

## Króna-denominated Eurobond issues

*The origin of króna-denominated Eurobond issues can be traced to buoyant demand for domestic credit, which has pushed up interest rates and caused the króna to appreciate at the same time as interest rates in international markets are low and investors are prepared to enter new territory in search of higher yields. The following article traces the development of offshore bond issuance in local currencies since the early 1980s and describes the structure of the króna-denominated Eurobond issues and their driving forces, with a look at New Zealand's informative experience in this field. An assessment is made of the impact of issuance on Iceland's capital markets and interest rates, the exchange rate of the króna and effectiveness of the Central Bank's monetary policy. It concludes by focusing on the immediate future with an attempt to explain the possible impact of issuance on economic developments.*

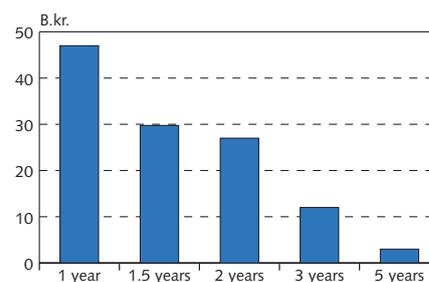
### Introduction

Outstanding króna-denominated Eurobond issues amounted to 120 b.kr. at the time of writing in mid-November – more than the total stock of Treasury instrument issues in the domestic market. While such issuance is an innovation in Iceland it is well known in international markets and testifies to increased integration between Icelandic and international capital markets, where massive growth in such transactions has been seen in recent years.<sup>2</sup> However, these issues coincide with heavy imbalances in the Icelandic economy and the need for a tight monetary stance. Their impact on capital markets, the economy as a whole and the effectiveness of Central Bank monetary policy need to be assessed. It is important to examine other countries' experience of offshore issuance while also taking into account a number of distinctive Icelandic features and their possible effect.

### International development of offshore issues in minor currencies<sup>3</sup>

In the early 1980s, two trends converged in international bond markets. First, many governments launched reforms aimed at liberalisation of capital markets. Some sought to attract foreign investors to support the development of domestic capital markets. Second, investors in core markets began to look farther afield in search of higher yields and new ways to diversify their portfolios. This was shortly after the oil cri-

Chart 1  
Volume of króna Eurobond issuance  
by maturity



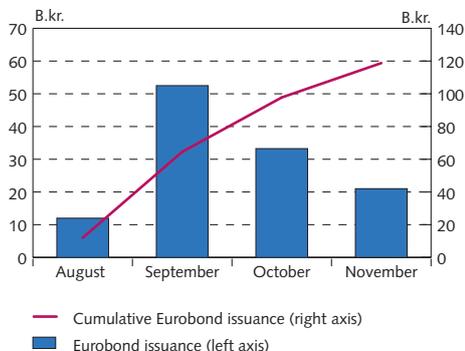
Sources: Reuters, Central Bank of Iceland.

1. The author is an economist at the Central Bank of Iceland Economics Department. He would like to thank Haukur Benediktsson, Thórarinn G. Pétursson, Magnús Fjalar Gudmundsson, Tómas Örn Kristinsson, Guðmundur Kr. Tómasson, Jakob Gunnarsson, Guðrún Sóley Gunnarsdóttir and Helga Rún Helgadóttir for their assistance in preparation of this article. The author also thanks Anella Munro, Senior Economist at the Economics Department of the Reserve Bank of New Zealand, for her very constructive feedback on New Zealand's experience of Eurokiwi bonds, and Yüksel Görmez, Manager of the Financial Department of the Central Bank of the Republic of Turkey, for assistance with procuring information about the experience of Turkey and other countries. The author alone is responsible for any errors or omissions. The opinions expressed in this article are those of the author and do not necessarily represent the views of the Central Bank of Iceland.

2. The structure of króna-denominated Eurobond issues is described in Box 1.

3. This section is largely based on Herrera-Pol (2004). The term "minor currencies" is used here for all currencies apart from the main five (US dollar, euro, yen, sterling and the Swiss franc), in which 97% of bonds issued in international markets are denominated (see Cohen, 2005).

Chart 2  
Króna Eurobond issuance  
August-November 2005  
Monthly and cumulative volume



Sources: Reuters, Central Bank of Iceland.

ses of the 1970s. Many countries faced severe inflation and monetary policy was widely tightened. Lured by the resulting high interest rates, foreign investors were quick to seize the opportunity when countries in Australasia and Scandinavia (apart from Iceland) broke the ice and enabled offshore issuance of bonds in their currencies.

Over the past twenty years, more countries have joined the group that enable offshore issuance of bonds in their currencies, see Table 1. Spain, Portugal and Greece were the first to follow the Scandinavians' lead when aiming at accession to the EU, where full freedom of capital movements was due to enter into force in 1993. A number of Eastern European countries, after transforming into market economies in the beginning of the 1990s, and South Africa, were in the next group to open their markets to offshore bond issuance in their currencies around 1995. Most recently several Asian and South American countries, along with Turkey, have followed suit. Iceland is the latest name on the list.

International financial institutions have played a key role in opening new markets for offshore bond issuance in minor currencies. The World Bank has been a pioneer in this field, with almost sixty years'

Table 1 Launch of offshore bond issues in domestic currencies 1985-2005

c. 1985-1989	1990-1994	1995-1999	2000-2003	2004-2005
Australia New Zealand Denmark Ireland Norway Sweden Finland				Iceland
	Spain	Portugal Greece Hungary Czech Republic Slovakia Poland		
				Turkey
	Hong Kong	Taiwan Philippines South Korea Singapore		India Thailand PR China Malaysia
		South Africa		
			Mexico Chile Columbia	Peru

Sources: Herrera-Pol (2004), Görmez and Yilmaz (2005), Central Bank of Iceland.

experience of bond issuance to fund its own lending.<sup>4</sup> The reason is that the high credit rating of institutions such as the World Bank makes their bonds a secure investment option even if they are denominated in unusual currencies. Especially for new investors who appreciate being able to isolate credit risk, i.e. the risk of an issuer failing to honour its obligations, from currency risk. New channels are also opened up for domestic investors to increase their portfolio diversification.

### **Australasia**

Australia and New Zealand made a large-scale overhaul of their capital markets in the early 1980s, both applying tight monetary policies at that time to counter high rates of inflation. One aspect of liberalisation was to allow offshore issuance of bonds in their own currencies, and *Kiwi* and *Kangaroo bonds*<sup>5</sup> soon became highly popular among smaller European investors.<sup>6</sup>

One crucial reason for the popularity of these bonds was the existence of developed swap markets in these two countries. They had evolved because both private and public companies earned sizeable shares of their income in foreign currency and sought to limit currency risk through swaps, and the banking system was sufficiently developed to respond to such demand. Banks also used swaps to fund fixed-interest household mortgage lending.

Since the early 1990s, offshore issuers have also been able to issue bonds in the domestic market in these two countries, leading to substantial growth in foreign investor participation. New Zealand's experience is discussed in more detail later in this article.

### **Scandinavia**

In the early 1980s the Nordic countries (with the exception of Iceland) allowed approved international financial institutions to issue bonds in their domestic currencies. Most of these bonds were bought by foreign investors in Europe and Japan, who were attracted by the high interest rates in Scandinavia at the time.

### **Southern Europe**

Spain, Portugal and Greece were the next group of countries to allow offshore bond issuance denominated in their currencies. These countries' domestic bond markets were thin when they began the EC accession process and one reason that international financial institutions launched issues in their currencies was to contribute to their development.

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4. There is nothing new about the World Bank pioneering an international bond issue – it made the first cross-currency swap in 1981 (Görmez and Yılmaz, 2005).

5. Bonds denominated in Australian and New Zealand currencies and issued in the Japanese market are known as *Uridashi*.

6. In a climate of fully deregulated cross-border capital movements, there is effectively nothing to prevent offshore bond issues denominated in participating countries' currencies. Deregulation was introduced in the EC (EU) on January 1, 1993 and likewise for cross-border capital movements to and from Iceland at the beginning of 1995. Countries where cross-border capital movements are restricted can exert considerable control over offshore issuance because of its reliance on domestic counterparties. Hence the use of the term “allow offshore issuance in their own currencies” in the above discussion.

Spain led the way with its *Matador bonds* in pesetas, with a clear policy of establishing Madrid as the country's financial centre. A number of requirements were set to ensure access for banks in the city, listing of bonds on Madrid Stock Exchange and development of a secondary domestic market for them. Portugal and Greece set fewer requirements when they authorised issuances of the respective *Caravela and Marathon bonds* and the secondary market for them has been in London.<sup>7</sup>

### Eastern Europe

In the mid-1990s, Hungary, the Czech Republic, Slovakia and Poland opened up their capital markets to foreign investors as a step in their transformation from centralised to Western market economies. At the time they were already aiming for EU membership. International financial institutions led the way in Hungary with *Euroforint bond* issues, while the other three allowed offshore corporate issuance in their currencies from the outset.

Issuance has boosted the capital market infrastructure in these countries by adding depth, extending maturities and contributing to involvement of international institutional investors. Nonetheless, Eurobond maturities have been short, with small-scale and dispersed end-investors. It should be pointed out that issuers, banks and end-investors have firmly supported these countries and been more inclined to take risks by virtue of their EU membership and cultural links with the region.

### Asia

Ratings agencies have invariably ranked Hong Kong in the top bracket for economic freedom. Not surprisingly, it was one of the first countries to allow offshore issuance in its currency in the mid-1980s. The Philippines, South Korea and Taiwan followed suit a decade later, but issuance was slow off the mark because of the Asian financial crisis of 1997-1998. Singapore opened its markets in 1998.

