FOOD PRICES ANALYSIS FOR THE BALTIC STATES ON THE BACKGROUND OF AGMEMOD 2020 MODELLING FRAMEWORK

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ABSTRACT. *Article examines the price dispersion in the Baltic States before and after accession. The Law of One Price (LOOP) states that, regardless of the location, at a given moment of time prices of the same products should be equal when converted to a common currency.*

Using the AGMEMOD model which allows analysing the economic impact of prices by providing for the generation of both no policy change (baseline) and scenario analyses, will be of more general applicability and relevance to policy makers. Prices projections are provided over a medium term time horizon, so that by the time of the project's completion it will be possible to make forecasts up to the year 2020. The modelling results analysis based on the high prices model version elaborated at the second half of 2008.

Keywords*: Law of One Price, Common Agricultural Policy, Baltic States, AGMEMOD 2020 model, price dispersion, price convergence, price divergence.*

Introduction

The agrarian sector has become less important in terms of its economic weight and share in GDP during the last ten years in New Member States (NMS) in EU. Farm gate prices (producer prices) most of the NMS cannot reached the levels of Old Member State (OMS) yet. Investigation of this topic based on the Law of One Price theory which says that in an efficient market, competition should ensure the prices of commodities converge on one another. The Law of One Price is the economic rule that, in the absence of trade barriers or transport costs, competition will ensure that a particular good will sell at the same price in all countries.

Estonia, Latvia and Lithuania are the three Baltic States located on the coast of the Baltic Sea on the Nord part of EU. All before mentioned countries are typical with high investments, financial, business and monetary freedom.

This favourable investment situation (good monetary conditions, strong financial position of companies and EU funds) together with attractive incentives for foreign investors has attracted investments from Western, Central Europe and, eventually, Russia. Each of the three countries has entered the Exchange Rate Mechanism and is aiming for Euro zone that now has been postponed probably up to 2011 due to the overall economic stagnation in 2009 caused by unfavourable international economic developments (decreasing of purchasing power, increasing unemployment, diminishing of trade etc.). Producers of tradable goods are facing difficulties due to tight labour market conditions, which have lead to rapidly increasing unit labour costs and constraints on output.

The EU accession agreement on free trade in agricultural products is perceived as a logical continuation to the gradual economic integration for the Baltic States. In May 2004 such an agreement was signed. The main goals of the EU Common Agricultural Policy for ten new EU Member States (including the Baltic States) were

- to create of a free trade zone for agricultural, food and fish products;
- to guarantee the environment and food safety requirements of the CAP;
- the liberalization of agricultural policy;
- to create a fair competition environment among the Old and New Member States of EU.

Due to the previously mentioned goals the investigation of different food prices convergence processes in common economic space is extremely important for agro food trade development in future. On other hand it's absolutely clear that costs and prices for food products, taking into account the requirements of food safety and maintaining environment in good conditions must to increase.

The focus of this paper is on how the food prices dispersion varied related to EU 27 prices in Baltic countries.

The main objective of research is to analyse the market integration opportunities on the base of prices convergence for main agricultural and food products in Baltic States. Therefore the main investigated issues in this article are:

- To use AGMEMOD 2020 model and the methodology to evaluate the price dispersions for the main food commodities of Baltic States;
- To compare and evaluate the Baltic States agricultural producer and food prices on the background of EU prices;

The article compiled on the bases of two research projects. First, which is supported by the Estonian Ministry of Agriculture 'Unification of Prices in European Union and the Expected Impact to the Estonian Food Sector' (2006…2008). And second is the EU 6 Framework Programme project 'Agricultural Member States Modelling for the EU and Eastern European Countries' (2006… 2008).

First section of article devoted to the theoretical overviews and different explanations of price dispersion subject, how AGMEMOD model is built up and what kind of scenarios used for the forecasts.

Second section describes the price data which are used for analyses. The third section presents the empirical evaluation of time series using accounted Price

Dispersion Coefficients (PDC) and visualization of prices forecasts, based on the AGMEMOD model results 2010…2020.

Theories and methods

Theoretical background of the price dispersion analysis based on the Law of One Price (LOOP) conception for investigation the prices of food products before and after accession to European Union. The Law of One Price is the economic rule that, in the absence of trade barriers or transport costs, competition will ensure that a particular good will sell at the same price in all countries. Last years a large body of literature has been dedicated to analysing the empirical evidence for the LOOP as well as for Purchasing Power Parity (Brissimis, S. N., Sideris, D., & Voumvaki, F. K. (2005). What does Purchasing Power Parity (PPP) mean? An economic theory that estimates the amount of adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each currency's purchasing power. The relative version of PPP is calculated as (1):

$$S = p_1 / p_2 \quad (1)$$

Where:
'S 'represents exchange rate of currency 1 to currency 2;
'P_1' represents the price of good 'x' in currency 1;
'P_2' represents the price of good 'x' in currency 2.

In other words, the exchange rate adjusts so that an identical good in two different countries has the same price when expressed in the same currency.

Due to the lack of appropriate econometric techniques and insufficient or unsuitable data, early empirical studies were mostly unable to find evidence for either of the two hypotheses (Gouveia, P., & Rodrigues, P. (2004). Later studies which extend the data set by including more observations on cross country data are generally able to find support in favour of price convergence. Analysis contributes to the empirical literature on the LOOP in an intra-regional framework by analysing the development of relative prices on a disaggregated level for the entire European Union (EU) over the past 10 years (Jenkins, M. A. (2004). The data used for the empirical assessment of the LOOP consist of harmonized consumer price indices for 90 different product groups from 25 EU countries. In addition to analysing the validity of the LOOP for the entire EU, broad data set also allows to investigate differences between the 15 old EU countries and the 10 countries of Central and Eastern Europe and the Mediterranean that joined the European Union in 2004 (Chilac M., Thomas H. (2004) (Wolszczak-Derlacz J. (2006). The second main approach on the field of LOOP is the investigation of price dispersion problems (Bergin P. R., Glick R. (2006). Indeed, numerous papers have studied the degree of international price dispersion, focusing on various issues. Crucini, Telmer, and Zachariades (2005) demonstrated the effect on price dispersion of basic gravity factors such as tradability and distance, usually interpreted to represent trade costs. Parsley and Wei (2002) examine the impact of currency arrangements, finding that country pairs with currency unions or other exchange rate stabilization have lower price dispersion.

