# Estonian Economy and Monetary Policy

# CONTENTS

# ECONOMIC FORECAST FOR 2011–2013

## SUMMARY

From 1 January 2011, the euro is legal tender in Estonia. Joining the euro area reduces transaction costs, diminishes macroeconomic risks, deepens economic ties with other countries, and markedly changes the monetary policy environment in Estonia. Sustainable fiscal policy and successful exit from the global recession have improved the country's credibility and the future outlook.

At the start of 2011, the Estonian economy enjoyed rapid growth owing to soaring export income. Post-recession adjustments improved the competitiveness of the manufacturing sector in external markets. Another factor supporting fast recovery was growth in the demand of our main trading partners. According to the forecast, most of the production capacity that became underutilised in the crisis has been put into use again by now and the economic growth impetus will slow to a sustainable level in the second half of 2011. The remaining idle production capacity may not be fully suitable for servicing demand in the new growth cycle. Consequently, future economic growth depends on investment in increasing and updating production capacity. According to the forecast, Estonia's real GDP reaches close to the pre-crisis level by end-2013.

Substantially faster inflation also indirectly refers to a decrease in underutilised capacity. For the most part, however, price growth has been brought about by rising food commodity prices in the global market, coupled with more active trading with the neighbouring countries and the price hike of crude oil and agricultural products. Commodity futures show that prices will either halt at the current high level or decline somewhat in the years to come. In other words, upward price pressures from that source will ease from now on and inflation will slow in Estonia. However, the risk of further commodity price growth persists, depending on the speed of global economic expansion. The Estonian electricity market will be fully open from 2013, which is an exceptional inflation factor and means that our electricity price developments will be similar to the Nordic market. Current calculations show this will impact the price level here by 0.7%.

Developments in the global economy and especially in the euro area play the key role in Estonia's future economic success. The European Central Bank expects the euro-area economy to grow by 1.5–2.3% in 2011 and by 0.6–2.8% in 2012. The growth outlooks of Estonia's main trading partners outside the euro area (Sweden, Russia, Latvia, and Lithuania) have also improved. The Estonian economy has greatly benefited from the pick-up in international trade over the past year and a half, being a small link in the international division of labour. Active trading has helped many other countries besides Estonia to reduce recession damages and to restore economic wellbeing.

However, the economic situation is still uncertain in several countries as a result of the ongoing sovereign debt or banking crises. Risks deriving from these problems may spread to countries that are already recovering from the downturn. The global crisis has shown how tight is the economic interdependence between various countries. Many advanced economies have exhausted their policy support measures, so the

global economy's shock resilience is considerably more contained. In such circumstances, a small and open economy needs to have enough savings to cushion the impact of unfavourable market conditions.

Estonia's economic recovery has been uneven. Foreign-owned and export-oriented companies have benefited the most from strong external demand. Their profits have resumed much faster than in the economy as a whole, so GDP growth is surpassing that of GNI. Spillovers from export revenues are finally stimulating fields of activity targeted at domestic demand. For instance, households are more willing to invest and to buy durable goods. Since real estate has become more affordable, transactions in the housing market are on the increase.

Many households revised their consumption habits in the downturn. As a result, saving soared to a historical high in 2009. The household saving rate has declined by now, but it is still higher than before the boom. Consumption expenditures will increase even more, because the fear of becoming unemployed has decreased and general confidence has strengthened. Thus, the saving rate is likely to decline further along with the economic upturn. If lending activity picks up as well, the growth of households' financial savings may turn out to be too slow to withstand future shocks. The low level of accumulated savings available forced households to quickly curb their spending, which further boosted the recession. If people saved more in good times, it would help to smooth consumption over time.

The government's fiscal objective is to reach a nominal surplus in 2013 and there will be no considerable changes in fiscal policy in 2011–2013. According to the baseline scenario of Eesti Pank's forecast, this objective is sensible and, if expenditure increases are constrained, also rather easily attainable. At the same time, the recent crisis experience showed that the objective of a fiscal balance or a surplus by itself is not sufficient in the rapidly changing economic environment. It is difficult, maybe even impossible, to assess a current business cycle situation and to differentiate between one-off excessive tax revenues and sustainable tax income. Thus, the fiscal policy framework should be supplemented expenditure rules that would directly rein in costs.

The post-crisis adjustment of the labour market is still underway, though unemployment shrank notably in 2010. The ongoing increase in long-term unemployment is a challenge to labour-market institutions helping the jobless to get necessary retraining and supporting the preservation of skills. Insufficient labour force may also prove to be a problem in Estonia in the future. In addition to ageing population, there occurred a notable increase in people going to work abroad in the second half of 2010. This may be interpreted as a hidden cost of the steep recession, especially if they stay abroad for a long time.

Compared to Eesti Pank's 2010 autumn forecast, the wage growth forecast is substantially higher now. Wage pressures may pose a threat to the economic balance both in the coming years and in a slightly longer term. The nearly 5% year-on-year average wage growth in the first quarter of 2011 was rather rapid against the background of high unemployment. The growth was caused by dynamic productivity growth at end-2010 and one-off factors, such as the restoration of wages that were cut during the recession.

In both 2011 and 2012, it is important to keep the current high inflation from passing through to wage growth, since this could bring about additional price increases. Wage growth should not be tied to inflation; otherwise the competitiveness of the economy will suffer. From the viewpoint of macroeconomic stability, the entire remuneration or at least some of its relevant components should depend on labour productivity. Diver-

gence from this principle caused an economic weakness here in 2006–2008, since the ratio of labour costs to profit was unsustainable.

Accelerating economic growth has so far not resulted in a pick-up in credit volumes. The latter will remain modest in the next years as well, although export income and wage growth have contributed to corporate and household borrowing ability. The situation of banks operating in Estonia is improving. The banking sector is posting profits again, owing to shrinking provisions and lower resource costs. Banks' capitalisation is strong and they have ample funds to lend, because deposits have increased. Looking ahead, it is important that banks be willing to take risks and to finance projects that are essential to sustainable economic growth.

This forecast has four boxes of background information. The first one provides an overview of changes in the monetary policy environment. The second box is looking at the impact of volatility on economic growth, concluding that countries with higher volatility normally have slower growth. The third box is a technical analysis of the market share of the Estonian exports, and the fourth box treats the impact of the adoption of the euro on inflation in Estonia.

### EXTERNAL ENVIRONMENT

The growth in international trade and the inventory cycle breathed life into global economy, with the recovery being quicker than expected. Further growth may be hampered by the lessening of fiscal policy stimuli and countries' debt problems. At the same time, it seems that the recovery has taken a sustainable path, increasingly relying on the growth in private consumption and investment activity alongside exports. The process is positively affected by the prevailing cautious optimism and the consistency of problematic countries in implementing consolidation measures. At the same time, global economic

growth is held back by the sluggish recovery of employment in many economic areas, and complications in the implementation of the required reforms.

The recent years' global economic growth has been strongly supported by Asian countries, where growth is expected to decelerate in the near future. High demand and inflation in different emerging Asian economies are a sign of overheating and require tighter monetary policy. Otherwise, the rapid growth would continue raising commodity prices and boosting inflation. The cooling of overheated economies will affect global growth and is liable to reducing Estonia's external demand. The aftermath of the natural disaster in Japan may also stifle global growth in the near future. Although Japan is a minor contributor to Estonia's foreign trade, we may still experience the negative effect of the disaster through international supply chains.

The US economic growth (see Figure 1) decelerated in the first quarter of the year to an annual

**Figure 1. Economic growth in advanced economies**



Sources: OECD, Eurostat

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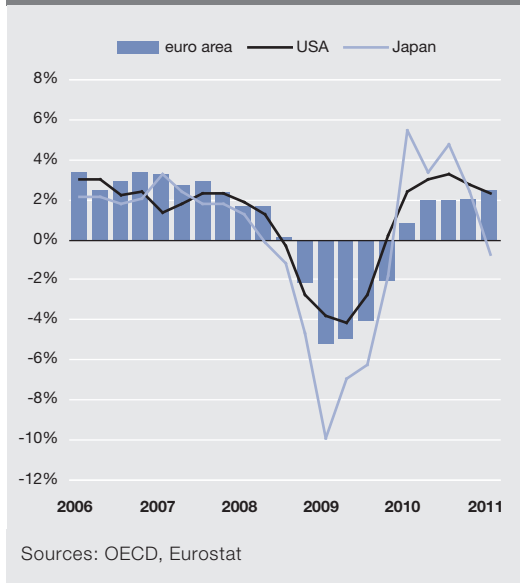
2.3% (2.8% in the fourth quarter of 2010). Fiscal problems prevail and the situation in the real estate sector remains complicated.

The faster-than-expected global economic growth supported exports in the euro area, and the confidence of enterprises remained high. Even though economic growth in the euro area has been faster than forecasted, countries will need to consolidate their budgets to restore the confidence of the financial markets and to reduce the debt burden. The fiscal situation in many countries remains problematic: the Government of Portugal has requested help from the European Union and the IMF, while Greece has failed to fully adhere to the objectives established in the bailout programme. Fiscal and sovereign debt problems in Ireland and several other EU Member States have reduced public confidence and the sense of security. Due to growing concerns about the sustainability of countries with a high sovereign debt, tensions started brewing in the euro area securities market at the beginning of 2011. The interest rates on the government bonds of several euro area countries rose, rendering debt financing more expensive for them. These problems may pass through to real economy and hamper further recovery.

The 2011 growth outlook for Estonia's main trade partners, Sweden and Finland, has improved to some extent, compared to the last autumn's forecast. Sveriges Riksbank has balanced the economy by raising interest rates and is expected to continue doing so in 2011. Regardless of the last year's heavy drought, the Russian economy has made a remarkable recovery on the back of commodity price growth, with commodity exports providing sufficient support to further expansion. Economic growth in Russia could still be inhibited by high inflation. To keep inflation in check, the central bank has raised the key interest rates twice this year. In addition to raising interest rates, the central bank has pursued the policy of strengthening the rouble, even

though the effect on inflation is yet to be seen. The Latvian and Lithuanian economies are also recovering from the crisis, faster than expected in the autumn forecast. Economic growth is mainly fuelled by export demand, but domestic demand is also slowly recovering.

Various 2010 autumn forecasts revolved around the perception that risks related to the price stability outlook for the euro area would remain more or less in balance in 2011, with an acceleration in the price increase only forecasted for the first few months of the year. Above all, the upward pressures were related to developments in energy and other commodity prices. It was also believed that, due to the need for budget consolidation, indirect taxes and administered prices might show a faster-than-expected rise in the coming years. Inflation rates continued to increase, fuelled by rising commodity prices, at the beginning of 2011. In March, the Governing Council of the ECB raised the key interest rates, because, based on economic analysis, there were upward pressures prevailing in the inflation outlook, although the pace of underlying monetary expansion was moderate and general uncertainty remained at a high level. The key interest rates were raised with the aim of managing the upward pressures endangering price stability. The monetary policy environment is described in detail in Box 1.

Despite the recent pick-up in inflation, broad-based inflationary pressures should not increase in the medium term. The Governing Council of the ECB stands ready to take steps to prevent the materialisation of the upward pressures endangering price stability in the medium term. The 3-month Euribor – the European interbank short-term interest rate, which also reflects the cost of credit in Estonia – thus continues on a rising trend. Compared to the autumn forecast's external assumptions, those concerning the key interest rate and commodity prices have changed. The 3-month Euribor has seen

**Table 1. External-environment related forecast prospects**

|  | 2009 | 2010 | 2011 | 2012 | 2013 | 2010* | 2011* | 2012* |
|---|---|---|---|---|---|---|---|---|
| External demand growth (%) | –17.2 | 8.8 | 7.6 | 7.0 | 6.7 | 6.6 | 6.3 | 6.6 |
| Oili price (USD/barrel) | 61.9 | 79.6 | 111.1 | 108.0 | 103.7 | 78.8 | 84.0 | 86.8 |
| Interest rate (3-m Euribor, %) | 1.2 | 0.8 | 1.6 | 2.3 | 2.8 | 0.8 | 1.1 | 1.4 |
| USD/EUR exchange rate | 1.4 | 1.3 | 1.4 | 1.4 | 1.4 | 11.9** | 12.0** | 12.0** |

\* 2010 autumn forecast
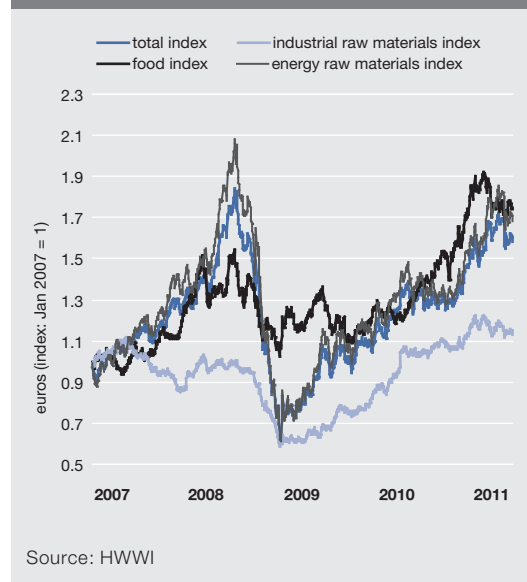\*\* USD/EEK exchange rate
Sources: Reuters, Eesti Pank

an upward adjustment since autumn, and is expected to reach 2.8% in 2013 (see Table 1).

With the recovery of economic activity, the global market saw a rise in all main commodity prices (see Figure 2). Energy and commodity prices were mainly influenced by demand growth in Asia. Price hikes were also fuelled by the recovery in advanced economies and by unfavourable weather conditions in the second half of 2010. Energy prices are also significantly affected by the Middle East and North Africa, where the political situation has exerted pressure on oil production. Among the key factors influencing the price are also the oil production reserves, which have dropped to a very low level due to civil unrest in the Middle East and North Africa. Compared to autumn, oil prices have risen faster than indicated by futures prices, rising to 111 USD per barrel in 2011. For the European consumer, the oil price hike has been cushioned by the 15% strengthening of the euro against the US dollar over the past 12 months. Even though oil price volatility is expected to be high over the forecast horizon, the assumption (based on future oil prices) of a drop in oil prices (to a level of 104 USD per barrel in 2013) is prevalent in the market.

The relative price level in Estonia – the real effective exchange rate (REER)[1] – supported Estonia's competitiveness in external markets. Decreasing by 2.3% in 2010, REER dropped by 1.2% in the



**Figure 2. World commodities price indices**

Source: HWWI

first quarter of 2011 due to accelerating inflation (see Figure 3). The nominal effective exchange rate (NEER)[2] decreased by 3.1% in 2010 and by 2.4% in the first quarter of 2011, indicating the strengthening of the trade partners' against the currency used in Estonia. Above all, this concerns the Swedish krona, which reached its highest value in the last decade at the beginning of 2011.

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[1] REER shows how prices in Estonia have moved compared to the weighted average prices of the main trading partners, considering also price and exchange rate dynamics.

[2] NEER only considers exchange rate dynamics.

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**Figure 3. NEER and REER yearly growth rates**

NEER
REER
weighted average inflation of Estonian trade partners

Source: Eesti Pank

**Box 1: Monetary policy environment**

From 1 January 2011, Estonia is a euro area Member State and Eesti Pank belongs to the Eurosystem, which consists of euro area National Central Banks (NCBs) and the European Central Bank (ECB).

The euro area monetary policy framework comprises regular refinancing operations (i.e. repo auctions), the minimum reserve system and standing facilities (i.e. marginal lending and deposit facilities). The Eurosystem has established a 2% reserve requirement for the liabilities in the balance sheet of credit institutions with maturity of up to 2 years.

Due to the changeover to the euro, the reserve requirement in Estonia was gradually lowered from 15% to 2% in the euro area from September 2010 onwards. From the beginning of 2011, all credit institutions in Estonia must thus adhere to the 2% reserve requirement. Unsurprisingly, the change of the reserve requirement failed to trigger significant changes in banks' behaviour.

The monetary policy environment remained lenient throughout 2010. Euro-area monetary policy rates stood low, as the key policy rate of the European Central Bank retained the 1% level established in May 2009 (see Figure a). As a result of the imminent adoption of the euro, risk premia in the local money market fell significantly in 2010. At the start of the year, the 6-month Talibor of the local money market exceeded the 6-month Euribor by nearly three times, but the the euro area and the Estonian interest differences were smoothed out by the end of the year, with the Talibor dropping to the level of the Euribor.

Due to growing price pressures in the euro area, the ECB's Governing Council decided to raise the key interest rate by 25 basis points to 1.25% at its meeting on 7 April. The marginal lending facility interest rate was raised by 25 basis points to 2% and the deposit facility interest rate by 25 basis points to 0.5%. These changes, along with expectations of a rise in key interest rates, are also reflected in the money market interest rates – for example, the 3-month Euribor advanced by 43 basis points and the 6-month Euribor by 49 basis points from the beginning of the year to the end of May (see Figure b). On the one hand, this will increase the cost of borrowing for the private sector, but on the other hand, depositing will become more attractive.

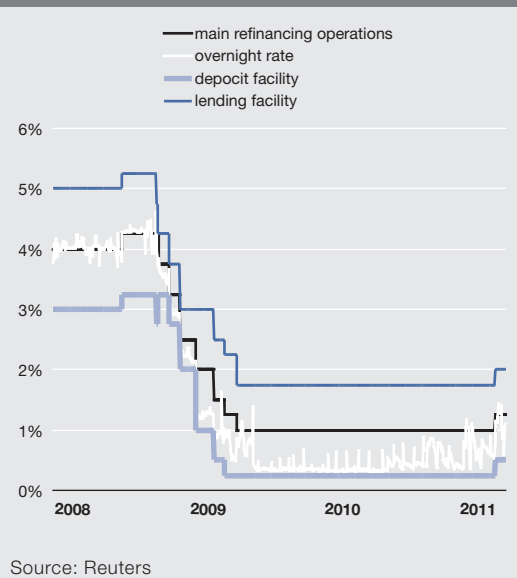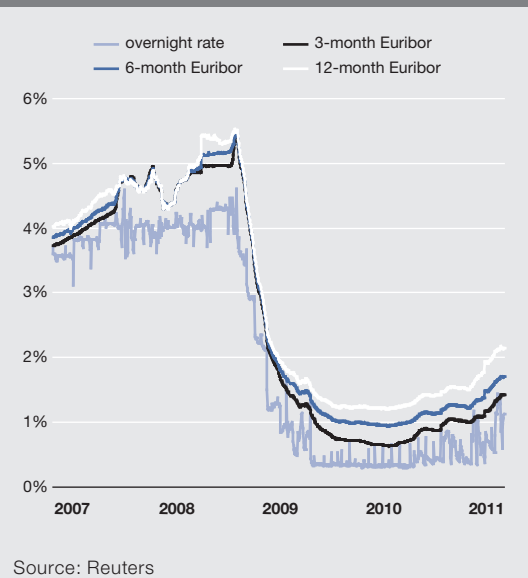**Figure a. Euro area monetary policy interest rates**



Source: Reuters

**Figure b. Euro area money market rates**



Source: Reuters

## BASELINE FORECAST SCENARIO

### Economic activity

Followed by a steep decline in 2009, Estonia's real GDP increased by 3.1% in 2010. The resumption in economic activity was conditioned by several factors. Firstly, the pick-up in economic activity of the euro area and Estonia's main trading partners, fuelled by global economic growth and recovery of international trade. Secondly, the positive effect of the inventory cycle, with the recession-time reduction in inventories followed by the accumulation of new inventories upon recovery. Thirdly, the upturn in private consumption and investment, which partly reflect a rise in confidence compared to the previous level. The recovery of economic activity has been supported by the euro area monetary policy and measures taken to ensure the functioning of the financial system.

Macroeconomic developments at the end of 2010 and the beginning of 2011 exceeded the expectations of the autumn forecast, encouraging an upward adjustment in the macroeconomic projections. According to the flash estimate, economic growth in the first quarter of 2011 was 8%, year-on-year. The economy grew by 2.1% on the previous quarter. This is comparable to the years of rapid growth. We must still consider that growth partially relies on short-term factors generated by the reactivation of production and the recovery of orders in the tradable sector. The economic growth will thus slow, posting markedly smaller results in the second half of 2011. Growth will be slower compared to the pre-crisis pace and the economy is expected to reach close to the pre-crisis level at the end of the forecast horizon.

In the long term, the growth rate of the Estonian economy will depend on the increase in production capacity. This means that production capacity needs to be enhanced, so new investments as well as the development of labour and technologies are needed. We must also consider the contraction in the working population, which is affected by the low birth rate on the one hand and emigration to countries with a higher wage level on the other hand. Since it is unclear how much of the boom-time production capacity can serve the new economic cycle, we cannot rule out that the Estonian economy is already operating close to its potential. Even though idle machines can be readjusted and unemployed persons retrained, the process has its limits.

The difference between actual and potential output is referred to as the GDP gap. Idle resources produce a negative GDP gap, generating no price pressures. When the gap is positive, production capacity is exploited beyond the optimum level, generating price pressures. Increasing price and wage pressures may indicate that the potential output has almost been reached. Where the resources are idle, the price of excessive resources should decline until the resources are utilised. The past 12 months, however, have witnessed a price hike. According to the baseline scenario of this forecast, a portion of the production capacity is idle and the GDP gap is negative, though it has significantly contracted compared to 2009 and 2010. This indicates that future growth will be slower than in the past quarters, as the gap between the actual output and potential output is eroding, and less growth can be generated by reutilising idle production capacity.

The Estonian economic growth was highly volatile in 2000-2010, ranging from −17% to +12%. Despite the high growth figures in the rapid growth years, the average economic growth for the decade is 4.7%. The relation between the volatility of economic growth and average economic growth is discussed in Box 2.

**Table 2. Economic forecast by key indicators**

| | 2009 | 2010 | 2011 | 2012 | 2013 | Difference from previous forecast | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | | 2010 | 2011 | 2012 |
| GDP (EUR billion) | 13.9 | 14.5 | 15.9 | 17.1 | 18.4 | 0.3 | 0.8 | 1.0 |
| GDP, chain-linked volume change (%) | -13.9% | 3.1% | 6.3% | 4.2% | 4.2% | 0.6% | 2.2% | 0.4% |
| HICP inflation(%) | 0.2% | 2.7% | 4.7% | 2.5% | 2.9% | 0.3% | 2.0% | 0.8% |
| GDP deflator change (%) | -0.1% | 1.5% | 2.8% | 3.2% | 3.5% | 1.6% | 1.0% | 0.5% |
| Current account (% of GDP) | 4.5% | 3.6% | 1.7% | 1.0% | -0.2% | 2.3% | 4.3% | 3.8% |
| Private consumption expenditures, chain-linked volume change (%) | -18.8% | -1.9% | 2.8% | 4.8% | 5.4% | -1.0% | -3.9% | 0.4% |
| Government consumption expenditures, chain-linked volume change (%) | 0.0% | -2.1% | 2.1% | 0.6% | 1.0% | -1.2% | 1.8% | 0.1% |
| Fixed capital formation, chain-linked volume change (%) | -32.9% | -9.2% | 25.3% | 13.2% | 9.7% | -2.1% | 8.4% | 4.0% |
| Exports, chain-linked volume change (%) | -18.7% | 21.7% | 22.5% | 4.7% | 6.4% | 7.4% | 16.1% | -2.2% |
| Imports, chain-linked volume change (%) | -32.6% | 21.0% | 22.6% | 6.3% | 8.6% | 3.2% | 12.1% | -1.5% |
| Unemployment rate (%) | 13.8% | 16.9% | 13.0% | 11.5% | 10.1% | -0.9% | -1.8% | -1.9% |
| Employment growth (%) | -9.9% | -4.8% | 5.1% | 1.4% | 0.9% | | | |
| GDP growth per person employed (%) | -4.5% | 8.3% | 1.2% | 2.8% | 3.3% | | | |
| Real compensation per employee growth (%) | -2.4% | -2.3% | -1.8% | 3.7% | 3.3% | | | |
| Compensation per employee growth (%) | -3.3% | -0.2% | 3.2% | 6.1% | 6.3% | | | |
| Nominal money supply growth (%) | 0.8% | 3.0% | 5.0% | 7.9% | 7.8% | -2.6% | -2.2% | 1.3% |
| Credit stock growth (%) | -6.2% | -6.4% | -3.2% | 4.0% | 7.5% | -2.7% | -4.2% | 2.6% |
| Gross external debt (% of GDP) | 125.5% | 114.2% | 100.9% | 92.7% | 88.0% | -6.3% | 0.0% | -3.6% |
| General government budget balance (% of GDP) | -1.8% | 0.1% | 0.0% | -1.6% | 0.4% | 1.3% | 1.1% | -0.3% |

Sources: Statistics Estonia, Eesti Pank

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**Box 2. The impact of volatility on economic growth**

The Estonian economy is characterised by a high degree of cyclical volatility. Prior to the eruption of the global financial crisis, the Estonian economy experienced a prolonged period of very strong economic growth but during the global recession, it witnessed one of the largest declines in output. For this reason, the high degree of cyclical volatility of the Estonian economy calls for an assessment of its potential impact on long-term economic growth. For that purpose the experience of other countries is examined.

An often-cited paper that demonstrated the presence of a significant negative relationship between the volatility of economic growth and the average growth level was a research by Ramey and Ramey (1995). Their data covered 92 countries for the period of 1962–1985; the dependent variable was per capita output growth, and volatility was measured as variability in output growth. The estimation results of Ramey and Ramey implied that an increase in volatility would reduce the average level of economic growth. The negative effect of volatility was lower for the advanced countries and higher for developing countries. Importantly, this negative relationship was significant despite the fact that the authors took into account the impact of investment on growth. This means that volatility is reducing growth not (only) by lowering investment but via some other mechanism(s) as well. More recent re-estimations of the Ramey and Ramey equations using updated data series (Aghion and Banerjee, 2005) confirm these results, though

the negative effect of volatility on growth is less clear for the OECD countries.

Today, the idea that volatility and economic growth are negatively related is quite widely accepted. For example, Easterly et al. (2000) take that as given, and raise an important follow-up question: if macroeconomic volatility is bad for growth, what causes it? In particular, Easterly et al. (2000) argue that when trying to explain output volatility, too little attention has been paid to the crucial role of the financial sector and financial factors in general.[3] Using data for a large number of countries, they find that the private credit to GDP ratio, a proxy for financial sector development, is related to volatility in a non-linear way: up to a certain point (the credit to GDP ratio is below a certain level), the financial sector plays a stabilising role, but as it gets deeper and more sophisticated its association with volatility becomes positive. Instead of diversifying and insuring risks, very advanced financial sectors may, in fact, create additional risks. In the backdrop of the recent recession, this argument appears particularly relevant and appealing today.[4]

However, it has to be kept in mind that these earlier empirical estimates are based on data until 2000 and therefore do not include the latest data preceding the global financial crisis and the data during the financial crisis that might potentially change the earlier conclusions. For this reason, Eesti Pank carried out a study to estimate the impact of volatility on economic growth by using more recent data until 2010. Furthermore, a slightly larger sample of countries (121) was used.

Using more recent data and a broader sample of countries, the study by Eesti Pank confirmed the result reached by Ramey and Ramey (1995) that macroeconomic volatility is negatively related to economic growth. Eesti Pank's estimates for the whole sample of 121 countries indicate that a 50 percent increase in volatility translates into 0.4 percentage point lower annual per capita growth. The analogous estimate based on the sub-sample of OECD countries is about 10 percent smaller but statistically indistinguishable from the whole-sample result. These results indicate that policies and institutions that mitigate cyclical volatility may be conducive for long-term growth.

*References*
Aghion, P., and Banerjee, A. (2005). Volatility and growth, Oxford University Press.

Easterly, W., Islam, R., Stiglitz, J.E. (2000). Shaken and stirred: explaining growth volatility. In Pleskovic B. and N. Stern (eds.) Annual World Bank Conference on Development Economics, The World Bank, Washington, D.C., 191–211.

Ramey, G. and Ramey, V. A. (1995). Cross-country evidence on the link between volatility and growth. American Economic Review, 85(5), 1138–1151.

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[3] Financial institutions, cash flow constraints, firm wealth effects and other balance sheet effects.

[4] Easterly et al. (2000) also find that volatility is typically higher in developing countries and countries more open to international trade. Concerning the latter, they note, however, that openness is also known to contribute to growth itself, and so the overall effect is likely to be positive.

**Domestic demand**

***Private consumption***
The recession-time uncertainty – the fear of losing one's job as well as concerns about the deterioration of the economic situation increased precautionary saving. By now, these fears have withdrawn and the confidence of households has been restored (see Figure 4). This is reflected by the consumption of durable goods which showed a significant rise in the second half of 2010, compared to 2009. At the same time, the share of durable goods in the consumption basket is still lower than in the pre-boom years.

Acceleration in the growth of retail sales at the beginning of 2011 corresponds to the recovery of consumption. The sale and repair of motor vehicles has shown the highest growth, with the retail sales volume index rising by 66% in March 2011. Growth in that commodity group is expected to slow further on, due to the high reference base. Annual growth in the registration of passenger cars decelerated to 69.5% in April, compared to the 80% in March. Still, motor vehicles are a minor contributor to retail sales, and total retail sales growth has been slower, amounting to 8% in March. Retail sales in non-specialised stores (supermarkets) predominated by food commodities have decreased. This is partly due to changes in household preferences, considering that sales in stores specialising in food commodities have increased faster than the average. On the other hand, the rapid increase in food prices has made consumers very selective and forced them to weigh their purchasing decisions. Further price increases may also cause a setback in the recovery of private consumption.

