LIQUIDITY PROBLEMS AND POLICY IMPLICATIONS DURING THE RECENT FINANCIAL CRISIS IN THE BALTIC-SCANDINAVIAN REGION: EX ANTE EMPIRICAL STUDY

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Abstract

This article provides an empirical examination of the development and determinants of the liquidity position in the financial sector during the past financial crises in the Baltic-Scandinavian region. We look at fiscal and monetary policy implications of the liquidity problems arising in the crisis, using panel data from Datastream and IFS data collection. The results are consistent with the theoretical predictions for a small open economy with the expected sign of changes and developments in common economic indicators. The main finding is that the changes (and the speed of changes) of interest rates, GDP and money supply have occurred relatively fast, meaning that the rising area of the LM-curve has been shorter than theory would predict. Market reactions took place quickly and relatively simultaneously – there was no time for the slow restructuring, thus liquidity needs were higher than generally. The impact of crises on the liquidity position of the financial sector is also studied.

Keywords: financial crisis, policy implications, interest rates, liquidity position, stock regulating process, capital flows

JEL Classification: G01, G21

1. Introduction and the theoretical background

The purpose of this study is to explain how the situation of capital market and the relative structure of financial companies' assets (money supply) are related to the changes in main economic indicators. The study concentrates on the last financial crisis and the preceding period with data used from 1994 to 2009.

The research is related to the theoretical examination of ISLM model on specified areas[1] of the LM-curve, sequence of changes and lengths of phases of the curve. All that has an impact on rational decisions of capital market transactions, resulting in

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[1] LM-curve is probably steady and rising but it is efficient to treat three areas separately. Under the conditions of deep depression, economy can fall into liquidity trap - it is Keynes's area and the curve is quite horizontal. In the case of fast expansion and high interest rates, all money will be used for business transactions and LM-curve will become quite vertical - this is called classical area. The most important is a rising LM-curve when money is used for business transactions and money is also on speculative accounts (Gordon 1994).

the money market moving to the next theoretical equilibrium point. The theoretical sources of the hypothesis are supported by the Law of Say[2] and the Law of Verdon[3].

One year after publishing the theory of Keynes, John Hicks wrote an article *Mr. Keynes and Classics: Suggested Interpretation*[4] in which he presented a simplified conclusion of Keynes's work. After elaboration by Alvin Hansen[5] and other authors, it became the model of Hicks (ISLM model), which in 1950 won popularity as "Keynesian" economic-theory. Like any other model it is also a simplified version of describing processes in real economy. A reason why this model is still used nowadays is because it is simple (Brown 1997). The main advantage may also lie in the fact that the model includes one of the basic corner-stones of economy, such as money (in this case money as a stock variable, not income as a flow variable), which can be determined when referring to the time of research.

Also the term called stock regulating process[6] is related with the theory of Keynes and the Law of Say, explaining how market economy can head lower than full employment equilibrium despite the fact that all production will be bought (Brown 1997). For developing the stock regulating process, savings and investments should be used, which by nature are also stocks and can be taken as stock variables.

For the management of stock it is important to consider the components of the economic indicators method worked out by Wisley Mitchell and Arthur Burns. According to the method, the US Department of Commerce has come up with a

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[2] According to the neo-classical school of thought, market mechanism is strong enough to overcome the external instabilities and take economy to the state of overall balance. This is a situation where demand equals supply and there is no incentive for a change. For such an opinion to be reasonable, neo-classical economic scientists had to assume that there are enough alternatives in the economy. The centre of neo-classical economic science was law of Say, according to which "supply creates itself demand". In certain markets there may be short-term problems but when prices are flexible enough, the prices of oversupplied products should fall and prices of products with over demand should rise. The essence of the Law of Say is that market economy cannot fall into extensive depression and that because supply creates demand and generally there is no saturation.

[3] Profitability often rises in booming periods. Since the economy is growing, enterprises are increasing their capacities, buying new capital and training new employees - all this increases profitability. Positive relationship between economic boom and profitability is known as the Law of Verdon (Brown 1997: 27)

[4] John Hicks, Mr. Keynes and the Classics: Suggested Interpretation, Econometria, 5 (April 1997), pp. 147-159.

[5] A Guide to Keynes. New York: McGraw-Hill, 1953.

[6] Stock regulating process takes place in the following manner. When companies are producing more than they sell, then stock will accumulate. When stock increases over the wanted level and there is no place where to realize it then an enterprise will stop activities in that direction and will fire employees related to that action (inputs). In the following period, an enterprise can realize at the expense of previously accumulated stock more than it produces in that period. If this process continues, inputs should be increased for the next period to increase production. There is an equilibrium when entrepreneurs realize just as much as they produce and the stock remains relatively the same.

selection of 12 leading economic indicators[7] and most of them are stock variables or indicators describing stock changes. But the standard for measuring the stock level is still money. The aspect of the importance of money has been emphasized by Brunner and Meltzer (1993).

Under the conditions of depression, economy can fall into liquidity trap which is the Keynes's area of the LM-curve when the curve is quite horizontal. The opposite of the situation is the vertical area of the LM-curve, which occurs in booming economy when all money is used for business transactions. In-between there should be a more realistic area of the LM-curve when the curve is rising, meaning that money is divided between bank accounts and business transactions. Theoretically, shifts from the vertical area to the horizontal area should take some time but empirical data shows that time for shifts can be significantly shorter during crisis.

The theoretical models illustrate how important it is to manage stocks in economy and how money is a standard for measuring the stocks with its characteristics like interest rates[8] and volume. Currently we still cannot say that the financial and economic crisis that has spread all over the world has ended. Thus, this paper acts as an *ex ante* study of the consequences of financial crisis for the money market, more precisely arising liquidity issues and policy implications of problems faced in the crisis.

We approach the problem from a LM-curve based theoretical background and take an indirect approach by studying economic indicators to see the shift between the booming area in the LM-curve and the crisis area. We study how the level of overnight interest rates has fluctuated in the viewed Baltic countries (Estonia, Latvia and Lithuania) as well as in the Scandinavian countries (Finland, Sweden and Denmark). In the LM-curve framework, interest rates are more easily observable than the demand and supply quantities at different interest rate levels. Thus, data availability problems dictate our indirect approach by looking at different relevant economic indicators and drawing mostly qualitatively explained conclusions from the time series and cross sectional differences of the economic indicators within the used sample.

The sample has been chosen since it enables to take a simultaneous look at three small open economies (namely the Baltic States) and see whether and how much can

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[7] Those 12 leading indicators are as follows: (1) average hours of work week in processing industry; (2) new requirements from employees for securing employment; (3) new orders for consumer goods at constant prices; (4) sales intensity; (5) starting a new business (net); (6) contracts and orders for factory equipment at constant prices; (7) new private property floor unit index; (8) stock of goods net change at constant prices; (9) change in price vulnerability; (10) Standard & Poors´s stock price index for stocks price level of 500 companies; (11) M2 money supply; (12) amount of unpaid bills in business activity and change in consumption credit (Brown 1997).

[8] Actually there are many interest rates in economic theory: interests on state securities, corporate securities, fixed date deposits, claimed deposits, etc. There is also a difference between nominal and real interest rates. Interest rates can vary in terms of different dates.

the policy makers of those countries can influence the situation from a providing and improving the overall liquidity point of view. At the same time the Baltic States are greatly influenced by the European Union countries as data shows (see e.g. Table 1 and Table 2) especially by the neighboring Scandinavian countries. In the framework of liquidity and money market, the influence is evident due to a fact that most of the major banks in the Baltic States are owned by Scandinavian origin financial institutions.

Although our focus is on money market, we cannot neglect the importance of other economic indicators. From the policy makers' perspective, we have to look at the as complete economic picture as possible. Money market as a fundamental part of the capital market is influential in the investment decision process and is one of the main indicators of the discount rate. The most used value base in the management models in the investment decision process is NPV (Net Present Value), PI (Profitability Index), EP (Economic Profit), EVA^{TM} (Economic Value Added) etc. These models are related on the basis of discounted future cash flows and this means that the value depends directly on the discount rate. Accordingly there is a fundamental influence on investment decisions and the assets structure of the companies.

Data used in the empirical analysis comes from two main sources which are Datastream and International Monetary Fund IFS data collection. We use the latest available data. In the case of seasonally unadjusted data, we use seasonal adjustment techniques. For better comparability, we use the average exchange rates in situations where comparing the magnitude of the series across countries is necessary. Data about interest rates comes from Datastream as well as most economic indicators. Data about reserves, foreign trade and investments, as well as data concerning the asset and liabilities structure of financial institutions comes from IFS databank. By assets we mean financial assets in classical terms. Depository institutions are used because commercial banks are the most important participants in money and capital markets in the Baltic States and the influence of other players in this field is still small (Kein 1999).

