The Political Economy of Capital Controls: The Case of Iceland*

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Abstract

Analysis of sovereign debt problems is often treated as a game between creditor and debtors. But the political economy of the game is transformed by a tool the debtor may employ: capital controls. And the environment is also different when the sovereign is not itself formally the debtor but sets the rules for negotiations. These were two important features of the Icelandic case. In January 2016 a consortium of US based hedge funds transferred assets worth $2.8 bn - more than a fifth of Iceland's GDP at the time - to the Icelandic state. The 'voluntary' transfer of assets and related measures were key steps in the resolution of three Icelandic banks that collapsed in October 2008, eventually allowing Iceland to lift the strict capital controls it had maintained since the crisis. The legacy of the failed banks and a large stock of carry-trade funds locked in by the controls hindered lifting them, but they also helped in resolving the banks and reducing the net fiscal cost of the crisis. A later attempt at resolving the carry-trade stock failed, resulting in a dispute with international investors. We formulate and calibrate a bargaining model describing the strategic interaction between Iceland and international investors. Outcomes indicate a judicious bargaining approach by Icelandic

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authorities in the case of the old banks, but a degree of overconfidence in the case of the carry-trade funds.

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1 Introduction

In January 2016 a consortium of US based hedge funds voluntarily handed Íslandsbanki, an up-and-running Icelandic bank with equity worth $1.4 bn, to the Icelandic state without receiving compensation in return. Íslandsbanki was the single largest asset handed to the Icelandic state at this time in a transfer worth $2.8 bn in total. The transfer of assets and other related measures were a key step in the resolution of three Icelandic banks that collapsed during the banking crisis of October 2008. The resolution, in turn, eventually made it possible, in March 2017, to lift the strict capital controls Iceland had lived with since the crisis.

The capital controls were imposed during the 2008 crisis to stem capital flight and prevent the collapse of the Icelandic krona (ISK).[1] They were rigorously enforced and were effective in that the exchange rate stabilised and it was possible to lower interest rates quite rapidly after the crisis. The successful implementation of the controls, however, resulted in a large overhang of ISK-denominated, foreign-owned assets composed of the Icelandic krona holdings of failed banks and carry-trade funds locked in by the controls. It was therefore very difficult to remove the controls: there was a high risk of rapid capital outflows and a renewed currency crisis. So the controls stayed in place far longer than the originally envisaged two years.

Ultimately, the Icelandic authorities found that the capital controls could be employed as a strategic tool in dealings with foreign investors. They were transformed from problem to solution. In June 2015, after several years of grappling with the issue, a 'comprehensive strategy for capital account liberalization' (Ministry of Finance, 2015a) was announced. We show how this strategy was executed: the controls, in combination with other measures, were successfully used as a bargaining device in the resolution of the failed banks.

Critics of the Icelandic authorities' approach often do not appreciate the subtleties of the political economy interactions between the authorities and the creditors. We employ a bargaining approach to model the strategic interaction between Iceland and foreign creditors on the resolution of the failed banks. We calibrate the

[1] The controls were part of the conditionality of Iceland's IMF programme; see Baldursson and Portes (2018) for details on the programme.

model and find that outcomes are consistent with a judicious estimation of Iceland's bargaining strength, leading to resolution by settlement.

The bargaining model is structured to capture the main elements of Iceland's actual strategy vis-à-vis the international creditors of the failed banks. The parties in our model bargain over how to split the assets of the banks before they are released and converted from ISK to foreign currency. The split is implemented by a haircut: a transfer of ISK-assets from the estates of the banks to the Icelandic state, termed a 'voluntary stability contribution' by the Icelandic authorities. In the case of disagreement, Iceland threatens to impose a larger, previously announced, unilateral haircut - a 'stability tax' - on bank assets which creditors are bound to contest in court. If Iceland wins the court contest the stability tax is imposed, but creditors convert the remaining assets into foreign currency; if Iceland loses, creditors retain and convert all the assets. A dispute is costly for both parties, but more for Iceland, which – as in a sovereign default - would face not only costs of litigation, but also loss of reputation and possible market exclusion, which creditors do not incur.

Our modeling approach combines elements from two literatures: one is a strand of the law and economics literature on out-of-court settlement versus litigation; the other, aspects of some recent work on bargaining between debtors and creditors in the sovereign debt and default literature. We also rely on the latter literature for numerical values of some parameters when calibrating the model.

The legal and political economy framework is important. The punitive tax announced by the authorities invites litigation by creditors, but an out-of-court settlement can be made by creditors making a sufficiently large stability contribution. There is a large literature on out-of-court settlement versus litigation within law and economics.[2] In recent work on this topic the setting is usually one of asymmetric information, and the focus is on the implications of different legal rules and the costs of litigation. In our setting information was not obviously asymmetric: both parties had access to the same factual information, employed experienced lawyers and consultants etc. Hence, we employ an approach that is closer to an older strand of the litigation literature where the concept of a *decision standard* for deciding the outcome of a case is central: if the *quality* of the case exceeds the decision standard the plaintiff wins. In the original model of Priest and Klein (1984) the decision standard is known, but plaintiff and defendant each estimate the quality of a given case independently, subject to unbiased error. If their views are sufficiently different the case will go to trial. The parties may also have different views on the value of

[2]See *e.g.,* Spier (2007) for a review.

the decision standard (Waldfogel, 1995). We adapt these concepts to the Iceland circumstances: we *assume the quality of the case is known and can be measured by the size of the announced stability tax. The value of the decision standard is, however, unknown* due to limited precedent, *but its statistical distribution is assumed to be known to both parties*, given circumstances such as the size of the ISK overhang. In turn, given the distribution of the decision standard the probability of a judgment for Iceland can be inferred from the announced tax rate.

The literature on sovereign debt and default - especially bargaining models where debt is renegotiated - is also relevant to our setting.[3] There the framework is typically that of a small country which is subject to income shocks and borrows abroad to smooth aggregate consumption. Renegotiation is usually modelled by Nash bargaining and a dynamic general equilibrium is obtained, allowing for calibration of the model to capture fluctuations in output, borrowing and default rates. A recent paper in this vein by Asonuma and Trebesch (2016) is particularly relevant to our work; they employ a modelling approach similar to that just described, but allow for pre-emptive restructuring of debt - corresponding to resolution by stability contribution in our case - as well as post-default restructuring - corresponding to the imposition of a stability tax in our setting. The parties engage in generalised Nash bargaining in both types of restructuring. In our model there is Nash bargaining at the pre-emptive stage only, *i.e.*, over the stability contribution, but the government uses the stability tax rate to create a threat point in the bargaining process. To be credible, the tax rate must be set so as to maximise the expected utility of Iceland's payoff in the case of disagreement and a court dispute. Our model is set up to capture a one-off interaction and is therefore static.

We rely on the sovereign debt and default literature for numerical values of parameters describing risk aversion, bargaining power and - to some extent - dispute costs. We then calibrate the median value and standard deviation of the distribution for the decision standard to the observed outcome of the resolution of the failed banks. Here the model fits and the strategy succeeds, as we shall see.

There was a second stage of negotiations. In June 2016, a year after announcing its strategy on the resolution of the ISK overhang, the Icelandic authorities attempted to execute a restructuring of locked-in carry trade funds - also referred to as 'offshore ISK' - similar to that of the assets of the old banks. The strategy

[3]The seminal paper in this literature is Eaton and Gersovitz (1981). For bargaining models of sovereign default see *e.g.*, Bulow and Rogoff (1989), Kovrijnykh and Szentes (2007), Bi (2008), Benjamin and Wright (2009), Bai and Zhang (2010), D'Erasmo (2010), Yue (2010), Pitchford and Wright (2012), Arellano and Bai (2014), Hatchondo et al. (2014), Asonuma (2016) and Asonuma and Trebesch (2016). Also related to our work is Arellano et al. (2013) who study 'partial' sovereign default.

consisted of a haircut - similar in magnitude to the previously announced stability tax on bank assets - to be executed by 'voluntary' participation in an auction of foreign currency conducted by the Central Bank of Iceland, combined with a threat to lock in the ISK-denominated assets that were not offered for sale in the auction. But this time the strategy largely failed: only a third of the assets was offered for sale in the auction.