Last year the process continued when international institutions launched issues denominated in Indian rupees. Thailand, China and Malaysia have declared an interest in allowing international institutions into their markets, where savings levels are higher than the Western norm.

### South Africa

Rand bonds have been very popular among European investors since their market debut in 1995. Like New Zealand and Australia, South Africa already had a developed market for currency swaps.

### Latin America

Offshore bond issuance in Latin American local currencies has grown substantially in the past few years, especially in the currencies of Chile,

7. Icelandic króna bonds have not yet been nicknamed. The author of this article proposes *Euroviking bonds*.

Columbia, Mexico and Peru. Major structural reforms in the wake of the debt crisis of the 1980s have bolstered stability across much of the continent and domestic saving has surged, for example with the introduction of pension savings schemes. Bond issuance by international institutions in these countries' currencies has provided domestic investors such as pension funds with new options for portfolio diversification and increased foreign investment in domestic bond markets.

### Turkey

International Turkish lira bond issuance began at the end of last year and the internal revaluation of the lira on January 1, 2005 paved the way for trading with them in Euroclear and Clearstream. In the space of just over a month (figures based on February 4, 2005), issuance amounted to 1.5 b. lira, or 1.2 b. US dollars. Görmez and Yilmaz (2005) draw a comparison with Hungary and Poland: the outstanding stock of Euroforint bonds on December 10, 2004 amounted to just over 6 b. US dollars and the Polish bond stock was even larger at 11 b. US dollars. By comparison, the Icelandic króna bond stock was almost 2 b. US dollars at the time of writing in mid-November.

Many of the issuers are the same as for króna bonds, e.g. Rabobank Nederland, Kommunalbanken, the Republic of Austria and the World Bank. Like króna bonds, lira maturities are short, at 2.7 years on average.

## Currency choice in international bond issuance

International institutions such as the BIS and the IMF have taken a greater interest in bond issuance in minor currencies recently and both have addressed them specifically in 2005.

BIS research shows that there is more issuance in a given currency when (i) it is strong relative to historical averages, (ii) long-term interest rates in that currency are high relative to those available in other major currencies and (iii) home country demand for funding is high (Cohen, 2005). Precisely such conditions have been in place in Iceland, some emerging markets and the developed Australasian countries in recent years. Elsewhere, international bond issuance has contracted because the interest-rate differential with abroad has altered since it was launched.

Table 2 shows the fall in yields on many bonds in various currencies since international issuance began. In many cases, interest rates no longer exert the same attraction as when the authorities were tightening their monetary policies to counter high rates of inflation. Nonetheless, the market for bonds in minor currencies has doubled over the past ten years: capital markets in many emerging markets have strengthened, international trading practices have widely become the norm, financial products have become more efficient and foreign investors have become more involved in domestic markets, even though in most countries they only represent a small fraction of total market participants.

Table 2 Falling yields on international bonds in minor currencies

Currency	Year	<i>First international bond issue in currency</i>	<i>Yield on Treasury bonds of a similar maturity (%)</i>
		Yield (%)	September 2004
Portuguese escudo	1988	13.50	4.23
Greek drachma	1994	17.50	3.51
Czech krona	1995	10.50	3.91
S. Korean won	1995	12.15	3.81
Taiwan dollar	1995	6.28	2.26
South African rand	1995	15.00	7.62
Slovak krona	1996	12.00	4.25
Polish zloty	1996	17.00	7.52
Singapore dollar	1998	4.50	1.59
Mexican peseta	2000	15.88	2.58
Chilean peseta	2000	6.60	2.92
Turkish lira <sup>1</sup>	2004	15.00	19.25
Icelandic króna	2005	8.50 <sup>2</sup>	9.30 <sup>3</sup>

1. Yield on Turkish Treasury bonds based on January 2005.

2. The weighted average interest rate on Eurobond króna issues until November 14 is 8.44%.

3. Yield on RIKB 07 as of November 14, 2005.

Sources: Herrera-Pol (2004), Görmez and Yılmaz (2005), Central Bank of Iceland.

Turkey and Iceland provide two recent examples of Eurobond issuance, which has surged in both cases. Kiwi bond issuance has also been at a historical peak since 2002, as tight monetary policy has widened the interest-rate differential with abroad and caused the New Zealand dollar to appreciate, backed up by robust domestic credit demand. These countries are highlands in an otherwise exceptionally flat interest rate landscape in international capital markets. This is why international investors have turned to Iceland as they seek out higher yields.

## The global search for higher yields

Króna Eurobond issues must be seen in the context of recent trends in international capital markets towards low interest rates, plentiful liquidity and low interest margins on both high-risk and low-risk instruments. The quest for yields has led investors into uncharted territory and there are many signs of heightened appetite for risk. This quest is reflected in increased investment in (i) FX markets, (ii) domestic bonds denominated in minor currencies, especially of the emerging markets of Latin America and Asia, and (iii) increased international issuance of bonds denominated in minor currencies.

### FX market investments

One investor focus has been on foreign exchange markets where the interest-rate differential with abroad and indications of clear trends in exchange rate movements for some currencies have tempted investors to borrow in a currency where interest rates are low and invest in a higher one, gambling that the interest-rate differential will outweigh possible exchange rate movements over the term of the loan. This pat-

tern of investor behaviour is clearly revealed in increased daily global FX market turnover, which according to BIS data grew by 57% from 2001 to 2004. A massive increase in FX market transactions between banks and other financial institutions also testifies to the popularity of this approach. Such trades grew by 78% over the same period, according to the BIS (BIS, 2005a).

### Investments in minor-currency bonds

Another target for investors seeking new yields is bonds denominated in unconventional currencies rather than in US dollars, euros, yen or sterling. Investors have increased their portfolios of residents' bond issues as well as international market issues in minor currencies. Both have happened in Iceland.

The share of non-residents' holdings of Treasury bonds has been growing in many emerging markets and in some cases has doubled over only two years. In Mexico, non-residents' Treasury bond portfolios grew from virtually zero in 2003 to around 10% this year. In Turkey the share increased from 10% to 20% over the same period, and in Poland from 15% to almost 25% (IMF, 2005b). Foreign investors currently own some 30% of Icelandic Treasury bonds, compared with less than 5% when an international promotion drive for them was launched in 2001 (NDMA, 2005).

International issuance of bonds in minor currencies has also increased in the past few years, as discussed above. Emerging markets in South America and Asia dominate the field. Prior to that, *original sin* was commonly regarded as an obstacle for emerging markets to issue bonds in local currencies.<sup>8</sup>

Bonds denominated in emerging market currencies are issued in international capital markets by international institutions or entities in the home country, in particular the state or major corporations. Uruguay and Columbia, for example, as well as Mexican and Brazilian banks, have issued bonds in local currencies for the equivalent of more than 1 b. US dollars (IMF, 2005b). Governments in emerging markets see important benefits in international issuance of bonds in local currencies, since this spreads the currency risk between investors and sovereign authorities, instead of the latter shouldering the whole risk as was the case when their debt was almost entirely denominated in foreign currencies. This was a key factor underlying *original sin*.<sup>9</sup> Likewise, investors are attracted to these instruments which open access for them to high-yielding markets while trading remains within an international regulatory framework and without a risk of the illiquidity which is often present in local markets (IMF, 2005b).

### The trend reaches Iceland

Given the findings of the BIS, the first króna-denominated Eurobond issue in August 2005 is very understandable. Iceland combines a wide

8. Eichengreen, Hausmann and Panizza (2003) coined the term "original sin" to describe the inability of emerging market economies to issue bonds in their own currencies.

9. "Original sin" constitutes part of an extensive economic literature emphasising the balance sheet approach to financial crisis. Rosenberg et al. (2005) provide a good overview of this literature and its importance for emerging markets.

interest-rate differential with abroad, a strong local currency which is well above its historical average, and apparently unlimited domestic credit demand. These factors make króna bond issues attractive to investors and the increased capital inflows were probably welcomed by domestic capital markets, where demand for credit runs high. Market expectations of ongoing Central Bank policy rate hikes following the strong message delivered in recent editions of *Monetary Bulletin* will probably spur further issuance.

## Domestic credit demand

While króna Eurobond issues must be seen in the context of the quest by international investors for higher yields, as discussed above, domestic factors are no less important a consideration, especially surging credit demand and the global integration of Icelandic financial activities.

### Iceland's economic transformation

Major structural changes have been made in the Icelandic economy over the past two decades. They include trade liberalisation, more effective fiscal policies, privatisation, membership of the European Economic Area, financial sector reforms and the introduction of a monetary policy framework based on a floating exchange rate and inflation target. Coupled with favourable external conditions, these factors have contributed significantly to the turnaround in growth which has taken place over the past decade.<sup>10</sup>

The financial sector has felt the full thrust of these reforms. Financial institutions have witnessed substantial expansion with strong returns on equity, rapid asset growth and abundant liquidity. Soaring volume of lending and a surge in foreign debt, however, are the main risks in bank operations.

According to the latest annual report by the Financial Supervisory Authority (FME) for the period July 1, 2004 to June 30, 2005, total assets of the commercial banks and largest savings banks amounted to 900 b.kr. on a consolidated basis in 2001, equivalent to 138% of GDP. By the end of June 2005, however, total assets had swollen to 4,530 b.kr., which is almost five times GDP. Over the same period, book equity value of the commercial banks and largest savings banks grew from 56 b.kr. to 332 b.kr., or from 8.6% to 36% of GDP (FME, 2005).

