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The collapse of a country

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The Collapse of a Country[1]

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Abstract
Iceland's banking system collapsed in October 2008. The collapse coincided with a full-fledged currency crisis and the insolvency of large segments of its business sector. The collapse of Iceland's economy is a testimony of the combined effects of deregulation, privatization and lax financial supervision in a world of cheap credit. The systemic collapse of a developed country presents a unique case study for future reference. Moreover, the collapse offers some insights into the feasibility of small countries joining a much larger economic area without reforming its institutions and integrating them into a larger institutional framework. In the EU context, the lesson appears to be that a single market and a monetary union are complementary. Also that cross-border banking practices raise a host of regulatory issues, as well as issues that have to do with deposit insurance.

1 Introduction

Iceland experienced the deepest and most rapid financial crisis recorded in peacetime history when its three major banks all collapsed in the same week in October 2008 triggering a systemic crisis, the first in any advanced economy. Its collapse is related to the global financial crisis, but a unique set of circumstances suggests that the recession in Iceland will be deeper than the recession in most other European countries.

Many of the events contributing to the crisis can be explained by the historical evolution of the Icelandic economy and its institutions. Traditionally, the Icelandic economy was more regulated and politicized than economies in most Western countries. Economic management was more based on discretion than rules, with tight connections between private sector firms and political parties.

Government control over the economy has reduced over time, with a key event being Iceland joining the European Economic Area in the early 1990s. That meant Iceland got extensive access to European markets and adopted European regulations. It did, however, retain its discretionary approach to economic management and its key institutions, such as the Central Bank and the financial regulator which remained weaker than most of its European counterparts.

The government deregulated and privatized the banking system in the late 1990s and early 2000s. The banks passed into the hands of individuals with little experience in

[1] Our papers can be downloaded from www.RiskResearch.org for Danielsson and www.hag.hi.is for Zoega. We are grateful for the many comments and suggestions we received on the first version of this paper. We are solely responsible for the content of this paper.

modern banking, which then proceeded to take advantage of ample capital in international markets to fuel a high degree of leverage and exponential growth.

In effect, the country decided to stake its economic future on international banking, without having the necessary safeguards in place, eventually developing a banking system much beyond the ability of the state to come to its help with liquidity or solvency support.

Its institutional structure lagged behind developments in the banking sector. Neither the Central Bank nor the financial regulator developed the necessary infrastructure nor did they receive the necessary independence and backup from the authorities to fulfill their duties adequately.
Eventually, the banking system grew to about ten times the size of the economy while suffering increasing liquidity problems. The optimal policy response would have been to deleverage and reorganize the banks.[2] The Icelandic authorities opted for the opposite, apparently standing by when the banks were facing increasing difficulties. The fact that the banks were allowed to finance themselves through internet saving accounts launched by several of their branches and subsidiaries in Europe in 2007 and 2008 is the clearest manifestation of the failure of supervision.

By not addressing the pending failure of the banking system, perhaps in the hope that the instability would disappear, we cannot escape the feeling that the Icelandic authorities gambled for resurrection[3] and failed. If the authorities had acted prudently, the economy would have been left in a much better shape.

Another element contributing to the crisis was monetary policy. For most of the 2000s the monetary policy was inflation targeting, which failed in lowering inflation, but the resulting interest rate rise both motivated domestic households and firms to borrow in foreign currency and attracted foreign speculative capital — carry traders. The amount of hot money inflows is not publicly known, but it appears to have exceeded 50% of GDP. It is unclear why this did not raise concerns with the authorities.

Currently the real economy in Iceland is imploding, with widespread bankruptcies and mass layoffs. The estimates of the share of non-financials that are technically bankrupt ranges between 33% and 60%. The current unemployment rate is around 8% and has risen from an average rate of 4.8% in December and 1.3% in September 2008. It continues to rise sharply.

Government debt is increasing rapidly because of a combination of collapsing tax revenues and rising government debt. Coming into the crisis with relatively low levels of government debt, in the near future debt levels will exceed the annual GDP, perhaps significantly so. In the worst case, sovereign default is possible.

[2]The International Monetary Fund recommended that this be done in its Article IV Consultation Statements; see the one from May 2006: http://www.imf.org/external/np/ms/2006/051506.htm.
[3] Gambling for resurrection refers to the situation where e.g. a bank is about to fail, and may be shut down by the authorities. Faced with this, the bank takes a high risk−high payoff bet in the hope of surviving. Typically this would fail, and the eventual losses to creditors and tax payers become much higher than otherwise would have happened.

2 Historical Background

The collapse of the economy has its roots in the, often peculiar, institutional structure of Iceland, which needs to be explained from a historical perspective. It has traditionally had an economy that was more inward looking and politicized than its neighboring countries. This left it unprepared to deal with the challenges arising from EEA membership and a full participation in the global economy.

Iceland is a relative newcomer to the world of market capitalism. For most of the 20th century its economy was heavily regulated, largely dependent on fishing. The business cycle was primarily caused by changes in the volume and export prices of the fishing industry.

Iceland, along with most of its neighbors, implemented trade restrictions and strong government control over the economy during the Great Depression, but retained some of these restrictions for much longer than its neighbors. This inevitably resulted in large-scale economic inefficiencies, the politicization of the economy and corruption.

The monetary regime was an adjustable peg where the government devalued whenever the fish catch or world export prices fell. The devaluation almost instantly lowered real wages and increased the profitability of the export industries. The peg was adjusted frequently, especially in the 1970s and 1980s. Exchange rates were for a long time determined with a view of making average profits in the fishing industry equal to zero. It was difficult to diversify the economy because the exchange rate was maintained at too high a level for most other industries to prosper, a case of the Dutch disease.

Capital was rationed between different industries, nominal interest rates were decided by the Central Bank, and real interest rates kept negative until the late 1980s. This resulted in excessive investment where capital was available, and a proliferation of unproductive, unprofitable firms.

The unemployment rate was kept close to zero percent and inflationary pressures persisted, only to be curbed by the occasional imposition of price controls. A period of moderate inflation in the 1960s was due to successful incomes policy. However, this broke down in the 1970s and this inevitably resulted in strong boom and bust cycles coupled with high inflation.

Until this century, the banking system consisted of relatively large state-owned banks along with smaller private banks. The banking system was heavily regulated and politicized, with politicians represented on banks' boards and loan decisions often made on the basis of political affiliation and connections. The large parties jealously guarded their influence in the banks.

The same political structure applied to the Central Bank, with each of its governors representing one of the main political parties. This explains why the Bank has had three governors up to this day. Consequently, the Central Bank of Iceland has always been perceived as being closely tied to the central government, raising doubts about its independence and reducing its credibility.

Output growth was mostly generated in the fishing industry. The extension of the fishing limits in the 1950s and the 1970s to 200 miles resulted in an increased catch, which raised economic growth temporarily. The government introduced a transferable quota system for fishing rights in the early 1980s giving the owner of a quota a fraction of the total catch. Over time, the quota system resulted in increased profitability and considerable wealth creation, which became one of the main pillars in the subsequent banking-based economy. The quota system has always remained controversial in Iceland because of the perception that it gives away public resources to private interests.

