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STRUCTURAL CHANGES IN POLISH AND HUNGARIAN AGRICULTURE SINCE EU ACCESSION: LESSONS LEARNED AND IMPLICATIONS FOR THE DESIGN OF FUTURE AGRICULTURAL POLICIES

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STRUCTURAL CHANGES IN POLISH AND HUNGARIAN AGRICULTURE SINCE EU ACCESSION: LESSONS LEARNED AND IMPLICATIONS FOR THE DESIGN OF FUTURE AGRICULTURAL POLICIES

Research Institute of Agricultural Economics, 2014

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Foreword

Dr. KAPRONCZAI István

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Hungary's accession to the European Union (EU) has had a significant impact on the agro-food sector. On accession the country became part of a large, organised but highly competitive market which offered great opportunities for the stakeholders but also brought along serious challenges. Newly accessing Member States not only had to cope with competition within the EU but also in their domestic markets, resulting in significant economic, social and environmental changes.

In general, EU accession has had a positive impact on the 'new' Member States (i.e. those that joined from 2004 onwards) although each country has used the opportunities in different ways. Each country has enjoyed benefits from EU accession but Poland has managed to adapt the most to the conditions that were set by the EU and has exploited the potential well. One of the most critical factors in this process has been the agricultural and support policy followed in the years before EU accession. If the available subsidies had been used primarily to promote improvements in producer competitiveness they would have been very beneficial. However, in Hungary subsidies mainly took the form of price support and consequently the opportunities provided by the accession to the EU were not fully exploited. Those countries where the level of subsidies was lower and price support was minimal have responded to EU membership in a more positive way.

For Hungary an understanding of the workings of the food economy in Poland is particularly important because this country not only represents the largest market among the countries of the Visegrad Group but its food economy has developed remarkably in the decade since EU accession. Poland has evolved from being a net importer of agricultural and food products to a net exporter and in recent years Hungary has incurred its largest deficit in agricultural and food exports in trade with Poland.

This is the first publication that the Research Institute of Agricultural Economics, during its 60 years of existence, has produced in close cooperation with a foreign partner institution and it aims to give a detailed comparison of the food economies of the two countries.

This book provides instructive and useful knowledge for researchers, stakeholders in the agro-food sector and agricultural policy decision makers and we hope that it will be followed by similar volumes in the coming years.

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Poland's accession to the European Union (EU) on 1 May 2004 required the fulfilment of a number of difficult political, economic and social conditions. It involved the determination of political elites and major social groups in the implementation of socially and economically costly transition towards a market economy and adjustment to the EU standards. However, Poland's joining the European structures implied neither a successful resolution of all economic and political problems nor a completion of the transition. Integration into the EU offered an opportunity and legitimate hope for the continuation of the process in a much more efficient manner and with lower social costs. The development of the Polish food economy is based on a large and still developing domestic market, and the economic recovery following integration with the EU has strengthened this trend.

In general, the enlargement of the EU meant an integration of 24, and then 28 Member States with varying levels of national income per capita. The 'new' Member States are characterised by much lower levels of development in terms of factor productivity, the stability of the macroeconomic environment, the efficiency of institutions implementing economic policy, and a business-friendly institutional environment, including the legal order. The attainment of the EU levels of those indicators will take time and require the implementation of economic policies with an emphasis on significantly increased investment, human capital development and on the transfer of technology and capital.

Agriculture, as with the entire food sector, ranked among the sections of the national economy with the most complicated modernisation and restructuring processes. The resolution of acute social and economic problems in agriculture in the 'new' Member States was one of the most difficult challenges facing successive governments, and the assessment of such processes is a complex exercise.

To meet this challenge, researchers from the Research Institute of Agricultural Economics in Budapest and the Institute of Agricultural and Food Economics – National Research Institute in Warsaw developed this comprehensive, comparative analysis of the Hungarian and Polish food sectors during the period of adaptation to the single European market. The analyses of the differences and similarities in the two countries of agriculture, the food industry, agricultural extension and support policy make this publication a unique source of information from which universal conclusions that are useful for research, business practice and for future agricultural policy can be drawn.

A comparison of the agro-food sectors in Poland and Hungary from a macro perspective

POTORI Norbert[1], Paweł CHMIELIŃSKI[2] and Bożena KARWAT-WOŹNIAK[2]

Introduction

In both Poland and Hungary, high social and political importance is still attributed to the agro-food sector although its economic significance has declined substantially and almost continuously since the transition to a market economy. This is a natural process in developed economies, although the paths followed may be different. The aim of this chapter is to briefly compare the development of the Polish and Hungarian agro-food sectors from a macro perspective, focusing on, *inter alia*, the contribution of agriculture and food processing to the national economy, as well as on the development of production structures, financing and agro-food trade. Our analysis was based on data available from the Central Statistical Offices of both countries (the *Główny Urząd Statystyczny* (GUS) in Poland and the *Központi Statisztikai Hivatal* (KSH) in Hungary), from the respective Paying Agencies (the *Agencja Rynku Rolnego* in Poland and the *Mezőgazdasági és Vidékfejlesztési Hivatal* in Hungary, from Eurostat, from the Economic Accounts for Agriculture (EAA) and from the Farm Accountancy Data Network operated by IERiGŻ-PIB in Poland, and by AKI in Hungary. The general time frame for the analysis was 2000-2011; however, in some cases, the available data series were incomplete or, due to methodological reasons, different base years had to be chosen for comparison (for example, the last agricultural census prior to European Union (EU) accession was carried out in Poland in 2002 and in Hungary in 2000). References to earlier periods were made when it was felt necessary. This chapter provides the fundamentals which help to better understand the chapters that follow.

Agricultural production

The total area of Hungary is 93.03 thousand km^2, of which the land area is 92.34 thousand km^2. In 2011 the utilised agricultural area (UAA) was 5.34 million hectares, while 1.92 million hectares were covered by forests, 65 thousand hectares by reeds and 35 thousand hectares by fish ponds. The arable area totalled 4.32 million hectares, and fruit orchards, vineyards and kitchen gardens occupied around 92, 82, and 82 thousand hectares of the UAA, respectively. The remaining 759 thousand hectares were grassland.

In 2011, irrigated area accounted for 79.5 thousand hectares, representing just 1.5 per cent of the total UAA, and a 31 per cent drop since 2000. Consequently, crop production is heavily exposed to the risk of drought. The area covered by glasshouses and polytunnels was only 3.9 thousand hectares in 2011, 37 per cent less than in 2000.

The area eligible for EU direct payments totalled 4,957 thousand hectares in 2011, a decrease of over 120 thousand hectares since 2007, when it peaked at 5,081 thousand hectares, and around 40 thousand hectares less than in 2004, the first year of application. In the same period, the number of farms eligible for direct payments declined from 208.5 thousand in 2004 to 176.3 thousand in 2011. The vast majority of farmers giving up agricultural activity farmed less than 10 hectares. In contrast to the number of farms eligible for direct payments, the agricultural census in 2010 registered 566.7 thousand private holdings and 8.8 thousand legal entities. These figures represent a 41 per cent drop in private holdings and an almost 5 per cent increase in legal entities over the census data from 2000[3].

[1] Agrárgazdasági Kutató Intézet, Budapest.

[2] Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej - Państwowy Instytut Badawczy, Warszawa.

[3] The definition of a farm in Hungary is having a minimum of 1,500 m^2 land area including agricultural area, forests, reeds and fish ponds; or 500 m^2 fruit orchards and/or vineyards; or 100 m^2 protected area; or at least one larger livestock such as cattle, pig, sheep, goat, horse, etc.; or 50 heads of poultry; or 25 rabbits; or 25 animals kept for fur production; or 25 meat pigeons; or 5 bee families.

The principal arable crops in Hungary are maize, wheat, barley, sunflower and oilseed rape (Table 1). The production of each of these would normally exceed domestic needs by about twofold, thus they represent the bulk of exportable agricultural goods. While in the past maize and wheat had relatively stable sowing areas of 1.2 million and 1.1 million hectares respectively, the area devoted to oilseeds has increased significantly at the expense of other field crops such as barley. In the years following Hungary's accession to the EU on 1 May 2004, the area under oilseed rape has more than doubled to 240-260 thousand hectares, paralleling the boom in biodiesel production within the EU, an industry heavily dependent on rapeseed oil. Thanks to the increase in vegetable oil prices, sunflower has also considerably gained in popularity, raising the sowing area by around 20 per cent to 600 thousand hectares. Owing to the EU sugar policy reform, the sugar beet area has fallen by over two-thirds to under 20 thousand hectares since 2004. Arable production in Hungary is characterised by considerable seasonal swings in both yields and output. All-time production records for maize, sunflower, and rapeseed that were observed after EU accession can be attributed, *inter alia*, either to the introduction of the EU cereal intervention system, or to the first of the oilseed price rallies in the latter half of the 2000s.

Table 1: **All-time production records of the principal arable crops in Hungary.**

Crop	Year	Area (million hectares)	Yield (tonne/hectare)	Production (million tonnes)
Maize	2005	1.176	7.70	9.050
Wheat	1984	1.361	5.41	7.366
Barley	1992	0.480	3.59	1.723
Sunflower	2008	0.550	2.67	1.468
Oilseed rape	2008	0.247	2.65	0.655

Source: KSH

Fruits and vegetables account for over 20 per cent of the value of agricultural production in Hungary. The fruits sector is dominated by apple production with sour cherries, plums, peaches, apricots and pears being next in importance. In the vegetables sector, sweet corn, green pepper, tomatoes and water melons are the major products, with sweet corn, either frozen or canned, being an exportable good of considerable value. Production both of fruits and vegetables has declined slightly since EU accession.

Livestock numbers in Hungary have been falling for decades (Table 2 and Figure 1). This process was accelerated firstly by the splitting of large cooperatives during privatisation after the political and economic transition, accompanied by the collapse of the Comecon (Council for Mutual Economic Assistance) market where most of the livestock products were sold, and later by EU accession (i.e. the elimination of trade barriers and the termination of direct support to non-ruminants) as well as the dramatic increases in feed grain and oilseed meal prices. According to official statistics, by the end of 2011 the number of pigs had fallen to almost 3 million, this being the lowest figure since 1949, while the number of sows hit an all-time low with just around 210 thousand.

The declines in cattle raising and milk production appear to have recently been reversed. The number of cattle increased significantly in 2011, reaching 694 thousand in December, the highest level until then since EU accession. The number of dairy cows bottomed out in 2010 and also increased, by 2.1 per cent to 197 thousand, in 2011, while milk production gained 3 per cent in the same year. Nevertheless, only around 82 per cent of the national milk quota was used in the 2011/12 marketing year. The number of suckler cows (including dual-purpose breeds) reached 130 thousand, showing a remarkable 12.1 per cent increase over 2010 as a response to the intense demand for beef cattle primarily from Turkey.

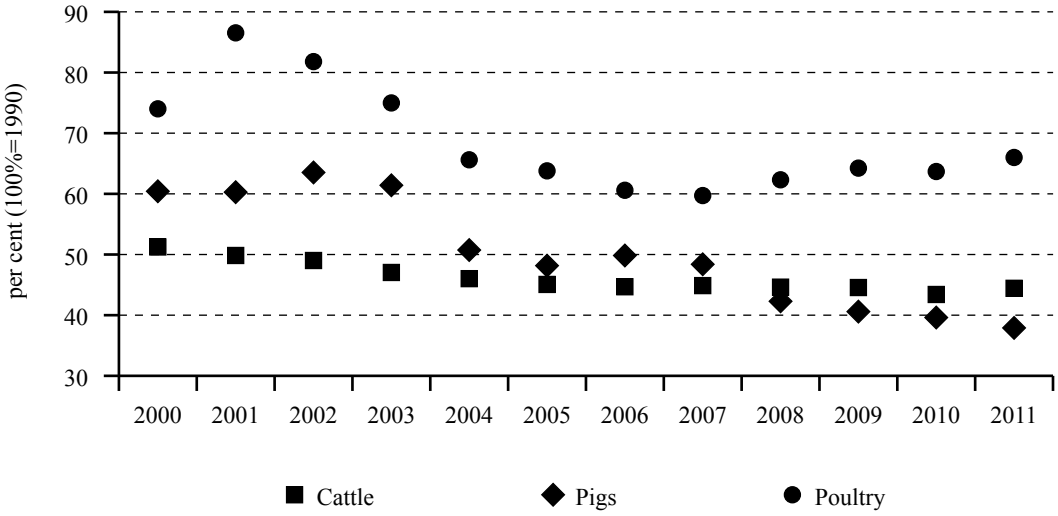
The number of ewes declined to 821 thousand in 2011, the lowest since EU accession, representing just over 70 per cent of the national quota. Broiler chickens and laying hens account for 80 per cent of the Hungarian poultry flock. In 2011, the number of broiler chickens was around 33 million (12 per cent less than in 2003), while the number of laying hens fell by 30 per cent to 11.4 million during the same period. In 2011, turkeys and waterfowl (i.e. geese and ducks) numbered around 3 million and 5.6 million, or 30 per cent less and 1 per cent more than in 2003, respectively.

Table 2: **Livestock record numbers in Hungary in the past 50 years.**

Livestock	Year	Numbers (thousand)
Cattle	1974	2,017
of which dairy cows		797[a)]
Ewes	1982	1,947
Pigs	1983	9,844
of which sows		740
Poultry	1982	67,552
of which hens		42,009

[a)] The figure represents all cows (almost entirely of the traditional dual-purpose breed) of which over 90 per cent were used in milk production.
Source: KSH

Figure 1: **Changes in livestock numbers in Hungary, 2000-2011.**



Source: KSH

The total area of Poland is 322.57 thousand km^2, of which the land area covers 311.89 thousand km^2. Land suitable for agricultural activities represented 60.5 per cent of the total area with 18.93 million hectares in 2010, 1.5 per cent less than in 2002. The share of the UAA declined from 54.1 per cent to 49.7 per cent during the period 2002-2010. It accounted for 82.1 per cent of the land suitable for agriculture with 15.53 million hectares in 2010, 8.1 per cent less than in 2002.

The UAA eligible for EU direct payments in Poland in 2010 was more than 14.10 million hectares. In that year there were almost 2.28 million farms, of which 715 thousand were subsumed agricultural parcels with up to 1 hectare UAA and holdings of livestock farmers with up to 0.1

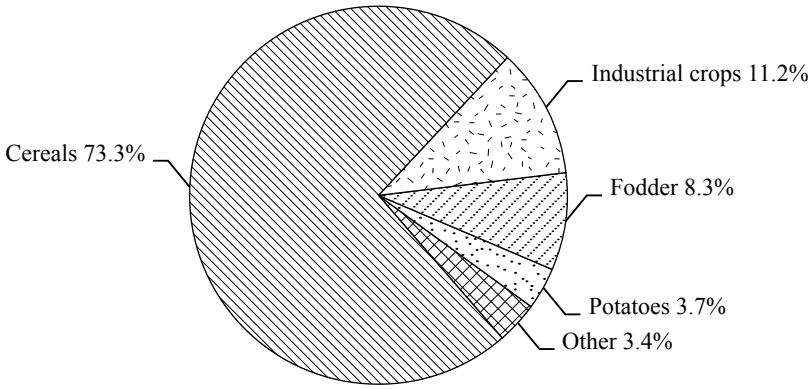
hectare or with no agricultural land[4]. The number of commercial farms was around 1.4 million, of which over 61 per cent utilised more than 1 hectare.

Arable area made up 70.4 per cent of the UAA in Poland in 2010, followed by permanent grasslands with 21.0 per cent and fruit orchards by 2.4 per cent, while 6.3 per cent of the UAA was not kept in good condition. The number of farms not pursuing crop production and/or livestock keeping declined by 47.1 per cent to 399.5 thousand during the period 2002-2010.

In 2010, the total cropped area covered 10.43 million hectares, 3.1 per cent less than in 2002 and 15.2 per cent less than in 1996. The pace of the decline in the cropped area slowed down even more after EU accession due to farm acquisitions boosted by the introduction of area based support (Józwiak, 2012). The reduction in the cropped area during 2002-2010 was primarily due to the halving of the number of small farms with up to 1 hectare UAA withdrawing from production, a change which the 14 per cent and 18 per cent increase in the number of farms with 30 to 50 hectares and over 50 hectares of UAA, respectively, could not offset.

In Poland, cereals were grown on around 7.65 million hectares in 2010, occupying around three quarters of the total cropped area (Figure 2), but 0.65 million hectares less than in 2002. There had been a steady decline in the area under the *grande cultures*, i.e. wheat, barley and triticale since at least 1990. But since 2002, the share of triticale and grain maize has increased the most, by 6.0 and 4.1 percentage points, respectively. The area under rye, one of the principal arable crops in Poland, has decreased by 31.5 per cent, and its share in the total cereal area has fallen from 18.8 per cent to 13.9 per cent. These changes resulted from the rapid growth in the consumption of concentrate feeds driven by the intensification of milk production, the concentration process in the production of poultry for slaughter, and changes in the pig feeding systems (Józwiak, 2012). Besides the introduction of new feeding technologies, the implementation of the Common Agricultural Policy (CAP) instruments (i.e. direct subsidies for crop producers, agri-environmental measures and, in some cases, production quotas), and the development of the biofuels industry also had a significant impact on the structure of crop production, turning around the decline in the area observed during the pre-accession years for some crops such as rapeseed.

Figure 2: **The share of the different crop groups in the cropped area in Poland in 2010.**



Source: based on GUS agricultural census 2010

[4] Holdings of this type had at their disposal 256.4 thousand hectares of UAA, i.e. 1.8 per cent of the agricultural land used by agricultural holdings and possessed 4.6 per cent of the livestock population expressed in livestock units in 2010. Thus although this group makes up around one third of all farms, classifying them as farms is debatable. The statistics obscure the actual status of Polish agriculture and hinder its objective analysis and assessment. However, amongst the data it is not always possible to separate this group from the rest.

A decreasing trend in the livestock population intensified after 1990, both in physical and in livestock units (LSU), but it gradually bottomed out in 2000-2004, and reversed following EU accession (Table 3) (Józwiak, 2012). Consequently, the livestock population in 2010 numbered almost 10.5 million LSU or 38.0 per cent more than in 2002. Livestock density per 100 hectares of UAA amounted to 67.4 LSU (with 4.6 LSU per farm on average and 10.0 LSU per farms engaged in livestock keeping) in comparison with only 45.0 LSU in 2002.

Table 3: **Changes in livestock numbers in Poland, 2002-2010.**

thousand physical units

Years	Cattle		Pigs		Sheep and goats	Poultry[a)]	Horses
	Total	Cows	Total	Sows			
2002	5,533	2,873	18,707	1,910	-	158,712	330
2005	5,483	2,795	18,112	1,813	458	-	312
2007	5,696	2,787	18,129	1,767	-	-	329
2008	5,757	2,807	15,425	1,367	-	-	325
2009	5,700	2,687	14,279	1,374	405	-	298
2010	5,761	2,657	15,278	1,427	385	176,488	264

[a)] All races included aged over two weeks.
Source: GUS

This growth in the livestock population registered in the period 2002-2010 contributed to the improvement of the nutrient content of soils by organic fertilisers[5]. The increase resulted primarily from a 4.1 per cent rise in the total number of cattle which continually had the greatest share in livestock density with 43-45 per cent. There was also a drop in the number of farms breading and raising bovines which resulted in a 43.6 per cent increase in the scale of cattle farming to nearly 11 LSU per cattle farm. The increase in the total cattle population was the result of the boost in the number of beef cattle accompanied by a 7.5 per cent drop in the number of dairy cows, resulting from the introduction of milk production quotas with Poland's accession to the EU, and the higher quality and hygienic requirements which some producers were unable to meet. The profitability of beef cattle farming improved significantly due to the rise in producer prices after accession.

In 2002-2010, the number of poultry decreased by 11.2 per cent as a result of a strong concentration process in particular concerning the laying hens, broilers and turkey sectors.

Share of agriculture and food processing industry in the GDP

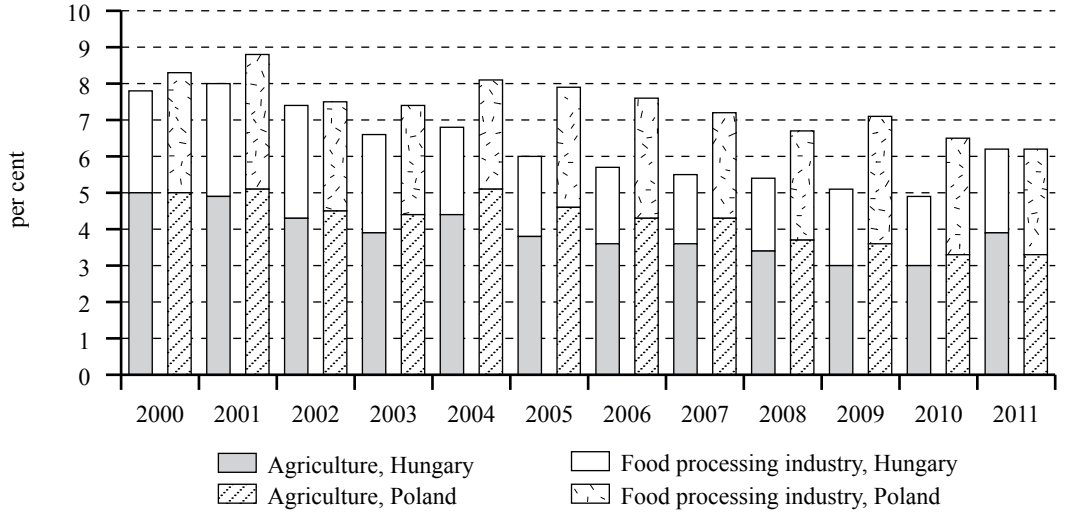
Owing to its high foreign currency indebtedness, Hungary has permanently been exposed to the shifts in the confidence of its lenders in the new Millennium. As one of the most vulnerable among the economies of the Central and Eastern European countries, it was hit hard by the global financial and economic crisis already in 2008, experiencing a decline in exports as well as in domestic consumption, and fixed asset accumulation, dampened by government austerity measures in subsequent years which resulted in the contraction of the economy. Although, due to the general macroeconomic, legal and social environment, Hungarian agriculture and the processing industries had been in a long recession before EU accession, the crisis impacted the agro-food sector to a lesser extent than other sectors of the national economy (Potori *et al*., 2011).

Agriculture in Hungary contributed 3.9 per cent to the Gross Domestic Product (GDP) in 2011, remarkably the same as in 2003 and more than twice the EU-27 average. In recent years, the unprecedented high volatility of agricultural produce prices and weather extremes have interrupted the

[5] For example in 2005-2009 emission of organic fertilisers per hectare of UAA increased by around 11 per cent as compared to 2000-2004. (It was, however, partly due to reduction of the UAA).

declining trend and made the year on year changes of this indicator rather erratic (Figure 3). In 2009, for instance, arable production was affected by the most severe drought in decades while in 2011 high commodity prices coincided with favourable weather conditions and the downturn of other sectors of the national economy which ultimately led to recession in 2012.

Figure 3: **Share of agriculture and food processing industry in the GDP in Hungary and Poland, 2000-2011.**



Source: KSH, GUS, Eurostat

Until 2007, the share of the food processing industry in the GDP continuously shrank from around 3 per cent to 1.9 per cent, then it climbed above 2 per cent only to drop back to 1.9 per cent in 2011 (Figure 3). Again, in 2009 and 2010, the economic crises contributed to the relative strengthening of the position of the food processing industry.

It is worth noting that food price inflation has been racing ahead of the Consumer Price Index in Hungary since 2006. Depreciation in the value of the Hungarian Forint (HUF) against the Euro (EUR) has also impacted on the performance of the agro-food sector.

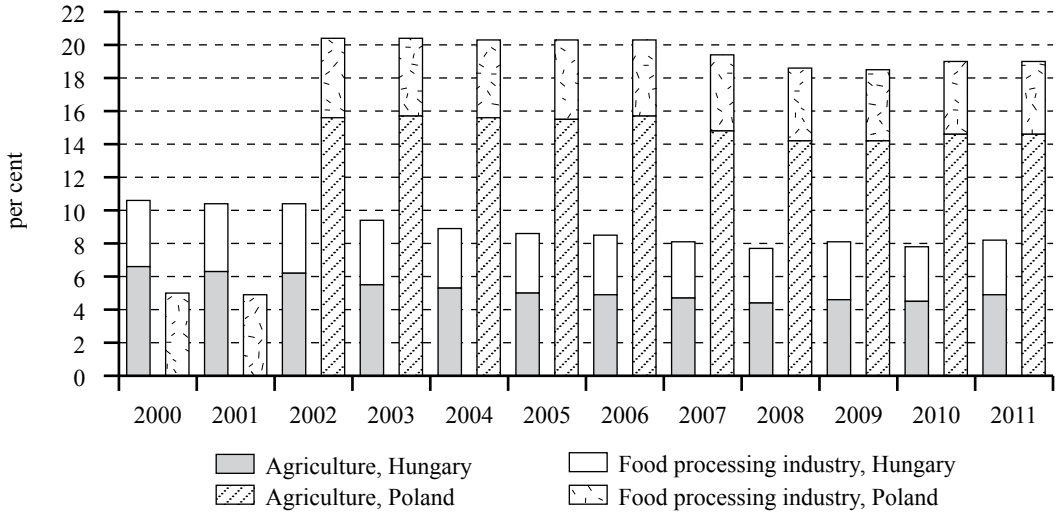
In contrast to Hungary, since 2007 Poland has been the best economic performer among the OECD member countries, as measured by real GDP growth. Its strong performance can be explained by the substantial inflows of EU funds (which have contributed to modernising the transport infrastructure), the stimulus from domestic macroeconomic policies (through 2010), exchange rate depreciation and the prudent and effective regulation of the comparatively sound financial system (OECD, 2012). The share of agriculture in the GDP has slowly declined during the period 2000-2011 (Figure 3) but at the same time the importance of the sector has not decreased. Agriculture still contributes significantly to the national economy (Tomczak, 2004) by offering employment to rural residents (Karwat-Woźniak, 2009) and generating income for rural households (Sikorska, 2006) thereby improving rural livelihoods.

The food sector is one of the most important and fastest growing sectors of the Polish economy. Its share in the sales value of the whole domestic industry was almost 24 per cent in 2011, 9 percentage points higher than the average of the EU-15. Agriculture and food processing industry together generate around 6 to 7 per cent of GDP in Poland (Figure 3).

Share of agriculture and food processing industry in employment

The share of agriculture in employment had been continuously declining in Hungary for many years. However, in 2009 this trend was reversed (Figure 4) by the economic crisis which severely impacted on other sectors of the national economy, as well as by the simplification of a bureaucratic seasonal work permit process. In 2011 the share of agriculture in employment increased by an even larger proportion than in the previous years, reaching the level of 2006, which can be attributed to a modification in the public work system: since 2011, public workers have been accounted for as regular employees.

Figure 4: **Share of agriculture and food processing industry in employment in Hungary and Poland[a], 2000-2011.**



[a] For Poland, no data for the share of agriculture in employment were available for 2000 and 2001.
Source: KSH, GUS

The share of food processing industry in employment had also been decreasing until 2008 (Figure 4). Again, the break in this trend in 2009 can be explained by the economic downturn leading to the loss of jobs in other sectors of the national economy.

In Poland, the share of agriculture in employment had been slowly declining too, but with no substantial reversal during this period, reaching 14.6 per cent in 2011 (Figure 4). That is a much higher number than for Hungary. Data from the National Accounts reveal a drop of more than 2.95 million persons employed in agriculture in the EU-27 since 2000, with Poland alone representing 19.4 per cent of this decrease. Even so, owing to the large number of smaller individual holdings, around 70 per cent of employment in agriculture is concentrated in only seven EU Member States[6] of which Poland alone accounts for almost 18 per cent of the total, i.e. nearly 2 million people[7]. According to GUS data, irrespective of the number of hours worked, in 2010 almost 2,407 thousand family members worked exclusively on individual farms, while a further 117.5 thousand combined on- and off-farm employment, with agriculture being their main professional activity. However, the agricultural workforce is not evenly distributed throughout the country: the share of agriculture in employment is over 40 per cent in several regions of Eastern Poland while the primary sector plays a minor role in providing job opportunities in Western Poland (EC, 2013).

[6] Romania, Poland, Italy, Spain, France, Bulgaria and Germany.
[7] In 2010 the number even increased (due to the change in methodology of calculation) and data for 2010-2011 are not fully comparable with data from previous years.

In contrast to the still significant role of agriculture in rural livelihoods, the share of the Polish food processing industry in employment has been only around 1 percentage point higher than in Hungary in the past few years and its pace of decline has been much slower during this period (Figure 4). This suggests that the processing sector is much more concentrated than agricultural production.

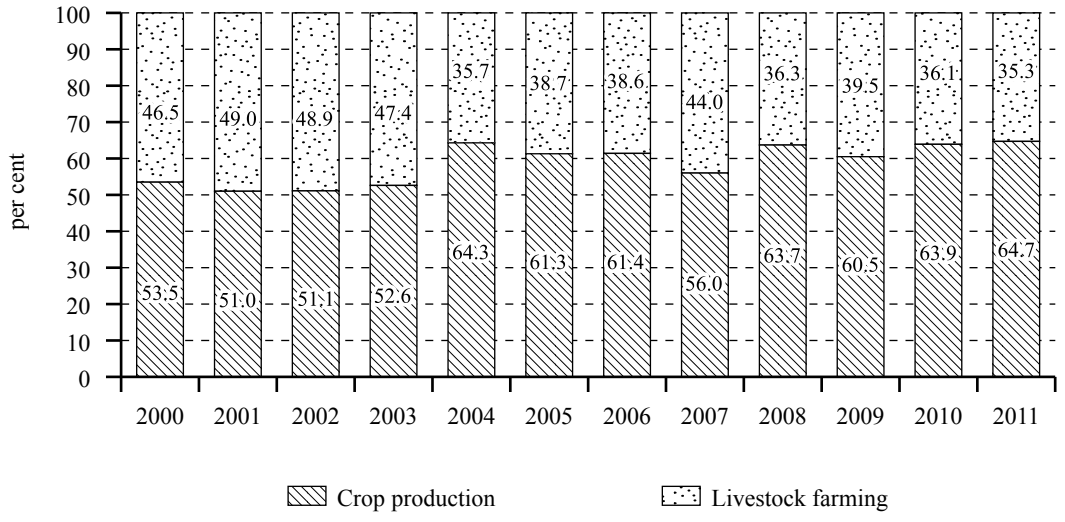
The pre-EU accession years in Poland were characterised by an economic slowdown, accompanied by a decline in the growth rate of national incomes and job losses in the food processing industry. After EU accession, however, the strengthening demand for Polish food products on the export markets, increasing consumer spending and investments put a brake on the loss of jobs in the sector. Labour productivity in the food processing industry improved considerably during the period 2000-2011. In recent years around 20 per cent of the food processing industry jobs have been related to meat processing, another 20 per cent to the bakery industry, and around 10 per cent to dairy processing (Judzińska, 2011).

Value of agricultural production

The value of agricultural production in Hungary totalled EUR 7.75 billion in 2011, showing a 26.7 per cent increase over the 2010 in current prices, primarily thanks to the rise in agricultural commodity prices. In 2005 fixed prices, however, its value was 4.5 per cent below of that in 2005 and only 7.2 higher than in 2000. In 2011, Hungary represented 2.0 per cent of the value of agricultural production of the EU-27. The values of crop and livestock production amounted to EUR 4.68 billion (2.3 per cent) and 2.53 billion (1.6 per cent) respectively. The value of agricultural production per hectare of UAA reached EUR 1.45 thousand, exceeding the EU-12 average by 10.8 per cent but being only 56.1 per cent of the EU-15 average in 2011. The value per annual work unit (AWU) was EUR 18.0 thousand, 34.7 per cent above the EU-12 average but just 28.0 per cent of the EU-15 average.

Parallel to a decline in livestock numbers, the share of livestock farming in the gross output of agriculture dropped from almost 50 per cent in the early 2000s to around 35 per cent in 2010 and 2011 (Figure 5).

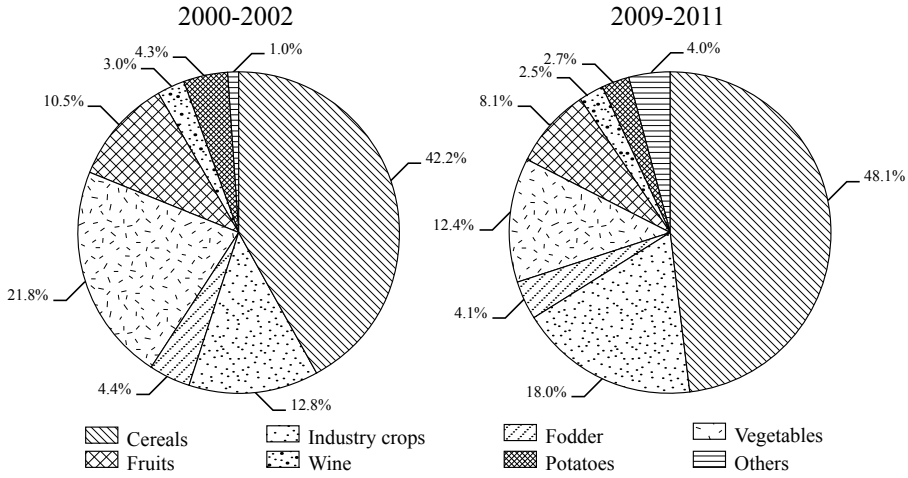
Figure 5: **The share of crop production and livestock farming in the gross output of agriculture in Hungary, 2000-2011.**



Source: KSH

The value of crop production averaged EUR 3.78 billion in current prices during the period 2009-2011, a sharp increase over the EUR 2.64 billion for 2000-2002[8]. The share of cereals and industrial crops much demanded on the export markets increased substantially, causing the share of fodder, fruits, wine, potatoes, and especially vegetables production to shrink (Figure 6).