The comparison of price level differences across food commodities in different countries are implemented by measuring declining of price dispersion in certain time path. More specifically, let $p^k_{i,t}$ be the price of food commodity k in country i at time t and $p^k_{j,t}$ is price for same commodity in country j at time t. Then price dispersion $q^k_{ij,t}$ be expressed (2)

$$q^k_{ij,t} = p^k_{i,t} - p^k_{j,t} \quad (2)$$

This approach is almost closer to the present research methodology.

The AGMEMOD 2020 model is an econometric, dynamic, multi-product partial equilibrium model that allows us to make projections and simulations in order to evaluate measures, programmes and policies in agriculture at the European Union (EU) level as well as on the Member States level. Research implemented through the two types of models. First, all the EU Member States compiled the stand-alone country model and after that on the bases of these country models the overall EU model was synthesised.

Country alone model. For each Member State and for all of the commodity markets covered by the model, an operational dynamic multi-market partial equilibrium model has been developed. In particular the AGMEMOD model covers a detailed set of agricultural policy instruments in each country (Figure 1). The model is closed on a residual element of the supply and use identity in general the exports is the closure variable.

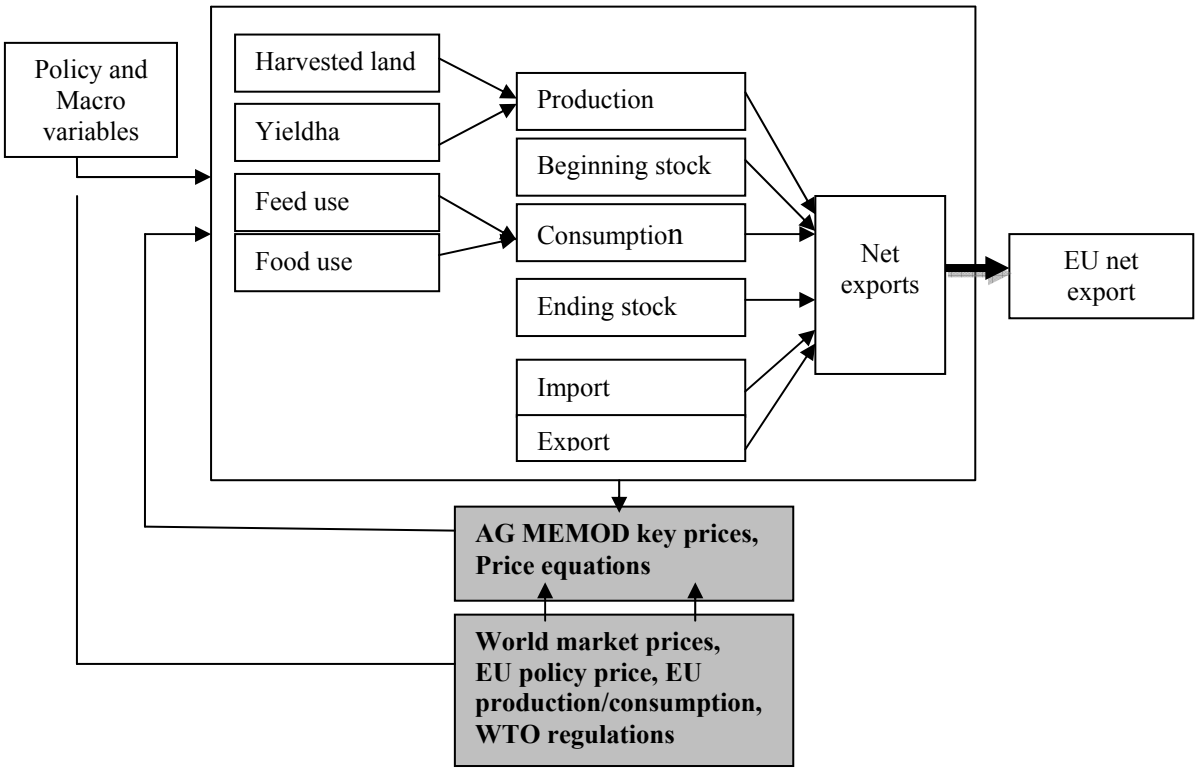

Figure 1. Country model structure of AGMEMOD
Source: Leeuwen M., Tabeau A., Dol W., Bouma F. (2008) 'Technical Report on the combined model' Deliverable reference number: AGMEMOD WP6 P16 D8; Agricultural Economics Research Institute (LEI); p 47.

As a country model mostly does not represent a closed economy, the concept of key markets and key prices has been introduced in order to take into account the influence of other member states on a given country market.

Hence, when the national level market is not considered as the key market in the EU, the internal price is determined as a function of the chosen key price for the EU and the self-sufficiency rate for this market and the self-sufficiency rate for the key market. Thus, these modelling tools allow to generate projection and scenario simulation results for each country and for the EU in aggregate, assuming that variables relative to other countries are exogenous.

EU model. AGMEMOD 2020 is an econometric, dynamic, multi-product partial equilibrium model wherein a bottom-up approach has been used. Based on a common country model template, country level models with country specific characteristics has been developed to reflect the specific situation of their agriculture and to be subsequently combined in a composite EU AGMEMOD model. This approach captures the inherent heterogeneity of the agricultural systems existing across the EU while still maintaining analytical consistency across the country models via as close as possible adherence to template. The maintenance of analytical consistency across the country models is essential for the aggregation and also facilitates the comparison of the impact of a policy across different member states. One of the aims of this study is to integrate all member state models into an EU combined model (Figure 2).