The three commercial banks have exploited their new financial strength and favourable conditions for procuring capital in international markets to invest and expand abroad. The point has been reached where roughly half of the three largest banks' assets are held by their foreign subsidiaries, and similarly some 50% of their net operating income derives from activities outside Iceland.<sup>11</sup>

10. GDP growth has exceeded 3% every year since 1996, apart from a contraction in 2002, and has averaged 3.7%. All forecasting agencies expect Iceland's robust growth to continue this year and in 2006.

11. Discussed further in *Financial Stability 2005*, the Central Bank of Iceland's first financial stability report to be published in a separate edition.

Finally, in 2004 the banks began providing mortgage loans at much lower interest rates than had been on offer before, which has caused lending to surge, as discussed below.

### Macroeconomic imbalances

Heavy imbalances characterise the present economic situation in Iceland, with a simultaneous record current account deficit, historically high real exchange rate, soaring house price inflation, mounting debt by households, businesses and the economy as a whole, and inflation above target. Private consumption has also surged over the past two years, driven more by increased debt than by growth in disposable income, as pointed out in *Monetary Bulletin* in September. A massive increase in investment has also taken place, especially in the aluminium and power sectors, but the outlook is for a slowdown next year and a further drop in 2007.

Investments for the aluminium industry, movements in the credit market and upbeat sentiment have generated huge domestic demand growth, with a resulting build-up in inflationary pressures. The situation is strongly reflected in seemingly unlimited demand for credit, causing household and business lending to surge.

### Rapid lending growth

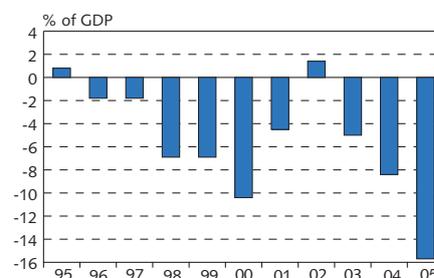
Lending by deposit money banks (DMBs) has been growing by leaps and bounds in recent years and has still not been reined in by tighter monetary policy, see Chart 4. In September 2005, the twelve-month increase in domestic lending was more than 59%, after adjustment for estimated exchange rate and CPI movements. Lending to households increased by almost 118% and to domestic businesses by more than 42% (Central Bank of Iceland, 2005b). Part of the surge in domestic lending over the past twelve months is explained by the commercial banks' entrance into the mortgage loan market – new borrowing was largely deployed on prepayment of existing loans from the Housing Financing Fund (HFF). Foreign lending has also soared, from 7% of total DMB (parent) lending at the end of June 2003 to 20% at the end of June 2005 (FME, 2005).

This surge in lending has put upward pressure on interest rates, both through greater upward pressure on the supply of króna funding and because the resulting inflation has pushed up nominal interest rates, not least due to a tightening of the monetary stance with policy rate hikes. However, international interest rates have remained low, so the interest-rate differential with abroad has been rapidly widening.

### Drivers of bond issuance

Króna Eurobond issues have therefore been spawned by buoyant domestic credit demand, which has driven up interest rates and the exchange rate, at the same time as international interest rates are low and investors are prepared to break new ground in their quest for higher yields.

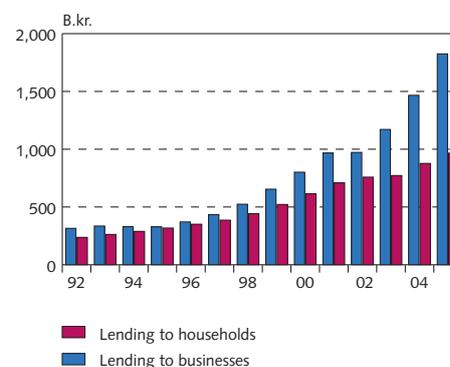
Chart 3  
Current account balance 1995-2005<sup>1</sup>



1. Central Bank forecast for 2005.  
Source: Central Bank of Iceland.

Chart 4  
Lending to households and businesses  
1992-2005<sup>1</sup>

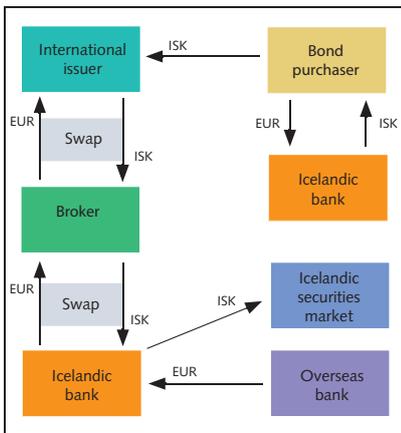
Outstanding lending to households and businesses  
at year-end



1. Classifications were revised in 2003. Figures for 2005 are for the end of June.  
Source: Central Bank of Iceland.

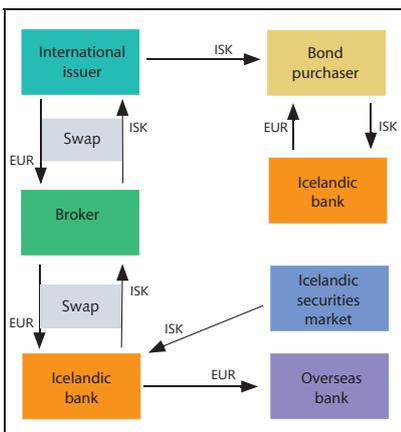
## Box 1 Structure of króna-denominated Eurobond issues<sup>1</sup>

Chart 1  
Króna Eurobond issue  
Payment flow on issuance



Source: Central Bank of Iceland.

Chart 2  
Króna Eurobond issue  
Payment flow on maturity



Source: Central Bank of Iceland.

The following is a brief account of the structure of króna-denominated Eurobond issues. The process is broken down into a number of steps, but it should be noted that certain stages of the transactions may entail several steps at once.

### Step 1

The international issuer issues Eurobonds denominated in Icelandic currency. All issues hitherto have been coupon bonds in which the principal is paid in a lump sum on maturity and interest is paid at intervals of, for example, six months. These bonds carry a lower yield than is available to the Icelandic Treasury on comparable issues in the domestic markets, based on the nominal yield curve. When foreign investors purchase the bonds they must convert foreign currency into Icelandic krónur in the domestic FX market.

#### Outcome:

International issuer: Has a fixed-interest liability in Icelandic currency and receives the amount of the issue in Icelandic currency.  
International investor: Holds an asset in the form of a fixed-interest liability in Icelandic currency. Bears the currency risk.

### Step 2

An international broker makes a currency swap with the international issuer converting the latter's króna-denominated liability to a liability denominated in foreign currency. The broker receives the amount of the bond issue in Icelandic currency and presents the issuer with the equivalent amount in foreign currency. At the same time the broker pays the issuer fixed interest in Icelandic currency in return for floating interest (based on LIBOR rates), plus/minus a fixed margin, from the issuer.

#### Outcome:

International issuer: Has a liability denominated in foreign currency on which it pays a variable LIBOR interest rate, and receives the issue amount in foreign currency.  
International broker: Holds a fixed-interest liability denominated in Icelandic currency and a foreign currency-denominated claim at variable interest plus/minus a fixed margin. Retains the equivalent amount of the issue in Icelandic currency.

### Step 3

The international broker makes a reverse currency swap with an Icelandic bank, matching the swap with the foreign issuer. However, the broker does not need to hedge his position in full, i.e. he can opt to retain part of the exposure on his books.

1. This Box on the structure of króna-denominated Eurobond issues was written by Haukur Benediktsson, economist at the Central Bank of Iceland's International Department and lecturer at the University of Iceland Faculty of Economics and Business Studies.

*Outcome:*

International broker: If he makes a full hedge, his net exposure is zero, i.e. the currency swaps with the international issuer and Icelandic bank balance each other.

Icelandic bank: Holds a fixed-interest liability denominated in krónur and a foreign currency-denominated claim at variable interest plus/minus a fixed margin. Retains the equivalent amount of the issue in Icelandic currency.

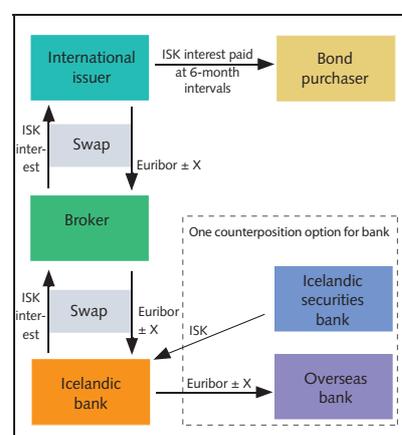
**Step 4**

The Icelandic bank borrows foreign currency at variable interest rates plus a fixed margin, thereby creating a foreign currency-denominated liability against its claim on the international broker under the swap agreement. This minimises the Icelandic bank's currency risk. Under the swap agreement, the Icelandic bank holds a fixed-interest liability denominated in krónur and retains the equivalent amount of the issue in that currency. To hedge that risk, the Icelandic bank can purchase Treasury notes in the domestic securities market (i.e. create a króna-denominated asset) and use the interbank króna market to fine-tune the króna cash flow. The structure of the domestic bond market and interbank króna market make it virtually impossible for the Icelandic bank to hedge the deal in full, i.e. it assumes some interest rate risk. Also, the Icelandic bank may simply regard the króna-denominated liability which it holds under the swap agreement as a cheap source of funding in krónur – certainly cheaper than would be available by a direct issue of króna bonds in the domestic bond market. In other words, the Icelandic bank lends the equivalent of the issue in krónur on fixed interest terms.<sup>2</sup>

*Outcome:*

Icelandic bank: The currency risk is minimised because the bank holds counterpositions in the foreign currency. The Icelandic bank can opt to hedge its króna-denominated liability to some or a large extent, but some interest rate risk could develop.

