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Iceland's Capital Controls and the Resolution of its Problematic Bank Legacy¹

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Abstract

Iceland's capital controls were imposed in October 2008 in order to prevent massive capital flight and a complete collapse of the exchange rate. The controls were in place for more than eight years, primarily because of the risk of large outflows of domestic holdings of the failed Icelandic banks. As argued in a precursor to this paper (Baldursson and Portes, 2014), significant restructuring of domestic holdings of foreign creditors of the banks was required before the controls could be lifted. Such a restructuring was finally accomplished in January 2016. Broadly in line with the recommendations of Baldursson and Portes (2014), the resolution involved a voluntary – in much the same sense as the Greek debt restructuring was voluntary – restructuring of the banks' debt, under which most of the Icelandic krona assets of the banks were relinquished to the state or tied up in Iceland. An attempt at resolving so-called 'offshore kronas' – the remains of the carry trade into Iceland in the years before the 2008 crisis – failed resulting in a dispute with international investors. We model the strategic interaction between Iceland and creditors on the resolution of the failed banks as well as the interaction between Iceland and investors on the resolution of the offshore krona holdings. The model explains why the bank resolution was successful and why the offshore krona auction was not. Resolution of the old banks will cut Iceland's public debt, but it will still be substantially higher than before the crisis. The net international investment position of Iceland has, however, turned positive and is stronger than it has been in decades. In March 2017, the capital controls were removed in practice, albeit not by statute. Inflow measures remain.

Keywords: capital controls, cross-border banking, Icelandic banks, resolution of failed banks
JEL Codes: E58, F31, G21

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1. Introduction

The case of Iceland illustrates the difficulty of resolving large cross-border banks situated in a small currency area. Iceland's capital controls were imposed in October 2008 in order to prevent massive capital flight – including the outflow of a large stock of carry trade funds – and a complete collapse of the exchange rate, after it had already fallen by 25% during the week before the banks collapsed. Significant steps were taken at the end of 2016 towards relaxing the controls and they were removed for the most part in March 2017.² The controls lasted much longer than originally envisaged³ and even if the primary reason for imposing the controls at the outset was the carry trade overhang, this problem was exacerbated by the risk of large outflows of domestic holdings of the failed cross-border Icelandic banks. As argued in a precursor to this paper (Baldursson and Portes, 2014), significant restructuring of domestic holdings of foreign creditors of the old banks was required before capital controls could be lifted; even if the controls are damaging, the gains from lifting them were likely to be much lower than the costs associated with a potential currency crisis following a premature liberalization of capital outflows.⁴ Simply scrapping the capital controls after a short 'emergency' period was never a serious option.

The restructuring of the failed Icelandic banks was finally accomplished in January 2016 with composition agreements⁵ after an understanding was reached between creditors and the Icelandic authorities half a year earlier. The Government of Iceland was not directly a legal party to deliberations regarding resolution of the old banks. It was the role of winding-up committees and creditors to resolve the banks, and Icelandic authorities were always adamant that under no circumstances could the Icelandic state take on liabilities or subject itself to risk related to the resolution. The authorities' role is to safeguard legitimate Icelandic interests; financial stability, the solvency of Iceland and lifting capital controls. The Government did, however, have considerable legal powers to influence the resolution of the failed banks: provisions of the Foreign Exchange Act allowed it to block payments out of the banks' estates, indefinitely.

Broadly in line with the recommendations of Baldursson and Portes (2014), the resolution involved a voluntary – in much the same sense as the Greek debt restructuring was voluntary (Zettelmeyer et al., 2013) – restructuring of the banks' debt, under which most of the Icelandic

² See Section 10 for details.

³ An IMF staff report issued in relation to Iceland's Stand-by Arrangement with the Fund in November 2008 envisaged that the controls would be removed during the program period (IMF, 2008). This was initially set at two years, but turned out to be almost three: the program ended in August 2011.

⁴ A contrary view is in Danielsson and Arnason (2011): '...the imposition of capital controls was both unnecessary and unjustified...causing significant short-term and long-term economic damage.' We note that Iceland's real annual GDP growth rate 2010-2015 was about 3.5%, well above the average for advanced countries during this post-crisis period.

⁵ See Section 3 for details on composition agreements.

krona assets of the banks were relinquished to the state or tied up in Iceland. In particular, the Icelandic state is left holding two commercial banks – one as a consequence of restructuring. Ownership of Iceland’s banks has come full circle: the Icelandic banking boom began with privatization of two state-owned banks in 2003. There is much to be learned from this experience (Baldursson and Portes, 2013). The remains of the carry trade into Iceland in the years before the 2008 crisis were left unresolved until March 2017 when most of these funds were let out.

Resolution of the old banks has cut Iceland’s public debt, but it is still substantially higher than before the crisis. The net international investment position of Iceland is, however, stronger than it has been in decades; a historical turning point was reached in December 2016 when it turned positive.

This paper explains how capital controls have permitted orderly resolution of the failed banks and some of the implications for Iceland. There are broader lessons for emergency capital outflow control policies, their consequences, and the process of scrapping them. The first two sections following this Introduction give a brief background explaining why the capital controls were imposed initially, describe the creation and financing of the new banks and explain the winding-up procedure of the old banks. The next two sections give an overview of the Icelandic krona overhang within the failed banks’ estates and document the resulting overall balance of payments problem. Section 6 describes the strategy of the Icelandic authorities and the economic incentives involved. Section 7 documents the actual resolution. Section 8 analyses the incentives for creditors and the Icelandic authorities for reaching an agreement on resolution and places their interaction in a game theoretic context. Section 9 describes the failed attempt at resolving the so-called offshore kronas, i.e. the remains of the carry trade as well as the current state of capital controls. Section 10 briefly discusses external and public finance consequences of the resolution. Section 11 concludes.

2. Capital controls and offshore *kronas*

Iceland’s capital controls were put in place during the banking crisis of October 2008. Almost eight years later, they are still in force by statute even if they have now been mostly removed in practice by changes to the Central Bank’s regulation on currency exchange (Central Bank of Iceland, 2017b). The controls were imposed to prevent massive capital flight, especially outflows of carry trade money.⁶ These funds had come into the small Icelandic economy seeking high returns during the boom period preceding the crisis. The Central Bank of Iceland (CBI) was holding interest rates high to dampen inflationary pressures and support the exchange rate. As the banks were going under, the tide quickly turned, and the exchange rate of the Icelandic *krona* fell rapidly. Initially, the CBI continued to support the exchange rate, purchasing kronas out of foreign exchange reserves. Within a few days this became untenable

⁶ A comprehensive account of the carry trade in Iceland before the crisis and, more generally, the Icelandic banking crisis, is given in Baldursson and Portes (2013). For an empirical study of carry trade and its determinants, see Anzuini and Fornari (2012).

as net reserves became negative; in other words, Iceland did not have enough currency to cover known contractual outflows over the next twelve months, let alone other potential outflows.

Although foreign exchange transactions were effectively halted during the banking crisis, the controls were implemented formally in November 2008 as a part of the conditionality of an IMF Stand-By Arrangement for Iceland (IMF, 2008). The Foreign Exchange Act was amended to allow current account transactions only;⁷ it was subsequently modified several times, mainly for closing loopholes and tightening the controls. The most important change was made in March 2012, severely limiting possibilities for cross-border transactions of the estates of failed financial institutions.

The EEA Agreement stipulates free movement of capital between EEA (including EU) countries. It would therefore seem that the controls are a breach of that agreement. The EFTA Court has, however, ruled that given the circumstances the controls are compatible with the EEA Agreement. It has, nevertheless, been on the agenda of every government since the crisis to lift the controls.⁸

Initially it was thought that the main challenge in lifting the controls would be the remainder of the carry trade money – the so called *offshore kronas*. Even if much of these funds had already left the economy by the time the controls were imposed,⁹ there was a substantial amount, equivalent to 40% of GDP, locked in. This stock, which is held in cash or invested in liquid assets, was gradually reduced to approximately 14% of GDP by the end of 2015 by various means.¹⁰ In particular, the CBI has held auctions, matching investors that want to sell offshore kronas and those willing to buy kronas. The latter have mostly been domestic pension funds who – even if they have not been allowed to invest abroad since 2008 – are in possession of foreign assets amounting to a third of GDP. The krona exchange rate in these auctions, which were discontinued in early 2015, was considerably weaker – 25% or more – than the official exchange rate. This was sufficient to entice domestic institutional investors to participate in the auctions, even if, in the slightly longer term, the purchases went against a preferable portfolio allocation, i.e. to reduce their weighting on ISK assets. The CBI aimed at clearing these funds

⁷ While the foreign exchange act was changed so capital movements were restricted, it left current account movements free, at least in principle. Hence imports of goods and services were unrestricted. Factor payments (*i.e.* wages, interest and dividends) to non-residents were also allowed. The controls have therefore mainly affected investors and firms seeking capital.

⁸ Removing the controls is named as a priority issue in the platform of the centre-right coalition government that came into power in January 2017 (Government Offices of Iceland, 2017).

⁹ At the end of September 2008 the net forward currency position of the banks, was approximately 70% of GDP. Forward contracts were used for hedging foreign exchange risk of intermediaries in the carry trade, so this indicates the amount of carry trade funds.

¹⁰ A part of the relative reduction is due to growth in nominal GDP, which was 43% over the period 2008-2015.

out in an auction in June 2016, but this largely failed so significant funds still remain locked in; we shall return to this issue in Section 9.

It has, however, been clear since March 2012 that the largest obstacle to lifting the capital controls was in fact not the offshore kronas, but the estates of the failed Icelandic banks that were still unresolved. We next consider this issue.

3. Creation and financing of new banks; winding-up of old banks

When virtually the entire Icelandic banking sector began to collapse in early October 2008, several pieces of legislation were passed through Parliament to contain the foreseeable costs to the economy of Iceland.¹¹ Among this legislation was the so-called Emergency Act (Act no. 125/2008), entering into force on 7 October 2008. Prior to these legislative changes, which were accomplished in a matter of hours on 6 October, deposits and deposit insurance claims were considered to be ordinary, non-priority claims and therefore had the same standing as, for example, (senior) bonds. The Emergency Act, *inter alia*, gave priority to deposits and deposit insurance over ordinary claims and also gave the Icelandic Financial Supervisory Authority (IFSA) extensive powers to intervene in failing banks. The Emergency Act entailed various amendments to legislation, relating to financial activities and supervision thereof, granting the IFSA further powers as described below.

As each of the three large Icelandic banks failed on consecutive days, the IFSA created a new bank on the basis of *domestic* assets and liabilities of the failing bank.¹² All the banks were cross-border banks, large relative to the Icelandic economy,¹³ so there was a large nominal amount of *foreign* assets and liabilities left in the ‘old’ failing banks.