The relatively quick lowering of unemployment and wage growth have increased households' disposable income. On the other hand, fuelled by the global food and energy price hikes, inflation will have a negative effect on households' purchasing power. The rise in interest rates will



Figure 4. Consumer confidence indicator

Source: Estonian Institute of Economic Research
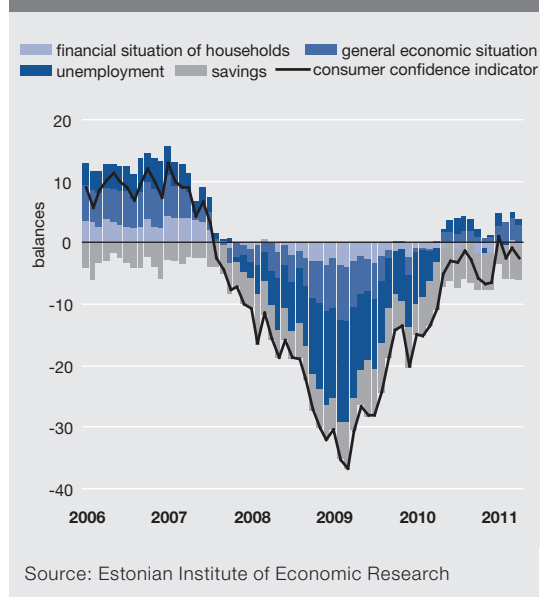
also decrease the disposable income of households, because their deposits are smaller than their borrowings. According to Eurostat, interest earned by households amounted to an average of 4% of disposable income in the euro area countries and 3.2% in Estonia in 2009. Interest paid by households amounted to 2.4% of disposable income in the euro area, and 6.6% in Estonia. This means that the net effect of interest rates has reduced the disposable income of the Estonian households.

One of the key factors boosting household savings during the recession was uncertainty regarding future income, triggered by the financial crisis and waning economic activity. Employment contracted markedly during the downturn, while unemployment soared. Being concerned about their jobs, households were prompted to reduce expenses and increase savings. The consumer sentiment indicator since the end of the recession indicates that households are more optimistic towards the economic situation, especially towards unemployment. Fears are withdraw-

ing and confidence has been restored. These changes are reflected with a lag in consumption as people's habits are slow to change and the experience of the recent crisis calls for caution. In foresight, the declining saving rate could result in a rise in private consumption that is quicker than the increase in income (see Figure 5).

According to the spring forecast, the household saving rate will continue to fall but it will still be higher than before the crisis. The boom-time loan burden growth facilitated the unsustainably low saving rate and therefore hampered future consumption due to increased loan repayments. The slower increase in income and a higher debt burden compared to the pre-crisis period do not support a rise in asset prices, but rather endorse a more balanced development. A quick rise in asset prices and growth in consumption due to increased nominal wealth is still a risk that may affect the private consumption forecast.

### Investment

As expected, investment growth picked up speed in the second half of 2010. Investment in transport equipment posted the largest growth (370%) in the last quarter of 2010. This is impressive, albeit part of the growth can be attributed to one-off transactions. Investment in computers, machinery and equipment and dwellings increased as well, whereas investment in other buildings and structures remained modest.

Capital goods imports and the structure of industrial production support investment growth. In the first quarter of 2011, capital goods imports grew by 81%, indicating acceleration in investment growth. The annual rise in the volume index for other mining, which serves as an indicator of construction volumes and reflects the mining of stone, sand and clay, accelerated to 46% in March.

Compared to the pre-crisis years, the investment level is currently low, and investment growth



**Figure 5. Real private consumption growth**

- household saving rate (% of disposal income)
- disposable income
- private consumption

Sources: Statistics Estonia, Eesti Pank
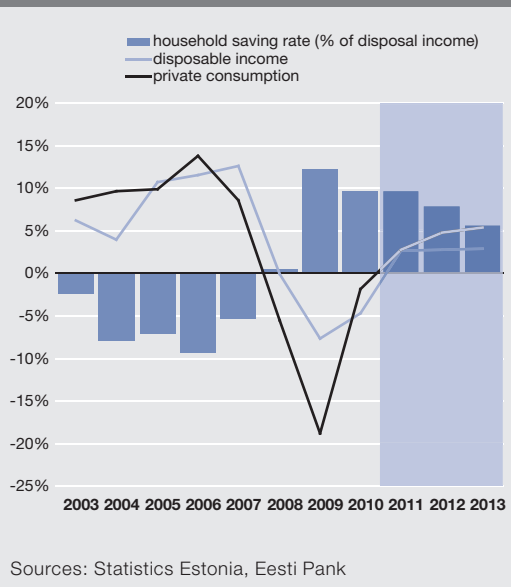


**Figure 6. Value added compared to the average level for 2007**

- other activities (left scale)
- wholesale and retail trade (left scale)
- industry without construction (left scale)
- total value added (left scale)
- capacity utilisation in industry (right scale)

Sources: Statistics Estonia, Estonian Institute of Economic Research
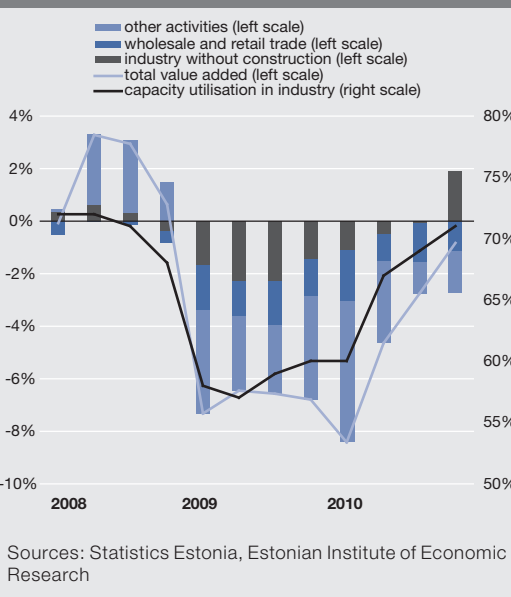
could prove quite substantial, considering the modest reference base. The investment cycle is characterised by two-speed economic recovery: even though the gross value added currently falls short of the pre-crisis level, production volumes in several fields of activity in the manufacturing sector are breaking records, with new investment required for further growth (see Figure 6).

In the coming years, the volume of investment required for securing sustainable economic growth (measured as a ratio to GDP) could prove much smaller than in the boom time. Firstly, the exploitation of production efficiency enhancing technology and equipment is not fully covered in GDP by the notion of capital formation, if installation of new equipment is preceded by the uninstallation and disposal of older and less efficient equipment the use of which is no longer economical, considering alternatives. Secondly, a new plant is not necessarily required for enhancing production volumes – replacement of the old equipment or installation of new equipment will do.

Investment in dwellings is also on the rise. On the one hand, there is an increased demand for energy efficiency, so more investments are made to improve the thermal resistance of buildings. On the other hand, the improving economic situation will urge people to upgrade their living conditions, resulting in an increased demand for higher-quality residential space. In the long term, investment in housing will be affected by a decrease in population.

In the next few years, investment in Estonia will be affected by several major infrastructure and government sector projects. In 2011 and 2012, the government sector will make a significant contribution by investing the revenue from unused AAUs[5]. This will be a one-off development, with the government sector investment
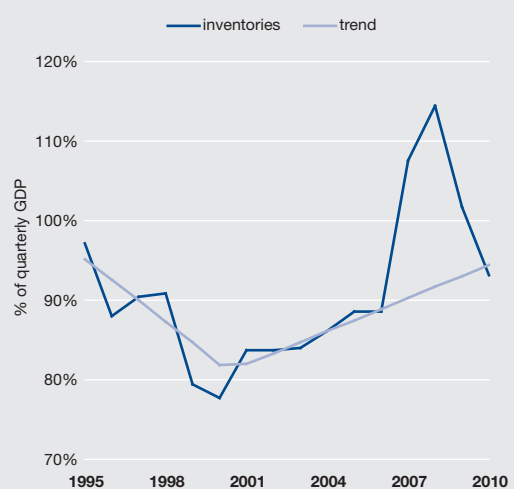
**Figure 7. Gross fixed capital formation growth**
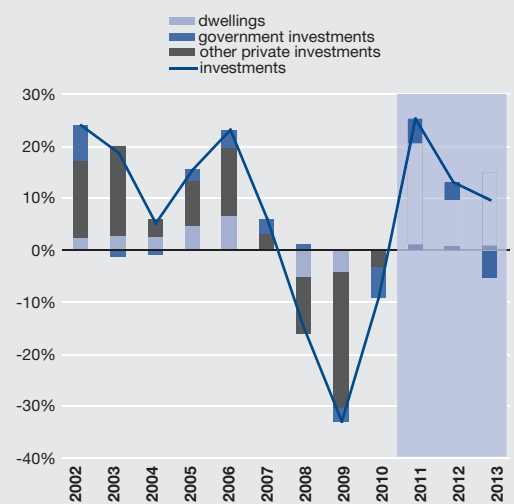


Sources: Statistics Estonia, Eesti Pank

**Figure 8. Inventories to GDP ratio**



Sources: Statistics Estonia, Eesti Pank

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[5] AAU – Assigned Amount Unit, Kyoto unit or carbon credit.

consequently expected to decrease in 2013 (see Figure 7).

*Inventories*

In the fourth quarter of 2010, corporate stocks were approximately 95 million euros larger than in the corresponding quarter a year ago, with the stocks of manufacturing increasing by about 200 million euros, including computer, electronic and optical equipment production stocks of nearly 127 million euros. However, several fields of activity showed a year-on-year decrease in stocks – e.g. a decrease of 97 million euros in real estate and 64 million euros in construction.

Corporate stocks make up the majority of the inventories, and are also the biggest contributor to the change in inventories. The business stocks to GDP ratio has advanced after the Russian crisis of 1998, amounting to about 91% of the quarterly GDP in the fourth quarter of 2010 (see Figure 8). Aside from the boom years, when the deviation in the inventory ratio was attributable to quick price movements, and the recession, when the sudden decrease in GDP kept the inventory to GDP ratio at a high level, the inventory to GDP ratio has continually grown in the past decade. However, future trends are very difficult to predict. On the one hand, the stocks to GDP ratio is quite high in Estonia. On the other hand, rising economic activity should contribute to further growth. Our forecast is based on the assumption that the stocks to GDP ratio will continue to climb, but it will fall short of its historical trends in the forecast horizon.

**External balance and competitiveness**

The Estonian economic recovery is fuelled by the faster-than-anticipated exports growth, which started in 2010, and the flexibility of Estonia's companies. Exports growth exceeded the expectations of the autumn forecast in the fourth quarter of 2010 and the first quarter of 2011. This was affected by improving global confidence and the faster-than-expected economic recovery of our main trading partners. In addition to the rapid growth experienced by the trade partners, Estonia's exports were also supported by the above average increase in global demand for the product groups manufactured in Estonia. Nearly a third of the strong export growth in recent months may be attributed to the improvement in the competitiveness of the Estonian companies (see Box 3).

**Box 3: Market share of the Estonian exports in the EU internal market**

The end of 2008 saw a sudden decline in global external trade flows. As a small and open economy, Estonia experienced a sharp fall in exports. Measured at current prices, goods exports hit rock bottom in the first quarter of 2009, standing nearly a third lower than the peak level. A greater-than-average drop on the European scale could also be seen in our main export markets – Finland and Sweden. In 2010, Estonia's exports enjoyed rapid growth, measured at current prices. The extreme pick-up in year-on-year growth indicators was caused, above all, by the low reference base. Still, at current prices, exports surpassed the pre-crisis peak of end-2008 already at end-2010.

The Estonian export growth over the past quarters has exceeded all institutional forecasts. This raises the question of whether we are dealing with one-off transactions characteristic to small nations. To which extent can export growth be associated with long-term effects in the changed economic structure? An exercise in decomposing export growth has thus been

conducted to answer these questions. We applied the traditional shift-share analysis[6], which allows decomposing export growth into the sub-components of destination market growth, growth caused by trading partners and the structure of export goods, and the residual. The latter is associated, above all, with competitiveness, i.e. with the ability to export on a greater scale than dictated by destination market growth and growth caused by trading partners and the structure of export goods.

The analysis has been conducted on the basis of COMEXT, the database for foreign trade statistics of the EU Member States. The database provides access to the monthly foreign trade statistics of all EU Member States. As a rule, changes in foreign trade have quite a prolonged effect. The more easily accessible annual data is thus often used for empirical analyses. However, as the fastest changes in Estonia's exports took place at the end of 2010, an analysis prepared on the basis of the annual data would not provide an adequate overview of the events. This analysis uses the BEC classification of goods.

The results for Estonia have been presented in Figure a. As it happens, growth in the residual – competitiveness – has been a major contributor to the growth in Estonia's exports throughout the period under review. Nearly a third of the rapid export growth at the end of the period may be attributable to growing competitiveness, with two-thirds attributable to the destination market and the specific needs of our export partners and export goods. The fact that our main export destinations in the Nordic countries have experienced faster-than-average recovery on a European scale has been a major contributor to Estonia's exports. The crisis triggered a sharp reduction in global investment activity, causing a decline in the demand for investment goods. The enhanced need for investment upon revival of production volumes has contributed to the quick recovery of the export of investment goods.

The contribution of competitiveness factors to growth in Estonia's exports is considerable. The analysis of the results across countries reveals that the contribution of competitiveness to export growth is quite similar in Estonia and Sweden. The positive contribution of competitiveness to export growth is clearly evident in both countries. The recent growth in Finland's exports, on the other hand, is only attributable to the characteristics of the destination market, partner countries and the structure of export goods.

**Figure a. Estonia's exports to European Union (year-on-year growth)**
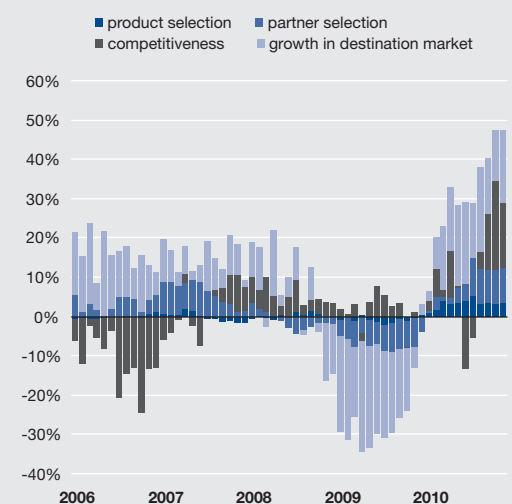
Source: Eesti Pank

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[6] For detailed information on the shift-share analysis see Buechler (2007) "Enlargement of a customs union: a reduction in trade diversification".

The above analysis does not allow drawing far-reaching conclusions on future export growth. The contribution of competitiveness may reflect a level shift in export volumes or the beginning of longer-term positive development trends. In Estonia, exports have been significantly boosted by the growth in the production volumes of single companies. For example, the share of telecommunication equipment in our exports has more than doubled in the past 12 months, contributing more than 10% of the total exports of goods. Despite the considerable contribution of single exporters, broad-based growth in exports allows to claim that our exporters have succeeded in increasing their market share by enhancing competitiveness.

The Estonian external environment is strongly supported by the external demand of non-euro area countries (Sweden, Latvia, Lithuania and Russia). Measured at current prices, the exports of Estonia's goods to these destinations grew by 35% in 2010. With 57.5%, intermediate goods were the biggest contributor to Estonia's foreign trade in 2010, referring to the orientation of the industry to subcontracting and dependence on foreign suppliers. In 2010, external demand growth was rapid in all major branches of industry, with the exports of machinery and mechanical equipment being the largest contributor to exports, growing by 56% year-on-year.

Trade within the euro area is expected to show stable growth in the years ahead, and it will be slower than growth in non-euro-area trade. The exports of electronic equipment is increasing, supporting the development of more capital-intensive exports.

The exports of mobile phones and related equipment has shown a significant increase in the last few months. For example, the wide-scale production of innovative mobile network technology base stations is liable to raise the exports of more capital-intensive products and services, where Estonia's share is currently below the EU average. The exports of electronic equipment is on the increase, and its share in total exports is growing. In March, the Estonian export turnover rose to an annual 71%, posting a record level of 1.07 billion euros. This growth was mainly supported by two groups of goods. Approximately 43% was attributable to growth in the exports of machinery and equipment, and 30% to growth in the exports of mineral products (see Figure 9). Without these two components, annual export growth would have amounted to 19% in March.

This may cause high volatility of export figures also in the future. The forecast is based on the assumption that the exports of electronic equipment will remain high, but its contribution to the general growth in exports will be smaller. Maintaining the quick export growth in the coming years will prove a complicated task, considering the huge volumes and quick recovery of exports.



**Figure 9. Annual export growth**
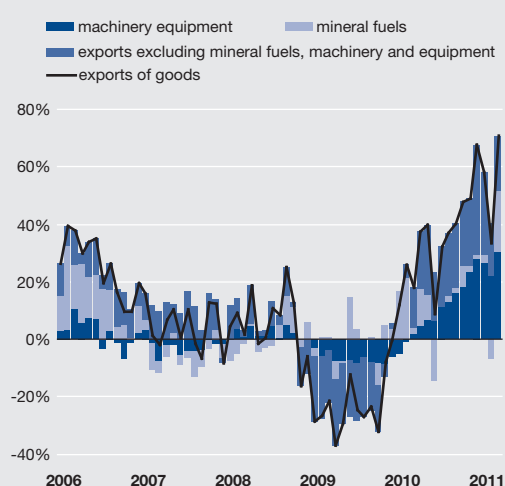
Source: Statistics Estonia

In 2012, export growth is expected to slow to 4.7% and stabilise at the level of 6.4% in 2013.

The outlook for export growth corresponds to external demand developments. Although Estonia has succeeded in continually gaining market shares, these trends are not expected to go on in the same extent over the forecast horizon. In the next few years, export growth will be hampered by little investment in the enhancement of production capacity over the past two years, and by recovering domestic demand generating more orders from the domestic market (see Figure 10).

Services export growth will be slower than the goods export growth throughout the forecast horizon, but it will be more stable, since it is less dependent on the economic activity of the trading partners. Similarly, services exports did not contract as much as goods exports during the recession. At the same time, increase in the exports of goods will fuel transport services growth.

Even though the recovery of external demand boosted exports, its effect on net exports was less significant, as imports also showed rapid growth.

Goods and services imports will show a strong growth in 2011, supported by increasing export inputs and raw material imports. Considering the recuperation of domestic consumption and implementation of postponed investment decisions, import growth is expected to outpace export growth over the forecast horizon. The current account balance for 2011 and 2012 has been improved, compared to the previous forecast. The current account surplus is generated by strong growth in the exports of goods and services, especially by the balance of services. The current account balance for 2013 will be negative, mainly due to improved corporate investment activity (see Figure 11).

**Figure 10. Exports and imports (year-on-year growth)**
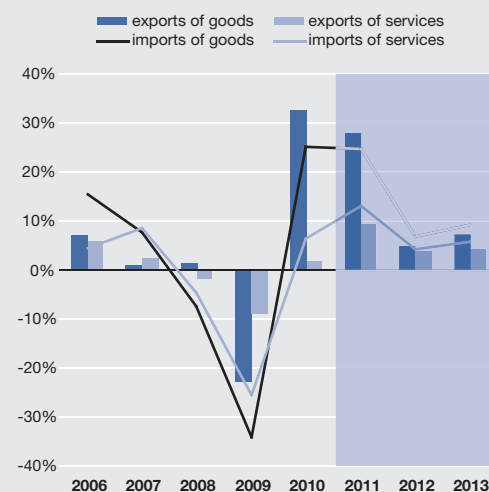


Source: Statistics Estonia

**Figure 11. External balance**
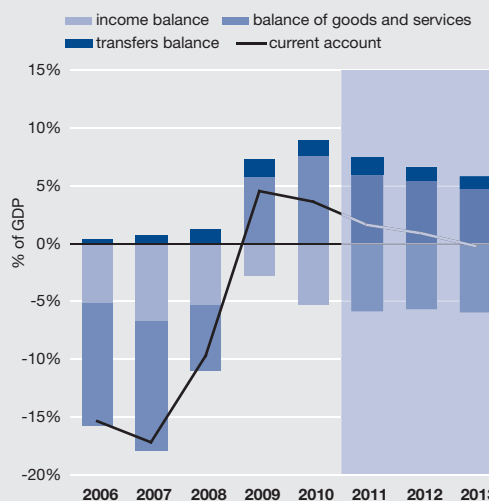


Source: Eesti Pank

Estonia's gross external debt was reduced by 5% in 2010, amounting to 16.6 billion euros at end-2010. Gross external debt is also expected to decrease in 2011, because the reduction in the reserve requirement from 15% to 2% (the norm in the euro area) allowed banks to pay back part of their external debt. Banks have also succeeded in increasing the share of resources engaged from the domestic market. The combination of these factors will reduce the gross external debt to 100.9% of the GDP in 2011 and to 88.2% of the GDP in 2013, thus reaching the level of 2006.

## Labour market

The labour market adjusted to the crisis through three channels – a decline in employment, a decline in working hours per employed person, and a slight decline in wages per working hour. Changes in the compensation of emloyees followed the change in GDP at current prices with a two-quarter time-lag. The adjustment in the labour market significantly reduced the wage and productivity gap, which had emerged in the boom years.

Recent developments in employment, working hours and wages indicate that the adjustment of the labour market through a decrease in employment, working hours and wages has been completed. Compensation per employee started growing already in the second half of 2010, with the increase being slower than growth in labour productivity per head. Unit labour costs decreased and the profit margins increased. Due to the time-lag between economic growth and wage adjustments, there is a risk that the acceleration of economic expansion in the first half of 2011 will generate a wage growth that is faster than the productivity growth in the middle of the year, when the economic growth rate will have decelerated to a sustainable path. In this case, labour costs will again exceed economic growth, generating inflationary pressures.

### *Employment and productivity*

Labour demand as reflected by the total hours worked started growing in the second quarter of 2010 – two quarters later than the real GDP. Hours worked per employee, which were scaled down during the crisis, were the first to start recovering. Employment in persons started increasing from the third quarter. Due to the stronger-than-expected recovery in the manufacturing sector, the rate of growth in employment and drop in unemployment in the fourth quarter of 2010 and the first quarter of 2011 exceeded our previous forecast. Total employment grew by 2.1% in the last quarter of 2010 and by 6.8% in the first quarter of 2011.

Contributors to total employment growth included also the Estonian residents working abroad, especially in the fourth quarter of 2010. These people are covered by the Estonian employment statistics, since Estonia remains their permanent residence even while working abroad, and they are thus closely related to their home country. The phenomenon is also referred to as pendulum migration. Construction, transportation, storage and manufacturing are the most popular fields of activity for Estonian residents working abroad. It is quite obvious that the recession in the local construction sector, strong recovery of the Scandinavian countries and the large gap in relative wages favoured pendulum migration. With the recovery of the construction sector, the effect of such "push factors" will be reduced. In the forecast, we assume that domestic and national employment will grow at the same rate. This could be considered a conservative or neutral assumption. Whether the Estonian residents working abroad will migrate permanently or return to their homeland when the situation improves is an important issue in preparing long-term forecasts and assessing the economic potential.

Even though the first quarter of 2011 experienced exceptionally rapid employment growth, it

is unlikely to be a one-off rise. Conjunctural indicators for the second quarter and statistics on registered unemployment point to a continued strong growth momentum. Peaking in the second quarter of 2010 at 18%, registered unemployment fell below 10% in May 2011. According to the forecast, employment growth will decelerate in the coming years and the number of the employed is expected to reach the pre-boom level of 2005-2006 in 2013. The increase in the number of working hours will be the highest in 2011, and will continue at a slower rate until the end of the forecast horizon (see Figure 12). Employment is expected to grow mostly in the private sector in 2011–2013. Employment in the government sector is forecasted on the basis of the State Budget Strategy, which establishes strict limitations on the increase in public sector labour costs. Still, working hours per employee will grow in the public sector as well, due to the gradual restoration of working hours that were scaled down for budget consolidation purposes.

The flexibility of companies and their ability to cope with the consequences of the crisis has enhanced production efficiency and increased labour productivity. Quick productivity growth in 2010 is partially related to the labour market's lagged response, to the decline in demand – many companies did not adjust their staff to the contraction in production volumes before the beginning of 2010. With the temporary factors receding, growth in productivity decelerated in the last quarters and it will converge to its long-term annual rate of 3–4% in the forecast period, as is determined by technology and human capital growth.

***Unemployment***
Unemployment growth was the price the Estonian economy had to pay for the crisis. Unemployment amounted to 19.8% in the first quarter of 2010 – according to the available statistics, the highest level after Estonia regained inde-



**Figure 12. Growth in the number of hours worked**

Source: Statistics Estonia
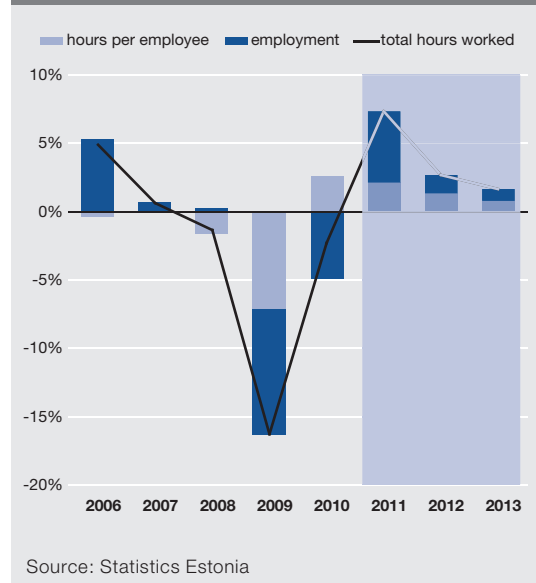
pendence. By the time the forecast was compiled, unemployment had decreased by nearly 5 percentage points, significantly exceeding our previous expectations and attesting to the flexibility of the Estonian labour market. The unemployment depletion rate will decelerate in the coming years, but a downward trend is expected to continue for the entire forecast horizon.

The estimated unemployment rate depends on employment and the economic activity of the working population – i.e. the activity rate. The rise in activity rate in 2006 has proved more sustainable than expected. Firstly, this can be explained by the change in the age structure of the working population – the large birth cohort of the Singing Revolution reaching the best working age where the activity rate is the highest. Secondly, due to the gradual raising of women's retirement age, the activity rate of older women has risen. The number of the discouraged, i.e those who have given up hope of finding a job, has not significantly increased. This is probably attributable to positive developments in the economy and

changes in labour market regulations. We do not expect a large increase in the number of people giving up their search for a job in the forecast period. The unemployment rate will drop in the coming years, fuelled mainly by employment growth, and dropping below 10% by the end of the forecast horizon (see Figure 13).

The unemployment rate will decline in the forecast period, but the share of long-term unemployment will increase. A further drop in unemployment is progressively hindered by the gap between the qualification and geographical location of the unemployed and the needs of employers. The skills of people who lost their job during the crisis might not correspond to the needs of the recovering labour market and the retraining of the unemployed and enhancement of their qualification is time-consuming. Indeed, the duration of unemployment itself will lower the probability of finding a job – over time, the search intensity will wane, and competitiveness will decrease. Structural unemployment will thus remain high for the time being and the employers' difficulties in finding suitable employees might result in higher wage offers. This, in turn, will endorse wage growth that exceeds productivity growth and generate inflationary pressures.

Labour market policy reforms support a quicker shrinkage in long-term unemployment than after the Russian crisis. In recent years, labour market institutions have been reformed, and measures targeted at the unemployed have been efficiently developed. The budget funds assigned to active labour market measures have also substantially increased. Health insurance, which is offered to all the registered unemployed since 2009, represents a policy measure that urges to continue the search. While a year ago, the main target group consisted of young people entering the labour market, labour market measures in the coming years should be directed towards the activation of those who have been unemployed for a long period of time.



Figure 13. Employment and unemployment

Source: Statistics Estonia
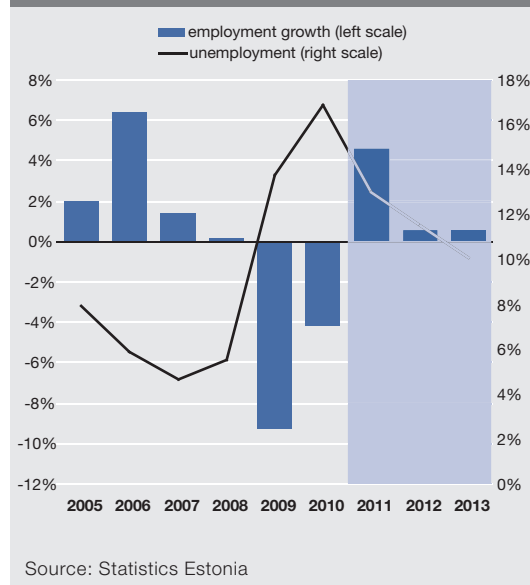
***Wages and labour costs***

Labour cost growth will gradually accelerate in the coming years, with several channels exerting wage pressures. The strong productivity growth and enhanced profitability of the exporting sector will allow to restore performance pay and motivational wages there already in 2011. The number of orders in the construction sector, which experienced the deepest contraction in employment during the recession, will start growing, fuelled by growing investment activity. According to the labour force survey, a considerable number of the Estonian residents have left to work in the construction sector abroad after the crisis. Thus, with the increased labour demand in the construction sector, the supply of skilled workers may prove to be too low, regardless of the high rate of general unemployment, exerting wage pressures.

Wage growth in the private sector and the relatively large drop in purchasing power in 2010–2011 are expected to generate wage pressures also in the public sector. The wages in education

that were cut as a part of state budget consolidation measures have not been restored yet and the Estonian Health Insurance Fund has decided not to raise the prices of health services to the pre-crisis level for 2011. Due to strong economic growth and good tax revenues, it will be increasingly difficult for the government to stand up to the wage pressures.

Even though trade unions play a much more modest role in wage regulation in Estonia than in other European countries, they could serve as coordinators of wage demands in the current economic growth stage. The minimum wage was last raised in 2007, so we may also expect intense negotiations on minimum wage this autumn, especially considering the rapid food price increase. This exerts the strongest impact on the receivers of the minimum wage, as food makes up a large share of their consumer basket. The unused labour resource – the unemployed – remains the main factor curbing wage growth. In the public sector, wage growth is restrained by conservative fiscal policy which sets limitations on the growth in government-sector labour costs. We expect wage growth to accelerate to nearly 7% per employee in 2013 (see Figure 15).

