PROSPECTS AND CHALLENGES IN LITHUANIAN AGRICULTURAL MARKETS AFTER EU ACCESSION

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Abstract

Medium-term prospects for key agricultural markets in Lithuania are analysed under alternative policies. Policy alternatives show the impacts of EU accession and also the impacts of implementing CAP reforms in 2007. The model is a partial equilibrium, multi-commodity model where commodity prices are linked to key prices in major EU markets.   The accession analysis shows significant impacts on production, prices, and even on relative prices. It indicates impacts on production and trade patterns. The most realistic scenario (SAPS to 2006 and SFP from 2007 to 2010) generates a growth in product value more than 10 percent higher than the non-accession scenario. The largest increase is in the value of milk production. There also is a decline in crops share and increase in milk share of the total market revenue, while cattle and dairy together increase from about 35 percent of output value in 2002 to over 45 percent in 2010.

Introduction

As Lithuania prepared for accession to the EU there was considerable uncertainty about the impacts of joining the EU and its implications for the food and agricultural industry. Among the earliest studies done under the Lithuanian Agrarian Economics Institute-Iowa State University collaboration that began in 1989 were models developed to analyse Lithuanian policy changes (Kazlauskiene et al, 1991; Meyers and Kazlauskiene, 1992). Although a number of studies have been made since then on the potential impacts of accession (European Commission, 2002; Valdes, 1999; Kazlauskiene, 1997b), this is the first comprehensive study to be done since the completion of negotiations. All previous studies had to speculate on how the CAP would be implemented, and many other changes have taken place in the evolution of the sector over recent years.

The purpose of this paper is to analyze the medium-term prospects for key agricultural markets in Lithuania and to compare the likely outcomes under alternative policy scenarios. These scenarios correspond to no-accession (baseline), accession without CAP reform, and accession with CAP reform implemented in 2007. This choice of options makes it possible to analyze the impacts of joining the EU and separately look at the impacts of the Luxembourg Agreement for CAP reform. The modelling approach is a partial equilibrium, multi-commodity, single country model.

The paper provides background on Lithuanian agricultural policy prior to accession, comparison of prices and support measures to those of the EU, and the results of accession negations and decisions on implementation of CAP in Lithuania. The methodology and scenarios are described briefly, results of the analysis are presented and discussed, then a summary and conclusions.

Preparing for accession

The agricultural sector in the Republic of Lithuania performs very important economic, social, environmental, and ethno-cultural functions. Therefore, it is considered to be a priority sector of the national economy. However, the economic importance of agriculture has been declining significantly during the last decade. The change to a market oriented economic policy initially lead to a contraction of the agricultural sector and a change in its structure. In addition, the effects of the Russian crises in 1998 put further strain on agriculture. In recent years, however, the Lithuanian agricultural sector has recovered, and the projections for future development are quite optimistic.

Lithuanian price levels and relative prices have changed significantly since the beginning of transition. Prices have become more responsive to world as well as domestic market conditions. By 2001, producer prices of grains were close to those in France, but rapeseed prices were still 20 percent below Hamburg prices (Table 1). Potatoes are dominated by domestic factors, so they are sometimes much above and sometimes much below Netherlands prices. Pig and chicken prices in Lithuania have been consistently above those of Germany in recent years, due to tariff protection in the Lithuanian market. However, cattle and dairy products have been consistently and significantly below the key prices in Germany and France.

The commodity balances for 2002 indicate that Lithuania was a net exporter of wheat, total grains, milk and diary products, and beef and a net importer of other main agricultural products. This net trade position has been rather stable in recent years, and dairy products are by far the largest export product in volume and even more so in value, with cheese being the most important of these.

The main objective of agricultural and rural policies during the transition period was to support rural incomes through the implementation of market regulation and structural development measures. All these measures have undergone a drastic evolution process, being rather restrictive, inconsistent, and unstable at the beginning and moving towards more transparent, longer-term policies of an EU CAP-type by 2003.

With the CAP programs starting upon accession to the EU, the level of support for farmers increased dramatically. The most significant areas of increase are in direct payments, rural development measures, and investment programs under Structural Funds. This is a simultaneous increase in investment resources and cash flow availability for farmers and, consequently, should create very favorable conditions for increased farm and rural investment.

