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The Icelandic and Irish Banking Crises

Alternative Paths to a Credit-Induced Collapse

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DAVID HOWDEN

Standard illustrations of an Austrian business cycle (ABC) center on a central bank–controlled money supply being expanded so as to lower the market rate of interest below its natural (i.e., savings- and investment-determined) level. The result is a discoordination between consumption, savings, and investment manifested in two forms: malinvestment along the temporal structure of production and/or overconsumption (Friedrich Hayek [(1935) 1967] focuses on the former, whereas Ludwig von Mises [(1949) 1998] and Roger Garrison [2001] utilize a combination of the two). Although this approach has wide appeal based on its use of “the” interest rate as a general cause of economic downturns, it suffers from its near-exclusive focus on the central bank–controlled money supply as the unique source of the artificially low interest rate.

This paper uses Iceland and Ireland’s recent banking crises to demonstrate that although centralized monetary authorities can create artificially low interest rates via monetary expansion, this method is not the sole method for doing so. Both countries are compelling cases for examination because the extent of their recessions is formidable. Ireland’s main stock index, the ISEQ, fell nearly 80 percent between 2007 and 2008, and Iceland’s (now-defunct) ICEX15 collapsed more than 97 percent.

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Per capita gross domestic product (GDP) in Iceland declined 30 percent from peak to trough, and Ireland's GDP fell 12 percent over the same period. (The equivalent decline in the United States was about 5 percent.) The use of these countries is also appealing because their crises offer similar symptoms—large buildups of debt that propagated speculative banking activity and unsustainable consumption patterns. These two countries are also interesting in that their debt buildups have several common denominators: increases in the money supply, inflation, and low real interest rates enticed what are now identified as excess debt levels. A general theory, such as ABC theory, is useful to explain why these disruptions to the money side of the economy trigger such widespread effects. By focusing on changes to risk perceptions in each economy, I can illustrate that the general theory holds true with less onus placed on the central bank. In this way, this essay is influenced by Tyler Cowen's book *Risk and Business Cycles* (1997, especially chapter 3), which phrases a traditional ABC in terms of increased risk taking through manipulations to the natural rate of interest.

In particular, I contrast three sources of disruption on the money side of the economy that promoted debt buildups in each country. First, and consistent with the traditional exposition of an ABC, I explore what role each country's central bank had in setting interest rates too low and in expanding their money supplies too quickly to be sustainable. Second, I assess the assets in which banks in each country focused their investment activities—equity in Iceland and real estate lending in Ireland. Finally, I discuss the guarantees secured by governmental or institutional arrangements that skewed risk perceptions and led to artificially high risk-adjusted returns. I conclude by giving a summary view of the effects of these three disruptions and why it is important that ABC theorists move toward giving a more holistic account of crises that includes these additional factors.

The Lead-Up to Iceland's Bust

When the Central Bank of Iceland (CBI) floated the króna in March 2001, it also adopted an inflation-targeting regime. Under this regime, the CBI targeted yearly consumer price inflation of 2.5 percent. Despite this target, Iceland's annual inflation rate averaged 4.7 percent from 2001 to 2006 and peaked at 9.4 percent in 2007. By its own admission, it had done an unsatisfactory job at targeting inflation over this period (CBI 2007, 12–13). Part of this error can be explained in part by a faulty inflation-targeting model (as discussed in Bagus and Howden 2011, 16–18) and in part by the large influx of foreign bank funding.¹ With inflation remaining above

1. There is also evidence that the CBI lowered its key interest rate in 2001 in response to pressure from the Icelandic government (*Report of the Special Investigation Commission* 2010, chap. 21, p. 27). The CBI estimates that Icelandic nominal interest rates were set more than 4 percent below that suggested by its own Taylor Rule. This gap persisted until midway through 2004, at which time the increase in interest rates by the CBI (by almost 8 percent over two years) normalized its target rate with the projected Taylor Rule target (CBI 2007).

target for most of the early 2000s, artificially low real interest rates spurred domestic borrowers to take on increasing amounts of debt.

The CBI's monetary expansion had the twofold effect of increasing inflation while simultaneously holding nominal interest rates low. This interest-rate policy did not just affect domestic borrowing but also filtered through to foreign lenders. By 2005, the Icelandic banks had more or less exhausted the amount of domestic funds that the approximately 320,000 Icelandic residents could deposit in the narrow banking system or invest in the broader financial sector (Portes and Baldursson 2007, 36–38; Jónsson 2009, 107–12). In a bid to continue financing their expanding operations, Icelandic banks turned to foreign depositors who were seeking higher interest rates than their own countries provided. These nominal interest rates may have been low by Icelandic standards but were high compared to other countries' rates. This disparity can be explained in part by a lower inflation premium on borrowing in other countries, especially within the core of Europe.

