

Ernst-Moritz-Arndt-Universität Greifswald  
Rechts- und Staatswissenschaftliche Fakultät  
Wirtschaftswissenschaftliche Diskussionspapiere



**Estonian Monetary System:  
Reconstruction, Performance, and Future Prospects**

Mart Sörg

Diskussionspapier 11/04  
Dezember 2004

ISSN 1437-6989

Address:

Mart Sörg  
Professor of Money and Banking  
Institute of Finance and Accounting  
Faculty of Economics and Business Administration  
University of Tartu  
4-A303 Narva Rd.  
51009 Tartu  
ESTONIA  
Phone: + 372 737 6332  
Fax: + 372 737 6312  
E-mail: Mart.Sorg@ut.ee

Keywords: monetary system, currency reform, currency board, monetary policy

JEL Category: E42, E5



## **Acknowledgements**

This research was undertaken with support from the Estonian Science Foundation. This study was written while the author visited the University of Greifswald in November 2004. The author is very grateful to Professor Armin Rohde and his colleagues whose support and encouragement was there enjoyed. The author expresses his thanks also to research partners Mr. Siim Kallas and Mr. Vello Vensel who kindly agreed with using our joint paper materials (Kallas and Sörg, 1995; Sörg and Vensel, 2002) in this paper.

## **Abstract**

Nearly twenty years have passed since the beginning of the transition from the planned economy to the market economy system in Estonia. A successful transition to a market economy requires a sound currency and Estonia introduced its own currency in June 1992.

Estonia has been quite successful in achieving economic stability and growth and steadily declining inflation. An essential element of Estonia's economic development success has been the currency board-based monetary system that has served as a signal of commitment to prudent monetary policy and as a guarantee of sound money during the transition period.

We discuss the experience of operating the currency board in Estonia and future prospects of the currency board arrangement in Estonia in the framework of the European Union and the future joining the Economic and Monetary Union.

## 1. Introduction

Estonia was the first of the Baltic States which, after regaining independence in August 1991, could completely stop using the former Soviet Union's currency, the "rouble" as a means of circulation, and introduce its own currency, the Estonian kroon (EEK) (Spencer and Cheasty, 1993, 3).

Discussion about the introduction of the national currency lasted for nearly 5 years. During that time the pros and cons of the different concepts of the currency reform were thoroughly discussed. Still, many questions were without answers by the beginning of the currency reform. Regardless, the members of the currency reform committee displayed statesmanlike boldness and carried through the currency reform at the earliest possible date.

The liberation of the Central and Eastern European countries (CEEC) from the socialist political and economic regime previously forced on them, gave birth to financial and economic problems analogous to those caused by the liberation from colonial subjection. It was therefore natural for the idea of the currency board to be reborn in the 1990s. The aim of a currency board system is to achieve currency convertibility and a fixed exchange rate, and thereby help to stabilise the economy, bring about structural change and integrate the country into the world economy as quickly as possible. Details how to solve problems of introducing a currency board in a former socialist country are presented by Hanke, Jonung and Schuler, 1993.

Estonia has already over twelve years of positive experience in applying a currency board system, which permits some generalisations about its positive and negative impact on the development of Estonia's economic reforms. Given the spread of the currency board arrangement, the time seems right for trying to draw some conclusions about its performance at the present time. The currency board seems to be fulfilling its objectives. By choosing the external discipline of a currency board arrangement, the government has enhanced the credibility of its intentions to fight inflation, and policy makers operate within a relatively predictable internal monetary environment (Sörg, 1998; Sörg and Vensel, 2002).

Currency boards are not a new phenomenon in economy. The currency board principle was established in the Bank Charter Act of 1844, where the Issue Department of the Bank of England acted as a currency board. For this reason, many of the British colonies in Africa, Asia and the Caribbean used currency boards on introduction of their own currencies. The first currency board was established in Mauritius in 1849. More than 70 such boards operated at one time. There is also a numerous literature about the experience of the currency board arrangement in various countries (see Williamson, 1995; Kwan and Lui, 1999; Balino *et al.*, 1997; Perry, 1997; Enoch and Gulde, 1997; Eichengreen *et al.*, 1998; Ghosh *et al.*, 1998; Schuler, 1998; Dobrev, 1999; Avramov, 1999; Korhonen, 1999; Gulde, 1999 etc.).

This paper is organised as follows. The first section presents the necessity of a currency reform in Estonia in 1992 and the main characteristics and impacts of the monetary system on the Estonian economy, and the second section discusses some future prospects of Estonian monetary system after joining the European Union in 2004, and the paper ends with some conclusions.

## 2. Currency Reform in Estonia and Estonian Monetary System

### 2.1. The Necessity of a Currency Reform

Estonia was the first among the former Soviet republics to introduce its own currency, the Estonian kroon (EEK), in June 1992. The supporters and designers of the idea of a national monetary system hoped to achieve three main objectives: eliminate inflationary influences from the east, establish approximate macroeconomic balance of money supply and demand, and conquer persistent cash crises (Kallas and Sörg, 1995, 53).

Hyperinflation had broken out due to the liberalisation of prices and the disruption of Estonia's eastern trade at the beginning of 1992. This caused a sharp cash crisis and threatened to paralyse monetary circulation completely. Confidence in the inflationary rouble, also called the occupation rouble, was completely lost. This was stressed by a high dollarisation ratio. So, as the ability of a domestic currency to deliver basic functions of money were distorted in an environment of high inflation and excessive exchange rate volatility, economic agents substituted the domestic currency for the stable U.S. dollar.

Before Estonia's currency reform (second quarter 1992), the dollarisation ratio peaked around 60 percent in Estonia, 50 percent in Lithuania (first quarter 1993), and 35 percent in Latvia (first quarter 1993) (Sahay and Végh, 1995, 37).

For Estonian authorities, this situation set up two preconditions for a successful currency reform. First, the currency reform must be carried out as quickly as possible before multiple wage and inflation shocks would cause a social explosion and economic collapse. Second, the new currency must inspire confidence, though introduced under circumstances of a deep economic crisis and a lack of experience by the central bank in carrying out monetary policy. An early main goal of monetary reform was to control inflation.

The most decisive stage of the currency reform withdrawal of roubles from circulation and replacement with the national currency happened in June 1992. The main features of the currency reform are presented in Table 1.

**Table 1. Main features of Estonian Currency Reform**

Date:	The Estonian kroon became the sole legal tender at 4:00 a.m. on June 20, 1992. Individuals could convert roubles into kroon at special cash exchange offices at the official conversion rate during the period June 20–22, 1992 during the hours 9 a.m.–10 p.m.
Official Conversion Rate:	10 roubles = 1 Estonian kroon
Conversion of Cash Roubles:	All resident individuals (including children) and non-residents with residence permits could convert rouble notes equivalent to a maximum of roubles 1,500 at specific bureaus based on place of residence (which was equivalent to about US\$13 at the prevailing exchange rate). Cash exceeding roubles 1,500 could be exchanged at the (punitive) exchange rate of 50 roubles =1 Estonian kroon. Enterprises had until June 20, 1992 to deposit cash roubles into their bank accounts which were then converted as noted below.

Conversion of Account Roubles at Commercial Banks:	All rouble accounts, time deposits, and savings accounts were re-denominated into Estonian kroon at the official conversion rate. However, balance in savings accounts in excess of roubles 50,000 deposited since May 1, 1992 and transactions from other roubles states in excess of rouble 1 million and made after May 1, 1992 were blocked until their origin was verified and a decision on conversion was made on a case-by-case basis. Commercial banks were closed during the period June 20–25, 1992 to allow for the re-denomination of rouble accounts. The Bank of Estonia guaranteed access to cash by commercial banks up to the amount of their correspondent accounts with itself.
Total Cash Roubles Collected	Roubles 2.3 billion (or about 3 percent of GDP).

Source: Knöbl *et al.*, 1996, 18.

Those who carry out a currency reform must take into account a temporary acceleration of inflation. Having eliminated the shortage of cash, it is necessary to create confidence in the new currency. This may be done by means of a currency board arrangement where the value of the new currency is fixed in terms of a major reserve currency. In Estonia, the exchange rate between the Estonian kroon and the German mark (DEM) was based on the prevailing market exchange rate between the Soviet rouble (SUR) and the German mark, that is, approximately 80 SUR = 1 DEM. Thus, roubles were exchanged for kroons at the rate of 10 SUR = 1 EEK, and the Estonian exchange rate was fixed at 8 EEK = 1 DEM. In general, the Estonian kroon was under-valued by about four to five times. The undervaluation was obviously too great and caused inflationary pressure on consumer prices. However, the inflation rate in Estonia declined continuously (Table 2), and in 1998 the CPI increase had reached a level lower than 10%, and in 2003 it was already 1.3%.