The liberalization of credit markets in the 1980s and 1990s made real interest rates positive for the first time, eliminating many firms and industries that had depended on subsidized credit. Both real interest rates and unemployment approached their equilibrium value in the early 1990s and inflation remained relatively low by domestic standards, but still high compared to its neighbors. Widespread inflation indexation of lending was adopted, particularly at longer maturities. This increased savings but has diminished the effectiveness of monetary policy because of the prevalence of fixed long-term interest rates on cpi-indexed bonds.

Iceland joined the European Economic Area[4] (EEA) in 1994, and thereby adopted legislation relating to the so called “four freedoms”.

Joining the EEA had a positive impact on the economy. However, opening a relatively insular economy to the EEA without significant institutional reforms carried with it dangers. Neither the Icelandic authorities nor private firms were adequately prepared to operate in such an environment. This was especially relevant in the case of banking.

3 Prelude to the collapse

The Icelandic banking system was deregulated and privatized in the 1990s and early 2000s. At that time, the world was awash in cheap credit and the newly privatized banks experienced little difficulty in raising capital internationally. They used this capital to fund expansion domestically and abroad. This expansion was subject to little regulatory scrutiny, neither in Iceland nor abroad. The process started before the privatizations and continued thereafter.

Banking quickly became a large part of the economy. This happened in an economy where there is little evidence that either the government or the private sector had sufficient understanding of the necessary risk management processes and banking supervision needed when a banking sector becomes such a large part of the economy.

The Icelandic authorities are far from unique in deregulating its banking system without the necessary regulatory safeguards, eventually triggering a banking collapse. We have seen repeated examples around the world where similar mistakes have been committed, e.g., the Savings and Loans in the early 1980s in the U.S. and the Scandinavian deregulation in the late 1980s and early 1990s. The problem arises

[4] The agreement on the formation of a common market for goods, capital and labor between the European Union and some of the remaining members of the EFTA trading block (Iceland, Lichtenstein, Norway) came into effect in 1994.

when the banks enjoy an explicit or implicit government guarantee without the government adequately supervising their activities. The guarantee enables them to raise large sums of funds and create an asset price bubble, where those providing the funding are less concerned than they otherwise would be because of a government guarantee.

3.1 An orgy of borrowing

The banking expansion was the source of the rapid economic growth that took place between 2003 and 2007. It enabled households and enterprises to take advantage of the abundance of low-interest funds in international capital markets to finance domestic investment and consumption, as well as the acquisition of domestic and foreign firms. Because the banks got funds in the international wholesale market – this was an externally-financed boom – the inflow of credit had a predictable effect on the exchange rate, the stock market and the current account. See table in the Appendix.

While there is nothing unique about these events, the size of its banking system and the corresponding scale of Iceland's current-account deficit set the country apart. Various Central Bank reports note that national savings fell from 15.5% of GDP on average in the 1990s to 12.0% on average 2004-2007 and below 10% in 2006 whilst private investment rose from an average of 19.3% of GDP in the 1990s to 28.3% on average during 2004-2007 and 33.7% in 2006. At the same time household debt rose from 178% of disposable income in year 2000 to 221% of disposable income in 2007 (103% of GDP). Gross external debt went from around 180% of GDP in 2004 to 552% of GDP in 2007 of which short term debt amounted to 200% of GDP. At the same time, net foreign debt went from 90% of GDP in 2000 to 243% in 2007 with a net external position of -109% of GDP.

Iceland was one of the wealthiest countries in the world at the turn of the century, with per capita GDP that exceeded that of Germany, France and the UK; its educational and health systems were exemplary, and level of debt manageable. The deregulation and privatization of the banks caused an economy based on natural resources to become increasingly indebted, with the balance sheet of households and firms exploding. In the short term this increased living standards and firm profitability because asset prices increased in value. However collapsing asset values and exchange rates triggered mass bankruptcies.

3.2 Monetary policy and financial stability

The Central Bank has remained weak, it had foreign exchange reserves (official reserve assets) of around 375 billion kronas (3.5 billion dollars) just before the collapse in an economy with a GDP around 1,300 billion kronas, just under 30% of GDP. While the reserve ratio is quite high, for example the comparable figure for Sweden was 7% at the end of 2007. However, the short-term liabilities of Icelandic banks in proportion to Iceland's GDP were a staggering 211% at the beginning of 2008.

3.2.1 Inflation targeting gone wrong

Following a common trend in monetary policy, Iceland adopted inflation targeting in the spring of 2001, but inflation still remained high. The Central Bank responded by a sequence of interest rate hikes, from 5.3% in 2003 to 15.25% in 2007. This did very little to prevent the inflation or the bubble.

The reasons for the failure of inflation targeting are not completely clear, but a key factor seems to be that the massive currency inflows effectively became a part of the local money supply, with interest rate increases further stimulating the growth of currency inflows by encouraging speculative inflows of currency and motivating households and firms to borrow in foreign currency. [5]

Because of the Central Bank's lack of credibility and firms' willingness to borrow in foreign currencies, interest rate changes had a very limited effect on long-term interest rates and investment activity. The exchange rate channel had some impact on exchange rates but little or no on domestic demand. Import prices were reduced when the exchange rate appreciated but this was about the only visible effect on inflation.

The Central Bank should have realized the dangers of the exchange rate appreciation. A sensible policy at the time would have been to resist the exchange rate appreciation by buying foreign currency, and sterilizing the intervention to contract the inflationary impact of this expansion in the money supply. This would have had, at least, two positive impacts. First, by preventing the exchange rate appreciations it would have limited the exposure of domestic agents to currency risk. Second, it would have built up extensive foreign currency reserves, leaving the Bank in much better shape to meet potential future crisis events.

3.2.2 Carry trade and the policy mix

In small open economies such as Iceland, high interest rates encourage domestic firms and households to borrow in foreign currency as well as attracting carry traders based in other countries who speculate against 'uncovered interest parity'. This became particularly tempting when the investors realized that businesses and households were highly leveraged in foreign-currency denominated loans which made the Central Bank hesitant to lower interest rates out of fear of an exchange rate depreciation raising the domestic-currency value of private debt and inflation.

The result was large foreign-currency inflows and an exchange rate appreciation that gave Icelanders an illusion of wealth and rewarded the carry traders. The currency inflows also encouraged economic growth and house-price inflation; outcomes that induced the Central Bank to raise interest rates further, which convinced investors that the carry trade would remain profitable. The amount of hot money inflows is not publicly known, but its stock appears to have exceeded 50% of GDP. Why this appears not to have raised (public) concerns is unclear.

The carry trade, as well as the borrowing in foreign currencies by households and businesses, may have been further encouraged by an unfortunate policy mix that consisted of an expansionary fiscal policy and a contradictory monetary policy – the government cut taxes and raised expenditures in spite of inflationary pressures and

[5] See e.g. Egilsson og Sigurðsson (2001).

external deficits.[6] At the same time the government was able to reduce its debt considerably, especially foreign currency debt. The policy mix thus gave investors a further reason to expect high interest rates and high exchange rates in the future, which then justified more carry trade and foreign borrowing to finance investment and consumption.

3.3 Oversized and immature banking sector

The most important factor in the implosion of the Icelandic economy was the size of its banking sector. A credit expansion abroad, initially to support the foreign operations of Icelandic firms abroad, expanded the banking sector's balance sheets. Icelandic banks, operating in a country with a population of around 300,000 (i.e. 0.3% of Germany or similar to the city of Coventry in the UK) became significant players in international capital markets. In total, the asset side of the three largest banks' balance sheets was nine-fold the country's annual GDP at the end of 2007, a big change from year 2004 when they were roughly equal one year's GDP. This expansion was almost entirely driven by foreign borrowing.