This too conforms to our bargaining model, which we adapt to the restructuring of the offshore ISK. In this version of the model Iceland and investors holding offshore ISK bargain over the haircut to be applied to those funds as they are converted to foreign currency. In the case of disagreement a court dispute is expected *ex ante*; if Iceland were to win that dispute the haircut is applied, if Iceland loses the investors retain their funds without any haircut and can convert them into foreign currency. Both parties suffer costs in the case of dispute. The difference in this case is that the investors' assumptions diverged notably from those of the authorities, who did not take account of changes in their bargaining power.

The centre-piece of the political economy framework here is the lever that capital controls provide for the authorities, counterbalanced by pressures to remove them. The case of Iceland is not unique: in the 1980s several emerging market countries used capital controls as levers in debt restructuring - sovereign and private - for reducing outflows of foreign exchange reserves.[4] Hence, even if circumstances are different in each country, there are important lessons to be learned from the case of Iceland.

The next section gives background on the capital controls, why they were imposed and how the overhang of ISK-denominated funds made them so challenging to remove; Section 3 provides an informal discussion of the principles involved in resolving the problematic ISK assets and presents the actual strategy of Iceland; Section 4 presents the bargaining game between Iceland and the creditors of the old banks, including assumptions on functional forms and numerical values for parameters in the model; Sections 5 and 6 present the actual outcome of the bank resolution and a calibration of the model based on that outcome, respectively; Section 7 recounts the attempted resolution of the offshore ISK and an analysis of the probable cause of its failure; Section 8 briefly discusses the external and fiscal consequences of the resolution; Section 9 concludes. Two appendices give details on the creation and financing of Iceland's new banks and the rules on bankruptcy and composition in Icelandic law, respectively.

[4]See, *e.g.*, Buchheit (1987) on the case of Costa Rica and Daly and Buchheit (2015) on the cases of Mexico and the Philippines.

2 The capital controls and the ISK overhang

This section explains why assets denominated in Icelandic krona but held by foreign investors made it so difficult to remove the capital controls. We pay particular attention to the situation in June 2015, when the Icelandic authorities issued a strategy for restructuring the overhang.

2.1 Imposition of the capital controls

Iceland's capital controls were imposed during the banking crisis of October 2008. In March 2017 they were mostly removed in practice by changes to the Central Bank's regulation on currency exchange (Central Bank of Iceland, 2017b), but they are still in force by statute and could in principle be introduced again at short notice.

The controls were put in place to prevent capital flight, especially outflows of carry trade money.[5] The carry trade funds had come into the small Icelandic economy attracted by high interest rates during the boom period before the crisis. The Central Bank of Iceland (CBI) had raised interest rates to check inflationary pressures and support the exchange rate. As confidence in the banks fell over the course of 2008, the exchange rate of the Icelandic krona (ISK) fell too, most rapidly in the days before and during the crisis. The Central Bank continued to support the exchange rate during the crisis, purchasing kronas out of foreign exchange (FX) reserves. Within a few days this became untenable, as net reserves became negative.

Foreign exchange transactions effectively ceased during the banking crisis. A few weeks later, in November, the capital controls were formally implemented as 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;[6] it was subsequently modified several times, mainly for closing loopholes and tightening the controls.

2.2 The challenge of lifting the controls

At first the main challenge in lifting the controls appeared to be the remainder of the carry trade money - the so called offshore kronas. Even if much of these funds

[5] 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).

[6] 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.

had left by the time the controls were imposed, the equivalent of 40% of 2008 GDP was locked in.[7] This stock, which was foreign owned and held in cash or invested in liquid assets, clearly presented a serious balance of payments risk.

In early 2012 the problem posed by the offshore ISK had been somewhat reduced - the stock now amounted to 26% of GDP. But now another, larger problem was made public: ISK assets - or FX claims on Icelandic parties without FX income (below: 'domestic FX claims') which posed a similar problem - held by the estates of the failed, but still unresolved Icelandic banks. In total these assets were estimated to be 54% of GDP (Parliament of Iceland, 2012).

Most of the banks' bondholders were US-based hedge funds. Had payments out of the estates been enabled, the total ISK overhang would have been 80% of GDP. Demand for converting a sum of that magnitude into foreign currency over a short period of time - as was the most likely scenario had restrictions on capital outflows been removed - constituted a major balance of payments risk as well as a serious threat to financial stability and general welfare in Iceland. So the authorities took action: exemptions granted to the old banks in the Foreign Exchange Act were tightened; rules which had enabled them to pay creditors in foreign currency were restricted. Moreover, the Bankruptcy Act was changed, restricting provisions for paying out ISK 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 problem had been contained, if not solved, by locking the assets into the estates. They could only be released subject to approval of the Icelandic authorities.

Over the next three years, the ISK overhang became somewhat more manageable. The stock of offshore ISK fell gradually, and by mid-2015 it stood at approximately 14% of GDP; much of the reduction came from purchases of ISK assets by domestic pension funds at a substantial discount to the official exchange rate. ISK holdings and domestic FX claims of the bank estates also fell as a ratio of GDP, from 54% to 42%, mostly from robust growth of real and nominal GDP. But an ISK overhang of more than half GDP still represented a huge problem.

[7] 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. By this token, carry trade money worth some 30% of GDP exited during the month that passed until the crisis started in October 2008.

Table 1: 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	-	14.6
Domestic FX	2.2	3.0	13.6	18.7
Foreign	27.6	27.2	5.7	60.6
Total assets	44.3	37.8	20.8	103.0
Claims				
Priority claims	-	-	9.5	9.5
General claims	102.8	127.6	72.8	303.2
Total claims	102.8	127.6	82.3	312.7
Estimated recovery to general claims	43%	30%	16%	31%
Foreign assets as percentage of total assets	62%	72%	28%	59%

Source: Central Bank of Iceland, authors' calculations

2.3 Failed banks' ISK assets

There were three failed banks: Glitnir, Kaupthing and Landsbanki. Each of these banks had an owner and/or creditor relationship with a specific new bank - Íslandsbanki, Arion banki and (new) Landsbanki, respectively - set up on basis of the domestic assets and liabilities carved out of the old bank during the 2008 crisis; see Appendix 1 for the details of this structure.

Table 1 gives a breakdown of the assets and liabilities of the three old banks at mid-2015. Domestic assets of the banks were 42.4% of GDP in total. More than half of these assets were ISK-denominated, the major part being creditor share of equity in two new banks. Claims on domestic parties denominated in foreign currency ('Domestic FX') were almost 19% of GDP, three-quarters of this being FX-denominated bonds issued by the new Landsbanki and held by the old (failed) Landsbanki (LBI).[8],[9]

Foreign holdings constituted the majority of assets at Glitnir and Kaupthing. 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.[10] In principle, foreign holdings

[8]The bonds covered the difference between assets and liabilities transferred from the old Landsbanki to the new bank in 2008.

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

[10]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

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.

2.4 Domestic outflows and necessary restructuring

In addition to the foreign overhang, 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. This was probably an overestimate, since it disregarded home bias.[11] Nevertheless, potential resident outflows, from pension funds and others, were on the order of 20-25% of GDP. Iceland had liberalized the capital account with very unbalanced domestic portfolios - starting from practically no foreign portfolio investment - without problems when Iceland entered the European Economic Area in 1994. But there was no foreign-owned overhang of ISK assets then.

It was necessary to resolve the problem of the foreign overhang before foreign investment by residents could be allowed. Since the underlying international investment position was within normal bounds,[12] 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 determined that it would

Kaupthing had previously paid all their priority claims, approximately 11% of GDP.

[11] '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 (Coeurdacier and Rey, 2012). 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.

[12] Until the end of 2015 the international investment position (IIP) of Iceland as well as its current account had 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. The underlying IIP position gradually improved and was estimated to be negative at 33% of GDP by mid-2015 (Central Bank of Iceland, 2015b).

not do so and raise its already high debt to let out foreign holdings of ISK.[13] Thus, the refinancing problem turned into a balance of payments problem.