Table 1. Comparison of Lithuania and EU producer prices in national currency

	units	1996	1997	1998	1999	2000	2001
LT Wheat	lt/t	650	630	470	517	414	383
FR Wheat	lt/t	698	593	514	482	406	405
percentage of EU	%	93%	106%	91%	107%	102%	95%
LT Barley	lt/t	621	506	379	393	380	352
FR Barley	lt/t	635	541	484	472	405	377
percentage of EU	%	98%	94%	78%	83%	94%	93%
LT Rapeseed	lt/t	1121	852	943	658	633	692
DE Rapeseed	lt/t	1111	1184	908	760	808	880
percentage of EU	%	101%	72%	104%	87%	78%	79%
LT Potatoes	lt/t	267	300	501	315	227	432
NE Potatoes	lt/t	374	308	657	700	124	325
percentage of EU	%	71%	98%	76%	45%	183%	133%
LT Cattle	lt/t c.w.	5827	5558	5974	4845	3306	5083
DE Young Bulls	lt/t c.w.	13422	12124	12321	11386	9673	10264
percentage of EU	%	43%	46%	48%	43%	34%	50%
LT Pigs	lt/t c.w.	6537	6953	6022	4786	5527	5841
DE Pigs	lt/t c.w.	8006	7274	4760	4294	4666	5467
percentage of EU	%	82%	96%	127%	111%	118%	107%
LT Broilers	lt/t c.w.	7015	7582	7518	6110	5528	5780
DE Broilers	lt/t c.w.	7554	6835	6490	5275	4575	5446
percentage of EU	%	93%	111%	116%	116%	121%	106%
LT Cheese	lt/t	1200	1031	980	911	909	967
FR Cheese	lt/t	2285	2001	2041	1971	1692	1719
percentage of EU	%	53%	52%	48%	46%	54%	56%
LT Butter	lt/t	944	843	741	646	601	583
FR Butter	lt/t	1667	1542	1579	1319	1159	1204
percentage of EU	%	57%	55%	47%	49%	52%	48%
LT SMP	lt/t	n.a.	594	503	463	648	714
NE SMP	lt/t	1023	940	883	859	872	820
percentage of EU	%	n.a	63%	57%	54%	74%	87%

Source: Eurostat and Lithuanian Department of Statistics (LT is Lithuania, FR is France, DE is Germany, NE is Netherlands, and c.w. is carcass weight)

Lithuania has chosen, in implementing the CAP program, to use the Single Area Payment Scheme (SAPS) and to top-up EU funded payments with Complementary National Direct Payments (CNDP) to the maximum possible level each year. Adopting this scheme means that many of the payments will be at least partially decoupled from production decisions and will permit farmers some flexibility in adjusting their production patterns in response to changing conditions and opportunities. The decoupling will be even greater when the Luxembourg CAP Reform Single Farm Payment (SFP) approach is adopted, most likely by 2007. Starting with SAPS is a good step in the decoupling direction, though the CNDP payments are very commodity specific and do not have the decoupling benefit that will come later with the SFP.

Results of accession negotiations
On December 13, 2002, Lithuania's negotiations for the EU membership were completed. The size of milk and white sugar quotas, the base area and the base yield for cereals, as well the number of

cattle and sheep were the most important items in the negotiation. The negotiated quotas in Lithuania are higher than the initial proposal by the EU Commission, and, except for sugar, they are above the 2001 production levels.

Significant changes in Lithuanian agricultural policy occurred after accession into the EU. First, while the national direct support measures applied only to 1,000 thousand hectares of agricultural land in 2003, the area eligible for CAP direct support increased to 2,288 thousand hectares under the SAPS. In this case, the direct payments are paid to the utilized agricultural area (UAA), which includes the area sown, permanent crops, fallow, cultivated meadows, and pastures in all farms meeting EU requirements. Of the total land included, 41.3 percent of eligible land is used in the livestock sector and 50.7 percent is used for crops supported by the EU programs.

Second, the major part of Lithuania's state support after regaining independence was focused on to market regulation, farmers' income support, and modernization of farms according to the restructuring programmes. At the same time, national support measures occupied a rather small share of support. The changes related to the EU accession include the application of rural development measures, and several rural development measures are based on agricultural land as well. The measures related to the development of Less-Favoured Areas (LFA) will cover the largest part of land area under rural development measures.

Concerning the direct payment scheme (DP), Lithuania has chosen the simplified DP scheme. The main principles are:

- The Single Area Payment Scheme (25% of the EU level) and CNDPs up to approximately 30 percent additional are the basis of the direct payment scheme paid to farmers in Lithuania beginning in 2004.
- The amounts of CNDPs have been allocated among the sectors that play a substantial role in the national strategy for agriculture and rural development, as well as also complying with Common Agricultural Policy provisions.
- The EU Rural Development Fund and the National Budget will provide the funds for CNDPs up to the maximum permitted top-up of the EU direct payments.

Methodology and scenarios
Model specification

The Lithuanian model covers the following commodities: three types of grain (wheat, barley, and rye), rapeseed, sugar/sugarbeet, potatoes, cattle and beef, pigs and pig meat, poultry, lamb and sheep meat, and dairy (fluid milk, cheese, butter, skim powder, and whole powder).

The Lithuanian policy model is a dynamic partial equilibrium commodity model. The model generates estimates of supply, domestic utilization, trade, and market prices in Lithuania. The model parameters are mostly synthetic, in that supply and demand elasticities are not directly estimated with Lithuanian data due to lack of sufficient degrees of freedom in historical data series. Some demand elasticities are based on LA-AIDS parameter estimates conducted a few years ago with Lithuanian household budget survey data (Hossain and Jensen), but even these can only approximate current demand behaviour.

