

*SAE. / No.88 / September 2017*

*Studies in Applied Economics*

---

**ANALYSIS OF THE  
ESTONIAN CURRENCY  
BOARD**

---

*Andreas Katsis*

Johns Hopkins Institute for Applied Economics,  
Global Health, and Study of Business Enterprise



*Subsequently published  
in KSP Books,  
December 2020*



# **Analysis of the Estonian Currency Board**

By Andreas Katsis

Copyright 2017 by Andreas Katsis. This work may be reproduced or adapted provided that no fee is charged and the original source is properly credited.

## **About the Series**

The Studies in Applied Economics series is under the general direction of Professor Steve H. Hanke, co-director of the Institute for Applied Economics, Global Health, and Study of Business Enterprise (hanke@jhu.edu). This working paper is one in a series on currency boards. The currency board working papers will fill gaps in the history, statistics, and scholarship of the subject. The authors are mainly students at The Johns Hopkins University in Baltimore.

## **About the Author**

Andreas Katsis is a junior at The Johns Hopkins University in Baltimore pursuing a degree in Economics. He wrote this working paper while serving as an undergraduate researcher at the Institute for Applied Economics, Global Health, and Study of Business Enterprises. He will graduate in May 2019.

## **Abstract**

We provide a spreadsheet data series and legislative history of the Estonian currency board from 1992 to 2011. The paper assesses the level of orthodoxy exhibited by the board through statistics from annual reports. This paper makes various balance sheet data available in machine-readable form in a companion spreadsheet workbook.

## **Acknowledgements**

I thank Dr. Kurt Schuler and Professor Steve Hanke for their advice and assistance.

Keywords: Estonia, currency board

JEL codes: E58

## 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 19<sup>th</sup> century and early 20<sup>th</sup> 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 20<sup>th</sup> 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.

**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 and Schuler 2015: 43; national sources)

## The Operation of a Currency Board

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.

### **Policy Comparisons between Currency Boards and Central Banks**

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, the rules 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 drawback of 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, 1919 to 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.

### DETAILS OF THE ESTONIAN CURRENCY BOARD SYSTEM

<b>Date</b>	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.
<b>Official Conversion Rate</b>	10 Russian (formerly Soviet) rubles = 1 Estonian kroon.
<b>Conversion of Cash Rubles</b>	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.
<b>Conversion of Account Rubles at Commercial Banks</b>	All ruble accounts, time deposits, and savings accounts were redenominated 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.
<b>Total Cash Rubles Collected</b>	2.3 billion rubles (or about 3 percent of GDP).

(Source: Sutt, Zavoico and 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 mass conversion of rubles into krooni with 90 percent foreign 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, Zavoico, and 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, Zavoico, and 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.<sup>1</sup> Neither was as recognizable and internationally well regarded as the mark (Sorg and 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.

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 unusual features 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

---

<sup>1</sup> Hanke, Jonung, and 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.

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 an 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 currency, the Banking Department would buy krooni from the Issue Department with 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 Russia 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 krooni were 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 eliminated the 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 funds was 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 on demand 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.