2. Anatomy of financial crises

When studying the history of financial crises, there are typical characteristics present in the economy that precede the crisis and how economy tends to move out of the crisis. The current section gives a short overview of the anatomy of financial crises mostly based on the study of Reinhart and Rogoff (2009). Financial and economic crises tend to be preceded by fast economic expansion with increasing consumption and booming prices in different real and financial sectors. GDP reaches its largest decline one year after the start of the crisis. Unemployment is regarded as a lagging indicator and starts to decrease during the first or second year of the crisis, not before. There is not a clear trend concerning inflation but depending on the specific broader economic conditions, inflation can still be high during the start of the crisis and start declining thereafter as economic expansion turns into recession. Reinhart and Rogoff (2009) show that there is a very high co-movement in the share of countries having high inflation and defaulting on their sovereign debt. In current

crisis it does not concern the viewed Baltic States but otherwise both external and internal debt problems are common causes of the crisis. Kaminsky and Reinhart (1999) show that usually inflation during domestic debt crisis is clearly higher compared to external debt crisis. As currently rising levels of domestic debt were the drivers of pre-crisis economic growth in the Baltic States, relatively high level of inflation was more expected than it would have been in external (government) debt problems.

Experience from the past crises (Reinhart and Rogoff 2009) show that countries experiencing sudden large capital inflows are at high risk of experiencing a debt crisis. This can lead to over borrowing in good times, leaving countries vulnerable during the inevitable downturns. Banking crises lead to sharp declines in tax revenues. Other factors leading to higher deficits can include the operation of automatic fiscal stabilizers, countercyclical fiscal policy and higher interest payments due to elevated risk premiums and rating downgrades. Government debt rises by 86 percent during the three years following a banking crisis. Those indirect costs are usually larger than the usual bank bailout costs.

There is a high probability of current account balance being negative before the crises as higher consumption and import tend to overpass export. Either by devaluation of local currency or restructuring economy and production, exporting goods starts to pick up during crisis. Thus, weakening currency or devaluation necessity (in case of pegged currencies) are very common artifacts of economic and financial crises.

There are a number of common policy implications that help to avoid the worst outcomes during crisis. Namely, having a complete picture of government indebtedness is critical. Debt sustainability must be based on plausible scenarios for economic performance and is a must factor in the possibility of sudden stops in capital flows. The inflationary risks to monetary policy frameworks seem to be linked in important ways to the levels of domestic debt. Many governments have a temptation to inflate away domestic debt. Using stimulus packages has become widely spread during current crisis but such packages have not been widely used (with some exceptions) during past crises which makes the success and efficiency of such stimulus harder to predict. The following empirical sections try to shed light on the current crisis in the Baltic and Scandinavian countries.

3. Empirical study of the crisis
3.1. Interest rates

When studying the interest rate co-movement of Baltic and Scandinavian countries, we can see that interest rates of Denmark, Sweden and Finland coincide greatly with Euro interest rates. Although Denmark and Sweden have not adopted Euro, their central banks have lowered the rates in quite a similar manner as the European Central Bank as can be seen from the overnight interest rate (see Appendix A) which follows closely the base rate of the country.

Interest rates of the Baltic States have behaved slightly differently during the crisis. During the period of 2000 to 2007 we can see more volatility especially in Latvian and Lithuanian rates. There has been a remarkable decrease in overnight rates after the end of 1997-1999 crises. As currencies of all Baltic States are principally pegged to euro, central banks of the countries do not have means to directly influence the rate by money supply. Basically policy makers cannot influence liquidity on that level. Still, implications of recent model of Brunnermeier and Pedersen (2009) suggest that central banks can help to mitigate market liquidity problems by easing funding or margin requirements. Even public statements that extra funding will be provided during liquidity dry-ups could help.

The dramatic increase (and also decoupling from Euro rates) of the overnight and also longer term interest rates in the Baltics clearly illustrates the situation where central banks are unable to provide expansive measures, local markets are more influenced by outflow of foreign investments, which has happened after the beginning of 2007. The speed in the change of interest rates has been dramatic. For example it took 20 days in September 1999 for Lativain overnight rate to rise from 3.5% to over 8% and less than 10 days in March 2007 to rise from around 2% to 8%. Such quick changes do not allow the economy to adjust to the changes in interest rates and shrinking money supply.

Appendix B illustrates the situation further. When Scandinavian countries as well as Euro area, on average, have been able to continue to hold more or less stable positive trend in money supply even after GDP levels have started to deteriorate, the same has not happened in the Baltics. Especially Latvia and Lithuania have faced even more abrupt decline in money supply than the dramatic fall in GDP figures. At least till the second half of 2009, Estonia has done a little better.

A classical policy makers approach is to start cutting interest rates in the case of economic downturn to stimulate economy. Another negative consequence is the loss of confidence in the financial system during the crisis[9]. Currently, cutting interest rates is exactly what has happened in the Euro area as well as in Sweden and Denmark, starting from 2008. Interest rates have dropped significantly moving in the same direction as the falling GDP, which we use as a primary proxy for assessing the state of the economy. The same has not been possible in Estonia, Latvia and Lithuania. Interest rates have moved in the opposite direction and thus it should not be too surprising that in addition to the shrinking economy, decreased money supply and increased interest rates have worsened the situation even further.

Although interest rates have been directly uncontrollable by policy makers in the Baltics, the high level of interest rates has partly been also caused by the lack of confidence of market participants in the perseverance of currency pegs and the banking system. It could be argued that injecting confidence in the market

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[9] See Allen and Gale (1998) for more detail who study the optimality of choice regulators and central banks have to make when dealing with the risks associated with crises to avoid bank-runs.

participants as well as preserving a sound economic climate (we mean conditions under which the central government is able to control the level of external public debt and its expenditures) could help to smooth the magnitude of negative speculations towards currencies. On the other hand, although stimulus packages have not been too widely used during the past crises in the world (Reinhart and Rogoff, 2009) (with the not too successful exception of Japan), decreased government expenditures and the lack of external financing options will be decreasing money supply. Thus, policy makers in pegged currency systems can have expansive means on the capital markets basically only when borrowing and spending has been conservative during good times, so that external financing and assurance of stability remain possible during the crisis when the confidence of financial markets has eroded. In crisis the outflow of funds occurs not only from small emerging economies but also from most other countries.

We also look at spreads between short-term (overnight as well as 6-month) interest rates and long-term interest rates (we use 10-year government bonds for that). Tightening of spreads during the crisis epicenter can be regarded as an expected result as short-term interest rates rise higher than long term government bond yields in all countries in the study. Thus changes in long-term interest rates are slightly smoother than in overnight rates. But compared to 10-year rates, short-term interest rates have a clearly stronger impact on current liquidity positions.

3.2. Inflation and real interest rates

By the inflationary levels, Estonia and Lithuania have been in a better position than Latvia. Latvia hadn't seen lower than 5% inflation (we look at CPI) since the beginning of 2004 until the above 10% levels of 2007 and 2008 dropped below 5% in the second quarter of 2009 and have been decreasing since. Inflation rises also above 10% level also in Estonia and Lithuania in 2008. Before that it stayed around 5% level and was increasing since 2007. Pre-crisis years clearly indicate that the Baltics were facing a very high inflationary environment which in turns encouraged to invest (and seemingly for households also to further spend) as much as possible and real interest rates were negative due to the high inflation. In the light of providing liquidity, pre-crisis years attracted foreign inflows of money. When soaring interest rates and inflationary environment turned into deflationary, it discouraged investments as real interest rates were also expected to rise in the light of diminishing inflation (by the third quarter of 2009, only Estonia had shown negative CPI). Such an effect caused a situation where holding money on deposits with minimum risk was rewarded by high real interest rates and investing funds was discouraged by higher risk of investments in a shrinking economy. This caused a situation where more funds were waiting on the sidelines (read: were lying on deposit accounts) than invested into the economy facing outflow of foreign funds at the same time.

3.3. Economic growth

We look at GDP as the main indicator of economic health. To make the figures comparable, we calculate GDP for all countries in euro and adjust the time series for seasonality. As Swedish kronor has been the single most volatile currency against euro that has weakened nearly 20% against euro since the first half of 2008, it puts Swedish economic performance in a darker light than it would be measured in local currency.

Table 1. Correlation between changes in country GDP in EUR from 2000-2009

	Denmark	Estonia	Euro Area	Finland	Latvia	Lithuania
Denmark	1.000					
Estonia	0.880	1.000				
Euro Area	0.821	0.835	1.000			
Finland	0.891	0.896	0.911	1.000		
Latvia	0.848	0.810	0.906	0.867	1.000	
Lithuania	0.763	0.859	0.822	0.855	0.850	1.000
Sweden	0.804	0.794	0.666	0.838	0.707	0.746

In Table 1 we present the correlation between the GDP (measured in EUR) growth rates of the studied countries since 2000. Viewing longer periods would make the correlation between the Baltic States higher and using local currencies would increase the correlation between Sweden and the rest of the sample. We would assume significant influence by the Scandinavian countries on the Baltic States, as much of the financial sector in the Baltics is under control or direct influence of Scandinavian origin banks.

Indeed, correlation of GDP growth rates is quite significant in all cases. Finland has nearly 0.9 correlation with all Baltic countries, the highest figure with Estonia that is, considering geographical proximity, an expected result. Sweden again has higher correlation with its neighboring countries and slightly lower correlation with Latvia and Lithuania. Although we cannot show causality in those relationships, all countries do seem to have a higher correlation within the Baltic Sea region than with the average Euro area.

