Econometric analysis and forecasting of Latvia's balance of payments

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ECONOMETRIC ANALYSIS AND FORECASTING OF LATVIA'S BALANCE OF PAYMENTS

Summary of the Promotion Paper

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Introduction

Globalization is one of the most important tendencies in nowadays world economy, but integration into international organizations and countries unions is one of the preconditions for economic development. Nowadays there is no country that can be viewed as closed and independent economic system. Therefore, it is necessary to analyse not only internal processes of the economy, but also interactions with other economic systems. In addition, the consequences in economic relations should be considered while realizing the economic policy.

The analysis of international economic links is of great importance for Latvia because of relatively small size and high degree of openness. The other reason for international economic relations to be in focus of society is Latvian integration into European Union and future accession into the Economic and Monetary Union.

The most important statistical statement that describes country's economic links with the rest of the world is balance of payments, which includes all payments during the fixed period of time between residents and non-residents for goods, services, transfers and financial assets. Latvia's balance of payments, which is summarized and published by the Bank of Latvia, includes Latvia's international trade statistics, surveys of enterprises, commercial banks' external operations' statistics and other information about international transactions.

Special attention is paid to the current account of the balance of payments, which shows country's incomes and expenditures on international flows of goods, services, income and transfers. Current account is an important indicator of country's strong and weak sides in international economy. Furthermore, the level of current account has a strong impact on gross domestic product, interest rate, exchange rate and other economic variables.

Current account deficit, covered by positive financial account, persists in Latvia for the long time. It means, that Latvia's international expenditures for real resources exceeds international incomes and this gap is financed by inflows of foreign capital. Although up to date current account deficit was not a problem for economic development and stability of the lat, economists argue that it is one of the most significant risk factors for Latvian economy.

During the last years the question of current account deficit's danger is arisen more and more often. If current account deficit is too high, than it can be a cause of financial and economic crisis. Unfortunately, it is very difficult to evaluate acceptable level of deficit, therefore a detailed analysis of current account is needed.

The main goal of the promotion paper is to forecast Latvia's current account, and using this forecast to define, whether the current account deficit is a significant risk factor for Latvian economy.

To achieve the goal of the paper, the following **targets** were introduced:

- To explore and to summarize the most important theories of current account. To adapt theoretical models to Latvian situation, if possible.

- To build up an econometric model of Latvia's current account on the basis of export and import equations, using theoretical models.

- To build up an econometric model of Latvia's current account on the basis of flows of savings and investments, using theoretical models.

- To estimate the expected impact of pension reform on Latvia's current account.

- To make the current account models' simulations for evaluating the reaction of the current account to different external and internal shocks.

- To make assumptions about exogenous variables of the models, using the forecasts of Latvian and foreign institutions.

- To make forecasts of Latvia's current account balance and its items, using developed econometric models.

- To analyse the sustainability of Latvia's current account deficit, by using acquired forecasts of the current account and the theoretical models of sustainability.

The novelties of the research are:

1. The modelling of Latvia's current account is made by using econometric methodology, on the base of all the most important theoretical concepts of current account. During the last years there were made a lot of researches about Latvia's international economic relationships, but still, multilateral and detailed econometric analysis of current account was not made.

2. Some theoretical models do not suite well for Latvian situation. Therefore, some significant modifications were made to national savings model and intertemporal solvency model, to make them closer to Latvian reality.

3. We calculated critical values of cointegration tests for small samples, that is of great importance for correct analysis of short time series.

On the basis of research results the **author maintains the following theses**:

1. Although the current account deficit is a risk factor for Latvian economy, it will not cause currency and financial crisis during the time period before Latvia's accession into the Economic and Monetary Union (EMU).

2. The econometric models well describe Latvia's current account and its components. Developed current account models are suitable for macroeconomic analysis and forecasting.

Models, developed in the paper, have **practical importance** in macroeconomic analysis and realizing economic policy:

- For the time being, econometric model of Latvia's current account is regularly used by the Monetary Policy Department of the Bank of Latvia. It is used for forecasting exports, imports and current account balance. These forecasts are important for internal needs (development and realization of monetary policy), as well as for joint projects with European Central Bank and European Commission.

- Econometric models of current account can be used in other institutions, that have a strong need for macroeconomic analysis (Ministry of Finance, Ministry of Economy etc.)

In the first part of the promotion paper we deal with the definition and structure of the balance of payments, Latvia's balance of payments statistics in the years of first republic and nowadays. Also all main theories of current account, their history and interaction are described in details. At the beginning the focus is on export and import flows, then we deal with savings and investments and finally, the concept of current

account sustainability is introduced and some theoretical models of sustainability are presented.

The second part of the paper contents the econometric models of Latvia's current account, based on export and import flows. We review Latvia's export and import dynamics and structure, and then we develop econometric models of exports and imports, using total exports and imports as well as their division by countries and groups of goods. In addition, we also make models of international flows of services, income and transfers.

Unfortunately, time series, used in econometric models of current account, are very short. Therefore, one of the main principles of this paper is simplicity of the models. All regression equations are linear in the parameters, and ordinary least square method was employed for estimation.

At the end of the second part, estimated econometric models were used for making forecasts of current account for 5 year horizon. Some simulations were made as well, to investigate sensitivity of current account to different external and internal shocks.

In the third part current account is viewed as a difference between national savings and investments. For that reason we develop econometric models of Latvia's private savings and investments. Estimated equations form alternative model of current account, which is also used for forecasts and simulations. In addition, within the framework of this part we analyse and evaluate the effect of pension reform on savings and current account deficit.

The last part summarizes and analyses all current account forecasts obtained in previous parts. The goal of this analysis is to check, whether current account deficit is a significant risk factor for Latvian economy. In other words, we analyse, whether the current account deficit is sustainable. This is done within the framework of theoretical models of sustainability as well as using macroeconomic analysis.

In the paper we use statistical data from the Bank of Latvia, Central Statistical Bureau of Latvia and foreign statistical bureaus. Bibliography contains Latvian sources, dealing with practical analysis of Latvian current account, foreign theoretical papers and some empirical researches about balance of payments in the Baltic and other developing countries.

1. Short Review of Current Account Theories

Balance of Payments Definition

Balance of payments is a statistical document that keeps records of all payments for goods, services, transfers and financial assets between residents and non-residents during some period of time. Balance of payments shows the balance between all real and money flows across country borders.

Usually, balance of payments is divided into two components:

- Current account – shows international flows of goods, services, income and transfers.

- Capital and financial account that displays international capital transfers, foreign direct investments, portfolio investments and other investments.

Current account is a part, to which economists pay the most attention, as current account indicates what are country's incomes from international flows of goods, services, income and transfers, and what are country's expenditures on these items. Current account is divided into 4 sections: goods, services, income and transfers.

Latvia's Balance of Payments from 1996 till 2003

After regaining its independence in 1990, Latvia needed a statistical document that would account for all real and financial international operations. Therefore, Latvia's balance of payments has been published since 1992. However, Latvia's balance of payments from 1992 till 1995 is not very reliable because of significant lack of statistical information, that is why data from these years is not used in the paper.