**Table 2. Inflation against the previous year (%)**

	1992	1993	1994	1995
Increase in consumer prices (CPI)	1076.5	89.8	47.7	29.0
open sector	991.6	84.9	33.9	17.5
sheltered sector	1702.7	149.3	89.2	52.1
Increase in producer prices (PPI)	...	99.9	36.8	25.6
Increase in export prices	...	...	...	15.1

Source: Bank of Estonia.

## 2.2. The Estonian Monetary System

The advantages and disadvantages of a fixed exchange rate regime, including a currency board arrangement (CBA), are well known. The most important advantage of a CBA is that it gives high credibility to conduct the monetary and exchange rate policy in the unstable macroeconomic environment, as it still exists in transition economies. The credibility argument is still the main advantage of a CBA in comparison with the benefits of the inflation-targeting approach to monetary policy (Calvo and Mendoza, 2000, 63), and a widespread fear of floating is closely linked with credibility problems (Reinhart, 2000, 69), and is a satisfactory unit of account (Ghatak, 1995, 73). At the same time, the fixed exchange rate can successfully act as a nominal anchor during macroeconomic stabilisation.

Introduction of the CBA requires tight fiscal policy since financing of the government's budget deficit is not allowed under the regime of the currency board.

Williamson identified four major claims made on behalf of currency boards:

- they assure convertibility,
- they instil macroeconomic discipline;
- they provide a guaranteed payment adjustment mechanism;
- because of those three features they create confidence in the monetary system and therefore promote trade investment and growth (Williamson, 1995, 13).

The CBA chosen by the Bank of Estonia put strict constraints on economic policy. Under the CBA, base money could only be created against convertible foreign currency. There was, therefore, no scope for a discretionary monetary policy; there was also to be no central bank credit to Government or enterprises; and lending to banks could occur only under exceptional circumstances, when the soundness of the entire banking sector was at risk, and then only within strict limits of excess foreign exchange cover of base money. The CBA also provided a framework for fiscal policy: any budget deficit had to be constrained to what could be financed in the domestic financial market outside the Bank of Estonia, or abroad, which at the time was close to zero, implying that the budget needed to be roughly balanced. It was also recognized that to ensure a high degree of confidence in the reform, restrictions on conversion would need to be minimal. Accordingly, it was agreed to introduce the kroon with broad current account convertibility and limited capital account convertibility (Knöbl *et al.*, 1996).

It is also important to say that the central bank's ability to act as a lender of last resort to the commercial banking system is rather limited. This is a clear signal to bank owners and managers to manage their banks more prudently, but this is also a disadvantage if banks' difficulties are the result of external shocks. Because the monetary base in the case of the CBA is fully covered by foreign currency reserves, the danger of a potential speculative attack against the domestic currency is quite low. CBA requires a very liberal economic policy and completely free capital movements, as introduced in Estonia.

The Estonian monetary system is considered particularly liberal because the kroon's purchasing power and currency flows are entirely determined by market forces. No restrictions are imposed on the flows of currency and capital to and from Estonia. It is also possible in Estonia to freely convert foreign currency into kroons and *vice versa* and to hold savings either in foreign currency or the kroon. No maximum or minimum interest rates on deposits and loans have been imposed. Also, the right of people to hold and use their money is secured by the fact that its stability is guaranteed by pegging the Estonian kroon to the German mark from 1 January 1999 to the euro at the same fixed exchange rate (€ 1 = EEK 15,6466), and the cash in circulation is at least 100 percent backed by foreign reserves.

The operation of the Estonian CBA is the task of the central bank (the Bank of Estonia), which also retains the option of pursuing certain monetary policies. In order to allow the CBA to operate efficiently, it was deemed necessary to safeguard the independence of the Bank of Estonia to a large extent, while regulating its detailed functions as a currency board. The independence of the Bank of Estonia is guaranteed by the following stipulation: it is not allowed to extend credit to the government, its assets are kept separate from the state budget, and its managerial staff is appointed by Estonia's president and Parliament. Only Parliament can change the fixed exchange rate as the nominal anchor, though the Bank of Estonia may permit fluctuations of the pegged rate within three-percent margins (this permission has been never used by the central bank).

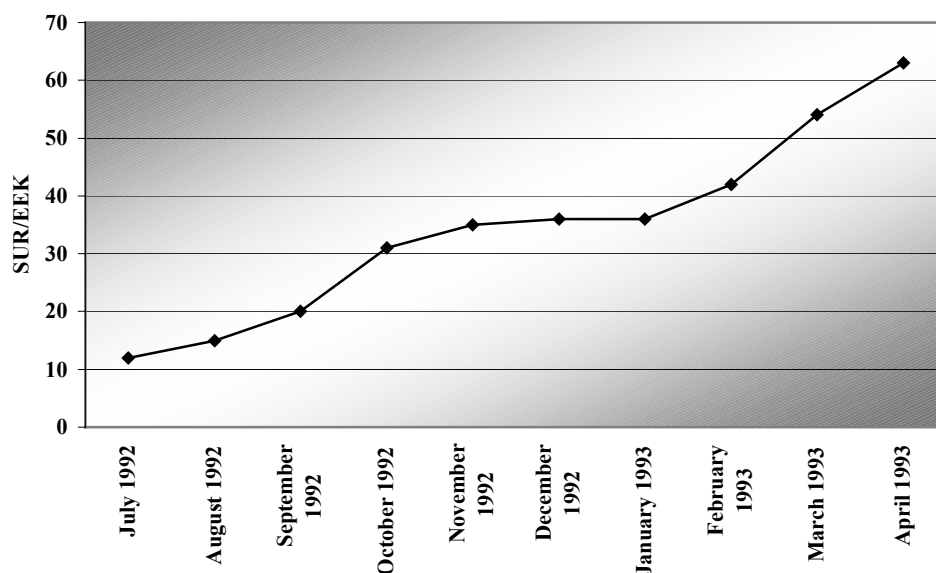


### 2.3. The Impact on the Economy

Abatement of inflation can be regarded as the major success of the currency board system. The rate of inflation had dropped somewhat just before the currency reform, but after the reform, there was a great jump upward again. The original price rise was caused by an increase in taxes ensuing from the currency reform and further price liberalisation. Research by the IMF staff has shown that countries with a currency peg have comparatively low inflation. For example, in a sample of countries, those with pegged exchange rates had an average annual inflation rate of 8 percent, compared with 14 percent for intermediate and 16 percent for floating exchange rate systems (Ghosh *et al.*, 1996, 4).

Figure 1 demonstrates that Estonian currency reform restored the credibility of the currency in circulation and Estonian kroon exchange rate towards Russian rouble rapidly strengthened.

**Figure 1. Market exchange rate of SUR to EEK after Estonian currency reform**



Source: Bank of Estonia.

Later, IMF researchers found that countries with the CBA had also slower growth in the velocity of money (Ghosh *et al.*, 1998). It is quite interesting that the effect that currency boards have had on the rate of money growth is called the “discipline effect”, and the effect on the velocity of money is called the “confidence effect”. Korhonen and Sutela (2000) calculated annual changes in the velocity of money and money growth in the Baltic States and several other transition economies between 1993 and 1999. They found that the velocity growth has been relatively low in Estonia, Lithuania, and Latvia. The average growth of money supply has been relatively high both in Estonia and Lithuania due also to the large capital inflows that lead to the growth of the monetary base and consequently to the rise in the money supply. Results are in accordance with arguments (Ghosh *et al.*, 1998) that currency boards are associated with higher confidence, lower velocity of money, and thus lower inflation. Money supply growth data are presented in Appendix 1.

Implementation of the currency board arrangement and fixing the Estonian kroon to the German mark and later euro has been a solid nominal anchor to the economic recovery and development of the economy. Of course, the fixed exchange rate regime was only one (but possibly the most important) component of the Estonian economic policy framework for

macroeconomic stabilisation. Other policies include the liberal trade regime, or tight fiscal discipline, which has been an important factor of macroeconomic stabilisation. The main indicators characterising Estonian economic development from 1997 to 2003 are presented in Table 3.