Domestic prices for the model are determined by linkages to the EU key prices as specified by the AGMEMOD project (The study was supported by the AG-MEMOD Fifth Framework research project QLK5-2000-00473). In each case the EU price is converted to domestic currency using the annual exchange rate, and a price linkage equation is estimated over the period. Price linkage equations in this model determine the domestic price of the commodity as a function of the relevant key prices in France, Germany, and the Netherlands:

$$P_d = \alpha + \beta \cdot EP \cdot EXCHR \text{, in which}$$

P – domestic price
EP – the key price that is linked to the domestic price (differs for different commodities)
EXCHR – exchange rate between Litas and the currency of the key price

Lithuania is modelled as a price-taker in the EU market, so the market clearing condition calculates net trade as the residual of supply and demand at that price. For every commodity modelled, the domestic prices and different other variables generate projections of supply and demand. For each

commodity and year, net export supplies (import if negative) equal the difference between domestic supply and domestic demand. In order to calculate both imports and exports, the less important one is set as an exogenous variable and the other is calculated from the net trade estimate of the model. Standard specifications were used for the model structure, including biological constraints on animal numbers and fat and protein allocations for dairy products. In all scenarios there are milk quotas and sugar quotas. When these are reached, the cow numbers and acres, respectively, are determined by dividing quota by yield. In the case of milk production, there is still production outside the quota for feed, waste, and other, which is about 15 to 20 percent of total production in most years.

When this model is linked to the rest of the EU model, Lithuanian net trade along with net trade of other member countries interacts with world net trade to clear the market and set new equilibrium prices and quantities. In such a combined model, Lithuanian prices and quantities would adjust as the whole EU linked model iterates to equilibrium. When operated alone, the model is completely recursive.

In the pre-accession period, the price linkage equations with key prices are used; but beginning in 2004 there are price convergence assumptions for all commodities except potatoes and sugar. These assumptions are different in the Non-accession Baseline and the two accession scenarios and are provided in detail below in the scenario assumptions.

Data and scenarios
All commodity balances were obtained from the Lithuanian Department of Statistics. Most price information was obtained from the same source. Actual historical data on GDP, GDP deflator, real GDP and population were obtained from the Ministry of Finance and Department of Statistics for the period up to 2003 were used. Projection assumptions relied on EcoFin projections of the macro variables and are the same for all scenarios. Assumptions were made regarding the degree of decoupling under different payment schemes. For example, a "coupling coefficient" of 0.6 means that the payment has 60 percent of the impact of a market price change of equal size.

Three scenarios were specified to compare continuation of pre-accession policy to the accession results:
1) Baseline Scenario (N-ac): Non-accession, continue 2003 policies.
Policies assumed for this scenario are described below, reflecting continuation of 2003 policies with the exception of milk direct payments (Table 2). It is assumed that even without accession, price convergence with EU prices would occur as the product markets matured and trade with the EU increased, but it would be at a slower pace.
- Crops – extend 2003 payment levels to 2010 and assume a 0.6 coupling coefficient.
- Milk – extend 2003 national quota of 1500 thousand tons but not the 2003 direct payment of 32 LTL/ton, which was intended as a one-time program.
- Livestock and sheep – extend 2003 direct payments and assume a coupling coefficient of 1.0.
- Price convergence assumptions – use 7 years rather than 2, 3 or 4 years as in the two accession scenarios and reduce the degree of convergence except for crops. Crop prices are already so close to EU levels it is not deemed realistic to change the degree of convergence (Table 2). However, pork and poultry are kept 10 percent above key prices levels to account for the higher import tariffs.
2) Accession Scenario (A-SAPS): Accession in 2004, implement single area payment scheme (SAPS) until 2010.
Policies change according to the Accession agreement described above. Lithuania decided to implement SAPS rather than standard CAP programs and also decided to use the maximum top-up under CNDP, which is primarily focused on payments to beef cattle, ewes and sensitive crops.
- Crops with basic payment only (potato, pasture, sugar beet), assume a coupling coefficient of 0.3.
- Crops with top-up payments (grains, rapeseed, potato for starch, buckwheat, and legumes), assume 0.8 coupling coefficient for top-up and 0.3 for basic or weighted average of 0.6 for total payments.
- Milk – EU milk quota of 1647 (1705 from 2007 onward) thousand tons constrains cow numbers when factory plus fluid and direct sales reach the quota level.
- Livestock and sheep – EU quotas and SAPS in place, assume a coupling coefficient of 1.0 for CNDP animal payments and 0.3 for grassland equivalents (for cattle, sheep and milk).

- Introduce price convergence assumptions (Table 2).

3) CAP Reform (Luxembourg Agreement) Scenario (A-SFP): Accession in 2004, implement single area payment scheme (SAPS) through 2006 and begin CAP Reform in 2007.

    Policies the same as A-SAPS up to 2006, Beginning in 2007 the CAP Reform single farm payment (SFP) is adopted. Common agreement among AGMEMOD participants was to begin in 2007 and use only decoupled payment options.