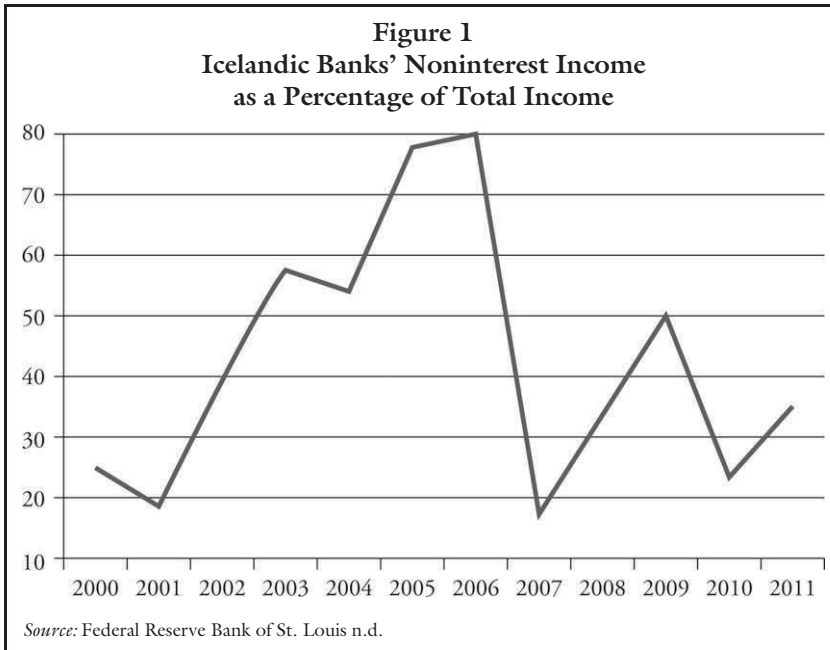
Although high inflation and low real interest rates incentivized Icelanders to borrow funds instead of loaning money to the banking system, the same did not hold true for foreigners. A foreign lender is not concerned with Icelandic inflation (except through effects on the exchange rate); his focus is centered only on his own domestic rate of inflation rate. High nominal Icelandic interest rates coupled with lower foreign inflation premia translated to high real returns for the foreign investor interested in lending money to an Icelandic financial institution. To the extent that higher Icelandic inflation would also depreciate the exchange rate, the expected return on a króna and home-currency investment would be equalized for the foreigner. As discussed later, a robust carry trade maintained the króna's strength and mitigated fears of depreciation, thus leading to above-average risk-adjusted returns for foreigners investing in the Icelandic market.

Icelandic Bank Operations

Icelandic banks were able to enhance their credit-issuing capabilities through two changes that occurred in the 2000s. First, the internationalization of its financial markets allowed them to start seeking foreign retail funding after a long period of reliance on domestic deposits. Second, the banking system was able to enhance its credit-issuing capabilities endogenously by investing in inflation-sensitive assets to finance external growth. This type of investment commonly resulted in equity-based bank assets, in contrast with the more usual financial position for banks with debt-based assets.

By not only holding assets in the form of loans, but also taking a position in the equity of companies, the Icelandic banks realized significant returns on their assets from 2000 to 2007.² By 2006, 80 percent of bank income came from gains on assets

2. None of the big three Icelandic banks had a return on equity of less than 24 percent for the years 2006 and 2007 (Portes and Baldursson 2007).



as distinct from the more usual interest income from loan portfolios (figure 1), which enabled them to increase their liabilities commensurately without endangering their liquidity, primarily by increasing the money supply. In 2004 and 2005, Icelandic bank investments in equities grew by 57.5 percent and 24.7 percent (*Report of the Special Investigation Commission* 2010, chap. 21). External growth was strong from 2004 to 2007, with Icelandic outward investment hovering around 33 percent of its GDP in each of these years (Portes and Baldursson 2007, 39). Internal growth composed the bulk of the banking system's growth from 2006 to the crash. The primary driver of this growth was expansion of these previously undertaken equity activities, usually by decreasing the quality of the investments made (Flannery 2009, annex 3).

The market liberalizations of the late 1990s opened the Icelandic financial sector to the well-established world of global finance. One way to look at the internationalization of Iceland's financial arena is in terms of the current-account deficit that built steadily throughout the mid-2000s, peaking at nearly 20 percent of GDP in 2006 (table 1). By the end of 2006, the net international investment position of Iceland was negative, 121.5 percent of GDP—quite high also by international standards (Portes and Baldursson 2007, 43–44).

Less-risk-averse investors could invest directly in the Icelandic market via “Glacier Bonds”—króna-denominated bonds that were marketed directly to foreigners in a bid to attract foreign capital. Issuances of Glacier Bonds commenced in August 2005 and reached their peak in spring 2007 with \$6.3 billion of these bonds

Table 1
Icelandic Trade Balance

Year	Trade Balance as a Percentage of GDP
2000	-7.3
2001	-1.1
2002	1.6
2003	-3.1
2004	-5.6
2005	-12.3
2006	-18.2
2007	-10.7
2008	-2.8
2009	8.6
2010	10.1
2011	8.5
2012	6.3

Source: Organisation for Economic Cooperation and Development n.d.

outstanding, equivalent to almost 40 percent of the country's GDP (Bagus and Howden 2011, 63).