In principle, the outflows could have been financed from a surplus on the current account. This 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 large surplus on the current account. Most likely this would have 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 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.[14] And the controls would remain in place in the meantime.

The remaining and only politically and economically feasible strategy was to restructure the foreign overhang.[15] The first stage, accomplished in 2014, was a reprofiling of the Landsbanki bonds (14% of GDP), which cut their servicing burden by two-thirds. But there were still the ISK assets and remaining domestic FX assets of the failed banks and the offshore kronas, in total 43% of GDP.

From 2012 to mid-2015, various Icelandic parties (including ourselves) made proposals for the necessary restructuring.[16] Some of the proposals involved forcing the failed banks into bankruptcy rather than allowing them to enter into composition agreements,[17] 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.[18] But the

[13]For example, it was only in 2015 - seven years after the crisis - that Icelandic banks received an investment-grade credit rating by Standard & Poor's. Icelandic banks began accessing international capital markets in 2013 but with high margins until mid-2016 (Baldursson and Portes, forthcoming).

[14]This was especially true after the Icesave dispute. See Baldursson and Portes (2013, 2018).

[15]This was argued forcefully in Baldursson and Portes (2014).

[16]Baldursson and Portes (2014) contains a blueprint for how to do the restructuring; that blueprint is more-or-less identical to the strategy announced in June 2015.

[17]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 were able to negotiate payments to creditors, including the currency in which they were disbursed. Following a confirmation of their composition agreements, the old banks could resume existence as normal solvent entities, free from any legislative encumbrances 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.

[18]See *e.g.,* Pétursson (2013)

Icelandic Supreme Court eventually 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. The hedge funds also tried to affect the outcome, submitting proposals to the Icelandic authorities (Morgunbladid, 2014).

3 The 'Comprehensive Strategy' for resolving the overhang

In Section 4 we shall present a formal framework for analysing the strategic interaction between the Icelandic authorities and the US hedge funds that were the creditors of the failed banks. But first we provide an informal discussion of the principles involved in resolving the problematic ISK assets and present the actual strategy of Iceland. The principles for resolution had to satisfy two conditions:[19]

1. To create economic incentives, becoming 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. To establish 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 Central Bank had issued a strategy for lifting the controls in the first years after they were imposed (Central Bank of Iceland, 2009, 2011), but that strategy was flawed and failed on both the above points.[20] For consistency with the principle of proportionality, it was also important to be clear on the proper role of the authorities. 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

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

[20] 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.

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."

The political economy of this configuration imposed clear limits on the Icelandic authorities. They were indeed careful to avoid formal bargaining with creditors, opting instead for informal consultations. In mid-2014, they started such consultations on how to restructure the problematic assets and engaged a group of international and Icelandic experts (Ministry of Finance, 2014b).

Eventually, in June 2015, a 'Comprehensive Strategy for Capital Account Liberalization' (Ministry of Finance, 2015a) was announced. The measures proposed in fact concerned mostly how to deal with the offshore kronas (see Section 7) 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 strategy on the bank estates was intended to set up strong economic incentives for creditors to finish resolution of the estates by composition agreements. Parliament passed a law creating a so-called 'stability tax' of 39% to be imposed in 2016 on the book value of assets of bank estates in winding-up proceedings 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 so-called 'stability conditions' laid out by the Central Bank (2015a).[21] 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 Central Bank 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.

Before discussing the details of the actual resolution, the next section presents a bargaining framework for analysing the strategic interaction between creditors and

[21] Glitnir (2015) includes a nuanced analysis of the financial consequences for the estate of these two options under the heading 'Stability contribution vs. stability tax'.

the Icelandic authorities.

4 Bargaining framework

The model is a simple bargaining game set up to capture the main elements of Iceland's strategy vis-à-vis the international creditors of the failed banks.[22] Exogenous to the model is the design of the bargaining game. This is part of the political economy framework, in which the rules of the bargaining game were decided. Here Iceland definitely had the upper hand due to the lock-in of assets and the ability of the sovereign to enact laws, impose taxes etc.

4.1 Model

We model the group of creditors as a single agent and lump the banks together as one asset structure. These assumptions rest 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 $x = X/Y$ where Y is domestic GDP. Without loss of generality, we normalise the value of A to 1 below.

The game proceeds as follows:

1. Iceland announces its intention to impose a tax at rate t on bank assets. Iceland and creditors then engage in generalised Nash-bargaining, with relative bargaining power $\alpha \in (0,1)$ and $1-\alpha \in (0,1)$, respectively, over how to split the banks' assets. If the parties come to an agreement, the game ends at this stage by creditors making a 'stability contribution' of s, where $0 < s < t < 1$. Payoffs in the case of agreement are

$$\begin{aligned} y^a(t) &= s, \\ z^a(t) &= 1 - s, \end{aligned} \tag{4.1}$$

   for Iceland and creditors, respectively.

2. If the parties do not come to an agreement in Stage 1 then Iceland imposes the tax at the previously announced rate; creditors are bound to contest the

[22] Here we disregard the distinction between 'informal consultation' and 'bargaining' discussed in Section 3 and thus take the Icelandic authorities to be one of the bargaining parties.

imposition of the tax in court.[23],[24] Creditors lose the case with probability $p(t\,|x,y)$ (see discussion of this function below) in which case they pay the tax and retain $1-t$; creditors win with probability $1-p(t\,|x,y)$ and retain all the assets. The dispute will cost $k>0$ and $c>0$ for Iceland and creditors, respectively. Let I be an indicator random variable which is equal to 1 if Iceland wins and zero if Iceland loses. Payoffs are then given by

$$\begin{aligned} y^d(t) &= tI-k, \\ z^d(t) &= 1-tI-c, \end{aligned} \tag{4.2}$$

for Iceland and creditors, respectively.

3. The game ends.

We assume that all elements of the game are common knowledge among the parties. Moreover, we assume creditors to be risk neutral so they choose a strategy to maximise their expected payoff. Iceland on the other hand is taken to be risk averse and maximizes expected utility of its payoff, $Eu(y)$, where u is a concave utility function.[25]

For simplification, we assume that the return on assets equals the discount rate for both parties so the time it takes to resolve a dispute (which is likely to be on the order of five years) does not affect the disagreement payoffs. Another simplifying assumption is to have the game end conclusively at Stage 3; if Iceland's offer were to be rejected by creditors and they would 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 ISK overhang; we do not model that continuation game.

The assumption that Iceland wins (and creditors lose) a court contest with a certain probability, $p(t\,|x,y)$, which is a function of the tax rate t conditional on the amount of ISK-denominated assets x and other relevant aspects of the case collected in an information set y, is key in the game; y could include items such as an estimate of the economic damage the old banks were considered to have caused to Iceland as

[23] We can disregard the possibility that creditors do not contest the tax - they would be better off making a corresponding stability contribution in that case.

[24] We do not specify to which jurisdiction the case would be brought. The possibility that creditors could successfully bring a case against Iceland before a court in the US and the high proportion of bank assets held outside Iceland no doubt strengthened their bargaining position. See Buchheit (1987) and Daly and Buchheit (2015) for insights into related legal aspects.

[25] These assumptions are standard in the literature on sovereign debt and default. However, Asonuma and Joo (2017) explore a multi-round debt renegotiation with risk-averse creditors and find that foreign creditors' business cycles influence both the processes and outcomes of sovereign debt restructurings.

well as the amount of windfall gains made by creditors by investing in the banks' bonds. The existence of such a function can be justified by the concept of a *decision standard* (Priest and Klein, 1984) which in this case is the cutoff point, or a critical tax rate, T, for the imposed tax to be found lawful. We assume that this critical rate is unknown, but its *ex ante* statistical distribution, given x and other relevant information, y, is known. The probability that the imposed tax t is found lawful (constitutional) by the court is equal to the probability that t does not exceed the decision standard. Hence, $p(t\,|x,y) = \Pr_{x,y}\{T \geq t\}$.[26] It follows that p is decreasing in the tax rate t, other things being equal.