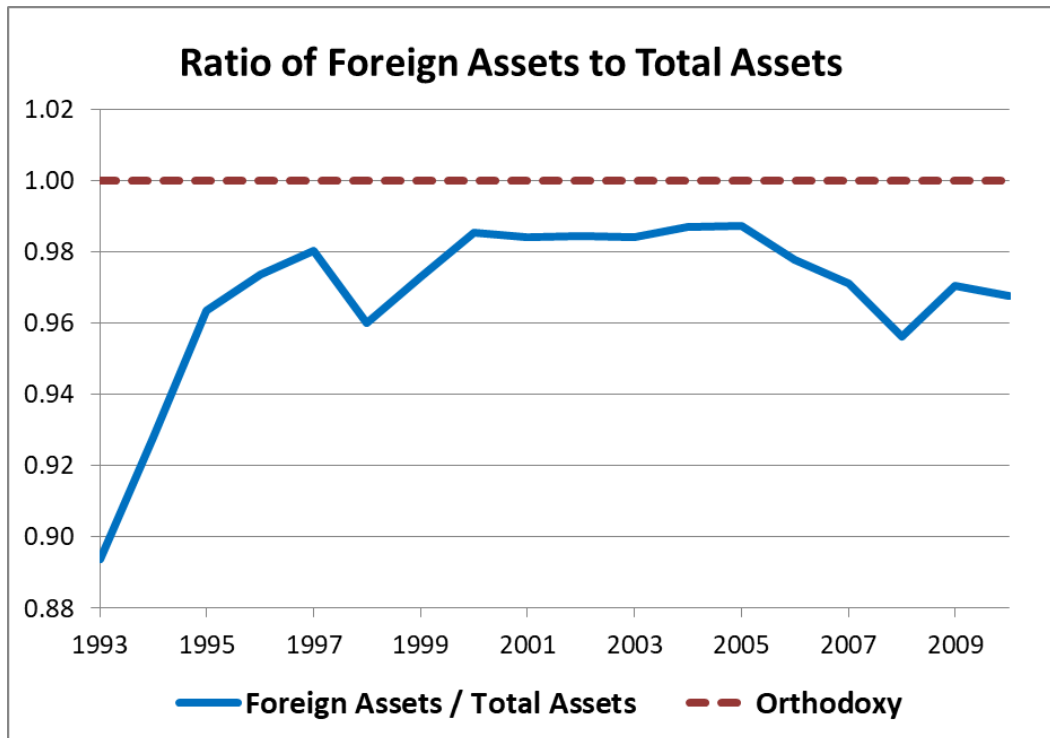
#### **Test #1: Foreign Assets to Total Assets**

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.

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 chart 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 chart 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.

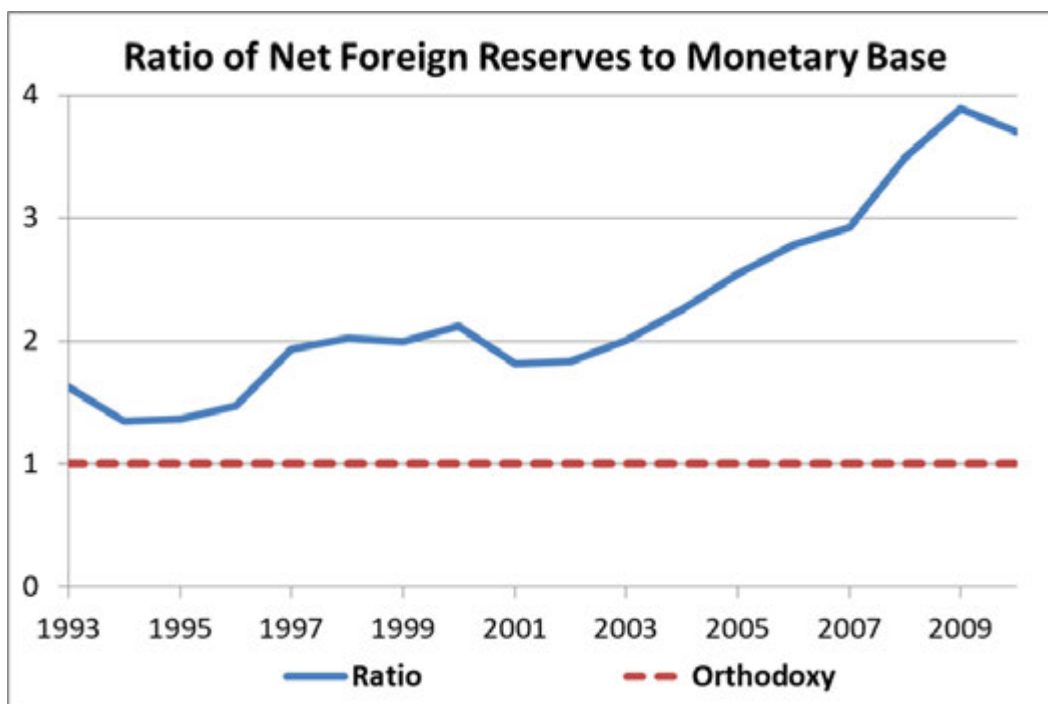


## Test #2: Net Foreign Reserves to Monetary Base

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 0.8:1 to 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 1.2:1 range. 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.<sup>2</sup>