Figure 1.1 shows Latvia's balance of payments for the last 8 years is. We can see, that during the sample period there exists a strong current account deficit, covered by surplus of capital and financial account. It means, that Latvia's international expenditures on real resources (goods, services, labour force etc.) exceed international incomes and this difference is financed by inflows of foreign capital
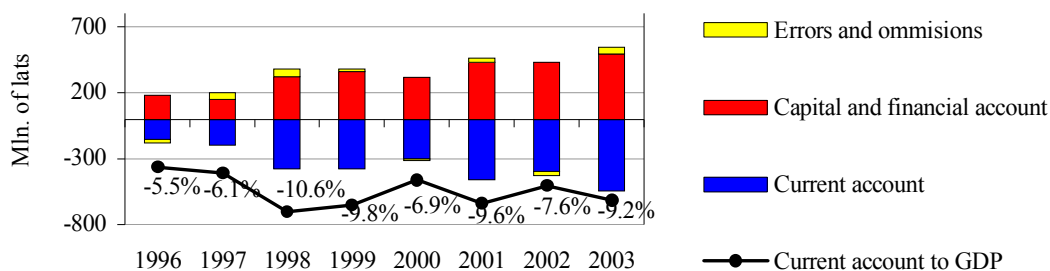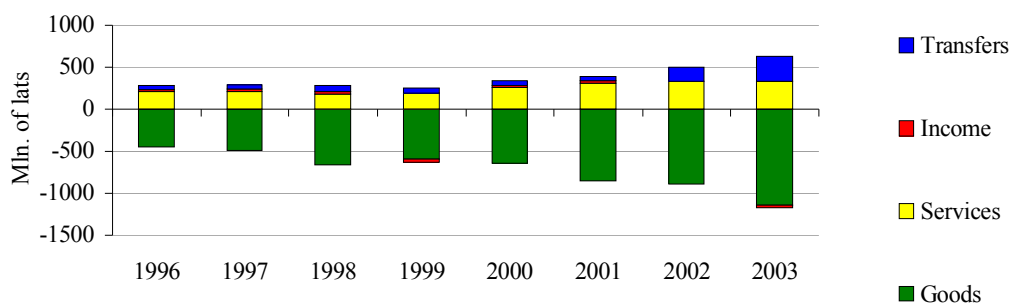

Figure 1.1. Latvia's Balance of Payments (from 1996 till 2003)
Source: Latvijas maksājumu balance, (2000-2003). – Rīga: Latvijas Banka, 2000-2004.

The figures for current account to GPD have contradictious tendencies. In the period between 1996 and 1998 current account deficit increased sharply and in 1998 (the year of the Russian crisis) the level of deficit was 10.6% of GDP – the highest level in Latvian history. After that, deficit declined for two years and in 2000 it was only 6.9%. In the next years situation worsened again (that was mainly determined by

stagnation of the world economy) and the level of deficit was only slightly lower than 10% – in 2003 current account deficit was 9.2%, in other words, international expenditures of Latvian residents exceeded international incomes for 9.2% to GDP.

At the same time, Latvia enjoyed positive capital and financial account (see Figure 1.1). Inflow of foreign financial capital into Latvia is higher than outflows of Latvian capital abroad and this net inflow covers the difference between Latvia's international expenditures and incomes.

Figure 1.2. Current Account of Latvia's Balance of Payments (from 1996 till 2003)

Source: Latvijas maksājumu balance, (2000-2003). – Rīga: Latvijas Banka, 2000-2004.

Figure 1.2 shows the structure of the current account. It can be clearly seen, that negative balance of goods is the main reason of current account deficit. Latvian imports of goods (international expenditures) are much higher than exports of goods (international income) and although other components of current account are positive, it cannot compensate negative balance of goods.

The Importance of Current Account in the Balance of Payments Analysis

Regardless of the fact, that there are two main components in the balance of payments (current account and capital and financial account), in this paper we will mainly deal with Latvia's current account. There are several reasons for that:

- Current account is more important indicator, that is in focus of economists, politicians and mass media. It is especially true for Latvia because of high level of current account deficit.

- Current account is much better described theoretically in economic literature.

- Current account can be modelled with more success. Latvia's financial account is dominated by foreign direct investments and long-term loans, which are dependent on such non-quantified factors like investment environment, administrative impediments, quality of labour force etc. In addition, the level of direct investments and long-term loans usually is strongly influenced by one big investment project that make correct econometric analysis very difficult.

In further analysis we will not ignore financial account at all. Data from financial account (mainly data on foreign direct investments) will be used as exogenous factors for current account variables. Combining the data on direct investment inflows with econometric models of current account we will get ambient view of Latvia's current account.

The Most Important Current Account Theories

Now, we will shortly introduce the development of current account theories. It can be shown, that economists' view on current account changed many times and many of these changes happened after economic crises in developed and developing countries occurred.

Flows of Exports and Imports

After the World War II discussions about the current account were focused on real flows, mainly exports and imports. Although it was known, that current account can be stated as a difference between national savings and investments, that time economists stressed on the dependence of exports and imports on income, relative prices and exchange rate.

Accent on trade balance, exchange rate and elasticities also influenced political discussions in developing countries. Until mid 70s political discussions were focused on question: whether devaluation of national currency will improve country's competitiveness, trade balance and current account. The dominant point of view was "elasticity pessimism" – view that elasticity of exports and imports is too low for improving current account after devaluation.

In the 2nd part of the paper some econometric models of Latvia's exports and imports are developed. These models are used for analysing and forecasting Latvia's current account.

Savings and Investments

After mid 70s economic theories moved away from analysing exports and imports and concentrated on the research of savings and investments. Theories were based on two simple facts. Firstly, it is well known from the national accounts that current account balance is equal to national savings (sum of private savings and governments budget balance) minus investments. Secondly, as savings and investments depend on intertemporal factors (life cycle decisions, profitability of investment projects), current account is also an intertemporal phenomenon. In this type of models smoothing of private consumption is one of the fundamental factors for current account. If country is increasing investments, the only way not to reduce current consumption is to worsen current account balance.

According to the new current account theory, any changes in economy that enlarge investments, definitely worsen current account balance. Nevertheless, worsening of current account should not provoke government on actions to improve current account.

The increase of current account deficit, that happened because of private sector behaviour (increase of investments or decrease of savings) is not a reason for anxiety. One more theoretical statement was the following: big current account deficit in not a reason for concern if fiscal account (budget) is balanced.

This conception of current account was very popular until 1982, when financial crisis in Chile happened. Before the crisis the current account deficit in Chile amounted to 14% of GDP and was determined by investment projects in private sector. In the following periods the popularity of this type of theory was subject to conditions in the world economy: it was unpopular in crisis or after-crisis periods, but widely used in more favourable periods

Latvia's national savings and investments are modelled in the 3rd part of the paper, that enable us to create alternative econometric model of current account and to make forecasts based on fundamental variables.

Sustainability of Current Account

After the financial crisis in Chile in 1982 some economists refused the concept, that current account deficit is not a reason to worry. They argued that big current account deficit usually is a sign of crisis, even when savings are high and increase. Current account deficit is a primary indicator of crisis.

According to the theory of sustainability it is not important, whether the deficit of current account is high, but it is important, whether current account deficit is sustainable. If deficit is not sustainable or it can be foreseen that it will be not sustainable in future, than devaluation will happens early or later.

In practice, it is very difficult to evaluate the sustainable level of deficit. The widely spread view, supported also by International Monetary Fund (IMF), was that deficit, which level exceeds 5% of GDP is unsustainable, especially if it is financed by short-term financial inflows.

Nevertheless, the most part of the economists acknowledge, that sustainable level of current account depends on many factors and it is unique for each country. Unfortunately, there is no consensus among the economists how to determine this sustainable level, so calculation methods are very different. Some economists regard that deficit is sustainable when country's external debt ratio to GDP is not growing. Other argue, that sustainable level of current account deficit depends on international net demand on country's assets.

The sustainability of Latvia's current account is checked in the 4th part of the paper, using forecasts from theoretical models of sustainability and econometric models.

2. Models of Exports and Imports

Now we will look at Latvia's balance of payments by analysing export and import flows. In this paper several econometric models of exports and imports are developed, the models analyse either total exports and imports and their division into countries groups and products categories. Finally, estimated models are used for forecasting Latvia's current account for 5 years ahead.

For careful analysis it is not enough to use only data on total exports and imports. Latvia's exports and imports are not homogenous – they content various groups, each of which can behave differently during the sample period. Therefore, in this paper Latvia's exports are divided into following groups:

- Latvia's exports to Economic and Monetary Union (EMU).
- Exports to other EU countries (EU-25).
- Exports to other countries.

Latvia's imports are divided into following groups:

- Imports of capital goods. Intertemporal goods, that form fixed assets and are not consumed.
- Imports of intermediate and consumption goods. Goods, that are used in manufacturing process or consumed.