Chart 3  
Króna Eurobond issue  
Interest payments



Source: Central Bank of Iceland.

2. In fact, the bank could lend krónur on variable interest terms and offer other customers an interest rate swap under which they would be paid variable interest in Icelandic currency but pay fixed interest. This could be a worthwhile risk in a climate of rising interest rates.

## Who gets what?

Most issuers of króna Eurobonds are international financial institutions with high ratings from international credit agencies. On first impression it would seem paradoxical for them to issue bonds denominated in Icelandic currency to fulfil their need for foreign capital, but there are rational explanations for their behaviour

On the strength of their reputations, well known financial institutions with high credit ratings can issue króna bonds at lower interest rates than are offered in the Icelandic market. However, even though the rates are lower than in the domestic bond market they are much higher than in most international markets, which attracts foreign investors who are prepared to trade with familiar partners and assume the accompanying currency risk. While they could invest directly in the Icelandic bond market at higher interest rates, they probably prefer to deal with known names with high credit ratings within an international regulatory framework instead of making the effort involved in learning about the Icelandic bond market and its own regulatory structures.

By issuing bonds at lower interest rates than are on offer in the Icelandic market, the issuer can procure Icelandic currency more cheaply than local borrowers. Consequently, the issuer can offer krónur to Icelandic banks at lower interest rates than are available to them in the domestic market.<sup>12</sup> In return, the issuer asks for the currency he really lacks, e.g. euros. Interest rates in these swaps lie somewhere between the bond yield and the domestic market rate, so that both the issuer and the Icelandic bank profit on the deal. The Icelandic bank then procures the euros required by the issuer by borrowing abroad at current market rates.

In effect, the issuer and the Icelandic bank borrow in the respective markets where they enjoy a *comparative advantage* and split the gains. Even if the Icelandic bank has to pay a higher rate of interest to borrow euros than the issuer could obtain, this margin is crucially less than between the issuer's rates for króna bond issuance and those available to the Icelandic bank in the domestic market. Both parties end up with the desired currency at less cost than if they had taken loans directly denominated in it. The reason is the end-investors' confidence in the issuer, and the character of the issue structure, which leaves the currency risk with the end-investor.

Icelandic banks therefore obtain less expensive funds in krónur than are available to them domestically. The banks can use the funding for investments, on-lending to domestic borrowers or refinancing of existing debt which is on less favourable terms. Because of the small size of Icelandic bond classes with a similar maturity to the international issues, Icelandic banks only have limited scope for hedging against interest rate risk through that channel. Another option is to lend the domestic currency in the interbank króna market. Buoyant domestic demand for credit should make it easy for banks to on-lend the krónur in Iceland, at interest rates determined by domestic credit supply and

12. In most cases an international securities trader brokers the deal between the issuer, the Icelandic bank and the end-investor. Because this intermediate stage has no major effect on the main process it is omitted from this example. See further Box 1.

demand. Many of the banks' customers are likely to be willing to convert older floating-rate loans to nominal loans at fixed interest rates and thereby take a position in interest rates based on expected further increases in the policy rate.

The banks' arbitrage on international króna bond issues depends on the margin between interest rates in swaps with the issuer and the interest they can earn by investing the krónur in Iceland or lending them on to domestic households and businesses. Competition among Icelandic financial institutions then determines how large a share of this arbitrage is passed on to the banks' customers in the form of lower lending rates.

As mentioned above, the end-investor is attracted by high interest rates in Iceland. The issue broker often profiles Iceland strongly as a booming economy with high foreign investment inflows where a tighter monetary stance will maintain the strength of the domestic currency. Nonetheless, the end-investor can hedge against exchange rate volatility, which they do to some extent, according to information from issue brokers. In this context, it is noteworthy that the share of total Treasury bond portfolios held by foreign investors has increased recently and now amounts to around 30%. If this information is correct, however, it is rather surprising that the end-investor should buy foreign bonds denominated in krónur at lower rates of interest than are available domestically, then invest in domestic bonds as a hedge against currency risk.

### **In a nutshell**

In a nutshell, the essence of the process is that two financial institutions take part in bond issuance to finance their lending. One is a recognised international institution which needs to fund its lending in foreign currencies, and the other is an Icelandic bank that needs to fund its lending in domestic currency. Instead of each institution borrowing in the currency that it requires, they agree to lend in the currency that the other needs, then perform a swap in order to procure cheaper funding than otherwise.

The preconditions for this process to function are the existence of demand for the international institution's bonds among investors who are prepared to take a currency risk, and likewise the existence of strong demand for króna-denominated loans in the domestic market. Demand from foreign investors is likely to persist for as long as they expect Iceland's interest-rate differential with abroad (especially with the investors' home country and the countries where they normally invest) to remain wide enough that movements in the exchange rate of the króna do not erode their profit. Demand for króna loans in the domestic market, on the other hand, is determined by aggregate demand in the Icelandic economy and the cyclical position. Changes in end-investors' expectations regarding (i) interest rate developments both in Iceland and internationally, (ii) the exchange rate of the króna and (iii) economic growth developments in Iceland can therefore halt, reduce or increase international issuance of króna bonds.

Before attempting to assess the impact of these bonds issues on Iceland's capital markets and aggregate economy, as well as on Cen-

tral Bank of Iceland monetary policy, it is worthwhile to examine the experience of New Zealand.

## The experience of New Zealand

New Zealand has some twenty years' experience of offshore issuance of bonds denominated in New Zealand dollars. Issuance has peaked three times when the interest-rate differential with abroad has been at its widest, in 1985-1987 and 1996-1998 and since 2002. Volume has increased between these periods and is now at a historical peak. Current offshore issuance exceeds the volume of New Zealand Treasury bonds, but the secondary market is much smaller. Issuers have mostly been international development banks and securities houses.

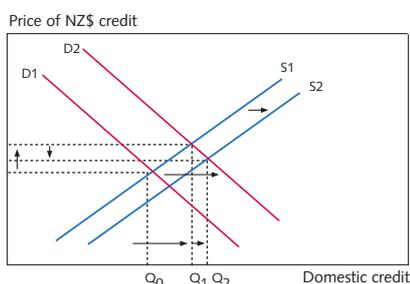
### An informative comparison for Iceland

New Zealand's experience provides an informative comparison for Iceland, since both are small, open economies which have undergone major structural reforms over the past decades.<sup>13</sup> Like Iceland, New Zealand is on an inflation target with a floating exchange rate, and is currently experiencing economic imbalances of a similar character. The New Zealand economy is presently characterised by a strong domestic currency, widening current account deficit, strong inflationary pressures, soaring private consumption, inflated asset prices and monetary tightening.

New Zealand's capital markets are considerably more developed than Iceland's and within it are various institutions which play a significant role in the offshore bond issuance process. Most important are a deeper market for Treasury bonds and swaps.<sup>14</sup> However, it should be pointed out that four Australian banks form the backbone of the New Zealand banking system.

Economists at the Reserve Bank of New Zealand have studied the impact of offshore bond issues on the capital markets and the aggregate economy. Their findings are particularly thought-provoking for Iceland.<sup>15</sup>

Chart 5  
Supply and demand for New Zealand dollar credit



D1 to D2: Increase in demand for NZ\$ credit (e.g. housing boom)  
S1 to S2: As offshore investors gain access to NZ\$ market, supply of credit increases  
Source: Drage et al. (2005)

### Impact on interest rates and the current account deficit

The Reserve Bank of New Zealand underlines that offshore bonds are best understood as a part of the process of capital market integration. If credit demand causes an imbalance between domestic savings and investment, domestic interest rates rise above world interest rates, which enables the economy as a whole to invest more than it saves by borrowing from non-residents. The current account deficit, i.e. the difference between national savings and national investment, is then met by an inflow of foreign savings, attracted by higher interest rates than are available elsewhere.

13. Evans et al. (1996) present an overview of structural reforms in New Zealand over the period 1984-1995.

14. Briggs (2004) and Woolford et al. (2001) discuss the importance of swaps for the New Zealand economy.

15. This discussion of the experience of New Zealand is based on Drage et al. (2005), Eckhold (1998), Woolford et al. (2001) and information provided by Anella Munro, Senior Economist at the Economics Department of the Reserve Bank of New Zealand.

**Table 3 Comparison of international bond issues in local currencies of New Zealand and Iceland**

	<i>New-Zealand</i>	<i>Iceland</i>
Outstanding international bond stock in November 2005	1,958.5 b.kr – 30% of GDP	114.75 b.kr – 13% of GDP
Average maturity of bonds <sup>1</sup>	Almost 4 years	1.7 years
Issuance began	1985	2005

1. Maturity of bonds has lengthened between the peaks and average maturity of Eurokiwi bonds in the most recent wave is almost five years. Almost all Uridashi bonds have a maturity of two to three years.

Sources: Drage et al. (2005), Reserve Bank of New Zealand (2005b).

Offshore bond issues in New Zealand dollars increase the available supply of credit<sup>16</sup> and let it balance with demand at a lower interest rate, see Chart 5. This downward pressure on domestic interest rates stimulates investment, which in turn widens the current account deficit by driving the gap between domestic saving and investment even wider.

In the absence of bond issues, greater domestic demand for credit would have to be met by increased domestic saving, requiring higher interest rates. A rise in interest rates would boost domestic saving and reduce the current account deficit.