When studying the starting points of the economic downturn in the area, we look at time series of GDP in both Euro and local currency. Although Sweden showed quite a stable GDP growth in the fourth quarter of 2007 in local currency, weakening of the kronor decreased the growth to only 0.5% when all other countries (with a minor exception of slowing Denmark) were still near their previous period strong growth phases (especially Latvia and Lithuania). Already the next quarter meant a surprising turn into negative territory for Estonia and Denmark, Latvia followed a quarter later and all other countries in the fourth quarter of 2008. This effectively turned all hopes of soft landing for economy into an ineluctable global crisis that had already suffered significant setbacks earlier in autumn 2008 with the plummeting financial markets and unseen surge of volatility after Lehman Brothers was forced to declare bankruptcy.

As Sweden is the largest economy in the viewed sample, one might expect greater influence from there on the smaller neighboring countries. We can qualitatively argue that the influence of the Swedish financial sector worries was the most evident in Estonia and Latvia. Although Swedish GDP growth stayed quite stable till the fourth quarter of 2008 when looking at the figures in kronor, it was along with Estonia the leading country with slowing and turning negative when considering the framework of EU and looking at GDP figures in euro. We can also see (see Appendix A) that the stock market (which is considered one of the main leading indicators) started to fall first in Estonia and Sweden.

Correlations within countries (see Table 2) between money supply (either M2 or M3) and GDP are strong ranging between 0.82 for Latvia (0.84 for Finland) and 0.93 for Estonia (0.91 for Sweden). The correlation between money supply and interest rates has an expected negative sign (except for Latvia – data problems connected with the availability of money supply data) and falls in the range from -0.22 to -0.52.

3.4. Reserves, investment position and foreign trade

The current crisis situation is well reflected also in the international reserves which reflect the monetary policy of central banks. For example the reserves of Denmark more than doubled in less than 6 months starting from Q3 2008 and jumped by 40% in June 2009 for Sweden. The changes have not been so drastic in Finland and in the Baltics with pegged currencies and limited ability to enforce monetary policy, but growing reserves are evident for the whole sample. When comparing international reserves to total depository financial institution assets, the changes in reserves are not as abrupt but can still indicate that piling up the reserves had negative effects on liquidity (and money supply) in economy. In Q2 2009 the reserves amount to approximately 6%, 4% and 2% of depository assets in Denmark, Sweden and Finland respectively, but 12%, 9% and 15% in Estonia, Latvia and Lithuania which have to hold larger reserves due to pegged currencies. Maintaining the reserve level turned out to be a challenge for Latvia due to outflow of foreign funds (Transition Report 2009).

Studying the investment position of the countries shows clearly that in all cases investments start to be pulled out from foreign countries (see Appendix C). This is similar for both direct and portfolio investments when domestic interest rates soar and money supply starts to decline along with the shrinking economy. Scandinavian countries have a larger amount of foreign portfolio investments which should be a clear indicator of more developed financial markets. Baltic countries tend to have less portfolio investments and are dominated by a very large share of direct investments.

When comparing Estonia, Latvia and Lithuania amongst each other, we can see that although Estonian economy is the smallest of those in absolute numbers, it has attracted both the highest number of direct and portfolio investments. In case of economic downturn, those investments start to seek the way out. In case of

disappearing liquidity, this is not an easy task and starts to greatly affect domestic economy[10]. Estonia is the most affected country by the outflow of investments as its dependence on it is the greatest (highest share of foreign investments per GDP in local economy).
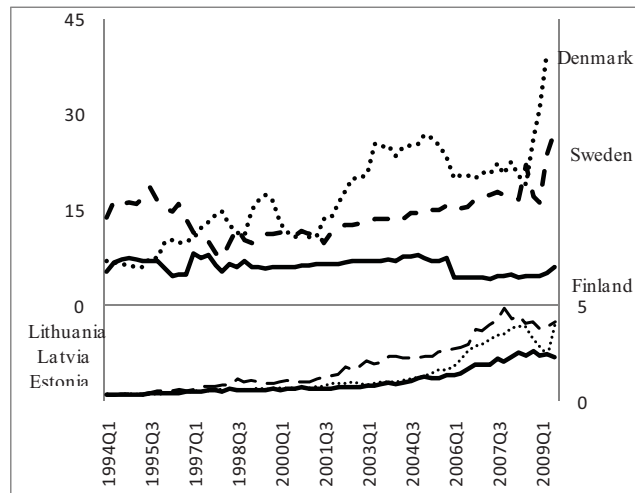

Figure 1. Boosting of international reserves during crisis. Left vertical axis presents the figures in billion SDR for Scandinavian countries and right vertical axis in billion SDR for Baltic countries.

We can see a clear correlation between fallen stock market prices and decreased value and outflow of foreign portfolio investments. In the sample, it is largest for Finland and Estonia. Unfortunately we do not have data available for Sweden. For Euro area and Scandinavian countries the drop in foreign portfolio investments has been larger than for direct investments. At the same time they have also pulled out (or lost value) their own portfolio investments abroad. As the Baltic States are greatly influenced by those countries, plummeting stock indexes and almost ceased lending activity of foreign owned banks should not be a big surprise in retrospect.

Currently we can only qualitatively argue that the drop in direct foreign investments in Baltic economies can have a longer term negative effect. Generally portfolio investments are more mobile, meaning that they can move in and out of the economy faster than direct investments. The latest available data shows some promising signs for the Baltics as both Estonia and Latvia seem to show the first signs of stabilizing foreign direct investment level in the economy. Due to a high correlation between the Baltic countries, Lithuania can be expected to follow their

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[10] See Masso, Varblane, Vahter (2008) and Vahter and Masso (2005) for more detailed study of spillover effects of inward and outward FDI.

lead. The amount of investments abroad is not very high for any of the Baltic countries which can be one of the reasons why foreign investments abroad have not lost relatively as much as Scandinavian countries. On the other hand, Scandinavian countries have been donors for inflow of investments into Baltic States and the fallen Baltic economies have negatively affected their investment values and decisions. Considering the size and correlation of the viewed Scandinavian economies, the drops in foreign investments are probably affected by pulling out portfolio investments from each other's economies and Baltic economies are negatively affected from the outflow of funds initiated by the Scandinavian side.

The inflow of funds to all Baltic States had more than tripled from 2004 till the end of 2007. As presented in the anatomy of crisis section of the paper, such a sudden large inflow of funds can lead to borrowing more than necessary, high inflation and thus can often cause trouble later when the inflow stops or reverses. This is one area where policy makers could theoretically have regulative means to discourage domestic borrowing from a certain level by higher capital requirements. As inflow of foreign investments during good times helps to boost the economy, motivation for policy makers to discourage such inflow is extremely low, resulting in a higher volatility in economy.

As expected, we can see an increasing current account deficit in all the Baltic States during times of booming economy (see Appendix D). At the same time capital account stayed positive. Thus Baltic States have followed a more classical and expected road to crisis than Scandinavian countries, where the changes in current or capital account have not been too noticeable. Both export and import have moved in sync with the GDP and faced significant drops in 2008. A clearly larger drop in imports compared to exports in the Baltics has been very harsh but had some sobering effects on the economies that had obtained their previous growth from consumer expenditure. The positive side of such a drop in imports is that trade balance starts to turn positive, which is necessary to restart the economy, as past crises have shown.

3.5. Government and household expenditure and investments

We look at growth in gross fixed capital formation (GFCF), household and government expenditure compared to GDP growth, which show a high correlation with each other[11]. GFCF both increases and decreases with a larger magnitude than GDP. As could be expected, government expenditure is more rigid and does not adjust to GDP decline as easily as for GDP growth. Government expenditure is one of the few main economic levers that can be directly affected by policy makers' decisions. One of the main problems that should have been an early warning sign for the Baltic States is that starting from 2005 and 2006, household expenditure started to increase much more quickly than GDP. For previous periods as well as Scandinavian countries throughout the viewed period, such a problem didn't exist.

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[11] Data and figures are available upon request.

High domestic household expenditure growth in the Baltics was also one of the main sources of inflation during the pre crisis period.

3.6. Depository institutions' balance sheet structure

We look at how the structure of depository institutions asset and liabilities structure has changed during the period of analysis. Well functioning financial institutions during crises is one of the most critical aspects for providing liquidity during the crisis, as disruptions in the banking system can have a harsh effect on the aggregate economic activity (see e.g. Bernanke 1983). As expected, Figure 2 shows an overall growth in the assets of banks till the second half of 2008 until which the negative effects did not reach the balance sheets of the banking system. After that point the Baltic States and Sweden (which has the most exposed risks towards the Baltics) have faced a slight drop in the assets which is at least partly explained by loan losses.

The trend in bank asset structure in the Baltics (see Appendix F), especially in Latvia and Lithuania is that claims on foreigners are decreasing and domestic exposure is rapidly growing. In that sense Denmark and Finland (see Appendix E) have been at quite a stable level but foreign exposure of Swedish banks has been clearly growing since 2004. At least part of that foreign exposure growth can be explained by financing Swedish owned banks in the Baltic States. Claims on the central government have become less and less important in time.

The liabilities side of the bank balance sheets clearly reflects the Baltic States reliance on inflow of foreign funds. Around 40% of liabilities in Estonia and Lithuania and 50% in Latvia are to nonresidents which are in majority loans from parent companies to local banks. In case of economic trouble, such funds can start fleeing the country making the liquidity position even harder which has been especially true for Latvia (see also Transition Report, 2009). Although the liabilities structure does not show a very clear decrease in liabilities to nonresidents during the crisis, we can still observe a slightly shrinking share of foreign money, on top of that assets and liabilities have started to decrease in general. That is empirical evidence that foreign money is flowing out more quickly than the decrease in assets.