- Imports of mineral products: fuel, other oil products, electricity and gas.

Moreover, to make the research of exports and imports more correct and deeper it is necessary to divide nominal flows into two parts: real exports/imports and export/import prices. The first component represents volume of exports or imports, but the second one – their value.

Modelling Methodology

All models were estimated for the period from 1996 till 2003, using quarterly data. To avoid seasonality in data all variables were seasonally adjusted by X-12-ARIMA. All regression equations are linear in parameters, but estimation was made using ordinary least squares (OLS). Stationarity of variables was checked by Augmented Dickey-Fuller test (ADF). Persistence of cointegration was checked by Engle-Granger and CRDW tests, using critical values calculated with Monte-Carlo procedure. In addition, equation errors were checked on normality, persistence of autocorrelation and heteroscedasticity.

Models of Latvia's Export and Import Prices

Models of Latvia's export and import prices are developed in the paper. They are integral part of current account model as they explain dynamics of export and import prices and therefore dynamics of total exports and imports. The models give some help in understanding which factors and how much influence Latvia's export and imports prices.

Latvia is a small and open economy and, accordingly to economic theory, it cannot influence world prices. That is why Latvia is so called "price taker" in the world markets – Latvia's export and import prices adjust to changes in world prices. It is obvious, that export and import prices are determined by two exogenous variables:

- Price level in partner countries.
- Exchange rate (as Latvia's export and import prices are expressed in lats). Nominal effective exchange rate of lat is mainly used in the models.
- In addition to abovementioned factors hyperbolic time trend was used (1/t, t=0 at 1st quarter of 1995), which turns to zero out of sample. Use of this type of trend is helpful, if endogenous variable systematically differs from the equilibrium level at the beginning of sample period.

Models of export and import prices are in logs (as well as the most part of other models in the paper), that allows to interpret regression coefficients as elasticities.

Models of Export Prices

In the model of total export prices (see Equation (2.1)) export prices (*px_total*) depend on exchange rate of lat to euro (*eur*), nominal effective exchange rate of lat to currencies of other countries (*neer_oth*), PPI in EU-15 (*ppi_int_eu*), CPI in other countries (*cpi_oth*) and hyperbolic time trend.

$$Ln(px\_total) = 0.341 + 0.557*Ln(eur) + 0.054*Ln(neer\_oth) + 0.763*Ln(ppi\_int\_eu) + \quad (2.1)$$

(t-value)	(12.714) (14.070)	(2.419)	(3.580)
(p-value)	(0.000) (0.000)	(0.023)	(0.001)

$$+ 0.093*Ln(cpi\_oth) - 0.416*(1/t);$$

(t-value)	(2.349)	(-3.572)
(p-value)	(0.027)	(0.001)

$R^2=0.946$ $DW=1.980$ $n=32$

Source: Author's calculations, sample period: from 1996 till 2003

Econometric models of Latvia's export prices for each group of countries are developed in similar way.

The results of the models show that export price indices are positively and significantly dependent on external prices and the exchange rate. Some specific features should be stressed, however:

- Elasticity on nominal exchange rate of lat is positive, but still it is lower than unity for all export price indexes (0.557 and 0.054 for total export prices). That means changes in nominal exchange rate does not transmit into changes in export prices fully. This low elasticity of export prices can be explained by the fact, that not all payments for exports are in euro, but some part is in US dollars. Remembering, that dynamics of euro and dollar exchange rates to lat are contrary, it is clear that elasticity of export prices on the nominal exchange rate of lat was reduced.

- In the case of the small and open economy export prices should change in similar way as world prices (in the case of stable exchange rates). But elasticities of export prices to world prices is lower than unity (0.763 and 0.093 for total export prices). Explanation of this phenomena can be related with different structure of Latvia's export and price indices, which characterize world prices.

Using the results of the models it is possible to argue that Latvia's export prices are heavily determined by external factors: world prices and nominal exchange rate. This is so because of a small size and high degree of openness of Latvian economy, so local producers cannot influence export prices significantly.

Models of import prices

In the model of total import prices (see Equation (2.2)) import prices (*pm_total*) are dependent on nominal effective exchange rate of lat (*neer_m*), production prices of capital products in EU-15 countries (*ppi_cap_eu*) and Brent oil prices, expressed in lats (*oil*usd*).

$$Ln(pm\_total) = -0.121 + 0.459*Ln(neer\_m) + 1.479*Ln(ppi\_cap\_eu) + 0.041*Ln(oil*usd); \quad (2.2)$$

(t-value)	(-2.864) (8.985)	(17.133)	(2.610)
(p-value)	(0.010) (0.000)	(0.000)	(0.017)

$R^2=0.976$ $DW=1.362$ $n=24$

Source: Author's calculations, sample period: from 1998 till 2003

Econometric models of Latvia's import prices for each category of goods are developed in similar way.

According to the econometrical models of import prices, the following variables explain well Latvia's import prices:

- Import prices are statistically significantly and positively influenced by nominal exchange rate of lat, but elasticity is lower than unity (0.459 for total import prices). Low elasticity is explained by the fact, that not all payments for imports from EU countries are made in euros, but some of them are in US dollars.

- Import prices are positively related to producer prices in EU countries. According to the models' results, elasticities to external prices significantly exceed unity (1.479 for total import prices), that means Latvia's import prices are growing much faster than producer prices in Europe. One of the possible explanations is connected with structural difference between Latvia's imports of goods and production in the EU. The other explanation is the following: there were qualitative change in imports during the sample period – Latvian enterprises began to import more qualitative and therefore expensive goods.

So, Latvian import prices are well explained by external factors. This is also determined by the small size and high degree of openness of Latvia, therefore internal demand cannot influence world and import price level.

Models of Real Exports and Imports

Now, knowing export and import prices it is possible to calculate Latvia's real exports and imports, which show real changes in exports and imports, and develop their econometric models. Models or real exports and imports are needed for analysis and forecasting of exports, imports and though – current account.

Models of real exports

In our models Latvian real exports depend on two exogenous variables:

- Real exchange rate of lat. Real exchange rate shows relative changes between internal and external prices. Changes in real exchange rate indicate changes in Latvia's firms competitiveness. If real exchange rate is increasing, it means that Latvian goods become relatively more expensive and real exports are declining.

- Second factor, that, without doubts, is important for real exports is external demand. In our models external demand is expressed as real GDP of importing country (more precisely, as a weighted average of real GDP; weights are determined by Latvia's export structure). According to theoretical models, expected effect of external demand on Latvia's exports is positive.

Results of total exports model (see Equation (2.3)) show, that Latvia's real exports (*xr_total*) is positively and significantly influenced by world demand or weighted average of foreign GDP (*y_r*_world*) with elasticity of 1.792: weighted foreign GDP growth by 1% will cause 1.8% increase of Latvia's total real exports. Real exports is significantly and negatively dependent on real effective exchange rate of lat (*reer*). Elasticity of real exports on real exchange rate is -0.716, therefore, 1% increase of real exchange rate will worsen competitiveness of Latvian enterprises on external markets (as internal prices will relatively increase) and real exports will decline by 0.7%. Like in export price models we used hyperbolic time trend (*1/t*) as an

exogenous variable. Regression coefficient before this trend is negative and significant, indicating that at the beginning of the sample period real export level was lower than it could be expected from macroeconomic variables (it was defined by transformation processes in economics and time needed for entry into new markets). After some time real exports increase to its equilibrium level.

$$Ln(xr\_total) = 12.650 + 1.792*Ln(y\_r*\_world) - 0.716*Ln(reer) - 2.465*(1/t); \quad (2.3)$$

(t-value)   *(783.6)* *(10.335)*   *(-4.540)* *(-7.642)*
(p-value)   *(0.000)*   *(0.000)*   *(0.000)*   *(0.000)*
R^2=0.961   *DW=1.408*   *n=32*

Source: Author's calculations, sample period: from 1996 till 2003

Econometric models of Latvia's real exports for each group of countries are also developed in the paper.