The three failed Icelandic banks were all subject to winding-up proceedings until they entered into composition agreements with their creditors at the end of 2015.¹⁴ Under Icelandic law,

¹¹ The crisis was nevertheless extremely costly for Iceland: GDP contracted by 12% from peak (2007:IV) to bottom (2010:I) and total debt of all sectors – homes, firms and the state – as a percentage of GDP peaked at almost 500% in 2010, up from (an already excessive) 400% at the end of 2007. Total debt is now estimated to be well within 300% of GDP, near the level in 2005.

¹² The constitutionality of the Emergency Act and legality of subsequent IFSA intervention were challenged. Iceland’s Supreme Court confirmed the constitutionality of the Emergency Act in 2011 (Case 340/2011). The EFTA Surveillance Authority had determined earlier that the banking intervention did not violate EEA law (Dec. No. 501/10/COL). The basis for both findings was that these actions were within the government’s legal room to manoeuvre under the circumstances and proportionate to their aims. For further discussion, see Helgadottir (2012).

¹³ Their combined balance sheets before the crisis – including foreign subsidiaries – were approximately tenfold GDP.

¹⁴ Act no 161/2002 on Financial Undertakings applies, *inter alia*, to financial reorganization and winding-up of financial undertakings. These measures were introduced into the Act via the implementation of the so-called Winding-up Directive (Directive 2001/24/EC), whose aim is to guarantee the mutual recognition of reorganization measures and winding-up proceedings.

composition with creditors refers to an agreement on settlement and/or relinquishment of debts concluded between a debtor and a certain majority of his creditors, which is subsequently confirmed in court. A composition agreement is binding upon the debtor's other creditors which have so-called composition claims.¹⁵ The composition agreements will be further discussed in Section 7.

Hence, three new banks were created, each on the basis of a failed 'old bank' parent:

- Arion banki was created on the basis of Kaupthing,
- Íslandsbanki was separated out of Glitnir, and
- New Landsbanki out of Landsbanki Íslands.¹⁶

Initially, the Icelandic state was expected to refinance all the new banks; the cost was estimated at 26% of GDP (IMF, 2008). In 2009, when the financial structure for the new banks was being finalized this plan was largely abandoned for Arion banki and Íslandsbanki; creditors of Kaupthing and Glitnir, respectively, became indirect majority owners of the new banks, through holding companies; the state became a minority shareholder (5% and 13%, respectively) and also provided additional funding in the form of subordinate loans. This had

“Reorganization” refers to moratorium, composition agreement and winding-up procedure according to Icelandic law. On the basis of the Act on Financial Undertakings, resolution committees were appointed for all three major Icelandic banks in October 2008. In November 2008, the District Court of Reykjavík granted them a moratorium. Under Icelandic law, moratorium proceedings are a financial reorganization measure, affording a debtor in financial difficulties temporary protection from creditors and suspension of payments, under the supervision of an assistant, in order to reorganize its finances. On 22 April 2009, Act no. 44/2009 entered into force, further amending the Act on Financial Undertakings. The Act prescribed a commencement of winding-up proceedings of financial undertakings, currently in moratorium under the control of resolution committees, with immediate effect upon the Act's entry into force. The role of the then winding-up committees is in essence similar to that of an administrator of an estate during bankruptcy proceedings. The same rules apply to the winding-up of financial undertakings as apply generally to insolvency liquidation – normally referred to as “bankruptcy” under Icelandic law – for example concerning reciprocal contractual rights and priority of claims.

¹⁵ In essence, composition claims are those that are affected by composition, and not cancelled by composition. In deciding which claims are composition claims one needs to decide 1) which claims are not affected by composition and 2) which claims are cancelled by it. Those claims which are not affected by composition are i) claims originating after a court order has been issued granting the debtor licence to seek composition, ii) claims for performance other than payment of money, which can be performed in substance, so-called claims *in natura*, iii) claims that would be ranked as provided in Art. 109, 110 or 112, so-called priority claims, if the debtor had been declared bankrupt at the date when a court order providing the debtor with a licence to seek composition was issued, iv) claims secured by an asset of the debtor, v) set-off claims, vi) claims particularly exempted from composition under the terms of the composition agreement by reason of their full payment, so-called small claims.

¹⁶ The New Landsbanki quickly reverted to the old name, Landsbanki Íslands, which has a long history in Iceland. The old, failed, bank took on its current name, LBI ehf.

the benefit of ameliorating the rise in gross sovereign debt after the crisis, as well as improving relations with international creditors. The creditors were dissatisfied with the Emergency Act and the restructuring process. Leaving them as majority owners offered a possible upside if things would turn out better than seemed likely for Iceland and, hence, the loan books of the new banks; loans had been transferred to the new banks at substantial discounts due to expectations of large overall losses.

The state did, however, provide 81% of the equity for the New Landsbanki, amounting to 8% of GDP. A probable reason for this different strategy for Landsbanki was that its largest creditors were official – i.e. the deposit insurance funds of the UK and the Netherlands – and held priority claims, whereas at Kaupthing and Glitnir they were private bondholders holding general unsecured claims. There was, however, an excess of assets over liabilities transferred to the New Landsbanki, even after the old bank (LBI) had received a 19% share in the new bank. This excess was eliminated by bonds issued by the new bank to the old bank. The bonds were denominated in foreign currencies and amounted to 19% of GDP at end-2009 exchange rates. These bonds were to be redeemed in 2015-2018.

The financing structure of the three new banks that emerged after negotiations with creditors in 2009 is summarized in Table 1.¹⁷ Total investment of the state amounted to ISK 190 bn, or 12% of 2009 GDP; 8.5% was in equity and 3.5% in the form of subordinate loans, which counted as part of regulatory capital and helped bring capital adequacy ratios up to the high level set as a minimum after the crisis.¹⁸ Initially, the state also provided the new banks with cash. Creditors provided equity amounting to 9.8% of GDP. As indicated in Table 1, the state took full ownership of New Landsbanki in 2013 with purchase of the 19% creditor equity share.

¹⁷ See Ministry of Finance (2011) for details on rebuilding of the Icelandic banking sector after the crisis.

¹⁸ The regulatory capital adequacy ratio was set at 16% of risk-weighted assets. Liquidity requirements were also made stricter and raised to 20% of deposits.

Table 1. Financing of new banks by Icelandic state and creditors

Amounts in ISK bn. Numbers in parentheses are the corresponding percentage of 2009 GDP

<i>Old bank</i>	Glitnir	Kaupthing	LBI
<i>New bank</i>	<u>Íslandsbanki</u>	<u>Arion banki</u>	<u>(New) Landsbanki</u>
<i>Assets</i>	717 (45%)	757 (48%)	1,061 (67%)
<i> Thereof loans</i>	490 (31%)	358 (23%)	667 (42%)
<i>Liabilities</i>	625 (39%)	667 (42%)	904 (57%)
<i> Deposits</i>	340 (21%)	495 (31%)	453 (29%)
<i> FX bonds to old bank</i>			306 (19%)
<i> Subordinate loans from state</i>	25 (2%)	30 [*] (2%)	
<i>Equity</i>	92 (6%)	90 (6%)	157 (10%)
<i>State equity share</i>	5%	13%	81% → 100% (2013)
<i>Creditor equity share</i>	95%	87%	19% → 0% (2013)

Source: Ministry of Finance (2009), Statistics Iceland, authors' calculations

Table 1 shows assets after revaluation.¹⁹ The total nominal amount of assets transferred to the new banks was ISK 4,000 bn. This amount was written down by approximately 50%. It can be inferred from the table that the assets of the three new banks amounted to 160% of 2009 GDP, so Iceland still had a sizable banking system after the crisis.

This financial set up for the new banks – in particular the creditor stakes – alleviated some problems at the time it was created, but it subsequently led to new challenges as we shall see below.

4. The old bank overhang

An understanding between the Icelandic authorities and creditors on resolution of the old banks was reached in June 2015. On the basis of that understanding, resolution was achieved in all cases by January 2016. Until they were resolved, a large part of the ISK holdings of the old banks Glitnir and Kaupthing consisted of equity in the new banks, Íslandsbanki and Arion banki, respectively. Happily, the Icelandic economy recovered faster than envisaged in 2009. As a consequence, the valuation of loans transferred to the new banks in 2008 turned out to be conservative and the new banks have continuously reported profits due to better recovery of loans than expected. Equity increased as a result, more than doubling, overall, in nominal terms from end-2008 to the second quarter of 2015.²⁰ Taking into account that nominal GDP grew by 39% between 2009 and 2015, combined equity in Arion banki and Íslandsbanki grew from

¹⁹ The valuation of assets transferred to the new banks was performed by Deloitte LLP of London, UK. The premise was that the new banks would be running, fully financed domestic concerns so no fire sales would need to take place. The valuation was also to take into account future expected economic conditions in Iceland rather than the dire conditions in 2009 when the valuation took place (Ministry of Finance, 2009). Even so, the valuation turned out to be very conservative.

²⁰ Financial reports of the new banks are available at www.arionbanki.is, www.islandsbanki.is and www.landsbanki.is.

12% of GDP in 2009 to 16% at mid-2015.²¹ The old banks also held loans denominated in ISK which have – at least in part – been recovered, as well as FX loans to domestic borrowers, many of which have no FX income. So the old banks held a large amount of assets (relative to the Icelandic economy) denominated in ISK or assets that required purchases out of foreign exchange reserves for ISK.

Table 2 gives a breakdown of the assets and liabilities of the three old banks at mid-2015. Domestic assets of the banks were close to 45% of GDP in total. More than half of these assets, 24% of GDP, were ISK-denominated, the major part (15% of GDP) being creditor share of equity in new banks. Claims on domestic parties denominated in foreign currency (dubbed ‘Domestic FX’ in Table 2) were almost 19% of GDP, three-quarters of this being the FX-denominated Landsbanki bonds.²²

Table 2. Assets and liabilities of old banks
Book value, 30 June 2015, as per cent of GDP

	Glitnir	Kaupthing	Landsbanki	Total
Assets				
Domestic ISK	14.5	7.7	1.5	23.7
Thereof equity in new banks	8.0	6.6	0.0	0.0
Domestic FX	2.2	3.0	13.6	18.7
Foreign	27.6	27.2	5.7	60.6
<u>Total assets</u>	<u>44.3</u>	<u>37.8</u>	<u>20.8</u>	<u>103.0</u>
Claims				
Priority claims	0.0	0.0	9.5	9.5
General claims	102.8	127.6	72.8	303.2
<u>Total claims</u>	<u>102.8</u>	<u>127.6</u>	<u>82.3</u>	<u>312.7</u>
<i>Estimated recovery to general claims</i>	<i>43%</i>	<i>30%</i>	<i>16%</i>	<i>31%</i>
<i>Foreign assets as percentage of total assets</i>	<i>62%</i>	<i>72%</i>	<i>28%</i>	<i>59%</i>

Source: Central Bank of Iceland, authors’ calculations

In addition to the ISK-denominated assets, FX claims on domestic parties without FX income created a problem. As explained in Baldursson and Portes (2014) these assets could be taken to be roughly equal to the Landsbanki bonds. Here the problem – prior to renegotiation of these bonds in 2014 – was the short redemption period.