**Table 3. Main Indicators of Estonian Economy**

	1997	1998	1999	2000	2001	2002	2003
Real growth of GDP (%)	9.8	4.6	-0.6	7.3	6.5	6.0	4.7
Growth of special export (%)	42.7	16.7	0.6	38.8	7.0	3.9	9.7
Growth of special import (%)	39.8	15.0	-5.4	36.2	6.7	10.9	12.9
Current account balance (% of GDP)	-12.2	-9.2	-4.7	-5.8	-6.0	-12.2	-13.7
General government budget deficit (-)/ surplus (% of GDP)	2.2	-0.3	-4.6	-0.7	0.4	1.2	2.6
Consumer price index of 12 months (%)	11.2	8.2	3.3	4.0	5.8	3.6	1.3
Export price index of 12 months (%)	7.5	2.1	-0.4	7.8	32.9	-0.6	6.6
Consolidated balance sheet of banks (% of GDP)	63.4	55.7	61.7	66.3	70.8	73.0	84.9
Share of foreign ownership in the banking sector (% of share capital)	44.2	55.5	62.2	83.9	85.7	86.7	85.7
Capital adequacy of banks (%)	13.6	17.0	16.1	13.2	14.4	15.5	14.5
True index change (%)	65.6	-65.8	38.3	10.1	4.7	20.6	34.9
Consolidated loan portfolio of banks (% of GDP)	33.3	32.5	34.9	39.3	42.2	44.7	59.6
M2 (% of GDP)	32.0	29.0	34.5	37.8	42.2	41.7	43.3
3months Talibor (%)	8.6	13.9	7.8	5.7	5.3	3.9	2.6

*Source:* Bank of Estonia.

From 1997 to 1998, there were some signs of financial crisis and speculative attacks against the Estonian kroon due to the developments in global financial markets (Asian and Russian crises) and developments in domestic financial markets (bursting of the 1997 stock exchange bubble, overly optimistic and risky attitudes toward the opportunities of the eastern markets, increasing current account deficit, and so on). Fortunately, policy makers learned lessons from this financial crisis experience. The main aims of the economic policy were formulated as follows:

- 1) maintain the stability of the monetary system, taking advantage of the existing possibilities of the currency board arrangement;
- 2) increase trust in the banking system (and the entire financial system) by improving legislation, strengthening banking supervision, making law enforcement and the legal system operate more efficiently, proceeding from good banking practice;
- 3) guarantee the balance of the state budget and state funds, proceeding from real income and the most essential expenditures;
- 4) continue allocations to the stabilisation reserve and adopt legislation that would allow its use only in the case of real emergencies;

- 5) save more in both personal and public consumption, which must be accompanied by the stability of the Estonian domestic currency and growing credibility of the banking system and other financial institutions; and
- 6) reconsider the current investment policy, proceeding from the interests of increasing Estonia's competitiveness and export potential.

In general, the implementation of these main economic policy objectives has been successful. At present, there are no urgent reasons to abandon the CBA in Estonia. The Estonian currency board can be maintained if fiscal policy is implemented as planned, if it succeeds in curbing the current account deficit and if limited monetary measures are sufficient to keep bank lending under control. Even in the long-run perspective, abandoning of the CBA may not be necessary.

### 3. Monetary policy perspectives for Estonia

#### 3.1. Suitable path for Estonia to the EMU

In the referendum of September 14, 2003, the majority of Estonian citizens voted for joining the European Union. This enables Estonia to join also the European Economic and Monetary Union (EMU). Giavazzi and Giovannini wrote, that the European Monetary System is simply a recent step in the historical quest for exchange rate stability in Europe. Europeans dislike exchange rate fluctuations for three reasons. First, they all live in relatively open countries. Second, many of them hold the floating rates of the 1920s and 1930s reasonable for the ensuring collapse of national economies and of the international trading and monetary systems. Third, post-war European institutions – particularly the common agricultural market – depend for their survival on exchange rate stability (Giavazzi and Giovannini, 1989, 1).

We share the opinion that joining the EMU has a positive impact on Estonia's economic development and enables the Bank of Estonia to perform better than before its main tasks – to ensure the stability of currency in circulation in Estonia, and a low level of inflation. The EMU also pursues stable economic growth and price stability (*Euro ja Eesti*, 2001, 129–170).

**Table 4. Exchange Rate Regimes: the IMF Classification System**

Exchange rate regime	Description
Dollarisation, euroisation	No separate legal tender
Currency board	Currency fully backed by foreign exchange reserves
Conventional fixed peg	Peg to another currency or currency basket within a band of at most +/- 1%
Horizontal band	Peg with band larger than +/- 1%
Crawling peg	Peg with central parity periodically adjusted in fixed amounts at a pre-announced rate or in response to changes in selected quantitative indicators
Crawling band	Crawling peg combined with band larger than +/- 1%
Managed float with no pre-announced path for the exchange rate	Active intervention without prior commitment to a pre-announced target or path for the exchange rate
Independent float	Market-determined exchange rate with monetary policy independent of exchange rate policy

Source: IMF, 1999:2.

Choosing a suitable exchange rate policy in the framework of accession to the European Union for the period before joining the EMU Estonia and other accession countries have several possibilities. In IMF classification system there are eight exchange rate regimes (Table 4).

From 8 possible exchange rate regimes crawling pegs and bands are not compatible with the ERM II framework, where accession countries have to participate after its accession to the EMU.

What are the prospects of the CBA in Estonia? In other words, will CBA constitute a viable monetary framework in the long run? Pautola and Backe (1998, 93–101) point out that there are two main subsets of issues to be considered in order to answer these questions. First, will the balance of economic advantages and drawbacks of CBA change over time, and how will it change in the future? Second, what relevance do the prospects of European Union integration have for Estonia with its currency board? That is, will a currency board arrangement be a suitable monetary framework for joining the European Union?

Researchers of the Bank of Estonia made an analysis in 2002 (Sepp and Randveer, 2002) where they evaluated the performance of various monetary regimes that could hypothetically be used in Estonia in ERM II period.

Their analysis is based on a typical small-scale macro-model with the standard features – the Keynesian short run and neo-classical long run. Their simulations demonstrate that CBA is the most suitable monetary regime for the Estonian economy at least as it functions during the period under consideration. The conclusion is similar to Haan, Berger and Van Fraassen (2001), who argue that the Estonian CBA is very much in line with the criteria for an optimal monetary regime.

The strength of the currency board is that its transparency and commitment to tight and conservative fiscal policies leave the economy relatively unsusceptible to speculative pressures, which is evident from the Estonian experience. Adjusted peg regimes are more vulnerable to speculative pressures, and the large size of net capital flows to transition economies has made the exchange rate commitments of these countries much more fragile (Masson, 1999). Net capital flows are very important for guaranteeing the economic development and growth of these countries, and withdrawal of capital flows can pose a significant problem for them. In this case, the currency board offers a more stable (but more costly) alternative. Regarding states, "... the major currencies should largely be free to float ... Many countries along Europe's periphery should adopt currency boards backed by the euro, he said, while countries in Latin America could dollarise their economies, as Ecuador has done, or follow the Argentine example of a currency board backed by the U. S. dollar." (Dornbusch and Loungani 2000, 250).

Experience has shown that exit from a pegged exchange rate regime has been quite often involuntary, being a result of speculative attacks. Countries that have exited from pegged rate arrangements have generally waited to do so until their domestic currency was under pressure. The main characteristics of such a situation are that reserves decline, output and export growth slows, expansionary monetary policy leads to high inflation, the domestic currency becomes over-valued, and large external imbalances arise due to policies that encourage imports and limit exports. In addition, speculative crises are associated with high unemployment, weak banking systems, and high ratios of public debt.

In order to ensure smooth entry into the EMU, the Bank of Estonia has in its strategic development plan declared its main monetary policy activities to be detailing of the conditions of EMU accession and preparation for accession. The framework of monetary policy, which is based on the fixed exchange rate of Estonian kroon and the currency board, will stay in place until full membership in the EMU and the euro system.

The policy position of the Governing Council of the European Central Bank on exchange rate issues relating to the acceding countries as of December 18, 2003 states that the ERM II exchange rate mechanism, established with June 16, 1997 Resolution of the European Council, has two roles. The first is to manage exchange rates between the currencies of Member States participating in the mechanism and the euro; second, the mechanism is tied to convergence criteria that the countries shall have to comply with before adoption of the euro. However, it states that if a country operates a euro-based currency board deemed to be sustainable, the country might not be required to float the currency within ERMII, in order to later re-peg it to the euro.