High nominal interest rates spurred on by high levels of inflation coupled with a comprehensive deposit-insurance scheme managed by the CBI incentivized banks to push into foreign markets to obtain lower-cost funding. In particular, online retail branches were set up in several European countries—notably the United Kingdom and the Netherlands—to attract foreign customers. These foreign retail deposit accounts offered foreigners the chance to capitalize on higher Icelandic interest rates in their own domestic currency, thus eliminating the risk of an adverse foreign-exchange movement. As an example, a Dutch saver could lend euros to an Icelandic subsidiary operating in the Netherlands. The Icelandic bank would convert these euros to króna and pay the Dutch saver the higher interest rate made possible through the resultant króna investment. The Dutch saver was able to earn a rate of return closer to that of the króna investment, and the Icelandic bank used the less costly euros to fund Icelandic investment activities.

The Icelandic deposit-insurance plan insured clients of the foreign branches of Icelandic banks, thus mitigating risk from the venture and enticing a steady flow of foreign retail deposits into the country. Icelandic banks loaned these foreign-denominated funds directly to the Icelandic public at relatively low interest rates to finance consumption activities. (Bagus and Howden 2011, chapter 5, examines the overconsumption that resulted from these loans.) Foreign-denominated

mortgages to take advantage of lower international interest rates became common, with around 80 percent of all foreign-currency household lending made in low-interest-rate Swiss franc- and Japanese yen-denominated mortgages (Buiter and Sibert 2008, 16).³ Although Icelandic companies had high levels of foreign revenues that made paying these foreign-denominated liabilities less problematic (Mishkin and Herbertsson 2006, 45, reports that 77 percent of revenues from firms in Iceland's main stock market index, ICEX15, were in foreign currency), households had limited access to foreign income to pay off their mortgages.

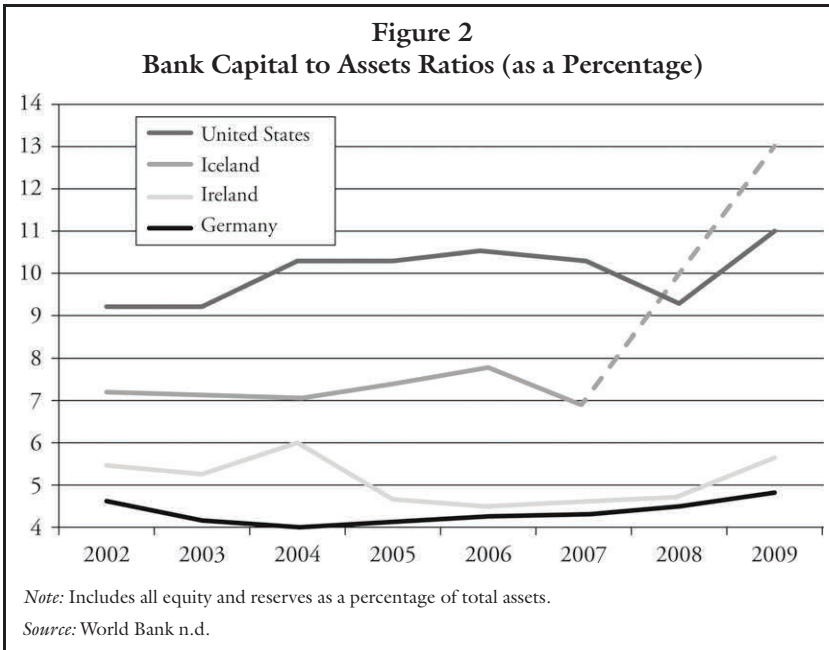
Some of these incoming foreign funds were converted to króna to fund domestic asset purchases, in what is now the well-known króna carry trade—borrowing at low foreign interest rates to invest in higher-yielding Icelandic investments. The conversion of this foreign funding to króna served an important purpose. The fresh demand for króna supported the exchange rate, mitigating any depreciation caused by the credit expansion (*Report of the Special Investigation Commission* 2010, chap. 21, p. 30). As a consequence, Icelandic banks initially faced little exchange-rate risk due to reduced króna volatility.⁴ Although this strategy reduced risk for Icelandic banks during the boom, it proved to be the country's undoing when liquidity dried up. As foreigners started redeeming their deposits, Icelandic banks lacked sufficient foreign-exchange reserves to meet these demands and began selling króna-denominated assets for foreign currency. These actions started a spiral in which depreciating pressure on the króna fueled increased asset sales to meet foreign redemption demands.

The Icelandic banking sector was ultimately exposed to two dangers.

First, its liquidity and eventually its solvency were reliant on equity prices. As a sizable portion of the banking system's balance sheet was held in equity investments (Flannery 2009), any stock-market decline hampered the banks' ability to meet redemption requests. For this reason, the International Monetary Fund (IMF) characterized Icelandic deposit banks as more closely resembling investment banks. By 2006, 80 percent of banks' operating profits came from capital gains and commissions from their equity portfolios, with only 20 percent coming from more conventional (and safer) interest income (see figure 1). This situation was largely not a problem during the boom because buoyant stock prices kept Icelandic banks well

3. Iceland's Housing Financing Fund, a state-operated facilitator of mortgage lending, also relaxed borrowing criteria in 2003. The maximum loan-to-value ratio was increased to 90 percent, and the maximum loan amount doubled, from 9.7 million kronur in 2004 to 18 million by 2006. Financing interest rates fell to 4.15 percent, their lowest level, for most of 2005 (*Report of the Special Investigation Commission* 2010, chap. 21, pp. 25–26).