²¹ Recall that the state holds all the equity in Landsbanki. This amounts to 12% of GDP, but obviously this holding poses no threat to the balance of payments.

²² These numbers are slightly different from those reported in Baldursson and Portes (2014), mostly due to value appreciation and exchange rate changes.

Foreign holdings constituted the majority of assets at Glitnir and Kaupthing, 62% and 72%, respectively. This share was much smaller at (old) Landsbanki, but by this time (mid-2015) Landsbanki had already paid out a large portion of its foreign assets – the equivalent of more than 50% of 2015 GDP - to priority creditors.²³ In principle, foreign holdings could be paid out to creditors without any pressure on the Icelandic FX market and the exchange rate.

The large holdings of assets denominated in Icelandic kronas would have been added to the offshore krona overhang if they had been paid out to creditors. These assets amounted to 24% of GDP and were mainly held by Glitnir and Kaupthing.

It was first in 2012 that the Icelandic authorities realized that the estates of the old banks could create a serious balance of payments problem and even pose a major threat to financial stability if they were allowed to proceed through insolvency resolution unchecked.²⁴ Hence, in March 2012 the Parliament tightened the Foreign Exchange Act in respect of the estates of the old banks; provisions which had enabled them to pay creditors in foreign currency were restricted. Moreover, the bankruptcy act was changed, restricting provisions for paying out Icelandic kronas from domestic insolvency estates. Following these changes to the law the estates were required to obtain exemptions from the Foreign Exchange Act in order to conclude winding-up proceedings.

The debt of the old banks is *private*. The Icelandic state is therefore not a direct party to their winding-up process. This process is the responsibility of winding-up boards and creditors. The state is, however, responsible for safeguarding legitimate Icelandic interests and can and should do this, using means proportionate to the aims. The legislative changes of March 2012 in all likelihood passed that requirement.

5. The overall balance of payments problem

If resolution of the old banks had been allowed to proceed without intervention – this would in all likelihood have happened during the period 2013-2014 – the overall amount of kronas likely to seek conversion into foreign currency due to foreign ownership would have increased drastically. Until late 2014 the foreign overhang came in three components:

- Offshore kronas already in circulation
- The Landsbanki bonds
- ISK holdings of the old banks

²³ In January 2016, after the composition agreement of LBI became binding, LBI fully settled all priority claims, including deposits and claims of deposit insurance funds (LBI, 2016). Glitnir and Kaupthing had previously paid all their priority claims, approximately 11% of GDP.

²⁴ The ISK overhang was a substantially more serious issue at that time than the numbers in Table 2, which date from three years later, indicate.

In mid-2015 these three components were 14%, 14% and 24% of GDP, respectively.

In addition, considerable pent-up demand from domestic investors, both private and institutional was predicted. On the basis of a constructed ‘desired’ portfolio (mean-variance optimisation), the IMF (2013) estimated that resident outflows, following liberalization of the capital account, could be in the range 30-45% of GDP. But this was probably an overestimate, since it disregards the tendency to home bias of portfolio investments.²⁵ For example, prior to the crisis Icelandic pension funds – with a total of 150% of GDP in assets they are the largest institutional investors in Iceland – never allocated more than 30% of their assets to foreign holdings. Moving to that ratio would imply a 12% outflow from pension funds, rather than the 18% estimated by the IMF. Nevertheless, potential resident outflows, from pension funds and others, are considerable, perhaps in the range 20-25% of GDP. Iceland has, however, liberalized the capital account in similar circumstances before without problems – this was done when Iceland entered the European Economic Area in 1994.²⁶

Still, the problem of the foreign overhang needed to be dealt with before opening up for foreign investment by residents. Since the underlying²⁷ international investment position was quite good in historical terms, this was a refinancing problem rather than a problem of national solvency: what was needed were inflows matching outflows from the overhang. But these outflows were likely to be rapid and large relative to private capital inflows. Iceland lost access to international capital markets during the banking crisis and had regained it only to a limited extent. Full access seemed unlikely with capital controls and foreign overhang in place. The one party able to borrow abroad at reasonable rates, the Icelandic state, was adamant that it would not borrow abroad and raise its already high debt to bail out foreign holdings of ISK. Thus, the refinancing problem turned into a balance of payments problem.

There was the technical possibility of financing the outflows from a surplus on the current account. Letting these funds out would either have to be done over a long period of time – probably on the order of a decade or more – or consumption would have to be reduced drastically in order to create a huge surplus on the current account. Most likely this would have

²⁵ ‘Home bias’ is the tendency in international capital markets for investors to hold a disproportionate share (relative to mean-variance optimisation) of their wealth in local assets. See Coeurdacier and Rey (2012) for a review of the open economy financial macroeconomics literature on home bias.

²⁶ Portfolios were more unbalanced then than they are now with practically no foreign portfolio investment.

²⁷ Until the end of 2015 the international investment position of Iceland as well as its current account needed to be adjusted for the impact of the old banks’ estates and other failed international investments which were listed as liabilities in official statistics. It was known that these liabilities would be eliminated as failed banks and investment companies were wound up. Hence the phrase ‘underlying international investment position’ and a corresponding prefix for the current account. The difference was huge: at Iceland’s nadir in 2009, the official international investment position was negative by 713% of GDP; the underlying position at the same time was negative by 72% of GDP.

happened through a devaluation, a reduction in purchasing power and a weakening of the real exchange rate. This was not politically viable; the Icelandic public would – perhaps reasonably – have asked why it should reduce consumption – private and/or public – in order to create a current account surplus for the purpose of repaying debt of private banks to foreign creditors. And the controls would remain in place in the meantime, over a duration of years. So this possibility was ruled out.

The remaining and only viable option was that of restructuring the foreign overhang.²⁸ The first stage was a restructuring of the Landsbanki bonds. While the bonds are a holding of LBI (the old Landsbanki) and therefore subject to the same restrictions as other holdings of the failed banks' estates, had they not been honoured, the new state-owned bank would have been in default. So even if the March 2012 legislation gave the Icelandic authorities the tools to hold up payments out of the LBI estate to creditors, it was clear – with governments effectively controlling both the debtor (Iceland) and the main creditors (the UK and Netherlands) – that this was not a desirable outcome for either party. With mutual political goodwill, renegotiation must have been the desired outcome on both sides.²⁹ Indeed, in 2014 the Landsbanki bonds were renegotiated, extending the redemption period by eight years, to 2026. As a *quid pro quo* LBI was granted exemptions from the capital controls to pay priority creditors (LBI, 2014). Priority creditors, including the UK Financial Services Compensation Scheme (FSCS), had been paid 85% of their claims at the end of 2014 and were subsequently fully paid.³⁰ The restructuring reduced the payments on the bond from approximately 4% of GDP p.a. to 1.5% p.a. which was manageable.

6. Strategy for resolving the krona overhang

As noted above, until late 2014, the krona overhang could be divided into three categories: offshore kronas, the Landsbanki bonds and ISK assets of the failed banks' estates. At the beginning of 2015, after the Landsbanki bonds were renegotiated, the offshore kronas and ISK assets remained. These two categories have different characteristics, leading to different bargaining positions and requiring different approaches. To stand a chance of success, any approach, however, must be based on two pillars:³¹

²⁸ This was argued forcefully in Baldursson and Portes (2014)

²⁹ Cf. Baldursson and Portes (2014).

³⁰ See Footnote 22 and FSCS (2015). As of 11 January 2016 the FSCS has recovered all of the principal on its Icesave claim on LBI. As an aside, the FSCS also expects to recover 95-100% of the principal on its claim on a UK subsidiary of Landsbanki, Heritable Bank, and 85-86% of its claim on a UK subsidiary of Kaupthing, Singer & Friedlander. In comparison, the FSCS expects to recover 57-59% from London Scottish. For Bradford & Bingley – by far the costliest bank failure for the FSCS during 2008/09 at £15.7 bn, approximately tenfold the Icesave cost – the FSCS reports nil recoveries received to date, but notes: 'B&B's management forecast full repayment of FSCS's loan but timing remains uncertain.' London Scottish and Bradford & Bingley are unrelated to Iceland. The comparison suggests that the British outrage against Iceland at the time was exaggerated.

³¹ These principles seem to have been first laid out in Baldursson (2012a, 2012b) and Baldursson and Portes (2014).

1. Economic incentives, sequenced so that they become progressively stronger with time, for creditors of the old banks and offshore krona owners either to exit the krona or tie up their holdings for the long term, on terms consistent with a sustainable balance of payments profile and economic and financial stability in Iceland.
2. A legal framework that supports and is consistent with such incentives, but does not overextend into the territory of expropriation. In other words, the framework must be based on the principle of proportionality.

The initial strategy for lifting the controls (Central Bank of Iceland, 2009, 2011) was flawed and failed on both the above points: as regards the first point it actually set up incentives for retaining offshore kronas by suggesting that terms for exiting would become better as time passed, rather than the opposite; the second point was absent.

For consistency with the principle of proportionality, it is also extremely important to be clear on the proper role of the authorities. To wit, as argued in Baldursson and Portes (2014, p. 48):

... The claims in question are on private parties – not the government or the Central Bank – so the Icelandic authorities are not in the position of a debtor negotiating for a restructuring with its creditors. The banks are in formal bankruptcy proceedings under Icelandic law, which in ordinary circumstances would be left to the winding-up boards and the creditors. ... The role of the authorities is first and foremost to look out for legitimate Icelandic interests; this includes both safeguarding financial stability and the solvency of Iceland and working towards the lifting of capital controls.

It took some time for the Icelandic authorities to formulate a policy based on the principles of properly sequenced economic incentives and proportionality. In the meantime, proposals were made for forcing the old banks into bankruptcy (rather than composition),³² based on the idea that creditors would then get paid in kronas; foreign currency from sales of the foreign assets of the banks would then have to be sold for kronas and could be used for buying out all offshore kronas (including those in the hands of creditors following liquidation) in one fell swoop. This approach gained some currency as it was lent support by influential commentators.³³ The

³² If the old banks would have been forced into bankruptcy proceedings, their existence would have been brought to an end and their assets distributed to creditors. By way of composition agreement, the old banks are able to negotiate payments to creditors, including the currency in which they are disbursed. Following a confirmation of their composition agreements, the old banks resumed existence as normal solvent entities, free from any legislative encumbrances of deriving from the winding-up proceedings. Nonetheless, the entities can still be subject to legal actions brought by their creditors if such legal actions rise out of claims that are established after confirmation of the composition agreements.

³³ See e.g. Pétursson (2013)

weight of the argument fell, however, after a decision by the Supreme Court where it was found that even if claims on insolvency estates have to be made in Icelandic kronas, the estates can distribute assets in any currency (Hæstiréttur Íslands, 2014). The point of forcing bankruptcy on the estates thus evaporated.