The EU AGMEMOD model developed in this study is based on a methodology similar to that implemented at the country level. To combine these country models, some exogenous variables are internalised in the EU model, and become endogenous variables (self-sufficiency rates and prices of key markets). When solving the EU AGMEMOD model, a closure variable has been chosen to ensure that the supply and use identity holds for all EU markets. AGMEMOD does not consider the distinction between intra EU and extra EU trade at the member state level. Thus intra EU trade disappears at the EU level when summing supply and use identities across countries. This implies that the EU net export variable is used as the closure variable at the EU level. As the combined model does not represent a closed economy, key price linkage equations are used to take into account the impact of the Rest of the World on EU agricultural sectors. The key price equation for a given commodity market is also a function of the EU self-sufficiency rate and thus reflects the endogenous development of the EU internal balance for the commodity concerned. For example, the EU soft wheat key price is modelled as a function of the world wheat price, the EU soft wheat intervention price, relevant trade policy variables and the self-sufficiency rate for wheat in the EU. Hence, the final dynamic, multi-market, multi-country composite model developed allows to generate baseline projections and alternative

scenario simulations for both the EU in aggregate and its member states individually, under the assumption of exogenous world prices. In its current form the composite EU AGMEMOD model also allows us to analyse agricultural policy changes for a given subset of the countries modelled, while considering the rest of the EU as exogenous.

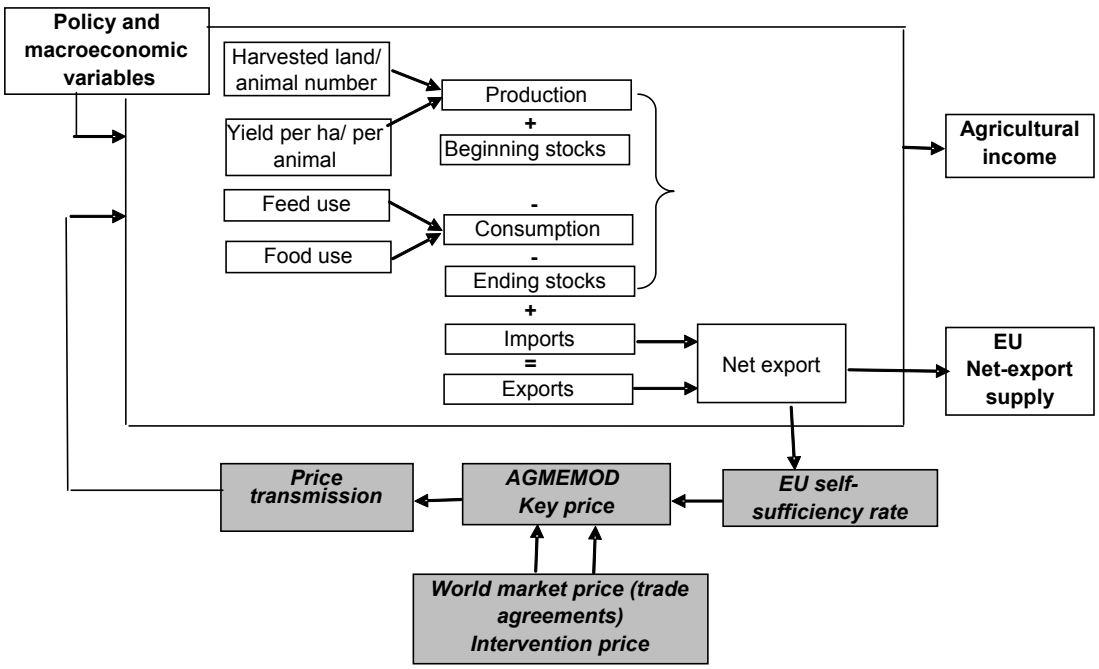

Figure 2. EU combined model structure of AGMEMOD
Source: Leeuwen M., Tabeau A., Dol W., Bouma F. (2008) 'Technical Report on the combined model' Deliverable reference number: AGMEMOD WP6 P16 D8; Agricultural Economics Research Institute
(LEI); p 47.

To better represent the increasing economic integration among Old Member States (OMS) and New Member States (NMS) within the AGMEMOD 2020 model, some variations are admitted for NMS with respect to the general country model template. In particular, all yield equations and all price transmission equations are adjusted to 'impose' technological and price convergence toward the EU avg., as shown in figure 3.

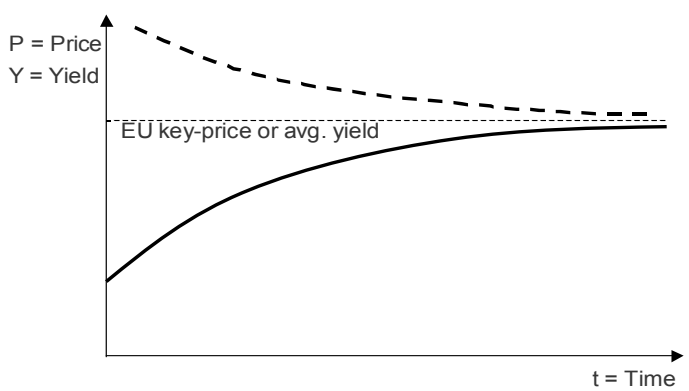

Figure 3. Graphical interpretation of price convergence estimation in AG MEMOD model.

This implies, which these equations have to include additional explanatory variables as follow:

$$y_{i,t} = \alpha + \boldsymbol{\beta}\,\mathbf{X}_{i,t} + D_t\left\{ y_{i,t-1} + \gamma\left[\exp\left(\frac{y_{iEUavg.,t-1} - y_{it-1}}{y_{it-1}} \right) - 1 \right] \right\} \tag{3}$$

Where $y_{i,t}$ indicates price or yield at time t for the i-th commodity in the given country; X indicates the vector of the other explanatory variables (normally included in the equation also in the OMS) and β the respective parameters. D is a dummy assuming value = 0 for OMS and = 1 for NMS. The term within brackets expresses the convergence process, γ being the parameter indicating the convergence speed (expected to be positive) and $y_{iEUavg.,t}$ the EU average yield or the EU key-price. To impose convergence, the exponential form is preferred to the more frequently used logarithmic one, according to the general indication of avoiding logarithmic specifications.