Thus the effect of issues is to bring down interest rates, extending the period for which domestic lending and investment can grow. In the long run, however, the economy is likely to slow down and the current account deficit trend towards balance. The downward pressure on interest rates from bond issues cannot – any more than monetary policy – contribute to stable growth in excess of long-term potential output.<sup>17</sup>

### Exchange rate effects

In theory, bond issues put upward pressure on the local currency at issuance and downward pressure at maturity, but extensive research at the Reserve Bank of New Zealand has not produced statistically significant evidence of this at either stage. In their view, any effect is likely to be either small, temporary or, consistent with forward-looking expectations, priced in well before the maturity date.

Theoretical exchange rate relationships are notoriously difficult to confirm empirically. Effects of upward and downward pressures on the exchange rate may be only short-lived, e.g. for part of a day or several days, without being captured in monthly data, but these cases would obviously have a minor economic impact. Another possibility is that the effect is negligible compared with other news to which the market reacts. Finally, time series regressions may be an inappropriate method for discerning the impact of forward-looking expectations.

16. However, offshore bonds are not viewed as a capital inflow in the balance of payments accounts, but as a hedge, typically in the form of borrowing in foreign currency by New Zealand banks. This does not alter the fact that available credit supply increases.

17. Pétursson (2001a) explains how monetary policy has no impact on real aggregates in the long run.

The Reserve Bank of New Zealand has found that the exchange rate impact of issuance has proved much less than was feared. Interestingly, large volumes of Eurokiwi maturities around the turn of the millennium do not appear to have had adverse effects. The concentration of approaching maturities potentially represents a point of vulnerability, however, and the Reserve Bank of New Zealand will continue to monitor developments closely (see Drage et al., 2005).

### Impact on financial stability

New Zealand ranks among the most indebted of the developed countries. Its net international liabilities have been mounting over the past three decades and are now equivalent to 84% of GDP. While the bulk of external debt is denominated in foreign currencies, New Zealand stands out from many other indebted countries because a substantial part is hedged. Offshore issues in local currency have increased foreign investors' appetite for owning assets in New Zealand dollars and provide a hedge for foreign currency-denominated debt, through swaps between New Zealand banks and issuers (see Woolford et al., 2001). For example, a significant depreciation of the New Zealand dollar increases foreign debt service, other things being equal. However, if foreign debts are hedged in New Zealand dollars by swaps between offshore issuers and New Zealand banks, the depreciation has a correspondingly much smaller impact on debt service. Roughly half of New Zealand's debt is denominated in foreign currencies, but most of this is hedged. The NZ\$ 24 b. in Eurokiwis outstanding in March 2005 provided hedging for 30% of the country's foreign currency debt (see Drage et al., 2005). Such hedging provides a degree of financial stability.<sup>18</sup>

### Bond yields

The Reserve Bank of New Zealand also studied the ex post returns on all offshore bonds in New Zealand dollars maturing in 2004. The ex post returns exhibited much volatility, ranging between -5% and 24%, but averaged 4.1%, virtually the same as German Treasury bond yields for the same period. This indicates that the risk is underpriced. Ex post returns appear to be determined mainly by exchange rate movements rather than coupon rates (see Drage et al., 2005).<sup>19</sup>

## Impact of issuance on financial markets

In Iceland, the financial markets have been radically transformed over the past two decades in tandem with trade liberalisation, an enhanced monetary and fiscal framework and global integration of domestic businesses. The exchange rate, interest rates and securities prices are now all determined in active markets. Important submarkets have been boosted by increased turnover, strong financial institutions and participation of non-residents. Nonetheless, Iceland's financial markets

18. A more detailed discussion of the impact of offshore issues on financial stability is found in Woolford et al. (2001) and in the Reserve Bank of New Zealand's recent *Financial Stability Report*. See in particular Box 3 on pp. 20-21, which also reports that the outstanding bond stock now amounts to NZ\$ 45 b. (Reserve Bank of New Zealand, 2005b).

19. It should be pointed out that bonds issued in 1996-97, on which yields were very poor, are a major determinant of this outcome. See Drage et al., (2005).

are still relatively underdeveloped compared with those of developed countries on both sides of the Atlantic, because turnover remains comparatively low, there are few participants and certain financial products are little used.<sup>20</sup> What effect has international issuance of króna bonds had on Icelandic financial markets? What is the possible long-term impact? Let us first examine several submarkets.

### Interbank market for domestic currency

An organised interbank market for domestic currency has operated in its current form since 1998. The market performs an important role in liquidity management by commercial banks and savings banks, and in general interest rate formation in the money markets. Financial institutions participating in the market can provide or procure capital there. Interest rates indicate the liquidity position in the interbank market, being high when liquidity is tight and low when it is abundant. Central Bank rates for overnight lending and deposits in its current accounts form a floor and ceiling for interbank market interest rates, so the position of the yield curve within that range also indicates market liquidity. Since interbank market rates are important for pricing of certain financial products, such as derivatives, they act as key components in general market interest rate formation (see Kristinsson, 2002).

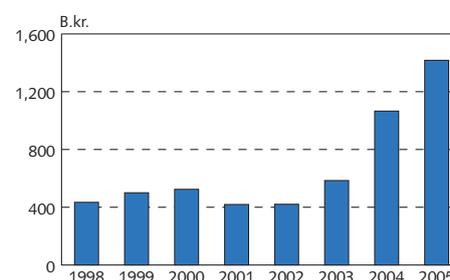
Consequently, the interbank market is an important channel for monetary policy transmission. A rise in the policy rate is generally transmitted almost simultaneously to interest rates in the interbank króna market where short-term instruments with a maturity of up to twelve months are traded (see Pétursson, 2001a).

By putting downward pressure on interbank market rates, króna Eurobond issuance can thereby hamper the transmission of Central Bank policy rate rises in the money markets. One possible counter-position available to Icelandic banks for their short swaps with króna Eurobond issuers is to lend domestic currency in the interbank market at a similar length to the maturity of the bonds. The impact of bond issuance should therefore mainly be reflected at the longer end of the interbank yield curve.

Chart 8 shows the yield curve of interbank market interest rates compared with just over a week earlier, before the announcement of the Central Bank policy rate hike at the end of September, and on November 21. The shape of the curve has clearly changed since Eurobond issuance began. In spite of expectations about a further policy rate hike, longer interbank market rates trend downwards, and on November 21 they are lower at the longer end than the shorter. This is a clear sign of abundant liquidity in the market, and a likely explanation is króna inflows in connection with bond issues.

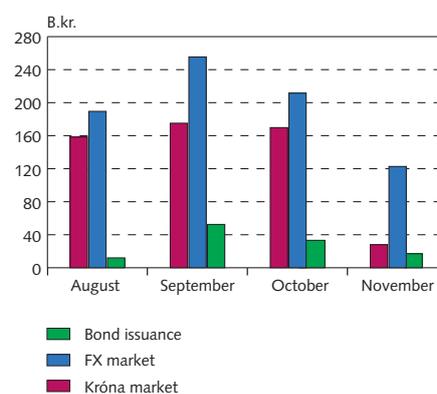
Charts 6 and 7 show that turnover in the interbank króna market has surged since króna Eurobond issues were launched at the end of

Chart 6  
Turnover in the króna market 1998-2005<sup>1</sup>



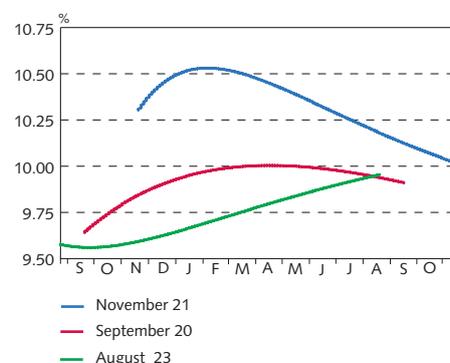
1. The value for 2005 is until November 14 inclusive.  
Source: Central Bank of Iceland.

Chart 7  
Króna Eurobond issues and turnover in the interbank FX and króna markets<sup>1</sup>



1. Data until November 11 inclusive.  
Sources: Central Bank of Iceland, Reuters.

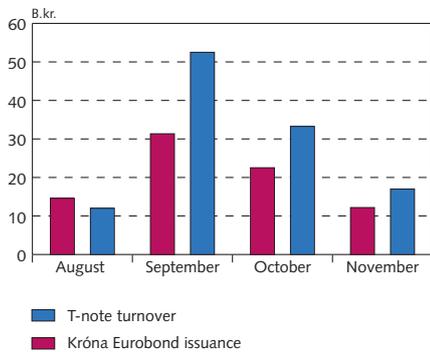
Chart 8  
Yield curve on króna market



Source: Central Bank of Iceland.

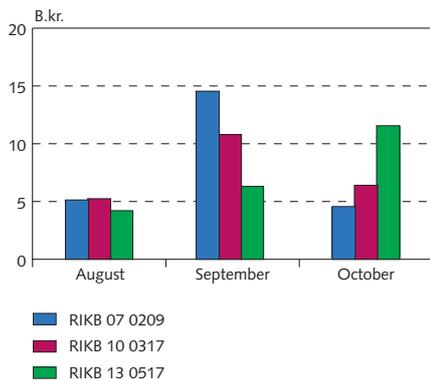
20. In a box appended to its Staff Report for the 2005 Article IV Consultation, the IMF compared the Icelandic banking sector and stock market with those of other Nordic countries. The IMF found that while Iceland's banking sector is quite active when compared to other Nordic countries, the stock market is not. The IMF therefore puts Iceland in the category of bank-based economies, while Denmark and Sweden, for example, are market-based economies where it is much easier for companies to raise equity on stock exchanges (IMF, 2005c).