Indications of the strategy that eventually emerged were first given by the Icelandic Minister of Finance in March 2014. The Minister noted what the role of the Icelandic authorities should be in the insolvency proceedings, but also indicated that incentives would be created for completing the insolvency process sooner rather than later:

Icelandic authorities are not negotiating directly with the creditors of the old banks – their claims are on domestic financial institutions in bankruptcy process but not on the Icelandic state. It is the responsibility of winding-up boards and creditors to negotiate agreements on composition. Neither the Central Bank nor the Icelandic authorities have any direct role in these negotiations. On the other hand, the responsibility of the Icelandic authorities is to ensure that the exemptions from the capital controls that the [old banks’] estates are seeking in relation to payments to creditors do not have adverse consequences for the Icelandic economy and those who remain inside the controls. ... Nevertheless, it must be noted that the life of the estates cannot be indefinite. ... If creditors do not finalize composition agreements [within 3-5 years] the only option [for the authorities] is [to force them] to enter bankruptcy.³⁴

In June 2015 a ‘comprehensive strategy for capital account liberalization’ (Ministry of Finance, 2015a) was announced. The measures proposed, however, concerned mostly how to deal with the offshore kronas and the ISK holdings of the estates – there was virtually no discussion of how to lift the controls once this was accomplished. The approach was two-pronged, with separate measures for each category of problematic assets.

The offshore kronas were an important part of the overhang (14% of GDP).³⁵ In sheer amounts, however, the ISK holdings of the old banks (24% of GDP) were the biggest problem. The 2012 changes to the bankruptcy code and Foreign Exchange Act, which blocked payments out of the banks’ estates, were an extremely important prerequisite for the solution of this problem. Had these changes not been made the estates would in all likelihood have distributed assets, foreign and domestic, to creditors. The ISK denominated assets would have been added to the offshore krona overhang, increasing it to almost 40% of GDP – a similar level as right after the 2008 crisis. In addition, foreign assets would have been paid out to creditors. The Icelandic authorities would have been left with no strategic power in their dealings with creditors.

³⁴ Ministry of Finance (2014). Since we were unable to find an English translation of this speech, the translation from Icelandic is ours. We note the similarity of this text to the citation from Baldursson and Portes (2014) above.

³⁵ We return to the issue of the offshore kronas in Section 9.

The June 2015 measures vis-à-vis the estates of the old banks created strong economic incentives for creditors to finish composition agreements. Parliament passed a law on a so-called *stability tax* of 39% to be imposed in 2016 on the book value of assets of failed bank estates at end-2015, subject to certain deductions. This would imply tax revenues amounting to some 30% of GDP and would certainly ensure that liquidation of the estates' assets would not cause balance of payments problems. The estates were, however, given another option, *viz.* to enter into composition agreements before the end of 2015 that would meet *stability conditions* laid out by the CBI (2015a). The agreements were to:

- 'adopt measures that sufficiently reduce the negative impact of distributing the proceeds of the sale of the assets in Icelandic [kronas];
- convert other foreign-denominated domestic assets owned by the failed banks into long-term financing to the degree required; and
- where applicable, to ensure the repayment of the foreign-denominated loan facilities granted by the authorities to the new banks following the financial market collapse.'

Provided the CBI found these conditions to be met, the estates would be allowed to enter into composition agreements, and an exemption to the Foreign Exchange Act would be granted.

7. Resolution

Even if formal negotiations had not taken place, there was evidently a prior understanding between creditors and the authorities on how to proceed: immediately following the announcement of the June measures, major creditors sent letters to the Ministry of Finance (2015b, 2015c, 2015d) stating their intention to enter into composition agreements³⁶ and outlining how the stability conditions were to be met by various 'voluntary stability contributions'. In October, agreement had been reached among creditors on composition agreements and stability contributions. On the basis of drafts for composition agreements, winding-up boards applied to the authorities for exemption from the relevant articles of the Foreign Exchange Act in order to be able to conclude winding-up proceedings. Exemptions were granted and the District Court of Reykjavik quickly confirmed all composition agreements. Virtually all votes cast at creditors' meetings were in favour of the composition agreements.³⁷

³⁶ Cf. Section 3. By using the method of composition agreement the creditors become shareholders. If, however, the banks had gone into bankruptcy proceedings the procedure would have concluded with distribution of all assets of the estate to the creditors, ending the existence of the bankrupt entity. It should be noted that a composition agreement only affects general claims leaving priority claims, for example deposits, unaffected. Further, a composition agreement has the effect of cancelling certain claims, such as interest accrued after the winding-up was issued, claims for gifts and claims made subordinate to all other claims by agreement.

³⁷ According to Icelandic law a composition agreement may provide for total relinquishment of debts, proportional relinquishment, deferred dates of payment, changes in form of payment, or the three last mentioned arrangements jointly. A composition proposal from a debtor shall be deemed to be approved

Amendments were also made to the Act on Financial Undertakings to facilitate the Icelandic banks entering into composition agreements with their creditors.³⁸ On the grounds of the composition provisions in the Act on Financial Undertakings, as amended on July 2015, each of the three old banks entered into composition agreements with creditors. The three agreements were similar and provided for:

- *De minimis* cash payments to small creditors. All three composition agreements prescribe a *de minimis* payment as allowed by Icelandic law. With respect to Glitnir the amount of the payment added up to ISK 3.5 million, with respect to Kaupthing ISK 4.6 million and with respect to Landsbanki ISK 1.7 million.³⁹
- Composition entitlements. As previously discussed, payments under composition agreements, so-called composition entitlements, include some type compromise to the benefits of the debtor. The compromise towards the old banks varied as the entitlements were structured differently in each of the old banks' composition agreements. However, they all have in common that entitlements involve the issue of shares in the entities so the creditors hereafter

if it is supported by the same proportion of votes, counted by the amounts of the claims of voting creditors, as the proportion of composition claims to be relinquished according to the proposal, provided that this corresponds to a minimum of 60% and maximum 85% of those votes and also 60% of the votes counted by the number of all voting creditors. Therefore, if the composition provides for an offer to pay creditors 20% of the claims that are affected by the composition agreement 80% of the amounts of the claims have to vote for the agreement as well as 60% of all voting creditors.

³⁸ The main amendments were, *inter alia*, the following:

1. The requirements made to the subject of composition proposals were reduced so to enable a prescription of payments depending on the realization and redemption of assets.
2. The authority to prescribe a *de minimis* cash payment in the composition proposal was further clarified. With respect to the old banks this was extremely relevant considering their large groups of creditors. By explicitly allowing for the prescription of *de minimis* cash payments adding up to 25% of the total sum of payments offered to creditors under the proposal, many of the creditors received full payment of their claim and were therefore unaffected by the composition. As a result, those creditors did not have the right to vote on the proposal.
3. The formal requirements made to the process of voting on the composition proposal were reduced, allowing creditors to vote electronically.
4. The rules on proportional support of votes were altered as previously described.

An exemption from the rules regarding the confirmation of composition agreements was granted so to enable the winding-up committees to submit composition proposals, despite the fact that the priority claims had not been paid, secured or agreed on in another way, as long as the proposal clearly prescribed that those claims would enjoy the same priority to funds deriving from the realization of assets (Alþingistiðindi A-deild, þskj. 1401 – 787. mál. [Icelandic Parliament's explanatory notes, document 1401 – case no 787]).

³⁹ The *de minimis* cash payments resulted in the elimination of a large number of small creditors and made it easier for creditors to coordinate on an agreement. See Footnote 43 for details.

own the old banks. The proportional shareholding of each creditor depends on the amount of his claim.

Table 3 gives a simplified overview of the stability contributions and the outcome of the composition agreements in regard to the balance of payments problem discussed above.⁴⁰ For ease of comparison with Table 2 we cast the results in terms of 2015 GDP.

Table 3. Stability contributions and other countervailing measures in composition agreements

Per cent of 2015 GDP, unless specified otherwise

	Glitnir	Kaupthing	Landsbanki	Total
Stability contribution	10.3	5.7	1.0	17.1
Thereof equity in new banks	8.4	0.0	0.0	8.4
Long-to-medium-term financing of new banks	2.5	4.4	0.0	6.9
Impact on FX reserves	-1.3	2.5	0.7	1.9
<i>Per cent of total reserves at end-2015</i>	<i>-4.3</i>	<i>8.4</i>	<i>2.3</i>	<i>6.4</i>

Source: CBI (2015b) and author's calculations

These measures are of two types. One is a direct stability contribution where assets are relinquished to the state. The other is in the form of long-term financing of the new banks, both converting foreign currency deposits to medium-term loans and refinancing the subordinate loans originally made by the state when the new banks were established.

In addition to the stability contribution the old banks were also paying a bank tax amounting to 1.2% of GDP; this tax was imposed in 2014 on total assets of financial institutions, including the failed banks. This they would have done regardless of whether of their choice between a stability contribution or a stability tax.⁴¹

The stability contribution totalled 17% of GDP, with the largest contribution made by Glitnir; this was to be expected, since Glitnir held the greatest amount of ISK assets (cf. Table 2). This contribution came in the form of cash, equity and bonds; in particular, Glitnir handed all equity in Íslandsbanki to the state.⁴² Recall that ISK assets of the banks were a total of 24% of GDP, so the stability contribution plus the aforementioned bank tax amounted to about 73% of the ISK assets of the banks. Total assets of the banks were approximately 90% of GDP (taking the share of the Landsbanki bonds into account) so the stability contribution was a much lower share of total assets, or 20%. This is the actual 'haircut' in the resolution.

⁴⁰ See CBI (2015b) for details on the resolution and the estimated impact on balance of payments.

⁴¹ There was, however, also the possibility of challenging that tax as expropriatory should the creditors have rejected the offer to conclude resolution by making stability contributions.

⁴² Glitnir could have reduced its stability contribution had it succeeded in finding foreign buyers for Íslandsbanki.

Long-to-medium-term financing of the new banks totals 7% of GDP. In total, the countervailing measures are 25% of GDP, i.e. slightly larger than the 24% overhang. The net impact on reserves is positive though small, viz. 2% of GDP. Creditor financing, plus interest, is due to return to the creditors in due course; this, of course, assuming that the loan contracts will be honoured.

An important part of the understanding reached with creditors was that they would commit to refrain from litigation against the Icelandic state pursuant to the composition agreements and would be granted exemptions for cross-border transfers.