The rapid increase of the banks' balance sheets is likely to have entailed the emergence of bad loans on the asset side. The first warning signals about the stability of the banking system were received in February 2006 and did prompt the banks to pay closer attention to the stability of their capital structure and triggered worries by their creditors.

A part of the blame for the collapse of the banking system is due to the global crisis. However, by and large the blame lies more at home than internationally.

3.3.1 Immaturity and bad luck

Three factors combine in making the Icelandic banking system more fragile than its counterparts abroad. First, unlike many other nations with an outsized banking system, such as Switzerland, the institutional experience of running a modern banking system in Iceland spans less than a decade, not centuries. Second, there were widespread accusations of political favoritism when the banks were privatized; their senior management and boards were typically composed of Icelandic citizens with little or no experience in international banking. Finally, given the size of the country and tight political connections between the private sector and the political superstructure, supervision was weak.

These factors are complicated by the fact that because of its EEA membership, Iceland essentially has the same banking regulations as other EEA/EU countries. It is, therefore, more a case of failure of supervision rather than a failure of regulation.

3.3.2 If banks are too big to save, failure is a self-fulfilling prophecy

In this global crisis, the strength of a bank's balance sheet is of little consequence. What matters is the explicit or implicit guarantee provided by the state to the banks to back up their assets and provide liquidity. Therefore, the size of the state relative to

[6] The government was criticized for the policy mix by both the Central Bank (see Central Bank of Iceland Monetary Bulletin, different issues) as well as the IMF (see 2008 Article IV Consultation of the IMF for years 2005, 2006, 2007 and 2008).

the size of the banks becomes a crucial factor. If the banks become too big to save, their failure becomes a self-fulfilling prophecy (see Danielsson, 2008; and Buiter and Sibert, 2008).

Faced with the rapid growth of the banks, a sensible policy response by the Central Bank would have been to accumulate reserves. By and large it failed to do so. However, even if it had, its ability to provide adequate liquidity support to the banks would have remained in doubt because of the size of the banks. This partly explains the reluctance of foreign central banks to offer help in the months leading up to the crash. The further use of borrowed money to support the banks would also have exposed the population to the risk of an intolerable debt burden in the case of bank failure.

The reasons for the failure of the Icelandic banks are in many ways similar to the difficulties experienced by many financial institutions globally, such as the seemingly unlimited access to cheap capital, excessive risk-taking, and lax standards of risk management.

The crucial difference is scale. While many countries have their share of troubled banks, in those cases the problems are confined to only a segment of their banking system, in economies where the overall assets of the banks are much smaller relative to GDP. In those countries the government has adequate resources to contain the fallout from individual bank failures.

Ultimately this implies that the blame for bank failures lies at home rather than internationally. We suspect that even if the world had not entered into a serious financial crisis, the Icelandic banks would have failed

3.3.3 Risk and regulatory capture

Since the banks passed into government hands after their collapse in early October 2008, detailed information about their management and investments has started to emerge. The early indications are that the banks practiced loose lending and investment standards.

Extensive cross holdings between financial and nonfinancial firms existed. A handful of large shareholders seem to have controlled both the banks and a significant number of non-bank firms, running them jointly as highly leveraged holding companies with apparent scant regard to minority shareholders rights or prudential regulations. Standards of risk management seem to have been lax. When one part of the group was facing difficulty or needed cash for expansion, funds were made available elsewhere within the group. The banks made large loans to SPVs for the purpose of buying the bank stocks with the stock purchased being the sole collateral.

Asset purchases at times apparently were designed to inflate asset prices in order to obtain better collateralization and stock market valuations. Off-balance-sheet vehicles were used to inflate the banks' capital and the price of their shares.

Because of the interconnectedness and a high degree of leverage, the whole structure was unstable and crumbled quickly when global financial markets entered into difficulty, and capital became scarce.

While the legality of these processes still remains to be tested, it is clear that they suffered little scrutiny from the financial and security supervisors, after all, the Icelandic financial regulator (FME) and the Central Bank, as guardians of financial stability, undoubtedly had, or should have had access to this information, and the legal ability and obligations to prevent destabilizing banking. Both institutions failed to do so. The FME did not receive adequate government support. The government only increased its budget by 47% as a fraction of GDP, while the banks assets grew 900%. Poorly staffed and supported supervisors often face difficulties dealing with rapidly growing financial institutions, and may even over time suffer regulatory capture.[7]
Some of the complications in the interrelationship between the supervisor and the banks are manifested in an interview by the in-house English language staff magazine of Landsbanki with the then chairman of the board of the supervisor in spring 2008.[8] In the interview the chairman indicates that the bank was sound, and that high borrowing costs on the interbank market were primarily due to the activities of foreign hedge funds. This was exactly the information the bank wanted to present at the time. The banks' employees could have used this information in the marketing of Icesave in the Netherlands (see next section), which was the main theme of the issue, without consulting the chairman. The financial supervisor apparently did not have any comments on this, which suggests it did not object to the interview being presented in this way.

The Central Bank shares in the blame. The Central Bank does have a legal obligation to ensure financial stability and the banks posed a clear risk to financial stability. The Bank could have raised the minimum reserve requirements and linked them to the rate of expansion of each bank's balance sheet. It could have raised reserves, and prevented the excessive exchange-rate appreciations. It is obliged to provide accurate information to the authorities and the public via its financial stability report. Its last report, prior to the collapse of the banks, in April 2008 did not sound alarm bells. However, the Chairman of the Board of Governors of the Central Bank has publicly stated that he warned the government that the banks had zero chance of surviving, some months prior to the crash. It issued no public warnings, and appears to have done little to prevent the bank collapse.

But perhaps the biggest failure of the Central Bank lies in the lack of leadership. It falls on the Central Bank as a guardian of financial stability to take a leading role in tackling financial crises. For that it is essential that the central bank is independent, impartial and competent. Given the high degree of politicization of the Central Bank, it has been unable to assume the necessary leadership role. Even decisions that may have been justifiable and correct gave rise to a suspicion of incompetence and misplaced intentions.

[7] Regulatory capture refers to situations in which a government regulatory agency acts in the favor of the commercial interests they are charged with regulating, and thus fails to act in the public interest.
[8] See http://eyjan.is/silfuregils/files/2009/01/landsbanki-islands.pdf.

The government that took power in February 2009 changed the governance structure of the bank by legislation,[9] after having requested that the governors resign, but being rebuffed by two out of three. All three claimed they had made no mistakes. The timing of the law indicates it was explicitly directed at removing the sitting governors. Going from three to one governor was sensible. But using legislation to remove the governors should only be done as a last resort. However, considering the importance of the Central Bank in rebuilding the economy, the government's actions were justifiable. Central Bank independence and the private interests of the governors should yield to the general interests of society.

3.4 Icesave

Perhaps the clearest example of the mismanagement of the financial system is the setting up of high interest internet savings accounts by Icelandic banks in the U.K. and later in the Netherlands and other European countries. The banks had relied on the wholesale market for funding and when this became more difficult decided to attract deposits by offering high-interest deposits in Europe. In this, they may have been following advice from the rating agencies.
The two largest banks in Iceland followed this strategy, Landsbanki and Kaupthing.[10] Of the two, Landsbanki, in the name of Icesave, operated these saving accounts under local branches of the Icelandic entity, meaning they were primarily regulated, supervised and insured in the home country, Iceland.