- All payments all go to land. All agricultural land receives the same payment level, and all payments influence production decisions with a 0.3 coupling coefficient.
- The only payments to cattle, sheep, and milk are indirect through grassland and pasture payments.
- Different key prices are used based on EU model simulations with Luxembourg Reform assumptions. Most prices change beginning in 2005.
- Price convergence assumptions same as Accession Scenario (Table 2)

Table 2. Price convergence assumptions by commodity (accession/non-accession)

Commodity	Direction	Years	% of EU Price
Wheat	Up	2/7*	100
Barley	Up& Down	3/7*	100
Rye	Up	3/7*	100
Rapeseed	Up	2/7*	100
Beef	Up	4/7*	85/75*
Pork	Down	3/7*	100/110*
Poultry	Down	3/7*	100/110*
Sheep	Up	4/7*	90/80*
Butter	Up	4/7*	85/75*
Cheese	Up	4/7*	80/70*
SMP	Up	4/7*	100/90*
WMP	Up	4/7*	1.04×SMP

    * different convergence and number of years are assumptions for the baseline scenario

Results of analysis

Crops

    Pre-accession producer price levels for grains were similar to price developments in the EU. The main differences across the various scenarios are in "basic" prices, which reflect the level of payments and the degree of decoupling. Since the basic price represents the incentive price, this declines for most crops in the CAP Reform scenario compared with the SAPS scenario after 2007, when increased decoupling occurs (Table 43). CAP Reform prices in 2010 are still higher than the non-accession scenario prices for most crops, but in some cases the difference is small. The prices for soft wheat and barley increase slightly from 2001 to 2010. Rapeseed prices increase more than 20 percent, though nearly half of that increase occurred between 2001 and 2003. The producer price for potatoes decreases from 2001 until 2010, but 2001 was a very low production-high price year due to weather problems. During the projection period, basic sugar prices increase only 6.5 percent because price plus support in Lithuania was nearly the same as in the EU. There seems to be a big increase in sugar beet producer prices after accession, but that is because the sugar regime before 2003 had a direct payment to producers that made up the difference. Except for potatoes and sugar, the highest level of basic prices for crops is in the A-SAPS scenario for 2005 and 2010, since the CAP Reform increases decoupling and thereby reduces the incentive prices.

Table 3. Producer and basic (incentive) prices for crops observed

	2001	2002	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				€per100 kg			
Soft wheat							
producer price*	10.9	11.3	11.3	11.2	11.2	11.2	11.2
basic (model) price**	10.9	11.5	11.3	12.8	11.2	13.4	11.9
Barley							
producer price	10.0	11.1	10.2	10.2	9.9	9.9	9.9
basic (model) price	10.0	11.4	10.3	12.5	9.9	13.4	11.0
Rye							
producer price	8.6	9.6	9.3	9.8	9.9	9.9	9.9
basic (model) price	8.6	10.7	10.2	12.2	10.8	13.3	10.9
Rapeseed							
producer price	19.6	21.6	23.2	25.1	23.9	23.9	23.9
basic (model) price	19.6	22.4	23.9	28.3	24.6	28.7	25.3
Potatoes							
producer price	12.2	7.4	9.8	9.8	9.4	9.4	9.4
basic (model) price	12.2	7.4	9.8	9.9	9.4	9.6	9.6
Sugar							
producer price	1.9	1.4	4.9	4.9	4.9	4.9	4.9
basic (model) price	4.6	4.4	4.9	4.9	4.9	4.9	4.9

* Market price paid to agricultural sellers of the product.
** Market price plus direct payment expressed as payment per unit of product sold and adjusted for decoupling coefficient.

Because of the changes in prices, especially incentive prices, already presented, total grain area is expected to increase by 3 percent in the baseline and 6 percent in the A-SFP scenario (Table 4). It increases as much as 11 percent in the A-SAPS scenario due to the higher incentive prices. There is a larger increase in barley than other grains, since changes in relative grain prices favour barley. It would seem that rapeseed area has a huge expansion, but that is only because 2001/02 was an outlier. Using the actual 2002/03 area as a starting point, the rapeseed area expansion is only 9 percent by 2010. Potato area does increase about like barley, since it was coming off such a low price in 2002. Sugar is the one crop that has a severe area reduction, nearly 50 percent, from 2002 and 2003 levels due to the imposition of quotas that are roughly equal to domestic consumption.

Table 4. Areas of selected crops

	2001	2002	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				'000 ha			
Soft Wheat	337.8	335.1	335.9	352.2	340.2	367.0	348.6
Barley	331.3	365.0	360.4	378.8	354.9	382.8	363.4
Rye	111.3	74.6	106.8	113.6	110.1	118.8	112.8
Total Grain Area	780.4	774.7	803.1	844.6	805.2	868.6	824.8
Rapeseed	36.4	59.9	62.6	62.9	65.5	65.2	65.2
Potatoes	102.2	99.2	118.4	118.0	113.8	115.7	120.6
Sugar	26.5	29.2	18.8	18.8	15.0	15.0	15.0

Again, because of generally poor weather conditions in 2001, it is better to compare yield growth relative to 2002. Yields are relatively low in Lithuania due to relatively low input levels, but this is expected to change as conditions improve over time. Grain and rapeseed yields are projected to increase by 20 to 30 percent by 2010 (Table 5). Potato yields are projected to remain stable, while the

restriction of sugar beet area and technological assistance from the refining industry allows yields to grow by slightly over 40 percent.