8. Why was resolution by stability contributions achieved?

Why should creditors be willing to enter into an agreement as described in the previous section, thereby relinquishing a good portion of the assets of the estates? Consider the case of Glitnir. According to financial information from Glitnir for the first half of 2015 (Glitnir, 2015), the book value of assets of Glitnir amounted to 43% of claims. This would be the approximate recovery ratio if assets were simply distributed without intervention. The stability contribution of Glitnir reduces this ratio to 33%. The stability tax of 39% of assets, imposed in the case of failure to reach composition agreements meeting the stability conditions, however, would have reduced it even further, to approximately 27%.⁴³ Hence, the hedge funds that hold most of the claims on Glitnir had a choice of two options:

1. Creditors make the stability contribution, conclude winding-up proceedings and receive 33% of the nominal value of claims in foreign currency.
2. Creditors do not make the stability contribution, contest the imposed stability tax in court and wait for several years for conclusion. Meanwhile, assets are locked into the estate. If creditors lose the case then eventually 27% of assets will be paid out in foreign currency. If they win, then the situation is basically unchanged and the game starts over.⁴⁴

The first option gives a known, near-term payoff with certainty. The second option, on the other hand, leads to protracted delay and an uncertain outcome. Which option is better will depend on a number of factors, in particular the relative sizes of the stability contribution and the tax bill, as well as the probability of winning a court case against the Icelandic state.

A similar analysis holds for Kaupthing and Landsbanki. It should, however, be noted that four hedge funds had taken major positions in the bonds of the three failed banks and these funds

⁴³ Glitnir (2015) includes analysis of the financial consequences of these two options for the bank with some nuances which we disregard here.

⁴⁴ There are precedents from the 1950s where property taxes up to 25 per cent were imposed twice over a 7 year period – in other words a cumulative 44% tax – on certain Icelandic citizens who had made windfall gains by a depreciation of the Icelandic krona. These taxes were found by the Supreme Court not to violate the constitution (Helgadóttir, 2006). Such precedents were no doubt known to the parties involved here.

acted together in dealings with the Icelandic authorities working towards a single coordinated resolution. The banks may therefore reasonably be considered as one entity in an analysis of the incentives to come to an agreement on their resolution.

One may also ask why the Icelandic authorities were willing to make such a deal: why accept stability contributions amounting to 17% of GDP when the stability tax would have netted 10-15% of GDP more in revenues for the state? The analysis is similar as for the creditors: settling for composition agreements and stability contributions opened the possibility of lifting the capital controls, provided immediate fiscal benefits and all but eliminated litigation risks, be it in Iceland or abroad. Moreover, the banking system was provided with long-term private financing, replacing the subordinate loans provided by the state during the crisis. Imposing the stability tax would have given higher nominal revenues, but litigation would inevitably have followed, delaying and creating uncertainty about the final outcome. Lifting capital controls would have been difficult until that uncertainty had been resolved.

In an appendix, we provide a simple game theoretic framework for analysing the interaction between creditors and the Icelandic state.⁴⁵ The probability of Iceland winning the court case in Stage 2 above is a key variable in the game. It seems reasonable to assume that it depends on the imposed tax rate – a tax rate that is ‘too’ high may be judged to be expropriatory – as well as the ratio of ISK denominated and total assets – a high ratio makes lifting the capital controls riskier and more difficult for Iceland and makes imposing a given tax rate easier to justify in court. We show that there is an equilibrium where Iceland manages to entice (or coerce) creditors to make a stability contribution, with the threat of a punitive tax if they do not acquiesce. In equilibrium, the tax rate is set to maximise expected tax revenues should creditors reject the ‘offer’ of finishing the game by making a stability contribution. Moreover, the stability contribution is lower than the nominal tax revenue, but the two are equal in expected present value terms.⁴⁶ A calibration of the model based on the relative size of the stability

⁴⁵ Our model is a simple non-cooperative one-off game between Iceland and creditors where Iceland is a first mover, choosing the ‘punitive’ tax to maximize expected payoff, taking into consideration that it may lose a possible court case if the tax is set too high. Creditors then choose between going to court or offering to resolve the game by making a ‘voluntary’ stability contribution. Exogenous in the model are total assets involved, the share of ISK denominated assets and the probability of Iceland winning a court case should an agreement between the parties not be reached; that probability is decreasing in the size of the haircut, but increasing in the share of ISK assets. The resulting stability contribution is an equilibrium outcome of the model. Our model shares certain elements with bargaining models in the sovereign debt literature, although there the framework is typically that of Nash bargaining; see Bulow and Rogoff (1989), Benjamin and Wright (2009), Kovrijnykh and Szentes (2007), Bi (2008), Bai and Zhang (2010), D’Erasmus (2010), Yue (2010), Pitchford and Wright (2012), Asonuma (2012), Arellano and Bai (2014), Hatchondo et al. (2014) and, in particular, Asonuma and Trebesch (2016). Perhaps coincidentally, the stability contribution of 20% in this case is close to the average haircut of 18.4% in preemptive sovereign debt restructurings, c.f. Asonuma and Trebesch (2016).

⁴⁶ For simplicity, the analysis disregards a number of aspects of the real interaction that may be relevant. First, litigation is likely to take several years and be quite costly, despite this we disregard both direct and indirect (discounting) litigation costs as well as the benefit of an early lifting of capital controls to

contribution and the imposed tax bill implies an equilibrium probability of Iceland winning a court case at 50-60%.

Driving the result is the assumption that the judiciary accepts the argument that the ISK denominated assets, unleashed, would create an unacceptable risk for Iceland. Also, that the rule of proportionality is respected so the creditors' chances of winning a case against Iceland on grounds of expropriation decrease with the severity of the problem, i.e. the amount of ISK denominated assets in proportion to the economy of Iceland.

The game theoretic analysis supports the intuitive conclusion that a resolution by stability contributions was to be expected, especially with rational, skilled actors.⁴⁷ It was probably also supportive of this outcome, that a majority – 71% based on 2013 numbers – of current creditors purchased their claims at a price lower than 33% of nominal values (Glitnir, 2013). These creditors stand to make a certain accounting profit if they choose the first option.⁴⁸

9. The offshore kronas

The strategy announced by the Icelandic authorities in 2015 (Ministry of Finance, 2015a) for resolving the offshore kronas took into account that they were not part of insolvency estates. Rather, they were deposits and other liquid assets directly held by various private parties and, while they were of course subject to the capital controls, they were not locked in to the same extent as assets in the banks' estates. The room for manoeuvre by the Icelandic authorities therefore seemed to be more limited for the offshore kronas. Hence, giving offshore krona owners a 'menu' of options, letting these funds out at a premium to the official exchange rate, imposing an exit tax or tying them up in long-dated ISK or FX bonds seemed a reasonable approach. Indeed, the authorities' *initial* strategy was to give the offshore krona owners three options.⁴⁹

1. Currency auction at a premium (equivalent to an exit tax),
2. Long-term Treasury bonds (ISK or EUR denominated), or
3. 'Locked' non-interest-bearing accounts.

Iceland. Second, the outcome of the court case is by its very nature uncertain and both parties may be risk averse, but we nevertheless assume below that they maximize expected payoffs. Third, and perhaps most importantly, if Iceland's offer is rejected by creditors and they subsequently win the case this would most likely imply that capital controls would not be lifted and a new game would start, where the ISK assets would be added to the existing offshore ISK overhang; we do not model that game. See the Appendix for a discussion.

⁴⁷ Iceland was helped by the advice of some highly skilled and experienced international experts.

⁴⁸ Many of the creditors purchased their claims at prices reflecting a much lower recovery ratio than 33% – estimated recovery in closure of CDS contracts on Glitnir bonds in November 2008 was 3%. Many of the original buyers, however, locked in profits by selling the bonds.

⁴⁹ These options are virtually identical to a proposal first made in Baldursson (2012b).

Taking the volume of these assets (14% of GDP at end-2015) into consideration this approach seems reasonable. It was designed to eliminate this part of the overhang, but also giving the owners of offshore ISK some choice, in accordance with the principle of proportionality.

Ideally, the offshore kronas would have been restructured at the same time as an agreement was reached on resolution of the old banks and their ISK assets. Together these two components – if unleashed – presented a significant balance of payments risk for Iceland and, hence, were a major obstacle to lifting capital controls. It was therefore easy to argue that both should be restructured. For some reason, however, the implementation of the above strategy on offshore ISK was delayed for almost a year from its announcement, i.e. until May 2016 when Parliament passed the ‘Act on the treatment of króna-denominated assets subject to special restrictions’ (Act 37/2016). The Act defined offshore ISK assets precisely and ‘segregated’ them, effectively locking them into special accounts at the CBI. While bonds and other financial instruments can be held until maturity, any cash is to be invested in special certificates of deposit bearing an interest rate of 0.5%; for comparison, the CBI’s key interest rate (the rate on seven-day term deposits) has been much higher, *viz.* in the range 5-5.75%, since January 2016. There is no sunset clause in the Act.

Following on this legislation, in June 2016 the CBI called for offers to sell offshore ISK assets in exchange for cash payment in foreign currency, where the exchange rate ranged from 210 ISK/€ for amounts lower than ISK 50 bn, to 190 ISK/€ for amounts exceeding ISK 175 bn; this was termed an ‘auction’ by the bank, although the price was fixed so bids were essentially restricted to the amount offered. The exchange rates offered correspond to a discount or ‘haircut’ of 26-33% from the official rate at the time (140 €/ISK). This haircut can be compared to that on ISK assets and total holdings of the failed banks, *viz.* 73% and 20%, respectively. Offshore krona owners would seem more likely to compare a haircut on offshore kronas with the latter number when making their decisions.

The auction largely failed: out of ISK 320 bn offshore only around 100 bn were exchanged. The remaining stock of offshore ISK assets at the end of 2016 was 191 bn,⁵⁰ approximately 8% of 2016 GDP. Apparently, mainly smaller investors accepted the deal offered by the CBI while large investors – who appear to be the same hedge funds as were the main creditors of the old banks – held out (Júlíusson, 2016). The remaining offshore ISK were locked into special segregated accounts.

Comparing the implementation with the initial strategy announced a year earlier, it is notable that the CBI abandoned Option 2 above, i.e. allowing offshore-ISK owners to invest in long-dated bonds, thereby narrowing available choices for the offshore ISK owners. Also, external circumstances improved considerably: Iceland’s GDP grew by 7.2% in 2016 on the back of a booming tourism sector, and is set for continued growth in 2017. Moreover, there were strong

⁵⁰ The difference between ISK 220=320-100 bn and ISK 191 bn, is explained by the CBI as ‘interest payments, re-examination of segregation, and [changes in] the market value of the assets’ (CBI, 2017a).

flows into the krona, which was unsurprising, given the large interest differential between Iceland and other developed economies, improved credit ratings and expectations of a continued strengthening of the exchange rate. Indeed, a few days before the auction, the CBI imposed a reserve requirement of 40% on new inflows into Icelandic deposits and bonds, effectively stopping such inflows.⁵¹ In order to stem further appreciation of the krona, the CBI purchased foreign currency for almost ISK 400 bn during 2016 (17% of GDP). Nevertheless, the krona appreciated by more than 18% over the year. At the end of 2016 reserves amounted to 34% of GDP.