Chart 9  
Turnover of Treasury notes and króna  
Eurobond issuance August-November 2005<sup>1</sup>



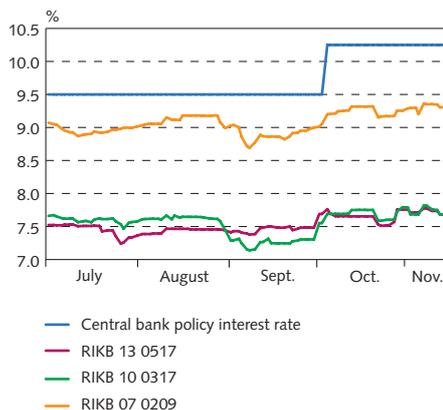
1. Data until November 14 inclusive.  
Sources: Iceland Stock Exchange (ICEX), Reuters,  
Central Bank of Iceland.

Chart 10  
Turnover of T-note classes  
August-October 2005



Sources: Iceland Stock Exchange (ICEX), Reuters.

Chart 11  
Interest rate developments on T-notes and  
the policy rate July-November 2005<sup>1</sup>



1. Data until November 11 inclusive.  
Source: Central Bank of Iceland.

August. In this respect, international bond issues have deepened the interbank market, as discussed in the chapter on *Financial markets and Central Bank measures* in this edition of *Monetary Bulletin*.

### Bond market

The bond market is Iceland's largest financial submarket and has expanded substantially in recent years. Central and local governments, corporations and households tap credit in it. Market capitalisation of bonds and notes amounted to 953 b.kr at the end of 2004 and market turnover was roughly 1,500 b.kr. that year, with Housing Financing Fund (HFF) bonds, housing bonds and housing authority bonds accounting for around two-thirds, see Table 4.

Króna Eurobond issuance has spurred demand from international securities houses, which broker the issues, for swaps with Icelandic commercial banks, which convert the issuer's liabilities in krónur into foreign floating interest rates. Counterpositions available to the Icelandic banks in these swaps include investments in nominal bonds of a similar maturity in the domestic market. In most cases the Eurobonds have a maturity of one to two years, so Treasury notes are the only instruments in the domestic market with a similar lifetime.

Table 4 Turnover on Iceland Stock Exchange (b.kr.)

	2000	2001	2002	2003	2004
Bank bills	40.1	32.2	69.9	51.4	43.1
Equities	198.8	138.3	321.3	553.6	721.4
Housing bonds	132.1	218.8	319.2	506.5	366.8
HFF and housing authority bonds	42.4	87.1	110.7	143.1	602.1
Treasury notes	25.3	108.0	133.2	149.8	269.1
Treasury bills	34.3	32.5	48.4	79.8	84.5
Treasury bonds	48.3	122.6	103.4	78.3	107.7
Total	521.4	739.6	1,106.3	1,562.4	2,194.7

Source: National Debt Management Agency (2005).

Treasury notes are non-indexed instruments issued by the National Debt Management Agency (NDMA) on behalf of the Treasury. Three classes are currently listed on Iceland Stock Exchange (ICEX): RIKB 07, RIKB 10 and RIKB13. As a small T-note class relative to international issues, it can only provide counterpositions for a small part of them. The impact of international issues and accompanying swaps is clearly reflected in secondary market trading with T-notes, especially RIKB 07 and RIKB 10 in September and RIKB 13 in October following Kommunalbanken's five-year króna bond issue, see Chart 10. Interest rates plunged likewise during the month, see Chart 11. However, they rose again in October following the Central Bank's policy rate hike and expectations of a tighter monetary stance in the near future.

Chart 12 compares the nominal yield curve before króna Eurobond issues commenced, just over a week before the Central Bank's policy rate hike was announced in September and on November 21. The shape of the curve changes markedly after issuance began and demand for RIKB 07 and RIKB 10 increased, as shown by the much

lower position of most of the curve for September 20 compared with August 23. Apparently, the 0.75 percentage-point rise at the end of September and strongly worded declaration about a tighter monetary stance managed to shift the entire yield curve to above the position before issuance began.

### Interbank FX market

The exchange rate of the króna has been determined by supply and demand in the interbank FX market since 1993, and without intervention by the Central Bank since March 2001 when Iceland moved onto an inflation target and the króna was floated. The market performs a vital role in facilitating and managing currency flows between buyers and sellers and its importance has grown with higher levels of international trade, full deregulation of cross-border capital movements and the currency float. However, Iceland's FX market has always been very thin, with low turnover and few participants. Thus a small trade can often have a disproportionate effect on currency prices.

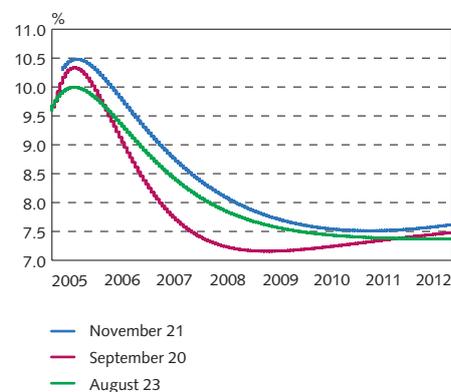
The exchange rate of the króna has been at a historical peak recently. As mentioned above, this is because of a tighter monetary stance to counter demand pressures in the economy. The króna has continued to appreciate after króna Eurobond issues were launched. The exchange rate index stood at 109 before issuance began and is at 103 at the time of writing, after moving as low as 100.6. In the meanwhile, the policy rate has been raised by 0.75 percentage points and the Central Bank has pledged "a tight monetary stance for longer than expected" – both factors which ought to contribute to a strengthening of the króna. Accordingly, the respective impacts of Central Bank monetary policy and króna Eurobond issuance are difficult to distinguish. The relationship between monetary policy and the exchange rate will be examined more closely below.

Turnover in the FX market this year has been brisk at roughly 1,600 b.kr., which is double the volume in 2004, and has soared to 200 b.kr. per month or more after króna Eurobonds were first issued at the end of August, see Chart 7. The three commercial banks report that they have made swaps with non-residents for almost 100 b.kr., which could indicate that the bulk of Icelandic currency connected with the issue has been fed into the domestic market, contrary to recent claims that the international brokers acting on behalf of issuers are keeping open positions in interest rates. However, all this is difficult to ascertain.

### Stronger Icelandic financial market infrastructure

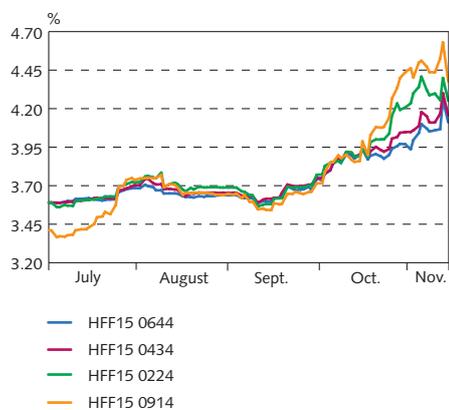
The interbank króna and FX markets have deepened following the Eurobond issues, with a marked jump in turnover. Foreign investors have also added substantially to their króna-denominated portfolios as a result of these issues; until this time, Iceland had not managed to drum up serious interest in its local currency bonds. Icelandic commercial banks have gained a new option for cheaper funding in krónur than if their own credit supply had been confined to the domestic market. Customers will probably benefit in the form of lower interest rates and more diverse credit products. Issuance has therefore strengthened

Chart 12  
Nominal yield curve



Source: Central Bank of Iceland.

Chart 13  
Interest rate developments on HFF bonds  
July-November 2005<sup>1</sup>



1. Data until November 14 inclusive.  
Sources: Iceland Stock Exchange (ICEX), Central Bank of Iceland.

Iceland's financial market infrastructure and is likely to spell narrower interest rate margins and risk premia in the long run. Deeper financial markets bolster the yield curve and are likely to sharpen competition between domestic banking institutions and boost the use of previously neglected financial products.

It will be interesting to see whether bond maturities lengthen as international issuers acquire greater knowledge and experience of Icelandic financial markets, as has been the case in, for example, New Zealand. Norway's Kommunalbanken is so far the only issuer of króna bonds with a maturity of five years.

## Economic impact of bond issuance

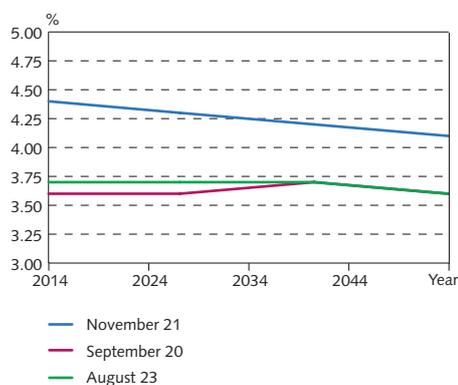
Iceland's experience of króna Eurobond issuance is still very short. None of the issues are close to maturity, so their economic impact can only be ascertained to a limited extent. A more relevant question is whether there is any reason to expect the impact of international bond issues in local currency to differ in principle between Iceland and New Zealand. This requires an evaluation of the effect of specifically Icelandic factors, in particular the shallowness of financial markets and their division into nominal and indexed bonds. Exchange rate volatility, on the other hand, is by no means more than in New Zealand.<sup>21</sup>

### Interest rates

As demonstrated above, króna Eurobond issues have exerted downward pressure on domestic interest rates. They have gone down at the longer end of the interbank market spectrum and yields on bonds with a similar lifetime dropped when international issues were launched, although the policy rate hike subsequently shifted them up again. Nominal interest rates are therefore lower now than if issuance had not begun. Issuance has clearly not prevented the rise in policy rate from being transmitted to nominal interest rates, but it is less than otherwise. In the current climate, króna Eurobonds have therefore dampened the effectiveness of Central Bank monetary policy across the yield curve, as discussed later.