Accurate and verifiable information about these accounts is not available, but some estimates have been reported in the media. Icesave started in the UK and its deposits there according to media reports eventually grew to over £4 billion with 300,000 customers.[11] We suspect the UK authorities became increasingly concerned about these accounts when it became clear that the financial situation of Landsbanki was deteriorating rapidly. However, under EU law the Landsbanki branch in the UK had not been established as a subsidiary of the Landsbanki in Iceland and was therefore not a legal entity in the UK, the result being that it was supervised in Iceland whose financial regulator should have been the first to take action.

We suspect that the UK authorities applied considerable pressure to limit the growth of Icesave in the UK, which in turn may have encouraged Landsbanki to seek funds in jurisdictions that were not fully abreast of the difficulties facing it, primarily in the Netherlands, where it eventually may have raised €1.7 billion[12] with 125,000 customers.

We suspect the UK authorities grew increasingly concerned with the state of Landsbanki over the summer of 2008 and attempted to resolve the issue. A sensible resolution would have been to split the bank into a good bank-bad bank. The good bank could have held on to the good assets of the bank, with deposits guaranteed, both

[9] See http://www.althingi.is/altext/136/s/0605.html
[10] Kaupthing with its Kaupthing Edge, opted to operate these accounts by a subsidiary, with the exception of Kaupthing Edge in Germany meaning that they were regulated and supervised in the host country.
[11] See "Britain vows to protect savers," *Agence France-Presse*, October 08, 2008 (http://www.news.com.au/business/story/0,27753,24467268-31037,00.html).
[12] See "Iceland reaches deposit accord with U.K., Netherlands," *Bloomberg*, 11 October, (http://www.news.com.au/business/story/0,27753,24467268-31037,00.html).

in Iceland and abroad. If this had been implemented in the summer of 2008 the eventual outcome for Iceland would have been much more favorable.

Following the crash it was revealed that the Icelandic authorities had been in discussions with the UK authorities regarding facilitating the transfer of the UK branch of the Landsbanki to a UK subsidiary, and hence the UK's jurisdiction, ostensibly for the main purpose to move the "Icesave liability" from Iceland over to the UK, whatever the reason the UK may have had for this[13]. The Icelandic authorities gave guarantees that they would facilitate this, but reneged.

3.5 Wider implications

The case of Icesave exposes flaws in the European Union regulations surrounding deposit insurance arising from cross-border branch savings accounts. In this case the home regulator is in charge of supervision and offers deposit insurance of at least €20,887. If however the host country provides additional insurance, as was the case in the UK, the host would need to be a party to supervision.

After the run on Northern Rock, the UK government announced that no individual UK deposit holder would lose money in the case of bankruptcy. At the very least, this provided implicit guarantee to Icesave depositors. In this case it would have been essential that the UK FSA also exercised supervisory duties. It is unclear to what extent this was done.

In addition, in the EU/EEA, deposit insurance is provided by a national insurance fund paid for by banks. The amount depends on the country, but typically ranges from 0.5% to 1.5%. It is unclear what is supposed to happen if the national insurance fund is not sufficient. In the first instance the cost may be borne by other banks, but if the entire banking system collapses, that would not be possible. The legal obligation of the national government to cover the shortfall is unclear.

The authorization of the opening of cross-border savings accounts of the magnitude and risk of Icesave represents a serious failure in the decision-making process by the supervisors in Iceland and the host countries, the UK and the Netherlands and/or in EU/EEA regulations. The supervisors in all three countries should have recognized the dangers and acted to prevent the rapid expansion of Icesave. Ultimately supervision failed. The notion that a nation of 300,000 inhabitants could assume the responsibility of providing deposit insurance of the magnitude of Icesave is absurd.

We suspect this also casts light on another failure of cross-border banking supervision in Europe. Host supervisors generally only observed the part of the banks operating in their country, not the overall picture. Some of the Icelandic banks had extensive operations of various types both within Europe and outside. Unless an individual national supervisor has a clear picture of those operations it is difficult to exercise

[13] We can e.g. see this from the conversation between the Icelandic and the UK finance ministers October 7, 2008, (http://www.ft.com/cms/s/0/4d74e1aa-a163-11dd-82fd-000077b07658.html), the reply of the Icelandic Commerce minister to a parliamentary inquiry (http://www.althingi.is/altext/136/s/0503.html), the public statements of the UK authorities, interviews with the governors of the Central Bank and the government's economic advisor in the UK media, and the testimony of the Chancellor and the head of the FSA to the treasury select committee November 3, 2008. (http://www.publications.parliament.uk/pa/cm200708/cmselect/cmtreasy/uc1167-i/uc116702.htm)

adequate supervision. The Icelandic regulator may have been the only supervisor that had the complete picture. If so, the only supervisor who had the necessary information failed. [14]

4 Destabilizing speculation

The Icelandic bubble fits well within the framework of Hyman Minsky (1992) for the destabilizing effects of speculative finance. It started with the excitement generated by the privatization and deregulation of financial institutions, and seemingly unlimited access to foreign capital markets at low interest rates. The capital inflows stimulated economic growth, the outlook brightened, further increasing the willingness to borrow. Asset prices started to rise.

At this stage a myth was created about the business acumen of Icelanders, and some universities even initiated research programs on the causes of their business success. Gradually a euphoria developed and high-risk borrowers found easy access to capital, risk appetites increased, and firms and individuals started to borrow for speculative reasons. Borrowing on the margin to buy equities became a popular activity.

Banks' competition for market share intensified and they lent to increasingly high-risk borrowers. A real estate bubble ensued, fueled by seemingly unlimited bank lending.

The disconnect between asset values and economic fundamentals became increasingly apparent, at the same time as access to foreign capital became skittish due to the global crisis. Investors started rushing to the exits. This was a classical endogenous risk event, as described by Danielsson and Shin (2003); the market went up by the escalator, down by the elevator.

Many of the largest asset shareholders of the Icelandic banks, being highly leveraged, were facing similar difficulties. It has been reported in the newspapers that they resorted to borrowing from their own banks to buy bank stock, with a view to prop up the price. In the end it was to no avail, and the entire structure collapsed. It is not clear at the time of writing if securities laws were violated.

5 Warnings

Ultimately, the superstructure of the Icelandic economy was built on sand. Ineffective supervision, large imbalances, and an oversized banking system were visible for anyone looking. Plenty of reports on the economy of Iceland were published, both positive and negative.