A large share of liabilities to foreigners distorts the overall liquidity picture in the Baltics. Leaving the foreign liabilities aside, we can see a slight piling up of liquid assets on deposits searching refuge from real economy and securities investments which have been losing value since the beginning of the crisis. Such an effect is the most evident for Sweden, Finland and Estonia and also supports the picture presented about international reserves.

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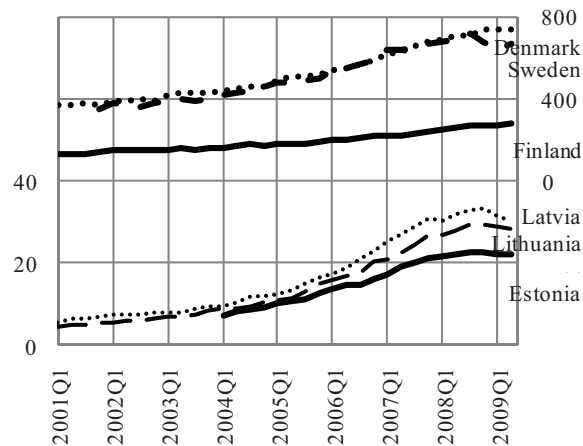

Figure 2. Assets of depository financial institutions. Left vertical axis presents the figures in billions EUR for Scandinavian countries and right vertical axis in billion EUR for Baltic countries.

Another interesting aspect is the liabilities to central government. That does not play an important role in Estonia but has clearly increased in the other Baltic States and Denmark. This would be one place where government aid packaged to banks would be reflected. It is slightly surprising not to see any noticeable changes here for Sweden in the used data.

4. Conclusions

Empirical data shows that changes in interest rates, GDP and money supply occurred relatively fast and simultaneously, so that it did not give economies much time to adjust. That caused a situation where interest rates in more fragile Baltic economies decoupled from Euro and Scandinavian area and soared to almost previous crisis' heights. This clearly illustrates the situation where central banks of open small economies are unable to provide expansive measures and local markets are more influenced by outflow of foreign investments which started happening after the beginning of 2007.

The correlation of GDP growth rates is quite significant in all cases which is positively connected with geographic proximity. All countries do seem to have higher correlation with the Baltic Sea region than with the average Euro area. Thus, the financial sector worries especially in Sweden, Estonia and Latvia closely influenced each other as Sweden and Estonia were the leading countries with

slowing and negative economic growth. High correlation of GDP and money supply meant that along with soaring interest rates, liquidity on the markets shrank significantly. After the inflow of investments to all Baltic States had more than tripled from 2004 till the end of 2007, the outflow of funds initiated by the Scandinavian side (seen from the data about investment position and consolidated balance sheets of depository institutions) and piling up of international reserves worsened the situation even further in the Baltics.

Experience from previous crises suggests that having a complete picture of government indebtedness is critical and inflating away domestic debt might not be a good idea. In the Baltic States central banks of the countries do not have clear monetary policy means to influence the money supply by interest rates but even public statements of providing extra funding when necessary could help to inject confidence in the financial markets during liquidity crises but only if necessary buffers exist. Buffers could be achieved by government controlling the level of external public debt and its expenditure also during good times. Policy makers in pegged currency systems such as the Baltic States can positively affect liquidity position basically only when borrowing and spending has been conservative enough during growing economy. That could improve the chances for external financing during crisis. Operating in a small and open economy can make policy makers' use of levers less effective due to high dependence on and correlation with larger neighboring economies.

As the economies of the studied region are still under stressed conditions, the current study reflects only an ex ante view, which could be complemented by a more thorough ex-post study that could take into consideration the whole economic cycle.

References

1. **Allen, F., Gale, D.** (1998). Optimal financial crises. – *Journal of Finance*, Vol. 53, pp. 1245-1284.
2. **Bernanke, B. S.** (1983). Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression. – *American Economic Review*, 73, 257-276.
3. **Brown, W. S.** (1997). *Makroökonoomika Baasteooria*. Külim, Tallinn.
4. **Brunner, K., Meltzer, A.** (1993). *Money and the Economy: Issues in Monetary Analysis. Raffaele Mattioli Lectures.* Cambridge University Press, Cambridge; New York and Melburne.
5. **Brunnermeier, M. K., Pedersen, L. H.** (2009). Market Liquidity and Funding Liquidity, *Review of Financial Studies.* Forthcoming.
6. Datastream. (2010). ThomsonReuters, Online Database, accessed Jan 15, 2010
7. **Fabozzi, F. J., Modigliani, F.** (1992). *Capital Markets, Insitutions and Instruments*. Prentice Hall, Englewood Cliffs, NJ.
8. **Friedman, M., Savage, L. J.** (1948). The Utility Analysis of Choices Involving Risk. – *The Journal of Political Economy,* LVI, 4.
9. **Gordon, M. J.** (1994). *Finance. Investments and Macro-Economics: The Neoclassical and PostKeynesian Solution*. Aldershot, U.K.

10. **Haggard, S., Lee, C. H. Maxfield, S.** (1993). *The Politics of Finance in Developing Countries. Cornell Studies in Political Economy*. Cornell University Press, Itacha and London.
11. **Hirshleifer, J.** (1965). Investment Decisions under Uncertainty: Choice Theoretic Approaches. – *The Quarterly Journal of Economics,* LXXIX, 4.
12. International Financial Statistics (IFS). (2009). International Monetary Fund. IFS CD-ROM, November 2009.
13. **Kaminsky, G. Reinhart, C. M.** (1999). The Twin Crises: The Causes of Banking and Balance of Payments Problems. – *American Economic Review*, Vol. 89, pp. 473-500.
14. **Kein, A.** (1999). Formation of Securities Market in Estonia in 1990s. In: Ennuste. Ü. and Wilder, L. (Eds.) *Harmonisation with the Western Economics: Estonian Economic Developments and Related Conceptual and Methodological Frameworks*. Estonian Institute of Economics at TTU, Tallinn, pp. 41-90.
15. **Krugman, P.** (1994). *The Age of Diminished Expectations: U.S. Economic Policy in the 1990s.* Second ed. Cambridge and London.
16. **Masso, J., Varblane, U., Vahter, P.** (2008). The Effect of Outward Foreign Direct Investment on Home-Country Employment in a Low-Cost Transition Economy. – *Eastern European Economics*, M.E. Sharpe, Inc., Vol. 46(6), pp. 25-59
17. **Reinhart, C. M., Rogoff, K.** (2009). *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press, New Jersey, USA
18. **Thiessen, U.** (1994). *Aspects of Transition to Market Economies in Eastern Europe.* Aldershot, UK.
19. Transition Report. (2009). EBRD Transition Report 2009: Transition in crisis? European Bank for Reconstruction and Development, November 2009.
20. **Vahter, P., Masso, J.** (2005). Home Versus Host Country Effects of FDI: Searching for New Evidence of Productivity Spillovers, Bank of Estonia Working Papers 2005-13, Bank of Estonia, revised 10 December 2005.

Table 2. Correlation matrix of Euro zone, Estonian, Latvian, Lithuanian, Finnish, Swedish and Danish GDP, money supply (M2 or M3) and average overnight interest rates (i) for the period Q1 1995 to Q3 2009

| | EUR | EUR | SWE | SWE | SWE | LIT | LIT | LIT | DEN | DEN | DEN | FIN | FIN | FIN | LAT | LAT | LAT | EST | EST |
	M2	SKP	SWE i	M3	SKP	LIT i	M2	SKP	DEN i	M2	SKP	FIN i	M3	SKP	LAT i	M2	SKP	EST i	M2
EUR i	-0.42																		
EUR SKP	0.94	1.00																	
SWE i	0.61	-0.59	1.00																
SWE M3	-0.36	0.91	-0.44	1.00															
SWE SKP	-0.32	0.99	-0.55	0.91	1.00														
LIT i	0.55	-0.75	0.96	-0.61	-0.63	1.00													
LIT M2	-0.32	0.92	-0.45	0.98	0.93	-0.52	1.00												
LIT SKP	-0.31	0.96	-0.48	0.93	0.97	-0.58	0.97	1.00											
DEN i	0.75	-0.29	0.53	-0.23	-0.31	0.50	-0.25	-0.29	1.00										
DEN M2	-0.36	0.90	-0.42	0.98	0.91	-0.39	0.99	0.95	-0.25	1.00									
DEN SKP	-0.18	0.98	-0.50	0.87	0.99	-0.63	0.89	0.95	-0.21	0.87	1.00								
FIN i	0.67	-0.55	0.87	-0.45	-0.50	0.85	-0.43	-0.46	0.75	-0.42	-0.44	1.00							
FIN M3	-0.34	0.84	-0.41	0.97	0.97	-0.40	0.98	0.91	-0.23	0.99	0.80	-0.41	1.00						
FIN SKP	-0.25	0.99	-0.52	0.90	0.99	-0.66	0.92	0.97	-0.25	0.90	0.99	-0.47	0.84	1.00					
LAT i	0.42	-0.46	0.89	-0.24	-0.42	0.96	-0.28	-0.36	0.43	-0.23	-0.41	0.77	-0.22	-0.40	1.00				
LAT M2	0.50	0.96	0.34	0.93	0.90	0.64	0.99	0.91	0.71	0.97	0.79	0.44	0.94	0.91	0.47	1.00			
LAT SKP	-0.25	0.96	-0.48	0.90	0.98	-0.60	0.95	0.99	-0.26	0.92	0.96	-0.44	0.88	0.97	-0.37	0.82	1.00		
EST i	0.50	-0.48	0.78	-0.18	-0.44	0.81	-0.24	-0.37	0.57	-0.18	-0.43	0.81	-0.15	-0.41	0.78	0.92	-0.39	1.00	
EST M2	-0.31	0.92	-0.45	0.99	0.93	-0.57	1.00	0.96	-0.22	0.99	0.89	-0.43	0.97	0.92	-0.27	0.99	0.94	-0.22	1.00
EST SKP	-0.31	0.97	-0.54	0.90	0.99	-0.64	0.94	0.99	-0.32	0.92	0.97	-0.50	0.86	0.98	-0.43	0.82	0.99	-0.46	0.93