Summarizing all results of the models it can be concluded that Latvia's real exports is well determined by external demand and real exchange rate of lat. Signs of regression coefficients are in accordance with theoretically expected, but values of coefficients vary across groups (that can be explained by difference in export structure).

Another important conclusion is that real exports have a much stronger reaction on changes in external demand than on changes in real exchange rate. Therefore, devaluation of lat will not be an effective way to stimulate exports. Firstly, according to the models' results, direct effect will not be high. Secondly, changes of nominal exchange rate of lat will decrease confidence of investors and local producers, worsen investment environment and can cause capital outflows, that will negatively affect export potential, decrease competitiveness in external markets and neutralize initial positive effect of devaluation.

Models of Real Imports

Latvia's real imports are modelled on the following independent variables:

- Latvian domestic demand. Taking into account, that different components of internal demand can have different impact on real imports, total domestic demand was divided into three parts: real private and government consumption, real investments, real exports of goods and services. Obviously, that the effect of domestic demand on real imports is positive.

- Real exchange rate of lat. It indicates the relative changes of internal and foreign price levels. If real exchange rate is increasing, goods produced in Latvia become relatively more expensive and real imports should grow.

In contradiction with other models, models of Latvia's real imports are developed both in levels and in logs:

- Modelling in logs is of great use while interpreting regression coefficient before real exchange rate of lat (it can be interpreted as elasticity).

- Modelling in levels give possibility to interpret regression coefficients before domestic demand as marginal propensities to import. Marginal propensity to import shows, what part of domestic demand's increase will goes to imports.

The results of the model of total real imports in levels (see Equation (2.4)) show, that total real imports (*mr_total*) is statistically significantly and positively determined by real consumption (*cg*), real investment (*i*) and real export (*x*).

Results of the models demonstrate that exports has the highest marginal propensity to import (0.580) because there is a high need for imported goods for producing most important Latvia's export goods. Marginal propensity to import of investments is also high (0.518), as Latvia is not producing a lot of capital goods. Consumption has the lowest level of marginal propensity to import (0.153).

mr_total = -198513.0 + 0.153*cg + 0.518*i + 0.580*x + 103772.0*reer ; (2.4)
(t-value)   (-2.987)   (1.740)   (6.261)   (5.089)   (2.543)
(p-value)   (0.006)   (0.093)   (0.000)   (0.000)   (0.017)
R^2=0.985   DW=1.649   n=32

Source: Author's calculations, sample period: from 1996 till 2003

The elasticity of real imports on real exchange rate (*reer*) is positive (see Equation (2.5)), although its level is relatively low (0.178).

Ln(mr_total) = -2.695 + 0.289*Ln(cg) + 0.314*Ln(i) + 0.601*Ln(x) + 0.178*Ln(reer);   (2.5)
(t-value)   (-1.648) (1.591)   (6.426)   (4.380)   (1.639)
(p-value)   (0.111) (0.123)   (0.000)   (0.000)   (0.113)
R^2=0.979   DW=1.952   n=32

Source: Author's calculations, sample period: from 1996 till 2003

Econometric models of Latvia's real imports for each category of goods are also developed in the paper.

Overall, Latvia's real imports are very inelastic to changes in real exchange rate (0.18, from model of total real imports), because high degree of openness and specialization of Latvian economy. Import elasticities on real exchange rate differs across product groups. Elasticity of imports of mineral products is insignificant as Latvia is not producing mineral products. Elasticity of capital goods' imports is also low (0.20) that is the result of high demand for investments. The highest real exchange rate elasticity is for imports of intermediate and consumption goods (0.62), although this level is still relatively low.

The results of the models explain high growth rates of imports by rapid development of Latvian economy (especially growth of exports and investments). Obvious, that under such a high propensities to import, high growth of imports will continue until Latvian economy will develop rapidly.

Small size and high level of specialization of Latvian economy does not allow to replace imports with local production. Therefore import price elasticity is very low. It means, that devaluation of lat will not cause significant decrease of real imports, but nominal imports will increase (because of price increase). Remembering low export price elasticities it is possible to argue that Marshal-Lerner condition does not hold for Latvia and devaluation will worsen trade balance and current account.

Forecasts of Export and Import Flows

Summarizing estimated models of exports and imports and adding models of services, income and transfers (which are also estimated in the 2nd part of the paper) it is possible to construct an econometric model of Latvia's current account. Model of current account can forecast not only total level of current account but also its components: international flows of goods, services, income and transfers. Figure 2.1 shows principal scheme of the model.
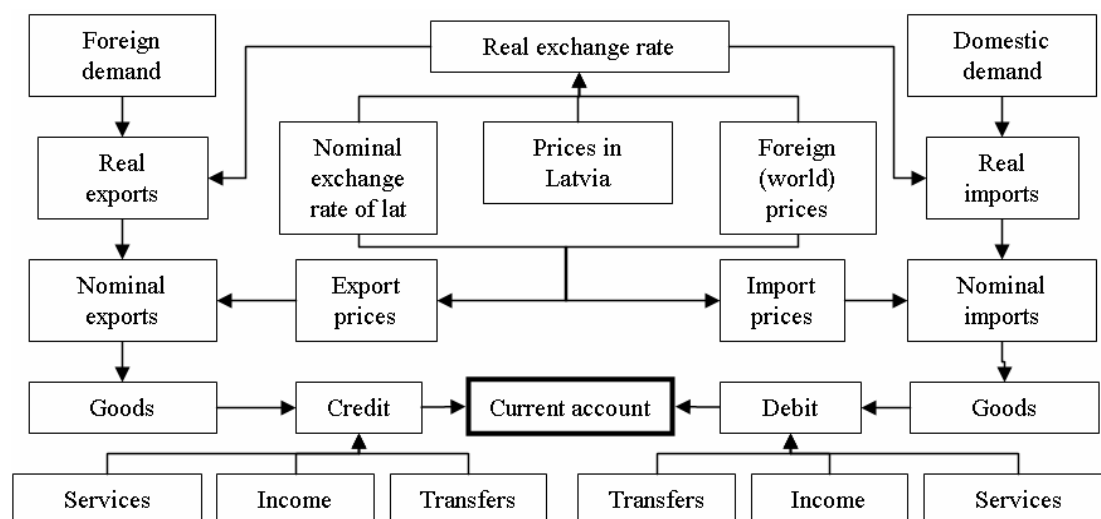
Figure 2.1. The Scheme of Latvia's Current Account Models

Source: Author's model of current account

The current account balance is modelled as a difference between credit and debit items. Credit and debit items are divided into four parts (goods, services, income and transfers) and each of them is modelled separately. Credit (exports) and debit (imports) of goods are modelled in details. Nominal flows of goods are divided into real flows (real exports and imports) and prices (prices of exports and imports). Real flow of goods are modelled from real exogenous variables: real exchange rate of lat, real external demand (for exports) and real domestic demand (for imports). Prices of exports and imports are determined by nominal exchange rate of lat and foreign prices.

In the paper we are modelling real exports and imports, as well as prices of exports and imports by different methods: using aggregated and disaggregated exports and imports of goods, and modelling real imports in logs as well as in levels. Therefore we created two models of current account. The first one is based on total exports and imports equations (further – 1st model of current account), but the second one – based on disaggregated exports and imports equations (further – 2nd model of current account). Choosing between models of real imports in logs and in levels we preferred the first one, because of better statistical properties.

The forecasts of Latvia's current account were made for the period from 2004 till 2008. The current account was forecasted only until 2008 because it is expected that in 2008 Latvia will joint Economic and Monetary Union and lat will be replaced by euro. Therefore, after 2008 Latvia's current account deficit will not be a risk factor for currency stability and economy.