4. Implicit bailout guarantees by several international organizations, primarily the IMF, also served to reduce the volatility of smaller currencies, such as the króna (Bagus and Howden 2011, chap. 3). Two risk reductions became apparent as the IMF increased the scope and frequency of its interventions. First, foreign investors became less concerned with sovereign insolvencies. Second, with bailouts more frequently forthcoming, foreign investors reduced the inflation premium on foreign-currency investments because sovereigns nearing insolvency would resort less to this option.



capitalized and liquid relative to the banks of some larger, more stable countries, such as Germany (figure 2).

Another common funding practice in Iceland was for two banks to swap their debt securities with each other to use as collateral in the CBI's funding facilities (Hreinsson, Gunnarsson, and Benediktsdóttir 2009, 44; Jännäri 2009, 18).⁵ When other banking sectors started shifting to more liquid assets as the crisis approached, Icelandic banks were caught amidst a collateral deficiency. Lacking sufficient assets to cover their increasingly requested liabilities, they were able to increase their liquidity and capital ratios only by defaulting and writing off large numbers of nonperforming assets. In contrast to their peers, Icelandic banks only appeared more liquid and better capitalized as the bust progressed due to the fact that their bad assets were mostly written off, and the banks were eventually recapitalized by the IMF and fellow Nordic countries. Note that in figure 2, the dashed line between 2007 and 2009 represents the fact that the Icelandic banking system collapsed, effectively erasing all capital. As liabilities were written off and the foreign loans from Denmark, Norway, and the IMF started flowing into the country, the Icelandic banking system's liquidity and capital positions increased commensurately. It is important to keep in mind, however, that

5. Indeed, the CBI was not the only institution to accept these swaps as collateral: the Eurosystem did as well (Hreinsson, Gunnarsson, and Benediktsdóttir 2009, 44; Sibert 2010). Mark Flannery notes that such collateral amounted to nothing more than a "love letter" (2009, 101).

this positive appearance could occur only after the collapse of the banking system erased many of its liabilities.

The second aspect of the danger facing the Icelandic banking system was that by the end of the boom a growing portion of funding came from foreigners via foreign-denominated accounts, thus exposing the banks to exchange-rate risk. As long as foreign depositors continued channeling funds into the Icelandic banks to exchange those funds into króna, there was appreciating pressure on the króna. The collapse of Lehman Brothers in September 2008 and the accompanying heightened awareness of international risk induced a flight to safety that included mass withdrawals from the Icelandic banks' foreign branches. The CBI lacked sufficient foreign-exchange reserves to meet these withdrawals or to defend the currency. By 2007, the banking sector held fourteen times the central bank's foreign reserves as foreign short-term liabilities (Gylfason 2008). In this way, a run on foreign branches of Icelandic banks put in motion a currency crisis that endangered the banking system's solvency.

Icelandic Exchange-Rate Stabilization

With an independent central bank and an autonomous monetary policy, Iceland was in no position to offer foreign investors a credible risk reduction in terms of inflation and exchange-rate risk. Attractive Icelandic interest rates were a product of high inflation. This feature would normally depreciate the króna and temper the expected returns of foreign investors' króna assets. Through a stroke of fortune, the large quantity of króna carry-trade funding temporarily kept the currency strong and stable, thus reducing investors' fears that they would suffer an adverse exchange-rate shock. Indeed, *The Economist's* Big Max Index ranked the króna as the most overvalued currency in the world on February 1, 2007. This state of affairs in Iceland was held up by a tenuous foundation and secured by an accommodative but ultimately deficient deposit-insurance plan.

The króna's strength was in essence maintained by a Ponzi scheme and was driven largely by Icelandic banks making purchases using their foreign funding sources. The sustainability of the króna's ascent required more foreign-deposit inflows into the country each period than outflows out of the country. Provided that foreigners were willing to lend Icelandic banks more money than they withdrew, banks would have a net positive cash flow to convert to króna. As a consequence, exchange-rate risk was temporarily reduced, but the fragility of this situation increased with each growth in foreign liabilities held by the Icelandic financial system. If foreign investors started to withdraw more funding each month than they deposited or loaned, as started in late 2007 and accelerated throughout 2008, Icelandic banks would find themselves in a spiral of selling domestic assets in ever more desperate attempts to cover their foreign losses with a dwindling supply of domestic assets.

The Icelandic banking system's generous and inclusive deposit-insurance plan limited the downside risk to both domestic and foreign account holders. This plan had three important features: (1) it was managed by the CBI; (2) deposits were

guaranteed up to an unlimited amount; and (3) both domestic- and foreign-denominated deposits were covered. Each of these facets reduced risk for depositors and enticed funding inflows in search of above-average risk-adjusted returns. The latter two points also reduced depositor monitoring of banking practices (Howden 2013), while the first point legislatively put the onus on the CBI, an institution poorly incentivized to promote financial stability.