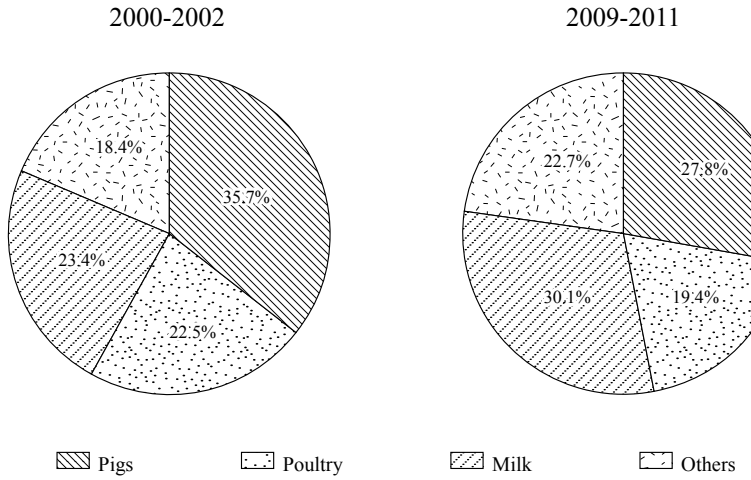
Figure 6: **The share of the major sectors in the value of crop production in Hungary, average of 2000-2002 versus 2009-2011.**



Source: KSH

In contrast to crop production, the EUR 2.46 billion average value of livestock farming in 2000-2002 fell to EUR 2.28 billion during the period 2009-2011 in current prices. The share of pig meat and poultry production (these livestock sectors have been excluded from all direct aids since EU accession) contracted considerably relative to that of milk production and other sectors of livestock farming (Figure 7).

Figure 7: **The share of the major sectors in the value of livestock farming in Hungary, average of 2000-2002 versus 2009-2011.**



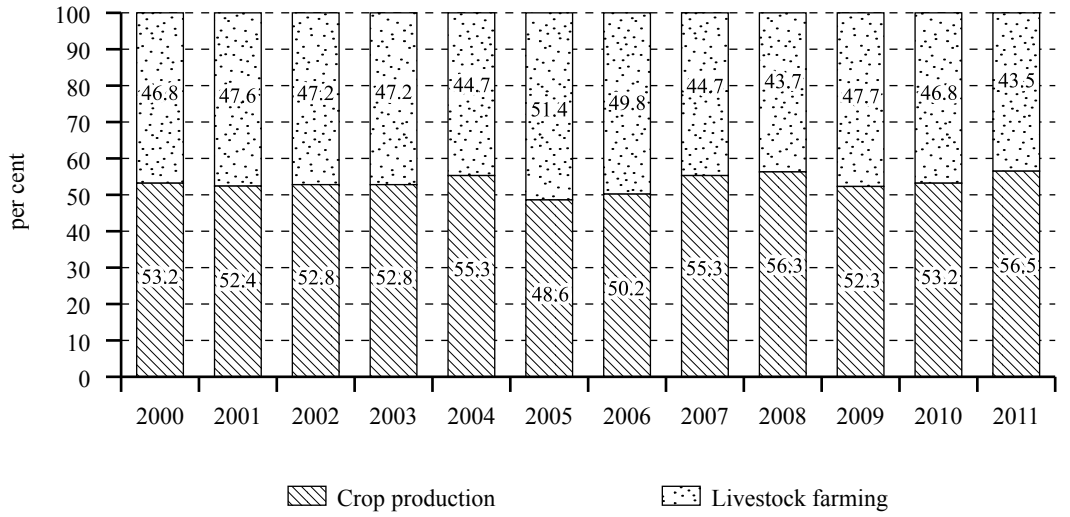
Source: KSH

[8] In the case of Hungary, owing to the large fluctuations in crop production, averages of three years were chosen for comparison.

In Poland, the value of agricultural production amounted to EUR 22.75 billion in 2011, this being a 15.1 per cent increase in current prices over 2010. In contrast to Hungary, this figure was 8.3 per cent higher than in 2005 and represented a 27.2 per cent increase over 2000 in 2005 fixed prices. The value per hectare UAA was close to EUR 1.54 thousand in 2011, or around EUR 0.1 thousand more than in Hungary, exceeding the EU-12 average by 17.4 per cent, and being 59.5 per cent of the EU-15 average in 2011. Owing to the high labour intensity, the value of agricultural production per AWU was EUR 10.8 thousand, or around EUR 7.2 thousand less than in Hungary, 18.8 per cent below the EU-12 average and only 16.9 per cent of the EU-15 average.

The value of crop and livestock production in Poland amounted to EUR 12.14 billion and EUR 10.0 billion in 2011, being a 5.9 per cent and a 6.3 per cent share in the output of the EU-27, respectively. Livestock farming was more or less able to preserve its share in the gross output of agriculture during the period 2000-2011 (Figure 8) although an increasing number of entities, especially small farms, have withdrawn from animal husbandry in recent years.

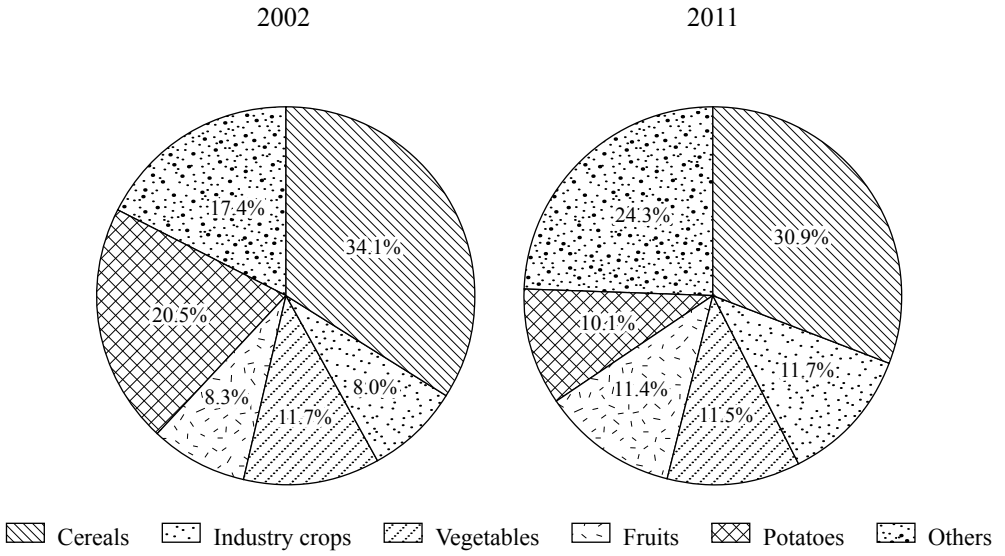
Figure 8: **The share of crop production and livestock farming in the gross output of agriculture in Poland, 2000-2011.**



Source: GUS

In contrast to Hungary, the proportion of cereals in crop production shrank during the past decade while the share of industrial crops, fruits and especially other crops grew significantly. Poland has traditionally been a potato growing and consuming country but, in parallel with the continuous decline in the number of small household farms with livestock which used potatoes for feeding too, the output of potatoes had more than halved by 2011 (Figure 9).

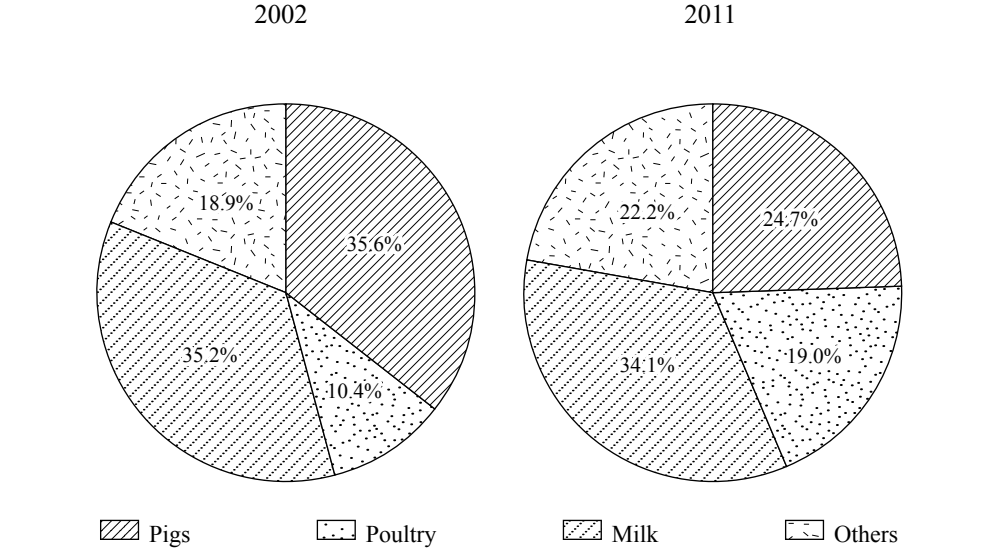
Figure 9: **The share of the major sectors in the value of crop production in Poland, 2002 versus 2011.**



Source: GUS

In the structure of Polish livestock farming significant changes have taken place. A robust increase in the output of the highly industrialised and well integrated poultry sector could be observed at the expense of the pig sector during the period 2002-2011 (Figure 10). This is due to the modernisation of poultry breeding, housing and processing facilities with the aim of reaching self-sufficiency in poultry meat production.

Figure 10: **The share of the major sectors in the value of livestock farming in Poland, 2002 versus 2011.**



Source: GUS

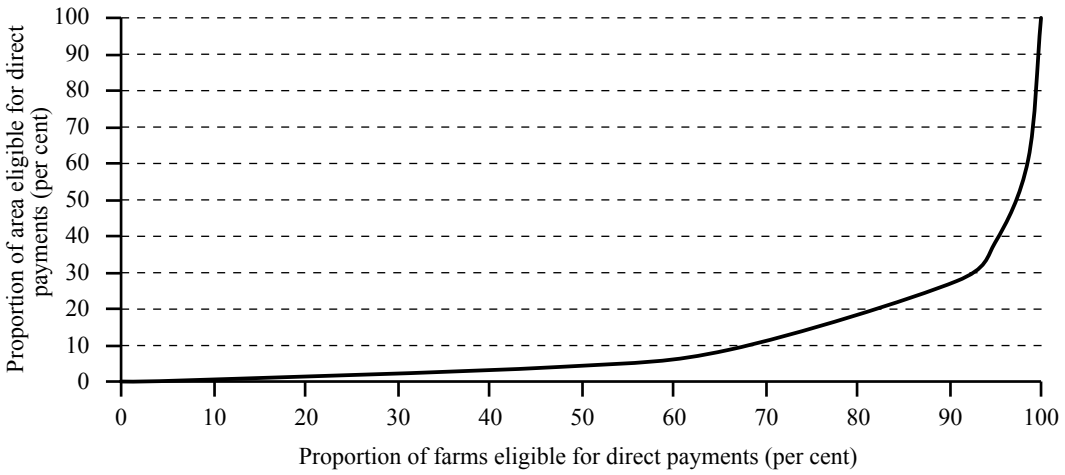
Land use changes

In Hungary, around 93 per cent of the 566.7 thousand private holdings and 77 per cent of the 8.8 thousand legal entities registered by the last agricultural census utilised land for agricultural activity in 2011. The average agricultural area used by private holdings increased from 2.5 hectares in 2000 to 4.6 hectares in 2010, while the average agricultural area managed by legal entities dropped, as a result of the splitting of holdings, from 532.9 hectares in 2000 to 322.4 hectares in 2010. Private holdings owned over 76 per cent of their agricultural area, while legal entities leased more than 91 per cent of their land under cultivation.

The average size of farms eligible for direct payments was 28.1 hectares in 2011, 4.1 hectares more than in 2004. The dualistic structure of farming is well represented within this group (Figure 11). Of the 176.3 thousand beneficiaries of EU direct payments, only 1.9 thousand had an agricultural area greater than 300 hectares in 2011, but these farms used 39.0 per cent of the 4,957 thousand eligible hectares. At the other end of the scale, 116.5 thousand farms of less than 10 hectares used less than 8.7 per cent of the area.

In reality, the dualistic structure of farming is less pronounced because many of the private holdings are split between family members in order to take advantage of tax allowances for smallholders.

Figure 11: **Structure of farms eligible for direct payments in Hungary, 2011.**



Source: ARDA

The predominance of the private sector became more and more pronounced in Polish agriculture as a result of the political and economic transition. Over 88 per cent of the farms are owned and farmed by natural persons, i.e. most of the farms are individual family farms (Zegar, 2008). The change in property rights is comparatively unproblematic because much of the land was privately owned even before transition.

Agricultural land use is rather fragmented in Poland. In 2010, there were around 2.28 million farms, of which 0.9 thousand belonged to the public sector. The number of farms with UAA exceeded 2.26 million, of which 1.56 million used over 1 hectare, 349.1 thousand over 10 hectares and only 27.2 thousand over 50 hectares. In contrast, the total number of direct payment beneficiaries was less than 1.36 million in 2011. While the overall number of farms declined by 22.4 per cent during the period 2002-2010, the average agricultural area in their use increased from 5.8 hectares in 2002 to 6.8 hectares in 2010 (Table 3). In the same time, almost 20 per cent of the small farms with less than

1 hectare UAA gave up agricultural activities which can be explained by EU direct support being decoupled from production and the improvement of the conditions for early retirement.

Table 3: **Changes in the structure of agricultural land use in Poland[a)], 2002 versus 2010.**

Years	Total UAA in thousand hectares	Farm size in hectares of UAA					
		1-5	5-10	10-15	15-30	30-50	over 50
		Share of UAA, per cent					
2002	16,503	16.8	20.9	15.3	20.5	8.1	18.4
2010	15,247	14.4	16.5	12.2	17.9	8.9	30.4
		Change, per cent					
	-7,6	-21.0	-27.4	-26.7	-19.4	+1.6	+52.3

[a)] Only farms with over 1 hectare UAA were considered according to Article 2 of the Act on shaping the agricultural system of 11 April 2013 which declares that only entities having a total agricultural area of over 1 hectare shall be considered as farms.
Source: based on GUS agricultural census 2002 and 2010.

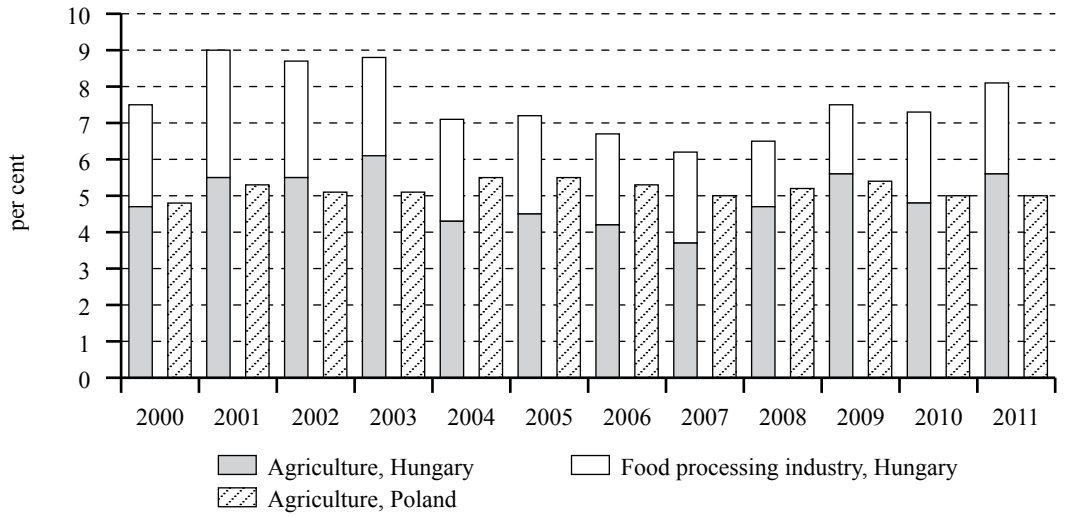
Given that changes in the land use structure progress very slowly and that these are usually evolutionary in nature, the decrease in the number of small farms is as significant. It signifies rationalisation of agricultural structures and professionalisation of the economic activity of the rural population; it allows for the more efficient use of agricultural land and greater economy of scale to improve the competitiveness of Polish farms (Karwat-Woźniak 2012), as well as to enhance the protection of the natural resources and to promote sustainable rural development (Zegar, 2006; Pawlak 2008).

The leasing of agricultural land is a means of enlarging the size of inherited farms. But only around 1 per cent of the Polish farms leased land, an estimated 20 per cent of the UAA from 22 per cent of individual farms, in 2009 (Sikorska, 2010).

Share of agriculture and food processing industry in investments

Prior to accession, the EU SAPARD programme funded investments in agriculture and the improvement of the processing and marketing of agricultural and fishery products in Hungary. After EU accession, the Agriculture and Rural Development Operational Programme and the National Rural Development Plan for the EAGGF Guarantee Section (EAGF) Measures were implemented during the period 2004-2006. However, owing to the late approval of these by the European Commission, there were no payments in 2004. Since stakeholders in agriculture were generally unprepared, and markets, flooded by bumper crops, were struggling with the lack of storage capacities and the inefficiency of the transportation infrastructure, and because institutions of vital importance had only just begun operating, the ability of Hungarian farmers to exploit the new opportunities and to cope with the challenges brought about by the CAP was limited (Popp and Potori, 2006a). This, accompanied by the fall of the remaining trade barriers between the old and new EU Member States, the introduction of EU environmental, animal health and welfare requirements, as well as the abolition of sector specific interest rate subsidies, set back investments in agriculture. Then in 2008 and in 2009, the share of agriculture in investments increased substantially (Figure 12). This growth was partially related to the decline in other sectors of the national economy which were hit harder by the economic crisis, but it was also boosted by the gradual increase of EU direct payments. Most of the investments occurred in arable farming.

Figure 12: **Share of agriculture and food processing industry in investments in Hungary and Poland[a)], 2000-2011.**



[a)] For Poland, no data for the share of food processing industry in investments were available.
Source: KSH, Eurostat

After 2009, owing to the global financial and economic crisis, the financing of agribusinesses became more selective and rigorous screening of the financial situation of credit applicants was introduced. Banks moved away from mortgage loans and instead demanded joint and several liabilities from customers, while costumers became more risk averse. Short- and long-term refinancing loans by the state-owned Hungarian Development Bank have, however, contributed to easing the pressure on enterprises in agriculture and agribusiness. These financial instruments, worth HUF 100 billion (around EUR 340 million) in total and provided on favourable terms, have helped the beneficiaries to comply with the own capital requirements for investment support from EU Rural Development funds. In 2011, EUR 567.5 million or EUR 106.3 per 1 hectare UAA was invested in Hungarian agriculture.

EU accession impacted food processing rather unfavourably because funds available for support were cut back and at the same time the market became fully opened. International retail chains, already dominating food retailing in Hungary, and wholesalers have had greater opportunities to import and offer competitive products, exercising a downward price pressure on their suppliers and squeezing out domestically produced goods from the shelves. Most of the processors were unprepared for this and their failure to invest in modernisation during the pre-accession years has been decisive. They have since been striving to maintain their shrinking market share in Hungary as well as abroad, but with little success owing to high interest rates, to their increasing indebtedness and lack of capital, as well as to their obsolete technology and lack of product, process and organisational innovation, small production volumes and weakening bargaining position. Only a few have been able to expand their activities, the rest have faced increasing underutilisation of their production capacities (Popp *et al*., 2008). Remarkably, the share of foreign capital in the food processing industry has been declining since 2002 and although this outflow has slowed down in recent years it is still ongoing. Between 2000 and 2011 the number of large food processing enterprises halved and investments in food processing decreased by 12.6 per cent in real terms during the period 2000-2011, representing 1.8 to 2.5 per cent of the total in the past few years (Figure 12). In 2011, EUR 378.8 million was invested in food processing in Hungary.

In Poland, investments in agriculture amounted to around EUR 0.5 billion a year on average in the pre-accession period. After 2004, as financial support to agriculture increased substantially, the yearly average expenditure on fixed assets surged to EUR 0.85 billion, totalling EUR 6.7 billion for the period 2004-2011. Of this, around EUR 2.3 billion is the net effect of introduction of CAP support schemes. In 2011, the average value of investments per hectare of UAA was around EUR 67 in the case of private farms. Intensity of production in agriculture measured as capital outlays per hectare of UAA amounted to EUR 941 in 2010, or around 60 per cent of the EU average (Poczta, 2013). This investment boom contributed to maintaining the share of agriculture in investments of the whole economy relatively stable and at a significantly higher level compared to Hungary (Figure 12), as well as to the increase in the value of fixed assets, mainly equipment, machinery and tools.

The food processing sector has been one of the most important and fastest-growing branches of the Polish economy since EU accession. During the pre-EU accession period, food processing enterprises could obtain financial aid from the SAPARD programme and after EU accession support for food processing was continued from the Sector Operational Programme (SOP) budgets i.e. 'Restructuring and modernisation of the food sector and development of rural areas' and 'Fisheries and fish processing 2004-2006' (Gradziuk, 2009).

During the period 2002-2006 most of the investment capital in the food processing industry (with dairy and meat processing having around 80 per cent share) was spent on compliance with EU standards and, during the period 2004-2008, 45 per cent of the investments focused on improving product quality as well as on bringing new products to the market (Wigier and Darvasi, 2012). In the 2007-2013 Rural Development programming period, 45 per cent of the investments aimed at increasing value added. Environmental investments have been marginal.

EU funds have been, and still are, a catalyst for investments in the sector. Since the launch of the SAPARD Programme until June 2011, almost 3.5 thousand investment projects have been implemented at over 2.1 thousand processing plants. The majority of the entities benefitting from EU investment support still conduct production activity. More than 40 per cent of the food processors benefiting from investment support have been small and medium-sized enterprises. The economic crisis slowed down the investment activity in the Polish food processing industry in 2009-2010 but, during the period 2000-2010, investments in this sector rose on average by 3.5 per cent a year and totalled EUR 15.5 billion (Mroczek, 2012).

Support to agriculture

Since the start of the transition to a market economy in the early 1990s until 2004, only limited progress was made towards market orientation of the agricultural sector in Hungary. Although regulations and subsidies played an important stabilising role, particularly within the livestock sectors, producers became used to the national intervention mechanisms and production became rather insensitive to market signals (Popp and Potori, 2006b).

Before accession to the EU, border measures, administered prices, input subsidies, and area and headage payments were the main policy instruments used to support agriculture in Hungary. Export subsidies constituted a policy instrument of declining importance in regulating crop and animal produce markets, especially in the case of poultry and pig meat. Imports were regulated by *ad-valorem* tariffs and tariff rate quotas. The significance of agri-environmental and rural development measures increased gradually.

On accession to the EU, Hungary fully adopted the EU mechanisms of border protection and market regulation. The country opted for the Single Area Payment Scheme (SAPS) as a substitute for all direct payment schemes financed from the EAGF with a decoupled flat rate payment per hectare of agricultural land. The Single Area Payment (SAP) was complemented by a complex system of

complementary national direct payments (CNDPs) that favoured arable, ruminant and tobacco farmers the most. The amount of the SAP increased from EUR 70.2 in 2004 to EUR 236.4 per hectare in 2013, a figure close to the EU average. In 2011, Hungarian farmers could apply for HUF 364.3 billion (EUR 1.3 billion) of direct payments from both EU and national funds.

Because of increasing budget constraints, the CNDPs were steadily reduced after their introduction, and by 2009 they were phased out in the arable sectors which, until then, had been absorbing the bulk of the national top-up. In 2007, according to the EU regulation in force, all CNDPs became fully or partially decoupled from production. Following the mid-term review, or 'Health Check' of the CAP, pursuant to Article 68 of Regulation (EC) No. 73/2009, 3.5 per cent of the EAGF funds in Hungary were granted to dairy farmers in the form of a re-coupled support, and a further 6.5 per cent were made available specifically for ruminant farmers, as well as for tobacco, rice, and fruits and vegetables producers.

Apart from the CNDPs, several national support programmes have been provided following EU accession as a continuation of pre-accession policy measures. These included support for on-farm afforestation, subsidised veterinary costs, intra-EU marketing of agri-food products, water management, training, education and research, credit subsidies, producer organisations and social insurance fees.

During the 2007-2013 programming period, 45.5 per cent of the HUF 964.3 billion (EUR 3.8 billion) available for Hungary from the European Agricultural Fund for Rural Development (EAFRD) were committed to enhancing competitiveness in the agro-food sector (Axis 1), 32.2 per cent to agri-environmental measures (Axis 2), 13.2 per cent to encouraging economic diversification in rural areas and improving the quality of rural life (Axis 3), 5.5 per cent to LEADER (Axis 4), and the rest to technical assistance.

Poland also introduced the SAPS in 2004, complemented by CNDPs from the national budget for tobacco and starch potatoes. The negotiated limits for payments to ruminants have been included in supplementary payments for pastures, partly financed from the national budget and partly from the Structural Funds. Until 2007, these payments were also available to farmers managing grassland and pasture without cattle or sheep. In contrast to Hungary, the level of complementary payments reached the maximum allowed in every year. Besides these payments, *de minimis* support has been granted to farmers using certified seeds since 2007, and aid has been provided to producers of dried fodder, and for the processing of flax and hemp for fibre. The amount of the SAP increased from EUR 44.5 in 2004 to EUR 207.5 per hectare in 2013. In 2011, Polish farmers received in total PLN 14.1 billion (EUR 3.4 billion) of direct payments from both EU and national funds.

The integration with the EU created new conditions for the development of agriculture and food processing industry in Poland. Since 2002 the agro-food sector has been benefitting from support programmes co-financed from the EU budget. The total value of financial aid from the beginning of 2002 until the end of 2011 exceeded PLN 113 billion (EUR 28 billion). This comprised PLN 4.5 billion (EUR 1.1 billion) of SAPARD payments, PLN 6.4 billion (EUR 1.6 billion) under the agricultural SOP, PLN 63.5 billion (EUR 15.8 billion) of direct payments, PLN 11.1 billion (EUR 2.8 billion) from the 2004-2006 Rural Development Programme (RDP), and PLN 27.5 billion (EUR 6.9 billion) from the 2007-2013 RDP.

Until 2012, the measure "Support for mountain farming and other LFAs" had the largest share (18.7 per cent) of all Rural Development payments. The aid for the Least Favoured Areas (LFA) has been the most important monetary transfer to farms after the SAP and CNDPs, especially in the southern regions of Poland. This was followed by the measure "Structural pensions" with 16.7 per cent, "Modernisation of farms" with 15.1 per cent and the "Agri-environmental scheme" with 12.6 per cent.

Within the current multiannual financial framework of the EU, Hungary and Poland could spend around EUR 8.9 billion and EUR 21.1 billion of EU funds on direct payments between 2014 and 2020, as well as EUR 3.4 billion and EUR 10.9 billion to co-finance rural development measures, respectively, not counting with any possible redistribution of parts of these funds between the two pillars of the CAP. These figures represent 3.0 per cent and 7.1 per cent shares of the financial commitments of the EU for direct payments in agriculture, and 3.6 per cent and 11.4 per cent shares of the financial commitments of the EU for rural development, respectively.

Incomes in agriculture

After 2004, owing to the introduction of EU direct payments, farm incomes in Hungary increased in nominal terms. The transfer efficiency of these payments, however, eroded significantly as they were gradually capitalised into land lease prices and into agricultural input prices (Kovács *at al*., 2008).

In 2011 the average monthly gross income per employee in Hungary was HUF 213,094 (EUR 763.2). Amongst the sectors, tourism represented the lower, and financing and insurance the higher end with HUF 125,757 (EUR 450.4) and HUF 456,980 (EUR 1,636.7), respectively. Agriculture, forestry and fishery were second only to tourism with HUF 153,301 (EUR 549.1), substantially below the national average. In comparison, the average monthly gross income per employee in the construction industry – hit most by the economic crisis – was only slightly higher, HUF 156,682 (EUR 561.2), while in education it reached HUF 192,984 (EUR 691.2) and in industry HUF 219,602 (EUR 786.5), the latter being about the national average. Although information and communication followed financing and insurance with HUF 392,963 (EUR 1,407.4), the difference between these two sectors in the average monthly gross income per employee was notable.

According to the EAA, factor incomes, comprising compensation of employees by, and operating surplus of, producers in Hungarian agriculture, totalled EUR 3.4 billion in 2011. This represents a 141.7 per cent growth over 2000 in current prices. Factor incomes per hectare of UAA reached EUR 0.64 thousand, exceeding the EU-12 average by 19.2 per cent, which can be explained by the relatively large share of arable production, but they lagged behind the EU-15 average by 31.3 per cent. Factor incomes per AWU were EUR 8.0 thousand, 36.5 per cent above the EU-12 average but only 34.8 per cent of the EU-15 average, which is a clear signal of the relative inefficiency of agricultural production technologies.

Agricultural incomes have improved sharply relative to the national average in Poland since 2005, which can largely be attributed to the adoption of the CAP (OECD, 2012). In real terms, their growth outpaced the growth of the value of agricultural production seven-fold (Poczta, 2012). The share of subsidies in agricultural incomes jumped from less than 9 per cent in the pre-accession years to around 50 per cent in 2011. Following EU accession, a rapid improvement in the livelihoods of a significant number of farmers and their families, members of cooperatives, land and capital owners, as well as of hired agricultural labourers occurred. Most farms were given the opportunity to prolong their existence, thereby allowing them to retain jobs and the incomes related thereto.

The average monthly net income per capita in Polish households reached EUR 306 in 2011, gaining EUR 116 over 2004. The per capita income in households of farmers increased from EUR 151 in 2005 to EUR 256 in 2010, out of which per capita income from farming activities surged from around EUR 100 to EUR 180.

As the EAA reveals, factor incomes in Polish agriculture totalled EUR 10.7 billion in 2011, three times more than in Hungary. This is a 228.3 per cent increase over 2000 in current prices. Factor incomes per hectare of UAA in Poland were also higher than in Hungary with EUR 0.73 thousand, the second highest among the Eastern EU Member States following Slovenia, but still 22.6 per cent behind the EU-15 average. On the other hand, due to the fragmented farm structure and more labour

intensive production, factor incomes per AWU were substantially lower than in Hungary with EUR 5.1 thousand, and also lagging behind the EU-12 average by 13.6 per cent, representing only 22.3 per cent of the EU-15 average.

Agro-food trade

Hungary has maintained its position as a net agro-food exporter since EU accession. During the period 2000-2012, its agro-food exports and imports increased in nominal terms from EUR 2.44 billion to EUR 8.08 billion and from EUR 1.10 billion to EUR 4.47 billion, respectively. Although the agro-food trade balance fell from EUR 1.34 billion in 2000 to EUR 916 million in 2005, since 2007 it has exceeded the level of the pre-accession years, reaching EUR 3.61 billion in 2012[9] (Figure 13).

Figure 13: **The evolution of agro-food trade in Hungary, 2000-2012.**

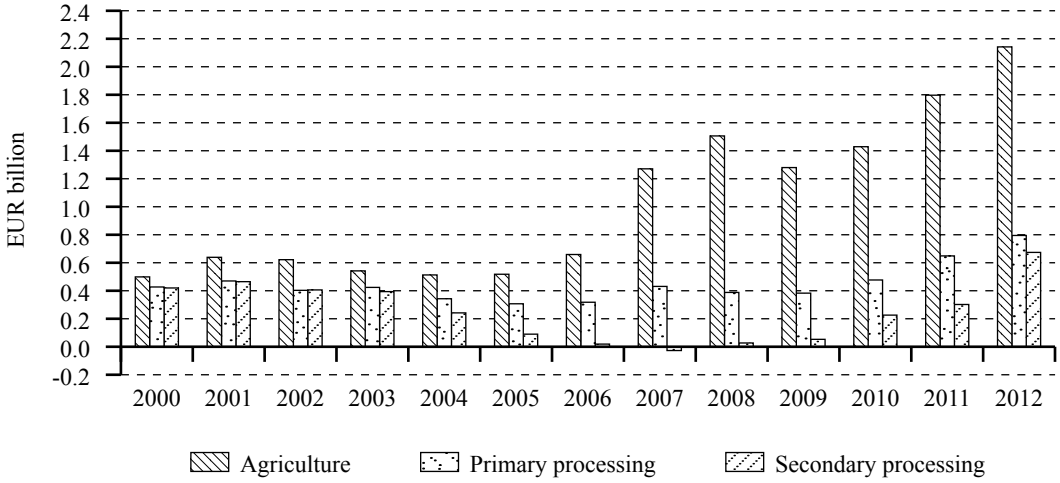
Source: KSH

The growth of the agro-food trade balance seems spectacular but its structure has changed significantly over the years. According to calculations based on Juhász and Wagner (2010), the nominal value of goods of primary and secondary processing represented only 23.6 per cent and 11.0 per cent respectively of the agro-food trade balance in 2011, compared to 32.1 per cent and 30.7 per cent in 2000, while the share of agricultural commodities increased from 37.2 per cent in 2000 to 65.4 per cent (Figure 14). This development clearly hints at the erosion of the competitive edge of the processing industry in Hungary, in particular during the first five years of EU membership. In 2012, however, the share of secondary processed products jumped by 7.7 percentage points, a move which can be explained mainly by the boom of maize-based fuel ethanol exports and the fall of fuel ethanol imports, and also by the expansion of pet food sales. In general, the growth of the agro-food trade balance in the past few years can be largely attributed to the increase in the value of cereals and oilseeds exports.

In value terms, the major agro-food export products of Hungary include, next to cereals and oilseeds, meat and meat products, and fruits and vegetables. The most important agro-food import products are fruits and vegetables, followed by meat and meat products, dairy products and soybean meal.

[9] Trade statistics were already available for 2012 when writing this chapter.

Figure 14: **The structure of the agro-food trade balance in Hungary, 2000-2012.**



Source: AKI calculations based on KSH data

Hungarian agricultural and food products are traded mostly with European countries. The integration of the agro-food trade between Hungary and the EU is more advanced on the import side: just over 80 per cent of exports go to the EU-27, while the share of imports from the EU-27 rose from around 78 per cent in 2003 to over 90 per cent in recent years.

Major buyers of agro-food products from Hungary included Germany with on average EUR 959.79 million worth of imports per year during the period 2010-2012, followed by Romania (EUR 865.05 million), Slovakia (EUR 778.20 million), Italy (EUR 620,00 million) and Austria (EUR 614.86 million). Poland ranked seventh with EUR 300.66 million behind the Netherlands (EUR 385.76 million). Hungarian agro-food exports to Poland hit an all-time record with EUR 363.39 million (4.5 per cent) in 2012.

During the period 2010-2012, Hungary imported on average EUR 506.75 million worth of agro-food products per year from Poland, which as a supplier was second only to Germany (EUR 868.97 million), followed by Slovakia (EUR 430.77), the Netherlands (EUR 409.33 million), Austria (EUR 358.12 million) and Italy (EUR 218.44 million). Imports from Poland also reached an all-time record of EUR 541.73 million (12.1 per cent) in 2012.