The Icelandic bond market consists largely of indexed bonds and long-term indexed interest rates are most important for households and businesses. Chart 13 shows the interest rate development of HFF bonds since July 2005. Chart 14 compares the yield curve of HFF bonds before international issuance began, just before the announcement of the September policy rate hike and on November 21. Both charts reveal that monetary tightening is finally beginning to pass through to the indexed yield curve. The CPI measurement in November reinforced the increase in yields. Also, the strength of the króna has encouraged foreign investors to close their positions in indexed bonds. HFF bond turnover has reached record levels recently and yields have risen substantially. Since increases have been more pronounced at the shorter end than at the longer end, the indexed curve now trends downwards after being almost continuously flat for a whole year. In the very last

Chart 14  
Indexed yield curve



Source: Central Bank of Iceland.

21. A comparison of fluctuations in the level of production, inflation, interest rates and exchange rates in the two countries is made in Pétursson (2004).

few days, indexed mortgage lending rates have gone up, following an increase announced by Landsbanki Íslands and an HFF bond auction.

The probable impact of króna Eurobond issues on long-term indexed rates is difficult to predict. They will be determined by the impact that issuance has on market expectations about the future development of short-term interest rates and inflation. Assuming sticky prices and normal substitution between indexed and nominal bonds, a change in short-term nominal rates should cause indexed rates to move temporarily in the same direction.<sup>22</sup> Market expectations concerning monetary policy measures and their credibility therefore have a significant effect, as discussed later.

### Exchange rate

The króna has appreciated in step with the tighter monetary stance, and apparently even more as a result of króna Eurobond issues, see Chart 15. Does this imply that international issuance could affect the króna more than it does the New Zealand dollar, for example because of Iceland's thin FX market? Or is this an overshoot which will eventually be reversed? Can a substantial depreciation of the króna be expected as the bonds reach maturity? All these questions hinge on a single key issue: What determines the exchange rate of the króna?<sup>23</sup>

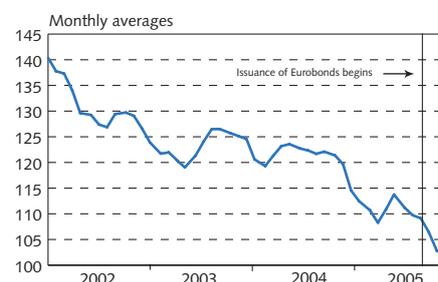
Explaining the determinants of exchange rates has long been a major challenge in economic theory, and although various hypotheses have been proposed about the relationship between the exchange rate and other fundamentals, especially interest rates, extensive research in recent decades has not succeeded in establishing their validity. Exchange rate economics abounds in puzzles that researchers are attempting to solve.<sup>24</sup> More than twenty years ago, Meese and Rogoff (1983) demonstrated that no exchange rate model could produce a better forecast than the simple hypothesis that the current exchange rate provides the best forecast of the future rate, i.e. a random walk. For all their efforts, economists have not managed to improve on this finding.

### The asset price approach

According to the asset price approach to the exchange rate, the price (i.e. exchange rate) of the króna should reflect market expectations of the future gain from holding assets denominated in krónur relative to another currency. Primarily, those expectations are determined by the interest-rate differential with abroad adjusted for risk premium and expected exchange rate movements.

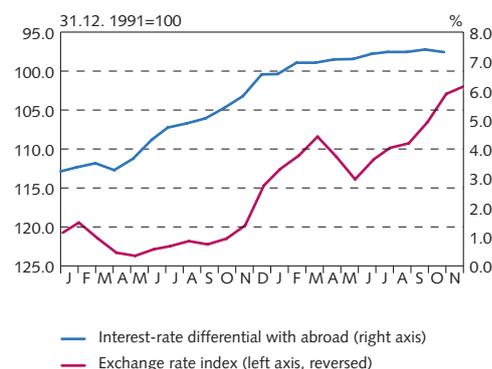
If market expectations are forward-looking, exchange rate developments will be determined by both the *size* of the interest-rate differential with abroad and its *duration*. However, if market agents assume an unchanged exchange rate in line with Meese and Rogoff,

Chart 15  
Exchange rate index 2002-2005<sup>1</sup>



1. Data until November 16 inclusive.  
Source: Central Bank of Iceland.

Chart 16  
Exchange rate and interest-rate differential with abroad 2004-2005<sup>1</sup>



1. Differential between twelve-month rate on domestic money market bills and comparable foreign securities.  
Source: Central Bank of Iceland.

22. See further Pétursson (2001a and b).

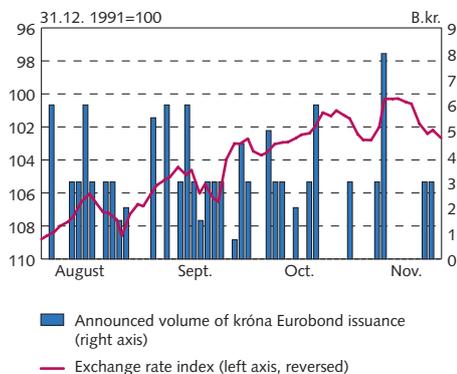
23. Determinants of exchange rates of currencies are discussed in more detail in *Monetary Bulletin* 2001/4, Box 3, 24-26.

24. The main puzzles are the exchange rate disconnect puzzle, purchasing power parity puzzle and forward bias puzzle. Sarno (2005) provides a good overview of the main puzzles in exchange rate economics and advances made towards solving them.

Chart 17

Exchange rate index and announcements of  
króna Eurobond issuance

Daily data August 24-November 14, 2005



Source: Central Bank of Iceland.

the *sign* of the interest-rate differential will prove crucial, and they will invest in króna-denominated assets as long as this remains positive, see Chart 16. If this is the case, short-term interest rates will weigh more heavily compared with forward-looking expectations in determining the exchange rate of the króna.

### The exchange rate of the króna and Central Bank monetary policy

If short-term interest rates are crucial for exchange rate developments, this prompts the question: What determines short-term interest rates? Monetary policy can obviously have a significant effect on short-term rates and there will be a differential with abroad if Iceland's stance differs from elsewhere. This encourages investors to switch their investments to the currency where interest rates are higher and maintain them until the arbitrage disappears. If the market is convinced that the Central Bank will keep short-term rates high, interest rates will not adjust when investors buy króna-denominated bonds. The adjustment to uncovered exchange rate parity will therefore take place through exchange rate movements.

Market expectations about short-term interest rate trends in Iceland and internationally are therefore a major determinant of how the exchange rate of the króna will develop. In turn, these expectations are shaped by expected inflation developments in Iceland and abroad, which determine the monetary stance. In historical terms, monetary policy has been accommodative in much of the world over the past two years, and since it coincides with surging domestic demand in Iceland which has forced the Central Bank to raise its policy rate, this has driven an almost unbroken appreciation of the króna. Króna Eurobonds, by fuelling demand for krónur when they are issued, and the Central Bank's strongly worded messages about tight monetary policy for longer than has been expected, have reinforced this development, but the extent to which international issues account for the appreciation is difficult to establish.

It is important to realise that although the short-term interest-rate differential with abroad is a major driver of the exchange rate of the króna and that the Central Bank of Iceland's monetary policy has a strong effect on it, this does not imply that the Central Bank can manage the exchange rate. Central Bank monetary policy is shaped by underlying inflationary pressures in the economy. If market agents consider that the Bank's monetary policy is at odds with its announced target, they will not expect the long-term yield curve to have changed unless they also believe that the Bank has access to information unknown to them, or that its measures represent a fundamental change in policy. For example, if they deem a policy rate hike excessive, they will expect lower interest rates in the future, as the only way to attain the inflation target. Thus their expectations about the profitability of investing in krónur should not change much, and the exchange rate will remain virtually unchanged.<sup>25</sup>

25. Box IX-1 on p. 46 in this edition of *Monetary Bulletin* demonstrates the importance of distinguishing between the part of the wider nominal interest-rate differential that entails a rise in real interest rates, and the part reflecting higher domestic inflation relative to abroad. This is necessary because it is not certain that a wider interest-rate differential with abroad will suffice to offset high domestic inflation relative to inflation abroad.

### Key role of expectations in exchange rate developments

It is not easy to pinpoint the methods that international issuers of króna bonds and potential investors use to forecast the exchange rate development of the króna. They are probably diverse, with some assuming an unchanged interest rate and others taking account of other factors such as inflation developments, interest rate movements in Iceland and abroad, economic growth forecasts, declarations by monetary authorities, etc. All these factors are likely to affect plans by króna Eurobond issuers. Any news which may influence market expectations can also affect the exchange rate of the króna, just like ordinary securities prices. This is precisely how the asset price approach explains short-term volatility in FX markets.

Perhaps it is not surprising that exchange rate developments are difficult to explain by modelling, since market expectations about so many factors are crucial. Expectations are liable to change quickly, many factors may affect sentiment and herd behaviour is common in FX markets. A tightening of monetary policy abroad, an improved domestic inflation outlook, movements in international capital markets and fears that the króna is too far from its equilibrium value are only a few of the factors that may alter market expectations and have a decisive effect on the exchange rate of the króna, and thus on króna Eurobond issuance.

The outlook is for higher interest rates in the euro area, where inflation prospects have deteriorated. In the US, the Federal Reserve has already raised its federal funds rate by three percentage points since its monetary policy was most accommodative in 2003. The Bank of Canada has likewise hiked its key rate. At the same time, the Central Bank of Iceland has said its monetary stance is likely to be tightened. The question is therefore how Iceland's interest-rate differential with abroad will develop if monetary policy is tightened on both sides.