Price dispersion analysis

Special computer programme in Excel environment for automatic price dispersion analyse system (PDAS) was elaborated in Institute of Economics and Social Sciences of Estonian University of Life Sciences. In principal we have opportunity to use the Excel model to compare the prices for every EU country which are presented in database. But our interest at the moment is to analyse the prices of Baltic States with acknowledged key prices (states).

Competitiveness of Estonian, Latvian and Lithuanian agricultural products on the EU common market depends how fast are the price convergence or divergence between the New and Old Member States is. One possible formula for evaluation of price dispersion is (4):

$$\mathbf{PDC_i = (P_{t0,Ri} - P_{t0,Xi})/(P_{t,Ri} - P_{t,Xi})} \qquad \mathbf{(4)}$$

Where:

$\mathbf{PDC_i}$ Price Dispersion Coefficient for commodity i;
$\mathbf{P_{t,Xi}}$ ending price for commodity i in country X;
$\mathbf{P_{t0,Xi}}$ starting price for commodity i in country X;
$\mathbf{P_{t,Ri}}$ ending key price for commodity i in key country R;
$\mathbf{P_{t0,Ri}}$ starting key price for commodity I in key country R.

For the evaluation:

- if PDC > 1 is indication to the price convergence;
- if PDC < 1 is indication to price divergence;
- if PDC < 0 [−] is exceptional case when in the first occur the price convergence and after the equilibrium, usually followed the price divergence or vs.

In case of high price version of AGMEMOD 2020 model solution the highest prices increase for soft wheat, barley, oilseed, milk, cheese, pig meat and eggs are in Lithuania (Table 1). For butter, skim milk powder and beef meat in Latvia.

Data. The database section describes the EU27 historical data and projections for the period to 2020, which are generated by the current AGMEMOD model (AGMEMOD combined model 3.1, December 2008). The macroeconomic projections, key prices for agricultural commodities and agricultural policy assumptions underlying the Baseline are presented in model database. These data are also used in the generation of projections under the alternate policy scenarios. On the national level the database reflected the main indicators (prices, production, consumption, export, import, balances, etc) collected mainly through the EUROSTAT or national statistics agencies.

For any commodity, the market price is endogenously determined. It means that any commodity model includes one equation (*price formation equation*) where price is the dependent variable and the independent variables explain how price is formed within the market. Nonetheless, the endogenous determination of market prices does not mean that they are market-clearing prices. In other words, these prices are not computed to make the market close; as mentioned, market closure is achieved imposing the supply-use identity, given the market price, through one market-closing variable.

There can be two kinds of price formation equations in the commodity models. In the first case, which is the most frequent, we have a *price transmission equation*, where the price is driven by an external price. Generally, this external price is the EU key-price; if there is no EU key-price (for instance in oilseeds' model) price transmission is directly driven by the world price or by other world market indicators. A second case occurs when, for the commodity under consideration, the given country is the most important market within the EU. In this case, the country model presents a *key-price formation equation*. This equation drives price transmission in all the other country models and also 'captures' all exogenous variables affecting price formation and the dynamic structure of the model at the EU combined level. World market price, price policies (intervention prices, for instance), trade agreements, etc., may be included in the key-price (*Source: AGMEMOD 2020; WP2 D2 10/1182)*

In addition, key-price formation may include as explanatory variable the lagged EU self-sufficiency rate, thus making the key-price dynamically respond to previous year's outcome and, consequently, inducing all the other price transmission equations to adjust accordingly.

Historical price data. Historical price data represented the actual prices of different food commodities in certain time path (for Baltic States for example 1995…2006). All historical prices are accounted in Euro's per 100 kg of production (Table 1).

All endogenous data, including the actual prices used in the AGMEMOD model and stored in special file named *HistoryData-EU27.xls* (based on EUROSTAT prices database) − which contains individual country sheets with common set of time series.

Table 1. Price dynamics of main food commodities before and after accession to EU in Baltic States

	1998−2000 €/100 kg	2001−2003 €/100 kg	2004−2006 €/100 kg	PDC	Price dispersion speed and direction
Soft wheat					
Estonia	10.0	9.7	10.6	1.9	Fast convergence
Latvia	10.1	10.2	10.0	1.0	Zero dispersion
Lithuania	11.3	11.1	10.0	0.1	Fast divergence
Key price (FR)	11.4	11.2	11.4	x	x
Rapeseed					
Estonia	20.5	24.1	23.6	0.3	Fast divergence
Latvia	19.1	21.4	20.4	0.9	Slow divergence
Lithuania	17.9	20.8	20.6	4.0	Fast convergence
Key price (DE)	19.6	27.6	21.0	x	x
Raw milk					
Estonia	14.8	18.5	23.1	3.5	Fast convergence
Latvia	14.1	16.1	21.6	2.7	Fast convergence
Lithuania	12.8	14.1	17.0	1.6	Fast convergence
Key price (NL)	29.5	29.8	27.2	x	x
Cheese					
Estonia	231.8	290.1	290.3	1.6	Fast convergence
Latvia	243.8	252.1	275.6	1.4	Fast convergence
Lithuania	226.1	259.7	287.2	1.6	Fast convergence
Key (FR)	463.4	469.3	438.0	x	x
Pig meat					
Estonia	145.0	158.0	159.4	0.8	Moderate divergence
Latvia	135.5	169.8	148.5	0.7	Moderate divergence
Lithuania	157.3	151.6	144.5	4.2	Fast convergence
Key price (DE)	127.4	146.8	137.3	x	x

Source: AGMEMOD combined model 3.1 (2008)

Derived prices (projections). Data for exogenous variables are determined outside the model and these reflect information on agricultural and trade policy, the macro economy and key prices. All exogenous data including the key prices for the EU combine model up to 2020 are stored in the *AssumptionsInput.xls* file which is one module of AGMEMOD combine model 3.1.

Each country model is based on the aligned database with annual time series for agricultural commodity supply and use market balance sheets and price data related to the respective commodities modelled. The current sample covers the price projections for Baltic States from 2004 to 2020 (Table 2).