Among its trade partners, Hungary had the largest agro-food trade deficit with Poland during the period 2010-2012, with an annual average of EUR 206.09 million. After Poland came Brazil, with only EUR 23.57 million. The agro-food trade deficit with Poland, however, has been declining over this period, dropping to EUR 178.34 million in 2012. During these three years, Poland was the largest buyer of Hungarian water melons and potatoes, with average annual imports of 14.80 thousand tonnes and 2.01 thousand tonnes respectively. The country was the second biggest importer of Hungarian onions with 736 tonnes and was the third major destination of canned and the fourth of frozen sweet corn exports from Hungary during this time, respectively importing on average 19.70 thousand tonnes and 3.71 thousand tonnes a year. Poland was in seventh place amongst the buyers of grain maize from Hungary during the same period, importing on average over 160 thousand tonnes a year.

Hungarian exports of poultry meat to Poland averaged 4.93 thousand tonnes per year during the period 2010-2012, meaning that Hungary was the sixth most important poultry meat supplier to that country. On the other hand, poultry meat imports from Poland exceeded this amount by far, being 7.25 thousand tonnes per year on average, placing Poland third among the sources of poultry meat imports. Poultry meat imports from Poland increased by over 40 per cent during the three year

period. At the same time, with an average annual figure in excess of 15.17 thousand tonnes, Poland was the largest supplier of live pigs to Hungary. Poland also sold on average 37.29 thousand tonnes of pig meat to Hungary, ranking as second. It was also the second biggest source of imported cheese and quark for Hungary during these three years, supplying on average over 67 thousand tonnes a year. Poland was the number one supplier of chicken eggs to Hungary during this period, delivering on average 2.65 thousand tonnes of shell eggs and 0.49 thousand tonnes of liquid eggs a year. With an average annual volume of 259 tonnes, Poland was second only to Romania in selling edible fungi to Hungary.

For many years, the Polish agro-food trade has been dominated by the exports of poultry meat, beef, pork and dairy products, chocolate and products containing cocoa, bakery and confectionery products, fruit juices (especially apple juice), cigarettes, sugar syrup, frozen fruits, smoked fish and sugar, as well as by processed and canned fish exports. The value of these goods sold to other countries accounts for around 50 per cent of the total sales of agro-food products abroad. In 2012, the value of agro-food exports totalled EUR 18.79 billion, representing a 20.4 per cent increase over 2011. By contrast, in 2000, agro-food products worth only EUR 2.89 billion were sold abroad (Figure 15).

Figure 15: **The evolution of agro-food trade in Poland, 2000-2012.**

Source: GUS

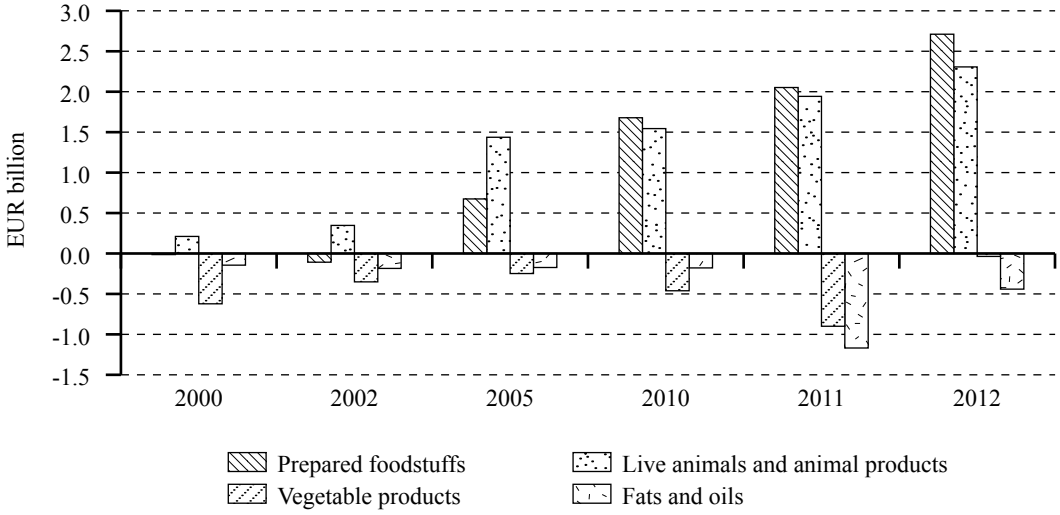
Polish agro-food trade has, for many years, primarily focused on the European market. EU Member States were the major trade partners, importing predominantly dairy products, pig meat, poultry, beef, chocolate and products containing cocoa, and tobacco. In 2012, these countries had a 76.4 per cent the share of the total value of Poland's agro-food exports, over three times higher than in 2004, representing a 12.4 per cent increase over 2011 (with 13.9 per cent on the account of the 'old' and 8.0 per cent on the account of the 'new' EU Member States). Major buyers of agro-food products from Poland included Germany with EUR 3.5 billion worth of imports, the UK with EUR 1.2 billion and the Czech Republic with over EUR 1.1 billion in 2012, followed by France and the Netherlands. Hungary ranked eighth with EUR 781 million. Germany's leading place can be explained by the relatively low transport costs and the significant share of German capital in some of the food processing sectors (e.g. sugar and dairy).

The Commonwealth of Independent States (CIS) had a 10 per cent share in the value of Polish agro-food exports on average; however, it varied considerably from year to year due to the changes in the trade policy of the Russian Federation (i.e. introduction of restrictions which impacted the imports of pig meat, fruits and vegetables, and dairy products).

The geographical breakdown of the imports of agro-food products to Poland shows a share of around 70 per cent for other EU Member States. Owing to a constantly improving trade balance with these countries, the agro-food trade balance of Poland has grown continuously since 2000, reaching EUR 3.1 billion in 2011. In contrast, Poland has maintained a negative agro-food trade balance with developing third countries which have around 20 per cent share in the value of imported agro-food products.

In general, the growth of the Polish agro-food trade balance in the past decade can be mainly attributed to the increase in the value of prepared foodstuffs, live animals and livestock products (Figure 16).

Figure 16: **The structure of the agro-food trade balance in Poland, 2000-2012.**



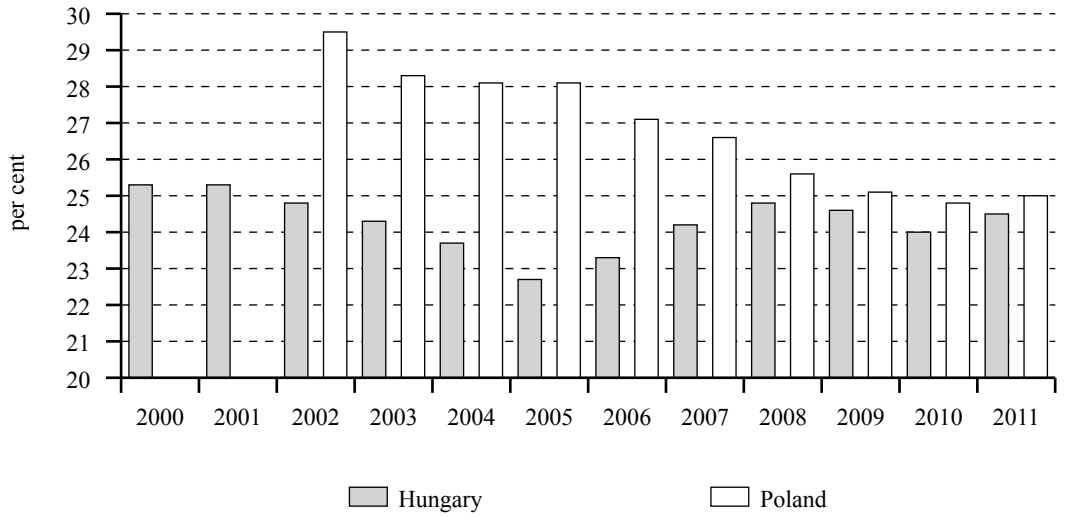
Source: GUS

Consumer spending on food

In Hungary, consumers spent, on average, 24.5 per cent of their income on food in 2011[10]. The unprecedented hikes in agricultural commodity prices, the strong inflation of food prices and the economic crisis turned around a decreasing trend in the mid 2000s (Figure 17), forcing consumers to spend relatively more on food and less on luxury goods. The volume of food product sales has been declining since 2008, and the structure has changed too, with consumer preferences turning towards less expensive products in the past few years, lowering the margins in the food retail sector which, in turn, has had an unfavourable effect on the entire food chain (Potori *et al*., 2011).

[10] 'Food' includes non-alcoholic beverages and tobacco.

Figure 17: **The share of consumer spending on food[a] in Hungary and Poland[b], 2000-2011.**



[a] Based on the classification of individual consumption according to purpose (COICP).
[b] For Poland, no data for the share of consumer spending on food were available for 2000 and 2001.
Source: KSH and calculations based on GUS Household Budgets data

In 2011, the average Polish household had PLN 1,081 (EUR 306.7) of disposable income per month per capita, 127 per cent higher than in 200 in nominal terms. The continuous growth of consumer incomes translated into a systematic decrease of the share of spending on food until 2011 when it slightly increased from 24.8 per cent to 25.0 per cent in 2010 (Figure 17) as a ripple effect of the economic crisis. This figure is still high compared to 15.6 per cent for the EU-15 in 2011, and even exceeds that for Hungary. In 2011, the average Polish household spent PLN 253.67 (EUR 61.7) per month per capita on food, compared to PLN 162.5 (EUR 46.1) in 2002.

Conclusions

The aim of this chapter was to provide a brief introduction to the Polish and Hungarian agro-food sectors by comparing their developments from a macro perspective. From what has been discussed, the points thought to be of most crucial importance are as follows:

- Hungary and Poland became members of the EU at a time when the modernisation of agricultural production had been gradually replaced as a main objective of CAP by the increasing recognition of the non-productive functions of agriculture. Both countries have found themselves in a new economic and institutional environment, facing new challenges to which they responded differently due to the differences in the economic and social bases. For example EU support, both in the form of financial aid and institutional prices, has been perceived to have contributed to the development of the agro-food sector and rural existences in Poland much more than in Hungary.
- Land use structure in Hungary is more dualistic with, in particular, large scale farms and legal entities leasing a substantial part of their land, while in Poland farming is decisively based on land ownership with a highly fragmented structure. Therefore, although the process of land concentration has been pronounced in the past decade, the role of agriculture in rural livelihoods is still significant in Poland.
- The financial and economic crises impacted the two countries differently: Poland, due to its low budget deficit and total debt, was able to respond by stimulating its economy while Hungary had to introduce severe austerity to cope with its fiscal and financial imbalances. This par-

tially explains the divergent movements in the selected economic indicators in both agriculture and food processing in these countries in the past few years. The state of the national economy is crucial from the aspect that owing to the relatively high share of consumer spending on food, the level of incomes still has a significant impact on the demand for food in both countries.

- As the EAA reveal, agricultural production technologies are relatively inefficient in both countries in comparison with the EU-15. Despite its fragmented farm structure, factor incomes per hectare of UAA in Poland were higher than in Hungary, a fact that deserves attention, but factor incomes per AWU on the other hand were substantially lower due to the extremely labour intensive production.
- In Poland, investments in the agro-food sector deliberately focused on compliance with EU standards, improving product quality, bringing new products to the market, and increasing value added. Experiences with the SAPARD programme were successfully implemented further after accession to the EU. As a result, the sector has become one of the most important and fastest growing in the Polish economy. It also explains for example why, despite its considerable restructuring, livestock farming in Poland has, in contrast to Hungary, been able to preserve its share in the in the gross output of agriculture. In Hungary, stakeholders in agriculture were generally unprepared for EU accession and failed to respond adequately and efficiently to the challenges brought on by EU membership. In particular the failure of the food processing industry to invest in modernisation during the pre-accession years has proven to be decisive with negative knock-on effects on some of the agricultural production branches. The financial and economic crises further worsened the situation.
- Poland has become a net exporter of agro-food products since its accession to the EU whereas Hungary was a traditional net exporter of agro-food products among the countries of the Visegrad Group for decades. Both countries have been able to strengthen their net exporter position in the past few years, but while the growth of the Hungarian agro-food trade balance could primarily be attributed to the increase in the value of cereals and oilseeds exports, in Poland it was due to the increase in the value of prepared foodstuffs, live animals and livestock products, i.e. products of higher value added.

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Land tenure

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Introduction

Agricultural land is the basic resource for agricultural production. Its rational use is essential for the competitive development of the sector. The role of land in economic growth and development is especially important in countries with a rural character (Begg *et al*., 1992). The finite supply of land makes the allocation of agricultural land a really important topic. The process of land reallocation in the agricultural sector should lead to improved efficiency (in Pareto meaning) of this production factor. The welfare theory claims that any efficient allocation within the Pareto meaning can be achieved as a result of a 'decentralised market mechanism' (Stiglitz, 2004).

In Poland the land allocation by market mechanism is quite limited, while in Hungary – with its well-developed land lease system – it is well organised. So the question arises to what extent and how the existing system of property rights limits the scale of the physical market allocation of land resources. At the same time, the second claim of the welfare theory shows that the State's role should be limited only to the determination of the initial structure of the resource. It is important in this regard to consider whether a State which has the ability to interfere in the property rights system should not limit its activities only to the adaptation of this system to the requirements of the market. This adjustment should be based primarily on the appropriate definition of the property rights and the ways of its transfer, monitoring and execution. It is difficult now to make a change in the original structure of the resource – although the State should have such a right for emergency situations (Stiglitz, 2004).

In view of the above conditions, the aim of this chapter is to define the status of agricultural land in Poland and Hungary, as well as the conditions and the impact of this production factor on the process of allocation. Firstly we describe the main characteristics of land tenure both before and after two countries' accession to the European Union (EU). We introduce the main restrictions on land use and land ownership, and the current characteristics of the land and the land lease market. Finally the effects and prospects of future land policy are assessed.

Historical background

The intention of Poland to join the EU, as well as the accession itself, had no significant effect on the system of property rights of agricultural land. Even so, the majority of changes in this system took place in the period from the beginning of the political changes in 1989 until the Polish accession to the EU. Most of the legislative solutions adopted then are still in force, and these will be discussed in the following sections. Attention must be drawn though to several key changes in land policy that took place in the early 1990s, the most important of which include the repeal or liberalisation in 1990-1991 (Szymanska, 2012) of the:

- obligation to the agricultural use of agricultural land;
- provisions relating to restrictive rules for the owners of agricultural land;
- system of penalties related to the control of the implementation of the Act on the Protection of Agricultural and Forest Land, 1982.

Prior to the transition in 1989, about 3.8 million hectares of arable land, or 20 per cent of the utilised agricultural area, remained in the hands of state-owned farms, whose share in agricultural production steadily decreased. At the start of the economic transformation the issue of privatisation of

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farms was raised. The response of the politicians was the adoption of the Act of 19 October 1991 on the management of agricultural property of the State Treasury. By virtue of the Act the Agricultural Property Agency of the State Treasury[3] was established, whose main objective was the development of land owned by the State Farms and the State Land Fund. The main forms of land management included sale or lease. From the inception of its activities until the end of 2011 the Agency took over about 4.7 million hectares of land (Sikorska, 2012), about 1.9 million hectares of which is still in the resources of the Agency. Of these areas, 1.4 million hectares are leased. The Agency still has about 311 thousand hectares, which should be distributed among farmers. It carries out the task entrusted to it despite that fact the relatively large area of agricultural land has not yet been privatised. At the core of this there is also to some extent the system of property, namely the unregulated property of land remaining in the reservoir and associated claims of the former owners from whom the earlier political authorities deprived the property.

Although the regulations were adopted concerning the privatisation of agricultural land, it has not resolved the issue of re-privatisation. As a result it is only possible to allocate the land by a transfer of limited property rights. Changing the economic system was also associated with a change in the approach to individual farms. Previously, there had been maximum limits to farm area, and the possibility of acquiring land for agricultural purposes was limited. These restrictions resulted primarily from the Decree on land reform adopted in 1944, which provided that the maximum area of the farm in western and northern Poland was 100 hectares, and in the rest of the country was 50 hectares. The person enlarging the farm could not exceed 15-20 hectares, depending on the quality of land or activities (Act on the Agricultural Estate). These restrictions were lifted in the 1990s, but the regulation of individual farms (family farms) was, in principle, implemented only in the Act on the Agricultural System of 11 April 2003.

In Hungary, the pre-transition farm structure was characterised by a dominance of collective and state farms. The 'symbiosis' between large-scale farms and household plots led to the relative success (high profitability, excellent crop yields and high willingness to invest) of Hungarian agriculture under the former regime. Prior to the transition (1989-1990), three main types of economic organisations were predominant in Hungarian agriculture: state farms, agricultural producer co-operatives and household farms. State farms were enterprises established and owned by the state and operated by hired workers. They were large-scale production units, both in crop production and in livestock. In 1989, there were 136 state farms with an average size of 6,886 hectares. Hungarian collective farms were similar to Western-style agricultural producer co-operatives. Production assets and three-fifths of the collective farm land were in collective ownership, while another one-third of the land was privately owned by the members (Table 1). In 1989, there were 1,245 collective farms and their average area amounted to 4,180 hectares. Household plots were small plots cultivated by members of collective farms or state farm workers. The amount of land and livestock was limited by law. Together with other private farmers their number was estimated at 1,435,000 in 1989, with an average size of 0.6 hectares (Mathijs and Mészáros, 1997).

The political, economic and social transitions of the 1990s have resulted in an extremely fragmented, bipolar farm structure in which individual farms and corporate farms still predominate. This farm structure shows opposite trends in terms of their numbers and their land use. The size of individual farms varies greatly: the majority of farms cultivate only 10 hectares and 90 per cent of them occupy less than 1 hectare (although this percentage has decreased in recent years). The number of private farms which cultivate 50-100 hectares or more is still small. The majority of the corporate farms cultivate more than 50 hectares and there are many farms which cultivate more than 300 hectares. These farms employ many people who cannot find jobs in other sectors such as industry or the service sector.

[3] The Agency is still functioning under the name Agricultural Property Agency.

Table 1: **Ownership distribution of farmland in Hungary, 1968-1989.**

per cent

Year	State farms	Collective farms	Members[a)]
1968	27.7	0.1	72.2
1975	4.4	44.7	50.9
1980	3.4	51.6	45.0
1985	4.0	56.7	39.3
1989	3.8	61.1	35.1

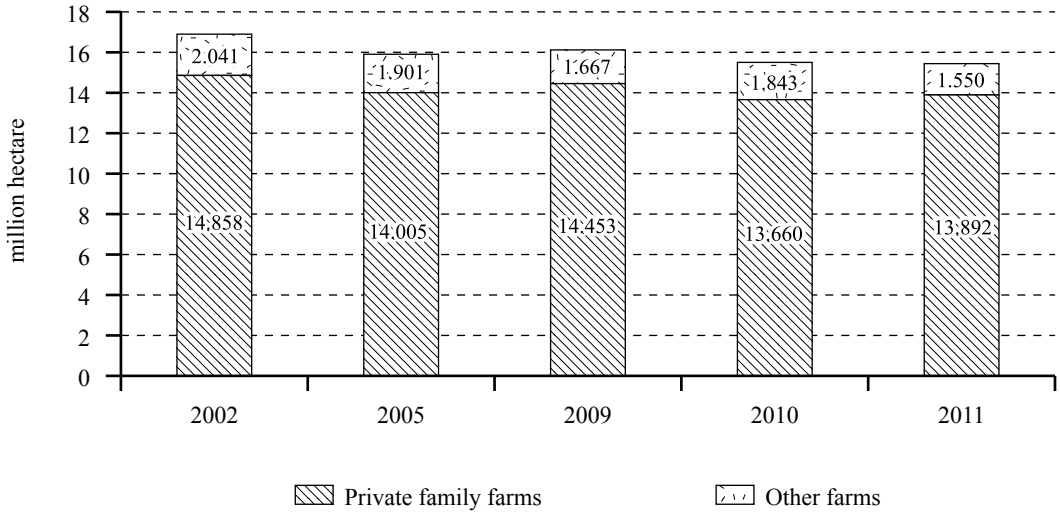
[a)] And those having the same legal status: partners in matrimony, living together with a member, being the widow of a member, aged persons entitled to land rent, and persons with usufructuary right.
Source: Harcsa, 1991

The changes resulted in the dominance of the private ownership of land in Hungary which has not changed substantially in the last decade. Land ownership and land use are separated from each other and both are characterised by fragmentation. The changes in ownership have increased the range of owners: most owners are not bound to agricultural production and activities, and rent out their land mainly to large economic organisations.

Farm structure

In Poland, there are 18.8 million hectares of agricultural land, 15.4 million hectares of which is utilised by farms. Currently about 90 per cent of agricultural land consists of individual family farms. This situation has existed almost since the beginning of the 21st century (Figure 1). The transfer of land from the farming sector to commercial entities or to the public sector is negligible, despite the lack of legal constraints. These changes resulted from changes in the agricultural land area, following the transfer of land to other sectors of the economy or for example land abandonment. These phenomena are not recorded in official statistics due to their limited scale. Reduction in the area of agricultural land was noticed in all sectors.

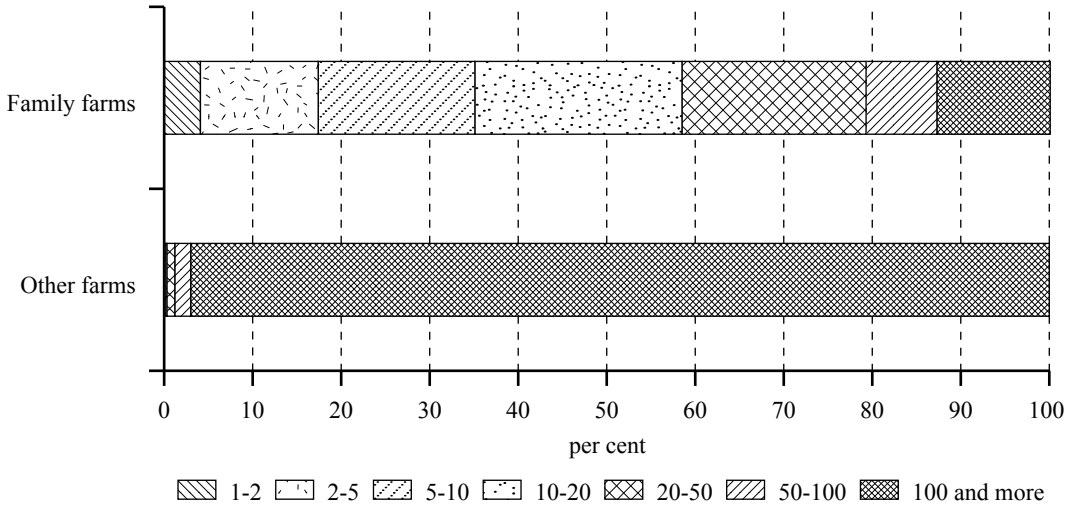
Figure 1: **Area of agricultural land in the farming sector in Poland, 2002-2011.**



Source: GUS

Private family farms ranging from 10 to 20 hectares cover nearly a quarter of agricultural land (Figure 2). Taking into account the fact that the average size of an individual farm is about 8.6 hectares of agricultural land, it should be noted that nearly 70 per cent of agricultural land is managed by farms above the national average size. However, Poland is still characterised by extensive farm fragmentation, despite the legislative measures which were adopted to counteract this. Fragmentation does not occur within the group of other farms (both public and commercial companies) in which the ownership of agricultural land area usually exceeds 100 hectares.

Figure 2: **Share of particular farm size groups in total area of agricultural land in Poland, 2011.**



Source: GUS

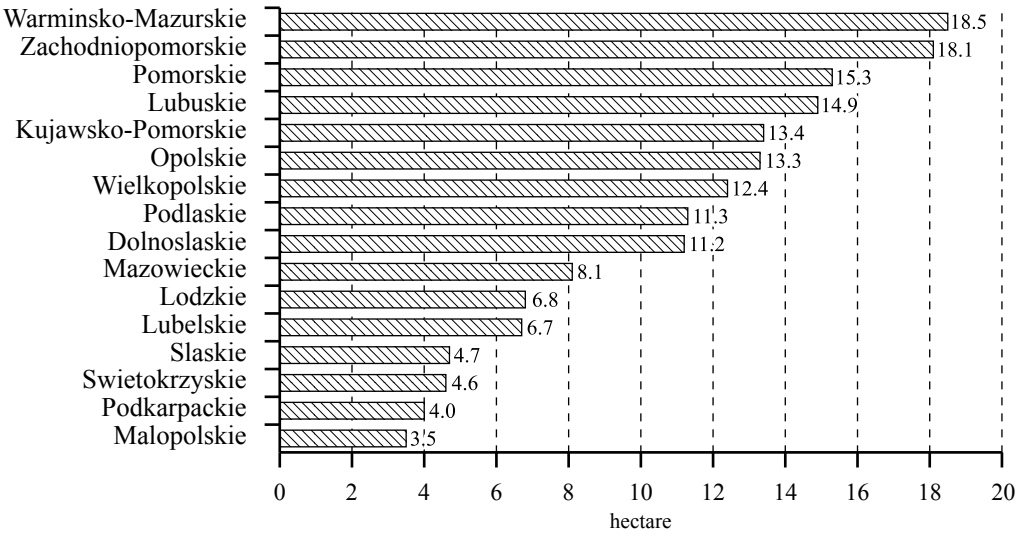
The fragmentation of family farms is confirmed by the fact that on the above-mentioned area of 13.9 million hectares of arable land, approximately 1.65 million farms pursue agricultural activities continuously. The result is a relatively small average farm size[4]. This phenomenon, however, is characterised by fairly large regional (NUTS 2) differentiation (Figure 3). Within the *Voivodeship* scheme the average size varies from 3.5 hectares in Małopolskie *Voivodeship* to 18.5 hectares in the *Voivodeship* of Warmia and Mazury.

In general, the most favourable farms size structure occurs in Western and Northern Poland, and the least in South-East. Existing regional differences are not the result of current land policy, but the policy pursued during the time of the centrally planned economy[5]. In addition, in Northern and Western Poland a significantly greater share of agricultural land was in the possession of the State. Currently this is a source of agricultural land to individual farms. The current policy does not result in major changes in the structure of the area.

[4] The average area of Polish farm is about 9 hectares of agricultural land. However, there is no registry of farms in Poland and real number of farms is rather estimated.

[5] Centrally planned economy was focused on the weakening of farmers through the barriers for farm enlargement and consent for farm fragmentation.

Figure 3: **The average area of family farm in *Voivodeships* of Poland, 2011.**



Source: GUS

Hungary has an area of 9,303 thousand hectares, of which 79 per cent, i.e. 7,362 thousand hectares, is productive land and the remaining 21 per cent is uncultivated land area[6]. The level of land use concentration is high. The basis of farming is the land lease system but in private farms the share of own property is very high. Legal entities are excluded from the land market. The rate of the utilised agricultural area in Hungary is high compared to the other EU Member States but there are many countries such as France, the United Kingdom, Germany or Poland where this ratio is much higher. There are significant differences between the (NUTS 2) regions and (NUTS 3) counties of Hungary in the size and structure of land use categories. In the main agricultural regions arable land dominates but in the hilly northern part of Hungary the proportion of land covered by forest is very high.

In 2010 private farms smaller than 2 Standard Output (SO) accounted for 6.5 per cent of the total agricultural area of Hungary, and for 13.3 per cent of the livestock (KSH, 2012). Their share in labour input was much larger (52.5 per cent), but this number indicates the time spent on agricultural activity and does not mean that private farms smaller than 2 SO can ensure subsistence for 226 thousand people (Table 2). These farms are mainly rural agricultural households producing primarily for self-subsistence, and the excess production generates additional income for the farms. In connection with this, in the farms smaller than 2 SO – compared with those of 3-5 SO – the agricultural area and number of livestock per Annual Work Unit (AWU) are much smaller.

[6] The Hungarian Central Statistical Office (KSH) definition of uncultivated land area is the aggregate of unused agricultural and other non-productive areas such as buildings and structures, farm yards, parks and ornamental gardens, roads and the associated ditches, ponds, quarries, waste land etc. required for the operation of the holding.

Table 2: **Numbers of farms in Hungary by economic size, production structure and labour input, 2010.**

Type of farm	Economic size category	Number of farms	Agricultural area		Number of livestock (livestock unit)		Labour input	In which: paid labour
	SO[a)]	thousand	thousand hectares	hectares/ AWU[b)]	thousand heads	head/ AWU	thousand AWU	
Private farms	1-2	467.8	299.1	1.3	329.9	1.5	225.9	2,2
	3-5	82.2	763.4	8.9	271.7	3.2	86.2	7,6
	6-7	14.6	843.5	31	186.2	6.8	27.2	6,1
	8 <	3.1	514.4	45.6	297.0	26.3	11.3	4,9
	total	567.6	2,420.4	6.9	1,084.8	3.1	350.7	20,8
Economic organisations	< 8	6.2	201.1	11.5	27.7	1.6	17.5	17,5
	8-9	1.8	565.4	35.4	106.3	6.7	16.0	16,0
	10 <	1.2	1,425.5	30.8	1,262.5	27.3	46.3	46,3
	total	9.2	2,266.0	27.5	1,396.4	17.5	79.7	79,7
Farms in total		576.8	4,612.4	10.7	2,481.2	5.8	430.4	100.5

[a)] Standard Output: size category of the farm output (1 SO: less than 2000 EUR, 2 SO: between 2000-4000 EUR, etc); [b)] Annual Work Unit: the work performed by one person who is occupied on a full-time basis.
Source: KSH, 2012

The area of agricultural land per 1 AWU of private farms bigger than 2 SO is 17 hectares while the value for economic organisations of more than 8 SO is 32 hectares. However above a certain size the high labour input of private farms disappears. The agricultural area per 1 AWU of private farms bigger than 8 SO is 45.6 hectares, which is larger than that of economic organisations of the same size. This shows that from among large commercial farms the labour input per agricultural area of the economic organisations is larger than that of private farms.

Land ownership

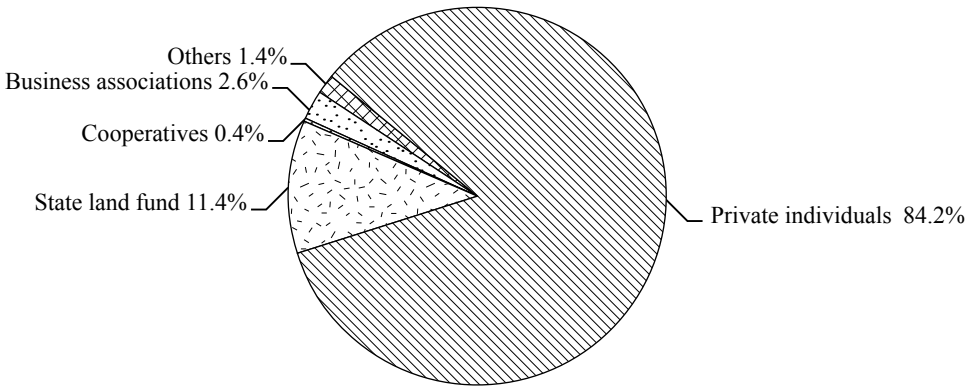
In Poland 90 per cent of agricultural land remains the property of family farms. The dominant form of ownership is private property. It should be noted, however, that the agricultural land at the disposal of family farms is not wholly owned by the users. A part of this land is in fact leased. However, the assertion of the dominant role of private property is justified by the fact that a large part of the agricultural resource, beyond the farms, it is also privately owned. Still, owing to the size of the area held by the owner, these plots do not meet the definition of a farm[7]. In addition, some of agricultural land resource is owned by legal entities. The land ownership of the public sector remains as well. To achieve this, in terms of agricultural land property, a number of institutional changes were required, despite the fact that during the time of the centrally planned economy, private ownership of agricultural land was also the dominant form. In the early 1990s, however, steps were taken to regulate the precise scope of the property rights of agricultural land, ways of transfer within and outside the agricultural sector and the execution rules of the property rights. Governmental institutions also created a system of limited property rights, such as leasing.

The aim of the legislative activity was primarily the regulation of property rights in the private sector, which would allow the allocation of the greatest possible area of agricultural land, either through market and non-market methods[8]. In addition, the created system was supposed to favour

[7] It refers to definition utilised by agricultural land tax system, i.e. 'the unit is the farm if the area of agricultural land exceeds 1 hectare'.
[8] In former system many land users have not been the owners of possessed land. Sometimes the land belongs to their ancestors because of the legal difficulties to change its status. In other words they were not the owners according to court land register.

the privatisation of state-owned land and the co-operatives sector, which was much a larger resource in the early 1990s than today. The possibility of allocation of land was instead intended to foster the creation and development of the family farms and to some extent counteract the fragmentation of the agricultural land.

Figure 4: **Ownership structure of agricultural areas in Hungary[a].**



[a] Outskirt areas.
Source: based on Hungarian Central Property Register, January 2011

Table 3: **The distribution of land areas in Hungary by land owners, 2011.**

Land owner	Total land area		Real estate			
	Thousand hectares	per cent	Number, thousand	per cent	Average area, hectares	per cent[a]
Natural persons	5,665.0	67.4	2,105.2	75.4	2.7	89.4
Legal entities in total	2,743.8	32.6	685.7	24.6	4.0	132.9
- state property	2,148.2	25.5	256.2	9.2	8.4	278.4
- co-operatives	52.1	0.6	39.9	1.4	1.3	43.2
- economic organisations	295.6	3.5	80.5	2.9	3.7	121.9
- others[b]	247.9	2.9	309.0	11.1	0.8	26.6
Total	8,408.8	100.0	2,790.9	100.0	3.0	100.0

[a] Compared to the average size of a parcel (index: 3.0 hectares = 100%); [b] local governments, associations, churches, etc.
Source: based on Hungarian Central property register January, 2011

In Hungary, 84.2 per cent of the agricultural area is in private ownership in 2011 (Figure 4). As for legal entities, the share of the state was 11.4 per cent and that of cooperatives and economic organisations was only 3.0 per cent. Land ownership is fragmented and scattered. In rural areas in 2011 2.8 million units –averaging only 3 hectares each – were registered (Table 3). The units in the property of natural persons were of 2.7 hectares on average, while the average size of the land in state property was 8.4 hectares. In order to stop the decrease in the sizes of the parcels (between 2000 and 2011 it was of 10 per cent), measures for land consolidation and for preventing further fragmentation the modification of regulations on agricultural inheritance are required.