For ten new member states of the EU accession to the EMU is a great challenge. The candidate countries are obliged to fulfill the convergence criteria (Maastricht criteria), that are the precondition for joining the EMU. As shown in Table 5, there are five monetary policy criteria, some of them having fixed values, whereas inflation and interest rates are judged on the basis of three EU member states in which these indicators have the lowest levels.

**Table 5. Maastricht Criteria**

Criterion	Principles of the criterion
Inflation criterion	Inflation in a candidate country must not exceed average inflation of the three EU member states with the lowest inflation, plus 1.5 percentage points – in 2004, the indicator was 2.4%.
Interest rate criterion	Interest rate on long-term (10 years) government bonds nominated in national currency of the candidate country must not exceed average long-term interest rates in the three EU member states with the lowest inflation, plus 2 percentage points – in 2004, the indicator was 6.4%.
Exchange rate criterion	During the period in ERM II, the national currency of the candidate country must not fluctuate more than $\pm 15\%$ against the euro. Usually accession agreements state narrower limits to fluctuation.
Government budget criterion	Annual budget deficit of the candidate country must not exceed 3% of the country's annual GDP.
Public debt criterion	General government debt of the candidate country must not exceed 60% of the country's annual GDP.

*Source:* European Central Bank.

In his introduction to the book “The Road to the Monetary Union in Europe” Tommaso Padoa-Schioppa wrote in December 1995: “So-called Maastricht criteria have become the compass for macroeconomic policy-making in all the EU countries. Moreover, since markets and the media have adopted them as the benchmark of economic performance, even those who have (probably not unfounded) reservations about their being the ultimate truth have to reckon with them.” (The Road ..., 1994).

For the stability of the Estonian economy, it is important that joining ERM II framework takes place without altering the current principles of monetary policy and the currency board. The

European Union and the Member States have stated the present system of Estonia is in accord with the requirements of ERM II. Yet one should be alert to possibilities that this favourable position of Estonia is not endangered by baseless speculations, based on our own economic developments, against the sustainability of the currency board that has successfully operated for more than 12 years.

Membership of the EMU will benefit those countries whose economies are closely integrated with other member states. This means that there must be close trade and financial relations, which should guarantee similar effects of the common monetary policy to economies of all the member states. Estonian main trade partner is enlarged EU. In second quarter of 2004 Estonian export to the 24 EU countries accounted for 82,1% of the total export and import for 79,2% of the total import.

The preparation of a candidate country for successful participation in the EMU is measured by five Maastricht criteria. In order to become a full-fledged member of the EMU, each member state must fulfill all those criteria during the ERM II period. Yet all depends on the EU's readiness to compromise when the new member states are to adopt the common currency. When the 11 countries adopted euro in January 1999, only Finland and Luxembourg were able to fulfill the public debt criterion (they had it lower than 60% of GDP) (see Wójtowicz, 1999, 63). Public debt of the euro area has started to decrease, but nevertheless on average made up 69% of these countries' respective gross domestic products (European Central Bank, 2004, 52).

As for fulfilling the Maastricht criteria, the Estonian economy is in several respects in a unique situation compared to other accession countries. Our inflation and government deficit balance is under control (see Table 6 and Figure 2), but fulfilling all Maastricht criteria requires great efforts from us as well. Here, we must consider effects that result from special characteristics of the Estonian economy, as well as from economic policy decisions, that may complicate fulfillment of the criteria.

**Table 6. Compliance with the Maastricht Criteria in Accession Countries**

	Inflation August 2004	Government budget deficit 2003	Public debt 2003	Interest rate on long-term bonds August 2004
Cyprus	2,1	6,4	70,9	5,2
Czech Republic	1,8	12,6	37,8	4,7
Estonia	2,0	-3,1	5,3	4,6
Hungary	6,5	6,2	59,1	8,1
Latvia	4,9	1,5	14,4	5,0
Lithuania	-0,2	1,9	21,4	4,7
Malta	2,6	9,7	71,1	4,7
Poland	2,5	3,9	45,4	6,9
Slovakia	8,4	3,7	42,6	5,1
Slovenia	4,1	2,0	29,4	5,2
Eurozone (EU12)	2,1	2,7	70,7	4,3
Criterion	2,4	-3,0	60,0	6,4

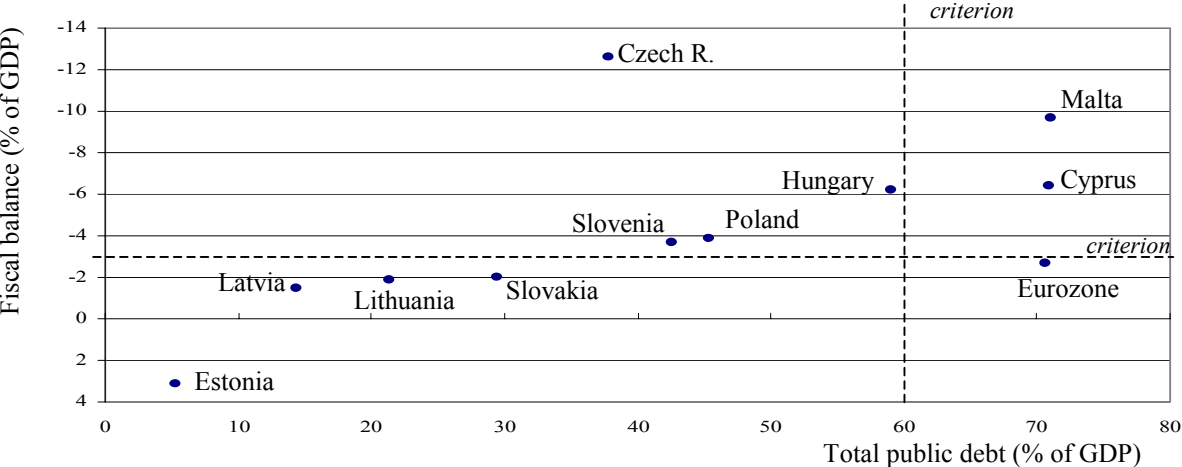
(-) Surplus of the budget.

Source: ECB, National Convergence Program Reports.

Our most important special characteristic relevant to the Maastricht criteria is our relatively low level of income, but economic growth at a faster rate than in the current EMU member states. Estonia's per capita GDP was in 2003 about 42% of the respective EU statistical and Estonia's price level is about 45% of the price level in the EU. Yet the potential annual growth rate of Estonia's GDP is variously estimated to be 5 to 6% – while the annual economic growth in the EU will be 2–2.5% (faster or slower rate of growth in the EU would mean that estimates of Estonia's potential growth rate would have to be corrected accordingly). If such differences in growth rates persist, the level of income in Estonia would attain the current EU average level in 20 years and converge to EU member states in 30 years.

**Inflation criterion.** If the higher than the EU rate of economic growth persists in Estonia, then presumably it will cause the rate of inflation to be higher. In principle, this means that together with convergence in income levels, the Estonian and EU price levels also converge. With regard to the Maastricht inflation criterion, it is important to make sure that on top of higher inflation due to faster economic growth, there would be no additional price increases caused by domestic economic policy decisions. Only in such a case shall we be able to fulfill also the inflation criterion in the conditions of faster growth in income. Feldman and Watson (2002) find that the accession countries must take extraordinary measures (e.g. reducing indirect taxes) in order to fulfill the inflation criterion. Some researchers are not sure that CBA will be able to deliver satisfaction of the inflation criterion for EMU membership without an unnecessary recession (Buiter and Grafe, 2001, 43). And really, when in Estonia inflation dropped in 2003 to 1.3% from 3.6% in 2002, then the real GDP growth also dropped from 6% to 4.4 %. But inflation in Lithuania decreased in 2003 to –1.0%, however they saved a high growth rate + 6.6% in 2003 (ECB 2004, 47).

**Figure 2. Indicators of compliance with the Maastricht Criteria in 2003**



Source: Table 6.

In Table 7 we see that several new EU members predict difficulties with fulfilling the inflation criterion in the next years.

**Table 7. Inflation decrease programs of eight new EU members**

	2004	2005	2006	2007
Czech Republic	2.8	2.6	2.2	2.2
Estonia	3.1	3.0	2.8	2.8
Hungary	6.5	4.5	4.0	3.5
Latvia	4.5	3.7	3.0	3.0
Lithuania	0.9	2.0	2.1	2.5
Poland	1.7	2.0	2.1	1.9
Slovakia	8.1	4.0	2.9	2.5
Slovenia	3.3	3.0	2.7	2.6
EU-8	3.9	3.1	2.7	2.6

Source: National Convergence Programs.