Table 5. Yields of selected crops

	2001	2002	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				t/ha			
Soft Wheat	3.19	3.63	3.87	3.87	4.55	4.55	4.55
Barley	2.34	2.39	2.66	2.66	2.96	2.96	2.96
Rye	2.08	2.28	2.63	2.63	3.04	3.04	3.04
Rapeseed	1.78	1.76	1.90	1.90	2.12	2.12	2.12
Potatoes	10.31	15.44	14.98	14.98	15.30	15.30	15.30
Sugar	33.20	36.0	41.49	41.49	51.09	51.09	51.09

Crop production reflects the area and yield changes, so from 2002 to 2010 grain production increases 30 percent in the baseline and somewhat more in the accession scenarios. Rapeseed production increases about 30 percent in all scenarios. Potato production growth is somewhat less, and sugar beet production declines by 25 percent to stay within the quota.

Rising incomes and increased feed demand for a growing cattle and dairy sector, drive demand for crop products. The pattern of importing barley and rye and exporting wheat continues (Table 6). In the early years of the projection, however, feed demand growth exceeds growth in grain production, so Lithuania would become a net grain importer for a few years. By the end of the projection period net exports of grain return to the 100 to 200 thousand ton range. The largest share of rapeseed continues to be exported, while potato exports are expected to grow somewhat, since domestic use is relatively stable in the face of growing production. In the early years of accession, consumption of sugar can exceed production without much import, as stocks are drawn down. However, in later years, imports increase to keep pace with domestic use.

Livestock

Cattle and dairy product prices in Lithuania have been well below those in the EU while pig and chicken prices have been higher. Therefore, not only do prices change significantly in the projection scenarios, the relative prices also change significantly. This is true in all scenarios, but the changes are more dramatic in the two accession scenarios (Table 7). Producer milk prices increase 25 to 30 percent from 2001 to 2010, driven by the even greater increases in dairy product prices such as cheese and butter. Payments to milk are only indirect through pasture payments, so that effect is relatively small.

The largest price increases are for cattle, which are in the range of 50 to 60 percent even though only partial price convergence is assumed. Here there is a large effect of direct payments in the A-SAPS scenario, since the CNDP are heavily targeted to stimulate beef cattle production. Sheep prices also have a significant increase of nearly 20 percent and a sizable CNDP payment, though payments to sheep were even larger in the 2003 pre-accession policy. The situation is different with pigmeat and chicken prices, which are both projected to decline after the protection of import tariffs is removed to harmonize with EU trade policy.

Table 6. Model results for selected crops

Commodity	2001	2002	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				'000 t			
Soft wheat							
production	1076	1218	1298	1361	1549	1671	1587
consumption	928	947	1089	1144	1142	1222	1219
net exports	395	202	209	218	407	449	368
Barley							
production	776	871	958	1007	1050	1132	1075
consumption	818	899	1111	1194	1204	1327	1323
net exports	-31	-41	-153	-187	-155	-195	-248
Rye							
production	231	170	280	299	335	361	343
consumption	257	259	352	363	372	402	400
net exports	7	-33	-71	-65	-37	-41	-57
Total grain							
production	2083	2259	2536	2667	2934	3164	3005
consumption	2003	2105	2552	2701	2718	2951	2942
net exports	371	128	-15	-34	215	213	63
Rapeseed							
production	65	106	119	120	139	138	139
consumption	31	32	32	30	27	27	27
net exports	34	74	87	90	112	111	111
Potatoes							
production	1054	1531	1773	1768	1741	1771	1846
consumption	1703	1338	1704	1717	1694	1729	1746
net exports	4	-14	70	51	48	42	100
Sugar							
production	109	138	103	103	103	103	103
consumption	114	96	115	115	121	121	121
net exports	28	-2	-2	-2	-18	-18	-18

Table 7. Producer and basic prices for animal products

	2001	2003	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				€100 kg			
Cows' Milk							
producer price *	15.6	14.4	16.2	18.9	18.3	20.6	19.5
basic (model) price**	15.6	14.9	16.2	19.3	18.3	21.4	20.4
Beef							
producer price	144.1	121.0	139.7	181.9	190.6	216.0	230.1
basic (model) price	144.1	132.2	159.9	232.4	212.4	326.4	257.8
Sheep							
producer price	262.2	279.2	293.9	309.3	276.9	311.5	311.5
basic (model) price	262.2	362.5	343.2	343.1	329.7	381.7	333.7
Pigmeat							
producer price	165.6	126.6	138.0	131.9	137.5	125.0	125.3
basic (model) price	165.6	126.6	138.0	131.9	137.5	125.0	125.3
Chicken							
producer price	163.9	138.5	144.1	132.8	119.3	108.4	108.7
basic (model) price	163.9	138.5	144.1	132.8	119.3	108.4	108.7
Cheese							
ex-plant price	274.2	254.9	286.4	335.8	341.1	389.8	389.8
Butter							
ex-plant price	165.3	164.7	195.1	233.4	216.8	245.7	220.6

* Market price paid to agricultural sellers of the product, ** Market price plus direct payment