In Hungary, the general structure of land use was established before the accession to the EU. Analysis of the land use of farms exceeding the statistical threshold[9] shows that land consolidation is continuous: 13.7 thousand farms (2.6 per cent of all farms) with more than 50 hectares of land used 73.6 per cent of the agricultural area of all farms with the average of 248.7 hectares in 2010 (Table 4). By considering the change in the agricultural land used by farms with more than 50 hectares a slow consolidation can be seen, caused by the increasing number of farms in this size group. It means that in Hungary a slight differentiation between farms has started, and several non-viable holdings have begun a moderated land concentration. Between 2000 and 2010 the share of leased area slightly increased in both private farms and economic organisations; in 2010 it reached 55.8 per cent of the area used by farms.

Table 4: **The main characteristics of land use of farms in Hungary by economic size categories, 2000-2010.**

Size class (hectares)	Number of farms			Average area (hectares)			Share of own property (per cent)		
	2000	2010	Change[a] (per cent)	2000	2010	Change (per cent)	2000[b]	2010	Change (per cent)
Individual farms (thousand)									
less than 1	662.2	376.9	57.2	0.25	0.23	92.0	95.9	98.2	102.4
1-5	174.0	82.1	47.2	2.2	2.4	109.1	93.0	94.7	101.8
5-10	39.4	25.6	65.0	6.8	7.1	104.4	88.5	91.0	102.8
10-50	40.7	32.5	79.9	20.1	21.5	107.0	77.1	82.5	107.0
50-100	4.2	5.6	133.3	67.1	70.3	104.8	69.0	73.0	105.8
over 100	2.1	4.5	214.3	185.2	191.3	103.3	55.2	63.2	114.5
Total	**922.6**	**527.2**	**57.1**	**2.5**	**4.6**	**184.0**	**77.6**	**76.3**	**98.3**
Economic organisations (piece)									
less than 1	201	303	149.8	0.4	0.4	100.0	63.2	48.5	76.7
1-5	316	739	233.5	2.6	2.9	111.5	34.9	28.9	82.5
5-10	230	570	247.8	7.1	7.5	105.6	26.1	28.8	110.3
10-50	1,003	1,628	162.3	27.9	25.4	93.2	18.5	20.8	111.9
50-100	370	695	187.8	71.4	72.7	101.8	15.0	15.0	100.0
over 100	2,269	2,864	126.1	1,011.2	731.0	72.3	9.8	8.4	85.7
Total	**4,389**	**6,799**	**154.8**	**532.9**	**322.4**	**60.6**	**10.1**	**8.8**	**87.1**

[a] (index: 2000 = 100%); [b] in the case of economic organisations 2003.
Source: KSH, 2012

The share of rented land increased in parallel with the size of farms. Farming on own land is more significant in the case of private farms, where the share of rented land accounts for 23.7 per cent on average. The production of enterprises is based mainly on rents (91.2 per cent). Among private farms, those with more than 100 hectares rent the largest area (46.8 per cent) and farmers producing on less than 10 hectares of land rent the smallest area. Farming on rented land is the most frequent in the NUTS 3 regions of Transdanubia (64-65 per cent). In the Hungarian Great Plain farming on own land is more significant; the share of rented land is 16-18 percentage points less (Table 5).

The land consolidation can be identified on the basis of farms registered for EU land-based direct payments (Table 6). In 2011 15.7 thousand farms with more than 50 hectares of land used 72.4 per cent of the total agricultural land of the registered farms (4956.6 thousand hectares) and the average agricultural area was 228.5 hectares. The efficiency of production not only depended on the area of land used but also on the area of the land parcels. In the cases of areas registered for direct aids an agricultural parcel can be defined as a contiguous property unit planted with only one type of crop

[9] The statistical threshold in land use is very small, that is, 0.15 ha of land, or 0.05 ha of orchard or vineyard.

(for example, two neighbouring areas planted with different crops was identified as two parcels, which also indicated the diversification of production).

Table 5: **Characteristics of land use by NUTS 3 region in Hungary, 2010.**

Regions	Number of farms (thousand)	Agricultural area (thousand hectares)	Average area (hectares)	Share of rented land (per cent)
Central Hungary	48.0	318.9	6.6	59.3
Central Transdanubia	52.0	507.5	9.8	64.4
Western Transdanubia	61.1	519.1	8.5	65.4
Southern Transdanubia	74.7	675.2	9.0	64.5
Northern Hungary	73.0	475.9	6.5	57.7
Northern Great Plain	143.8	1,037.1	7.2	49.3
Southern Great Plain	124.1	1,078.8	8.7	45.9
Total	576.8	4,612.4	8.0	55.8

Source: General Agricultural Census 2010

Table 6: **Characteristics of Hungarian farms registered for European Union land-based direct payments, 2011.**

Size class (hectares)	Farms		Agricultural area		Parcels[a]		
	number (thousand)	distribution (per cent)	thousand ha	distribution (per cent)	number (thousand)	average area	distribution[b] (per cent)
Private farms							
0.3-1.0	7.3	4.3	4.1	0.1	9.7	0.4	9.1
1.1-5.0	76.0	44.8	192.9	6.8	182.4	1.0	22.8
5.1-10.0	32.0	18.9	228.7	8.1	133.5	1.7	36.9
10.1-50.0	42.0	24.7	895.0	31.5	302.8	3.0	63.6
50.1-100.0	6.7	3.9	472.2	16.6	102.6	4.6	99.1
100.1-300.0	5.2	3.1	899.2	31.7	133.6	6.7	144.9
over 300.1	0.3	0.2	148.9	5.2	15.7	9.5	204.1
Total	169.7	100.0	2,840.9	100.0	880.3	3.2	69.5
Economic organisations[c]							
0.3-1.0	0.01	0.2	0.01	0.01	0.02	0.5	10.8
1.1-5.0	0.6	9.1	1.8	0.1	1.4	1.3	27.7
5.1-10.0	0.6	9.1	4.3	0.2	2.3	1.9	40.2
10.1-50.0	1.7	25.8	42.4	2.0	11.8	3.6	77.3
50.1-100.0	0.7	10.6	51.8	2.4	9.0	5.8	123.9
100.1-300.0	1.2	18.2	228.9	10.8	28.7	8.0	171.7
over 300.1	1.6	24.2	1,786.4	84.4	133.3	13.4	288.4
Total	6.6	100.0	2,115.7	100.0	186.5	11.3	244.1
Total farms							
0.3-1.0	7.3	4.1	4.1	0.1	9.7	0.4	9.1
1.1-5.0	76.6	43.4	194.7	3.9	183.8	1.0	22.8
5.1-10.0	32.6	18.5	233.0	4.7	135.8	1.7	36.9
10.1-50.0	43.7	24.8	937.4	18.9	314.6	3.0	64.1
50.1-100.0	7.4	4.2	524.0	10.6	111.6	4.7	101.1
100.1-300.0	6.4	3.6	1,128.1	22.8	162.3	7.0	149.6
over 300.1	1.9	1.1	1,935.3	39.0	149.0	13.0	279.6
Total	176.3	100.0	4,956.6	100.0	1,066.8	4.7	100.0

[a] A contiguous property unit planted by only one type of crop; [b] National average = 100%; [c] with the organisations engaged basically in non-agricultural activities (e.g., local governments, national parks, etc.).
Source: Agricultural and Rural Development Authority data

In 2011 the average area of an agricultural parcel registered for direct aids was 4.7 hectares. The majority of parcels (82.5 per cent) were used by private farms (5.2 parcels/farm) with an average area of 3.2 hectares, which was two thirds of the national average. The parcels of economic organisations (28.3 parcels/economic organisation) covered 11.3 hectares on average; this was about three times the national figure. The development of the property structure depends largely on the policy of agricultural subsidies since direct aids capitalise in land prices and rental fees. Similarly to land use, a concentration can also be seen in the field of subsidies. In Hungary, 12.7 per cent of supported farms received more than EUR 5 thousand in 2010; while their share in the total of direct aids was 79.2 per cent (EC, 2011).

Land ownership restrictions

In Poland the Act on the agricultural system of 11 April 2003 set a higher farm size limit[10] at one hectare of agricultural land. Furthermore, in accordance with this law, a farm gained the status of family farm if its area did not exceed 300 hectares of agricultural land. The result of defining of family farm, however, was deprivation of the agricultural land owners of certain privileges connected with owning the farm. Restrictions on the agricultural land property transfer were also implemented. The buyer of agricultural land had to meet the following conditions:

- personally lead the owned or leased family farm;
- be a resident of the *gmina* (local commune) in which the land is located for at least five years and where at least one property forming part of his household is located;
- have professional qualifications, such as agricultural education or work experience in agriculture.

The aim of this approach was, according to the legislator, to improve the structure of farms and to create a strong family farm sector, because the land should be first of all transferred to the neighbouring farms. However, the established restrictions on the buyer on the transfer of agricultural land had not led to a significant improvement in farm structures. The result was a rather limited demand for agricultural land, which slows down the increase in the prices. This, in turn, constitutes a barrier to making a decision to sell agricultural land by the owners with small holdings or parcels of land.

In Hungary, the Act LV of 1994 on arable land limited[11] the acquisition of land (with the exception of legal inheritance, adverse possession, attachment, expropriation and compensation during the auction for the acquisition of property). There are different rules applying to the domestic individuals, domestic legal persons and foreigners in the relation of restrictions. A domestic private person may acquire the ownership of arable land of not more than 300 hectares or to the value of 6,000 Golden Crowns[12] (GC) (§ 5). The amount of land in the property of private individual and a close relative may not exceed a quarter of the total land area of the city or one thousand hectares. The acquisition limits do not prevent the development of large-scale holdings, as calculated on the 1,000 hectares limit: about six thousand families could theoretically have possession of the total agricultural area. There are no rights of pre-emption between close relatives and co-owners, the support for the early retirement of farmers and in case of sale and purchase of enclosed gardens. Otherwise the possibility of acquisition of land property occurs under the right of first refusal according to the following order (§ 10): leaseholder, a natural person or a shareholder[13] of an organisation with legal person or without legal personality, a resident neighbour, a local resident[14], and the Hungarian State (National Land Fund).

[10] Earlier it was 0.5 hectare of agricultural land.
[11] Land ownership can be transferred only in exchange for land transfer; donation is possible only between close relatives.
[12] Golden Crown is for land quality. Average arable land is valued at 20 Golden Crowns.
[13] If the tenant is an organisation with a legal person or without a legal entity.
[14] The order is as follows: family farmer, a primary producer with registration number, the individual farmer, legal person, in case of organisation without a legal person, the local resident and resident shareholder.

No domestic legal entity or unincorporated organisation may – with the exception of the Hungarian State, local governments, forest-owners' and pasture-owners' associations and public foundations – acquire[15] the ownership of arable land (§ 6). However on the basis for pre-emption rights, the members and the shareholders as individuals may purchase land which they have been free to sell to their relatives. Foreign individuals and legal persons may not acquire ownership of land except since the accession those EU Member State nationals[16] who wish to become a self-employed farmer in Hungary and at least live continuously and legally in Hungary and carry on agricultural activities (§ 7).

Land use restrictions

The importance of property rights in the context of land management results mostly from the specificity of the situation Poland has found itself in, because one of the effects of the previous socio-economic system is unregulated property relations. The users of a substantial area of agricultural land do not possess the status of owners of the property that has been created by them. This constitutes quite a serious barrier for rural development. In agriculture it slows down the changes of the area structure of farms. Sometimes land plots are too small and they should be consolidated. These procedures require the possession of property rights by all the participating users. In other words, unregulated property relations reduce the supply of land for both agricultural and non-agricultural purposes. As a consequence, the price of land which is not dependent on this market barrier is higher. The Act of 11 April 2003 implements the right of pre-emption for a renter in respect of agricultural property, and in the case of its absence for the Agricultural Property Agency, if the area is larger than 5 hectares.

The current legal norms that regulate the process of agricultural land conversion limit the right of ownership to a large extent. The public interest resulting from, among other things, the necessity to preserve the land with the highest natural values, the land with a high agricultural usability for the purposes of agricultural production, as well as the protection of other persons' rights of ownership. An overly-complex institutional system of agricultural land management which is rather of no significance for fulfilling the above objectives can be contrary to the public interest. The system in question generated high operational costs which are borne by the public. The transactions enabling the transfer of land to non-agricultural and non-forest economy sectors are, in addition, charged with extra costs that result from the established conversion procedures. Consequently, the transactional costs of this kind are imposed on the final beneficiaries who can be, for example, the persons purchasing an apartment, and in some cases the local community or the whole of society. However, on the whole, the decrease in the area of agricultural land in relation to its overall area is relatively small (Wasilewska, 2006), and significant threats caused by the process have a merely local dimension and they appear mostly in rural areas localised in the vicinity of big urban centres.

The Constitution of Poland and the Act on the Protection of Nature and Environmental Law in Poland contain general rules that should be followed by land owners and users, as well as public administration bodies, in the process of managing the resource. A legal act that regulates the protection of agricultural and forest land, as well as its rehabilitation and an improvement in the utility value in a detailed way is the Farm and Woodland Conservation Act of 3 February 1995. In accordance with Article 3 of the Act, the conservation of agricultural land involves:

- a limitation on allocating it for non-agricultural or non-forest purposes;
- preventing degradation and the devastation processes of agricultural land, as well as damage to agricultural production arising as a result of non-agricultural activity and land mass movements;
- the rehabilitation and development of land for agricultural purposes;
- the conservation of moorland and ponds as natural water reservoirs.

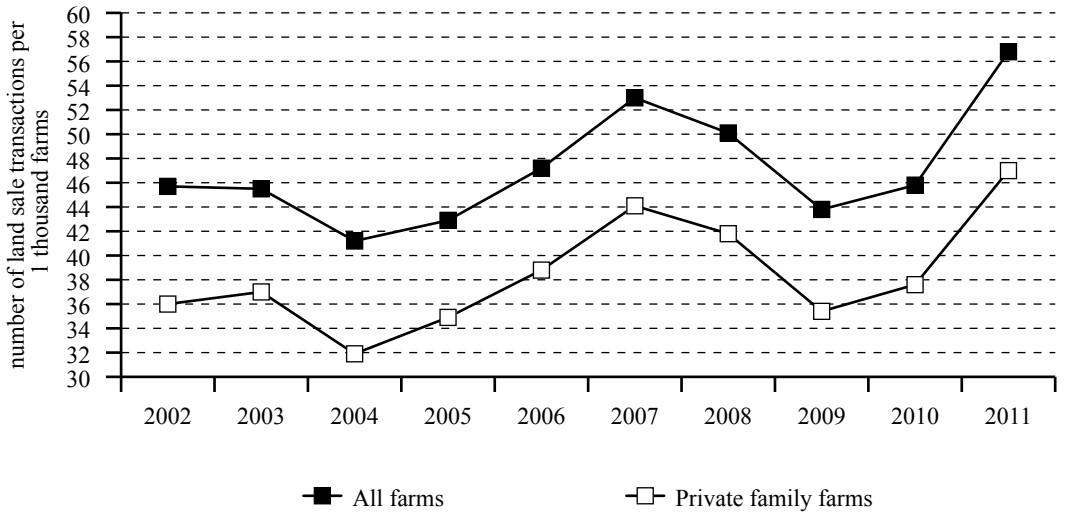
[15] Excepted the Hungarian State, the government and the foundations.
[16] According to the rules on domestic private person.

The use of land in Hungary is also limited (Act Number 55/1994, Chapter II). The lease may be up to twenty years duration (§ 13). A domestic private person and legal entity or unincorporated organisation may take on usufructuary lease arable land of not more than 300 hectares or of the value of 6,000 GC An economic association and a co-operative may take on usufructuary lease an arable land of not more than 2,500 hectares or of the value of 50,000 Gold Crowns. In the course of this restriction, the arable land which is taken by a co-operative on usufructuary lease from its members or by an economic association from its quota holders shall be left out of consideration. There is a pre-lease law (§ 22) for the former leaseholder, for the operator of the livestock farm (or fish pond), and the local neighbours and residents[17]. The land ownership structure and its change is significantly dependent on the legal regulation of inheritance. According to the general rules of legal inheritance the descendants inherit in equal shares (Civil Code 607 §). There are no specific regulations by arable land and that leads to the fragmentation of holdings (Tóth *et al*, 2004).

Land market

The actual size of the annual transfer of agricultural land in Poland is not recorded by official statistics. Such activities would generate very high transaction costs. The large number of small farms and fragmentation of these farms results in the very large number of sale and purchase transactions in the land market. Data from the Ministry of Justice show that in recent years about 100 thousand sale and purchase transactions per year were made, more than 70 thousand of which were carried out in the sector of individual farms. The individual transactions involved relatively small areas. However, intensification of land sale is strongly related to the macroeconomic situation of the country. In 2007-2009, i.e. during the financial crisis in Europe, there was a significant decrease in the number of transactions (Figure 5). This means that the owners treat agricultural land as a form of safe capital investment. This in turn does not help to improve the agrarian structure and implies the need to develop a system of limited property rights, such as leases.

Figure 5: **Transaction of agricultural land sales in Poland over the period, 2002-2011.**

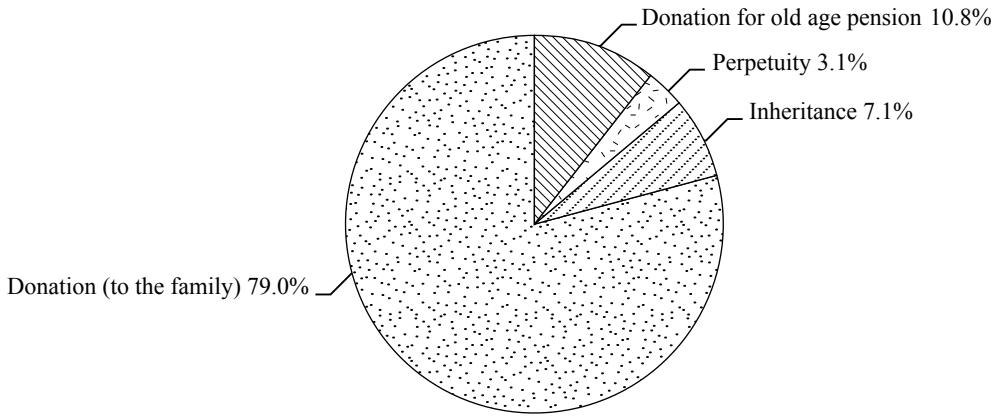


Source: Sikorska, 2012

[17] In the case of the local neighbourhood and a local resident, the order is: a family farmer, a primary producer with registration number, a private farmer, a legal person and other organisations without legal person.

A large area of agricultural land is the subject of these non-market transactions (donation, perpetuity, inheritance) (Figure 6). More than 70 thousand transactions of this type were recorded by the Ministry of Justice in 2011. Over 75 per cent of these transactions were various donations – mostly between family members. It should be noted that the land allocation does not exclude this land from the market. It is governed by the law of property rights and it can be traded on the market at any time. However, such a large number of non-market transactions indicate the utility value of land.

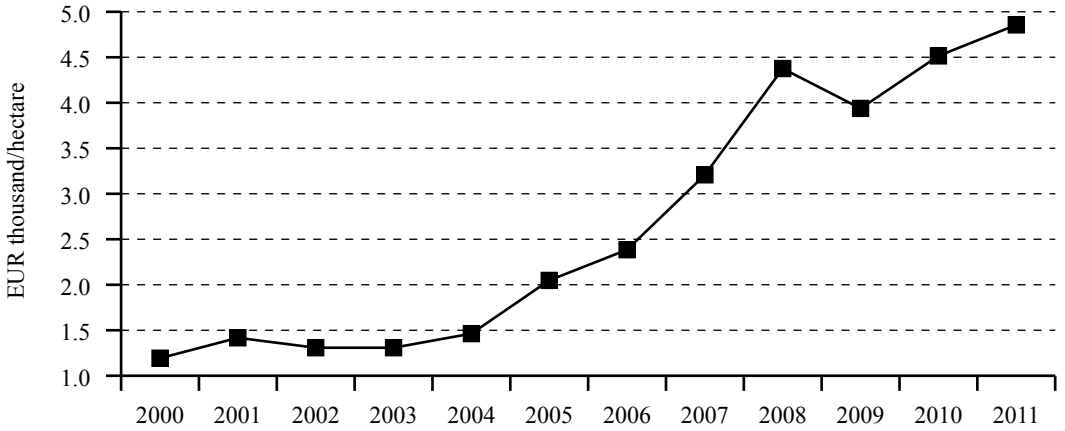
Figure 6: **Structure of non-market land transactions in Poland in 2011.**



Source: calculations made by Wasilewski on the basis of Sikorska, 2012

The increase in the number of transactions for the purchase and sale of agricultural land after 2004 was associated with the Polish accession to the EU. As a result of accession, the possibility of obtaining additional income from the land appeared, such as from direct payments. The result was an increase in the demand for agricultural land, which led to a systematic increase in prices (Figure 7). There was only a slight slowdown in 2009 as the result of several phenomena, namely the strengthening of the Polish currency during the financial and economic crisis in Europe, the need for liquidity and operators demand, and the decline in willingness in selling the land. Since 2009, the price of land has been increasing again. Any drastic change in the trends should not be expected in the light of the current directions of support under the Common Agricultural Policy or regulation in the trade of land. Change in these instruments may, however, lead to significant disturbance of the existing trend. But given the price of land in the EU, as well as the growing demand for food, further price increases in this production factor must be expected in Poland.

Figure 7: **Prices of private agricultural land in Poland, 2000-2011.**



Source: calculation made by Wasilewski on the basis of GUS data and Sikorska, 2012

Table 7: **Average prices of agricultural land in Poland by *Voivodeship* sold by the private sector, 2010 and 2011.**

EUR/hectare

Specification	Total		In the year 2011, broken down by quality valuation		
	2010	2011	good	medium	bad
Poland	**4,515**	**4,856**	**5,804**	**5,050**	**3,981**
Dolnoslaskie	4,643	4,868	5,991	5010	3,807
Kujawsko-pomorskie	6,594	6,851	8,164	7,200	5,432
Lubelskie	3,157	3,517	4,728	3,551	2,545
Lubuskie	2,516	2,973	3,327	3,128	2,557
Lodzkie	4,288	4,579	5,042	5,130	3,712
Malopolskie	4,139	4,503	4,964	4,515	3,396
Mazowieckie	4,867	5,381	7,258	5,575	4,310
Opolskie	4,593	5,114	7,096	4,969	3,944
Podkarpackie	2,941	2,675	3,149	2,648	2,155
Podlaskie	5,165	5,229	6,286	5,709	4,371
Pomorskie	5,285	5,814	7,248	5,701	5,229
Slaskie	5,243	5,550	7,010	5,641	4,126
Swietokrzyskie	2,349	2,685	3,623	2,655	1,855
Warminsko-mazurskie	3,660	3,645	4,151	3,911	3,156
Wielkopolskie	7,154	7,423	9,442	7,991	5,798
Zachodniopomorskie	3,328	3,680	4,187	3,783	3,053

Source: calculation made by Wasilewski on the basis of GUS data and Sikorska, 2012

Land prices in Poland vary between *Voivodeships* (Table 7). In 2011, they ranged from EUR 2.6 thousand per hectare in the Podkarpackie *Voivodeship* to more than EUR 7 thousand per hectare in the Wielkopolskie *Voivodeship*. Higher land prices were generally observed in regions with a higher level of development of individual farming. The lowest price of land was in the *Voivodeships* with fragmented structure of agricultural land, with a small number of farms classified as developing. Prices of agricultural land in all the *Voivodeships* were also dependent on the quality of the land, i.e. their suitability. This condition arises from the fact that the demand for land is secondary.

Table 8: **Average lease prices for agricultural land in Poland by *Voivodeship*, 2010 and 2011.**

EUR/hectare

Specification	Total		In the year 2011, broken down by quality valuation		
	2010	2011	good	medium	bad
Poland	**109**	**114**	**147**	**116**	**88**
Dolnoslaskie	146	153	192	146	132
Kujawsko-pomorskie	149	172	225	176	132
Lubelskie	104	112	136	108	91
Lubuskie	56	56	68	61	43
Lodzkie	109	114	139	126	91
Malopolskie	76	77	97	72	41
Mazowieckie	132	112	144	117	90
Opolskie	98	105	159	104	69
Podkarpackie	63	55	66	56	41
Podlaskie	101	96	124	102	79
Pomorskie	95	105	155	104	77
Slaskie	88	106	147	95	79
Swietokrzyskie	92	112	150	104	65
Warminsko-mazurskie	95	104	141	102	92
Wielkopolskie	179	181	257	189	136
Zachodniopomorskie	81	86	104	84	71

Source: calculation made by Wasilewski on the basis of GUS data and Sikorska, 2012

The assumption that the price of land is the discounted sum of rents is confirmed by the spatial differences in rents in Poland (Table 8). As in the case of prices, the highest level of rent was recorded in the regions where the private farm sector was the most developed and characterised by a relatively high marketable output[18]. It should be noted, however, that the price of leases recognised in official statistics may be understated. In Poland there is no obligation to register the leases and, therefore, many of them are informal, i.e. there is no written contract, in the form of a notarial deed. In practice, however, landowners often set rents at the level achieved in direct payments[19].

[18] Share of agricultural production sold to the market in total production of the farm.

[19] According to our field research the real level of land rent is higher than the level presented in official statistics. Especially if there is no duty to register the lease transaction.

In Hungary, the land market is segmented; the local supply and demand determine the market. The yearly land turnover is balanced. With inheritance[20], the annual property change involves about 210 thousand hectares, which is about 2.5-3 per cent of all agricultural land. In Hungary the ownership of 203.6 thousand hectares changed in 2010, which accounts for 2.7 per cent of all agricultural land (Table 9). The ownership of the land can be changed by various legal titles. Based on the data of 2010 the area affected by property change:

- the ownership of 129 thousand hectares, or 63.4 per cent of the 203,6 thousand hectares changed due to inheritance and sale without pre-emption right;
- the property acquisition of co-owners with pre-emption rights and of close relatives accounted for 22.4 per cent;
- 13.4 per cent of the total land turnover was purchased by lessees with pre-emption rights, local farmers, primary producers, agricultural entrepreneurs and the members and shareholders of legal entities;
- the purchases of the Hungarian National Land Fund accounted for only 0.6 per cent,
- land purchases of EU farmers settled in Hungary, and legally entitled for land owning amounted to 600 hectares, accounting for 0.3 per cent of the total turnover;
- the average area purchased was of 1.8 hectares, while the average size of parcels changing ownership was only 1.2 hectares.

Table 9: **Land turnover in Hungary by legal title, 2010.**

Description	Land area	
	thousand hectares	per cent
With pre-emption right:	74.6	36.6
- Co-owner, close relative	45.6	22.4
- Lessee and local farmer	27.2	13.4
- EU farmer	0.6	0.3
- Hungarian State (NLF)	1.2	0.6
Without pre-emption right:	129.0	63.4
- Inheritance, purchase, exchange, gift	117.6	57.8
- Other land turnover	11.4	5.6
Total land turnover	203.6	100

Source: Ministry of Rural Development Property turnover database, 2011

On the Hungarian land market, the ownership of 110-120 thousand hectares of land changes annually excluding inheritance. 35-40 per cent of the land is purchased by pre-emption rights, two thirds of which is bought by co-owners, close relatives, one third by lessees and local farmers. Purchase by others may account for about 5-10 per cent. In the cases of undivided properties (1.3 million hectares) withholding land turnover significantly the sales are delayed due to the slow re-allotment of land units and the current requirements of tenancies. In these cases the purchaser can mostly be the tenant.

Location, infrastructure and land quality determine land rents. Within NUTS 3 regions 2-4 fold differences on average may occur between the best and the worst quality of arable lands; in the Northern Great Plain even almost 7 fold differences can be found (Table 10). In most parts of Hungary arable land of average and good land quality can be rented for EUR 80-210 per hectare. Arable land rents are the highest in the Northern Great Plain and in the Southern Transdanubian (NUTS 3) regions.

[20] Property acquisition through inheritance is not a separate category. Based on estimations the annual share of inheritance accounts for 80-90 thousand hectares, it is about 35-40 per cent of the total land turnover.

Table 10: **Arable land rents in Hungary by land quality and NUTS 3 regions, January 2013.**

EUR/hectare[a)]

Region/land quality	Poor (under 17 GC/ hectare)	Average (17-25 GC / hectare)	Good (25-30 GC / hectare)	Excellent (above 30 GC / hectare)
Central Hungary	69-104	86-138	121-155	138-207
Central Transdanubia	52-138	69-207	86-207	155-225
Western Transdanubia	52-121	86-173	104-207	121-311
Southern Transdanubia	86-190	86-242	121-294	155-397
Northern Hungary	52-121	52-155	86-190	86-207
Northern Great Plain	52-207	86-242	104-242	121-346
Southern Great Plain	86-121	104-173	138-242	207-311

[a)] EUR at exchange rate 289.4 HUF.
Source: based on data from the National Food Chain Safety Office, 2013

Table 11: **Arable land prices in Hungary by land quality and NUTS 3 regions, January 2013.**

EUR thousand/hectare

Region/land quality	Poor (under 17 GC/ hectare)	Average (17-25 GC/ hectare)	Good (25-30 GC/ hectare)	Excellent (above 30 GC/ hectare)
Central Hungary	1.0-2.4	2.1-3.5	2.8-5.2	3.5-6.2
Central Transdanubia	1.4-2.8	1.6-3.5	2.2-4.3	3.5-5.5
Western Transdanubia	1.2-3.1	2.6-4.5	2.8-5.5	2.9-7.6
Southern Transdanubia	1.2-3.1	1.4-4.7	2.1-5.9	3.3-6.9
Northern Hungary	0.7-1.2	1.0-3.1	1.6-4.1	1.7-4.5
Northern Great Plain	1.2-3.8	1.7-5.2	2.2-6.2	2.8-8.6
Southern Great Plain	0.9-2.1	1.4-2.4	1.7-3.8	2.8-6.9

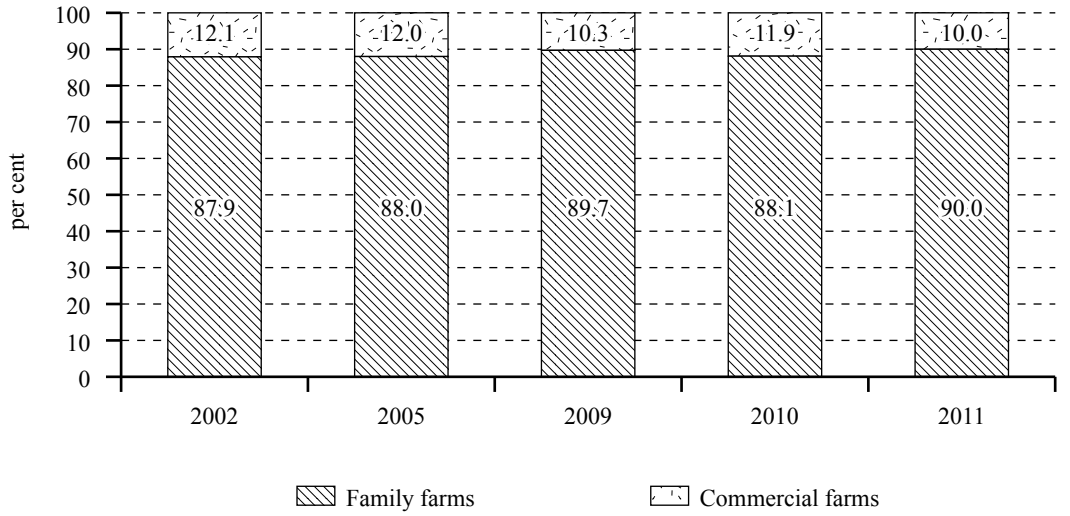
Source: based on data from the National Food Chain Safety Office, 2013

Based on the FADN survey prepared on the basis of the evaluation of lands in own property of individual farms (Keszthelyi and Pesti, 2013), in 2011 the average price of one hectare of arable land was EUR 1.8 thousand, a 13 per cent increase over the previous year. The land prices prior to Hungary's accession to the EU, EUR 1.2 thousand/hectare (Kapronczai *et al*., 2005) have increased by 50 per cent in seven years. By comparing the Hungarian arable land prices to those of the 'old' Member States, only a small degree of catching up may occur. Compared to the Netherlands for instance the difference is 20 fold, to Denmark 15 fold, to Spain 7 fold and even to France a 2.5 fold difference can be seen. Compared to the national land prices the average arable land prices are higher in the Western Transdanubian region, EUR 3.5 thousand/hectare, while in the Northern Hungary region the price of one hectare arable land is EUR 1.4 thousand/hectare on average. Similarly to the rents, significant differences can be seen in arable land prices by regions and by land quality. The differences in price between good quality land in the Western Transdanubian, Southern Transdanubian and Northern Great Plain regions and poor quality land in the Southern Great Plain region can be 10 fold; while within a region, the price differences between the poor and good quality land can be 2-2.5 fold (Table 11). In most regions, the prices of average quality land are steady, that is, between EUR 1.4 thousand and EUR 3.5-4.5 thousand; while in the regions of Northern Hungary and the Southern Great Plain, the prices are 10-20 per cent lower.

Effect of land policy

The effects of land policy in Poland are quite well illustrated by the changes in the ownership structure (Figure 8) and the change of the land in farms size groups (Figure 9). Relationships in the resources of agricultural land between the individual family farms and other forms of land ownership remain relatively constant. In recent years the land of family farms as a proportion of the total resource of agricultural land even showed a slight increase. This means that the existing regulations do not support the outflow of land[21] to commercial entities. It is not promoted also by the low price level of land in the opinion of farmers. Quite positive changes also occur in the agrarian structure. The resources of agricultural land in farms with an area of over 20 hectares are increasing, and they are reducing the number of small farms. This should lead to an improvement in labour productivity in agriculture and thereby improve the sector's competitiveness in the international arena.