Appendix A. Interest rates, GDP, stock market and local currency. Bottom pane of the charts presents figures for the Baltic States and upper pane for the Scandinavian coutries for overnight interest rates, GDP and stock market. GDP is presented in quarterly constant prices in million EUR. Latvian currency is presented in 10xLAT per EUR.

Overnight interest rate

GDP in EUR

Stock market index

Local currency per EUR
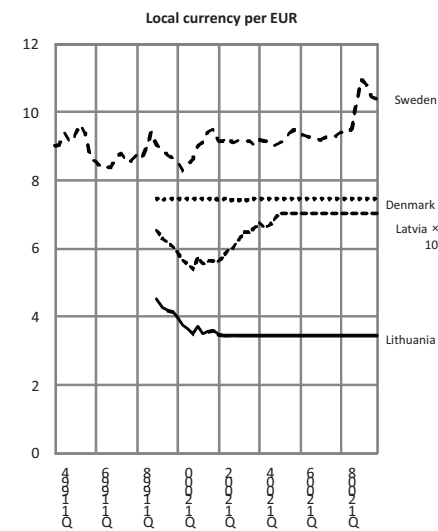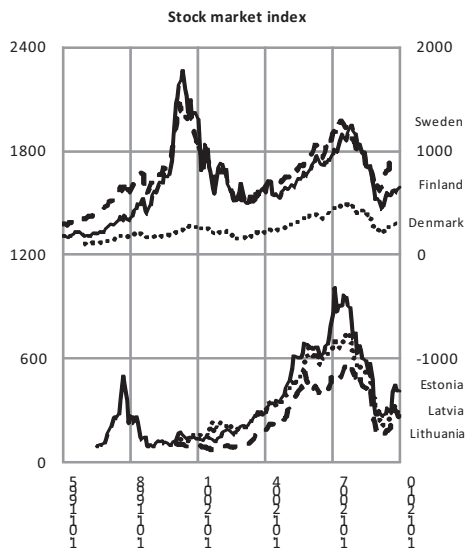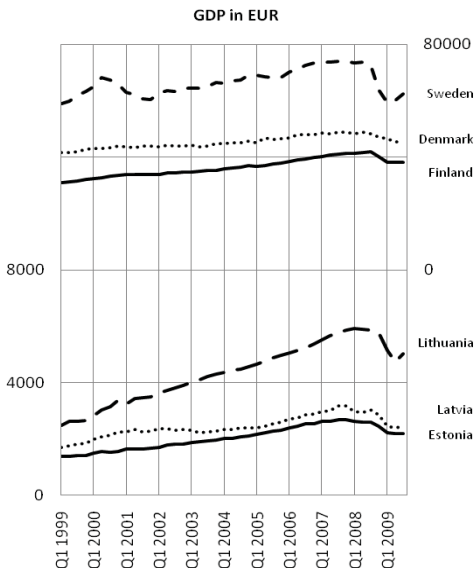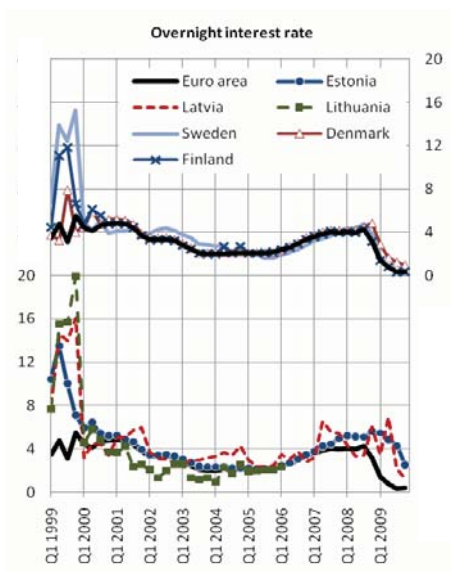
Appendix B. Changes in interest rates, GDP and money supply before and during crisis. Left vertical axis presents the changes in money supply and GDP. Money supply and GDP are indexed to their initial value at the starting point of the data. Right vertical axis presents the changes in overnight interest rates. Data covers the period from Q1 1995 to Q3 2009.
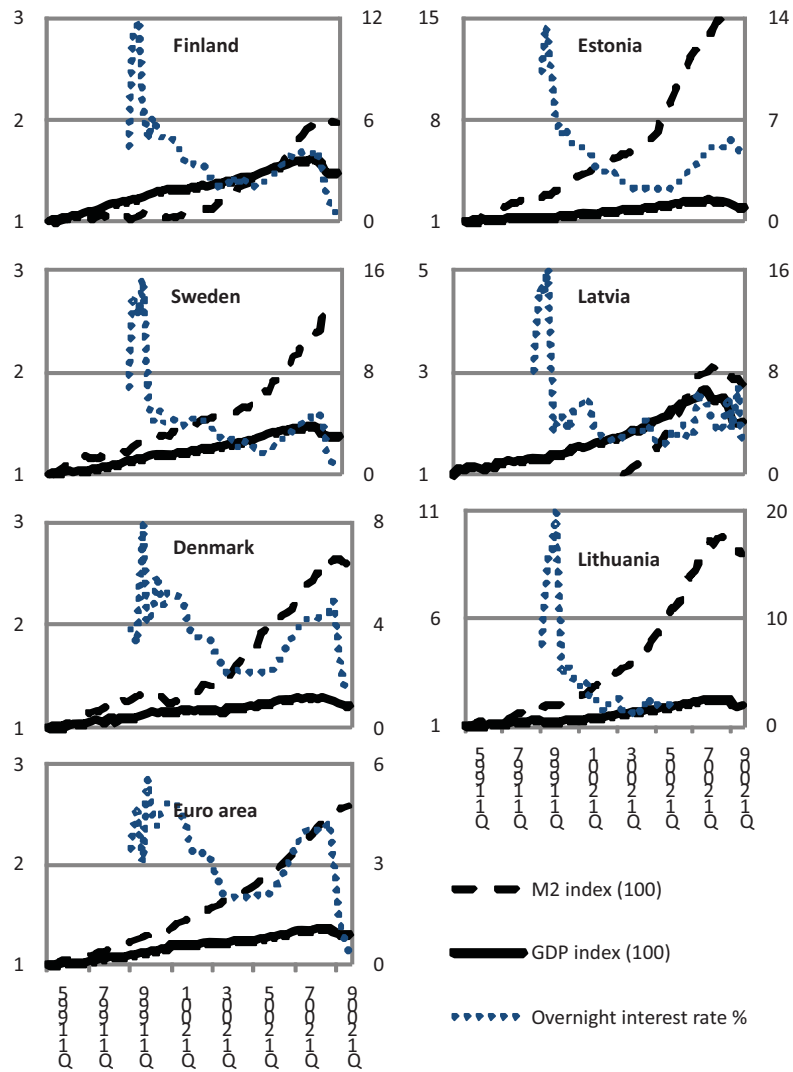
Appendix C. Direct and portfolio investments in economy and abroad. Data is presented in million USD from Q1 1996 to Q2 2009.