**Budget criteria.** Estonia's strict and balance-oriented budget policy has created a strong initial position for fulfillment of the Maastricht budget balance and public debt criteria. At present, the Estonian general government debt amounts to 5% of GDP, which is the lowest level among candidate countries, whereas the general government budget deficit exceeded the allowed maximum level only in 1999.

In Table 8 it may be seen, that the budget deficit criterion is even harder to fulfill than the inflation criterion for transition countries. In year 2004 half of countries will not see possibilities to have less than the 3% deficit.

**Table 8. Fiscal balance programs of eight new EU members**

	2004	2005	2006	2007
Czech Republic	-5.6	-4.9	-4.0	-3.5
Estonia	0.7	0.0	0.0	0.0
Hungary	-4.6	-4.1	-3.6	-3.1
Latvia	-2.1	-2.2	-2.0	-2.0
Lithuania	-2.7	-2.5	-1.8	-1.5
Poland	-5.7	-4.2	-3.3	-1.5
Slovakia	-4.0	-3.4	-3.0	-2.0
Slovenia	-1.9	-1.8	-1.5	-0.9
EU-8	-3.2	-2.9	-2.4	-1.8

Source: National Convergence Programs.

One should keep in mind that fulfillment of the budget deficit criterion doesn't in itself guarantee the country's successful participation in the EMU. With common monetary policy, fiscal policy will be the main instrument of economic policy that a member state can use to independently influence its economic development (e.g. stimulating its economy during a period of slow economic growth). But ensuring the budgetary capacities sufficient for such actions requires the budgets of the member states to be balanced over the economic cycle – in surplus during periods of rapid economic growth and in deficit of up to 3% of GDP during recessions.

**Interest rate criterion.** The Maastricht interest rate criterion indicates whether the EMU candidate country is able to maintain balanced development of its economy over a longer period. If it seems for international financial markets and investors that the candidate country



has fulfilled e.g. its budget criteria with one-off and unsustainable measures or that the economy shows other indications of possible problems in the longer run, this country would probably run into difficulties in fulfilling the interest rate criterion. It is therefore important that the candidate country's economic policy is oriented to balanced developments and fulfillment of the Maastricht criteria already as early as possible.

At present, Estonia lacks an instrument (ten-year government bonds nominated in national currency) meant for assessing fulfillment of the Maastricht interest rate criterion. However, the European Central Bank has assured Estonia that it may use the interest rate on long-term kroon loans as a reference. In order to make sure that interest rates on kroon loans granted to Estonian enterprises and individuals remain low in the future, it is necessary to use all instruments of economic policy to ensure balanced economic development also in the long run.

### ***3.2. Estonia's Schedule of EMU Accession***

Accession to the EMU and the euro system will take place in two stages. In the first stage, after May 1, 2004, Estonia applied to join the ERM II exchange rate mechanism. As a member of ERM II (in the status of members with a derogation of the monetary union), Estonia will have to bring its legislation regulating economic, fiscal, and monetary policy in harmony with EU legislation. During this stage, the country must fulfill the Maastricht criteria, which is required for joining the euro system. In the second stage, Estonia will join the euro area and obtains the status of a full-fledged member of the monetary union.

In this final stage Estonia will adopt the euro as the sole legal means of payment. Estonia will start to participate in the making of the common monetary policy of the European Union, contributing to its fixed and reserve capital. This means that the Bank of Estonia will become a co-owner of the European Central Bank and the governor of the Bank of Estonia will become a member of the Governing Council of the European Central Bank, participating in the making of common monetary policy. The Bank of Estonia will start to implement monetary policy directives of the ECB and manage the transaction and cash circulation of the euro in Estonia. Thus, Estonia will start utilising the full set of monetary policy instruments of the euro system. Among other things, this will mean that Estonia will receive a portion of the revenue from emission of euro, as well as of profits of the European Central Bank (*Euro ja Eesti*, 2001, 108).

There are two opposite positions for the schedule of joining the eurozone. For example, in their paper "Assessment of the Euro's Implications for European Economic Development", Korhonen and Randveer (2002, 2) stress that countries should hold back on pegging to the euro until they have achieved sufficient convergence to attain credibility for a policy for fixed exchange rates. Martti Hetemäki from the Ministry of Finance of Finland sees that the biggest benefits will be obtained during the first period of EMU but possible big expenses will come after several years (Hetemäki, 1996, 285).

It is possible to add two arguments for not hurrying joining the EMU. Old members themselves are not fulfilling the Maastricht criteria. When in 1997 the structure of zone participants was fixed, only Finland, France and Luxembourg unreservedly met the conditions – the required ceiling of public debt (it should not exceed 60% of GNP) (Wójtowicz, 1999, 63). Now France and Germany are not able to fulfill the government deficit criteria (general government deficit below 3% of GDP). Also the integration degree of politics and economics is low. For instance, some scientists do not recommend an independent common currency for

Latin America because the necessary degree of political and economic integration is absent (Berg *et al*, 2003, 27).

To avoid these problems, the Copenhagen European Council in 1993, agreeing that CEE countries shall become members of the European Union, stated requirements to the candidate countries. The Copenhagen criteria require that the candidate country has achieved: stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities; the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union; the ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union; and has created: the conditions for its integration through the adjustment of its administrative structures, so that European Community legislation transposed into national legislation is implemented effectively through appropriate administrative and judicial structures.

The optimum currency area theory of Mundell (1961) sees that a country would find it more advantageous to peg the external value of its currency when the business cycles of these countries are highly correlated. Several researches have estimated readiness of the accession countries by the convergence criteria. In their research Fidrmuc and Korhonen (2003, 2) found that economic cycles in the most advanced acceding countries are highly correlated with the euro area cycle. This seems to be especially true for Hungary and perhaps Slovenia. Although the Baltic countries were not usually included in the studies, there is also evidence that Estonia has achieved a certain degree of convergence with the euro area cycle.

In another research by Boreiko (2002) from the European University Institute, the algorithm reveals that Estonia and Slovenia are the leaders in both nominal and real convergence, whereas the other countries from the 1998 Accession Wave have achieved substantial results only in real convergence

Estonian aim was to join ERM II as soon as possible after May 1, 2003. This also was the opinion shared by the Bank of Estonia (see Kraft, 2003). At a meeting on Sunday June 27 the representatives of the euro area countries, the ECB and Denmark, presently the only ERM II member, decided to approve Estonia's, Lithuania's and Slovenia's applications to join the Exchange Rate Mechanism II. Entry to the ERM II leaves the exchange rate of the Estonian kroon unchanged. Also in coming years Estonia will run the currency board arrangement with a fixed exchange rate, one euro corresponding 15,6466 Estonian kroons.

As every country must be member of ERM II for at least 2 years, the earliest possible accession to the EMU can take place in the second half of 2006. This date may also require requesting for exceptions or at least pressure from our side to carry out the assessment of the Maastricht criteria within no less than 2 to 3 months after our two-year ERM II membership (i.e. the period from July to October 2006). But it may also be possible to request assessment of fulfillment of the criteria sooner than after 2 years. Such an approach was used in 1998 for e.g. Finland and Italy.

“The decision to approve our application to join the exchange rate mechanism is of historical importance for Estonia, as it creates a possibility for us to be technically ready for the single currency by the middle of 2006. It is primarily a recognition to the viability of our economic and budgetary policy principles in the united Europe. Joining the exchange rate mechanism enables further integration of our economy with Europe's nearly half billion single market, which undoubtedly increases the well-being of all the Estonian people via faster economic

growth”, said Mr. Taavi Veskimägi, Estonian Minister of Finance ([www.eestipank.info/pub/en/yldine/press/pressiteated/pt2004](http://www.eestipank.info/pub/en/yldine/press/pressiteated/pt2004)).

Also, we don't share the worries of the Swedish opponents of the euro. Their ten arguments against adoption of the euro are easily refuted not only for the Swedish case, but also Estonian. Whereas Sweden has active exchange rate management policies that must be given up upon accession to the EMU, Estonia has used fixed exchange rate since the beginning and it has had a positive impact on the economy.