Table 2. Price dispersion projections of main food commodities related to key prices in Baltic States

	2004−2006 €/100 kg	2018−2020 €/100 kg	PDC	Dispersion speed and direction
Soft wheat				
Estonia	10.6	18.5	−0.4	Convergence to divergence
Latvia	10.0	16.1	2.2	Fast convergence
Lithuania	10.0	17.8	−1.3	Convergence to divergence.
Key price (FR)	11.4	16.7	x	x
Rapeseed				
Estonia	23.6	27.5	1.7	Fast convergence
Latvia	20.4	34.2	−0.1	Convergence to divergence
Lithuania	20.6	37.4	0.0	Fast divergence
Key price (DE)	21.0	25.9	x	x
Raw milk				
Estonia	23.1	28.9	4.2	Fast convergence
Latvia	21.6	24.7	1.1	Slow convergence
Lithuania	17.0	26.0	2.6	Fast convergence
Key price (NL)	27.2	29.9	x	x
Cheese				
Estonia	290.3	306.8	0.8	Slow divergence
Latvia	275.6	322.3	1.0	Zero dispersion
Lithuania	287.2	452.2	4.0	Fast convergence
Key price (FR)	438.0	489.8	x	x
Pig meat				
Estonia	159.4	177.8	1.1	Slow convergence
Latvia	148.5	151.9	−1.7	Convergence to divergence
Lithuania	144.5	187.4	0.2	Fast divergence
Key price(DE)	137.3	158.4	x	x

Source: AGMEMOD combined model 3.1 (2008)

World market prices. Generation of prices for baseline and scenario projections mainly depends on exogenous world market prices. The world market prices projections have, in general, been taken from FAPRI World Outlook (2008). The world livestock and grain prices are market prices from the US Dairy commodity prices and oilseed are generally Northern European prices. In particular, the world market prices are introduced in the key price equation to capture the effect of global supply and demand on the EU market.

Results

Concerning the Baltic States the significant increase of production is expected in oilseeds sector where the yield of rapeseeds increasing more than three time. Production of soft wheat should be increase in all Baltic States. Total milk production in small scale increasing in Estonia and Lithuania.

Fast price convergence in all Baltic States is occurring on the field of milk production where the Price Dispersion Coefficient (PDC) varied between 1.8 and 2.7 which indicate to fast price convergence during the projection period (Table 3). Due to the low price of raw milk the producer prices for cheese and butter significantly under the EU 27 average price in 2005−2020.

High price divergence on the field of pig meat production forecasted during the projected period in Latvia and Lithuania.

Table 3. Prices Dispersion Coefficient (PDC) and forecasts for Baltic Countries (2005…2020)

	2005 €/100 kg	2020 €/100 kg	2020/2005 (%)	Average per year (%)	PDC*
Soft wheat					
Estonia	9.8	18.5	189	5.5	−0.7
Latvia	8.8	16	182	5.1	1.8
Lithuania	8.4	17.7	211	6.9	−1.8
EU 27	10	17.3	173	4.6	x
Oilseeds					
Estonia	21.2	27.5	130	1.9	0.4
Latvia	17.9	34.4	192	5.8	2.5
Lithuania	18.1	37.4	207	6.7	−9.9
EU 27	23.5	37.5	160	3.7	x
Raw milk					
Estonia	22.9	28.7	125	1.6	1.8
Latvia	22	28.2	128	1.8	1.8
Lithuania	17.6	28.2	160	3.8	2.7
EU 27	27.5	31.3	114	0.9	x
Cheese					
Estonia	290.3	315	109	0.5	0.8
Latvia	285.6	332.7	116	1.0	0.9
Lithuania	287.2	467.2	163	3.9	2.6
EU 27	438.8	519.2	118	1.1	x
Butter					
Estonia	252.7	310.5	123	1.4	1.5
Latvia	223	311.6	140	2.5	2
Lithuania	242.6	321.8	133	2.0	2
EU 27	344.6	366.9	106	0.4	x
Pig meat					
Estonia	162.3	178.5	110	0.6	5.8
Latvia	134	151.5	113	0.8	0.3
Lithuania	144.1	188.5	131	1.9	0.3
EU 27	141.1	180.9	128	1.8	x

*Time series 2005−2020
Source: AGMEMOD combined model 3.1 (2008)

Following three subchapters devoted for examples of price dispersion analysis using the automatic price dispersion analyse system (PDAS) which is covered the three main most important agricultural commodities in Baltic States − rapeseed, milk and pig meat.

Price dispersion analysis of rapeseed

Concerning the rapeseeds the main engine of price change is external and internal market demand for rape oil. Rapeseeds prices after the accession (2005) were slightly below the EU 27 average price and close to German (DE) key price in Latvia (LV) and Lithuania (Table 2 and 3).

The price convergence trends for rapeseed are forecasted in Baltic States up to 2020 (Figure 4). High price convergence speed predicted for Estonia where the value of price dispersion coefficient (PDC EE 2.4) is rather notable. For all Baltic countries the rapeseed price projections are higher compared with German key price and below compared with EU 27 average price.

