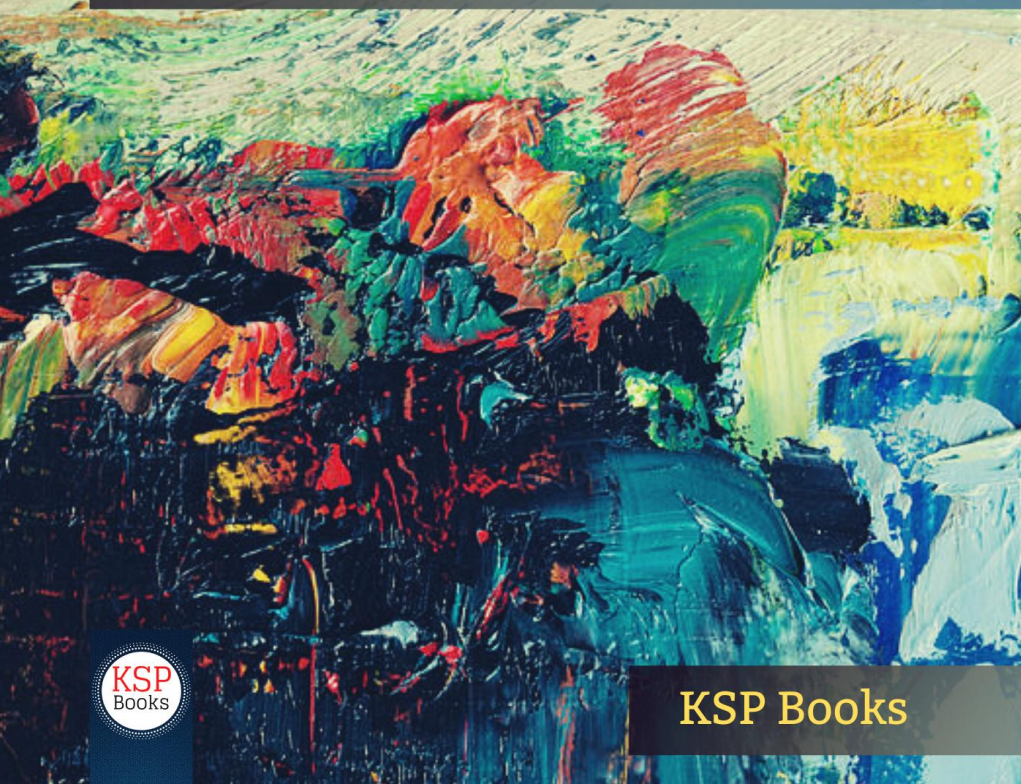
Currency Boards

Vol. 2. Studies on Selected European Countries

Edited By

Steve H. Hanke



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Vol.2 Studies on Selected European Countries

Editor
Steve H. Hanke
The Johns Hopkins University, USA

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Currency Boards: Vol.2. Studies on selected European countries

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Preface

In 1995, I founded the Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise. One of the purposes of that research institute was to continue a research program on currency board systems, which was established in the early 1980s. The program has included the works of many leading experts on currency boards and has benefitted enormously from the involvement of my former post-doctoral student and long-time collaborator Dr. Kurt Schuler.

Many of the papers in this volume focus on various aspects of currency boards. They are original because they are based on primary data. Indeed, the Johns Hopkins research program on currency boards, which is directed by Dr. Schuler and me, has now collected and digitized all of the financial data for virtually all of the currency boards that have ever existed. So, just what is a currency board?

An orthodox currency board issues notes and coins convertible on demand into a foreign anchor currency at a

fixed rate of exchange. As reserves, it holds low-risk, interest-bearing bonds denominated in the anchor currency and typically some gold. The reserve levels (both floors and ceilings) are set by law and are equal to 100%, or slightly more, of its monetary liabilities (notes, coins, and, if permitted, deposits). A currency board's convertibility and foreign reserve cover requirements do not extend to deposits at commercial banks or to any other financial assets. A currency board generates profits (seigniorage) from the difference between the interest it earns on its reserve assets and the expense of maintaining its liabilities.

By design, a currency board has no discretionary monetary powers and cannot engage in the fiduciary issue of money. It has an exchange rate policy (the exchange rate is fixed) but no monetary policy. A currency board's operations are passive and automatic. The sole function of a currency board is to exchange the domestic currency it issues for an anchor currency at a fixed rate. Consequently, the quantity of domestic currency in circulation is determined solely by market forces, namely the demand for domestic currency. Since the domestic currency issued via a currency board is a clone of its anchor currency, a currency board country is part of an anchor currency country's unified currency area.

Several features of currency boards merit further elaboration. A currency board's balance sheet only contains foreign assets, which are set at a required level (or tight range). If domestic assets are on the balance sheet, they are frozen. Consequently, a currency board cannot engage in the sterilization of foreign currency inflows or in the neutralization of outflows.

A second currency board feature that warrants attention is its inability to issue credit. A currency board cannot act as a lender of last resort or extend credit to the banking system. It also cannot make loans to the fiscal authorities and state-

owned enterprises. Consequently, a currency board imposes a hard budget constraint and discipline on the economy.

A currency board requires no preconditions for monetary reform and can be installed rapidly. Government finances, state-owned enterprises, and trade need not be already reformed for a currency board to begin to issue currency.

Currency boards have existed in about 70 countries. The first one was installed in the British Indian Ocean colony of Mauritius in 1849. By the 1930s, currency boards were widespread among the British colonies in Africa, Asia, the Caribbean, and the Pacific islands. They have also existed in a number of independent countries and city-states, such as Danzig and Singapore. One of the more interesting currency boards was installed in North Russia on November 11, 1918, during the civil war. Its architect was John Maynard Keynes, a British Treasury official responsible for war finance at the time.

Countries that have employed currency boards have delivered lower inflation rates, smaller fiscal deficits, lower debt levels relative to the gross domestic product, fewer banking crises, and higher real growth rates than comparable countries that have employed central banks.

Given the superior performance of currency boards, the obvious question is "What led to their demise and replacement by central banks after World War II?" The demise of currency boards resulted from a confluence of three factors. A choir of influential economists was singing the praises of central banking's flexibility and fine-tuning capacities. In addition to changing intellectual fashions, newly independent states were trying to shake off their ties with former imperial powers. Additionally, the International Monetary Fund (IMF) and the World Bank, anxious to obtain new clients and "jobs for the boys," lent their weight and money to the establishment of new central banks. In the end,

the Bank of England provided the only institutional voice that favored currency boards.

Currency boards have witnessed something of a resurgence. In terms of size, the most significant currency board today is Hong Kong's. It was installed in 1983 to combat exchange rate instability. In the wake of the collapse of the Soviet Union, several countries adopted currency boards. They were installed rapidly and without any preconditions. Indeed, in most cases, implementation took a month or less. The reasons for the post-Soviet adoption of currency boards varied. In Estonia in 1992, the overriding objective was to rid the country of the hyperinflating Russian ruble and replace it with a sound currency. In 1994, Lithuania desired to put discipline and a hard budget constraint on the government's fiscal operations. Hyperinflation was ravaging Bulgaria in early 1997, and the Bulgarians wanted to stop it. As a result, Bulgaria adopted a currency board in July 1997. In Bosnia and Herzegovina in 1997, acurrency board was mandated by the Dayton Peace Accords, which ended the Balkan Wars.

None of these modern currency boards has failed to maintain convertibility at their fixed exchange rate. Indeed, no currency board has ever failed, and this includes Keynes's Russian currency board in Archangel. The so-called Russian ruble never deviated from its fixed exchange rate with the British pound. The board continued to redeem rubles for pounds in London until 1920, well after the civil war had concluded.

At present, the following countries and territories use orthodox currency boards: Bermuda, Bosnia and Herzegovina, Brunei, Bulgaria, the Cayman Islands, Djibouti, the Falkland Islands, Gibraltar, Guernsey, Hong Kong, the Isle of Man, Jersey, Macau, and Saint Helena. Note that Estonia and Lithuania are not included in the list because both transitioned from currency board systems to

the Eurozone, in 2011 and 2015, respectively. This was done with ease because both countries were already unified with the Eurozone via their currency boards.

It is worth noting that, contrary to assertions by most economists and reportage in the popular financial press, Argentina did not have a currency board in the 1990s. A Convertibility System was introduced in Argentina in April 1991 to stop inflation, which it did. The system had certain features of a currency board: (a) a fixed exchange rate, (b) full convertibility, and (c) a minimum reserve cover for the peso of 100% of its anchor currency, the U.S. dollar. However, it is important to note that it had two major features that disqualified it from being an orthodox currency board. It had no ceiling on the amount of foreign assets held at the central bank relative to the central bank's monetary liabilities. So, the central bank could engage in sterilization and neutralization activities, which it did. In addition, it could hold and alter the level of domestic assets on its balance sheet. So, Argentina's monetary authority could engage in discretionary monetary policy, and it did so aggressively.

Since Argentina's Convertibility System allowed for both monetary and exchange rate policies, it was not a currency board. Most economists fail to recognize this fact. Indeed, a scholarly survey of 100 leading economists who commented on the Convertibility System found that almost 97% incorrectly identified it as a currency board system.

Currency boards' historical performances have been outstanding.

Editor
Prof. Dr. Steve H. Hanke
Baltimore, USA
13 March, 2020

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1 On extending the currency board principle in Bulgaria: Long live the currency board

Steve H. **Hanke**
Todor **Tanev**

Long Live the Currency Board

The year 1997 was both the worst and best of years for Bulgaria. The year started badly. In February, Bulgaria's hyperinflation peaked at the fantastic rate of 242% per month (Hanke & Krus, 2013). Then, things dramatically changed for the better. On July 1st, a currency board law was adopted, and the Bulgarian National Bank (BNB), specifically its Issue Department, began to operate under currency board rules. These rules required the lev to be fully backed by Deutschemark reserves (now euro reserves) and to freely trade at a fixed exchange rate with the Deutschmark (Hanke, 2016). With that, the lev became a clone of the Deutschmark, and good news followed:

- The currency board results were immediate and dramatic. The annual inflation rate collapsed to 13% by mid-1998. Interest rates collapsed, too, with the BNB basic rate falling from above 200% in early 1997 to 5.3% in October 1998. And, that is not all. The demand for the lev that the new currency board issued soared. And, as night follows day, the foreign reserves at the

BNB soared, too. After all, the only way lev could be obtained was by exchanging Deutschmarks for lev at the stated fixed rate of exchange. The BNB's foreign reserves rocketed from $864.26 million USD at the end of 1996 to $2,485.36 million USD at the close of 1997 (Hanke, 2000).

- In addition to these immediate, positive results, Bulgaria's currency board allowed Bulgaria to weather all post-1997 external financial crises—including the collapse of the Russian ruble in 1998, the Greek FinancialCrisisof 2009, and the Great Recession of 2009 (Hanke, 2018).
- The currency board also allowed Bulgaria to weather the 2014 banking collapse of the Corporate Commercial Bank (KTB) (Hanke & Sekerke, 2014). Yes. The KTB catastrophe was not caused by the currency board system (the BNB's Issue Department), but by the failure of the Banking and Supervision Departmentsof the BNB to properly regulate and monitor the KTB. Unlike most cases in which banking and currency crisis are joined at the hip, the KTB crisis did not disturb Bulgaria's currency. Thanks to the currency board system, Bulgaria did not witness a typical banking-currency crisis. Indeed, the crisis was restricted to the banking sector. So, Bulgaria's currency board mitigated the damage that accompanied the collapse of the KTB.
- Importantly, the currency board imposes fiscal discipline on Bulgaria's politicians and fiscal authoritiesbecause the government cannot borrow from the currency board (BNB's Issue Department). In consequence, since the installation of the currency board in 1997, fiscal deficits have been tightly controlled, and the level of Bulgaria's debt relative to its GDP has plunged. Bulgaria's fiscal discipline and debt reduction have made Bulgaria a star fiscal performer in the 28-country European Union (Hanke, 2002 & 2018). Indeed, Standard and Poor's recently upgraded Bulgaria's credit rating to "BBB," with a positive outlook (Bulgarian News Agency, 2019). This places Bulgaria at the top of the ratings for all Balkan countries.
- The geopolitical aspects of Bulgaria's currency board should not be allowed to pass without mention. As former President Petar Stoyanov confided to one of us (Hanke):

Bulgaria would have had much more difficulty entering the North Atlantic Treaty Organization (NATO) in 2004 and the European Union in 2007 if it were not for the confidence and stability created by Bulgaria's currency board (Hanke, 2016).

- It is not surprising that Bulgaria's currency board is highly respected and supported by the populace. Bulgarians are rightly proud of their lev and what is the most important post-communist Bulgarian institution: the currency board system (Hanke, 2018).

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With this record in the currency sphere, it is rather shocking that Bulgaria finds itself adrift, like a barge lazily floating down the Danube, occasionally putting out a boat-hook to avoid collisions, but a barge adrift nevertheless. In consequence, instead of Bulgaria running its own currency show, Brussels appears to be running the show. Yes. At present, Bulgaria, under directions from Brussels, is actually contemplating abandoning its own currency, the lev, and its currency board (BNB's Issue Department). These would be replaced by the euro and the European Central Bank (ECB).Such a dramatic move raises a number of troubling questions:

- Why would Bulgaria want to try to fix something that is not broken? No smart person would attempt to do so. Polling data indicate that Bulgarians are "smart." They are not too keen about the idea of abandoning their beloved lev and replacing it with the euro. This sentiment among the public should give Bulgarian politicians cause for concern about the potential adoption of the euro.
- Why in these times, when nationalist sentiments are running high, would Bulgaria contemplate giving up its monetary sovereignty? Indeed, the Bulgarian populace knows that by formally joining the eurozone, Bulgaria would give up its national sovereignty over its monetary system. This sovereignty is valuable, particularly if the euro encounters troubles. If that happens, Bulgaria could immediately switch its currency board's anchor from the euro to a superior anchor

currency. Furthermore, Bulgaria could make this switch without asking for any other country's or organization's permission because, with its currency board, Bulgaria retains full sovereignty over its monetary system.

- Why would Bulgaria want to join and be locked into a club whose very future is uncertain? Formal entry into the eurozone would be like checking into the "Hotel California." That was the title of the Eagles hit song of 1976. As the Eagles' lyrics put it,"You can check out anytime you like, but you can never leave." At this time, the only country that could check into and then check out of the eurozone is Denmark. It has obtained a valuable opt-out option, something Bulgaria does not have and will never obtain.
- Why would Bulgaria want to incur the costs required to formally enter the eurozone? For example, when Lithuania abandoned its currency board and currency, the litas, to join the eurozone in 2015, Lithuania transferred a total of EUR 43,051,594 as part of its contribution to the ECB's capital. In addition, it transferred EUR 338,656,541 to the ECB's foreign assets, and EUR 162,454,493 into the ECB reserves and provisions. These transfers constitute a cost because these funds—once transferred to the ECB—while still Bulgarian assets, are tangled up in a web of ECB/EU rules and politics. So, a loss in freedom and flexibility accompanies the transfer of funds required for formal eurozone entry. (Lietuvos Bankas, 2016; Eesti Pank, 2018).
- Why would Bulgaria want to give up known rules of the road and fiscal discipline for a moral hazard that encourages bad fiscal behavior? Yes. Entry into the eurozone brings with it a moral hazard, one that is not associated with a currency board. Just look at Greece. Interestingly, maybe that is exactly what some Bulgarian politicians who advocate formal membership in the eurozone are dreaming about. Maybe they are tired of the tight straitjacket that the currency board makes them wear. Of course, the Bulgarian populace likes the straitjacket feature of the currency board. Indeed, that is probably why the public justifiably harbors concerns about the

adoption of the euro and the discarding of the currency board's straitjacket.

- Why would Bulgaria be pursuing formal entry into the eurozone when Bulgaria is already part of a unified currency area: the eurozone? Yes. By virtue of the fact that the lev is a clone of the euro, Bulgaria is in the eurozone, and it is "in" without having to carry the burden of any of thecosts associated with formal entry.
- Does it make sense forBulgaria to be contemplating entry into a club that is employing different standards for entry for Bulgaria than those that have been used for other members? Great care is required when dealing with organizations that apply double standards. Both Estonia and Lithuania employed currency board systems. These systems were similar to Bulgaria's and, not surprisingly, produced similar results. One of us (Hanke) knows this first hand as he was deeply involved in the design and implementation of all three currency board systems. But, when Estonia (in 2011) and Lithuania (in 2015) adopted the euro, it was clear sailing, as it should have been. After all, they were already both part of a unified currency area—the eurozone—as is Bulgaria. But, for mysterious reasons, the standards for formal entry into the eurozone that are being applied to Bulgaria are different than those that were applied to Estonia and Lithuania. Indeed, it has not been clear sailing for Bulgaria. In May 2019, Bulgaria was denied the right to enter ERM-2 by the European Commission. This suggests that, even if Bulgaria was to formally enter the eurozone, Bulgaria would risk not being treated on the same footing as other members.

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This brings us back to the KTB fiasco and Bulgaria's commercial banking sector. Thanks to Bulgaria's currency board, the damages associated with the collapse of KTB were mitigated (Hanke, 2018). Indeed, the KTB banking crisis did not spill over into a currency crisis, too. Accordingly, a typical banking and currency crisis was avoided. But, the damages were significant nevertheless.

Importantly, the KTB was never, in fact, a commercial bank. If the KTB had been operated according to commercial banking principles, it would have been virtually impossible for KTB to destroy value on the scale witnessed by the independent auditors. As of 30 September 2014, the auditors estimated that 76% of the asset value in KTB's non-financial loan portfolio, which accounted for 80% of KTB's assets, had been lost. The KTB audit report tells a story in which KTB blatantly ignored the basic pillars of commercial lending. According to the report, there is little evidence that initial loan underwriting and subsequent credit monitoring ever took place at KTB. Indeed, the auditors stated that KTB lied to and misled BNB banking supervisors and engaged in transactions with no evident commercial purpose (Hanke & Sekerke, 2014).

The economic fallout from KTB was significant. Deposits had been guaranteed by the Bulgarian Deposit Insurance Fund (BDIF). But, the BDIF was undercapitalized. So, the government was forced to go to the international bond market to raise funds to recapitalize the BDIF so that it could meet its obligations to KTB depositors. In consequence, there were negative fiscal effects.

In addition, there were negative monetary effects following the collapse of KTB. Bulgaria's money supply measured by M3 from June 2014 to November 2014 actually contracted by 3.27%. And, credit to the private sector in Bulgaria contracted by a stunning 11.18% from June 2014 until May 2015. These contractions slowed Bulgaria's economy down.

It will not be banking supervisors and regulators, whether they are from Bulgariaor the European Union, who will ensure that banking problems of this magnitude do not occur in the future. No. Safety will be ensured by changing the rules that govern Bulgaria's banks.

As it turns out, the new rules were proposed by one of us (Hanke) over two decades ago on 1 February 1997 at the World Economic Forum in Davos, Switzerland (Hanke & Burstein, 1997). The proposal was to establish a currency board in Bulgaria and to extend the currency board principle into the commercial banking sphere. This proposal harks all the way back to the great British economist David Ricardo and the 1844 Bank Act that governed the

Bank of England and British banks. So, it is not new, and it is widely recognized. Indeed, no less of an authority than a high priest of economic theory, Nobel laureate Sir John Hicks, did so in 1967 (Hanke, 2002).

If currency board rules were extended into the commercial banking sphere, the bankswould be required to operate under currency board rules. Accordingly, the banks would have to fully back the demand deposits they accept with reserves. These required reserves would be deposited at the BNB, and the BNB would pay a market rate of interest on them. Under 100%-reserve banking, banks that accept deposits would essentially be transformed into money-market mutual funds. With lev bank deposits covered by 100%-lev reserves, bank money would be just as safe and sound as currency board money. Note that there are several ways in which currency board principles could be extended into commercial banking. In what follows, we only present the outlines of one of them.

Under 100%-reserve banking, depositors would no longer have to live in fear of being unable to withdraw their deposits because banks would have the liquid reserves to cover all withdrawals. Banking panics, system-wide banking crises, and taxpayer bail-outs would be things of the past. So, the BDIF and government insured bank deposits would be redundant and, therefore, unnecessary.

Another important advantage of 100%-reserve banking is that banks would need very little equity capital to cover the small risks associated with the matching of their assets and deposits. This makes the 100%-reserve system particularly well suited for Bulgaria, where banks have a history of being undercapitalized.

If the currency board principle is applied to both base (currency board) and bank money, all money would be sound. But how would credit be supplied? Merchant, or investment, banks would assume that function. They would intermediate savings and generate credit (not money) by issuing shares and subordinated debt instruments (unsecured bonds that have low-ranking claims on a company's earnings and assets). It is important to note that the merchant banking functions could be carried out by separate stand-alone merchant banks. Or, they could be carried out within

existing commercial banks if those banks segmented and fire-walled their balance sheets into deposits that were fully reserved and investments that could be lent out.

This approach allows for expanding credit flows while separating money from credit. By doing so, safety and soundness would be injected into the credit circuit. Shareholders would provide an important source of market discipline to the merchant banks because the owners of these banks would risk losing their investments in the case of merchant bank failure.

The other element in the merchant banks' capital structure would, at least initially, be provided by subordinated debt. This debt also provides an attractive source of market discipline because, as distinct from depositors, the holders of capital notes cannot withdraw their funds on demand when bad news surfaces. The holders of subordinated debt, therefore, have an incentive to prefer safe, conservatively managed merchant banks. Investors will only purchase riskier capital notes at significantly higher interest rates, and these higher rates (the cost of capital) will impose a strong market discipline on risky merchant banks.

Again, merchant banking is nothing new. Indeed, it has a rich history. The names Baring, Rothchild, Hambro, Lazard, Schroder, Warburg, and Morgan all go hand-in-glove with merchant banking. The record of merchant banking is long and notable.

Bulgaria should stop aimlessly drifting into troubled waters. A Bulgarian captain must take control of the money and banking tiller and steer the "barge" into safe waters. Money and banking safety and soundness can be found by retention of Bulgaria's currency board system and by extending it into the sphere of commercial banking.

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2 Remembrances from Montenegro's momentous currency reform: The 1999 adoption of the German Mark

Steve H. **Hanke**

The 1999 adoption of the German Mark

While still part of the rump Yugoslavia, Montenegro dumped the hapless Yugoslav dinar and replaced it with the mighty German Mark in late 1999. This dramatic, daring, and dangerous move was engineered by then-President Milo Djukanovic. It will go down as one of the 20th century's most momentous currency reforms—one that set Montenegro on a path towards independence, NATO membership, and what might one day be entry into the European Union.

This is not the first time that tiny Montenegro has been at the center of momentous events and strategic tug-of-wars. Indeed, no less than "The Sage of Baltimore," H.L. Mencken, writing in the June 1934 issue of *The Seven Seas*, after a visit to Montenegro, reminds his readers of just how strategic Montenegro has been over the centuries. "It has been, in its time, Roman, Venetian, Turkish, Spanish, Serbian, Hungarian, Bulgarian, Russian, French, English, and Austria, and all the while it was really Montenegrin."

Since I played a role in Montenegro's currency reform and dash for freedom, Ernest Welteke—who was President of the Deutsche

Bundesbank at the time of Montenegro's adoption of the German mark—invited me to write my remembrances on the 20th anniversary of the currency reform. For me, the Montenegrin currency reform came in three phases. The first was centered in Belgrade; the second occurred in Sarajevo; and the third momentous phase was in Podgorica, or as I first knew it: Titograd.

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Let's begin at the beginning in Belgrade. I served as the Personal Economic Advisor to the Deputy Prime Minister of the Socialist Federal Republic of Yugoslavia from 1990 until June 1991, when the civil war broke out. I first met Deputy Prime Minister Zivko Pregl in late 1989 at a dinner in Vienna, Austria. The dinner, which Mrs. Hanke and I attended, was arranged by our good friend, the late-great Daniel Swarovski from Wattens, Tyrol. The day following our most pleasurable dinner, Pregl—the person responsible for developing economic reforms for the Yugoslav government led the by the late Ante Marković—requested a meeting. We discussed his reform ideas and he invited me to become his advisor. I indicated that I had reservations because I was a classical liberal, free-market economist and he was a leader of the Communist League of Yugoslavia. Pregl then surprised me when he said my qualifications were exactly why he invited me to be his advisor. He asserted that he wanted to implement free-market reforms and didn't want watered-down advice. Pregl persisted and after I learned that he had a hand in the dissolution of the Communist League of Yugoslavia in January 1990, and was committed to real free-market reforms, I agreed to become his advisor.

I concluded that my first task should be the development of policies to stamp out Yugoslavia's inflation. After all, stability might not be everything, but everything is nothing without stability. I set out to design a currency board system (CBS) that would rid Yugoslavia of its endemic inflation problems. From 1971-91, Yugoslavia's annualized rate of inflation was 76 percent; only Zaire and Brazil recorded higher inflation rates during that period.

The Ekonomski Institute Beograd, a research institute that was headed by our good friend, Danko Djunic, published my blueprint as an attractive book in the Serbo-Croatian language (Hanke & Schuler 1991a). The book was also published in an English edition by the Centre for Research into Communist Economies, a London-based think tank that was headed by a Yugoslav (Slovenian) expatriate, and another good friend, Prof. LjuboSirc (Hanke & Schuler 1991b).

Mrs. Hanke and I spent a great deal of our time in 1990-91 in Belgrade, where we were in residence at the Intercontinental Hotel. We traveled extensively throughout Yugoslavia, including trips to Titograd, to educate the public about the virtues of sound money and benefits of adopting a CBS. We attracted many supporters, but in June 1991, Yugoslavia's civil war began, and currency reform was pushed to the sidelines.

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My next stop was in Sarajevo. I served as a special advisor to the U.S. Government in December 1996. The Dayton/Paris Peace Agreement (November 21, 1995) mandated that Bosnia and Herzegovina employ a CBS for at least six years. My assignment was to make certain that the new CBS law, which was being written by local government officials and International Monetary Fund staff member was as orthodox as possible (Hanke, 1996/97).

The most memorable part of the CBS episode was the flight Mrs. Hanke and I had from Zagreb to Sarajevo on December 11, 1996. We were packed with NATO-IFOR Troops into a very noisy Dutch military transport. At that time, this was the only safe means of passage into the war-torn city of Sarajevo.

During our stay in Bosnia and Herzegovina, we had heavy security, particularly when we traveled to Pale for meetings with officials from the Serb Republic. Those meetings with the Serbs struck me because the Serbs were quite fluent with my CBS ideas. The Serbs indicated that they had studied the book I co-authored with Dr. Kurt Schuler (Hanke & Schuler, 1991a).

I discovered another surprising connection to that book during a lunch with Mrs. Hanke and other notables at the Grand Hyatt

hotel in Hong Kong on March 27, 1998. In discussing the Dayton/Paris Peace Agreement with the late Ambassador Richard Holbrooke, he recounted how easy it was to deal with the late Slobodan Milosevic (head of the delegation representing the Federal Republic of Yugoslavia in Dayton) when it came to the issue of a new monetary system for Bosnia and Herzegovina. It turns out that Milosevic was familiar with my book in Serbo-Croatian and my CBS ideas because of my work with Deputy Prime Minster Pregl.

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My work during both the Belgrade and Sarajevo phases proved to be vital for the momentous currency climax that would occur in Montenegro. Indeed, that work had put my currency reform ideas in wide circulation in the Balkans. In Montenegro, I served as State Counselor, a position that carried Cabinet rank, and Advisor to the President Djukanovic (1999-2003). In that capacity, I determined that the replacement of the Yugoslav dinar with the German mark was both feasible and desirable, and assisted in developing the architecture for the official introduction of the German mark as legal tender in Montenegro (where the euro is now the coin of the realm).

During the summer and fall of 1999, I assisted President Djukanovic in formulating an economic strategy designed to create the conditions for Montenegro to become a fully independent republic (Hanke 1999a, Hanke 1999b, Hanke 1999c). Much of the basis for my early work with President Djukanovic was laid out in a book that I co-authored with Dr. ZeljkoBogetic, a Montenegrin, who at the time was an economist at the International Monetary Fund in Washington, D.C. Bogetic and I wrote the book in record time—days, not months or years. It was published in Serbo-Croatian in Podgorica and was widely circulated (Bogetic & Hanke, 1999).

In 1999, Montenegro was still part of the Federal Republic of Yugoslavia, along with Serbia. Strongman Slobodan Milosevic was the President of Yugoslavia and had control of the Yugoslav army. On November 2, 1999, President Djukanovic made a daring and

decisive move that would set Montenegro on a course towards independence: Montenegro granted the mighty German mark legal tender status. This all but eliminated the hapless Yugoslav dinar from circulation in Montenegro. It also infuriated President Milosevic. Although he refrained from unleashing the Yugoslav army on Montenegro, he was reported to have given serious consideration to that idea.

President Milosevic's operatives did engage in a great deal of mischief, however. For one thing, I became a marked man. The Yugoslav Information Minister, Goran Matic, produced a steady stream of bizarre stories about my alleged activities. These were disseminated via the Yugoslav state news agency, Tanjug. Among other allegations, I was accused of being the leader of a smuggling ring that was destabilizing the Serbian economy by flooding it with counterfeit Yugoslav dinars. The most spectacular accusation, however, was that I was a French secret agent who controlled a hit-team code-named "Pauk" ("Spider"), and that this five-man team's mission was to assassinate President Milosevic. In addition to this comedy of the absurd, there was a serious side. I knew this was the case because, although we were kept in the dark about the specific nature of the threats, Mrs. Hanke and I were always supplied with proper security from the President's office when we traveled to Podgorica—a difficult destination that often required a flight from Zagreb to Dubrovnik, Croatia and then a long, but beautiful, trip through the mountains of Montenegro.

In any case, the adoption of the German mark was Montenegro's first secession step – a step that was eventually supported by the United States and its allies. On November 4, 1999, I, with the help of Senators Steve Symms and Trent Lott, arranged a meeting at the U.S. Capitol in which Djukanovic and I made a case for Montenegro's currency reform. The members of Congress in attendance – Trent Lott, Steve Symms, Richard Lugar, John Warner, Harry Reid, Larry Craig, Kay Bailey Hutchison, among others – warmly received our message. As a result, the United States ended up supporting Montenegro's currency reform.

Even after twenty years, the scene remains, in many ways, the same. For one thing, Milo Djukanovic is still the President of Montenegro. And an independent Montenegro remains at the

center of geopolitical tug-of-wars, as the Sage of Baltimore H.L. Mencken reminded us in 1934. Indeed, as recently as April 30, 2019, the *Financial Times* carried a headline: "Balkan Hopefuls Told Joining Bloc Unlikely Soon." The *FT*'s reportage featured Montenegro. Then, on May 10, 2019, the *New York Times* reported that two Russians, who were believed to be Russian agents, had been (along with 12 locals) convicted by a court in Montenegro for their part in a failed 2016 coup d'état.

As I look back on the Montenegrin currency reform, I can confidently say that it was momentous.

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3 Analysis of the Estonian currency board

Andreas **Katsis**

Introduction

Estonia provides a fruitful case for monetary analysis. It was the first country to install a currency board among formerly centrally planned economies. Afterwards it witnessed strong economic growth amid a period of sweeping reforms. From its time with a currency board (1992-2011), Estonia earned a reputation as a "Baltic Tiger," successfully transitioning from a socialist planned economy to a market economy (Bithrey, 2011: 1). Estonia's currency board is now a completed episode that has not previously been analyzed as a whole, because scholarly interest in it tapered before it ended.

Historical background on currency boards

The first currency board opened in the British colony of Mauritius in 1849. In the late 19th century and early 20th century, currency boards spread to many other British colonies (Roi, 2013: 1). Most were then replaced by central banks, which were expected to be superior at monetary management. Those hopes were often disappointed. In the late 20th century, currency boards witnessed

somewhat of a resurgence, with notable successes in Estonia, Lithuania, Hong Kong, Bosnia, and Bulgaria, plus a controversial episode in Argentina. The table below details currency boards or currency board-like systems currently in operation.

Table 1. *Currency boards and currency board-like systems today*

Country	Began	Exchange Rate	Population	GDP (in U.S. $)
Bermuda	1915	Bermuda $1 = US$1	62,000	$1.9 billion
Brunei	1952	Brunei $1 = Singapore $1	320,000	$5.4 billion
Bosnia	1997	1.95583 convertible marks = 1 euro	3.5 million	$5.8 billion
Bulgaria	1997	1.95583 lev = 1 euro	8.2 million	$34 billion
Cayman Islands	1972	Cayman $1 = US$1.20	39,000	$930 million
Djibouti	1949	177.72 Djibouti francs = US$1	450,000	$530 million
Falkland Islands	1899	Falklands £1 = UK£1	2,800	unavailable
Gibraltar	1927	Gibraltar £1 = UK£1	29,000	$500 million
Hong Kong	1983	Hong Kong $7.80 = US$1	6.8 million	$168 billion
Macau	1999	1.03 pataca = Hong Kong $1	612,167	$44.8 billion
St. Helena	1976	St. Helena£1 = UK£1	4,255	unavailable

Source: Hanke & Schuler, 2015: 43; national sources.

The operation of a currency boards

A currency board is a monetary authority that maintains a fixed exchange rate with another currency, allows unrestricted convertibility into the anchor currency, and upholds external banking of 100 percent against the monetary base, at least at the margin. Central banks often in law or practice have a dual mandate, with the goals of maintaining price stability and maximizing sustainable employment. Some central banks have only one paramount goal. The European Central Bank (ECB), to which Estonia now belongs, has price stability as its overriding goal, although it is also allowed to promote full employment and balanced economic growth insofar as they are compatible with price stability. In the case of currency boards, the sole objective is to maintain a fixed, stable exchange rate with an anchor currency. Because of this, discretionary monetary policy to influence inflation or unemployment is not feasible. Direct comparisons of currency boards with central banks will be the subject of the following section.

To maintain a fixed exchange rate with the anchor currency, currency boards hold assets in foreign currency (usually the

anchor currency) to back all their monetary liabilities in circulation, i.e., their notes, coins, and demand deposits. Frequently, their foreign assets modestly exceed their domestic monetary liabilities. (Unorthodox currency boards, in contrast, may hold fewer foreign assets than their domestic monetary liabilities.) Currency board reserves have usually been composed of foreign currency, bonds of stable foreign governments, and other low-risk assets. Having fully backed liabilities in circulation allows any amount of domestic currency to be converted into the anchor currency, at the specified exchange rate, on demand. An orthodox currency board holds few or no domestic assets. The money supply is therefore fully market driven, resulting in market equilibrium, because an orthodox currency board has no power to change the monetary base independently of market participants. This is where central banks and currency boards differ, because central banks can alter the money supply based on the judgments of their officials, such as by initiating open market operations.

In a currency board system, commercial banks need not be required to hold any minimum level of reserves. In that case, they estimate the frequency and magnitude of net withdrawals in the near future and stock domestic reserves accordingly. To have domestic currency in stock, commercial banks can obtain it from the monetary authority, in exchange for foreign assets. Responsibility for obtaining adequate reserves lies entirely with banks and other financial institutions. An orthodox currency board does not serve as a "lender of last resort" to them.

In addition, an orthodox currency board does not manipulate interest rates by setting and maintaining a policy rate, as a central bank does.

Because an orthodox currency board does not lend to the government or to commercial banks, the only ways for the government to raise money are taxation and borrowing; there is no way to print more money to raise funds. This is one of the main draws of the currency board system. Inflation is tethered to the rate of the anchor currency, which will be low if the anchor currency has been well chosen. Likewise, interest rates will be similar to those of the anchor country through arbitrage with financial markets in the anchor currency.

A currency board earns revenue from interest on the foreign assets it holds, including securities and bank deposits. Historical experience indicates that the annual expenses of operating an efficient currency board should not exceed one percent of the board's assets. The main expenses come from printing notes, minting coins, paying salaries of employees, and standard maintenance costs. The profit earned by the currency board year over year is thus the interest from the reserve assets minus the maintenance and operational costs.

In summary, orthodox currency boards exhibit the following characteristics. These characteristics will be quantitatively analyzed in regard to the Estonian currency board system.

- Sufficient foreign currency reserves must be held to ensure that all domestic currency is convertible into anchor currency on demand.
- Convertibility into the anchor currency must be unrestricted.
- The currency board does not engage in discretionary monetary policy and does not lend to the government; the government is unable to print money.
- The currency board does not bail out commercial banks as a lender of last resort.
- The currency board does not set a policy interest rate to affect market rates.

Historical background on currency boards

Below we detail some pros and cons of operating a currency board versus a central bank to help understand where currency boards might work best.

The most obvious benefit of operating a currency board is that the stability of the domestic currency is no longer in question. The credibility of an appropriate anchor currency, such as the U.S. dollar or Euro, should transmit to the domestic currency. In addition, especially in an orthodox currency board system, therules of the system are clear and balance sheet data should be often published, so the system becomes autonomous and self-regulating. This may not be the case with a central bank, as the operations of the central bank may not be hidden from view. In

countries where running a central bank professionally, knowledgably, and independently from political interests without corruption is unlikely, a currency board may yield a reputable, transparent, and effective national monetary system. The restraints applied through the currency board system also limit the domestic government from accumulating debt. Perhaps the greatest benefit a currency board may provide, especially to a developing country, is that inflation is essentially guaranteed to be low, based on the importation from the anchor currency. This low inflation would spur investment, critical for future growth within the specific developing country.

The biggest potential drawbackof a currency board is its inability to engage in discretionary monetary policy to influence economic conditions. For instance, a central bank would be able to engage in expansionary monetary policy in times of recession, decreasing the unemployment rate. While operating a currency board however, the country is unable to engage in these policies and instead is only able to maintain the fixed exchange rate against the anchor currency. The advantage of discretionary monetary policy should be weighed against the disadvantages of getting the policy wrong more often than a nondiscretionary system would, and that many central banks have been unable to insulate themselves from pressures to create high inflation.

The Estonian currency board arrangement

The modern monetary history of Estonia begins on November 11, 1918, following the surrender of the German Empire to the Entente Powers of World War I. The German occupation of most of Estonia began only months earlier, in February 1918. The German military authorities issued the Ostmark, a currency nominally equal to the German mark, for circulation. Following Germany's surrender, the Estonian Provisional Government revamped the national finance system, establishing the Estonian mark as the national currency.

The Estonian Central Bank, called Eesti Pank in Estonian, was established on February 24, 1919to regulate currency circulation. Following rapid inflation of the Estonian mark and dwindling gold reserves, a period of monetary reform began, marked by the

implementation of a new Estonian currency, the kroon, which lasted until World War II.

After the Nazi and Soviet invasion of Poland in September 1939, the Baltic states found themselves in a precarious strategic position; they were too weak to withstand Soviet aggression and were without any outside protector. They capitulated to Soviet occupation in May 1940 because their governments concluded that the alternative was a war that would have resulted in many deaths and would have ended in defeat regardless (Clemens, 2001: 186). The Soviet ruble was then introduced into parallel circulation with the kroon. However, on March 25, 1941, all Estonian currency was removed from circulation, by Soviet decree, and Soviet currency became the sole legal tender in the Baltic state. The sole circulation of Soviet currency would be short-lived.

Following the dissolution of the German-Soviet Non-Aggression Pact by Germany, the German army advanced on Estonia in the summer of 1941. The Germans supplanted the recently installed Soviet monetary system. Currency circulation was dictated by occupying German forces under the State Credit Fund for Eastern Territories, which issued its own paper monies and coins, alongside German pfennigs and Soviet money. In addition, currency-like credits were issued in exchange for flax, cotton, and other goods. All of these currency forms were in circulation throughout the German occupation of Estonia, which lasted until 1944. Then the Soviet army re-conquered the Baltic states. Estonia re-entered the Soviet sphere and again only Soviet currency was circulated. The United States never officially recognized the Soviet occupation of the Baltic states, and allowed the Estonian ambassador in Washington to maintain control over gold reserves of the Bank of Estonia deposited at the Federal Reserve Bank of New York. The ambassador used it to pay the expenses of the embassy during the decades of the Soviet occupation. The United Kingdom, Sweden, and the Bank for International Settlements, where the Bank of Estonia had also deposited gold, eventually allowed the Soviet government to take control of the gold.