Figure 8: **The structure of the remaining agricultural land in Polish farms according to ownership, 2002-2011.**



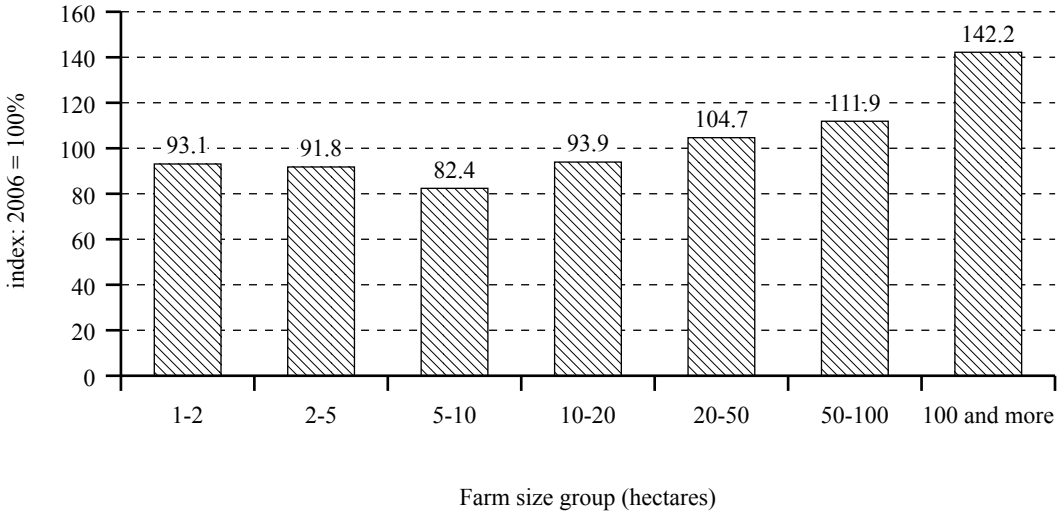
Source: calculated by Wasilewski on the basis of Central Statistical Office data

The negative effect of the land policy is, however the exclusion of land users with unregulated property relations from support. They need first of all to legalise their status which comes with transaction costs, e.g. related to notarial deed preparation. Although there are no precise data on the area of such land, the scale of the phenomenon can be quite substantial. Many farmers use the agricultural land owned by their ancestors without a legal title of property. The costs associated with conducting probate proceedings and the lack of knowledge about the related procedures are barriers to stabilising property rights. Unregulated ownership turns this area off the market for agricultural land and prevents land transfers to other sectors of the economy.

In the current land policy, too little attention is paid to the development of limited property rights, such as a long-term leasing system. A short-term lease agreement does not favour long term production planning, in particular investment on the land. For this reason, the impact of leases on the improvement of the agrarian structure is quite limited. In addition, it is quite difficult to measure because it is not required to formalise agreements and, consequently, official statistics do not show the whole scale of the use of this instrument by farmers.

[21] It means that there is no land transfer from private family farms to other farms, which include commercial farms and other farms.

Figure 9: **Changes in the area of agricultural land in Poland by farm size groups during the period 2006-2011.**



Source: calculated by Wasilewski on the basis of Central Statistical Office data

In addition to the relatively favourable production conditions of Hungarian agriculture another important factor of the competitiveness is the advantage deriving from relatively low land prices and land rent but it should be also noted that from the aspect of financing it is not an advantage. In the structure of land rents the price of land should be determined on the basis of the demand. Considering the present high concentration level of land use and its low turnover level Hungary's land policy after EU accession cannot be judged successful. Loans for farm development (the purchased area was 30 thousand hectare), subsidies provided for land purchases with the aim of land consolidation (20 thousand hectare), the programme of 'Life annuity for land' of the National Land Fund (70 thousand hectare) and its public sale (60 thousand hectare) have mainly intensified the market demand (by 5-10 per cent annually). The land consolidation programme financing state subsidies – which could speed up the decrease the share of undivided properties – has not been launched. The most important measure of the land policy is the pre-emption right assisting the further land consolidation. Since the amendment of Act No. LV of 2010 by the pre-emption rights the land purchases of local farmers, primary producers and individual agricultural entrepreneurs are facilitated.

It is a deficiency that, following the EU accession, the Hungarian land policy did not focus on the viability of small farms. For assisting their development the strengthening of the local farmers, rationalising and increasing their land use would be required. In a series of articles debating issues raised by Kapronczai (2010), agricultural economics experts representing the sector expressed their opinion on the most important issues connected to agricultural land. These were as follows: the ownership structure of land, land use, land rents, land market, regulations on agricultural holdings, land consolidation, inheritance of land, land purchase by foreigners, the role of the state and the measures to be applied. The conclusions drawn from the debate were the following:

- Land ownership of the farmers is threatened by speculators. The prohibition of land purchase of economic organisations encumbers the establishment of medium-size agricultural holdings. The transparency of land use could decrease speculative transactions;
- Hungarian speculators can operate freely on the land market. Speculative transactions could be decreased by introducing licencing requirements and creating regulations limiting land acquisition;

- In land consolidation aiming to increase the efficiency of production a conflict of interests could evolve by increasing land prices and land rents generated by the consolidation of viable farms.

Vision of the future

The future land policy in Poland should not be focusing on the introduction of additional restrictions on the transfer of land in agriculture. The accepted solutions are already too restrictive and do not contribute to significant changes in the agrarian structure. Moreover, the implementation of any restrictions generates additional transaction costs resulting from the obligation to monitor and enforce them. These costs, in turn, are charged to the state budget. In the land politics, attention should be paid to land that remains outside the farms and the possibility of bringing it into the farm sector. These are often the parcels of land with an area of less than one hectare which do not meet the definition of a farm or abandoned land. In this area it is essential to maintain the support for land consolidation. This instrument can also be beneficial to farmers. However, a barrier to its use is the low awareness of the owners of the benefits to be gained from activities connected with re-parcelling. On the one hand, it may result in improving the efficiency of production, and on the other it may increase the property value.

The general direction of the land policy in Poland should therefore include measures to improve the agrarian structure, i.e. the transfer of land from small farms to individual family farms with the capacity to develop. However, the instrument consisting of subsidising the purchase of land shall not be used for this purpose. The introduction of such an instrument would lead only to an increase in land prices. That can be done although by strengthening of the system of leases. The positive effect would be to create a system of long-term leases, because nobody is interested in investing in land if his/her rights are not secured. However, only the introduction of the obligation of agricultural use of agricultural land owned would increase the scale of leases. Moreover, that does not require the implementation of too innovative legislative solutions. This can be done by requiring the payment of property taxes for agricultural land on which no agricultural activity is performed. A significantly higher tax rate would oblige owners to enter into lease agreements. At the same time it would not be necessary to maintain the obligation to live in a community, which is a prerequisite for the purchase of land. The person making the purchase would immediately lease the land to the local farmers if they would not plan to undertake agricultural production.

Quite an important issue, which should be the subject of Polish land policy, is to regulate the property rights of land owned by farmers. The unregulated property rights exclude that land of the market and prevent the growth of scale and efficient allocation. According to the theory of welfare, any allocation made by the market is efficient in the Pareto meaning. In this regard, it would be important to introduce informational and financial support to land owners who start the property adjustment procedure.

In Hungary land management is in the focus of the National Rural Strategy, 2012-2020 (Ministry of Rural Development, 2011). The Strategy aims to maintain agricultural land in national authority ownership and in the ownership of family farms, to prevent speculative and illegal land acquisitions. The focus of the land policy is on family farms/individual farms and on their associations and on strengthening the position of the State in the land market. In order to reach these aims the rural strategy recommends changes to be implemented in the land policy:

- to introduce regulations on agricultural holdings, to implement further requirements of land purchase and land rents;
- to re-allot undivided properties on requests and to put into possession, state buying-up of the remaining/offered land;

- to start land consolidation by utilising the National Land Fund managed by the State and to assist the voluntary exchanges of land;
- to restructure institution system of the National Land Fund in order to meet the land requirements and long-term land rents of small- and medium- scale farms and furthermore to assist in reaching the land management aims of the State;
- to improve the demographic situation and to prepare for the new generation the Demographic land programme is needed;
- to replace the programme of 'Life annuity for land' by the handover of farms within the family and among relatives without duties and by providing subsidies to young farmers;
- to assist the autonomous (self-sufficient, self-subsistence, semi self-sufficient) farms and the long-term subsistence of part-time family farms.

Based on the Act CXXII of 2013 on the Turnover of Lands used for Agriculture and Forestry, focusing on family farms can result in social benefits: maintaining and generating the employment capacities and reviving the population retention capacity in villages; preventing migration to cities; and managing the social and mental depression of village populations.

Conclusion

Land policy tools are hindering the development of the land market, leading to inefficient allocation of this production factor among producers. Comparative analysis of land price development in Hungary and Poland clearly showed than 'unrestricted' market operation (in Poland) resulted in considerably higher land prices, while in Hungary the relatively free land lease market ensured faster structural changes in agricultural production. To initiate structural changes in agriculture in Poland the focus should be on supporting efficient land users by strengthening the land lease system, while in Hungary the efficient land users should be given the option of purchasing land to safeguard future agricultural production capacity.

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Financing of Agriculture and Investment Supports in Agriculture

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Introduction

Agriculture has been undergoing a rapid process of structural changes in both Hungary and Poland directly influenced by the application of the European Union (EU) Common Agricultural Policy (CAP) and the intensified the competition on the EU single market. The agriculture of these countries likewise other countries in the Central and Easter European (CEE) region is characterized by lower investment comparative to the farming sector of the EU-15 countries. Therefore, in both countries supporting agricultural investments represents an important issue in analyzing the competitive perspectives of the sector in the EU market. Currently the CAP supporting tools play a vital role in financing the investment of agricultural development in these countries.

This chapter is aimed at presenting the key aspects of financing the agriculture and supporting investment in Hungarian and Polish agriculture in. In the first section both the scale and structure of public financing of the agri-sector are described since the EU accession. Second section concentrates on the investment support and presents policy instruments targeted at investment in agricultural holdings as well as on offer of the private sector.

The structure of financing agriculture in Hungary and Poland

The agricultural producers in Hungary and Poland are financing their operations from various sources beyond their own capital. In addition to banking financial sources there are other financing opportunities for agriculture. For instance agricultural input-producers and machine producers are also considered an important pillar in financing agriculture (Figure 1).

Despite various channels for financing agricultural production Hungarian and Polish farmers are facing financing constraints due to credit rationing, high borrowing costs and rural financial market imperfections (Bakucs at al., 2009; Latruffe, 2005). The most important external financing source of Hungarian agriculture are the short- and long-term bank credits of EUR 1.15 billion representing about 35 per cent of EUR 3.41 billion total liabilities in 2011. This is followed by the account payable financing source of EUR 0.64 billion with the share of 21 per cent, mainly provided by the input producers. The other short term liabilities represent also an essential financing tool of about EUR 1.25 billion. The most important part of this later amount is the integrator financing channel[4] with approximately EUR 0.35-0.54 billion, 10-16 per cent of the total agricultural financing. The factoring financing is also included in the other short term liabilities record and this provides financing sources for agriculture of about EUR 0.04-0.05 billion[5]. The leasing financing tool contributed to agricultural financing by EUR 0.24 billion (7 per cent) according to the Hungarian Leasing Association. Consequently, 58 per cent of total farm liabilities are financed directly and indirectly by bank sources and 21 per cent by creditors (account payable).

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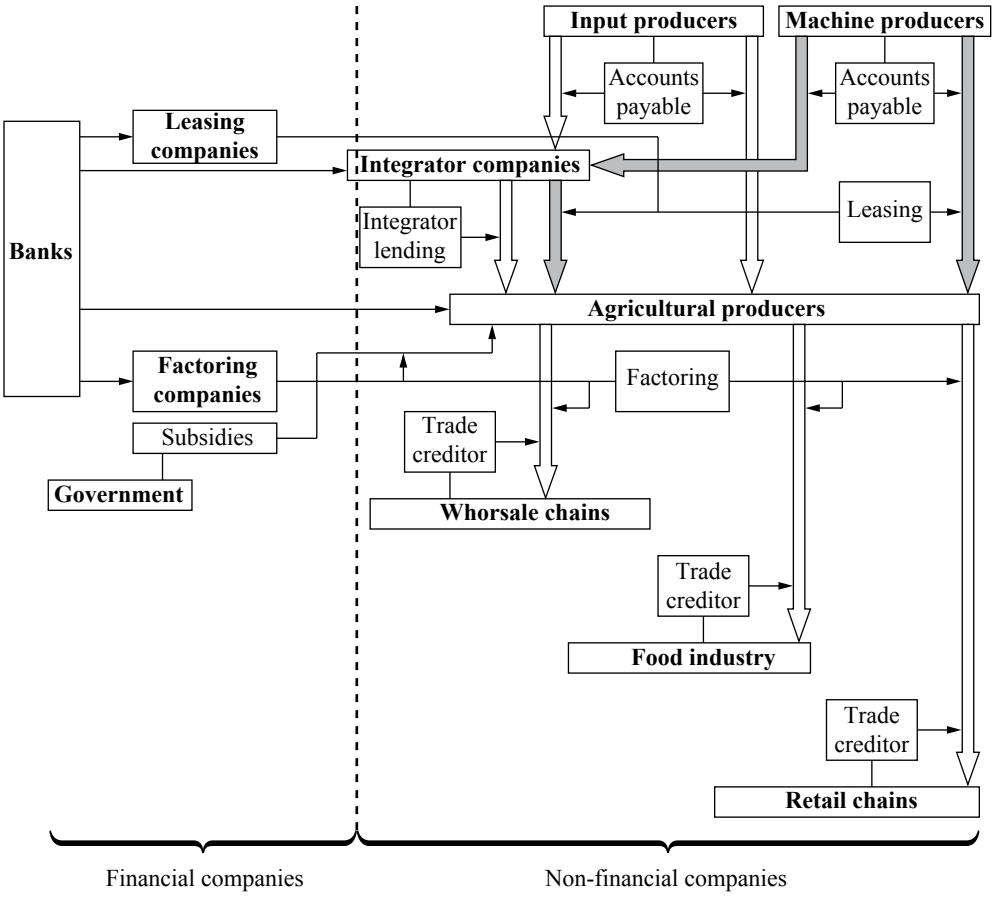
[4] There is no data collection regarding the integrator lending and data presented here are own calculations based on our inquiry of the most important integrator companies.
[5] Authors' calculations based on data provided by Hungarian Factoring Association.

Figure 1: **Financial channels of agricultural production[6].**



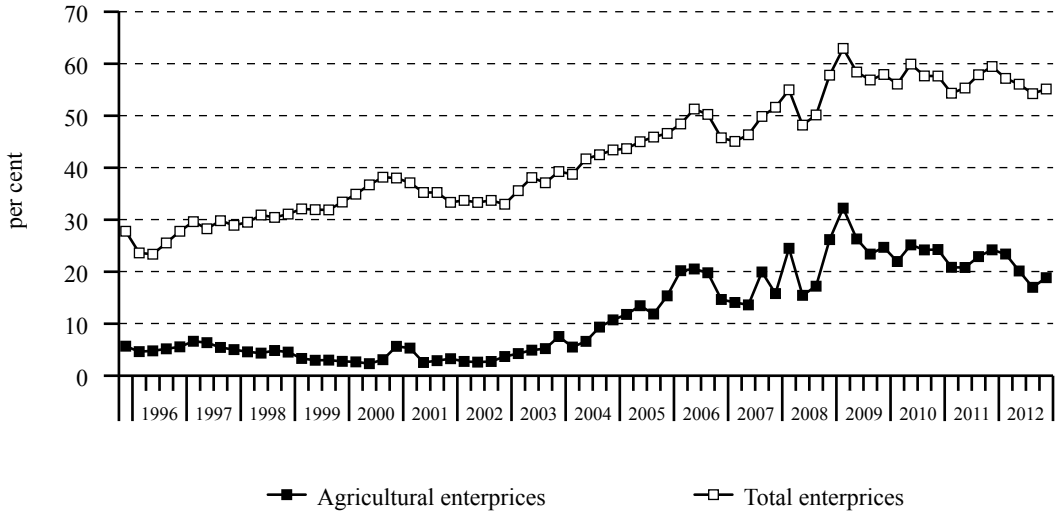
Source: Kemény *et al.* 2010, p. 33

The role of bank loans in financing the Hungarian agriculture has decreased after EU accession when the profitability of the sector has been increased mainly due to support measures entitled to agriculture in the framework of CAP. Consequently public financial sources play an important role in financing agricultural activities since about 20 per cent of total agricultural financial sources are provided by governmental subsidies.

The share of loans in foreign currency granted to Hungarian agriculture has varied around 5 per cent before EU accession due to the interest rate subsidy programs of national currency loans. After joining to EU the interest rate subsidy of national currency loans ended and the share of foreign currency on the loans to agriculture has increased above 20 per cent until 2012. However the share of foreign currency in total loans of agriculture is significantly lower than in other sectors of the economy where the share is close to 60 per cent (Figure 2). The increase of foreign currency loans to Hungarian agriculture amplified the exposure of the sector to exchange rate risks in a period when international competitiveness of the Hungarian agri-food products has worsened.

[6] The thick arrows show the flow of goods (grey ones the machine buy-sell contacts), the thin ones show the financial channels of agriculture.

Figure 2: **The share of foreign currency in bank loans in Hungary.**



Source: MNB, 2013

Finally, it should be emphasised that the external sources of financing the agricultural production are not widespread even in countries with a developed market economy and government intervention in the market. The simultaneous reform of the agricultural sector and restructuring the banking sector in both countries has created additional problems for financing agriculture. Financing agriculture is a high risk activity for most banks because of low profitability in the sector, high nominal inflation, problems with collaterals due to uncertain property rights and ineffective land markets (Swinnen and Gow, 1999). After the EU accession with the introduction of CAP and direct payments the profitability of some agricultural sectors has been improving, but the increasing risk awareness attitude of financial institutions after the recent financial and economic crisis are not facilitating the credit supply for agriculture. Accordingly, the role of subsidies in financing the agriculture from the EU and national budget has increased.

The role of subsidies in financing the agriculture

Implementing the objectives of CAP agricultural subsidies has important impacts on agricultural markets. The current objective set of the CAP, according to the 'EU 2020' strategy, is that agriculture should contribute to smart, sustainable and inclusive growth (European Commission, 2010). Government policy measures have static effects, risk-related effects and dynamic effects on production (OECD, 2001a), and different transfer efficiency on farm income depending on policy tools applied (OECD, 2001b). The impact of agricultural subsidies on income distributional effects depends on their type, the structure of the markets and the existence of market imperfections (Ciaian and Swinnen, 2009). Most of the studies investigate the direct impacts of subsidies on prices, output, income, the environment, etc. by assuming that subsidies do not alter the structure of agricultural markets and do not interact with market institutions. In reality, government policies may have various unintended effects (they can change the structure of market organization or crowed out some market institutions).

The role of subsidies in financing agricultural producers from external sources has various interpretations in the literature. Subsidies may increase bank loans, reduce them or have no impact depending on whether farms are credit constrained, whether subsidies are allocated at the beginning or at the end of the growing season, and on the relative cost of internal and external financing (Ciaian et al., 2011).

An analysis of such effects goes beyond the focus of the current section. Our objective is to compare the major subsidy tools applied in Hungary and Poland for support the agricultural production and rural development.

CAP funds and instruments

Integration process to the EU created new conditions for the development of food economy in Poland and Hungary. Policy instruments implemented within the CAP create chances for the stabilisation of structural policy conditions over the period of several production cycles, thus stimulating the desired changes in the area structure of farms, the improvements in the competitiveness of production, environmental protection and multi-functional development of rural areas. Thus they are a fundamental instrument supporting the process of modernisation of Hungarian and Polish rural areas and agriculture.

The total value of financial aid programmes (together with direct payments) for the agri-food sector and rural areas from the beginning of 2000 until the end of June 2011 exceeded in Poland and Hungary EUR 28 billion and EUR 11 billion respectively[7]. This comprises SAPARD payments – ca. EUR 1.2 billion in Poland and EUR 0,2 billion in Hungary[8], Sectoral Operational Programme "Agriculture" (SOP Agriculture 2004-2006)/Agricultural and Rural Development Operational Programme (ARDOP 2004-2006) and Rural Development Plan 2004-2006 (RDP 2004-2006) – EUR 4.3 billion in Poland and EUR 0,9 billion in Hungary[9], Rural Development Programme 2007-2013 (RDP 2007-2013)/New Hungary Rural Development Programme – EUR 9.7 billion in Poland and EUR 2.7 billion in Hungary,[10] and EUR 17.6 billion in Poland and EUR 7.5 billion in Hungary from direct payments. The implemented programmes are characterised by a certain continuity of general objectives, at the same time, gradually extending the forms of aid and changing the scope and value of provided support. The SAPARD programme aimed at preparing the Polish and the Hungarian agri-food sector to the accession, especially regarding the adjustments to the sanitary, hygienic and environmental protection requirements of the EU.

After 2004, the strategic objectives of agricultural policy have covered: improving the competitiveness of the agri-food sector, sustainable development of rural areas, improvement of the condition of the natural environment, improvement of the quality of life and diversification of economy in rural areas. The majority of measures implemented between 2007 and 2013 are a continuation of measures implemented in the previous periods. This proves policy continuity as regards implementation of the set objectives, but it does not mean that agricultural policy itself is cohesive in the long-term perspective. Because of the multiplicity of measures and objectives some of them are mutually exclusive and neutralize each other.

Considering the value of financial flows allocated between 2002 and 2010 to the Polish and Hungarian agri-food economy and to rural areas, it can be concluded that most public funds (ca. 70 per cent in Poland and ca. 50 per cent in Hungary) were used to co-finance actions related to developing the industrial sector (Figure 3).

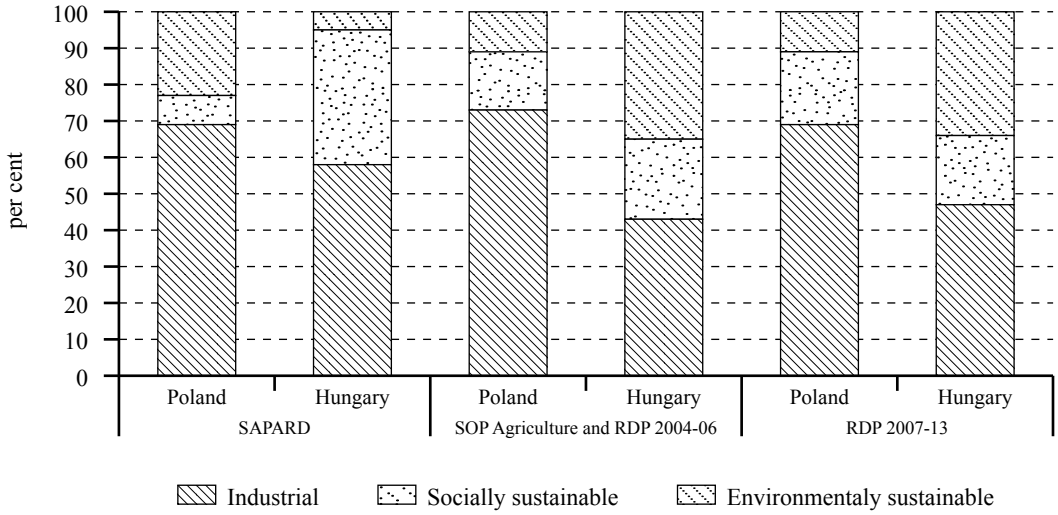
[7] EUR 1 = PLN 4, EUR 1 = HUF 260.

[8] This amount includes PLN 468 million of payments financed by the RDP 2004-2006.

[9] It does not include the payments that originate in SAPARD commitments and does not include the commitments that were shifted to be financed under the RDP 2007-2013.

[10] Including commitments under the RDP 2004-2006 – ca. PLN 9.2 billion.

Figure 3: **The structure of subsidies for food economy and rural development.**



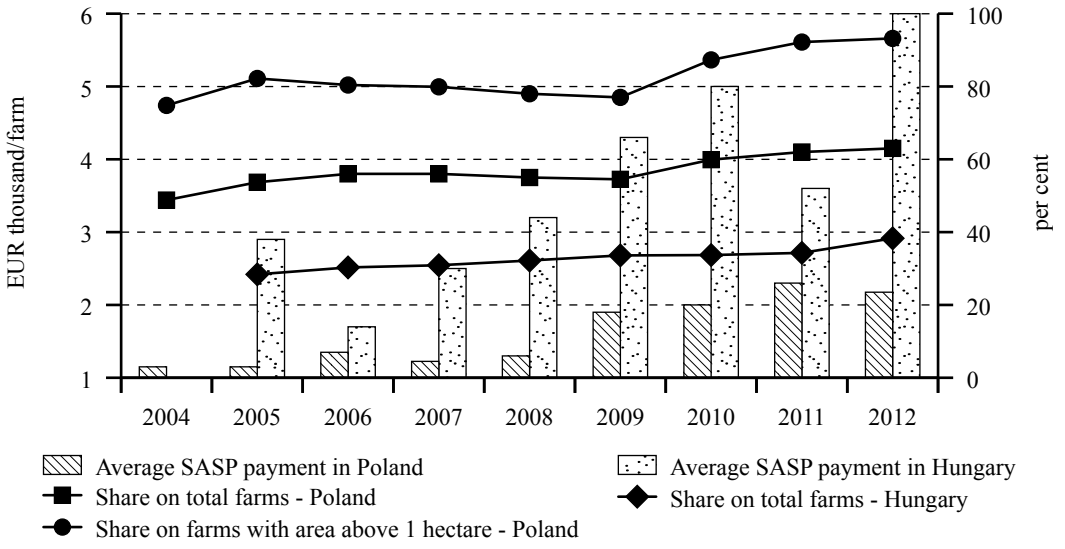
Source: based on data from Polish ARMA and Hungarian ARDA monitoring

In general, this shows that the most important priority of agricultural policy in Poland was to increase the competitiveness of the sector. However, a number of activities within that priority were also related to supporting farmers' income.

At the same time in Hungary for socially and environmentally sustainable actions the same amount of public subsidies were granted than for increasing competitiveness, which imply that in Hungary the share of payments for sustainable actions is higher than in Poland in contrast with competitiveness actions.

Direct payments financed from the European Agricultural Guarantee Fund (EAGF) are the most common type of support for agriculture in Hungary and Poland. They are received by ca. 1.4 million farmers every year in Poland. The value of payments transferred to farmers every year between 2004 and 2011 increased systematically from ca. PLN 6 billion to PLN 14 billion per year. When calculated per one farm, it reaches an average of ca. PLN 9 thousand (EUR 1.44 thousand), and this form of support is used by 87 per cent of farms with an area of more than 1 ha (Figure 4). An equally important source of income (independent of production and based only on the farm's location) is represented by payments for less-favoured areas (LFA). Each year these payments are used by ca. 700,000 farmers, i.e. half of those who receive direct payments. The land surface covered with LFA payments amounts to ca. 6.9 million ha.

Figure 4: **Direct payments - amount of payments and share in the number of farms.**

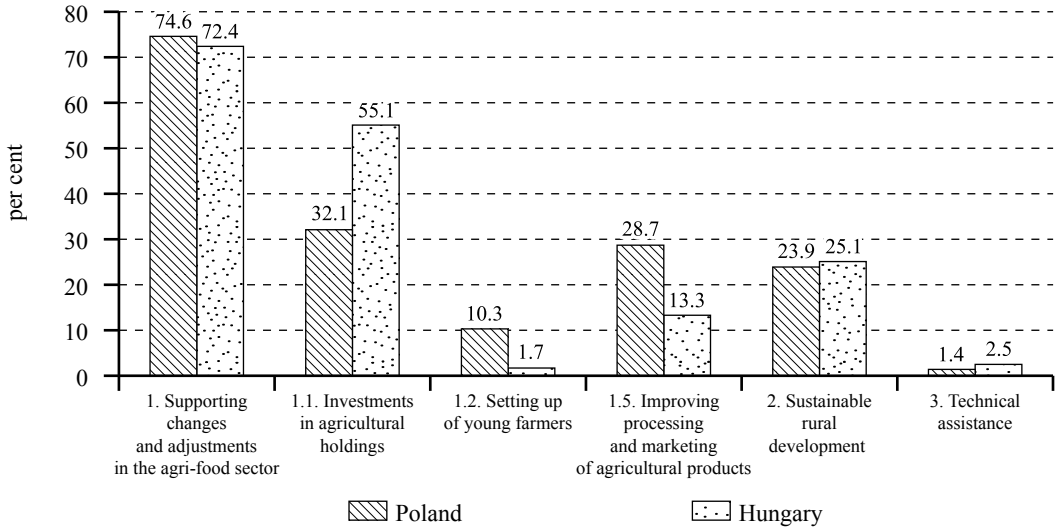


Source: based on KSH, GUS, MVH and ARiMR.

The share of farms receiving direct payments is lower in Hungary (32 per cent) than in Poland (55 per cent) due to a strongly dualistic farming structure (Davidova *et al.*, 2013). The number of farms eligible for the Single Area Payments Scheme (SAPS) in Hungary declined from 202.7 thousand in 2005 to 174.2 thousand in 2011. The majority of farmers giving up agricultural activity were smallholders with and agricultural area less than 10 hectares (Potori *et al.*, 2013). From the total of 4,957 thousand eligible hectares in Hungary for SAPS payments 8.7 per cent of SAPS area was used by 116.5 thousand farms of less than 10 hectares in 2011. At the other end of scale, 39.0 per cent of SAPS eligible area was used by 1.9 thousand farms greater than 300 hectares. The average size of farms eligible for the SAPS in Hungary was 28.1 hectares in 2011, 4.1 hectares more than in 2004.

Each of the EU co-financed programmes targeted at supporting agriculture and rural development had its own specific features based on the EU regulations concerning their possible shape and the implementation process. As Poland and Hungary, together with eight other countries, joined the EU in 2004 the financial perspective 2000-2006 was already in force and the Polish and Hungarian structural programmes could tackle only the period 2004-2006. As it has already been mentioned, at that time the support for agriculture and rural areas was split into two separate programmes. The first one was Sectoral Opertive Programme Agriculture 2004-2006 in Poland and Agricultural Development Operational Programme in Hungary, which were concentrated on supporting the changes in agricultural sector. The implemented measures were divided into three priorities with the highest share of the total budget devoted to the priority 1 focused on competitiveness of the agriculture and food industry as well as their adjustment to the EU with 3/4 of the funds envisaged for it (Figure 5). All of the measures with the highest share in the total programme's budget were part of the priority 1 and included investment support towards both agricultural holdings (32 per cent in Poland and 55 per cent in Hungary) and food processing industry (28 per cent in Poland and 13 per cent in Hungary). The demographic structural changes were given the priority with the support of setting-up young farmers in Poland.

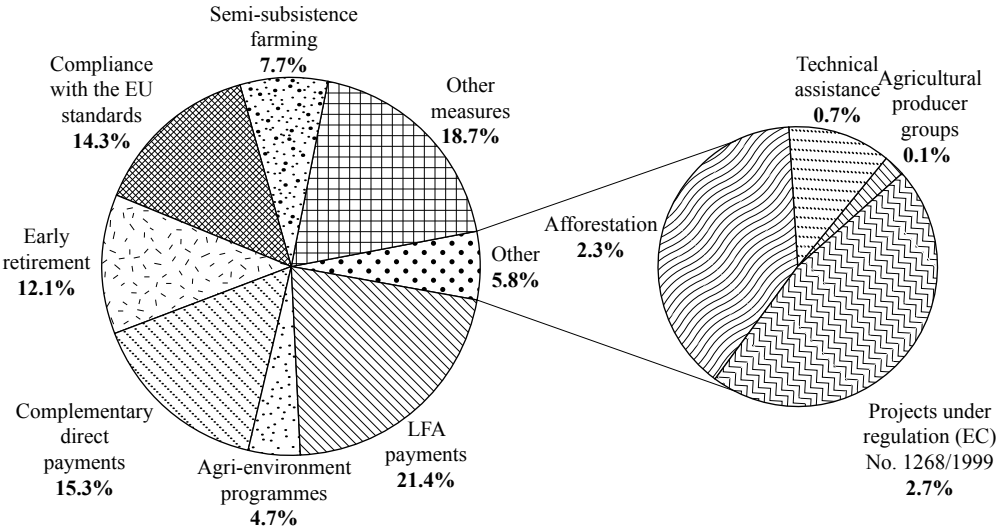
Figure 5: **The share of priorities and key instruments in total budget of SOP Agriculture 2004-2006 in Hungary and Poland.**



Source: based on SOP Agriculture 2004-2006

The second programme for the period 2004-2006 was the Rural Development Plan (RDP 2004-2006) financed from European Agricultural Fund for Rural Development (EAFRD). It was complementary to the first suppurt measures. Over 20 per cent of the RDP total budget in Poland was targeted towards demographic structural changes that were to be achieved by an early retirement scheme (Figure 6). Also support for gaining compliance with the EU standards was one of the programme's key instruments with over 14 per cent of the resources. The RDP included special type of complimentary direct payments that were aimed at reducing the difference in the level of direct payments received by farmers in the EU-15 and Poland.

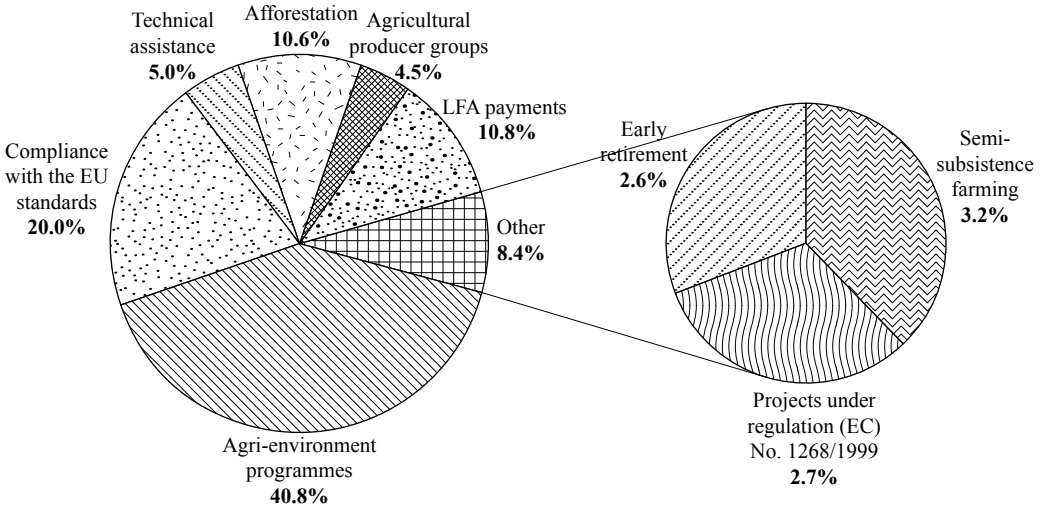
Figure 6: **Implemented measures of RDP 2004-2006 in Poland.**



Source: based on Polish RDP 2004-2006

Supporting the agri-environmental programmes represented the most important priority of Hungarian RDP 2004-2006 (Figure 7). In contrast with Polish RDP focusing on LFA payments, early retirement, semi-subsistence farming Hungarian RDP was focusing next to agri-environmental programmes to afforestation and production groups. An important difference between Polish and Hungarian RDP is that the complementary direct payments were not included in Hungarian RDP and not financed from EU budget, but from national budget (top up) according to the agreement of EU accession negotiations.