The European Central Bank's Accession Master Plan for preparation of expansion of the euro zone presumes that the expansion of the ESCB by 10 states takes place in May 2004 and that the first wave of countries adopts euro in January 2007. A large-scale simultaneous expansion is not likely, however, because the accession countries have themselves set varying dates for accession. After all, besides the generally positive impact of accession to the EMU, candidate countries can also expect new limitations to their economic policies, which they are trying to consider when drawing up accession schedules. In the monograph published for the 10<sup>th</sup> anniversary of the Estonian kroon, the benefits and dangers of joining the EMU are discussed in more detail (*Alternative ...*, 2002). In joining ERM II, there was the first group of countries that joined ERM immediately. This included Estonia, Lithuania and Slovenia. Latvia has announced its wish to join ERM II in January 2005. Czech Republic, Hungary, Poland and Slovakia have in the past mentioned that they wish to join as quickly as possible. However, this position has been changing during the past half year, as these countries are postponing their joining to the EMU to years 2008 to 2010. In principle, the countries can be member of ERM II also for more than two years and therefore join ERM II already next spring, independently of when they wish to join the EMU. Yet for various reasons several countries do not wish to be in ERM II more than the compulsory 2 years and therefore the date of their joining is also postponed for several years. Malta has not publicly announced any dates.

#### **4. Conclusions**

At the time of writing this paper, over twelve years had elapsed since the Estonian currency reform. The Estonian economy had reached the upturn stage, the balance of payments (except current accounts) showed a modest surplus, Estonia's external debt was minimal, the inflation rate is declining, the unemployment rate is stable and real income is growing. It seems reasonable to conclude that this success is positively related to the country's currency board system, supported by liberal monetary and economic policy.

After the restoration of national independence in 1991, it was natural for Estonia to choose CBA. The economic stability, resources and experience necessary to introduce a flexible exchange rate regime did not exist at the time. Instead, a monetary system that met the actual economic and financial situation in Estonia, suitable to its banking and management skills, was opted for. CBA endowed the Estonian kroon with confidence, which helped to attract foreign capital to support the country's reforms and supply the resources necessary to back its currency. Another key to the success of the currency board is the extremely liberal monetary policy applied at the same time. This created a favourable environment for the financial infrastructure necessary for the progress of reform, and the rapid integration of Estonia's monetary system and economy with the international economy.

There are also serious arguments that would compel Estonia to give up the currency board system and its liberal monetary policy. On the contrary, these principles amount to an

important mechanism, which allows Estonia's economy to develop consistently, and retain and improve its competitiveness in the world market. A small country has no better road to social welfare. This view is shared by the Board of the Bank of Estonia, the Government, and the majority in the Parliament (*Riigikogu*). Recent macroeconomic developments and introduced economic policy measures will assert this general conclusion.

The main aim of Estonian macroeconomic policy is to continue preparations for the integration with the European Union and for joining the European Monetary Union in the future. Fixing the exchange rate of the domestic currency to the euro, Estonia is already connected with the European monetary policy remarkably. CBA is a suitable monetary framework for joining the European Union, and after meeting the Maastricht convergence criteria, also with the European Monetary Union.

## References

- Alternative Monetary Regimes in Entry to EMU. Ed. by Sepp, U. and Randveer, M. 2002. Tallinn: Bank of Estonia.
- Avramov, R. 1999. The Role of a Currency Board in Financial Crises: The Case of Bulgaria. – Bulgarian National Bank Discussion Paper DP/5/1999. Sofia: Bulgarian National Bank.
- Balino, T., Charles Enoch, C. and others. 1997. Currency Board Arrangements: Issues and Experiences. – IMF Occasional Paper No. 151. Washington DC: IMF.
- Berg, A., Borensztein and P. Mauro. 2003. Monetary Regime Options for Latin America. – *Finance & Development*, September, 24–27.
- Boreiko, D. 2002. EMU and Accession Countries: Fuzzy Cluster Analysis of Membership. Working paper 71. Oesterreichischen Nationalbank, March 8.
- Buiter, W. H. and C. Grafe. 2001. Central Banking and the Choice of Currency Regime in Accession Countries. SURF Studies No. 11, Vienna: SUEF.
- Calvo, G. and Enrique G. Mendoza. 2000. Capital Markets Crises and Economic Collapse in Emerging Markets: An International Frictions Approach. – *American Economic Review*, 90, 2, 59–64.
- Dobrev, D. 1999. The Currency Board in Bulgaria: Design, Peculiarities and Management of Foreign Exchange Cover. – Bulgarian National Bank Discussion Paper DP/9/99. Sofia: Bulgarian National Bank.
- ECB, Eurostat and Spring 2003 Fiscal Notifications.
- Eichengreen, B., Masson, P. *et al.* 1998. Exit Strategies: Policy Options for Countries Seeking Greater Exchange Rate Flexibility. – IMF Occasional Paper No. 168. Washington DC: IMF.
- Enoch, C. and A.-M. Gulde. 1997. Making a Currency Board Operational. – IMF PPAA/97/10. Washington DC: IMF.
- Euro ja Eesti*. 2001. Tallinn.
- European Central Bank. 2004. ECB Monthly Bulletin. February.
- Feldmann, R. A. and C.M. Watson. 2002. Into the EU, Policy Frameworks in Central Europe. Washington, D.C: International Monetary Fund.
- Fidrmuc, J. and I. Korhonen. 2003. The Euro Goes East: Implementations of the 2000–2002 Economic Slowdown for Synchronisation of Business Cycles between the Euro Area and CEECs. Discussion Paper No. 6. Bank of Finland. Institute for Economies in Transition, BOFIT.
- Ghatak, S. 1995. Monetary Economics in Developing Countries. Second Edition. St. Martins Press, INC.
- Ghosh, A. R. *et al.* 1996. Does the Exchange Rate Regime Matter for Inflation and Growth. – IMF Economic Issues 2, September.
- Ghosh, A. R., Gulde, A.-M., Wolf, H. 1998. Currency Boards – The Ultimate Fix? IMF Working Paper No. 98/8. Washington DC: IMF.
- Giavazzi, F. and Giovannini, A. (1989). Limiting Exchange Rate Flexibility: The European Monetary System. Cambridge, MA:MIT Press.
- Gulde, A.-M. 1999. The Role of the Currency Board in Bulgaria's Stabilization. – IMF Policy Discussion Paper 99/3. Washington DC: IMF.
- Haan, de Y., Berger, H., Van Fraassen, E. 2001. How to Reduce Inflation: An Independent Central Bank or a Currency Board? The Experience of the Baltic Countries. - *Emerging Markets Review*, 2, 3, 218–243.
- Hanke, S. H., Jonung, L., Schuler, K. 1993. Russian Currency and Finance: A Currency Board Approach to Reform. London: Routledge.
- Hetemäki, M. 1996. Totuus EMUsta? - *Kansantaludellinen aikauskirja*, 92 vsk. 31/1996, 280–287.

- International Monetary Fund. 1999. Annual Report on Exchange Arrangements and Exchange Restrictions.
- Kallas, S. and M. Sõrg. 1995. Currency Reform. In: Lugus, O. and Hachey, G.A.Jr, eds. Transforming the Estonian Economy. International Center for Economic Growth. Tallinn, 71–91.
- Knöbl, A., A. Sutt and B. Zavoico. 1996. The Estonian Currency Board: Its Introduction and Role in the Early Success of Estonia's Transition to a Market Economy. – International Monetary Fund. IMF Working Paper WP/02/96.
- Korhonen, I. 1999. Currency Boards in the Baltic Countries: What Have We Learned? – BOFIT Discussion Paper No. 6. Helsinki: Bank of Finland.
- Korhonen, I. and M. Randveer. 2000. Assessment of the Euro's Implications for European Economic Development. Eesti pank. Working Papers No. 2.
- Korhonen, I. and P. Sutela. 2000. Currency Boards in the Baltic Countries: What Have We Learned? Paper presented at the Sixth International Council for Central and East European Studies World Congress.
- Kraft, V. 2003. When Estonia Introduces the Euro? – *Kroon & Economy* No. 4, 2003, 43–47.
- Kwan, Y. K. and F.T. Lui. 1999. Hong Kong's Currency Board and Chancing Monetary Regimes. NBER Working Paper No. 5723.
- Loungani, P. 2000. Dornbush Offers Advice on Role of Countries' Exchange Rate Policies. – International Monetary Fund Survey, 29, 15, 249–51.
- Masson, P. R. 1999. Monetary and Exchange Rate Policy of Transition Economies of Central and Eastern Europe after the Launch of EMU. IMF Policy Discussion Paper No. 99/5. IMF, Washington DC.
- Mundell, R. 1961. A Theory of Optimum Currency Area. - *American Economic Review*, 51, 657–665.
- Pautola, N. and P. Backe. 1998. Currency Boards in Central and Eastern Europe: Past Experience and Future Perspectives. – Oesterreichische Nationalbank, *Focus on Transition*, 1, 72–113.
- Perry, G. E., ed. 1997. Currency Boards and External Shocks: How Much Pain, How Much Gain? World Bank Latin American and Caribbean Studies, Proceedings Series. Washington DC: World Bank.
- Reinhart, C. M. 2000. The Mirage of Floating Exchange Rates. – *American Economic Review*, 90, 2, 65–70.
- Sahay, R. and C.A. Végh. 1995. Dollarization in Transition Economies. – *Finance & Development*, March, 36–39.
- Schuler, K. 1998. Currency Boards and Dollarization. Introduction. <http://users.erols.com/kurrency/intro.htm>
- Sepp, U. and M. Randveer. 2002. A Currency Board Arrangement versus Alternative Exchange Rate Regimes in Estonia. In: Sepp, U. and Randveer, M., eds. Alternative Monetary Regimes in Entry to EMU. Bank of Estonia, Tallinn, 363–420.
- Sõrg, M. 1998. Estonian Currency Board and Economic Performance. – *South African Journal of Economic and Management Sciences*, 1, 3, 463–482.
- Sõrg, M. and V. Vensel. 2002. Development of the Banking System under the Estonian Currency Board. - *International Advantages in Economic Research*, 8, 1, 35–48.
- Spencer, G. and A. Cheasty. The Rouble Area: A Breaking of Old Ties? – *Finance & Development*. June 1993.
- The Road to the Monetary Union in Europe: Emperor, the Kings and the Genies. Ed. Tomasso Padou-Schioppa. Oxford University Press. First published 1994.
- Williamson, J. (1995) What Role for Currency Boards? – Institute for International Economics. Washington, DC. September 1995.

Wójtowicz, G. 1999. The Monetary Policy of European Union in the Globalisation Area, and its Influence on Central and Eastern European Countries. In: Jerzy Kleer and Aleksander Lukaszewicz, eds. Euro and its Impact on the Banking System in Central and Eastern Europe. Friedrich Ebert Foundation, Warsaw Office, 63–73.  
[www. eestipank.info/pub/en/yldine/press/pressiteated/pt2004](http://www.eestipank.info/pub/en/yldine/press/pressiteated/pt2004)

*Appendix 1. Money Supply in Estonia (EEK bln., and of the period)*

<b>Year</b>	<b>M0 = cash in circula- tion in economy + money on account held with central bank</b>	<b>o/w cash issued</b>	<b>M1 = M0 + demand deposits</b>	<b>o/w foreign currency demand deposits</b>	<b>M2 = M1 + time and saving deposits</b>	<b>o/w foreign currency time and saving deposits</b>
1993*	3,9	2,7	6,2		7,2	
1994*	4,3	3,5	7,9		10,0	
1995	5,1	4,3	9,5	0,9	10,8	0,2
1996	6,2	5,0	12,4	1,1	14,9	0,5
1997	8,9	5,4	15,9	1,9	20,5	1,2
1998	9,1	5,4	14,8	1,7	21,3	1,6
1999	11,5	6,6	19,3	2,0	26,3	1,8
2000	13,2	7,3	23,4	2,7	33,0	3,7
2001	11,9	8,1	28,7	3,8	40,8	3,2
2002	11,7	8,1	31,4	4,2	45,3	3,3
2003	13,5	8,3	36,1	5,3	50,2	2,6
2004 Sept 30	16,1	8,5	39,6	5,8	54,4	2,8

\* Demand time and saving foreign currency deposits held with commercial banks held at the end of 1993 bln. 0,35 and 1994 bln. 1,16.

Source: Bank of Estonia.



**Ernst-Moritz-Arndt-Universität Greifswald**  
**Rechts- und Staatswissenschaftliche Fakultät**  
**Wirtschaftswissenschaftliche Diskussionspapiere**

**Bisher erschienen:**

- 1/97 Ole Janssen/Carsten Lange: „Subventionierung elektronischer Geldbörsen durch staatliche Geldschöpfungsgewinne“
- 2/97 Bernd Frick: „Kollektivgutproblematik und externe Effekte im professionellen Team-Sport: 'Spannungsgrad' und Zuschauerentwicklung im bezahlten Fußball“
- 3/97 Frauke Wilhelm: „Produktionsfunktionen im professionellen Mannschaftssport: Das Beispiel Basketball-Bundesliga“
- 4/97 Alexander Dilger: „Ertragswirkungen von Betriebsräten: Eine Untersuchung mit Hilfe des NIFA-Panels“
- 1/98 Volker Ulrich: „Das Gesundheitswesen an der Schwelle zum Jahr 2000“
- 2/98 Udo Schneider: „Der Arzt als Agent des Patienten: Zur Übertragbarkeit der Principal-Agent-Theorie auf die Arzt-Patient-Beziehung“
- 3/98 Volker Ulrich/Manfred Erbsland: „Short-run Dynamics and Long-run Effects of Demographic Change on Public Debt and the Budget“
- 4/98 Alexander Dilger: „Eine ökonomische Argumentation gegen Studiengebühren“
- 5/98 Lucas Bretschger: „Nachhaltige Entwicklung der Weltwirtschaft: Ein Nord-Süd-Ansatz“
- 6/98 Bernd Frick: „Personal-Controlling und Unternehmenserfolg: Theoretische Überlegungen und empirische Befunde aus dem professionellen Team-Sport“
- 7/98 Xenia Matschke: „On the Import Quotas on a Quantity-Fixing Cartel in a Two Country-Setting“
- 8/98 Tobias Rehbock: „Die Auswirkung der Kreditrationierung auf die Finanzierungsstruktur der Unternehmen“
- 9/98 Ole Janssen/Armin Rohde: „Einfluß elektronischer Geldbörsen auf den Zusammenhang zwischen Umlaufgeschwindigkeit des Geldes, Geldmenge und Preisniveau“
- 10/98 Stefan Degenhardt: „The Social Costs of Climate Change: A Critical Examination“
- 11/98 Ulrich Hampicke: „Remunerating Conservation: The Faustmann-Hartmann Approach and its Limits“
- 12/98 Lucas Bretschger: „Dynamik der realwirtschaftlichen Integration am Beispiel der EU-Osterweiterung“

- 13/98 Heiko Burchert: „Ökonomische Evaluation von Telematik-Anwendungen im Gesundheitswesen und Schlußfolgerungen für ihre Implementierung“
- 14/98 Alexander Dilger: „The Absent-Minded Prisoner“
- 15/98 Rainer Leisten: „Sequencing CONWIP flow-shops: Analysis and heuristics“
- 1/99 Friedrich Breyer/Volker Ulrich: „Gesundheitsausgaben, Alter und medizinischer Fortschritt: eine ökonomische Analyse“
- 2/99 Alexander Dilger/Bernd Frick/Gerhard Speckbacher: „Mitbestimmung als zentrale Frage der Corporate Governance“
- 3/99 Paul Marschall: „Lebensstilwandel in Ostdeutschland: Ansatzpunkte für gesundheitsökonomische Analysen“
- 4/99 Lucas Bretschger: „On the predictability of knowledge formation: the tortuous link between regional specialisation and development“
- 5/99 Alexander Dilger: „Betriebsratstypen und Personalfuktuation: Eine empirische Untersuchung mit Daten des NIFA-Panels“
- 6/99 Claudia Werker: „Market Chances of Innovative Firms from Transition Countries in Interregional Markets“
- 7/99 Udo Schneider: „Ärztliche Leistung und Compliance des Patienten - der Fall des Double Moral Hazard“
- 1/00 Florian Buchner/Jürgen Wasem: „Versteilerung der alters- und geschlechts-spezifischen Ausgabenprofile von Krankenversicherern“
- 2/00 Lucas Bretschger: „Konvergenz der europäischen Regionen“
- 3/00 Armin Rohde/Ole Janssen: „EU-Osterweiterung: Ist ein schneller Beitritt zur Europäischen Währungsunion für Estland sinnvoll?“
- 4/00 Lembo Tanning: „Schätzkriterien des Außenhandels zwischen der Europäischen Union und mittel- und osteuropäischen Ländern“
- 5/00 Frank Hettich/Carsten Schmidt: „Deutschland, ein Steuermärchen?“
- 6/00 Cornelia Kerim-Sade/Alexander Crispin/Jürgen Wasem: „An External control of Validity of the German EuroQol-5D Questionnaire“
- 7/00 Lucas Bretschger/Frank Hettich: „Globalisation, Capital Mobility and Tax Competition: Theory and Evidence for OECD Countries“
- 8/00 Frank Hettich: „The Implications of International Cooperations for Economic Growth, Environmental Quality and Welfare“