In the absence of a deposit-insurance plan, depositors monitor banks to ensure that the banks' lending practices are sufficiently prudent. This enforcement mechanism arises as depositors entrust their cash holdings to a bank, and its liquidity affects their ability to withdraw in a timely manner (also, the bank's solvency affects their ability to withdraw their money at all). Most deposit-insurance plans have a legal maximum insurable amount to limit the obligation that the insurer will have to pay out in the event of insolvency and to entice large depositors to act as a secondary monitoring mechanism on the banks. By insuring deposits without limit, the CBI exposed itself to unlimited liability and removed one set of monitors from the banking sector.

Deposit-insurance plans also mitigate losses by insuring deposits made in only the domestic currency because insuring foreign-denominated deposits implies that foreign-exchange reserves will need to be made available to settle claims. The denomination of the insured deposits is important in that it tempers what type of depositor will use the banking system and defines the insurer's risk.

With the offer of foreign-denominated deposit insurance, there was an ambiguity as to who was liable for Icelandic banks operating in foreign countries. One of the largest banks in Iceland, Landsbanki, operated an online retail bank, Icesave, in the United Kingdom. Because Icesave was operated as a branch and not as a legally independent subsidiary, deposit insurance for it was the CBI's responsibility (Danielsson and Zoega 2011). British depositors, for their part, were not concerned with the risk because as far as they were aware, the CBI insured all deposits. Regulators in the United Kingdom were uninterested in the branch's operations because the branch was presumed to be held accountable by the Icelandic authorities.

When these foreign-operating branches, such as Icesave, came under pressure in late 2008, it was soon clear that the CBI held insufficient foreign reserves to honor foreign-denominated liabilities. The Icelandic Depositors' and Investors' Guarantee Fund, which administered the deposit insurance, had only about €100 million of equity in late 2008, far from the €3.9 billion held with foreign branches of Icelandic banks and subject to insurance under the European Union's minimum-deposit insurance directive (Benediktsdóttir, Danielsson, and Zoega 2011). When the time came to exercise the deposit fund, its underfunded state caused not only financial volatility and losses but legal repercussions that still reverberate today.⁶

6. Governments in the United Kingdom, the Isle of Man, and the Netherlands unilaterally enacted legislation to include these branches in their own deposit plans under the pretext of protecting their own citizens from the Icelandic collapse. In August 2009, Iceland's Parliament approved a bill now known as the "Icesave Bill," which would pay the United Kingdom and the Netherlands \$5 billion to cover losses.

Deposit-insurance plans are usually administered by the government. In the United States, the Federal Deposit Insurance Corporation operates under the Treasury as an independent agency. An explicit link to the government has some advantages over an insurance plan managed by a central bank. The first advantage comes in the form of the limitation that the budget constraint imposes on the Treasury. Governments generally have large, though binding, budget constraints. Funding must ultimately be provided through taxes, making taxpayers aware of the expenses that their government incurs. Central banks, because of their role as monopoly suppliers of money, face no explicit budget constraint. They can unilaterally increase their assets to fund such insurance claims by issuing liabilities in the form of nonredeemable currency. In this way, they face no explicit pressure to minimize the losses of their deposit-insurance operations.

The insurer of deposits is also tasked with regulating the financial system—or at least the deposit-taking part of it. Confronted by a real budget constraint, governments face the costly possibility that if they have to pay out a claim, they will have to divert resources from elsewhere. A central bank faces no such threat. If a claim is made, it can issue currency to paper over the loss. In this sense, we can expect a deposit-insurance plan in a government's hands to take its role as regulator of the financial system more seriously than a central bank would.⁷

The CBI had little incentive to monitor its banking system. At the same time, a central bank can honor its deposits only if they are denominated in a currency under its control. By late 2008, the CBI had only 3 percent of the foreign reserves necessary to honor all the foreign-denominated liabilities of the banking system (Bagus and Howden 2011, 101). Such a precarious position would necessitate a recapitalization of the central bank after even a minor loss of foreign assets, a situation that materialized in 2008.

Lacking the foreign-exchange reserves to guarantee the now insolvent banking system, the CBI turned to the government for help in late 2008. Because the banking sector's assets were almost nine times the size of the country's 2007 GDP (Organization for Economic Cooperation and Development 2009), the Icelandic government was largely powerless to aid the insolvent banking system. Lacking the funds to save its financial system, and with larger countries focused on their own problems, the Icelandic government allowed its banking system to default on a large number of its obligations, thus saving the sovereign from a commensurate default.

On March 6, 2010, in its first referendum since 1944, the country voted 93 percent in favor of rejecting the Icesave Bill (with 5 percent of ballots miscast). A second referendum on April 9, 2011, had the same result (though by a slimmer margin of 60 to 40 percent in favor of rejecting the bill). The United Kingdom and the Netherlands are still seeking legal redress.

7. After Sheila Bair stepped down as chairwoman of the Federal Deposit Insurance Corporation, her "exit interview" with the *New York Times* demonstrates how aware she was of her role to protect taxpayers' money and depositors (Nocera 2011). She was quite clear that the deposit-insurance fund is not an investment vehicle to put tax dollars at risk, nor does it exist for any role other than protecting depositors. To my knowledge, no such discussion is found among the regulators of Iceland's deposit-insurance plan.