Assumptions about internal and external exogenous variables were made using Ministry of Finance (for Latvian GDP growth), European Commission (for foreign GDP growth and prices) and Energy Information Agency (for oil prices) forecasts. Assumptions about exchange rates and interest rates were made by extrapolating latest values. Forecasts about external assets and liabilities of banking system, as well as foreign direct investments, were made by extrapolating current trends. It was assumed that growth of external assets and liabilities of banking system will be 25% per year, but growth of foreign direct investments will be 5% per year.

The forecasts of current account balance are shown at Figure 2.2. It is clearly seen, that two models give two different forecasts:

- First model (with aggregated exports and imports) foresee that current account deficit will stay stable (~8% to GDP) during the forecasting period.

- Second model (with disaggregated export and import flows) forecast significant improvement of current account – deficit will decrease until ~2% to GDP in 2008.
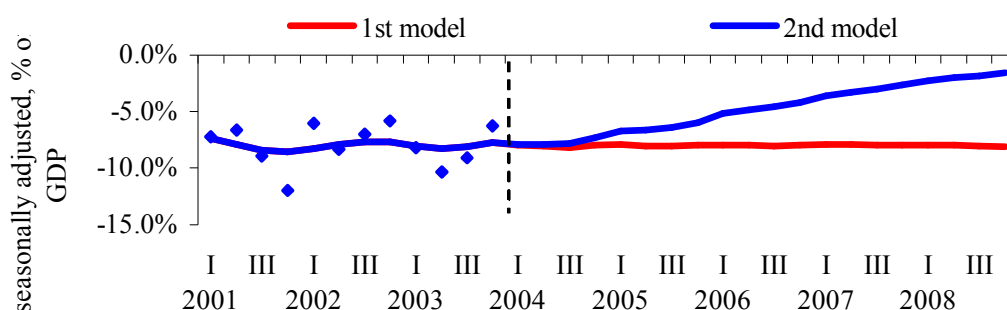
Figure 2.2. Latvia's Current Account Forecasts (form 2004 till 2008)

Source: Forecasts of author's model of current account

The most important difference in forecasts is in real flows of goods. Real imports growth is higher than real exports growth in aggregated model, that negatively affects trade balance and it cannot be compensated by improvement in balance of services and income. In its turn, real exports growth is higher than imports growth in disaggregated model, that determine expected gradual decrease of current account deficit.

Finally, speaking about forecasts of current account and its components, it should be mentioned that estimated econometric models cannot describe and foresee the effects connected with Latvia's joining the European Union, lat's re-pegging to euro or introduction of euro.

Without any doubts, Latvia's integration into Europe will have significant effects on current account:

- All custom taxes are abolished after Latvia's accession to European Union, that will stimulate trade with EU countries.

- Lat's re-pegging to euro diminishes currency risks for those enterprises, which make payments in euro.

- Introduction of euro will abolish currency risk and diminish costs of currency exchange, that will made trade operations with EMU countries even cheaper.

Unfortunately, all these effects cannot be described by econometric models, because Latvian economy had no experience of such events. Therefore all abovementioned effects (as well as other effects connected with EU entrance, such as psychological effects) are not taken into account. The effects of integration can be evaluated only *post factum* by re-estimating the model after some time, approximately in 2006-2007.

3. Models of National Savings and Investments

Current account can be viewed not only as a difference between export and import flows, but also as a difference between national savings and investments. In this part we estimate econometric models of private savings and investments. Joining these two models we will get alternative econometric model of current account and alternative forecasts.

Savings Model

According to the theory, developed in the 1st part of the paper, private savings ratio to GDP should be modelled on the following exogenous variables:

- Long-term deposit real interest rate, which is calculated as a difference between nominal interest rate and changes of consumer prices – denotes profitability of savings.

- Real productivity of labour – calculated as real GDP per one employed person. Expected impact on savings – negative.

- Unemployment rate – indicates changes in employment in the middle term perspective. Expected influence – positive as higher unemployment means lower expected labour income in the future periods (wage rate and possibility of working is decreasing). Therefore inhabitants should increase their savings to smooth intertemporal consumption.

- Income level – it is indicated by reciprocal of GDP. Regression coefficient before this variable will represent autonomous savings.

In the process of modelling it turned out that private savings (s_pr/y_n_lv) are not significantly affected by interest rate and productivity of labour. To increase the degree of freedom of the model, only two exogenous factors with statistically significant influence were retained: unemployment (u) and income level ($1/y\_n\_lv$). Results are represented in Equation (3.1).

$$(s\_pr/y\_n\_lv) = 0.156 - 163006.4*(1/y\_n\_lv) + 1.621*u ; \qquad (3.1)$$
(t-value)   *(3.430)*   *(-9.563)*   *(3.673)*
(p-value)   *(0.002)*   *(0.000)*   *(0.001)*
R^2=0.811   ***DW=1.877***   ***n=32***

Source: Author's calculations, sample period: from 1996 till 2003

Conclusions from the private savings model are the following:

- Private propensity to save is 0.156 (under full employment). If nominal GDP is increasing by 1 lat (but other factors stay unchanged), private savings increase by aproximately 16 santims.

- Increase of income level will enlarge private savings ratio to GDP, but autonomous savings (savings when income is zero) are 163 mln. of lats.

- Savings are positively influenced by unemployment rate (when other factors stay unchanged).

Investments Model

If we want to forecast Latvia's current account we need to develop econometric model of investments too. Theoretical part of the paper described Tobin's q model, which shows that investments should be positively affected by income and negatively – by real interest rate. In contradiction to Tobin's q theory in our model endogenous variable will be investments ratio to GDP (not the level of investments). In addition, amount of foreign direct investments was subtracted from total investments.

So, the dependent variable of the following model are investments (to GDP) that are not financed by foreign direct investments (*i_nom/y_n_lv*). Exogenous variables are the following:

- Long-term credit real lat interest rate (*i_kred*). Theory assumes, that it should negatively affect investments ratio to GDP.

- Income level – calculated as reciprocal of GDP (*1/y_n_lv*). We use reciprocal level (similar to savings model) because endogenous variable is investments ratio to GDP.

- Time trend (*t*). Latvian economy should have a high propensity to invest, that is explained by transition process and need for capital renovation. However, this process cannot go indefinitely, and it can be expected that propensity to invest will fall while the level of development and capital stock will grow.

The last hypothesis is also proven by the fact, that "old" European Union countries (EU-15) with higher development level have lower investments ratio to GDP. Therefore, we can expect that trend will negatively influence investments level – investments ratio to GDP will decrease over time.

The effect of real interest rate turned out to be statistically insignificant during the sample period and this factor was not included in the final model (see Equation (3.2)), that increased the degree of freedom of the equation.

(i_nom/y_n_lv) = 0.782 – 528246.0*(1/y_n_lv) – 0.007*t ;   (3.2)
(t-value)   (4.224) (-3.644)   (-2.002)
(p-value)   (0.000)   (0.001)   (0.055)
R²=0.759   DW=2.476   n=32

Source: Author's calculations, sample period: from 1996 till 2003

Results of the equation show that propensity to invest in Latvian economy is extremely high and at the beginning of the sample period it was equal to 0.782 (represented by constant term), although it deceased by 0.007 each quarter (represented by negative coefficient before time trend). Regression coefficient before reciprocal of GDP is negative and significant: growth of income increases investments ratio to GDP (regression coefficient represents that autonomous investments are equal to 528.2 mln. of lats).

Now, joining investment model with private savings model we can create an alternative econometric model of Latvia's current account (further – 3rd model of current account).

Forecasts of Savings and Investments

Forecasts period of the current account is from 2004 till 2008, similar to the one in the previous part. Assumptions about exogenous variables were made by using forecasts of Ministry of Finance (for nominal GDP and budget balance) and assuming that inflows of foreign direct investments will be 3% of GDP, but unemployment will decrease by 0.2% points each year.

Forecasted savings ratio to GDP during the forecasting period is very stable (~20-22% to GDP) and is determined by two facts. Firstly, income level increase will enlarge savings ratio. On the other hand, decrease of unemployment rate will negatively affect savings ratio and neutralize positive effect from enlarged incomes.

