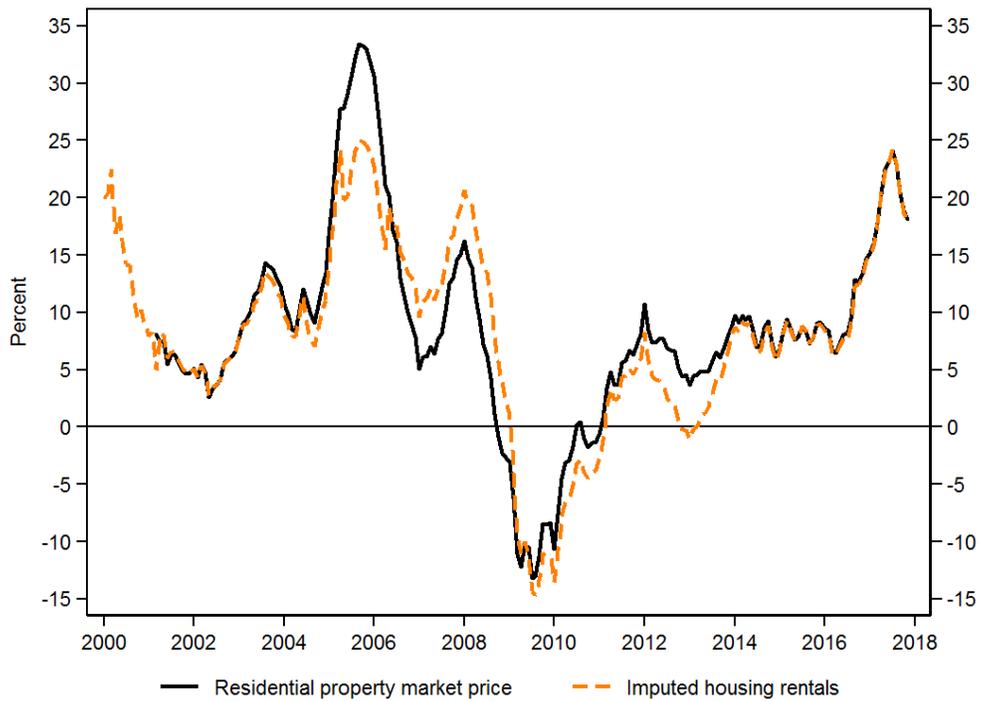


Figure 10

**Share of indexed and foreign exchange debt**