- 9/00 Alexander Dilger: „The Market is Fairer than Bebchuk’s Scheme“
- 10/00 Claudia Werker: „Market Performance and Competition: A Product Life Cycle Model“
- 11/00 Joachim Schwerin: „The Dynamics of Sectoral Change: Innovation and Growth in Clyde Shipbuilding, c. 1850-1900“
- 12/00 Lucas Bretschger/Sjak Smulders: „Explaining Environmental Kuznets Curves: How Pollution Induces Policy and New Technologies“
- 13/00 Franz Hessel: „Wertigkeit der Augeninnendruckmessung mittels Non-contract Tonometrie durch Augenoptiker in Deutschland. Eine Kosten-Wirksamkeits-Analyse“
- 14/00 Lucas Bretschger: „Internationaler Handel im Ostseeraum - sozioökonomische Hintergründe“
- 15/00 Hans Pechtl: „Die Kongruenzhypothese in der Geschäftsstättenwahl“
- 01/01 Joachim Prinz: „Why Do Wages Slope Upwards? Testing Three Labor Market Theories“
- 02/01 Armin Rohde/Ole Janssen: „Osteuropäische Currency Board-Länder und die optimale Integrationsstrategie in die Europäische Währungsunion am Beispiel Estlands“
- 03/01 Lucas Bretschger: „Wachstumstheoretische Perspektiven der Wirtschaftsintegration: Neuere Ansätze“
- 04/01 Stefan Greß, Kieke Okma, Franz Hessel: „Managed Competition in Health Care in The Netherlands and Germany – Theoretical Foundation, Empirical Findings and Policy Conclusion“
- 05/01 Lucas Bretschger: “Taking Two Steps to Climb onto the Stage: Capital Taxes as Link between Trade and Growth”
- 06/01 Udo Schneider: “Ökonomische Analyse der Arzt-Patient-Beziehung: Theoretische Modellierung und empirische Ergebnisse”
- 07/01 Paul Marschall: „Lernen und Lebensstilwandel in Transformationsökonomien“
- 08/01 Thomas Steger: „Stylised Facts of Economic Growth in Developing Countries“
- 09/01 Hans Pechtl: “Akzeptanz und Nutzung des B-Commerce im B2C. Eine empirische Analyse“
- 10/01 Hannes Egli: „Are Cross-Country Studies of the Environmental Kuznets Curve Misleading? New Evidence from Time Series Data for Germany“
- 01/02 Stefan Greß, Kieke Okma, Jürgen Wasem: „Private Health Insurance in Social Health Insurances Countries – Market Outcomes and Policy Implications“

- 02/02 Ole Janssen, Armin Rohde: “Monetäre Ursachen der Arbeitslosigkeit in Currency Board-Systemen?”
- 03/02 Alexander Dilger: „Never Change a Winning Team – An Analysis of Hazard Rates in the NBA“
- 04/02 Thomas Steger: “Transitional Dynamics in R&D-based Models of Endogenous Growth”
- 05/02 Franz Hessel, Eva Grill, Petra Schnell-Inderst, Jürgen Wasem: “Modelling costs and outcomes of newborn hearing screening”
- 06/02 Veronica Vargas, Jürgen Wasem: “Using selected diagnoses to improve the Chilean Capitation formula”
- 07/02 Susann Kurth: “Die mittel- und osteuropäische EU-Beitrittskandidaten auf dem Weg in die EU: Eine Bestandsaufnahme und Analyse der Kriterien von Maastricht“
- 08/02 Roland Rollberg: „16 Fälle kostenminimaler Anpassung eines Aggregats bei im Zeitablauf konstanter Intensität“
- 09/02 Jüri Sepp: „Estlands Wirtschaftspolitik im Rahmen der Koordinationsanforderungen der EU“
- 01/03 Ole Janssen: „Vergleich zwischen Currency Board-System und Standard Fix-System“
- 02/03 Mart Sörg: „Reformation of the Estonian Banking System“
- 03/03 Bert Kaminski: „Aktuelle steuerliche Neuregelungen und deren Auswirkungen auf unternehmerische Entscheidungen – unter besonderer Berücksichtigung des Steuervergünstigungsabbaugesetzes vom 11. April 2003“
- 04/03 Stefan Mirschel, Roland Rollberg, Ulrich Steinmetz: „Technologische Fundierung der Produktionsfunktion vom Typ D mit Hilfe von Verbrauchs- und Erzeugungsfunktionen“
- 05/03 Heiko Kay Xander: “Evolutionäre Optimierung mit MUTABA (Mutativ-Biologischer Algorithmus) Version 2.1”
- 06/03 Michael Lerm, Roland Rollberg: “Ellipsenverfahren zur betriebsübergreifenden simultanen Losgrößen- und Bestellmengenplanung“
- 07/03 Bert Kaminski, Günther Strunk: „Anmerkungen zum Entwurf der „Gewinnabgrenzungsaufzeichnungsverordnung“ GAufzV vom 11. August 2003 (BR-Drucks. 583/03)“
- 08/03 Jan Körnert, Jan Hendrik Abendroth, Marén Holdschick u. Robert Straßner: „Internationale Preisindexanleihen als Instrument zum Schutz vor Inflation und zum Schätzen von Inflationserwartungen“

- 09/03 Robert Straßner u. Jan Körnert: „Strategische Allianzen als betriebswirtschaftliches Konzept zur strategischen Unternehmensführung“
- 10/03 Jan Körnert, Bernd Nolte u. Marén Holdschick: „Neuere Entwicklungen im italienischen Bankensystem“
- 11/03 Jan Körnert: „Empirische Befunde zur Balanced Scorecard: Umsetzungsstand und Konsequenzen“
- 01/04 Hans Pechtl: „Das Preiswissen von Konsumenten. Eine theoretisch-konzeptionelle Analyse“
- 02/04 Cornelia Wolf, Jan Körnert: „Stakeholder Scorecard versus Balanced Scorecard“
- 03/04 Stefan Mirschel, Heinz-Eckart Klingelhöfer, Michael Lerm: “Bewertung von Stimmrechtsänderungen”
- 04/04 Matti Raudjärv: „Wirtschaftspolitische Ziele und marktwirtschaftliche Transformation in Estland“
- 05/04 Matti Raudjärv: „Unternehmensgründung und -tätigkeit in Estland: Einige wirtschaftspolitische Aspekte“
- 06/04 Jan Körnert, Robert Straßner: „Schwedens Bankenkrise und das Rating von Nordbanken und Gota Bank in den 1990er Jahren“
- 07/04 Stefan Mirschel, Michael Lerm: „Zur Interpretation der Dualvariable der Mindestzielfunktionswertrestriktion im Zustandsgrenzpreismodell“
- 08/04 Ralf Döring: „Wie stark ist schwache, wie schwach starke Nachhaltigkeit?“
- 09/04 Bert Kaminski: „Anmerkungen zum Entwurf der „Verwaltungsgrundsätze-Verfahren“ vom 18. Oktober 2004“
- 10/04 Hans Pechtl: „Definitions- und Wirkungsbereiche des decoy-Effekts – eine empirisch-explorative Untersuchung“

Dieses Werk ist durch Urheberrecht geschützt. Die damit begründeten Rechte, insbesondere die der Entnahme von Abbildungen und Tabellen, der Funksendung, des Nachdrucks, der Übersetzung, des Vortrags, der Mikroverfilmung oder der Vervielfältigung auf anderen Wegen und der Speicherung in Datenverarbeitungsanlagen, bleiben, auch bei nur in Auszügen erfolgender Verwendung, vorbehalten. Eine vollständige oder teilweise Vervielfältigung dieses Werkes ist in jedem Fall nur in den Grenzen der gesetzlichen Bestimmungen der jeweils geltenden Fassung des Urheberrechtsgesetzes der Bundesrepublik Deutschland vom 9. September 1965 zulässig. Grundsätzlich ist die Vervielfältigung vergütungspflichtig. Verstöße unterliegen den Strafbestimmungen des Urheberrechtsgesetzes.