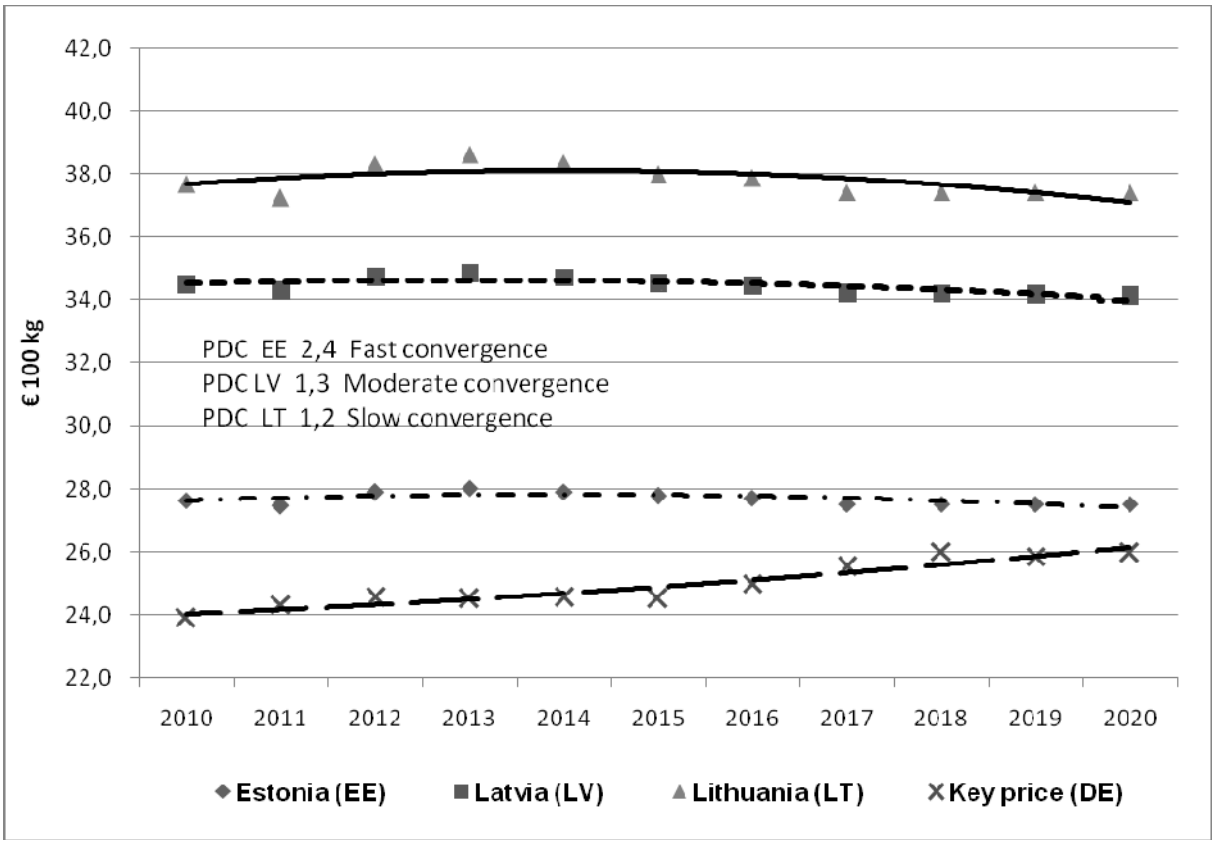

Figure 4. Price projection trends for rapeseed in Baltic States up to 2020.
Source: AGMEMOD combined model 3.1 Baseline (2008)

Significant price changes for rapeseed are predicted in Latvia and Lithuania Prices for rapeseeds is quite stable in Estonia. Growth per year (2005−2020) 0.4 % − is significantly under the predicted general inflation (3%) rate. Moderate and slow price convergence for rapeseed is in Latvia and Lithuania.

Rapeseed strongly competed with cereals. Therefore the grains area are decreasing and rapeseed area harvesting are increasing. Due to the increasing demand for oilseed the EU and World markets the net-exports of rapeseeds during the simulation period are significantly increasing in all Baltic States.

The value of Price Dispersion Coefficient (PDC = 0.4) indicated to the moderate price divergence in future between Estonian and EU 27 average prices.

Rapeseed price was significantly below the EU 27 average price in 2005 and expected to increase close to the reference price level up to 2020 in Lithuania (Table 3).

Rapeseed harvested area and production shows increase in both directions. Yield increase due to the EU and national support, which capacitates to use more fertilisers and pesticides and conditions improvement of technology. Same time path the harvested area of rapeseed expected to increase 2.5 times. Rapeseed domestic consumption increases 15.2 times, taking in to account increasing plants capacities.

The value of Price Dispersion Coefficient (PDC = −9.9) indicated up to 2020 quite fast price convergence and after that divergence between Lithuanian and EU 27 price.

Rapeseed price is under the key price level in 2005 and there are quite fast price convergence observes in simulated period in Latvia (Table 3). Rapeseed yield is growing in line with grain yields. Rape oil is expected to continue to be the fastest growing market for Latvian agricultural products and to be a net-exporter of this commodity. High demand, variety of use and land areas available for crop rotation are contributing to further increase of rapeseed production and export amounts.

The value of Price Dispersion Coefficient (PDC = 2.5) indicated to the fast rapeseed price convergence between Latvian and EU key prices up to 2020 (Table 3).

Price dispersion analysis of milk

Baltic States located in one of the world's most important milk production region. Share of milk production in gross agricultural production varied from 21 up to 28 % in 2007. Some negative trends in the dairy sector have been observed since the beginning of 1990 in all NMS countries. Political and economical changes resulted in a reduction in state support for milk producers and consumers, rapid price growth for production equipment, a change in the land ownership and purchasing power of the population. Milk producers in the Baltic States were reacted to the changes by reducing their milk production.

After the accession to EU (2004) the milk production due to the fast market price increase and introduction of EU support schemes are stabilized in Baltic States. If an average milk prices in 1998−2000 were significantly under the Netherland key price, then first years (2004− 2006) after the accession the fast milk price convergence took place (Table 1).

By model projection producer prices for milk in all Baltic countries will stay under the key prices up to 2020 (Figure 5).