It also seems reasonable to assume that a higher ratio of ISK-denominated assets increases the probability of a judgment for Iceland; a high ratio makes lifting the capital controls riskier and more difficult for Iceland and makes imposing a given tax rate easier to justify. Formalizing these considerations, we assume that $p(t\,|x,y)$ is a smooth function which satisfies the following conditions:

1. For a given stock of ISK assets, x, and information set y the probability of Iceland winning decreases with the tax rate, $p'(t\,|x,y) < 0$.

2. A tax rate of zero implies a certain win for Iceland, $p(0\,|x,y) \equiv 1$, while a rate of 100% implies a certain loss, $p(1\,|x,y) \equiv 0$.

3. For given tax rate and value of y, the probability of an Icelandic win increases with the ratio of ISK assets, x, $\frac{d}{dx}p(t\,|x,y) > 0$.

The analysis below is done for arbitrary but fixed values of the conditioning variables x and y. To reduce clutter we shall usually omit them and write $p\,(t)$ rather than $p(t\,|x,y)$.

To find the recursive equilibrium in this game, first assume the parties have disagreed at Stage 1 and consider how Stage 2 then plays out for an arbitrary tax rate $t \in (0,1)$. Expected utility/payoff is given by

$$\begin{aligned} Eu\left(y^d\,(t)\right) &= p(t)u\,(t-k) + (1-p(t))\,u\,(-k)\,, \\ Ez^d(t) &= 1 - p(t)t - c, \end{aligned} \tag{4.3}$$

for Iceland and creditors, respectively. Regardless of what tax rate Iceland announced at the beginning it will now want to adjust it to maximise its expected

[26] In the original litigation model of Priest and Klein (1984) the decision standard is known and fixed, but the quality of the case is subject to random observational error, independently by each party. Such an assumption is reasonable when there is a well-established precedent, but that is not the case here. Waldfogel (1995) allows for estimation error for the decision standard as well as the merits of the case. In this paper the parties do not attempt a point estimate of the decision standard, but, rather, make an assumption regarding its distribution.

utility at this stage. To ensure that there is a unique maximum we assume that $Eu\left(y^d(t)\right)$ is strictly quasi-concave. Then there is a unique tax rate t^* that achieves maximum utility, *i.e.*, $t^* = \arg\max_t Eu\left(y^d(t)\right)$. This is the only credible tax rate for Iceland to announce at the outset.

The first-order condition for maximum of $Eu\left(y^d(t)\right)$ at t^* is

$$p(t^*)\,u'(t^*) + p'(t^*)\left[u(t^* - k) - u(-k)\right] = 0.$$

The first term is positive and represents the marginal increase in expected utility from a rise in the tax rate, disregarding the change in the probability of an Iceland judgment; the second term is negative and represents the marginal drop in expected utility due to a lower probability of winning as the tax rate is increased. The optimum tax rate balances these two effects. It is straightforward to show, using the concavity of u, that risk aversion reduces the optimal tax rate from that obtained under risk neutrality of Iceland.

The Nash product to be maximised with respect to s at Stage 1 is given by

$$N(s) = \left[u\left(y^a(t^*)\right) - Eu\left(y^d(t^*)\right)\right]^{\alpha}\left[z^a(t^*) - Ez^d(t^*)\right]^{1-\alpha}.$$

Substituting from (4.1) and (4.3) we get

$$N(s) = \left[u(s) - Eu\left(y^d(t^*)\right)\right]^{\alpha}\left[-s + p(t^*)t^* + c\right]^{1-\alpha}.$$

After simplification, the first-order condition for maximising $N(s)$ reduces to

$$\alpha\left[-s + p(t^*)t^* + c\right] = (1-\alpha)\,E\left[\frac{u(s) - u\left(y^d(t^*)\right)}{u'(s)}\right]. \tag{4.4}$$

Using the concavity of u and a second-order Taylor expansion, it is now straightforward to show that

$$s^* = t^* \cdot p(t^*\,|x, y) + \alpha c - (1-\alpha)k - (1-\alpha)\,\Delta, \tag{4.5}$$

where

$$\triangle = \frac{-u''(s)}{u'(s)} E\left[s - y^d\right]^2 + O\left(\left|y^d - s\right|^3\right) \geq 0. \tag{4.6}$$

It is straightforward to show that

$$s^n = t^* \cdot p(t^*\,|x, y) + \alpha c - (1-\alpha)k$$

is the Nash bargaining stability contribution when Iceland is risk neutral. It follows directly that risk aversion lowers the stability contribution; the reduction comes in addition to the reduction in the optimal tax rate.

The following proposition now easily follows :

Proposition 1. *a) Differences between expected payoffs with and without agreement are*

$$u\left(s^{*}\right)-Eu\left(y^{d}\left(t^{*}\right)\right)=\alpha\left(c+k+\Delta\right)u'\left(s\right)>0$$

and

$$z^{a}\left(s^{*}\right)-\bar{z}^{d}\left(t^{*}\right)=(1-\alpha)(k+c+\Delta)>0$$

for Iceland and creditors, respectively, where $\Delta \geq 0$ *is given by (4.6). It follows that both parties are better off settling on* s^{*}*. Hence, the game will end at Stage 1 by settlement where creditors make the stability contribution* s^{*}*.*

b) As Iceland approaches risk neutrality, Δ *tends to zero and the stability contribution tends to* $p^{*}t^{*}+\alpha c-(1-\alpha)k$*. Hence, in the case of Iceland's risk neutrality, the bargaining solution splits the surplus (costs of not settling),* $k+c$*, between the parties according to their relative bargaining power.*

We note the following for the special case when Iceland is risk neutral:

1. With small dispute costs (relative to the stakes in the game) the solution will be close to a simpler case with zero costs. In the limit, as costs approach zero the equilibrium stability contribution will tend to a break-even value equal to the maximal expected tax revenue $s^{*}=t^{*}\cdot p(t^{*}\left|x,y\right.)$.

2. If the ratio of dispute costs equals the ratio of bargaining strengths, $k/c=\alpha/(1-\alpha)$, then the equilibrium stability contribution is also equal to the break-even value $s^{*}=t^{*}\cdot p(t^{*}\left|x,y\right.)$. This holds, in particular, if both bargaining strength and costs of the parties are the same.

3. In the limit, as $\alpha\rightarrow 1$, the bargaining equilibrium tends to a Stackelberg solution where Iceland is first mover. The stability contribution then tends to $t^{*}\cdot p(t^{*}\left|x,y\right.)+c$. At this limit, the full amount of creditor dispute costs is added to the expected tax revenue, whereas Iceland's costs don't affect the stability contribution.

The following proposition sums up the results on the equilibrium of the bargaining game.

Proposition 2. *The subgame perfect equilibrium of the game is given by Iceland announcing at the outset that it intends to impose the tax rate* $t^{*}=\arg\max_{t} Eu\left(y^{d}\left(t\right)\right)$.

Following on that announcement the parties end the game in Stage 1 by settling on the creditor stability contribution s^* which satisfies the equation (4.4). In the case where Iceland is risk neutral the tax rate is chosen so as to maximise expected revenues, $t^* = \arg\max_t t^* \cdot p(t^* | x, y)$, and the stability contribution simplifies to $s^* = t^* \cdot p(t^* | x, y) + \alpha c - (1 - \alpha)k$. Risk aversion reduces the optimal tax rate and the equilibrium stability contribution.

4.2 Functional forms and parameter values

Utility function

As is standard in the sovereign debt literature we assume that Iceland's utility is given by the constant relative risk aversion (CRRA) utility function

$$v(c) = \frac{c^{1-\gamma}}{1-\gamma},$$

where c is aggregate consumption. Since our model is static we assume c to stand in direct relation to national wealth. Normalising national wealth at the outset of the game to 1 we can then define utility in terms of payoffs

$$u(y) = v(1 + c_w y)$$

where c_w is a scaling coefficient, converting payoffs y into units of national wealth.