A number of local and outside economists described the perils of persistent and massive current account deficits and inappropriate monetary policy in the run-up to

[14] This relates to paragraph 28 of the Larosiere 2009 report. Also, in the Icelandic newspaper Morgunbladid March 4th 2009 it is reported that the Luxemburgish financial supervisor had complained about not receiving warnings about the serious state of the banks, warnings received by the Icelandic authorities April 2008 from the IMF and Scandinavian (Central) Banks. This is especially worrying because some Icelandic banks used Luxemburg to get liquidity support from the ECB. See http://www.mbl.is/mm/frettir/innlent/2009/03/04/fjarmalaeftirlit_luxemborgar_undrast_upplysingaleys/.

the crash.[15] Occasional foreign visitors made headlines by pointing out the danger of a collapse. A very critical report came from the Danske Bank (2006), titled "Iceland: Geyser Crisis." The report received a lot of attention because it identified many of the problems with the Icelandic economy,[16] in particular macroeconomic imbalances.
The foreign minister at the time has recently stated that the IMF and Scandinavian (Central) Banks warned the government in April 2008 that it was necessary to address the difficulties facing the banks.[17] The unwillingness of the Bank of England, the ECB and the Federal Reserve to help boost the Icelandic Central Bank's foreign exchange reserves should also have been a strong signal to the Icelandic authorities that urgent actions were required.[18]

In early May 2008, Robert Aliber of the University of Chicago Business School presented a paper at the University of Iceland where he emphasized the adverse effects of the imploding stock market bubble on corporate balance sheets and financial market stability. He maintained that the banks faced a grave danger because of falling asset prices reducing their capital base and as a consequence limiting their access to foreign credit.

Anne Sibert of Birkbeck College and Willem Buiter of the London School of Economics (Buiter and Sibert, 2008) were commissioned by the Landsbanki to write a report about the Icelandic banking system in early 2008 and presented their paper to the authorities in early July, having shown the report earlier to the Landsbanki. They came to the conclusion that having large banks in a tiny currency area was a difficult business model due to the lack of a credible lender of last resort – a grave danger of a modern bank run was present, even if the banks were solvent.

Note that while Buiter and Sibert assumed that the quality of assets on the bank's balance sheets was secure and focused on liquidity problems, Aliber's paper was on the likely collapse of the banks due to the deterioration of the balance sheet. As it turned out, the Icelandic banks had problems on both fronts.

Not every report was negative and other economists pointed out the strength of the economy and the financial system. Perhaps the most prominent positive reports were commissioned by Icelandic interests, joining Icelandic economists with prominent foreign colleagues. Two of the best-known examples of this are Herbertsson and Mishkin (2006) and Baldursson and Portes (2007), both of whom painted the Icelandic economy and its banking system in favorable terms. In all fairness, it should

[15] See, amongst others, Robert Wade, "Iceland pays price for financial excess," Financial Times, 1 July 2008; Robert Wade, "IMF reports uncertain outlook for Iceland," *Financial Times*, 15 July 2008; Thorvaldur Gylfason, "Events in Iceland: Skating on thin ice?" VoxEU, 7 April 2008; Gylfi Zoega, "A spending spree," VoxEU 9 April 2008; Robert Aliber, "Monetary turbulence and the Icelandic economy", lecture, University of Iceland, 5 May 2008.; Jón Danielsson: Lausafjárkreppan og hagstjórnarmistök (06.06.2008), public lecture at the University of Iceland.; Ragnar Arnason,." The Central Bank's monetary policy: Is it worth the cost?", 2006.,

[16] See http://danskeanalyse.danskebank.dk/link/FokusAndreIceland21032006/$file/GeyserCrises.pdf. The author of the report comments on it in the FT on October 8th 2008, "As a result I had to go to Reykjavik back then and got a pretty hot reception. The Prime Minister publicly denounced our research piece, and banks issued denials. … In essence two years ago all these problems were in the open. Yet Icelandic authorities have not acted and the banks were not reined in (enough)."

[17] http://www.mbl.is/mm/frettir/innlent/2009/03/01/imf_varadi_vid_i_april/).

[18] See http://www.sedlabanki.is/?PageID=13&NewsID=1888.

be pointed out that these reports did mention weaknesses and suggested policy measures. However, they do not emphasize structural problems in the banking system, and their reports appear to have been used to justify the lack of action by the authorities prior to the crisis, which was probably not the authors' intention.

Official reports from the Icelandic government are also favorable. For example, the financial stability report of the central bank of Iceland in April 2008 indicated that the economy was in a good state. In particular, the banks were "resilient" and the financial system was "broadly sound."

6 Government's response — gambling for resurrection

Given the ample warnings the government had of the pending difficulties in the banking system its apparent lack of concern is surprising. Surely the regulator and the Central Bank knew what was happening, and indeed the then Chairman of the Board of Governors of the Central Bank has publicly stated that he repeatedly warned the government.

The only public information we have has the Central Bank and the financial regulator blaming each other, with the government claiming not to have been informed, and blaming the global economy. We do not find his convincing. Such a catastrophic pending failure had to have been discussed by the entire Cabinet. Individual government ministers have publicly declared that they did not receive the warnings from the Central Bank,[19] and not known about the danger facing the economy. We do not find those denials plausible.

We therefore cannot escape the feeling that the board and directors of the Central Bank and the financial regulator, along with senior officials there knew what was happening. Similarly, all government ministers, along with senior bureaucrats in the ministries of finance, commerce, foreign affairs, and office of the prime minister had to have known.

Still the government failed to act. It could have at any point taken decisions that would have alleviated the eventual outcome. If the Government had acted prudently the economy would have been left in a much better shape.

By not addressing the pending failure of the banking system, perhaps in the hope that the instability would disappear, we cannot escape the feeling that the Icelandic authorities gambled for resurrection, and failed.

7 A systemic crisis

A common definition of a systemic crisis is a collapse of the payment system. According to this definition Iceland suffered a systemic crisis in October 2008,

[19] The foreign minister at the time states in an interview with Icelandic TV March 1, 2009, that she received warnings from the IMF and Scandinavian (Central) banks and complained that neither the financial regulator nor the Central Bank took action, http://www.ruv.is/heim/frettir/frett/store64/item253546/).

because the international part of its payment system shut down. Another symptom of a systemic crisis is that the quantity of base money (paper money and coins) increases significantly. Following the collapse of the banks the amount of base money increased by 80%,[20] and the Central Bank was only a few hours away from running out of paper money October 6th.[21]

On Monday morning the 29th of September the Central Bank explained that Glitnir, the smallest of the three large banks, had approached the bank for help because of an anticipated liquidity problem in the middle of October. Lacking confidence in the collateral offered, the Central Bank decided to buy 75% of its shares at a very low price, leaving Glitnir few options but to accept.

Perhaps the government anticipated that with Glitnir in the hands of the government its credit rating would improve. Instead the opposite happened and the credit rating of the government was adversely affected.

The part nationalization of Glitnir undermined the confidence in the Icelandic banking system and the Icelandic state. The government and the banks had repeatedly claimed that all of the three main banks were liquid and solvent. The failure of Glitnir demonstrated that those statements were untrue, and the mishandling of its failure by the Central Bank undermined the confidence of the Central Bank's crisis management abilities.

The immediate effect was to cause credit lines to be withdrawn from the two remaining banks. There was a run on the Icesave branch of the Landsbanki in the UK. Both Kaupthing and Landsbanki had significant operations in the UK. The UK and Icelandic authorities had been for some time in discussion on how to solve the difficulties facing those two banks, but, as discussed elsewhere in this paper, the Icelandic authorities were resisting addressing the issue, and repeatedly reneged on guarantees to the UK authorities.

Public statements by UK government officials indicate how exasperated they were with the duplicity of the Icelandic government. A BBC report on 10 October states, "Prime Minister Gordon Brown has condemned Iceland's handling of the collapse of its banks and its failure to guarantee British savers' deposits. He said its action were 'effectively illegal' and 'completely unacceptable'."[22] Undoubtedly, the harshness of Mr. Brown's words had something to do with domestic political considerations as well.