International experience shows that offshore bond issuance is primarily a cyclical phenomenon and generally peaks when the interest-rate differential is wide, the currency is strong in historical terms and domestic credit demand is robust. Also, while there are indications that króna bond issues may make the currency more volatile, the experience of New Zealand shows that this can also take place smoothly.

### Impact of issuance on the Central Bank's monetary policy

Price stability is the main objective of the Central Bank of Iceland, defined as a twelve-month rise of 2½% in the CPI. Another objective is promoting an efficient and safe financial system, including payment systems domestically and with foreign countries. This has become an increasingly prominent central banking task in recent years, in response to the deregulation of cross-border capital movements. Króna bond issuance affects both objectives. The following discussion is largely confined to monetary policy.

### Increased pressure on the exchange rate channel

The transmission mechanism of monetary policy describes how Central Bank policy rate changes pass through the economy to affect

household and business decisions on consumption and investment, and thereby aggregate demand, inflation expectations and, finally, inflation. The mechanism is complex, rife with uncertainties and liable to change in step with macroeconomic conditions at any given time, partly because household and business expectations weigh so heavily. Major structural changes in recent years have altered the transmission mechanism, while the economy is obviously so imbalanced at present that historical experience provides very limited guidance. Thus it is difficult to assess the impact of króna Eurobond issuance on the transmission mechanism and effectiveness of the Central Bank's monetary policy in the current climate.

The above discussion suggests that monetary policy transmission through the interest rate channel is temporarily weakened in the current climate, because króna Eurobond issues counteract the Central Bank's policy rate hikes. On the other hand, transmission through the exchange rate channel is temporarily strengthened due to the appreciation of the króna, but this effect may unwind if capital flows are reversed and the króna weakens.

Thus the effect of króna Eurobonds on monetary policy is to heighten the extent to which rises in the policy rate are passed through the exchange rate channel relative to the yield curve. This is not to say that monetary policy has a negligible effect on the yield curve, however. Recent indexed yield curve developments have shown an impact, but it is weaker than if króna bond issuance had not taken place. As mentioned earlier, it is not easy to assess how much of the appreciation can be attributed to international bond issues, but these probably reinforced a process that had already been triggered by the policy rate hike.

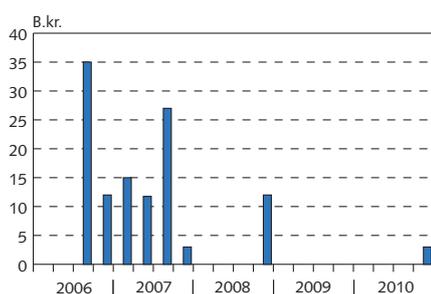
A shift in monetary policy transmission can have unfortunate consequences because of its varying sectoral impact. The export sector will need to display great flexibility. However, a monetary authority typically faces a dilemma. It cannot have simultaneous objectives of ensuring domestic (i.e. price) stability, exchange rate stability and fully deregulated capital movements – what has been called the impossible trinity of monetary policy. When the Central Bank of Iceland moved onto an inflation target and floated the króna in March 2001, it opted for price stability and free capital movements. Króna Eurobond issues could amplify exchange rate volatility, so it can be said that Iceland is experiencing the limitations set by the impossible trinity more strongly now than before.

### What happens as maturity approaches?

Chart 18 shows the maturity profile of the króna bonds issued so far. Bonds to a nominal value of 47 b.kr will mature in the second half of next year and to around 30 b.kr. in each half of 2007. A total nominal value of more than 100 b.kr will therefore mature in the space of one and a half years. Since they are all coupon bonds, buyers are paid the entire principal in krónur on maturity. International buyers of the bonds can then convert the krónur into foreign currency in the Icelandic FX market or invest in new króna-denominated bonds. The former option will increase the supply of krónur, which could cause

Chart 18  
Outstanding stock of króna Eurobonds  
by maturity

Q3/2006-Q4/2010



Source: Central Bank of Iceland.

a depreciation, although this is not certain since the exchange rate is determined by many other factors, as already described. However, substantial amounts are certainly involved, especially in the third quarters of the next two years.

What impact could a possible depreciation of the króna towards the end of 2006 have on Central Bank's monetary policy and the Icelandic economy as a whole? Of course the answer depends on the state of the economy when the króna begins to slide and whether it would mark the beginning of a depreciation path or whether the króna would already have begun to yield before the impact of the bonds came into play. In a worst-case scenario, the monetary authorities could face the risk that a significant depreciation of the króna would be passed through to the price level, which would force the Central Bank to respond to the inflationary effect with an even tighter stance. Such measures could contribute to a contraction of the economy.

Is this development likely? There are at least two indications that it is not. First, in New Zealand's experience the exchange rate effects connected with offshore bond issues are extremely limited – the large volume of bonds maturing over the period 2000 to 2002 had no negative impact on the New Zealand economy and did not catalyse a significant devaluation of the currency.

Second, the relationship between prices and the exchange rate has changed in recent years whereby short-lived exchange rate movements are passed through to consumer goods later and on a smaller scale before. This change is by no means confined to Iceland and has been confirmed on both sides of the Atlantic by extensive research. Conceivable explanations include more credible monetary policy, tougher international competition which gives businesses less scope to pass exchange rate movements on to prices, a shift in the composition of goods and services in international trade, the development of new financial products that facilitate businesses in hedging against exchange rate swings, and changes in household expectations that reflect increasing global exchange rate flexibility. These changes serve to soften the impact of short-term exchange rate swings so that even if international bond issues were to cause a weakening of the króna, inflation would not be certain to increase by as much as is widely feared, and the effect would be milder. However, this is difficult to state with any certainty in the absence of research to show precisely how the relationship between price and exchange rate changes has altered in Iceland in recent years, because of the relatively short experience of the current exchange rate framework.<sup>26</sup>

### **Increased uncertainty in monetary policy implementation**

All the above highlights the large degree of uncertainty and the difficulty of forecasting near-term developments. Króna Eurobond issues

26. Hampton (2001) demonstrates that the price effect of exchange rate movements has changed in New Zealand. He studied the pass-through of exchange rate movements to prices under the NZ dollar depreciation around the turn of the millennium and compares the results with earlier studies of the period 1985-1990. Hampton found a much weaker pass-through of exchange rate movements to the price level, whereby a 10% rise in import prices now raises the CPI by only 0.5% in the short term and 1.5% in the long run.

increase uncertainty in monetary policy implementation by changing its transmission through the economy, which coincides with one of Iceland's sharpest upswings for many years. However, uncertainty is not a new challenge for the Central Bank of Iceland or any other monetary authority.<sup>27</sup> Developments over the next few months may also provide the Central Bank with important indications about this new source of uncertainty in the Icelandic economy and the best response to it. This article is merely intended to mark the beginning of more in-depth discussion of the impact of króna Eurobond issues over the coming months and years.

## Conclusion

Króna Eurobond issuance is a strong testimony to the global integration of Icelandic financial activities and a reminder that no man is an island in the swirling seas of international capital markets. Buoyant domestic demand has led to higher interest rates and an appreciation of the króna, drawing international investors' attention to the possibilities offered by this high-interest rate country in the North Atlantic.

Issuance of króna Eurobonds will continue for as long as expectations persist that the forces driving them will remain in place, i.e. an ongoing wide interest-rate differential with abroad, strong króna and robust domestic demand for credit. Many factors may alter market expectations about these drivers and some signs are already appearing. International interest rates are heading upwards and bond markets could rally. Another question is how long market agents expect the króna to retain its strength given the steady widening of the current account deficit.

This article has outlined, first, global development of offshore bond issues in local currencies over the past two decades. Second, it presents research findings on currency choice in international bond issues, focusing on the interest-rate differential with abroad, historical strength of the currency and domestic credit demand. It also discusses the structure of króna bond issues and why these factors are crucial drivers of them.

Third, New Zealand's experience of offshore issues is discussed in some detail. The reasons are that New Zealand and Iceland have similar economies in many ways and are currently witnessing similar conditions, and that twenty years' experience of offshore bond issues and its impact on the home economy have been studied in depth by economists at the Reserve Bank of New Zealand. Their findings are very reassuring for Iceland, despite the need for reservations in such comparisons, given that no two countries are never identical.

Finally, an attempt was made to assess the present and potential impact of króna bond issues on the Icelandic economy. Iceland's experience is of course very limited and such evaluations are fraught with uncertainties. It is impossible to apply the same methods as for New

27. Cf. Alan Greenspan, retiring Chairman of the US Federal Reserve: "Uncertainty is not just an important feature of the monetary policy landscape; it is the defining characteristic of that landscape." (Greenspan, 2003).

Zealand, which has documented experience of two waves of issuance and has operated a floating exchange rate for twenty years.

However, there are a number of indications that króna bond issues could have a very positive impact on Icelandic financial markets and strengthen their infrastructure in the long term.

While international issues of króna bonds have exerted downward pressure on nominal interest rates, it is difficult to predict their effect on indexed rates, which are most important for households and businesses. It is known that the króna has appreciated substantially since issuance began, but since monetary policy has been tightened at the same time, it is difficult to isolate the contribution that bond issuance has made. Likewise, it is difficult to state what the long-term exchange rate effect will be, since this is largely determined by market expectations of domestic and international inflation developments, interest rate changes and investor appraisals of the risk posed by the strength of the króna.

The impact of króna bond issues on Central Bank monetary policy is to channel it more through the exchange rate and away from interest rates, by counteracting the full pass-through of policy rate hikes across the nominal yield curve. This increases the inherent uncertainties in monetary policy implementation and calls for further research in the months to come. The author hopes this article will be a useful contribution towards that end.

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