Distribution of decision standard

We assume the probability distribution of the decision standard T to come from the beta family of distributions. This gives a rich set of distributions on the interval $[0, 1]$, which includes *e.g.*, the uniform distribution as well as distributions where the probability mass is bell shaped (although not necessarily symmetric) and more concentrated around a given value. The beta distribution is usually indexed by two parameters, a and b in the formula for its probability density function, $f(x|a, b) = Cx^a (1 - x)^b$, where C is a normalising constant. We use this parametrisation in the technical execution of calibration of the model below. However, we express the results in terms of the the median, m, and standard deviation, σ, of the relevant distribution; there is of course an isomorphism between these two parametrisations so they are equivalent, but the latter is more directly relevant and intutitive in terms of our model.

Parameter values

With the above functional forms there are seven parameters in the model that need to be specified to obtain predictions from it: c_w, γ, α, c, k, m and σ. Below we specify values for the first five parameters, leaving the parameters of the beta distribution, m and σ, free for calibration of the model. Most of the assigned parameter values are subject to a high degree of uncertainty so we shall also consider alternative values in a sensitivity analysis.

We proxy national wealth at the time of bargaining by the stock of fixed capital assets plus the net international investment position of Iceland both measured at the end of 2014. The ratio of wealth to GDP (2015) on this measure was 3.16. Since neither natural nor human resources are included in the fixed capital stock this is likely to be an underestimate of actual national wealth. This will tend to exaggerate somewhat the relative impact of payoffs on wealth and, thus, the impact of risk aversion as well. However, we set the scaling parameter to the value $c_w = 3.16^{-1} \doteq 0.31$.

It is common in the sovereign debt and default literature to take the coefficient of relative risk aversion, γ, to be equal to two; see *e.g.*, Asonuma and Trebesch (2016) and the literature cited therein. We follow this convention and assume $\gamma = 2$ as our main case.

We also go to recent papers on sovereign debt and default that rely on Nash bargaining for estimates of α, the bargaining power of Iceland; Yue (2010), D'Erasmo (2010) Asonuma and Trebesch (2016) find the values 0.72, 0.574, 0.83, respectively for the bargaining power of Argentina and the last paper finds the value 0.57 for Uruguay. Here we assume α to be equal to 0.7.

As for the values of c and k each party has to be considered separately. The main cost item for creditors will be direct costs of preparing and pursuing litigation.[27] We assume litigation costs for creditors as a share of assets to be 3%, *i.e.*, $c = 0.03$[28]

We assume the same litigation costs for Iceland as for creditors. However, in addition to direct costs Iceland could potentially suffer indirect, less tangible costs in the case of a dispute with international creditors – loss of reputation, market exclu-

[27] In the law and economics literature costs of litigation are generally assumed to be large relative to the stakes. For example, Priest and Klein (1984) and Waldfogel (1995) assume (based on lawyers' contingent fees in personal injury litigation) the sum of costs of plaintiff and defendant, in excess of settlement costs, to be one-third of the judgment amount. In the case of the bank resolution in Iceland a third of the revenue from the announced stability tax was about $2 bn. It is hard to believe that litigation costs – even with very highly paid lawyers and consultants – would be this high.

[28] With assets worth $17 bn this is equivalent to $500 mn or $100 mn per year on average if litigation takes five years.

sion etc. Going once more to the literature on sovereign debt and default, Asonuma and Trebesch (2016) estimate the cost of unilateral default on sovereign debt to be 2% of GDP in each period of renegotiation whereas pre-emptive restructuring carries a cost of 1.5% in each period. Taking into account that renegotiation takes on average four years longer in the case of outright default, the total net cost of unilateral default is therefore approximately 8.5% of GDP on average in their study. We assume this type of costs to be somewhat lower in our case, or about 7% of GDP, bringing Iceland's total dispute costs to about 10% of GDP. Since bank assets were approximately equal to GDP we also assume this to be the value of Iceland's costs as a share of assets, *i.e.*, $k = 0.1$.

Given the above parameter values we can calibrate the model by finding values of the parameters of the beta distribution that replicate the observed values of the announced tax and stability contribution. We shall do this in Section 6. As a point of reference, however, we can note here that with these parameter values and the decision standard distributed uniformly on the unit interval ($m = 0.5$ and $\sigma = 12^{-0.5} \doteq 0.29$, indicating that any value in the range $(0, 1)$ is equally likely) the optimal tax rate and stability contribution are found to be $t^* = 0.47$ and $s^* = 0.23$, respectively. Were Iceland risk neutral the optimal tax rate and stability contribution would equal 0.5 and 0.24, respectively.

5 Resolution of failed banks

The analysis of the previous section indicated that a judiciously chosen 'stability tax' as a threat in bargaining for a 'stability contribution' could lead to a quick resolution of the failed banks by a stability contribution. If successful, this outcome could eliminate the balance of payments risk and create substantial revenues for the Icelandic state without a conflict with the creditors.

Events certainly played out quickly after the announcement of the 'stability' measures in June 2015 (cf. Section 3): major creditors sent letters to the Ministry of Finance (2015b, 2015c, 2015d) stating their intention to enter into composition agreements[29] and outlining how the stability conditions were to be met by various 'voluntary stability contributions'. Even if formal negotiations had not taken place, there was an understanding between creditors and the authorities on how to proceed.

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

[29] Cf. Section 3. See Appendix 2 for the details on outright bankruptcy versus composition.

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.[30]

Amendments were also made to the Act on Financial Undertakings to facilitate the Icelandic banks entering into composition agreements with their creditors.[31] 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.[32]

- Composition entitlements. As previously discussed, payments under composition agreements, so-called composition entitlements, include some type of 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 own the old banks. The proportional shareholding of each creditor depends on the amount of his claim.

Table 2 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.[33] For ease of comparison with Table 1 we cast the results in terms of 2015 GDP.

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.

[30]See Appendix 2 for details on the relevant voting rules.

[31]See Appendix 2 for details on these amendments.

[32]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 Appendix 2 for details.

[33]See Central Bank of Iceland (2015c) for details on the resolution and the estimated impact on balance of payments.

Table 2: 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
Financing of new banks	2.5	4.4	0.0	6.9
Impact on FX reserves	-1.3	2.5	0.7	1.9
Per cent of total reserves at end-2015	-4.3	8.4	2.3	6.4

Source: Central Bank of Iceland (2015c) and author's calculations

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 all financial institutions, including the failed banks. This they would have done regardless of their choice between a stability contribution or a stability tax, so we do not include the tax in the resolution measures.[34]

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 1). This contribution came in the form of cash, equity and bonds; in particular, Glitnir handed all equity in Íslandsbanki to the state.[35] ISK assets of the banks were a total of 24% of GDP, so the stability contribution plus the aforementioned bank tax amounted to 72% of those assets. However, total assets of the banks were approximately 90% of GDP (netting out the share of the already renegotiated Landsbanki bonds) so the stability contribution was a much lower share of total assets, or 19%. This is the actual 'haircut' in the resolution and the observed value of s^* in our analytical framework.

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

An important part of the understanding 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 of assets after stability contributions had been made.

The game theoretic analysis of Section 4 indicated that an early resolution of the

[34]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.

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

Table 3: Results of calibration

Per cent of bank assets, unless specified otherwise	m	σ	$p(t^*)$
Baseline: $\alpha = 0.7$, $c = 0.03$, $k = 0.1$, $c_w = 0.31$, $\gamma = 2$	38.3	17.3	67.4
$\alpha = 0.6$	39.2	15.8	71.5
$\alpha = 0.8$	36.7	18.9	62.9
$c = 0.02$	38.9	16.5	69.7
$c = 0.04$	37.6	18.3	64.9
$k = 0.09$	37.9	17.7	66.4
$k = 0.11$	38.6	17.0	68.3
$c_w = 0.25$	38.0	17.1	67.2
$\gamma = 1$	37.8	16.8	67.0

bank estates by stability contributions was to be expected, especially with rational, skilled actors.[36] The outcome is certainly consistent with that analysis. It was probably also supportive of the outcome, that a majority - 71% based on 2013 numbers - of creditors purchased their claims at a price lower than 33% of nominal values (Glitnir, 2013). These creditors stood to make a certain and quick accounting profit by opting for stability contributions.[37]

6 Calibration

We now calibrate the model of Section 4, fitting the two 'free' parameters of the distribution for the decision standard so that the model outcome matches the observed values for the tax rate and stability contribution, $t^* = 30\%$ and $s^* = 19\%$. Baseline values for other parameters are as given in subsection 4.2.