The UK authorities – perhaps afraid of a repeat of their experience with the London branch of Lehman Brothers two weeks earlier – then used a clause in its antiterrorist laws to freeze the assets of Landsbanki in the UK, which then triggered the bankruptcy of the remaining Icelandic bank, Kaupthing. The UK authorities used the Banking (Special Provisions) Act 2008 to take over Kaupthing.[23] The immediate

[20] http://www.mbl.is/mm/frettir/innlent/2009/02/14/milljardar_af_gotunni/

[21] http://eyjan.is/blog/2009/02/27/sedlafordi-islands-var-adeins-nokkrum-klukkustundum-fra-thvi-ad-klarast-i-oktober-sl/

[22] http://news.bbc.co.uk/1/hi/uk_politics/7662027.stm

[23] Given the speed in which the UK authorities reacted to Kaupthing, we suspect that the decision to take it over may have been made much earlier. The specific timing may have been dictated by

effect of the UK's actions was a complete closure of the international part of the Icelandic payment system. It became impossible to transfer funds in or out of Iceland, as no foreign bank was willing to transfer funds between Icelandic financial institutions and abroad. This meant that the foreign exchange market collapsed on October 8th.

The government anticipated that a significant financial crisis was on the horizon, and as a part of its contingency planning had prepared emergency legislation, granting it widespread powers to maintain the domestic operations of the banks. This legislation was passed by Parliament October 6th. It created "new banks" from the ruins of the old ones, containing domestic deposits and domestic loans. The foreign operations were left in "old banks" which are in administration and on their way to formal bankruptcy. While this has created legal issues that have to do with equal treatment of different creditors – deposit holders vis-à-vis foreign banks, domestic deposit holders vis-à-vis foreign deposit holders, and so forth – the legislation managed to protect the internal payment system.

The Icelandic public was however only made aware of the seriousness of the situation when the Prime Minister made a speech on October 6th, outlining the difficulties. However, the nature of the difficulties was never explained to the population, which contributed to the sense of disbelief and anxiety.

These events have an immediate impact on the Icelandic society. The closing of the international part of the payment system immediately affected foreign trade, importers could not pay suppliers and exporters could not transfer funds to Iceland to meet domestic costs. Cash in Iceland was temporarily rationed and it became almost impossible to obtain foreign currency.

The crisis spread quickly to the nonfinancial sector of the economy. First the three big banks defaulted on their external obligations but eventually between 33-60%[24] of non-financial firms became technically bankrupt; and a large swath of industries and employment – based on an abundance of borrowed money – became obsolete overnight, setting in motion a sudden rise of structural unemployment. The institutions of government lost credibility domestically and abroad.

Neither the government nor the Central Bank appeared well prepared in handling the crisis. The authorities knew that a crisis was possible and prepared the emergency legislation. It does not appear to have made other preparations. Both the systemic crisis and subsequent events were predictable consequences of the collapse of its banking system.

The Central Bank's lack of understanding of the situation is evidenced by some of its measures taken during the crisis. Examples include an announcement from the central bank October 7th of a pending loan from Russia in the amount of €4 billion, which later turned out to be illusionary. It then pegged the exchange rate to the euro, an

circumstance, but not the eventuality. This would have been known to the Icelandic authorities. Their public statements that they were taken unawares by the takeover of Kaupthing are not convincing. Also note the testimony of the UK chancellor to the treasury select committee November 3, 2008, http://www.publications.parliament.uk/pa/cm200708/cmselect/cmtreasy/uc1167-i/uc116702.htm.

[24] Source: Confederation of Icelandic Employers (lower estimate).

operation that lasted only a couple of hours. On October 15 the governors lowered interest rates by 3.5% to 12%, only to raise them to 18% on October 28.

8 Coping with the crisis

8.1 The IMF program

The Icelandic authorities eventually requested IMF assistance weeks after the IMF team had started to work in Reykjavik and also a couple of weeks after the IMF had drafted a program for the country. The government's delay in asking for this assistance apparently falls on internal politics, especially the resistance of the Central Bank's governors.

The IMF published in November 2008 their analysis of the crisis and the only published official plan on how to respond to it.[25] The plan in effect dictates monetary policy, fiscal policy and the restructuring process for the banking sector. The IMF program aims at stabilizing the exchange rate by a combination of high interest rates and severe capital controls that are planned to be gradually dismantled; to foster a banking system and protect relations with foreign financial institutions by the adoption of a strategy that is nondiscriminatory and collaborative; and, finally, to organize fiscal consolidation in light of the much greater anticipated level of public indebtedness. With the program came a rescue package worth around $5.2 billion from the IMF and several countries.[26]

The IMF loan is apparently intended to support the exchange rate. However, it may also end up being used in part to recapitalize the newly created banks.

One problem preventing a return to a floating exchange rate is the substantial amount of foreign speculative capital remaining in Iceland.[27] Another is the lack of a credible monetary authority. If the exchange rate were to float, the expectation is that a substantial amount of funds would flow out, causing a large and sustained fall in the exchange rate, which would have further damaging effects on firms' balance sheets. In accordance with the IMF program, the Icelandic authorities imposed extensive capital controls in November 2008.

Capital controls undoubtedly help solve the immediate problems facing the currency. However, the longer-term problems of capital controls may outweigh the short-term benefits. It is for this reason very important that the credibility of the Central Bank be

[25] International Monetary Fund, Iceland, *Request for Stand-By Arrangement,* November 25, 2008 (see http://www.sedlabanki.is/lisalib/getfile.aspx?itemid=6606).

[26] See *Letter of Intent,* 15 November 2008 (http://www.imf.org/external/np/loi/2008/isl/111508.pdf) and the Stand-By Agreement (http://www.sedlabanki.is/lisalib/getfile.aspx?itemid=6606). Of this, $2.1 billion comes from the IMF, which is much more than its country quota of $173.6 million. The stand-by arrangement amounts to 1,190 percent of Iceland's quota.

[27] Newspaper accounts estimated this to be around IKR 500 bn., some 42% of GDP. If the notes are publicly issued, we might expect the issuance to go through Euroclear and Clearstream, in which case one can monitor it on Bloomberg and Reuters. A rough analysis of the numbers from those sources indicates that at least IRK 400Bn. was outstanding when the banks collapsed. Around half seem to have expired since then, and are in Icelandic bank accounts or government bonds. Most of the remainder expire this year or the next. These numbers probably don't show the whole picture because not all issues may be reported to the data providers.

enhanced and that the bank plays a constructive role in the implementation of the IMF program. Also, that foreign creditor banks are treated with respect and that the country asserts its intention to abide by both domestic and international law in its treatment of both foreign banks and deposit holders. The relaxation of the capital controls will represent the reintegration of the Icelandic economy into the world economy, while their maintenance will represent a long-term pariah status.

8.2 The search for miracle cures

There is a growing consensus in Iceland that one of the main reasons for the economic difficulties is its rather weak currency, and that it would be desirable to replace the krona with a more solid currency such as the euro.

The best way to adopt the euro would be to join the EU and then the euro system, a process that takes several years. However, the Icelandic population is split on the merits of EU membership. As an alternative, the idea of a unilateral adoption of a foreign currency, the euro being most frequently mentioned, has gained considerable traction. The idea is based on converting base money (M0) into euros, which could be accomplished at a relatively low cost. This would mean that the common currency in Iceland would be the euro, raising confidence in the economy, and thus solving the currency crisis. The country would then emulate the unilateral adoption of the dollar by Ecuador in 2000.