**Prices**

Inflation has been highly volatile in Estonia in recent years, due to both domestic and external factors. Inflation[7] slowed to 0.2% in the downturn in 2009, when the prices of the main goods groups decreased in the second half of the year. Without the indirect tax increase, prices would have fallen by nearly 2.5% and the GDP deflator by 2% in 2009 (see Figure 14). When global economic activity started to recover, inflation gained momentum in three stages. In the first half of 2010, the price of imported energy showed the biggest increase. Fuelled by crude oil price hikes, the inflation of motor fuel amounted to 32% in April 2010, year-on-year.

[7] The chapter refers to the Harmonised Index of Consumer Prices (HICP).



Figure 14. Growth rates of deflators
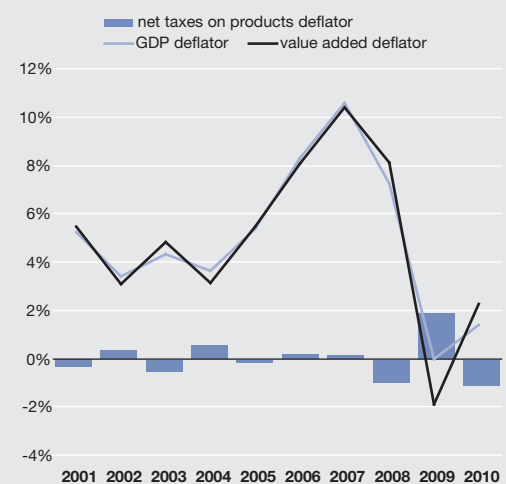
Sources: Statistics Estonia, Eesti Pank



Figure 15. Profit margin indicator growth

Sources: Statistics Estonia, Eesti Pank

The global price of all main commodities continued to rise in the second half of the year, with the prices of food and industrial raw materials posting new records. The main difference from the last rapid price increase period (2007-2008) was the lower inflationary pressure exerted by domestic demand factors.

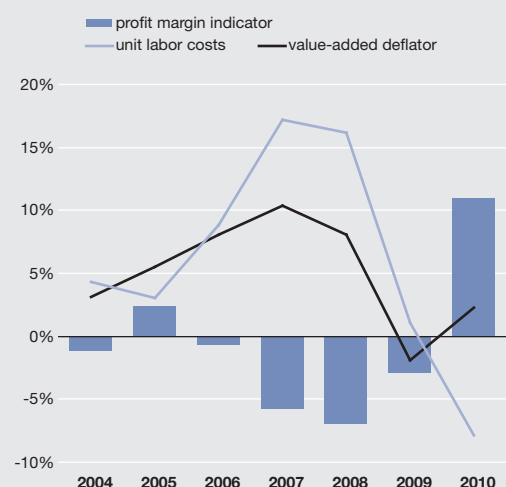Estonia's general price level showed no changes upon the adoption of the euro in January 2011. This may have been due to consumers' caution, which was mainly reflected in the contraction of retail sales volumes. The price increase of some goods and services is nevertheless attributable to the changeover. Its total effect on inflation amounted to an estimated 0.3 percentage points (see Box 4). In February, consumer prices rose by 5.5%, year-on-year, declining to 5.1% due to the high reference base in March. The key contributors included a sharp increase in the price of certain food commodities (above all, coffee and sugar), as well as the abnormal volatility of fruit and vegetable prices. April saw the unexpectedly broad-based food price growth continuing, which boosted inflation to 5.4%.

**Box 4. Inflationary effects of the adoption of the euro in Estonia**

On 1 January 2011, Estonia became full member of the European Monetary Union, with the euro introduced as legal tender. The rise in the inflation expectations of households in the second half of 2010, as registered by the consumer survey of the Estonian Institute of Economic Research, reflected fears of a price increase related to the changeover to the euro. Inflation expectations retreated in the first quarter of 2011, as the euro did not trigger a price hike (see Figure a). Our calculations show that the faster than usual growth of CPI components from December to March contributed 0.3 percentage points to inflation. According to Eurostat, the euro's impact on inflation was 0.2–0.3 percentage points[8].

In January, the consumer price index increased by 5.3% year-on-year, with the price level remaining unchanged from December 2010. The monthly growth was lowered by 0.1 percentage points by the decrease in the price of electricity and gas, but it is likely companies avoided raising prices in January due to increased public attention and temporary weaker demand.

**Figure a. Consumer price expectations and CPI inflation**



CPI yearly growth (left scale)
consumer survey: prices in the next 12 months (right scale)

Source: Statistics Estonia, Estonian Institute of Economic Research

Changeover to a different currency may impact inflation in several ways and it may cause a temporary acceleration in price growth. First of all, prices may rise more than usual due to consumers'

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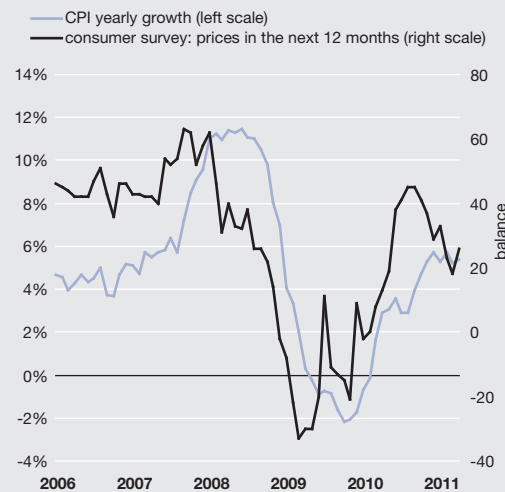
[8] See http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/documents_pub/Euro_changeover_report_EE.pdf.

lower price sensitivity, since it is more time intensive and thus costly to qualify prices as high or low in the new currency. This effect was not confirmed by retail trade data in the start of the year, which show that people's insecurity made them postpone consumption rather than step it up.

Second of all, changing prices (reprinting of restaurant menus and price tags, for example) entails costs. During the changeover, companies had to change price lists and cover the related expenditure anyway, so the marginal cost of changing prices was zero. Thus, *ceteris paribus*, it can be expected that price movements will be more frequent and input prices will pass through to consumer prices more extensively.

The third way how the adoption of the euro may affect inflation is rounding and psychological price setting. For instance, the prices of tickets, services and menu items tend to end in zero or five, whereas food and clothing prices often end in nine. Several other inflationary economic processes, such as the recovery of demand after the downturn, the hike in commodity and oil prices in the global market, and growing external demand for the Estonian products may increase the relative frequency of upward rounding.

In order to analyse the impact of the euro, we conducted a study of the CPI sub-indices to discover unusual price movements from December 2010 to March 2011. The same method was also used by Eurostat to assess the impact of the euro adoption in Estonia and by the Institute of Macroeconomic Analysis and Development of the Slovenian government to do the same for Slovenia[9]. We excluded from our calculations the prices of food, fuel and transport services, since these were affected by commodity price developments. Administered prices were also excluded. Larger than usual increases were found mainly for various services and for goods and services related to spending leisure time. All in all, the contribution of the faster-than-usual growth to inflation over the four months under review was 0.3 percentage points, which broadly coincides with Eurostat's assessment.

Although the described method has been used in several studies, there are some serious caveats that need to be mentioned. On the one hand, it underestimates the effect of the euro adoption, because it only looks at the historically abnormally high growth rates, whereas the impact of the euro may remain within the normal range. In addition, the changeover may have increased the pass-through of the commodity price hike to the prices of goods excluded from the study. On the other hand, it may overestimate the effect of the euro, since part of the price growth included in the calculations may have been caused by commodity prices. For example, costs in catering facilities increased because of food price growth. To conclude, it can be said that the adoption of the euro does affect inflation, but it is hard to quantify. In order to get more exact results, it would be necessary to analyse detailed data on prices instead of price indices, but these are not available.

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[9] See http://www.stat.si/doc/evro/euro_changeover_effect_on_inflation_in_slovenia-imad_02mar07.doc.

The inflation forecast has been significantly raised, compared to the autumn forecast, with estimated inflation for 2011 amounting to 4.7%. Still, the key factor – commodity price increases in the global market – has retreated by now. The short-term consequences for consumers would mainly include a drop in the price of motor fuel. In the medium term, this could contribute to the stabilisation of the general price level. By the beginning of 2012, inflation is forecasted to slow to 4%. The inflation rate will decelerate in the fourth quarter, partially due to a change in the reference base.

In 2010, companies succeeded in recovering a bulk of their profitability lost in the wage race in the previous four years. Some branches (e.g. the food supply chain) could raise prices beyond the increase in the price of their production inputs. The profit margin indicator[10] rose by more than 10% in 2010, mostly as a result of the 7.8% contraction in unit labour costs (see Figure 15).

In 2012-2013, the main risk related to the inflation forecast will be the intensification of second-round effects of the price increase, especially in the non-tradable sector. In order for unemployment to continue to decrease, wage growth must be in line with productivity growth. The forecast sees a decrease in real unit labour costs in the forecast horizon.

### Food
The broad-based increase in the price of food started in the fourth quarter of 2010, with the price of dairy and bread products soaring the most. The price level of these food products has shown stabilisation signs in recent months. The growing price of vegetables, coffee and sugar was the key contributor to inflation in the first quarter of 2011. April saw growth in the price of meat products. This was not unexpected, considering the previous increase in feed grain

[10] Profit margin indicator is the ratio of the value added deflator and nominal unit labour costs indices.

prices. Fuelled by the raised excise duty, the price of tobacco products went up by 9.8% in March-April. This will contribute 0.2 percentage points to the 2011 inflation.

Considering the abrupt increase in the price of food in Estonia, compared to other euro area countries, it would be increasingly difficult to find ground for a further rise in food prices. The annual increase in the price of food amounted to 11.5% in April 2011, and it is expected to decline to 5% by the end of the year. Based on futures contract prices, the price of cereals in the global market is expected to remain high in the second half of the year, contributing to the sustained high price level of processed food, such as bread, meat and milk. An improvement in weather conditions could result in a year-on-year fall in the price of fruit and vegetables.

### Energy
Energy price, which has been the major source of forecast revisions, will grow by nearly 7% in Estonia in 2011. The price of crude oil rose from 80 USD per barrel in autumn to 120 USD in April-May. It is assumed that the price of crude oil will not change significantly in the forecast period, and the markets are expecting crude oil prices to decline to 104 USD per barrel by 2013.

Electricity and thermal energy prices will continue to increase in the second half of 2011. In August, network charges will raise electricity price by 6%. It is expected to soar further in 2013, due to the opening of the electricity market. The extent of the price increase is still unclear, as it depends on a multitude of factors. The forecast assumes a 20% increase in the price of electricity, directly contributing 0.7 percentage points to inflation.

As the new price formula enables Estonia to import natural gas at a more favourable price than in 2010, the price of natural gas for households dropped by 8% in January. The previous oil price increase will pass through to ther-

mal energy prices with a time-lag of up to nine months. On the whole, the increase in the price of thermal energy in the second half of the year will be smaller than previously forecasted.

### Core inflation

Core inflation remained below 2% in the first quarter, though its composition indicated some unfavourable developments. Services inflation advanced to 3.4% in April, and it was broad-based. The main reason lies in the energy price hike and wage growth. Furthermore, it has been easier for the services sector to raise prices after the adoption of the euro. Rent increases have to do with the real estate market showing signs of recovery.

The price movements of industrial goods have not deviated much from their usual seasonal pattern. The recent increase in the price of vehicles is an exception, and can be attributed to growth in demand, production difficulties in Japan, as well as the upcoming one-third rise in customs duties in CIS countries. The sharp rise in the price of metal, cotton and fibre in the global market in the fourth quarter of 2010 and at the beginning of 2011 constitutes a risk. These factors have not yet totally passed through to import prices. Nevertheless, industrial goods inflation should not differ much from the average in the euro area in the long term, considering competition.

The core inflation rate is expected to gradually pick up over the forecast horizon together with the recovery in economic activity, amounting to 2.8% in 2013 (see Figure 16).

### General government

The Government is not planning major changes in fiscal policy for the period under observation. In 2011–2012, fiscal balance will still be largely influenced by the consolidation measures of 2009 and issues related to trading with AAUs. One-off and temporary factors significantly influence both the



**Figure 16. Inflation**

Sources: Statistics Estonia, Eesti Pank
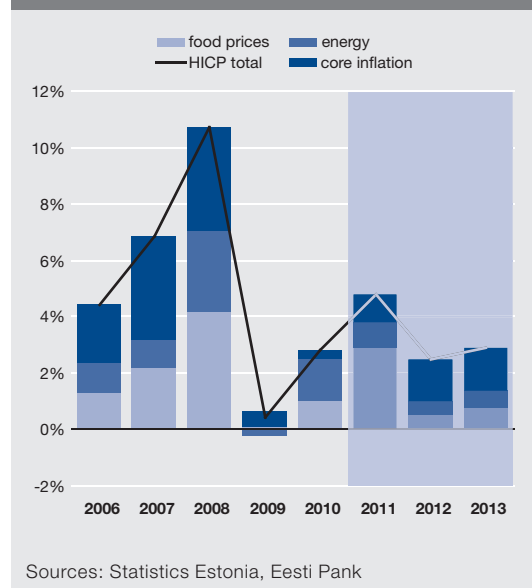
government revenues and expenditures. The level of expenditures and revenues is also shaped by large funds from the budget of the European Union.

### General government revenues

Although the Estonian economy started recovering already in the fourth quarter of 2009, no rapid growth in tax revenues has occurred. This is mostly because the pick-up in Estonia's economic growth has mainly been export-driven, and it will take time before export income starts bolstering the growth of such domestic demand components which yield greater tax revenues. In addition, the income from selling assets and the withdrawal of dividends, which temporarily picked up during the downturn, started to decrease this year. The tax revenue forecast relies on an assumption that tax rates will remain the same (excluding the tobacco excise tax, which rises 10% at the beginning of 2012 and 2013) and the one-off and temporary measures adopted during the recession will be terminated. The government will restore payments to the second pillar of funded pensions. Technically,

this means that the tax burden will decrease. The fiscal burden will decrease owing to the less tax rich GDP structure from the level of 2010 by 1.5 percentage points to 32% of GDP by 2013.
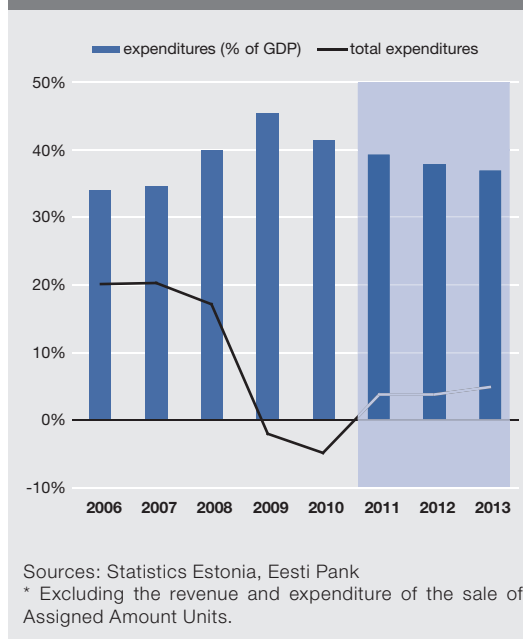
### General government expenditures

According to the national fiscal strategy, the government's aim is to restore the budget surplus by 2013. In order to achieve this, the government should use the increasing tax revenue primarily to improve its fiscal position. In addition, the forecast assumes that old-age pensions will start increasing in line with the index again from the next year – this will entail a moderate increase in social transfers. The latter are partially offset by shrinking unemployment related expenditures. Increasing expenses more slowly than taxes is sensible not only when recovering from an economic downturn, but also in the long run (see Figure 17).

### Fiscal balance and debt

In the forecast period, the nominal balance of the state budget will be strongly influenced by the income received from the sales of AAUs and the expenses made on their account. The income from the sales of AAUs will improve the fiscal balance of 2010 and 2011 by 1.1 and 0.4 percentage points in ratio to GDP, respectively, but the expenses incurred on their account will increase the 2012 budget deficit by 1.3 percentage points. In 2013, after the effects of sales of AAUs and other short-term factors have abated, the consolidated budget will reach a small surplus.

Structural budget balance, i.e. the fiscal position indicator that excludes the cyclical impact and temporary measures, will be in surplus throughout the entire forecast period and will remain virtually the same. This means that the government is not implementing discretionary fiscal policy and the nominal fiscal balance will improve owing to the recovery of the economy's cyclical position (see Figure 18).



**Figure 17. General government expenditure growth***

Sources: Statistics Estonia, Eesti Pank
* Excluding the revenue and expenditure of the sale of Assigned Amount Units.

The government sector's debt burden declined to 6.6% of GDP by end-2010. Compared to end-2009, nominal debt remained almost the same, decreasing by 40 million euros to 950 million euros. The shrinkage in government debt to GDP ratio mainly stemmed from GDP growth. The government sector's debt burden is expected to remain at 6-7% of GDP throughout the forecast period. Since, according to the forecast, the central government and local governments will run deficits in the forthcoming years, they are expected to borrow, while social insurance funds with surpluses will increase their reserves.

### Banking sector and financing of the economy

#### Credit supply

So far, the euro area's debt crisis has only affected single countries and has not spread all over Europe. In Sweden, the measures adopted by regulators to cool off the real estate sector

have not entailed any setbacks to the real econ-
omy. The parent banks' financing conditions of
banks operating in Estonia are comparable to
those six months ago. Although Swedish banks
are generally better capitalised than other Euro-
pean banks, they are still very sensitive to mar-
ket developments and to prevailing trends due
to their relatively smaller share of deposits. In
this context, it is necessary to consider the risk
related to Swedish real estate prices, which, may
exert substantial negative influence on the entire
Estonian financial system through the financing
of parent banks.[11]

The situation of banks in Estonia is improving.
Although the volume of non-performing loans is
still large, their stock in the portfolio is expected
to decrease in the coming years. The banking
sector is posting profits again due to contracting
loan provisions and decreasing financing costs.
Capitalisation is strong and there are enough
funds for lending available in the local market.
The loan market analysis[12] indicates that although
large companies have an advantage, banks are
willing to take risks and fund projects that are
necessary for sustainable economic growth.

Interest margins of loans to households, which
had soared during the global downturn, abated
by the end of the first quarter of 2011. Since the
economic environment is improving, both house-
hold and corporate loan interest margins are
expected to decline.

Considering the current capital buffer and the
expected improvement in capitalisation, the
planned tightening of the Basel III capital regula-
tion will not exert a strong direct influence on the
lending capacities of local banks or the branches
of foreign banks operating in Estonia. Meanwhile,
the higher capital requirements imposed on
European banks may affect the financing envi-



Figure 18. Fiscal stance

Sources: Statistics Estonia, Eesti Pank

ronment of banks in general and influence the
local lending conditions through parent banks.

***Credit demand***

The investment structure of companies in the
new economic cycle is different: less is invested
in real estate and more in machinery and equip-
ment. As the latter investments are smaller,
they also require less loan resources and there-
fore, credit has less impact on the new growth
cycle. While credit demand was low at the start
of 2011, some growth may be expected in the
second half, when companies start requiring
additional funds to finance their investment.
Although credit demand is also expected to
increase due to growing investments, several
factors may restrain companies' desire to bor-
row. Compared to earlier periods, investment is
increasingly funded from different sources such
as equity and foreign borrowing. In addition, the
high debt burden of the non-financial sector may
curb companies' wish to take on new long-term
liabilities.

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[11] See Financial Stability Review No 1/2011.

[12] See Lending Review No 1/2011 (in publication).

In 2010, companies continued to repay their loans and increase equity, reducing their dependence on external financing sources. The loan stock of companies declined by over 0.4 billion euros within the year, while equity increased by a total of 2.7 billion euros. The amount of new loans and leases granted to companies in the first quarter of 2011 rose by 10% compared to last year, primarily owing to growth in the short-term loan volume. In the coming quarters new loans will increase mainly due to short-term financing, which is increasingly needed in the improving economic environment as companies' operations are expanding. Using short-term credit to finance companies' operations was exceptionally low at the end of last year – therefore, due to the recovering and growing operating capacity, the use of this financing source is expected to grow (see Figure 19).

Positive labour market developments boost the confidence and incomes of households, which gradually increases their willingness to obtain new loans. Real estate has remained affordable, which fosters the improvement of demand. This, in turn, motivates developers to build new housing. The housing loan market has recovered more modestly than expected – in the first quarter, the amount of housing loans issued was just 4% larger than a year ago. In the second half of 2011, however, the borrowing activity of households is expected to pick up. In the long run, growth in the stock of housing loans will be driven by the currently very low share of financing real estate purchases with loans, which is expected to increase. Household consumption is increasing along with the improvement of the economic environment, but it is funded by current incomes and collected savings. Owing to the recent crisis experience, the financial behaviour of households remains cautious, which is expressed by the fact that compared to the previous cycle, fewer loans are obtained to finance private consumption.



**Figure 19. Use of short-term credit to finance business activities**

Sources: Eesti Pank, Statistics Estonia
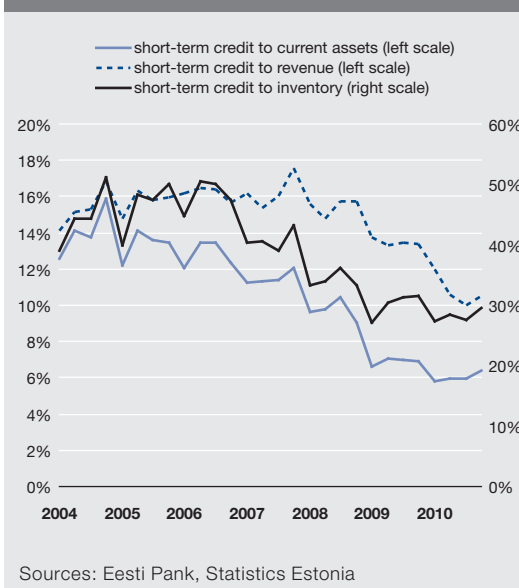
In 2011, the corporate and household loan stock is nonetheless expected to decline despite the increase in new loans issued. In 2012, however, the loan portfolio is expected to start growing again after four years of decrease (see Figure 20).

## FORECAST RISKS

Productivity growth and declining labour costs have so far kept domestic price pressures in check and helped maintain low core inflation. This has been supported by ample underutilised production capacity and high unemployment. However, growing domestic price pressures are a significant risk factor in future periods.

The alternative scenario deals with the situation where the economic production potential is smaller than in the baseline scenario. This means the economy is already operating at a level that is unsustainable in the long run and the scarcity of production inputs causes additional price and wage pressures. The increasing likelihood of this

materialising is referred to by faster inflation and growing wage pressures against the backdrop of relatively high unemployment.

The below-baseline scenario production potential may derive from several factors. First of all, we may have overestimated the past potential, meaning that the boom-time rapid expansion pushed production volumes even further beyond the potential than it was thought. Another explanation may be that production potential was more damaged in the recession than stated in the baseline scenario. This might be because those who became unemployed during the crisis have either lost their skills or have very specific know-how, which is of no use in jobs created after the downturn. Another indicator referring to a possible decline in potential is the large number of people working abroad – they do not create value-added here. Decreasing working population and the mismatch between the unemployed and newly created jobs means employers have a smaller number of candidates to choose from than expected in the baseline scenario and they may fail to find a suitable employee. As a result, people who are well-positioned in the labour market may start demanding higher wages.

The mismatch between existing skills and new jobs does not, of course, mean that new employees will not be hired or that unemployment will not decrease. Companies do wish to expand production and new employees are hired for as long as it is profitable, but the usage of poorly skilled workers reduces productivity and the marginal profit. Lower labour force productivity means that it is necessary to hire more people, leading to stronger employment growth than assumed in the baseline scenario and giving rise to labour shortage.

Skills do not conform to employers' expectations and there is also the risk of labour force leaving the country. Wage declines have already come to an end in most sectors and many private compa-



**Figure 20. Credit stock growth**
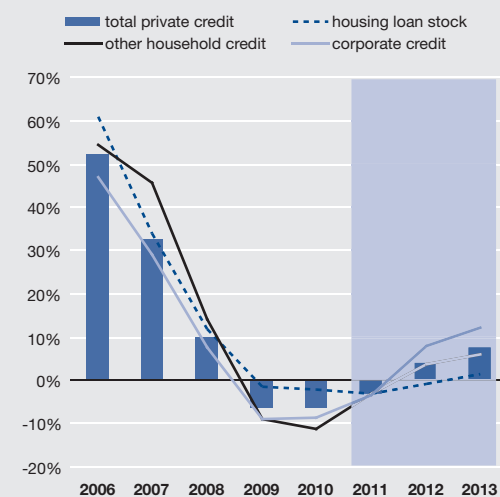
Source: Eesti Pank



**Figure 21. Growth in compensation per employee**
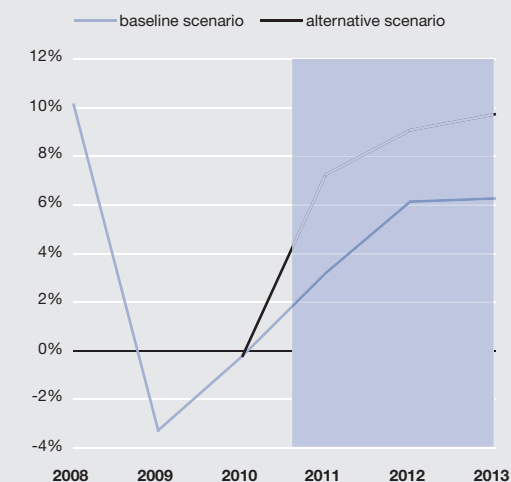
Sources: Statistics Estonia, Eesti Pank

nies have started to raise either basic wages or performance pays. Upward wage pressures are further intensified by the joint impact of labour shortage and structural mismatch. This will result in a short acceleration in economic and domestic demand growth, especially a faster restoration in private consumption. But if wage growth exceeds that of labour productivity, wage pressures will make production more expensive, inflation will pick up and export competitiveness will deteriorate (see Figure 21).

# HOW DOES THE ESTONIAN FOOD MARKET SERVE MARKET PARTICIPANTS?

**Martin Lindpere, Orsolya Soosaar (Eesti Pank)**
**Kristjan Pungas (Ministry of Finance)**
**Mario Lambing (Ministry of Economic Affairs and Communications)**

## INTRODUCTORY SUMMARY

Rising food prices have always made a significant contribution to inflation in Estonia. Food was, once again, behind the acceleration of the inflation rate in 2010. By December last year, consumer prices had risen by 5.7% compared to the previous year, including food, alcohol and tobacco by 3.3%, energy by 1.7% and core inflation components by 0.5%.

Admittedly, rising commodity prices on the world market have contributed to the increase in the prices of foodstuffs, as in the previous period of rising prices (2006–2008). Many food prices have increased at a rate comparable to the one that prevailed from 2006 to 2008, or even more. This time, too, milk and cereal products, as well as vegetables, are the main contributors to inflation. The latter product group has been excluded from this analysis, however, because its prices have evolved in quite a similar way to other countries. Unlike during the previous period of price surges, meat products have not contributed to the price increase (yet).

A graphic comparison of changes in the food price level in Estonia with other EU Member States is provided in Annex 1. For many product groups (such as dairy, cereal and meat products) the price level has varied to a significantly greater extent in Estonia than in most EU Member States since 2006, indicating a possible change in food pricing. Why might the current inflation pose problems?