The outcome of the calibration exercise is shown in the top line of Table 3 ('Baseline'). The median decision standard for the tax rate is found to be about 38% with a standard deviation of 17%. This implies that the probability of Iceland winning the case at the observed tax rate of 30% is estimated to be 67%. Importantly, the estimate of the standard deviation implies considerable uncertainty about the true value of the decision standard: 50% and 90% confidence bounds are given by 26%-51% and 13%-70%, respectively.

It is difficult to find close parallels to this case for comparison. The 'Fifty Percent Rule' in the law and economics literature (Priest and Klein, 1984; Kessler et al., 1995) does predict that the win rate of plaintiffs that go to trial rather than settle

[36]Iceland was helped by the advice of some highly skilled and experienced experts.

[37]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.

tends to 50% (even as the fraction of cases going to trial approaches zero); here the implied probability of the creditors winning is 33%. However, the theory behind the Fifty Percent rule rests on some strong assumptions - in particular of clear and available precedent - that hardly seem justified in our setting. Indeed, as shown by Waldfogel (1999), the rule is no longer valid when the strict assumptions of the original Priest and Klein model are relaxed. The win rate of plaintiffs (investors) in investment arbitration trials is possibly an appropriate empirical comparison; there, states win 60% of cases (Franck and Wylie, 2015) - not far from our estimate of the implied probability of an Iceland judgment. It should, however, be noted that cases that go to trial are in general not representative of the total population of cases.

Icelandic case law does not allow for a statistical estimation of win probabilities here. But there is anecdotal evidence: in the 1950s property taxes up to 25% were imposed twice over a seven-year period on certain Icelandic citizens who had made windfall gains by a large depreciation of the Icelandic krona. These taxes were found by the Supreme Court not to violate the constitution (Helgadóttir, 2006). Combined, these taxes resulted in a cumulative 44% tax, *i.e.*, in the same ballpark range as our baseline estimate for the median value of the decision standard.

Table 3 also gives the results of a sensitivity analysis where one of the given parameters is varied at a time. Here it should be noted that since the observed values of t^* and s^* are given and fixed, anything that weakens the bargaining hand of Iceland, directly or indirectly, should, intuitively, indicate a higher cutoff point for the decision standard - *i.e.*, a higher value of m. The results are in line with this intuition: first, Iceland's bargaining power is set close to the lower and upper range of estimates from the sovereign debt and default literature; lower bargaining power raises the median value for the decision standard and, consequently, the implied probability of an Iceland win at t^* and vice versa for higher bargaining power; lower cost of litigation for creditors has a similar qualitative effect as lower bargaining power for Iceland; lower dispute costs of for Iceland have the opposite effect, as would be expected; a lower relative risk aversion parameter, viz. $\gamma = 1$ - corresponding to a logarithmic utility function[38] - also lowers the implied median value and probability of an Iceland win; finally, lowering the scaling parameter for the conversion of monetary payoffs to national wealth from 1/3.16 to 1/4 has a similar qualitative effect as lower risk aversion. The baseline results are rather robust to these parameter variations: m varies between 37% and 39% and σ between 16% and 19%. Figure 6.1 shows the probability density functions for all parameter values in

[38]Gandelman and Hernández-Murillo (2015) use micro data to estimate γ for a large set of developing and developed countries and find that it varies closely around one.

Figure 6.1: Implied probability density functions for the decision standard

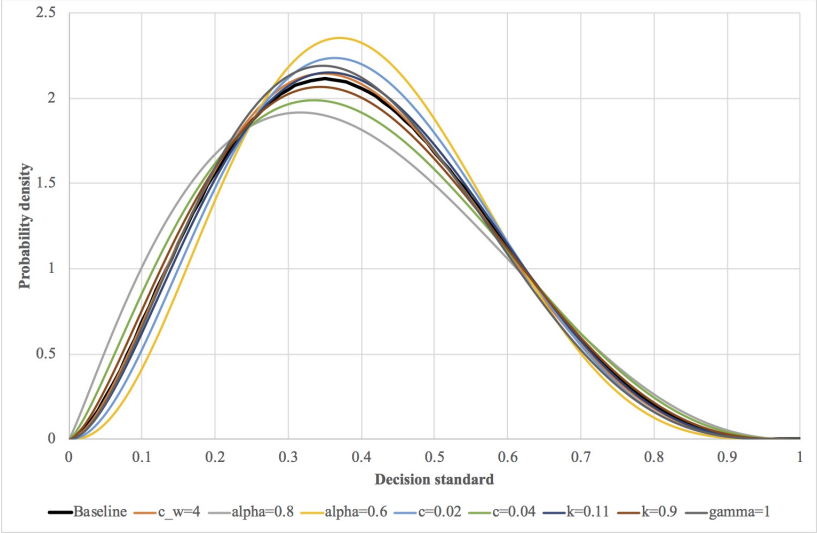


Table 3.

Qualitatively, these results are consistent with a belief by the parties that the "Fifty Percent" point (*i.e.*, median value) for the highest lawful tax rate lies somewhere in the interval 35% to 40%, but with considerable uncertainty about the true value: a symmetric interval around the median value for the decision standard containing the true standard with 50% probability is generally of a width of approximately 25 percentage points (*i.e.*, ±12.5 percentage points from the median value).

To sum up, at the observed tax rate and stability contribution of 30% and 19%, respectively, the calibration indicates that (in the context of our model) the parties believed the median decision standard - *i.e.*, the value of the stability tax where there is a 50:50 chance of an Iceland judgment - to be on the order of 35-40%. The calibrated standard deviation of approximately 17 percentage points indicates considerable uncertainty about the true value of the decision standard. With these parameter values the probability of an Iceland judgment, had the creditors opted to go to court, is estimated at 67%.

7 The offshore kronas

7.1 Strategy

The strategy announced by the Icelandic authorities in 2015 (Ministry of Finance, 2015a) for resolving the offshore kronas needed to take into account that they were not part of insolvency estates. Rather, they were deposits and other liquid assets -

inter alia cash and government bonds - directly held by various private parties and, while they were subject to the capital controls, they were not locked in to the same extent as assets in the banks' estates. The room for manoeuver by the Icelandic authorities was therefore more limited for the offshore kronas. In particular, it was highly risky for the Icelandic authorities to impose a tax on offshore ISK: imposing such a tax on government bonds would in all likelihood have constituted a preemptive default by the Icelandic state. Hence, giving offshore krona owners a 'menu' of options seemed a reasonable approach. Indeed, the authorities' initial strategy was to give the offshore krona owners three options:[39]

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.

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. The implementation of the above strategy on offshore ISK was, however, 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 and 'segregated' them, effectively locking them into special accounts at the Central Bank of Iceland. While the Act allowed bonds and other financial instruments to be held until maturity, any cash was to be invested in special certificates of deposit bearing an interest rate of 0.5%; for comparison, the Central Bank's key interest rate (the rate on seven-day term deposits) at the time was 5.75%. There is no sunset clause in the Act. Comparing the implementation with the initial strategy announced a year earlier, it is notable that Option 2 above, *i.e.* allowing offshore-ISK owners to invest in long-dated bonds, was abandoned, thereby narrowing available choices for the offshore ISK owners.

Following on this legislation, in June 2016 the Central Bank called for offers to sell offshore ISK assets in exchange for cash payment in foreign currency, where the

[39]Similar options were outlined in Baldursson (2012b).

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. 72% and 19%, respectively. Offshore krona owners would seem more likely to compare a haircut on offshore kronas with the latter number when making their decisions.

Events did not play out as smoothly this time as a year earlier when the bank estates were resolved. 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,[40] approximately 8% of 2016 GDP. Apparently, mainly smaller investors accepted the deal offered by the Central Bank while large investors - who were 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 as stipulated by the newly passed Act.