<sup>2</sup> 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

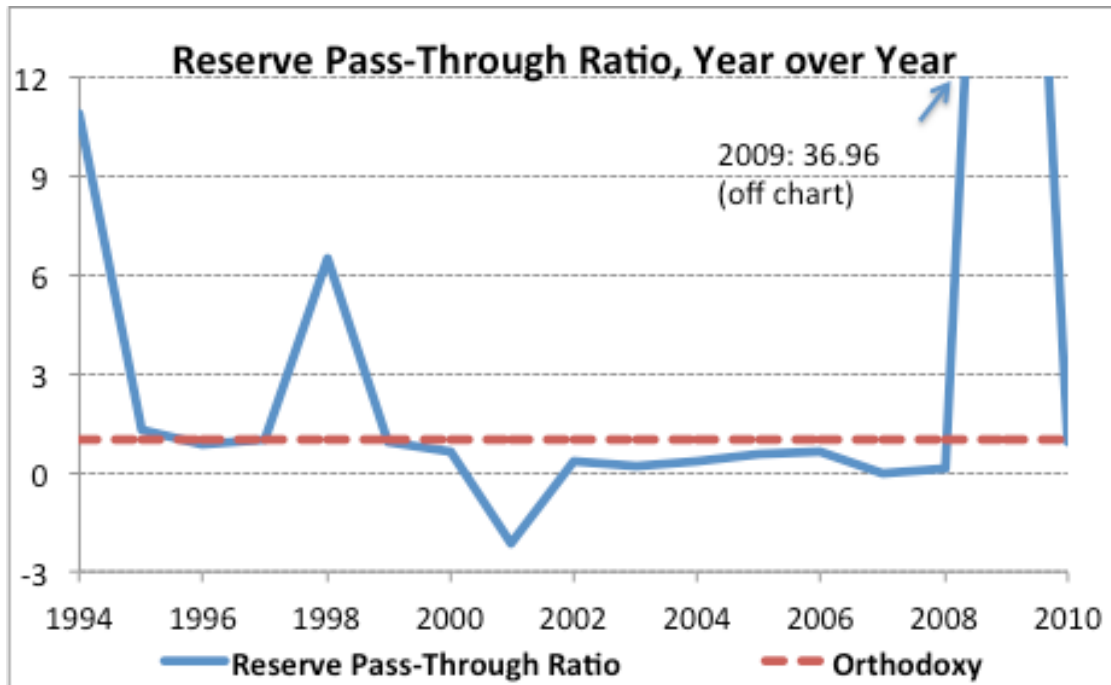


### Test #3: Reserve Pass-Through

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 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.