Model's results give reason to expect that investments ratio to GDP can gradually decrease (amounting ~25% in 2008), although staying at a relatively high level. It can be connected with the increase of Latvian economy's development, therefore demand for investments will not be so high.

Gradual decrease of investments ratio will be the main reason for current account to improve (see Figure 3.1), and, according to the model's result, it can be expected that current account will be even balanced in 2008.
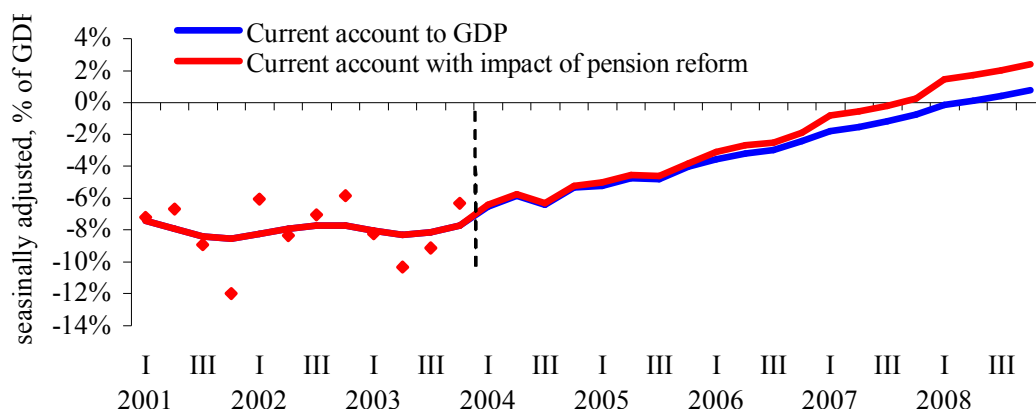
Figure 3.1. Forecasts of Latvia's Current Account (from 2004 till 2008)

Source: Forecasts of author's model of current account

This econometric model of current account also cannot make forecasts taking into accounts Latvian accession to European Union. No doubts, the accession provides possibility for using EU funds that in its turn will enlarge investments and the deficit of the current account (and that will not be defined by fundamental macroeconomic variables, like interest rate or income level). Unfortunately these effects cannot be evaluated in framework of econometric model. Therefore, current account was forecasted ignoring the fact of EU entrance. Effects of accessions can be analysed *post factum* by re-estimating models in the years 2006-2007.

4. Sustainability of Latvia's Current Account

The current account deficit, covered by positive financial account, persists in Latvia for the long time. It means, that Latvia's international expenditures for real resources exceed international incomes and this gap is financed by inflows of foreign capital. Although up to date the current account deficit was not a problem for economic development and stability of lat, economists argue, that it is one of the most significant risk factors for Latvian economy.

During the last years the question of current account deficit's danger was arisen more and more often. If current account deficit is too high, it can lead cause of financial and economic crisis. Unfortunately, it is very difficult to evaluate acceptable level of deficit in practice.

Latvian lat was pegged to SDR from February 1994 till December 2004 and parity was never changed. From January 2005 Latvian lat is pegged to the euro with fluctuation band +/-1%. One of Latvia's duties after accession to the EU is obligation to entry Exchange Rate Mechanism II (ERM II), that should be in 2005. After fulfilment of all criteria (approximately after 3-4 years) lat will be replaced by euro. Although currency risk will disappear after introduction of euro, the risk of exchange rate crisis still remains during nearest 4-5 years and therefore question about sustainability of Latvia's current account is still actual.

The most part of the economists acknowledge, that sustainable level of current account depends on many factors and it is unique for each country, although proposed calculation methods are very different. In the theoretical part of the paper there were overviewed two principal methods of calculating current account's sustainability: intertemporal solvency model of Milesi-Feretti and Goldman Sachs sustainability model.

The analysis of Latvia's current account sustainability for the next 5 years is made further. It is performed using the theoretical models of sustainability and the current account forecasts from econometrical models.

Testing Sustainability by Intertemporal Solvency Model

The first method for determining the sustainable level of the current account is the intertemporal solvency model. According to it, country's economy is solvent if discounted future value of the current account balance is equal to current external liabilities. Principal idea of the model is that the current account is sustainable only if external liabilities ratio to GDP is diminishing or unchanged. The following model, developed by Milesi-Feretti and Razin, defines the following trade balance under which external liabilities ratio to GDP is unchanged:

$$tb = -b(r^* - \varepsilon - \gamma),$$ (4.1)

where tb – current account balance (exceptign income balance) to GDP;
ε – changes of the real exchange rate;
γ – growth rate of national economy;
r^* – world real interest rate;
b – net external assets to GDP.

Equation (4.1) has some disadvantages, as it does not take into account the structure of capital inflows. The inflows of foreign direct investments (that are very important

in covering Latvia's current account deficit) are long-term and, in addition, are not increasing the external debt. Therefore, paper's author made some modifications in the intertemporal solvency model, assuming that country needs to stabilize only net debt ratio, but foreign direct investment stocks to GDP can increase without worsening the sustainability of the current account. Now, the equation for sustainable current account is the following:

$$tb = -b(r^* - \varepsilon - \gamma) - \Delta f + f(\eta - \gamma),$$ (4.2)

where f – net foreign direct investments to GDP;
      η – real profitability of direct investments.

Now, using Equations (4.1) and (4.2) we can evaluate the sustainable level of Latvia's current account. Assumptions about real GDP and exchange rate changes, as well as about foreign direct investments' inflows are the same as in 2nd and 3rd parts. It was also assumed that Latvia's gross external debt will grow by 4% to GDP each year, but dividends to non-residents are highly correlated with Latvian real GDP growth rate (exceeding it by 1% point).

According to the intertemporal solvency model, Latvia's current account deficit (excluding income balance) will be sustainable at the level of 2% to GDP, if we will not take into account the structure of inflows and it will be sustainable at 4% to GDP level if we will take into account foreign direct investments. Under these levels of deficit Latvia's external net liabilities (debt) will be stable and Latvian economy will be solvent. It should be noted that this level is even stricter than widely used 5% criteria. Figure 4.1 represents the sustainable levels and all 4 forecasts of Latvia's current account.
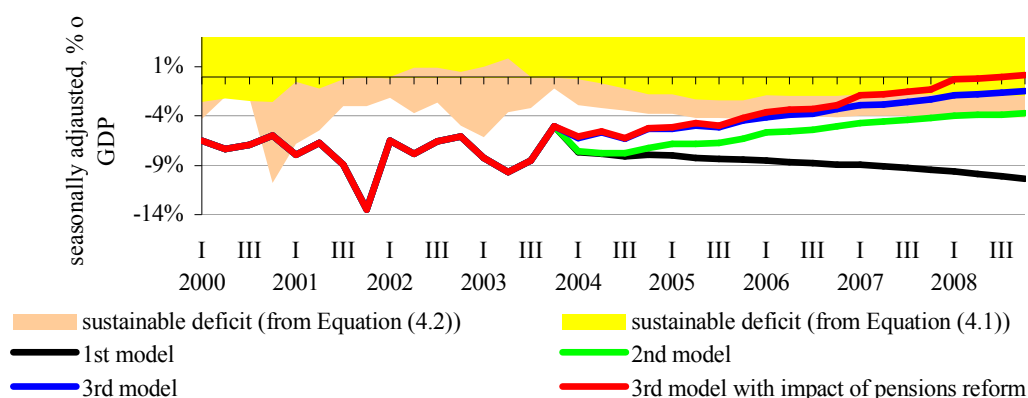
Figure 4.1. Forecasts of Latvia's Current Account and Its Sustainable Level, Evaluated by Intertemporal Solvency Model (from 2000 till 2008)

Source: Forecasts of author's models of current account and intertemporal solvency model

The intertemporal solvency model unambiguously shows that Latvia's current account deficit was unsustainable during the period between 2000 and 2003 (according to the model's definition). Moreover, this conclusion stays the same when we take into account or do not take structure of inflows. Therefore, Latvia's net foreign liabilities and net external debt increased during the sample period.