7.2 Analytical framework

One can apply similar analytical reasoning to this interaction as to that employed to the resolution of the failed banks in Section 4. There are, however, important differences from the previous setting: instead of the two-pronged approach of a stability tax and a voluntary stability contribution, which could be set independently of one another, the Icelandic authorities here only had one instrument at their disposal, *i.e.*, a haircut in the foreign currency auction. In principle, the interest rate on locked-in cash - approximately half the offshore ISK - was also a strategy variable to be determined, but assuming it did not affect the outcome of a possible court dispute it only made sense to set it as low as possible. And indeed it was set close to zero, effectively reducing the overall return on locked-in funds by at least a half.

There was also a different group to deal with: in addition to the same (largely) unified group of a few large hedge funds as in the resolution of the banks there was also a considerable fringe of smaller investors in offshore ISK.[41] Nevertheless, we model the group of investors as one party below.

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

[41] There was also a fringe of minority creditors in the old banks, but as described in Section 5 they were eliminated by the hedge funds themselves by *de minimis* cash payments.

Since in the simple setting of the model the haircut is now the only strategic variable to be decided by the Icelandic authoritites the game now only has one stage: Iceland announces the segregation and lock-in of offshore ISK, but gives investors the option to exit by participating in the foreign currency 'auction' accepting a haircut, h. Offshore ISK owners can either accept the haircut, take their money and leave, in which case their payoff is $1-h$ (where we normalise the value of offshore ISK to 1) or challenge the measures in court.

We assume the court would either allow or reject the rates set in the auction so the original haircut would either be upheld or set to zero. So in the case of a dispute, Iceland's monetary payoff is $h-k$, in the case of a win, or $-k$, in the case of a loss; here k is the cost of a dispute measured as a proportion of offshore ISK. Investors' payoffs are $(1-h)\,\rho^T - c$ in the case of an Iceland judgment, or $1-c$, if investors win; here c is the creditors' cost of litigation measured as a proportion of offshore ISK, ρ is the effective discount rate on the offshore ISK taking into account that cash earns a close to zero interest rate, and T is the time it takes to resolve the dispute.[42]

The offer of the haircut was only accepted by a minority of investors, *i.e.*, by what could be termed the competitive fringe in the investor group. It follows that, in the context of our model, the offered haircut was not an equilibrium outcome arising from a shared set of beliefs among Iceland and investors. Here, however, we proceed counterfactually as if the option of the haircut had been accepted. The results are therefore indicative of Iceland's beliefs rather than those prevailing on the investor side.

We make the same assumption as before on the functional form of the distribution of the decision standard for the haircut to be found lawful, but since we only have one observed value of the haircut we can only calibrate one free parameter; we thus allow the median value of the decision standard to vary and assume the standard deviation of the standard to be known and equal to the calibrated value in our baseline case above, viz. $\sigma = 17.3\%$. We still assume Iceland is risk averse and use the same utility function as above (*i.e.*, CRRA with $\gamma = 2$). We use the same scaling factor for conversion of monetary payoffs as a percentage of GDP to wealth as before ($c_w = 0.31$), but also take into account that the offshore ISK were only 14% of GDP. Iceland's relative bargaining power is set at $\alpha = 0.7$. We set $\rho = (1-(5.75\%+0.5\%)/2)^{-1} \doteq 0.975$ and $T = 5$. We assume the same absolute values for dispute costs as in the bank resolution; this implies that as a share of

[42] Iceland earns seigniorage on the locked-in cash so there is no corresponding discounting on its side.

offshore ISK the cost parameters are considerably higher than before, viz. $c = 0.21$ and $k = 0.71$, respectively.

With this parametrisation and calibrating the model to a haircut of $h = 30\%$ (close to the midpoint of the actual range of 26-33%), the median value of the decision standard distribution turns out to be 36.7%, close to, but slightly below, the value of 38.3% found for the same parameter values in the case of the bank resolution. The implied probability of an Iceland judgment for the haircut value is 64%, which is also slightly lower than the corresponding probability for the bank measures.

7.3 Why did the auction fail?

Taking the above result at face value, it indicates that Iceland had more-or-less the same expectations regarding its strategic position in the case of the offshore ISK as for the bank resolution. Evidently the hedge funds that held out evaluated their strategic position differently. They must have estimated the probability of Iceland winning as considerably lower than that implied by the offered haircut.

Arguably, there were good reasons for this: first, since the ISK assets of the failed banks had already been resolved the size of the ISK overhang had been reduced by two-thirds: from 38% to 14%. Moreover, Iceland's external circumstances had improved considerably: Iceland's GDP grew by 7.2% in 2016 on the back of strong export earnings from a booming tourism sector; continued growth was expected (and realised) in 2017. Moreover, there were strong capital 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 Central Bank imposed a reserve requirement of 40% on new inflows into Icelandic deposits and bonds, with zero interest on the reserved amount - effectively stopping such inflows. And in order to stem further appreciation of the krona, the Central Bank of Iceland purchased $3.3 bn worth of foreign currency 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. It was much harder to argue convincingly now that Iceland needed a haircut of this size to let out the offshore ISK. In the context of our model, all of these improved circumstances would be expected to shift the probability function downwards and weaken Iceland's case in the eventuality of litigation.

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.'[43] Following on this setback, however, a suit against the Icelandic state in domestic courts was prepared, on the grounds that the Act went further than necessary to avoid a balance of payments crisis and therefore constituted a breach of the property rights clause of the Icelandic constitution.[44]

The political economy environment changed somewhat. 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.[45] A website dedicated to the issue was set up,[46] and two-page advertisements were run in Icelandic newspapers accusing the Central Bank of Iceland of corruption. It is not clear who was behind these public relations efforts. It would be natural, however, for the hedge funds in question to try to improve their bargaining position.

A calibration of the model to the values set by Iceland in the auction indicates that the authorities employed similar assumptions on the distribution of the decision standard as in the case of the old banks, with the median value only slightly lowered. This despite Iceland's much improved external circumstances and the fact that much of the problematic assets had already been restructured in the bank resolution. The failure of the auction indicates that the investors - to a large extent the same hedge funds that had already taken a haircut on the assets of the old banks - did not share these assumptions, believing their chances to be better. Their strategy paid off: 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 the remaining offshore

[43]ESA Decision No: 207/16/COL

[44]A decision by the Supreme Court in Case 826/2016, Icelandic State vs. Autonomy Capital, 12 January 2017 gave a preliminary indication that the hedge funds could attain some success from litigation in Iceland. Autonomy Capital was partially successful in its request that the court would appoint assessors to evaluate the economic case for the Act and the Central Bank of Iceland's auction.

[45]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.

[46]The path was http://icelandwatch.org/, but it has since been shut down.

ISK assets. Two weeks later a similar offer was extended to owners of the remaining offshore funds, then around 4% of GDP (Central Bank of Iceland, 2017d). This offer was not accepted, however and in March 2019 the last restrictions on offshore ISK were lifted and the funds released without any haircut (Central Bank of Iceland, 2019).