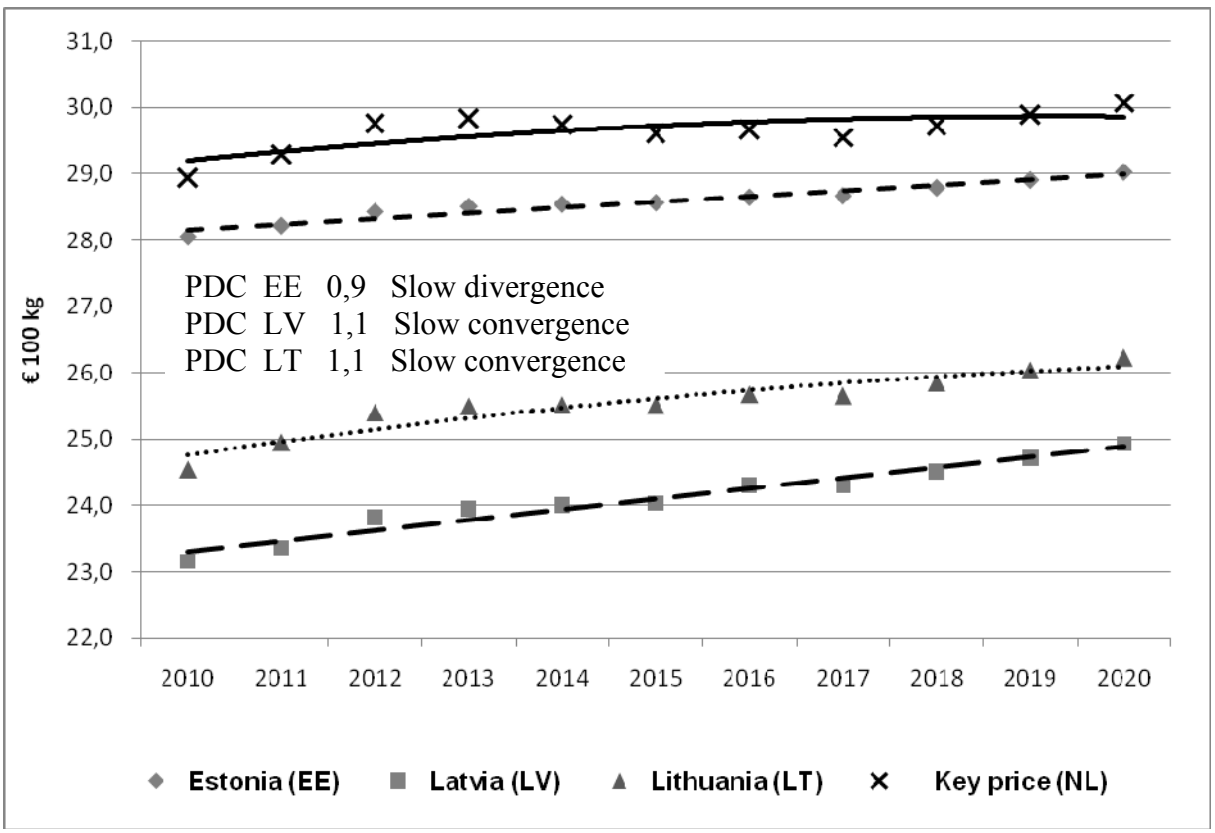

Figure 5. Price projection trends for raw milk in Baltic States up to 2020.
Source: AGMEMOD combined model Baseline 3.1 (2008)

Slow price divergence projected for milk in Estonia and slow convergence for Latvia and Lithuania. The low milk producer price is a grant to obtain some competitive advantages for production of cheese, butter, skim and whole milk powder.

Price dispersion analysis of pig meat

Pig meat is the main meat production branch in Baltic States. The share in gross agricultural production was in Estonia 11%, in Latvia 7.4% and in Lithuania 6.5% in 2008. The self sufficiency of pig meat in same time is slightly under the 100 % in Estonia (89%) and Lithuania (85%), but significantly under 100 % in Latvia (52%).

Historically the pig meat producer prices in Baltic States are higher compared with German key prices and close to average EU 27 in Latvia and Lithuania up to 2006 (Table 1 & 3). By the AGMEMOD 2020 model projections the pig meat producer prices are increasing in all Baltic States and as well in key country (Figure 6).

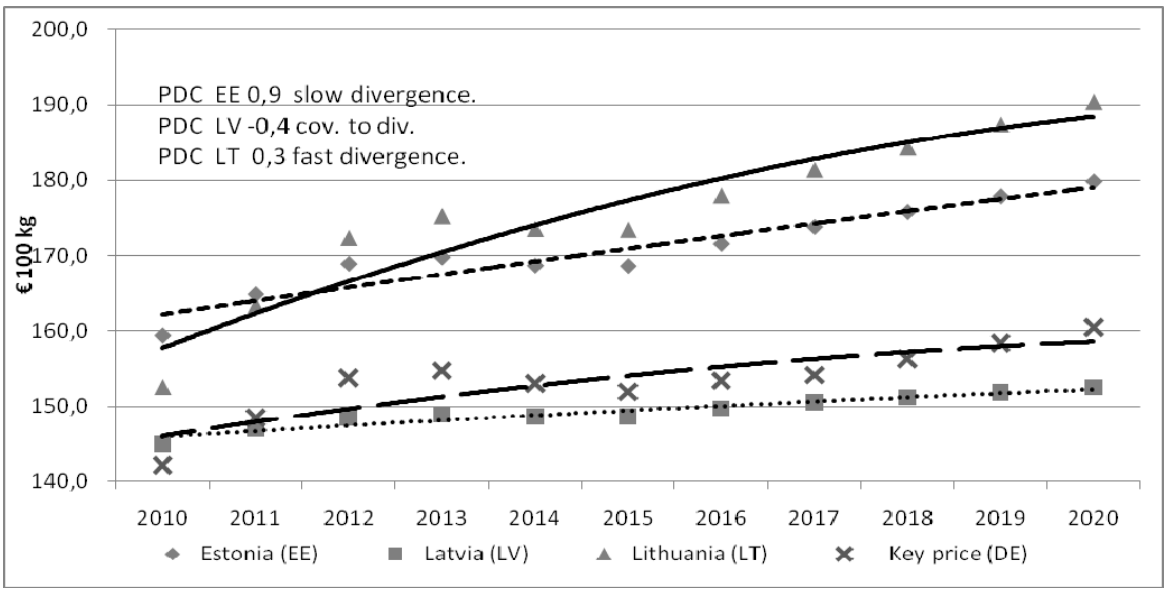

Figure 6. Price projection trends for pig meat in Baltic States up to 2020.
Source: AGMEMOD combined model 3.1 Baseline (2008)

Fast increase of pig meat producer prices up to 2020 are projected for Estonia and Lithuania and these ones are significantly higher compared with German key price. Same indicator remains slightly under the German key price in Latvia.