The analysis of Latvia's current account's sustainability during the period between 2004 and 2008 gives ambiguous results. If we use econometric models based on export and import flows (1st and 2nd models) than expected current account is

unsustainable. It is especially true if the model with aggregated export and import flows is used – expected current account is not only unsustainable, but it even move away from the sustainable level.

On the other hand, the econometric model based on savings and investments (3rd model) shows that current account deficit will be sustainable during the period between 2006 and 2008 and therefore will not be a risk factor for Latvian economy.

Finally, shortages of the intertemporal solvency model should be stressed. The main assumption of the model is that current account is sustainable only if external liabilities (debt) ratio to GDP is diminishing or stable, that is a significant simplification of the reality. Different countries have different levels of debt, an of it is obvious, that debt enlargement for countries with lower initial level of debt (like in Latvia's case) is not so risky as for countries with high initial level of debt.

The model does not take into account the fact, that there can be differences in demand for each countries' assets. If foreign investors expect a high capacity of a country, it will increase sustainable level of current account. This fact is used in Goldman Sachs model.

Testing Sustainability by Goldman Sachs Model

The second way to test sustainability of the current account is Goldman Sachs model, according to which, sustainable level of the deficit is determined by net international demand for country's assets. Goldman Sachs model determines sustainable current account level by the following equation:

$$\frac{CA_j}{Y_j} = (g_j + \pi_j^*)\gamma_j^* \,, \qquad\qquad (4.3)$$

where CA / Y – sustainable current account level to GDP;

   g – real growth of national economy;
   π^* – world inflation;
   γ^* – proportion coefficient, which represents net international demand for country's assets to GDP.

It is very difficult to find the value of the last variable (γ^*), especially for transition economies like Latvia. That is why we will use values, used in other researches about similar countries.

The research by investment bank Goldman Sachs makes think that γ^* values for transition economies of the Central and Eastern Europe should be between 31.1% (Czech, Hungary) and 55.4% (Poland). Therefore, it was assumed that international demand for Latvia's assets is located in this interval. For comparison we calculated also sustainable deficit level when γ^* is at least 65% that is close to the level of Taiwan and is one of the highest values for all countries covered in the research (except China). It was assumed that world inflation will be 2%.
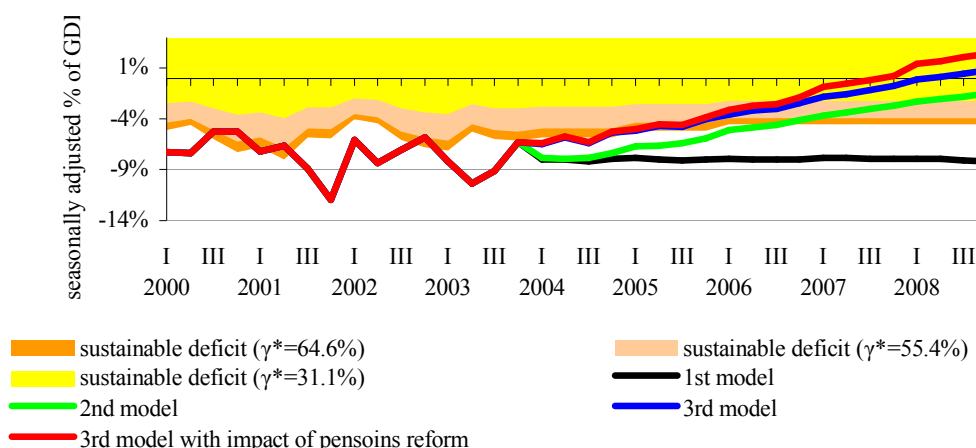
Figure 4.2. Forecasts of Latvia's Current Account and Its Sustainable Level, Evaluated by Goldman Sachs Model (from 2000 till 2008)

Source: Forecasts of author's models of current account and Goldman Sachs model

Figure 4.1 (like Figure 4.1) represents the sustainable levels and all 4 forecasts of Latvia's current account.

The results of Goldman Sachs model are similar with the previous model conclusions. Between 2000 and 2003 Latvia's current account deficit was unsustainable (according to the model's definition), or at the sustainability level.

The current account deficit (from 2004 till 2008) forecasted by the model based on aggregated export and import flows is clearly unsustainable and even move away from the sustainable level. The current account balance, forecasted from the 2nd econometric model is on the border of sustainability in 2008 under condition that attractiveness of Latvian assets is similar to assets of Taiwan and Poland. The model based on savings and investments reports sustainability of the current account and reduced risk of financial crisis.

Sustainability of Latvia's Current Account

It can be concluded, that analysis of the current account sustainability gives us ambiguous results and it is not possible neither reject neither accept sustainability of the current account in the forecasting 5 years with high degree of credibility. The models, based on export and import flows, forecast higher and therefore unsustainable current account deficit. On the other hand, the econometric model based on savings and investments foresees gradual reduction of deficit until sustainable levels.

However, choosing between these two types of models the author gives priority to the second group. The reasons are the following:

- Equations of savings and investments describe the current account from the fundamental point of view, using intertemporal tendencies in economics. In addition, pension reform impact was taken into account in one of the forecasts.

- Although equations of export and import flows represent well reactions on external and internal shocks in the short-term perspective, they do not take into account such fundamental variables as production factors (capital and labour). It is possible that the trade equations do not represent expected increase in competitiveness fully and the current account deficit is overestimated.

- The econometrical equations of savings and investments have better statistical properties.
- The models based on savings and investments have the smaller amount of equations, that increases stability of the model.

Summarizing all abovementioned we can make the following conclusions:

- For the time being Latvia's current account is unsustainable (according to the models' definitions).
- Perspectives of Latvia's current account are ambiguous. According to the first scenario, the current account deficit will not diminish, or will diminish too slow to reach sustainable level. According to the second scenario, the deficit will decrease faster and will be sustainable at the end of forecasting sample. Author argues that probability of the second scenario is higher.

Conclusions of the models about Latvia's current account's sustainability should be taken with caution, as it was not possible to take into account such an important factor like Latvia's entry into EU. The current account's sustainability can significantly increase (if accession will stimulate exports) or diminish (because of EU funds) and this effect will be especially strong in 2004-2005. All effects from accession can be evaluated only *post factum* – for more accurate determination of sustainability models' re-estimation in 2006-2007 is needed.

Conclusions

The goal of the promotion paper is to forecast Latvia's current account, and by using this forecast to define, whether the current account deficit is a significant risk factor for Latvian economy. The main novelty of the paper is that the modelling of Latvia's current account is made by using econometric methodology, on the basis of all the most important theoretical concepts of the current account. Therefore, multilateral and detailed econometric analysis of current account was made.

Firstly, the current account was modelled and forecasted concentrated on export and import flows. After that alternative model and forecasts of current account were developed on the basis of equations of savings and investments. Finally, sustainability of Latvia's current account was checked, therefore fulfilling the main goal of the paper.

In the process of econometric analysis the following results and conclusions were obtained:

1. During the econometric analysis of Latvia's export and import flows the following models were developed and the following conclusions were made:

   1.1. Latvia's export prices are heavily determined by external factors: world prices and nominal exchange rate. Elasticity of export prices on nominal exchange rate of lat is positive, but still it is lower than unity for all export price indexes except export price index to other EU countries. That means that changes in the nominal exchange rate does not transmit into changes in export prices fully. This low elasticity of export prices can be explained by the fact, that not all payments for exports are in euro, but some part is in US dollars. Elasticities of export prices to world prices are also lower than unity. Explanation of this phenomena can be related with different structure of Latvia's exports and price indices, which characterize world prices.

   1.2. Latvia's real exports are well determined by external demand and the real exchange rate of lat. Signs of regression coefficients are in accordance with theoretically expected:

      1.2.1. Latvia's real exports are positively and significantly influenced by weighted average of foreign GDP with elasticity of 1.8, but the elasticity of real exports on real exchange rate is -0.7.