DIRECT INV ABROAD

PORTFOLIO INV ABROAD

DIRECT INV IN ECONOMY

PORTFOLIO INV IN ECONOMY
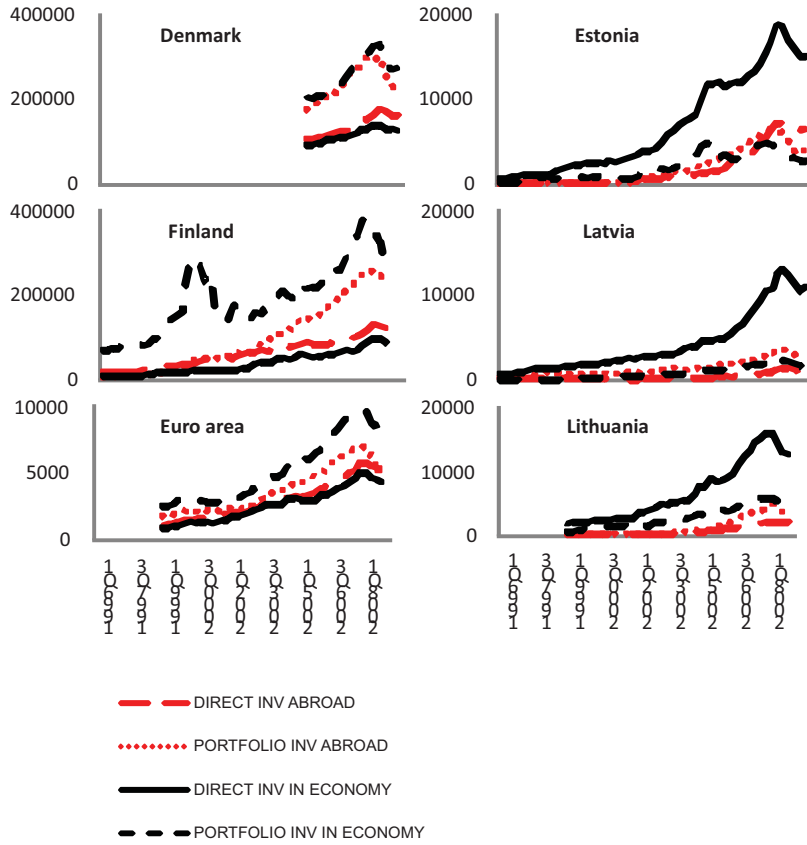
Appendix D. Exports, imports, current account and capital account.
Data is presented in million USD from Q1 1994 to Q2 2009.
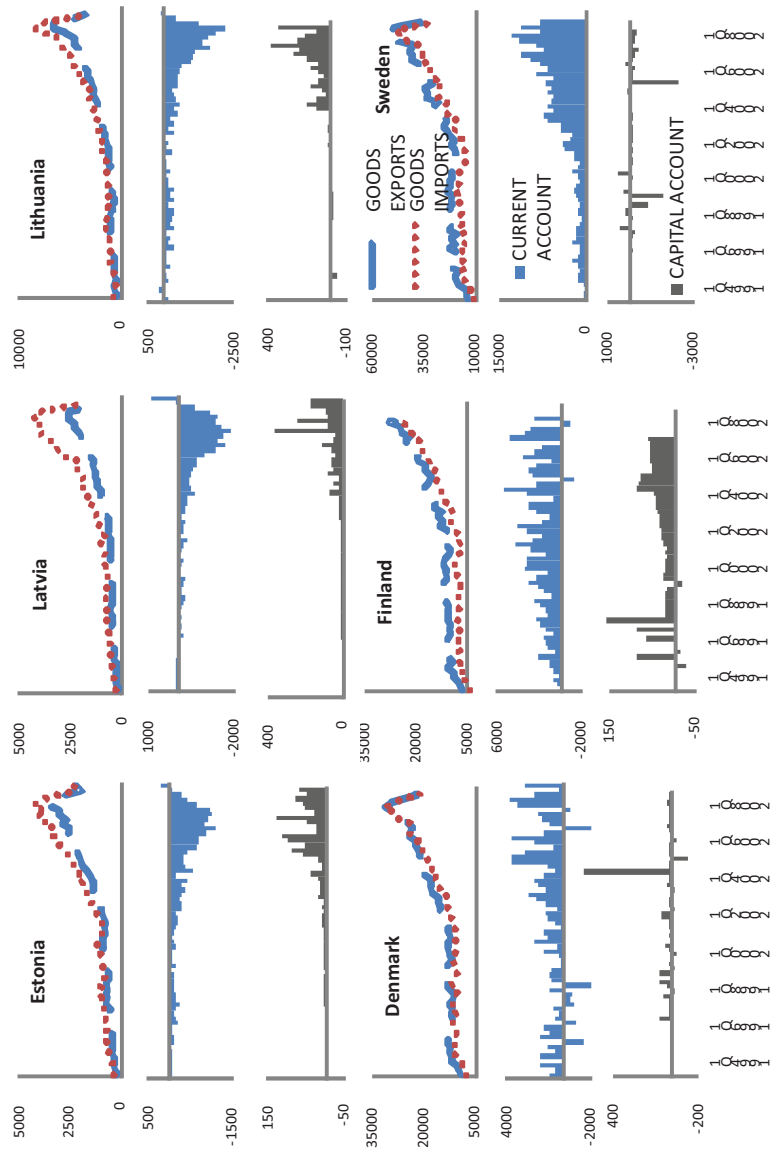
Appendix E. Asset and liability structure of depository financial institutions in Denmark, Finland and Sweden. Left pane presents the asset structure in the following order: claims on other sectors, claims on central government, claims on nonresidents. Right pane presents the liability structure in the following order: shares and other equity, other shares excl. from broad money, liabilities to central government, liabilities to nonresidents, M2 deposits, M1 deposits.

- CLAIMS ON OTHER SECTORS
- CLAIMS ON CENTRAL GOVERNMENT
- CLAIMS ON NONRESIDENTS

- SHARES AND OTHER EQUITY
- SEC.OT.TH.SHARES EXCL.F/BROAD MONEY
- LIABILITIES TO CENTRAL GOVERNMENT
- LIABILITIES TO NONRESIDENTS
- M2 Deposits
- M1 Deposits

94
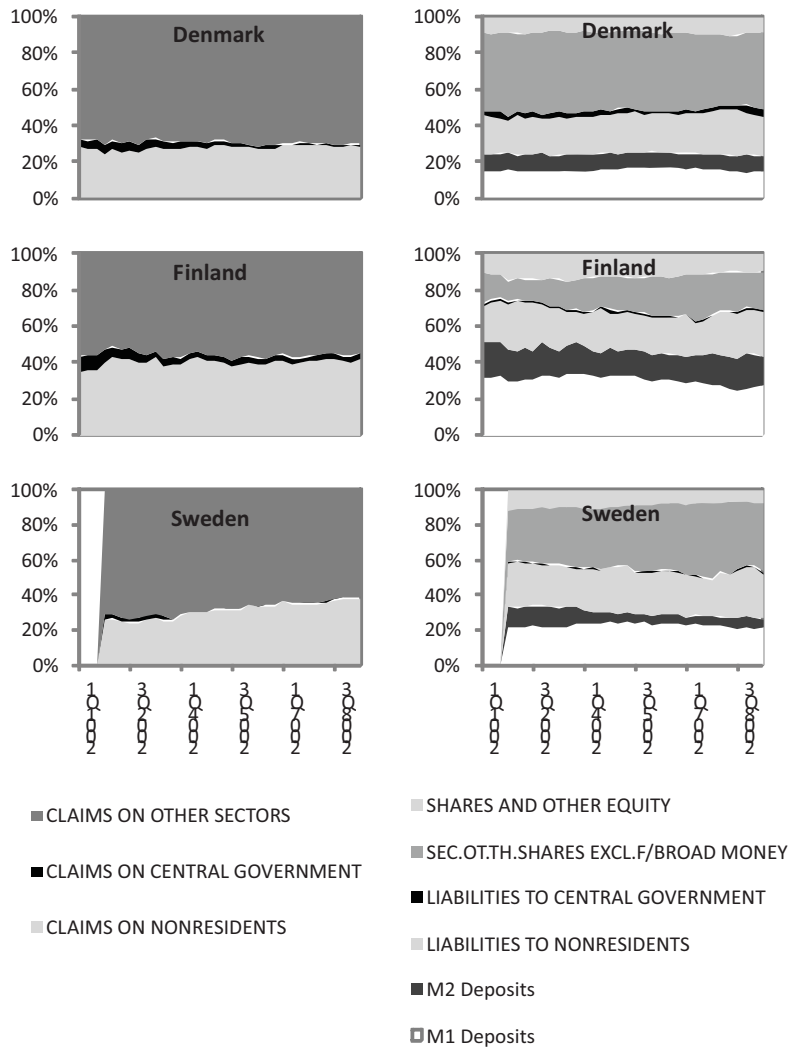
Appendix F. Asset and liability structure of depository financial institutions in Estonia, Latvia and Lithuania. Left pane presents the asset structure in the following order: claims on other sectors, claims on central government, claims on nonresidents. Right pane presents the liability structure in the following order: shares and other equity, other shares excl. from broad money, liabilities to central government, liabilities to nonresidents, M2 deposits, M1 deposits.