One can apply similar strategic reasoning to this interaction as to that employed in the discussion of the resolution of the failed banks in Section 8. The ‘voluntary stability contribution’ corresponds here to offshore krona owners offering assets for sale at a discount in the CBI’s auction. Here it is, however, more convenient to consider the value of assets after a haircut has been applied in the auction. Risk-neutral investors will accept such a haircut if that value exceeds the expected present value of the assets locked into segregated accounts following on non-participation in the auction. The non-participation value depends on a number of factors, the most important being the waiting time until a court case is resolved, the discount rate, the return on assets while waiting, the probability of winning a case against Iceland and the haircut applied if the case is lost.

For example, with a waiting time of 5 years, a discount rate of 6%, a return on assets of 3% and full victory in court, the present value of assets would be 87% of the nominal value (i.e. the discount would be 13%). Assuming the case is lost and the original haircut of the auction applied, say 30%, the present value of assets is 61%. With a 35% chance of investors winning the case the expected present value becomes 70% of the nominal value and investors would be indifferent between participating in the auction or not. A higher probability of winning gives a higher expected present value.⁵²

The optimal strategy for Iceland – assuming risk-neutrality on revenues, but a preference for lifting capital controls fully – is to set the auction discount as high as possible but yet in such a way as to make the offshore krona owners very slightly prefer participating in the auction. Assuming this was the strategy employed and that the parameter values used above are in the right range indicates that Iceland assumed its chances of winning a court case given the haircut of the auction to be high, *viz.*, better than 65% with those particular parameter values. This probability is of a similar order of magnitude as the implied probability of Iceland winning in a court contest on the resolution of the failed banks, which was estimated to lie in the range 50-60%.

⁵¹ Inflows into equities continued, however.

⁵² The model of the appendix needs slight modification for this situation: there the tax rate and the up-front haircut (stability contribution) could be set independently of one another; here, the up-front haircut (auction discount) will also affect the present value of non-participation in case of a loss by investors as well as the probability of such a loss.

Evidently the hedge funds that held out did not evaluate their strategic position in quite the same way as the CBI and seem to have calculated their chances in court as better than the CBI did. Indeed, right after the passing of Act 37/2016 the hedge funds filed complaints with the EFTA Surveillance Authority (ESA) arguing that criteria for the ‘protective measures’ of the act were not met. These complaints were unsuccessful: ESA closed the complaint cases in November 2016 and found: ‘that Icelandic laws on treatment of offshore króna assets are in compliance with the EEA Agreement. The laws are part of measures for removing capital controls in Iceland.’⁵³ Following on this, a suit against the Icelandic state in domestic courts was prepared, on the grounds that the Act goes further than necessary to avoid a balance of payments crisis and therefore constitutes a breach of the property rights clause of the Icelandic constitution.⁵⁴

Interestingly, a number of individuals, including former officials of the US Government and respected scholars, expressed views in important international publications (e.g. *The Financial Times* and *The Wall Street Journal*) and fora (e.g. at seminars held by the Emerging Market Traders’ Association) supporting the point of view of the offshore krona owners.⁵⁵ A website dedicated to the issue was set up⁵⁶ and two-page advertisements have been run in Icelandic newspapers accusing the Central Bank of Iceland of corruption. It is not clear who is behind these PR efforts. However, it would be natural for the hedge funds in question to try to change the odds in their favour.

As the capital controls were lifted in March 2017 the Central Bank announced that it had concluded an agreement with offshore krona owners to purchase their assets at an exchange rate which corresponded to a 15% haircut on these assets (Central Bank of Iceland, 2017c). The amount involved was around half of total offshore ISK assets. Two weeks later a similar offer was extended to owners of the remaining offshore funds, around 4% of GDP (Central Bank of Iceland, 2017d). A similar analysis as above (waiting time of 5 years, 6% discount rate, 3% return on assets) the implied probability of holdouts winning a court case is estimated at 90% with these parameters.

At the time of this writing it is still unclear whether owners of the remaining offshore ISK funds accept the CBI’s offer or opt to hold out. We do not wish to speculate on the outcome of possible litigation following on the offshore krona strategy of Iceland. However, regardless of the merits of the arguments of the parties to this dispute, it seems clear that the delay in implementing the offshore krona strategy weakened Iceland’s strategic position vis-à-vis the

⁵³ ESA Decision No: 207/16/COL

⁵⁴ Decision by the Supreme Court in Case 826/2016, Icelandic State vs. Autonomy Capital, 12 January 2017. Autonomy Capital was partially successful in its request that the court would appoint assessors to evaluate the economic case for the Act and the CBI’s auction. The

⁵⁵ See Glassman (2016a, 2016b, 2017), Gros (2016), Porzecanski (2016a, 2016b) for views supporting offshore krona owners. See Benediktsson (2016) and Arnason (2016) for responses from Icelandic authorities.

⁵⁶ <http://icelandwatch.org/>

hedge funds: the elimination of the failed bank overhang as well as improvements in Iceland's external position made the case for the imperative of large haircuts more difficult to argue. A speedier implementation, following directly on the resolution of the failed banks – and a more judicious setting of a haircut would have made resolution of the offshore funds by auction more probable.

10. External and public finance consequences of the bank resolution

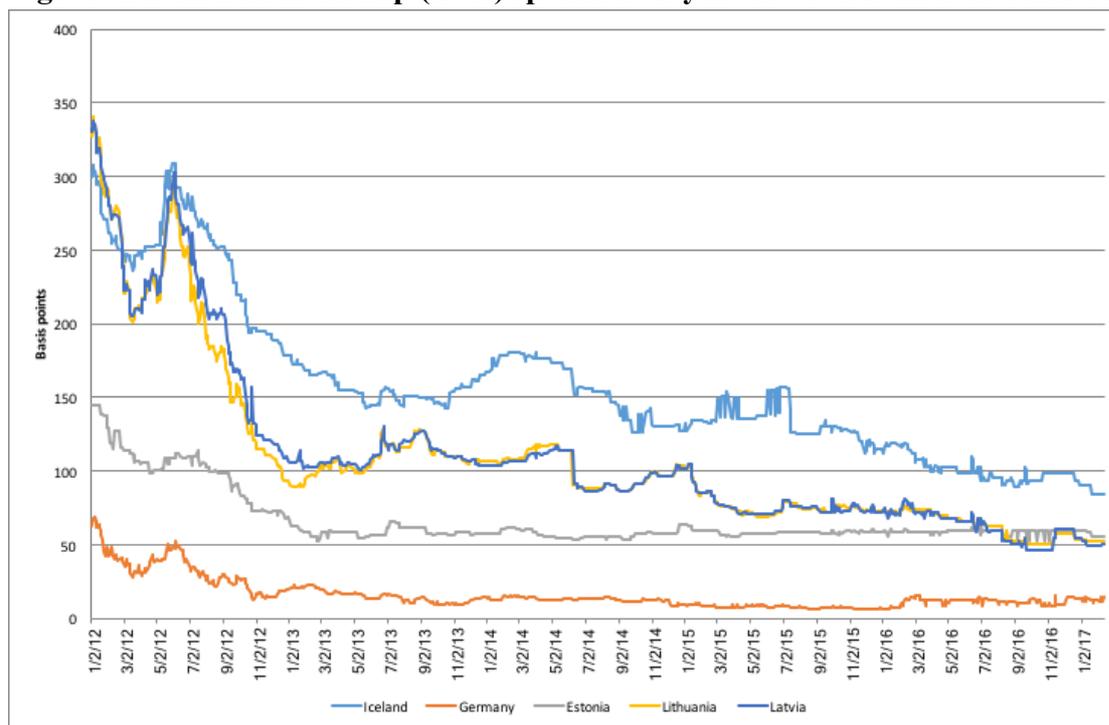
Due to the reduction in foreign-owned ISK-denominated assets, the underlying international investment position improved by 17% of GDP following the resolution. Another consequence of the resolution is that underlying and official debt became one and the same so the official net foreign debt of Iceland dropped from 350% of GDP to 15% of GDP between the third and fourth quarters of 2015. This is by far the best position Iceland has been in on this measure for several decades.

The public finance consequences were also positive. The eventual impact on gross public debt is to decrease it, *cet. par.*, by an amount similar to the international investment position, i.e. by about 17% of GDP. Indeed, this is the immediate impact on net debt. But reducing gross debt correspondingly will take time, as assets – e.g. the equity in Íslandsbanki – need to be sold off to realize the gains. With sensible fiscal policies and continued robust growth, gross public debt could fall to around 50% by the end of 2017. This is a comparatively low public debt ratio, although it is considerably higher than before the crisis when it stood at 27% of GDP (IMF, 2016).

Rating agencies raised Iceland's sovereign debt rating after the announcement of the resolution strategy in June 2015. Ratings rose further in 2016 following on the conclusion of composition agreements, the resulting elimination of uncertainty regarding the resolution of the banks, and the improvement in Iceland's macroeconomic finances.⁵⁷ Financing costs of the sovereign and corporations should decrease as a result. Spreads on credit default swaps provided early indications of this as they dropped following on the announced resolution strategy in June 2015 (see Figure 1).

⁵⁷ Iceland was upgraded to A3 by Moody's Investor Service in August 2016. Standard & Poor's upgraded Iceland to A- in January 2017 and to A in March 2017, following on the lifting of capital controls. Fitch's rating is still at BBB+ at the time of this writing in February 2017, but the outlook was revised to positive in January 2017. It deserves note that Iceland held on to an investment grade rating with Moody's and Standard & Poor's despite its massive crisis; indeed, it stayed current on its debt throughout. Fitch downgraded Iceland to speculative grade (BB+) in January 2010 and maintained that rating for two years.

Figure 1. Credit default swap (CDS) spread on 5-year senior bonds of selected countries



Significant steps were taken in late 2016 towards lifting the capital controls and they were mostly removed by changes to the Central Bank's Rules on Foreign Exchange in March 2017 (Central Bank of Iceland, 2017b). The Foreign Exchange Act has, however, not been changed and restrictions on offshore ISK funds as well as restrictions designed to stem speculative inflows into the ISK remain.

The krona weakened somewhat during the period after the easing and subsequent lifting of controls. The Central Bank nevertheless continued a program of weekly purchases in the foreign exchange market, albeit at a lower rate than in 2016, and may have welcomed the weakening. The krona has since recovered and is 3% stronger than at the end of 2016 at the time of this writing. The easing of capital controls therefore seems to have had no significant impact on the level of the exchange rate which is supported by strong growth in export earnings and high domestic asset returns.