1)  The current inflation rate in Estonia is higher than the equilibrium inflation. Considering the price level in Estonia, the neutral cyclical position of the economy[1] and the stable exchange rate, the equilibrium inflation could be in the order of up to 2% above the euro



**Figure 1. Annual contribution of consumer price index (CPI) to inflation**
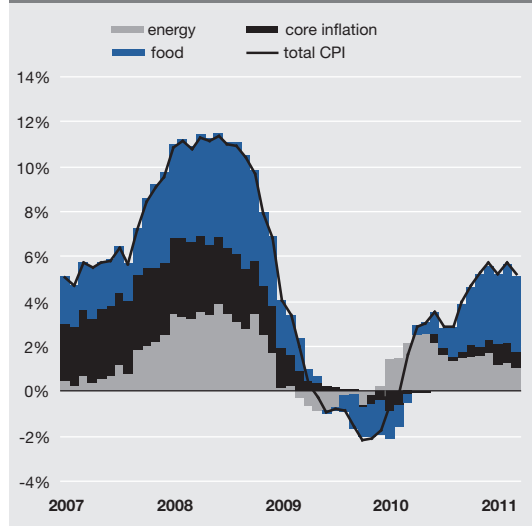


**Figure 2. Monthly contribution of consumer price index (CPI) to inflation**

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[1] The GDP gap and the fiscal impulse do not contribute to inflation.
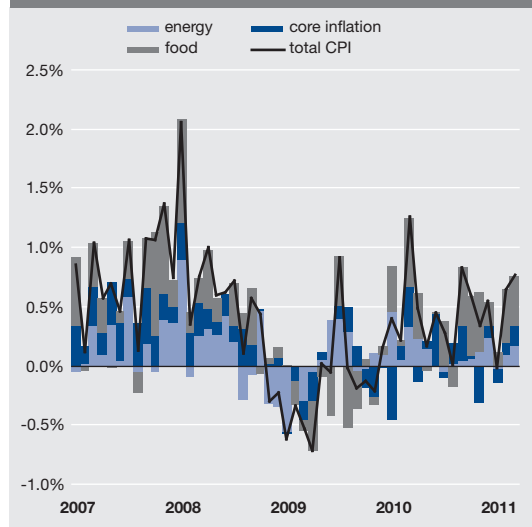
## Figure 3. Annual contribution of processed food (CPI) to inflation



Legend: milk, cheese, eggs; bread, cereals; sugar, sweets; mineral water, beverages, juices; coffee, tea, cocoa; oil, fats; other; proceed food (excluding alcohol and tobacco)
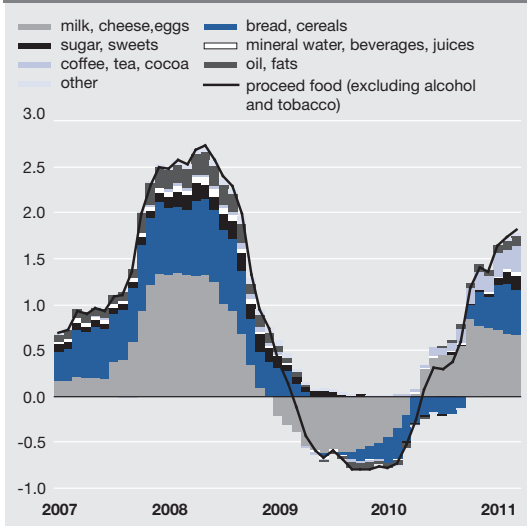
## Figure 4. Monthly contribution of processed food (CPI) to inflation



Legend: milk, cheese, eggs; bread, cereals; sugar, sweets; mineral water, beverages and juices; coffee, tea and cocoa; oils, fats; other; processed food (excluding alcohol and tobacco)
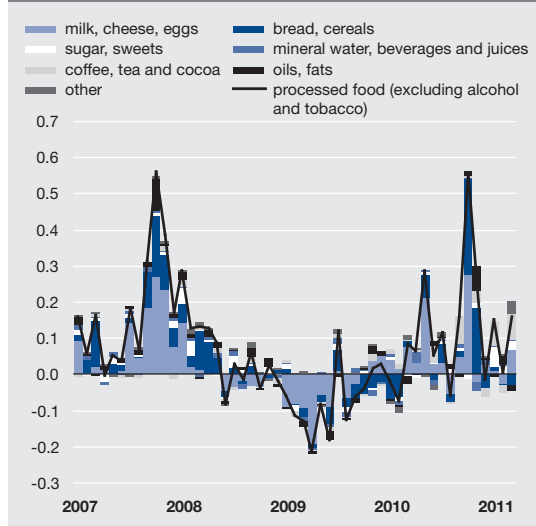
## Figure 5. Annual contribution of non-processed food (CPI) to inflation



Legend: meat and products; vegetables; fruits; fish and products; unprocessed food
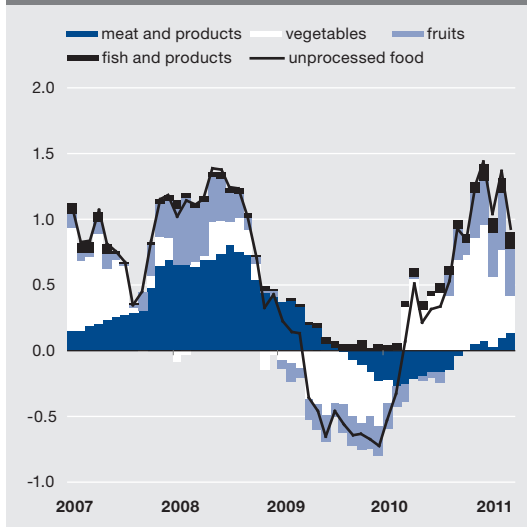
## Figure 6. Monthly contribution of non-processed food (CPI) to inflation



Legend: meat and products; fruits; unprocessed food; vegetables; fish and products
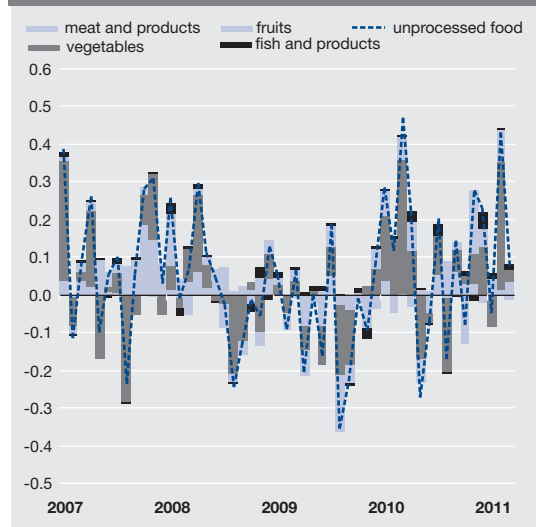
area average.[2] However, as the GDP gap (as well as the relative GDP gap compared to the euro area) was strongly negative in 2010, the inflation differential between Estonia and the euro area should currently be even lower, according to this calculation. In December, Estonia's inflation rate was 5.4% under the Harmonised Index of Consumer Prices (HICP) compared to 2.2% in the euro area. An inflation rate exceeding that of equilibrium inflation could result in wasteful or even inappropriate deployment of resources in the economy. Indications of such a trend are quite limited at the moment, though.

2) A higher inflation rate is not conducive to the recovery of the Estonian economy from the recession. A very narrow-based (mainly food) and strong price increase will redistribute money within the economy. While the income of a small number of market participants is increasing, the purchasing power of the vast majority of households is decreasing. The increase in the real spending of those benefitting from the price surges will probably be lower than the contraction of the real spending of the ones whose purchasing power is diminishing, which means that, overall, economic growth will suffer.

3) Having been among the countries with a low inflation rate, last year Estonia became one of the Member States of the European Union in which inflation was highest. This might lead to a reputation risk, especially in light of the introduction of the euro. Continuing rapid price advances over a longer term will reduce the competitiveness of the economy.

4) In comparison to many other countries, retail food prices have demonstrated much greater

instability in Estonia in recent years. Volatility in prices could discourage investments, reducing the response of food supply to price increases.

The project aims to analyse the causes of the acceleration of food price advances in 2010, looking back at the previous boom as well. Food price formation is analysed from three different angles, and margins are calculated for selected product groups.

1) We evaluate the rate and extent of the pass-through of commodity prices to producer and consumer prices in Estonia.

2) We evaluate the impact of food exports on food prices.

3) We evaluate the intensity of competition in the food supply chain and its potential impact on food prices.

The following are the main findings and some conclusions of the different parts of the analysis.

1) Commodities play a major role in the formation of the cost price of foodstuffs. Compared to the impact of commodities, the tax changes introduced in recent years play an insignificant role in changes to cost price. The same can be said about the energy input of the supply chain, although the opening up of the electricity market in 2010 resulted in price increases. The contribution of labour costs to food price increases has been modest as well, amounting to a couple of percent during the years of fast growth in wages.

2) Changes in the margins of processing companies and retailers have made inflation in Estonia more volatile, weakening or amplifying the pass-through of cost price changes to the consumer prices of food. In different periods this factor may have had a far more significant impact on changes in the prices of some products compared to the contribution of commodities. The margins of selected foodstuffs suggest that trading

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[2] From 1996 to 2009, the average inflation differential between Estonia and the euro area ranged between 0.5% and 0.8% per 10% price level difference. Thus, when the price level in Estonia accounted for 50% of the euro area average, the equilibrium inflation rate in Estonia was 2.5–4% above the inflation in the euro area. Source: Inflation Differentials Between Eastern and Western Europe: Should the Maastricht Inflation Criterion Be Adapted?, M. Lindpere, *mimeo.*

tactics changed in 2007 when the margins of processing companies and retailers were predominantly higher. This is how record profits were earned. The decrease in the prices of food commodities that began in 2008 and continued in 2009 was not passed on to consumer prices in full. The same year saw divergent changes in margins. For some foodstuffs the margins of processing companies and retailers continued to grow, while in some cases the margins of retailers increased at the expense of processing companies. In 2010 the rise in food prices was mainly driven by increases in cost price as a result of appreciation of commodities, but for some foodstuffs also by increased margins.

3) Conclusions by product group

a. Dairy products. The consumer prices of dairy products, which have increased more than the buying-up price of milk, are characterised by large fluctuations. Such a situation is exceptional among Member States of the European Union. See the graphs in Annex 2.

i. Vector autoregressive models or VAR-based analysis suggests that the producer and consumer prices of dairy products respond to a 1% commodity price shock by an increase of more than 1%. Over the year the prices of dairy products have increased by 1.6–2%, while on average, raw milk accounts for only one third of the retail price. It takes six months or even more before the global prices of the commodity (milk powder) are passed on to producer and consumer prices, but an increase in the buying-up price of local raw milk is reflected in producer and consumer prices quickly (1-2 months). This suggests that competition forces are unable to prevent the pass-through of price advances for a long time.

ii. At the end of 2010, the buying-up price of raw milk in Estonia was one of the highest in the Central and Eastern European countries of the EU-27, while at the beginning of 2010 it was at the average level of those countries. See the graphs in Annex 3. By contrast, when compared to Western European countries our buying-up price of milk is one of the lowest, at around the same level as that of the United Kingdom, Spain and Portugal. The average difference between the buying-up price of milk between Estonia and the EU-25 has been decreasing since 2008, amounting to EUR 5 per 100 litres in 2008 and 2009 and having dropped to less than EUR 3 by now.

iii. The relation between the price of raw milk and the retail price of many dairy products is now lower than in the pre-boom period.

iv. Recent price increases cannot be fully justified by the growth in expenditure components. The reason here lies in increase in foreign demand, as it has been possible to earn far more by selling drinking milk to Russia than by selling it to the European Union or on the domestic market in Estonia. Thus, exports have increased significantly. This has enabled processing companies, in particular, to restore the margins that had dropped below the historical average of 2009–2010. By October 2010 the processing companies' margins had probably risen above the historical average for many products.

To better understand the pricing of dairy products, the strategic behaviour of companies in the different parts of the supply chain, especially since 2007, should be further investigated.

b. As for meat products, the consumer prices have been more in line with changes in production costs compared to dairy products.

i. In comparison to dairy products, the divergence of consumer prices from the price increase justified by rising commodity prices was not as significant from 2006 to 2008. According to the VAR analysis, an increase in the buying-up price of meat by 1% resulted in a mere 0.3–0.5% increase

in producer and consumer prices of meat products from 2002 to 2010 on average.

c.  The prices of bakery products have also been more in line with changes in production costs compared to dairy products, but their margins rose significantly in 2007 and 2008. The price increases in 2010 can largely be justified by rising commodity prices.

i.   The VAR analysis suggests that consumer prices of bakery products respond to changes in commodity prices with a 3- to 7-month lag. An increase in the price of the commodity by 1% results in an increase in the prices of bakery products by nearly 1%.

ii.  The relation between the price of the commodity and retail prices has risen to around the level of 2006.

iii. The export prices of white bread and bread products are statistically relevant to the retail prices of these products, while the export volumes are not. This can be explained by the fact that the export volume of cereal is somewhat volatile due to large single transactions.

d.  Differences in the pass-through of the impact of changes in commodity prices on consumer prices can be explained by the proportion of imported goods in the consumer basket. The more an industry is sheltered from foreign competition, the greater the role of domestic factors in price increases. For example, meat products and production thereof are more open to foreign competition than dairy products. See the graphs in Annex 4. Therefore, a situation where the proportion of imported goods is small and the market is characterised by oligopolistic competition is conducive to price distortions. It is highly likely that food price inflation would stabilise in Estonia if the proportion of imported goods was raised.

e.  The authors of this paper are of the opinion that the ongoing monitoring of inflation should include monitoring of price mark-ups on the basis of product groups or even individual products to a larger extent.

In a free and competitive market, consumer benefits form a phenomenon known as 'first mover disadvantage' in the game theory. This means that the company who is the first to raise its prices risks losing market share. (For this to happen, different companies' goods of the same type must be easily interchangeable, which is definitely the case with food.) By contrast, the others gain market share and cover more fixed costs at the same price level. The fewer the suppliers' opportunities to coordinate price increases, the greater the benefit for the consumer. Price agreements, on the other hand, minimise first mover disadvantage, which means that the market is less likely to serve the interests of the consumer. For example, the question arises as to how the price of black bread could make a significant leap in just one month in November 2008 (8.8%) while the price of the commodity had not changed and the price of white bread (using the same production technology) did not.

The Estonian market is small and, consequently, market concentration is high in the trade sector. Similar to the processing sector, a major concentration has occurred in the trade sector over the past 20 years. Considering the size of the country, the number of companies in Estonia's food sector is several times lower than the EU average, which makes the country more akin to the Northern European model. A small market is characterised, on the one hand, by difficulties in achieving economies of scale, and on the other hand by loss of competitive density, which can result from market concentration.

Estonia's food industry did not stand out in the background of other industries in the study of competitive density. The study was conducted at a time when numerous supermarkets were being erected in Estonia and market share was rapidly redistributed. This project looks at developments since 2006. A study that is largely based on macro- and industry-specific average indicators does not reveal systemic competition problems

in the food supply chain. This assessment does not exclude the existence of problems, however. To further analyse the competitive situation, more micro-level data are needed which are not available to the public.

Margin increases, which have been stable over a relatively long period in the different parts of the production chain, imply that competition is not fierce, although some market participants consider the situation to be the other way round. In the case of fierce competition, retail prices should follow changes in the cost price rather quickly. However, the data do not confirm this. Sudden opening of external markets can reduce the intensity of competition on the domestic market.

The competitive situation may require a more detailed examination in the plant and animal oils and fats production sector, where market concentration is very high (2 companies cover 99.5% of the market of locally produced vegetable and animal oils and fats). A weak competitive environment may be the reason for the consumer prices of cooking fats and oils having increased so significantly in Estonia in comparison with the EU-27 over the past five years, despite the relative importance of imports.

This paper provides some micro-level evidence of the downward rigidity of food prices, which indicates that the price bubbles of some products which occurred during the period of rapid economic growth might not have fully disappeared. At the macro level, comparisons of Estonian price and income levels and changes therein with other countries give rise to a suspicion of a growing bubble. This analysis is limited to food, but the findings may be characteristic of other goods in the consumer basket whose supply chain is also characterised by oligopolistic market organisation, the extensive use of domestic input and the supply of domestic output. For example, utility prices

have not been adjusted since the economic downturn. Under these circumstances it may be necessary to further explore Estonia's inflation.

# PART I. COMMODITY PRICES AND REASONS FOR THEIR INFLATION, PRIMARILY IN 2010

During the economic boom in 2007 and 2008 the retail prices of food experienced a high growth cycle around the world. Many food articles appreciated significantly even in the second half of 2010. The most common explanation for the price increases is the appreciation of commodities caused by both supply and demand factors. Although the share of commodity prices in production costs decreases along the production chain, food commodities originating from the agricultural sector (raw milk, meat and cereals) continue to represent a significant part of the retail price of food. Fluctuations in the prices of commodities are reflected in the retail prices of foodstuffs with a lag and to a lesser extent. The immediate pass-through of price shocks is prevented by long-term supply contracts, the length of the production process and uncertainty about the duration of the shock. In Estonia and the other Baltic States, food prices increased during the previous boom far more than the EU average, and the price surge accelerated more than in other countries even in the last quarter of 2010. The extent to which the increase in retail prices in Estonia at the time can be blamed on the appreciation of internationally traded commodities is an important empirical question. Evaluation of the impact of commodity prices and the dynamics of its pass-through provides important added value in terms of predicting increases in consumer prices.

In this paper, we first calculate the hypothetical growth of consumer prices if the entire commodity price shock were passed on to them one-to-one, i.e. the ceiling of the impact of commodity prices. To this end, we use a methodology that is similar to the one applied in the study published by the Institute of Economic Research in 2008 titled "Formation of food prices and changes of margins in the value chain"[3]. First, based on the cost structure of industry and retailing, we calculate the share of the cost of commodities, labour and energy in the retail price. Then, based on the prices and shares of

production costs, we find the increase in the retail price wherein the relation between production costs and retail price remains unchanged, and compare the results with actual price developments. Unlike the Institute of Economic Research, we look at price developments over several years, as this gives a better overview of the timing of the pass-through of commodity price inflation.

To assess the pass-through we then use a structural VAR model inspired by the linear version of the model described in the research published by the European Central Bank in spring 2010.[4] This is a simplified approach, since the pass-through of commodity prices need not be linear – large and sustained price shocks are more likely to be passed on than temporary and smaller ones. This can be explained by e.g. menu cost: changing prices result in costs that can make responding to small and temporary changes in prices unprofitable. Thus, a linear VAR model would overestimate the impact of small commodity price shocks and underestimate the impact of large commodity price shocks. In Estonia's situation, empirical analysis is also rendered difficult by the relatively short time series, plus an important change relating to accession to the European Union in May 2004. Very short time series affect the reliability of the estimates of parameters and prevent the assessment of equations with excessively long lags.

## COMMODITY PRICES

To select the commodity indices that are the most relevant for Estonia is a difficult task, as food commodities and the derivatives based on them are traded on many exchanges around the world. Due to the common agricultural policy, not all fluctuations in world market prices are passed on to commodity prices in EU Member States. For instance, intervention prices prevent the buying-up prices of some commodity groups

[3] http://www.agri.ee/public/juurkataloog/UURINGUD/eki_muud_uuringud/Toidukaupade_hindade_kujunemine_ja_marginaalide_muutused_vaartusahelas.pdf (in Estonian only).

[4] http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1168.pdf.

dropping below a specified level. Full convergence of prices, as well as the pass-through of short-term fluctuations, is prevented by transport costs. The shorter the shelf life of commodities, the more they are sold on the local market.

In Estonia, local farmers cover a large part of the needs of the food industry, and the local buying-up price is essentially the commodity price for the industry. Buying-up prices may be considered a connecting link that follows the prices of foreign commodities in the price chain. In an open economy, the arbitrage opportunity ensures that these prices do not differ from export and import prices over a longer period, taking into account transport costs. We will now compare the buying-up prices of milk, meat and cereals in Estonia and the prices of foreign commodities, using the average EU buying-up prices published by the European Commission as approximations. Their advantage is the impact of agricultural policy measures; in addition, other EU Members States constitute most of Estonia's export and import markets.

Raw milk spoils quickly and contains a lot of water; therefore, it is milk powders, cheeses, butters and oils made from milk fat with differing fat content that are traded on exchanges around the world. Estonia fully covers its domestic need for commodities and exported 6.4% of its output in 2009. Some dairy products (mainly cheese) are imported in small amounts. As to the commodity for milk, for the VAR model we used the European Commission's milk powder price index as the price indicator of dairy products from the European Union and, as an alternative indicator and so as to increase the reliability of the results, the buying-up price of raw milk in Estonia. Compared with the buying-up price of raw milk, the price of skimmed milk powder fluctuates more and, until 2009, the changes in it anticipated the changes in the price of raw milk by around two quarters. In 2009 the link between the two indicators changed materially: the lag decreased, and at the end of 2010 the increase in the buying-up price of milk exceeded that of powder.



**Figure 1. Annual growth rates of buying-up price of raw milk in Estonia and price of skimmed milk powder in EU**

Sources: http://ec.europa.eu/agriculture/markets/, Statistics Estonia
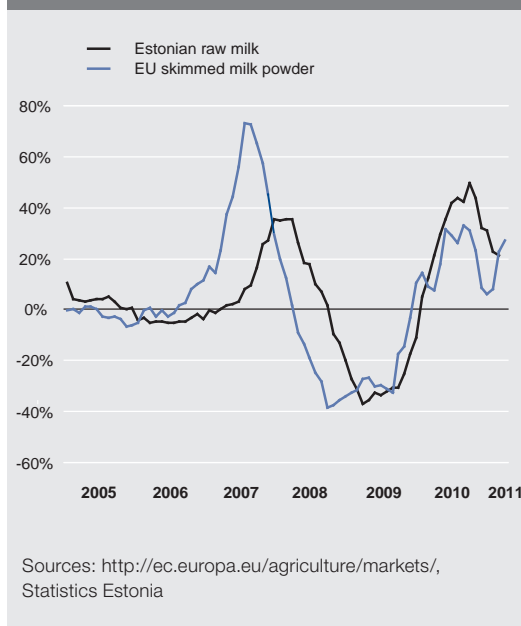
The commodity index for meat is composed on the basis of the weighted sub-indices of pork (normal) and beef (arithmetic average of the basic indices of four varieties) published by the European Commission, with the quantities of human consumption in Estonia used as weights. Unfortunately, weights only exist for 2002–2008, so the missing observations were extrapolated using the nearest available observations. As an alternative, we estimated equations using the weighted average buying-up prices of pork and beef in Estonia. It appears from the graphs in Figure 2 that the buying-up price of pork has moved hand-in-hand with the EU average, while the link is somewhat weaker in the case of beef. Compared to milk, the shelf life of meat is longer and therefore its tradability is higher. Thus, a higher level of synchronisation is the expected result. Estonia is a net importer of meat, with domestic output covering most of the needs of the market.

For the cereal commodity price, an index calculated according to the quantities of common wheat,

durum wheat and rye used for human consumption in Estonia was used. Volatility of the prices of cereal commodities is affected on the supply side by yields dependent on climatic conditions, and on the demand side by the growth in global demand. Cereals are easily storable and, therefore, easily tradable commodities, which can also be seen in the graphs depicting the average increases of buying-up prices in Estonia and the EU in Figure 3.

In summary it can be concluded that local buying-up prices of meat and cereals increased during the boom years (2007 and 2008) and in the second half of 2010 at the same pace as the EU average. The dynamics of the buying-up price of milk differed more from changes in the price of skimmed milk powder in the EU, which can largely be explained by differences between these articles.



**Figure 2. Annual growth rates of prices of beef and pork in Estonia and in EU**

Sources: http://ec.europa.eu/agriculture/markets/,
Statistics Estonia



**Figure 3. Annual growth rates of prices of wheat and rye in Estonia and EU**

Source: http://ec.europa.eu/agriculture/markets/
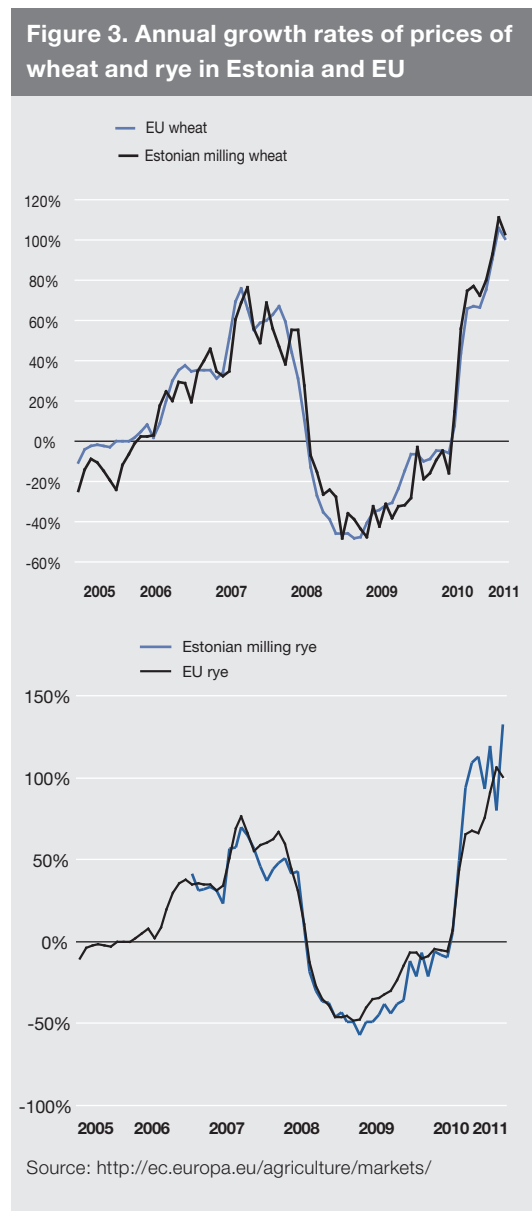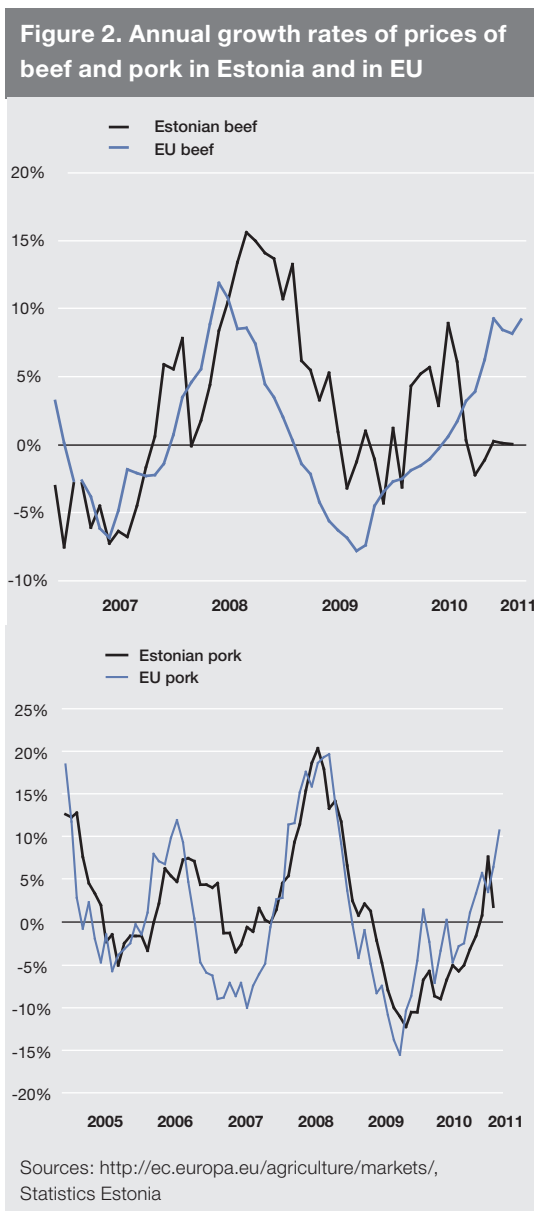
## COST STRUCTURE OF FOOD PRODUCTION AND PRICES OF COMMODITIES

This chapter aims to calculate the magnitude of the impact of changes in production input from 2005 to 2010 on the cost price of food and to compare this to consumer price developments. A number of simplifying assumptions must be used in order to determine the share of commodities and other essential items of expenditure in the end prices of product groups. First, a supply chain can contain more links than a producer and a retailer. For example, wholesalers can act as intermediaries. Then again, in practice major local producers sell their produce directly to store chains. If wholesale, however, were an important link, the share of labour and energy in the product price would be underestimated. Secondly, it is not possible to distinguish between the expenses incurred with a view to selling different product groups and thus the average estimate must be used. A number of operating expenses (such as depreciation and other costs)

are excluded. Thus, no conclusions about profitability can be drawn. Statistics Estonia does not publish the costs of commodities among industry statistics of economic indicators: these are included in general material costs. In addition to the basic commodity, the industry also uses other materials; thus, the cost of the basic commodity would be overestimated rather than underestimated.

Aggregation of the costs of the industry and the retail trade sector indicated in Table 1 was inspired by the aforementioned study of the Institute of Economic Research. The production of commodities was excluded, because changes in the prices of production input are included in the price of the commodities, and taking these into account in the cost structure would lead to double counting. For example, if the energy costs of a producer of raw milk increase, the price of raw milk will likely rise as well. The cost structure reflects the production technology. This is why it does not change much over time, as shown in Table 1.

**Table 1. Relation of production costs to retail revenue**

| Processing and preserving of meat and production of meat products | | | | | |
|---|---|---|---|---|---|
| | **2005** | **2006** | **2007** | **2008** | **2009** |
| Materials, supplies and intermediate goods | 70.4% | 67.7% | 66.1% | 67.0% | 66.3% |
| Electricity | 1.4% | 1.3% | 1.2% | 1.2% | 1.5% |
| Fuel and energy | 1.7% | 1.7% | 1.8% | 2.2% | 1.7% |
| Labour costs | 11.1% | 11.7% | 13.2% | 13.6% | 13.9% |
| **Production of dairy products** | | | | | |
| | **2005** | **2006** | **2007** | **2008** | **2009** |
| Raw milk | 48.0% | 46.0% | 43.4% | 42.6% | 42.1% |
| Electricity | 1.1% | 1.0% | 0.9% | 0.9% | 1.2% |
| Fuel and energy | 2.1% | 1.9% | 1.7% | 2.1% | 1.9% |
| Labour costs | 7.5% | 7.6% | 7.3% | 7.9% | 8.9% |
| **Production of bakery and pasta products** | | | | | |
| | **2005** | **2006** | **2007** | **2008** | **2009** |
| Materials, supplies and intermediate goods | 38.8% | 37.8% | 37.3% | 36.8% | 35.7% |
| Electricity | 2.4% | 2.0% | 1.7% | 1.5% | 1.7% |
| Fuel and energy | 2.3% | 2.1% | 2.1% | 2.7% | 2.2% |
| Labour costs | 24.0% | 23.9% | 25.0% | 24.4% | 24.6% |
| **Retail sales in non-specialist stores with food and beverages predominating, and retail sales of food, beverages and tobacco in specialist stores** | | | | | |
| Goods | **83.6%** | **81.8%** | **81.9%** | **81.9%** | **82.7%** |
| Electricity | 0.8% | 0.8% | 0.7% | 0.8% | 1.0% |
| Fuel and energy | 0.4% | 0.4% | 0.3% | 0.3% | 0.3% |
| Labour costs | 6.5% | 7.2% | 7.8% | 8.3% | 7.5% |

Commodities are: raw milk for the dairy industry; meat for the meat industry; and cereals for bakery products. The share of commodities was equated with the share of material costs. However, in the case of dairy products this was adjusted in accordance with the share of raw milk in the material costs of the dairy industry in 2007 as presented in the study of the Institute of Economic Research. As the costs of retailing cannot be differentiated by product group, the overall cost structure is used.

As for the prices of commodities, we used the buying-up prices of agricultural products published by Statistics Estonia, because meat and cereal products cover most of the local industries' needs and dairy production exceeds them.