The Lead-Up to Ireland's Bust

If Iceland's crisis was caused mostly by domestic policies, Ireland's was instigated primarily by European unification. Prior to Ireland's entry to the Eurozone, its nominal interest rate was an equilibrating force set endogenously in its economy and subject to influence by its national central bank. With the advent of the euro, this nominal rate was set exogenously and became a destabilizing mechanism. This occurred as the rate was set without heed to domestic Irish savings and investment demand conditions or to shocks affecting its economy. Although the nominal rate set by the European Central Bank (ECB) moved qualitatively with the needs of the Irish economy, the large and sustained quantitative fall in this nominal rate had repercussions on the nation's propensity to borrow (Honohan and Leddin 2005).

The depreciation of the Irish pound in 1986 started the economy down the path to unsustainability in terms of low and stable inflation and a balance of trade. Disequilibria during the 1990s were solved primarily through exchange-rate realignments within the European Exchange Rate Mechanism. Although still in control of its monetary policy throughout most of the 1990s, the central bank of Ireland was able to target a nominal interest rate aligned with what the Taylor Rule would suggest was prudent (Eleftheriou, Gerdesmeier, and Roffia 2006). Although adherence to the Taylor Rule does not rule out a savings–investment imbalance, it is the guide that central bankers most commonly use to assess the sustainability of their policies.⁸

Accession to the Eurozone upset this stability because equilibrium could no longer be sought through flexible exchange-rate adjustments, and the nominal interest rate was no longer determined endogenously by domestic Irish affairs. From 2000 to 2005, the ECB's target nominal interest rate for the aggregate Eurozone was regularly 1.5 to 2 percent lower than the Taylor Rule suggested was appropriate for Ireland's economy. Indeed, disaggregating the Eurozone into a “core” and a “periphery” suggests that this target rate was set to equilibrate the core's economies, with little heed to the periphery (Nechio 2011). Not only was the ECB's target rate set below the periphery's Taylor Rule target from 2000 until 2008, but during 2006 the divergence grew to more than five percentage points. In sum, there is evidence that the interest rate set by the ECB was not in response to Ireland's economic realities (Sharkah and Pawela 2010; Lane 2012).

8. The Taylor Rule is a monetary-policy guideline that aims to balance inflation with output through the central bank's policy rate. The benchmark version of the rule states that the central bank's target interest rate (e.g., the Federal Funds Rate in the United States) will equal $2 + \text{the inflation rate} + 0.5 \times (\text{the inflation rate} - 2) + 0.5 \times (\text{the percentage by which real GDP deviates from full-employment GDP})$. Although the rule is currently the most commonly used guideline for monetary policy, it is not without its own shortcomings. Price stability from following an appropriately specified Taylor Rule, for example, still allows for relative price adjustments capable of triggering an ABC (Garrison 2006).

Irish Bank Assets

Ireland's funding sources were conventional by comparison to those of its Icelandic neighbor. The country's banks traditionally used the domestic-deposit base to finance mortgage and commercial lending (Ó Gráda 2008). The asset side of the banking system's balance sheet, despite ballooning in size, remained largely consistent in composition during the boom. Funds were used to finance Irish consumption and investment expenditures. The key difference during the boom was the source of this funding and its amount.

Lenders are concerned primarily with the default risk, the nominal interest rate, and the relevant loss of purchasing power through inflation over the period of their investment. Accession to the Eurozone altered each of these factors, thus adjusting the cost of funding for Irish banks and the consequent availability of credit.

With exchange-rate risk removed from other European investors' profit calculus, Ireland's financial system witnessed a large influx of credit. Some of this funding was a positive development in response to increasingly encouraging fundamentals—a low corporate tax policy attracted foreign investment, and an educated and English-speaking workforce provided an ample pool of employees to fuel these businesses (Powell 2003; Evans 2011). By 2007, 8.1 percent of Ireland's GDP flowed in through foreign direct investment, placing it behind only Austria and Spain as a recipient country of these funds in Europe. As in Iceland, much of this incoming credit was directed at unproductive sources. In contrast to Iceland, this influx of credit lacked one significant problem: these liabilities were in the same denomination as the assets they purchased and the investments they financed.

The sustainable flow of funding into Ireland—those funds entering the country to take advantage of the positive changes to the country's tax, regulatory, and demographic structure—largely fueled employment growth. These funds were also largely secure. The combination of Ireland's tax structure and educated employment base was so much more conducive to domiciling foreign subsidiaries than were continental European countries that there was little fear the funding that accompanied these companies would swiftly shift to greener pastures. Those funds that came in due to a short-term imbalance in real interest rates within the Eurozone during its early years were less reliable. Because these funds were invested solely in a quest to seek out the highest risk-adjusted return, Ireland's competitive advantage in securing them disappeared as the Eurozone matured. As real interest rates normalized with the rest of Europe, the flow of funds into Ireland slowed. A mere slowing of funding would not have instigated a credit crunch of the magnitude witnessed in 2008. However, because the funding was used for nonproductive activities—in the sense that it created non-self-liquidating debt through the construction of what proved to be unsalable real estate—borrowers' ability to repay was hampered as credit continued flowing into the country. In the initial stages of the boom, this was not problematic because the country had low debt levels. As borrowing continued, though,

foreign investors were increasingly less likely to be repaid in full, and the flow of funding reversed outward.