11. Conclusion

Iceland was one of the first casualties of the financial crisis of 2008/09. With no effective lender of last resort for its large cross-border banks situated within the small currency area of the Icelandic krona and no access to external funding there was no option other than to let the banks fail. Rather than letting this happen in a disorderly manner and in a way that would have imposed losses of an unprecedented scale on Icelandic households and corporations, the Emergency Act was enacted, virtually in real time as the crisis unfolded. Many of the features

of this legislation were later adopted in European legislation on bank resolution.⁵⁸ In particular, Iceland let shareholders and creditors take first losses, converted debt in part to equity, protected deposits and deposit insurance schemes, and avoided putting the burden of bank bailouts on taxpayers.⁵⁹

Once the line was drawn in the sand, it became a firm principle that the Icelandic public should not bear additional losses from the failure of the banks.⁶⁰ This principle was successfully employed in the final stage of the resolution of the banks as the Icelandic krona overhang was restructured without costs to taxpayers.

Thus, Iceland is emerging from the ‘perfect storm’ in surprisingly good shape. Public debt never rose to the high levels predicted at the time of the crisis (IMF, 2008), in part because creditors rather than the state refinanced two of the new banks, but also because of consolidation of public budgets. The sovereign managed to stay current on its debt and hold on, even if barely, to its investment grade rating. Even before the restructuring of the old banks the underlying net debt of the country was lower than before the banking boom started in 2003, due to a low real exchange rate and consistent surplus on the current account. All sectors – households, government and corporations – have reduced debt, so gross debt in relation to GDP is approaching the levels at the beginning of the boom. This is the result of sensible economic policies, but, admittedly, also a good bit of luck.⁶¹ Still, the counterfactual without capital controls seems to us unlikely to have given such good results.

The resolution of the failed Icelandic banks is nearly over, and capital controls have been removed for all practical purposes. This is a major milestone for the small Icelandic economy, marking the end of the economic crisis that began in 2008. By contrast, in some other advanced countries, the banking systems have still not recovered from the crisis.

⁵⁸ Bank Recovery and Resolution Directive (BRRD) (European Commission, 2014). See Carmassi (2015) for a discussion of the BRRD.

⁵⁹ There are of course many additional features in the BRRD. Choices were also made that differ from the provisions of the BRRD, such as splitting the banks along the lines of domestic vs. international assets and liabilities rather than good vs. bad assets. Most of the bad assets were left in the old banks, but also many good assets.

⁶⁰ In the notorious Icesave case (see Baldursson and Portes, 2013), the heated rhetoric notwithstanding, it seemed rather a question of *which* taxpayers – Icelandic or British and Dutch – should bear the costs of deposit insurance for Landsbanki depositors in the UK and Netherlands. As it turned out the assets of old Landsbanki sufficed to cover priority claims, including deposit insurance, as well as a part of general claims. Costs to taxpayers are negligible. Historians will assess the political costs to the British and Dutch governments of their injudicious response. But there may also have been a financial cost – a more sensible UK policy might have allowed Kaupthing to survive.

⁶¹ It is difficult to see the boom in tourism, which has driven robust economic growth during the last three years, as a result of a conscious policy, although it was certainly helped initially by the devaluation of the krona.

In an ironic twist of fate, the state comes out of the crisis as the owner of two commercial banks. So in this respect, as in many others, Iceland is returning to the state of affairs before the banking boom started with the privatization of two state-owned banks in 2003. The circle has been closed and a new round can begin. One can only hope that this time it really will be different.

Asonuma and Trebesch (2016).

References

- Anzuini, A and F Fornari (2012). ‘Macroeconomic determinants of carry trade activity’, *Review of International Economics*, Vol. 20, pp. 468-488
- Arellano, Cristina and Yan Bai (2014). ‘Linkages across Sovereign Debt Markets,’ Working Paper, Federal Reserve Bank of Minneapolis.
- Arnason, Gudmundur (2016). ‘Iceland responds to Porzecanski’, FT Alphaville, 22 June
- Asonuma, Tamon (2012). ‘Serial Default and Debt Renegotiation.’ Working paper, International Monetary Fund
- Asonuma, Tamon and Trebesch, Christoph (2016). ‘Sovereign debt restructurings: preemptive or post-default’. *Journal of the European Economic Association*, 14(1), 175-214
- Bai, Yan and Jing Zhang (2010). ‘Duration of Sovereign Debt Renegotiation.’ *Journal of International Economics*, 86(2), 252-268.
- Baldursson, Fridrik M. (2012a). ‘Afnám gjaldeyrishafta’ [Removing Capital Controls], presentation at open meeting organized by SA-Business Iceland, 15 May, available at https://www.researchgate.net/publication/289671165_Afnam_gjaldeyrishafta_Removing_capital_controls and <http://dx.doi.org/10.13140/RG.2.1.1037.8323>
- Baldursson, Fridrik M. (2012b). ‘Removal of Capital Controls, Comments at meeting with Ad Hoc Group on the Removal of Iceland’s Capital Controls’, 21 September, available at https://www.researchgate.net/publication/289671335_Removal_of_Capital_Controls and <http://dx.doi.org/10.13140/RG.2.1.2086.4089>
- Baldursson, Fridrik M. and Richard Portes (2013). Gambling for resurrection in Iceland: the rise and fall of the banks, CEPR Discussion Paper No. 9664 (108 pp.). Available at https://www.researchgate.net/publication/257310308_Gambling_for_Resurrection_in_Iceland_The_Rise_and_Fall_of_the_Banks and <http://dx.doi.org/10.2139/ssrn.2361098>
- Baldursson, Friðrik and Richard Portes (2014). ‘Capital controls and the resolution of failed cross-border banks: the case of Iceland’, *Capital Markets Law Journal*, 9(1), 40-54
- Benediktsson, Bjarni (2016). ‘Iceland shares very little with Argentina’, *The Wall Street Journal*, 15 June
- Benjamin, David and Mark L.J. Wright (2009). ‘Recovery Before Redemption? A Theory of Delays in Sovereign Debt Renegotiations.’ Working Paper, University of California, Los Angeles.
- Bi, Ran (2008). ‘“Beneficial” Delays in Debt Restructuring Negotiations.’ IMF Working Paper 08/38
- Bulow, Jeremy and Kenneth S. Rogoff (1989). ‘Sovereign Debt: Is to Forgive to Forget?’ *American Economic Review*, 79, 43-50
- Carmassi, Jacopo (2015). ‘New rules for bank crisis resolution in the European Union and the United States’, Istein Regulatory Brief No. 3, Istituto Einaudi, February

- Central Bank of Iceland (2015a). ‘Announcement concerning capital account liberalisation measures’, Press release 13/2015, 8 June
- Central Bank of Iceland (2015b). ‘Settlement of the failed financial institutions on the basis of stability conditions: impact on balance of payments and financial stability’, October 28
- Central Bank of Iceland (2016). ‘Amendments to the rules of foreign exchange’, 31 December
- Central Bank of Iceland (2017a). ‘Offshore króna assets as of end-2016’, 13 January
- Central Bank of Iceland (2017b). ‘New Rules on Foreign Exchange’, 12 March 2017
- Central Bank of Iceland (2017c). ‘Central Bank of Iceland concludes agreement with owners of offshore króna assets’, 12 March
- Central Bank of Iceland (2017d). ‘Purchase of offshore krónur by the Central Bank of Iceland’, 4 April
- Coourdacier, Nicolas and H el ene Rey (2012). ‘Home Bias in Open Economy Financial Macroeconomics’, *Journal of Economic Literature*, 51(1), 63–115
- D’Erasmus, Pablo (2010). ‘Government Reputation and Debt Repayment in Emerging Economies.’ Working Paper, University of Maryland
- Danielsson, Jon, and Ragnar Arnason (2011), ‘Capital controls are exactly wrong for Iceland,, VoxEU 11 November
- European Commission (2014). ‘Bank Recovery and Resolution Directive’, Directive 2014/59/EU of the European Parliament and of the Council, 15 May
- Financial Services Compensation Scheme (2015). ‘Annual Report and Accounts 2014/15’, July
- Glassman, James K. (2016a). ‘Northern Europe’s Argentina Imitator’, *The Wall Street Journal*, 13 June
- Glassman, James K. (2016b). ‘Iceland’s terms look like a default to many’, *The Wall Street Journal*, 22 June
- Glassman, James K. (2017). ‘Iceland’s rationale for stiffing bondholders melts away’, *Bloomberg*, 13 January
- Glitnir h.f. (2013). ‘Analysis of trading activity in Glitnir hf. Claims’, presentation by Moelis and Company to the winding-up board of Glitnir, 14 November
- Glitnir h.f. (2015). ‘Statement of Assets and Liabilities’, August
- Government Offices of Iceland (2017). ‘Platform of the Coalition Government formed by the Independence Party, the Reform Party and Bright Future’, 11 January
- Gros, Daniel (2016). ‘Northern Debt Magic and the Moral Cost of Capital Controls’, presentation slides at Emerging Markets Trading Association Special Seminar on Iceland’s Global Outlook after Capital Control, Reykjavik, 15 September
- Hatchondo, Juan C., Leonardo Martinez and Cesar Sosa Padilla (2014). ‘Voluntary Sovereign Debt Exchanges.’ *Journal of Monetary Economics*, 61, 32-50
- Helgadóttir, Ragnhildur (2006). ‘The Influence of American Theories of Judicial Review on Nordic Constitutional Law’, Martinus Nijhoff Publishers 2006.
- Helgadottir, Ragnhildur (2012). ‘Economic crises and emergency powers in Europe’, *Harvard Business Law Review Online*, 130-139, March 10
- Hæstiréttur Íslands (2014). ‘Kaupþing h.f. gegn Aresbank S.A.’ [Kaupthing hf. Vs. Aresbank S.A.], Case 707/2014, November 10