Figure 4 shows that in 2007 and 2008 approximately half of the rise in consumer prices could be explained by increases in commodity, labour and energy costs. The other half must have resulted from an increase in other costs (for example, depreciation could have significantly contributed, considering previous increases in real estate prices) and from margins. During the crisis that followed, consumer prices dropped by a similar magnitude as production costs, which means that the level of retail prices has remained rather high since the boom years considering the input prices. This is confirmed by the analysis of margins applied by the industry and the trade sector, which indicates remarkable changes in the case of drinking milk in particular. The margins on retail sales of drinking milk were low for a long time (6.5% in 2004 and 2005 and 3% in 2006 and 2007). At the beginning of 2007, the margins were in fact negative, which was not a sustainable situation over the long term. Retail businesses likely made use of the price of drinking milk in competition for market share. At the end of 2007, differences between retail prices and the delivery prices applied by the industry started to grow and amounted to 17% on average in 2009 and 2010. This implies a change in pricing policy. As drinking milk accounted for as much as 20.2% of the consumer basket of dairy products in 2009



Figure 4. Annual growth rates of consumer prices and production costs of dairy products
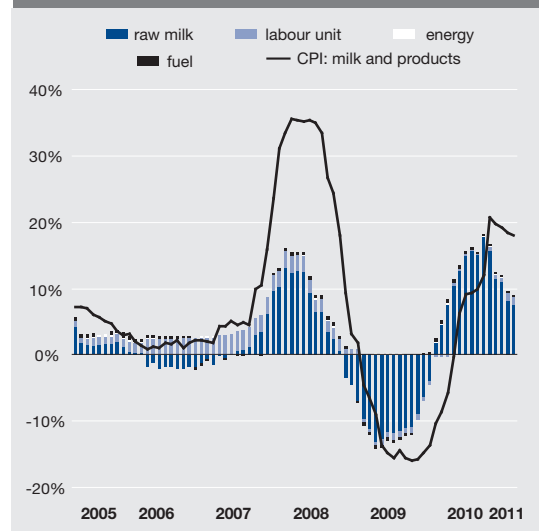
and 2010, this change significantly affected the dynamics of the overall components of dairy products. From 2009 onwards, the consumer prices of dairy products have moved quite consistently with the price dynamics of input (with a lag of a few months), including during the growth cycle in 2010.

As for meat products, the consumer prices of pork and beef and other types of meat cannot, unfortunately, be distinguished. Therefore, the meat products component of the consumer price index is used in Figure 5. The buying-up price of pork was used as the commodity price, as pork accounts for the majority of meat consumption in Estonia. Demand for meat products increased during the economic boom (2007-2008), resulting in rising retail prices. The buying-up price of meat began to increase in 2008, after about a quarter. During the economic downturn following the boom, commodity prices fell slightly more than the retail prices of meat, but overall the dynamics of retail prices is explained by the prices of input far more clearly than in the case of dairy products. The buying-up price of pork remained stable in Europe and Estonia in the second half of 2010,

but the sharply increasing prices of feed cereals indicate upward pressure on prices in the near future.

To analyse the price developments of bakery products we used the price of milling wheat published in the database of the European Commission and the weighted average buying-up price of rye in Estonia as the commodity prices. Unfortunately, the cost structure of bakery products is less precise than that of milk and meat products because of the additional link in the chain of production – the milling industry – regarding which there are insufficient data due to the small number of businesses. In the calculations we had to use the share (79%) of the material costs (mostly cereals) in the milling industry's total revenue for 2002 for the entire period under observation.

Retail prices of bakery products follow changes in production costs with a lag of about half a year. This is logical, as flour can be stored and reserved. According to the data of Statistics Estonia, the buying-up prices of both wheat and rye dropped in the second half of 2008 by 40% compared to the first half-year, but the annual increase in prices of bakery products only became negative a year later. During the boom, retail prices grew more than the costs observed, but the difference was much smaller than in the case of dairy products. Due to unfavourable weather conditions around the world, the buying-up price of cereals increased in Estonia in the second half of 2010 at almost the same pace as in 2007. According to calculations, the annual growth rate of commodities exceeds the rise in retail prices in 2010.

## TIMING AND EXTENT OF COMMODITY PRICE SHOCKS

The temporal profile and extent of the pass-through of commodity price shocks to consumer prices can be examined with the help of structural VAR models. The following is inspired by research conducted by the European Central

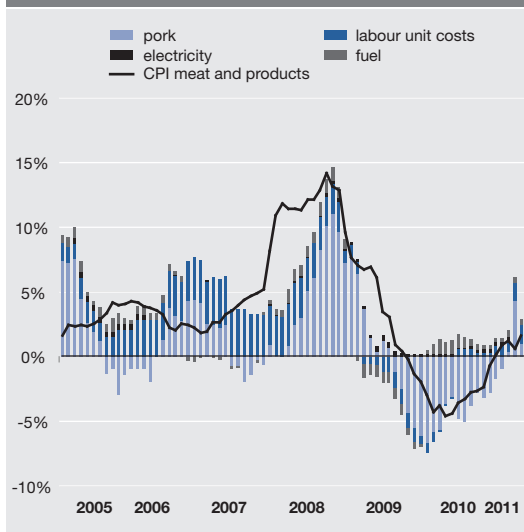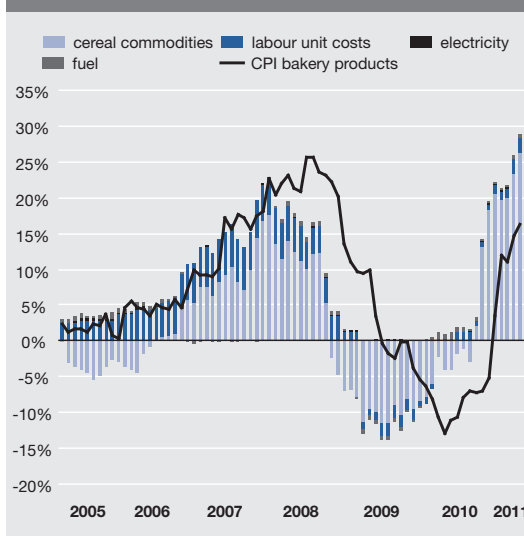**Figure 5. Annual growth rates of consumer prices and production costs of meat products**

**Figure 6. Annual growth rates of consumer prices and production costs of bakery products**

Bank[5] which looked at the pass-through of commodity price shocks to food prices and its possible non-linearity in the euro area. To identify price shocks, we assume that commodity prices are not affected by producer or consumer prices in the same period; producer prices are only affected by commodity prices, and consumer prices are affected by both commodity prices and producer prices. Thus we can examine the impact of commodity price shocks on producer and consumer prices, using impulse response functions, and break down the variations in consumer prices.

We first assessed the VAR model at the aggregate level and thereafter separately examined the responses of the prices of milk, meat and bakery products. No global food commodity price index is currently prepared for Estonia, which is why we used the composite index published by the European Central Bank for the euro area. Its disadvantage lies in the use-based weights determined on the basis of the data of 16 countries which might not correspond to the structure of the Estonian food industry. The advantage of examining the cumulative impact of commodity prices is that any random 'noise' contained in the price volatility of individual product groups is cancelled out. On the other hand, the price cycles of various components may or may not temporally coincide.

First, we examined the degree of integration of all logarithm-based underlying indices, and all time series were found to be I(1)-processes[6]. We assessed the models with first-order differences of natural logarithms, i.e. monthly increases. First we assessed the models for the entire period for which data are available, but at least for dairy products Estonia's accession to the European Union proved to be a major structural change, and so we next observed the period from May 2004 to September 2010. The number of lags is different in the models; we were guided by the most common tests of the optimal number of lags. Table 2 presents a summary of the models.

## RESULTS: SPEED, DURATION AND EXTENT OF PASS-THROUGH OF PRICE SHOCKS

The speed and duration of the pass-through of a commodity price shock is measured as the number of months in which the values of the impulse response function are statistically significant within a 95% confidence band. The results are summarised in Table 3. The extent of the impact of commodity price increases on producer and consumer prices is characterised

**Table 2. Description of models**

| | Models | Period | Max. lag (months) | AIC | SW |
|---|---|---|---|---|---|
| 1. | Total foodstuffs | 1997/01–2010/12 | 6 | −17.5 | −16.5 |
| 2. | Total foodstuffs | 2004/05–2010/12 | 6 | −16.7 | −15.0 |
| 3. | Dairy products: EU skimmed milk powder price | 2004/05–2010/12 | 2 | −16.2 | −12.8 |
| 4. | Dairy products: buying-up price of raw milk in Estonia | 2004/05–2010/12 | 12 | −16.4 | −13.0 |
| 5. | Bakery products: producer prices of flour and grain mill products | 2002/01–2010/09 | 7 | −15.7 | −13.9 |
| 6. | Bakery products: producer prices of bakery and pasta products | 2002/01–2010/09 | 12 | −14.8 | −11.8 |
| 7. | Meat products: EU meat | 1998/01–2010/09 | 12 | −17.7 | −15.4 |
| 8. | Meat products: buying-up price of meat in Estonia | 2004/01–2010/09 | 10 | −18.1 | −15.1 |

[5] See http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1168.pdf.

[6] In the I(1)-process the expectation and variation of the first-order difference are constant over time.

**Table 3. Number of months during which commodity price shock had a statistically significant (95%) impact on consumer and producer prices**

|  | Producer prices | Consumer prices |
|---|---|---|
| Total foodstuffs | 2–6 | 3–5 |
| Dairy products: milk powder | 5–8 | 6–8 |
| Dairy products: raw milk | 1–2 | 1–2 |
| Meat: buying-up price in EU | 4 | – |
| Meat: buying-up price in Estonia | – | 2 |
| Bakery products: producer prices of flour and grain mill products | – | 3 |
| Bakery products: producer prices of bakery and pasta products | 4 | 3–7 |

by the cumulative value of impulse response functions (see Tables 4 and 5). In the longer term these should be concentrated around the value of the commodity component of the prices. At the aggregate level, a 1% commodity price increase results in a 0.36–0.5% increase in producer and consumer prices, most of which is realised within two to three quarters of the price shock. Also, the IMF evaluated, at the aggregate level, the impact of food commodity price shocks on consumer prices in its short study published in February 2011 titled "Republic of Estonia: Staff Report for the 2010 Article IV Consultation".[7] Unlike the models described in this paper, the IMF examined the impact of commodity prices on core inflation and the consumer price index as a whole, rather than the food component of the consumer price

index. The results showed that a 1% commodity price shock increased the consumer price index by 0.2% and core inflation by 0.1% in the third quarter. This is consistent with the results of this paper, because the commodity content of the overall consumer basket is lower than that of the food component, and core inflation reflects the impact of the second-round effects of higher food prices.

Similar to the results of the European Central Bank's study, the pass-through takes longest – around half a year – in the case of dairy products, reaching consumer prices on average one month later than producer prices. On the other hand, an increase in the buying-up price of raw milk in Estonia is passed on to producer

**Table 4. Cumulative reaction of producer prices to 1% commodity price shock (%)**

| Model |  | Month | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | 1st | 3rd | 6th | 9th | 12th | 15th | 18th | 21st | 24th |
| 1. | Total foodstuffs | 0.01 | 0.09 | 0.20 | 0.26 | 0.31 | 0.33 | 0.35 | 0.36 | 0.36 |
| 2. | Total foodstuffs (after accession to EU) | −0.01 | 0.13 | 0.29 | 0.39 | 0.47 | 0.48 | 0.50 | 0.50 | 0.50 |
| 3. | Dairy products: EU milk powder | 0.05 | 0.17 | 0.56 | 1.10 | 1.23 | 1.32 | 1.26 | 1.07 | 0.88 |
| 4. | Dairy products: raw milk | 0.32 | 0.85 | 1.35 | 1.64 | 1.97 | 1.99 | 1.87 | 1.44 | 1.09 |
| 5. | Bakery products: producer prices of flour and grain mill products | 0.03 | −0.01 | 0.06 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6. | Bakery products: producer prices of bakery and pasta products | −0.02 | 0.12 | 0.27 | 0.50 | 0.67 | 0.90 | 0.99 | 1.03 | 0.98 |
| 7. | Meat products: buying-up | −0.05 | 0.13 | 0.36 | 0.26 | 0.26 | 0.32 | 0.46 | 0.34 | 0.21 |

[7] See http://www.imf.org/external/pubs/ft/scr/2011/cr1134.pdf, pp. 33-34.

and consumer prices within just 1-2 months, which suggests that EU skimmed milk powder is placed before the buying-up price of raw milk in Estonia in the price chain. A 1% increase in the price of skimmed milk powder results in a statistically significant increase in the producer and consumer prices of dairy products from the 5th to the 8th month (0.25–0.3% per month). The extent of pass-through is extremely high in the case of both commodity indices. The extent of impact exceeds 100%, although the cost of raw milk accounts for less than half in the retail prices of dairy products. The result is probably affected by the price increases of 2007 and 2008, which cannot be explained by the appreciation of the commodity.

The impact of cereal and meat commodity price shocks was not as clearly pronounced as in the case of dairy products, but still followed the expected pattern. For cereals the model in which the price index of bakery and pasta products published by Statistics Estonia was used, since the producer price index functioned more effectively.

A 1% meat commodity price shock did not yield a non-zero response from producer or consumer prices in any period. This means that the price of meat is not overly sensitive to changes in commodity prices. We also estimated the model with

an index composed on the basis of the buying-up prices of meat in Estonia, which yielded a statistically significant increase of about 0.1% only in the case of consumer prices in the second month. Actually, the weakness of the link can be ascertained when looking at the price indices: meat commodity prices increased on the EU market for a short time in 2007, but then fell back to pre-boom levels, while producer and consumer prices rose rapidly and have remained almost at the boom peak level.

## SUMMARY

Food commodities make up a significant part of the food industry's costs: about 40–50% in the case of dairy products, 60–70% in the case of meat products and 35–40% in the case of bakery products. Food commodity prices surged on the world market in 2007 and 2008, and this price increase found its way into the buying-up prices applied in Estonia to a similar extent. After some delay, inflation in the consumer prices of foodstuffs increased, but far more in Estonia and the other two Baltic States than in other Member States of the European Union, raising questions about the reasons for the increases. The results of this analysis revealed that Estonian consumer prices actually rose much more than can be explained by increases in commodity prices.

**Table 5. Cumulative reaction of consumer prices to 1% commodity price shock (%)**

| Model | | Month | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1st | 3rd | 6th | 9th | 12th | 15th | 18th | 21st | 24th |
| 1. | Total foodstuffs | −0.03 | 0.08 | 0.18 | 0.24 | 0.29 | 0.33 | 0.35 | 0.36 | 0.36 |
| 2. | Total foodstuffs from May 2004 | −0.02 | 0.14 | 0.29 | 0.38 | 0.46 | 0.48 | 0.49 | 0.49 | 0.49 |
| 3. | Dairy products: EU milk powder | −0.01 | −0.02 | 0.18 | 0.79 | 0.93 | 1.05 | 1.04 | 0.91 | 0.80 |
| 4. | Dairy products: raw milk | 0.14 | 0.56 | 0.98 | 1.26 | 1.47 | 1.57 | 1.62 | 1.29 | 1.04 |
| 5. | Bakery products: producer prices of flour and grain mill products | 0.04 | 0.11 | 0.04 | 0.04 | 0.02 | 0.01 | −0.01 | −0.02 | −0.02 |
| 6. | Bakery products: producer prices of bakery and pasta products | 0.02 | 0.12 | 0.32 | 0.53 | 0.63 | 0.83 | 0.92 | 0.94 | 0.90 |
| 7. | Meat products: buying-up price of meat in Estonia | 0.02 | 0.22 | 0.40 | 0.47 | 0.47 | 0.42 | 0.45 | 0.38 | 0.35 |

In the second half of 2010 the prices of milk commodity and cereals rose in the same range as in 2007 and 2008. The growth rate of the buying-up price of milk in Estonia exceeded the previous boom time levels. At the same time, the consumer prices of milk and bakery products increased sharply in the autumn. This time, commodity prices explain a much larger part of the consumer price increase. Increasing cereal prices have not been passed on to meat commodity prices yet, but this pass-through is expected to occur in the near future.

We examined the extent and timing of the commodity price shock with the help of a structural VAR model. At the aggregate level the figure calculated by the European Central Bank was used as the foreign food commodity price index. At the aggregate level the food component of the Estonian consumer price index responded to commodity price shocks with a 1- to 2-quarter lag, and a 1% commodity price increase resulted in a 0.36–0.50% increase in producer and consumer prices within a year and a half. The lag was lengthiest and the extent of the commodity price shock greatest in the case of dairy products. A similar result was obtained in the European Central Bank's study. In the case of Estonia the extent of the pass-through was likely influenced by the situation prevailing in 2007 and 2008, where consumer prices rose more than could have been expected on the basis of commodity prices alone. As for meat products, no statistically significant results were obtained. In the case of bakery products, the model yielded results when we used the producer prices of bakery and pasta products. Consumer prices of bakery products responded to a cereal price shock in around the third quarter, and the final extent of the pass-through of the price shock was significant, as in the case of dairy products, i.e. up to 0.9%.

# PART II. FOREIGN TRADE DYNAMICS AND REASONS FOR ITS INFLATION, PRIMARILY IN 2010

## BASIC CONCEPTS

Exports of **milk and dairy products**, which account for the largest proportion of food exports, increased in 2010 by almost half. The main products behind these increased exports were raw milk (fat content 3–6%), drinking milk (1–3%) and cream (fat content 21–45%). The main target market was Russia; exports to the country almost tripled compared to 2009. Estonia's milk production exceeds the needs of the domestic market and therefore the demand and price levels of foreign markets affect price developments in the domestic market.

In 2010, changes in the retail price of milk were better described by the export volumes and prices of packaged drinking milk. Analysis of the exports of drinking milk to the European Union and Russia reveal substantial price gaps, which result from product-specific factors. While the export prices of packaged drinking milk sold to the EU have not increased as much as the buying-up price of milk, exports to Russia appreciated considerably during the autumn months. Thus, the weighted average export price of drinking milk was 60% higher in October than a year ago. In addition, a sharp increase in Russia-bound export volumes was seen; this occurred at the expense of exports to the EU. The shift in the exports of packaged drinking milk can be explained by unfavourable weather conditions in Russia in 2010 which led to a reduction of output. Due to increased demand, higher prices are paid for milk production in Russia, and this made it possible to charge higher prices on the Estonian market as well. Increased trade margins also had a certain impact: trade margins of packaged drinking milk were higher in 2010 than in previous years.

Improved export opportunities eastwards thus enabled the margins of processing companies which had dropped below normal by the end of 2009 to be restored in autumn 2010. As shown

with milk, export prices are the first to respond to changes in world market prices, and thereafter the changes are passed on to retail prices. The export prices of some dairy products, such as drinking milk (fat content 1–3%) and raw milk, have historically been lower than those in Finland and Lithuania and the EU-27 average. The reasons lie at the micro level, depending on the characteristics of the products exported.

Links between the retail prices and export volumes of milk are weak, and even weaker when we look at dairy products in their entirety. Most of the changes in the retail prices of milk can be explained by changes in the global market prices of milk, which find their way into local prices within 4–5 months. It is possible to find statistically significant relationships between retail prices and export volumes of drinking milk. Although the quantities of such milk exported to Russia have been volatile in recent years, they can be far better explained than the export volumes of all drinking milk. This most likely refers to the greater profitability of exports to Russia, which translates into the higher export prices of the milk sold there.

Estonia's cereal harvests cover the needs of the domestic market, provided that the weather conditions are normal. Cereal exports have been quite volatile in recent years and are influenced by larger single cereal transactions. In 2010, exports of cereals and cereal products increased a little, by 3% (10% by volume). The export volumes of cereal and bakery products grew. Compared to other cereal product groups, more success was achieved in increasing exports of wheat and barley. Exports of cereal and cereal products began to recover in spring 2010, as world market prices had bottomed out. Even though the drought in Russia boosted cereal prices on the international market, export volumes did not increase significantly during the autumn months. The only exceptions were wheat and barley, exports of which clearly increased

after the harvest. High prices contributed to an increase in sales to foreign markets at the end of the year.

Analysis suggests that export prices remained at a low level until mid-2010, and it was only in July that a significant increase in export prices could be seen for some products in line with world market prices. The export prices of bakery products increased more than in other countries. Data also show that cereal export prices respond to changes in world market prices faster than buying-up prices or retail prices. In light of buying-up prices, the margins of commodity exporters were modest in 2010 compared to previous years. The rise in export prices in summer enabled export margins to be increased again. In addition, it has emerged that in 2010 the retail prices of white bread adapted more (moving downwards) than the export prices of bakery products. This could be explained by a price war between producers. The general increase in the prices of cereals in recent months was first reflected in the export prices of bread and was then passed on to retail prices.

We could not find a strong link between the export volumes of cereals and cereal products and the changes in retail prices. However, looking at price movements alone, statistically significant links can be observed between the world market prices of cereals on the one hand and the export and retail prices of cereal products on the other. Thereby, export prices somewhat better describe changes in retail prices compared to world market prices. The results of the analysis also show that in 2010 no potential excessive response occurred in the consumer prices of cereal products in comparison with export prices. The results indicate that an increase in commodity prices on foreign markets is swiftly passed on to both export and retail prices. The consumer prices of some products, such as bread, have been in line with commodity and export prices, even during

the recession period of the crisis, and quickly responded to the appreciation of commodities in autumn 2010. In the case of black bread, a change in commodity and export prices finds its way into consumer prices with a 2- to 3-month lag. Consumer prices of flour correspond better to changes in commodity prices, considering the export prices of black bread and white bread.

## IMPACT OF FOOD EXPORTS ON FOOD PRICES

Consumer prices of food increased rapidly in 2010, and the food price increase was the main reason for the acceleration of inflation. In this analysis we seek to determine the extent to which the food price increase in Estonia can be explained by increasing export volumes. To do this, we take a closer look at two groups of foodstuffs: milk and dairy products; and cereals. The data we use include detailed data on foreign trade from Eurostat, producer prices and retail prices from the Institute of Economic Research, producer price and export price indices from Statistics Estonia and world food price indices from the UN Food and Agriculture Organisation.

The major export markets for agricultural and food products are our closest neighbours: Russia, Finland, Latvia and Lithuania. After a fall in export volumes in 2009, demand increased in 2010 on key foreign markets, which allowed Estonian companies to increase their food export turnover by 24.6% during the first 10 months of 2010. Milk and dairy products account for the largest proportion of food exports (Chapter 04). The export volumes of cereals and cereal products are somewhat smaller.

### Milk and dairy products

Buying-up of raw milk has been fairly stable in recent years. In 2009, demand for milk dropped and the price was low; therefore, production was restricted and output decreased significantly at the beginning of 2010. Production increased in

**Figure 1. Buying-up, exporting and importing volumes of milk**
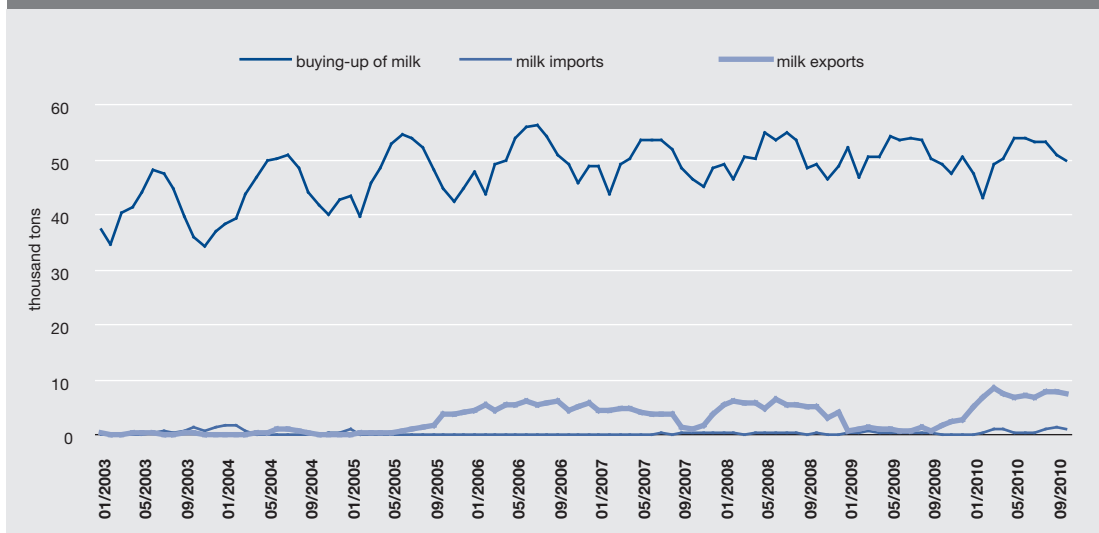


Sources: Eurostat, Statistics Estonia

the second half of the year, but the total quantity of milk bought in 2010 still decreased by 1.4%.

In Estonia more milk is produced than is needed on the domestic market – according to the milk balance, consumption accounts for around two-thirds of production – and therefore the demand and price levels of foreign markets should have an impact on price developments on the domestic market. Starting from 2010, exports of milk and dairy products have risen considerably: export turnover increased by 50% in just 10 months. During the autumn months, exports of dairy products were the highest in a decade in terms of quantity and financially. Russia was the main target market for dairy products, to which exports increased around three-fold. The main dairy products showing the highest increases were raw milk and drinking milk. Exports of other important items, such as cheese, did not grow significantly. Exports of milk powder, conversely, declined.

In 2009, the export volumes of milk (Chapter 0401) were modest, but thanks to improved external demand and rising prices, around 12% of milk pro-

duction[8] (ca 14% of bought-up milk) was exported in the first three quarters of 2010. Thus, the export share of milk was slightly higher in the period under review in 2010 than in the previous years of export growth (see Figures 1 and 4). Import volumes of milk continued to be insignificant. In addition, milk was used as a raw material in different products (e.g. yoghurt, cream and powder), which ultimately increases the share of milk production exported. It is difficult to assess, however, the average share of milk as a raw material in such exports. Raw milk content coefficients could be used, but as the material costs of products are different and the product range is extensive, a reliable estimate is difficult to calculate. According to the milk balance, exports of dairy products accounted for almost a third of milk resources in 2009)[9]. However, given the upturn in exports last year, the share of exports of dairy products has increased.

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[8] Milk production comprises bought-up milk and milk produced for own use. Bought-up milk accounts for 85-90% of milk production. Production statistics are quarter-based, while buying-up statistics are month-based.

[9] Milk resources comprise total production, imports and reserves of milk.

## Figure 2. Export turnover of milk and dairy products



Legend: cheese, curds ■ milk, cream ■ milk powder, skimmed milk □ yoghurt ■ butter ■ other

y-axis: EEK million (0, 50, 100, 150, 200, 250)
x-axis: 01/2004, 06/2004, 11/2004, 04/2005, 09/2005, 02/2006, 07/2006, 12/2006, 05/2007, 10/2007, 03/2008, 08/2008, 01/2009, 06/2009, 11/2009, 04/2010, 09/2010
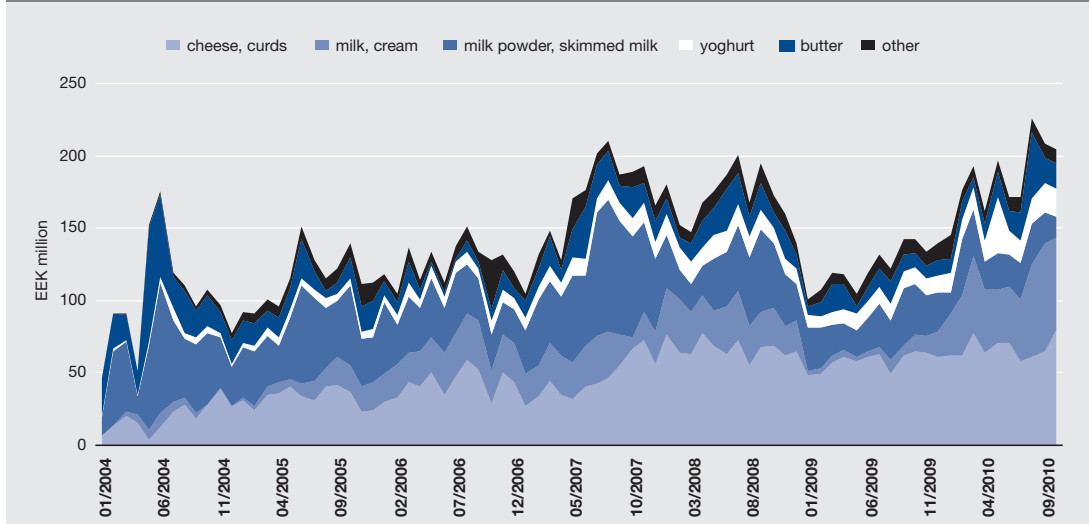
Source: Eurostat

## Figure 3. Milk exports by fat content



Legend: ■ milk (fat content less than 1%)  ■ milk (fat content 1-3%)  ■ milk (fat content 3-6%)  □ cream (fat content 6-21%)  ■ cream (fat content 21–45%)

y-axis: thousand tons (0–9)
x-axis: 01/2003, 05/2003, 09/2003, 01/2004, 05/2004, 09/2004, 01/2005, 05/2005, 09/2005, 01/2006, 05/2006, 09/2006, 01/2007, 05/2007, 09/2007, 01/2008, 05/2008, 09/2008, 01/2009, 05/2009, 09/2009, 01/2010, 05/2010, 09/2010
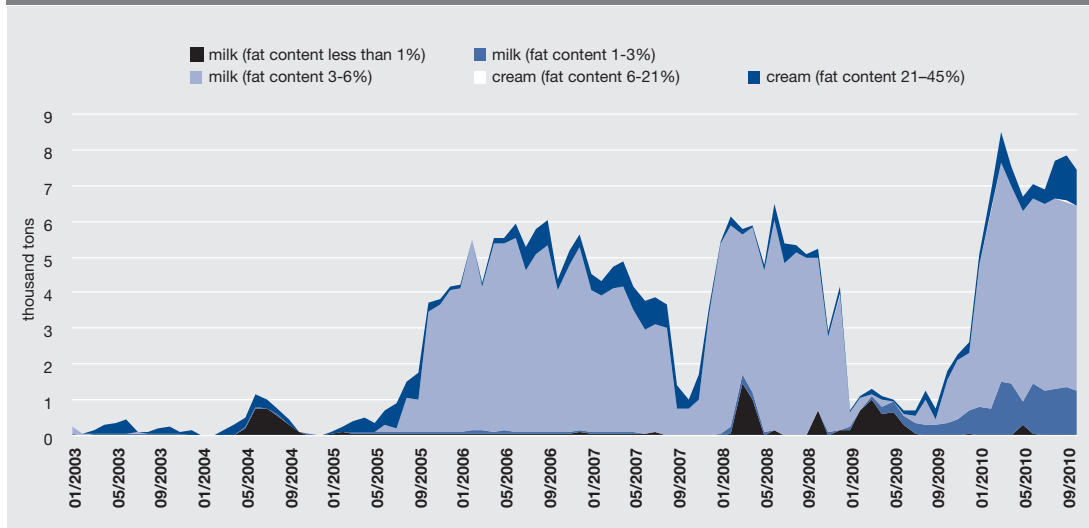
Source: Eurostat

This is indicated in Figure 2, showing the export turnover of dairy  products. Figure 3 describes the subgroup of milk and cream in terms of quantity and fat content.