8 External and public finance consequences of the bank resolution

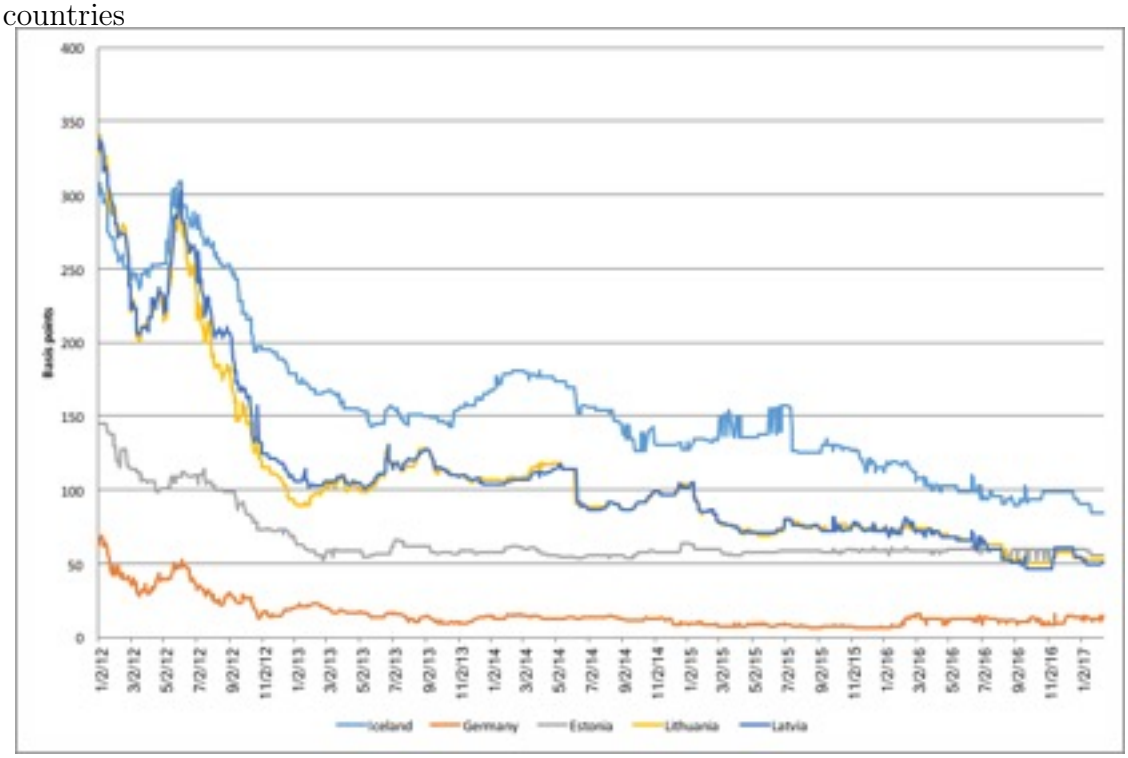
Due to the reduction in ISK-denominated assets of the failed banks, the underlying international investment position of Iceland improved by 17% of GDP following the resolution. Another positive consequence of the resolution was that underlying and official debt became one and the same so the official net international investment position of Iceland dropped from -390% of GDP to -5% of GDP between end-2014 and end-2015 (IMF, 2017). This was by far the best position Iceland had been in on this measure for several decades.

The public finance consequences were also positive. The eventual impact on gross public debt will be to decrease it, *cet. par.*, by an amount similar to the international investment position, *i.e.*, by about 17% of GDP. Indeed, this was 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. Gross public debt (excluding pension liabilities) has been on a downward trend and was projected to be 47% at the end of 2017 (IMF, 2017). This is a comparatively low public debt ratio, although it is considerably higher than before the crisis, when it stood at around 30% of GDP.

Rating agencies raised Iceland's sovereign debt rating after the announcement of the resolution strategy in June 2015. Ratings rose further in 2016 and 2017 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.[47] 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

[47]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 upgraded Iceland to A- in July 2017 and to A in December 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 8.1: Credit default swap (CDS) spread on 5-year senior bonds of selected countries



(see Figure 8.1).

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 in March 2017 and fluctuated for some months afterwards. It has since stabilised at a somewhat stronger level than before the lifting of controls. The easing of capital controls therefore seems to have had no significant impact on the level or volatility of the exchange rate, which is supported by strong growth in export earnings and high domestic asset returns.

9 Conclusion

We show how Iceland's capital controls, in combination with other measures, were successfully used as a bargaining device in the resolution of the failed banks; we also study how a similar strategy failed when it came to reducing the stock of carry trade funds. We set up and calibrate a bargaining model to analyse these two interactions

of a very small sovereign state with a consortium of international hedge funds. The results indicate that Iceland employed a judicious bargaining approach in the case of the old banks, but exhibited a degree of overconfidence in the case of the carry-trade funds.

Asonuma and Trebesch (2016) present a new dataset and some stylised facts on sovereign default and debt renegotiation which may be relevant to the outcome in the resolution of Iceland's failed banks. They distinguish between outright default and subsequent renegotiation of debt, and pre-emptive restructuring of debt. In the game between Iceland and the creditors the former - default - may be likened to the imposition of a stability tax whereas the latter - pre-emptive restructuring - can be compared to resolution by a 'voluntary' stability contribution. Asonuma and Trebesch (2016) show that haircuts are much lower in pre-emptive restructurings than when debt is renegotiated after default, 18% vs. 48%. Perhaps coincidentally, the stability contribution in the Icelandic case corresponds to a haircut of 19%, almost identical to that in preemptive restructurings. The stability tax of 30% (after deductions), however, was well below the 48% haircut after outright sovereign default (although closer to the median value of 43% for the decision standard).

The Icelandic authorities were strongly criticised by many domestic commentators for letting the creditors off easily. The difference between the stability tax and the stability contribution (some 10% of GDP) was touted as a 'giveaway' in the negotiations. Although much of this criticism was politically motivated, it is legitimate to ask whether it was a mistake by Iceland to settle for the stability contributions. Our game theoretic analysis indicates that it was not a mistake - indeed that Iceland was better off (in the sense of expected values) by allowing resolution by stability contributions than by imposing a stability tax.

It seems clear, however, that the delay in implementing the offshore krona strategy weakened Iceland's strategic position vis-à-vis the hedge funds: the elimination of the failed bank overhang as well as improvements in Iceland's external position made it more difficult to argue for large haircuts. 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.

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Appendix 1. Creation and financing of new banks; winding-up of old banks

When the Icelandic banking sector began to collapse in its entirety in early October 2008, several pieces of legislation were passed through Parliament to try to limit the foreseeable costs to the economy of Iceland.[48] 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.[49] All the banks were cross-border banks, large relative to the Icelandic economy - their combined balance sheets before the crisis, including foreign subsidiaries, were approximately tenfold GDP - so there was a large nominal amount of foreign assets and liabilities left in the 'old' failing banks.

[48] 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. See Baldursson and Portes (2018) for a discussion of the fiscal legacy of the crisis.

[49] 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 manoeuver under the circumstances and proportionate to their aims. For further discussion, see Helgadottir (2012).

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.

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. "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.

Under Icelandic law, 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. 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 se-

cured 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.

As a result of the Emergency Legislation and subsequent intervention in the failing banks, three new banks were created, each on the basis of a failed 'old bank' parent:

1. Arionbanki was created on the basis of Kaupthing,

2. Íslandsbanki was separated out of Glitnir, and

3. New Landsbanki out of Landsbanki Íslands.[50]

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 Arionbanki 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 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.

[50]The New Landsbanki soon 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.

Table 4: Financing of new banks by Icelandic state and creditors
Amounts in ISK bn. Numbers in parentheses are amounts in per cent of 2009 GDP

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

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

The financing structure of the three new banks that emerged after negotiations with creditors in 2009 is summarized in Table 4.[51] 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 comparatively high level set as a minimum after the crisis.[52] Initially, the state also provided the new banks with cash. Creditors provided equity amounting to 9.8% of GDP. As indicated in Table 4, the state took full ownership of New Landsbanki in 2013 with purchase of the 19% creditor equity share.

Table 4 also shows assets after revaluation.[53] 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.

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

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

[52] 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.

[53] 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.

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.[54] Taking into account that nominal GDP grew by 39% between 2009 and 2015, combined equity in Arion banki and Íslandsbanki grew from 12% of GDP in 2009 to 16% at mid-2015.[55] 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.

Appendix 2. Bankruptcy vs. composition

If the failed banks had gone into bankruptcy proceedings that procedure would have concluded with distribution of all assets of the estate to the creditors, ending the existence of the bankrupt entity. By using the method of composition agreement, however, creditors become shareholders. 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.

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 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.

The main amendments made in 2015 to the Act on Financial Undertakings to facilitate the Icelandic banks entering into composition agreements with their creditors were, inter alia, the following:

1. The requirements made to the subject of composition proposals were reduced

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

[55] Equity in the state-held Landsbanki amounts to 12% of GDP, but this holding poses no threat to the balance of payments.

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 (Alþingistíðindi A-deild, þskj. 1401 - 787. mál. [Icelandic Parliament's explanatory notes, document 1401 - case no 787]).