The combination of these changes means that after accession, beef prices are projected to rise significantly above pigmeat and chicken prices, which dramatically changes relative prices (Figure 1). This relative price pattern is more typical of EU and world market price relationships. All dairy product prices also increase significantly (Figure 2). The prices in these figures also reflect the effects of CAP reform, so butter prices do decline somewhat after 2006 as butter intervention prices are reduced in the EU.
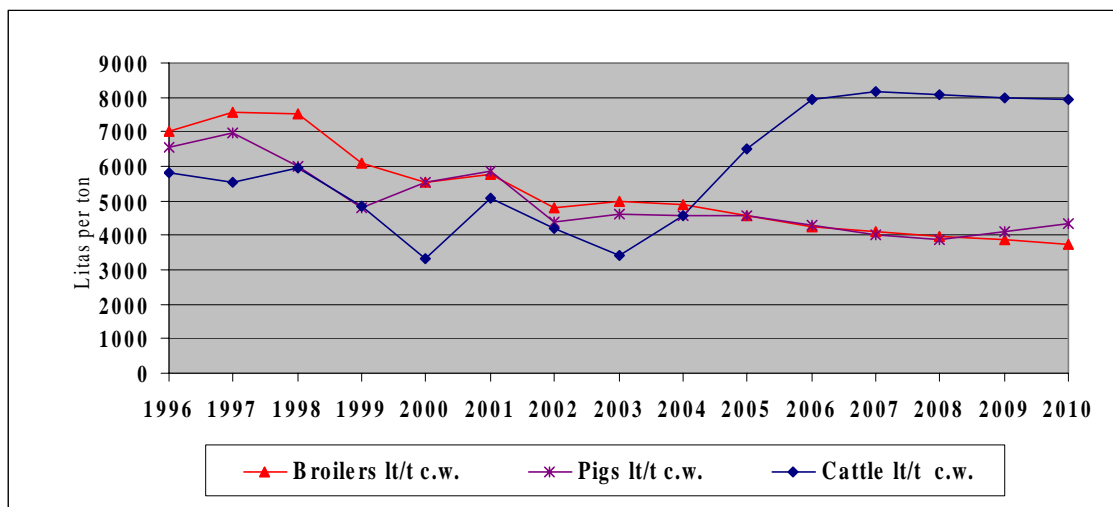

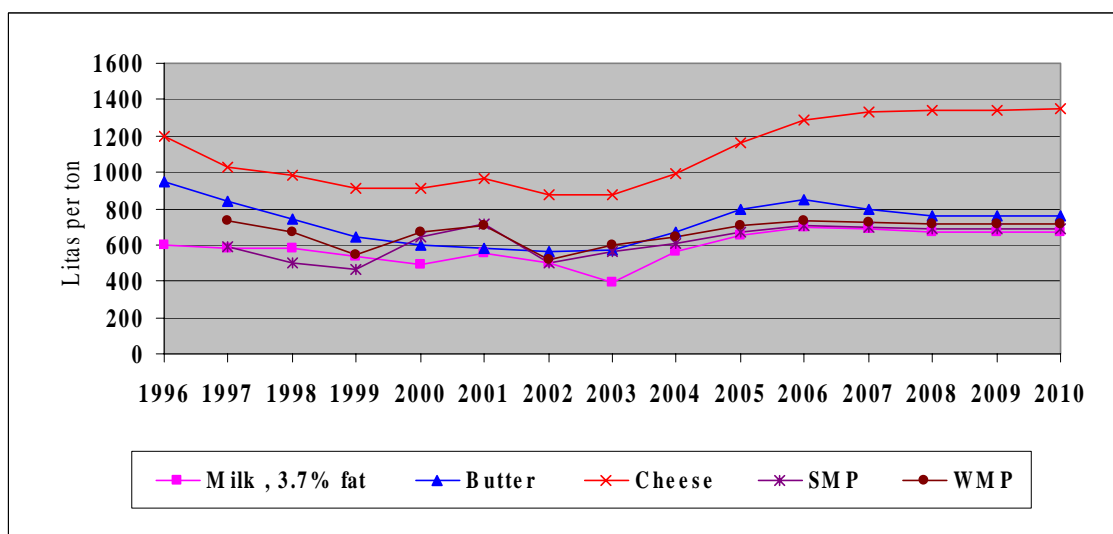Figure 1. Animal price projections

Figure 2. Dairy product price projections

Since Lithuania had an EU-like dairy quota prior to accession, all three scenarios are constrained by a quota. The EU quota is somewhat higher than the pre-accession Lithuanian quota, so the number of dairy cows can grow more in the accession scenarios. Between 2005 and 2010, the dairy herd declines as milk yields increase (Table 8). Since incentive prices are slightly lower in the A-SFP scenario, yields grow more slowly and the cow numbers in 2010 are higher than for the A-SAPS scenario. The decline in dairy cows is partially offset by growth in beef cow numbers, which is stimulated by the suckler cow premia. The number of suckler cows in the baseline scenario increases from 1.2 in 2001 to 15.4 in 2010, since the pre-accession policy also included a suckler cow premium. Likewise, the number of fattening cattle also increases significantly, stimulated also by CNDP targeted payments for bulls and adult cattle slaughter. The suckler cow and fattening cattle numbers are lower in the A-SFP scenario, since the targeted payments are lost and only indirect incentives through

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pasture payments remain. A similar pattern emerges for sheep, for which the ewe premium has its largest impact in the A-SAPS scenario. The pig numbers grow moderately, and this growth is slightly higher in the N-ac scenario because of tariff protections and higher prices. It should be noted that the number of breeding sows in the A-SAPS framework slightly decreases by 2 percent.