We will now compare the export prices of a popular dairy product consumed in Estonia –

packaged drinking milk[10] (fat content 1–3%) – with those of neighbouring countries. It is important to distinguish between exports to

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[10] Product code of packaged drinking milk: 04012011.

## Figure 4. Milk price developments



Legend:
- Estonia`s exports to EU
- Estonia`s exports to Russia
- producer price for packaged milk (2.5%)
- EU-27 exports
- buying-in price for milk in Estonia
- consumer price for 2.5% packaged milk (net of VAT)

Y-axis: EEK/kg (l), scale 0 to 10

X-axis: 01/2007, 07/2007, 01/2008, 07/2008, 01/2009, 07/2009, 01/2010, 07/2010
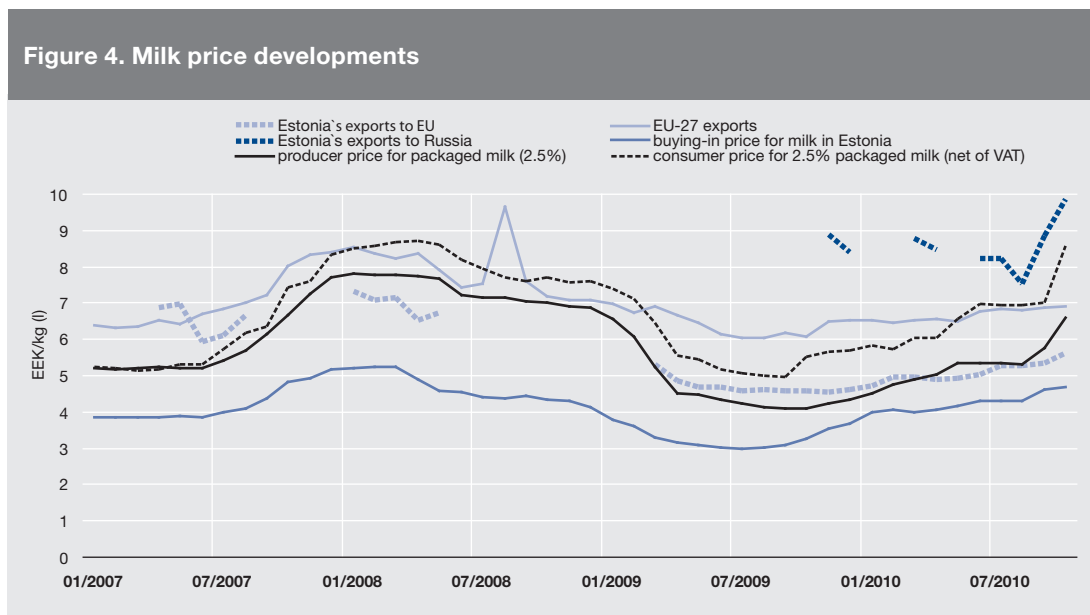
Sources: Eurostat, Statistics Estonia, Estonian Institute of Economic Research

the EU and exports to Russia, because there are marked differences in export prices. The price differences can be explained primarily by the higher price paid in Russia, differences between packages[11] and specific characteristics of the product: drinking milk is mostly exported to the EU as the trademark of a given retail chain, i.e. private label. This is cheaper drinking milk packaged in plastic bags which Estonian processing companies do not sell under their own trademarks. Exports to the EU mainly involve two countries: Lithuania and Latvia. It appears that the export price of Estonian packaged drinking milk is lower than that of Finland and Lithuania and the EU-27 average. Drinking milk exports increased (by volume) in the second half of 2009 and reached their highest level at the beginning of 2010. The export volumes of drinking milk were stable over the last year. Starting from the summer and autumn months of 2010, a decline in exports to the EU and an increase in the quantities

exported to Russia could be seen. Export prices rose from the low level of 2009 in both Estonia and the EU-27 to a similar extent (EEK 1.0/kg in Estonia [23%] and EEK 0.8/kg in the EU-27 compared to October last year). For the sake of comparison, the buying-up price increased by EEK 1.4/kg [44%] and the consumer price of milk increased by 39% in the same period. EU-bound export prices have not risen as much as buying-up prices, because private labels of retail chains are subject to inflexible contractual conditions.

It appears that the prices of EU Member States (including Estonia) for packaged drinking milk exported to Russia are higher. In October, Estonian dairy processors were paid EEK 5.6 for 1 kg of drinking milk[12] exported within the EU, while in Russia the price was EEK 9.8. Our neighbours benefit from the difference in the export price regarding Russia, too. While in previous years the quantities of drinking milk exported to Russia

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[11] It appears from producer prices that the difference between milk packaged in plastic bags and tetra packs is around EEK 1.50/l.

[12] Specific weight of milk: 1 litre of milk weighs 1.03 kilograms. Due to the insignificant difference, kilograms are not converted to litres or vice versa.

were marginal, the unfavourable summer of 2010 resulted in a decline in production in Russia, which was why Estonian processing companies[13] had the opportunity to increase the quantities of their Russia-bound exports. While in June exports to Russia comprised just 5% of all exports, in October nearly half of exported drinking milk was sold to Russia. Furthermore, as a result of these developments Estonia has become the major exporter (among EU Member States) of packaged drinking milk to Russia. It is possible to charge higher prices in Russia; in addition, contractual terms are more flexible compared to exports to the EU.

Due to the rapid rise in consumer prices of milk, its retail price has been above the level of EU-27 export prices since mid-2010. Figure 4 shows that dairy processors' margins decreased significantly in 2009. The production capacity of milk exceeds domestic consumption; therefore, and due to the limitations of export opportunities, the retail price was pushed down on the supply side, thereby contributing to the decline in the margins of processing companies. It is also likely that while commodity prices climbed, the contracts between industries and traders did not enable producer prices to be raised in line with the appreciation of the commodity. Processing companies' margins have since risen to the average of recent years. Traders' margins have historically been lower than those of processing companies, although in recent years they have consistently increased. At the end of 2009 traders temporarily increased their margins (at the expense of processing companies' margins). Since June 2010, traders' margins have been back at the peak level achieved at the end of 2009 (23%). In October, as processing companies significantly increased their margins (from 20% to 29%), traders' margins remained at 23% (in monetary terms, an increase of EEK 0.4).

Thus, when comparing buying-up prices, retail prices and Russia-bound export prices, a link between the substantial rise in the latter and the increase in processing companies' margins (which were passed on to the retail prices of drinking milk) emerges. Consequently, the increase in Russia-bound export volumes can be considered one of the reasons for the rise in drinking milk retail prices in October.

Next we look at the export prices of other dairy products by country. First we discuss raw milk with 3–6% fat content in packaging larger than 2 litres[14], which is a major export article among dairy products and whose exports have grown more rapidly than those of other products[15]. Similar to drinking milk, the export prices of Estonia and the EU-27 for raw milk have risen by around EEK 1/kg over the past year. At the same time, the export prices of Estonian raw milk have historically been lower than the EU average, although Estonia's prices follow price developments in the European Union quite well. Also, similarities between the export prices of Estonia and Latvia can be observed. Raw milk exports recovered at the beginning of 2010 and remained at that level throughout the year. Export prices of raw milk correlate with the buying-up prices of milk.

As to exports of milk powder and skimmed milk powder, we analyse developments concerning the latter with a fat content of up to 1.5%. The price developments of skimmed milk powder[16] are similar in Estonia, neighbouring countries and the EU-27, with Estonia's export prices being slightly higher in 2010. The reason for similar price dynamics lies in the fact that milk powder is a widely traded product around the world and thus the export price evolves on the global market. Estonia's export prices rose

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[13] Exports of drinking milk from Latvia, Lithuania and Finland to Russia also increased during the summer months.

[14] Product code of raw milk: 04012099.
[15] Estonia only exports raw milk within the European Union.
[16] Product code of skimmed milk powder: 04021019.

substantially at the end of 2009; in 2010 the price rise was smoother. Export prices of skimmed milk powder have followed changes in the world market price of milk fairly closely. Compared to 2009, our export prices rose by nearly a third, and exports doubled in volume. Exports of milk powder with a fat content exceeding 1.5%, on the other hand, declined significantly in 2010. Over the year as a whole, exports of both milk and skimmed milk powder declined by a tenth, despite rising prices. Skimmed milk powder and butter exports were profitable last year due to high prices. As milk fat was used for the production of butter, there was not enough raw material for the production of full milk powder. In the production process, skimmed milk is what remains, and a major quantity of skimmed milk powder was produced.[17]

As to exports of cream[18] with a fat content of 21–45%, Estonia has been successful in both increasing export volumes and achieving somewhat higher export prices than the reference group. The product exported is non-packaged cream used for e.g. the production of ice cream. In 2010 cream was exported to Russia only and in October the price charged was around 40% higher than a year ago. In addition, export volumes rose sharply from August. Unfortunately, data on the producer or retail prices of cream are not collected and therefore these prices cannot be compared to export prices or more accurate conclusions drawn. Then again, it is possible to establish that from mid-2009, when world market prices were depressed, cream exports have been more in line with world market price changes than the other dairy products analysed above. This means that the milk price increase which began on foreign markets in 2009 was followed by an immediate and equivalent response in terms of the export prices of cream.

We examined the relationship between the quantity of exported milk and the consumer prices of milk (Figure 5) to see if there was a link



Figure 5. Relationship between exported and bought-up quantities and consumer price (CPI)
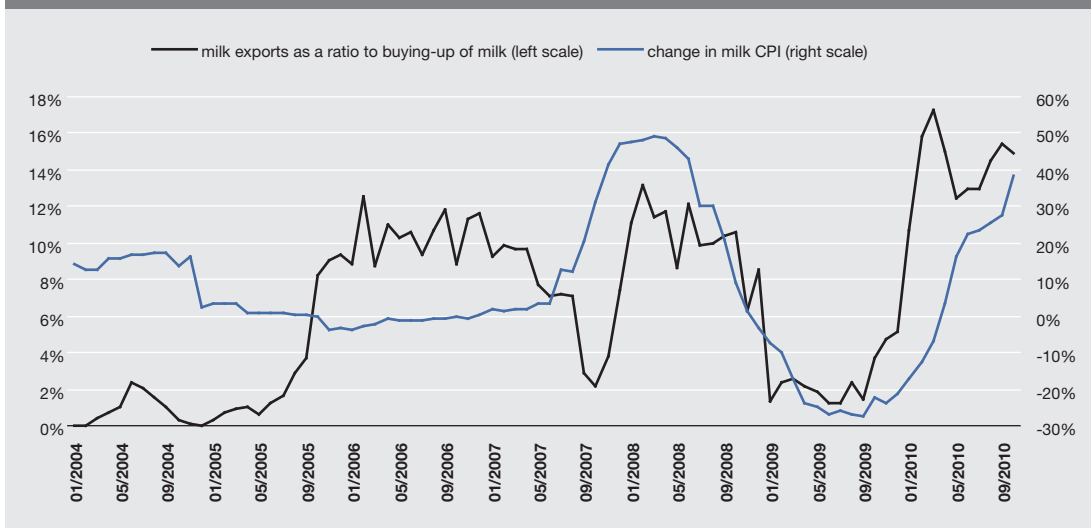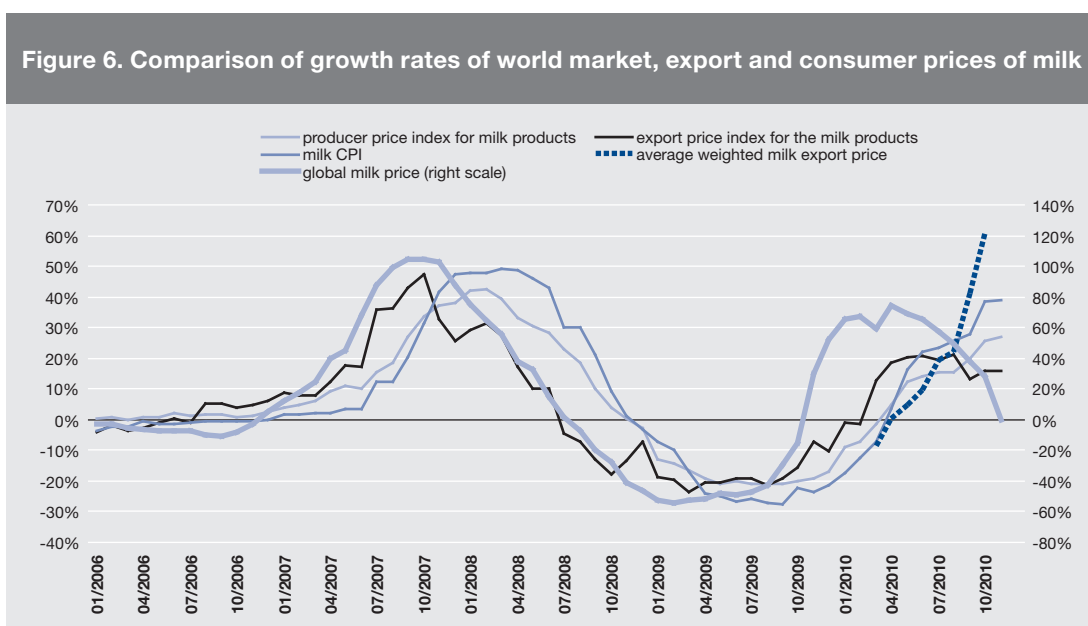
Sources: Eurostat, Statistics Estonia

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[17] Source: Ministry of Agriculture.
[18] Product code of cream with 21-45% fat content: 04013019.

between the price of milk and the quantity of milk left for domestic consumption. A clear correlation can be seen for the period 2008–2010, but no such link can be established for earlier years. The lack of correlation in 2006 could be explained by the decline in milk prices on the world market. In the second half of 2007 the increase in the price of milk on the global market found its way into retail prices and, after a few months' delay, was reflected in increasing export volumes. The recovery in demand in 2010 caused a price increase on foreign markets, which was passed on to retail prices. Thus, the relation between exports and bought-up quantities and the dynamics of retail prices prevailing last year should indicate upward pressure on retail prices caused by increasing exports of milk.

The following is a wider analysis of dairy products, namely of developments in the producer, export and consumer prices of dairy products according to the data of Statistics Estonia. Figure 6 indicates that the dynamics of producer and export prices of dairy products and consumer prices of milk have been similar over the past five years. Export prices respond to increases in world market prices immediately, and such increases are passed on to consumer prices around a quarter later. The indices behaved the same way during the period of decreasing prices. At the end of 2009, the increase in the world market price of milk was followed by a somewhat slower and smoother response from the other indices. Companies were probably unable to raise their prices to a comparable extent at once. This is also confirmed by the conclusion set out above, according to which EU-27 export prices recovered gradually (as in Estonia). World market prices peaked at the end of 2009; therefore, in the last few months of 2010 the annual price increase slowed substantially. Export prices of dairy products also started to recover at the end of 2009, which is why the annual price increase decelerated slightly during the last few months of the year. For export and producer prices only the composite index of dairy products can be used, which makes comparison with retail prices somewhat inaccurate. However, when we look at the weighted average export price of packaged drinking milk, it appears that a major increase

**Figure 6. Comparison of growth rates of world market, export and consumer prices of milk**



Sources: Statistics Estonia, Eurostat, Dairy Price Index of UN Food and Agriculture Organisation

in export prices occurred in autumn, amounting to 60% in October. Considerable exports of drinking milk began in spring 2009, which is why the time series is rather short in the figure. Nonetheless, it can be concluded that the rise in the export prices of packaged drinking milk was reflected in retail prices a month later.

**Cereals and cereal products**

Cereal production depends on the weather. Good harvests result in higher export volumes. The prices of cereals and rapeseed depend on world market prices, which in turn are affected by yields around the world. Estonia's cereal harvests cover the needs of the domestic market provided that the weather conditions are normal. In the last harvest year (1 July 2009 to 30 June 2010) consumption accounted for approximately 80% of production. Animal feed accounts for most consumption, with human consumption making up a modest 15%. Exports of cereals exceed imports by as much as 100%. The UN Food and Agriculture Organisation (FAO) predicts a 2.6% decline in the total harvest for

this harvest year. A slight decrease in yield was followed by an excessive response by market participants. Prices of cereals skyrocketed on the world market in the second half of 2010.

Cereal exports have been quite volatile in recent years and are influenced by major single cereal transactions. This volatility is caused by large-scale exports of cereals and seeds in the last quarter, since a large part of the harvest is intended to be marketed. In the first 10 months of 2010 export turnover was 3% higher than one year previously (10% higher by volume). Exports of cereal products can be categorised into four groups: cereals, processed cereals (such as flour and grain mill products), bakery products and oil seeds and fruits. The export volumes of cereal and bakery products grew. Compared to other cereal product groups, more success was achieved in increasing exports of wheat and barley (the export turnover of which increased by nearly 50% in 2010). Exports of cereal products were declining at the beginning of the year, but picked up again in the summer months due to, inter alia, rising world market prices and export



**Figure 7. Development of buying-up prices and export prices of wheat**
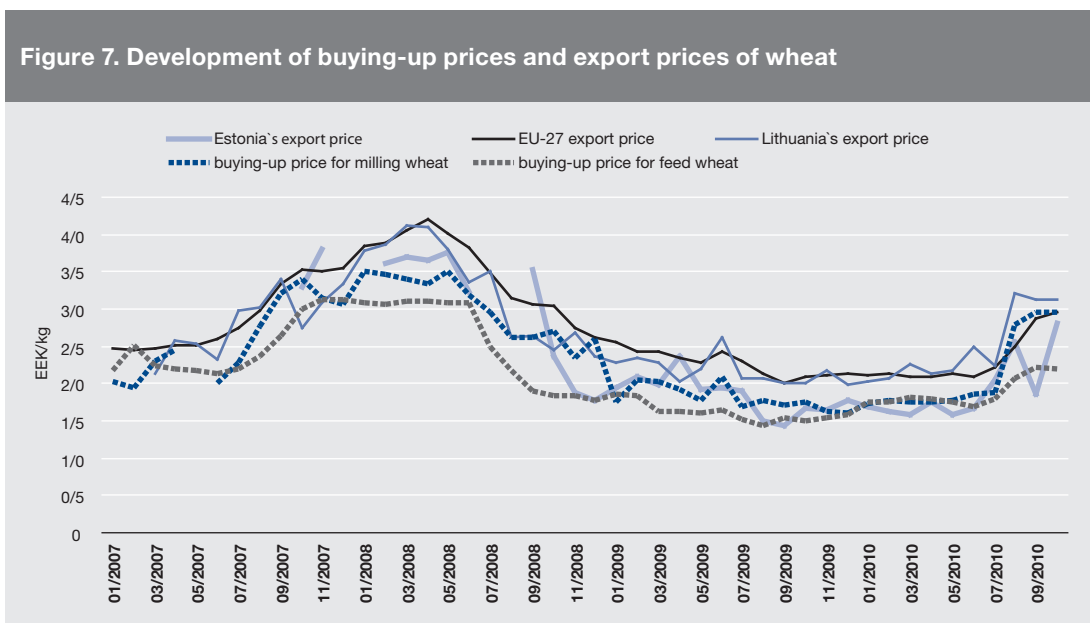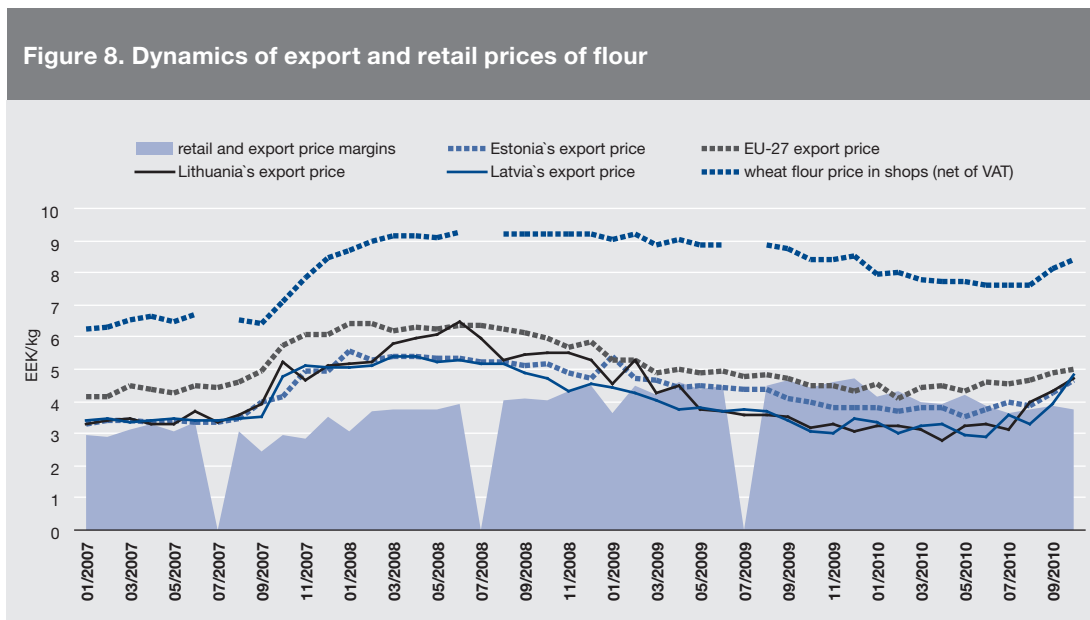
Sources: Statistics Estonia, Estonian Institute of Economic Research

prices. Cereal export markets are extensive, but the rest of the groups are dominated by Estonia's closest neighbours: Latvia, Lithuania, Finland and Russia.

Next we analyse producers' export prices in neighbouring countries, using detailed trade statistics from Eurostat. We first look at the price developments of wheat[19], Estonia's main export article. It appears that in recent years Estonian producers' export prices have been lower than those in Latvia and Lithuania and the EU-27, but comparable with those of Finland. Since mid-2009, the export prices of these countries have remained at a stable level. In July and August 2010, they responded to rising world market prices: the export prices of Estonia and the reference group increased sharply. When comparing these developments with buying-up prices, it appears that from autumn 2009 the margins of producers or buyers-up were almost non-exist-

ent and that from the beginning of 2010 export prices were lower than the buying-up prices. However, world prices started to rise in summer, enabling producers and buyers to raise their margins again. Although yields did not increase and prices were low, producers increased wheat exports in spring. It should be noted that there may be a time difference between buying-up and exporting and that prices from the same period may not necessarily present an adequate picture of profitability. In addition, transactions may have been agreed in advance. Rye exports were modest due to reduced yield in 2010. Of processed cereals, wheat flour[20] has the highest export turnover, but volumes declined in 2010. Although Estonia exports flour at lower prices than the EU-27, the prices are higher than those of Latvia and Lithuania. As a result of the rapid rise of world market prices during summer and autumn, export prices are now the same in all three Baltic States. Export prices did not



**Figure 8. Dynamics of export and retail prices of flour**

Sources: Eurostat, Estonian Institute of Economic Research

[19] Product code of wheat: 10019099. As this code includes both food and feed wheat, it is not possible to distinguish between the export volumes. According to the cereal balance of Estonia, feed wheat accounts for the majority under this code.

[20] Product code of wheat flour: 11010015.

fluctuate significantly in the first half of 2010 and were lower than in 2009. It also appears that export prices rapidly responded to the reduction in world market prices, but in stores the price level of flour did not start to decline until autumn 2009. However, prices showed downward rigidity in stores, which means that industries and traders were able to raise margins (the difference between retail prices and export prices) on the domestic market in the second half of 2009. The margins have since come down, but are still higher than in 2007.

Exports of bakery products[21] as products with the highest added value among the products discussed above are also important. Similar to cereals, exports of bakery products have been increasing since spring 2010, but growth rates are modest. Their export prices have been lower in Estonia in recent years than in the reference countries. In recent months, however, Estonian

companies have managed to raise export prices, unlike Latvian and Lithuanian companies, and as a result our export prices are somewhat higher now than those of our southern neighbours. In autumn the export prices were higher than the price level in 2008, while in October 2010 the export value was 35% higher than at the same time the previous year.

The price increase reached general retail stores in October. As regards general retail stores, it should be noted that during the period of falling world market prices the price of black bread and white bread reached its lowest level nearly six months after export prices (i.e. at the beginning of 2010). White bread fell in price far more than black bread. Processing companies' and traders' margins cannot be elicited separately; therefore, we rely on statements made in the media, according to which the greater drop in the price of white bread[22] can be explained by a price



Figure 9. Dynamics of export and retail prices of bakery products
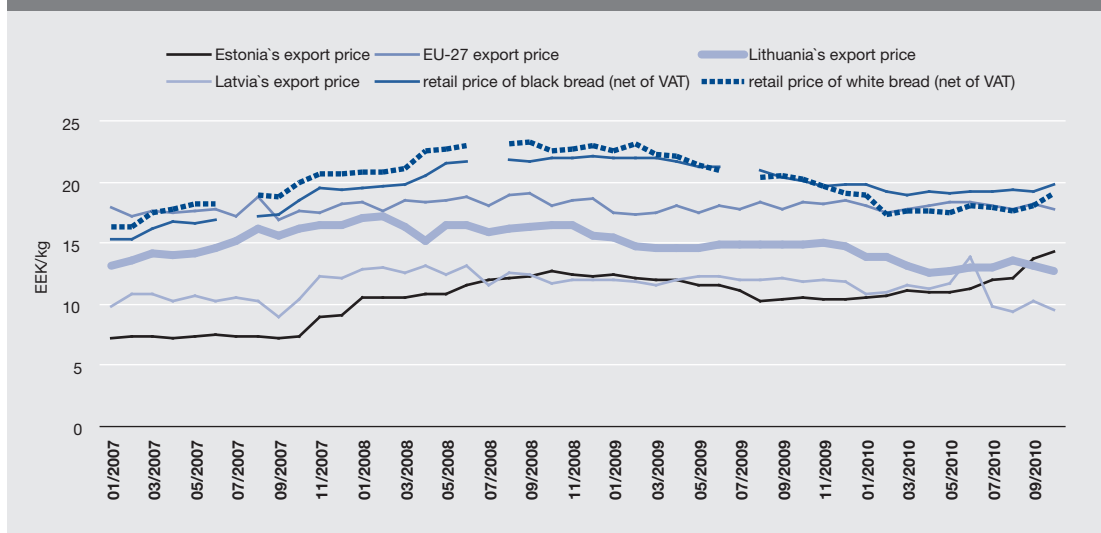
Source: Eurostat, Estonian Institute of Economic Research

[21] Product code: 19059030. This includes both black bread and white bread, which are difficult to distinguish in exports.

[22] The decline in the buying-up price of food wheat in the second half of 2008 and during 2009 was not greater than the decline in the buying-up price of food rye. Therefore, the greater decline in the prices of white bread cannot be explained by differences between buying-up prices.

war between producers.[23] The ratio between bakery products' retail prices and export prices declined at the end of 2009, and as export prices started to rise in summer 2010, while retail prices were still declining, dropped further, below the level prevailing at the beginning of 2007. Thus producers of bakery products found themselves in a better position exporting than they did selling on the domestic market in 2010.

Unlike in Estonia, EU-27 export prices have been stable in recent years, despite large fluctuations in world market commodity prices. This can be explained by the smaller proportion of cereals in the end product. If competition is strong, margins are temporarily cut instead of passing commodity appreciation on to the end price of products. It appears in Estonia's case, however, that changes in commodity prices are passed on to export prices.

Analysis of developments in world market prices, exports prices and the consumer price of cereals and cereal products indicates that the export prices of cereals and cereal products follow changes in world market prices most closely. In addition, export prices are more volatile than consumer prices. Export and consumer prices responded with some delay to the global rise in cereal prices in the second half of 2010.

We could not identify a strong relationship between the export volumes of cereals and cereal products and changes in retail prices. However, looking specifically at price movements, statistically significant links can be observed between world market prices of cereals on the one hand and the export and retail prices of cereal products on the other. Thereby, export prices somewhat more effectively describe changes in retail prices compared to world market prices. The results also show that in 2010 no excessive response occurred in the consumer prices of cereal products in comparison with export prices.



Figure 10. Comparison of growth rates of cereal and flour product prices
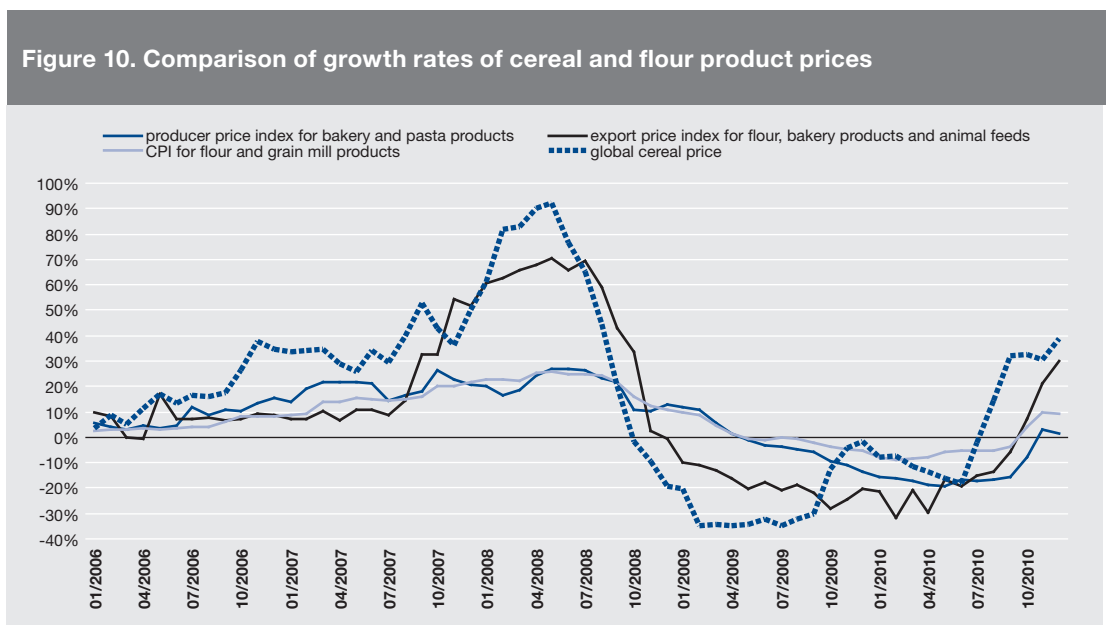
Sources: Statistics Estonia, Cereals Price Index of UN Food and Agriculture Organisation

[23] See http://www.ap3.ee/?PublicationId=05722609-b4db-47a9-ac00-9f1749b1184c.