Discussion and conclusions

The main comparative advantages of the Baltic countries, which determine their specialization in the world market after regaining their independence and during the whole transition period, have been related to their geographical location, highly qualified labour and relatively low wages. After the accession to EU Baltic States with some exceptions were accepted the common market rules.

Over the last few years agricultural prices in all Baltic States as well as in EU internal market have been very floating. After the long term steady decline was broken by a big increase during 2007 which reached exceptional levels by early 2008. Increases in EU market prices in February 2008 against the same month in 2007 were of the following order of magnitude: 84% for wheat, 63% for rapeseed oil, 30% for milk and 35% for cheese.

However food prices have sharply declined since April 2008 and have come back to levels similar to or even below those before the price spikes. Moreover, the global economic uncertainty raises concerns about possible renewed price volatility. The effect of some of the short-term drivers which amplified the increase in agricultural prices in the second half of last year has diminished due to more favourable weather conditions, declining energy prices, lifting of export restrictions. Global supply has responded swiftly and strongly to higher prices, supported by a relaxation of production constraints in the CAP, notably the suspension of mandatory set-aside of arable land and the increased milk quotas from 2008 onwards.

The basic discussion point for the future AGME MOD model solutions is to determine the reliable key prices. Previous model results in large scale affected by extremely high crop prices in 2007 as exceptional case. In 2008 and probably in 2009 also the crop prices significantly decreasing.

Concerning the choice of scenarios these ones are quite similar to each other, without any extreme offers. Therefore the widening of certain extreme model variations allows testing and improving the equations flexibility of the AGMEMOD model.

The general assumption is that the law of one price can be applied in EU internal food markets. Unlike in international trade, where it takes time and effort to move goods physically from one place to another and secondly there are some significant barriers in global food market. But this law does not always hold in practice in food market in EU also. The reason is mostly concern lower transaction and input costs in NMS.

The integration of the NMS into the EU is certainly a good actual experiment to test the LOOP and several price dispersion issues. On the other hand, NMS, as relatively low-price countries undergoing price convergence towards the EU average, would experience a rise in their inflation rates and would have problems in fulfilling the nominal convergence criteria. New Member States (NMS) are afraid that their prices will increase due to integration, while Old Member States (OMS) are afraid that they will have to drop prices if they want to be competitive.

AGMEMOD 2020 model assumed only the price convergence trends. Unfortunately, based on Law of One Price among of some commodity prices related to the EU key prices the price divergence trends are occurred.

This study is quite unique the purpose of analyzing price convergence after the European enlargement in 2004. The main results of the research through the different topics are following:

- Analyses of technical efficiency (yield convergence) indicated to the significant increase of crops yield and livestock productivity in Baltic States after the accession to the European Union compared with forecasted basic indicators before 2004. Therefore, taking into account the quite stable demand of agricultural products on the food market some structural changes were occurred on the field of cereals and oilseed sector. In dairy sector the diminishing of animal compensated the milk production through the rising productivity of dairy cows.
- Concerning the price dispersion the general trend in Baltic States between the national and EU 27 prices are the prices convergence, of course with some exceptions (pig meat).
- By the Baseline results of AGMEMOD 2020 model the self sufficiency rate (SSR) compared with 2005 will increase in grain sector for all Baltic States. Decreases are forecasted for cheese production (except Lithuania).
- Taking into account quite stable demand of food products on the market, purchasing power of national currency and the low share of agriculture in macroeconomic indicators (GDP, GDP deflator, population etc) of the AGMEMOD 2020 high key and world market prices significantly affected the baseline and scenarios results.
- By the results of AGMEMOD 2020 model solutions the best alternative scenario for Baltic States and for all New Member States is the EU wide flat rate scenario with implementation of SPS payment model (2B).

The next steps to improve the model forecasts are to generate two additional AGMEMOD 2020 model versions. First is with moderate increase and the second in condition of low EU key prices.

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Toiduhindade analüüsid Balti riikides AGMEMOD 2020 mudeli raamistikus

Mati Sepp

Kokkuvõte

Hindade konvergents (ühtlustumine) ühises majandusruumis, kus toimib tööjõu ja kaupade vaba liikumine, on objektiivne protsess, millega peavad arvestama kõik sellesse ühendusse kuuluvad riigid. Hindade ühtlustumine põhineb ühel universaalsemal majandusseadusel, mida tuntakse ühe hinna seaduse nime all. Samas, sõltuvalt turumoonutuste ulatusest võib hindade konvergents olla erinevate riikide vahel kiirem või aeglasem. Liigsed turumoonutused aeglustavad hindade ühtlustumist ning vaba konkurentsi soodustamine, vastupidi, kiirendab protsessi. Seepärast, terve majanduse aluseks on olnud, on ja jäävad eelkõige terved hinnad. Põllumajandustootjale pole midagi tähtsamat, kui nende poolt progressiivselt rakendatud töö ja kapitali koostöö tulemusena genereeritud tulem (toode, teenus) ning selle tulemi eest saadav hüvitis (hind).

Toiduhindade ühtlustumise või eristumise hindamiseks täiustas Eesti Põllumajanduse Ministeeriumi 2007. aastal riikliku programmi 'Põllumajanduse rakendusuuringud ja arendustegevus aastatel 2004−2008' raamistikus tellitud uuringus 'Hindade konvergents Euroopa Liidus ning selle mõju Eesti toidusektorile' väljatöötatud hinna konvergentsi koefitsienti (PCC). Arvestades, et alati ei ole tegemist üksnes hindade ühtlustumise trendiga, −2006) ja prognoose (2007−2020).

Kirjutis analüüsib, millises ulatuses muutusid põhiliste toiduainete tootjahinnad Balti riikides esimese kolme Euroopa Liidu liikmesoleku aasta jooksul (2004−2006) võrreldes aastatega 1996−1998 ning üleminekuperioodiga 2001–2003. Teiseks, tuginedes mudeli AGMEMOD 2020 prognoosi tulemustele analüüsiti toiduhindade võimalikke muutusi aastatel 2007−2020.