Figure 7: **Implemented measures of RDP 2004-2006 in Hungary.**



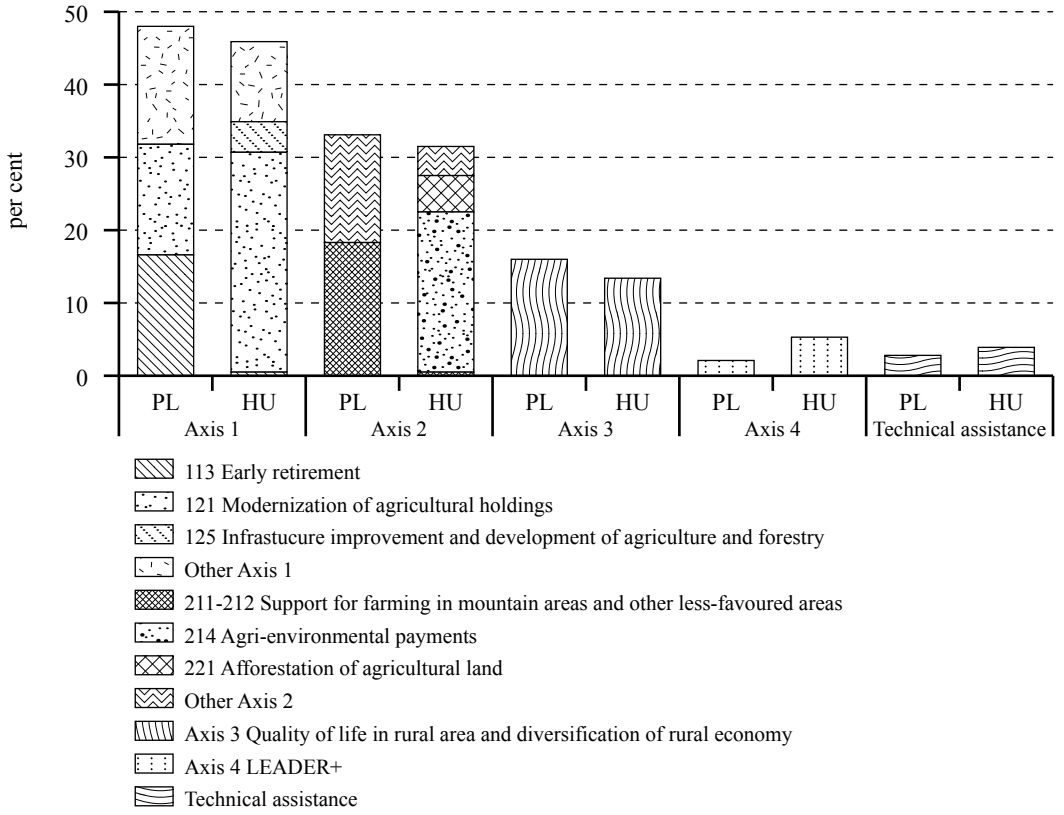
Source: based on Hungarian RDP 2004-2006

In the period 2007-2013 there is only one EU co-financed programme for rural development. According to the EU regulations for this programming period the programme is divided into four axes that include measures targeted to specific fields of supporting rural development.[11] Almost half of the public funds envisaged for this programme are to be spent on improving the competitiveness of agriculture (Axis 1) in both countries. As in the previous period are among the key measures the investment support and early retirement scheme in Poland (Figure 8). The modernisation of agricultural holdings is the main priority of Axis 1 support programmes in Hungary (66 per cent), while this priority in Poland has the same share (16 per cent) as "Early retirement" programme.

The financial situation of agricultural producers in both Hungary and Poland has been improving after the introduction of CAP, especially those farmers who are entitled to receive SAPS payments and who are eligible for applying to any call of RDP. The SAPS payments per hectare are higher in Hungary than in Poland mainly because of the higher reference yield used for the initial establishment of direct payments. Therefore the SAPS payments per farm are higher in Hungary than in Poland. At the same time less Hungarian farms receive SPAS payments than Polish farms, namely the share of farmers receiving SAPS payments on the total number of farms is smaller in Hungary than in Poland.

[11] Improving the competitiveness of the agriculture and forestry (Axis 1), Improving the environment and the countryside (Axis 2), Quality of life in rural areas and diversification of rural economy (Axis 3), and LEADER+ (Axis 4).

Figure 8: **The share of axes and key measures in total budget of RDP 2007-2013 in Hungary and Poland.**



Source: based on Hungarian and Polish RDP 2007-2013

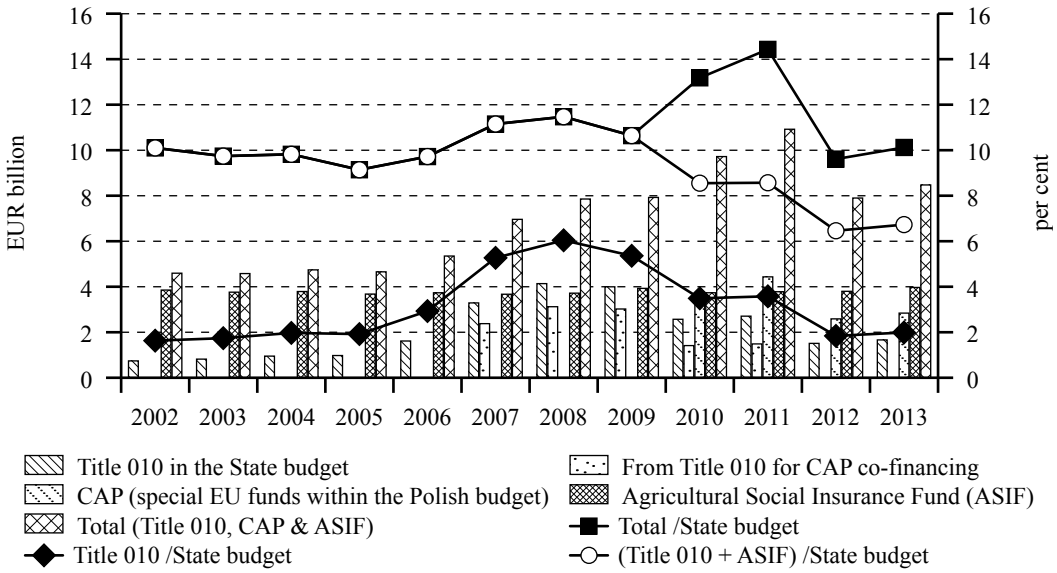
National funds and instruments

Poland and Hungary still support the agriculture and rural areas from its own state budget not only in the form of co-financing the CAP instruments that require it but also through Polish and Hungarian state aid measures that have to comply with the EU regulations on state aid.

The state expenditures on agriculture have been changing in Poland (Figure 9). Due to the changes in the regulations on public finances in Poland that came into force in 2010, the analysis of the funds targeted towards agriculture is made more difficult. Yet, it is clearly visible that the amounts directed to agriculture increased significantly with the EU accession. The second increase was observed with the start of the current programming period. The current crisis let to a fall in resources targeted at agriculture, yet the funds are still significant.

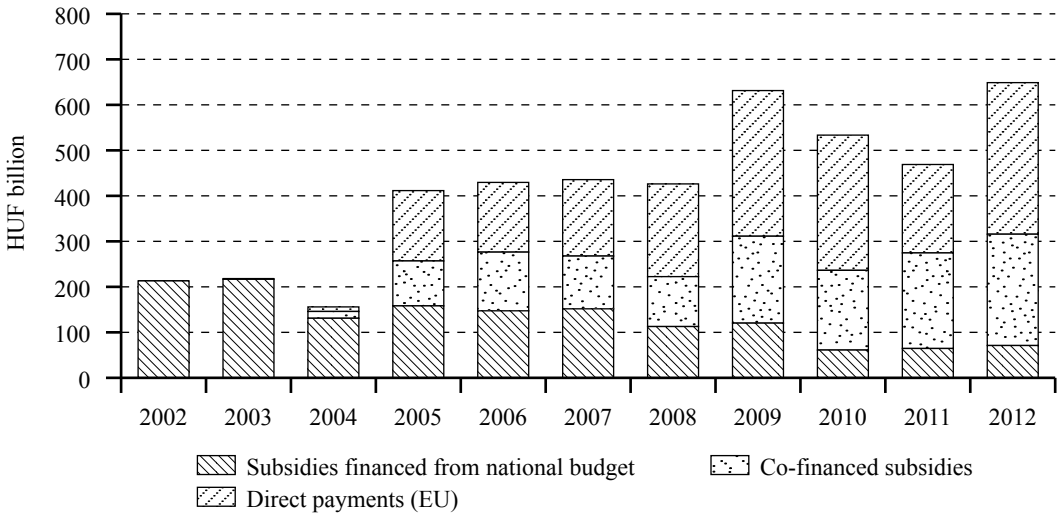
The financing of agricultural support measures has been changed after the accession to the EU. The subsidies on agriculture financed from national budget have been decreasing in Hungary after the accession to the EU and introduction of CAP, as long as co-financed measures and direct payments have been increasing (Figure 10). The share of national financial sources supporting agriculture and rural development in Hungary has decreased from 43 per cent in 2005 to 21 percent in 2012. The total expenditures for agricultural and rural development subsidies financed from national budget and EU budget represented 4.35 per cent on total expenditures of Hungarian consolidated public budget, of which 0.89 per cent from national sources.

Figure 9: **Public expenditure for agriculture in Poland in the period 2002-2013.**



Source: B. Wieliczko, 2012

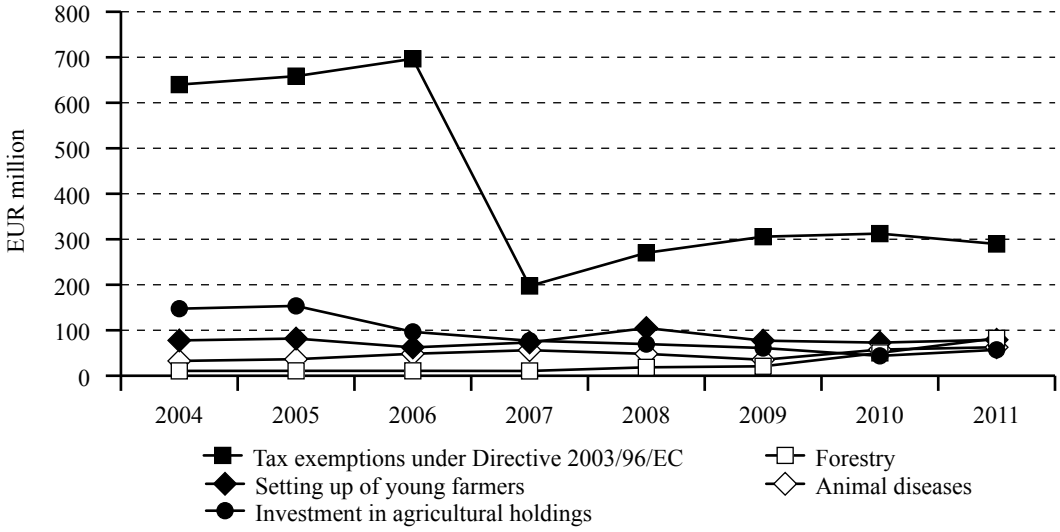
Figure 10: **Financing sources of agricultural and rural development subsidies in Hungary.**



Source: Ministry of Rural Development, 2013

Poland supports its agricultural sector with a set of over 20 state aid instruments. Yet, the total amount of aid decreased substantially from ca. EUR 2.8 billion to EUR 1.7 billion in 2011. In 2007, after a transition period, they had to be modified in order to comply fully with the EU standards. This also gave an initiative to alter the set of state support measures to make it more adequate to changing conditions and to new set of the CAP measures envisaged for the programming period 2007-2013. Therefore there was also a significant change in the amounts of state aid targeted to specific measures (Figure 11). Despite these changes tax exemptions remain the key state aid measure in Poland although their share in total budget and the amount devoted fell significantly in 2007.

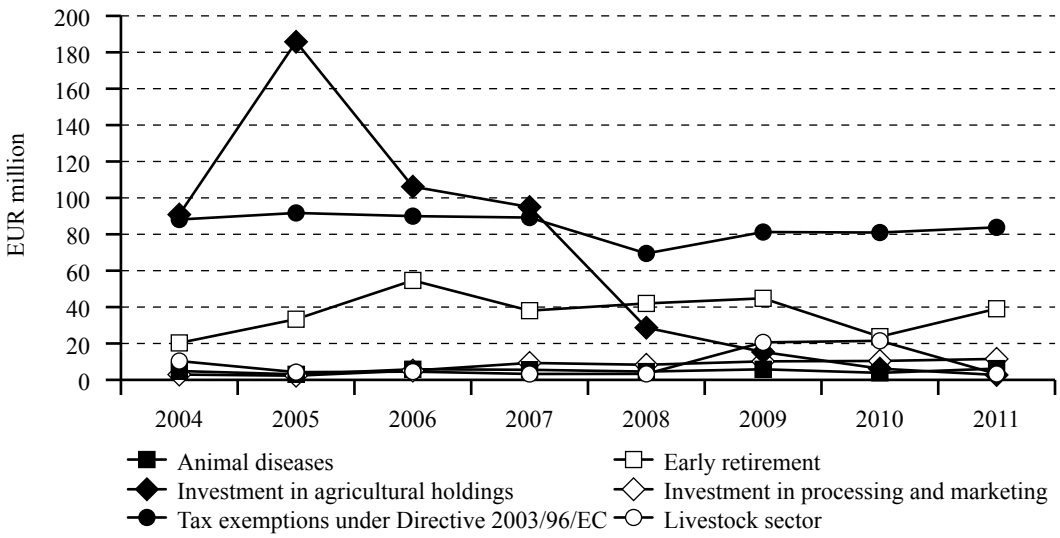
Figure 11: **Key state aid instruments in Poland in the period 2004-2011.**



Source: based on European Commissions data

The most important support instruments for agriculture from the national budget are the investment in agricultural holdings, tax exemptions and early retirement programmes in Hungary (Figure 12). After the EU accession the investment in Hungarian agricultural holdings support measure has peaked at EUR 185.6 million in 2005 following a continuous decrease period. The tax exemptions represented annually around EUR 90 million in the fist part of the period, which decreased to EUR 80 million simultaneously with the intensification of financial and economic crisis. This instrument is less important in Hungary than in Poland, where a yearly average of EUR 650 million was used for tax exemptions for agricultural economy after EU accession which decreased to EUR 300 million after 2008.

Figure 12: **Key state aid instruments in Hungary in the period 2004-2011.**



Source: based on European Commissions data

A further important difference between Hungary and Poland is that the early retirement programme in Hungary was financed predominantly from the national budget after the EU accession and in Poland this programme was included in the RDP of the country.

Consequently, the importance of EU funds have increased in supporting agriculture in both countries, but a major distinction between the two countries can be observed regarding the national expenditures on agriculture. After the EU accession the expenditures from the national budget on agriculture in nominal terms had been increased in Poland, while in Hungary the national public funds have not been increased, rather a decreasing trend prevailed. Moreover the Agricultural Social Insurance Fund (KRUS) was established in Poland at the beginning of the transition to the market economy for elderly people and disability insurance as well as accident, health and maternity insurance financed from farmers' contribution and national budget. The public expenditure on KRUS is maintained at the same level as before EU accession of the country.

The differences in Hungarian and Polish farm structure resulted differences in the SAPS payments per farm as presented above. In Poland a higher share of eligible farms receive a lower amount of direct payments per farm than in Hungary, but if we consider the subsidy per hectare, the support level is same in Hungary and Poland: EUR 260 per hectare, which represents only 83 per cent of the support level in the EU-27 in 2011.

Investment supports in agriculture

The investment support has been considered an important vehicle for enhancing competitiveness of Hungarian and Polish agriculture since the beginning of the economic transition characterised by low investment rate similarly than in other transition countries. Feil *et al.* (2013) presented evidences that economic efficiency of an investment subsidy is higher than the economic efficiency of other support measures (price floor, production ceilings) in agriculture.

The interest rate subsidy was one of the main investment support measure until the EU accession in both countries, but after accession different measures of rural development programmes have become more important investment support tools than interest rate subsidy.

However, direct payments are not considered an investment support measure empirical evidences found that direct payments may stimulate agricultural investment (Vercammen, 2007). The increase of investment value in agriculture can be observed in both countries Hungary and Poland during the phasing-in period of SAPS payments.

Hungary

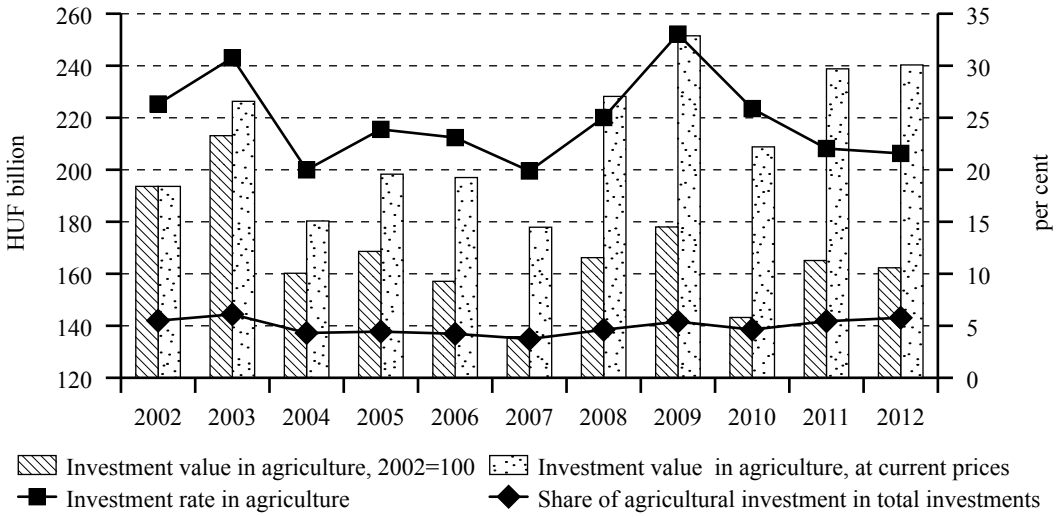
Credit market imperfections have impact on investment decision of Hungarian farmers and the liquidity constraint farmers are those with low debts and using mainly rented land (Bakucs *et al.*, 2009). The role of investment support instruments is to facilitate the access of agricultural producers financing their activity in case of market imperfections. The principal investment support tool before EU accession was the interest rate support and after EU accession several measures in the RDP become the key instruments in supporting investments in agriculture. However, the direct payments have been contributing to increase the investment activity in agriculture although this support tool of CAP represents primarily an income support and not an investment support tool.

Total factor productivity has been increasing yearly in average by 2.4 per cent in the last decade in Hungary from which 2.1 per cent is attributable to the improvement of technical efficiency and 1.3 per cent to the enhancement of technological progress (Fogarasi *et al.*, 2013). The positive effect of technological progress on productivity increase suggests an effective investment activity in agricul-

ture. This investment development could not have taken place without the increasing support from the public sources, especially from EU funds (EAGF and EAFRD).

This improvement of technological progress in Hungarian agriculture was attained by a stagnant investment value. A slightly increase in the nominal value of investment in the period between 2002 and 2012 represented a stagnant evolution in real terms: After the EU accession the investment value had been decreasing until the starting of the Financial Framework 2007-2013. The increasing of investment value started in 2008 was injured by the effects of financial and economic crisis. Moreover, the share of agricultural investments in total investments in Hungarian economy and the investment rate had varied since 2002 around 5 per cent and 25 per cent respectively (Figure 13).

Figure 13: **Investment value and rates in Hungarian agriculture.**



Source: based on KSH data

The total subsidy commitments in the Hungarian RDP for the programme period 2007-2013 represented HUF 1,487 billion of which HUF 667 billion (45 per cent) for agricultural investment instruments. The number of applications for agricultural investment subsidies was 28,497 until the end of 2012, applying for HUF 1,084 billion. Investment subsidies were granted to 17,045 projects, 88 per cent of the financial commitments until the end of 2012.

The granted non-refundable subsidies from the Hungarian RDP 2007-2013 represented HUF 589.2 billion until the end of 2012, of which 13.5 per cent failed to finalize. This average share of failed projects covers a wide variation among investment subsidy instruments. Especially high number of failed projects after granting the subsidies was found in case of Modernization of livestock farms, Modernization of vegetable producer farms, and Settlement of energy crops instruments, and investment supports for food industry. Tanító et al. (2013) found that the typical reasons of failing projects are difficulties with financing the projects: missing own contribution or the collateral for banking financing and the changing of financial and market conditions until the granting decision was taken. The applicants for agricultural investment grants claimed that during the long decision period in average 212 days, the business conditions had been changed, which made impossible to complete some of the projects.

The conditions of Credit Programme for Agricultural Development for production, marketing and processing of small and medium agricultural smallholdings were adjusted to the EU subsidy regulations from the July 2007. The New Credit Programme for Agricultural Development also offers pref-

erential credits for production activity of small and medium agricultural smallholdings up to HUF 1 billion and up to a period of 15 years. The interest rate paid for these credits was between 6 and 8 per cent, the same condition as for preferential credits for other sector in the economy. The modifications of this credit support programme conditions in 2009 made possible to benefit form both public subsidy programmes and preferential credit programmes beside small and medium agricultural smallholdings the large corporate farms also.

Table 1: **Credits of Credit Programme for Agricultural Development for supplementing the granted subsidies from EAFRD.**

	No. of granted credits	of which individual farms	Eligible costs of total investments	Credit value of total applications	Of which individual farms
Supplementary project credits	32	10	2,118.2	1,113.2	137.8
Procurement of individual machinery and equipments without construction	125	51	8,884.3	4,757.1	979.3
Modernisation of livestock farms	21	3	7,461.8	3,084.6	82.7
Modernisation of horticultural farms	4	2	1,044.4	182.0	77.0
Procurement of horticultural machinery and technological equipments	6	5	81.6	44.5	38.8
Development of irrigation, soil improvement and territorial water management in agricultural holdings and public faculties	1	0	87.6	47.5	-
Modernisation of production facilities in crop producing farms	13	0	1,716.7	715.1	-
Total	**202**	**71**	**21,394.6**	**9,944.0**	**1,315.6**

Source: Tanító *et al.,* 2013

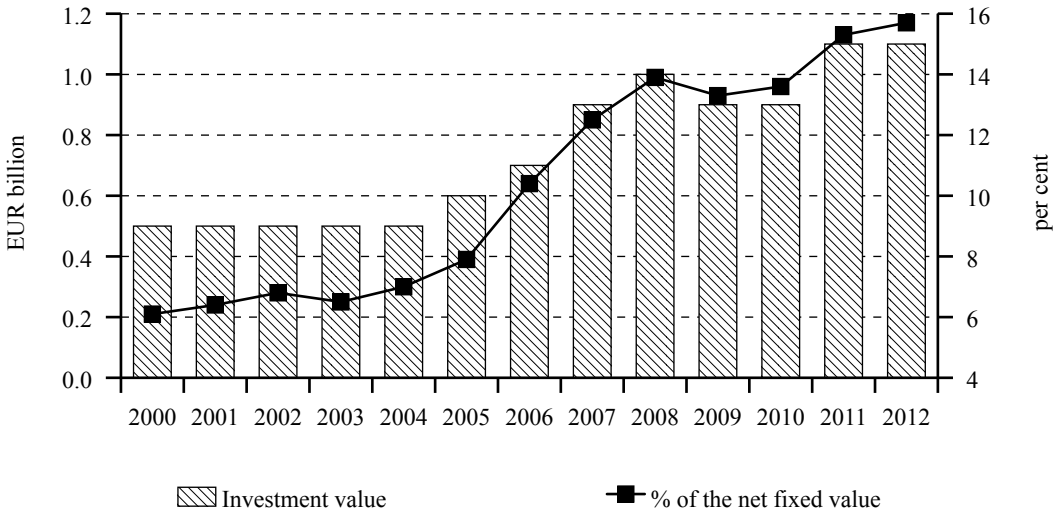
The value of credit applications from the New Credit Programme for Agricultural Development represented 30 per cent of the supplementary funds for the RDP. This corresponded to 202 preferential credit grants until the end of 2012, of which one third of applicants were individual farms (Table 1). The total value of preferential credits paid was HUF 9.95 billion, HUF 49.2 million per farms (HUF 18.5 million in case of individual farms and HUF 65.9 million on case of corporate farms). The value of investments financed from Credit Programme for Agricultural Development has ranged between HUF 13.6 million and HUF 355.3 million. The value of credit the total project costs represented in average 46.4 per cent.

This preferential credit value of almost HUF 10 billion represents only small part of the implemented investments of HUF 310 billion until the end of 2012. The low value of granted preferential credits is due to the application of individual guarantees based on reference interest rate for every applicant on the one hand, and the different requirements for preferential credits and non-refundable subsidies on the other hand.

Poland

After transformation of Polish economy in a market oriented economy the share of the fixed assets has increase slowly in the structure of means of production, on the one hand, and, on the other, decapitalisation of fixed assets is observed. Between 2005 and 2010, programmes co-financed from the EU and national funds contributed to nearly double increase in the value of investments (Figure 14). Owing to them, the value of fixed assets in agriculture increased from ca. 8 per cent to ca. 15 per cent.

Figure 14: **Value of investments and change in the value of fixed assets in the agricultural sector in 2000-2012.**



Source: based on GUS data

Investments were mostly made by large and economically powerful farms. These farms have focused on machinery and not buildings and facilities investments used in the agricultural production. The estimated number of investments in farms amounts to 150-250 thousand. Agricultural activity conducted in the remaining farms does not enable recovery of fixed assets which increases its usage. As a result of investments in machinery the overall number of tractors increased by nearly 10 per cent, and the number of combine harvesters – by 25 per cent (Table 2). The technical supply of labour also improved. Apart from the greater traction output of new tractors, farms were equipped with modern accompanying machinery and field generators. Thereby, new technologies contributed to the improvement of quality of agrotechnical measures and the improvement of quality and safety at work.

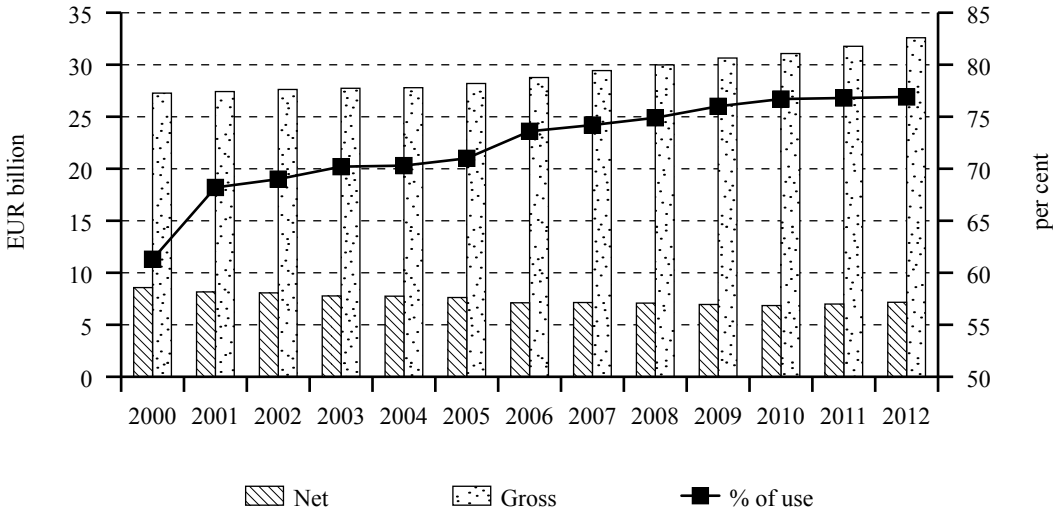
Table 2: **Fixed assets in farms**

	2002	2010	2002=100
Tractors	1,339	1,471	109.9
Combines	123	152	123.6
	Per one farm		
Tractors	0.46	0.65	141.8
Combines	0.04	0.07	159.5

Source: based on GUS data

Despite favourable investment tendencies, easy access to aid funds and relatively substantial public funds earmarked for investment in fixed assets, their net value has been decreasing systematically. Also the percentage of its usage increased (Figure 15). In 2009 it already exceeded 75 per cent. This situation concerns mostly buildings and facilities. The usage of machinery is considerably lower. This affects small and medium-sized farms to the greatest extent. Due to their financial potential and opportunities for obtaining grants and investment loans, large farms renew their fixed assets on a greater scale.

Figure 15: **Value of fixed assets in the agricultural sector and their usage in 2000-2012**



Source: based on GUS data

The extent of influence of the CAP programmes is relatively small as compared to the vastness of investment needs. In 2011 the number of applications (call for proposals) reached 34.7 thousand (in previous years it was much smaller, ca. 20 thousand), which is an insignificant number when compared to the vast number of farms in Poland. Nevertheless, thanks to the support under the CAP one can clearly see the increasing investment activity of farmers (increase in the value of investments and their share in fixed assets). However, a very small group of farms are engaged in investments. A vast majority of them are rather large commercial holdings. There are ca. 150-250 thousand of them. In others one may observe decapitalisation of fixed assets. While machinery has been renewed, decapitalisation of buildings and facilities is progressing fast. The CAP investment programmes indirectly influence changes in the agrarian structure and support the concentration of production as well as the specialisation of farms.

An improvement in the competitiveness of agriculture depends on structural changes (that predetermine the efficiency of production factors used) and on the development of the entire national economy, especially in the context of the capacity to create new jobs outside agriculture. Rural development programmes, direct payments and changes in the entire economy have accelerated structural transformations in agriculture. They consisted e.g. in the concentration of production. This is evidenced by a drop of over 20 per cent in the number of farms in 2000-2010; the greatest decrease, i.e. by 25 per cent, pertained to the smallest farms in terms of acreage (1-5 ha UAA), while the number of the largest farms increased significantly. The average area of a farm (with UAA > 1 ha) increased by 13 per cent, i.e. up to ca. 9.5 ha UAA. However, the greatest part of agricultural land still belongs to the small and medium-sized farms (of less than 20 ha UAA), and the distance between Poland and the main food producers in Europe remains huge in this respect.

The EU programmes did not impede high variability of agricultural productivity, especially in terms of plant production. It mostly results from lower technological level and relatively low-quality soil that considerably increases the plantation sensitivity to atmospheric conditions. Following the accession to the EU there was certain improvement in terms of production technology. However, it was not sufficient to considerably impede fluctuations in production, especially due to serious weather anomalies observed in this period. *"... Fluctuations in production cause changes in prices of plant products and, consequently, result in business fluctuations in livestock sector, and change in the production level ..."* (Łopaciuk, 2011). In the case of livestock sector, the most significant changes concerned decrease in pig production volume, and increase in the poultry, eggs and beef production volume. Milk production volume did not change.

Impact of the other CAP regulations on agriculture is considerably lower, at least in the current perspective. Production quota and the cross compliance requirement have positive impact on agrarian structures and the processes of concentration of production. However, the scale of impact is very limited. According to many farmers, cross compliance requirements impede production and result in the increase of production costs, while production quota, as directly interfering in the market administration, limit supply. *"... The most important consequences of the introduction of quota (milk market, sugar market) are: lower production capacity utilization, deficit in the national balance, increased imports, and disturbing farmers' decision-making process ..."* (Łopaciuk, 2011). Environmental regulations also have limited range. Despite relatively high value of support per beneficiary, in average PLN 8-10 thousand, still a small number of farms benefit from these programmes. However, year after year, the number increases dynamically which undoubtedly contributes to raising farmers' environmental awareness. Nevertheless, impact of the regulations to date on the entire sector is insignificant.

The state support for investments in agriculture takes the form of subsidies to investment credits. These credits are offered only by commercial banks that signed a special agreement with the Agency for Restructuring and Modernisation of Agriculture (ARMA) acting as the administrator of this state aid measure. Currently, there are credit lines with subsidised interest rates and one with a partial repayment of principal. The whole process of verification of applications for credits is conducted by participating banks based on the general rules specified for each of the credit lines and bank's internal procedures. Depending on the credit line there are different maximum amounts of credits. The interest rate is paid both by the borrower – up to a certain threshold – for example in case of credits for investment it is less than 3 per cent on an annual basis and the rest is paid by the ARMA. The regulations concerning subsidised credits were reshaped in 2007 so that they are in line with the EU regulations on state aid. The farmer's interest in applying for this support is variable depending on the credit line and situation on the market (Table 3). Also the average amount of credit varies significantly not only in case of different credit lines but also in time. The most popular credit lines are the one for purchasing agricultural land and for setting up and purchasing equipment by young farmers. Each year several thousand new borrowers receive these credits.

After the EU accession most of the investment support, as in case of other forms of public aid for the Polish agricultural sector are financed from the EU budget. The subsidized credits amount to about 750 million euro annually and thus are only a supplement to the EU co-financed policy measures.