We remain unconvinced. The unilateral adoption of the euro would transform the crisis from a currency crisis to an even more severe banking crisis because the banks would not have any lender of last resort. The adoption of the euro would require restrictions on withdrawals from bank accounts because the supply of notes and coins in circulation will not be sufficient to convert money in demand deposit accounts or other accounts into cash. Effectively, the notion of unilateral adoption of the euro is dependent on strict capital controls.

Moreover, such a move would make EU membership more remote because by unilaterally adopting the euro before applying formally for membership, the country would be bypassing the prescribed procedures – hence setting a bad example for other prospective members – and depriving the EU from determining the exchange rate at which the krona would be converted into euro.

8.3 The current situation

The citizens of Iceland are demanding to know what happened, why it happened and who was responsible. The government has largely been unable to provide this information or show willingness to take responsibility for what has happened. The Central Bank and the financial regulator blame each other and the government blames the global credit crunch.

In response to popular demands for accountability, an investigation committee has been appointed.[28] The committee is supposed to investigate the causes of the crash and submit evidence of any illegalities to a special prosecutor.

[28] It consists of the Parliamentary ombudsman, one judge from the Supreme Court, and an economist.

Government debt is rising significantly following the crash, with sovereign default not impossible. However, there is uncertainty about the level of gross public debt and even more uncertainty about the level of net public debt. Both the internal as well as the external debt will put downward pressure on public expenditures, savings and investment in the future. Total public debt is likely to fall somewhere between 110-160% of GDP. There is considerable uncertainty because the future level of the exchange rate is uncertain as is the level of output as the economy recovers from the shock.

Taken together, the fiscal position of the state of Iceland is perilous. If the economy picks up, it is possible that this will correct itself in a few years. If however an economic recovery is not forthcoming, we are likely to see widespread reduction in government expenditures with a sovereign default not out of the realm of possibility.

9 Future prospects

Iceland already has experienced a rapid contraction of the construction sector, financial services and the import sector, with firms in the remaining sectors experiencing serious difficulties. These problems are likely to persist in the medium term.

This period will be characterized by widespread bankruptcies and rapidly rising structural unemployment rate and, presumably, the emigration of both foreign as well as Icelandic workers.

Lower real exchange rates will boost the tradable sector. The economy will gradually change from one based on consumption, speculative investment and international borrowing to one based on production, exports, and a current-account surplus. A record trade surplus in December is one of the first signs of a new economy emerging.

The economy is likely to continue to contract in the short-term. The fact that the main driver of economic growth in the recent years, banking, is unlikely to play a big role in the near future means that unless some new industry emerges, recovery is likely to be slow.

The resolution of the economic problems in the medium to long term depends on securing access to international capital markets. For this reason it is important that foreign creditors receive fair treatment; that the remaining disputes with the UK, the Netherlands and Germany are resolved and domestic institutions made credible.

10 What should be done

10.1 Establish trust domestically and abroad

The Central Bank governor, the financial regulator and the government have to explain what happened, why it happened and apologize for any mistakes made. Any officials responsible for mistakes must take responsibility, possibly by resigning. A mea culpa from the government would go some way towards establishing trust.

The government of Iceland collapsed late January, and the incoming government is expected to make institutional reform a priority. It needs to be outward oriented and to reestablish confidence in the country's institutions domestically and abroad.

A decision to apply to join the EU may go some ways to establish trust internationally.

The government has already replaced the director and board of the financial regulator, and the governors of the Central Bank. Unfortunately it took legislation to do so.

10.2 Support for households and firms

A significant number of households and firms face severe difficulties, and even bankruptcy. To address this problem, the bankruptcy process has been largely frozen, and firms and households that in normal circumstances would face bankruptcy, are being kept afloat.

Some form of debt forgiveness is already happening and such efforts need to be accelerated. Such debt forgiveness is aided by the fact that with the banks in government hands, most private debt is to the government. However, given the perilous state of government financing, the scale of debt forgiveness will have to be limited.

The most efficient way to achieve debt forgiveness would be to introduce a simple and universal formula. In its purest form, it is politically impossible as it implies debt amnesty for those who are perceived responsible for the crash.

It would be positive if the banks changed debt into equity positions in the case of firms with relatively good finances. In that case the current owners and management could continue to work for the firms, with the option to purchase their share when the economy is in a better state. This should not apply to the financial sector.

10.3 Public finances and transparency

Considerable uncertainty exists with respect to the state of public finances. This is partly due to some numbers simply not being yet available, most importantly obligations arising from Icesave. The authorities have however shown reluctance to publish their estimates on government income and obligations. An accurate assessment on the likely level of public debt is urgently called for.

Limited and often contradictory information is available about events leading up to the crisis, what was known, and who had the responsibility to take action. The little public information available seems to originate from foreign institutions, and the information originating in Iceland generally takes the form of Icelandic public officials or politicians leaking to the press, or being interviewed in the media, possibly for reasons of self interest, rather than any desire to inform the public. This is unlikely to increase trust in those particular individuals, nor Icelandic authorities in general.

10.4 A new banking system

A functioning banking system is needed if the economy is to recover. The speedy restructuring of the existing banking system as well as the introduction of subsidiaries of foreign banks is important. It is not advisable to neglect the buildup of the banking system because prosperity in other sectors depends on the presence of banking services.

Foreign ownership of some of the banks, perhaps in the form of creditors taking over a bank might be of benefit, but in the adverse global economic environment might not be feasible.

10.5 Monetary and exchange rate policy

Current interest rates are 18%. Inflation has been high, but is rapidly approaching zero, with a real danger of deflation in the near future. The optimal policy, from the perspective of demand management, would be to lower interest rates sharply but this might have an unpredictable effect on balance sheets due to the past borrowing of businesses in foreign currencies and possible evasion of the capital controls.

Iceland has extensive capital controls with both inflows and outflows severely restricted. The key justification for maintaining capital controls is the amount of foreign speculative funds – from carry trades – in Iceland, amounting to perhaps 40% of GDP, in addition to the central bank's lack of credibility.

10.6 Increased economic scrutiny

It would be of benefit if the government appointed a panel of independent economists to provide a thorough economic analysis of Iceland's economics situation, perhaps twice a year. Such an arrangement has been successful in both Denmark and Norway.

11 Conclusion

The collapse of Iceland's economy is a testimony of the combined effects of deregulation, privatization and lax financial supervision in a world of cheap credit. A speedy recovery depends on the authorities taking the right steps to steer the economy towards a path of sustainable development.

The systemic collapse of a developed country presents a unique case study for future reference. Moreover, the collapse offers some insights into the feasibility of small countries joining a much larger economic area without reforming its institutions and integrating them into a larger institutional framework. In the EU context, the lesson appears to be that a single market and a monetary union are complementary. Also that cross-border banking practices raise a host of regulatory issues, as well as issues that have to do with deposit insurance.