■ CLAIMS ON OTHER SECTORS

■ CLAIMS ON CENTRAL GOVERNMENT

■ CLAIMS ON NONRESIDENTS

■ SHARES AND OTHER EQUITY

■ SEC.OT.TH.SHARES EXCL.F/BROAD MONEY

■ LIABILITIES TO CENTRAL GOVERNMENT

■ LIABILITIES TO NONRESIDENTS

■ M2 Deposits

□ M1 Deposits
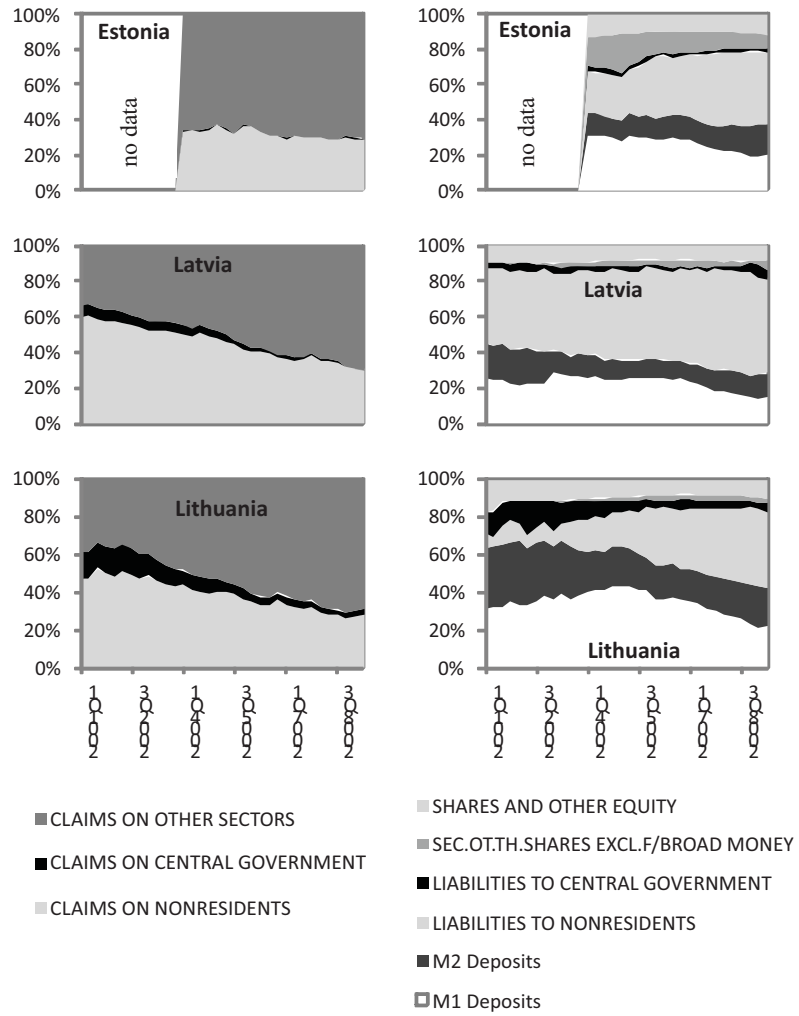
LIKVIIDSUSPROBLEEMID NING NENDE MAJANDUSPOLIITILINE KÄSITLUS VIIMASE FINANTSKRIISI AJAL BALTI JA SKANDINAAVIA REGIOONIS: EX ANTE EMPIIRILINE UURIMUS

Ivo Karilaid, Tõnn Talpsepp
Tallinna Tehnikaülikool

Käesolev artikkel on *ex ante* empiiriliseks uurimuseks, mis vaatleb likviidsusprobleemide algeid ning põhjuseid viimase finantskriisi ajal. Töös käsitletakse fiskaal- kui monetaarpoliitilisi aspekte, mis mõjutavad likviidsus-probleemi. Andmed pärinevad kahest peamisest allikast: ThomsonReuters Datastream andmebaasist ja International Monetary Fund IFS andmekandjalt. Töös kasutatakse viimaseid kättesaadavaid paneelandmeid Balti riikide (Eesti, Läti, Leedu) ning Skandinaavia piirkonna (Soome, Rootsi, Taani) kohta. Kokku hõlmab vaadeldav periood ajavahemikku 1995 kuni 2009, kuid keskendub 2007 alguse saanud finantskriisile. Võrdlusvajadustest lähtuvalt on andmed vajalikel juhtudel korrigeeritud sesoonsuse suhtes ning kasutades perioodi keskmisi valuutakursse, teisendatud eurodeks. Valimiks on valitud Balti ja Skandinaavia maad seetõttu, et see võimaldab üheaegselt uurida, kas ja kuidas kolm väikest avatud majandust (Balti riigid) on mõjutatud lähimatest välispartneritest ning kas kriisisituatsioonis on antud riikidel üldse olemas majanduspoliitilisi hoobi, millega likviidsusprobleeme lahendada või ennetada.

Antud artikli eesmärgiks on uurida kuidas rahapakkumine, situatsioon kapitali- ja rahaturgudel ning finantsinstitutsioonide varade struktuuri muutused on seotud muutustega peamistes makromajanduse näitajates. Uurimises lähtume ISLM-mudelil baseeruvast teoreetilisest lähtepunktist, kus uurime rahapakkumise poolt ehk LM-kõvera osa. Lähtuvalt teooriast võib majandussurutise tingimustes majandus langeda likviidsuslõksu ning sel ajal on LM-kõver praktiliselt horisontaalne. Situatsioonis, kus kogu majanduses olevad vahendid on täies ulatuses reaalmajanduse tehingutes kasutuses ning tegemist on majandusbuumi olukorraga, võib LM-kõver olla praktiliselt vertikaalne. Kahe äärmuse vahel peaks jääma vahepealne traditsiooniline piirkond, kus LM-kõver on positiivse tõusuga ning raha on majandustehingutes kasutusel kui deposiitarvetel pankades. Kiiresti buumiaegsest olukorrast kriisi-situatsiooni liikudes võib vahepealses LM-kõvera piirkonnas viibimine jääda väga lühikeseks, mis tähendab, et majandusel pole aega kohanduda uute oludega ning seetõttu on likviidsusvajadused selgelt suuremad, kui kriisiaegne majandus pakkuda suudaks. Teoreetiline mudel illustreerib rahapakkumise mahu ning intressimäärade olulisust majandusele.

Antud artiklis lähenetakse LM-kõveral baseeruvatele likviidsusprobleemidele mõneti kaudselt ehk kuna rahapakkumise mahte erinevatel intressitasemetel on keeruline kättesaadavate andmete puhul jälgida, vaadeldakse lisaks rahapakkumisele ja intressimäärade muutustele, muutusi ja nende kiiruseid peamiste makro-majanduslike näitajate puhul. Lisaks uuritakse rahapakkumise ning intressimäärade seoseid ning seoste tugevusi muude majandusnäitajatega (toodud tabelis 1). Kuigi põhitähelepanu on pööratud raha- ja kapitaliturgudele, siis majanduspoliitilisest

vaatenurgast ei saa kuidagi kõrvale jätta muude näitajate olulisust, sest likviidsust puudutavaid otsuseid tuleb teha omades võimalikult terviklikku pilti olukorrast majanduses.

Uuringu tulemused vastavad teoreetilistele ootustele väikese ja avatud majanduse kohta. Seoste suund ja tugevus on oodatud tasemetel. Empiirilised andmed näitavad, et muutused intressimäärades, rahapakkumises ja SKP-s on toimunud suhteliselt kiiresti ning kohandumisaeg on olnud äärmiselt lühike. Näiteks Läti üleöö intressimäärad on tõusnud mõlema viimase kriisi ajal üle 4% võrra lühema kui kuu ajaga. Kui tavasituatsioonis on nii Euro, Skandinaavia kui Balti intressimäärad liikunud suhteliselt tugevas korrelatsioonis, siis kriisisituatsioonis on toimunud selge lahknevus. Keskpankade baasintressimäärade langetamisest lähtuvalt on nii Euro kui Skandinaavia intressimäärad näidanud langustrendi, kuid kriisi algusajal liikusid Balti riikide intressimäärad hüppeliselt vastassuunas, millele on küll olukorra stabiliseerudes hakanud järgnema taas ühtlustumine Euro ja Skandinaavia regiooniga. Intressimääradega toimunu on selge illustratsioon sellele, et väikeste avatud riikide keskpangad (eriti kui tegemist on süsteemiga, kus valuutakurss on fikseeritud) ei saa kasutusele võtta ekspansiivseid monetaarpoliitika meetmeid ning seega on riigid selgelt mõjutatud väljavoolavatest välisvahenditest, mis hakkas Balti riikide puhul toimuma alates 2007 aastast.

Seosed riikide vahel vaadeldes SKP kasvunumbreid on tugevad, jäädes vahemikku 0,7 kuni 0,9. Alates 2000 aasta algusest on seosed Balti riikidel oma otseste naabritega muutunud tugevamaks (nt Eesti ja Soome vahel). Pikemat perioodi vaadeldes on seosed Balti riikide ja Skandinaavia siseselt tugevamad, kui gruppidevahelised. Üldiselt võib järeldada, et valimi siseselt on seosed tugevamad kui seos Eurotsooni keskmisega. Seetõttu saab kvalitatiivselt väita, et nii Rootsi, Eesti kui Läti finantssektori probleemid on tihedalt seotud, kusjuures probleemid ilmnesid esmalt Eestis ja Rootsis. Eesti ja Rootsi olid esimesed riigid, esiteks aktsiaturu liikumises ning sellele järgnevalt ka euros mõõdetult SKP numbrites, kus oli näha majandustõusu aeglustumise ja negatiivseks pöördumise märke. Tugev seos (vt. tabel 1 ja joonis 1) rahapakkumise, majanduskasvu ja intressimäärade vahel tähendas, et regioonis alguse saanud majandusprobleemid vähendasid likviidsust ka teistes regiooni riikides, eriti hüppeliselt tõusnud intressimääradega Balti maades.