Table 8. Number of animals, January 1

	2001	2005		2010		
	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
	'000					
Dairy cows	438.3	467.3	482.4	438.0	471.0	476.0
Suckler cows	1.2	6.0	10.0	15.4	41.0	9.4
Fattening cattle	308.8	375.6	372.7	436.2	461.8	459.6
Ewes	7.5	9.5	8.6	8.91	10.0	7.7
Breeding sows	59.6	79.7	79.6	78.6	77.7	77.7
Fattening pigs	808.0	1123.2	1123.1	1261.2	1241.4	1241.7

In the baseline scenario, beef production and consumption are projected to increase by 38 percent and 25 percent, respectively, from 2001 to 2010 (Table 9). Net exports increase slightly. In the accession scenarios, prices increase more rapidly than in the baseline, leading to higher production, lower consumption and significantly greater exports. A similar pattern emerges for butter and cheese, where production expands faster than consumption and leads to increased exports. Before accession, cheese exports took 70 to 80 of production and they rise to 85 percent in the accession scenarios. Butter exports were less than half of production in recent years, but in the accession scenarios they rise to more than 60 percent of production.

The picture for pigmeat and chicken is clearly different. First, their production increased significantly between 2001 and 2003. Second, prices are declining slightly in the accession scenarios rather than rising, so consumption grows faster and production grows more slowly. The fact that beef prices are rising enhances this consumption growth. Lithuania has been a net importer of pork and poultry, and the impacts of accession are to increase net imports in both cases.

Discussion and conclusions
Summary of the accession effects
The accession analysis shows significant impacts on production, prices, and relative prices. It also impacts production and trade patterns. Combining these effects into market value of different sub-sectors of the food and agriculture industry shows that significant changes can be expected. Comparing the period 1996 to 2002+03 (average of two years), little change can be seen in the total value of production of crops, meat, and milk or in the relative shares of these sub-sectors (Table 10). However, the most realistic scenario (SAPS to 2006 and SFP from 2007 to 2010) generates a growth in product value more than 10 percent higher than the non-accession scenario. All sub-sectors grow faster, but the largest increase is in the value of milk production. As a consequence, the shares of each sub-sector, which remained relatively stable from 1996 to 2002+03, are projected to shift. The main change is a decline in crops share and increase in milk share of the total market revenue. Within the meat sector, beef increases from about 25 percent of market revenue in 2002+03 to over 40 percent in 2010. So cattle and dairy together increase from about 35 percent of output value in 2002 to over 45 percent in 2010.

In terms of farm gross revenues, this represents an increase of €100-160 million annually in market revenues plus an increase of €50-100 million annually in direct payments. This analysis has not specifically addressed the impacts on farm income, but these figures suggest increases in gross revenue in the sector in the range of 15 to 20 percent between the baseline and the A-SFP scenario. Of course, many input costs will also rise, but the increase in net income or profit should be significant.

Table 9. Model results for selected animal products

	2001	2003	2005		2010		
	N-ac	N-ac	N-ac	A-SAPS	N-ac	A-SAPS	A-SFP
				'000			
Beef							
production	47.3	50.8	60.7	63.8	65.1	72.8	72.7
consumption	46.1	46.5	58.2	47.5	57.7	51.4	48.5
net exports	2.4	4.3	2.6	16.3	7.5	21.5	24.2
Pigmeat							
production	72.3	105.4	107.2	106.3	112.4	109.4	109.4
consumption	78.8	112.6	110.5	118.9	123.8	130.9	132.8
net exports	-6.0	-7.5	-3.3	-12.6	-11.3	-21.6	-23.4
Chicken							
production	29.7	35.5	37.7	36.8	42.2	40.1	40.2
consumption	38.2	47.5	46.9	49.5	52.6	54.3	54.7
net exports	-8.7	-12.0	-9.2	-12.8	-10.4	-14.1	-14.5
Butter							
production	18.1	17.6	28.4	30.5	28.4	31.9	32.3
consumption	10.4	10.1	12.0	11.0	13.9	13.2	13.9
net exports	9.0	5.6	16.4	19.5	14.5	18.7	18.5
Cheese							
production	50.6	50.4	59.0	76.7	58.7	81.0	80.3
consumption	12.5	9.7	12.2	11.2	13.7	12.8	12.8
net exports	34.4	38.7	46.8	65.5	45.0	68.2	67.5

Table 10. Impacts of accession on market value and shares of crops, meat and milk production

commodity	1996	Average 2002+03	2010	Growth 2010/2002-3	Ave. share 2002+03	Share 2010
	mil. Euro	mil. Euro	mil. Euro	percent	percent	percent
Baseline	868.3	874.6	1216.4	39	100	100
Crops	412.0	413.4	512.3	24	47	42
Meat	242.6	227.4	336.9	48	26	28
Milk	214.7	233.9	367.2	57	27	30
CAP Reform	868.3	874.6	1320.5	51	100	100
Crops	412.0	413.4	529.9	28	47	40
Meat	242.6	227.4	354.6	56	26	27
Milk	214.7	233.9	436.0	86	27	33

Effects of policy change scenarios

The main comparison of interest is that between the baseline and A-SFP, since the later is the expected policy outcome. Though the A-SAPS scenario is not as important as the other two, it does reveal the impacts of CAP reform when it is assumed to be implemented in 2007 and beyond. All three scenarios will be compared briefly.