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	Real economy							Asset prices			Debt			Monetary	
Variables	GDP (real)	C	I	CA	e	P	U	Mark.cap.	Share prices	House prices	Househ. debt	Corp. debt	Net ext. debt	Inflation (CPI)	Inter. rates*
Units	Growth rates			% of GDP	index	% of work-age pop.	% of labor force	% of GDP	index	index	% of disp. income	% of GDP	% of GDP	Annual change	Highest observed
2000	4.3	4.16	11.82	-1.7	100.0	83.5	2.3	58.36	100.00	100.00	177.8	1.17	-94.0	5.0	11.40
2001	3.9	-2.85	-4.31	-0.2	87.3	83.6	2.3	55.45	70.88	106.32	192.0	1.41	-102.1	6.7	11.40
2002	0.1	-1.50	-13.97	1.5	91.7	82.8	3.3	64.82	82.22	111.27	194.0	1.42	-89.8	4.8	10.10
2003	2.4	6.11	11.08	-4.8	96.0	82.1	3.4	78.30	102.40	124.45	184.5	1.70	-94.3	2.1	5.80
2004	7.7	6.97	28.10	-9.8	98.1	80.7	3.1	116.70	190.56	140.38	190.6	2.12	-115.2	3.2	8.25
2005	7.4	12.92	35.66	-16.1	111.4	81.9	2.6	176.94	273.54	189.98	207.3	3.23	-154.1	4.0	10.50
2006	4.4	4.40	20.37	-25.4	104.2	83.1	2.9	222.31	382.20	214.11	213.3	4.50	-208.0	6.8	14.00
2007	4.9	4.30	-13.66	-15.5	108.6	83.3	2.3	200.89	490.70	235.88	221.1	5.61	-242.7	5.0	14.25
2008									241.12	244.97				12.4	15.50

Source: Central Bank of Iceland, Statistics Iceland and Fasteignaskrá Íslands (Fasteignamat Ríkisins). Notation: C is private consumption, I is gross capital formation, CA is the current account surplus, e is the real exchange rate, P denotes the participation rate and U the rate of unemployment.

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W06:08 Fridrik M Baldursson and Nils-Henrik M von der Fehr: Vertical integration and long-term contracts in risky markets.

W06:07 Ragnar Arnason: Conflicting uses of marine resources: Can ITQ's promote an efficient solution?

W06:06 Thorvaldur Gylfason and Gylfi Zoega: A golden rule of depreciation.

W06:05 Ron Smith and Gylfi Zoega: Global factor, capital adjustment and the natural rate.

W06:04 Thorolfur Matthiasson: To whom should the rent accrue?

W06:03 Tryggvi Thor Herbertsson and Gylfi Zoega: Iceland's Currency Dilemma.

W06:02 Thorolfur Matthiasson: Possible stakeholder conflicts in quota regulated fisheries,contribution to the political economics of fisheries.

W06:01: Eyjolfur Sigurdsson, Kristin Siggeirsdottir, Halldor Jonsson jr , Vilmundur Gudnason, Thorolfur Matthiasson, Brynjolfur Y Jonsson:Early discharge and home intervention reduces unit costs after total hip replacement: Results of a cost analysis in a randomized study.

W05:14 Gylfi Zoega and J Michael Orszag: Are Risky Workers More Valuable to Firms?

W05:13 Friðrik Már Baldursson: Fairness and pressure group competition.

W05:12 Marias H. Gestsson and Tryggvi Thor Herbertsson: Fiscal Policy as a Stabilizing Tool.

W05:11 Tryggvi Thor Herbertsson and Gylfi Zoega: On the Adverse Effects of Developement Aid.

W05:10 Thráinn Eggertsson and Tryggvi Thor Herbertsson: Evolution of Financial Institutions: Iceland's Path from Repression to Eruption.

W05:09 Tryggvi Thor Herbertsson: The Icelandic Pension System in 2004.

W05:08 Ron Smith and Gylfi Zoega: Unemployment, investment and global expected returns: A panel FAVAR approach.

W05:07 Gylfi Zoega and Thorlakur Karlsson: Does Wage Compression Explain Rigid Money Wages?

W05:06 Thorvaldur Gylfason: India and China

W05:05 Edmund S. Phelps: Can Capitalism Survive?

W05:04 Thorvaldur Gylfason: Institutions, Human Capital, and Diversification of Rentier Economies

W05:03 Jón Daníelsson and Ásgeir Jónsson: Countercyclical Capital and Currency Dependence

W05:02 Alison L. Booth and Gylfi Zoega: Worker Heterogeneity, Intra-firm Externalities and Wage Compression

W05:01 Tryggvi Thor Herbertsson and Martin Paldam: Does development aid help poor countries catch up?

W04:12 Tryggvi Thor Herbertsson: Personal Pensions and Markets

W04:11 Fridrik M. Baldursson and Sigurdur Johannesson: Countervailing Power in the Icelandic Cement Industry

W04:10 Fridrik M. Baldursson: Property by ultimatum: The case of the Reykjavik Savings Bank

W04:09 Ingólfur Arnarson: Analyzing Behavior of Agents of Economic Processes in Time

W04:08 Otto Biering Ottosson and Thorolfur Matthiasson: Subsidizing the Icelandic Fisheries

W04:07 Niels Vestergaard and Ragnar Arnason: On the Relationship between Greenland's Gross Domestic Product and her Fish Exports: Empirical Estimates

W04:06 Ingolfur Arnarson: Modelling Fishery Management Schemes with an Olympic System Application

W04:05 Ingolfur Arnarson and Pall Jensson: Adding the Sales Markets Dimension to Bio-Economic Models. The Case of Fishery Management

W04:04 Edmund S. Phelps: Changing Prospects, Speculative Swings: Structuralist Links through Real Asset Prices and Exchange Rates

W04:03 Ingolfur Arnarson: Analysing Behavior of Agents of Economic Processes in Time

W04:02 Ron Smith and Gylfi Zoega: Global Shocks and Unemployment Adjustment

W04:01 Fridrik M. Baldursson and Nils-Henrik M von der Fehr: Prices vs. quantities: public finance and the choice of regulatory instruments

W03:07 Sveinn Agnarsson and Ragnar Arnason: The Role of the Fishing Industry in the Icelandic Economy. A historical Examination

W03:06 Thorolfur Matthiasson: Paying paper by paper, the wage system of Icelandic University teachers explained

W03:05 Gur Ofur and Ilana Grau: Bringing the Government hospitals into line: The next step of reform in the healthcare sector

W03:04 Ingolfur Arnarson and Pall Jensson: The Impact of the Cost of the Time Resource on the Efficiency of Economic Processes

W03:03 Torben M. Andersen and Tryggvi Thor Herbertsson: Measuring Globalization

W03:02 Tryggvi Thor Herbertsson and J. Michael Orszag: The Early Retirement Burden: Assessing the Costs of the Continued Prevalence of Early Retirement in OECD Countries

W03:01 Eirik S. Amundsen, Fridrik M. Baldursson and Jørgen Birk Mortensen: Price Volatility and Banking in Green Certificate Markets

W02:10 Tryggvi Thor Herbertsson and Gylfi Zoega: A Microstate with Scale Economies: The Case of Iceland

W02:09 Alison, L. Booth and Gylfi Zoega: Is Wage Compression a Necessary Condition for Firm-Financed General Training

W02:08 Asgeir Jonsson: Exchange rate interventions in centralized labor markets

W02:07 Alison, L. Booth, Marco Francesconi and Gylfi Zoega: Oligopsony, Institutions and the Efficiency of General Training

W02:06 Alison L. Booth and Gylfi Zoega: If you're so smart, why aren't you rich? Wage inequality with heterogeneous workers