**Figure 11. CPI of white bread vs. wheat export price**



Legend: residual, actual, model estimate
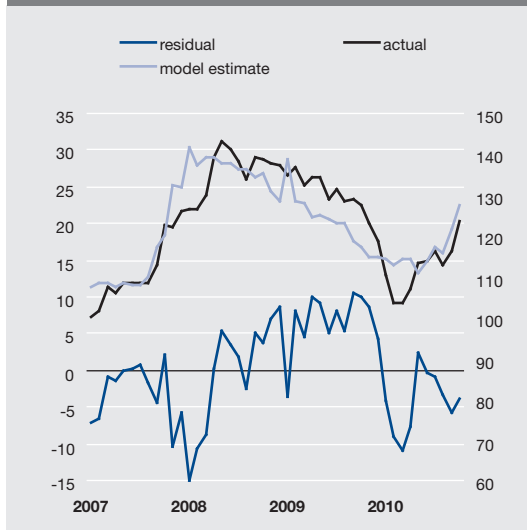
**Figure 12. CPI of black bread vs. world market price of cereals and export price of bakery products**



Legend: residual, actual, model estimate
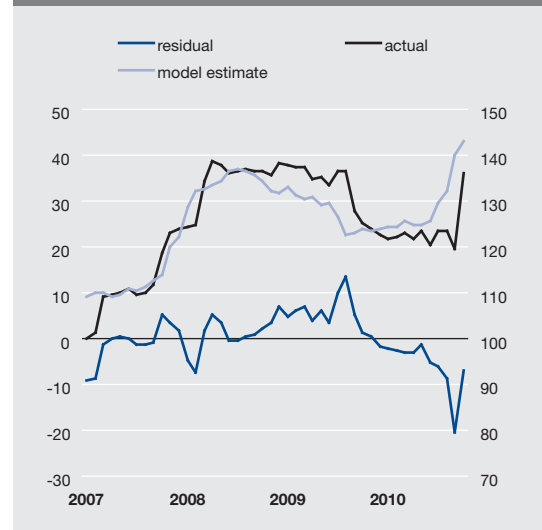
The results indicate that an increase in commodity prices in foreign markets is swiftly passed on to both export and retail prices. The consumer prices of some products, such as bread, were in line with commodity and export prices even during the recession, and quickly responded to the appreciation of commodities in autumn 2010 as well. Figure 11 reflects the decline in the consumer prices of white bread at the beginning of 2010 which resulted from a price war between producers; the model cannot describe this change with the existing explainable variables. Looking at the changes in the price of white bread from the lowest price prevailing at the time of the price war, we might conclude that there was an excessive response in the price of white bread, given the changes in world market prices. However, this conclusion would be erroneous, as the earlier price was unreasonably low. In the case of black bread, a change in commodity and export prices finds its way into consumer prices with a 2- to 3-month lag. Also, the export prices of black bread and white bread – which have risen more than in reference countries – can be attributed to changes in commodity prices. Consumer prices of flour correspond more closely to changes in commodity prices, considering the export prices of black bread and white bread.

# PART III. ANALYSIS OF COMPETITIVE SITUATION IN FOOD SUPPLY CHAIN

## SITUATION IN EUROPEAN UNION OVERALL

Close attention has been paid to the food sector in the European Union, especially since the steep price increase in 2007 and 2008. The European Commission examined[24] whether concentration in the food supply chain can cause problems, whether there is price rigidity and whether these can be linked to competition failure. It is difficult to draw firm conclusions, given the different conditions in terms of products, geographical areas and seasonality.

The non-processed food sector is fragmented in the EU, with producers being the least concentrated link in the supply chain. Fragmentation and weak links with end customers (many intermediaries) often lead to low productivity, as well as weak bargaining power among producers. Thus, problems are seen in low concentration (rather than high concentration) in the non-processed food sector, which can be alleviated to some extent by producers' concentration in associations.

The processed food sector (food industry) is characterised by higher concentration and the presence of multinationals who can resist pressure from the trade sector (branded products which must be represented in the range of goods) and thus earn higher profits than the market average. There are also many smaller companies on the market that offer alternatives (in terms of range and price) but whose bargaining power is much weaker.

The retail sector has followed an intense concentration trend over the last 20 years. However, there are countries in the EU whose market is shared by a higher number of companies. Despite high concentration, competition is regarded as fierce and price wars are not uncommon. All in all, retail price increases have been lower than general inflation.

Nevertheless, consumers perceive that the cost of food has risen more than that of other goods and that food is too expensive. To some extent, such a perception derives from the fact that people prefer processed foods whose production, storage, transportation, advertising etc. are more expensive and in the case of which the share of commodities in the end price is small. Additional regulations have resulted in extra costs, too.

The more the intermediaries in the food supply chain, the weaker the link between the end price of a product and the commodity price: each chain adds its margin to cover costs and ensure profitability. Discrepancies between current market prices and actual costs result from seasonality, multi-year cycles involving entry into contracts and product consumption and different contractual prices. Therefore, short-term differences in price developments need not directly refer to problems; the relationship between producer prices and end consumer prices "is far from being mechanical, determinist, easily identifiable, foreseeable or immediate in time"[25] (for the dairy sector). Competition violations have been ascertained and sanctions have been imposed in the food sector of the EU, with cartels being the focus of attention. Abuse of market power has not been ascertained in the retail sector. However, worrying trade practices have been identified which may prove to be problematic in certain circumstances (joint purchases, exclusive supply agreements, certificates and increasing use of private labels by retail chains). This behaviour does not necessarily inhibit competition and could even be economically reasonable, but it may harm competition in some cases.

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[24] For more information, see Competition in the Food Supply Chain. Commission Staff Working Document. Brussels, 28.10.2009, SEC(2009) 1449.

[25] *Ibid*, p. 15.

According to the data of the Estonian Competition Authority, criminal proceedings are underway in three cases concerning the food sector:

1. possible prohibited agreement on the sale of milk (a 'milk cartel');
2. possible prohibited agreement on certain cereal products (a 'bread cartel'); and
3. possible prohibited agreement between mills (a 'mill cartel').

Earlier cases concerning the food sector date back 10–15 years.

## PEOPLE'S PERCEPTIONS OF COMPETITION POLICY AND COMPETITIVE SITUATION IN THE FOOD SECTOR

In November 2009 a population survey was conducted in the Member States of the European Union which looked at how people perceived competition policy.[26] The survey was conducted at a time when prices (including food prices) were relatively low; therefore, such a survey could well give different results if conducted today.

Estonians' interest in competition policy was among the lowest of all Member States; opinions regarding related issues (controlling competition between companies would benefit consumers and society; agreements on prices between companies should not be allowed; financial aid from governments to companies might give these companies an unfair advantage over their competitors; and the need for more information about competition) were also among the lowest. Estonians' lower than average estimates in many areas, however, do not necessarily refer to the insignificance of the problems, but may rather imply a shift in general attitudes and opinions. The proportion of those who did not respond or did not have an opinion was rather large in the case of Estonia. On the other hand, the proportion of those who did not agree with the statements presented was somewhat larger.

Similar to other Member States, the energy sector is seen as a major problem area in terms of competition, with other sectors (such as medications, transportation, telecommunications and financial services) being perceived as far less important. 16% of the Estonian population perceive major competition concerns in the food sector; this is equal to the EU average.

Excessively high prices are seen as the main problem of the food sector (and other sectors) in Estonia and elsewhere. Some other problems – the quality of products, difficulties in changing suppliers and limited choice – are perceived as somewhat more important in Estonia than in other countries.

## EARLIER COMPETITION ANALYSIS

Taking guidance from a competition analysis carried out in the United Kingdom,[27] the Ministry of Economic Affairs and Communications assessed the competitive situation in Estonia a few years ago based on the productivity, profitability and revenue concentration of different sectors. Due to the limited nature of the data, a simplified approach was used in which sectors at the level of three-digit codes under the classification of Estonia's economic activities (EMTAK) were arranged on the basis of the sum of scores for said indicators. It was assumed that potential competition problems should normally be accompanied by a slow increase or decrease in productivity, higher-than-average profitability and strong concentration. Based on this methodology and the data for 2003–2005, potential problem sectors were dominated by those which are relatively capital-intensive and often related to the provision of utility services (telecommunications, gas, heat and water).[28]

[26] Flash Eurobarometer 264. EU citizens' perceptions of competition policy. November 2009. http://ec.europa.eu/competition/publications/reports/citizens_en.pdf.

[27] Empirical indicators for market investigations. Office of Fair Trading, September 2004. http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft749a.pdf.

[28] Very small sectors (whose share in the total sales of companies is less than 0.19%) and export-oriented industries (where exports account for more than 50% of sales) were excluded.

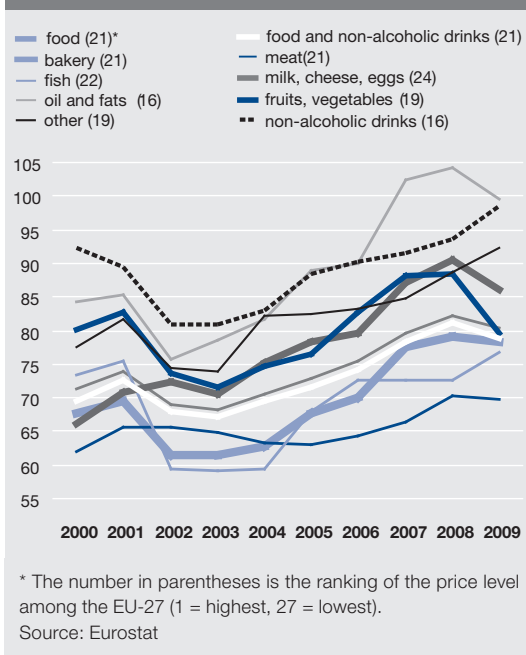Of the sub-sectors of the food sector, the meat industry was ranked 14th.

Based on the data of the Tax and Customs Board, possible entry and exit barriers were evaluated, using data on the establishment and liquidation of companies. It was assumed that entry and exit barriers were higher in sectors where competition does not function. However, there are other factors that affect this (capital- and knowledge-intensity and infrastructure). At the level of two-digit EMTAK codes, entities included in the food supply chain were placed in the middle of the order arranged on the basis of entry and exit barriers.

### FOOD PRICES

Over the past decade, food prices have risen in Estonia much faster than on average in EU Member States (around 60% vs. 35% in the local currency). A similar or faster price increase has occurred in only a few countries (Latvia, Cyprus and Bulgaria). Different product groups are generally characterised by similar developments as well. Such developments are typical of new Member States; price changes similar to those in Estonia can be seen in Latvia, Lithuania and Poland.

The fast price advance has approximated the food prices of Estonia to the EU average: whereas in 2000 the level in Estonia was 70% of the EU-27 average, in 2008 and 2009 the same indicator was around 80%. Compared to changes in wages, the overall price level and living standard, convergence has been even more modest, but the baseline was higher in the case of food. The greatest changes have occurred in the prices of dairy products, but the price level of these products in Estonia remains among the lowest in all Member States. Overall, the price level of food has remained unchanged in the EU ranking (19th in 2000 and 2008; 21st in 2009 due to the decline in prices).



**Figure 1. Relative food price level in Estonia (EU-27 = 100)**

Legend:
- food (21)*
- bakery (21)
- fish (22)
- oil and fats (16)
- other (19)
- food and non-alcoholic drinks (21)
- meat(21)
- milk, cheese, eggs (24)
- fruits, vegetables (19)
- non-alcoholic drinks (16)

\* The number in parentheses is the ranking of the price level among the EU-27 (1 = highest, 27 = lowest).
Source: Eurostat

### SUPPLY CHAIN PRICES

Price analysis across industries[29] indicates that despite a general price increase, producer prices did not rise faster than commodity prices in the dairy industry until October 2010; in fact, to the contrary. In the case of milk, margins added to the commodity cost decreased. This could primarily be observed in the case of milk packaged in plastic bags, while a slight increase in margins could be observed in the case of milk with 3.5% fat content packaged in tetra packs. Margins of other dairy products (butter and cheese) attributable to costs and profit have generally remained at the same level since 2008. Based on longer-term changes, a slight upward trend can be observed which corresponds to the overall increase in costs. Increase in efficiency may have slowed more rapid price increases.

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[29] As mentioned above, the links in the chain need not be one-to-one interdependent.

**Figure 2. Notional margins on dairy products (producer price less buying-up of milk)**
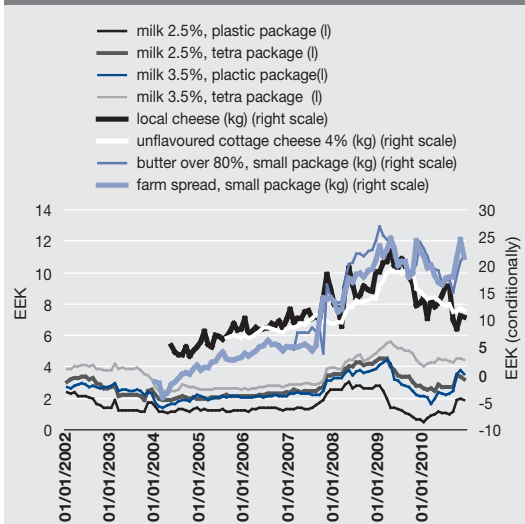
milk 2.5%, plastic package (l)
milk 2.5%, tetra package (l)
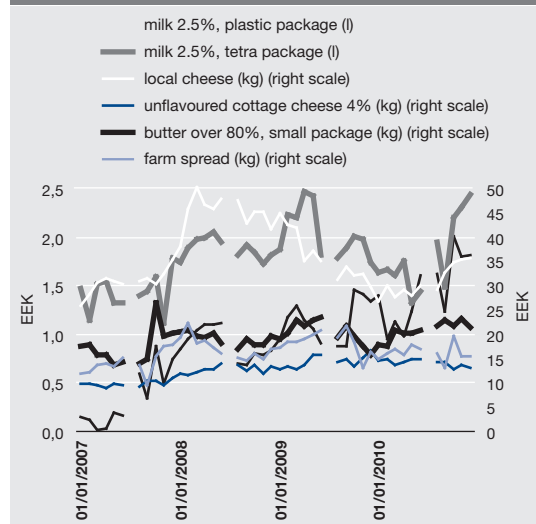milk 3.5%, plactic package(l)
milk 3.5%, tetra package  (l)
local cheese (kg) (right scale)
unflavoured cottage cheese 4% (kg) (right scale)
butter over 80%, small package (kg) (right scale)
farm spread, small package (kg) (right scale)

Sources: Estonian Institute of Economic Research, Statistics Estonia, author's calculations

**Figure 3. Margins on retail sales of dairy products (retail price excluding VAT – producer price)**

milk 2.5%, plastic package (l)
milk 2.5%, tetra package (l)
local cheese (kg) (right scale)
unflavoured cottage cheese 4% (kg) (right scale)
butter over 80%, small package (kg) (right scale)
farm spread (kg) (right scale)

Sources: Estonian Institute of Economic Research, Statistics Estonia, author's calculations

Sales revenue per employee more than doubled in the dairy industry from 2000 to 2008. Profitability[30] has also improved (from roughly 3% to 6%), but Estonia does not stand out among other Member States in this regard. Although there has been some consolidation, the number of companies per capita is almost the same in Estonia as the EU average. In relative terms, the number of dairy companies in Estonia is higher than in Latvia, Lithuania, Poland, Finland, Sweden and Denmark.

The last few months of 2010, especially October, saw quite a significant price jump: margins on milk rose in the order of 50% over a month; margins on other dairy products also increased. Although there are signs of economic recovery, price developments still seem steep at first glance. It should be taken into account, however, that last year was relatively difficult for compa-

nies and profitability is expected to rise to normal levels. In the fourth quarter of 2010, margins on milk and butter rose to the level of the average estimate for the last three years (including the period of high food prices in 2008) or even slightly higher, while margins on cheese were lower than the average of recent years.

For cheese and butter it was assumed that it takes 10 litres of milk to produce 1 kg of cheese and 5 litres of milk to produce 1 kg of cottage cheese.[32]

On the production side, there were no significant signs of a more rapid rise in prices compared

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[30] Profitability is viewed as gross operating surplus, with intermediate consumption of products and services, as well as labour costs, being deducted on the cost side (no depreciation is taken into account).

[31] The practice of making cheese is taken as the basis (http://www.endla.joosu.ee/piim-ja-piimatooted): on average, it takes 10 kg of milk to produce 1 kg of cheese; as the specific weight of milk is a little more than 1kg/l, a litre of milk is equated to 1 kg of milk). For other products, the estimates are inaccurate; the estimations aim to characterise the relationship between commodity and end prices in general terms. For more information about links between milk and end products, see e.g. Dairy Technology. SPX Corporation  http://www.apv.com/pdf/brochures/Dairy_Technology_9002_01_07_2008_GB.pdf.

to commodity prices until October 2010. Similar developments occurred on the sales side, although fundamental changes in pricing can be observed in the case of some products.

Margins on milk packaged in plastic bags are particularly noteworthy. A few years ago milk was offered in stores with virtually non-existent margins (which cannot be regarded as normal in commercial terms, but rather as a strategy to attract customers). The difference between margins on milk packaged in plastic bags and tetra packs has decreased substantially since then, but the increase in milk prices in recent months can in no way be justified by an increase in cost components. (Ex-post compensation for costs could be a reason for the price increase.)

Margins on other dairy products also rose quickly in October 2010, but were comparable with average historical levels (in absolute terms and when looking at the relation of margins to producer prices).

As regards other foodstuffs, there are insufficient data to analyse prices in the buying-up – producer – consumer chain; therefore, we compared changes in commodity buying-up prices and retail prices.[32]

During the last few months of 2010, margins on meat products, black bread, white bread and flour were generally close to the historical average, or slightly higher. Margins on beef, however, reached a new peak.

Other products were also characterised by rapid price hikes in October 2010, but these cannot be considered exceptional, given the developments that had already occurred.

[32] We looked at simplified relations: retail price (excluding VAT) – commodity price (meat or cereal), without any additional revaluations of quantities based on the commodity content (1 kg of end product was compared to the price of 1 kg of the commodity).

As to the average price, it is worth noting that in practice the prices of even 'homogeneous' products differ significantly across regions and stores. For example, the maximum price of 2.5% milk packaged in plastic bags differed from the minimum price by anywhere between 10% and 50% in 2010. The difference was slightly lower in economy stores and markets, but even there the gaps were in the order of 20%. Price differences were even greater in the case of other products.

## STRUCTURE OF FOOD INDUSTRY

Given the size (population) of the country, the number of companies in the Estonian food industry is around two times lower than the EU average. The situation is similar to northern European countries; in general, there are many companies in southern Member States. Like other countries, there has been consolidation in Estonia, which means that the number of companies has decreased over the years.

Profitability of the companies operating in Estonia's food industry is at the level of the EU average or even below average, and the situation has not changed significantly in recent years. Also, Estonia does not differ from other countries in terms of the share of profit in added value. These observations apply to the food industry as a whole and to all sub-sectors. The meat industry has been in a somewhat better position in terms of profitability. As regards business density, there are relatively fewer companies in the Estonian flour and grain mill sector (and profitability data are not published due to confidentiality) but more in the fishing industry.

In the trade sector, business activity in Estonia's wholesale trade segment (which includes all areas, not only food) is among the highest in Europe; the opposite is true in the retail trade segment (all sub-segments). In the segment of non-specialised retail establishments (with food, beverages or tobacco predominating),

**Table 1. Profitability indicators in food industry and trade sector**

| | Profitability (%) | | | | | | Share of profit in added value (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EE 2008 | EE 2007 | EU 2007 | EE 2000–2008 | EE 2004–2007 | EU 2004–2007 | EE 2008 | EE 2007 | EU 2007 | EE 2000–2008 | EE 2004–2007 | EU 2004–2007 |
| Food and beverage industry | 6.7 | 8.8 | 9.1 | 7.2 | 7.3 | 9.3 | 35.2 | 42.1 | 42.7 | 37.7 | 38.0 | 42.8 |
| Meat industry | 5.6 | 8.1 | 5.8 | 7.4 | 7.8 | 5.4 | 29.1 | 38.2 | 33.0 | 38.8 | 39.3 | 31.3 |
| Fishing industry | 4.8 | 0.2 | 7.2 | 3.9 | 2.4 | 6.7 | 23.3 | 1.4 | 38.7 | 17.8 | 12.6 | 36.2 |
| Fruit and vegetables | 7.8 | 10.3 | 9.3 | 10.4 | 10.0 | 9.4 | 35.2 | 43.7 | 42.5 | 43.7 | 44.1 | 42.4 |
| Oils and fats | | | 5.9 | | | 5.5 | | | 59.0 | | | 52.6 |
| Dairy industry | 6.3 | 7.8 | 6.1 | 4.3 | 4.2 | 6.0 | 44.5 | 51.4 | 40.0* | 34.5 | 32.9 | 39.3** |
| Flour and grain mill products | | | 9.6 | | | 9.4 | | | 51.0 | | | 48.2 |
| Other foodstuffs | 6.2 | 8.6 | 12.4 | 7.7 | 7.3 | 13.3 | 30.4 | 28.9 | 40.7 | 29.0 | 26.0 | 42.6 |
| Beverages industry | 13.1 | 14.3 | 13.0 | 13.2 | 14.4 | 13.6 | 52.9 | 56.2 | 53.0 | 55.3 | 57.1 | 53.1 |
| Wholesale trade | 3.5 | 4.8 | 5.5 | 4.9 | 5.2 | 5.2 | 43.8 | 53.5 | 47.7 | 53.5 | 55.2 | 45.8 |
| Retail trade | 2.8 | 5.5 | 7.1 | 4.1 | 4.9 | 7.1 | 24.3 | 37.6 | 37.8 | 33.5 | 36.9 | 38.3 |
| Non-specialist stores | 3.2 | 4.4 | 4.8 | 3.3 | 3.7 | 4.5 | 27.2 | 35.2 | 31.7 | 31.7 | 33.3 | 30.6 |
| Non-specialist stores with food, beverages or tobacco predominating | 2.8 | 3.6 | 4.5 | 2.7 | 3.1 | 4.1 | 25.1 | 31.3 | 31.4 | 27.2 | 30.2 | 29.6 |
| Stores specialising in food, beverages or tobacco | 1.7 | 2.4 | 9.8 | 2.5 | 3.0 | 10.1 | 18.6 | 27.1 | 49.1 | 28.9 | 33.1 | 50.4 |

\* Data for 2006
\*\* 2004–2006
EE – Estonia
Profitability – gross operating surplus on sales revenue
Profit – gross operating surplus
Source: Eurostat

Estonia's situation is similar to the reference group of neighbouring countries. There has been consolidation in the trade sector which is particularly noticeable in the segment of non-specialist retail establishments (where the number of companies has more than halved).

In terms of profitability and the share of profit in added value, Estonia is at the level of the EU average, but the position of Estonian companies is even worse in the food retailing segment.

An indicator that refers to market power is the concentration of the market in the hands of a few companies. For example, it is possible to examine the share of a sector's sales revenue which belongs to the four leading market participants. A share of 80–100% is indicative of high concentration (from oligopoly to monopoly); the average concentration level of 50–80% refers to an oligopolistic market; and the lower end of the 0–50% range indicates perfect competition, while the top end refers to oligopoly.

A similar measure of competition is the Herfindahl-Hirschman Index, which is the sum of the squares of all companies' market shares. An index value below 0.1 indicates low concentration; 0.1–0.16/0.18 indicates moderate concentration; and higher values indicate high concentration. Each of the approaches depends on the correct definition of the sector and region – or more generally the market. For example, although the market may be relatively evenly distributed between companies at the national level, one of the companies might possess significant market power in the supply of a particular product or service or in a particular area.

We now present the concentration figures of the sub-sectors operating along the food supply chain which are based on the value added tax returns for 2009 submitted to the Tax and Customs Board. The agricultural sector and food industry are observed at the 3-digit level classification of EMTAK, while the trade sector is observed at the level of 4-digit

codes. Smaller segments, in particular, are characterised by higher concentration (production of oil, production of flour and grain mill products and sales of fruit and vegetables in specialist stores still compete with non-specialist stores). Among larger segments, the production of beverages is heavily concentrated, but here the above-mentioned issue of market definition must be remembered – among the four major producers there are two breweries, a producer of strong alcoholic beverages and a producer of non-alcoholic beverages. At a more detailed level the results are affected by the smallness of Estonia (there are a just a couple of companies in some segments).

The concentration indicators show that the situation is generally better in the link of unprocessed food (agriculture and fisheries); concentration can be considered moderate at the level of major food industry segments.

Some comparisons with other countries indicate a much higher concentration in the food industry of Estonia. Five leading companies generally hold over 60% of the market in Estonia; in Ireland[33] and the United Kingdom[34] the share of the five leading companies was several times lower (in the order of 20–40%) in the main segments of the food industry (milk, meat and fish) a few years ago. As to other sectors, the example of the United Kingdom also refers to a higher concentration in smaller segments, such as the production of confectionery products, oils and fats and soft drinks. Overall, market concentration is much higher in Estonia.

When defining a market, imports must also be taken into account. At the aggregate level, imports account for around one-fifth of the total supply of agricultural products; in the supply of fish, food and beverages, imports make up more than a third.[35] At a more detailed level, some products are presumed to exhibit 'specialisation': the proportion of imports is greater in the case of products that are not produced in Estonia (e.g. exotic fruits); the role of the domestic industry is greater in the case of basic foodstuffs (meat and dairy products).

Estonian foodstuffs have traditionally played a strong role on the Estonian market. According to the study "Position of Estonian foodstuffs in the domestic market" conducted by the Institute of Economic Research,[36] the proportion of domestic foodstuffs in the range of products accounted for more than 60% in May 2010 (the share being higher in rural areas and lower in Tallinn). Based on sales it can be concluded that the vast majority (90% or more) of dairy products (except processed cheese), meat products (except poultry and canned meat) and bread is of Estonian origin. Imported goods cover more than half of the market in such segments as margarine and cooking oil, wheat flour, pasta, cucumbers and tomatoes, cookies and juices. Imported goods mainly originate from Latvia, Finland, Poland, Germany and Lithuania. Over the last 15 years Estonian products have lost some of their positions (in many cases, the baseline was 100% market share), but some products have increased their market share (yoghurt, vegetable and animal fats and vegetables).

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[33] Patrick McCloughan. What's Been Happening To Concentration in Irish Industry 1991–2001. The Economic and Social Review, Vol. 36, No. 2, Summer/Autumn, 2005, pp. 127–156; table 3, p. 144. http://www.esr.ie/Vol36_2/03_McCloughan_Artlcle.pdf.

[34] Sanjiv Mahajan. Office for National Statistics. Concentration ratios for businesses by industry in 2004. Economic Trends 635 October 2006, pp. 25–47; Appendix 1, pp. 42–44. http://www.statistics.gov.uk/articles/economic_trends/ET635Mahajan_Concentration_Ratios_2004.pdf.

[35] Based on the supply tables for 2006.

[36] See the summary in the Quarterly Review of the Estonian Economy No. 3 (174) 2010, pp. 57–60.