Table 3: **Investment credits with subsidies from Agency for Restructuring and Modernisation of Agriculture**

Investment credit subsidies for	Value of credits - EUR million				Average value of credits - EUR million			
	2005	2009	2010	2011	2005	2009	2010	2011
implementation of investment projects in agriculture, agri-food processing and services for agriculture by the groups established on the basis of the Act of agricultural producer 15/9/2000 on groups of agricultural producers and associations thereof, and amending other acts	1.27	0.52	4.13	5.39	0.18	0.17	0.52	0.17
purchase of agricultural estate properties designated for setting up and equipment of family farms under the Act of 11/4/2003 on the development of agricultural system	13.34	22.13	40.10	56.85	0.03	0.05	0.07	0.07
implementation of investment projects in agriculture, agricultural processing and services for agriculture	79.84	33.34	44.32	41.95	0.02	0.04	0.04	0.04
restarting of production in farms and special sectors of agricultural production in areas affected by: drought, hailstorm, excessive precipitations, flood, hurricane, fire, plague of rodent or landslides	0.28	0.21	0.57	0.55	0.01	0.02	0.02	0.01
purchase of agricultural land	83.11	176.55	200.63	257.49	0.01	0.03	0.04	0.04
setting up and equipment of agricultural holdings by persons below 40 years of age	266.19	157.84	220.71	291.23	0.03	0.05	0.06	0.06
shared use of agricultural machines and equipment under the sectoral programme	4.91	0.19	0.36	0.19	0.09	0.07	0.12	0.05
restructuring of starch potato processing industry under the sectoral programme	0	0.87	0.32	0.02	0	0.87	0.32	0.02
implementation of investment projects introducing new production technologies in agriculture, including production of raw-materials for bioethanol and biocomponents and aimed at ensuring high quality of product or adjustment of animal production to the sanitary requirements, environmental protection and animal welfare standards	46.50	53.81	64.95	117.10	0.07	0.09	0.09	0.10
restructuring and modernisation of the meat and egg processing industry in Poland	9.35	2.34	6.40	2.29	0.19	0.29	0.40	0.23
dairy farms under the ''Sectoral dairy programme''	23.91	1.88	12.87	9.50	0.04	0.03	0.12	0.07
restructuring and modernisation of the waste treatment and disposal industry in Poland Under - SOP support	0.16				0.16			
setting up and equipment of agricultural holdings under the programme for agricultural settlement on land owned by the State Treasury, as accepted by the Minister of Agriculture and Food Economy and the Minister of Finance			0.13					
implementation of investment projects in agricultural holdings with partial reimbursement of loan capital			0.63	6.47			0.02	0.02

Source: based on GUS data

Conclusion and discussion

Ten years after the EU accession Hungarian and Polish agriculture has undergone significant changes. They are closely linked to the implementation of the Common Agricultural Policy that multiplied the public expenditure directed towards the Hungarian and Polish agri-food sector. The funds led to acceleration of the changes in some areas, but stopped them, or seriously slowed them down in the others. The biggest problem concerns the land market where direct payments reduced the willingness to sell land by the smallest farms.

The public funds from the state budget play currently a supplementary role in both countries although the state aid for agriculture in Poland and Hungary expressed as a share of the GDP is much higher than the EU-27 average. In both countries the share of public founds from national budget for agriculture was 0.18 per cent in 2011 comparative to average of 0.07 per cent in EU-27. The share of state aid devoted to tax exemptions under Directive 2003/96/EC was over 40 per cent in both countries in 2011, but followed a different path: in Poland decreased from 61.3 per cent in 2004 to 42.6 per cent in 2011, while in Hungary increased from 27.4 per cent in 2004 to 46.8 per cent in 2011.

In case of direct payments there is not much room for choosing the level and structure of support. Yet the choice of the system of implementation – SAPS proved to be the right one in terms of administrative costs and simplicity of application. Direct payments are eligible to all farmers with at least 1 ha of agricultural land maintained according to good agricultural practices. Direct investment support takes the form of subsidies to repayment of investment credits and is especially popular among young farmers.

The public administration of the funds allocated for the pillar 2 represents a much greater challenge. Their allocation should be in line with the development strategy for rural areas and agriculture. This aim is difficult to achieve given opposing stakeholder groups and different lobbies. The Polish first experiences in programming rural development programmes showed that detailed procedures on implementation of the policy measures play a key role in influencing their actual attractiveness to potential beneficiaries. It is also difficult to shape the measures in such a way that they ensure efficiency in their implementation. The Hungarian first experiences in implementing rural development programmes revealed one the one hand that an important modernisation process was facilitated in agriculture by these programmes, and on the other hand that social and economic territorial inequalities cannot be reduced by these programmes as the majority of these measures are available not only on the rural areas.

Therefore, in preparing rural development programme for the period 2014-2020 the lessons learnt so far should be taken into account. With the level of resources most probably lower than in the period 2007-2013 it is even more important to spend the funds on the measures that are the most efficient and effective in stimulating structural changes in the Polish agriculture. The funds aimed at supporting investment in agriculture should be given priority and should be subject to most detailed monitoring and evaluation processes as they are to play a strategic role in accelerating structural changes.

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Taxation in the Polish and Hungarian agriculture and health care systems

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Introduction

The taxation and social insurance system is not a part of Common Agricultural Policy (CAP) regulation and the general regulations of the European Union (EU) do not concern these fields either. The EU Member States have autonomy regarding their taxation and social security systems. The only exception is value added tax (VAT), where Council Directive 2006/112/EC[3] gives Member States a framework on how they can formulate the relevant laws. This paper shows how the different taxation systems (income taxation, value added tax and social contributions) are regulated and used in Poland and Hungary. As the Polish and Hungarian agricultural taxation systems are so different, they first have to be discussed separately.

Income taxation of Polish agriculture

Legal framework of family farms in Poland

The most important legal act referring to the family farm in Poland is the Constitution of the Republic of Poland of 1997. In accordance with the provision of the Constitution, a family farm constitutes the basis of the agricultural system. The term 'family farm' comprises two principal features: farmer's (owner, user) and his/her family members' own labour as well as the use of income for production and farming purposes and the socio-economic needs of the family. Therefore, the family farm is not only an enterprise, but also a certain form of work and life. Family farms constitute a foundation of Polish agriculture and are characterised by a number of features related to, for example, the feeling of solidarity within local communities, strengthening memories of previous generations' output, reinforcing basic values and respect for the environment. Thus, in the Constitution this term is interpreted rather as a family proprietary community than as a systemic pattern or an agrarian standard. This means that every farm that is a family community is a family farm. As observed by Michna (2013), the provisions of the Constitution fail to answer the question of which farms should the agricultural system comprise in economic terms. The lack of such regulations also limits changes that need to be made in the Polish financial law, since in accordance with the Constitution a family farm as a basic form of the agricultural system mainly performs family functions instead of being treated as an economic entity. Polish agriculture includes three groups of farms under the name 'family farms' (they are all proprietary communities). These are:

- ca. 270 thousand family farms, which recover almost total production potential (commercial farms), with an ESU of at least 8. They form the basis of commodity production and guarantee the continuity of Polish agriculture.
- ca. 100 thousand farms with an ESU below 8 (most commonly 6-8 ESU) that are not fully capable of recovering production potential (semi-subsistence farms). These farms are promising in terms of their development since they have a relatively large land area and a successor. In this respect, it is necessary to support them with EU and national resources.
- ca. 1.5 million of family farms of a social character, without the full capability to recover production potential (subsistence farms).

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[3] Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax.

In total ca. 9 million ha of agricultural land is administered by farms without a full capability to recover production potential and only 7 million ha of agricultural land belongs to farms capable of providing outlays for current production and recovering production potential. Across all EU Member States 75-90 per cent of agricultural land is managed by farms capable of recovering production potential and providing current outlays.

Taxation of farms in Poland

The situation described above results in Polish agriculture being treated as a specific sector of the national economy and is thus subject to different tax solutions than other entities. The individuality of the agricultural tax system consists of excluding individual farmers from personal income tax.

The lack of income tax in Polish agriculture does not exclude the existence of other types of taxes imposed on farms, including agricultural tax, property tax, forest tax, tax on civil law transactions, tax on special branches of agricultural production, inheritance and donation tax. EU Member States can apply their own regulations, except for reductions and exemptions, which are subject to ratification as State aid. Poland applied for the post-EU accession retention of, for example, reductions and exemptions from agricultural tax and property tax.

The main burden on Polish agriculture is an agricultural tax, a property tax of local character, the proceeds therefore feed local budgets. The tax was introduced by the *Agricultural Tax Law of 15 November 1984*[4] and has been in force since 1 January 1985. All land classified in the land and buildings register as agricultural land or wooded and shrub agricultural land, except for land under business activities other than agricultural activities regardless of the area, location or profitability, is subject to agricultural tax. The basis of taxation of land belonging to farms is the number of equivalent hectares and for other land the number of hectares resulting from land and building inventory. The number of equivalent hectares is calculated on the basis of three criteria: classifying the land to a given tax district, the type of agricultural land and the class of agricultural land.

Historically, the determination of agricultural tax on the basis of these rules aimed to take account of differences in the profitability of particular farms, where these differences result from the type of agricultural land, its quality, the economic conditions of agricultural production as well as production and climate conditions(Hanusz and Czerski, 2004). Until the end of 2006 agricultural tax covered natural and legal persons as well as organisational units without legal personality and companies without legal personality. On 1 January 2007 this category was extended to agricultural land lessees, if such land had been leased on the basis of an agreement concluded in accordance with the provisions of the Agricultural Tax Law. After this period no applicable changes have been introduced. The most significant changes to the agricultural tax came into force on 1 January 2003[5] when the system of tax reductions and exemptions was extended and the amount of tax for agricultural land forming a holding and located outside the holding was differentiated.

Legal solutions regarding the structure of the agricultural tax have their drawbacks, since this taxation model is also used by persons who do not perform agricultural activities, but who purchased land for speculation and enjoy preferential treatment originally intended for farmers.

Land subject to agricultural tax that forms a farm is taxed at a rate equivalent to the value of 2.5 quintal of rye per hectare, whereas other land is taxed at a rate equivalent to the monetary value of 5 quintal of rye per hectare. The price of rye therefore clearly influences the income of *gminas*[6]. In 2000 the income from agricultural tax increased regularly between 2000 and 2010 (Table 1).

[4] Ustawa o podatku rolnym z dnia 15 listopada 1984 r. [Agricultural Tax Act of 15 November 1984]. (Dz. U. z 1984r., Nr 52, poz. 268 z późn. zmianami, Dz. U. z 1993 r., nr 94, poz. 431).

[5] Ustawa o zmianie ustawy o podatku rolnym z dnia 10 października 2002 roku [Law amending of the Law on agricultural tax of 10 October 2002]. Dz. U. z 2002r., Nr 200, poz. 1680.

[6] The gmina is the principal unit of administrative division of Poland at its lowest uniform level. LAU 2 level (former NUTS 5).

Table 1: **Budget income on account of agricultural tax in 2000-2009.**

Years	Income on account of agricultural tax (EUR million)	Income on account of agricultural tax per one inhabitant (EUR)	Share of earnings on account of agricultural tax in total income of *gminas* in Poland (per cent)
2000	180.2	18.9	2.08
2001	197.9	20.8	2.12
2002	205.3	21.5	2.38
2003	219.6	23.0	2.44
2004	230.5	24.2	2.29
2005	241.7	25.4	2.11
2006	202.3	21.3	1.56
2007	232.9	24.5	1.63
2008	306.9	32.3	1.97
2009	303.8	31.9	1.87
2010	247.4	20.1	1.64

Source: Local Data Bank, GUS

In the period 2000-2010 the share of agricultural tax in the income of *gminas* was about 3.7 per cent, although in fact it ranged from 3.9 per cent in 2000, through 4.3 per cent in 2005, to 3.0 per cent in 2010 (Table 2). Although the agricultural tax is influenced by the price of rye, it fails to reflect the average profitability of farms and so it is hard to treat it as a main measure and determinant of profitability. Therefore, the amendment of the law is proposed, which provides for an extension of the period of calculating an average rye purchase price from three to eleven quarters of a year (the first three quarters of a year preceding the fiscal year and eight quarters directly preceding the year preceding the fiscal year). A long-term rye purchase price would be independent of periodic or even momentary price fluctuations. What is more, this solution can improve the stability of income planning on this account by *gminas*.

In the analysed period the total agricultural tax reductions, adjournments, amortisations, exemptions and waivers constituted on average around 4.7 per cent of the amount of agricultural tax paid to *gminas*. However, a positive trend in this area is worth noting, since the share of reductions, exemptions and so on amounted to 7.6 per cent of the agricultural tax in 2000, 4.7 per cent in 2005 and only 1.9 per cent in 2010.

Table 2: **Share of taxes in own income of *gminas.***

per cent

Specification	2000	2005	2010
Own income in total income	**52.5**	**48.7**	**44.6**
including:			
Agricultural tax	3.9	4.3	3.0
Property tax	23.4	31.4	28.1
Tax on means of transport	1.4	1.7	1.7
Forest tax	0.4	0.2	0.2

Source: own study based on information concerning overall budget performance in 2000-2010

Despite the fact that earnings on account of agricultural tax amount to only around PLN 1 billion, they are the most important tax burden imposed on farms (Table 3). In 2004-2007 agricultural tax amounted to ca. 86-87 per cent of the tax burden (except for 2006). Forest tax amounted to ca. 4 per cent, while tax on special branches of agricultural production was characterised by a diverse share due to a different structure of this tax compared to agricultural tax or forest tax.

Table 3: **Structure of fiscal burdens in farms.**

per cent

Specification	Years			
	2004	2005	2006	2007
Agricultural tax	86.0	86.2	83.9	86.6
Forest tax	3.9	3.8	4.3	3.8
Tax on special branches of agriculture	4.7	5.0	6.6	5.2
Property tax	0.8	0.9	0.9	1.0
Other taxes	4.6	4.1	4.3	3.4
Total taxes	100	100	100	100

Source: Mądra, 2009

The lack of income tax in agriculture has significant non-economic consequences, most importantly, the transfer of costs of state support to other social groups, resulting in unfair and uneven tax burdens. The Constitution stipulates that all legal entities should be treated equally, i.e. according to the same measure without either discrimination or favour. Different treatment is acceptable if it serves social equality, which concerns, for example, the exclusion from taxation of groups receiving salaries below the social minimum. In this context, exclusion of farmers from the tax law violates both the equality rule and the social justice rule. In the light of the lack of political stability, regulating this issue may be difficult. Moreover, the existing situation violates the competitiveness rule within agriculture, creating inequalities between individual farmers and farmers running specialist farms (who pay an income tax). It does not favour agricultural market development.

In the context of the lack of income tax, the economic aspects including the subsidisation of Polish agriculture is a serious problem. Exemption from income tax can be treated as an additional subsidy to agriculture. In this context the level of subsidies and grants supporting the development of agricultural activity remains a matter of debate. We also need to bear in mind the solutions applicable in EU Member States in the scope of subsidy taxation. In accordance with the Council Regulation (EC) No 73/2009 of 19 January 2009[7], point 24 of the Preamble, "payments provided for under Community support schemes should be made by competent national authorities to beneficiaries in full, subject to any reductions provided for in this Regulation and within prescribed periods", subject to the situation when a farmer fails to meet the requirements concerning granting a subsidy, he/she cannot receive it in full. However, this provision does not rule out the possibility of taxing the payments made, which is confirmed by examples from Member States. For instance, in the Netherlands and Denmark direct payments are included in the income, which means that they are subject to taxation, since in these countries farmers are covered by a tax system. In Belgium subsidies are not included in the income, however, they fall into a separate taxation rate. In some other countries, such as Germany, subsidies are not subject to taxation (Van der Veen *et al*., 2007).

[7] Council Regulation (EC) No 73/2009 of 119 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers, amending Regulations (EC) No 1290/2005, (EC) No 247/2006, (EC) No 378/2007 and repealing Regulation (EC) No 1782/2003

Income taxation of Hungarian agriculture

As the legal and business forms used by farms in Hungary are discussed in chapter two, here we deal only with income taxation and the problems connected to this.

The taxation of private farms is regulated by the *Act CXVII of 1995 on Personal Income Tax* (hereinafter referred to as Act on PIT) and the income taxation of companies is regulated by the *Act LXXXI of 1996 on Corporate Tax and Dividend Tax* (hereinafter referred to as Act on CT). The personal income taxation is especially complex. In case of individual farms the Act on PIT consists of not only different rules of traditional small-scale farmers and single entrepreneurs, but also definitions and rules of how to start agricultural activity. On the other hand, the Act on CT contains the special taxation rules, which are uniform for the different type of companies; the rules of funding, and operating the different forms of corporate farming.

Individual farms

Agricultural individual farms can carry out their activity as individual entrepreneurs, i.e. the general form of economic activity in every branch, or as traditional small-scale producers. This is a special regulation form for agricultural producers. A traditional small-scale producer is an individual of at least 16 years of age who is not an individual entrepreneur and who is performing traditional agricultural production[8] on his/her own farm[9] according to the Annex VI of Act on PIT. To justify the former, the traditional small-scale producer has to register to work as a farmer.

Table 4: **Taxation of individual farmers according to sales revenue limit, 2013.**

<table>
<tr><th>Revenue (EUR thousand)</th><th>0-2.0</th><th>2.0-13.3</th><th>13.3-26.6</th><th>26.6-50.0</th><th>50.0-83.3</th><th>83.3-</th></tr>
<tr><td rowspan="4">Traditional small-scale producers</td><td rowspan="4">Do not pay any taxes</td><td>Declared no income</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Flat rate taxation</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Itemised cost accountancy, Smallholder cost allowance</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="5">Itemised cost accountancy</td></tr>
<tr><td colspan="6">Cost ratio of 10 per cent, income is the 90 per cent of revenue</td></tr>
<tr><td rowspan="3">Individual entrepreneurs</td><td colspan="4">Flat rate taxation</td><td colspan="2"></td></tr>
<tr><td colspan="5">Simplified business tax</td><td></td></tr>
<tr><td colspan="6">Entrepreneurial personal income tax (Itemized cost accountancy)</td></tr>
</table>

Source: AKI, Financial Policy Department

For individual farms, the sales revenue determines which of these two categories will be applied. The complexity of this system can be illustrated by the nine taxation methods (six types for traditional small-scale producer, three types for individual entrepreneurs) (Table 4). The farmers have to keep in mind their economic size and the desire to pay the lowest taxes (Merkel and Tóth, 2011).

[8] Traditional agricultural production means: crop production, plantation and animal husbandry on an owned farm, and their processing. Furthermore traditional agricultural production is collecting certain agricultural products from an owned farm and forestry in an owned area.

[9] The producer has disposal of land and tools, those are in his property are rented, or leased.

Individual entrepreneurs may choose – depending on the amount of revenue – between three methods of taxation:

- For revenues below HUF 15 million (about EUR 50,000) flat rate taxation is optional. In that case the cost allowance may take into account 40 per cent of revenue, which rate is 80 per cent when the revenue derives solely from agricultural production;
- For revenues below HUF 25 million (about EUR 83,350) simplified business tax may be chosen. Its rate is 37 per cent on revenues;
- There is no revenue limit for itemised cost accountancy. The tax base is the entrepreneurial income, i.e. the difference between entrepreneurial revenues and costs.

If total revenue does not exceed HUF 600 thousand (about EUR 2,000) per year, traditional small-scale producers do not have to account agricultural income and to pay any taxes. Above this limit itemised cost accountancy may be chosen, meaning that the tax base is different between revenues and costs, or the cost ratio is 10 per cent if the farmer does not want to account his/her costs. In this case the 90 per cent of total revenue is the income.

For the small traditional producers whose revenue is below HUF 8 million (about EUR 26,600) there are three favourable tax forms available according to certain revenue limits:

- If revenues are below HUF 4 million (about EUR 13,300) per year, farmers who have chosen itemised cost accountancy can give a simplified declaration if costs reach at least 20 per cent of the total revenue. In this case they also declare that they did not generate income from agricultural activity in the tax year concerned;
- In the case of itemised cost accountancy, if revenues are below HUF 8 million (EUR 26,600) per year, income is deductible with the so-called smallholder[10] cost allowance over the declared cost up to 40 per cent of revenue. This amount cannot exceed HUF 1.2 million (EUR 4,000);
- The flat rate taxation is also optional for farmers whose revenue does not exceed HUF 8 million (EUR about 26,600). In crop production 15 per cent of the revenue is considered as income, while in animal husbandry or animal products the rate is 6 per cent.

Table 5: **Evaluation of different limits and rates of traditional small-scale producers taxation.**

EUR thousand

Category	2000	2001	2002	2003	2004	2005-2008	2009-2012
Small scale producers income limit	13.3	13.3	13.3	20.0	20.0	23.3	26.6
Family taxation income limit	–	–	20.0	20.0	20.0	–	–
Non-taxing income limit	0.8	0.8	0.8	1.3	2.0	2.0	2.0
Declaration of no income limit	3.3	6.6	6.6	15.0	15.0	13.3	13.3
Small-holders cost allowance rate	40% max. EUR 40 th.	40% max. EUR 40 th.	40%	40%	40%	40%	40%
Flat income taxation rate for small scale producers	6% (animal husbandry) 15% (other actvity)						

Sources: Merkel and Felkai, 2008, Act on PIT

The different taxation methods are illustrated in Table 5. The taxation of individual farms is further complicated by the fact that the same tax payer can be in parallel a traditional small-scale producer of traditional agricultural production and an individual entrepreneur of other (agricultural or

[10] Smallholder farmers are small-scale producers, who are under the revenue of EUR 26 600 per year.

non-agricultural) production, and can choose the same or different taxation method. In Hungary, 86.4 per cent of individual farmers (122.6 thousand) carry out their activity as traditional small-scale producers, the remaining 13.6 per cent (19,336) is the group of individual entrepreneurs (Table 6).

Table 6: **Number and revenue of individual farmers according to forms of taxation, 2011.**

	Denomination	Number of producers	Revenue (EUR million)
Traditional small-scale producers	Declared no income	59,187	514.46
	Itemised cost accountancy	13,219	609.23
	Itemised cost accountancy, Smallholder cost allowance	40,474	655.32
	Flat rate taxation, without animal husbandry	5,074	57.47
	Flat rate taxation, only animal husbandry	4,661	52.94
	Total	**122,615**	**1,889.42**
Individual entrepreneurs	Itemised cost accountancy	18,800	1,031.75
	Flat rate taxation	566	4.45
	Total	**19,366**	**1,036.20**
Individual farmers		**141,981**	**2,925.62**

Source: calculations are based on Hungarian Tax and Financial Control Administration data

The reason for the high proportion of traditional small-scale producers is their allowances concerning taxing and other accounting rules compared to individual entrepreneurs. Very few individual entrepreneurs choose the simplified business tax because the specific regulation of agricultural taxation ensures a much more favourable situation. In 2011, only 353 individual farms were taxed according to the simplified business tax, their average tax base was HUF 5.6 million (about EUR 19,000). A further 281 corporate entities chose the simplified business tax, with the level of HUF 6.2 million (about EUR 20,600) per firm average tax base.

Supports are also complicated for individual farmers. The non-refundable development-oriented or cost compensation payments are not qualified as revenues for every personal income taxation form. The small-scale producer's revenue limit is increased by the amount of supports received. The Single Area Payment cannot be considered as a non-refundable development-oriented or cost compensation support, so it must be taken into account as tax base.

The personal income tax rate is 16 per cent. A maximum of HUF 100 thousand (EUR 330) in tax reliefs can be accounted in case of those traditional small-scale producers who have chosen the taxation form of itemised cost accountancy or 10 per cent cost ratio.

The traditional small-scale producer can declare that he/she carries out his/her activity together with the family. In that case a common registered licence is required and each member of the family must choose the same taxation method.

The definition of a family farm is not a separate taxation category, but in the context of the individual farms it should be mentioned. This category is defined in the *Act LV of 1994 on arable land*. According to this definition, family farms constitute not more than 300 hectares of land (including agricultural, forestry cultivated and urban land that can be owned or leased), and movable and unmovable property assets included in the inventory. At least one member of the family must be a

full-time worker and the other family members who are contributing to the activity of farming as well. From the taxation aspect the common taxation rules concern on family farms.

The smaller the size of individual holdings, the more favourable are the taxation rules. In practice this means that the producers share their revenue among family members, and a significant proportion of producers exist only 'on paper'. This makes transparency difficult, and the economic structure does not reflect to the real situation.

Corporate entities

The Act on CT provides sector-neutral legislation, the general rules concern on agricultural corporate farms as well, of which there were 11,700 in 2011 with a combined sales revenue of EUR 5,554 million. Economic organisations pay corporate tax, which is a percentage of income. The tax accounting rules are independent from size, management forms or activity. However, the tax rate depends on the sales revenue. If the tax base is below HUF 500 million (EUR 1,667 thousand) per year, the rate of corporate tax is 10 per cent. Above this limit, the rate is 19 per cent.

In Hungary the corporate entities pay almost twice as much tax as one-personships (Table 7). In fact this is what tax allowances for smaller farms mean in practice. They are not obliged to count with all of the sales and other revenues (other revenues are mainly direct supports) that leads to a very unbalanced tax and not least social contribution paying. However, both kinds of entities are paying tax according to the same arrangement.

Table 7: **Income tax payment of joint ventures and individual farmers 2000-2011.**

EUR million

	2000	2002	2003	2005	2006	2008	2010	2011
Total income tax of individual farms	11.39	14.51	12.58	11.51	14.51	18.95	13.62	16.78
Total income tax/Total revenue of individual farm (per cent)	0.01	0.74	0.66	0.58	0.69	0.71	0.54	0.57
Total corporate tax of corporate farms	15.94	14.14	13.83	21.55	26.79	31.11	25.53	33.77
Total income tax/Total revenue of corporate farm (per cent)	0.53	0.41	0.39	0.56	0.65	0.64	0.55	0.63

Source: AKI, Financial Policy Department

Value added tax

Council Directive 2006/112/EC is harmonising the VAT regulation of EU Member States. The standard VAT rate has no upper limit, only the lowest limit (15 per cent) is determined. But Member States have the competency to regulate which products fall under which rates. According to this, Poland and Hungary can apply different rates for agricultural and food products. In the following we show what rules apply to agricultural products and we make an international comparison to highlight the differences between EU Member States.

Value added tax in Polish agriculture

Since August 2000 the sale of unprocessed agricultural products has been subject to VAT. On the other hand, agriculture is a specific sector of the economy and VAT is accounted on slightly different terms than for other sectors. Agricultural activity can be accounted either:

- on general VAT terms – a farmer sells his/her products, calculating a tax on this account and is entitled to deduct a tax paid when purchasing goods needed for production;
- in a flat-rate system – the flat-rate payers selling agricultural products are exempt from VAT. Flat-rate payers delivering agricultural products to a taxpayer who accounts this tax on general VAT terms are entitled to a flat-rate tax refund on account of purchasing certain means of production for agriculture that are chargeable by this tax.

The existence in agriculture of these two VAT accounting possibilities requires an active attitude of a taxpayer. Therefore, in order to select one of these accounting possibilities, a farmer should take account of various factors, e.g. type of activity and resulting income and expenditure structure as well as binding and planned tax regulations, including special rates for particular products, means of production and services.

After Poland's accession to the EU, in accordance with the Treaty of Accession, a reduced VAT rate of 3 per cent for agricultural products, material means of production and agricultural services was in force until 1 May 2008, pursuant to the *Act on Value Added Tax of 11 March 2004*[11]. As of 1 May 2008, after the amendment[12] of the *Act on Value Added Tax*, which was a result of the harmonisation of national regulations concerning VAT with the EU law, the VAT rates for inputs of production and services were 7 per cent and 22 per cent respectively. As a result of negotiations, parties agreed to maintain a 3 per cent VAT rate for unprocessed agricultural products until the end of 2010. At the same time, to compensate for the increase in tax for means of production, the VAT rate for flat-rate payers in agriculture was increased from 5 per cent to 6 per cent. As of 1 January 2011 new regulations concerning VAT have been in place arising from the termination of the transition period for reduced VAT rates for processed and unprocessed consumption goods. Current VAT rates are also a result of the latest act[13] (in force since 1 April 2011) amending the *Act on Value Added Tax of 11 March 2004*. As a result of the changes, the lowest preferential rate is 5 per cent and concerns such products as, for example, annual plants, seed, milk, fresh fruit and vegetables. The rate for livestock, mineral fertilisers, feed concentrates and agricultural services increased to 7 per cent (8 per cent at the end of 2013). The 23 per cent rate covers fuel, electric power and non-agricultural services, as well as agricultural machines and equipment until the end of 2013 (after this period a return to 22 per cent is intended). At the same time, a flat-rate VAT return was increased from 6 per cent to the target value of 6.5 per cent. Within the transition period between 1 January 2011 and 31 December 2013 the rate amounted to 7 per cent. A decrease in the flat-rate VAT return from 7 per cent to 6.5 per cent is to take place on 1 January 2014. A detailed list of VAT rates in agriculture is presented in Table 8. The amended act does not provide for facilitations for farmers giving up flat-rate payments.

[11] Ustawa o podatku VAT z dnia 11 marca 2004 roku [VAT Act of 11 March 2004]. (Dz. U. Nr 54, poz. 535).
[12] Dz.U. No. 74, item 444.
[13] Ustawa o podatku VAT z dnia 18 marca 2011 roku [VAT Act of 18 March 2011]. (Dz. U. Nr 64, poz. 332).

Table 8: **Examples of VAT rates for agricultural products in Poland, 2013.**

VAT rate	Products and services covered by a given rate
5%	Annual plants (e.g. cereals, maize, sugar beet, potatoes); Seed (of cereals - except for oats, rape, mangelwurzel); Milk, Fruit, Honey, Fresh vegetables
7%	Flat-rate return
8%	Veterinary medicines, Mineral fertilizers, Straw, hayseed, Soya meal, rape meal, feed concentrates, Plant protection products, Agricultural services, Live pigs, poultry and cattle, Veterinary services in the scope of animal treatment
23%	Energy carriers (engine fuels, furnace oils, carbon, coke, electricity, heat, gas), Non-agricultural services (construction services, veterinary services in the scope of animal care, telecommunications services, etc.), Agricultural machines and equipment.

Source: own study

The amendment of 2008 introduced necessary terms to the *Act on Value Added Tax* such as flat-rate farmer, agricultural products, agricultural activity and farm. A *flat-rate farmer* is defined as a taxpayer enjoying an exemption from VAT on the basis of Article 7(1) point 7 of the Act. We need to note that the Article 7(1) point 7 of the Act does not provide for subjective exemption from VAT, instead it provides for exemption from VAT - apart from certain exceptions - applicable to the sale of agricultural products, i.e. objective exemption. Therefore, in practice a flat-rate farmer is not the one who enjoys exemption from VAT, but the one whose sale of agricultural products enjoys exemption from VAT. *Agricultural products* are goods whose sale is eligible for flat-rate VAT return, at the same time constituting goods whose sale (except for imports) performed by a flat-rate farmer (with certain exceptions) is exempt from VAT. These goods have been listed in Annex 8 to the Act. *Agricultural production* has been defined as plant and animal production, including production of seed, planting stock, breeding and reproductive material, vegetable, ground, greenhouse cultivation and cultivation under plastic, production of ornamental plants, mushrooms and orchard production, animals, birds and insects breeding and production of animal breeding material, industrial or farm production of animals and freshwater fish and other live aquatic animals breeding as well as cultivation of plants in greenhouses and heated plastic film covers, cultivation of mushrooms and mycelium, *in vitro* cultivation of plants, farm production of slaughter and laying poultry, poultry incubation grounds, production of furry and laboratory animals, production of earthworms, production of entomophags, production of silkworms, beekeeping and production of other animals outside a farm as well as sale of forestry and hunting products except for deciduous, coniferous and exotic wood. A *farm* is defined – for VAT purposes – as a farm in the meaning of regulations on agricultural tax[14]. *Forest farms* are defined as farms run by a taxpayer whom a tax obligation in the form of forest tax concerns, in the meaning of regulations on forests[15]. A *fish farm* is defined for VAT purposes as performing an activity in the scope of production of freshwater fish and other live aquatic animals.

[14] Article 1(2) of the Act of 15 November 1984 on Agricultural Tax, Dz.U. of 1993 No. 94, item 431, as amended.
[15] Article 61 of the Act of 28 September 1991 on Forests – Dz.U. of 2000 No. 56, item 679.

Flat-rate VAT in agriculture

A flat-rate farmer selling agricultural products from his/her own agricultural activity exempt from VAT, whose buyers are VAT taxpayers, is entitled to a flat-rate tax return on account of purchasing certain means of production for agriculture covered by VAT. The amount of flat-rate tax return is paid to a flat-rate farmer by a buyer of agricultural products. Only a farmer selling agricultural products from his/her own agricultural activity is entitled a flat-rate tax return. A flat-rate farmer is exempt from certain tax obligations, such as:

- keeping a sale register of own products and a purchase register of goods and services;
- issuing invoices;
- submitting a registration application;
- submitting VAT declarations at the tax office;

A farmer can resign from the abovementioned exemption after meeting several conditions, that is:

- making a delivery of agricultural products and providing agricultural services with a value exceeding PLN 20,000 in the previous fiscal year;
- submitting a registration application with a VAT;
- keeping a VAT register from the day of resignation;
- keeping a sale register for a given day, however, no later than before making a purchase on the following day, within at least 3 months preceding the month of resignation from an exemption.

The only obligation of a farmer is to store VAT-RR invoices (VAT invoices of flat-rate farmers) issued by buyers for five years, counting from the end of the year in which these invoices were issued. Therefore, the flat-rate has been created to relieve farmers from registry obligations and fiscal accounts with the tax office. A negative side of flat-rate farmers' accounting is the lack of the right to deduct VAT included in purchased goods and services.

There is a possibility to relinquish privileges for flat-rate farmers – a farmer can switch to general tax rules by filling out (in accordance with Article 43(1) point 3 of the Act on Value Added Tax) a VAT-R declaration form. However, such simplified conditions for switching to general tax rules have functioned only since 2011. A farmer should notify buyers to whom he/she submitted a flat-rate farmer declaration of the resignation in a separate written declaration – in the case of agricultural procurement contracts or other agreements with similar character in the contract period. Renewed use of exemption which flat-rate farmers are entitled to is possible only after three years from the date of resignation from the exemption – it takes place via notifying a head of a tax office before the beginning of a month or a quarter from which a taxpayer wishes to make use of the exemption again.

In order to receive a flat-rate tax return, a flat-rate farmer should have a bank account. Moreover, he/she should provide a taxpayer purchasing agricultural products with his/her personal data and then sign an invoice, which should contain his/her declaration of being a flat-rate farmer exempt from VAT. A farmer is obliged to store original VAT-RR invoices and copies of declarations for five years, counting from end of the year the invoice was issued. It is important that invoices are issued by a VAT taxpayer purchasing these products from a flat-rate farmer and that they document an act of purchasing agricultural products instead of their sale. The invoice in question – analogously as in the case of other invoices, the rules of issuance and storing of which have been provided for in VAT regulations – is issued in two copies, out of which:

- the original document is handed over to a flat-rate farmer (i.e. a seller of agricultural products);
- a copy remains at the issuer, i.e. a buyer of agricultural products.