Thus, not only did the flow of funds into Ireland slow as its maturity in the Eurozone harmonized its real interest rates with those of its peers, but in risk-adjusted terms it increasingly became an unattractive bet for foreigners. The vulnerability that pressured Ireland at the time was a banking sector with large overexposure to the domestic construction sector on its asset side and an overreliance on interbank euro borrowing on its liability side (Kelly 2009). This vulnerability became especially apparent in 2008 as housing projects that were previously generating income for their constructors went unsold, the ability to repay debt was hampered, and interbank lending slowed.

An asset's default risk comes from two sources. Explicitly there is the chance that lenders will not get their principle returned, and implicitly there is the loss on the investment through a depreciation of the exchange rate (if the investor is foreign) or through a loss of purchasing power (if the investor is domestic). Upon Ireland's accession to the Eurozone, European investors had their fears allayed that an adverse exchange-rate movement would reduce their payoff. The risk premium on Irish (versus other European) bonds was reduced, increasing the demand by foreigners. Because the ECB was modeled largely after the inflation-fighting German Bundesbank, investors previously wary of inflationary policies through the national banks could rest assured that a more prudently managed ECB would keep inflationary pressures at bay.

An increase in real interest rates for foreign borrowers of Irish debt resulted as a consequence of this reduced risk premium. A contrast between the nominal interest rates (ten-year government bond), inflation, and real interest rates in Germany and Ireland is shown in table 2.

A German could earn the nominal interest rate by investing in a German *bund* or an Irish bond. Nominal interest rates in Germany were lower than in Ireland, if due mostly to lower inflation (a condition that in equilibrium would yield equal real interest rates and that the data show was almost the case by 2005). Yet the German investor with no exchange-rate risk was now free to lend money to the Irish borrower at the Irish interest rate and was himself concerned only with the domestic German rate of inflation. In other words, a German would have expected to earn almost 0.2 percentage points more interest by investing in Ireland in 2002 than by keeping his money in Germany. The low-interest-rate environment created by the ECB magnified this advantage. Note that these 0.2 percentage points translate to a 5.2 percent increase over what the German could earn by investing his money domestically. As the European Monetary Union matured and culminated in the formation of the Single European Payments Area in early 2008, transaction costs on financial movements were reduced. Coupled with the reduction of default risk on inter-European sovereign debt, the home bias that defined European investment portfolios prior to the introduction of the Euro gave way to a "Euro bias" as

Table 2
Interest and Inflation Rates

Year	Germany			Ireland		
	Nominal Interest Rate (Ten-Year Government Bond)	Inflation	Real Interest Rate	Nominal Interest Rate (Ten-Year Government Bond)	Inflation	Real Interest Rate
2000	5.3	1.4	3.9	5.5	5.3	0.2
2001	4.8	1.9	2.9	5.0	4.0	1.0
2002	4.8	1.4	3.4	5.0	4.7	0.3
2003	4.1	1.0	3.1	4.1	4.0	0.1
2004	4.0	1.8	2.2	4.1	2.3	1.8
2005	3.4	1.9	1.5	3.3	2.2	1.1
2006	3.8	1.8	2.0	3.7	2.7	1.0
2007	4.0	2.3	1.7	4.0	2.9	1.1

Source: Eurostat n.d.

cross-border capital flows rapidly moved to exploit arbitrage opportunities (Balli, Basher, and Ozer-Balli 2010).

Low real interest rates during the early 2000s were largely the result of factors outside of Ireland's control. Irish accession to the euro occurred at the peak of the "Celtic Tiger" boom. The standard prescription for countries entering monetary unions under such conditions is for an appreciation of the exchange rate just prior to entry, such that any inflationary pressures in the economy are absorbed by the appreciation and not through the post-entry inflation rate. This was notably not the case with Ireland's accession, thus resulting in an undervalued entry conversion rate of the Irish pound to the euro, which contributed to inflationary pressures in Ireland in the early years of joining the Eurozone (Lane 2011, 26). The natural harmonization process upon accession to the Eurozone meant that Irish inflation was structurally higher than that of core European countries (e.g., Germany) for a considerable period (table 2). Furthermore, due to strong foreign participation in Ireland's economy, inflationary pressure there was greatly influenced by the value of the euro. As a result, during the euro depreciation from 1999 to 2002, Ireland experienced a positive shock and an inflow of investment, especially from the United States, that increased its inflation differential relative to the rest of the Eurozone (Honohan and Lane 2003). From 2000 to 2005, Irish inflation outpaced that of the rest of the Eurozone by 2 to 3 percent per year. Though this pace leveled off by 2005, Irish inflation still averaged about 0.5 percent higher than that of Germany and the United Kingdom until the early stages of the financial crisis in late 2007. The presence of inflation is significant because it reduces the real cost

of borrowing and thus lowers the cost of issuing debt.⁹ With real interest rates hovering around zero for a decade, long-lived assets (such as residential property) became increasingly attractive.

Core European investors could seize on the real-interest-rate differential available by investing in Ireland with no fear that the country might one day exit the monetary union should the unsustainability of its boom be exposed. In effect, investors were able to get a free lunch—high risk-adjusted returns by the core's standards, with no risk that a future currency depreciation would diminish profits.