The Soviet Union dissolved in December 1991 and Estonia became independent. At the beginning of 1992, prices were

liberalized, and Estonia ceased to be part of the planned economy of the former Soviet Union. Estonia continued to use the Russian ruble, the successor to the Soviet ruble. The ruble was suffering from high inflation and Estonia found itself in a hyperinflationary spiral (Aslund, 2012: 1). As a result, there was a national cash crisis, without enough legal tender in circulation to cover now inflated transactions.

Confidence in the still-circulating Soviet ruble had fallen greatly, as evidenced by a dollarization rate of roughly 60 percent. Dollarization is when a country officially or (as in this case) unofficially uses foreign currency widely in preference to domestic currency. Estonians sought greater stability of value from using foreign currencies instead of using the ruble, highlighting a general lack of confidence in the ex-Soviet currency. In implementing general monetary reform, Estonian authorities highlighted the need to implement reforms quickly in order to avoid total economic collapse. Reforms would need to establish a stable currency to garner wide confidence as well as cut inflation, now spiraling out of control. They would face the challenge of implementation in a country with a young, inexperienced monetary authority; the pre-World War II generation of policy makers was dead, retired, or in exile.

Foreign advice played an important role in shaping Estonia's monetary reform. A group of Estonian leaders met with Ingemar Ståhl, a professor of economics at Lund University who put them in contact with his colleague Lars Jonung. Jonung suggested to his friend Steve Hanke, a professor at Johns Hopkins University, that Estonia could benefit from a currency board. With Kurt Schuler, then a doctoral student at George Mason University who had previously written with Hanke about currency boards, they wrote a newspaper article and a short book in English that was also translated into Estonian (Hanke *et al.*, 1991, 1992). Hanke presented the currency board blueprint from the book to Estonia's Constituent Assembly in May 1992. Estonian government leaders agreed that implementing a currency board in Estonia would "reestablish monetary sovereignty with a strong, rule-bound currency regime – one that would allow for a safe, rapid Estonian exit from the ruble zone" (Hanke 2016: 5). The Estonian monetary

reform as implemented was not as orthodox a currency board as Hanke, Jonung, and Schuler had proposed (and for this reason they have often termed it "currency board-like" or a "quasi currency board"), but it did have major features that they had advocated. The International Monetary Fund initially opposed a currency board, but changed its position when it became evident that at least for the near future Estonia would not establish a typical, discretionary central bank. The currency board proposal also initially received some criticism within Estonia.

The solution of a currency board was however agreed upon and then instituted on June 20, 1992. Not by coincidence, the date was the anniversary of West Germany's introduction of the Deutsche Mark in 1948, a successful currency reform that had ignited West Germany's post-World War II "economic miracle." The mark was initially the anchor currency for the revived Estonian kroon. The table below lists the main characteristics of implementation for the Estonian currency reform.

Table 2. *Details of the Estonian currency board system*

Date	The Estonian kroon became the sole legal tender at 4:00 a.m. on June 20, 1992. Individuals could convert rubles into kroon at special cash exchange offices at the official conversion rate during the period June 20–22, 1992 during the hours 9 a.m.–10 p.m.
Official Conversion Rate	10 Russian (formerly Soviet) rubles = 1 Estonian kroon.
Conversion of Cash Rubles	All resident citizens (including children) and noncitizens with residence permits could convert ruble notes equivalent to a maximum of 1,500 rubles at specific bureaus based on place of residence (which was equivalent to about US$13 at the prevailing exchange rate). Cash exceeding 1,500 rubles could be exchanged at the (punitive) exchange rate of 50 rubles =1 Estonian kroon. Enterprises had until June 20, 1992 to deposit cash rubles into their bank accounts, which were then converted as noted below.
Conversion of Account Rubles at Commercial Banks	All ruble accounts, time deposits, and savings accounts were re-denominated into Estonian kroon at the official conversion rate. However, balance in savings accounts in excess of rubles 50,000 deposited since May 1, 1992 and transactions from other rubles states in excess of 1 million rubles and made after May 1, 1992 were blocked until their origin was verified and a decision on conversion was made on a case-by-case basis. Commercial banks were closed during the period June 20–25, 1992 to allow for the redenomination of ruble accounts. The

	Bank of Estonia guaranteed access to cash by commercial banks up to the amount of their correspondent accounts with itself.
Total Cash Rubles Collected	2.3 billion rubles (or about 3 percent of GDP).

Source: Sutt, Zavoiceo & Knobl 2002: 18

Operation of the Estonian currency board

As explained above, the function of a currency board system is to supply or redeem local currency, and if they exist, demand deposits at the currency board, for a foreign currency, at a fixed exchange rate. Often, such as with the Hong Kong currency board system, only bank notes were backed by foreign currency (Bennett, 1993: 452). Coins, usually a much smaller part of currency circulation than notes, might be the responsibility of another government agency, and many currency boards have not accepted deposits. This left them with no direct role in the interbank payments system. The Bank of Estonia did however leave in place the existing system of reserve deposits with it. The reserve deposits were backed by foreign assets to ensure that banks held adequate balances as protection in the result of unforeseen mass withdrawals.

Estonia began its massconversion of rubles into krooni with 90 percentforeign reserve backing from the Bank of England's restitution of prewar gold. The figure jumped to 100 percent following further restitution of prewar gold from Sweden and the Bank for International Settlements (Sutt, Zavoiceo, & Knobl, 2002: 14). This was fortunate for Estonia, as full backing to ensure unlimited convertibility maximized confidence in the new currency board arrangement. The foreign asset mix was almost all gold; Estonia held virtually no foreign currency deposits at the time. The original amount of gold from the Bank of England totaled USD 52 million, while the value of gold from restoration by other parties totaled USD 45 million. At the time of the currency board's inception, USD 63 million was required to back all liabilities (Sutt, Zavoiceo, & Knobl, 2002: 14).

Another important issue when instituting a currency board is which foreign currency to use as an anchor. Newly independent from the Soviet Union, Estonia hoped to join the European

Community (later the European Union) in the near future. One possibility was therefore to fix the Estonian kroon to the European currency unit (ECU), a basket of the currencies of member states of the European Community. However, the ECU was not widely used in the international market and would not instill the same confidence as using a well-known, stable foreign currency as the anchor. Because of this, the Deutsche Mark (DEM) was chosen. Other foreign currencies that were considered as anchors were the Finnish mark and the Swedish krona.[1] Neither was as recognizable and internationally well regarded as the mark (Sorg & Vensel, 2011: 37).

The official exchange rate between the kroon and DEM was an extrapolation of the prevailing exchange rates between the ruble and DEM and the kroon and the ruble. To maximize transparency and confidence in the new system, windows of exchange at specified locations were opened throughout the country. Both foreign and domestic individuals and businesses could exchange krooni into DEM at the specified exchange rate. Unlimited quantities of currency could be exchanged. Exchange was however limited to residents of Estonia, and large exchanges were treated differently from small ones to minimize the potential for nonresidents to collude with residents to exchange rubles into krooni. The ruble had limited convertibility for foreign exchange transactions, so to have converted rubles for nonresidents would have opened a hole in the Russian exchange control system that might have attracted huge flows of rubles.

[1] Hanke, Jonung, & Schuler (1992) proposed the krona as the anchor. Jonung at the time had just begun a stint as economic advisor to the Swedish prime minister and thought that he might be able to use a kroon-krona link to unlock more Swedish aid to Estonia. The krona at the time was de facto pegged to the Deutsche Mark through the Exchange Rate Mechanism of the European Monetary System. In the autumn of 1992, the krona came under speculative attack. The government let the kroona float on November 19, 1992, rather than endure the costs of high interest rates to defend against attack. The krona was and remains issued by the Bank of Sweden, the world's oldest central bank. It has a good record over the long run, despite occasional problems such as those of 1992.

On January 1, 1999, the euro replaced the German mark and the currencies of other countries that at the time joined the European Central Bank. The Estonian kroon became anchored to the euro at 15.64664 krooni per euro, reflecting the cross rate between the DEM and the euro.

The Estonian currency board had some unusualfeatures arising from the responses of policy makers to perceived problems in the financial system. Orthodox currency boards do not undertake discretionary lending to local financial institutions. However, the Bank of Estonia was allowed to undertake temporary intervention for the sake of providing needed liquidity or for the sake of helping a commercial bank, solely using resources in excess of those fully backing the monetary base. Because of this capability, the Bank of Estonia was divided into ane Issue Department and a Banking Department. Each had different powers.

The Issue Department was responsible for the operation of the currency board. On its balance sheet, liabilities included notes, coins, and deposits, all of which were guaranteed for exchange under the currency board system. Its assets were comprised of foreign currency of equal or greater value than its liabilities. All seigniorage (profit from currency issue), such as interest accrued on the assets it held, was automatically routed to the Banking Department.

The Banking Department formed the second half of the Bank of Estonia. It held all foreign currency exceeding the value of notes, coins, and deposits outstanding. Using these excess reserves, the Banking Department could engage in certain discretionary functions, the most notable of which was settling payments with the former Soviet Union, as described below. In addition, the Banking Department could provide emergency loans to the banking system. Loans could not be of greater value than the excess foreign reserves; larger loans would have undermined the foundation of the currency board. In effect, to make loans in local curerncy, the Banking Department would buy krooni from the Issue Departmentwith excess foreign reserves. This system of checks and balances ensured all coins, notes, and deposits were always backed by exchangeable foreign currency, given all rules and regulations were followed properly.

At the time of the monetary reform, the Russian authorities prohibited any ruble-based transactions from occurring within Estonia. This prevented domestic commercial banks from handling transactions between states of the former Soviet Union. Russia maintained that all ruble transactions between former Soviet republics must be carried out between their central banks, requiring each central bank to have an account in all other central banks in the former Soviet Union. For this reason, the Bank of Estonia held a registered credit of 500 million rubles in Moscow at the Central Bank of Russia, while the Central Bank of Russian held a registered credit of 50 million krooni in Tallinn. Under the terms of the credit arrangement, the krooni held by the Central Bank of Russia were not exchangeable on demand into Deutsche Marks under the currency board system, but were held exclusively for state-to-state transactions.

The Russian funds in krooniwere held on the balance sheet of the Banking Department, and were fully backed by prewar gold restored to Estonia. Quickly, the Russian government ran them down to fund the expenses of Russian troops still in Estonia, who remained until August 1995. As the funds were spent they became liabilities on the balance sheet of the Issue Department, prompting the Banking Department to send foreign exchange to the Issue Department. Over time, this process eliminatedthe foreign reserve holdings of the Banking Department corresponding to the Russian funds, highlighting the importance of commercial banks to cover any state-to-state transactions.

In the Soviet banking system, household savings were concentrated in a single institution, the Savings Bank (Sberbank). By January 1, 1992, all Savings Bank deposits had been frozen in the wake of bilateral discussions between Estonia and Russia. The Savings Bank had traditionally operated by sending all proceeds made upon the Bank's deposits directly to Gosbank, the Soviet central bank in Moscow, which was succeeded by the Central Bank of Russia (Fleming 1996: 4). Following Estonian independence, the restoration of those fundswas being debated between the two nations as part of a wider discussion of who owed what to whom in the liquidation of Soviet-era debts. During 1992, the ruble faced a high rate of inflation, reducing the real value of Savings Bank

balances in Russia to merely 230 million krooni, or about $20 million. Because the amount was modest, the Estonian government decided that Savings Bank liabilities would be guaranteed to be convertible into cash. The Savings Bank was now in effect fully capitalized. Two main benefits came of the Savings Bank's full backing. First, in the early days of the new currency board system, mass withdrawals that might paralyze a traditional central bank system could be met without causing a liquidity shortage. Second, the Estonian monetary system could create added liquidity by providing incentives for citizens to swap Savings Bank deposits for interest-bearing, non-guaranteed deposits in commercial bank.

Testing currency board orthodoxy

An orthodox currency board issues notes, often also coins, and in some cases deposits, all of which are convertible on-demand into a foreign currency at a fixed exchange rate. In the case of Estonia, the Estonian kroon was convertible ondemand into the Deutsche Mark, at the fixed rate of 8 krooni = 1 Deutsche Mark. This rate was based on the prevailing rate in rubles, where 1 kroon = 10 rubles.

Test #1: Foreign Assets to Total Assets

We conducted three tests on the balance sheet to determine how orthodox the Estonian currency board was during its operation from 1992 to 2010.

The raw balance sheet data come from the annual reports of Eesti Pank and are available on its website. The raw data and our calculations for the tests of currency board orthodoxy are available in an accompanying Excel workbook [for source].

One test of currency board orthodoxy is the ratio of foreign assets to total assets. An orthodox currency board maintains a ratio of 1:1 (100 percent). It holds no domestic assets, holding only foreign assets. On the Figure below, the dotted blue line shows where an orthodox currency board would hold the ratio, at 1:1. The red line shows the actual ratio of foreign assets to total assets for the Bank of Estonia.

As the Figure indicates, the Estonian currency board showed the highest levels of orthodoxy in the early 2000s. Using this

metric, the Estonian system operated at a high level of orthodoxy throughout, with the lowest foreign assets to total assets ratio being .89:1 in 1993.

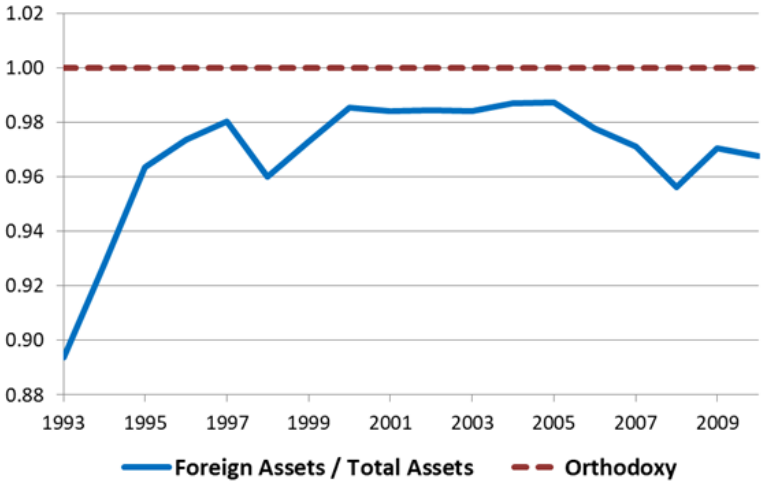

Figure 1. *Ratio of freign assets to total assets*

Test #2: Net Foreign Reserves to Monetary Base

A second test of currency board orthodoxy is the ratio of net foreign reserves to the monetary base. Net foreign reserves are foreign assets minus foreign liabilities. The monetary base is comprised of notes in circulation, coins, and demand deposits. An orthodox currency board in principle maintains a ratio of 1:1, depicted by the dotted blue line below. In practice, analysts of currency boards such as Steve Hanke have suggested that a ratio within the range 0.8:1to 1.2:1 is close enough to demonstrate orthodoxy. Changes in the market value of securities in the reserves, expenses paid by selling reserves, and other factors mean that the ratio is seldom exactly 1:1. The rationale for imposing an upper limit to the ratio is that excess foreign reserves offer the currency board opportunities to engage in discretionary monetary policy without going below 100 percent foreign reserve backing.

Using this metric, the Estonian currency board arrangement did not operate with a high degree of orthodoxy, never once in its tenure holding a ratio of net foreign reserves to monetary base within the 0.8:1 to 1.2:1range. As in some other currency board

systems, notably Hong Kong, the Bank of Estonia was not just the issuer of the monetary base. It was also the manager of the government's foreign assets, and because on average the government budget had a modest surplus, the Bank of Estonia's foreign assets apart from those providing backing for the currency grew. Net foreign reserves always exceeded the monetary base, so the Bank of Estonia always had more than sufficient reserves to redeem Estonian currency for anchor currency.[2]

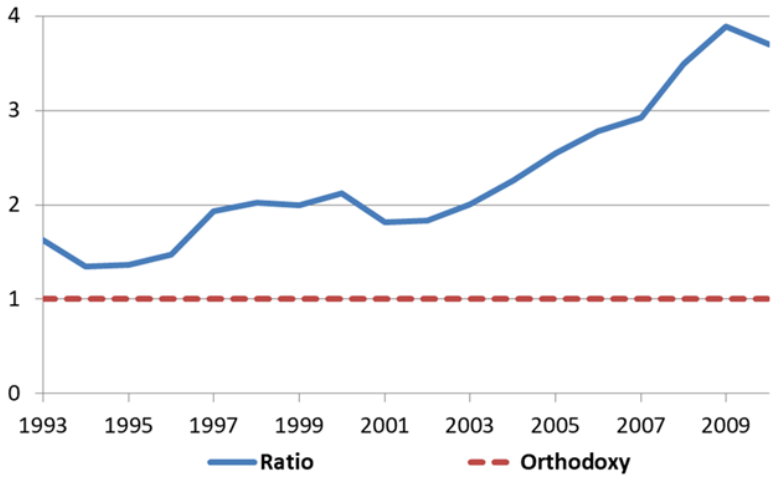

Figure 2. *Ratio net foreign reserves to monetary base*

Test #3: Reserve Pass-Through

A third useful test for the orthodoxy of a currency is the reserve pass-through ratio, calculated by dividing the net change in foreign reserves by the total change in the monetary base. Calculating the reserve pass-through ratio year over year eliminates seasonal or one-time variations. Because of this, the

[2]Here is how the Bank of Estonia's annual report described the large jump in its foreign reserves in 1997, for example: "During 1997, Eesti Pank's convertible foreign currency assets have increased by more than one third due primarily to foreign currency purchases from Estonian commercial banks, income earned on foreign currency reserves, unrealized profit gained from the rise in the price of German government bonds and exchange rate movements due to the decline in the value of the German mark against most of the foreign currencies."

first year is 1994, the year after the first full year of the Estonian currency board arrangement. Using this metric Estonia's currency board generally showed a level of orthodoxy, with exceptions being the years of 1994, 1998, and 2009. These outliers suggest divergence from currency board orthodoxy based on fluctuations specific to those three years.

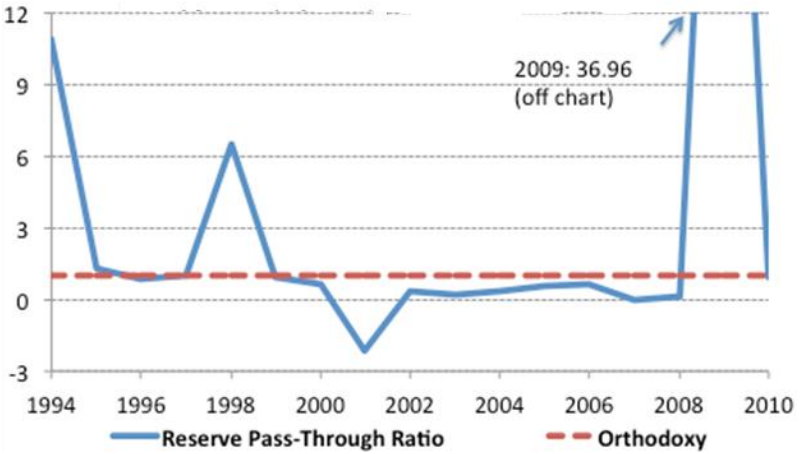

Figure 3. *Reserve pass-through ratio, year over year*

Test #4: Total Change of Net Foreign Reserve to Monetary Base

A fourth test of currency board orthodoxy is the total change of net foreign reserves to the total change in the monetary base on a year-over-year basis. An orthodox currency board would maintain a ratio close to 1:1. The Estonian currency board was closest to orthodoxy by this metric in 2010, maintaining a ratio of 1.12:1. Overall, though, it was far from orthodoxy, with the largest outlier being in 2007, maintaining a ratio of -88.03:1.

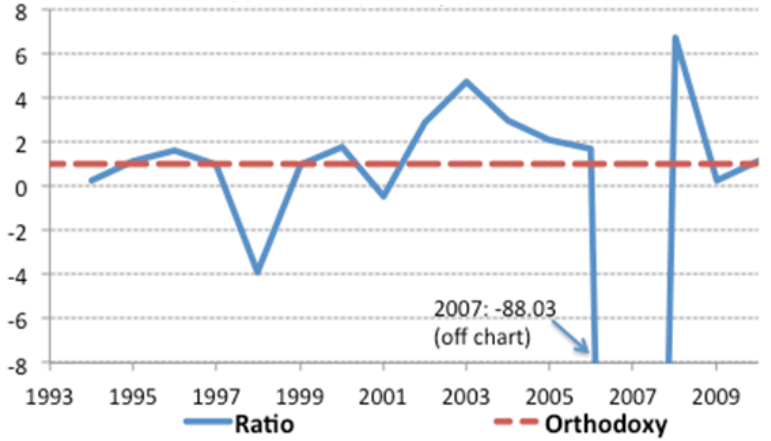

Figure 4. *Total change of net foreign reserves to total change in monetary base, year over year*

Estonia Under the Currency Board

Under the currency board system the Bank of Estonia successfully maintained without alteration the fixed exchange rate first against the Deutsche Mark, then against the euro after the euro replaced the mark. The kroon was fully convertible into its anchor currency. Inflation, which was 1,076 percent in 1992 as a result of the depreciation of the Russian ruble before the currency reform, fell to 89.8 percent in 1993, then approximately fell in half every subsequent year until reaching 3.3 percent in 1999.

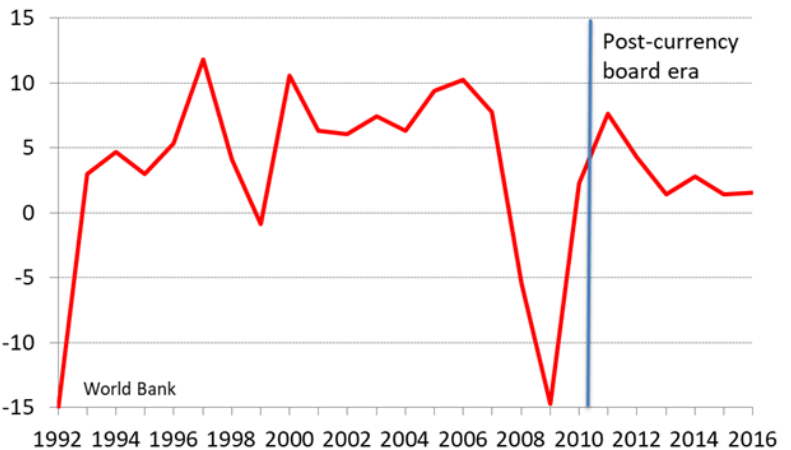

Figure 5. *Estonia GDP growth (annual %)*

Estonia's time under the currency board arrangement was marked by three main crises. The first occurred in 1992, directly after implementing the currency board arrangement, as a reaction to economic turbulence caused by the breakup of the Soviet Union at the end of 1991 (Erixon, 2010: 10). Also in early 1992, the Vnesheconombank, the Russian (ex-Soviet) bank in charge of foreign trade and transactions based in foreign currencies, froze all assets belonging to non-Russian banks. The freeze caused an economic downturn across the post-Soviet states, including Estonia (Fleming, 1996: 42). Three major Estonian banks collapsed: Tartu Commercial Bank, Revalia Bank, and Narva Bank. The government decided to not bail them out, citing fears of inflation and hurting the recently established foreign exchange rate (Fleming, 1996: 43). A major bailout by the Bank of Estonia would have undermined the currency board setup by having the bank act as a lender of last resort. Over the course of 1992, Estonian GDP decreased by roughly 15 percent.

Following the 1992 shock, Estonia saw high growth rates until another round of economic malaise in 1997 and 1998. Estonian GDPgrowth peaked in 1997, prior to that year's economic crisis, at over 10.6 percent. This was the highest rate in Europe, prompting the European Commission to recommend Estonia for fast-track EU membership (Feldman, 2003: 520). The Asian financial crisis of 1997-98 had ripple effects in Estonia. A wave of uncertainty made both investors and banks cautious, decreasing the amount of available capital. The following year came a crisis closer to home as Russia defaulted on its debt and the Russian ruble was devalued. At the time, Russia was still a top trading partner of Estonia. The devaluation of the ruble decreased Russian purchasing power, hurting Estonia's exports to Russia. The industry most affected was food. Russian imports of Estonian food products declined by 44 percent in 1998. More widely, this crisis affected consumer confidence and threw the future of the kroon into uncertainty (Pilinkus, 2011: 359). GDP fell 0.85 percent in 1999. Ultimately, the Estonian economy recovered, on the back of closer ties with the European Union, which became the main importer of Estonian goods, replacing Russia.

Estonia's biggest fall in GDP growth came during the 2008-2009 global financial crisis, in which the country was hit particularly hard. Export markets vanished and a domestic housing bubble popped, resulting in GDP shrinking by 3.7 percent in 2008 and 14.3 percent in 2009. Estonia's status as a small, open economy and the country's recent, rapid credit expansion are two main factors that compounded to yield the third deepest recession in the European Union (Parts, 2013: 269). Estonia engaged in fiscal policy stimulus during the crisis followed by retrenchment afterwards, and also underwent economic reforms, with main focus being the labor market. Estonia's recovery since the most recent crisis became a successful example of fiscal austerity, with Estonia seeing high growth as a member of the Eurozone. Despite this, by 2012, Estonian GDP had not yet recovered to pre-crisis levels, putting in question the "triumph" of the Estonian recovery for some observers (Krugman, 2012).

In comparing the Estonian experience to the experiences of its Baltic neighbors, we gain further insight into the effects of the currency board system and the progression of the Estonian and wider Baltic economic transition. Estonia began its stabilization reform earlier than Lithuania and Latvia. The Latvian ruble was introduced in May 1992 and originally circulated side-by-side with the Russian ruble at a one-to-one exchange rate. Latvia eventually eliminated the ruble from circulation in July 1992, one month after Estonia. Starting in March 1993, the Latvian lats became official legal tender, replacing the Latvian ruble. Starting in February 1994 the lats was pegged to the IMF's Special Drawing Right. Lithuania left the ruble area on October 1, 1992, at first issuing a temporary currency called the talonas — which at one point depreciated by about 50 percent against the U.S. dollar— then establishing the litas as sole legal tender on June 25, 1993. The litas was more stable than the talonas. In 1994 Lithuania established a currency board in part because it had observed Estonia's success in currency stabilization and wished to lock in the credibility from a stable exchange rate. Steve Hanke again played a role; he was an economic advisor to the Lithuanian prime minister during the period.

The Latvian and Lithuanian economies reacted similarly to the Estonian economy following sweeping stabilization policies. In all three cases, inflation sharply decreased following the initial tightening of monetary policy. Interestingly, Latvian inflation dropped the most, hitting single digits in 1996, earlier than Estonia. The results in terms of output were also similar, with output stabilizing in all cases once stabilization policies took hold. Following monetary reform, Estonian GDP per person remained higher than its Baltic neighbors. (In the graph, the 2015 decline in GDP per person reflects depreciation in the euro against the dollar, not shrinking real GDP.)

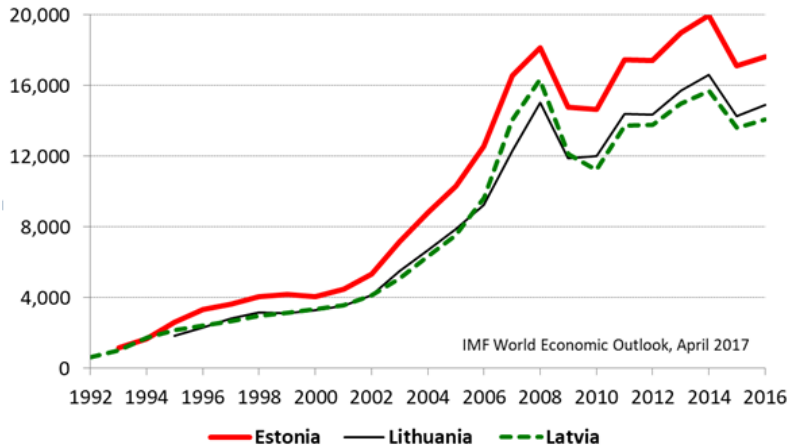

Figure 6. *GDP per person, purchasing pover parity terms (USD)*

The broadly similar experienceof all three Baltic states poses the question of whether the details of monetary and exchange rate policy are all that important provided that they avoid creating high inflation. What is certain is that they avoided the monetary and fiscal problems that resulted in continuing high inflation in a number of other former centrally planned economies, including Russia, Bulgaria, and Serbia.

End of Estonia's currency board

On January 1, 2011, Estonia joined the European Central Banking system, implementing the euro as its sole official tender.

This signaled the end of the Estonian currency board system, which was a necessary part of Estonia's monetary transition. Estonia became the 17th state to adopt the euro, with the Bank of Estonia joining the European Central Bank according to the Statute of the European System of Central Banks. The Bank of Estonia paid its contribution of capital to the ECB as part of the ECB's foreign reserve assets.

The Estonian currency board arrangement brought monetary stability and confidence in the financial system, and allowed Estonia to close much of the gap in living standards with Western Europe. Estonia was now able to end its period of transition with successful entrance into the European Central Bank. The move signaled a deepening of financial as well as political ties with Western Europe, an example of a politically charged monetary decision. It also signaled that Estonia had no desire to ally closely with Russia, or to be part of a successor bloc to the Soviet Union. Estonia was the first of the Baltic states to join the euro area; all are now members.

Conclusion

Estonia's currency board was relatively orthodox, though it did allow some room for discretionary monetary policy, particularly with excess foreign reserves held by the Banking Department. Over the first few years of the Estonian currency board, inflation fell drastically, and remained low until the end of the system. Estonia was the first of the former Soviet republics to undertake sweeping monetary reform, both as a way to liberalize the national economy and as a form of asserting political independence from Soviet and then Russian influence. Both Lithuania and Latvia were influenced by the Estonian model with similar degrees of success. The Estonian currency board arrangement proved an important step toward a market economy and transparent macroeconomic policies. Estonia is a successful story of transition, overcoming expected reluctance and resistance in the form of the old, planned market economy towards a Western-facing, free market-driven state.

Appendix

Relevant Estonian Currency Laws and Regulations from the Currency Board Period

Law of the Republic of Estonia on the Security for the Estonian Kroon, 1992: Established a currency board-like backing rule.

Law on the Central Bank of the Republic of Estonia (Bank of Estonia Act), 18 May 1993: Formalized the status of the Bank of Estonia in post-independence law.

Official Statistics Act, 2007: The central bank is entitled as well as obliged to collect and publish monetary, financial and balance of payments statistics.

Eesti Pank Act, 2007: Requires the publication of a bulletin at least once every three months in addition to the Annual Report of Eesti Pank. The quarterly bulletins focus on monetary or financial policy issues in turns.

Act of Introduction of Euro, 22 April 2010: Regulates the exchange of Estonian krooni issued on the basis of the Republic of Estonia Money Act into euros, withdrawal of the kroon from circulation, and dual circulation of the kroon and the euro.

Estonia, act of 22 May 2010: Enabling act for Estonia to join the European Central Bank and participate in issuing the euro in place of the kroon.

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4 History, policies and financial statements of the Irish currency commission and the Central Bank of Ireland (1927–1979)

Charlie **Wang**

Introduction

Although the country referred to as Ireland today has a history that stretches back for centuries, the part of history that is of interest to the discussion of this paper can be traced back to when Ireland first joined with Great Britain in 1801 following the passing of the Acts of Union 1800, which brought both kingdoms – the Kingdom of Great Britain and the Kingdom of Ireland – together into the United Kingdom of Great Britain and Ireland. Ireland was a part of the union until 1922 when the Irish Free State (in Gaelic, Saorstát Éireann) broke from the union and established itself as a self-governing dominion following the Anglo-Irish Treaty of December 1921.

When the constitution of the Irish Free State came into operation on December 6, 1922, the only full legal-tender paper currency that was in circulation in 1922 was the notes issued by the British government (Moynihan, 1960: 20). Those notes, nicknamed Bradburies after the official whose signature appeared on them, were issued as a World War I emergency measure in amounts

from 2 shillings 6 pence (£0.125) to £1.[1] Also in circulation, and accepted means of payment were notes issued by the Bank of England and by several Irish commercial banks. The financial markets and banks of Ireland were closely tied to those of England when Ireland was part of the United Kingdom, and thus, all the provinces of Ireland used the pound sterling as the official currency. Even today, Northern Ireland, which remained a part of the United Kingdom after the Irish Free State became independent, continues to use the pound sterling and have arrangements such as note issues by commercial banks (Dixon, 2015: 14-21), continuing currency arrangements that are reminiscent of those before and during the early years of the Irish Free State.

The influences and establishment of the currency commission

Following the successes of becoming a self-governing dominion in 1922, the idea of establishing the State's own currency was a logical and natural progression, as it would give the Irish Free State control over the supply and issuance of coinage and would help provide the Irish Exchequer, the national treasury, a profit (Moynihan, 1960: 24). There were multiple considerations related to how to setup the new currency and the financial system of the Irish Free State. Due to the details that needed to be worked out, the Minister of Finance notified the existing banks in April 1925 that he would be setting up a body to consider changes to banking and note issue laws (Moynihan, 1960: 38). The body came to be known as the Currency Commission. By February of 1926, the members of the Commission were announced, and the formal warrant of appointment was signed by the following month (Moynihan, 1960: 39). The chairman of the commission was Henry Parker Willis, an American economics professor who had been director of research for the Federal Reserve Board of Governors and president of the Philippine National Bank, a note-issuing commercial bank. The Philippine government of the era also issued notes, under a currency board-like arrangement.

[1] Under the currency system used in Britain and Ireland until decimalization occurred in 1971, £1 = 20 shillings (s.) = 240 pence (d.).

The question of setting up a new currency independent of the pound sterling arose. Historically, from the late 1700s, Ireland had a note issue separate from those of England, Wales, and Scotland – several local banks issued notes, though the privately-owned Bank of Ireland had certain privileges beyond those accorded to the other banks. Also, the old Irish pound had been a separate unit of account from the pound sterling until the 1820s. Should the new currency be linked to the pound sterling or not? The underlying factor that influenced the decisions the Commission made was the country's close ties to Great Britain. At the time of separation, Britain was Ireland's largest import and export partner (Moynihan, 1960: 67). Thus, for the foreseeable future, the Commission considered that because trade would be tied to Britain, and without strong institutions independent of British finances and credit policies (Moynihan, 1960: 67), any monetary policies set forward in Britain would greatly influence and possibly override whatever policies were set forth in Ireland.

Thus, to maintain the existing level of nominal prices and freedom of trade between Ireland and Britain (Moynihan, 1960: 66), the Commission decided that there should be parity between the Irish currency, which would come to be known as the Irish pound (or punt, in Gaelic), to the pound sterling. Similarly, the opinion of the general business community, as represented by the Associated Chambers of Commerce, was that the Irish pound should be at parity with sterling (Moynihan, 1960: 65). With parity, the public would maintain its confidence in the currency. Nonetheless, fixing the Irish pound to sterling would place Ireland entirely in the hands of whatever monetary policy arose in Britain (Moynihan, 1960: 22). For example, the deflationary policy followed by Britain in the early 1920s so that it could return to the pre-World War I exchange rate of sterling with gold had been considered disastrous for Ireland (Moynihan, 1960: 75). The Commission recognized that farmers who had bought land at high prices during the expansionary period right after World War I had seen their wealth diminished due to falling prices (Moynihan, 1960: 65). However, the Commission emphasized that by establishing parity, the Irish pound would have unquestioned value since the currency had no gold reserves of its own

(Moynihan, 1960: 66). Thus, parity between sterling and the Irish pound would be maintained.

Another major question the Currency Commission faced was whether to establish a central bank. On the international stage, the consensus of opinion was that any country without a central bank should establish one, per the proceedings from the League of Nations International Financial Conference, 1920 (9). On the other hand, the Commission argued against a central bank, contending that the Irish Free State lacked the fundamental elements needed for an effective central bank, notably a local capital market and a short-term money market (Moynihan, 1960: 67). Without these two fundamental elements that showed evidence of substantial liquidity of both private and public Irish credit, a central bank would not be able to operate effectively. Furthermore, the Commission argued that though they could solve the problems identified, such as by creating a short-term money market, the support to central bank policies that naturally comes with a well-defined and established market would be lacking in a new capital market (Moynihan, 1960: 67).

The primary concern that the Commission needed to address was issuing notes, and the Commission believed that the goal could be achieved at a greater pace and with less cost without having to set up a central bank (Moynihan, 1960: 51). Likewise, though there was a need for money markets, there was still access to money market facilities through offices in London. The country as a whole had a sound banking system, and the banking business of the government was satisfactory (Moynihan, 1960: 50), so if it was working, there was no need to change it.

The Minister of Finance agreed with the proposal set forth by the Currency Commission to proceed as a Banking Commission and not as a central bank. The Minister added that though keeping many elements of the existing banking system was conservative, the existing system did have the confidence of the public (Moynihan, 1960: 73). In fact, the argument was that any disturbance of the existing system to setup a central bank would likely cause more damage than was worth facing (Moynihan, 1960: 73). Furthermore, with the decision of pegging the Irish pound to sterling, according to the Commission, a slightly fluctuating rate of

exchange between Ireland and Britain would most likely develop (Moynihan, 1960: 67), which was exactly the opposite of the Commission's decision with regards to the exchange rate.

These ideas were rolled up, along with some others, into the Currency Act, 1927. The Act bestowed one power on the Currency Commission – the power to exercise the functions of a banker (Currency Act, 1927, Section 63, Subsection 3). Furthermore, in the Act, eight banks – the Bank of Ireland, the Hibernian Bank Limited, the National Bank Limited, the Northern Bank Company Limited, the Munster and Leinster Bank Limited, the Provincial Bank of Ireland Limited, the Royal Bank of Ireland Limited, and the Ulster Bank Limited –became the Shareholding Banks of the Currency Commission (Moynihan, 1960: 97). Of the six commissioners, three were selected by the banks, while the other three were elected by the Minister of Finance. These six then elected the chairman – the first chairman being Joseph Brennan, formerly the top civil servant in the Department of Finance (Government of Ireland, *Currency Act, 1927*, section 18). And thus, this group of seven was formerly established as the first official Currency Commission as of September 21, 1927 (Moynihan, 1960: 110).

In the following years, the first Currency Commission was occupied with the bank notes that individual banks had that were circulating in the country, issuance of new consolidated bank notes, issuance of new token coins according to the Coinage Act, 1926, and counterfeiting. The Currency Act, 1927 gave the Currency Commission power to combine the multiple bank note issues into a consolidated issue, and reduce and eventually eliminate the bank note issues. Banks received some compensation for the loss of their note issues.

The second commission of inquiry in the currency and the transition to a Central Bank

As the 1930s came around, sentiment for establishing more central banks was once again in the air. The British Empire saw the establishment of the Reserve Bank of New Zealand in 1934, the Reserve Bank of India in 1935, and the Bank of Canada in 1935 (Moynihan, 1960: 202). On November 20, 1934, the Minister for Finance appointed a second commission of inquiry to examine and

report on the financial system in Ireland, especially with regards to banking, credit, currency, and lending (Moynihan, 1960: 204). Though not explicitly stated and though the business community and public at large did not hold the idea in much regard (Moynihan, 1960: 207), the second currency commission was also established for evaluating the possibility of a central bank.

The second commission was composed of 20 people, including a "bishop, university professors, trade union officials, businessmen, and civil servants" (Moynihan, 1960: 204). Of the 20, a chairman of the Agricultural Credit Corporation and a chairman of the Industrial Credit Company Limited represented the interests of the Irish rural community. Moreover, the Shareholding Banks had a presence, with three members. The commission presented its report to the government in 1934.

In Chapter VII of the majority report, the second commission of inquiry recognized that the Irish monetary system had worked satisfactorily since the passing of the Currency Act, 1927 due to two factors: the link with sterling and the large external reserves accumulated (Moynihan, 1960: 208). Overall, interest rates in the country were reasonable, which could be attributed to the well-established connection between the Irish banking system and the British banking system. Furthermore, although Ireland did not have a central bank and thus the Currency Commission had no power to supply funds against domestic assets, there was no difficulty for Irish banks since they had large holdings in sterling (Moynihan, 1960: 211).

Nonetheless, though the monetary system seemed fine, factors from the world stage influenced the establishment of an Irish central bank. At the World Economic Conference of 1933, there was an emphasis on having central banks independent of governments and political affairs for economic progress and development. Additionally, as World War II approached in 1939, there was a realization among the government that a gap existed in the financial mechanism of the State, specifically with regard to control over external payments and the purchase and sale of foreign securities, which were all limited under the existing powers of the Currency Commission (Moynihan, 1960: 287). In fact, most of the power was in the hands of the banks in Ireland,

and these same banks were only loosely associated in a non-statutory committee whose meetings were infrequent.

The Irish government also wanted the existing banks in the Irish monetary system to increase their domestic assets and to expand the credit available locally. Thus, the central bank would serve as an influencer of the commercial banks. The second commission of inquiry was cautious, especially with regards to having the central bank serve as the lender of last resort (Moynihan, 1960: 213). Nonetheless, the government was receptive to the idea of a central bank, and the commission worked on drafting a bill for one.

With the drafting of the bill came the question once again whether to continue the parity between the Irish pound and sterling. The majority report of the second commission of inquiry unequivocally recommended maintaining the parity. With the parity, Ireland, as a member of the sterling area, could benefit from exchange stability, sound credit conditions, and relatively stable price structures. Furthermore, the parity enjoyed the confidence of the public, safeguarded against fluctuations in the domestic price levels, and allowed Ireland a stable exchange rate with other countries in the sterling area (Moynihan, 1960: 218).

The Central Bank Bill was drafted and sent to the government on March 4, 1942 (Moynihan, 1960: 281). Though this period included the fall of France in World War II, and the threat of invasion of Ireland and Britain was of utmost prominence, the Dáil (lower house of parliament) hotly debated the Central Bank Bill along with the link to sterling, the degree of independence or subordination of the Central Bank, and the commercial banks' positions in respect to the Central Bank (Moynihan, 1960: 302). In total, over 67 amendments were proposed (Moynihan, 1960: 303) before the bill made it through the summer of 1942. By the time the bill was passed and accepted on October 29, 1942, it had been revised with compromises between more government control versus safeguarding the interests of commercial banks. In the end, the powers of the Central Bank were enlarged to some extent while the previous legislation regarding the backing of the currency was relaxed (Moynihan, 1960: 308).

On November 4, 1942, President Dr. Douglas Hyde signed the bill and the Central Bank Act, 1942 came into operation (Moynihan, 1960: 308). The Central Bank Act dissolved the existing 15-year-oldCurrency Commission, transferred all the power and duties of the Commission to the newly established Central Bank, and furthermore included additional duties and power on the Central Bank.

The early Central Bank of Ireland (1943-1953)

The newly established Central Bank of Ireland enjoyed more power than the previously established Currency Commission. A key provision of the Central Bank Act, Section 6, said:

In addition and without prejudice to the functions, powers, and duties vested by law in the Commission immediately before the appointed day and to such functions, powers, and duties as are specifically conferred or imposed by this Act on the Bank, the Bank shall have the general function and duty of taking (within the limit of the powers for the time being vested in it by law) such steps as the Board may from time to time deem appropriate and advisable towards safeguarding the integrity of the currency and ensuring that, in what pertains to the control of credit, the constant and predominant aim shall be the welfare of the people as a whole.

Functions that the Central Bank inherited from the Currency Commission included the management of issuance and redemption of legal tender notes as well as curtailing the use of consolidated bank notes that had been created under the Currency Act, 1927. Further inherited and new functions of the Central Bank included:

- Purchase and sale of gold and silver bullions, foreign currencies, and coins
- Acceptance of interest-free deposits from the Ministers of State, public authorities, banks and other credit institutions
- Rediscounting bills and fixing and publicizing the minimum rediscount rate
- Lending of security to both banks and credit institutions
- Dealing (buying, holding, and selling) in quoted State or public authority securities or of securities guaranteed by external governments

- Keeping registers on the State and public authority securities
- Keeping accounts of bankers' clearings

Besides those functions, the Central Bank was tasked with collecting and studying data regarding the country's monetary and credit problems, publishing material with respect to the data and maintaining contact with external monetary authorities (Central Bank Act, 1942, sections 7-8).

Heading the new central bank was Joseph Brennan, who had served as the chairman of the Currency Commission during the Commission's entire existence (Moynihan, 1960: 311). A new board was also formally announced for the Central Bank on January 29, 1943, and it came into effect a few days later on February 1, 1943 (Moynihan, 1960: 311).

The board consisted of eight directors. Three were banking directors, initially from the Provincial Bank of Ireland, the Bank of Ireland, and the Munster and Leinster Bank. Their terms ranged from two years to five years. Two directors were permanent civil servants, including the Secretary of the Department of Finance. Another was a Galway businessman, another was General Secretary of the Irish Transport and General Works' Union, and the last director was a farmer in County Wexford. These directors, in addition to Governor Brennan, who had a seven-year statutory term, oversaw the Central Bank of Ireland (Moynihan, 1960: 311).

In its first few months, the Central Bank experienced little change from the functions and responsibilities inherited from the Currency Commission, especially maintaining parity with sterling. However, within the first year of the Central Bank's existence, one major policy change did occur: the Central Bank announced on November 23, 1943 that it would rediscount Exchequer bills (short-term Irish government securities) and certain other securities at a minimum rate of 2.5 percent (Moynihan, 1960: 315).

Over the next few years, especially from 1944-1945, the Central Bank noticed evidence of inflation. The cost-of-living index in Ireland greatly increased in respect to Britain. Furthermore, though there was restraint on the creation of credit by the Central Bank, wages and agricultural prices steadily rose, along with property values and security prices. Likewise, consumer prices were high,

though stable, but the outlook for some important agricultural products was unsatisfactory, paired with a deterioration of the external trade balance and a notable increase in bank deposit turnover (velocity of money). After the end of World War II, imported goods greatly increased to replenish the stock that had been depleted during the wartime interruption of trade. Imports were financed by increased bank credit. Heavy taxation, large public expenditure, and expected further expansions in public expenditure compounded the inflation problem. Over its first five years, the Central Bank of Ireland was regarded as a failure, as it was blamed for not more actively exercising its powers (Moynihan, 1960: 323 - 337).

As if the negative outlook of the trade balance was not enough, talk of devaluation of sterling against the U.S. dollar emerged from the British government. Talks commenced once again to break the link between the Irish pound and sterling. It appeared that the question was still not resolved when on September 17, 1949, the Bank of England and British Prime Minister gave advance information to the Irish government of their decision to devalue sterling (Moynihan, 1960: 355). The official exchange rate with the United States dollar would be altered from $4.03 to $2.80 perpound, a devaluation of 30.5 percent (Moynihan, 1960: 355). Since the Irish pound was pegged to sterling, this corresponded to a devaluation of 30.5 percent for the Irish pound.

The Minister of Finance issued a public statement shortly after the British devaluation that the course of least disadvantage for Ireland was to allow the devaluation and preserve the parity with sterling. Alternatives included choosing some intermediate rate that was higher than $2.80, or keeping the old rate of $4.03 per Irish pound. The eventual higher cost of dollar imports was not expected to cause significant rises in the cost-of-living index since much of the index was food items and Ireland was a food-producing nation, and devaluation would in fact expand the markets available for Irish agricultural exports (Moynihan, 1960: 356-357).

In addition to inflation and devaluation, before the end of the 1940s, the Central Bank encountered difficulties with seemingly never-ending deficits in the balance of payments. In 1947, the

deficit was £40 million; in 1948, £20 million; in 1949, £10 million; and in 1950, the expected deficit at the time was£30 million. With growing public expenditures, large capital expenditures over a short period, and inflationary methods of borrowing, the country was unable to offset the growing strong demand for imports in the form of exports, especially since Ireland had limited natural resources. The expansion of the supply of money and rising income did not help either (Moynihan, 1960: 372).

The changing Central bank (1954-1979)

By 1955, it became clear to the Central Bank of Ireland that a serious deterioration in the balance of payments was in store. There was utmost need to increase production and savings and to reduce the excess of imports over exports. Banking statistics backed up the Central Bank's worries, as they showed a £26.6 million increase in domestic credit over the preceding 12 months, accompanied by a reduction, not an increase, of £4.6 million in deposits (Moynihan, 1960: 425).

The difficulties with the balance of payments continued well into the 1960s. Although the gap and corresponding deficit seemingly disappeared between 1960 and 1961, deficits grew once again in the mid-1960s (Central Bank of Ireland *Annual Report,* 1966: 14). By the end of the decade, there were still fluctuations between surpluses and deficits in the balance of payments (Central Bank of Ireland *Annual Report,* 1969: 34).

In the 1970s, a few significant developments occurred. The Decimal Currency Act, 1970 decimalized the currency simultaneously with Britain's decimalization, which occurred on February 15, 1971. The Central Bank Act, 1971 gave the Central Bank of Ireland another monetary instrument: the ability to prescribe ratios between bank liabilities and liquid assets, which was intended to sharpen competition (Central Bank of Ireland *Annual Report,* 1971: 32 and Ireland, Central Bank Act, 1971, section 23). Near the end of the decade, a highly significant event occurred when the parity between the Irish pound and sterling was finally broken.

The break in the peg of the Irish pound to sterling began on December 15, 1978, when the prime minister of Ireland announced

that the country would be joining the European Monetary System, which the United Kingdom announced it would not join. When the system began on March 13, 1979, the exchange-rate mechanism of the system also began. It limited the intervention levels possible for the Irish pound to ±2.25 percent around the central parity of the European Currency Unit (ECU), a basket of currencies of members of the European Monetary System. On March 30, 1979, market forces pushed sterling to a level such that maintaining the parity of the Irish pound would have moved the Irish pound beyond the upper intervention limits of the ECU. The Central Bank of Ireland finally broke the parity of the Irish pound with sterling that had existed for a century and a half, dating back well before Ireland's independence (Central Bank of Ireland *Annual Report*, 1979: 40-41). On January 1, 1999, Ireland joined ten other European countries as a founding member of the euro, which it continues to use today.

Comparing the currency commission to the Central Bank of Ireland

The break of the peg to the pound sterling marked a definite shift of monetary policy in Ireland. How continuous was the policy before then, and, as several observers have thought, did the changeover from the Currency Commission to the Central Bank of Ireland involve no true alteration in monetary policy for many years? To investigate, let us consider both the institutional frameworks of the two monetary authorities and the evidence their balance sheets offer.

Currency commission vs. Central Bank: Board composition

The commissioners and directors that made up the boards of the Currency Commission and of the Central Bank, respectively, managed and directed both institutions in their functions and in their monetary policies. A comparison of the composition of the boards is of great interest, as the voices of those on the board influenced whatever policies the institutions followed.

By the Currency Act, 1927, the board for the Currency Commission consisted of a chairman, three commissioners elected

by commercial banks in the Irish Free State, and three commissioners selected by the Minister of Finance (sections 15, 18). Of the three selected by the Minister of Finance, two were to represent business, industry, or trade, while the other commissioner could be a civil servant (section 18).

The Central Bank Act, 1942 stated that the board of the Central Bank of Ireland would consist of a governor, three directors to be known as "banking directors" attributed to the commercial banks, and up to five other directors of whom no more than two could be "service directors," that is, government employees (section 5). However, the Central Bank Act, 1971 amended this provision by reducing the total number of banking directors from three to two while increasing the number of service directors from five to six (section 53).

It can be seen in the composition of the board of the Currency Commission that the interests of the commercial banks were strongly represented, as their representatives comprised three of the six commissioners. However, with the establishment of the Central Bank in 1943, the commercial banks were reduced three of eight directors. The Central Bank Act, 1971 reduced the influence of the commercial banks further to two out of eight directors. The significance of the reduced presence of the commercial bank interest on the board can be seen in its influence on the policies of the early Central Bank in comparison to the Currency Commission.

Currency commission vs. Central Bank: Policies and powers

The Currency Act, 1927, Section 63, Subsection 3, specified that "it shall be lawful for the [Currency] Commission to exercise the functions of a banker in relation to the moneys for the time being in the general fund." This blanket clause allowed the Commission to operate with as much banking power as needed. In the Central Bank Act, 1942, these blanket powers were repealed in favor of particular powers explicitly listed under Section 7 of the new act. A summary of the specific powers was provided in Section IV above.

Although the Central Bank Act, 1942 gave the Central Bank more specific banking powers than the Currency Commission had had, it is unclear that the act provided the Central Bank with more

latitude in operations than the Currency Commission. In fact, come 1971, another Central Bank Act added back the general clause of the 1927 act: "It shall be lawful for the Bank, for the purposes of or through the general fund, to exercise and carry out, in addition to those functions specifically assigned to it by the Currency and Central Bank Acts, 1927 to 1971, powers and functions of a kind which, in accordance with normal banking practice, may be exercised and carried out by banks or bankers" (Central Bank Act, 1971, section 47).

The decisions that went into the Central Bank Act, 1942 also affected the standing and effectiveness of the Central Bank of Ireland in its early years. One of the primary reasons for establishing the Central Bank was to promote the expansion of credit. This included the ability to rediscount bills, buy Government securities, and impose penalties on banks holding "too large" a proportion of their resources as external assets (Moynihan, 1960: 461). However, though specific powers were conferred on the Central Bank to expand credit, there was no clause in the Central Bank Act, 1942, that provided the Central Bank power to restrain the growth of credit. Thus, during the early years of the existence of the Central Bank, which were considered a failure for it, the best it could do when contractionary monetary policy was needed was to sit on the sidelines and hope for the best. Ireland was neutral in World War II, but the link of the Irish pound to sterling and the open capital account between Ireland and Britain meant that Ireland imported Britain's expansionary wartime monetary policy.

Another decision that detrimentally influenced the effectiveness of the Central Bank was that it did not function as the government's main banker. The Central Bank accordingly too long lacked the full authority, prestige, and power to influence the government and commercial banks, which according to one governor of the Central Bank negatively affected its performance in guarding the integrity of the currency (Moynihan, 1960: 215).

The composition of the financial system also reduced the effectiveness of the powers of the Central Bank. For example, the powers of the Central Bank could be used for credit control, though they were primarily designed for safeguarding bank

deposits (Moynihan, 1960: 473). But due to the lack of a sufficiently broad money market, effective open market operations were impossible for the Central Bank to accomplish (Moynihan, 1960: 473). Furthermore, since the commercial banks in Ireland had extensive liquid sterling assets and reserves at their disposal (Moynihan, 1960: 303, 473), open market operations had limited effect on them. (Economists adhering to efficient-market views might regard the ineffectiveness of open market operations as a strength rather than a shortcoming of the Irish monetary system.)

The inability to limit credit during the years when limitation was needed, the lack of the status and powers traditionally attributed to a central bank such as serving as the government's bank, and the unique composition of the Irish monetary structure meant that the Central Bank of Ireland was limited to functioning similarly to the Currency Commission it was supposed to replace. In fact, some commentators claimed that the early Central Bank of Ireland was little more than a name change, and the Central Bank did little more than issue currency and manage the holding of assets against notes issued without addressing the greater economic trends at play (Moynihan, 1960: 224). However, it is important to remember that the Central Bank Act, 1942 limited the functions of the Central Bank and only provided it with expansionary monetary policy tools, not contractionary tools.

Balance sheet data

Besides examining the similarities and differences between the legal structure of the Currency Commission and the Central Bank of Ireland, we can also compare their balance sheets. Data from the Currency Commission period, which was from 1927-1943, are from Krus & Schuler (2014), who compiled the data from the Commission's annual reports (The first annual report of the Currency Commission was issued in 1928 and the last in 1942.) Data for the Central Bank of Ireland from its founding in 1943 to when the link with sterling was broken in 1979 were compiled by me from the balance sheets found in the *Statement of Accounts* and the annual reports of the Central Bank. I standardized the combined data in a simplified balance sheet to make comparisons over time and analysis of the most important points easier.

The continuous annual balance sheet data from 1928-1979 provide more complete statistics for the period than are available from the Central Bank's website or the International Financial Statistics database of the International Monetary Fund. This paper uses the balance sheet data to analyze how closely both the Currency Commission and the Central Bank conformed to an orthodox currency board and to compare the Currency Commission to the Central Bank of Ireland in its first three-and-a-half decades of existence. Other researchers may find the data useful in different types of analysis.

Currency board orthodoxy tests

The analysis in this paper will consist of tests of currency board orthodoxy based on balance sheet data. The tests will probe how closely both the Currency Commission and the Central Bank conformed to the ideal of an orthodox currency board. This fundamental analysis on the primary source explores the topic of currency boards in a different way from previous literature on Irish financial structure from 1928-79, including a paper written by Patrick Honohan (1977), who would later become governor of the Central Bank.

The three most important characteristics that define an orthodox currency board are a fixed exchange rate, no exchange controls with the anchor currency, and 100 percent foreign reserves against the monetary base (at least at the margin) (Hanke & Schuler 2015: 2-7). The tests below explore how closely the Currency Commission and Central Bank of Ireland reflected orthodox currency board characteristics and how closely the data support the arguments of some previous observers that at least in the early years of the Central Bank of Ireland, its policy differed little from that of the Currency Commission.

Foreign assets to total assets

One test of currency board orthodoxy is the ratio of foreign assets to total assets. In an orthodox currency board, the ratio should be around 1 (100 percent), as the currency board would hold few or no domestic assets, and thus would hold only foreign assets. The Figure below plots the data. The thin brown line shows

the data from the Currency Commission period, while the thick blue line shows the data from the Central Bank of Ireland period. The black dotted line represents where an orthodox currency board would keep the ratio, at 1.

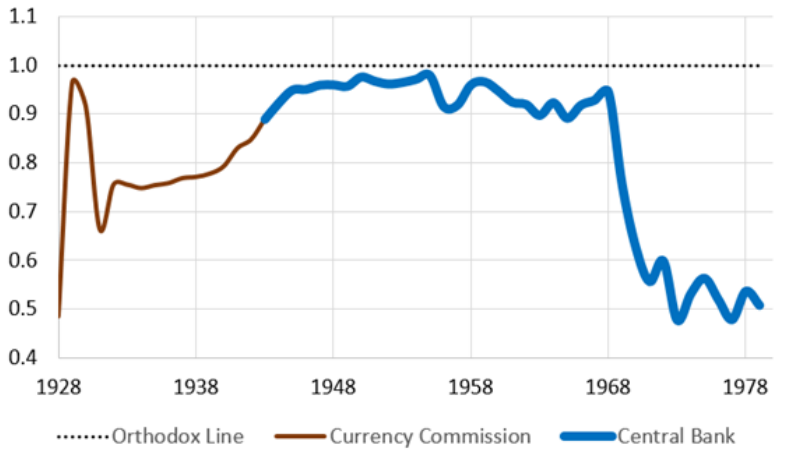

Figure 1. *Ratio of foreign assets to total assets, 1928-1979*

As one can see in the Figure, the Currency Commission in its 15 years of existence had a lower ratio of foreign assets than the Central Bank of Ireland's in its' first 20 years of existence. Thus, the Central Bank of Ireland actually conformed more to an orthodoxy currency in this regard than the Currency Commission. However, after 1968, the Central Bank of Ireland held about half of its assets in foreign holdings and domestic holdings, diverging from an orthodox currency board.

The divergence seen in the Figure above is of interest. The Central Bank's annual reports says the Central Bank started implementing changes to the banking system in preparation for an Irish money market system starting in 1968 (Central Bank of Ireland *Annual Report*, 1970: 54-55). The effects of the development on the monetary system can be seen in the Central Bank's balance sheets. There was a centralization of external monetary reserves (primarily into gold) and the provisioning of increased internal sources of liquidity for money market facilities, which appear in the balance sheet as a marked increase in rediscounted bills and money at call and at short notice. Thus, one can conclude that in

promoting the development of a money market – which the first Currency Commission identified the lack of as a strong reason for not having a central bank – the Central Bank of Ireland diverged from currency board orthodoxy.

Net foreign reserves to monetary base

A second test of currency board orthodoxy is the ratio of net foreign reserves to the monetary base. Net foreign reserves consist of the foreign assets minus the foreign liabilities. The monetary base consists of the notes in circulation, coins (if any), and demand deposits of financial institutions at the monetary authority. An orthodox currency board maintains a ratio of 1 – indicated by the black dotted line – between net foreign reserves and the monetary base.

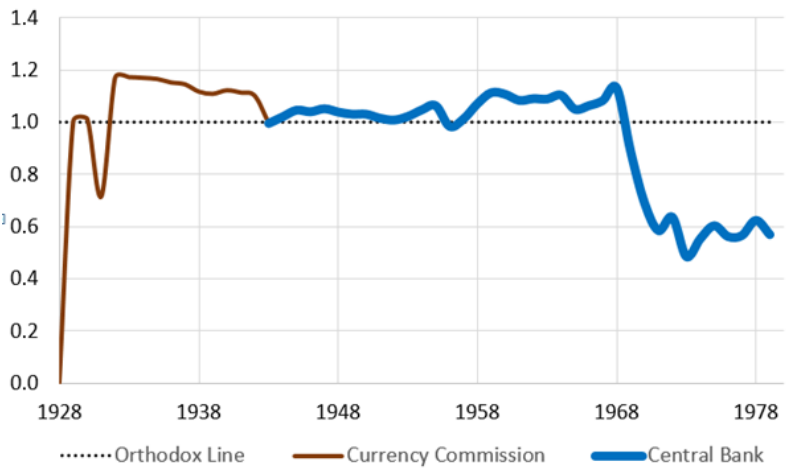

Figure 2. *Ratio of net foreign reserves to monetary base, 1928-1979*

The ratio may not be exactly 1 because of changes in the market valuation of assets or other factors, but a ratio below 0.8 or above 1.2 creates a presumption of unorthodoxy.

As one can see in the Figure above, the ratio was close to 1 except in 1928, the first year of the Currency Commission, and 1931. At the start of the Central Bank of Ireland in 1943, it can be seen that the ratio fell below 1, but by the following year, the ratio was maintained around or slightly above 1 until 1969. Thus, one

can see that for the majority of the years of the Currency Commission and the some 25 years of the early history of the Central Bank, the institutions conformed to currency board orthodoxy with regard to the ratio of net foreign reserves to monetary base.

Reserve pass-through

A third test of currency board orthodoxy is the reserve pass-through ratio, which is the total change in net foreign reserves divided by the total change in the monetary base. The preferred way of measuring the reserve pass-through ratio is year over year to eliminate or reduce the effect of seasonal or idiosyncratic factors that may introduce noise.

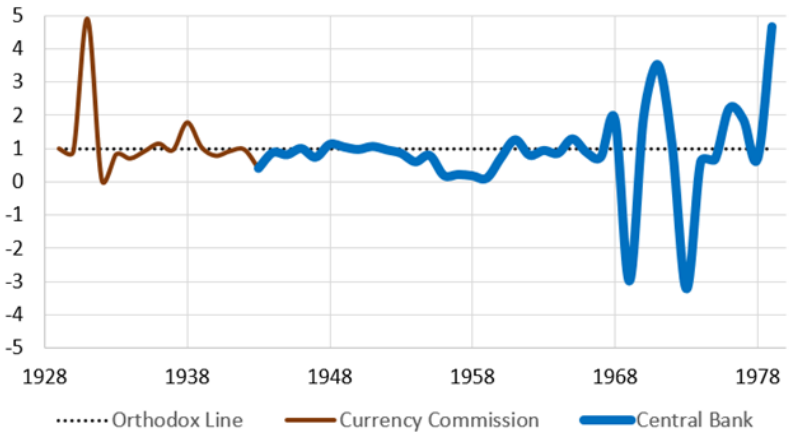

Figure 3. *Reserve pass-through ratio, year over year*

Thus, the data start in 1929, the year after the first annual balance sheet. In an orthodox currency board, the ratio should stay at around 1. It can be seen that the ratio was generally around 1 from about 1935-1942 under the Currency Commission and from 1944-1967 under the Central Bank of Ireland. Thus, these years were the ones that most conformed to an orthodox currency board. It is notable that after 1967, wide fluctuations can be seen from year to year both above and below 1, which illustrates the divergence from currency board orthodoxy.

Total change of net foreign reserve to monetary base

A fourth test of currency board orthodoxy is the total change of net foreign reserves to the total change in monetary base in Irish pounds and on a year–over–year basis. Again, an orthodox currency board would maintain a ratio close to 1.

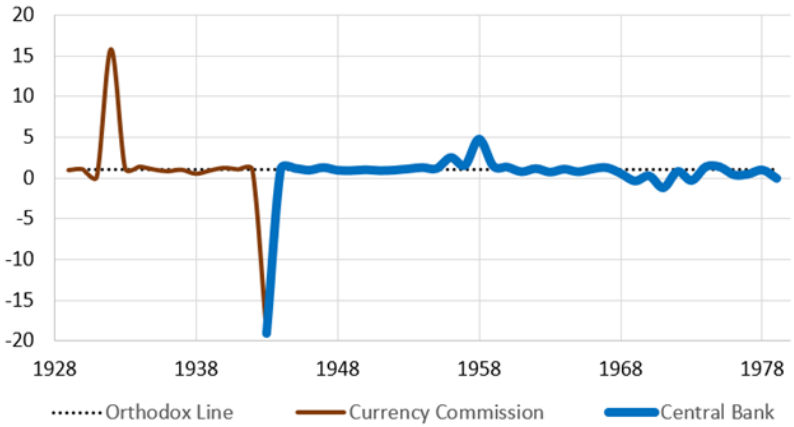

Figure 4. *Total change (in million Irish pounds) of net reserves to total change in monetary base, year over year*

This in fact happened except for 1931 during the Currency Commission era and in 1943 during the transition from the Currency Commission to the Central Bank. Up until 1968, except for a rise to about a ratio of 5 in 1958, the Central Bank of Ireland stuck close to a ratio of 1. More variability can be seen after 1968. Thus, for most of the years of the Currency Commission and the first twenty-odd years of the Central Bank of Ireland, it conformed to a currency board according to this orthodoxy test.

Income and expense as percentage of assets

Now we move on to analysis that is not directly related to currency board orthodoxy but is of interest because it addresses whether the Central Bank was costlier or more profitable than the Currency Commission.

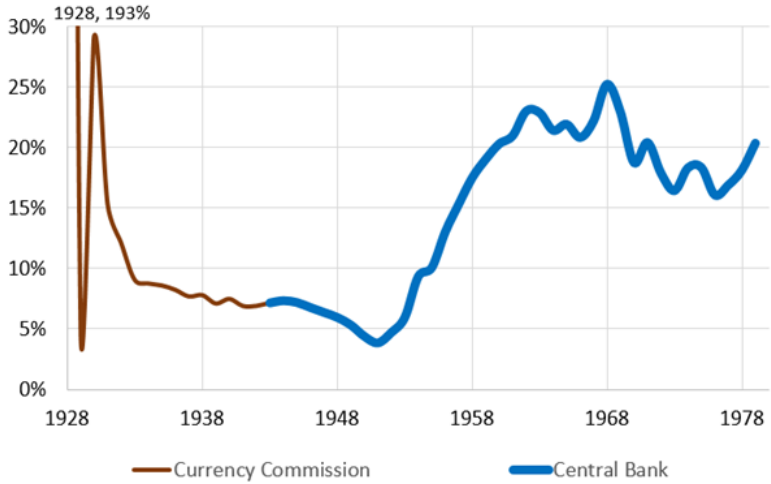

Figure 5. *Income and expenses as a percentage of assets, 1928-1979*

It can be seen that income and expenses made up a larger percentage of assets during the mid-to-late years of the Central Bank of Ireland. In the underlying data, it can be seen that this is because of increasing expenditures by the Central Bank of Ireland, which are categorized under "Other or Unspecified." Overall, it can be seen that except for the first year of the Currency Commission, when certain costs of establishing a new institution arose, the ratio hovered around 10 percent from 1930 to 1952, but then rose to hover around 20 percent from 1958 to 1979.

Profitability

Finally, let us examine profitability, specifically the amount distributed to the Irish government as a percentage of assets. In the very early years of the Currency Commission, distributions can be seen to be about two to three times higher as a share of assets in its later years.

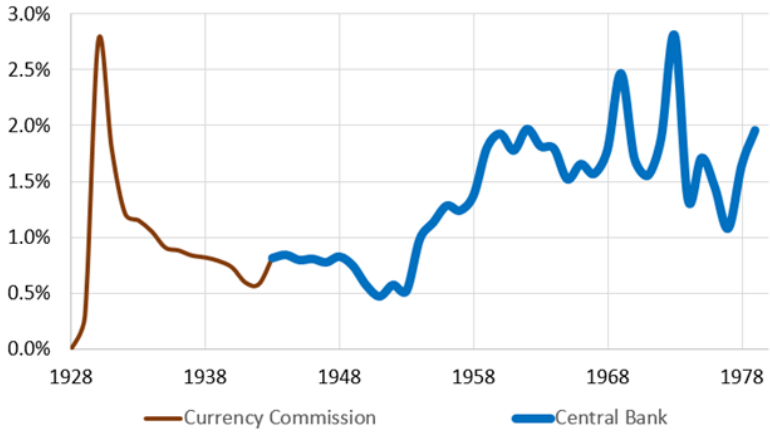

Figure 6. *Profitabilite: Amount distributed to Irish government as a percentage of assets, 1928-1979*

This is probably due to the issuance of new Irish coins to replace British coins in circulation, which provided a one-shot boost. However, profitability stayed at less than 1 percent until the transition to a central bank was completed and the 1950's came around. Then, profitability rose again. Overall, profitability was higher during the later years of the Central Bank than in its early years, and the early years of the Central Bank were similar to about the last decade of the Currency Commission.

Conclusion

The early Central Bank of Ireland functioned much like a currency board, continuing the policies it inherited from its predecessor, the Currency Commission, which also functioned like a currency board. On paper, there were some significant legal differences between the two monetary authorities, but the data show how alike they were. It was only after 1968 that the Central Bank began to behave much differently from a currency board, which corresponds to when the Central Bank started establishing the foundations of an Irish money market system. Then, in 1979, one of the main pillars dating back to the Currency Commission period and earlier was broken when the one-to-one exchange rate between the Irish pound and sterling ended.

One sees the distinct differences between a currency board and central bank through the analysis of the Currency Commission and Central Bank of Ireland from 1927-1979. Even though a central bank can at times operate in practice like a currency board, there is no guarantee of durability. Having been granted the powers and flexibilities bestowed on a central bank, the Central Bank of Ireland could stop acting like a currency board from 1968 and onwards, moving assets from Associated Banks to the central bank, increasing credit, and establishing the foundations needed for a money market system. Thus, a distinct currency board system, when needed, should be established to conform to currency board orthodoxy in lieu of a central bank that acts like a currency board.

References

Photographs of the balance sheets of the Currency Commission can be found in the Digital Archive on Currency Boards. Krus and Schuler (2014) digitized them. I have photographs of the balance sheets of the Central Bank of Ireland and will share them with other researchers on request. See the accompanying spreadsheet workbook for my digitization of the original Central Bank balance sheets as well as a standardized balance sheet covering the Currency Commission and the Central Bank.

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5 Prospects for a currency board in Iceland

Alexander **Mabie**

Introduction

To properly evaluatehow various monetary systems would fare in Iceland, it is critical to understand something of the history of itseconomy and the unique features that developed as a result. With just over 300,000 inhabitants, Iceland is one of the smallest countries with an independent monetary policy. Iceland's economic track record has not been particularly good. It has been predominately characterized by high inflation, fluctuations in the exchange rate, and overall instability Sigurðardóttir (2012: ii).

Historically, abundant resources in two sectors – energy and marine – have fed the engine of Iceland's economic growth. The recently established aluminum smelting industry is the country's most power-intensiveand contributes to Iceland's position as the world's largest electricity producer per capita (Iceland National Energy Agency, 2014). Fisheries and related sectors are the most important part of the Icelandic economy, consistently contributing roughly a quarter of GDP. In recent decades, however, a third sector of substantial size emerged in Iceland: the financial sector.

Until the 1980s, the Icelandic government engaged in a high level of economic intervention. The three main banks were state owned, financial markets were tightly regulated, and there was a peggedexchange rate regime. Under the regime, the exchange rate was frequently adjusted so as to make profits in the fishing industry equal to zero Carey (2009: 6), which further emphasizes the industry's importance.

The 1990s represented a decade of bold, free-market reform. In 1994, Iceland joined the European Economic Area (EEA). The accession agreement essentially extended the freedom of movement of capital, labor, and goods and services afforded to members of the European Union to Iceland as well. Following this, the liberalization of financial markets accelerated. The government privatized state-owned companies, implemented person and corporate tax cuts, and deregulated the financial sector. Iceland's banks gained the right to open subsidiaries in any EEA country Carey (2010: 6). The result was a decade of robust economic growth, price stability, and low unemployment Spruk (2010: 7).

Analysis of Iceland's financial crisis

How did we get here? The causes of Iceland's financial crisis

There are two separate but related stories that characterize the build up to the crisis. The first is the rapid rise and fall of Icelandic banks. The second is Iceland's boom and bust cycle and how problems arose from severe macroeconomic mismanagement in a small, open, and financially integrated economy. These two episodes converged in a tragic grand finale in October 2008, when Iceland's three commercial banks collapsed and were put into receivership.

Overbanked

The 1994 EEA agreement led to the privatization of Iceland's three largest banks, Glitnir, Kaupthing, and& Landsbanki, by 2003 (Aliber & Zoega, 2011: 27). It also allowed the banks to open subsidiaries in any EEA country, which constituted most of Europe. In addition to the favorable regulatory environment, the banks took advantage of easy monetary conditions abroad. For example, Landsbanki introduced an online savings account brand

under the name Icesave, available to depositors in the United Kingdom and in the Netherlands. Icesave accounts were especially attractive because they offered unusually high rates of interest. Between 2006 and 2007, rates exceeding six percent were offered to UK customers (Icesave, 2008), which were among the highest offered by online banks at the time (Lewis, 2006). Kaupthing Bank offered similarly lucrative online savings accounts under the Kaupthing Edge brand. Meanwhile, on the lending side, the Icelandic banks were giving loans to Icelandic investment companies such as Baugur and Samson. These firms typically took equity stakes in foreign companies, indirectly exposing the Icelandic banks to global equity market risk (Carey, 2009: 8,9). As a result of the vast expansion both in Iceland and abroad, Deposit Money Banks (DMBs, which include the three main banks and other domestically registered banks) grew their total consolidated assets (including assets of banks' foreign subsidiaries) from 138 percentof GDP at the end of 2003 to 712 percent of GDP by the end of 2007(Figure 1). The rapid expansion in assets included both domestic and foreign assets (Carey, 2009: 7).

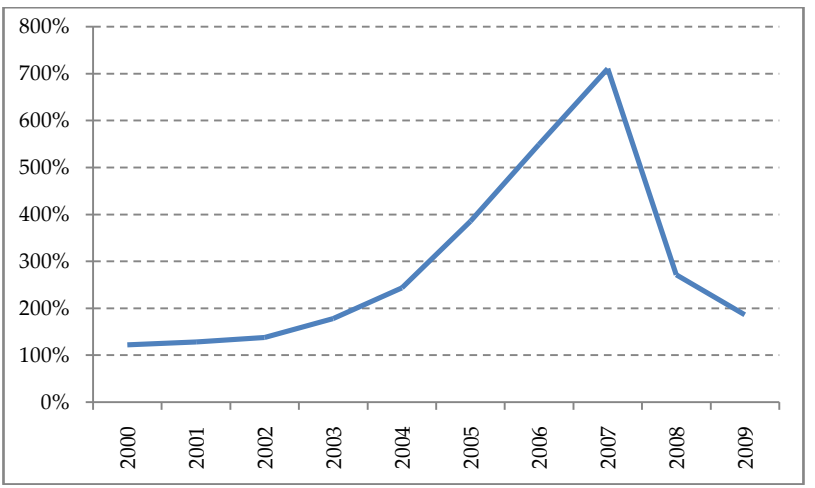

Figure 1. *Total Bank Assets (% of Nominal GDP)*
Source: Central Bank of Iceland, Statistics Iceland, Calculations

The commercial banks' extreme growth essentially stripped the Central Bank of Iceland (CBI) of its capabilities to act as a lender of

last resort. When banks' total assets exceed a country's GDP by several times, the central bank becomes unable to accumulate sufficient reserves to save them (Aliber & Zoega, 2011: 22). This problem was especially dangerous in Iceland, where the main banks were not systematically important in other countries (Carey, 2009: 7). Therefore, only the Icelandic government would potentially back the banks if they needed the support. So as Glitnir, Kaupthing, and Landsbanki grewhuge in relation to the size of Iceland's economy, they rendered themselves too big to save.

Overheated

After the rapid expansion, a credit-induced asset price boom occurred. As the size of the banks skyrocketed, so did the amount of private credit. Domestic credit to the private sector as percentage of GDP grew from 102 percent in 2002 to 311 percent in 2006. The banks contributed to this significantly as they increased their market share. These high rates of credit put upward pressure on equity prices and house prices (Carey, 2009: 12,14). During the same period, the monetary baseand money supplyboth climbed rapidly as well. The rapid growth of private credit, the monetary base, and the money supply are shown in the following Figure (Figure 2).

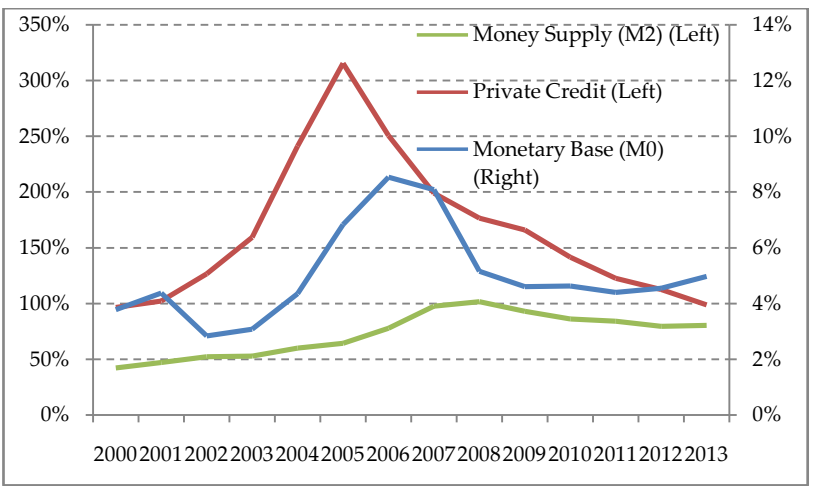

Figure 2. *Iceland: Monetary Base, Money Supply, and Private Credit (% of GDP)*

Source: Central Bank of Iceland, IMF International Financial Statistics, Calculations

Iceland was experiencing an unsustainable domestic-demand boom, and the economy was showing serious signs of overheating. From 2003 to 2007, real GDP grew at an annual rate of 6.3 percent, (Carey, 2009: 21). compared with an average of 2.8 percent over the previous 20 years (Statistics Iceland, 2015). In early 2006, unemployment stood at 1 percent, while wage growth hovered above 7 percent. The CBI had adopted inflation targeting in 2001, but changes in CPI accelerated to 5.2 percent on average from 2003 to 2007, roughly double the target rate (Carey, 2009: 26). During that period, the CBI continually raised interest ratesuntil they reached double-digit levels (Spruk, 2010: 58) (Figure 3). These higher rates encouraged domestic firms and households alike to borrow in foreign currency. They also amplified the small, open economy's predisposition to currency speculation and carry trades against uncovered interest rate parity (Spruk, 2010: 8).

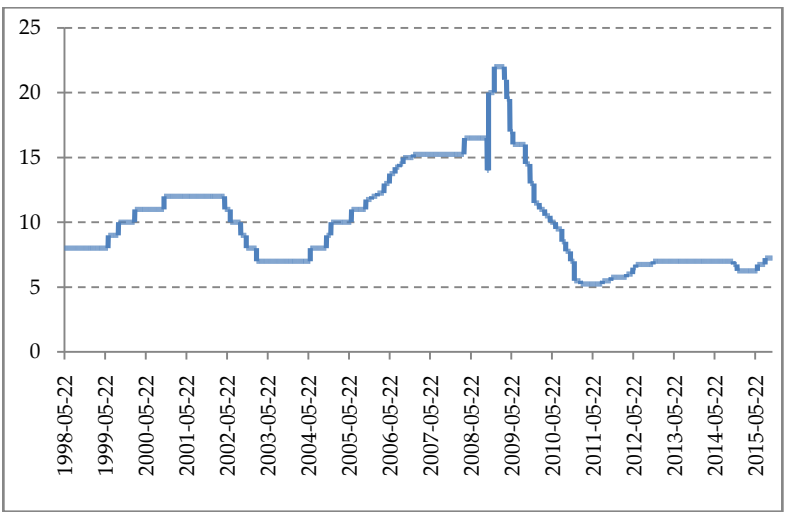

Figure 3. *CBI's Overnight Interest Rate (%)*
Source: Central Bank of Iceland

The inflow of foreign investors' money led to a sharp increase in the value of the Icelandic kroná. As a result, imports rose dramatically relative to exports. The jump in imports was also driven by the surge in household wealth that formulated along with the boom in asset prices. A dramatic increase in Iceland'scurrent account deficit accompanied the corresponding

increase in its capital account surplus (Aliber & Zoega, 2011: 5). The current account deficit soared from 5 percent of GDP in Q32003 to 26 percent of GDP in Q42006 (Figure 4).

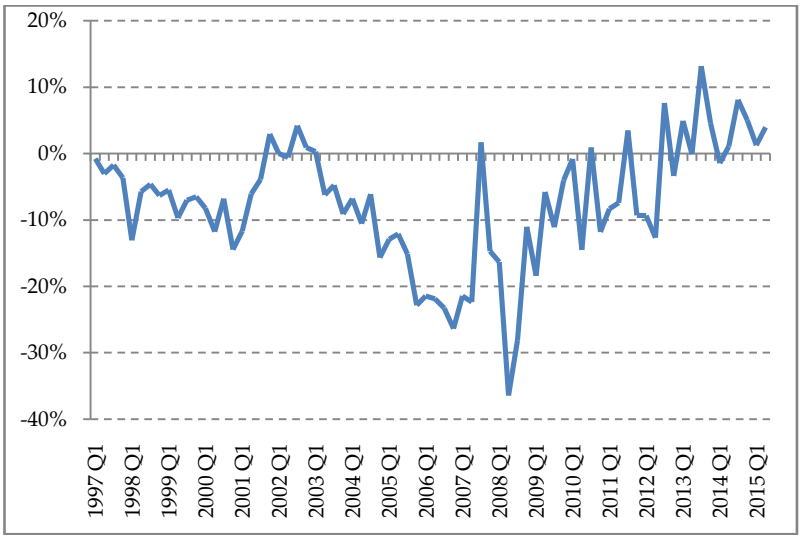

Figure 4. *Current Account Balance as a Share of GDP*
Source: Central Bank of Iceland, Statistics Iceland, Calculations

The crisis and its effects

Early Warning Signs

By 2005 and 2006, many analysts and hedge funds had taken note of the extreme overheating. Groups of hedge funds started to short the kroná and take out credit default swaps (CDSs) on the Icelandic banks' debt obligations (Bergmann, 2014: 90). Essentially, the funds were betting on a plummeting kroná and the collapse of Iceland's banking system. Merrill Lynch voiced similar concerns over the potential risk of a systemic failure in Iceland's financial sector (Thomas, 2006). Dankse Bank soon published a research report termingIceland's situation a Geyser Crisis, adding that Iceland was essentially cut off from international capital markets and exceptionally vulnerable (Valgreen *et al.*, 2006).

Collapse

In early 2008, the huge capital inflow that characterized the several years prior made an about-face. The carry trade that had helped limit inflation by propping up the kroná reversed (Bergmann, 2014). The value of the kroná continually fell over the course of the year as large financial institutions worldwide toppled. When Lehman Brothers went bankrupt in September, Iceland's bankswere pushed to the brink of collapse, hinging on the prospects of a government bailout. On October 6, Iceland's prime minister announced that the banks could not be saved. The entire financial system collapsed over the next three days.

Effects of the crisis

Help from Abroad

Immediately, a widespread sense of economic uncertainty came over the entire Icelandic public. Iceland needed foreign funding to prevent the economy from completely derailing. The government swallowed its pride and accepted emergency loans from the IMF. The program provided a total of $5.1 billion in financing (about 7 percent of GDP). Of that amount, $2.1 billion came from the IMF, and the remainder came from the Nordic states and Poland (Bergmann, 2014).

Capital Controls

Still, Iceland faced a serious problem in the stabilization of its exchange rate. The emergency loan program allowed Iceland to rebuild its foreign currency reserves. At the same time, however, taking on the loans complicated re-entry to international capital markets. In the autumn of 2008, foreign investors were holding high-yielding kroná-denominated bonds that amounted to 40 percent of GDP (Bergmann, 2014). The bonds were known as "glacier bonds," and were issued by other European banks that used Icelandic banks to exchange their kroná for foreign currency (Bergmann, 2014). Creditors and carry traders sought to convert these assets to assets denominated in stronger currencies. This would put severe downward pressure on the kroná, and thus the implementation of capital controls was deemed necessary. The controls were introduced in November and were meant to prevent

serious deficiencies in Iceland's balance of payments without the overreliance on the interest rate tool (Gudmundsson, 2010: 1). A large gap quickly developed between the onshore and offshore rates for the kroná.

Alternative monetary regimes

In June of 2015, the Icelandic government announced plans to lift capital controls. Especially considering that, since Iceland became independent in 1944, ithas never truly had a sustainable monetary regime–one that has produced low inflation and a credible currency over a long period—it is relevant to ask what money policy would be most viable once thecontrolsarefully lifted.

Goals of Monetary Policy – Conditions for a strong monetary regime

It is useful to identify the objectives of monetary policy and its limitations before prescribing a specific monetary regime. "Monetary policy can only affect the nominal variables in the long term. This implies that monetary policy is unable to maintain higher growth or employment than the underlying structure of the economy allows at any given time" (Central Bank of Iceland, 2001b: 40-45).

Economist Lars Christensen, who warned of the Geyser Crisis two years before it occurred, echoes this sentiment in his assertionthe primary goal of a monetary policy regime should be to achieve "nominal stability." Since the central bank controls the monetary base, but commercial banks can create money as well, the central bank only has indirect control over the entire money supply. But overall, the central bank can control the nominal pieces of the economy. While monetary policy can significantly impact economic growth in the short run, it cannot stimulate long-term economic growth. However, because a central bank has the ability to control inflation, it can control nominal GDP (Christensen, 2015). Christensen also echoes the sentiments of the late Milton Friedman, arguing that monetary policy should work "as a computer."This means it should rely on minimal discretionary decision-making and should be rule-based. Monetary policy should be predictable and transparent. It shouldn't distort

economic decision-making or relative prices in the economy. Rather it should set the level of nominal demand and nominal spending in the economy by setting the money base (Christensen, 2015).

All central banks have the same and only ultimate policy instrument: the monetary base. Intermediate targets, such as interest rates, the exchange rate, or the broad money supply can be used to reachan ultimate target. A central bank's ultimate target can be the inflation rate, the price level, or the nominal GDP level. However, the central bank is limited by The Tinbergen constraint. This says that in economic policy, the number of tools must be equal to the number of targets (Tinbergen, 1952). For central banking, this implies that there can only be one policy target, since the monetary base is the only available instrument.

Monetary regime choices – Sovereign monetary policy versus "Outsourcing"

Sovereign monetary policy

Iceland has the option to maintain its own currency and its floating exchange rate (managed exchange rate) and hit nominal targets while continuing to havea sovereign monetary policy. Three possible ways of doing so are inflation targeting, price level targeting, and nominal GDP targeting.

Inflation targeting

The first sovereign monetary policy choice for Iceland is inflation targeting. Under inflation targeting, the central bank selects an explicit target or a narrow band for the inflation rate. The assumption is that price stability is the optimum way that monetary policy can support long-term economic growth. Inflation targeting uses the interest rate tool to expand or contract the monetary base based on below-target or above-target inflation.

Two conditions are required for inflation targeting to have a chance of coming close to its target consistently. First, the central bank must be free from government impositions and fiscal policy considerations. The central bank needsthe ability to choose the instruments necessary to achieve the desired rate of inflation.

Second, the monetary authority must adhere to the Tinbergen constraint and refrain from targeting other indicators such as wages, the unemployment level, or the exchange rate (Jahan, 2012).

Those in favor of inflation targeting praise the policy for its inherent transparency. Monetary authorities in countries that employ inflation targeting often engage in formal communication with the public regarding their views on inflation and monetary policy. Proponents such as Ben Bernanke argue that this transparency promotes stable and noninflationary economic growth by reducing uncertainty among businesses and consumers about future interest rates and inflation (Hoy, 2005).

Inflation targeting has been in place in Iceland for roughly fifteen years. Overall, the experience has been less than successful. The CBI gained its independence in 2001 and put in place an inflation target of 2.5 percent (Sigurðardóttir, 2012: 17). That same year, the CBI and Icelandic government abandoned the use of the ISK's exchange rateas the intermediate target and nominal anchor for monetary policy (Central Bank of Iceland, 2001b: 40-45). The ISK was allowed to float freely, and the deviation bands that had been in place in the past were completely removed (Sigurðardóttir, 2012: 17). It was thought that if inflation would stay close to the target, the exchange rate would be more stable. When the fixed exchange rate regime was abolished, the CBI and Icelandic government expected substantial fluctuations in the ISK. However, the ISK depreciated by over 16 percent for the first six months of 2001 – much more drastically than expected (Central Bank of Iceland, 2001a: 57-62). The CBI failed to consistentlykeep inflation within the tolerance interval between 2001 and 2011 (Figure 5).

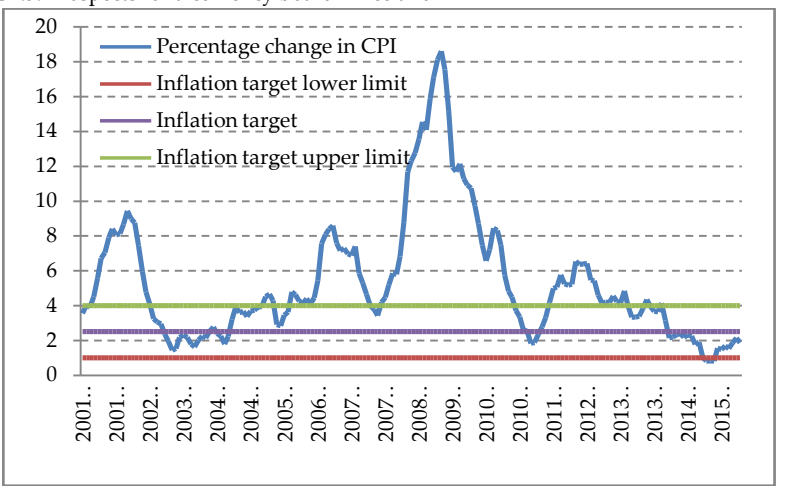

Figure 5. *Iceland: Inflation, 2001-Present (%)*
Source: IMF International Financial Statistics

Under inflation targeting, it is difficult to stay within a narrow band but possible to be on target over the medium term. Still, the policy has proved relatively successful for economies small and large. As can be seen in the Figures below, Canada (Figure 6) and Norway (Figure 7) among others have been fairly successful in keeping inflation within their control ranges. Particularly, inflation targeting has served the Canadian economy well. Since the adoption of the monetary policy in 1991, inflation has averaged 2 percent. The Bank of Canada says that this has given clarity to consumers and business regarding their future purchasing power (Bank of Canada, 2011). Additionally, economies of similar size to Iceland such as Albania, Moldova, and Paraguay have kept their rates fairly close to their targets since they established inflation targeting regimes. Figure 8 shows Albania's historical inflation rate since the establishment of an inflation targeting regime. Figures for Moldova and Paraguay can be found in the accompanying spreadsheet workbook [for source].

Price level targeting

A policy closely related to inflation targeting is price level targeting. The price level can be set once and for all, or more likely it can be allowed to increase by, say, 2 percent a year. Unlike

inflation targeting, which lets bygones be bygones, price level targeting requires the central bank to compensate for past misses in the target. Hence it may promote greater long-run certainty about the price level than inflation targeting does. Price level targeting is currently a purely theoretical system; no central bank adheres to it.

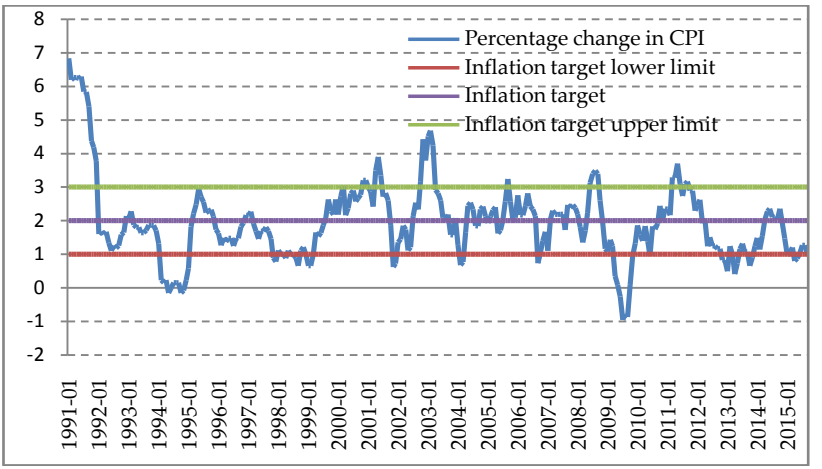

Figure 6. *Canada: Inflation, 1991-Present (%)*
Source: IMF International Financial Statistics

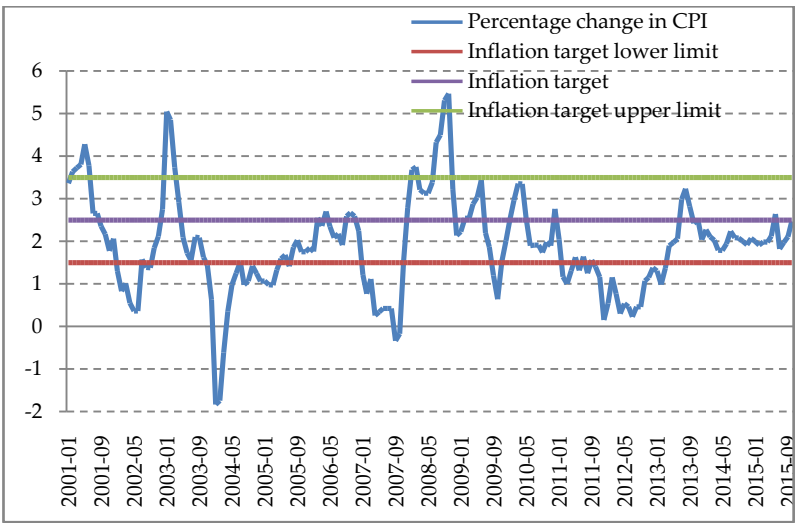

Figure 7. *Norway: Inflation, 2001-Present (%)*
Source: IMF International Financial Statistics

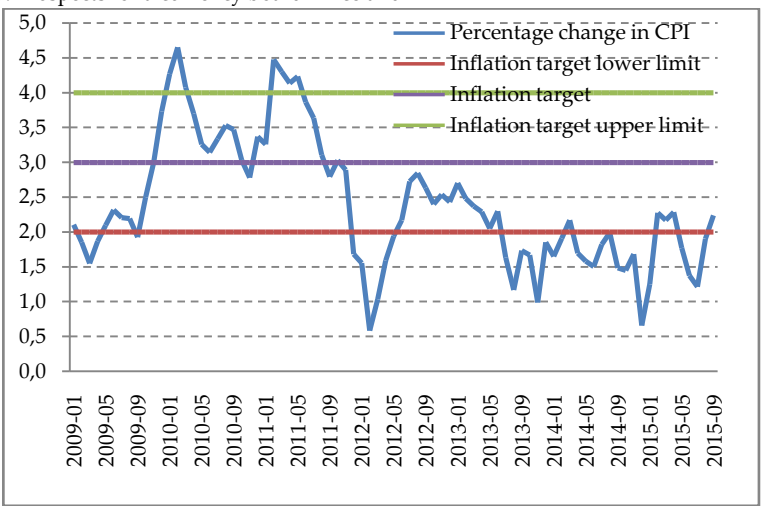

Figure 8. *Albania: Inflation, 2009-Present (%)*
Source: IMF International Financial Statistics

Nominal GDP targeting

Anotheroption for a sovereign monetary policy is nominal GDP (NGDP) targeting. In this system, the centralbank chooses to target a growth rate of nominal GDP for a given period. In developed countries, this rate would likely hover between 4 and 5 percent annually. The monetary authority then simply loosens or tightens as needed in order to hit the target using the same short-term interest rate tool that it uses in inflation targeting. If expected nominal GDP is sluggish, the central bank eases. It does the opposite if expected nominal GDP is too high. If nominal GDP falls below the target growth rate in one year, the central bank compensates for that in the following years, setting an overall path for nominal spending. Year to year, the breakdown of inflation and real GDP growth would differ (Economist, 2011).

NGDP targeting has grown in popularity within the academic community in the wake of the 2008 financial crisis. This group of economistshasspawned the development of a school of macroeconomic thought known as "Market Monetarism". Prominent individuals include Scott Sumner (2015) of Bentley University and Lars Christensen, a former economist at Danske Bank.

Sumner and Christensen share the view that NGDP targeting achieves macroeconomic stability more effectively than other monetary policies. According to Sumner, It dominates inflation targeting because it is robust to supply shocks. He gives the example of an oil embargo in the Middle East that reduces a country's oil imports by 10 percent and raises the price of oil by 60 percent. Under inflation targeting, the country's central bank would have to tighten money in order to lower non-oil prices to achieve the overall level of CPI in check (Sumner, 2014: 324). However, under NGDP targeting, such tightening is not necessary given that nominal GDP is in line with the target (Christensen, 2015).

Christensen has explained how pre-crisis Iceland would have fared under a NGDP targeting regime. He notes that if NGDP targeting had been in place between 2003 and 2004, the CBI would have noted a dramatic acceleration in nominal GDP. This would have been a signal for the CBI to substantiallytighten monetary policy. However, at the time, the CBI was targeting the rate of inflation. The artificially strong kroná acted to subdue inflation and therefore sent the wrong signal on the need for monetary accommodation. While it wouldn't have completely saved Iceland from the crisis to come, NGDP targeting would have tightened monetary policy earlier and perhaps reduced the crisis's overall damage to the Icelandic economy (Christensen, 2015).

No country has formally adopted a strictNGDP targeting policyyet. However, there has been some central bank discussion surrounding the topic. For example, the Bank of England hinted at the emphasis that it places on nominal GDP in 2011 (Warner, 2011). In a letter to the UK Chancellor George Osbourne, Bank of England Governor Sir Mervyn King noted the following regarding above-target inflation:

There is, however, a limit to what monetary policy can do when large real adjustments are required. And it cannot influence inflation over the next few months. But it can ensure that the adjustment takes place against a backdrop of low inflation in the medium term. In so doing, monetary policy will make the best contribution it can to high and stable levelsof growth and employment.

King essentially implies that the Bank's priority was growth rather than inflation. Additionally, the Federal Open Market Committee of the U.S. Federal Reserve briefly discussed the possibility of NGDP target in September 2010 (Federal Reserve Board of Governors, 2010: 7). These instances reflect that rich, developed economies recognize the merits ofNGDP targeting. It follows that this monetary regime option is worth considering for Iceland.

Outsourcing

Alternatively, Iceland could outsource its monetary policy. There are several reasons why it is natural to consider this option for Iceland. Outsourcing monetary policy is very common for small, open economies such as Iceland. Finland, Denmark, Holland, and Switzerland have each anchored their exchange rates to more stable currencies in various ways.

Moreover, Iceland has a trackrecord of imprudent monetary policy. Rampant inflation in the 1970s and 1980scrippled the country's economic situation. Icelandic monetary policy has also been heavily politicized. This has essentially extended a helping hand from the central bank to the government. If monetary policy is outsourced, by default it also becomes depoliticized and an environment is created that fosters fiscal discipline. Denmark and the Baltic states present good examples of this (Christensen, 2015).

Last, there is merit to the fact that outsourcing monetary policy strips the monetary authority of any discretionary decisions making. In all too many countries, discretionary monetary policy very rarely achieves positive long-term effects. Rather, it only gives central banks the ability to make impulsive and unpredictable policies (Christensen, 2015). Perhaps the most blatant example of this in Iceland occurred just days prior to the collapse of the banks. On October 7, 2008, the CBI published a press release announcing that the ISK was to be pegged to the euro at 131 (Mason, 2008). compared with the previous day's closing market rate of 155 (Central Bank of Iceland, 2015). The move completely threw off the market and caught investors by surprise. The CBI abandoned the peg the next day as investors remained unconvinced of its ability to be maintained (Brogger & Einarsdottir, 2008).

Pegged exchange rate

The first outsourcing option for Iceland might be to simply peg the exchange rate to another currency orbasket of currencies. Iceland has experimented with the type of monetary regime in the past, and the experience was not exactly good. The ISK was established in 1886 and pegged to the Danish crown (DKK) until 1922 and then again from 1933 to 1939. Since 1939, the ISK has depreciated 99.5 percent against the DKK (Sigurðardóttir, 2012: ii).

Additionally, there is little theoretical merit for introducing a pegged exchange regime in any economy. Unlike the floating exchange rate that exists under the aforementioned sovereign monetary policies, a pegged exchange rate (as opposed to the fixed exchange rate of a currency board, described below) lacks the fully automatic mechanism to adjust to fluctuations in the balance of payments. A central bank is required to monitor both the exchange rate and monetary policy, which violates the Tinbergen constraint (Hanke, 2008: 277).

Furthermore, in a pegged exchange rate regime the monetary base comprises both domestic and foreign pieces. This creates a conflict surrounding the simultaneous management of the exchange rate and monetary policy. For example, in the instance of excessive capital inflows, as was the case in Iceland prior to the crisis, a central bank will often engage in tight monetary policy to reduce the domestic component of the monetary base. As the central bank continues to compensate for changes in the foreign component of the monetary base by adjusting the domestic component, currency speculators are likely to notice the discrepancies between exchange rate and monetary policies (Hanke, 2008: 278).

A pegged exchange rate also forfeits the ability to absorb shocks that a floating exchange rate regime achieves. The success of the pegged rates depends heavily on how closely the domestic business cycle mirrors that of the anchor country (Gudmundsson, 2012: 63). Iceland is known to experience extremely asymmetric shocks that come primarily from fluctuations in fishery prices and aluminum prices. It is difficult to find another fish and aluminum producing country with a stablecurrency to which Iceland can simply peg (Christensen, 2015). For this reason, Iceland needs a

more structured, rule-based system if it wishes to outsource its monetary policy.

Currency board

Another outsourcing option for Iceland is a currency board. An orthodox currency board typically issues notes and coins that are fully convertible to a foreign currency at a fixed rate of exchange. It holds anchor currency-denominated bonds and gold as reserves, which are set by law and equal at least 100 percent (Hanke, 2002: 88). In this case, Iceland would maintain its own currency, but the kroná would be fully backed by a foreign currency reserve. It would always be able to covert ISK into the anchor currency (Christensen, 2015).

Therefore, the CBI would cease to exist in its present form. There would still be a physical kroná, but monetary operations would be fully independent of any policy decisions made in Iceland. This is one of the arguments that currency board proponents cite: a currency board is rule-based by nature. A monetary authority sets a fixed exchange rate, but it has no discretionary monetary powers. The money base is purely determined by market demand, which removes the conflicts that arise under a pegged exchange rate regime between exchange rate and monetary policies. As a result, there have only been instances of failed attempts at speculative attacks on currency board systems[1].

The main argument against currency boards is that they remove a central bank and therefore there is no lender of last resort, the central bank's key role. As detailed earlier, Iceland actually experienced this circumstance when its banks collapsed in October of 2008. The CBI couldn't act as a lender of last resort to the banks that had liabilities in foreign currencies, because the CBI's foreign currency reserve was not large enough. Some argue that looking forward, Iceland will benefit from not having a lender of last resort because having one fuels the moral hazard and risk

[1] Hanke (2002: 91). The often-cited case of Argentina in 2001-02 had important differences with an orthodox currency board, and advocates of currency boards do not accept it as a clear example of a currency board failure.

taking that placed the banks in their precarious 2008 positions (Christensen, 2015). Indeed, the main banking crises in the world have taken place in countries with central banks that abused the lender of last resort function (Hanke, 2002: 100).

There have been several examples of currency boards in recent history. Hong Kong currently operates under a currency board, the Hong Kong Monetary Authority (HKMA), which was founded in 1993. Bulgaria employs a currency board system as well. Estonia and Lithuania each had a currency board until they adopted the euro.

Hong Kong has had particular success under the currency board system. It first established a currency board in 1935 but abandoned it in 1972 during the breakup of the Bretton Woods system of worldwide pegged exchange rates. After experiencing a decade of severe currency depreciation and volatility, Hong Kong reinstated its currency board in 1983. Since the reintroduction, HKMA's GDP growth has only had two negative years. The first came in 1998 as a result of the Asian crisis, and the second came in 2009 along with the Great Recession (Figure 9).

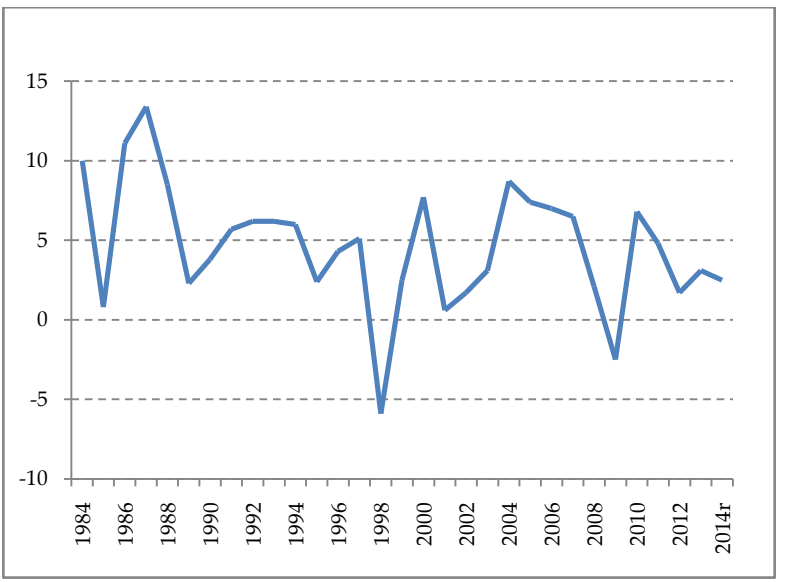

Figure 9. *Hong Kong GDP Growth (%)*
Source: Hong Kong Census and Statistics Department

Among the monetary options with which Iceland has no historical experience, other writers have already considered nominal GDP in some detail. Let us therefore consider the currency board system. If Iceland were to introduce a currency board, what mightit look like and how might it be instituted?

Rates

What currency or basket of currencies would be a viable anchor for the ISK under a currency board system?

The most common choices for a reserve currency are the U.S. dollar, the euro, and the Japanese yen. The U.S. dollar has the advantage of a long track record of generallylow inflation, low real interest rates, and overall credibility. Furthermore, many commodities and raw materials such as oil, natural gas, timber, and minerals are denominated in dollars. The euro is also a key currency of international trade and finance. It links foreign investments from countries in Eastern Europe, Russia, and Africa to Western Europe. The Japanese yen is the third most popular currency choice. While it is less central to international trade than the dollar or the euro, it is important in Asia and other countries as Japan's trade and investment have grown significantly since the 1980s[2].

As mentioned earlier, Iceland would ideally choose a reserve currency whose country/countries and economy are similar to Iceland and its economy. Of the three currencies listed above, the euro seems to be the obvious candidate. The United States and Japan are very large economies that have minimal interaction with Iceland and experience different shocks to their business cycles.

Therefore it mightseem as though the euro would be the logical anchor for the ISK. After all, the euro plays the biggest part in Iceland's trade (Sigurðardóttir, 2012: ii). However, there are two problems that would arise if Iceland were to decide to join the eurozone in the short term.

[2] Hanke & Schuler (2015[1994]: 52). The Chinese yuan is now challenging the yen in regional importance. Unlike the other currencies mentioned, the yuan is not fully convertible for capital account transactions.

The first has to do with the currency area's credibility. The current European debt crisis is an obvious threat to stability in the eurozone, with Greece's situation being of particular concern. Iceland would be assuming considerable risk if it anchored the kroná to the euro. Throughout the eurozone crisis, the euro has been extremely volatile. Over the past six years, the euro has depreciated 26 percent against the dollar (Figure 10). In the wake of its own currency crisis, Iceland needs a stable currency.

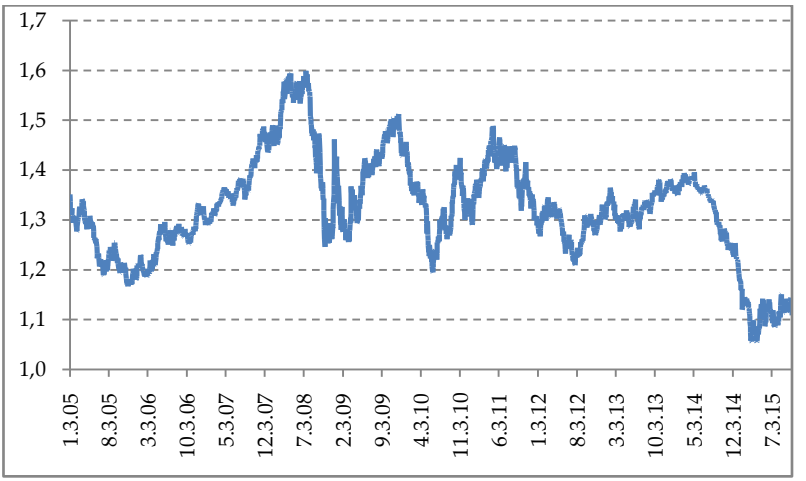

Figure 10. *EUR/USD (U.S. Dollars per Euro)*
Source: European Central Bank

Over the same period, monetary policy in Europe has actually been extremely tight. Despite very low rates, there has been essentially no growth in the monetary base and the broadly determined money supply (M3) (Christensen, 2015). This is largely a result of the strict capital requirements imposed by the Basel III accord. The new regulations have put a damper on bank money, which typically accounts for the majority of M3. Still, growth in the eurozone has a brighter future. The ECB's adopting of quantitative easing (QE) in March of 2015 has accelerated M3 (Hanke, 2015).

The second issue is that the European Central Bank (ECB) has stated that "Iceland would not be able to adopt the EU currency without first becoming a member of the EU" (IceNews, 2008). The opinion polls in Iceland on the matter of EU membership show

that this option is not feasible (Christensen, 2015). Therefore, a currency board that anchors to the euro is an option that Iceland should only consider in the long term. This would allow time both for Icelanders to warm up to the idea of EU membership and for QE to further boost money supply growth.

Given the situation in Europe, economists have suggested other currencies that Iceland might consider if it was to introduce a currency board. One of these is the Canadian dollar (CAD). In terms of the average shocks, the Canadian economy is actually similar to the Icelandic economy (Christensen, 2015). Canada's extensive coastline contributes to it having the eighth largest commercial fishing and seafood industry in the world (Fisheries & Oceans Canada, 2011). Additionally, cheap energy from hydroelectric power has fostered the growth of several important industries, including British Columbia's large aluminum industry (Canadian Manufacturing, 2011). Also, the Bank of Canada seems to be a credible monetary authority, as the country has fared quite well under its inflation targeting monetary policy as noted earlier in this paper. Furthermore, the CAD hasperformed relatively well. During the same six-year period that the euro depreciated 26 percent against the U.S. dollar, the Canadian dollar only depreciated 5 percent (Figure 11).

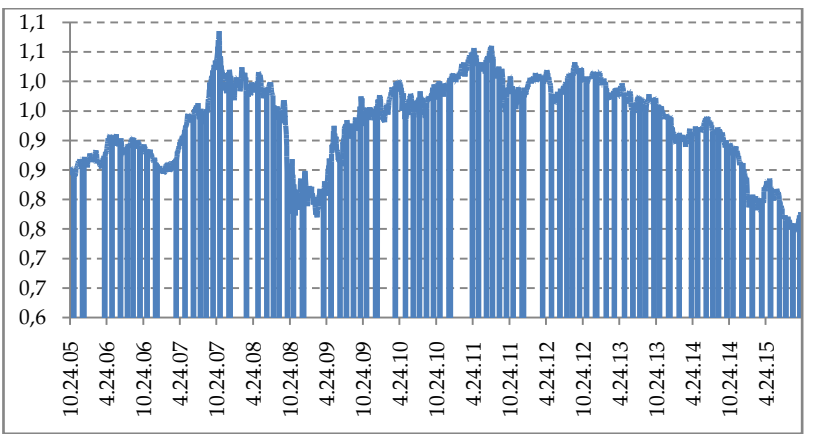

Figure 11. *CAD/USD*
Source: Bank of Canada

The Norwegian krone (NOK) could also be a candidate anchor currency. Historically, Norway's economy has been based largely

on agriculture and fishing. Today, the country still has an abundant industry in cold-water fishing. It also is home to Norsk Hydro, one of the largest aluminum companies in the world. Like Canada, Norway operates under a flexible inflation rate targeting regime. The value of the NOK has remained stable since the implementation of inflation targeting in 2001 (Figure 12).

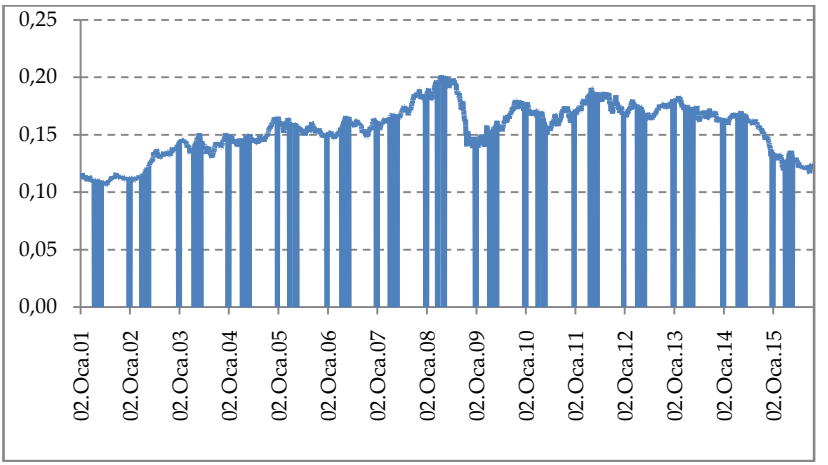

Figure 12. *NOK/USD*
Source: Norges Bank

Some economists have evenproposedthat Iceland use a basket comprising the CAD and NOK as its reserve currency (Christensen, 2015). However, using a basket of currencies reduces the transparency of the currency board to the public and therefore creates the potential risk of not achieving prompt credibility. A basket of currencies is also more expensive. Furthermore, each component of the basket could have large variability, which would undermine the goal of achieving lower variability with the basket as a whole (Hanke & Schuler, 2015 [1994]: 53).

Rules and Logistics

The conversion of the CBI to a currency board would be a relatively simple process. Furthermore, it should be the same regardless of the anchor currency that Iceland chooses, be it the CAD, NOK, the euro, or a different currency. Iceland would first need to phase out the CBI. It could do this by allocating the

responsibility of regulating of commercial banks to the Icelandic Ministry of Finance and Economic Affairs. Iceland's commercial banks would then convert a portion of their required reserves into currency board notes and coins or into foreign securities depending on the banks' preferences. The remaining reserves could be disposed of.

A necessary condition for the proper establishment of a currency board is that foreign reserves must equal 100 percent of the country's notes and coins in circulation (Hanke & Schuler, 2015: 47). For Iceland, this means that the CBI's net foreign assets would be at least equal to the monetary base. Indeed, this is the case, and has been the case in Iceland for nearly the past decade (Figure 13). Furthermore, the current ratio of both gross and net foreign assets to the monetary base in Iceland is 373 percent, well above the required minimum. Therefore, fully backing or converting the monetary base into foreign currency would prove little trouble for Iceland.

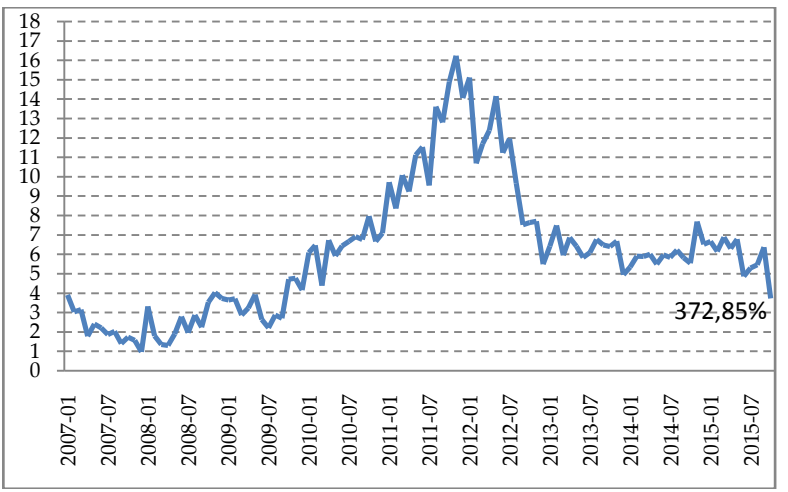

Figure 13. *Iceland: Ratio of Net Foreign Assets to the Monetary Base (%)*

Source: Central Bank of Iceland, IMF International Financial Statistics

Another precaution during the conversion concerns interest rates. The following Figures (Figures 14 and 15) demonstrate that nominal interest rates (both on loans and deposits) have been

significantly higher in Iceland than in Canada and Norway. This is likely due to higher inflation expectations in Iceland. In the event that Iceland anchors the kronáto the Canadian dollar or to the Norwegian krone, which both have lower expected inflation, borrowers would face an added burden if no legal provision in place alters the rates or renegotiates the terms of the loans. Therefore, it is worthwhile to examine how Iceland might do this.

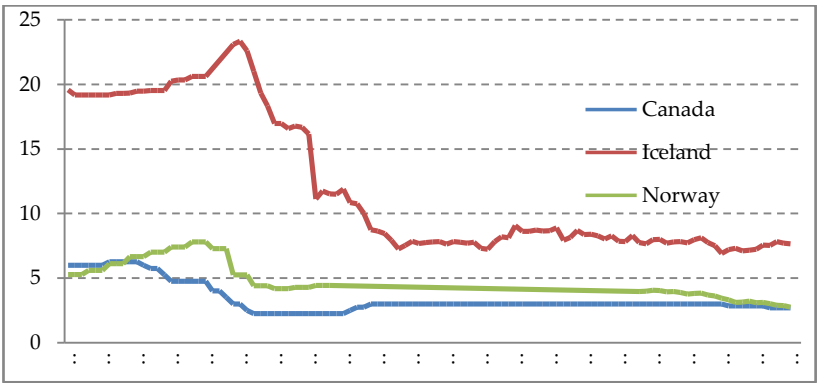

Figure 14. *Canada, Iceland, and Norway: Interest Rates on Loans 2007-Present (%)*

Source: IMF International Financial Statistics, Statistics Norway

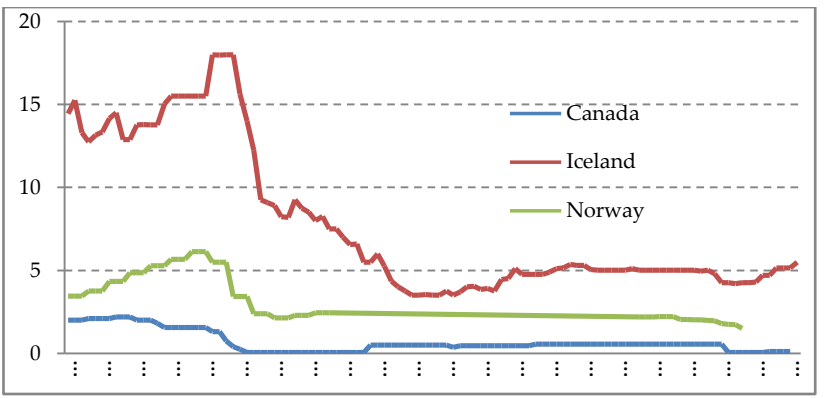

Figure 15. *Canada, Iceland, and Norway: Interest Rates on Deposits 2007-Present (%)*

Source: Bloomberg, IMF International Financial Statistics, Statistics Norway

One possible procedure for Icelandwould be to reset the nominal interest rates so as to permanently lower their nominal values under the new currency board. Ecuador took such steps

when they adopted the U.S. dollar as legal tender in 2000. Specifically, an Ecuadorian law established new reference interest rates. Iceland could feasibly implement a similar policy (Beckerman, 2001: 27).

For example, suppose that Iceland tries to establish a currency board using Norway's currency, the krone, as the anchor currency. The first step of the procedure is to identify reference rates in both the current monetary system, such as the Reykjavik interbank offered rate (REIBOR), and in the Norwegian interbank offered rate (NIBOR). Next, reference rates are used to rescale interest rates on loans. The three-month REIBOR for October 2015 is 6.4 percent (Central Bank of Iceland, 2015). and Iceland's weighted average lending rate for October is 7.65 percent (IMF International Financial Statistics, 2015). Therefore the interest rate on a loan in Iceland is 1.2 times the reference rate. The new reference rate, the three-month NIBOR for October 2015 in this case, is 1.11 percent. Simply applying this 1.2 multiplier to the 1.11 percent NEIBOR implies a new permanently lowered nominal interest rate on loans in Iceland of 1.33 percent. However, the Norwegian interest rate on loans for October 2015 is 2.75 percent (Oslo Bors, 2015). Given Norway's long track record of price stability, it is highly unlikely that rates in Iceland should be initially lower than those in Norway. Therefore, it may be suitable to include an adjustment factor of 3, which when multiplied by the 1.33 percent rate yields a 3.98 percent new nominal interest rate on loans. This presents a reasonable premium 45 percent over the Norwegian rate of 2.75 percent.

Since the kroná has been floating since 2001, there is no need to designate a deliberate period of unrestricted, free-floating exchange rates (Hanke & Schuler, 2015 [1994]: 46). Rather, the average of the most recent 90 days' trading exchange rates can be used to set the fixed rate of exchange with the anchor currency. This 90 day period is meant to replicate the typical period of unrestricted floating rates that most governments introduce when their central banks are converting to currency boards (Hanke & Schuler, 2015 [1994]: 46). The 90-day average (ending December 1, 2015) CAD/ISK was 97.41. The corresponding NOK/ISK was 15.13 and EUR/ISK was 142.10. These values are shown in the table

below and then in a respective contextual time series Figures (Figures 16,17,18).

CAD/ISK	NOK/ISK	EUR/ISK
90 DAY AVG	90 DAY AVG	90 DAY AVG
97.4136508	15.307127	142.0914286

Source: Central Bank of Iceland

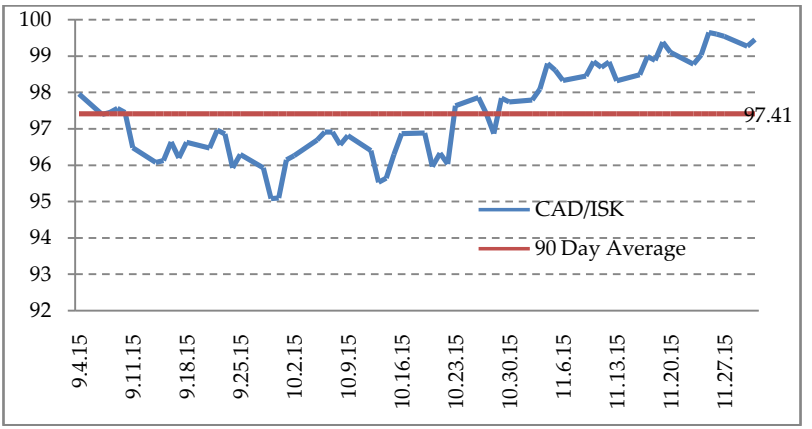

Figure 16. *CAD/ISK*
Source: Central Bank of Iceland

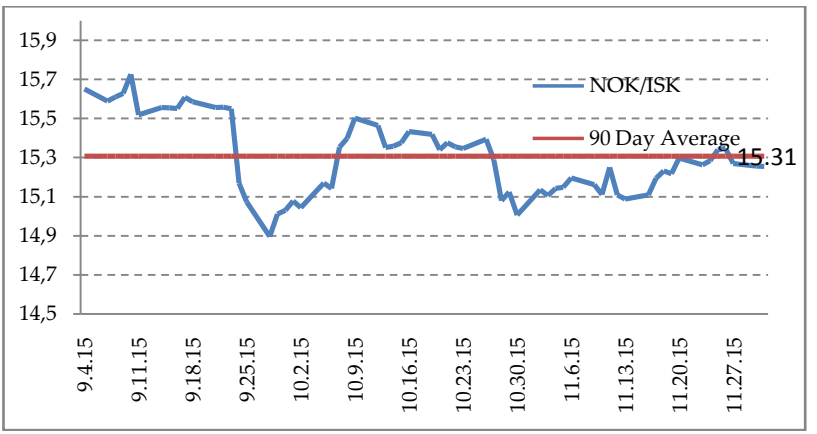

Figure 17. *NOK/ISK*
Source: Central Bank of Iceland

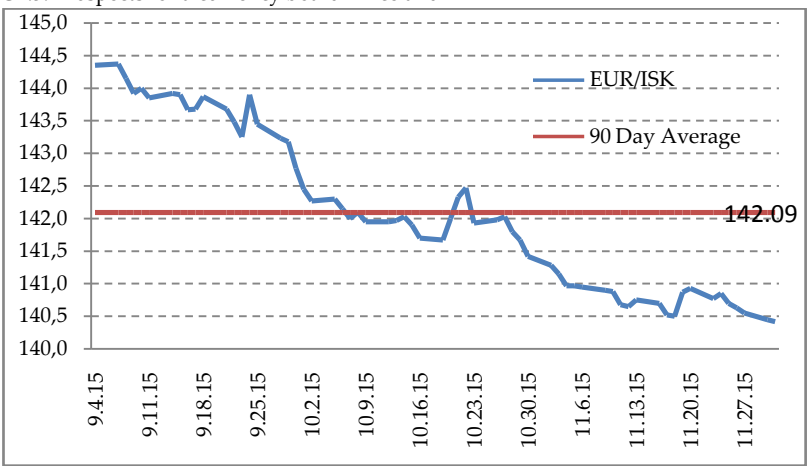

Figure 18. *EUR/ISK*
Source: Central Bank of Iceland

Evaluation

To properly evaluate the various currency board options explored above, there are two distinctions and tradeoffs that need to be made. The first concerns feasibility versus suitability. The second concerns the short run versus the long run. Indeed, Iceland could elect different structures for a currency board depending upon the country's priorities. If Iceland chooses the most feasible currency board system of those outlined in this paper, it would likely anchor the kroná to the Canadian dollar or the Norwegian krone. These options are more feasible than the anchoring to the euro given the requirements that the ECB has outlined for euro adoption in the past and Icelanders' stance on EU membership. At the same time, it is likely that prioritizing feasibility would sacrifice theoverall long-term suitability and compatibility of the anchor currency. While Canada and Norway do experience similar shocks as Iceland, Europe is Iceland's largest trading partner and thus the largest international economic presence on the island. The euro is also a more globally important currency than the CAD and the NOK. If Iceland decides to that it wants to institute a currency board system now, the euro option is not realistically available. The debt crisis and the after effects of prolonged tight monetary policy have created an undesirable economic climate at present.

However, many are bullish on Europe in the long run. Considering that the euro is likely a better fit with the kroná, a euro reserve currency under an Icelandic currency board system could potentially prove to be the solution to Iceland's long history of drastically unstable economic developments.

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6 The currency board monetary system: The case of Malta (1939-1968)

Lily **Zhu**

Introduction

Before its current era of central banking, Malta had a period of monopoly note issue by the Treasury to 1948 andthen byCommissioners of Currency of Currency from 1949 to 1967. Some narrative accounts of the period exist, the most detailed beingJoseph C. Sammut's book *Currency in Malta* (2001). In contrast, statistics of the period in the machine-readable form necessary for detailed quantitative analysis are not readily available. Here we start to remedy the situation with annual (1944-1949) and semiannual (1950-1968) statistics of the balance sheet of the Treasury note issue (later entrusted to the Commissioners of Currency). An analysis of the legislative history and the balance sheet shows that it worked like a currency board but seems to have been somewhat unorthodox by a certain index. This paper also raises the question whether some statistical measures are more applicable and useful than others in some circumstances.

We focus on determining the extent to which the Treasury/ Commissioners of Currency operated like a currency board and do not address broader issues such as whether a different

arrangement might have promoted economic growth better. The statistics (in a companion spreadsheet workbook [for source]) and perhaps also the legislative history (in Appendix A) that we provide should, however, be useful to any future analysis of the Maltese monetary system of the period.

Origins and workings of the government note issue

When the British administration took over Malta in 1797 it found a currency issued by the Knights of Malta and based on the "scudo,"silver coins that were promptly exported and melted down. The administration declared various foreign coins, mainly Spanish and Sicilian dollars, as the effective currency (Caine, 1948–1949; Sammut, 2001).

The dominant part played in the local economy by the expenditure of naval pay made it particularly convenient to continue the use of U.K. coin and (after 1914) notes; a temporary issue of Maltese Treasury notes was made in 1914 but later withdrawn, and up to the outbreak of the Second World War Malta remained the only important British overseas possession without its own currency (Caine, 1948-1949: 46).

A major development regarding currency in Malta was precipitated by the rapidly deteriorating international political climate in the late 1930s. In June 1938 the Secretary of State for the Colonies advised the Governor that since difficulties might arise in regard to currency if war threatened or broke out, it would be essential that there should be, in all colonies, sufficient supplies of currency to meet the sudden temporary demand which might occur. As a result, an order for the supply of 240,000 two-shilling-sixpence, 300,000 ten-shilling and 500,000 one-pound notes was placed (Sammut, 2001: 165).The Paper Currency Ordinance, 1939 provided that currency notes issued under that Ordinance would be convertible into sterling notes at par.[1] However, the law did not

[1]The Paper Currency Ordinance, 1939 explicitly provided that "notes issued under this Ordinance should be convertible at the Treasury at sterling rates on days to be fixed by the Governor and notified in the Government Gazette." *Malta Government Gazette (Supplement)*, No.4, 13 September 1939. Recall that under the pounds-shilling-pence system of Britain and many of its colonies, £1 was equal to 20 shillings (s.) or 240

provide explicitly for any particular reserve backing. Such convertibility was embodied in that law on the insistence of Dr. Enrico Mizzi, a Maltese politician and leader of the Maltese Nationalist Party, who wanted to ensure that the government would eventually withdraw those temporary notes and would exchange them for English currency without any loss of value. The Ordinanceauthorized the issue of £1, 10s., 5s., 2s. 6d. and 2s. denominations some of which had already been printed but had still to be supplemented by a signature and date (Sammut, 2001:167).

After the end of the war these small denomination notes became obsolete and fell into disuse mainly because the notes wore out too quickly, and within a few months were replaced by British coins whose supply was restored to normal levels (Sammut, 2001).

Local currency notes printed up to 1939 were only intended to be temporary issues in order to counteract the scarcity of metallic currency and were an anticipatory measure against difficulties that would eventually arise when coins could not readily be shipped to Malta from the United Kingdom during the war. Accordingly, on 21 January 1949, the Currency Notes Ordinance 1949 (No. I of 1949) was passed, replacing the 1939 ordinance. As a result, the issue of local paper currency was finally put on a permanent basis. The Maltese pound was set (or more accurately, confirmed) at par and became mutually exchangeable with the British sterling on demand.

The 1949 ordinance also provided for the setting up Commissioners of Currency (also known as the Currency Board), composed of the Financial Secretary, the Accountant General and a third person appointed by the Governor. The board became the sole body responsible for the issue of paper currency, and Bank of England as well as British Treasury notes ceased to be legal tender in Malta in 21 September 1949 (Sammut, 2001:171). However, the denominations and designs of notes had to be approved by the Secretary of State for the Colonies. Currency notes issued by the Currency Board were legal tender for the payment of any amount exceeding forty shillings (below that, coins could be used). The

pence (d., an abbreviation for *denarius*, a Roman coin that was the ancestor to the penny).

board took over the sterling balances and securities of the Note Security Fund (established in 1939) which at the time was invested wholly in United Kingdom or British Common wealth securities. The board issued Maltese currency notes to the local banks and received an equivalent amount of sterling in exchange whenever the banks needed more local currency. Conversely, when the local banks had an excess of Maltese notes on hand, they transferred them to the Currency Board and received sterling in return. Thus whenever Maltese currency was supplied or withdrawn, the Currency Board's sterling balances in London (in its account with the Crown Agents for the Colonies, a body that performed financial and other services for colonial governments) rose or fell accordingly (Sammut, 2001: 171).

The Treasury only published brief summaries of the note issue in some of its annual reports on the finances of Malta, and Commissioners of Currency did not publish an annual report, giving only periodic summaries of its balance sheet. Official narrative detail about the note issue is therefore scarce.

The year 1968 marked another major development aiming to bridge the conspicuous institutional gaps within the local industrial sector and monetary system, namely the setting up of the Malta Development Corporation and the Central Bank of Malta (Sammut, 2001: 243). This originated from a recommendation to establish a central bank submitted by United Nations mission in January 1964. It felt that there were serious gaps in Malta's financial infrastructure, particularly concerning advice to Government on financial and monetary matters (History of Central Bank of Malta, n.d.). During 1960s, the low proportion of gold and eternal reserves held by the UK authorities in relation to the sterling balances held by Sterling Area members was severely undermining confidence in the pound sterling. Against this background of intense uncertainty in the international monetary system and the suggestion by United Nations missions, following independence in September 1964, the Maltese Government sought technical assistance from the Bank of England and from the International Monetary Fund to establish a central bank. Legislation was enacted on 11 November 1967 and five months later, on 17 April 1968, the Central Bank of Malta was formally

established, with Dr.Philip Hogg, a Ban of England official, appointed as the first governor (History of Central Bank of Malta, n.d.).

To what extent was the treasury (later commissioners of currency) a currency board? A first cut

The key characteristics of a currency board are a fixed exchange rate with an anchor currency; 100 percent net foreign reserves, at least at the margin, against the whole monetary base(by definition, net foreign assets + net domestic assets = monetary base); and full convertibility (no exchange controls) with the anchor currency (Hanke, 2002). To what extent did the Maltese monetary system actually have those characteristics from 1939 to 1967 before establishing the Central Bank?

The Maltese currency notes issued under the Paper Currency Ordinance of 1939 were fully backed by sterling deposits and securities held in the Note Security Fund in London. These funds were managed by the Crown Agents on behalf of the Treasury.

The arrangement was put on a sounder basis in January 1949 with the passing of the Currency Notes Ordinance, 1949 (Ordinance No.1 of 1949). The ordinance specified that the Note Security Fund "should be invested in securities or guaranteed by the Government of any part of His Majesty's dominions or of any territory under His Majesty's protection which are quoted or dealt with on the London Stock Exchange or such securities as the Crown Agents, with the approval of the Secretary of State, may in their discretion select." By the same ordinance, the maximum ratio of external reserves to Maltese currency notes was fixed at 110%. This provision for a surplus of assets beyond the 100% level was intended as a safeguard against any sharp fall in the market value of securities (Sammut, 2001: 231).

The 1949 ordinance also provided for the mechanism for wholesale conversion of Maltese currency notes into sterling or vice versa on demand. Such conversion was established at the rate of one Maltese pound for one pound sterling, subject to such commission, not exceeding 0.5%, as might be prescribed. This

statutory guarantee of convertibility at par was instrumental in instilling the public's confidence in the local currency.

Unlike the case of currency notes, no backing was required for UK coins in local circulation. Indeed, when such UK coins were in the hands of the Treasury as the local issuing authority, they qualified as part of the country's external reserves (Sammut, 2001: 232). Malta used British coins and issued no local coins throughout the period studied here.

The data and our tests

We transcribed annual or semiannual balance sheet data on the Treasury(later Commissioners of Currency) from 1944 to 1968. The main source was the *Malta Government Gazette*, including the supplements. The balance sheets are not available from 1939 to 1944 in the *Malta Government Gazette*, though they may be available in archival records that we lacked the ability to consult. It also seems that the *Gazette* did not publish data during certain later periods that appear as gaps in our data, or that the Library of Congress, our source of publications, is missing the relevant issues. We performed tests on the balance sheet items of the Treasury and Commissioners of Currency.

Test # 1: Domestic Assets, Foreign Assets, and the Monetary Base

We first measured total assets as a share of the monetary base, in Figure 1 and Figure 2.Figure 1 is a discrete version showing missing data in March and September 1959, March and September 1960, September 1962, March 1963 and September 1966. Figure 2 is a continuous version showing only the available data. As indicated before, by Ordinance No.I of 1949, the maximum ratio of external reserves to Maltese currency notes was fixed at 110%. From March 1944 to June 1968 (including March 1961 to June 1968, when Maltese securities were held by the currency board), net foreign assets ranged from approximately 90 to nearly 107 percent of currency in circulation, and total assets ranged from approximately 90 to nearly 112 percent of currency in circulation, remainingator very near to the legal maximum, suggesting that during the period

the Treasury (later Commissioners of currency) actedina highly rule-likemanner.

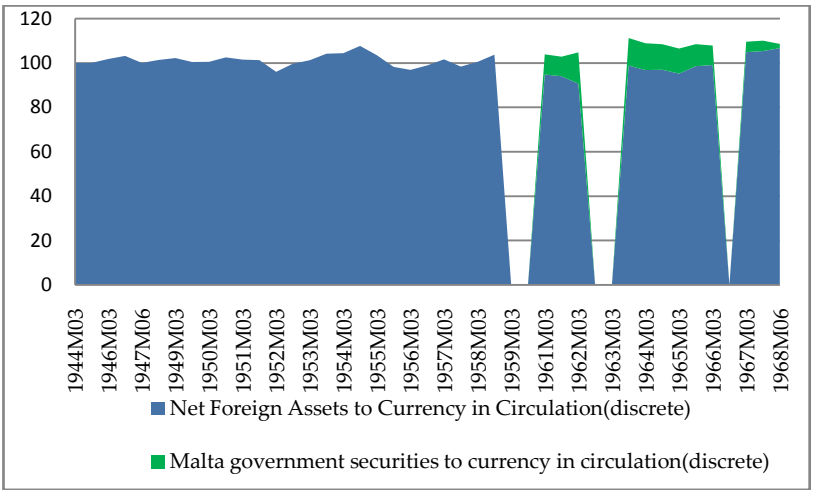

Figure 1. *Net Foreign Assets and Maltese Securities (% of monetary base; currency board orthodoxy = 100% or a bit more)*
Sources: Malta Government Gazette; calculations.

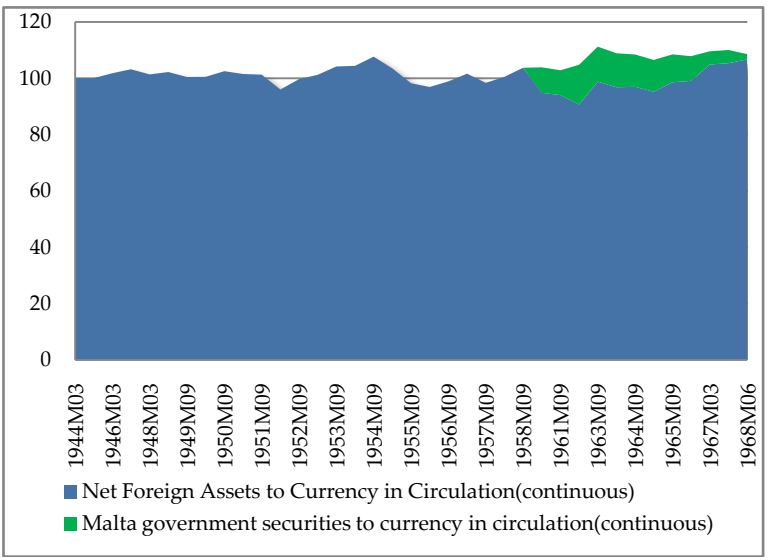

Figure 2. *Net Foreign Assets and Maltese Securities (% of monetary base; currency board orthodoxy = 100% or a bit more)*
Sources: Malta Government Gazette; calculations.

Figure 3 and Figure 4 give an idea of how big the absolute changes in net domestic assets(namely Malta government securities) were by comparing them to total liabilities (equal in this case to notes in circulation) a year earlier. Before 1960s, no Maltese securities were issued. Hence the graphs only show the net domestic assets to note in circulation beginning in March 1962, when the first year-over-year change of Malta Government Securities is available. Again, we have both figures providing discrete data showing missing data (Figure 3) and a continuous version (Figure 4). The graphs likewise bring out the placidity of the policy followed by Commissioners of Currency.

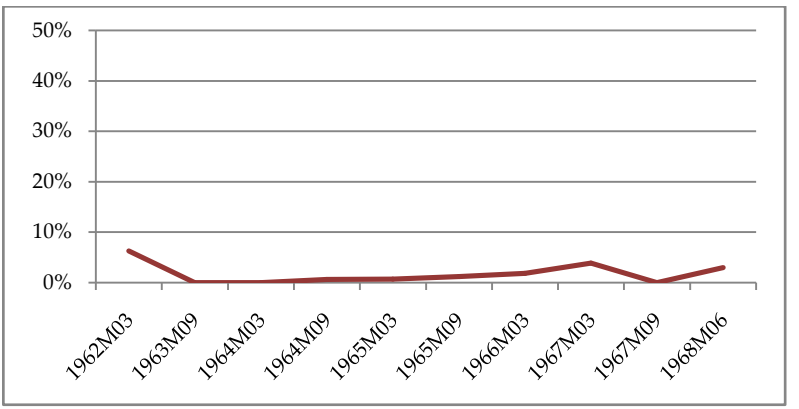

Figure 3. *Dynamic Monetary Composition (discrete)*

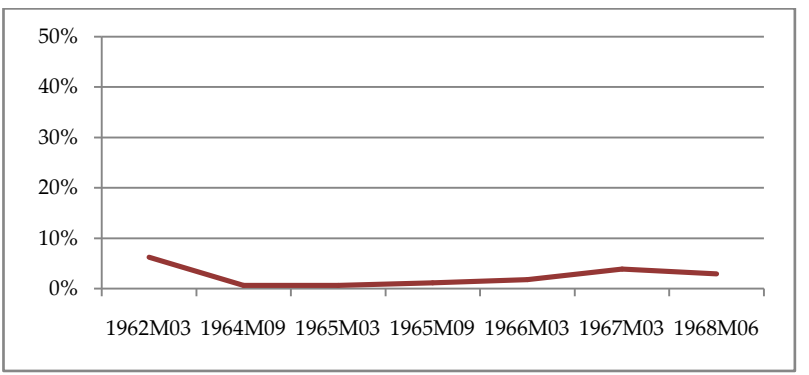

Figure 4. *Dynamic Monetary Composition (continuous)*
Sources: Malta Government Gazette; calculations.

Test # 2: Reserve Pass-Through

The historical facts and the data so far suggest that the Treasury and Commissioners of Currency may have been following currency board orthodoxyfor the periods March 1944 to June 1968. Now we proceed to the most important single test, "reserve pass-through," which measures year over-year change in the monetary base divided by year-over-year change in net foreign reserves.Measuring on a year-over-year basis tends to eliminate any seasonal effects and diminish the importance of one-time events such as extraordinary distributions or retentions of profit. For an orthodox currency board, reserve pass-through should typically be "close" to 100 percent—in practice, within the 80-100 percent range (Hanke, 2008). Again, we have both figures providing discrete data showing missing data (Figure 5) and a continuous version (Figure 6).

Reserve pass-through was volatile from March 1944 to June 1967, indicating that the currency board of Malta is somehow unorthodox. In order to test it further, we used adjusted reserve pass-through, by valuing securities at cost instead of its market value. The securities include both foreign securities and, in the last few years of the currency board's existence, Maltese securities. The balance sheet values securities at market price, which can differ from the cost at which the currency board purchased them. We used Maltese securities at cost to re-calculate the reserve pass-through for 1961-1968 when Maltese securities were issued, as is shown in Figure 7(discrete) and Figure 8(continuous). For 1961-1968, there is less fluctuation. The Malta monetary system looks more like currency board orthodoxy after this adjustment. However, the large fluctuation stills suggests unorthodoxy.

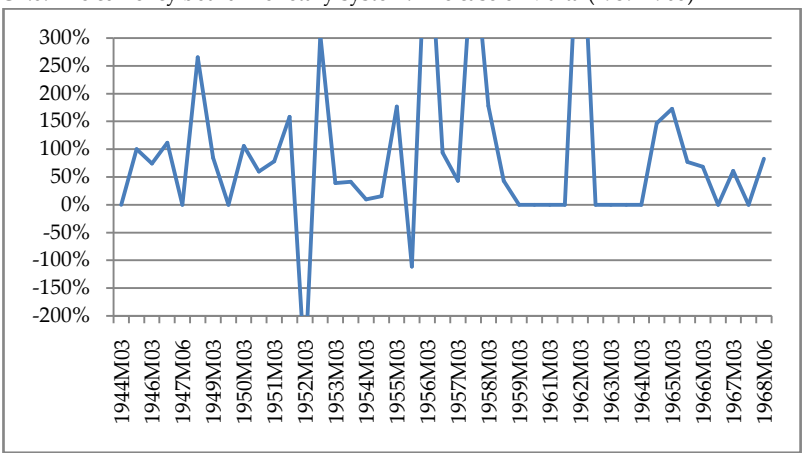

Figure 5. *Year-over-Year Reserve Pass-Through (%) (100% = currency board orthodoxy) (Discrete)*

Sources: Malta Government Gazette; calculations.

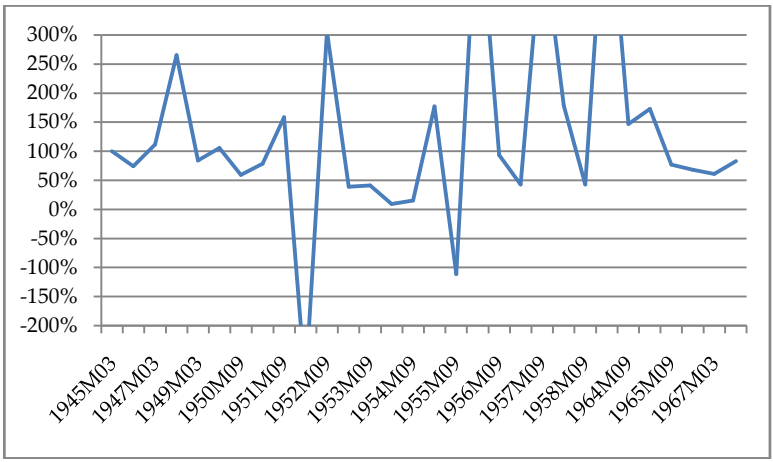

Figure 6. *Year-over-Year Reserve Pass-Through (%) (100% =currency board orthodoxy) (Continuous)*

Sources: Malta Government Gazette; calculations.

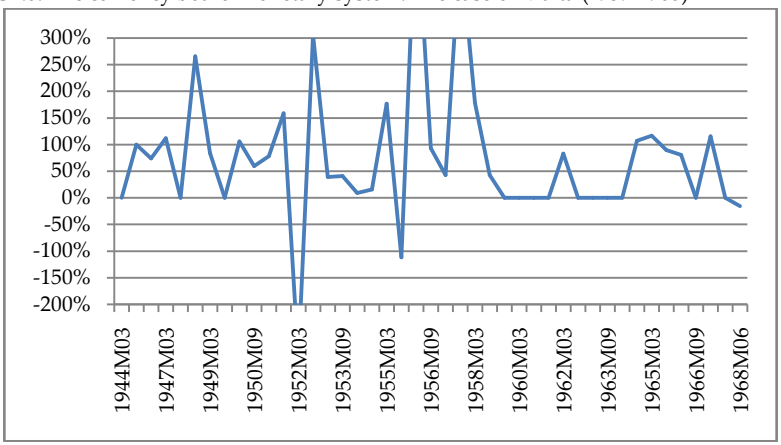

Figure 7. *Year-over-Year Reserve Pass-Through (%) (100% =currency board orthodoxy) (Discrete)*
Sources: Malta Government Gazette; calculations.

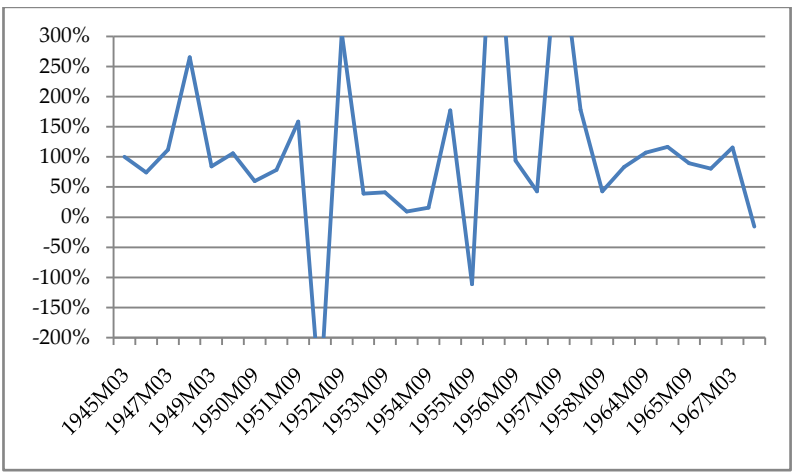

Figure 8. *Year-over-Year Reserve Pass-Through (%) (100% = curency board orthodoxy) (Continuous)*
Sources: Malta Government Gazette; calculations.

Conclusion

Results seem to be mixed. First, the legal framework and some of the data tests make it seem orthodox. The Paper Currency Ordinance, 1939 provided that notes issued under this Ordinance should be convertible at the Treasury at sterling rates on days to be fixed by the Governor and notified in the Government Gazette.

However the law did not provide explicitly for any particular reserve backing. By Currency Notes Ordinance, 1949, the maximum ratio of external reserves to Maltese currency notes was fixed at 110%. The 1949 ordinance also provided for the mechanism for wholesale conversion of Maltese currency notes into sterling or vice versa on demand. These legislations are consistent with the currency board orthodoxy.

Second, by statistical analysis, some indices suggest orthodoxy. Net foreign assets ranged from approximately 90 to nearly 107 percent of currency in circulation, and total assets ranged from approximately 90 to nearly 112 percent of currency in circulation between 1944 and 1968, remaining at or very near to the legal maximum, suggesting that during the period the Treasury (later Commissioners of currency) acted in a highly rule-like manner. Moreover, the flat dynamic monetary composition index also suggests orthodoxy.

However, the volatile reserve-pass through seem to indicate unorthodoxy, even after adjusted by using cost instead of market value of the Maltese government securities. Hence this is a question that remains to be fully resolved by further study of the data and the development of other ways to try to measure currency board orthodoxy statistically. On the one hand, it is possible that the Treasury/Commissioners of Currency were somewhat unorthodox. On the other hand, there might be circumstances in which reserve pass-through is not as good an indicator, though often it works well.

Although this study gathered and digitized mass data from 1939 to 1968, there are several years when data are incomplete.[2] This might barely affect the significance of the statistical test, but possible future studies might be to gather the missing data and hence confirm the reliability of the current study.

[2] For the year 1945, the interest earned on Note Security Fund is missing. Other missing years include 1959, 1960, 1962 and 1963.The International Monetary Fund's International Financial Statistics database has balance sheet data for part of Malta's currency board period, which we did not use because it is rounded to the nearest million pounds rather than giving exact amounts; it has no income-expenditure data.

Appendix

Appendix A. Summary Legislative History of Maltese Note Issue, 1939-1968

(acts relating to the Treasury/Commissioners of Currency and selected other measures)

Here is a brief discussion of Malta's World War I note issue. Malta had been using British currency. The war both interrupted shipments of currency and increased demand for currency. Malta, Ordinance No. 8, 12 August 1914, permitted the Maltese government to issued notes as an emergency measure. Sammut (2001: 161) offers a quotation suggestion that the notes were backed 100% by external assets. The government issued notes in denominations from 5 shillings to £10, equal to their sterling counterparts. Notes up to 10 shillings were redeemable in silver, while notes of higher denominations were redeemable in gold (Malta, Government Notice No. 149, 15 August 1914; No. 162, 25 August 1914; No. 183, 8 September 1914; No. 194, 17 September 1914; No. 209, 29 September 1914; No. 229, 19 October 1914). British notes continued to circulate. Malta, Ordinance No. 5, 10 June 1915, allowed notes of 10 shillings and £1 issued by the British Treasury to be legal tender; previously, only Bank of England notes, whose smallest denominations was £5, had been legal tender. The notes were made legal tender by a governor's proclamation of 16 June 1914. Ordinance No. 5 also permitted the governor to call in Maltese government notes for cancellation and redemption. Malta, Government Notice No. 110, 6 May 1915, stripped Maltese £1 notes of legal tender effective the following day. Malta, Government Notice No. 204, 23 September 1915, stripped other Maltese notes of legal tender effective 30 September 1915. Notes could continue to be redeemed at the government treasury (Malta, Government Notice No. 270, 25 November 1915). The total amount of Maltese notes in circulation never rose as high as £100,000, and by 22 June 1915 it had fallen to £1,533, according to the government treasurer (Malta, "Report of the Treasurer for 1915-15," *Malta Government Gazette,* Supplement No. 19, 17 September 1915: 121).

Malta, Paper Currency Ordinance, No. 48, 13 September 1939: The government issued notes up to £1 as an emergency measure during the Second World War. The British government did not want to expand the circulation of British notes in Malta lest the island be captured by Axis forces. British notes already in Malta remained in circulation, though. It's provided that notes issued under this Ordinance should be convertible at the Treasury at sterling rates on days to be fixed by the Governor and notified in the Government Gazette. However the law did not provide explicitly for any particular reserve backing.

Malta by a multitude of government notices authorized further issues of notes. Insofar as we have them, the notices and their dates are: No. 13, 12 January 1940; No. 215, 18 May 1940; No. 318, 24 June 1940; No. 353, 13 July 1940; No. 401, 2 August 1940; No. 137, 1 April 1941; No. 236, 16 May 1941; No. 250, 30 May 1941; No. 324, 4 July 1941; No. 399, 22 August 1941; No. 468, 17 October 1941; No. 563, 10 December 1941; No. 91, 20 February 1942; No. 146, 26 March 1942; No. 246, 27 May 1942; No. 319, 30 June 1942; No. 365, 16 July 1942; No. 412, 11 August 1942; No. 477, 12 September 1942; No. 526, 12 October 1942; No. 587, 9 November 1942; No. 615, 17 November 1942; No. 698, 24 December 1942; No. 69, 2 February 1943; No. 184, 13 April 1943; No. 272, 1 June 1943; No. 307, 18 June 1943; No. 352, 20 July 1943; No.

452, 2 October 1943; No. 496, 2 November 1943; No. 212, 30 May 1944; No. 308, 26 July 1944; No. 419, 3 October 1944; No. 451, 31 October 1944; No. 173, 13 April 1945; No. 283, 19 June 1945; No. 435, 11 September 1945; No. 461, 27 September 1945; No. 608, 11 December 1945; No. 630, 21 December 1945. The notices, in the *Malta Government Gazette*, authorize the additional issue or the exchange of notes of various denominations.

Malta, Paper Currency (Amendment) Ordinance, No. 15, passed 22 September 1942, assented 25 September 1942: Reduced the lowest denomination of note from 2 shillings to 1 shilling.

Malta, Currency Notes Ordinance, No. 1, 21 January 1949, brought into force by Governor's Proclamation No. 2, 8 March 1949: Established a currency board.

Malta, Currency Notes Regulations, Government Notice No. 226, 12 April 1949: Regulations governing aspects of the currency board's operation.

Malta, Currency Notes (Amendment) Regulations, Government Notice No. 780, 9 December 1949: Made a change regarding note serial numbers.

Malta, Currency Notes (Amendment) Ordinance, No. 15, passed 7 August 1960, enacted 8 August 1960: Substituted the Financial Secretary and the Accountant General for the Legal Secretary and the Treasurer as the members of the board.

Malta, Central Bank of Malta Act, No. 31, 11 November 1967; Notice No. 32, 17 April 1968; Notice No. 47, 7 June 1968: Established the Central Bank of Malta on 17 April 1968 to replace the currency board. The transfer of the Note Security Fund, making the central bank a monetary policy institution, became effective on 7 June 1968.

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7 The currency systems of the United Kingdom periphery

Brandon **Dixon**

Introduction

This chapter assesses the currency systems of Scotland, Northern Ireland, the Isle of Man, Guernsey, and Jersey. Scotland and Northern Ireland are part of the United Kingdom. The Isle of Man, Guernsey, and Jersey are not part of the United Kingdom but are possessions of the British Crown; the British government can legislate for them and it manages their foreign affairs and defense. These states, all of which have a history intertwined with England, continue to have locally issued notes (in Scotland and Northern Ireland) or notes and coins (in the Isle of Man, Guernsey, and Jersey) at parity with the pound sterling issued by the Bank of England and the Royal Mint. This means that any person in possession of a local pound can exchange it for apound sterling at one-to-one. To ensure the functioning of such a program, the resident governments have provided legislation as to entice a 100 percent backing of all local notes and coins in circulation in the form of low-risk "foreign" assets, largely or entirely held in sterling.

By fixing local currency to the pound sterling and legislating a 100 percent minimum reserve requirement, these monetary regimes seem to resemble currency board systems; however, to determine whether they maintaincurrency board orthodoxy, we must examine the relationship between the monetary base—the state's ultimate financial unit of debt settlement—and the foreign reserves.

In an orthodox currency board system, local money in circulation (to be precise, the monetary base) is closely tied to demand: it expands if and only if people trade their holdings of the anchor currency for local currency. It follows, then, that when the economy gains local money in circulation, the currency board's reserve fund also gains, hence an increase in one correlates with an increase in the other. Symmetrically, a decrease in one correlates with a decrease in the other.

Accordingly, this paper applies several tests to judge whether the currency systems of Scotland, Northern Ireland, the Isle of Man, Guernsey, and Jersey comply with this mechanical relationship.

(1) Is the exchange rate rigid, as in an orthodox currency board? All the systems examined have rigid exchange rates with the pound sterling.

(2) Are there any exchange controls with the anchor currency? An orthodox currency board has no such controls, and neither do any of the systems examined.

(3) From the standpoint of the jurisdiction under consideration, is the monetary base set through the nondiscretionary workings of market forces, or in a discretionary manner by a local monetary authority?

(4) What is the ratio of foreign reserves to the monetary base? In an orthodox currency board system, it is at least 100 percent; however, this ratio does not exceedan upper bound, typically no greater than 115 percent. This ensures that the monetary authority does not sterilize inflows of foreign reserves without limit. The purpose of the modest reserve in excess of 100 percent is to insure against depreciation of the currency board's assets, so that in practice they never fall below 100 percent (Hanke, 2002: 205). To check, I apply a simple reserve ratio, dividing the reserve fund at

the end of the financial year by the contemporaneous total value of local notes and coins in circulation. Readers should be aware that in Hong Kong and some other cases, governments have commingled external reserves held against currency in circulation with other external reserves, such as those arising from government budget surpluses. Such arrangements make it harder to separate changes in foreign reserves arising from monetary factors from changes arising from nonmonetary factors.

(5) Does the monetary base rise and fall with changes in foreign reserves? In an orthodox currency board, a positive value in the annual change of the local currency—an expansion of the notes and coin in circulation (plus deposits at the currency board, if any)—matches a positive value in the annual change of the reserve fund. Necessarily, it follows that a negative value in the annual change of the local currency—a contraction of the notes and coins in circulation—matches a negative value in the annual change of the reserve fund (Hanke, 2008: 56-58). A way to test for this effect is to measure "reserve pass-through": the ratio of the change in the local monetary base divided by the change in the foreign reserves during a period. The reserve pass-through allows us to distinguish among sterilization of foreign reserve inflows or outflows—as indicated by values between zero and 100 percent; magnified reserve effects—values above 100 percent; and super sterilization—values less than zero.

An orthodox currency board, in principle, should maintaina reserve pass-through ratio of 100 percent. In practice, confounding factors exist that create "noise" in the test. One is the timing of income or expenses. If certain expenses are paid quarterly, then the end-of-quarter months will show a bigger drop in reserves than other months in the quarter. A way to handle the problem is to calculate reserve pass-through on a year-over-year basis, which should eliminate ordinary seasonal factors. Another confounding factor is interest earnings. A currency board where the monetary base is unchanged but interest earnings are 3 percent will appear to have a ratio of zero divided by the amount of interest earnings. Yet another confounding factor is changes in the value of assets. If assets are assessed at their market value, they may rise or fall in value even if there is no, or little to no, change in the monetary

base. Because of these confounding factors, as a rough-and-ready rule, it is reasonable to establish a band around the 100 percent central value. Following the advice of experienced researchers on currency boards, I will consider the band of probable orthodoxy to be 80 to 120 percent. Even then it should be remembered that there may be one-off accounting changes or temporary deviations from orthodoxy that result in ratios outside the 80 to 120 percent band but do not necessarily disqualify a system from being a currency board.

By examining the legal foundations of the monetary systems in the jurisdictions under scrutiny and applying criteria (3)-(5) to them, we will determine whether they are in fact currency boards.

Scotland

Originally a separate country from England and Wales altogether, Scotland came under the ruling of the same monarch in 1603 with the ascension ofKing James VI (James I in England) to the throne. Even though James I attempted unification throughout his entire rule, it would take until 1707 with the Act of Union to enforce it. This relationship with England has continuedto the present, having recently been reaffirmed in a referendum on September 18, 2014 in which a majority of Scottish voters chose to remain part of the United Kingdom.

Table 1. *Key Legislation on the Scottish Monetary System*

Year	Number	Short Title	Significance
1695	Scottish Parliament	Act for Erecting a Bank of Scotland	Established the Bank of Scotland
1707	6 Anne c. 40	Act of Union	United Scotland with England and Wales; ended the Scots pound as a separate currency
1727	Royal warrant, May 31	Royal Bank of Scotland Figureer	Established the Royal Bank of Scotland as a rival to the Bank of Scotland
1765	5 Geo. III c. 49	Bank Notes Act	Prohibited notes of less than £1 in Scotland
1845	8 & 9 Vict. c. 38	Bank Notes (Scotland) Act	Required Scottish bank notes to be backed 100 percent at the margin by gold and silver reserves

1928	18 & 19 Geo. V c. 13	Currency and Bank Notes Act	Allowed for securities and English notes to back Scottish notes
1971	1971 c. 24	Coinage Act	Allowed only the Royal Mint to produce coins
2009	2009 c. 1	Banking Act	Provided stricter regulation on Scottish note production (namely, daily accountability on English reserves)

Scottish note issue began with the 1695 Act of the Scottish Parliament for Erecting a Bank of Scotland. The Bank of Scotland was founded only a year after the Bank of England and modeled after it in many ways. Before the end of 1695, the Bank of Scotland initiated printing Scotland's own paper currency in response to the deficient supply of hard coinage. With a continued emphasis on independence, the Scottish people had no desire to link their currency with the English pound sterling; however, this mindset begins to transform with the aforementioned Act of Union in 1707 (CSCB n.d.). Scotland adopted the pound sterling as its monetary unit at Scots £12 = £1 sterling. As incentive to unite with England, Scottish government creditors and other persons received an amount of British government securities known as "the Equivalent." In 1727 the "Equivalent Company" formed to represent the interests of the holders of the securities secured a royal warrant establishing the Royal Bank of Scotland. In the same year, the Royal Bank of Scotland opened and issued its own notes in competition with the Bank of Scotland, beginning an era of "free banking." Other note-issuing banks were established later, although only the British Linen Bank was given a Figureer like the Bank of Scotland and the Royal Bank of Scotland, limiting the liability of its shareholders. Other Scottish banks operated with unlimited liability until the second half of the 19th century, when it became possible to attain limited liability without a special act of Parliament.

Paper currency only grew in popularity, so much that many small merchants issued notes. There was a belief that it was better for ordinary, poor people to use coins rather than notes for everyday transactions, because coins, issued only by the government and having a metallic value equal or close to their face

value, did not carry the risk of default that notes had. The British Parliament's Bank Notes Act of 1765 prohibited notes for less than £1 in Scotland, as well as notes not payable on demand. (An act of 1775 extended the £1 restriction to England and Wales.)

A series of financial crises in England, from which Scotland was largely exempt, provoked extensive debate about currency regulation. The English system was one in which there was a privileged central bank, the Bank of England, having a predominant--though not yet monopoly--role as note issuer. Limits on the number of owners had restricted the size of other English banks, which were also forbidden from issuing notes if they had branches in London. The Scottish system had no bank as privileged as the Bank of England, so it developed a better balanced system of relatively large, strong banks with extensive branch networks that could issue notes anywhere in Scotland. (Cross-border branching between England and Scotland was nearly nonexistent then; it later became commonplace.) In the debate over currency regulation, the proponents of extending the Bank of England's influence won. An 1844 act confirmed the Bank of England as a true central bank, establishing provisions that eventually would lead to all other English banks ceasing to issue notes. The complementary piece of legislation for Scotland was the Bank Notes (Scotland) Act of 1845. It required Scottish banks to back notes in excess of levels at the time the act was passed by external reserves. These reserves were to be held mainly at the Bank of England and would accountfor a 100 percent backing of the pounds in circulation, averaged and checked every Wednesday. This would remain the protocol until the 2009 Bank Notes (Scotland) Act, which provided increasing transparency to the practice, and whereas previously the reserve requirement was averaged and checked only on a weekly basis, this new regulation enforced a constant 100 percent reserve requirement on all Northern Irish notes in circulation.

To continue with our understanding of the legal underpinnings of this rather peculiar system, it is important to remark that coins are legal tender throughout the United Kingdom (Royal Mint, 2014), but Scottish notes are not legal tender even in Scotland. Nor are Bank of England notes legal tender in Scotland (ACBI, 2012),

though they are in England and Wales. Despite this, trade in Scotland and even some parts of England regularly employ Scottish notes as means of exchange, and Scotland imposes no limits on the use of Bank of England notes (Bank of England, n.d.).

As we have seen, the law requires that external assets back every note circulated by the three Scottish banks that continue to issue notes today: the Bank of Scotland (now part of Lloyds Banking Group), the Royal Bank of Scotland, and the Clydesdale Bank (now part of National Australia Bank Group).As the Figure below shows, onthe aggregate, the private Scottish banks not only consistently maintain a reserve ratio between 100 percent and 105 percent, but tend towards the 100 percent point that represents the currency board ideal.

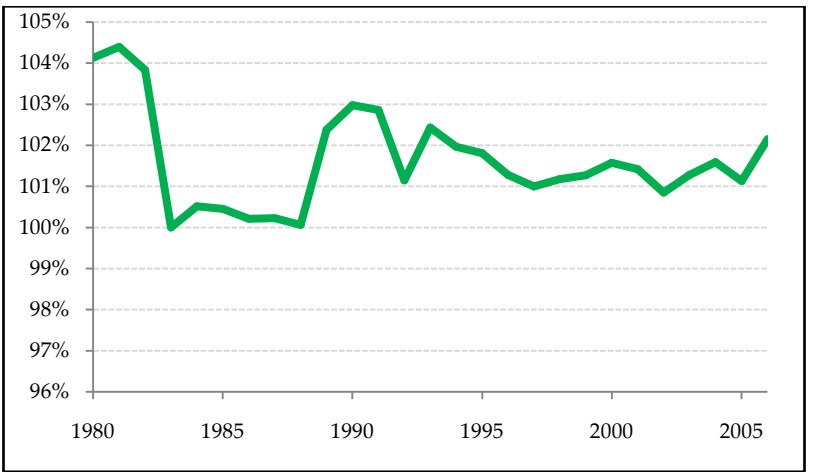

Figure 1. *Graph S-1. Scotland: Ratio of Reserves to Notes in Circulation*

In the second graph, as opposed to the annual *levels* we were dealing with previously, the data displayed show aggregate annual *changes*in Scottish bank notes in circulation mapped alongside the aggregate annual change in the reserve accounts providing backing. By simply subtracting each year's aggregate number of notes and aggregate reserve value from the previous year's totals, we may construct the annual change data. As observed, over the course from 1980 to 2006, we see an increase in the number of Scottish notes in circulation consistently matched

with an increase in the reserve value. Observe that the change is always positive; there are no year-over-year shrinkages of Scottish notes in circulation, though there may be shrinkages over shorter periods for which I did not collect data.

To illustrate the degree to which Scottish bank note issue may involve sterilization, the figure nearby shows reserve pass-through. To repeat, for reasons discussed above the orthodox ratio is not considered to be 100 percent, but a band of 80-120 percent. Although the previous graph showed no deviation from orthodox currency board practice, this graph shows reserve pass-through considerably above the band in 1983 at 153 percent with lesser deviations in 1989 (74 percent), 1992 (124 percent), and 2006 (78 percent). It would take further research to determine whether there might be special factors accounting for the deviations.

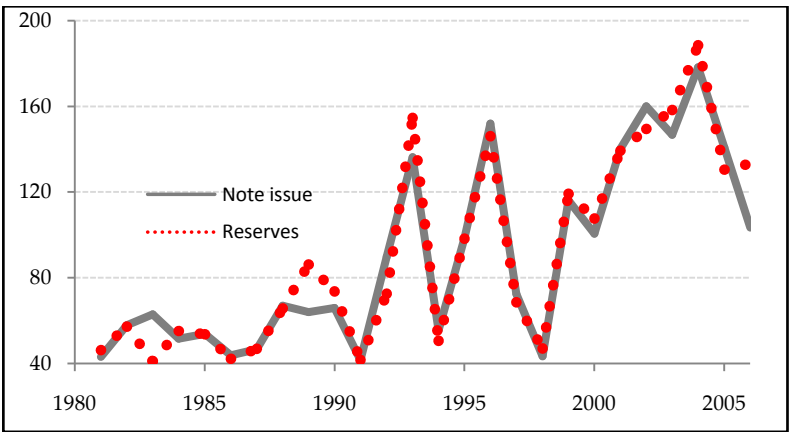

Figure 2. *Scotland: Changes in Note Issue and Reserves (£ million)*

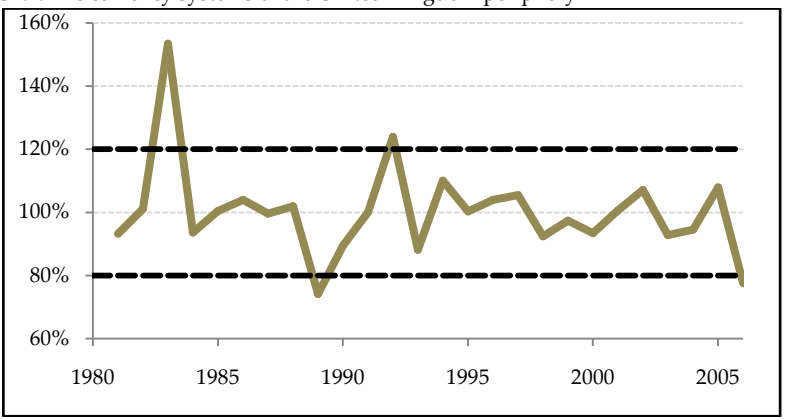

Figure 3. *Scotland: Reserve Pass-Through Ratio*

So, is Scotland a currency board or not? Of the five considerations mentioned at the start, Scotland clearly meets three: rigid exchange rate, no exchange controls with England, and external reserves close to 100 percent. It mostly meets the fourth consideration, reserve pass-through "close" to 100 percent, but not completely. That leaves the fifth consideration, namely, whether the monetary base is set through the nondiscretionary workings of market forces (as in a currency board system) or in a discretionary manner by a local monetary authority (as under central banking). Here, both the law and market practice say that it is a central banking system, though with some unusual features. To repeat, under the Act of Union Scotland and England have had the same currency since 1707. Scottish bank notes are denominated in pounds sterling, not in legally defined, distinct Scots pounds. Bank of England notes circulate in Scotland alongside Scottish bank notes and with no connotation that they are a foreign currency. The total supply of bank notes in Scotland is therefore determined at least in part in a discretionary manner, by a monetary authority that is equally as local as the Scottish note-issuing banks. Scottish banks are inside the British monetary system, in which the Bank of England sets the monetary base in a discretionary manner. At least since the late 19th century, when the Bank of England recognized a responsibility as a lender of last resort, Scottish banks have been able to borrow from the Bank of England on terms that might not be available in the open market. During Scotland's free banking

period, in contrast, the Bank of England sometimes lent to Scottish banks, but not within the context of acting systematically as a lender of last resort, and there was therefore a degree of separation between the English and Scottish banking systems that no longer exists. Scotland today does not have the degree of separation from the English monetary system that would make it a currency board, though it would become one if Scotland became independent while also maintaining the existing arrangements.

Table 2. *Scottish Notes in Circulation by Bank, 1980-2006 (£ sterling)*

Year	Bank of Scotland	The Royal Bank of Scotland	Clydesdale Bank Plc	Aggregate
1980	163,371,891	227,172,861	80,682,379	471,227,131
1981	170,579,124	244,156,414	99,641,730	514,377,268
1982	169,413,957	251,909,304	150,972,661	572,295,922
1983	187,403,645	262,143,338	185,753,794	635,300,777
1984	215,667,356	310,536,822	160,777,057	686,981,235
1985	241,880,091	331,092,242	167,925,528	740,897,861
1986	262,519,047	344,570,782	177,682,822	784,772,651
1987	278,975,827	371,599,922	180,906,338	831,482,087
1988	252,670,757	455,988,781	189,814,861	898,474,399
1989	265,092,094	490,105,945	207,256,576	962,454,615
1990	280,194,956	532,863,248	215,384,183	1,028,442,387
1991	283,211,370	559,814,862	227,030,451	1,070,056,683
1992	304,814,691	601,835,481	253,309,358	1,159,959,530
1993	337,135,264	683,139,613	276,030,702	1,296,305,579
1994	349,385,024	710,914,769	291,580,652	1,351,880,445
1995	373,074,884	756,100,753	321,278,371	1,450,454,008
1996	436,219,881	811,768,030	354,412,282	1,602,400,193
1997	464,091,438	843,232,654	367,560,068	1,674,884,160
1998	473,001,844	869,980,792	375,342,772	1,718,325,408
1999	530,075,919	914,858,423	389,508,762	1,834,443,104
2000	570,464,725	949,565,545	414,976,855	1,935,007,125
2001	625,601,561	997,082,724	452,536,987	2,075,221,272
2002	676,384,693	976,927,190	581,986,718	2,235,298,601
2003	725,352,103	1,000,421,779	656,273,487	2,382,047,369
2004	806,764,825	1,025,486,857	728,002,203	2,560,253,885
2005	809,575,516	985,639,353	905,842,486	2,701,057,355
2006	812,727,662	973,381,845	1,018,456,817	2,804,566,324

Notes: For all tables on Scotland, the underlying sources of data are the *London Gazette* and *Edinburgh Gazette,* and the data given are monthly averages for March. Monthly data exist, but due to constraints on research time, I only collected annual figures.

Table 3.*Scottish Note Reserve Backing by Bank, 1980-2006 (£ sterling)*

Year	Bank of Scotland	The Royal Bank of Scotland	Clydesdale Bank Plc	Aggregate
1980	168,691,568	235,717,090	86,278,253	490,686,911
1981	177,461,050	253,443,513	106,098,098	537,002,661
1982	175,535,849	260,999,013	157,725,627	594,260,489
1983	187,335,998	262,352,948	185,624,086	635,313,032
1984	217,191,263	311,762,046	161,560,231	690,513,540
1985	243,714,929	332,510,223	167,995,071	744,220,223
1986	263,693,964	345,177,003	177,546,877	786,417,844
1987	279,954,392	372,306,898	181,064,370	833,325,660
1988	252,882,634	456,285,353	189,866,092	899,034,079
1989	272,247,342	501,063,266	212,012,920	985,323,528
1990	292,478,295	545,319,314	221,266,474	1,059,064,083
1991	292,544,296	575,610,627	232,537,035	1,100,691,958
1992	316,238,058	594,930,376	262,083,044	1,173,251,478
1993	348,548,014	694,880,654	284,445,497	1,327,874,165
1994	359,676,548	720,136,392	298,579,928	1,378,392,868
1995	381,350,239	765,273,524	330,037,927	1,476,661,690
1996	445,671,197	818,784,846	358,399,775	1,622,855,818
1997	470,412,420	851,243,161	369,892,646	1,691,548,227
1998	479,535,472	881,416,610	377,589,392	1,738,541,474
1999	538,508,107	922,439,782	396,830,094	1,857,777,983
2000	580,593,476	966,666,182	418,133,589	1,965,393,247
2001	637,796,013	1,006,501,295	460,428,420	2,104,725,728
2002	686,827,412	982,419,528	584,971,960	2,254,218,900
2003	736,521,456	1,011,635,747	664,260,578	2,412,417,781
2004	820,935,354	1,040,758,542	739,285,767	2,600,979,663
2005	822,046,108	998,450,159	911,005,698	2,731,501,965
2006	846,927,982	991,955,834	1,025,988,495	2,864,872,311

Table 4. *Annual Scottish Reserve Ratio*

Year	Aggregate Value of Backing Reserves	Aggregate Number of Notes in Circulation	Reserve Ratio
1980	490,686,911	471,227,131	104.1%
1981	537,002,661	514,377,268	104.4%
1982	594,260,489	572,295,922	103.8%
1983	635,313,032	635,300,777	100.0%
1984	690,513,540	686,981,235	100.5%
1985	744,220,223	740,897,861	100.4%
1986	786,417,844	784,772,651	100.2%
1987	833,325,660	831,482,087	100.2%
1988	899,034,079	898,474,399	100.1%
1989	985,323,528	962,454,615	102.4%
1990	1,059,064,083	1,028,442,387	103.0%
1991	1,100,691,958	1,070,056,683	102.9%
1992	1,173,251,478	1,159,959,530	101.1%
1993	1,327,874,165	1,296,305,579	102.4%
1994	1,378,392,868	1,351,880,445	102.0%
1995	1,476,661,690	1,450,454,008	101.8%
1996	1,622,855,818	1,602,400,193	101.3%
1997	1,691,548,227	1,674,884,160	101.0%
1998	1,738,541,474	1,718,325,408	101.2%
1999	1,857,777,983	1,834,443,104	101.3%
2000	1,965,393,247	1,935,007,125	101.6%
2001	2,104,725,728	2,075,221,272	101.4%
2002	2,254,218,900	2,235,298,601	100.8%
2003	2,412,417,781	2,382,047,369	101.3%
2004	2,600,979,663	2,560,253,885	101.6%
2005	2,731,501,965	2,701,057,355	101.1%
2006	2,864,872,311	2,804,566,324	102.2%

Table 5. *Annual Change in Scottish Notes in Circulation and Note Reserve Backing*

Year	Aggregate Annual Change of Scottish Notes in Circulation	Aggregate Annual Change of Scottish Reserves	Scottish Reserve Pass-Through
1981	43,150,137	46,315,750	93.2%
1982	57,918,654	57,257,828	101.2%
1983	63,004,855	41,052,543	153.5%
1984	51,680,458	55,200,508	93.6%
1985	53,916,626	53,706,683	100.4%
1986	43,874,790	42,197,621	104.0%
1987	46,709,436	46,907,816	99.6%
1988	66,992,312	65,708,419	102.0%
1989	63,980,216	86,289,449	74.1%
1990	65,987,772	73,740,555	89.5%
1991	41,614,296	41,627,875	100.0%
1992	89,902,847	72,559,520	123.9%
1993	136,346,049	154,622,687	88.2%
1994	55,574,866	50,518,703	110.0%
1995	98,573,563	98,268,822	100.3%
1996	151,946,185	146,194,128	103.9%
1997	72,483,967	68,692,409	105.5%
1998	43,441,248	46,993,247	92.4%
1999	116,117,696	119,236,509	97.4%
2000	100,564,021	107,615,264	93.4%
2001	140,214,147	139,332,481	100.6%
2002	160,077,329	149,493,172	107.1%
2003	146,748,768	158,198,881	92.8%
2004	178,206,516	188,561,882	94.5%
2005	140,803,470	130,522,302	107.9%
2006	103,508,969	133,370,346	77.6%

Northern Ireland

With a similar monetary and political relationship as that which has historically existed between England and Scotland, the Northern Ireland analysis largely mirrors that done on Scotland. The legal relationship between Northern Ireland and England, however, is a much more recent one. After being in effect a British colony following its conquest by England in the 16th century, Ireland became part of the United Kingdom in 1800, gaining representation in the British Parliament. Conflict over religious and political doctrine continued to simmer. In 1916 Irishmen favoring independence began a revolt. Parliament responded with the

Government of Ireland Act in 1920, splitting the country in two. Predominantly Protestant Northern Ireland remained a state in the United Kingdom, while predominantly Catholic Ireland became independent. Despite hostility and acts of violence since, the relationship between Northern Ireland and the United Kingdom remains unaltered.

Table 6. *Key Legislation on the Northern Irish Monetary System*

Year	Number	Short Title	Significance
1800	39 & 40 Geo. III c. 67	Act of Union	United Ireland with England, Wales, and Scotland
1816	56 Geo. III c. 98	Consolidated Funds Act	Merged the public funds of Ireland and Britain
1825	6 Geo. IV c. 79	Currency Act	Ended the Irish pound as a separate currency from the pound sterling
1845	8 & 9 Vict. c. 37	Bankers (Ireland) Act	Declared Bank of England notes not legal tender in Ireland; required Irish notes in circulation to be backed by silver and gold
1920	10 & 11 Geo. V c. 67	Government of Ireland Act	Established Northern Ireland as a separate entity from Ireland
1928	18 & 19 Geo. V c. 15	Bankers (Northern Ireland) Act	Applied the measures of the Bankers (Ireland) Act 1845 to Northern Ireland
1928	18 & 19 Geo. V c. 13	Currency and Bank Notes Act	Allowed for securities and English notes to back Northern Irish notes
1971	c. 24	Coinage Act	Allowed only the Royal Mint to produce coins
2009	c. 1	Banking Act	Provided stricter regulation on Northern Irish note production (namely, daily accountability on English reserves)

Like Scotland, Ireland originally had its own currency distinct from the pound sterling. The Irish pound and the pound sterling were generally quite close in value. A Parliamentary act of 1825 unified them at Irish £13 = £12 sterling. Ireland's banking system was distinct from the English and Scottish systems, and in term of restrictions on note issue it lay somewhere between English and

Scottish systems until 1845. The 1845 Bankers (Ireland) Act, like the Bank Notes (Scotland) Act passed the same year, required Irish banks to back notes in excess of levels at the time the act was passed by external reserves, held mainly at the Bank of England, backed 100 percent of the pounds in circulation, averaged and checked every Wednesday.

The splitting of Ireland into two required an updating of currency and banking laws. Southern Ireland began to issue its own currency, the Irish pound (in Gaelic, punt). In 1928, through a currency board, the Irish pound was equal to the pound sterling. As for Northern Ireland, the Bankers (Northern Ireland) Act of 1928 continued to apply to the north the 1845 act that had formerly applied also to the south. The Currency and Bank Notes Act, also of 1928, allowed English notes and coins as well as securities to provide backing for Northern Irish notes in addition to gold and silver. Northern Irish monetary regulation continued, little changed, until the passage of the Banking Act of 2009, which, being the same piece of legislation taking effect in Scotland, imposed stricter regulatory measures on Northern Irish note backing. Before, weekly averages of reserves and notes had satisfied the regulation, but henceforth, constant 100 percent backing of all Irish notes in circulation would become mandatory.

In Northern Ireland today, four banks issue notes: the Bank of Ireland (whose headquarters is in Dublin); the Northern Bank (a subsidiary of Denmark's Danske Bank); First Trust Bank (formerly Provincial Bank and Allied Irish Banks; the only note issuer that is locally owned); and the Ulster Bank (part of the Royal Bank of Scotland Group). The National Bank, a bank long ago merged into the Bank of Ireland, still has a small amount of notes outstanding, but they are not seen in circulation and likely all held by collectors or destroyed.

Despite the reserve-backing requirements of Northern Irish notes, the United Kingdom still does not consider them legal tender. As explained in the section on Scotland, England continues to operate with a definition of the term legal tender such that only English notes and coins meet the qualifications amongst monies. However, given the same legislative consideration as the Scottish pound, Northern Irish notes circulate throughout the English

economy, as a legal currency. Means of trade remain at the discretion of the individuals taking part in the interaction (Bank of England, n.d.). In Northern Ireland, on the other hand, no note constitutes legal tender, and thus, neither Northern Irish notes nor Bank of England notes meet the qualifications for legal tender (ACBI, 2012). English coins, on the other hand, hold legal tender status throughout the United Kingdom (Royal Mint, 2014).

As we did with Scotland, let us examine the reserve ratio against Northern Irish note issues; annual changes in note in circulation and external reserves; and reserve pass-through.

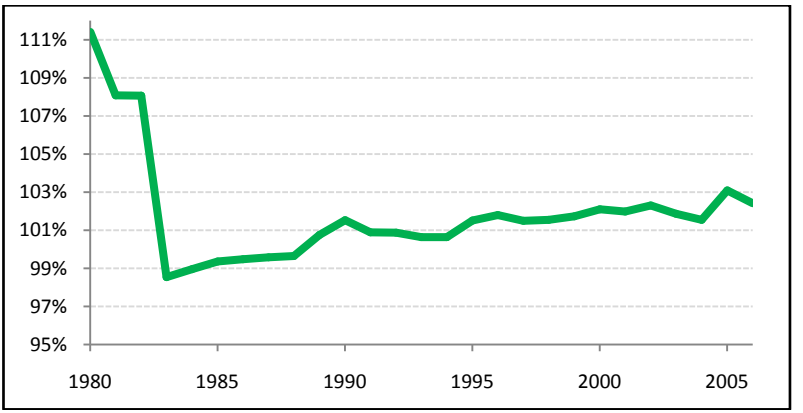

Figure 4. *Northern Ireland: Ratio of Reserves to Notes in Circulation*

Surprisingly enough, despite legislation enticing a 100 percent reserve ratio, between 1982 and 1985, Northern Ireland, as a whole, operated at less than full backing, as low as 98.5 percent.

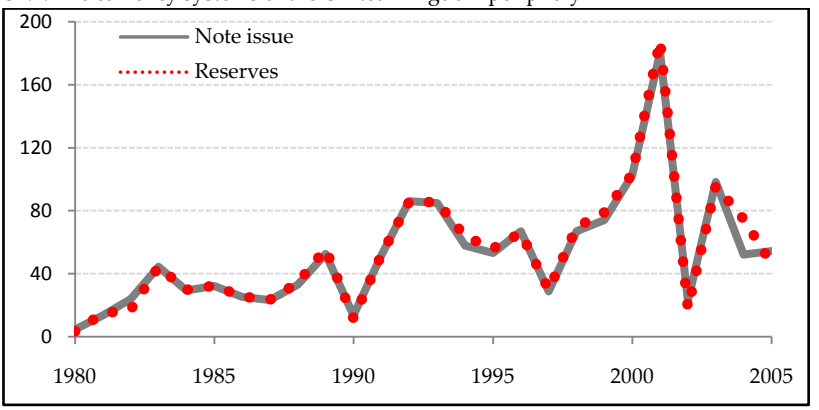

Figure 5. *Northern Ireland: Changes in Note Issue and Reserves (£ million)*

The relationship between the aggregate annual change of Northern Irish notes in circulation and the aggregate annual change of the Northern Irish reserves looks like that of Scotland. Not only do these figures expand alongside one another over the course of 1981 to 2006, but they also seem to be expanding at nearly a similar rate throughout the entire period. It should be noted thatalthough the money supply expands year-over-year, it is possible that the monetary base experienced contractions over smaller periods which I did not collect the data.

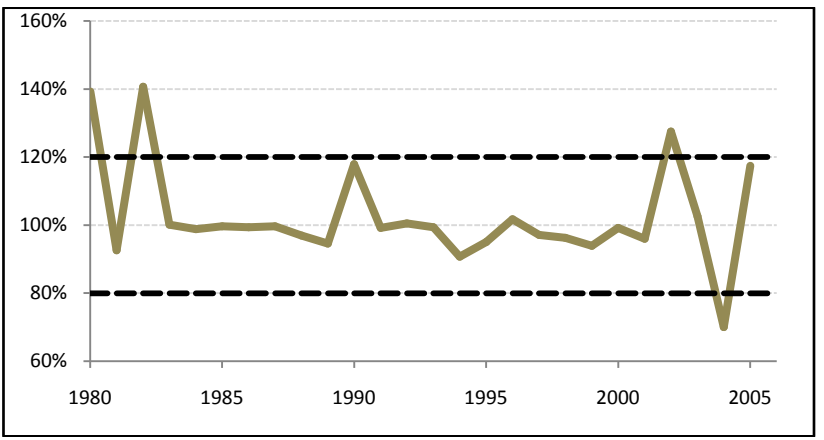

Figure 6. *Northern Ireland: Reserve Pass-Through Ratio*

In regards to the Northern Irish reserve pass-through, as was the case in Scotland, the ratiohas a tendency to stray outside of the 80-120 percent band. Specifically, in 1980 and 1982 the ratio was 140 percent; in 2002 it was 128 percent; and in 2004 it was 70 percent.

After examining all these figures, we are still left to the question: does Northern Ireland operate a currency board? In applying the same argumentation found in the Scottish section, it is clear that Northern Ireland is not a currency board, because the Bank of England sets the monetary base in a discretionary manner.

Curiously, publicly available figures for Scottish and Northern Irish note issue seem to cease publication in the Gazettes after 2006.Inquiries to various official and academic sources in the United Kingdom have indicated the Bank of England database would contain the necessary statistics; however, I have been unsuccessful in locating subsequent distinctive figures.

Table 7. *Northern Irish Notes in Circulation by Bank, 1981-2006(£ sterling)*

Month	Year	The Bank of Ireland	First Trust Bank/ Allied Irish bank/ Provincial Bank of Ireland	The Northern Bank Limited	The Ulster Bank Limited	The National Bank Limited	Aggregate
March	1980	6,807,055	10,858,823	20,918,384	12,482,048	80,007	51,146,317
March	1981	7,493,627	12,862,484	22,727,842	12,675,265	70,507	55,829,725
March	1982	14,408,295	16,262,201	25,936,450	12,725,332	70,507	69,402,785
March	1983	13,307,580	25,099,400	32,287,228	22,719,448	66,507	93,480,163
March	1984	28,003,387	32,563,082	45,605,224	31,647,989	64,507	137,884,189
March	1985	36,769,188	36,243,611	52,071,955	42,211,809	64,507	167,361,070
April	1988	45,688,318	53,563,504	79,229,159	58,811,377	61,507	237,353,865
May	1990	65,035,377	75,298,858	130,104,464	72,237,173	61,507	342,737,379
March	1991	85,059,884	68,593,186	127,420,779	75,288,052	61,507	356,423,408
March	1992	103,380,761	78,650,865	142,237,052	83,666,150	61,507	407,996,335
March	1993	124,192,908	120,467,874	150,978,479	98,346,467	61,507	494,047,235
March	1994	148,439,018	157,530,297	160,019,372	112,941,359	61,507	578,991,553
March	1995	183,314,935	152,547,500	175,016,507	125,870,600	61,507	636,811,049
March	1996	190,385,073	163,546,250	193,182,626	142,838,690	61,507	690,014,146
March	1997	212,780,106	172,736,000	221,460,927	149,971,506	61,507	757,010,046
March	1998	233,071,127	178,166,500	216,379,438	158,267,054	61,507	785,945,626
March	1999	272,574,265	192,645,500	218,922,255	168,768,299	61,507	852,971,826
March	2000	330,507,093	199,090,500	215,639,645	181,811,613	61,507	927,110,358
March	2001	377,842,266	215,032,250	227,362,755	209,401,392	61,507	1,029,700,170
March	2002	473,629,961	235,494,750	255,130,347	245,951,003	61,507	1,210,267,568
Feb.	2003	483,032,916	235,576,250	262,450,295	252,140,276	61,507	1,233,261,244
March	2004	508,975,704	257,067,500	284,217,225	281,244,124	61,507	1,331,566,060
March	2005	536,739,631	294,150,275	226,222,219	326,622,987	61,507	1,383,796,619
March	2006	555,410,750	298,042,700	233,160,067	351,600,090	61,507	1,438,275,114

Notes: For all tables on Northern Ireland, the underlying source of data is the *Belfast Gazette*. Monthly data exist, but due to constraints on research time, I only collected annual figures from March or, if not available, the month nearest March for that year. Data from 1986, 1987, and 1989 were not readily available.

Table 8. *Northern Irish Note Reserves by Bank, 1981-2006 (£ sterling)*

Month	Year	The Bank of Ireland	First Trust Bank/ Allied Irish bank/ Provincial Bank of Ireland	The Northern Bank Limited	The Ulster Bank Limited	The National Bank Limited	Aggregate
March	1980	6,755,037	10,810,311	25,527,978	13,787,712	100,000	56,981,038
March	1981	7,464,352	12,587,256	26,393,789	13,798,717	100,000	60,344,114
March	1982	14,406,845	16,265,729	29,617,250	14,612,030	100,000	75,001,854
March	1983	12,598,053	25,017,135	31,898,188	22,501,683	100,000	92,115,059
March	1984	27,414,286	32,348,813	45,216,816	31,408,327	65,000	136,453,242
March	1985	36,304,367	36,232,201	51,690,512	41,982,785	65,000	166,274,865
April	1988	45,271,739	53,652,259	78,953,679	58,579,061	65,000	236,521,738
May	1990	65,672,479	76,841,725	131,723,988	73,648,666	65,000	347,951,858
March	1991	85,602,140	68,418,119	128,578,773	76,900,272	65,000	359,564,304
March	1992	104,187,938	78,427,680	143,406,739	85,484,893	65,000	411,572,250
March	1993	124,576,185	120,249,325	151,963,338	100,318,476	65,000	497,172,324
March	1994	148,741,656	157,310,576	161,617,813	114,946,976	65,000	582,682,021
March	1995	183,656,226	157,757,253	177,314,617	127,649,489	65,000	646,442,585
March	1996	190,934,016	167,685,447	197,158,908	146,559,407	65,000	702,402,778
March	1997	213,584,564	177,468,564	224,243,856	152,925,678	65,000	768,287,662
March	1998	233,352,241	182,340,214	219,447,819	162,874,494	65,000	798,079,768
March	1999	275,343,427	194,500,515	222,859,542	174,936,368	65,000	867,704,852
March	2000	334,195,993	202,989,114	219,582,371	189,782,352	65,000	946,614,830
March	2001	381,107,226	218,198,828	232,007,172	218,685,334	65,000	1,050,063,560
March	2002	477,351,696	241,706,988	259,894,321	259,158,393	65,000	1,238,176,398
Feb.	2003	486,729,925	240,353,856	267,930,500	261,128,405	65,000	1,256,207,686
March	2004	511,765,070	263,205,343	288,735,647	288,271,912	65,000	1,352,042,972
March	2005	543,136,427	299,065,936	240,732,245	343,662,706	65,000	1,426,662,314
March	2006	559,931,283	302,426,571	239,789,923	370,842,572	65,000	1,473,055,349

Table 9. *Northern Irish Reserve Ratio*

Year	Aggregate Value of Foreign Reserves	Aggregate Value of Notes in Circulation	Reserve Ratio
1980	56,981,038	51,146,317	111.4%
1981	60,344,114	55,829,725	108.1%
1982	75,001,854	69,402,785	108.1%
1983	92,115,059	93,480,163	98.5%
1984	136,453,242	137,884,189	99.0%
1985	166,274,865	167,361,070	99.4%
1988	236,521,738	237,353,865	99.6%
1990	347,951,858	342,737,379	101.5%
1991	359,564,304	356,423,408	100.9%
1992	411,572,250	407,996,335	100.9%
1993	497,172,324	494,047,235	100.6%
1994	582,682,021	578,991,553	100.6%
1995	646,442,585	636,811,049	101.5%
1996	702,402,778	690,014,146	101.8%
1997	768,287,662	757,010,046	101.5%
1998	798,079,768	785,945,626	101.5%
1999	867,704,852	852,971,826	101.7%
2000	946,614,830	927,110,358	102.1%
2001	1,050,063,560	1,029,700,170	102.0%
2002	1,238,176,398	1,210,267,568	102.3%
2003	1,256,207,686	1,233,261,244	101.9%
2004	1,352,042,972	1,331,566,060	101.5%
2005	1,426,662,314	1,383,796,619	103.1%
2006	1,473,055,349	1,438,275,114	102.4%

Table 10. *Annual Change in Northern Irish Notes in Circulation and Reserves Backing Notes, 1981-2006 (£ sterling)*

Year	Aggregate Annual Change of Northern Irish Notes in Circulation	Aggregate Annual Change of Northern Irish Reserves Backing Northern Irish Pound	Northern Irish Reserve Pass-Through
1981	4,683,408	3,363,076	139.3%
1982	13,573,060	14,657,740	92.6%
1983	24,077,378	17,113,205	140.7%
1984	44,404,026	44,338,183	100.1%
1985	29,476,881	29,821,623	98.8%
1986	23,330,932	23,415,624	99.6%
1987	23,330,932	23,415,624	99.6%
1988	23,330,932	23,415,624	99.6%
1989	52,691,757	55,715,060	94.6%
1990	52,691,757	55,715,060	94.6%
1991	13,686,029	11,612,446	117.9%
1992	51,572,927	52,007,946	99.2%
1993	86,050,900	85,600,074	100.5%
1994	84,944,318	85,509,697	99.3%
1995	57,819,496	63,760,564	90.7%
1996	53,203,097	55,960,193	95.1%
1997	66,995,900	65,884,884	101.7%
1998	28,935,580	29,792,106	97.1%
1999	67,026,200	69,625,084	96.3%
2000	74,138,532	78,909,978	94.0%
2001	102,589,812	103,448,730	99.2%
2002	180,567,398	188,112,838	96.0%
2003	22,993,676	18,031,288	127.5%
2004	98,304,816	95,835,286	102.6%
2005	52,230,559	74,619,342	70.0%
2006	54,478,495	46,393,035	117.4%

Note: Because the data for 1986, 1987, and 1989 are not electronically available, I interpolate them.

Isla of Man

A small island situated in the Irish Sea almost equidistant from England, Wales, Scotland, and Ireland, the Isle of Man has shifted in and out of English control throughout its history. In 1866 it gained a measure of home rule. To repeat, the Isle of Man, Guernsey, and Jersey are not part of the United Kingdom but are possessions of the British Crown. The Isle of Man has a monetary history partly distinct from that of the surrounding jurisdictions. Assessing it will help in determining whether the island's current monetary system functions as a currency board.

Table 11. *Key Legislation on the Manx Monetary System*

Year	Number	Short Title	Significance
1679		Tynwald Act of this Year (Only a reference and a brief excerpt of the legislation could be found (Clay, 1858: 54-55).	MadeMurrey Pennies first national currency
1765	5 Geo. 3 c.26	Isle of Man Purchase Act (Mills, 1821: 527-530).	Incorporate the Isle of Man into the British Empire
1865		Companies Act (Gill, 1872: 368-461).	Allows for the opening of the Isle of Man Bank Limited (Royal Bank of Scotland Group, 2005).
1866	29 & 30 Vict. c.23	Customs, Harbours, and Public Purposes Act (Only a reference to this legislation could be found within the Isle of Man (Loans) Act of 1880 (Great Britain. Parliament. House of Commons. 1880: 493-500).	Provideda degree of independence (home rule) for the Isle of Man
1961		Isle of Man Government Notes Act (Only a reference to this legislation could be found (CORRIE Ltd. 2002).	Gave sole power of printing Manx notes and coin to the Treasury
1992		Currency Act	Allowed for the one-to-one exchange of Manx notes and coin and British notes and coin
1995		European System of National and Regional Accounts 1995 (Thame & Lamming, 2000).	Classified Isle of Man banks as non-residents of UK in statistics

The Isle of Man, like many states at one time or another, allowed for privately issued currency. During the early 1600's, one could find many varieties of coins, and even stamps, issued by different private and public interestscirculating in the Isle of Man. In fact, it would take until 1679 for the Isle of Man to first develop the notion of a national currency. In that year an act of the Tynwald (parliament) determined that the "Murrey Penny" would be the only legal currency allowable for trade. This declaration would stand until 1765 when England purchasedthe Isle of Man from the Dukes of Atholl and subsequently introduced the pound sterling. As in England, there were multiple private note issuers operating with unlimited liability, though there was no privileged counterpart to the Bank of England. Private issue of notes continued on the Isle of Man until 1961, making it, with South West Africa (now Namibia), one of the last places on earth to have a form of free banking. The Isle of Man Government Notes Act of 1961 made note issue a government monopoly.

Even before the Isle of Man gained home rule, the Tynwaldcontinued to issue some legislation relevant to the monetary system. Perhaps the most significant was the 1865 Companies Act concerning limited liability corporations, under which the allowance for the creation of the Isle of Man Bank came about. In 1866 the Isle of Man received home rule, and slowly regained autonomy in subsequent legislation passed by the British Parliament.

Nonetheless, the Isle of Man decided to remain in monetary union with the United Kingdom. The Currency Act of 1992, however, implies that the island's currency is distinct from the pound sterling. The opening clauses of the act are worth quoting in full:

Currency of the Isle of Man

(1) The currency of the Isle of Man shall continue to be the pound (in this Act referred to as "the Manx pound") which shall be divided into 100 pence.

(2) The Manx pound shall continue to have parity with the pound sterling.

Legal tender

(1) Government notes shall be legal tender at their face value for the payment of any sum.

(2) Coins shall be legal tender at their face value —

(a) in the case of coins of a denomination of one pound or more, for the payment of any amount;

(b) in the case of coins of other denominations, for the payment of any amount not exceeding £10.

(3) Subsections (1) and (2) shall apply (with the necessary modifications) inrespect of notes or coins which are legal tender in any part of the United Kingdom.

(Not having seen older legislation, such as the Currency and Bank Notes (Legal Tender) Act 1955, I am uncertain how far back the Manx pound was at least nominally a separate currency from the pound sterling.) Bank of England notes and British coin are legal tender in the Isle of Man alongside Manx note and coins. Manx notes and coins, in contrast, are not legal tender in the United Kingdom, although are considered legal currency under English law, and thus English merchants may choose to accept them as payment (Royal Mint, 2014).

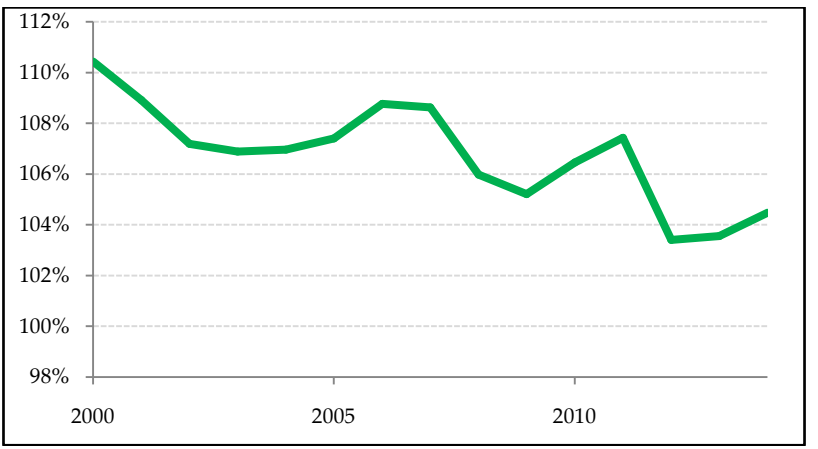

Figure 7. *Isle of Man: Ratio of Reserves to Notes and Coin in Circulation*

The Currency Act of 1992 imposed no specific external reserve requirement against Manx notes and coins. Even so, the government established the Manx Currency Fund to provide

backing to all Manx pounds and coin in circulation. Examining the external reserve ratio for the years readily available (since 2000) shows that it has remained within a range from 103 to 110 percent, and thus the reserve ratio seems to comply with currency board orthodoxy.

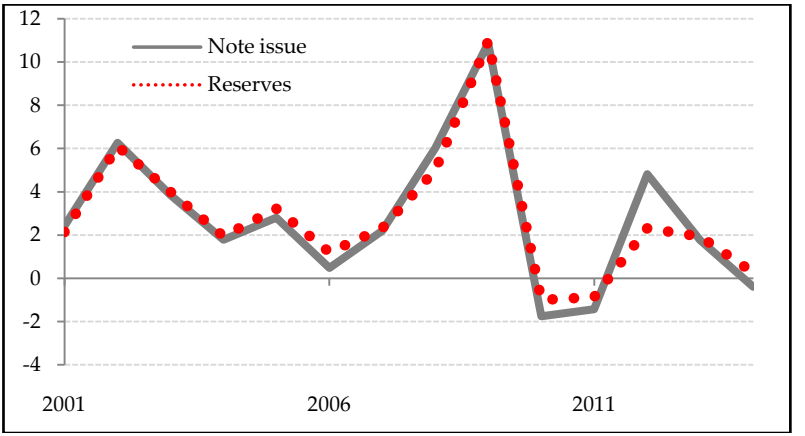

Figure 8. *Isle of Man: Changes in Note and Coin Issue and Reserves (£ million)*

However, comparing the annual change in the Manx Currency Account and Manx pounds in circulationwe observe a marked deviation in 2014 where a contracton of the money supply was matched with an expansion of the Manx Currency Account. In addition to this finding, the reserve pass-through shows many deviations from the 80-120 percent range. In 2006, the reserve pass-through hits a low of 50 percent, which on its face seems to indicate sterilization. From this point, the value only grows up to a 208 percent mark in 2012, which would mean the Manx currency felt the magnified foreign reserve effects from 2010, when it first surpassed 120 percent, to 2012. From this point, the reserve pass-through falls dramatically, though expectedly, ending up at a -144 percent value in 2014. These numbers certainly do not pose a strong case for the orthodoxy of the currency system.

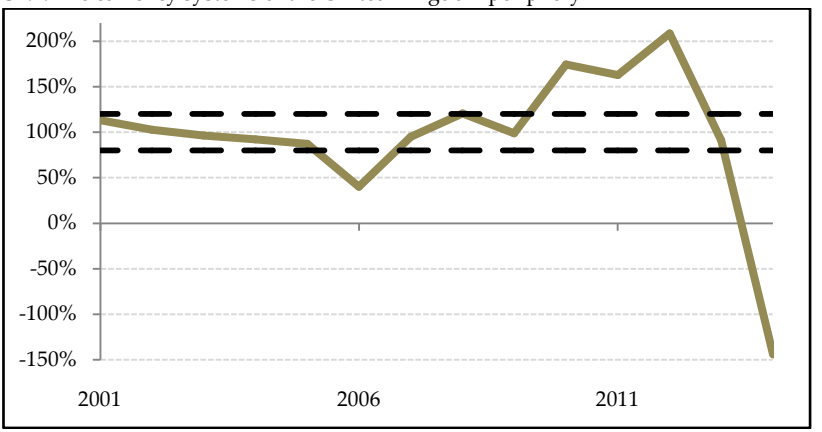

Figure 9. *Isle of Man: Reserve Pass-Through Ratio*

And yet, examining the raw numbers, the deviations from currency board orthodoxy do not look so large. In the year ending with March 2014, Manx currency in circulation fell £388,711 (0.53 percent), while reserves rose £269,939 (0.36 percent). The hugely negative reserve pass-through ratio is therefore the ratio of two small numbers. As was mentioned above, interest on external assets can confound calculations of reserve pass-through. That is especially the case when the change in currency in circulation is very small. The figures just mentioned imply that the result could have been produced by a return on assets of less than 1 percent. Perhaps we need some further measures of currency board orthodoxy to address the issue?

Table 12. *Manx Currency in Circulation, 1980-2014*

Year	Amount of Manx Notes and Coin in Circulation	Manx Currency Account Balance	Reserve Ratio
1980	9,206,343		
1981	9,993,203		
1982	10,750,960		
1983	11,315,192		
1984	11,728,826		
1985	12,145,173		
1986	12,343,594		
1987	12,720,104		
1988	13,241,435		
1989	14,140,749		
1990	13,278,472		
1991	13,612,765		
1992	18,117,385		
1993	20,277,701		
1994	22,905,398		
1995	23,513,530		
1996	25,442,323		
1997	26,435,528		
1998	27,253,562		
1999	29,217,280		
2000	32,600,891	36,002,565	110.4%
2001	35,016,968	38,137,766	108.9%
2002	41,279,378	44,243,909	107.2%
2003	45,132,270	48,240,732	106.9%
2004	46,913,891	50,177,578	107.0%
2005	49,710,628	53,388,307	107.4%
2006	50,195,914	54,595,011	108.8%
2007	52,386,582	56,903,515	108.6%
2008	58,416,867	61,908,222	106.0%
2009	69,277,590	72,885,222	105.2%
2010	67,522,510	71,879,692	106.5%
2011	66,090,726	71,001,087	107.4%
2012	70,900,138	73,308,401	103.4%
2013	72,663,444	75,242,901	103.5%
2014	72,274,733	75,512,840	104.5%

Notes: For all tables on the Isle of Man, the underlying source of data is an annual statement produced by the Manx government called the *Detailed Government Accounts.* E-mail communications with 4the Manx Treasury enabled me to locate electronic issues from 2000 onward; pre-2000 Manx Currency Account datais not online and remainsexcluded here; however further communication allowed for the obtaining of pre-2000 data concerning the amount of Manx note and coin in circulation, which is included.

Table 13. *Annual Change in Manx Currency in Circulation, 1981-2014*

Year	Annual Change in Manx Notes and Coins in Circulation	Annual Change in Manx Currency Fund	Manx Reserve Pass-Through
1981	786,860		
1982	757,757		
1983	564,232		
1984	413,634		
1985	416,347		
1986	198,421		
1987	376,510		
1988	521,331		
1989	899,314		
1990	-862,277		
1991	334,293		
1992	4,504,620		
1993	2,160,316		
1994	2,627,697		
1995	608,132		
1996	1,928,793		
1997	993,205		
1998	818,034		
1999	1,963,718		
2000	3,383,611		
2001	2,416,077	2,135,201	113.2%
2002	6,262,410	6,106,143	102.6%
2003	3,852,892	3,996,823	96.4%
2004	1,781,621	1,936,846	92.0%
2005	2,796,737	3,210,729	87.1%
2006	485,286	1,206,704	40.2%
2007	2,190,668	2,308,504	94.9%
2008	6,030,285	5,004,707	120.5%
2009	10,860,723	10,977,000	98.9%
2010	-1,755,080	-1,005,530	174.5%
2011	-1,431,784	-878,605	163.0%
2012	4,809,412	2,307,314	208.4%
2013	1,763,306	1,934,500	91.2%
2014	-388,711	269,939	-144.0%

Bailiwick of Guernsey

The Bailiwick (also known as the Isle) of Guernsey is one of the Channel Islands. It pledges allegiance to the Royal Family of England as a legal dependency and has done so since 1206, when it first guaranteed its loyalty to King John during his invasion of France (States of Guernsey, 2014). Despite this political affiliation, Guernsey's culture has historically maintained French ties, as shown by the usage of French currencyas the principal monetary unit until the early 1800s. During World War II, Guernsey was invaded by German forces, which issued an occupation currency (Lamine, 2006: 70). It never managed to achieve greater popularity than the currency of the Guernsey government (Bányai, 1970: 42). After the war, the prewar monetary system of a link to the pound sterling resumed.

Table 14. *Key Legislation on the Monetary System of Guernsey*

Year	Short Title	Significance
1914	Ordinance of the Royal Court of Guernsey (Adler, 1937: 342; see also p.343).	(see Act ofthe States of Guernsey, below)
1914	Act of the States of Guernsey (Adler, 1937: 342; see also p. 343).	Provides a monopoly on currency production to the States of Guernsey
1921	Currency and Legal Tender Ordinance [1]	-Grants legal tender status to the English Pound -Links Guernsey currency to English currency at a one-to-one exchange rate
1954	Currency and Legal Tender Ordinance[2][3]	Grants legal tender status to only English and Guernsey currency
1995	European System of National and Regional Accounts 1995 (Thame & Lamming, 2000).	Classifies Isle of Guernsey banks as non-residents of UK in statistics

For many years banks issued their own notes. Nationalization of note issue began with the Ordinance of the Royal Court of Guernsey 1914 and the Act of the States of Guernsey in 1914.

[1] I have not been able to locate a digital copy of this legislation but have managed to find a reference (Page, 1954).

[2] This piece of legislation has been updated several times seemingly to account for changes in legal tender policy held by the Bank of England.

[3]Page (1954).

Together, these two pieces of legislation removed the right to print money from privately owned banks and provided a monopoly on currency production to the States of Guernsey (Adler, 1937: 342; see also p. 343). After World War I, the French franc suffered depreciation against the pound sterling, prompting the Guernsey government to adopt a monetary parity with sterling (My Finance Tree 2008). This was accomplished in the "Ordonnance relative au changement du CoursLégal de la MonnaieencetteÎle, et les Île de Sercq, d'Herm et de Jethou" [Currency and Legal Tender Ordinance] in 1921. In addition to establishing parity with sterling, the ordinance granted legal tender status to English currency on the Isle of Guernsey.

The Currency and Legal Tender Ordinance of 1954 updated the currencies accepted as legal tender, granting status only to Bank of England and Guernsey banknotes; however, Manx, Scottish, Northern Irish, and Jersey Pound notes may still circulate across the island as a means of trade. Based on points mentioned in previous sections, it follows too that Isle of Guernsey pound notes and coin are not considered legal tender in England, although they may be legally used as currency, as this remains a decision by merchants (Royal Mint, 2014).

I have not been able to find any legislative reference to Guernsey's 100 percent reserve-backing policy despite the fact that the government operates the Guernsey Notes and Coins Account to accomplish just this. It may be a result of the 1921 Currency and Legal Tender Ordinance, which I have not been able to locate, or it may be only a policy that could be changed by an executive decision.

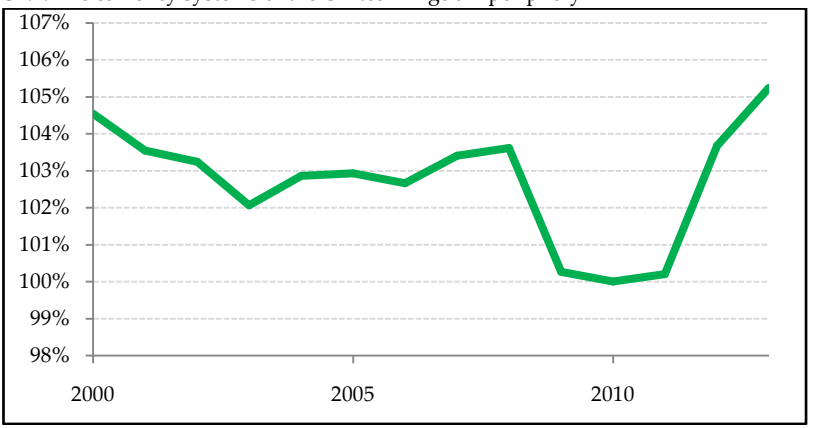

Figure 10. *Bailiwick of Guernsey: Ratio of Reserves to Notes and Coin in Circulation*

Data are available online from 1998-2013 from the *Accounts of the States.* As the graph above makes clear, reserve backing for notes and coins in circulation has been confined to a narrow range, 100-105 percent, nearing the theoretically orthodox 100 percent reserve value.

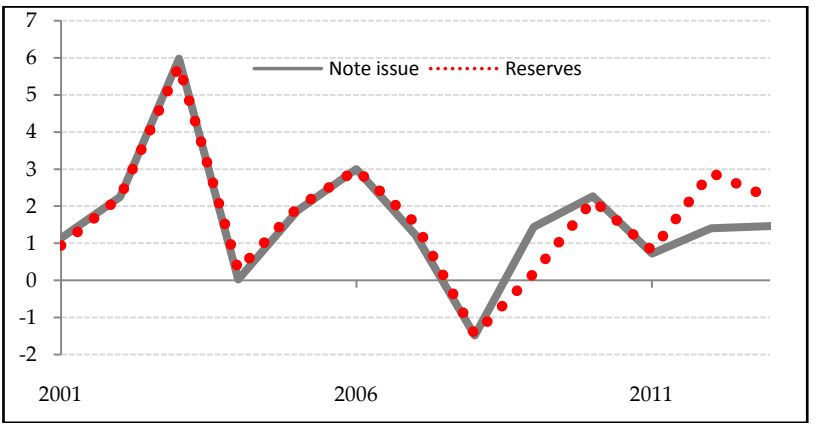

Figure 11. *Bailiwick of Guernsey: Changes in Note and Coin Issue and Reserves (£ million)*

Looking now at the annual changes of currency in circulation and of reserves, they track each other closely, though with some differences in 2009 and 2012. Despite these few removals, even the

year-over-year rate of change is matched significantly similarly through 2008.

The reserve pass-through ratio shows these results:

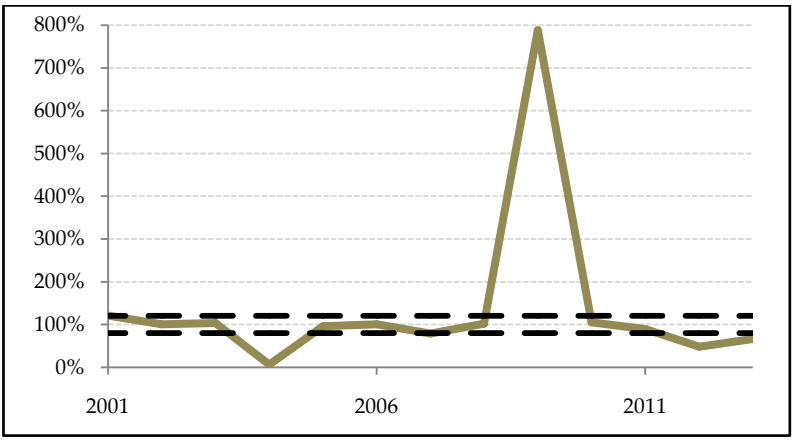

Figure 12. *Bailiwick of Guernsey: Reserve Pass-Through Ratio*

The reserve pass-through ratio reveals several unorthodox statistics, most significantly a 6 percent value in 2004 and an 800 percent value in 2009. As has already been explained, the reserve pass-through tends to intensify as the change in the money supply nears zero. A simple observation of the raw data reveals the number of Guernsey notes and coins in circulation rose by a mere 0.05 percent in 2004 and 3.8 percent in 2009. Because of the meager 2004 increase of notes and coins in circulation, the interest bore on the Guernsey reserves account ought to account for such a low value. However, the 3.8 percent increase in Guernsey notes and coins in circulation clears some of the "noise" away from the ratio. This, along with the lack of legislative data on the matter, calls for a more rigorous analysis on the currency board status of Guernsey.

Table 15. *Guernsey Notes and Coins in Circulation and Guernsey Notes and Coins Account from 2001-2013*

Year	Guernsey Notes in Circulation	Guernsey Coins in Circulation	Total Guernsey Notes and Coins in Circulation	Notes and Coins Account Total	Reserve Ratio
1998	16,174,734	4,355,200	20,529,934	21,544,974	104.9%
1999 (a)	18,761,268	4,792,312	23,553,580	24,335,464	103.3%
1999 (b)	16,174,734	4,355,200	20,529,934	21,311,818	103.8%
2000	18,761,268	4,792,312	23,553,580	24,623,610	104.5%
2001	19,617,016	5,068,322	24,685,338	25,562,409	103.6%
2002	21,446,640	5,490,339	26,936,979	27,810,411	103.2%
2003	25,635,017	7,280,099	32,915,116	33,597,028	102.1%
2004	25,039,101	7,893,842	32,932,943	33,877,551	102.9%
2005	26,632,412	8,174,488	34,806,900	35,828,552	102.9%
2006	29,200,876	8,605,505	37,806,381	38,813,029	102.7%
2007	30,184,918	8,839,865	39,024,783	40,354,942	103.4%
2008	32,430,000	5,105,000	37,535,000	38,892,000	103.6%
2009	33,591,000	5,379,000	38,970,000	39,074,000	100.3%
2010	35,632,000	5,605,000	41,237,000	41,238,000	100.0%
2011	36,231,000	5,728,000	41,959,000	42,045,000	100.2%
2012	37,486,000	5,872,000	43,358,000	44,952,000	103.7%
2013	38,719,000	6,098,000	44,817,000	47,170,000	105.3%

Notes: For all tables on Guernsey, the underlying source of data is the Guernsey Treasury and Resources Department's*Accounts of the States.* The 1999 statistics originally published in 2000 are in the row labeled 1999 (a); strikingly, when republished in 2001, the data, reproduced in the row labeled 1999 (b), were considerably different. The tables show calculations for both 1999 statistics but I exclude them from the graphs, analyses, and conclusions due to the lack of credibility.

Table 16. *Annual Change in Guernsey Notes and Coins in Circulation and in the Guernsey Notes and Coins Account from 2002-2013*

Year	Annualized Change in Total Guernsey Notes and Coins Circulated	Annualized Change in Guernsey Notes and Coins Account	Guernsey Reserve Pass-Through
1999 (a)	3.023.646	2.790.490	108,4%
1999 (b)	0	-233.156	0,0%
2000 (a)	0	288.146	0,0%
2000 (b)	3.023.646	3.311.792	91,3%
2001	1.131.758	938.799	120,6%
2002	2.251.641	2.248.002	100,2%
2003	5.978.137	5.786.617	103,3%
2004	17.827	280.523	6,4%
2005	1.873.957	1.951.001	96,1%
2006	2.999.481	2.984.477	100,5%
2007	1.218.402	1.541.913	79,0%
2008	-1.489.783	-1.462.942	101,8%
2009	1.435.000	182.000	788,5%
2010	2.267.000	2.164.000	104,8%
2011	722.000	807.000	89,5%
2012	1.399.000	2.907.000	48,1%
2013	1.459.000	2.218.000	65,8%

Bailiwick of Jersey

Although no political union exists between the two states, the Bailiwick (also known as the Isle) of Jersey shares a history with the Bailiwick of Guernsey. Both were under the rule of the Duchy of Normandy centuries ago, both are currently crown dependencies, and both link their currencies to the pound sterling. Jersey became subservient to the English Crown in 1066 when William the Conqueror invaded the Channel Islands. The Bailiwick of Jersey would remain part of the Duchy of Normandy until 1204 when King John of England, to convince the Jersey people to take the side of the Englishwhile the French were conquering the rest of the duchy, enticed them with legislative independence and military defense. Over the course of the next several centuries, this independence continued to expand into the modern Crown Dependency of the Bailiwick of Jersey (States of Jersey n.d.).

Table 17. *Key Legislation on the Monetary System of Jersey*

Year	Short Title	Significance
1834	Order in Council of 1834 [4]	Gives sole legal exchange currency status to the English currency
1840	Order in Council of 1840 [5]	Allows for the minting of a Jersey copper penny pegged to a partial value of the English shilling
1876	Emission de Monnaie de Bronze [6]	Reintroduces the Jersey copper penny, except at the same divisions and values of the English currency
1941	Currency Notes (Jersey) Law [7]	Introduces notes printed by the States of Jersey in response to the removal of silver coins by occupying forces
1955	Bank Notes (Jersey) Law [8]	Grants legal tender status to all notes of the Bank of England payable on demand
1959	Currency Notes (Jersey) Law [9]	Pegs Jersey notes to all notes considered to be legal tender at a one-to-one exchange rate, payable on demand
1995	European System of National and Regional Accounts 1995 [10]	Classifies Isle of Jersey banks as non-residents of UK in statistics

Due to its proximity to France, for most of its monetary history the Isle of Jersey used the French *livre tournois* as the major currency. However, because the *livre tournois* was replaced by the French franc as a result of the French Revolution, the Isle of Jersey's supply of coins of the old currency diminished in the late 18th and early 19th centuries. An Order in Council of 1834 reacted to this depletion, making the pound sterling the sole legal tender medium of exchange; nonetheless, the *livre tournois* continued to carry be used in Jersey citizens until the coins became too worn and scarce to use (Lamine, 2006: 70). In 1840, the Bailiwick of Jersey

[4]States of Jersey (1834).
[5]States of Jersey (1840).
[6]States of Jersey (1876).
[7] I only managed to find electronically accessible reference to this piece of legislation (Bois 1959).
[8]States of Jersey (1955).
[9]Bois (1959).
[10]Thame & Lamming (2000).

began to issue its own currencyin the form of copper coins pegged at either one fifty-second, one twenty-sixth, or one thirteenth the value of an English shilling. This would remain the States of Jersey's sole currency, with the *livre tournois* continuing circulate extensively until 1876 with the Emission de Monnaie de Bronze. This would introduce a Jersey copper penny with the same divisions and value of English coins. The following century would continue to introduce new coins into the Jersey monetary system. Moreover, the Currency Notes (Jersey) Law of 1941 introduced state-issued notes as a response to the removal of Jersey coin by occupying German forces (States of Jersey 2014).

The 1955 Bank Notes (Jersey) Lawidentified all notes and coin payable on demand and pegged to the poundsterling as legal tender, meaning all the notes of the other jurisdictions mentioned in this paper hold legal tender status in the Bailiwick of Jersey. Despite this, as explained already, England does not consider Jersey notes to be legal tender but allows that they are legal currency, as that is a matter of interpersonal trade rather than centralized policy (Royal Mint 2014). The 1959 Currency Notes (Jersey) Law, whichcontinues to govern locally issued notes, provided that note holders were entitled to receive payment in any notes they specified that were legal tender on the island. Neither the 1959 law nor, apparently, any subsequent law specifies a minimum ratio of external reserves to currency in circulation.

Online data are available from 2002-2013 using the Isle of Jersey's *States Accounts.* Unfortunately, the Jersey Treasury and Resources Department does not consistently record the total value of the Jersey Currency Fund. I calculated it as total assets less all listed liabilities other than the total value of notes and coins in circulation.

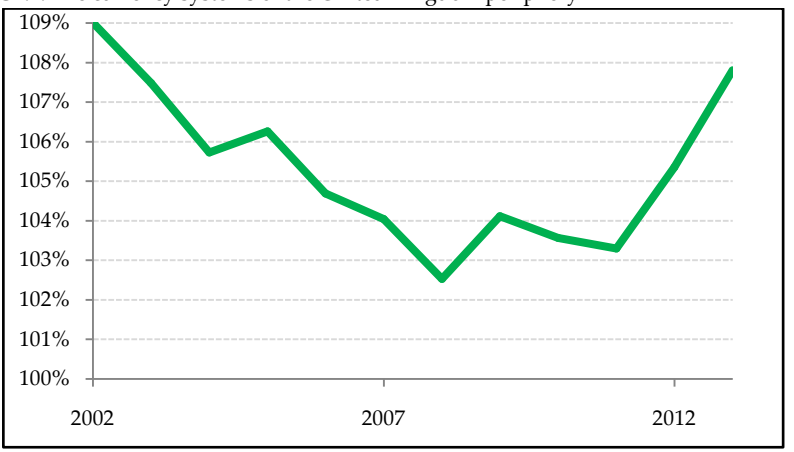

Figure 13. *Bailiwick of Jersey: Ratio of Reserves to Notes and Coin in Circulation*

As the graph above shows, over the period for which there are data, the reserve ratio remains within the range 100-110 percent, as would be expected from an orthodox currency board.

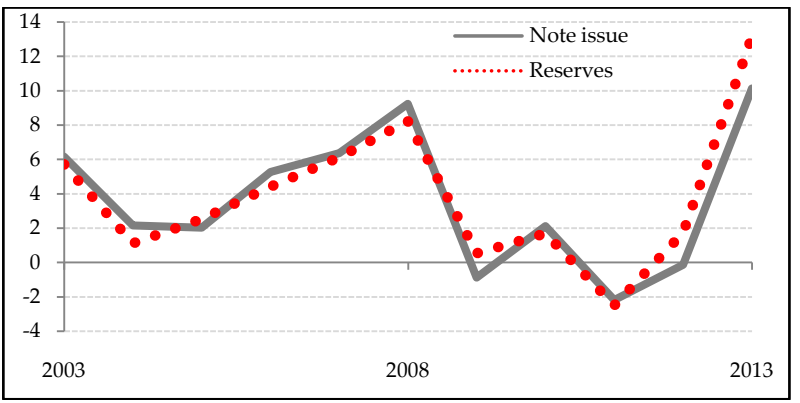

Figure 14. *Bailiwick of Jersey: Changes in Note and Coin Issue and Reserves (£ million)*

The change in reserves and the change in currency in circulation track each other closely. The only exception being in 2009 and 2012 where, in both instances, an expansion of the reserves was matched by a contraction in the number of Jersey notes and coin in circulation.

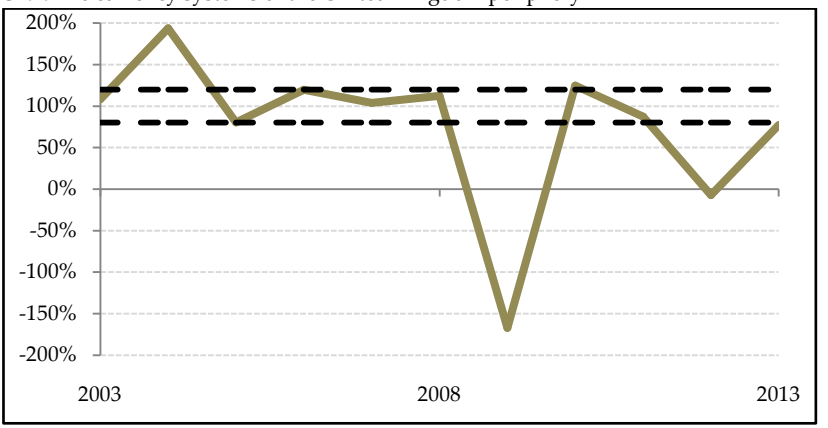

Figure 15. *Bailiwick of Jersey: Reserve Pass-Through Ratio*

Reserve pass-through shows frequent deviations from 80-120 percent range, including figures of 194 percent in 2004 and -167 percent in 2009. The 2009 figure might be explained as the 2014 Isle of Man figure was: a small decline in currency in circulation more than offset by interest earnings on external reserves, not necessarily indicating deviation from operating like a de facto currency board. The 2004 figure sits less well with the presumption that the system operated like a currency board. The assets of the Jersey Currency Fund increased only about half as much as currency in circulation. For the system to have worked like a currency board, the figures imply that the Jersey Currency Fund must have suffered negative returns, or that the government took money from the fund, reducing its reserves. I found no signs for either possibility, and therefore adduce it as reason to be skeptical that Jersey's currency system consistently operates on orthodox currency board principles.

Table 18. *Jersey Currency in Circulation, 2002-2013*

Year	Jersey Notes in Circulation	Jersey Coins in Circulation	Total Jersey Notes and Coins in Circulation	Value of Jersey Currency Fund	Reserve Ratio
2002	55,215,158	5,086,608	60,301,766	65,733,149	109.0%
2003	61,016,580	5,458,720	66,475,300	71,447,676	107.5%
2004	62,839,708	5,795,120	68,634,828	72,563,074	105.7%
2005	64,471,526	6,197,944	70,669,470	75,092,406	106.3%
2006	69,570,380	6,368,078	75,938,458	79,501,990	104.7%
2007	75,648,534	6,658,826	82,307,360	85,634,417	104.0%
2008	84,527,006	7,022,106	91,549,112	93,864,006	102.5%
2009	83,350,187	7,314,028	90,664,215	94,393,930	104.1%
2010	85,226,851	7,552,568	92,779,419	96,091,968	103.6%
2011	82,707,000	7,889,000	90,596,000	93,586,000	103.3%
2012	82,281,000	8,189,000	90,470,000	95,317,000	105.4%
2013	92,265,000	8,344,000	100,609,000	108,459,000	107.8%

Notes: For all tables on Jersey, the underlying source of data is the Bailiwick of Jersey Treasury and Resource Department's*Annex to Financial Report and Accounts.*

Table 19. *Annual Change in Jersey Currency in Circulation, 2003-2013*

Year	Annualized Change in Jersey Notes and Coins in Circulation	Annualized Change in Jersey Currency Fund Value	Jersey Reserve Pass-Through
2003	6,173,534	5,714,527	108.0%
2004	2,159,528	1,115,398	193.6%
2005	2,034,642	2,529,332	80.4%
2006	5,268,988	4,409,584	119.5%
2007	6,368,902	6,132,427	103.9%
2008	9,241,752	8,229,589	112.3%
2009	-884,897	529,924	-167.0%
2010	2,115,204	1,698,038	124.6%
2011	-2,183,419	-2,505,968	87.1%
2012	-126,000	1,731,000	-7.3%
2013	10,139,000	13,142,000	77.1%

Conclusion

In and around the United Kingdom, local monetaryissuers separate from those of the Bank of England exist in Scotland, Northern Ireland, the Isle of Man, the Bailiwick of Guernsey, and the Bailiwick of Jersey. All exchange at one-to-one with the pound sterling. All have legislation or policies providing 100 percent reserve backing for notes and (if locally issued) coins in circulation. Each jurisdiction therefore has, at the very least, a resemblance to a currency board system. However, the paper has shown that each

state deviates in some way from orthodox currency board practices.

In the cases of Scotland and Northern Ireland, the explanation is simple. They are part of the United Kingdom monetarily as well as politically, and, as such, the Bank of England sets their monetary base internally. Thus, Scotland and Ireland do not constitute currency board systems.

The other three cases, being more independent from England both monetarily and politically, are harder. For each, we must look directly to the analyses performed on the data. As with Scotland and Northern Ireland, each seemed to reveal deviations from currency board orthodoxy, especially by reserve pass-through measures. On their face, all states analyzed in this account failed to comply with standards of orthodoxy, overwhelmingly indicated by marks of sterilization as well as magnified reserve effects. However, the amount of data on these states is extremely limited, with the small window of data only produced annually. With the introduction of monthly or quarterly releases on the statistics published in this paper, we could prove more conclusively the status of these currency board-like systems.

On top of this discrepancy is the lack of legislative transparency in these isles. For all three, I was unable to locate the legislation outlining the principles by which they enumerate the powers and limits of those who control the reserve accounts. Without this critical information, it makes difficult to remove the "noise" from the data. For the time being, we may only leave this notion as mere speculation and focus only on the intricacies of the data within possession. That being said, the intricacies do not indicate the operations of orthodox currency boards, and so this is how we must conclude.

Investigation of the underlying data also raises a question how good an indicator reserve pass-through is of currency board orthodoxy when changes in currency circulation are small. Particularly in the case of a decline in currency in circulation that is small, external assets can continue to grow as long as yields are near or above, say, 1 percent a year. The reserve pass-through ratio makes it appear as if sterilized intervention is happening even though it may not be. Perhaps there are supplementary measures

or adaptations of the reserve pass-through measure that would make it more useful for such cases.

I hope this analysis provides opportunity for future research on the data provided. Perhaps even more significantly, I would hope this paper's conclusions and future conclusions on behalf of this paper's data allow for analysis on the costs and benefits of operating such regimes, for we must always take into regard that behind any concentration of economic data lie the operations of people.

Note

The data presented here are also in an accompanying spreadsheet workbook [for source] that should be posted with this paper. If it is not, I will provide the workbook on request. The workbook may be more convenient than the working paper for researchers interested in analyzing the numbers. I have provided copies of the primary sources used in the working paper and the workbook to the Institute for Applied Economics, Global Health and the Study of Business Enterprise. It maintains an archive of currency board annual reports and related material, which is available for consultation by scholars.

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8 The constitutions (Founding laws) and comparable features of select currency boards in the former British Empire

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Introduction

The origins and evolution of currency boards trace back to the British Empire of the 19th and 20th centuries, when it became necessary for the expanding empire to produce a stable, structured, and global financial system across its territories. At the same time, the adoption of paper currency in place of traditional metallic currency (silver and gold) to make financial transactions less burdensome made it even more necessary to institute a system to meet the new demands and challenges. The British were among the first to recognize the importance of stable exchange rates, ample backing for currency with reserves, and independence of the currency system from domestic governments that could abuse the power to print money to repay their debts through inflation. The concept of currency boards was born out of these criteria and demands, and the British Empire not only produced a currency system to serve its imperialistic needs, but also created a system that could be applied to other territories, countries, and regions around the world to promote a stable economic environment with minimal currency-related risk.

This chapter analyzes the laws of some importantcurrency boards of the British Empire. Comparing them provides insights into the development of currency boards. Changes between successive currency boards revealwhich features fell out of favor and which became more central, universal features of currency boards across the Empire. This paper was also influenced by the desire to fill a niche in the conversation about currency board structures begun by Camilleri Gilson (2004), Ho (2003), and Tsang (1999). They discuss recent currency boards in countries such as Argentina, Bulgaria, and Hong Kong. It is desirable to expand the analysis to encompass older currency boards, most of which were in the British Empire.

The British Empire systematically established currency boards in its territories and allowed each dominion to produce and circulate its own currency (notes and/or coins) that was backed by metal reserves and financial assets that paid interest. The territories included, but were not restricted to, those being analyzed in this paper (listed in chronological order according to when their respective currency board constitutions were passed into law): New Zealand, India, Ceylon, Straits Settlements, West Africa, East Africa, Palestine, Southern Rhodesia, and the British Caribbean. Local notes and coins generated seigniorage for colonial governments that would instead have accrued to the British government had they used sterling (British currency). In addition, the local currencies usually had local language and imagery on them besides English writing, which made them more accessible to the public.

The analysis of the select nine territories in the British Empire intends to juxtapose the different currency boards through their constitutions to show the evolution of characteristics of currency boards seen today as instrumental in maintaining their integrity. From a historical perspective, the analysis provides insights into the rarely documented original founding documents of currency boards and produces a storyline of certain characteristics that became more apparent to lawmakers as being of utmost importance. Even though amendments to the founding laws are not analyzedhere, it is possible to infer something about them by

comparing the constitutions of later currency boards with those of earlier currency boards.

In addition, studying the constitutions helps show how currency boards adapted to macroeconomic trends such as the proliferation of complex financial instruments and capital flows, and microeconomic trends specific to their territories or the British Empire such as the financial relationship between the territories and the mother country. The analysis of the constitutions sheds light on the adaptive capabilities of a currency board and the commitment of those who implement the system to economic stability through currency stabilization in the face of global political and economic uncertainty and upheaval, which are still relevant today.

Methodology

The core of my analysis relies on data collected from the original currency board constitutions of select former British Empire territories: New Zealand, India, Ceylon, the Straits Settlements, West Africa, East Africa, Palestine, Southern Rhodesia, and the British Caribbean. Once I decided that the British Empire was the focus of my analysis of the development and progression of early currency boards, the ability to locate the necessary and available documents became the main limiting factor of my analysis. The constitutions were collected through online searches of public archives and trips to public libraries such as the Library of Congress in Washington, D.C. and the British Library in London. The nine former British Empire territories were then chosen not only based on the availability of their currency board constitutions, but also because they provided breadth and depth of analysis since their currency boards were founded at different times and their locations spanned continents.

Once the original constitutions were collected through online download or photography of the physical copies, select information was transcribed onto Tables found in this paper. (Source information and downloadable PDFs for the constitutions can be found towards the end of this working paper in the section "Source Documents.") The Tables allow us to systematically juxtapose the currency boards and their constitutions based on

standardized criteria. They include basic information such as the name and date of the currency board law, and then go into detail about exchanges rates and the restrictions regarding the assets and liabilities that can be held by the currency board. The Tables are organized so that for each currency board, a simple response such as "Yes,""No," or "Unclear" is recorded to show if the constitution includes information pertaining to the criteria in question (with Unclear meaning either the information is not explicitly stated or has room for interpretation). If additional information is available, it is provided to explain the reasoning behind the responses.

This chapter uses seven out of the many regulations and characteristics recorded to narrow the analysis to the most salient points. These characteristics are: (1) exchange rate to anchor currency, (2) types of assets the currency board can hold, (3) prohibition against holding domestic assets, (4) minimum reserve ratio against monetary liabilities, (5) policy if liabilities exceed assets, (6) procedures for the distribution of profits, and (7) policy or managerial autonomy of the currency board from the government. These characteristics were chosen based on their historical relevance to the development of currency boards, which have taken on a more refined, universal definition over the years.

By the late 20th century, the concept an "orthodox" currency board had been developed. It specified a set of criteria that a currency board must comply with to maintain its integrityas a system where the monetary base expands and contracts according to well-specified rules. Johns Hopkins economist Hanke (2002) defines an orthodox currency board as a "rule-bound monetary institution without discretionary monetary policies." A more comprehensive definition can be found in the same text. In this working paper, the nine currency boards will be put through an "orthodoxy" test only based on the seven characteristics mentioned. The analysis and Figures were set up so that a "Yes" response for a currency board for the particular characteristic studied generally meant that the board was orthodox according to that particular trait. My interpretations of the criteria for the seven characteristics will be explicated in the analysis section this working paper. This method of analysis will reveal trends or

progressions over the years towards the present-day accepted definition of a currency board.

The analysis section includes a simple Figure with an overall view of each characteristic for each currency board. The Figure simply records a Yes, No, or Unclear response for whether or not aparticular currency board constitutionhas a provision regarding the specified characteristic. Then each characteristic has its own sub-section with a full analysis where the Yes, No, or Unclear responses are explained with explicit descriptions and details since the differences between currency board constitutions are often nuanced and the changes between each successive board are typically incremental. The information in each sub-section is also presented in Figure form for intuitive juxtaposition.

A currency board may be referred to not by its full name, but only by the name of the territory it served. Out of the nine currency boards analyzed, the term currency board was not explicitly used until the formation of the West African Currency Board in 1912. However, for the sake of simplicity and because they share the same lineage and many characteristics, the institutions are all referred to as currency boards even though some names did not use the term explicitly, i.e. the Colonial Bank of Issue (New Zealand), the Department of Issue (India), the Ceylon Currency Commissioners, and the Board of Commissioners of Currency (the Straits Settlements). After the West African Currency Board, the term became standardized, i.e. the East African Currency Board, the Palestine Currency Board, the Southern Rhodesian Currency Board, and the British Caribbean Currency Board.

Analysis of select regulations and characteristics

Table 1 is an overarching summary of the seven characteristics mentioned above and some identifying details of each currency board. Subsequent tables go into detail about each characteristic.

Table 1. *Summary of Regulations and Characteristics Specified in the Currency Board Constitutions of the Select British Territories*

	New Zealand	India	Ceylon	Straits Settle-ments	West Africa	East Africa	Pales-tine	South-ern Rhod-esia	British Carib-bean
Year of Constitution	1847	1861	1884	1897	1912	1921	1927/ 1928	1938	1950
Specifies exchange rate to anchor currency?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specifiestypes of assets the currency board can hold?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prohibits holding domestic assets?	No	No	Yes	Yes	No	No	No	No	Yes
Minimum reserve ratio against monetary liabilities?	Yes	Yes	Yes	Yes	Yes/ Unclear	Yes/ Unclear	Yes/ Unclear	Yes/ Unclear	Yes/ Unclear
Specifies policy if liabilities exceed assets?	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Specifies procedures for distribution of profits?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Policy or managerial autonomy of the currency board from the government?	No	No	No	No	No	No	No	No	No

Note: Each detail (besides the year the currency board constitutions was signed into law) was answered with Yes/No/Unclear depending on if it was specified. Some with gray areas and possible mixed interpretations are marked as Unclear and are explained in the body of the text document.

Exchange rate to anchor currency

All of the currency board constitutions required the currency boards to issue notes and coins convertible on demand into the anchor currency at a fixed exchange rate. People could exchange silver, poundssterling, or other acceptable money equivalents into the local currency and vice versa. The rationale behind a fixed exchange rate was that this type of monetary stability would create confidence that the publicly held local currency notes would not devalue against the anchor currency. If a devaluation risk existed, individuals would not have exchanged for the local currency. The paper notes were issued to be good stores of value, despite having no intrinsic value. Therefore, currency boards needed to have a fixed exchange rate, which could only be maintained if they had

sound balance sheets where the value of liabilities did not exceed the value of assets.

The table below shows the exchange rate of the local currency to the anchor currency. For the currency boards studied in this working paper, the anchor currency was either silver or sterling notes and coins. (Even though the anchor currency was either silver or sterling, some constitutions allowed gold or securities to be held as assets since they were highly liquid and could be easily exchanged for silver or sterling in the market.) Currency boards in India and Ceylon had silver as their anchor currency because in Asia, silver had been the standard of value for centuries prior to the formation of the currency boards. Silver was a liquid asset and had a fairly stable market value in the early and mid 1800s. In the late 1800s silver depreciated against sterling, which was a gold-standard currency, and India and Ceylon essentially switched to sterling as their anchor currency.

The switch to sterling was accompanied by a switch from metal to purely financial reserves. Early currency boards held large amounts of silver (or gold) coins in their vaults. Later on, British administrators figured out that the currency boards simply had to hold enough reserves in easily saleable securities in London to meet the convertibility requirement.

In the constitutions for the West Africa Currency Board and boards created after it, the exchange rate was simply expressed in terms of local currency to sterling. For ease of calculation, most currency boards maintained a one-to-one exchange rate with sterling. There were exceptions that kept their old units, though: India and Ceylon, where the rupee had been used as a unit of account for centuries before British rule, and the British Caribbean, where the dollar (originating from the Spanish silver dollar, also known as the peso or piece of eight) had been the standard unit of the hemisphere since the 1500s.

It is evident that over the years, currency board constitutions have had provisions that stressed the importance of maintaining a stable and predictable exchange rate, which has become an important criterion of an orthodox currency board. "An orthodox currency board issues notes and coins convertible on demand into a foreign anchor currency at a fixed exchange rate" (Hanke, 2002:

88), so all of the nine currency boards studied adhered to this principle.

Table 2. *Exchange Rate to Anchor Currency*

Currency Board	Yes/No/ Unclear	Details
New Zealand	Yes	"Every note shall be expressed to be payable in pounds sterling and in cash" (p. 299, Section 10)
India	Yes	979 Indian rupees = 1000 tolahs of standard silver fit for coinage (Section IX)
Ceylon	Yes	1 Indian rupee (note) = 1 Indian silver rupee (coin) (p. 350, Section 11)
Straits Settlements	Yes	Notes expressed in dollars can be exchanged for "payment in silver coin of the amount expressed in the note" (p. 1654, Section 4)
West Africa	Yes	British West African £1 (coin) = equivalent par value in gold (p. 7, Section 6)
East Africa	Yes	8½ Indian rupees = 2shillings 4 pence sterling (p. 2, Section 2)
Palestine	Yes	Palestinian £1(1000 mils) = £1 sterling (p. 6, Section 6)
Southern Rhodesia	Yes	Southern Rhodesian £1 = £1 sterling (p. 4, Section 13 and p. 5, Section 17)
British Caribbean	Yes	British Caribbean $1 = 4 shillings2 pence sterling (p. 248, Section 2)

Types of assets the currency board can hold

The currency boards held their assets in funds with names such as "Currency Fund" or "Note Security Fund," and to maintain convertibility, they needed to have enough reserves on hand so that anyone who demanded to exchange between the local currency and the anchor currency could do so at any currency board location. Therefore, a currency board or its agent needed sufficient silver, gold, cash, or sterling in its vaults to meet demands. Besides these very liquid assets, a currency board was allowed to hold assets that paid interest. The profits made currency boards self-sufficient and able to pay for expenses. Expenses included: wages for the board members, officers, and other staff, and costs for printing new notes and minting new coins to replace worn out money in circulation. All the currency board constitutions, except for New Zealand's, specified that government securities (especially those sold by governments within the British Empire) are the only investment allowed unless otherwise specified such as in case of the West African Currency Board. Government securities were generally the safest and most liquid

assets on the market, and by allowing currency boards to invest in government debt, governments had access to large institutional buyers.

The constitutions were typically vague about the required amounts and percentage of the total assets to be held in liquid assets such as silver, gold, cash ("gold or silver coin of the realm at English mint prices"[1]), or sterling, except in the case of New Zealand, whose constitution required at least one-fourth of total assets to be held in liquid assets (not securities). Metals such as silver and gold held their value in weight and quality. Discretion on the exact amounts and future changes was often given to the Governor or the British Secretary of State for the Colonies (or, in the case of India, the British Secretary of State for India), who were considered fairly impartial because they were not employed by the currency board or involved in its everyday operations. If the Governor felt that a larger reserve was necessary, less was invested in risky securities. The Governor was in charge of establishing the ratio in some cases because the government was exposed to risks associated with the currency board's balance sheet. According to all the constitutions, the government had to pay out of its general revenues to the Currency Fund if the value of assets in the currency board's balance sheet fell below the value of liabilities at the end of its accounting period. Government backing of the local currency made the currency even more secure. The role of the government in the operations of the currency board is further elaborated in this in later sections of the analysis: **"**Policy if Liabilities Exceed Assets,""Procedures for the Distribution of Profits," and "Policy or Managerial Autonomy of the Currency Board from the Government**."**

Over time currency boards became less and less concerned about holding metals as assets, especially in currency boards formed after World War I when the adherence to the gold standard was weakened by wartime inflation. By the time when the British Caribbean Currency Board was formed in 1951, it was no longer necessary to even mention or include silver, gold, or metals of any kind as part of reserves. The pound sterling (which was tied to the

[1] New Zealand, Paper Currency Act 1847,p. 303.

price of gold for most of the period from 1821until the collapse of the Bretton Woods in 1971) became the reserve of choice. In addition, it became standard practice for balance sheet calculations and investments to be denominated in sterling.

Out of the nine currency boards studied, those in India, Ceylon, the Straits Settlements, East Africa, and Palestine hadthe strictest regulations on the types of assets that can be held. They would have been in line with the modern definition of an orthodox currency board where "[as] reserves, [orthodox currency boards] should hold low-risk, interest-bearing bonds denominated in the anchor currency and typically some gold" (Hanke, 2002: 88).The other currency boards had more open-ended policies, especially Southern Rhodesia's currency board, which allowed the "depreciation reserve" of its currency fund (the portion in excess of 100 percent) to be lent out to local banks, invested in public funds, and left at the discretion of approval from its leadership. Even though historical records show that none of the currency boards studied suffered greatly from bad investments in local assets, such investments exposed them to political pressure and they were less liquid than investments in external securities that could be easily sold in London.

Table 3. *Types of Assets the Currency Board Can Hold*

Currency Board	Yes/No/ Unclear	Details
New Zealand	Yes	Cash of at least one-fourth the value of notes in circulation to be held as reserve, the rest can "be invested or placed out at interest on good and sufficient security by or under the direction of the Governor," gold and silver coins (p. 299, Section 20)
India	Yes	Silver or gold coin or bullion of the Government of India (issued before the currency board), foreign silver or gold coin or bullion, and Government securities (value of securities cannot exceed 40 million rupees) (Section X)
Ceylon	Yes	Silver rupees of India and government securities of British colonies (including India) except for Ceylon (p. 350, Section 13)
Straits Settlements	Yes	Silver coins (p. 1654, Section 4) and government securities of any British colony excluding the Straits Settlements (pgs. 1655-1656, Section 8)
West Africa	Yes	"The Board will maintain in London against the silver coinage a reserve of gold and securities, hereafter referred to as the gold standard reserve" (p. 7, Section 8) with securities meaning "securities of the Government of any part of Her Majesty's

		dominions, or in any other manner the Secretary of State may approve" (p.7, Section 14)
East Africa	Yes	British Treasury notes, Bank of England notes, gold coin, cash (p. 4, Section 8), and "securities of the Government of any part of Her Majesty's dominions" (p. 8, Section 15)
Palestine	Yes	Pounds sterling (p. 6, Section 7) and"securities of the Government of any part of His Majesty's Dominions or in such other manner as the Secretary of State may approve" (p. 7, Section 14)
Southern Rhodesia	Yes	"The liquid portion of currency board fund may be in cash or on deposit or in British Government Treasury Bills, or may be lent out at call to banks for short terms or invested in short-term sterling securities" and the other portion may be invested in parliamentary stock, public funds, or Government securities of the United Kingdom, other bonds and stocks that are approved, and gold bullion (p. 9, Section 30)
British Caribbean	Yes	Sterling, "sterling securities of or guaranteed by the Government of any part of the British Empire (except for the participating Governments)," cash, deposit in the Bank of England or in British Treasury bills, and short-term investments approved by the Secretary of State (pgs. 248-249, Section 3)

Prohibition against holding domestic assets

Going into more detail on points from the previous section, one of the features of an orthodox currency board is that the board is not allowed to invest in domestic government securities or other domestic assets. Without this requirement, it is possible for the local government to pressure the board to print currency to fund government debt. Printing money in exchange for bad government securities can lead to high inflation and a possible default by the currency board when the value of its liabilities exceedsthe value of its assets and the government is not in a financial position to back the currency.

However, as shown in the Figure below (using the same details from the constitutions as the previous section), only constitutions in Ceylon, the Straits Settlements, and the British Caribbean specifically state that domestic government securities could not be purchased. The other constitutions do not address the purchase of domestic government securities. Therefore, in the Figure, currency boards with ambiguous statements in their constitutions about the prohibition against holding domestic assets are marked as "Unclear."

There may have been a number of reasons why the governments that formed of the currency boards did not initially address the issue of domestic government securities. At the time, government default in British territories was not seen as a major risk. In the case of Southern Rhodesia, short-term government securities were considered fairly liquid and were held in limited amount, counting towards the "currency reserve" portion of the currency fund (the first 100 percent of assets) and not the "depreciation reserve" (the portion in excess of 100 percent). There was also minimal risk of the local government abusing its power to force the currency board to buy its debt since the territories had British oversight and kept careful records of transactions.

Therefore, it is more interesting to explore the reasoning behind the specific restrictions against holding domestic government securities placed upon the Ceylon, Straits Settlements, and the British Caribbeancurrency boards. It could have been that at the time British currency experts were worried about the risk associated with the government securities in these particular territories, or simply wanted to make sure the currency boards diversified their assets with assets from other parts of the Empire. Another possible explanation is that experts in charge of putting together the constitutional documents had opposing opinions on the riskiness of holding domestic government securities and some chose to have the restriction in place. Although no pattern seems to emerge as to which constitutions have the restriction, it is important to note that the constitutions analyzed are only the founding documents, so later amendments or attached appendices may have more details on the matter and reveal a trend.

In terms of adhering to the rule that orthodox currency boards should not hold domestic government securities to prevent possible abuse and high inflation, only the currency boards in Ceylon, Straits Settlements, and the British Caribbean qualify. The other currency boards have constitutions that are much more vague. Often the British Secretary of State for the Colonies had the power to grant a waiver that he never was asked to exercise or never granted, making those currency boards more orthodox in practice than they could have been in principle.

Table 4. *Prohibition against Holding Domestic Assets*

Currency Board	Yes/No/ Unclear	Details
New Zealand	No	Cash of at least one-fourth the value of notes in circulation to be held as reserve, the rest can "be invested or placed out at interest on good and sufficient security by or under the direction of the Governor," gold and silver coins (p. 299, Section 20)
India	No	Silver or gold coin or bullion of the Government of India (issued before the currency board), foreign silver or gold coin or bullion, and Government securities (value of securities cannot exceed 40 million rupees) (Section X)
Ceylon	Yes	Silver rupees of India and government securities of British colonies (including India) except for Ceylon (p. 350, Section 13)
Straits Settlements	Yes	Silver coins (p. 1654, Section 4) and government securities of any British Colony excluding the Straits Settlements (pgs. 1655-1656, Section 8)
West Africa	No	"The portion of the gold standard fund authorised to be invested may be invested in securities of the Government of any part of Her Majesty's dominions, or in any other manner the Secretary of State may approve" (p. 7, Section 14)
East Africa	No	"The Board may invest their funds in securities of the Government of any part of Her Majesty's dominions, or in such a manner as the Secretary of State may approve" (p. 8, Section 15)
Palestine	No	"The Board may invest its fund in securities of the Government of any part of His Majesty's Dominions or in such other manner as the Secretary of State may approve" (p. 7, Section 14)
Southern Rhodesia	No	"The liquid portion of currency board fund may be in cash or on deposit or in British Government Treasury Bills, or may be lent out at call to banks for short terms or invested in short-term sterling securities" and the other portion may be invested in parliamentary stock, public funds, or Government securities of the United Kingdom, other bonds and stocks that are approved, and gold bullion (p. 9, Section 30)
British Caribbean	Yes	"The Fund may be invested in sterling securities of or guaranteed by the Government of any part of the British Empire (except for the participating Governments)" (p. 248, Section 3)

Minimum reserve ratio against monetary liabilities

The minimum reserve ratio refers to the share of the currency fund devoted to a "liquid" portion as opposed to a less liquid "investment" portion. There is no current standard concerning the exact amount or ratio an orthodox currency board should hold in its liquid reserve. The reserve is usually composed of foreign reserves in cash, gold, short-term government securities that is

designed to meet the anticipated every-day demand for exchange (convertibility).

Only the constitutions of the earlier currency boards in New Zealand, India, Ceylon, and Straits Settlements included specific amounts or ratios that must be held in the liquid portion of the fund. The minimum ratio was typically half of total notes and coins in circulation, because the everyday exchange between local currency and reserve currency would under normal circumstances not come close to exceeding this amount (only a bank run would have caused higher amounts of exchange). A lower ratio allowed the currency boards to invest more in risky assets that had higher returns, which increased the board's income and the coffers of the general government that received the excess profits.

The currency boards formed later in West Africa, East Africa, Palestine, Southern Rhodesia, and the British Caribbean had more flexible policies and usually allowed the Governor or Secretary of State of the territory to fix the minimum from time to time. In the Figure below, these boards were marked as "Yes/Unclear." The advantage of flexibility was that the currency board couldrespond to changes in the economy if certain circumstances led to individuals exchanging currency at higher volumes or to securities becoming more risky. Since the general government had to pay into the currency fund if its value fell below 100 percent of currency in circulation, it was in the best interest of the government to have control of the minimum reserve ratio. Therefore, the transition towards a policy with more flexible minimum reserve ratios meant that the Governor and the British Secretary of State were trusted to make the proper decisions, which made the currency board and the government in theory more adaptable to changing economic conditions.

Another interesting development in reserves was the location in which they were held. Early currency boards held most of their reserves locally because local specie and other forms of money were converted into notes and coins circulated by the currency boards. Holding reserves locally allowed the boards to easily maintain convertibility. However, convertibility and bank runs were not seen as serious threats as currency boards became more widely adopted throughout the Empire. Therefore, in later

currency boards such as Southern Rhodesia (1938) and the British Caribbean (1951), almost all reserves were held in London. One reason for this practice was that it gave the British government more control of the territories since they held a non-negligible portion of the territories' wealth. In addition, the Crown Agents for the Colonies, which many currency boards empowered to act as their financial trustee in London, invested a large share of currency board reserves in British national government securities and a smaller but still substantial share in British local government securities. This new practice also caused currency boards around the Empire to shift towards holding more sterling securities as reservesand away from holding specie.

Since there is no defined minimum reserve ratio for a currency board to qualify as orthodox, as long as proper analysis has been conducted to arrive at an amount of reserves necessary to meet convertibility demands, all the currency boards here qualify as orthodox in this respect.

Table 5. *Minimum Reserve Ratio against Monetary Liabilities*

Currency Board	Yes/No/ Unclear	Details
New Zealand	Yes	Cash of at least one-fourth the value of notes in circulation to be held as reserve (p. 299, Section 20)
India	Yes	"The whole amount of the bullion and coin so received for Notes shall be retained and secured as a reserve to pay such Notes, with the exception of such an amount, not exceeding four crores [40 million] of Rupees, as the Governor-General in Council, with the consent of the Secretary of State for India, shall from time to time fix" (Section X)
Ceylon	Yes	"Retain a reserve in silver coin of one-half at the least of the amount of currency notes in circulation" (p. 350, Section 12)
Straits Settlements	Yes	Silver coin in the Note Guarantee fund must be no less than one-half of notes in circulation under any circumstance (p. 1655, Section 7)
West Africa	Yes/ Unclear	"The proportion of such reserve held in gold shall not fall below a limit to be fixed from time to time by the Secretary of State" (p. 7, Section 9)
East Africa	Yes/ Unclear	"A limit fixed from time to time by the Secretary of State" (p. 8, Section 17)
Palestine	Yes/ Unclear	"Subject to any directions which may be received from the Secretary of State, a proportion of its reserve [must be] in liquid form" (p. 7, Section 14)
Southern Rhodesia	Yes/ Unclear	"A proportion of the fund shall be held in London in liquid form, and such proportion may be determined and varied from time to time by the Board" (p. 9, Section 30)
British Caribbean	Yes/ Unclear	"Aproportion of the Fund shall be held in London in liquid form and such proportion may be determined and varied from time to time with the approval of the Secretary of State by the Board" (p. 249, Section 3)

Note: Certain currency boards counted government securities towards their liquid reserves and some counted them towards the investment portion of their funds.

Policy if liabilities exceed assets

Since the currency boards held assets that faced the risk of losing value, determining if and what kind of policy exists for the situation where the value of liabilities exceeds the value of assets will give insight into how much the lawmakers saw this as a risk. All the constitutions studied have measures in place to prevent the currency funds from reachinginsolvency (e.g. minimum reserve ratios and government oversight). Therefore, not surprisingly, most currency board constitutions also contained concrete policies in the event of insolvency.

All of the constitutions, except for those for West Africa and East Africa, explicitly state that payment in cash of all notes and coins in circulation are chargeable against the general revenue of the territorial governments if the currency boards do not have the ability to exchange them for the specified anchor currency or asset. Since all currency boards held securities, they facedthe possibility that their investments might go bad through default by the issuer. In addition, many currency boards also held gold and silver in their reserves, so depreciation was a concern in cases where there were large holdings of one metal (usually silver) but the anchor currency was tied to another metal (usually gold).

With these risks in mind, most of the constitutions use similar language to describe how the government was ultimately responsible for upholding the currency, which is why the exclusion of such a policy in the currency board constitutions for West Africa and East Africa wassurprising. The currency boards formed before and after them had such a clause. In East Africa, the currency board, fully supported by member governments, accepted silver coins for conversion into the board's sterling-based currency at a rate that proved to be too high, leaving the board with a hole in its balance sheet. During the Great Depression the hole got bigger. East African governments pledged to lend up to £1.5 million to replenish the board's foreign reserves if they became exhausted (East African Currency Board annual report 1933: 5, 10-15), which however did not happen. Not until 1946 did the board's years-long retention of profits eventually close the hole (East African Currency Board annual report, 1946: 7).

It is unlikely that the procedures for insolvency were intentionally left out of the constitutions for West Africa and East Africa because it is clear from looking at all the other constitutions that procedures were getting more sophisticated and not the other way around. Starting with Ceylon, currency boards were required to add to and maintain "depreciation funds" for the specific purpose of covering potential losses and preventing liabilities from exceeding assets. In general, one percent of profits from seigniorage and investments were placed into the funds every year. Although the likelihood of a currency board in the British Empire going insolvent was very low, lawmakers saw the necessity for having procedures in place for accountability purposes. It was important that the currency was fully backed by the currency board and government for the public to trust and adopt the currency.

In terms of trends, the Straits Settlements currency board constitution was one of the first documented instances of the "110 percent rule," where the currency board had to add to the depreciation fund until total assets (currency reserve and depreciation reserve combined) equaled 110 percent of liabilities. Orthodox currency boards have since adopted this "110 percent rule", although the "rule"is more of a general guideline rather than a requirement. In addition, the money in the depreciation fund can oftentimes be invested. With the exception of the currency boards of West Africa and East Africa, all the boards here can be considered orthodox since they have clauses that stipulate the procedures and responsibilities in case the value of liabilities exceeded the value of assets.

Table 6. *Policy If Liabilities Exceed Assets*

Currency Board	Yes/No/ Unclear	Details
New Zealand	Yes	"The ultimate payment in cash of all notes to be issued or reissued shall be charged and chargeable upon the general revenue of the Colony of New Zealand" (p. 299, Section 19)
India	Yes	"A tender of a Note or Notes issued under this Act […] shall be legal tender to such amount expressed […], and shall be taken to be taken to be valid as a tender to such amount in payment of any revenue or other claim […] due to the Government of India" (Section XVI)
Ceylon	Yes	"Currency notes shall be held to have been issued on the security of

		the said coin and securities [(in the reserve)] as well as on the general credit of the Government of Ceylon" (p. 350, Section 14), and the currency board is suggested to add to and have access to a depreciation fund which takes one percent of profits from investments each year (p. 351, Section 18)
Straits Settlements	Yes	"If a sum is required to meet the sum any such note and the said moneys are insufficient to meet it the sum shall forthwith on the demand of the Commissioners be issued under the order of the Governor out of that general revenue" (p. 1654, Section 4), and the currency board must create a Depreciation fund that holds not less than ten percent of the value of the investment portion of the Note Security fund (the assets held by the board) (p. 1656, Section 9)
West Africa	No	
East Africa	No	
Palestine	Yes	"Any losses which may be incurred will be debited to the [Currency Reserve] Fund" (p. 7, Section 13) and the board must "provide a reasonable reserve against possible depreciation" (p. 7, Section 20), and failing to pay the bearer of a currency note holder by the Board will be a charge against the general revenues of Palestine (p. 11, Section 2)
Southern Rhodesia	Yes	"If on the last day in any financial year there is a deficiency in the income account, such deficiency shall be met from moneys to be appropriated by Parliament from the revenues of the Colony" (p. 10, Section 34)
British Caribbean	Yes	"If the value of the Fund calculated […] at any time be less than the face value of the currency notes and coin in circulation […] each participating Government shall be liable" and "should one or more of the participating Governments make default […] the other participating Governments shall be liable to make good such default" (p. 254, Section 6)

Procedures for the distribution of profits

One of the most important features of currency boards is the ability to generate profits that can benefit the finances of their respective general governments. Their investments should create small profits under normal circumstances, since currency boards generally make conservative financial decisions. In addition, many of the currency boards studied in this working paper were permitted to earn commission fees. The Palestine Currency Board constitution, for instance, allowed the currency board toearn "proceeds [from] sale of coin and currency notes" and also allowed "[it to] charge for coin or currency notes to be delivered in Palestine against prepayment in London such premiums not exceeding 1 per cent above the nominal value" (Palestine Currency

Board annual report, 1928: 6-7). Since the currency boards anticipated profits, it follows that their constitutions contained sections pertaining to the distribution of profits. However, these distribution procedures also had their nuances and these nuances reveal many trends over time such as risk perception and the relationship between currency boards and their local governments.

From the New Zealand currency board constitution (1847) to the British Caribbean Currency Board constitution (1951), the evolution of procedures for the distribution of profits shows that over time currency boards became more wary of investment risks and continued to maintain close relationships with their local governments when it came to sharing the risks and profits. As stated in the previous section, some later currency boards had a more cautious attitude toward investment risks and placed some proceeds into a depreciation fund. When it came to the distribution of profits that remained after covering operational expenses and the depreciation fund, it was standard practice, from as early as the New Zealand currency board, to pay the surplus to the local colonial/territorial government as part of general revenue. Since the general government had to share the risk of backing the local currency notes and coins in circulation, it follows that it also shared the profits.

Although the general ideas behind profit distribution remained very similar over the years, the mechanisms through which the profits were distributed became more standardized and procedural. Prior to the enactment of Southern Rhodesia's currency board constitutionin 1938, the constitutions studied provided fewdetails on how the transfer of profits would take place and simply stated that the transfer would occur once several conditions were met. The Southern RhodesianCurrency Board was the first to have an "Income Fund" in its constitution and the British Caribbean Currency Board followed suit with a "Currency Fund Income Account" that held all profits before they were disbursed. For accounting purposes, it was easier to manage and keep track of money in one place, separate from other assets in other funds. Rules were also established according to which profitswere supposed to first cover operational costs, then add to the depreciation fund had enough assets to maintain 110 percent

backing, and finally supplement local government revenues. Even though the constitutions did not specify when profits were to be disbursed, it was typically at the end of the fiscal year when annual operational costs were calculated. It is also unclear if the currency boards were allowed to use proceeds held in the "Income Fund" to purchase short-term securities.

In terms of orthodoxy, all of the currency boards studied qualify as orthodox regarding this criterion because they have explicit clauses that declare how profits were meant to be used and disbursed. The general reliability and self-sufficiency (and oftentimes profitability) of currency boards were hallmark characteristics that made them very popular.

Table 7. *Procedures for the Distribution of Profits*

Currency Board	Yes/No/ Unclear	Details
New Zealand	Yes	Profits will "[first be applied to] defraying the expenses incurred in conducting the business […] and the surplus if any shall be paid to the Colonial Treasurer for the public uses of the colony" (p. 300, Section 22)
India	Yes	"The interest accruing due on the Government Securities […] shall, from time to time, as it becomes due, be paid […] into the revenues of the Government of India" (Section XV)
Ceylon	Yes	"Dividends, interest, or revenue shall form part of the ordinary revenues of the colony excepting the sum of one per centum which shall be appropriated annually […] to cover any eventual risk of depreciation in value of the investments [and placed into a] 'depreciation fund' [if a reason for the fund exists]" (p. 351, Section 18)
Straits Settle-ments	Yes	"The income derived from securities shall be applied – (a) in paying the expenses of and incidental to the execution of the Ordinance; and (b) in the payment of a sum equal to one per cent of the cost price of the securities to a Depreciation fund; and (c) […] as part of the ordinary revenue of the Straits Settlements" (p. 1656, Section 8)
West Africa	Yes	If the Secretary of State deems "that the gold standard reserve is sufficient to ensure the convertibility of silver currency, the Board may pay over the whole or any part of the surplus amount in aid of the revenues of the West African Governments" (p. 7, Section 11)
East Africa	Yes	"Profits […] after the necessary deductions have been made to for expenses of administration, be credited respectively to the funds hereinafter referred to as 'the Silver Coinage Fund,' 'the Nickel-Bronze Coinage Fund,' and "the Note Guarantee Fund" (p. 8, Section 13), and "when the Board are satisfied that their reserves are more than sufficient [they may] pay over the whole or part of the surplus amount in aid of the revenues of the Dependencies in East Africa" (p. 9,

		Section 21)
Palestine	Yes	"When the board is satisfied that its reserves are more than sufficient to ensure the convertibility of the currency […] the Board may pay over the whole or part of the surplus amount in aid of the reserves of Palestine" (p. 7, Section 20)
Southern Rhodesia	Yes	"All dividends, interest or other revenue […] shall be paid into an account to be called the income account" where general expenses incurred by the Board will be deducted from and where "sum equal to one per centum of the face value of all Southern Rhodesian coin and currency notes in circulation […] shall be paid annually into the [currency] fund as a reserve against the depreciation of the assets of the fund" (p. 10, Section 32), and if the value of the fund exceeds one hundred and ten per cent of the face value of Rhodesian notes and coins in circulation then the one per cent annual appropriation can stop and the excess can be transferred to the income account (p. 10, Section 35)
British Carib-bean	Yes	All dividends, interest, or other revenue will be paid into an account called the "Currency Fund Income Account" and charges against the account include: general expenses incurred by the Board and an amount equal to one per cent of the value of the Currency Fund that will be added to the Fund (p. 250, Section 4), and if on the last day of the financial year the value of the Fund exceeds one hundred and ten per cent of the face value of notes and coins in circulation, the annual one per cent appropriation out of the Income Account can discontinue and the excess can be transferred from the Fund and to the Income Account (p. 252, Section 4), and the participating Governments are entitled to share the surplus (p. 252, Section 5)

Policy or managerial autonomy of the currency board from the government

One of the most important characteristics of an orthodox currency board is that the board must operate independently from the general government. It cannot be influenced by policy decisions by the government or be controlled by its in day-to-day operations. Not surprisingly, since all of the currency boards studied in this working paper were colonies and territories of the British Empire at the time the constitutions were written, they all failed to have policy or managerial autonomy from the government.

As shown in Table 8 and in the details from previous sections, the general governments ultimately had final say in most decisions such as theappointments to the top positions in the currency boards, the required proportion of assets to be invested in

securities, and the types of securities that could be held. Even though such control did not lead to major financial problems for the currency boards, it provided opportunities for abuses of power. Since the Governor or Secretary of State appointed staff, the process could involve patronage. (Typically, though, some or all of the positions on a currency board's directorate were by custom assigned by position and not by person, so that for instance the colonial treasurer and auditor were members of the directorate.) The proportions of assets to be invested set by the government official might have conflicted with the proportions desired by the currency board. A major source of unorthodoxy in most of the currency boards studied in this working paper was that the general governments determined the types of securities that the boards could hold. In terms of government securities, the most boardswere limited to purchasing securities from other territories in the British Empire (and sometimes were even allowed to purchase domestic government securities), which was lower diversification than was readily achievable because all of their economies were connected through the mother country. The colonies were essentially buying each other's debt, which could have had bad consequences.

The most glaring potential for government abuse can be seen in a statement in New Zealand's currency board constitution where it states that the "it shall be lawful for the Governor from time to time to make […] rules and regulations."[2] Even though it was necessary to make amendments to the constitution to adapt to changing environments, providing the Governor with essentially sole discretionary power over the amendments prevented the currency board from acting independent of the government's interests that had to potential to conflict with the board's best interests.

However, even though the Crown and the general government representatives ultimately had control over the currency boards, the currency boards'constitutions had provisions to retain some autonomy to prevent abuse. The provisions yield insights into the early features of currency board independence from government.

[2]New Zealand, Paper Currency Act 1847(11 Victoriae No. 16), p.302, Section 35.

One important feature shared by all currency boards was 100 percent backing for liabilities so they could not be pressured by the government to simply print more money to cause inflation. In theory, the government could still make amendments to the currency board constitution such as in the case of New Zealand, but the currency board systemworked in such a way that it was essentially impossible for the government to lower the limit without damaging the colony's economy. All the provisions count on the board having at least 100 percent backing of liabilities. If the currency board could not maintain convertibility, the government was still liable for the maintaining the convertibility and the government would also have to deal with a loss in confidence in the notes and coins in circulation and a possible bank run.

Overall, governments had the incentive to act in the best interest of currency boards since their risks and rewards were interconnected, soit is easy to see that this relationship would functionwithout conflict during normal economic times. However, when economic crises hit, the lack of currency board independence would have allowed the Governor or Secretary of State to manipulate the system to try to solve the problems but potentially create even larger issues. Without policy and managerial independence from the government, none of the currency boards studied can be considered orthodox.

Table 8. *Policy or Managerial Autonomy of the Currency Board from the Government*

Currency Board	Yes/No/ Unclear	Details
New Zealand	No	"Every such Manager and officer shall hold his office during Her Majesty's pleasure" (p. 298, Section 3), and "it shall be lawful for the Governor from time to time to make […] rules and regulations" (p. 302, Section 35)
India	No	The Governor-General of India has the power to appoint head officials of the currency board (Section IV), alter or extend the limits of branches within the currency board (Section V), and order board officials to sell government securities when he deems necessary (Section XIV)
Ceylon	No	Appointments of officers in the currency board must be sanctioned by the Governor (p. 348, Section 3), and the Governor and Secretary of State for the Colonies have ultimate say in the amount and types of investments made (p. 350, Section 13)

Straits Settlements	No	"The accounts of all transactions of the Commissioners under this Ordinance shall be audit [and be in] accordance with such regulations as a Secretary of State directs" (p. 1656, Section 10)
West Africa	No	"The members of the Board and the Secretary are appointed by the Secretary of State" (p. 7, Section 2) and investments may be made in "such other manner as the Secretary of State may approve" (p. 7, Section 14)
East Africa	No	"The members of the Board and the Secretary are appointed by the Secretary of State" (p. 7, Section 2), and the Board can invest in Government securities in a manner approved by the Secretary of State (p. 8, Section 15)
Palestine	No	"The members of the Board and the Secretary are appointed by the Secretary of State" (p. 6, Section 2), and the Board can invest in Government securities in a manner approved by the Secretary of State (p. 7, Section 14)
Southern Rhodesia	No	"The Board shall be appointed by the Governor" (p. 2, Section 4)and the Governor has the "power to regulate coinage and currency notes by proclamation" in the *Southern Rhodesia Gazette* (p. 12, Section 41)
British Caribbean	No	"'The Board' […] shall consist of five members to be appointed by the Secretary of State [and Governors of the five territories in the British Caribbean]" (pgs. 244-245, Section 1)

Conclusion

The founding documents for the British Empire currency boards of New Zealand, India, Ceylon, Straits Settlements, West Africa, East Africa, Palestine, Southern Rhodesia, and the British Caribbean reveal major trends that shaped practices for currency boards around the world. They contributed to the formation of an "orthodox" currency board definition that is generally accepted by contemporary economists. To study the development of currency board practice weexamined seven criteria: (1) exchange rate to anchor currency, (2) types of assets the currency board can hold, (3) prohibition against holding domestic assets, (4) minimum reserve ratio against monetary liabilities, (5) policy if liabilities exceed assets, (6) procedures for the distribution of profits, and (7) policy or managerial autonomy of the currency board from the government. By comparing these characteristics across currency boards, we saw how practices were adopted and amended over the years and progressed towards the currency boards and quasi currency boards of today such as those in Bulgaria and Hong Kong.

Important developments observed in successive currency boards include: the creation of depreciation funds, the adoption of the 110 percent backing practice, and the adoption of holding reserves entirely in financial assets rather than in precious metals. These developments made the 110 percent backing of liabilities and holding only financial assets as reserves become the norm. Another rule that emerged out of the evolutionary process of currency boards in the British Empire was the practice against holding domestic securities due to potential investment risks and possibilities of government abuse of the financial system to fund public debt.

Most of seven characteristics studied remained relatively constant throughout successive currency boards and became cornerstones of orthodox currency board policies, such as the establishment of a fixed exchange rate between the local and anchor currencies, the avoidance of risky investments, the application of a minimum reserve ratio, the creation of policies for the situation where value of liabilities exceeds the value of assets, and the formulation of procedures for the distribution of profits.

A major difference between the currency boards of the British Empire and contemporary boards lies in policy or managerial autonomy from the government. In many ways, the currency boards studied were controlled by the British colonial officialspresiding over the colonies. Political independence movements in the 20th century naturally allowed currency boards to exist without regulation and oversight from a foreign government. In addition, the standardization of currency board practices made it the norm for orthodox currency boards to maintain a great degree of independence from the domestic government. By distancing themselves from economic policy and other maneuverings of their respective general governments, currency boards are able to efficiently perform their main function, which is to supply a stable, convertible currency that facilitates market exchange.

With a proven track record of self-sufficiency and profitability, and now greater autonomy from government, currency boards today are arguably improved compared to their British Empire counterparts. If a country is looking for economic and currency

stabilization, installing the orthodox currency board system, which has been perfected over a century and a half of experimentation and development, is a straightforward solution.

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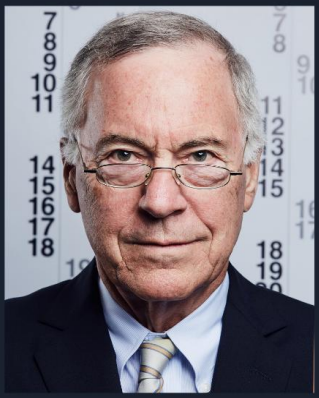

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