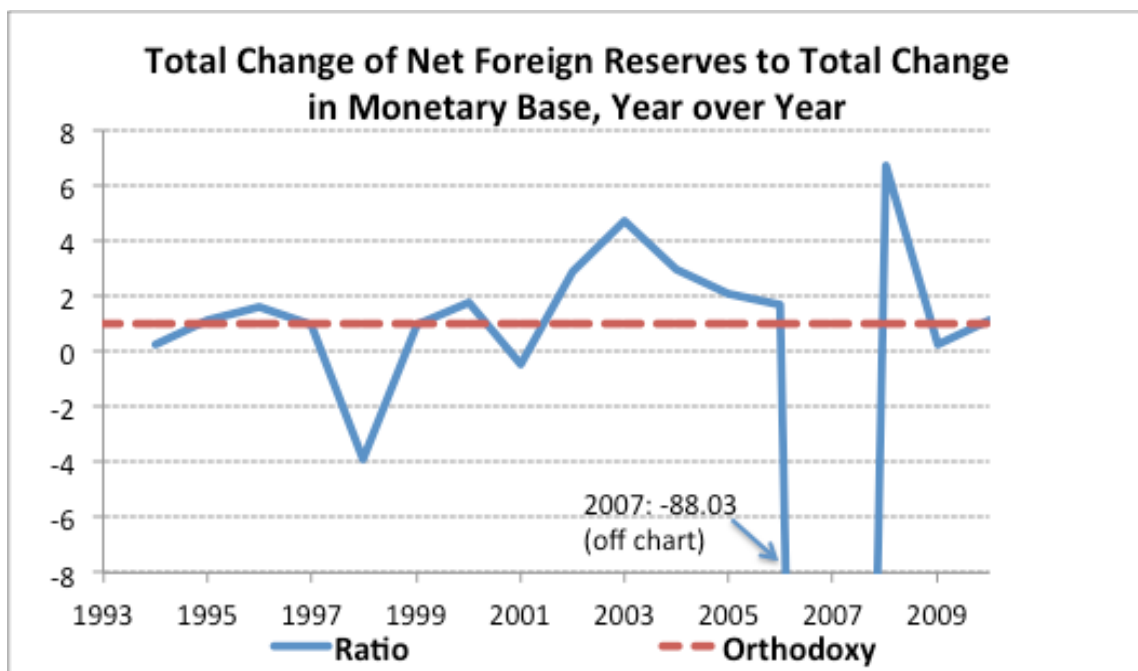
---

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.”



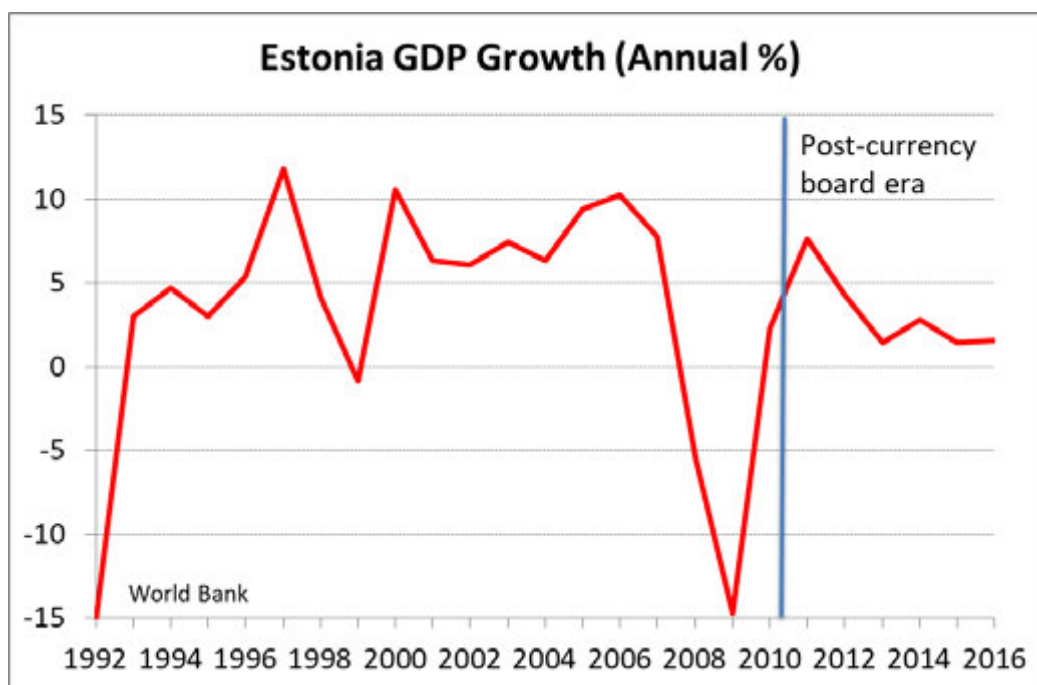
**Test #4: Total Change of Net Foreign Reserve to Monetary Base**

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.



## 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.



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 GDP growth 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.

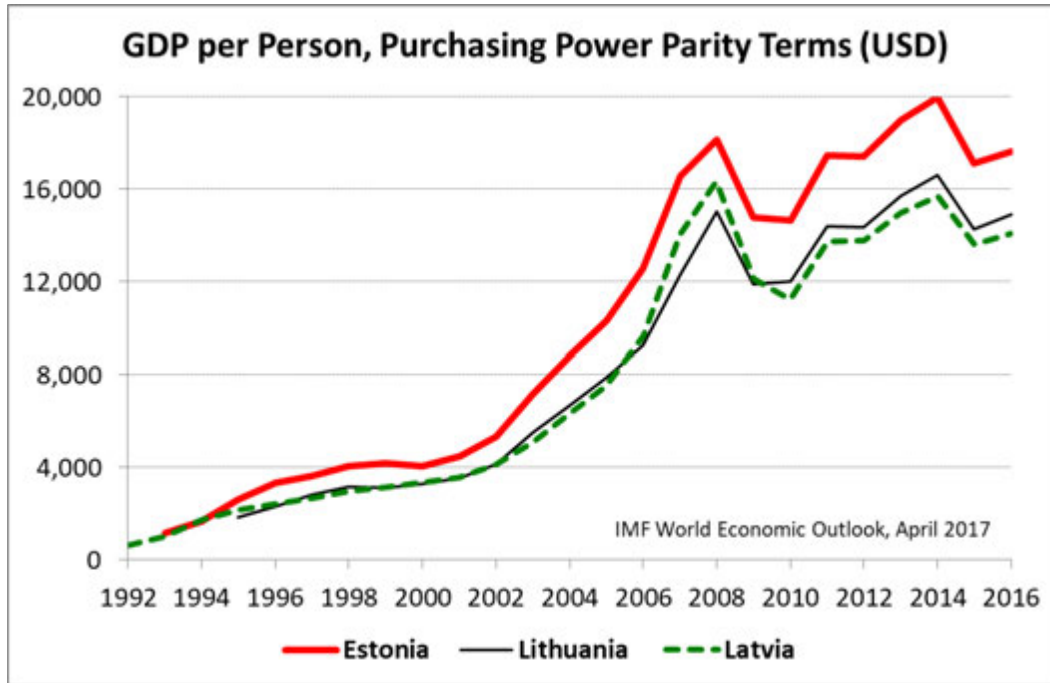
Estonia's biggest fall in GDP growth came during the 2008-2009 global financial crisis, in which the country was hit particularly hard. Export markets vanished and a domestic housing bubble popped, resulting in GDP shrinking by 3.7 percent in 2008 and 14.3 percent in 2009. Estonia's status as a small, 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.)



The broadly similar experience of 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 17<sup>th</sup> 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.

## References

- Aslund, Anders. (2012). "Hyperinflations are Rare, but a Breakup of the Euro Area could Prompt One." Peterson Institute for International Economics. March.  
<https://piie.com/publications/pb/pb12-22.pdf>.
- Bank of Estonia. *Estonia – Memorandum of Economic Policies*. (August 14, 1992).  
[https://www.eestipank.ee/sites/default/files/files/EestiPank/imf/...1992/1992\\_6en.pdf](https://www.eestipank.ee/sites/default/files/files/EestiPank/imf/...1992/1992_6en.pdf).
- Bank of Estonia. *Annual Report*. (1993-2010).  
<http://www.eestipank.ee/en/publications/series/annual-report>.
- Bennett, Adam. (1993). "The Operation of the Estonian Currency Board." Papers on Policy Analysis and Assessment no. 2, vol. 40, June, International Monetary Fund.  
<https://www.imf.org/en/Publications/IMF-Policy-Discussion-Papers/Issues/2016/12/30/The-Operation-of-the-Estonian-Currency-Board-1461>.
- Bithrey, Jon. (2011). "Estonia: The muted revival of a Baltic tiger." BBC News.  
<http://www.bbc.com/news/business-16338542>.
- Clemens, Walter. (2001). *The Baltic Transformed: Complexity, Theory, and European Security*. Lanham, Maryland: Rowman and Littlefield.
- de Lombaerde, Philippe and Vinhas de Souza, Lucio. (2006). "The Periphery of the Euro: Monetary and Exchange Rate Policy in CIS Countries."  
[https://www.researchgate.net/publication/262269770\\_The\\_Periphery\\_of\\_the\\_Euro\\_An\\_Introduction](https://www.researchgate.net/publication/262269770_The_Periphery_of_the_Euro_An_Introduction).
- Eesti Pank. See Bank of Estonia.
- Erixon, Fredrik. (2010). "Baltic Economic Reforms: A Crisis Review of Baltic Economic Policy." European Centre for Political Economy, ECIPE Working Paper no. 04.
- European Central Bank. (no date). "Objective of Monetary Policy."  
<https://www.ecb.europa.eu/mopo/intro/objective/html/index.en.html>.
- Feldman, Magnus. (2003). "Free Trade in the 1990s: Understanding Estonian Exceptionalism." *Demokratizatsiya* 11, no. 4. Fall.  
<https://www.sas.upenn.edu/polisci/sites/www.sas.upenn.edu/polisci/files/Sound%20Politics%20Spring%202017%20FINAL.pdf>.
- Fleming, Alex and Chu, Lily and Bakker, Marie-Renee. (1996). "Banking Crisis in the Baltics." International Monetary Fund Policy Research Working Paper no. 1647, March.  
<https://www.imf.org/external/pubs/ft/fandd/1997/03/pdf/fleming.pdf>.

Gross, Thomas and Heft, Joshua and Rodgers, Douglass A. (2012, 2013). "On Currency Boards – An Updated Bibliography of Scholarly Writings" Studies in Applied Economics no. 1, June, Institute for Applied Economics, Global Health, and the Study of Business Enterprise, Johns Hopkins University.

<http://sites.krieger.jhu.edu/iae/files/2017/04/Rodgers-et-al-bibliography-June-2013-Final.pdf>.

Hanke, Steve H. (2016). "Remembrances of a Currency Reformer: Some Notes and Sketches from the Field." Studies in Applied Economics no. 55, June, Institute for Applied Economics, Global Health, and the Study of Business Enterprise, Johns Hopkins University.

[http://sites.krieger.jhu.edu/iae/files/2017/04/Remembrances\\_of\\_a\\_Currency\\_Reformer.pdf](http://sites.krieger.jhu.edu/iae/files/2017/04/Remembrances_of_a_Currency_Reformer.pdf).

Hanke, Steve H. (2002). "Currency Boards." *Annals*, American Academy of Political and Social Science, no. 579. <http://ieagh.org/wp-content/uploads/2014/11/steve-hanke-annals.pdf>.

Hanke, Steve H., Jonung, Lars, and Schuler, Kurt. (1991). "Keynesi abil rubla konverteritavaks" (Keynes and Ruble Convertibility). *Äripäev* (Tallinn, Estonia), 17 December, p. 6.

Hanke, Steve H. and Jonung, Lars, and Schuler, Kurt. (1992). *Monetary Reform for a Free Estonia: A Currency Board Solution*. Stockholm: SNS Förlag. Estonian translation by Avo Viiol *Rahareform vabale eestile: valuutafondi lahendus*. Tartu, Estonia: Tartu Ülikool (University of Tartu), 1992.

Hanke, Steve H., Jonung, Lars, and Schuler, Kurt. (1993). *Russian Currency and Finance: A Currency Board Approach to Reform*. London: Routledge.

Hanke, Steve H., and Schuler, Kurt. (2015). *Currency Boards for Developing Countries: A Handbook*. Original edition San Francisco: ICS Press, 1994.

[http://sites.krieger.jhu.edu/iae/files/2017/06/Currency\\_Boards\\_for\\_Developing\\_Countries.pdf](http://sites.krieger.jhu.edu/iae/files/2017/06/Currency_Boards_for_Developing_Countries.pdf).

Ho, Corrinne [Miu-ching]. (2002). "A Survey of the Institutional and Operational Aspects of Modern-Day Currency Boards." Bank for International Settlements Working Paper no. 110. <http://www.bis.org/publ/work110.pdf>.

Krugman, Paul (2012). "Estonian Rhapsody". *New York Times*, 6 June.

<https://krugman.blogs.nytimes.com/2012/06/06/estonian-rhapsody/>

Krus, Nicholas and Schuler, Kurt. (2014). "Currency Board Financial Statements." Studies in Applied Economics no. 22, December, Institute for Applied Economics, Global Health, and the Study of Business Enterprise, Johns Hopkins University.

[http://sites.krieger.jhu.edu/iae/files/2017/04/Krus-Schuler\\_Currency\\_Board\\_Financial\\_Statements\\_2014.12.21.pdf](http://sites.krieger.jhu.edu/iae/files/2017/04/Krus-Schuler_Currency_Board_Financial_Statements_2014.12.21.pdf).

Lepik, Ilmar. (2014). "A Long Transition: The Estonian Currency Board Arrangement 1992-2010." Eesti Pank. <http://www.eestipank.ee/en/publication/varia/2015/long-transition-estonian-currency-board-arrangement-1992-2010>.

Madan, Miloni and Maki, Alex. (2016). "The Currency Board Monetary System – A Survey of Financial Crises." Studies in Applied Economics no. 52, March, Institute for Applied Economics, Global Health, and the Study of Business Enterprise, Johns Hopkins University. [http://sites.krieger.jhu.edu/iae/files/2017/04/Maki\\_and\\_Madan\\_A\\_Survey\\_of\\_Financial\\_Crises.pdf](http://sites.krieger.jhu.edu/iae/files/2017/04/Maki_and_Madan_A_Survey_of_Financial_Crises.pdf).

Parts, Juhan. (2013). "Estonia and the European Debt Crisis". *Cato Journal*, vol. 33, no. 2. <https://object.cato.org/sites/cato.org/files/serials/files/cato-journal/2013/5/cj33n2-8.pdf>

Pilinkus, Donatas and Svolka, Andrius and Bartkus, Edverdas Vaclovas. (2011). "The Role of Currency Board Regime During Economic Crisis." *Inzinerine Ekonomika-Engineering Economics*, no. 04, vol. 22. <http://www.ecipe.org/app/uploads/2014/12/baltic-economic-reforms-a-crisis-reviewof-baltic-economic-policy.pdf>.

Roi, Ramesh Basant. (2013). "A Historical Perspective of the Exchange Rate Regimes of the Rupee (Part II)." LeMauricien.com <http://www.lemauricien.com/article/historical-perspective-exchange-rate-regimes-rupee-part-ii>.

Sorg, Mart and Vensel, Vello. (2002). "Development of the banking system under the Estonian currency board." *International Advances in Economic Research*, vol. 8, pp. 35-48.

Sorg, Mart. (1999). "Risks during the Restructuring of Banking: the Estonian Experience." Eesti Pank. [http://www.eestipank.ee/sites/default/files/publication/en/Archive/bulletin/1999/index\\_14.html](http://www.eestipank.ee/sites/default/files/publication/en/Archive/bulletin/1999/index_14.html).

Sutt, Andres, Zavoico, Basil B., and Knobl, Adalbert. (2002). "The Estonian Currency Board: Its Introduction and Role in the Early Success of Estonia's Transition to a Market Economy." Working Papers no. 02/96, May, International Monetary Fund. <https://www.imf.org/en/Publications/WP/Issues/2016/12/30/The-Estonian-Currency-Board-Its-Introduction-and-Role-in-the-Early-Success-of-Estonia-s-15845>.

*The Economist*. (1997). "Something Horrible out There." October 16. <http://www.economist.com/node/103194>.

Wolf, Holger C., Ghosh, Atish R., Berger, Helge, and Gulde, Anne-Marie. (2008). *Currency Boards in Retrospect and Prospect*. Cambridge, Massachusetts: MIT Press.  
[https://mitpress.mit.edu/sites/default/files/titles/content/9780262232654\\_sch\\_0001.pdf](https://mitpress.mit.edu/sites/default/files/titles/content/9780262232654_sch_0001.pdf).