The lowest incentive prices and production levels for most products are in the baseline. The exceptions are pigmeat and poultry, where entering the EU Single Market means a removal of import tariff protection. It is also generally the case that the highest incentive prices and production levels occur in the A-SAPS scenario, because decoupling in the A-SFP scenario reduces the incentive price for many products. So production levels and incentive prices in the A-SFP scenario are generally between the other two scenarios. Aside from the pigmeat and poultry exceptions there are others. Potato production is slightly higher because of relative prices. Since incentive prices for potatoes change very little and the incentive prices for grains fall, the relative price of potatoes improve a little.

More importantly, the key price (German price) for cattle is higher under CAP reform, so this just offsets the reduction in the market price support. This leads to slightly higher beef and veal production in the A-SFP scenario compared with A-SAPS.

Much depends on assumptions about how SAPS and SFP are implemented and the selection of the degree of decoupling assumed (coupling coefficient). Larger or smaller changes between SAPS and SFP would result in different impacts of CAP reform. The complete removal of animal headage payments in the A-SFP scenario causes a significant reduction in incentive prices for cattle and sheep and in the growth of suckler cow and ewe numbers.

Evaluation of the modelling approach

The approach used in this modelling work is designed to achieve realistic results despite the severe shortage of data. For example, very few of the economic relationships could be statistically estimated, due to very short data series and the rapidly changing economic environment. For the most part, supply and demand elasticities are synthetic, and only price linkage equations could be estimated with regression equations. The focus was on selecting price and income elasticities that are realistic and theoretically sound.

Clearly there are weaknesses in this approach, but the main benefit is that an analytical system can be constructed in a relatively limited time with limited data and can provide analytical results that are plausible and useful. As improved data become available and a stronger statistical foundation for these economic behaviours can be developed, it is relatively straightforward to substitute improved model components into the system as they can be developed.

Other areas where expert judgement had to be employed were in the modelling of price convergence behaviour and the effects of more decoupled CAP reform policies on producer response. One can observe how such dynamics played out in other countries, but there is still relatively little hard scientific evidence on parameters needed for these adjustments.

The first months and years of observations on market behaviours after accession will provide evidence for validation or for adjustments to be made in subsequent modelling and analysis, especially regarding price convergence in the single market. The early evidence is that price adjustments after 1 May 2004 have been at least as rapid as were projected and possibly more so.

One of the most important means to improve the structure and validity of the model is to obtain more complete and improved data and to continually update all the data and the behavioural relationships. For example, in Lithuania only one or two years of data are available for complete supply and use balances on a crop year basis so very little meaningful work was possible regarding commodity stocks and it was not possible at the time to work with consistent supply and use data series on a crop year basis.

Commodity modelling and policy analysis have to be seen as a continuing process that always seeks to provide the best possible analysis given the state of knowledge at the time. The interaction between analyst and user and between model-generated results and observed reality are important ingredients in model development. The combination of these interactions with ongoing research and improved data availability are essential for the improvement of model performance and analytical results.

The results of this analysis are very preliminary and need to be updated as more knowledge is gained about the Lithuanian market's reactions to joining the single market. Even market reactions during the first few months after accession may be misleading as indicators of the longer run patterns. Nevertheless, we feel that the directions and relative patterns of prices, production and trade that emerged from this analysis are realistic even if the magnitudes of changes are still quite uncertain.

References

Department of Statistics. (2003 and 2003). Agriculture in Lithuania. Vilnius, Lithuania.

European Commission-Directorate General for Agriculture. (2002). "Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs." March 2002.

Hossain, F. and Jensen, H. (2000). Lithuania's food demand during economic transition. Agricultural Economics 23: 31-40.

Kazlauskiene, Natalija. (1997). Integration of Lithuanian agriculture into the EU market. In Maniokas, K. and Vitkus, G. (eds), Lithuania's Integration into the European Union. Vilnius, Lithuania: European Integration Studies Centre.

Kazlauskiene, Natalija, Devadoss, S. and Meyers, W. H. (1991). An Adaptive Policy Simulation Model to Analyze Price Reforms for Lithuanian Food and Agricultural Products. Technical Report 91-TR20, Center for Agricultural and Rural Development, Iowa State University, Ames.

Meyers, W. H. and Kazlauskiene, N. (1992). Modelling government policy for agricultural markets in transition. In State Regulation of Agricultural Production, Finnish-Baltic Joint Seminar, Vilnius, Lithuania. Research Publication 68, Agricultural Research Institute, Finland: 39-45.

Valdes, A. and Kray, H.A.. (1999). Strategy for the pre-EU accession period adjustments of Lithuanian agricultural and trade policies to the CAP. Washington, DC: World Bank.