A VAT-RR invoice differs slightly from standard VAT invoices. Apart from standard items, it should contain the farmer's ID number (or another document confirming the farmer's identity), date of issuance and issuing authority; moreover, such an invoice needs to be signed. Additionally, a farmer needs to make a statement in which he/she declares that he/she is a flat-rate farmer entitled to

a tax reduction for goods and services, in accordance with "Article 43(1) point 3 of the Act on Value Added Tax". In order for an entrepreneur to be able to deduct flat-rate VAT, transaction payment must take place via money transfer within 14 days from the date of transaction (unless a contract with extended payment date is concluded). Title of transfer also must contain an invoice number and date of issuance. Settlement of a flat-rate tax by a buyer takes place on slightly different terms than a full VAT settlement. The amount of flat-rate tax return is paid to a flat-rate farmer by a buyer of agricultural products. Then a flat-rate tax return increases the goods buyer's tax calculated for a month in which a payment was made, provided that: purchase of agricultural products is related to taxed sale; payment of receivables for agricultural products, including the amount of flat-rate tax return, takes place on a flat-rate farmer's bank account; the abovementioned document confirming the payment contains a number and a date of issuing an invoice confirming the purchase of agricultural products.

Value Added Tax in Hungarian agriculture

The 27 per cent Hungarian standard VAT rate is the highest among the EU countries. In 2012 the average standard VAT rate in the EU was 21.7 per cent. A 25 per cent rate applied in Sweden and Denmark (and Croatia), while the lowest rate (17 per cent) could be found in Cyprus. In Hungary there are no 'favourable' rates (i.e. rates below 15 per cent) concerning food and agricultural products. The Hungarian reduced rate (18 per cent) is the highest among the reduced rates in the EU, which otherwise range between 5 and 15 per cent. In addition, the range of products subject to the reduced rate is very narrow, namely milk and dairy products, and some bakery products (Table 9).

Table 9: **Examples of VAT rates for Hungarian food products, 2013.**

VAT rate	Products and services covered by a given rate
18%	Products from milk or milk based products and products containing cereals and sour, bakery products
27%	All the other products

Source: AKI, Financial Policy Department

In many EU Member States the preferential VAT rate for basic food products such as bread and milk are between 0 and 5 per cent while the average VAT rate on all food products in the EU is between 9 and 11 per cent. Member States pay special attention to keeping VAT rates on food at their traditional low level. Social considerations explain low VAT rates, but the effects on other sectors of increasing VAT rates for basic foods are also a reason for keeping the VAT rates for food low, because the inelasticity in the demand of consumers to basic foods implies a reduction in the demand for other goods when the VAT rate for basic food is increased. Experience shows that during the economic crisis in the EU VAT rates remained unchanged or only minor increases were imposed (Lámfalusi *et al*, 2013).

The great differences among VAT rates in EU Member States can influence the demand for certain products. Significant differences between neighbour countries' VAT rate can lead to 'shopping tourism'. High VAT rates encourage VAT fraud and the black economy. According to agricultural associations, fair market players and professional assessments the black market has increased greatly in the Hungarian agri-food sector, causing huge moral and financial losses for the mainstream economy and for the state budget. The dominant opinion is that one of the main drivers of the spread of the black market in the sector is the high rates of value added tax (VAT) applied to agri-food products, which damage the competitive position of the sector and destroy market relationships and social moral (lower willingness of tax payment in general) (Lámfalusi *et al*, 2013). To overcome these negative implications a considerable reduction in the VAT rates is needed, at least in the case of the basic food products.

In order to reduce VAT fraud in the agricultural sector a reverse VAT payment system has temporarily been introduced for the grain sector from 1 July 2012 covering maize, wheat, barley, rye, oats, triticale, sunflower seeds, rape or colza seeds and soybeans.

VAT regulation in Hungarian agriculture

The Hungarian *Act CXXVII of 2007 on Value Added Tax* – in contrast to the income taxation – does not distinguish taxpayers (traditional small-scale producers, individual entrepreneurs and corporates); the general rules are the same. Farms can choose among three taxation method depending on the sales revenue. The revenue limits of VAT regulation are different compared to that of income taxing regulation. Under EUR 16.6 thousand there is an individual exemption under VAT, between EUR 0 and 1,666.6 there is a compensation for agricultural products, at not least everybody can choose the general taxation at every revenue level. According to the general regulation the seller charges VAT after sales and pays VAT on purchases. The difference between these two amounts is remitted to the national budget.

A small agricultural producer will become subject to VAT when performing an economic activity in his/her own name, selling a product or service commercially and achieving a regular income. The producer does not become taxable person when he/she produces to cover their own needs, and the amount of redundant occasionally sells.

Council Directive 2006/112/EC and the Hungarian regulation also provide special facilities for the "taxable person who is engaged in agricultural activities". A taxable person engaged in agricultural activities shall not be subject to tax payment, nor shall be entitled to deduct tax. Receiving taxable persons shall pay a compensation premium, in addition to the purchase price but as part of the consideration, to the taxable person engaged in agricultural activities for the goods supplied within the scope of such activities. The rate of the compensation premium is 12 per cent for crop production and primary processing products and some processed, preserved, self-produced vegetables, fruits, pickles, etc., and must and wine, and 7 per cent for forest seeds and seedlings, as well as for livestock products and agricultural services.

The choice of special compensation for agricultural products has more conditions. One of these is that the taxpayer shall be a micro-enterprise. This limit is of no great importance because only 27 individual farmer and 15 per cent of corporate entities could not meet the criterion in 2011. Special compensation for agricultural products is applicable to the following agricultural activities:

- Crop production (such as cereals, pulses, potatoes, fruits and vegetables);
- Live animals husbandry (e.g. cattle, pigs, sheep, horses and poultry);
- Primary processing of crop products and animal products (e.g. cleaned potatoes, preserves, pickles, grape wine barrels and producing dairy products).

The general regulation or the rules of individual exemption can be used for those sales of goods or provisions of services in which the special compensation is not applicable. In the case of individual exemption the taxable person engaged in agricultural activity shall not be required to pay VAT but shall not have the right of deduction. The choice of individual exemption requires that the taxable income does not exceed either the current calendar year or the previous calendar year to HUF 6 million (about EUR 20,000).

Agricultural activity of traditional small-scale farmers according to Act on PIT and agricultural activity for special compensation agricultural products are not the same. This and the independence of the VAT regulation and income taxation from each other means that in practice many variations of them can occur, again making transparency difficult.

Social insurance in agriculture

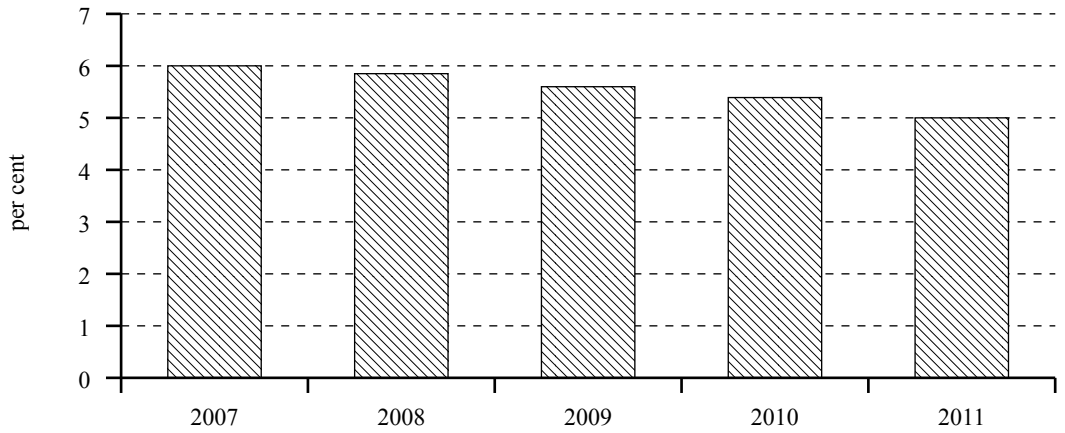
The Polish social insurance system is quite different to the Hungarian one. In Poland the social insurance is separated from taxation categories, and there is a quite different system for agricultural farmers. In Hungary the taxation categories can determine which social insurance payment category concerns agricultural farms.

Social insurance in Polish agriculture

Social insurance of farmers in Poland functions as an autonomous system. The scope of benefits offered in the insurance system for the agricultural sector is similar to the one in the industrial sector. Maternity, caregiver, childcare and unemployment benefits are exceptions here, as they only function in the industrial system. The level of benefits such as old age and disability pensions and sickness benefits are much lower than in the general system. In 2010 an average monthly non-agricultural old age pension amounted to ca. EUR 411, while an agricultural one amounted to EUR 239. We should note though, that agricultural old age benefits are financed from relatively low contributions, which translates itself into high budget subsidies to these benefits.

The analysis of a total subsidy to the Farmers' Social Security Fund (KRUS) indicates that in 2007-2011 its share in total state budget expenditure decreased from 6.1 per cent in 2007 to 5.0 per cent in 2011 (Figure 1). In 2011 the subsidy to KRUS amounted to EUR 3.8 billion, slightly higher (by ca. EUR 46 million) than in 2010.

Figure 1: **Share of expenditure on agricultural social insurance in the Polish state budget in 2007-2011.**



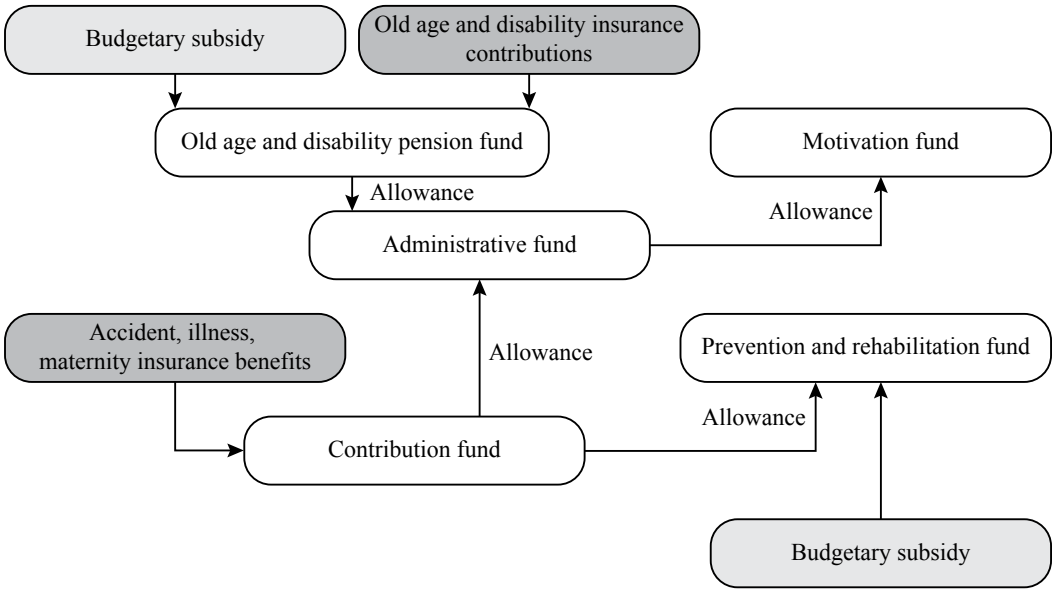
Source: own study based on Budget Act reports for 2007-2011 (www.mf.gov.pl)

KRUS financial resources are collected in five funds by means of which the entity performs its own financial management: old age and disability pension fund, contribution fund, administrative fund, prevention and rehabilitation fund and motivation fund. These funds have different financing sources (Figure 2). Budgetary subsidy is aimed at two funds: the *old age and disability pension fund* and the *prevention and rehabilitation fund*. A subsidy can also be channelled to other funds, since they are financially interlinked. Allowances are made from the old age and disability pension fund to the *administrative fund*, which constitute ca. ¾ of its revenues. The allowance from the administrative fund, the funds of which are calculated from the contribution fund, is channelled to the *motivation fund*. The only fund that is independent of state subsidy is the *contribution fund*. It is financed mainly from farmers' contributions and its resources serve as a basis for allowances to the adminis-

trative fund and the prevention and rehabilitation fund. Such links make the control of KRUS and the flow of budgetary funds between funds difficult.

In accordance with the Budget Act, the largest share of a budgetary subsidy for KRUS is received by the old age and disability pension fund. The old age and disability pension fund's revenues in 2011 amounted to PLN 16,567 million and were PLN 219 million higher than in 2010. This slight increase in revenues of the fund resulted from a slight increase in contributions (by 2.3 per cent) paid by farmers.

Figure 2: **Flows of funds between Farmers' Social Security Funds.**



Source: own study

In 2007-2011 the share of contributions in expenditure for the agricultural old age and disability pension grew only slightly, from 9.1 per cent in 2007 to 10.4 per cent in 2011. However, despite the greater share of contributions in financing agricultural benefits, the KRUS system has remained largely dependent on a budgetary subsidy, which amounted to ca. 92 per cent of revenues of the old age and disability pension fund in the analysed period (Table 10).

Table 10: **Main sources of income of the Polish old age and disability pension fund.**

Specification	2007	2008	2009	2010	2011
Total revenues (EUR million)	3,797	4,065	4,274	4,087	4,142
I. Budgetary subsidy, including:	3,494	3,750	3,926	3,734	3,780
Subsidy for health insurance	424	545	643	465	466
II. Earnings from benefits	299	311	325	339	347
Share of budgetary subsidy in revenues (per cent)	*92.0*	*92.2*	*92.0*	*91.4*	*91.3*

Sources: own study based on data from budget execution report for 2009-2011 and the draft budget act for 2012 (www.mf.gov.pl)

In 2011 a ca. 0.4 per cent decline in old age and disability pension fund expenditure was noted compared to 2010, a result of decreased expenditure on agricultural old age and disability pensions (by 4 per cent) and an increase in other benefits by ca. 37 per cent. Of the other items, funeral benefits are the most important, although they have gradually decreased since 2007. However, the value and amount of the following benefits has increased: disability pensions, veteran allowances, energy flat-rate payments etc.

Table 11: **Contributions of the Polish old age and disability pension fund expenditure.**

Specification	2007	2008	2009	2010	2011	2012 plan
Total expenditure (in EUR million)	**3,855**	**4,066**	**4,262**	**4,144**	**4,125**	**4,194**
including:						
- old age and disability pensions	3,252	3,336	3,422	3,475	3,335	3,419
- health benefits	424	545	643	465	466	445
- other benefits	179	185	196	204	324	330
Number of old age pensions and disability pensions paid (EUR thousand)	**383**	**370**	**357**	**344**	**332**	**n.a.**
Average old age pension and disability pension financed from old age pension and disability pension fund (EUR)	**203.5**	**214.5**	**191.6**	**201.7**	**209.5**	**n.a.**

Sources: own study based on data from budget execution report for 2009-2011 and the draft budget act for 2012 (www.mf.gov.pl)

The most important budgetary expenditure item is agricultural old age and disability pensions. In 2011 their share was slightly lower than in 2007 and amounted to ca. 84 per cent (Table 11). In the analysed period an average agricultural old age pension and disability pension slightly grew by ca. 3 per cent. The difference between the lowest payment and the average agricultural old age and disability pension leads to a situation where received benefits become an alternative for work, all the more since receiving benefits does not limit the opportunity to work on a farm.

It is clear from the data that the system of agricultural social insurances will require further changes. The current level of old age and disability pension contributions may discourage persons insured within the framework of KRUS to look for a non-agricultural job. These changes should consist of tightening the system and keeping farmers performing non-agricultural business activity in return for higher contributions. Therefore, proposals launched by the Polish Ministry of Agriculture and Rural Development in this regard need to be positively evaluated. The same applies to modifications of agricultural health insurance, provided that target solutions will enter into force.

Social care in Hungarian agriculture

In the Hungarian social security system everybody who is working either for an employer or is self-employed pays a certain percentage of their income as a contribution to the national insurance fund. The fund also receives considerable contributions from employers. The contributions are the basis of both the health service funds and pension funds. The funds are used to provide free medical treatment for patients, and several kinds of state benefits such as unemployment, invalidity, sickness, childcare, pension etc.

According to the current general rules the employer pays a social contribution tax (this is the new name from 2013, until 2012 it was the social insurance contribution, its extent 27 per cent) on employees. The basis of the social contribution tax is the employee's income, with a minimum of 112.5 per cent of minimum wage. This general regulation refers to corporate entities. Employees pay

10 per cent of income as pension contribution, 7 per cent health care contribution and 1.5 per cent labour market contribution after their income (Table 12).

Table 12: **Extent of social contribution tax and contributions paid by employees in Hungary, 2013.**

Specification			Extent
Tax paid by employer	Social contribution tax		27%
Contributions paid by employees	Pension contribution		10%
	Health care contribution	In kind	4%
		In cash	3%
	Labour market contribution		1.5%

Source: AKI, Financial Policy Department

The special rules concerning traditional small-scale producers ensure preferential contribution paying opportunities in agriculture. The system is defined more or less according to income tax categories (traditional small-scale farmers, individual entrepreneurs) and revenue limits. But this system simpler and fewer categories are differentiated. The concept of a traditional small-scale producer was introduced into tax in 1997, but did not appear in the social insurance system until 2006. Between 1997 and 2006 agricultural small-scale producers were left out of the social security system. They were not required to pay social security contributions, but this period was not be taken into account as approved service time when calculating pension. Agricultural traditional small-scale producers could use the general option to become entitled to the health care system: those who did not qualify as insured should pay social insurance contributions to the extent of some per cent (in 2006 it was 11.5 per cent) of the minimum wage.

Agricultural traditional small-scale producers could become members of the system from January 2007 again, and their payment obligations can start from that date. However, the full entitlement to benefits is not ensured since the new legislation does not provide full insured status (Szilágyi, 2008). Under the current pension rules, only those agricultural small-scale producers are secured whose approved service time until retirement age and already provided approved service time together are more than 20 years.

Problems can arise for those agricultural producers who performed agricultural activity as a main occupation in the period between 1997 and 2006, when they were not qualified as insured, and could not get approved service time. In case of many small-scale producers could not become secured before 1. January 2007, since his/her approved service time until retirement age and already provided approved service time together are less than 20 years. Those people who are not insured this way can make an arrangement with the pension board to become insured on a voluntary basis (Jurányi and Tóth, 2008).

The agricultural small-scale producer – depending on the amount of revenue – has a lower obligation to pay contributions compared with other forms of company. However, a lower payment obligation also means lower levels of sickness and retirement benefits.

The agricultural small-scale producer shall pay social contribution tax (27 per cent, until 2012 called social security contribution), pension contributions (10 per cent), health insurance contributions (7 per cent), and labour market contribution (1.5 per cent) on the amount of the minimum wage. An agricultural smallholder producer (whose revenue without subsidies does not exceed HUF 8 million) shall pay 4 per cent health care contribution in kind on the amount of 20 per cent of revenue in the previous year, and 10 per cent on the amount of the minimum wage. He/she is not required to pay the 27 per cent social contribution tax and health care contribution in cash (3 per cent). However,

the basis of health insurance benefits (for example, sickness benefits, child care fees etc.) is the paid health care contribution in cash. The traditional agricultural small-scale producer has an opportunity to pay his/her contribution on a greater amount that is required, and can receive health insurance benefits (Table 13).

Table 13: **Social contributions of individual farmers in Hungary depending on revenue, 2013.**

<table>
<tr><th>Revenue without subsidies (EUR thousand)</th><th>0-13.3</th><th>13.3-26.6</th><th>26.6-50.0</th><th>50.0-83.3</th><th>83.3-</th></tr>
<tr><td rowspan="2">Traditional small-scale producers</td><td colspan="2">4 per cent of 20 per cent of revenue + 10 per cent of the amount of minimum wage</td><td colspan="3"></td></tr>
<tr><td colspan="5">27 per cent social contribution tax, 10 per cent pension contribution and 7 per cent health care contribution on the amount of minimum wage</td></tr>
<tr><td>Individual entrepre-neurs</td><td colspan="5">27 per cent social contribution tax on the amount of income, but minimum 112.5 per cent of minimum wage, 10 per cent pension contribution on the amount of income, but minimum 100 per cent of minimum wage, 7 per cent health care contribution on the amount of income, but minimum 150 per cent of minimum wage</td></tr>
</table>

Source: AKI, Financial Policy Department

Calculation of approved service time is based on the principle of proportionality which in practice means the following: if the annual contribution fund does not reach the amount of minimum wage, the approved service time is also proportionally less than 365 days. Because of lower pension contribution of small-scale producers, later they can only count with lower social care from the government, which can lead to social problems on rural areas. However, the traditional agricultural small-scale producer has an opportunity to pay his/her pension contribution on a greater amount than that which is required, and can receive higher pension benefits. A further preference for traditional agricultural producers is that the amount of subsidies should not be considered at the HUF 8 million (about EUR 26,600) revenue limit. However, the calculation of the contribution base should take into account this item.

The traditional small-scale producer who is not insured according to the above rules or according to other titles should pay HUF 6,660 (about EUR 22.2) per month or HUF 222 (EUR 0.74) per calendar day as health care contribution. On the income that is not burdened by social security tax[16], the traditional small-scale producer should pay a social security contribution of 27 per cent. For agricultural small-scale producers the rate is lower, about 15 per cent depending on the taxation method.

The single entrepreneur should pay 27 per cent social contribution tax on the amount of entrepreneurial income, but at a minimum of 112.5 per cent of the minimum wage. Seven per cent of his/her income, but at a minimum of 150 per cent of the minimum wage, must be paid as a health care contribution and 1.5 per cent as a labour market contribution. A further 10 per cent of the income (not less than the minimum wage) is payable as a pension contribution. The single entrepreneur pays 14 per cent social contribution on the entrepreneurial dividend, but this is not subject to other contributory obligations.

[16] For example, this may occur when the revenue income ratio exceeds 20 per cent. Until the part of 20 per cent the farmer pays health care contribution, after the part above 20 per cent pays social security contribution.

Conclusion

The Polish and Hungarian agriculture taxation systems are fundamentally different from each other, making it difficult to compare them. However, their common feature is that the agricultural taxation is different compared to other sectors, corresponding to the specialties of the industry. It is important to be seen that in the frame of Common Agricultural Policy the government has only this possibility to somehow support the smaller farmers, and to help them to stay competitive compared to bigger cooperatives or partnerships.

In Poland, the agricultural production is mainly carried out by traditional family farms, which numbered in the reporting period amounted to about 1.8 million. Among them, more than 50 per cent of agricultural farmers produce primarily for their own use. Agriculture is the main source of income for 578 thousand households. It is estimated that only 14 per cent of farms in Poland are able to sufficiently contribute to production potential and give the basis of agricultural production. These facts are reflected in the special preferential tax structures of Polish agriculture and insurance. The preferential arrangements provide a clear form of support also for Polish agriculture and due to outdated structures (strongly separated from the market) do not fulfil their original function. The main problem that inhibits any changes to the system is the lack of obligation to keep records of the farm. This situation is not conducive to the transparency of the system, which leads to much fraud in the sector, as well as in cross transactions.

In Hungary agricultural producers (private farms and legal entities) pay taxes on their income. The laws and other regulations concerning taxation are more complicated and contain a lot of allowances for small agricultural farms. The farms have to pay taxes regarding their legal form, size and business activities. Today a traditional agricultural small-scale producer may choose from 10 or 12 taxation methods. In the light of these, the personal income tax system of agriculture does not satisfy the requirement of transparency, which is a basic principle of taxation. It can be seen that the actual agricultural taxation system facilitates tax avoidance and it encourages subsistence on supports and less efficient production on paper.

The particularly favourable Hungarian taxation form of traditional small-scale producers was well-founded before Hungary's accession to the EU because the level of profitability of these producers was very low. The initial amount of subsidies was only 25 per cent of EU producers' payments. However, the income situation of agriculture has improved significantly since EU accession (especially in crop production) due to the price increases in recent years. On the other hand the level of subsidies reached 100 per cent in 2013. So, in the near future it is necessary to review and revise the taxing of agricultural producers.

The general framework of VAT is prescribed by Council Directive 2006/112/EC, which means a limited regulation scope for each EU Member State, mainly in rates, and the range of products and services. VAT rates in Hungary (both standard VAT rate and preferential VAT rate) are the highest among EU Member States. The preferential rate is not only high (18 per cent, it exceeds the lower limit of standard rate) but concerns only a few food products. The Polish standard VAT rate is only four percentage points lower than Hungarian one. However, the most of the agricultural inputs and outputs are subject to preferential rate of 5-7 per cent (Table 8). Both countries take advantage of the special facility provided by the Council Directive and apply simplified flat rate taxation to small agricultural producers. The preferential VAT rate for agricultural products in Poland is currently 7 per cent, while in Hungary the values are 7 and 12 per cent. This analysis clearly indicates that the Polish flat-rate VAT in agriculture does not meet its fiscal functions, and its introduction was intended to support the development of agriculture through compensation expenses incurred for the purchase of means of production and investment. A much better solution would be VAT on general principles.

Like taxation, the social care systems are different in the two countries. Social insurance of farmers in Poland is an independent system, with lower farmer contributions and lower benefits than in the industrial sector. In Hungary social care is closely related to the categories of income taxation. The current rules still give traditional small-scale producers favourable opportunities for paying social contributions, but in return they are not eligible for all entitlements. According the present regulation the primary producers are not considered fully fledged members of the social security system, which is disadvantageous for them.

In summary, the socio-economic policy implemented in Poland and Hungary promotes preferential taxation of agriculture. It should be noted that Polish farmers have significantly greater advantages. However, the existence of special preferences in the construction of the tax and insurance in agriculture justifies the social necessity of agricultural production and the specificity of this activity, especially its dependence on the ever-changing operating conditions. The problem lies in the fact that the so-called tax expenditures for agricultural activities mean a greater tax burden for the other sectors of the national economy.

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Institutional preparations for the implementation of the European Innovation Partnership

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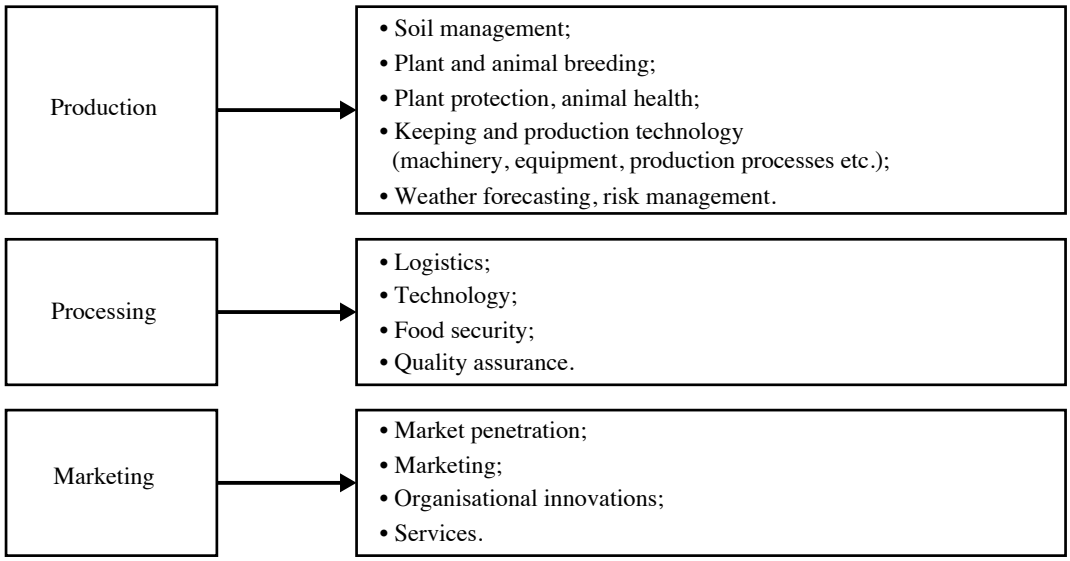
Introduction: innovation in agriculture

Innovation is often described as a new idea that proves successful in practice. The European Union's (EU) current growth strategy, Europe 2020, points to innovation as one of the main areas of development (EC, 2010a). In agriculture, innovation can occur anywhere along the supply chain (Figure 1). Innovative technologies are key elements for productivity improvement and to challenge environmental constraints on agricultural production. In the process of transformation of agriculture technological, social and institutional innovations represent traditional drivers of changes towards sustainable development (Rennings, 2000). On the other hand, the bio-based economy type of innovations is relatively new and its application depends on social attitudes (OECD, 2009).

The European Commission (EC) is presently (as of mid-July 2013) setting up the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' that will serve as a catalyst to enhance the effectiveness of innovation-related actions in agriculture during the 2014-2020 programming period (EC, 2012). The EIP can be seen as the next step in an EU agricultural and rural development policy that has moved from market intervention, through direct income and investment support, to strengthening innovation processes. It will bring together actors from across the Agricultural Knowledge and Innovation System (AKIS), be they farmers, scientists, farm advisors, enterprises or others, in 'Operational Groups' that will carry out projects aimed at testing and applying innovative practices, technologies, processes and products.

Figure 1: **Examples of areas of innovation in the agri-food supply chain.**



Source: AKI

[1] Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej - Państwowy Instytut Badawczy, Warszawa.
[2] Agrárgazdasági Kutató Intézet, Budapest.

This chapter does not try to assess the merits of the EIP as a methodology: it accepts that the initiative is embedded in the EU's 'Innovation Union' approach (EC, 2010b) and will be implemented across the EU from 2014. Instead, it explores the level of preparedness in Poland and Hungary for the implementation of the EIP. As the operation of the EIP is firmly grounded on the concept of the AKIS, we firstly discuss this concept and how it applies to the two countries. The next section compares and contrasts the preparations being made for implementing the EIP, and this is followed by some examples that illustrate actors' experience to date of 'Operational Group'-like activities. In the concluding section some recommendations are made.

Agricultural Knowledge and Innovation Systems

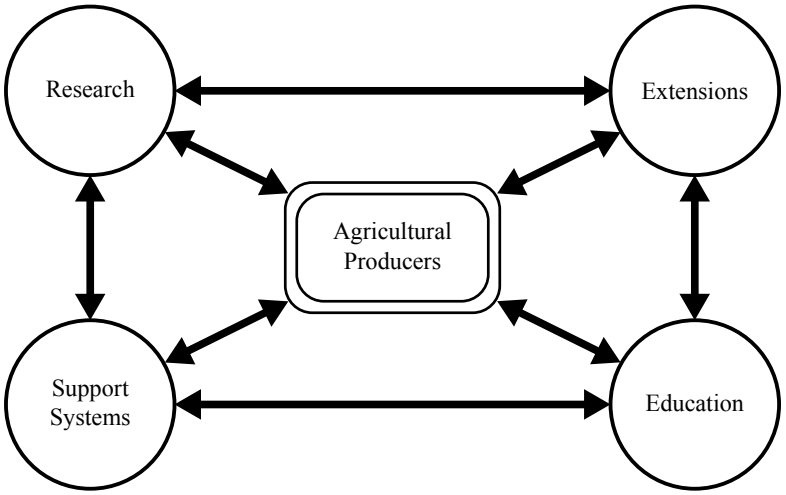
Since the 1970s, organisations such as the OECD and the FAO have introduced the concept of Agricultural Knowledge and Information Systems in policy discourses. This acronym has since evolved to describe Agricultural Knowledge and *Innovation* Systems, a concept that seeks to encompass and influence the complexity of knowledge and innovation processes in the rural sphere (Klerkx and Leeuwis, 2009). Hall (2006) defined an (agricultural) innovation system as 'a network of organisations, enterprises and individuals focused on bringing new products, new processes and new forms of organisation into economic use, together with the institutions and policies that affect the way different agents interact, share, access, exchange and use knowledge'.

Rivera and Zijp (2002) identified four main types of actor with an interest in agricultural (and rural development) innovation: *research*, *extension services*, *education and training*, and *support systems* (all the organisations providing credit, inputs and producers' associations, etc.). In their model, all four of these sets of actors act upon the knowledge of farmers and rural actors and generate innovations (Figure 2).

A number of factors have led to the erosion of the traditional concept of the AKIS in which research was a source of knowledge, extension and education were knowledge and information channels, and agricultural entrepreneurs were recipients of knowledge (Dockès *et al*., 2011). They include both theoretical and empirical factors:

- Research, extension and education have undergone a major restructuring. They have been transformed by the trend towards liberalisation, which has led to privatisation of service delivery or to public/private partnerships, the multiplication of extension organisations, farmers contributing towards the cost of these services, competitive bidding for research and extension contracts, and tighter evaluation procedures;
- The policy agenda has been modified by increasing concerns about the environmental impact of industrial agriculture, the quality of life of rural populations, rural employment and the need to support the positive 'externalities' (public goods) linked to agricultural production. This has led to new emphasis being placed on balancing and integrating agricultural policies with rural development;
- The 'linear' model of innovation has progressively been replaced by a 'participatory' network approach, in which innovation is 'co-produced' through interactions between firms, researchers, intermediate actors (input providers, experts, distributors etc.) and consumers;
- The growing disconnection between farmers' knowledge and research and extension systems which often results in the lack of adoption of innovative ideas by farmers.

Figure 2: **A model of an Agricultural Knowledge and Innovation System.**



Source: Redrawn from Rivera *et al*., 2005

A key message of the first Standing Committee on Agricultural Research (SCAR) foresight exercise (SCAR, 2007) was that the increasing challenges facing the agri-food and rural sectors in Europe require a review of the links between the production of knowledge and its use to foster innovation. Research could play a stronger role if different actors were better integrated into actual agenda setting and became part of the research process via such actions as innovative networks. The second SCAR foresight exercise (SCAR, 2009) described the AKIS in Europe as currently unable to absorb and internalise the fundamental structural and systemic shifts that have occurred. The remaining publicly funded AKIS 'appear to be locked into old paradigms based on linear approaches and conventional assumptions' (p.63). The report stressed the need for renewed political attention to the effectiveness, relevance and scale of Europe's AKIS and for a redefinition of AKIS.

The AKIS in Poland

The current development of AKIS in Poland is based on academic and research institutes, extension services, the Statistical Office, institutes and agencies that provide agricultural market information and analysis, agricultural analytical centres and the Ministry of Agriculture and Rural Development (MARD) that, among other activities, coordinates the efforts of public bodies involved in the system (Table 1). In the late 1970s it became clear that the implementation of modern technologies must be accompanied by management changes to become profitable (Woś, 2000). Twenty years later, the widely held view was that the priority should be to support farmers by supplying agricultural market information (Floriańczyk, 2004). As a result the Polish Agricultural Market Information System was implemented and this became the basis of the Integrated Agricultural Market information System operated by MARD[3]. This system provides information related to the main agricultural market developments.

Table 1: **The major components of AKIS in Poland.**

RESEARCH
Ministry of Agriculture and Rural Development (MARD) • ***Twelve institutes*** covering: Biotechnology for the food sector; Agricultural and food economics; Plant breeding and acclimatisation; Plant protection; Horticulture; