Steve H Hanke Lars Jonung Kurt Schuler

# MONETARY REFORM FOR A FREE ESTONIA

*A Currency Board Solution*

SNS FÖRLAG

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## *A Currency Board Solution*

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# *Preface*

The Estonian-Swedish Fund arranged a seminar in Tallinn in October 1991 on the future Estonian monetary system. Lars Jonung was invited to give a talk on monetary reform. After examining a number of proposals for currency arrangements, he suggested that a currency board would be the most promising route for the newly independent Estonia. When preparing a written summary of his talk, Lars Jonung contacted Steve Hanke and Kurt Schuler (who had been writing jointly about currency board systems) to discuss details of his proposal.

This report grew out of transatlantic cooperation among the three of us. Lars Jonung has adopted and extended the approach developed by Steve Hanke and Kurt Schuler to fit the case of Estonia. We have specifically considered the role that the Swedish government can play to foster credibility in the Estonian Currency Board that we recommend.

We are indebted to many people for help. Ingemar Ståhl at the University of Lund has been a source of inspiration and comments. Avo Viiol of Tartu University has furnished us with comments and recent data on the Estonian economy. He has translated an earlier version of this report into Estonian which is now being published by the Tartu University Press.

Roy Batchelor, Michael Bordo, Barry Eichengreen, Hans Genberg, Carl B. Hamilton, Lars Hörngren, Rudolf Jalakas, Bo Kragh, David Laidler, Axel Leijonhufvud, Carl-Göran Lemne, Hallar Lind, Nils Lundgren and Torsten Persson have furnished us with valuable and critical comments. We respond in Appendix III to some of the questions and objections raised by them as well as by commentators in the Swedish and Estonian financial press when summaries of our proposal were presented in December

1991 and January 1992. Of course, we take sole responsibility for all remaining idiosyncrasies. We have also been inspired by Christofer Halldin's interest in our work. We owe a special thanks to Britt-Marie Eisler for her patient work of turning our transatlantic faxes into a readable manuscript.

We greatly appreciate generous financial support by the Skandinaviska Enskilda Banken that made the printing of this report possible.

We regard our proposal as a contribution to the present debate concerning the support and aid to be given by Sweden and other Western nations to the newly independent Baltic states. Here we focus on Estonia but our recommendations could easily be extended to the cases of Latvia and Lithuania (see Schuler, Selgin and Sinkey [1991]).

This report is a study in comparative monetary systems. It amounts to a comparison between two alternative monetary arrangements: a currency board versus a central bank solution. Given Estonia's present chaotic economic and political situation – the disarray of its economy, its lack of financial markets and the public's distrust of domestic institutions – we argue here that a currency board solution is the better alternative.

Baltimore, Stockholm, and Fairfax, February 1992

*Steve H. Hanke* *Lars Jonung* *Kurt Schuler*

# 1. *Estonia's choice of monetary order*

## 1.1 Introduction

Estonia faces an important choice. Like every new nation, Estonia must establish a monetary system. This choice is crucial, for it will largely determine Estonia's future economic performance. History provides many examples of new nations setting up badly working monetary systems that have led to high inflation, thus contributing to economic instability, social unrest, and political conflict. That was the outcome in many new European nations formed after World War I. Lack of monetary and budgetary discipline caused hyperinflation, which quickly became the major economic, social, and political problem. Virtually all colonies that gained independence in the 1950s and 1960s have experienced high inflation. On the other hand, history provides examples of successful monetary systems that have encouraged rapid economic growth, social cohesion, and political stability.

Our analysis of alternative monetary systems and our interpretation of their historical performance lead us to conclude that the currency board system is the most promising monetary option for a free Estonia under present circumstances and for the foreseeable future. Under the currency board system, Estonia would establish a currency board rather than a central bank.[1] The currency board would issue notes and coins in the new Estonian currency, the kroon, backed 100 per cent by a "reserve" currency, which we propose should be the Swedish krona. The currency board would be required to exchange kroons for kronor at a fixed exchange rate that would be "permanently" locked in.

Sweden should play an active role in creating and operating the Estonian Currency Board. We propose that Sweden grant Estonia the initial reserves to establish the new currency board, which

would guarantee a smooth and credible start for the board.

To ensure that the new currency is widely used and that Estonia can attract an inflow of foreign capital and finance, the new Estonian kroon must be convertible and possess credibility. Credibility in this context means that the Estonian public and foreign investors believe that the kroon will be as good as the krona.

A currency board established along the lines we suggest will guarantee convertibility from the day it opens. The fixed exchange rate will be an "anchor" that will keep inflation and interest rates fairly low, as they are in Sweden. Moreover, foreign-exchange risk with respect to the Swedish krona will vanish. Because the krona is linked to the currencies in the European Monetary System, foreign-exchange risk with respect to those currencies will also be quite small. Domestic and foreign investment in Estonia and foreign trade will therefore be higher than if Estonia issues its currency through a central bank of its own that lacks credibility. Higher investment will lift the ratio of capital to labor; consequently, labor productivity and real wages will rise. Economic growth will be higher and emigration out of Estonia will be lower than if an Estonian central bank issued what would certainly be a less credible currency (Hanke and Schuler [1991b]).

With a currency board, Estonia will immediately take a great step towards monetary stability. Estonia should recognize, however, that monetary stability is not the only element of a successful transition to a market economy. A coherent and comprehensive reform package, including budgetary and tax reforms, is necessary (see Hanke and Walters [1991a]). We limit the scope of our inquiry to matters of monetary reform because they are the most urgent. If Estonia does not quickly attain monetary stability, all other reforms will be in jeopardy.

This study explains how a currency board operates and how to establish a currency board for Estonia. Chapter 2 shows how a currency board works. Chapter 3 contains our proposal for the Estonian Currency Board. We discuss how the Board should be established, how it should initially distribute its currency, and what part Sweden should play in the process. Chapter 4 sum-

marizes our proposal. Appendix I contains a proposed constitution for the Estonian Currency Board. Appendix II responds to criticisms that have been raised against currency boards, including some objections towards our proposal recently put forward in Sweden and Estonia. Appendix III is a technical analysis of money supply in a currency board system. Appendix IV explains how to convert a central bank into a currency board, if it is not politically possible to establish a currency board at the start.

The remainder of this chapter reviews economic conditions in Estonia at present and explains the role of a credible and efficient currency in fostering economic growth.

*Economic conditions in Estonia today*

As a former republic of the Soviet Union, Estonia is currently an integral part of the former Soviet economy, using the ruble as its currency. Consequently, Estonia is now experiencing very rapid inflation. The annual inflation rate in Moscow was reported to be in the range of 500 to 700 per cent as of November 1991. Price increases in Estonia will be of roughly the same magnitude as long as the ruble remains the main currency of Estonia.

Estonian data show the inflation rate to be rising in past years (Table 1). In the fourth quarter of 1991 the annual inflation rate was about 260 per cent. According to many reports, price increases have accelerated since then. Nominal wages have lagged behind the inflation rate, causing real wages to fall.

*Table 1. Inflation in Estonia.*

| *Period* | *Annualized inflation rate* |
|---|---|
| 1990, first quarter | 60 % |
| 1991, first quarter | 101 % |
| second quarter | 174 % |
| third quarter | 270 % |
| fourth quarter | 258 % |

*Source:* Statistical Bureau of Estonia.

The reported inflation rate, though high and increasing, understates the true underlying inflation in Estonia. There are persistent shortages of goods and commodities in Estonia, which suggests the presence of "repressed" inflation. Recent reports give ample proof that the accelerating inflation rate is accompanied by shortages of goods and commodities.

Accelerating inflation has caused Estonians' real savings held in rubles to plummet. Estonians do not want to hold ruble notes and coins. Nor do they want their savings accounts to be denominated in rubles, particularly when the interest on those accounts is far below the inflation rate. Hence, Estonians hoard goods and foreign currency as substitutes for ruble savings. The breakdown of willingness to accept rubles is hindering internal and external trade. Food shortages in Estonia at present seem to be occurring not so much because of lack of food as lack of willingness on the part of food suppliers to accept rubles. Trade with other former Soviet republics has also slowed greatly because the parties trading want goods or hard currency rather than rubles as payment.

Another manifestation of the hyperinflation of the ruble is that Estonia's financial system is presently "repressed" and cannot efficiently intermediate between savers and investors. Domestic savings are not being channeled into much-needed productive investments (Hanke and Walters [1991b]). Until Estonia reforms its monetary system it will be unable to transform itself into a market economy.

To sum up, Estonians are presently expecting a currency reform replacing the ruble with a domestic currency. These expectations cause producers to withdraw supplies while consumers try to get rid of ruble holdings. This process creates accelerating inflationary pressure.

When discussing monetary reform in Estonia, we must remember that Estonia is a small, poor country. It has about 1.6 million inhabitants. Its gross domestic product (GDP) per person is roughly 10 to 20 per cent of that of Sweden (whose GDP per person is US$21,600). Real income comparisons are difficult because Estonia lacks a market-based price system. Even so, most

observers conclude that Estonia is basically a less developed economy.[2] It is difficult for such a small country as Estonia to launch successfully a new currency and a new central bank while simultaneously transforming its economy into a market economy. This change of economic system would be greatly facilitated by a currency board, as we argue below.

## 1.2 Monetary reform and the development of a market economy

Estonia is struggling to throw off the shackles of a command economy so that it can become a market economy. The transformation will be difficult. To achieve it, Estonia must rid itself of the ruble and establish a sound currency—a currency that is stable and convertible into major international hard currencies.

*The role of a sound currency in a market economy*

A sound currency is vital for a well-functioning market economy. It serves as a satisfactory store of value, medium of exchange, and unit of account. The ruble at present fulfills none of those functions satisfactorily.

The ruble is not a reliable store of value because inflation makes its value highly unpredictable. As a result, Estonians save by hoarding commodities, which retain their value better than the ruble. Although commodity hoarding slows economic growth, it is rational for people in a nation with an unstable currency. Finnish marks, Swedish kronor, U.S. dollars, and other stable currencies also serve as substitute stores of value in Estonia. At present the volume of foreign currency circulating in Estonia is estimated to be equal to at least US$80 million. Most of the foreign currency is Finnish marks. ''Markization'' or ''dollarization'' is costly from an Estonian viewpoint, however. It requires Estonians to give up real goods and services to obtain bits of paper that Western central banks print at almost no cost. It generates a form of foreign aid that flows from Estonia to Western central banks.

The ruble is not a good medium of exchange. The outside world refuses to accept it. This impedes foreign investment and trade, and hence economic growth. Nor is the ruble a good unit of account. Inflation distorts the structure of relative prices and makes business calculation more difficult. Without a good unit of account, it is impossible to make meaningful accounting calculations or to write contracts that will be enforced. In sum, then, the ruble is an "unsound" currency that will prevent important elements of a market economy from working well in Estonia.

Two further aspects of a sound currency that we wish to stress here are convertibility and credibility. Let us first consider convertibility. A convertible currency allows people to carry out decentralized plans, which are more efficient than central planning. In nations with so-called internally convertible currencies, all that is usually required to buy goods in the domestic market is to have currency to pay a domestic seller. Internal convertibility implies that it is not necessary to obtain authorization from any central planner to buy or sell goods available inside the country. The exchange of goods is much more extensive, rapid, and efficient where internal convertibility exists, as in the United States, Germany, and Sweden, than where it does not, as in Estonia and Russia until recently.

The foreign-trade counterpart of internal convertibility is external convertibility—the ability to convert as much domestic currency into foreign currency as one wishes, at market rates rather than at much higher or lower official rates. External convertibility can be unlimited, as in the major Western countries, or it can be limited, as in Czechoslovakia and Poland at present. Czechoslovakia and Poland allow most current account purchases, in which people buy foreign goods for import, but they prohibit many capital account purchases, in which people buy foreign financial assets.

Current account convertibility exposes domestic producers to foreign competition. It is thus an important measure to foster competition. Current account convertibility also introduces into the domestic economy the structure of relative prices that prevails in world markets. The structure of prices in world markets in-

duces a nation that is open to foreign trade to specialize in making the goods it is best at producing. It can then trade those goods for other goods, which increases wealth all around.

Capital account convertibility helps attract foreign investment, because unless foreigners can repatriate profits they will be reluctant to invest. Foreign capital investment can offset a large current account deficit and speed the introduction of urgently needed foreign goods to modernize the Estonian economy. The present stock of usable physical capital in Estonia is low. If only domestic investment is available to augment the stock of capital, the Estonian economy will grow much less rapidly than if foreign investment can also augment it.

The ability to purchase both domestic and foreign goods of all sorts readily is what makes Western currencies fully convertible currencies; it is also what makes them so highly prized in Eastern Europe. To reap the full benefits of participation in world markets, Estonia needs a domestic currency that is fully convertible, including for capital account transactions.

*Credibility*

Every new nation that starts to issue its own currency faces the problem of establishing credibility, that is, belief that future inflation in its currency will be fairly low. Recent events in Poland illustrate the difficulty of establishing credibility. Poland has allowed most formerly subsidized prices to rise to market levels and has linked the zloty to the U.S. dollar, yet inflation remains very high because the Polish central bank lacks credibility. It has already devalued the zloty twice since establishing the link with the dollar. Like Poland, other East European nations also have long histories of bowing to political pressures for inflation.

A new central bank has been set up in Estonia, although it is still in an embryonic stage because it has not yet issued any currency. This new bank does not have the handicap of bad past performance, but it faces other problems concerning credibility.[3] So far, it has not announced any definite plan for keeping its currency stable.[4] Also, the general experience of central banks in developing nations suggests that both established central banks and

new central banks face overwhelming political pressures for inflation. For the 99 nations that the World Bank classifies as low- and middle-income, average annual inflation was 16.7 per cent from 1965 to 1980 and 53.7 per cent from 1980 to 1989. These figures are much higher than the comparable figures for developed nations. We thus expect that if the new central bank of Estonia issues currency, it will soon cause high inflation of its own.

The poor performance of central banks explains why Paul Volcker, the former chairman of the U.S. Federal Reserve System, has indicated that he has little faith that central banks in Eastern Europe can achieve full convertibility. Addressing central bankers in Jackson Hole, Wyoming, in 1990, Mr Volcker noted that markets developed long before central banks, and stressed that Eastern Europe and the USSR might actually retard their transition to markets by relying on central banks.[5] Central banks with legal monopolies of note issue are essentially not market institutions, which is why Marx and Engels said in the *Communist Manifesto* that one of the steps for achieving communism was ''Centralization of credit in the hands of the state, by means of a national bank with state capital and an exclusive monopoly''.[6]

The problem of credibility threatens to lock the Estonian public and the new central bank of Estonia, if it issues currency, into a game that promises to have no winners. If the central bank's attempts to maintain currency stability, even by means of fixed exchange rates, are not credible, prices will continue to rise quickly because wage-earners will base their wage demands on well-founded skepticism of promises of good behavior given by the central bank. State-owned enterprises and government ministries will probably spend freely because they will correctly expect that the Estonian government will rescue them by ordering the central bank to print money. Workers and enterprises will anticipate that this ''soft budget constraint'' will continue, and they will behave accordingly. Inflationary expectations will remain high, enforcing inflation.

If the central bank of Estonia against strong odds actually does

manage to maintain currency stability, the consequences could almost be worse than under continued inflation. Because the central bank will lack credibility, Estonians will remain skeptical of it for years. To gain credibility, the central bank will have to keep the kroon overvalued and keep real (inflation-adjusted) interest rates high. That may plunge the Estonian economy into a depression during the transition to a market economy. In such a depression, the export sector will suffer more than other sectors.[7] A credible monetary reform that has *no* devaluation risk can keep real interest rates in single digits or (for riskier loans) low double digits, as they are in Sweden, and hence can save Estonia much pain.

Estonia could make the kroon convertible by maintaining a floating exchange rate rather than a fixed rate. But though a floating rate would roughly balance supply and demand for domestic currency against foreign currency, it would not restrain the central bank's powers to cause inflation. On the contrary, a floating rate would increase pressure from political groups and ambitious politicians who favor inflation rather than stable money and prices. Inflation would rise and prices would become increasingly unreliable indicators for guiding economic activity. The transition to a market economy would become extremely difficult because a market economy needs fairly stable prices to work well.

To have a stable currency, Estonia at this point in its history needs to remove its monetary policy from political influence. It needs to give its monetary reforms instant credibility to avoid the dangers of continuing inflation on the one hand and depression on the other hand. The most promising way to do so is to strip its central bank of currency-issuing functions, and to establish a *currency board,* whose only task will be to issue a convertible currency according to strictly defined rules. The Estonian Currency Board that we propose is explicitly designed to maintain a fixed exchange rate. It will be easy to establish and operate. Historically, currency boards have *always* been able to maintain fixed-rate currency convertibility, even during the most trying times.

A currency board will quickly establish a hard domestic currency and instill monetary confidence in Estonia. As a result, economic agents will alter their expectations. If the Swedish krona becomes the reserve currency for the Estonian Currency Board, as we recommend, Swedish prices will become the anchor for Estonian prices. Also, wages will increase at about the same rate as in Sweden, plus an allowance for gains in productivity or quality. (Real wages can thus grow quickly under the currency board system, as they have in Hong Kong, if productivity or quality increases.) If Estonia establishes secure property rights and removes barriers to foreign investment, interest rates will also be close to Swedish levels.

Linking the Estonian currency to the Swedish currency will not subject Estonia to Swedish political domination, as some people may think. (We discuss this important point in more detail in Appendix III.B.) Rather, it will restore an element of national dignity by giving Estonia a stable currency. By establishing an Estonian currency as sound as the Swedish krona, the currency board system offers a quick way for the new Estonian currency to become attractive as a store of value and to displace foreign currencies from circulation.

A currency board is essential to wider fiscal and economic reforms in Estonia. History indicates that the usual cause of hyperinflation is large budget deficits financed by central banks. The Estonian government under a currency board system will not be able to finance deficits by means of the printing press. Consequently, the government will have to maintain its expenditures in line with its tax revenues and borrowing. This will require a successful tax reform in Estonia. During the transition to a market economy under a currency board, Estonia should receive aid to establish an efficient system of taxation.

A stable monetary environment provided by a currency board will make it easier for Estonia to successfully take further steps towards a market economy. With an unstable monetary environment such as we fear a central bank would produce, Estonia risks suffering low economic growth and continuing misery.

# 2. *The workings of a currency board*

## 2.1 What is a currency board?

This chapter explains what a currency board is. It describes the difference between the money supply process under a currency board and under a central bank. It demonstrates why the currency board system is better than central banking for Estonia under present conditions.

A currency board is an institution that issues notes and coins convertible into a foreign "reserve" currency[8] at a fixed rate and on demand. It does not accept deposits. As reserves, a currency board holds high-quality, interest-bearing securities denominated in the reserve currency. A currency board's reserves are equal to 100 per cent or slightly more of its notes and coins in circulation, as set by law. (Commercial banks in a currency board system need not hold 100 per cent reserves in reserve-currency assets against their deposits, though.) The board generates profits (seigniorage) from the difference between the interest earned on the securities that it holds and the expense of maintaining its note and coin circulation. It remits to the government or to another institution all profits beyond what it needs to cover its expenses and to maintain its reserves at the level set by law. The currency board has no discretion in monetary policy; market forces alone determine the money supply. (Here the money supply is defined as the public's holdings of notes and coins plus deposits held with the commercial banking system.)

As an introduction, let us briefly examine the main characteristics of a currency board. We shall discuss them in more detail later.

*Convertibility:* The currency board maintains unlimited convertibility at a fixed rate of exchange between its notes and coins

and the reserve currency. No currency board has ever had problems maintaining its fixed rate, as far as we have found. The currency boards of Burma and North Russia even maintained their fixed rates in the midst of civil war. The currency boards of British colonies maintained their fixed rates during the Great Depression of the 1930s and (where not overrun by enemy armies) during World War II.

*Reserves:* A currency board's reserves are adequate to ensure that even if all holders of the board's notes and coins wish to convert them into the reserve currency, the board can do so. Currency boards have usually held reserves of 105 or 110 per cent of liabilities, so that they would have a margin of protection in case the interest-earning securities that they held lost value. If Estonia uses the Swedish krona as its reserve currency, the Estonian kroon will remain as good as the krona. (Chapter 3 presents our proposal concerning how Sweden can grant the necessary initial reserves for the Estonian Currency Board.)

*Seigniorage:* Unlike securities or most bank deposits, notes and coins do not pay interest. Hence, notes and coins are like an interest-free loan from the people who hold them to the issuer. The issuer's profit equals the interest earned on reserves minus the expense of putting the notes and coins into circulation. In addition, if the notes and coins are destroyed, the issuer's net worth increases, because his liabilities fall but his assets do not.

Under the currency board system, the only difference between using kroons issued by the board as legal tender, instead of kronor, is that the seigniorage is captured domestically in Estonia. In contrast, if Swedish currency is used as legal tender, the Riksbank (the Swedish central bank) captures the seigniorage. (We discuss in Chapter 3 how the seigniorage may be distributed within Estonia.) The seigniorage generated by the currency board can be significant. Expenses incurred by currency boards are usually about 1 per cent of assets per annum. Profit rates are equal, therefore, to the interest rate earned on the Swedish assets minus 1 per cent. If Swedish long-term interest rates are 7 to 10 per cent, the currency board's profit will be 6 to 9 per cent per year of its average currency circulation.

In addition to seigniorage, use of a domestic Estonian currency board issue, rather than a foreign currency, enhances national pride. The Estonian notes will be printed in the Estonian language. Likewise, Estonian coins will be minted with an Estonian design.

*Monetary policy:* By design, a currency board has no discretionary powers. Its monetary policy is completely automatic, consisting only in exchanging its notes and coins for the foreign reserve currency at a fixed rate. Since a currency board's role is strictly circumscribed, it is less likely than a central bank to suffer political pressures to engage in inflationary policies.

* * * *

Over sixty countries have had currency boards during this century. Most have been British colonies or former colonies. However, there have also been currency boards elsewhere, including two cases in Eastern Europe. A Russian currency board existed in the northern region occupied by the British and other Allies in 1918 and 1919. It issued a ruble currency having a fixed exchange rate with the British pound sterling, until the Bolsheviks conquered the region and replaced the Northern ruble with their own inferior currency. The free city of Danzig (now the Polish city of Gdansk) had a currency board from 1922 to 1923. The Danzig currency board too maintained a fixed exchange rate with sterling. In 1923 Danzig established a central bank at the recommendation of the League of Nations. The later record of the central bank was mediocre. Both East European currency boards were successful in maintaining convertibility during their brief lives. The North Russian board maintained convertibility in the midst of a civil war; the Danzig board maintained convertibility despite a deep depression and hyperinflation in Germany, Danzig's chief trading partner.[9]

Despite the economic success of currency boards, only a few currency board systems exist today, most notably in Hong Kong and (in greatly modified form) in Singapore. Most other countries that once had currency boards replaced them with central banks.

These changes were made for political reasons, not economic ones. Politicians saw central banking as a way of controlling the money supply and thus of creating inflation. Since abandoning the currency board system, many of those countries have experienced inflation and economic stagnation. Hong Kong and Singapore, on the other hand, have been two of the world's most rapidly growing economies, despite their lack of natural resources. Moreover, they have experienced low rates of inflation.

## *2.2 How a currency board works*

The currency board system relies entirely on market forces to determine the amount of notes and coins that the board supplies. Market forces also determine the amount of deposits and other components of the broader money supply that commercial banks and other financial institutions supply. The currency board has no independent role in determining the supply of commercial bank reserves in the financial system, because its 100 per cent reserve requirement makes it simply a sort of warehouse for reserves once it has been established. Since a currency board cannot independently influence the amount of reserves, it cannot influence the total supply of credit. A central bank, in contrast, can independently expand or contract the amount of reserves available to commercial banks, thus influencing the supply of bank credit. Contrary to what one might suspect, though, the supply of notes, coins and credit in a currency board system is quite responsive (''elastic'') to changes in demand, because reserves can be acquired from the reserve-currency country.

In a currency board system, the amount of credit that commercial banks can create, and hence the money supply measured broadly, is limited by their ability to maintain sufficient reserves to support that amount of credit. Real credit is as plentiful as in a central banking system; indeed, Hong Kong and Singapore are major centers of ample, low-cost finance. Currency board rules merely prevent the currency board from creating reserves in an inflationary manner, as a central bank can do. The currency

board country stands in a similar relation to the reserve-currency country as, say, Stockholm does to the rest of Sweden. The city government of Stockholm cannot create bank reserves, nor can a currency board.

Commercial banks are middlemen between lenders (depositors) and borrowers (people who spend bank loans). A commercial bank cannot for long grant more credit to borrowers than depositors wish to grant to the bank. If a commercial bank grants excessive credit, the borrowers will spend it (for instance, by writing checks). More funds will flow out of the bank than flow into the bank from checks written on other banks. To prevent this sort of mistake from resulting in bankruptcy, a bank holds reserves. Reserves protect it from the consequences of its occasional mistakes.

The ultimate reserves in a currency board system are holdings of the reserve currency. The only way to acquire new reserves is to obtain them from the reserve-currency country. In its simplest form, this requires running a balance of payments surplus or receiving gifts, grants and loans from outside Estonia. Under certain simplifying assumptions enumerated in Appendix III, changes in the balance of payments change the supply of domestic money in the same direction. A balance of payments surplus increases the supply of domestic money. A balance of payments deficit, on the other hand, decreases the supply of domestic money. (The balance of payments is the value of exports minus the value of imports. The supply of domestic money taken in the broad sense comprises currency board notes and coins in circulation plus deposits at a commercial bank.)

The easiest way to illustrate the link between changes in the balance of payments and the domestic money supply under a currency board system is with flow diagrams. Readers who wish a more technical discussion should consult Appendix III.

We begin our analysis with Figure 1. To start, the balance of payments is in balance and exports equal imports. We then put the system in motion by generating a balance of payments surplus. That surplus works its way through a currency board system in the sequence depicted in Figure 1. Notice that the currency board

plays an explicit role in the chain of events depicted in Figure 1 only at the stage labeled "rise in demand for goods in general, including currency board notes and coins".

*Figure 1*


When there is a balance of payments *deficit,* the money supply process works as in Figure 2.

*Figure 2*


There are two important points to notice about the adjustment process in a currency board system. The first is that market forces rather than central bank action set it in motion; it is automatic, as far as the currency board is concerned. The second point is that because the exchange rate is fixed, arbitrage occurs entirely through changes in the quantity of money, interest rates, and the balance of payments, rather than through the exchange rate. In that respect, the currency board system is like the gold standard

or the gold exchange standard. A fixed exchange rate between the Estonian kroon and the Swedish krona should make arbitrage of goods very tight, if impediments to trade are small. Overall price changes, as reflected in wholesale price indexes, should not differ greatly between Estonia and Sweden.[10] Interest rates also should be roughly the same in both countries, unless taxes or perceived risks make lending costlier in one country. The experience of currency board systems bears this out. In Hong Kong, for instance, interest rates and the prices of exported goods have closely tracked their counterparts in the United States since Hong Kong linked its currency to the U.S. dollar in 1983, except for brief periods when people suspected that Hong Kong's balance of payments surpluses with the United States might tempt the Hong Kong government to revalue.

For the sake of clarity, our treatment of the mechanics of currency board money supply made some simplifying assumptions. Real conditions are rarely, if ever, so simple. It is possible, and in fact quite common in a currency board system, for changes in the money supply to move in the *opposite* direction from changes in the balance of payments. However, that is perfectly acceptable. There is no reason why the money supply in a modern fractional-reserve banking system should have a rigid relation with the balance of payments, if other factors simultaneously move the money supply in the other direction. Foreign investment is one of the important factors that can break the rigid relation of the money supply with the balance of payments. Hong Kong and Singapore have experienced balance of payments deficits for decades at a time, yet their domestic money supplies have steadily increased because they were attracting large inflows of foreign investment. This is a pattern that we expect to occur in Estonia, too. It holds generally for fast-growing countries that adhere to fixed exchange rates, such as Sweden during the gold standard period prior to 1914.[11]

## 2.3 Central banking

The essential difference between a currency board and a central bank is that a central bank does *not* work automatically. A central bank has discretionary power to influence the supply of money, and is not necessarily guided by considerations of economic profit and loss. A currency board system is by nature a fixed-exchange-rate system, while central banking is not. As we shall explain in the next section, the nature of central banking tends to make central banks abandon fixed exchange rates in favor of floating exchange rates. Consequently, we here compare a currency board to a central bank that maintains a floating exchange rate, not to a central bank that maintains a fixed rate.

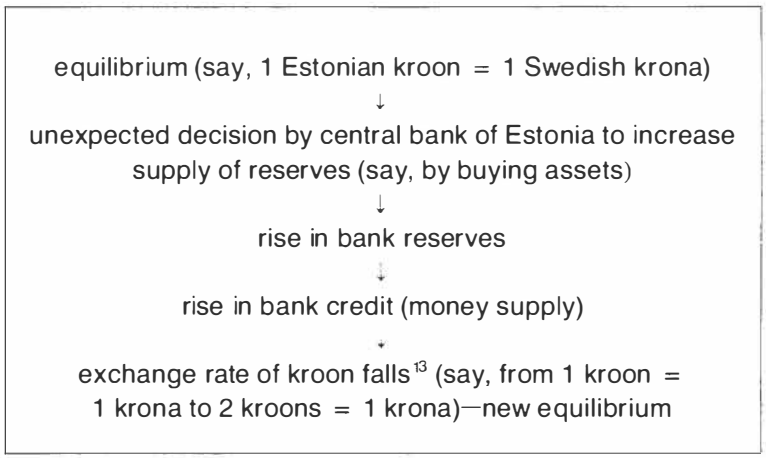
A central bank typically perform many other functions besides influencing the supply of money. It regulates commercial banks, serves as a lender of last resort to the banking system, gives economic advice to the government, and clears checks. All these are secondary to its role in influencing the money supply, however. Only a central bank controls the quantity of reserves in the banking system, whereas other government bodies can and often do perform the remaining central banking functions. For instance, in the United States the Federal Reserve System shares regulatory powers with the Treasury Department, powers as a lender of last resort with government deposit insurance agencies, economic advising powers with several other government bodies, and duties as an agent for check clearing with commercial banks. We shall focus only on how a central bank influences the money supply, contrasting it with the role of a currency board in the money supply process.

In a currency board system, the starting point in the chain of events in our example of a money supply *expansion* was a fall in the demand for imported goods in the currency board country. Changes in demand for imported goods originate in the market, as a result of changes in people's wants. In a central banking system, the starting point can be an independent decision by the central bank to expand the supply of bank reserves, for example in order to increase the reelection prospects of the incumbent

government. That is *not* a decision that originates in the market.

Diagrammatically, the chain of events in the case of an unexpected[12] money supply expansion under central banking is as in Figure 3.

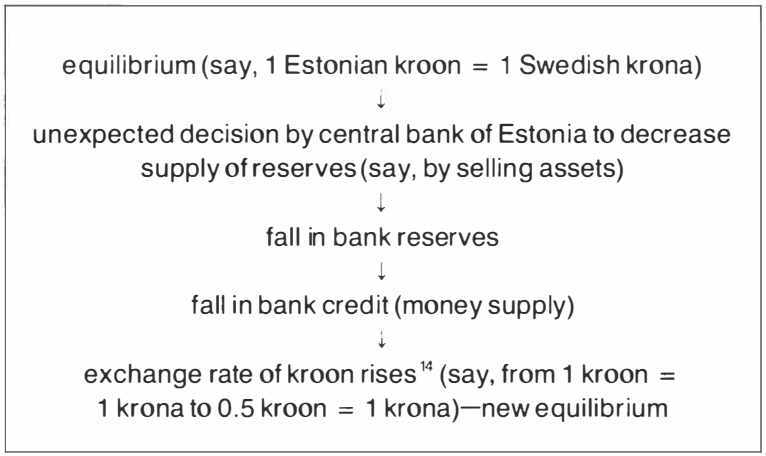
*Figure 3*




To bring out more clearly the contrast with a currency board system, we omit consideration of the effects of various lags. We assume that nominal prices adjust very quickly, leaving real prices unchanged. The only effect of the central bank's decision is a fall in the exchange rate. Under the more realistic assumption that some nominal prices do not change quickly because "stickiness" or "inertia" exists, the central bank's action has real effects on the economy. Indeed, that is the purpose of discretionary central bank policy under floating exchange rates. In the sequence above, the likely effect of the central bank's action would be to lower the prices of domestic goods compared to foreign goods, causing a temporary export boom.

The chain of events in the case of an unexpected money supply *contraction* under central banking is as in Figure 4.

*Figure 4*




Again, our discussion omits consideration of lags, and assumes that nominal prices adjust very quickly, leaving real prices unchanged. The only effect of the central bank's decision is a rise in the exchange rate. If some nominal prices do not change quickly, the likely effect of the central bank's actions is a rise in the prices of domestic goods compared to foreign goods, causing a temporary drop in exports.

## 2.4 Advantages of a currency board over a central bank

The key difference between a currency board system and a central banking system is that a currency board has no power to carry out a discretionary monetary policy. Two forces "pin down" the currency board's action: a fixed exchange rate with a foreign reserve currency and a fixed (100 per cent or more) reserve ratio. The currency board does not vary the exchange rate, nor does it alter the supply of bank reserves independently of changes in the balance of payments or other market forces. A currency board's supply function for its domestic currency issue is completely

elastic at the fixed exchange rate. Hence, the quantity of the domestic currency in circulation depends strictly on the demand for domestic currency.

Money supply is also completely elastic when a central bank adheres to a fixed exchange rate. However, central banks tend to abandon fixed exchange rates periodically. In a central banking system with a floating exchange rate, any nominal quantity of money is potentially possible, because the central bank's liabilities count as reserves for commercial banks. All else equal, commercial bank credit (deposits) expand or contract as reserves expand or contract. In a floating-exchange-rate system, the central bank can make the nominal supply of commercial bank reserves whatever it wishes. Therefore, if the public wishes to hold a constant amount of bank deposits and central bank notes and coins, when adjusted for inflation or deflation, the exchange rate must adjust to keep the real supply of money constant. In a currency board system, in contrast, the exchange rate is fixed.

* * * *

In our judgment and in the judgment of many other economists, a fixed exchange rate is better than a floating exchange rate for a small developing country like Estonia. A fixed exchange rate costlessly eliminates exchange rate risk with the reserve currency—here the Swedish krona. The krona is linked to the currencies of the European Monetary System, and Sweden intends to become an official member of the European Monetary System before the "irrevocable" fixing of exchange rates later in this decade. Other West European currencies are also officially or unofficially linked to the European Monetary System at present. Therefore, if Estonia establishes a currency board to link the kroon to the krona, it will join a common currency zone far more populous and wealthy than the present ruble zone. Trade between Estonia and Western Europe will become easier than it would be under floating rates because there will be no need to allow for a currency risk premium in the prices of goods. People will be able to make more exact price calculations for internationally traded

goods. That will enhance economic efficiency by making the lowest-cost producers within the common currency area those with the greatest natural advantages, not those temporarily benefiting from the distortions to the international price structure that large, sudden exchange rate fluctuations cause. A fixed exchange rate also enables entrepreneurs to apply to other problems talent that in a floating rate system they would apply to currency speculation.

Eliminating exchange rate risk will also encourage foreign investment in Estonia, particularly from other countries within the common currency zone. Investors will know with certainty what exchange rate they will receive in terms of the reserve currency if they should want to repatriate profits. By making it easy for them to exit the market, a fixed exchange rate is more likely than a floating rate to encourage them to enter the market. Under the currency board system, British colonies were very successful at attracting British capital to foster their economic development. Fixed exchange rates with the pound sterling and laws resembling those of Britain made investments in Kenya as secure as investments in the English county of Kent. British colonial banks aided the transfer of capital by linking London financial markets to their branch banking networks in the colonies. The colonial banks also helped speed economic growth by transferring the sophisticated banking techniques developed in Britain to areas where it otherwise would have taken generations to develop local banking expertise to such a pitch. Today many former British colonies, having discarded the currency board system, nationalized British banks, and reduced property rights, find themselves shut out of international capital markets.

A fixed exchange rate also enables a country like Estonia to "piggyback" on the financial markets of the reserve-currency country and of other countries within the common currency zone. Entrepreneurs in the country that sets the fixed rate can take their cues from the highly liquid, well-established markets elsewhere in the zone. Entering financial markets elsewhere in the zone becomes extremely easy. Financial markets in Western Europe offer facilities for interest-rate hedging, foreign-exchange

swaps, and many other transactions that will not be available on a similar scale in Estonia for many years. Ready access to large foreign financial markets, with no foreign-exchange risk, speeds economic growth. Hong Kong, for instance, attracted enormous investment first from Britain and then from the United States because the Hong Kong dollar was linked to the pound sterling (and, under the Bretton Woods system, to the U.S. dollar indirectly), and since 1983 to the U.S. dollar.

Finally, a fixed exchange rate for the Estonian kroon, if credible, will become a feature of the economic landscape and will cease to be a subject of political contention. In particular, it will enable Estonia to avoid those inflationary wage and price increases that produce pressure on central banks in other countries to depreciate their currencies as a way of keeping wages internationally competitive. This leads to a new round of wage increases as workers demand more money to keep pace with the price increases for imported goods, which depreciation was to blame for in the first place. In many developing nations today, the knowledge that the central bank will bow to pressure to depreciate the currency induces a vicious cycle of hyperinflation. A fixed exchange rate enforced by a currency board, on the other hand, is much more credible. A currency board stops hyperinflation cold because workers and employers know that if they want to stay in business, wages and prices must be competitive from the start. Since a currency board always has reserves of at least 100 per cent in assets that it can readily liquidate, it is always able to defend the fixed exchange rate.[15]

It is, of course, possible to *have* a central bank that offers a fixed exchange rate with a foreign currency. However, historical experience shows that it is difficult to *maintain* a fixed exchange rate in a central banking system in a country in Estonia's present position. Central banks have a strong tendency to break promises to maintain fixed exchange rates, specifically when subject to strong political pressure to finance budget deficits. Central bank incentives are such that, at least in the short run, a central bank benefits more by breaking promises about the exchange rate than by keeping them. There is an inherent conflict between a central bank's

power to create commercial bank reserves at will and a fixed-exchange-rate rule.[16] There is no such thing as a completely rule-bound central bank.[17] History indicates that discretionary power has almost always overcome attempts to confine central bank policies with monetary rules.

The Bretton Woods system collapsed because the U.S. Federal Reserve and some other central banks followed excessively expansionary monetary policies. The history of former currency board countries also offers evidence of the tendency of central banks to break fixed exchange rates. For instance, of the countries that formerly belonged to the East African and West African currency boards—Kenya, Uganda, Tanzania, Somalia, Yemen, Nigeria, Ghana, Gambia, and Sierra Leone—all have broken their fixed exchange rates, imposed capital controls, and had higher average rates of inflation than Britain (their former reserve-currency country) since they adopted central banking. From 1974 to 1983, Hong Kong abandoned the currency board system and experimented with a "free issue" system, an unusual arrangement that had neither a fixed exchange rate nor a central bank. Hong Kong returned to the currency board system in 1983 and since has experienced lower inflation and more stable rates of monetary growth than during the free issue period.

In short, then, a currency board cannot act as an independent disturbing element in the economy. Instead, market forces determine the responses of the currency board. A central bank, in contrast, has independent power to influence the economy. The history of central banks shows that they have often used that power in a destabilizing way, sometimes intentionally due to strong political pressure, other times by mistake.

In considering whether to establish a central bank in preference to a currency board, Estonians should inquire carefully into the character of the persons who would be in charge of the central bank. In the United States, a nation of hundreds of millions of people, it is nearly impossible to select persons with the requisite character and will to keep the central bank on a course that ensures a stable price level. The history of American central banking is full of politically inspired destabilizing decisions. The cen-

tral banks of many other nations have worse records of resisting political pressure; we have already mentioned the records of East European central banks. Will it be possible to find persons in Estonia able to resist political pressure under present chaotic conditions, and to resist the temptations that the great power of a central bank will offer? We are skeptical.

To sum up our discussion of the two choices of monetary systems available for Estonia today, we believe that a currency board is the better choice because it gives the new Estonian currency better insulation from short-run political pressure than a central bank. We expect such political impulses to be a major threat to the economic and political stability of Estonia. Of course, we are aware that the Estonian economy will also be the subject of real shocks. However, a currency board system will create a monetary environment suitable for successful adjustments to such disturbances. We would like to point to the case of Hong Kong—an economy that has shown great adaptability for economic change. If a currency board system is combined with other economic reforms, Estonia can find inspiration in the case of Hong Kong.

We have presented here a number of objections to central banking. How do these objections square with our recommendation that Estonia should tie its currency through a currency board to the Swedish krona, which is managed by a central bank? Is there not a great risk that the Swedish central bank would create monetary instability in Estonia? The track record of the Riksbank concerning inflation is not a perfect one.[18]

Our main argument is that the Swedish central bank (the oldest central bank in the world) has more credibility than any newly established Estonian central bank would have presently and in the immediate future. The relative credibility of the Riksbank will be carried over by a currency board to the Estonian kroon, while there would be no such effect if Estonia set up a central bank of its own. Since the spring of 1991, the Swedish currency has been tied to the ecu and Sweden has announced plans to join the European monetary system. These steps lend additional credibility to the Swedish krona.[19]

# 3. *Proposal for the Estonian Currency Board*

This chapter explains how to establish and operate a currency board for Estonia. It suggests how Sweden could furnish the currency board's initial reserves and how to insulate the board from political pressure.

## 3.1 How to establish the Estonian Currency Board

We recommend that the Estonian Currency Board be established jointly by the Swedish and Estonian governments, and that it issue notes and coins denominated in kroons, the new currency of Estonia. The Board can be established quickly according to the following sequence of steps.

1. The Swedish and Estonian governments jointly establish the Estonian Currency Board according to statutes like those proposed in Appendix I. The Swedish government supplies the Estonian Currency Board's initial reserves in a lump-sum transfer.

2. The Estonian Currency Board issues no more currency than the amount of its initial reserves, that is, the Estonian Currency Board has 100 per cent reserves from the start.

3. The new currency is put into circulation, preferably by a distribution to every citizen of Estonia according to a set plan.

4. All restrictions on foreign exchange are abolished; foreign commercial banks and financial institutions are permitted to operate freely in Estonia.

5. The kroon circulates as a parallel currency to the ruble. There is no fixed official rate between the kroon and the ruble.

6. Profits of the Estonian Currency Board may be channeled into the Estonian Research Fund, a body set up for distributing the seigniorage of the Estonian Currency Board.

* * * *

Let us consider these steps in turn.

*1. The role of Sweden:* Sweden should play an important role in the creation of the Estonian Currency Board. Basically, the role of Sweden will be to furnish credibility for the new Estonian currency. The Swedish krona is far more credible than a currency issued by an Estonian central bank would be. Certainly the krona is far more credible than any existing East European currency. Furthermore, through the European Monetary System the krona is linked to the currency that has been perhaps the most credible in the world over the past generation: the German mark.

To increase the credibility of the Currency Board's promise to always keep at least 100 per cent reserves, we propose that the kronor bonds backing the new kroons should be held in custody in Stockholm.

Sweden can and should support the Estonian Currency Board for a number of reasons. First, we expect close financial ties to develop between Sweden and Estonia. Stockholm served as a financial center for the Baltic states in the interwar period. The Estonian currency was even tied to the Swedish krona during part of that period. Thus, our proposal has some historical precedent. The Swedish financial system today is quite advanced; our proposal will allow Estonia immediate access to Swedish financial markets. Consequently, we believe that the Swedish currency is a suitable currency for the kroon to be connected with.

Second, Sweden will most likely be a future leading trade partner of Estonia; thus commercial links between the two countries will grow rapidly in the coming years. Estonia will also be a

country with attractive investment opportunities for Swedish firms as well as firms from other foreign countries, if Estonia establishes a convertible, stable currency.

Third, we anticipate that Estonia will receive substantial aid from Sweden. The new Swedish government announced in autumn 1991 its commitment to support the new Baltic states. The effectiveness of this program will depend on Estonia's choice of monetary system. The Swedish government should request that Estonia establish a stable monetary system, preferably a currency board, as a prerequisite for sending further aid. We believe that the best aid that Sweden can give at this point would be to establish an Estonian Currency Board in cooperation with Estonia.

2. *The size of the reserves of the Estonian Currency Board:* How big should the reserves of the Estonian Currency Board be? As a rule of thumb, the volume of currency is 4 to 5 per cent of gross domestic product in countries with annual income levels of around US$2000 per person. Estonia probably belongs to this category. We do not think that the actual size of the reserves is a crucial issue, however, because the design of the Estonian Currency Board will permit the money supply to adjust to demand once the system is set up. Cross-country comparisons indicate a wide variety of relationships between income and money among developing as well as industrial nations.[20] With this in mind, we recommend that the initial reserves of the currency board be 600 million Swedish kronor in kronor bonds. We suggest that the Swedish government supply the Estonian Currency Board with this amount through a grant. It would be a crucial first step of the Swedish policy of supporting the new Baltic states.

3. *The distribution of the Estonian notes:* The exchange rate between the Swedish krona and the Estonian kroon should be one to one, so as to make conversions easy to calculate. The rate between the kroon and the krona was also one to one in 1928 when the kroon was first introduced as the Estonian currency unit.

According to our plan, the Estonian Currency Board will now start the new monetary system by distributing kroons represent-

ing 600 million Swedish kronor. The actual distribution can be designed in various ways. The easiest method would be to give every Estonian citizen a one-time gift of 375 kroons. The currency could also be given on a per household basis, or according to various scales: for example, 500 kroons for the first person in the household, 300 for each additional adult, 100 kroons for each child and so on. The distribution could also be carried out in two steps. First a sum less than 375 kroons per person could be distributed, and half a year later the rest could be distributed.

To a Swede, 375 kronor would be a small sum, but to an Estonian it is several weeks' salary at present exchange rates. The distribution of 600 million kroons should also be regarded as a form of emergency aid, considering the bleak prospects for the Estonian public during the immediate future.

The initial grant of 600 million Swedish kronor will be the only foreign grant to the Estonian Currency Board's reserves. The Board will not become a funnel for continuing flows of aid that paralyze Estonian self-reliance and initiative. Nor will the Board become the focus of an International Monetary Fund-style stabilization program, which futilely attempts to prop up an overvalued currency issued by an undisciplined central bank. To keep the Currency Board "pure," we suggest that its constitution forbid it from accepting foreign grants of reserves beyond the initial grant from Sweden.

*4. Free entry of foreign financial institutions:* The design of the Estonian Currency Board is based on the idea that foreign commercial banks should be allowed free entry into Estonia. They will be credible institutions for deposits in kroons. The present banks of Estonia lack such credibility, and may be unsuitable for the transformation of Estonia into a market economy. Foreign banks will bring in new techniques and knowledge about financial matters now lacking in Estonia. These banks will also provide services for exchanging kroons for foreign currencies.

*5a. The fate of the ruble:* After these steps have been taken, the kroon will enter into circulation alongside the ruble. Nobody

in Estonia will be forced to use kroons, except to pay taxes; that is, the kroon will be the legal tender of Estonia. Much of the economy will quickly switch to the kroon as the unit of account because the kroon will be far more stable than the ruble. It will be a matter for individual enterprises and landlords to decide whether they now want to pay wages or be paid rents in kroons or in rubles. Banks will also have to decide whether to allow depositors to convert existing ruble accounts into kroon accounts.

We assume that there will be an unhindered foreign exchange market, so that people will be able to exchange rubles for kroons or vice versa. Hence it will be no disadvantage to be paid in rubles as it was under the old Soviet system, where the free (black) foreign exchange market was "thin" and persecuted by the authorities. The present hyperinflation of the ruble will most likely eliminate the ruble completely in the near future. Similar events occurred in North Russia after local currency board notes were introduced in parallel with the inflationary issues of other Russian governments fighting the civil war. However, since Estonia will not prohibit circulation of the ruble, it should be able to maintain cordial economic relations with Russia, which for some time will remain its largest trading partner.

As the Estonian public becomes convinced that the monetary reform is working, it will deposit its Finnish marks and other hard foreign currency with banks in Estonia. Many foreign-currency deposits held abroad by Estonians will also be transferred to banks in Estonia as confidence grows. Under our proposal, the new deposits will create no problems. People will be free to convert foreign currency into kroons or to hold the deposits in any foreign currency they wish. Permitting foreign currency deposits will promote financial development in Estonia, just as it has in Hong Kong, where foreign-currency deposits exceed Hong Kong dollar deposits.

*5b. Effects of the Estonian Currency Board on wages and prices in Estonia:* The Estonian Currency Board is based on a fixed exchange rate between the kroon and the krona. Using this rate as an anchor, nominal wages and prices within Estonia will have to be

set accordingly. No one knows at this stage what would be the proper wages and prices in Estonia; thus we cannot give any recommendations on "correct" wages and prices. Market forces should be allowed to set wages and prices freely. The new Estonian currency will, however, facilitate the process. Some wages and prices will be set in the short run at incorrect levels. However, through trial and error in the market, mistakes will tend to be self-correcting.

It is extremely important that wages and prices within Estonia are highly flexible during the establishment of the Estonian currency board. Such flexibility will guarantee that wages and prices will be set eventually at equilibrium levels given the exchange rate that the Currency Board sets for the Estonian currency.

Let us dwell a bit further on this issue. Many ruble prices are now above or below the equilibrium levels that would exist in a full-fledged market economy. Consequently, when translated into kroons, those prices will also be above or below their equilibrium levels. Adjustment through trial and error will be necessary. This is equally true under any monetary system. There is no magic formula for determining the equilibrium *relative* prices of goods.

But issuing a parallel currency is not like a currency conversion, such as the German monetary unification of 1990, in its effect on the *general level* of prices of goods. With a parallel currency the government does not set an exchange rate that determines the general level of domestic goods compared to foreign goods. Nobody will be forced to use the kroon except in payment of taxes, and the exchange rate between the kroon and the ruble will be determined on the free market. The role of the government is passive except insofar as it, like other parties that decide to use the kroon, must translate ruble prices into kroon prices. Unlike what happens in a currency conversion, the government refrains from dictating a rate for translating ruble prices into kroon prices for dealings in the private sector of the economy.

Aside from these theoretical points there remains the practical question of where Estonians should begin in translating wages and prices from rubles into kroons. An obvious solution is to use

the free-market exchange rate of the ruble against the Swedish krona as a benchmark for setting prices in kroons. For instance, suppose that a worker receives a salary of 1000 rubles per month from the enterprise where he works. Suppose also that the free-market exchange rate is 20 rubles = 1 krona. If the enterprise now decides to pay the worker in kroons, it could initially pay him 50 kroons per month, which is precisely equivalent to his previous salary of 1000 rubles.

Hyperinflation makes ruble prices seem extremely low when expressed in terms of a hard currency, such as the new kroon will be. The low prices reflect lack of confidence in the ruble. Within a year or two after the currency board issues the new kroon, wages and prices in kroons will probably be significantly higher because people will have confidence in the future of the Estonian economy. That is what usually happens after a successful currency reform. The Estonian government should not try to anticipate later success by setting kroon wages and prices high now. Doing so would only cause unemployment. Nor should it later try to halt price increases by imposing price controls on the private sector.

The fixed exchange rate of the kroon with the krona will set both a lower and an upper limit on wages and prices in Estonia. Wages and prices will reflect the value of workers and goods compared to their counterparts in Sweden. Wages and prices in Estonia will increase at Swedish rates, plus a margin for increases in the expected productivity of Estonian workers, land, and so on. Especially in the first few years, the increases may be quite large, but they are natural for a rapidly developing economy with a fixed exchange rate monetary system that is sound.

It is important to make wages and prices in Estonia highly flexible. Privatizing state enterprises and land rapidly is the best way of doing so, because the private sector is more atomistic and has more incentive to adjust quickly than the state sector.

*6a. The Estonian central bank:* Estonia has an institution called a central bank that as yet does not issue currency and exercises no real central banking powers. We believe that this institution

should not be a central bank in the Western sense. It should have no power to create or destroy reserves in the commercial banking system. We suggest that it should instead be a regulatory body for the Estonian financial system. It may also house the office of the Estonian Currency Board in Tallinn.[21]

*6b. The seigniorage of the Estonian Currency Board:* The Estonian Currency Board will earn profits from its interest-bearing bonds. Profits can be remitted to the Swedish government as repayment for the initial reserves; or retained by the Currency Board; or given to some part of the Estonian government. We would like to see the profits become the financial backbone of an Estonian Research Fund, similar to the Fund once set up by the Swedish Riksbank out of its profits from note issue. The Estonian Research Fund should support Estonian students and researchers and improve Estonia's system of higher education. The Fund could be managed by an independent body with representatives from the Estonian Currency Board.

## 3.2 How to operate the Estonian Currency Board

A currency board is simple to operate. Past currency boards have usually had staffs of 10 or fewer people. They have been able to achieve economies of staff by contracting some clerical and investment functions to outside parties. In fact, one of the great advantages of the Estonian Currency Board will be its extreme simplicity. Quite apart from the susceptibility of a central bank to undesirable political influences, it is doubtful whether Estonia now has enough well-trained people to staff a central bank. As we have seen, history demonstrates that a central bank has the power to create great economic troubles through its exercise of discretionary monetary policy. Even for well-trained central bankers not subject to political pressure, the opportunities for making mistakes are great during transition periods such as Estonia's transition to a market economy. Central bankers who are not well-trained or who are subject to political pressure are likely to

make even more mistakes. Therefore we suggest that it is better to rely entirely on the market signals that will be reflected through a Currency Board under present Estonian circumstances.

We now describe how to run the Estonian Currency Board.

*Exchange policy:* The Estonian Currency Board's business will be to stand ready to exchange its notes and coins on demand at a fixed rate into or from Swedish currency at its offices. To hold a large stock of Swedish currency notes and coins would reduce its profits, because the Board would not be able to invest those funds in interest-bearing securities. Hence, the Board should try to do a "wholesale" currency exchange business with commercial banks. It should also accept and pay in kronor by check or by electronic funds transfer.

*Clientele:* The Estonian public as well as banks should be able to deal directly with the Estonian Currency Board. Some British colonial currency boards dealt only with banks, as a way of reducing their need for staff. It seems unnecessary and unjust to discriminate against the public in such a fashion. Most people will exchange currency through banks in any case. That was the experience of the West African Currency Board when it switched from dealing with banks only to dealing with the public also. Accepting transactions from the public introduces a form of competition with banks, and ensures that their fees for exchanging into krona will be low, thus making the link between the kroon and the krona tighter.

*Lower and upper limits to exchanges:* To reduce their handling costs, many currency boards imposed minimum exchange amounts. Small British colonial currency boards such as those of Jamaica or Barbados had a minimum of £1000; larger ones such as the West African Currency Board had a minimum of £10,000.

We propose no minimum for the Estonian Currency Board. This should strengthen the public's confidence in the system. The public will know that the Board always stands ready to convert fully between Estonian and Swedish currencies.

There also should be no upper limit to the amount of the Swedish currency or of its own notes and coins in circulation that the Estonian Currency Board accepts for exchange. No past currency

board has ever had an upper limit to exchanges, because that would have defeated the full convertibility into and out of the reserve currency which is the purpose of the currency board system.

*Commissions:* Some currency boards have charged commissions of 0.125 per cent to 1.5 per cent for every transaction. (The North Russian board, for instance, charged a fee of 1 per cent.) Other boards had a scale of commissions, and charged lower commissions or zero commissions for large transactions. We suggest that the Estonian Currency Board charge no commission. Commissions would bring little income to the Board. Furthermore, commissions would loosen the link to the krona, especially in the short run. A few boards, most notably the East African Currency Board towards the end of its existence, deliberately manipulated commission rates to influence exchange flows. But the purpose of a currency board is to costlessly eliminate exchange-rate risk. Accordingly, there is no point in erecting barriers to exchange between the kroon and the krona. The social benefits of not charging commissions far outweigh the pecuniary benefits to the Board of charging commissions. Besides, the Estonian Currency Board will earn a major return on its assets in the form of interest from kronor bonds.

*Offices:* The Board should have a main office in Tallinn, the capital of Estonia, and perhaps a few branch offices in other large cities of Estonia. The main office will do most of the business, because it is located where banks do the greatest volume of clearing. The role of the branch offices or agents will be mainly to serve as places for safekeeping currency. It is not necessary to have actual branches. Instead, a commercial bank could act as the Board's agent outside Tallinn, as the Bank of British West Africa did for the West African Currency Board. The Board should also have an office in Stockholm to handle business in Sweden.

*Management:* The Estonian Currency Board should have a small board of directors—past currency boards have had three to eight directors—to oversee the board's managers. The powers of the board of directors and of the managers will be quite limited; unlike their counterparts in central banks, they will have no in-

fluence over monetary policy. To insulate the board of directors from political pressures, directors should have staggered terms. Furthermore, some of the members of the board of directors should be non-Estonian citizens, appointed by the Swedish government. We will return to this proposal later.

*Staff*: The Currency Board's staff will perform two functions: exchanging kroon notes and coins for kronor (and vice versa), and investing the Board's assets in high-grade kronor securities. The exchange work will require only a small staff of bank tellers. The investment work will require some expert financial traders, but since the Board will follow rather routine, conservative investment practices, its expenses should be smaller than those of commercial banks with portfolios of similar size. The assets of the Board should be held at a suitable institution in Sweden, for example with a major Swedish commercial bank, with the Riksbank (the Swedish central bank) or with the Swedish Treasury.

*Reserves–composition:* The Board should hold its reserves in high-quality bonds denominated in Swedish kronor only.[22] It should not hold assets denominated in Estonian currency, because that would open the way to central banking-type operations. Specifically, bank reserves could be changed by changing the proportion of local-currency assets to foreign-currency assets held by the Board. Allowing a currency board to hold assets denominated in local currency was one of the steps that pushed the East African and Southern Rhodesia currency boards, among others, along the road to becoming full-fledged central banks.

Besides opening the way for central banking, holding local-currency assets can also be dangerous, as the experience of the North Russian currency board shows. The North Russian board held 25 per cent of its reserves in local government bonds. When the Red Army routed the North Russian government, the North Russian government defaulted on its bonds. The British government, the main holder of currency board notes, lost about 15.5 million rubles as a result.

That all the Estonian Currency Board's assets should be denominated in Swedish currency does not mean that the Board can only buy securities issued in Sweden. The huge growth in

Eurocurrency markets in recent years has led many governments and companies to issue securities denominated in foreign currencies. To prevent the Estonian Currency Board from becoming entangled in the politics of domestic Estonian government finance, though, the Board should not be allowed to hold Estonian government securities.

*Reserves–maturities:* It may be desirable to specify in the Estonian Currency Board's charter or by-laws what types of assets it may hold and what the maximum maturity may be. Likely candidates are Swedish government bonds, high-quality corporate commercial papers, and Eurocurrency loans. Long-term fixed-rate bonds swing widely in value as interest rates change, although they may offer higher average returns. Some British colonial currency boards that invested heavily in long-term bonds suffered large losses when interest rates in the pound sterling rose sharply because of speculation against sterling. However, their additional reserve of 10 per cent prevented their reserve ratio from falling below 100 per cent.

British colonial currency boards often divided their investments into a "liquid reserve" and an "investment reserve". The liquid reserve, consisting of securities that had maturities of less than two years, was typically about 30 per cent of total reserves. The investment reserve, consisting of securities with longer maturities, was the rest of the total reserves, equivalent to an estimate of the public's minimum, "hard-core" demand for a board's notes and coins. The liquid reserves of the Estonian Currency Board should probably exceed 30 percent at the start, although it may be possible to reduce the ratio as time goes by and Estonia's economic situation becomes more stable.

*Expenses:* Judging from the experience of past currency boards, expenses should average no more than 1 per cent of total assets, and may be as low on average as 0.5 per cent of total assets. The main expense will be printing notes and minting coins. Salaries will be the next greatest expense, and rent, utilities, and remaining costs will be small.

To minimize the risk that the Estonian authorities will revert to inflationary finance, the notes of the Estonian Currency Board

should be printed outside Estonia, even if the costs to the Board are a bit higher. Only the Estonian Currency Board will put new Estonian notes into circulation, and only when the notes are backed 100 per cent by the assets of the Board.

*Profits:* The Board's profits will be the difference between the interest it earns on its Swedish kronor reserve assets and its expenses. After the Board repays any initial loans, it should accumulate a reserve of 10 per cent to protect it against capital losses on securities holdings, as most British colonial currency boards did. It should pay all profits into the reserve until the reserve is full, and in the future do likewise should the reserve ever fall below 10 percent. Profits beyond that should revert to the Estonian Research Fund as described previously.

## 3.3 How to protect the Estonian Currency Board

Although the currency board system was a great economic success earlier in this century, currency boards exist today only in a few of the more than sixty places that once had them. The most notable examples of currency board systems today are Hong Kong and Singapore. Currency boards elsewhere disappeared because they lacked the political independence to prevent them from being changed into central banks. Suspicion that a new currency board might be converted into a central bank would undermine foreign willingness to invest in Estonia, defeating one of the main advantages of convertibility. Therefore, in this section we propose ways of preventing the Estonian Currency Board from suffering the fate that befell most old boards. Our proposals can be summarized as *commitment*, *credibility*, and *competition*. They are complementary; any one could be implemented separately or along with the others.

The Board can *commit* itself to buy and sell forward exchange at the fixed rate. Some currency boards, such as those of Singapore and Hong Kong, have offered three- and six-month forward exchange contracts as a way of increasing the liquidity of their foreign exchange markets. When the forward market be-

comes sufficiently well established the Currency Board can leave it to commercial banks.

The Board can strengthen its *credibility* by insulating itself from any possible Estonian government manipulation. We have already discussed how a currency board has greater credibility than a central bank. To make the Estonian Currency Board even more credible than many past currency boards, we propose that its board of directors include some non-Estonian citizens, appointed by the Swedish government. There are precedents for such an arrangement. For example, only three of the eight directors of the Libyan Currency Board of the 1950s were Libyan nationals; the rest were British, French, Italian, and Egyptian nationals chosen by their respective governments. The persons appointed by the Swedish government need not be a majority, and they need not even be Swedes.

Another way of increasing the Board's credibility is to keep its assets in Sweden, as we already suggested for the initial reserves that Sweden grants to the Board. All of the Board's assets could be held in Sweden, and the Board could be incorporated under Swedish law, independent of the Estonian government (although the permission of the Estonian government would of course be necessary for the Board to operate in Estonia). The Burmese and Jordanian currency boards, among others, had their headquarters in London even after Burma and Jordan became independent.

A further way to promote credibility is for the notes of the Currency Board to contain a statement that they are convertible into Swedish kronor at a fixed rate at the Board's offices in Stockholm and Tallinn.

*Competition* will improve the Currency Board's incentive to maintain the fixed exchange rate. Estonians should be able to make contracts in and to use any currency that they find mutually agreeable. In particular, Swedish notes and coins should be allowed to circulate alongside the Currency Board's notes and coins, though we anticipate that the actual use of Swedish notes and coins will be small.

To subject the Currency Board itself to direct competition, solvent banks could be allowed to issue circulating notes to compete

with the Board's notes. Like the Board's notes, bank notes would be convertible into the Swedish currency at the fixed exchange rate. Hence, the Board's notes and bank notes would be like different brands of traveller's checks circulating alongside one another. What brands were most widely used would depend on what brands best satisfied consumers' needs, as is now the case with traveller's checks.[23] The Currency Board would have no responsibility for rival note brands, which is something that should be stressed to the public. The Estonian Treasury or other government organs, including any government-owned banks, should not be allowed to issue notes.

Competition between currency board notes and bank-issued notes has existed before. In the British Caribbean colonies, banks issued notes not subject to any special reserve requirements. Bank notes competed with currency board notes until the 1950s, when local governments outlawed bank note issue to gain more seigniorage revenue for themselves. In Hong Kong today, the currency board itself issues no notes. Rather, it holds the 100 per cent U.S. dollar reserves that the two note-issuing banks must deposit against their Hong Kong dollar note issues. In Scotland, three local banks issue notes against 100 per cent reserves that they hold at the Bank of England. Going farther back in time, over sixty countries had competitive note issue in the nineteenth and early twentieth centuries, with generally good results. This was the case in Sweden from 1832 to 1902, when notes issued by private banks were more attractive to the public than notes issued by the Riksbank.[24]

* * * *

Besides their lack of complete political independence, past currency boards also had one other widespread flaw, which however did not first become apparent until the late 1940s. The flaw was that they had no systematic procedure for untying their own currency from a reserve currency that became unsatisfactory. British colonies devalued their currencies with the British pound sterling in 1949, 1967, and 1972, because their currency board systems

were dedicated to maintaining fixed exchange rates with the sterling. Devaluation hurt them by raising the cost of the foreign goods that they needed for their economic development, such as the food that Hong Kong imported from China. The chronic weakness of sterling led Hong Kong, Singapore, Brunei, and the East Caribbean Currency Board to switch from sterling to the U.S. dollar as their reserve currency in the 1970s.

There is nothing objectionable about switching reserve currencies if the existing reserve currency becomes too unstable, because otherwise the currency board country will suffer the problems afflicting the reserve-currency country. If the Estonian Currency Board has the power to switch reserve currencies, though, the procedure should be carefully specified, rather than being a somewhat arbitrary government decision as was the case with the currency boards that switched reserve currencies in the 1970s.

We suggest that the Estonian Currency Board not be allowed to change the reserve currency unless annualized inflation in the reserve-currency country, as measured by the wholesale price index in the reserve-currency country, falls outside the range −10 per cent to −25 per cent for more than two years, or −20 per cent to 50 per cent for more than six months. If inflation exceeds that range, the Board will be free either to devalue or revalue its currency in terms of the reserve currency by no more than the amount of the inflation rate in the reserve country for the period just specified (two years or six months), or to choose a new, less volatile reserve currency and fix the exchange rate at the rate then prevailing between that currency and the original reserve currency. The Board's profits and the 10 per cent reserve that we have proposed it to hold in addition to its 100 per cent reserves will help cushion any losses from switching reserve currencies.

It may also be advisable to write a similar provision into the Estonian Currency Board's constitution allowing it to reset the exchange rate with the reserve currency if the reserve currency appreciates or depreciates too rapidly against a basket of foreign currencies representing other countries important in Estonia's foreign trade. The general point we wish to stress here is that it is

best to have predetermined procedures, known to the public, for handling such difficulties, rather than to respond to them in the rather capricious and ad hoc way that some past currency boards have done.

# 4. *Summary and conclusion*

Estonia is now facing one of its most important decisions as a free nation. It must decide what monetary system to adopt. The ruble is rapidly losing value. The embryonic Estonian central bank has no definite plan for producing a stable, convertible currency. The experience of many newly independent countries indicates that probably no form of central bank can produce a stable, convertible currency in Estonia in the foreseeable future. Estonia, being a small and developing country trying to move towards a market economy, faces great problems in creating confidence in and credibility for its new currency.

We recommend that Estonia, jointly with Sweden, establish the Estonian Currency Board. The currency board system, as used in Hong Kong and elsewhere, is a simple and proven vehicle for promoting price stability and economic growth.

The Estonian Currency Board has the following advantages: it can be established quickly, it can almost immediately circulate its notes through a nationwide distribution of the new notes to every Estonian citizen, it is simple to operate, it will constitute a credible monetary system that will reduce uncertainty about the future value of the Estonian currency, and it will open Estonia to Western banking and finance. In our opinion, our proposal has no major disadvantages compared to the alternative of establishing a central bank. We believe that the main text and Appendix III answer the major objections to the Estonian Currency Board.

In summary, we recommend that Estonia, together with Sweden, take the following steps:

1. Establish the Estonian Currency Board with 600 million Swedish kronor in initial assets provided by the Swedish government.

2. Issue notes and coins in the new Estonian currency, the kroon, through the Estonian Currency Board. The kroon will equal one Swedish krona. These notes and coins will be distributed according to a set plan to every citizen of Estonia.

3. Allow free trading in all currencies. Abolish all restrictions on interest rates and financial intermediation, permitting foreign commercial banks free entry into Estonia.

4. Declare that the Estonian central bank shall serve as an agent for the Estonian Currency Board. The central bank shall have no power to create or destroy commercial bank reserves.

5. Allow the kroon to circulate as a parallel currency to the Soviet ruble. No fixed rate shall be set between the kroon and the ruble. Eventually, the kroon will drive the ruble out of circulation because of the hyperinflation in Russia.

6. Channel the profits of the Estonian Currency Board into the Estonian Research Fund whose functions we have described above.

We regard monetary reform of this kind as the first and the central step towards the establishment of a market economy that will generate growth and progress for the new independent Estonia.

# *Appendix I: A currency board law for Estonia*

We propose here a law for the Estonian Currency Board. The law has many features taken from the constitutions of boards in West Africa, Hong Kong, the British Caribbean, Libya, Burma, and elsewhere.

## Currency Board Law

1. The Estonian Currency Board is hereby created by the Swedish and Estonian governments in joint cooperation. The Currency Board's purpose is to issue notes and coins in the Estonian currency, and to maintain them fully convertible at a fixed exchange rate into a reserve currency as specified in paragraph 6.

2. The Currency Board shall have its legal seat in Stockholm.

3. a. The Currency Board shall be governed by a board of six directors. Two directors shall be non-Estonian citizens chosen by the government of Sweden. They shall have veto power. Four directors shall be chosen by the government of Estonia.

b. A quorum shall consist of four members of the board of directors, including at least one of the two chosen by the government of Sweden. The board of directors may meet at the board's legal seat in Stockholm; in Tallinn; or in such other locations as it designates. Decisions shall be by majority vote, subject to the restrictions of paragraph 3a and paragraph 15.

c. The members of the board of directors shall serve terms of three years. They may be re-elected once. Should a director resign or die, the appropriate government as specified in paragraph 1(a) shall choose a successor to fill the remainder of the term.

4. The board of directors shall have the power to hire and dismiss the Currency Board's staff, and to fix salaries for itself and for the staff.

5. The Currency Board shall issue notes and coins denominated in the Estonian currency, the kroon. These notes should be fully convertible into the reserve currency. The Estonian notes shall be printed outside Estonia.

6. The reserve currency is the foreign currency with which the fixed exchange rate is maintained. Initially, the reserve currency shall be the Swedish krona and the fixed exchange rate shall be one Estonian kroon = one Swedish krona.

7. The Currency Board may not charge any commission for transactions when exchanging Estonian currency for reserve currency.

8. The Currency Board shall begin business with assets equal to at least 100 per cent of its notes and coins in circulation. It shall hold these assets in securities payable only in Swedish currency, primarily in Swedish government bonds. The Currency Board shall not hold any securities issued by the national or local governments of Estonia, or by enterprises owned by those governments.

9. The Currency Board shall pay all net profits into a reserve fund until its unborrowed reserves equal 110 per cent of its notes and coins in circulation. It shall remit all net profits beyond those necessary to maintain 110 per cent reserves to the Research Fund of Estonia. The distribution of profits shall occur annually.

10. The Currency Board's head office shall be in Tallinn. The Currency Board may establish branches or appoint agents in such other cities of Estonia as it sees fit. The Currency Board shall also maintain a branch in Stockholm as long as the Swedish krona remains the reserve currency.

11. The Currency Board shall publish a financial statement, attested by the directors, quarterly or more often. The statement shall appraise the Currency Board's holdings of securities at their market value.

12. The Currency Board may issue notes and coins in such denominations as it sees fit.

13. Should the annualized change in the wholesale price index in the reserve-currency country fall outside the range −10 per cent to 25 per cent for more than two years, or −20 per cent to 50 per cent for more than six months, within 60 days the Currency Board must either:

a. Devalue (if the index's change is negative) or revalue (if the index's change is positive) its currency in terms of the reserve currency by no more than the amount of index's change over the period specified above, or

b. Choose a new reserve currency and fix the exchange rate at the rate then prevailing between that currency and the original reserve currency.

14. If the Currency Board chooses a new reserve currency in accord with paragraph 13, within one year it must convert all its reserve assets into securities payable in the new reserve currency.

15. The Currency Board may not be dissolved or its assets transferred to a successor organization except by unanimous vote of the board of directors.

16. Beyond an initial grant of reserves from the Swedish government, the Currency Board may not accept grants of reserves from foreign governments.

# *Appendix II: Objections to currency boards*

We have presented in this report a number of arguments why a currency board would be a suitable solution to Estonia's monetary problems. Are there disadvantages associated with our proposal? We now consider the major objections to a currency board solution.

## A. General theoretical objections

In the 1950s and 1960s, it was claimed that currency boards had certain disadvantages compared to central banking. More recent theories have refuted or diminished the significance of this criticism, but since no recent published refutation exists, we briefly consider the criticisms here.[25]

Critics have claimed that the currency board system leaves no room for discretionary monetary policy, that it makes the money supply operate in a deflationary manner in a growing economy, that the 100 per cent foreign-currency reserve requirement deprives a currency board economy of real resources that are available in a system with a fractional-reserve central bank, and that a currency board system needs a lender of last resort.

1. The short reply to the claim that a currency board allows no room for discretionary monetary policy is that it is true. The purpose of a currency board is to carry out an automatic monetary policy rather than a discretionary policy. Economists are far more skeptical than they were in the 1950s and 1960s about the ability of discretionary monetary policy to influence economic growth favorably. The theory of rational expectations has alerted

economists to the insight that whatever systematic policy central bankers can carry out, other people can anticipate and offset it by their profit-seeking activity. Present-day analysis of central banking emphasizes that to improve macroeconomic performance, central banks should be independent of political influence and follow well-specified rules. This argument lends support to a currency board solution.

A related criticism of discretionary monetary policy, associated mainly with the "Austrian" school of economic thought, is that discretionary monetary policy is a form of central planning, subject to the same difficulties as, say, central planning of agricultural output. Central planning suppresses certain price signals that, in an unhampered market, would reveal information to those who know how to interpret them correctly. In the monetary system, the most important of such signals are changes to bank reserves. Changes in the balance of payments or in holdings of notes and coins by the public set in motion the changes to bank reserves and, through them, to the money supply, interest rates, and income that we explained in Chapter 2. Discretionary policy, to be worthy of the name, must try to fight the economy's adjustment towards a new equilibrium. By doing so, however, it merely makes adjustment more prolonged and costly.[26]

2. The claim that the money supply operates in a deflationary manner in a growing currency board economy is correct under certain stringent assumptions, but has little practical significance. Under the assumptions about a currency board system that we discuss in Appendix III, a rise in the demand to hold notes and coins requires a balance of payments surplus to produce additional reserves to exchange with the currency board. As an economy grows, then, it must generate continual balance of payments surpluses for the supply of notes and coins to expand as quickly as the demand. Continual surpluses are unlikely, implying that in periods of balance or deficit, the supply of notes and coins grows more slowly than the demand, resulting in a fall in prices. The fall would not occur if the notes and coins were liabilities of a central bank committed to a fixed exchange rate, because

it holds only fractional reserves. (The converse proposition, which critics of currency boards never stated, is that in a declining currency board economy, money supply is *inflationary*.)

As we explained in Chapter 2, the simplifying assumptions rarely, if ever, hold. A growing economy in a poor country, such as most currency board countries have been, generally has large capital inflows that balance its current account deficits. Furthermore, with international branch banking, banks are able to pool their reserves between the reserve-currency country and the currency board country, so that they may be able to offset much of the effect of changes in the balance of payments between the two countries (and, by extension, among all the countries where they have branches). An international bank's overall reserves are the same whether a given deposit is held by a customer in the reserve-currency country or by a customer in the currency board country.

Currency board systems seem to have had little experience of deflation caused by increases in the demand for notes and coins. The only example that we are aware of occurred in Hong Kong in early 1984. A few months before, Hong Kong had reintroduced the currency board system. During the Chinese New Year, the demand for notes increases because it is customary to give gifts of money. The increased demand for notes affected bank reserves and interest rates for about two weeks, after which they settled back to their previous levels. The banks learned their lesson: during subsequent Chinese New Years, they have kept higher than usual reserves on hand, and interest rates have been little affected.[27]

3. Another criticism of the currency board system is that the 100 per cent foreign-currency reserve requirement deprives a currency board economy of real resources that are available in a fractional-reserve system. Economists who investigated the matter in the 1950s claimed that 30 per cent to 50 per cent of currency boards' reserves were surplus, since there was a "hard core" of notes and coins that people held, which would never return to the boards for redemption. Surplus reserves, then, are a cost of the currency board system since they could be used to buy

imports, increasing the real goods available in the economy.

There is a question as to whether these estimates are accurate.[28] Leaving that aside, let us consider the nature of the alleged cost. Once spent, surplus reserves are gone, and yield no interest. Currency board reserves, on the other hand, pay interest because the board invests them in foreign-currency assets. The stream of future interest payments has a present-value equivalent. It is the difference between the surplus reserves and the present-value equivalent of the interest payments on them. That is the true cost of a currency board system as compared to a fractional-reserve system. Alternatively, it is possible to calculate the interest on the surplus reserves that would be paid if they were lent domestically, and to compare that with the interest a currency board earns from foreign-currency assets. Only if the present value of the goods that could be imported is markedly greater than the present value of the currency board's interest income (that is, domestic interest rates are markedly higher than foreign interest rates for comparable loans) is the currency board system more costly than a fractional-reserve system.

Even so, the currency board system remains less costly than fractional-reserve central banking if we take a broader view. The currency board system offers a degree of credibility and predictability that central banking has difficulty matching. Consequently, the currency board system is more likely than central banking to encourage investment, especially foreign investment, and to result in sustained economic growth. In our opinion, a currency board for Estonia has the great advantage of immediately establishing the credibility that Estonia needs at this point in its history.

4. Finally, there is the criticism that a currency board system has no central bank to act as a lender of last resort. The existence of a lender of last resort unavoidably encourages more risky actions by commercial banks than they would otherwise undertake. This is called the problem of "moral hazard". The present American savings and loan crisis is a lesson on moral hazard run amuck. American taxpayers will serve as the lender of last resort.

Commercial banks in a currency board system have a number

of means at their disposal to provide liquidity without recourse to a lender of last resort. Historically, bank failures have been rare in currency board systems. Perhaps the most important source of stability for banks in currency board systems has been their international branch networks. The currency board system promotes bank branching, not just nationally but also internationally, which enables banks to diversify risks. By offering banks easy access to the financial markets of the reserve-currency country, the currency board system enables them to tap a wider range of financial resources than if they were confined to domestic financial markets.

A measure that does not seem to have been tried in currency board systems, but that existed in Sweden before it established full-fledged central banking,[29] is for banks to include an option clause in their contracts with depositors. The option clause would allow a bank to delay for a set period depositors' requests for withdrawals. In return, the bank would pay a penalty rate of interest, for instance 3 per cent above the rate prevailing before it exercised the option clause. Banks would be free to offer an option clause or not, and depositors would be free to deposit with such banks or not.

The problem of financial panics and thus of a sudden lack of confidence in the banking system under a currency board can also be mitigated by the establishment of deposit insurance schemes. Such schemes can be organized either through private or public initiative. The institution responsible for deposit insurance may also be empowered to control and monitor the commercial banking system. Great care must be taken to prevent deposit insurance from falling victim to problems of moral hazard.

To sum up, the question of the lender of last resort requires us to think in comparative terms. The price of having a central bank as a lender of last resort is that it poses a great moral hazard risk. Furthermore, even a central bank cannot prevent a really severe economic crisis. During such a crises the central bank can preserve nominal values by pumping reserves into the financial system, but severe inflation and exchange rate depreciation occur. In a currency board system inflation and exchange rate

depreciation do not occur, but some financial institutions may go bankrupt. This risk can be minimized by various private or government initiatives (like deposit insurance) mentioned above.

## B. Practical objections specific to Estonia

Besides the general theoretical objections to a currency board system, there are also practical objections specific to Estonia that we have not considered or only briefly addressed in the main text. The objections that we deal with here were raised by a number of commentators in the debate following the presentation of our proposal in *Dagens Industri* and its Estonian counterpart *Äri Päev* in December 1991 and February 1992.

1. One objection is that the Estonian Currency Board may create a colonial relationship between Estonia and Sweden, since under our proposal the Estonian kroon will be linked to the Swedish krona. (This is the main criticism raised by Estonians against our proposal.) Estonia has just emerged from a long period as a Soviet colony, and it is understandably anxious not to experience such a relationship again.

In reply, we point out that the currency board system itself creates no colonial relationship. Historically, most currency boards have existed in British colonies, but currency boards have also existed in independent nations, including Kuwait, Burma, Danzig, and North Russia. The purpose of the currency board system is not to create a colonial relationship, but to promote more credibility than a domestic central bank could achieve. That is why the Hong Kong dollar is linked to the U.S. dollar, even though Hong Kong is a *British* colony. The Bank of England has more credibility than a Hong Kong central bank would have, but the U.S. Federal Reserve has more credibility still.

As we have mentioned, the krona itself is linked to the currencies of the European Monetary System, of which the most important is the German mark. Sweden is in fact eager to become a

full member of the European Monetary System. Yet the relationship of Sweden to Germany cannot be described as colonial. After the "irrevocable" fixing of exchange rates among the members of the European Monetary System that is scheduled to occur late in this decade, the Swedish central bank will become a type of currency board, as will the German central bank. Linking the kroon to the krona will encourage investment from Western Europe, but such investment will be a voluntary relationship between independent parties, with none of the forced character of Soviet investment. Investment from Western Europe will enable the Estonian economy to reorient itself towards Western Europe and to break the truly colonial economic relationships formerly dictated by Soviet central planners.

The kroon will not be an "imperialistic" currency as the ruble was. The ruble was an inconvertible currency forced on the Estonian people. Under our proposal, the kroon will be a convertible currency that people may choose to use or not use in their dealings with parties other than the Estonian government. If people want to use the U.S. dollar, the ruble, or other currencies not linked to the krona or to the European Monetary System, they will be free to do so. Furthermore, if the krona itself becomes an unsuitable reserve currency because of high inflation or deflation in Sweden, our proposal provides a means for breaking the kroon's link to the krona and establishing a link with a more stable currency, or even with gold should it appear best. Therefore a currency board will enable Estonia to achieve greater economic independence than it has had under Soviet rule or would have with a central bank.

2. If Sweden helps Estonia to establish a currency board, Sweden implicitly accepts responsibility for the future of the Estonian economy—a major committment that Sweden should not enter. (This is the foremost objection raised by Swedish civil servants in the Foreign Office and in the Riksbank.) We stress again that granting the initial reserves for the Estonian Currency Board will not obligate Sweden to make further grants to Estonia or the Currency Board. We have proposed that the constitution of the Cur-

rency Board explicitly recognize that the initial reserves are a one-time grant, never to be repeated. Sweden need not fear that Estonia will become a drain on Swedish resources, as many colonies have been. In contrast, if Sweden helps Estonia establish a central bank that works badly, there is a risk that Sweden will need to send aid to Estonia for a long time to come.

3. Another objection to a currency board system for Estonia is that unlike a central bank, a currency board will deprive Estonia of the opportunity to impose an inflation tax of its own choosing. We see this as an advantage rather than a disadvantage. Estonia is now suffering from the effects of a high inflation tax. The tax is being imposed by the Russian government rather than by the Estonian government, yet we doubt that Estonians would be any happier with domestically created inflation of the same magnitude.

Linking the kroon to the krona will prevent the Estonian government from destabilizing the economy as the Soviet and Russian governments have done. It will enforce a hard budget constraint on Estonian politicians. A government can run a budget deficit under a currency board system; the North Russian government did so, for instance. However, in a currency board system, the government cannot finance itself by inflation, which is a hidden and often very destructive tax. Since a currency board cannot be a source of inflationary finance, Estonia will need a tax system that can collect adequate revenue without Soviet-style resort to inflation to cover government budget deficits. It is most important for the Estonian government to understand this and to live within its means. The currency board system does not by itself prevent government budget deficits, but it does help ensure that the government cannot cheat those who have lent it money by repaying them in greatly depreciated currency. Taxes on Estonian citizens will therefore have to be imposed in a more open manner with broad popular consent. The currency board system thus helps prevent the pursuit of seigniorage from overriding the most important objective of monetary policy, which is ensuring a stable, convertible currency.

The Estonian Currency Board will still generate seigniorage profits, which will be substantial if Estonia enjoys rapid economic growth. Over the long run the currency board may yield more revenue than a central bank would, because there will be greater confidence in the currency board and greater willingness to hold its notes and coins.[30]

There are three further important questions (not really objections) that have been raised about the Estonian Currency Board.

4. One is whether it will inadvertently strengthen the Estonian "mafia" presently operating in Estonia. We think that to the extent the Currency Board has any effect, it will be to weaken the mafia. Some of the mafia's revenue comes from activities that are perfectly legal in a market economy but illegal in a socialist economy, such as dealing in foreign-currency exchange. The Currency Board, by promoting a market economy, will reduce the mafia's revenue from such activity. As for the mafia's other activities, they are the concern of the police, not of the Currency Board.

5. Another question is whether the currency board system implies any particular border controls. As we have said, there should be no limits to the amount of currency that the currency board will convert from krona into kroon or vice versa. The currency board system thus implies unlimited freedom to import or export currency and capital. Of course, proper controls can be enforced to ensure that people pay taxes or that money acquired through criminal activity is detected. As the experience of Hong Kong shows, such controls need not hinder ordinary financial transactions.

6. A final question is what is the worst thing that could possibly happen to the Estonian Currency Board. Suppose that the Estonian public converted all of its kroon notes and coins into kronor. What would happen then? The answer is that little would happen. The Currency Board's 100 per cent or greater kronor reserves

would ensure that it could meet all demands to convert kroon notes and coins. Instead of having kroons, Estonians would have kronor. If the exchange rate between the kroon and the krona is one to one, as we proposed, it would not even be necessary for shops to recalculate prices in kronor for the benefit of persons spending kronor. Bank deposits would also be completely unaffected.

Even in the worst case, then, the Currency Board could not disturb the Estonian economy. But the worst case will not happen. Any conversion of kroons into kronor will set in motion a chain of events whose most simple version we sketched in Chapter 2. The chain of events is self-correcting, leading to a new equilibrium in money supply, prices, and incomes. Furthermore, the necessity that payments to the Estonian government be made in kroons will create a hard core of demand for kroons, which will limit the amount of Currency Board notes and coins that people will wish to convert even in the worst case.

# *Appendix III: Money supply — a technical analysis*

This appendix goes into more detail than Chapter 2 to illustrate the linkage between changes in the balance of payments and the domestic money supply under a currency board system. We use "T account" diagrams to supplement the flow diagrams in Chapter 2. The flow diagrams depict a chain of events, whereas the T accounts depict simplified balance sheets for the relevant agents under a currency board system (see Figures 5, 6, and 7).[31]

## A. Currency board system

Figure 5 is a T account for a typical currency board.

*Figure 5*

| CURRENCY BOARD | |
|---|---|
| *Assets* | *Liabilities* |
| Foreign-currency securities | Notes and coins |
| | Net worth |

Figure 6 is a T account for typical commercial banks in a currency board system.

*Figure 6*

| COMMERCIAL BANKS | |
|---|---|
| *Assets* | *Liabilities* |
| Currency board notes & coins (reserves) | Public's deposits |
| Loans and investments | Stockholders' equity |

Figure 7 is the T account of the public as a whole (meaning the entire financial sector except the currency board and the commercial banks).

*Figure 7*

| PUBLIC | |
|---|---|
| *Assets* | *Liabilities* |
| Deposits at banks | Bank loans |
| Currency board notes & coins | Net worth |

The total money supply is the left-hand (asset) side of the public's T account.

Let us go back to Figure 1, the flow diagram in Chapter 2 that shows what happens when a balance of payments surplus occurs in a currency board system. To make the analysis concrete and simple, we adopt certain assumptions. The assumptions are:

1. Bank deposits are convertible into currency board notes at a fixed rate.

2. The ratio of notes and coins to the broader money supply (the currency-deposit ratio) is constant.

3. Income and money holdings move in the same direction.

4. There is no international branch banking between the currency board country and the reserve-currency country.

5. All balance-of-payments changes occur in the current account; the capital account does not change.

6. No binding minimum reserve ratios or other special bank regulations exist.

7. People do not hold stocks of the foreign reserve currency nor do they use the reserve currency in domestic transactions.[32]

To clarify the relationship between commercial banks and the currency board in the chain of events, we use T accounts (see Figures 8, 9, and 10). We use some hypothetical numbers to illustrate what happens. Let Stage 1 (the starting point) be a situation where the balance of payments is zero—an equilibrium. For the sake of simplicity, we assume that net worth in the T account of the currency board and stockholders' equity in the T accounts of commercial banks are zero. We assume further that the banks have a desired deposit-to-reserve ratio of 50:1, and that the public has a desired deposit-to-currency (notes and coins) ratio of 10:1 (see Figure 8). The currency of the currency board country is the kroon. Initially 600 kroons of currency are in circulation.

*Figure 8*

| CURRENCY BOARD—STAGE 1 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 600 | Notes and coins | 600 |
| **COMMERCIAL BANKS—STAGE 1** | | | |
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 100 | Public's deposits | 5000 |
| Loans and investments | 4900 | | |

| PUBLIC—STAGE 1 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Deposits at banks | 5000 | Bank loans | 4900 |
| Currency board notes & coins | 500 | Net worth | 600 |

Money supply = 5500
Banks' deposit-to-reserve ratio = 5000:100 = 50:1 (equilibrium)
Public's deposit-to-reserve ratio = 5000:500 = 10:1 (equilibrium)

Now let there be a balance of payments surplus of 12 kroons, in the form of foreign currency that the public deposits in local banks. Since we assume for the sake of simplicity that banks hold all reserves in the form of currency board notes and coins, the banks exchange the foreign currency at the currency board for domestic currency. (They exchange the reserve currency at the fixed exchange rate, and other currencies at prevailing market rates.) The board's assets and liabilities become 12 kroons more than in Stage 1. Bank reserves become 12 kroons more than in Stage 1, and the public's deposit holdings become 12 kroons more than in Stage 1. In addition, the money supply is 12 kroons more than in Stage 1. This is Stage 2 (Figure 9).

*Figure 9*

| CURRENCY BOARD—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 612 | Notes and coins | 612 |

| COMMERCIAL BANKS—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 112 | Public's deposits | 5012 |
| Loans and investments | 4900 | | |

| PUBLIC—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Deposits at banks | 5012 | Bank loans | 4900 |
| Currency board notes & coins | 500 | Net worth | 612 |

Money supply = 5512 (expansions = 12)
Banks' deposit-to-reserve ratio = 5012:112 = 44.75:1 (disequilibrium)
Public's deposit-to-currency ratio = 5012:500 = 10.024:1 (disequilibrium)

Notice that the banks have a deposit-to-reserve ratio of 44.75:1 (Stage 2), which is less than their desired (Stage 1) ratio of 50:1. Notice also that the public has a deposit-to-currency ratio of 10.024:1 (Stage 2), which is more than its desired (Stage 1) ratio of 10:1. Banks will expand their loans, and the public will expand its holdings of currency, to restore the original Stage 1 ratios. In Stage 3, they do so, achieving a new equilibrium, with the money supply now 110 kroons greater than it was in Stage 1 (see Figure 10).

*Figure 10*

| CURRENCY BOARD—STAGE 3 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 612 | Notes and coins | 612 |
| **COMMERCIAL BANKS—STAGE 2** | | | |
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 102 | Public's deposits | 5100 |
| Loans and investments | 4998 | | |
| **PUBLIC—STAGE 3** | | | |
| *Assets* | | *Liabilities* | |
| Deposits at banks | 5100 | Bank loans | 4998 |
| Currency board notes & coins | 510 | Net worth | 612 |

Money supply = 5610 (expansion = 110)
Banks' deposit-to-reserve ratio = 5100:102 = 50:1 (equilibrium)
Public's deposit-to-currency ratio = 5100:510 = 10:1 (equilibrium)

As the T accounts illustrate, efforts by banks to reattain their desired deposit-to-reserve ratio, and by the public to reattain its desired deposit-to-currency ratio, increase the broad money supply. That generates movements in interest rates, prices, and incomes that move the currency board system back to equilibrium

when a balance of payments surplus occurs. The foregoing example in a sense collapses the effects of these relationships into the deposit-to-reserve and deposit-to-currency ratios. The currency board responds to their actions automatically by virtue of its 100 per cent reserve ratio and its fixed exchange rate with the foreign reserve currency.

When a balance-of-payments *deficit* occurs in a currency board system, the money supply process works as in Figure 2 of Chapter 2.

Starting from an equilibrium in Stage 1 again, the T accounts in this case are as in Figure 11.

*Figure 11*

| CURRENCY BOARD—STAGE 1 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 600 | Notes and coins | 600 |
| **COMMERCIAL BANKS—STAGE 1** | | | |
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 100 | Public's deposits | 5000 |
| Loans and investments | 4900 | | |

| PUBLIC—STAGE 1 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Deposits at banks | 5000 | Bank loans | 4900 |
| Currency board notes & coins | 500 | Net worth | 600 |

Money supply = 5500
Banks' deposit-to-ratio = 5000:100 = 50:1 (equilibrium)
Public's deposit-to-currency ratio = 5000:500 = 10:1 (equilibrium)

Now let there be a balance-of-payments deficit of 12 kroons. The public pays foreigners 12 kroons more for goods than foreigners pay the public. Foreigners will only accept payment in foreign currency, and the currency board has all the foreign currency in the financial system, so people convert 12 kroons of its notes and coins into foreign currency. They do so by withdrawing 12 kroons from their bank deposit accounts as currency board notes. Consequently, bank reserves become 12 kroons less than in Stage 1. People exchange the notes for foreign currency at the currency board's fixed rate, so the board's assets and liabilities become 12 kroons less than in Stage 1. This is Stage 2 (see Figure 12):

*Figure 12*

| CURRENCY BOARD—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 588 | Notes and coins | 588 |

| COMMERCIAL BANKS—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 88 | Public's deposits | 4988 |
| Loans and investments | 4900 | | |

| PUBLIC—STAGE 2 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Deposits at banks | 4988 | Bank loans | 4900 |
| Currency board notes & coins | 500 | Net worth | 588 |

Money supply = 5488 (contraction = 12)
Banks' deposit-to-reserve ratio = 4988:88 = 56.68:1 (disequilibrium)
Public's deposit-to-currency ratio = 5988:500 = 9.976:1 (disequilibrium)

Note that banks have a deposit-to-reserve ratio of 56.68:1 (Stage 2), which is more than their desired (Stage 1) ratio of 50:1. Notice also that the public has a deposit-to-currency ratio of 9.976:1 (Stage 2), which is less than its desired (Stage 1) ratio of 10:1. Banks will contract their loans, and the public will contract its holdings of currency, to restore the original Stage 1 ratios. In Stage 3, they do so, achieving a new equilibrium, with the money supply now 110 kroons smaller than it was in Stage 1 (see Figure 13):

*Figure 13*

| CURRENCY BOARD—STAGE 3 | | | |
|---|---|---|---|
| *Assets* | | *Liabilities* | |
| Foreign-currency securities | 588 | Notes and coins | 588 |
| **COMMERCIAL BANKS—STAGE 3** | | | |
| *Assets* | | *Liabilities* | |
| Currency board notes & coins (reserves) | 98 | Public's deposits | 4900 |
| Loans and investments | 4802 | | |
| **PUBLIC—STAGE 3** | | | |
| *Assets* | | *Liabilities* | |
| Deposits at banks | 4900 | Bank loans | 4802 |
| Currency board notes & coins | 490 | Net worth | 588 |

Money supply = 5390 (contraction = 110)
Banks' deposit-to-reserve ratio = 4900:98 = 50:1 (equilibrium)
Public's deposit-to-currency ratio = 4900:490 = 10:1 (equilibrium)

As in the case of a balance of payments surplus, attempts by banks to reattain their desired deposit-to-reserve ratio, and by the public to reattain its desired deposit-to-currency ratio, move the currency board system back to equilibrium when a balance of payments deficit occurs.

We made a number of simplifying assumptions earlier. If we

drop them, the picture becomes too complex to analyze easily. However, the many additional factors that can complicate the analysis should not obscure the important point: market forces determine and limit money supply expansion in the currency board country. As long as it is more profitable to invest funds in the currency board country than elsewhere (after taking into account inflation, exchange-rate risk, and transaction fees), banks in the currency board country will expand their loans. They will be able to do so because foreign investment will be flowing in, bringing additional reserves to the banking system. Eventually banks will expand their loans in the currency board country to such an extent that making further loans there would be less profitable than investing the funds abroad. At that point banks will hold the volume of loans constant in the currency board country, and so the money supply will cease expanding.

If it becomes more profitable to invest funds abroad than in the currency board country, the currency board country will lose reserves, banks will reduce their loans to preserve their solvency, and so the money supply will fall. The currency board's role in this is passive: all it does is to convert notes and coins into and out of the reserve currency as the public and banks demand.

## B. Central banking system

Let us now look at a simplified case of a central bank and compare it to the case of a currency board. The T account of the public is the same in a central banking system as in a currency board system. However, the T account of the currency board (Figure 14) differs from the T account of the central bank (Figure 15).

*Figure 14*

| CURRENCY BOARD | |
|---|---|
| *Assets* | *Liabilities* |
| Foreign-currency securities | Notes and coins |
| | Net worth |

*Figure 15*

| CENTRAL BANK | |
|---|---|
| *Assets* | *Liabilities* |
| Foreign-currency securities | Notes and coins |
| Domestic securities | Deposits of commercial banks |
| | Net worth |

In addition to holding securities denominated in foreign currencies as assets, as a currency board does, a central bank can also hold securities denominated in domestic currency. Many central banks, including those of the United States, Japan, and Germany, hold far more domestic securities than foreign securities. It is hypothetically possible for a central bank that does not intervene in foreign exchange markets to hold no foreign securities at all. Besides notes and coins and net worth, a central bank's liabilities also include deposits that commercial banks hold with it. Unlike a currency board, a central bank accepts deposits, which count as *reserves* for commercial banks.

Figure 16 shows the T account of commercial banks in a currency board system.

*Figure 16*

| COMMERCIAL BANKS—CURRENCY BOARD SYSTEM | |
|---|---|
| *Assets* | *Liabilities* |
| Currency board notes & coins (reserves) | Public's deposits |
| Loans and investments | Stockholders' equity |

Figure 17 shows the T account of commercial banks in a central banking system.

*Figure 17*

| COMMERCIAL BANKS—CENTRAL BANKING SYSTEM | |
|---|---|
| *Assets* | *Liabilities* |
| Central bank notes & coins (reserves) | Public's deposits |
| Deposits at central bank (reserves) | Stockholders' equity |
| Loans and investments | |

Compared to the currency board system, there is the additional element of deposits at the central bank. However, in terms of T accounts, there is no important difference between a balance of payments surplus for a fixed-exchange-rate currency board system and an increase in the supply of central bank credit for a floating-exchange-rate central banking system. (To understand why there is no important difference, imagine that the central bank does not have any commercial bank deposits, and that commercial banks hold all their reserves in the form of central bank notes and coins.) The wider implications for the economy, however, are extremely significant, as Chapter 2 explained.

# *Appendix IV: How to convert a central bank into a currency board*

Rather than establishing a currency board at the start, Estonia may establish a central bank. We think there are no economic obstacles to establishing a currency board from the start. Indeed, we have argued that Estonia would do much better to establish a currency board rather than a central bank. Suppose, however, that there are political obstacles to a currency board at first. If Estonia later wishes to replace the central bank with a currency board, what steps must it take?

Past experience with currency boards in places as diverse as North Russia, Palestine, Danzig, and the Philippines indicates that it is fairly simple to convert a central banking system into a currency board system. Central bank functions that do not directly concern influencing the supply of money can be delegated to other government departments or to commercial banks. The central bank's deposit-creating powers can be abolished, its deposit liabilities can be separated from its note and coin liabilities, and then it can be converted into a currency board, issuing only notes and coins. The steps are as follows.

*1. Delegate to other bodies all central banking functions that do not directly concern influencing the supply of money.* For instance, the finance ministry can take over the job of regulating bank practices and giving advice on monetary affairs. Commercial banks themselves can take over the check clearing system. Commercial banks can also provide mutual deposit insurance protection, as they do in Germany and Switzerland.

2. *Abolish the central bank's power to create credit.* This involves freezing the central bank's overall credits (although not necessarily each individual credit) at existing levels.

3. *Separate the central bank's commercial banking functions (if any) from its currency issuing functions.* The commercial banking functions should be converted into a separate bank, which ultimately should be privatized.

4. *Make sure that commercial banks' existing reserves are appropriate.* Let us assume that Estonia develops a commercial banking system along Western lines.[33] If legal reserve requirements exist, they should be abolished in connection with instituting a currency board system. Required reserves are a type of tax that are a deadweight loss to banks. To prevent the abolition of reserve requirements from causing a massive expansion of credit, the government can neutralize (''sterilize'') the legally required reserves. They can be converted into government bonds, or even extinguished altogether. Commercial banks will retain possession of ''excess'' reserves, which were the true basis of their credit activity all the while.

5. *Convert all remaining commercial bank reserves with the central bank into currency board notes and coins or into foreign assets, as the commercial banks prefer.* With this step, the central bank's deposit liabilities will cease to exist.

6. *Fix an exchange rate.* After the deposit liabilities of the central bank cease to exist, all that remains will be its notes and coins issue and net worth (as liabilities), and its foreign exchange holdings (as its main assets). Its other assets and liabilities will have been given to commercial banks or to the government, or will have been extinguished.

To convert what remains of the central bank into a currency board, the Estonian government must now fix an exchange rate with a reserve currency, if the central bank had been maintaining a floating exchange rate or an unrealistic fixed rate supported by

exchange controls. Simultaneously, the government must make sure that the foreign currency reserves for domestic notes and coins in circulation equal 100 per cent.

The exchange rate between the foreign reserve currency and the domestic currency must be appropriate. A rate that is too high[34] will price exports out of world markets; a rate that is too low will make imports very expensive, inhibiting the ability of domestic industry to buy foreign capital goods for modernization. The best indication of an appropriate exchange rate is the free-market rate, which reflects unconstrained forces of supply and demand. Accordingly, the first step in *fixing* an exchange rate is to let the exchange rate *float* for a time. Market forces will most accurately reveal themselves if any existing restrictions on foreign exchange and on foreign trade are removed.

When exchange rates are allowed to float, the government should announce which foreign currency it intends to establish as the reserve currency and on what date it will fix the exchange rate. During the period of floating, the government can continue to deal in the foreign-exchange market, but it should not try to influence the market, which would defeat the float's purpose of revealing the free-market exchange rate. It could deal in foreign exchange passively at some suitable spread around the market rate.

When the date to fix the exchange rate arrives, the government should fix the rate somewhere within the range of recent trading rates. Exchange-rate fixing is an art rather than a science, and it is best to err by making the rate too low (too cheap in terms of the reserve currency) rather than too high. It is better to start with a rate that produces a high balance of payments surplus than one that produces a balance of payments deficit crisis. (Of course, there is nothing wrong with running a balance of payments deficit if it is the result of a surge in foreign investment. What Estonia wants to avoid is a situation where it does not obtain enough foreign exchange to pay its foreign-currency debts.) There is some latitude in setting an exchange rate, though, as the experience of other countries with exchange-rate fixing shows. As long as the rate is approximately correct and people are confident that the government is committed to it, the economy will make

minor adjustments towards equilibrium within a reasonable period.

*7. Ensure that foreign currency reserves equal 100 per cent of note and coin circulation.* The Estonian currency board replacing the Estonian central bank should begin its operation with foreign currency reserves equal to 100 per cent of its note and coin circulation. Allowing the board to operate with fractional reserves opens the way to discretionary monetary policy, like a central bank. The first source of foreign currency reserves would be the existing reserves of the central bank and the government. The government could increase the reserve ratio by selling state property for domestic currency and not reissuing the currency or, equivalently, selling the property for foreign currency. If reserves are still less than 100 per cent, it will be necessary to borrow to cover the difference. It should be easy to borrow from international agencies, foreign central banks, or foreign commercial banks. As the money supply grows, the proportion of unborrowed reserves will increase; the revenue from the unborrowed reserves can be used to repay the borrowed reserves.

*8. Transfer the remaining assets and liabilities of the central bank to the new currency board and open the board for business.* At the moment that the government fixes the exchange rate with the reserve currency, the central bank should officially be converted into the currency board for Estonia.

# Notes

[1] In Appendix IV, we explain how an existing central bank can be converted into a currency board.

[2] For a recent survey the state of the Estonian economy based on a transaction cost approach, see Ståhl (1992).

[3] The concept of credibility plays a central role in recent research in macroeconomics. For a survey of the literature on credibility and economic policy, see Persson and Tabellini (1990).

[4] Presently a committee of three persons selected by the Estonian government is considering how to introduce the new Estonian currency.

[5] Volcker (1990).

[6] Marx and Engels (1848/1948, p. 30).

[7] This is what has happened in Yugoslavia, whose January 1990 currency reform was not completely credible. People correctly anticipated that the National Bank of Yugoslavia would not maintain the original fixed exchange rate with the German mark. Real interest rates have been over 30 percent per year because they contain a large devaluation risk premium. The civil war in Yugoslavia has terminated the Yugoslav currency area.

[8] It is also possible to use a basket of currencies or gold as the reserve currency, as a few currency boards have done.

[9] Hanke and Schuler (1990, 1991a).

[10] The relationship between Estonia and Sweden would be similar to that between Sweden and England under the classical gold standard. Arbitrage in goods and financial markets made price movements in England and Sweden roughly identical. See Jonung (1984).

[11] See Jonung (1984).

[12] We consider only the case of a surprise to avoid complications concerning expectations.

[13] This is American terminology. Standard European terminology considers this a rise.

[14] Standard European terminology considers this a fall.

[15] Commercial banks can go bankrupt if they fail to keep appropriately liquid assets. Commercial banks have sole responsibility for keeping their deposits convertible at a fixed rate into currency board notes and coins (1 kroon of deposits = 1 kroon of currency board notes and coins). If commercial banks fail, the currency board has no responsibility for their deposits. The board is responsible only for redeeming its own notes and coins, not for redeeming commercial banks' deposits. Confidence in the stability of the banking system under a currency board can be fostered by a system (private or public) of deposit insurance.

[16] Economists call this problem "time consistency". See Kydland and Prescott (1977). See also Persson and Tabellini (1990).

[17] A central bank that maintains a fixed exchange rate with gold or a foreign

currency and that has a 100 per cent gold or foreign-exchange reserve requirement for its note issue is *not* like a currency board if it retains discretionary control of its deposit liabilities.

[18] See the analysis of the Swedish devaluations of 1981 and 1982 in Jonung (1991).

[19] Recent changes in the legal framework of the Riksbank have increased its independence from the Swedish government.

[20] See Appendix A in Bordo and Jonung (1987) for data on the ratio between income and money, that is, velocity, for 84 countries since World War II.

[21] If the Estonian central bank becomes active as a central bank, it is still possible to turn it into a currency board. See Appendix IV.

[22] We discuss a possible exception to this rule in the next section.

[23] For an explanation of the economic forces that govern competitive note issue, see Selgin (1988b).

[24] See Dowd (1992) and Jonung (1987).

[25] The best statements of the criticisms are Analyst (1953), Hazlewood (1954), Nevin (1961), and Basu (1971). For refutations, see Greaves (1953) and especially Ow (1985).

[26] Selgin (1988b) makes this argument.

[27] Selgin (1988a).

[28] Birnbaum (1957).

[29] Jonung (1989).

[30] Two other questions raised in the discussion about our proposal are: What will the currency board do to protect Estonia against real shocks? How can you guarantee that the exchange rate between the kroon and the krona will be the correct one? We supply answers to these questions in chapter 3 and 4.

[31] The account that follows draws heavily on Greenwood (1981, 1983a).

[32] Only assumption 1 is necessary for the analysis of currency boards; the rest can be dropped. The analysis becomes more complicated then, however. See Ow (1985) and Walters (1987) for more discussion.

[33] If Estonia still has a Soviet-style banking system, the appropriate procedures for ensuring that commercial banks have adequate reserves are discussed in Hanke and Schuler (1991c, pp. 22–3).

[34] In American terminology. Standard European terminology is the opposite.

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# About the authors

*Steve H. Hanke* is Professor of Applied Economics at The Johns Hopkins University in Baltimore and Chief Economist at Friedberg Commodity Management, Inc. in Toronto. He is recognized as a leading international authority on privatization, he was the main architect of president Reagan's privatization program, when he served on the President's Council of Economic Advisers at the White House (1981—82). He served as Personal Economic Adviser to Mr. Zivko Pregl, the Deputy Prime Minister of the Socialist Federal Republic of Yugoslavia, from 1990 until Mr. Pregl resigned on June 30, 1991. His most recent book is *Capital Markets and Development* (edited with Sir Alan Walters, 1991).

*Lars Jonung* is Professor in Economics and Economic Policy at the Stockholm School of Economics, Stockholm. Monetary economics, Swedish macroeconomic policy, and inflationary expectations are his main fields of research. He has published several books and articles in Swedish and English, including recently *The Long Run Behaviour of the Velocity of Money* (with Michael D. Bordo, 1987), *The Political Economy of Price Controls. The Swedish Experience 1970–1987* (1990), and (as editor) *The Stockholm School of Economics Revisited* (1991) and *Swedish Economic Thought. Explorations and Advances* (forthcoming 1992). Presently he is working on a study on Swedish central bank policy from 1945 to 1990. He also serves as economic adviser to the Skandinaviska Enskilda Banken and as editor of the *Skandinaviska Enskilda Banken Quarterly Review*. In March 1992 he assumed a new position as chief economic adviser to the prime minister of Sweden.

*Kurt Schuler* is a doctoral candidate in economics and holds the George Edward Durell Assistantship at George Mason University in Fairfax, Virginia. He has been a Summer Fellow at G.T. Management in Hong Kong, where he worked with John Greenwood, who designed Hong Kong's currency board system. He has published several articles on the economics of currency boards.

# Monetary Reform for a Free Estonia

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