Vaadeldes välisinvesteeringuid, eristuvad Balti riigid selgelt Skandinaaviast sissetulnud otseinvesteeringute kõrge osakaaluga võrreldes portfelli-investeeringutega. Välisraha sissevool kolmekordistus Balti riikides alates 2004 kuni 2007 aastani. Peale majandusolukorra halvenemist on investeerimispositsioonide andmetest ja selgelt pankade koondbilanssidest näha, et välisraha hakkas Balti riikidest põgenema. Antud tendents on tekitanud selgeid likviidsusprobleeme kohalikele pankadele olukorras, kus Skandinaavia päritolu emapangad suunavad tütarpankadele antud laenuraha koduriigi raskema olukorraga hakkamasaamise nimel pigem tagasi. Nimelt on nii Rootsi kui Taani olnud sunnitud tõstma koduvaluuta tagamiseks reservide taset (vt. joonis 1). Samas on raha välja-tõmbamine ning pangandussektori raskused põhjustanud nt Lätis välisreservide

ajutist kahanemist olukorras, kus üldiselt on reservid igal pool tõusnud, mis on omakorda majandusest likviidsust vähendanud.

Varasemate kriiside rahvusvaheline kogemus näitab, et omades terviklikku ülevaadet riigi võlatasemest on poliitilisest vaatenurgast äärmiselt oluline võtmaks vastu meetmeid kriisiolukorra parendamiseks. Balti riikide keskpankadel pole paraku otseseid meetmeid rahapakkumise ja intressimäärade muutmiseks. Kuid isegi tugevad avaldused võimaliku (keskvalitsuse või reservidest tuleneva) toe pakkumise kohta, võivad aidata süstida mureneva usaldusega finantssektorisse kindlust ning vähendada nii intressimäärade tõusu kui fikseeritud valuutakursi vastu suunatud spekulatsioone. Sarnased avaldused on kaalukad aga ainult juhul, kui reaalselt eksisteerib puhver, mida kriisisituatsioonis likviidsusraskuste leevendamiseks kasutada. Seega on fikseeritud valuutakursiga riikides majanduspoliitiliste hoobadega likviidsuspositsiooni parandada võimalik praktiliselt ainult juhul, kui riigi laenukoormus ja valitsuse kulutused on olnud piisavalt konservatiivsed headel aegadel. See võimaldab koguda vajaliku puhvri, mille olemasolul oleks vajadusel kriisisituatsioonis suurema tõenäosusega ja paremetel tingimustel võimalik näiteks välisraha kaasata. Tugeva korrelatsiooni tõttu suuremate naaberriikidega, on majanduspoliitilised likviidsuspositsiooni parandamise võimalused lisaks veel piiratud majanduse väiksuse tõttu, sest välismõju on tugev.

Kuna vaadeldud regiooni majandused on endiselt raskustes, siis on käesolev uuring peamiselt siiski *ex ante* vaade situatsioonile, mida saab täiendada omades juba terve majandustsükli andmestikku peale kriisisituatsiooni lahenemist.
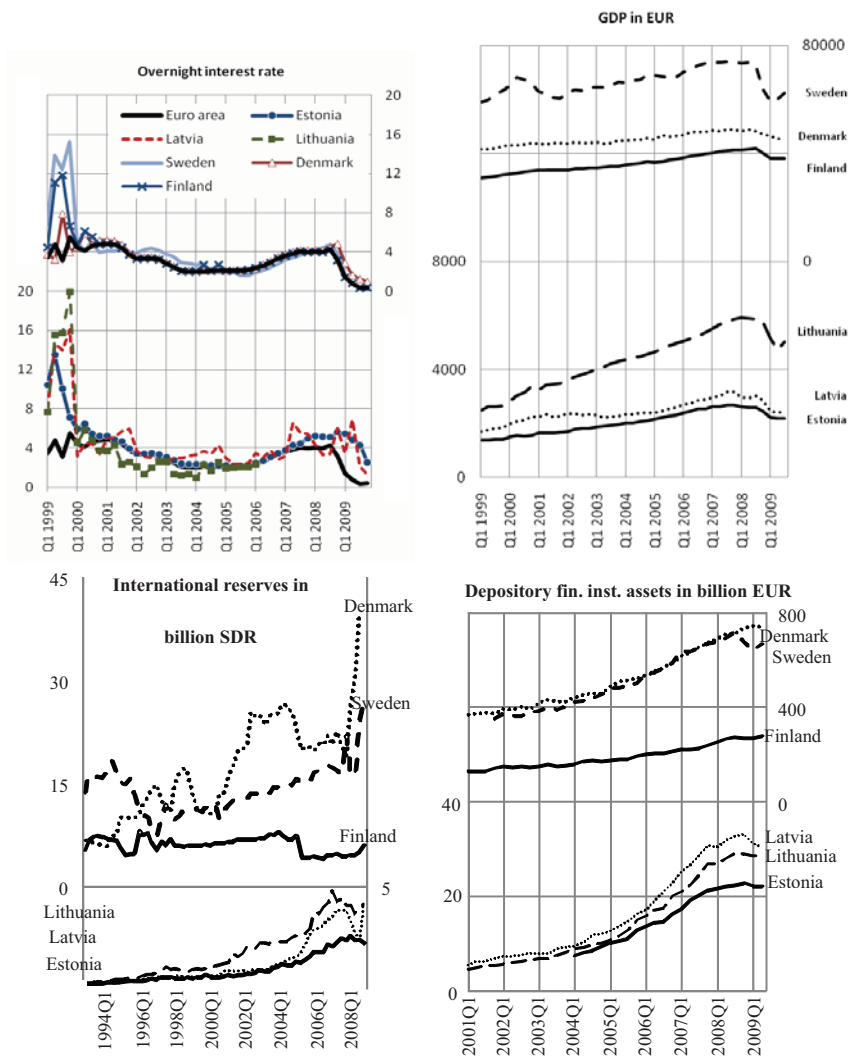
Joonis 1. Üleöö intressimäärad, SKP, reservid ja pankade varade maht. Balti riikide näitajad on kujutatud jooniste alumistel osadel ning Skandinaavia riigid ülemistel. SKP punul on tegemist kvartaalsete andmetega fikseeritud hindades miljonites eurodes.

Tabel 1. Korrelatsioonimaatriks eurotsooni, Eesti, Läti, Leedu, Soome, Rootsi ja Taani rahapakkumise (M2 või M3), keskmise üleöö intressimäära (i) ja SKP vahel perioodil 1995 (I kvartal) kuni 2009 (III kvartal)

	EUR M2	EUR SKP	SWE i	SWE M3	SWE SKP	LIT i	LIT M2	LIT SKP	DEN i	DEN M2	DEN SKP	FIN i	FIN M3	FIN SKP	LAT i	LAT M2	LAT SKP	EST i	EST M2
EUR i	-0,42	0,94																	
EUR SKP	-0,31	1,00																	
SWE i	0,61	-0,59	1,00																
SWE M3	-0,36	0,91	-0,44	1,00															
SWE SKP	-0,32	0,99	-0,55	0,91	1,00														
LIT i	0,55	-0,75	0,96	-0,61	-0,63	1,00													
LIT M2	-0,32	0,92	-0,45	0,98	0,93	-0,52	1,00												
LIT SKP	-0,31	0,96	-0,48	0,93	0,97	-0,58	0,97	1,00											
DEN i	0,75	-0,29	0,53	-0,23	-0,31	0,50	-0,25	-0,29	1,00										
DEN M2	-0,36	0,90	-0,42	0,98	0,91	-0,39	0,99	0,95	-0,25	1,00									
DEN SKP	-0,18	0,98	-0,50	0,87	0,99	-0,63	0,89	0,95	-0,21	0,87	1,00								
FIN i	0,67	-0,55	0,87	-0,45	-0,50	0,85	-0,43	-0,46	0,75	-0,42	-0,44	1,00							
FIN M3	-0,34	0,84	-0,41	0,97	0,85	-0,40	0,98	0,91	-0,23	0,99	0,80	-0,41	1,00						
FIN SKP	-0,25	0,99	-0,52	0,90	0,99	-0,66	0,92	0,97	-0,25	0,90	0,99	-0,47	0,84	1,00					
LAT i	0,42	-0,46	0,89	-0,24	-0,42	0,96	-0,28	-0,36	0,43	-0,23	-0,41	0,77	-0,22	-0,40	1,00				
LAT M2	0,50	0,96	0,34	0,93	0,90	0,64	0,99	0,99	0,71	0,97	0,79	0,44	0,94	0,91	0,47	1,00			
LAT SKP	-0,25	0,96	-0,48	0,90	0,98	-0,60	0,95	0,99	-0,26	0,92	0,96	-0,44	0,88	0,97	-0,37	0,82	1,00		
EST i	0,50	-0,48	0,78	-0,18	-0,44	0,81	-0,24	-0,37	0,57	-0,18	-0,43	0,81	-0,15	-0,41	0,78	0,92	-0,39	1,00	
EST M2	-0,31	0,92	-0,45	0,99	0,93	-0,57	1,00	0,96	-0,22	0,99	0,89	-0,43	0,97	0,92	-0,27	0,99	0,94	-0,22	1,00
EST SKP	-0,31	0,97	-0,54	0,90	0,99	-0,64	0,94	0,99	-0,32	0,92	0,97	-0,50	0,86	0,98	-0,43	0,82	0,99	-0,46	0,93