- IMF (2008). Iceland: Request for Stand-By Arrangement—Staff Report, IMF Country Report No. 08/362, November
- IMF (2013). ‘Iceland, 2013 Article IV consultation and third post-program monitoring discussions; selected issues’, Country Report No. 13/257, August
- IMF (2016). ‘Debt: Use it Wisely’, Fiscal Monitor, World Economic and Financial Surveys, October
- Kovrijnykh, Natalia and Balazs Szentes (2007). ‘Equilibrium Default Cycles.’ Journal of Political Economy, Vol. 115(3), 403-446
- Júliússon, Þórður Snær (2016) ‘Stórir aflandskrónueigendur segja nei takk við Seðlabankann’ [‘Large offshore krona owners say no to the central bank’], Kjarninn, 29 June
- LBI hf. (2014). ‘Extension and amendment completed’, Press release, 4 December
- LBI hf. (2016). ‘Exemption from capital controls - final settlement of priority claims’, Press release, 11 January
- Ministry of Finance (2011). ‘Skýrsla fjármálaráðherra um endurreisn viðskiptabankanna’ [‘Finance minister’s report on the restructuring of the commercial banks’], March
- Ministry of Finance (2014). Speech of the Minister of Finance at the Annual Meeting of the Central Bank of Iceland [in Icelandic], March. Available at <http://sedlabanki.is/library/Skraarsafn/Raedur--erindi-og-greinar/BB%20%C3%A1rsfundur%202014.pdf>
- Ministry of Finance and Economic Affairs (2015a). ‘Comprehensive strategy for capital account liberalisation announced’, Press release, 8 June
- Ministry of Finance and Economic Affairs (2015b). ‘Iceland in Continuing Consultations Regarding - Capital Control Liberalization (Glitnir)’, Press release, 8 June
- Ministry of Finance and Economic Affairs (2015c). ‘Iceland in Continuing Consultations Regarding - Capital Control Liberalization (Kaupthing)’, Press release, 8 June
- Ministry of Finance and Economic Affairs (2015d). ‘Iceland in Continuing Consultations Regarding - Capital Control Liberalization (LBI)’, Press release, 8 June
- Ministry of Finance and Economic Affairs (2016). ‘Progress of the Plan for Removal of Capital Controls’, Report, 21 October
- Ministry of Finance and Economic Affairs (2017). ‘Iceland Lifts Capital Controls’, Press Release, 12 March
- Pétursson, Reimar (2013). ‘Tálsýn um nauðasamning’ [Translation: ‘The illusion of a composition contract’], Morgunblaðið, 5 October
- Pitchford, Rohan and Mark L.J. Wright (2012). ‘Holdouts in Sovereign Debt Restructurings: A Theory of Negotiations in a Weak Contractual Environment.’ Review of Economic Studies, 79(2), 812-837
- Porzecanski, Arturo (2016a). ‘Iceland’s selective default?’, FT Alphaville, 14 June
- Porzecanski, Arturo (2016b). ‘Text of prepared remarks’, Emerging Markets Trading Association Special Seminar on Iceland’s Global Outlook after Capital Controls, Reykjavik, 15 September
- Yue, Vivian Z. (2010). ‘Sovereign Default and Debt Renegotiation.’ Journal of International Economics, 80(2), 176-187
- Zettelmeyer, Jeromin, Christoph Trebesch, Mitu Gulati (2013). ‘The Greek debt restructuring: an autopsy’, *Economic Policy*, Vol. 28 (75), pp. 513-563.

Appendix. A game between creditors and the Icelandic authorities

Below we present a simple analytical framework for thinking about the interaction between creditors and the Icelandic authorities. We model this interaction as a non-cooperative game with Iceland as the first mover. We model the group of creditors as a single agent and lump the banks together as one asset structure. This assumption rests on the fact that four hedge funds had taken major positions in the bonds of the three failed banks and these funds acted together in dealings with the Icelandic authorities working towards a single coordinated resolution.

Let A denote the total assets of the banks. Let $X < A$ denote the problematic ISK denominated assets and write $x = \frac{X}{Y}$ where Y is domestic GDP.

The game proceeds as follows:

1. The Icelandic authorities announce that a tax will be imposed on bank assets at the rate of t , where $0 < t < 1$. Creditors can, however, escape the tax by immediately making a voluntary ‘stability contribution’ of sA , where $0 < s < t < 1$ (this is ‘the offer’ below).
2. Creditors now decide whether to accept the offer and make the stability contribution or reject the offer and contest the imposition of the tax in court.⁶²
 - a. If creditors accept, they receive $V_C^a = (1 - s)A$ and the Icelandic authorities receive $V_I^a = sA$.
 - b. If creditors reject and contest the tax in court they either:
 - i. Lose the case with probability p , in which case they receive $(1 - t)A$ and Iceland receives tA ; or
 - ii. Win the case with probability $1 - p$, in which case they receive A and Iceland receives zero.
3. The game ends.

Clearly, this game is purely about splitting the assets – the sum of payoffs is always A – and for simplicity we disregard a number of aspects of the real interaction that may be relevant. First, litigation is likely to take several years and be quite costly, despite this we disregard both direct and indirect (discounting) litigation costs as well as the benefit of an early lifting of capital controls to Iceland. Second, the outcome of the court case is by its very nature uncertain and agents may be risk averse, but we nevertheless assume below that they maximize expected payoffs. Third, and perhaps most importantly, if Iceland’s offer is rejected by creditors and they subsequently win the case this would most likely imply that capital controls would not be lifted and a new game would start, where the ISK assets D would be added to the existing offshore ISK overhang; we do not model that game. At the end of the Appendix we briefly discuss the likely implications of taking these aspects into consideration.

⁶² We can disregard the possibility that creditors do not contest the tax – they would be better off making the stability contribution in that case.

The probability of Iceland winning the court case is a key variable in the game. It seems reasonable to assume that it depends on the imposed tax rate t – a tax rate that is ‘too’ high may be judged to be expropriatory – as well as the ratio of ISK denominated assets x – a high ratio makes lifting the capital controls riskier and more difficult for Iceland and makes imposing a given tax rate easier to justify in court. Formalizing this, we assume that $p = p(t, x)$, with

- (1) $p(0, x) = 1, p(1, x) = 0$ for all $x \geq 0$
- (2) $\frac{\partial p}{\partial t} < 0$ for all $x \geq 0, 0 < t < 1$
- (3) $\frac{\partial p}{\partial x} > 0$ for all $x \geq 0, 0 < t < 1$
- (4) For a fixed $x, p(\cdot, x)$ is concave (i.e. p is concave as a function of t)⁶³

To guarantee an interesting solution to the game, we also need a more technical (and less intuitive) assumption:

$$(5) \quad t \frac{\partial^2 p}{\partial x \partial t} + \frac{\partial p}{\partial x} > 0$$

Condition (3) implies that if $\frac{\partial^2 p}{\partial x \partial t}$ is non-negative then (5) holds.

The payoffs are deterministic if the offer of making a stability contribution is accepted and are equal to $V_C^a = (1 - s)A$ for the creditors and $V_I^a = sA$ for Iceland. If the offer is rejected the expected payoffs are $V_C^r = (1 - tp)A$ for creditors and $V_I^r = tpA$ for Iceland.

Since creditors are taken to be risk neutral they will be indifferent between acceptance and rejection if s and t are chosen such that

$$(6) \quad s = pt.$$

Exactly the same indifference condition applies to Iceland. We assume that if (6) holds, then the stability contribution will be made and the game ends, i.e. there is an implicit preference for finishing the game early.

Suppose now we are at stage 2 of the game and Iceland has for some reason chosen $s > pt$. The offer to make a stability contribution will then be rejected and Iceland will receive the payoff $V_I^r = tpA$. At stage 1 Iceland will choose t so as to maximize its payoff in these circumstances. The first-order condition for maximum is

$$(7) \quad p(t, x) + \frac{\partial p(t, x)}{\partial t} t = 0.$$

⁶³ This condition is unnecessarily strict but it is intuitive, *viz.* the probability of a win for Iceland drops more rapidly as t approaches 1.

Slightly reordered this becomes

$$(8) \quad p(t, x) = -\frac{\partial p(t, x)}{\partial t} t.$$

On the left-hand side of (8) there is p , which, as a function of t , starts at 1 for $t = 0$ and decreases to zero for $t = 1$. On the right-hand side there is the product of $-\frac{\partial p}{\partial t}$, a positive increasing function of t (by concavity of p as a function of t) and t , *i.e.* the right-hand side is an increasing function of t , starting at zero for $t = 0$. It follows that there is a unique solution $t^*(x) \in (0,1)$ to (8) and therefore to (7). The second derivative of V_I^r with respect to t is found to be equal to $\frac{\partial^2 p}{\partial t^2} t + 2 \frac{\partial p}{\partial t}$ which is negative by conditions (2) and (4), so the maximand is concave in t and the second-order condition for maximum holds. Hence $t^*(x)$ is the optimal tax rate. Note that the payoff and tax rate are independent of s as long as it exceeds pt .

Suppose, in contradistinction, that $s < pt$. The offer will then be accepted by creditors and Iceland receives the payoff $V_I^a = sA$. But then Iceland can increase its payoff by increasing s up to the limit pt where it is indifferent between acceptance or rejection of its offer by creditors. Increasing s beyond pt serves no purpose since then the offer will be rejected by creditors and the payoff will be exactly the same as for $s = pt$.

It follows that the equilibrium of the game is given by the Icelandic authorities setting the tax rate equal to $t^*(x)$ and giving creditors the option of making a stability contribution of $s^*(x) = p(t^*(x), x)t^*(x)$; being indifferent between acceptance and rejection the creditors will accept and make the stability contribution $s^*(x)$.

Intuitively we would expect to see both tax rate and stability contribution rise with an increasing amount of ISK denominated assets. First consider the stability contribution and differentiate $s^*(x)$ with respect to x :

$$(9) \quad \frac{ds^*}{dx} = \frac{\partial p}{\partial t} \frac{dt^*}{dx} t^* + \frac{\partial p}{\partial x} t^* + p \frac{\partial t^*}{\partial x} = \left[\frac{\partial p}{\partial t} t + p \right] \frac{dt^*}{dx} + \frac{\partial p}{\partial x} t^*.$$

The term in square brackets on the right-hand side of (9) is equal to zero by the first-order condition (7) so we're left with $\frac{ds^*}{dx} = \frac{\partial p}{\partial x} t^* > 0$ where the inequality follows from (3). It follows that the equilibrium stability contribution is an increasing function of ISK denominated assets. Note that this result does not depend on the assumption (5).

As for t^* , differentiating the first-order condition (7) with respect to x and solving for $\frac{dt^*}{dx}$ gives

$$(10) \quad \frac{dt^*}{dx} = \frac{\frac{\partial^2 p}{\partial x \partial t} + \frac{\partial p}{\partial x}}{-\left[\frac{\partial^2 p}{\partial t^2} t + 2 \frac{\partial p}{\partial t} \right]}$$

The denominator in (10) is positive (it is the negative of the second derivative of V_I^r with respect to t) and the numerator is positive by assumption (5) (recall that it suffices for $\frac{\partial^2 p}{\partial x \partial t}$ to be non-negative for this to hold). It follows that the equilibrium tax rate is increasing in the amount of ISK denominated assets.

We have therefore established that there is an equilibrium where Iceland manages to entice creditors to make a stability contribution, with the threat of a punitive tax if they do not acquiesce. Driving the result is the assumption that the judiciary accepts the argument that the ISK denominated assets unleashed would create an unacceptable risk for Iceland. But also that the rule of proportionality is respected so the creditors' chances of winning a case against Iceland on grounds of expropriation decrease with the severity of the problem, i.e. the amount of ISK denominated assets in proportion to the economy of Iceland.

The assumption that indifference between acceptance and rejection is resolved by positing that acceptance dominates deserves some comments. Here, the simplifying assumptions made at the outset should be taken into consideration. Most of these assumptions leaned towards making rejection more attractive for creditors. In particular, rejection by creditors will involve delay, litigation costs, risk and, last but not least, a portion of or all assets continuing to be locked into Iceland.⁶⁴ It therefore seems quite reasonable and realistic to resolve indifference by ending the game early with a stability contribution.

⁶⁴ Similar considerations apply to Iceland, with the lock-in interpreted as prolongation of capital controls.