## Table 2. Concentration indicators by area of activity

| EMTAK | Area of activity | Number of compa- nies | Sales revenue 2009, MEEK | Share of four leading compa- nies | HHI | Normalised HHI |
|-------|------------------|------|------|------|------|------|
| 01.1 | Growing of non-perennial crops | 484 | 1,603 | 30.3% | 0.036 | 0.034 |
| 01.2 | Growing of perennial crops | 45 | 27 | 40.4% | 0.068 | 0.046 |
| 01.3 | Plant propagation | 24 | 63 | 63.5% | 0.120 | 0.082 |
| 01.4 | Animal husbandry | 498 | 4,255 | 18.8% | 0.020 | 0.018 |
| 01.5 | Mixed farming | 69 | 140 | 67.3% | 0.128 | 0.116 |
| 01.6 | Support activities for agriculture and post-harvest crop activities | 112 | 194 | 38.9% | 0.060 | 0.052 |
| 01.7 | Hunting, trapping and related service activities | 7 | 16 | 93.6% | 0.574 | 0.503 |
| 03.1 | Fishing | 72 | 341 | 55.3% | 0.104 | 0.091 |
| 03.2 | Aquaculture | 26 | 53 | 65.1% | 0.149 | 0.114 |
| 10.1 | Processing and preserving of meat and production of meat products | 53 | 5,541 | 67.9% | 0.175 | 0.159 |
| 10.2 | Processing and preserving of fish, crustaceans and molluscs | 51 | 1,842 | 54.4% | 0.094 | 0.076 |
| 10.3 | Processing and preserving of fruit and vegetables | 27 | 399 | 81.5% | 0.261 | 0.232 |
| 10.4 | Manufacturing of vegetable and animal oils and fats | 5 | 757 | 100.0% | 0.500 | 0.375 |
| 10.5 | Production of dairy products | 29 | 5,678 | 63.3% | 0.142 | 0.112 |
| 10.6 | Production of grain mill products, starches and starch products | 8 | 659 | 98.9% | 0.714 | 0.673 |
| 10.7 | Production of bakery and pasta products | 106 | 2,054 | 63.9% | 0.117 | 0.108 |
| 10.8 | Production of other foodstuffs | 77 | 3,165 | 52.6% | 0.094 | 0.082 |
| 10.9 | Production of prepared animal feeds | 13 | 930 | 90.0% | 0.465 | 0.421 |
| 11.0 | Production of beverages | 33 | 5,570 | 83.8% | 0.225 | 0.201 |
| 46.11 | Agents involved in sales of agricultural raw materials, live animals, textile raw materials and semi-finished goods | 20 | 535 | 87.7% | 0.329 | 0.294 |
| 46.17 | Agents involved in sales of food, beverages and tobacco | 60 | 277 | 51.2% | 0.108 | 0.093 |
| 47.11 | Retail sales in non-specialist stores with food, beverages or tobacco predominating* | 621 | 27,937 | 65.5% | 0.126 | 0.125 |
| 47.21 | Retail sales of fruit and vegetables in specialist stores | 8 | 7 | 97.1% | 0.648 | 0.598 |
| 47.22 | Retail sales of meat and meat products in specialist stores | 32 | 107 | 48.0% | 0.088 | 0.059 |
| 47.23 | Retail sales of fish, crustaceans and molluscs in specialist stores | 27 | 47 | 47.8% | 0.084 | 0.048 |
| 47.24 | Retail sales of bread, cakes and flour- and sugar-based confectionery in specialist stores | 12 | 27 | 76.4% | 0.169 | 0.094 |
| 47.25 | Retail sales of beverages in specialist stores | 50 | 1,841 | 72.3% | 0.188 | 0.172 |
| 47.29 | Other retail sales of food in specialist stores | 57 | 140 | 37.1% | 0.056 | 0.039 |
| 47.81 | Retail sales via stalls and markets of food, beverages and tobacco products | 94 | 627 | 74.3% | 0.461 | 0.455 |

Only companies with sales greater than zero were taken into account.
HHI – Herfindahl-Hirschman Index (range: 1 / number of companies to 1)
Normalised HHI – index normalised with the number of companies (range: 0–1).
* Retail sales of foodstuffs do not include consolidated figures of groups; if ETK is included as a market participant, the four leading companies would have a nearly 80% share of the market, and HHI and normalised HHI would be greater than 0.16.
Source: Estonian Tax and Customs Board

**Table 3. Share of five leading companies in production or sales**

|  | United Kingdom 2004 | Estonia 2009 |
|---|---|---|
| Agriculture |  | 41% |
| Fishing | 16% | 53% |
| Meat processing | 17% | 72% |
| Fish, fruit and vegetables | 36% | 53% |
| Oils and fats | 88% | 100% |
| Dairy products | 31% | 72% |
| Flour, grain mill products and starch | 31% | 100% |
| Animal feed | 36% | 94% |
| Bakery products | 17% | 68% |
| Sugar | 99% |  |
| Chocolate and sugar-based confectionery | 81% | 98% |
| Other foodstuffs | 39% | 69% |
| Alcoholic beverages | 50% | 95% |
| Non-alcoholic beverages and mineral water | 75% | 98% |
| Wholesale trade | 6% | 13% |
| Retail trade | 20% | 31% |

Sources: Concentration ratios for businesses by industry in 2004. Economic Trends 635 October 2006; Estonian Tax and Customs Board, author's calculations

## SUMMARY

The food supply chain is a topical issue throughout Europe and gained particular attention in 2007 and 2008 when prices rose rapidly. Studies have not identified any obvious problems in the supply chain itself, because links are not unambiguous. Potential risks are understood and competition violations have been ascertained in many countries, but these do not amount to a massive problem. The need to keep the issue in focus and to conduct more in-depth analysis of specific sectors has been emphasised.

Food price movements within the supply chain have generally been logical in Estonia; greater variability only occurred in the last few months of 2010, and changes in commercial pricing practices have been introduced in the case of some products (such as milk packaged in plastic bags). Looking to the longer term, this cannot be considered to be extraordinary: prices and margins declined substantially during the crisis and are now being adjusted.

In comparison with other countries, the food chain of Estonia is more concentrated, but the smallness of the market plays a role in this. In general, concentration indicators are average in terms of larger sectors. The profits of Estonian companies are not high compared to those in other countries – rather the other way round. Estonian producers also have to compete with producers from neighbouring countries.

It can be argued that despite the small market, the competitive situation in the Estonian food sector is satisfactory, at least at the level of macroeconomic indicators.
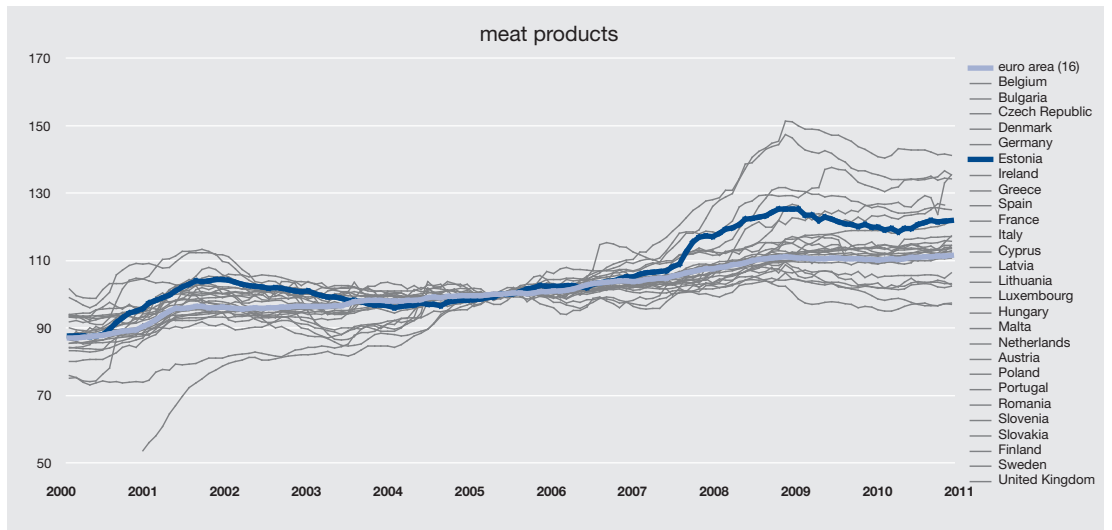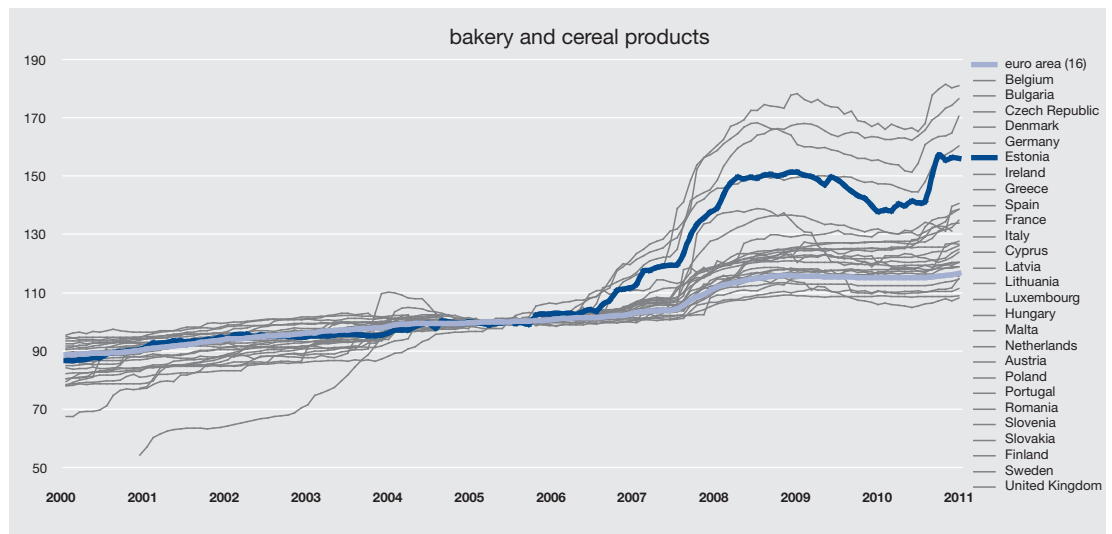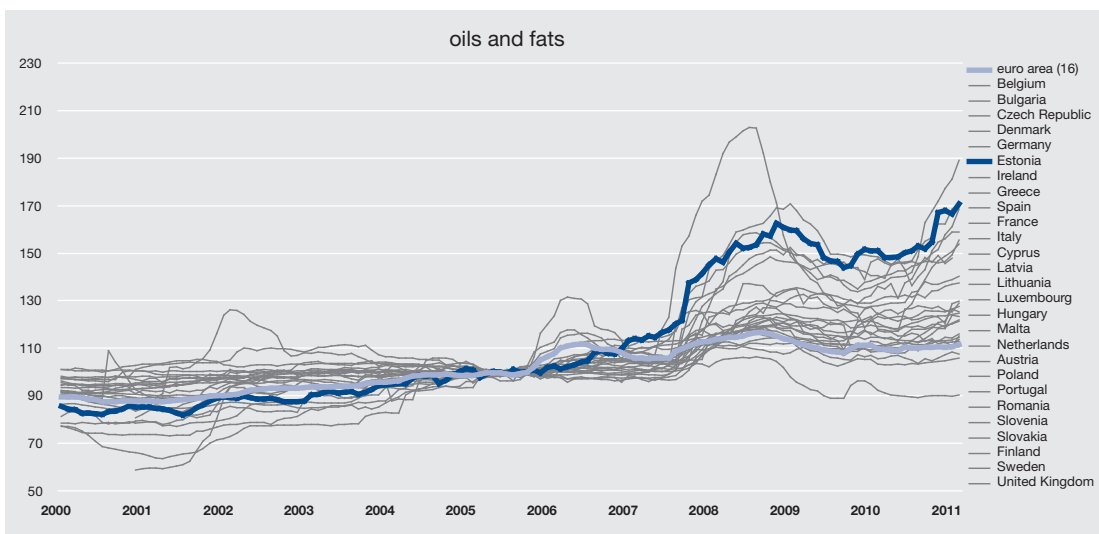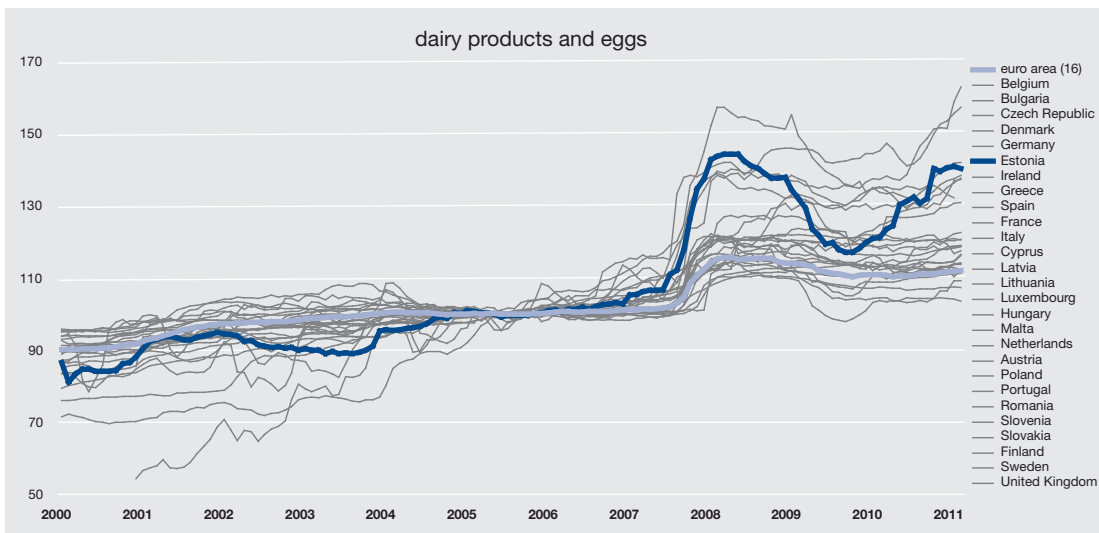
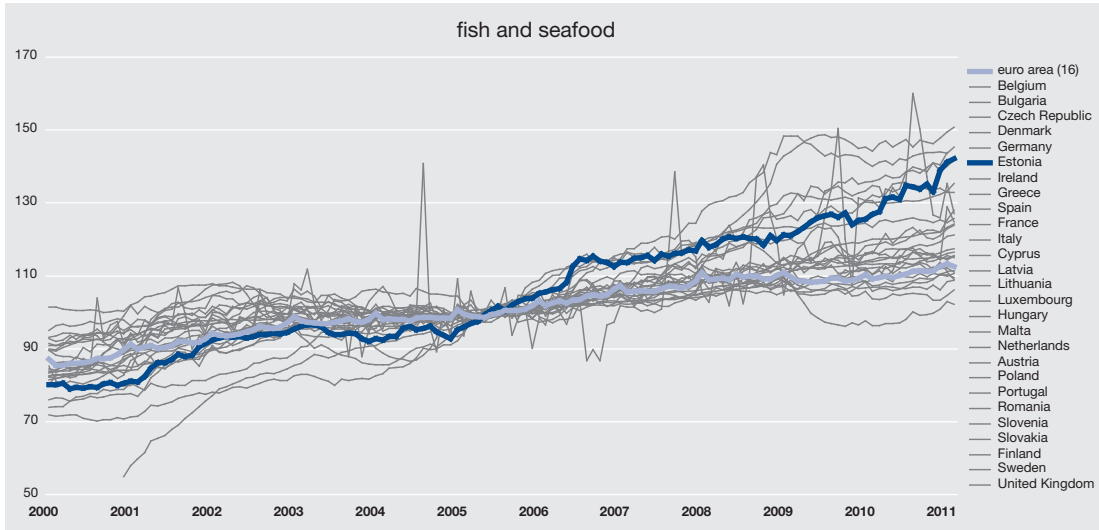## Annex 1. Changes in prices of selected food groups in EU-27 from January 2000 to November 2010
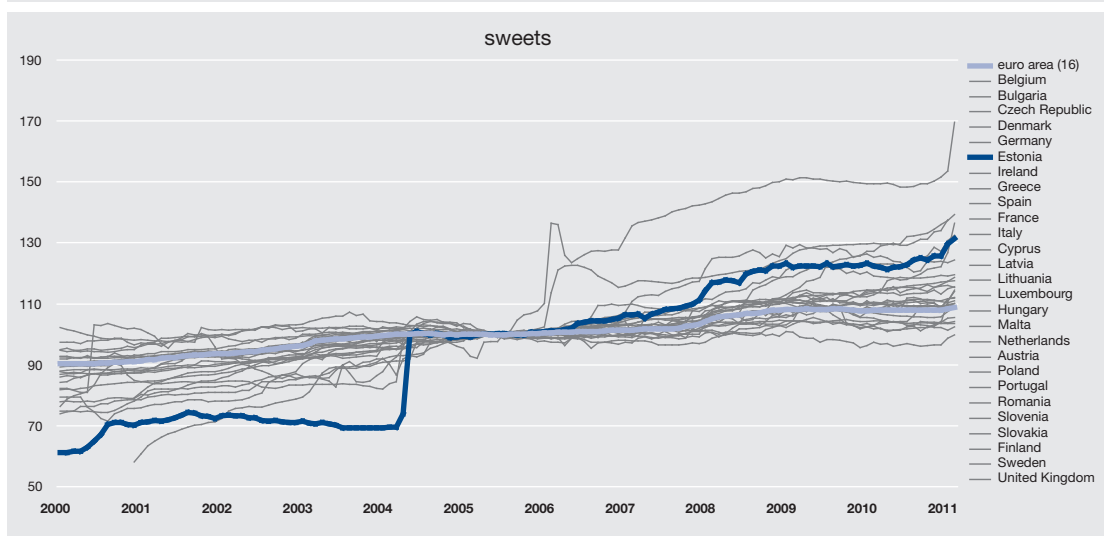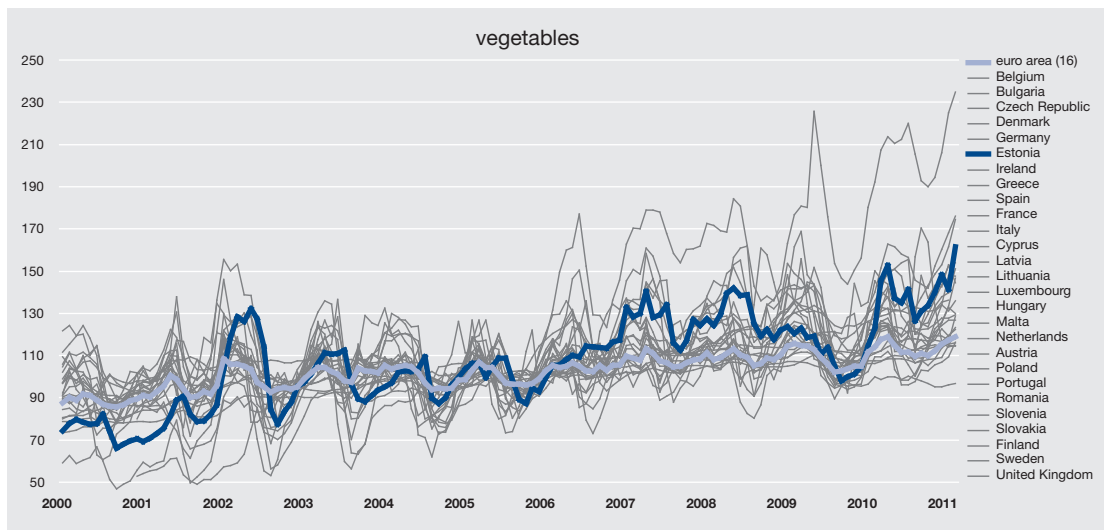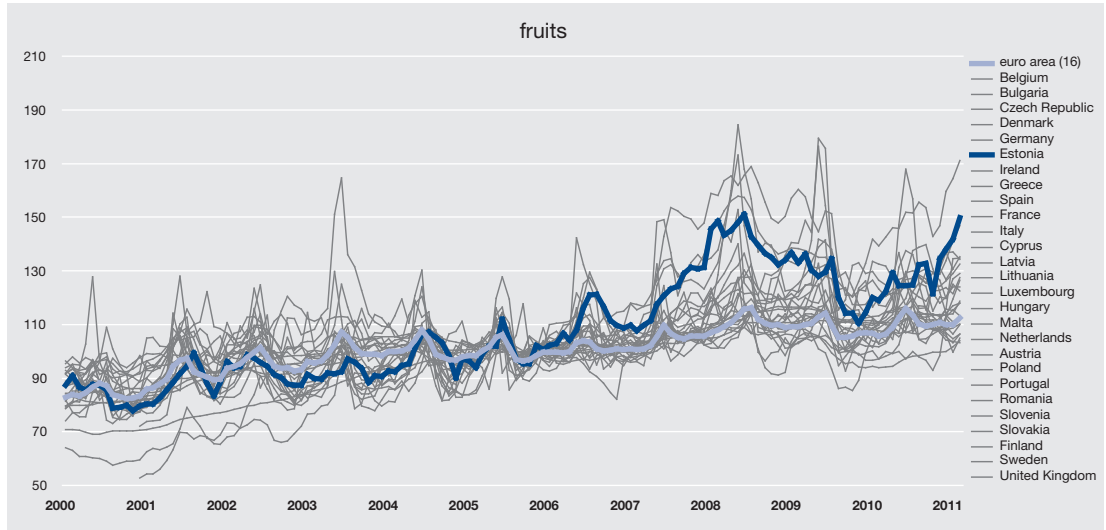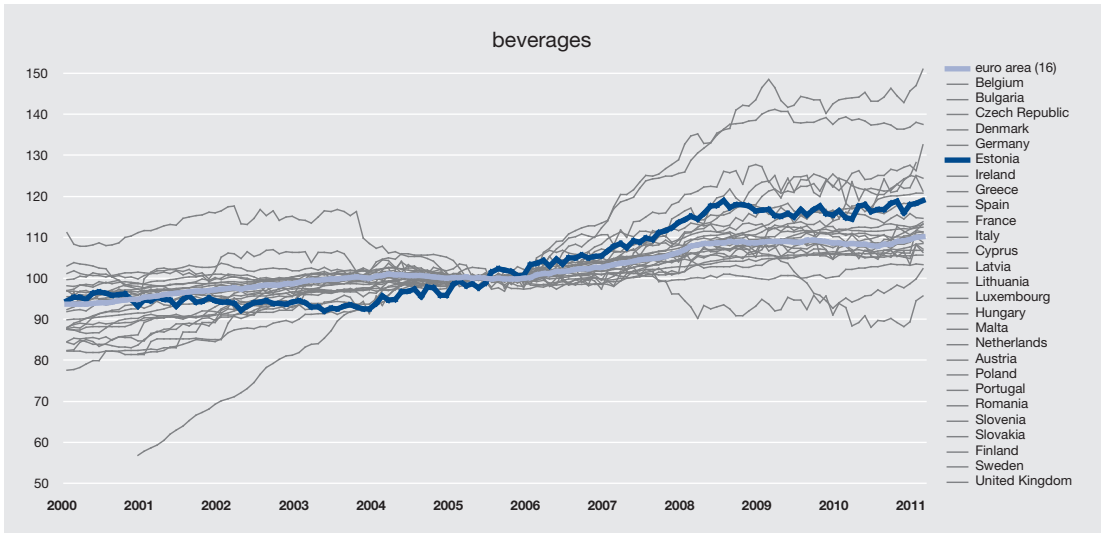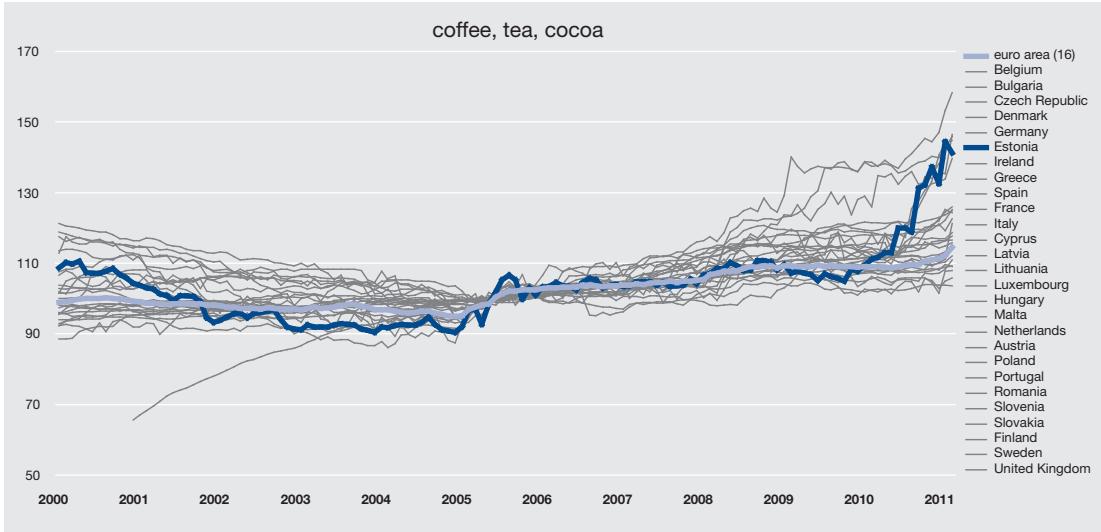
Underlying index 2005 = 100
In national currency
Developments in Estonia are indicated by the line in bold.
Source: Eurostat



bakery and cereal products



meat products

## fish and seafood



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

## dairy products and eggs



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

## oils and fats



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

## fruits



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

## vegetables



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

## sweets



Legend: euro area (16), Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom

coffee, tea, cocoa

| | |
|---|---|
| | euro area (16) |
| | Belgium |
| | Bulgaria |
| | Czech Republic |
| | Denmark |
| | Germany |
| | Estonia |
| | Ireland |
| | Greece |
| | Spain |
| | France |
| | Italy |
| | Cyprus |
| | Latvia |
| | Lithuania |
| | Luxembourg |
| | Hungary |
| | Malta |
| | Netherlands |
| | Austria |
| | Poland |
| | Portugal |
| | Romania |
| | Slovenia |
| | Slovakia |
| | Finland |
| | Sweden |
| | United Kingdom |



beverages
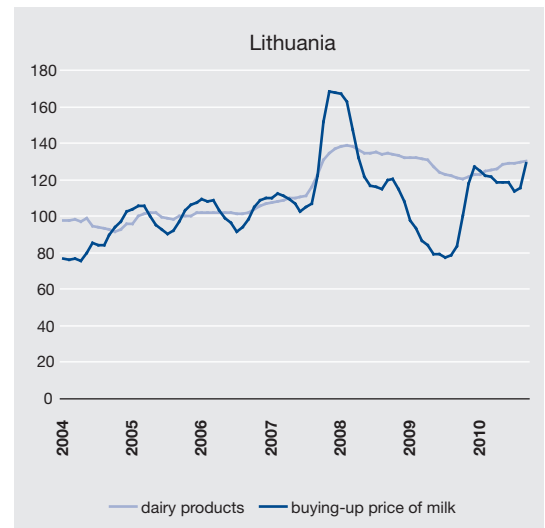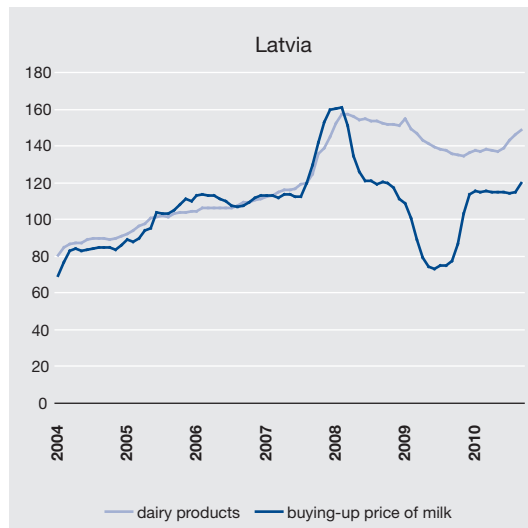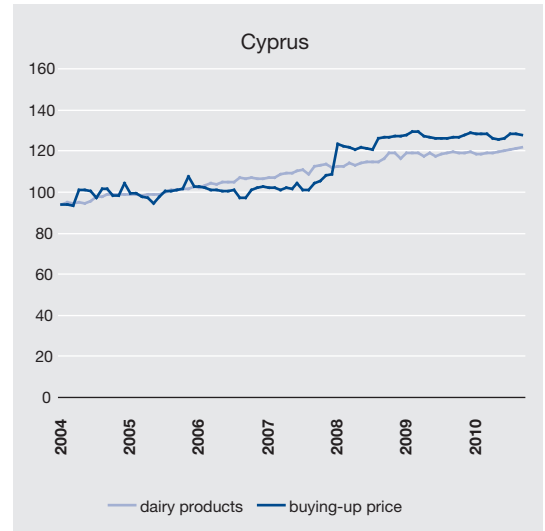
## Annex 2. Buying-up price of milk vs. consumer prices of dairy products in EU Member States

Sources: CLAL and Eurostat[37]



Belgium



Bulgaria



Czech Republic



Denmark

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[37] This is a simplified comparison, as exchange rates may influence the level of consumer prices.

## Germany



dairy products — buying-up price of milk

## Estonia



dairy products — buying-up price of milk

## Greece



dairy products — buying-up price of milk

## Spain



dairy products — buying-up price of milk

## France



dairy products — buying-up price of milk

## Ireland



dairy products — buying-up price of milk

## Italy



dairy products — buying-up price of milk

## Cyprus



dairy products — buying-up price

## Latvia



dairy products — buying-up price of milk

## Lithuania



dairy products — buying-up price of milk

## Luxembourg



dairy products — buying-up price of milk

## Hungary



dairy products — buying-up price of milk

## Malta



dairy products — buying-up price of milk

## Netherlands



dairy products — buying-up price of milk

## Austria



dairy products — buying-up price of milk

## Poland



dairy products — buying-up price of milk

## Portugal



dairy products — buying-up price of milk

## Slovenia



dairy products — buying-up price of milk

## Slovakia



dairy products — buying-up price of milk

## Finland



dairy products — buying-up price of milk

## Sweden



dairy products — buying-up price of milk

## United Kingdom



dairy products — buying-up price of milk

## Annex 3. Comparison of buying-up prices of milk in EU Member States

Developments in Estonia are indicated by the line in bold.
Source: CLAL, Eurostat



**Figure 1. Estonia vs. 'old' EU Member States**



**Figure 2. Estonia vs. Central and Eastern European EU Member States**

**Annex 4. Proportions of exports and imports in selected product groups**

Source: Statistics Estonia



fresh milk products (excl. fresh cream), imports-output ratio
fresh milk products (excl. fresh cream), exports-output ratio

milk and buttermilk, imports-output ratio
milk and buttermilk, exports-output ratio

fresh cream, imports-output ratio
fresh cream, imports-output ratio

wholemilk powder, imports-output ratio
wholemilk powder, exports-output ratio

butter, imports-output ratio
butter, exports-output ratio



cheese, imports-output ratio
cheese, exports-output ratio



processed cheese, imports-output ratio
processed cheese, exports-output ratio



meat total, imports-output ratio
meat total, exports-output ratio



beef, imports-output ratio
beef, exports-output ratio



pork, imports-output ratio
pork, exports-output ratio

poultry, imports-output ratio
poultry, exports-output ratio



mutton and goat meat, imports-output ratio
mutton and goat meat, exports-output ratio



cereals total, imports-output ratio
cereals total, exports-output ratio



wheat (durum wheat not grown in Estonia), imports-output ratio
wheat (durum wheat not grown in Estonia), exports-output ratio



rye, imports-output ratio
rye, exports-output ratio



barley, imports-output ratio
barley, exports output ratio

oats, imports-output ratio
oats, exports-output ratio