Banks' liabilities became increasingly dependent on foreigners' whims as foreign funds continued flowing into Ireland. Assets were for the most part domestically based, especially in the context of financing real estate endeavors on the island. As with Iceland, the Lehman Brothers collapse compounded the apparent problem of an economy overly dependent on debt financing. Foreigners commenced withdrawing their investment funds from Ireland, so Irish banks had to liquidate assets to fund these redemption requests. The plateauing of real estate prices exposed the overleveraged nature of the Irish banking system and ultimately led to a real estate collapse as banks sought ways to fund their liabilities. Unlike in Iceland, a concerted effort to "save" the banks was forthcoming, though at the expense of indebting the Irish government and ultimately its citizenry, far beyond what was foreseen even a short time earlier.

Conclusion

Although it is conceptually easy to aggregate crisis-stricken countries into a homogeneous group that experienced artificially low interest rates and excess credit creation during the recent financial crisis, understanding some key institutional differences allows for a more fruitful analysis. This paper has used the cases of Iceland and Ireland to illustrate this point. Although both countries experienced a similar ABC-type boom from typical monetary causes, the specific factors propagating these monetary effects were quite distinct in each.

Atypical for ABC narratives, this essay has not looked at specific instances of malinvestment or overconsumption. (This task has been performed elsewhere; see, e.g., Bagus and Howden 2011, chap. 5, for Iceland, and Howden forthcoming for Ireland.) Nor has it focused on the specific trigger that set in motion the collapses of late 2008. Readers familiar with ABC theory will note the similarities between my

9. The use of these borrowed funds for domestic expenditure is more apparent if we track the growth of imports over time. Although Ireland has for some time recorded a balance of trade, in part due to foreign companies' attraction to the relatively low tax rate and well-educated labor pool, this balance steadily declined after the country's accession to the monetary union. As recently as 2003, the country's current account was in balance, though it steadily declined to nearly -6 percent by 2008 (Eurostat n.d.). This decline in the trade surplus in part demonstrates an increase in imports, especially in the form of consumption expenditures.

paper and other case studies. As in Murray Rothbard's examination of the Great Depression (Rothbard [1963] 2000), I have looked only at the causes of the reduction of interest rates leading up the downturn in Iceland and Ireland. In particular, I have focused narrowly on alternative factors during the boom that served to entice lenders to accept lower risk-adjusted rates than would otherwise be deemed prudent (especially *ex post facto*). The most significant difference in my exposition compared to more conventional ABC narratives is my shift away from central-bank monetary policy as the sole cause of monetary disturbances to an emphasis on alternative factors.

In Iceland's case, a recently independent central bank and a move to a flexible exchange rate allowed it to entice foreign investment. In particular, as Icelandic banks opened foreign branches, they were able to attract new investment, which was then converted to local Icelandic króna. This process maintained the króna's strength and diminished the expected foreign-exchange risk that these investments entailed. Risk was further reduced through a comprehensive insurance guarantee on Icelandic deposits. This guarantee reduced the monitoring of the banking system by depositors because it lacked a maximum insurable amount and was extended to all foreign-denominated deposits. The deposit-insurance fund was itself backstopped by the Central Bank of Iceland, thus creating no heed to a hard budget constraint because the CBI had the ability (in theory) to inflate its liabilities away. As foreign liabilities of the banking sector increased, this policy option was removed. The banking system was increasingly exposed to a liquidity crisis as the boom progressed, and the collapse of Lehman Brothers in 2008 only exposed the previously unsustainable situation.

The unsustainability of the Irish situation is also attributable to its dependence on credit, though its origin is distinct. The debt buildup in Ireland was caused primarily by unequal inflation rates within the Eurozone. After accession to the euro in 1999 at an erroneously undervalued exchange rate, Irish inflation remained about 2 percentage points above that of the core of Europe for several years. As a result, it proved advantageous for core investors to invest their money at the higher nominal Irish interest rates caused by the inflation differential. With the common currency irrevocably in force, all exchange-rate risk was eliminated, offering a quick reduction in risk on cross-border transactions. As a consequence, a large amount of foreign funding flowed into Ireland, dependent on a maintained inflation differential with the rest of Europe. As the Eurozone approached maturity and inflation and nominal interest rates began to normalize across all countries, cross-border financial flows began to slow. This decline in the flow of credit exposed the tenuousness of the Irish credit-based economy. The credit freeze following the collapse of Lehman Brothers only reinforced a previously precarious situation, as happened in Iceland.

These two cases serve a broader purpose than just being examples of credit binges gone wrong. Their dependence on credit is illustrative for other countries as the global economy moves to recovery. A poorly designed deposit-insurance system in Iceland and poorly managed accession to the currency union for Ireland served to worsen a tenuous investment environment reliant on artificially low interest rates at the hands of their

central banks. This combination laid the foundation for the unsustainable booms witnessed and the devastating crises that followed. Although much attention is focused on sorting out these recessionary economies today, this article serves the purpose of illustrating specific causes that should be preemptively circumvented in the future to avoid a repeat of these credit-induced boom–bust cycles.

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