      1.2.2. Latvia's real exports to EMU countries, similarly to total real exports, are significantly dependent on the real exchange rate of lat and external demand.

      1.2.3. The model of real exports to other EU countries is also similar to the other models of real exports. The main difference is that this group of real exports is not reacting on changes in the real exchange rate of lat. It can be explained by the fact that EU market is of great importance and Latvian enterprises try to keep market share even under unfavourable exchange rate.

      1.2.4. Real exports to other countries are positively affected by external demand and negatively – by the real exchange rate of lat. By the model the decrease of exports in 1999 can be fully explained by the Russian crisis and the devaluation of the rubble

1.2.5. Real exports have a much stronger reaction on changes in external demand than on changes in the real exchange rate. Therefore, devaluation of lat will not be an effective way to stimulate exports. Firstly, according to the models' results, direct effect will not be high. Secondly, changes of the nominal exchange rate of lat will decrease confidence of investors and local producers, worsen investment environment and can cause capital outflows, that will negatively affect export potential, reduce competitiveness of Latvia in external markets and neutralize initial positive effect of devaluation.

1.3. Latvia's import prices are explained well by exchange rate and world prices. Import prices are statistically significantly and positively influenced by nominal exchange rate of lat, but elasticity is lower than unity. Low elasticity is explained by the fact, that not all payments for imports from EU countries are made in euros, but some of them are in US dollars. Import prices are positively related to producer prices in EU countries. According to the models' results, elasticities to world prices significantly exceed unity, that means Latvia's import prices are growing much faster than producer prices in Europe. One of the possible explanations is connected with structural difference between Latvia's imports of goods and production in the EU. The other explanation is the following: there were qualitative changes in imports during the sample period – Latvian enterprises began to import more qualitative and therefore expensive goods.

1.4. Latvia's real imports were modelled from Latvia's domestic demand and real exchange rate of lat. Obtained results are statistically significant and signs of coefficients are in accordance with theoretically expected:

1.4.1. Exports have the highest marginal propensity to import (0.58) because there is a high need for imported goods for producing most important Latvia's export goods. Marginal propensity to import of investments is also high (0.52), as Latvia is not producing a lot of capital goods.

1.4.2. Overall, Latvia's real imports are very inelastic to changes in the real exchange rate of lat (0.18, from model of total real imports), that is determined by high degree of openness and specialization of Latvian economy. It means, that devaluation of lat will not cause significant decrease of real imports, but nominal imports will increase (because of price increase). Remembering low export price elasticities it is possible to argue that Marshal-Lerner condition does not hold for Latvia and devaluation will worsen the trade balance and the current account.

1.4.3. The results of the models explain high growth rates of imports by rapid development of Latvian economy (especially growth of exports and investments). Obvious, that with such a high propensities to import, high growth of imports will continue until Latvian economy will develop rapidly.

1.5. Based on the estimated equations of export and import flows we developed two econometric models of the current account. The first one is based on total exports and imports equations, but the second one – based on disaggregated exports and imports equations:

1.5.1. Two models give different results. First model foresee that current account deficit will stay stable (~8% to GDP) during the forecasting

period. The second model forecasts significant improvement of current account – deficit will decrease until ~2% to GDP in 2008.

    1.5.2. The most important difference in forecasts is in real flows of goods. Real imports growth is higher than real exports growth in aggregated model, that negatively affects trade balance and it cannot be compensated by improvement in balance of services and income. In its turn, real exports growth is higher than imports growth in disaggregated model, that determine expected gradual decrease of current account deficit.

2. During the econometric analysis of Latvia's savings and investments the following models were developed and the following conclusions were made:

    2.1. By developing econometric model of Latvia's private savings we reached two goals. Firstly, savings' models is necessary to analyse and forecast Latvia's current account. On the other hand, the econometric model proved that behaviour of Latvian inhabitants is not rational (as they do not use all information about expected pension level), although they try to optimize their savings in the middle term perspective.

    2.2. Results of the investments' model show that propensity to invest in Latvian economy is extremely high, although it deceased each quarter. Growth of income significantly increases investments ratio to GDP. The effect of real interest rate turned out to be insignificant.

    2.3. Using equations for savings and investments we developed alternative econometric model of current account and made alternative forecasts:

        2.3.1. Forecasted savings ratio to GDP during the forecasting period is very stable (~20-22% to GDP), that is determined by two facts. Firstly, income level increase will enlarge savings ratio. On the other hand, decrease of unemployment rate will negatively affect savings ratio and neutralize positive effect from enlarged income.

        2.3.2. Model's results give reason to expect that investments ratio to GDP can gradually decrease (to ~25% in 2008), although staying at a relatively high level. It can be connected with the increase of Latvian economy's development, therefore demand for investments will not be so high.

        2.3.3. Gradual decrease of investments ratio will be the main reason for the current account to improve, and, according to the model's result, it can be expected that the current account will be even balanced in 2008.

    2.4. The forecasts of current account were made ignoring the fact that the pension reform currently takes place in Latvia, that without doubts will influence national savings and the current account:

        2.4.1. Knowing that inhabitants are not rational, but currently it is pension reform period, it can be shown that increase of retirement age will increase national savings and improve the current account, but introduction of fully funded pension will not affect level of savings.

        2.4.2. The effect of pension reform can be evaluated by using results of theoretical model and forecasts of Ministry of Welfare. If we take this effect into account, the forecasted current account improves a little.

3. Sustainability of Latvia's current account was checked by using the intertemporal solvency model, Goldman Sachs model and forecasts from econometric models:

3.1. The intertemporal solvency and Goldman Sachs models unambiguously show that Latvia's current account deficit was unsustainable during the period between 2000 and 2003.

3.2. Analysis of the current account sustainability in the period between 2004 and 2008 gives us ambiguous results and it is not possible neither reject neither accept sustainability of current account in these 5 years with high degree of credibility.

    3.2.1. The models, based of export and import flows forecast higher and therefore unsustainable current account deficit.

    3.2.2. The econometric model based on savings and investments foresees gradual reduction of deficit until sustainable levels.

4. The developed econometric models cannot describe and foresee the effects connected with Latvia's joining the European Union and lat's re-pegging to euro. All these effects cannot be described by econometric models, because Latvian economy had no experience of such events. Therefore, conclusions of the models about current account's sustainability should be taken with caution, as current account's sustainability can significantly increase (if accession will stimulate exports) or diminish (because of EU funds) and this effect will be especially strong in 2004-2005. All effects from accession can be evaluated only *post factum* – for more accurate determination of sustainability models' re-estimation in 2006-2007 is needed.

The models, developed in the paper, have practical importance in macroeconomic analysis and realizing economic policy. For the time being, the econometric model of Latvia's current account is regularly used in the Monetary Policy Department of the Bank of Latvia. It is used for forecasting exports, imports and the current account balance. These forecasts are important for internal needs (development and realization of monetary policy), as well as for joint projects with the European Central Bank and the European Commission. The econometric models of current account can be used in other institutions, that have a strong need for macroeconomic analysis (Ministry of Finance, Ministry of Economy etc.) For the effective use of the models, regular re-estimation of coefficients and improvement of the models' structure is needed.

Analysis of current account sustainability gives us ambiguous results and it is not possible neither reject neither accept sustainability of current account in 2004-2008 with high degree of credibility. Choosing between the two types of models the author gives priority to the model based on savings and investments, as this model describes the current account from the fundamental point of view. Although equations of export and import flows display well reactions on external and internal shocks in the short-term perspective, they does not take into account such fundamental variables as capital and labour. It is possible that the trade equations does not represent expected increase in competitiveness fully and current account deficit is overestimated.

Although the econometric models prove that current account deficit was and in the near future will stay a risk factor for Latvian economy, the fundamental factors indicate that the current account deficit will gradually diminish and will not cause currency and financial crisis during the time period before Latvia's accession into Economic and Monetary Union.

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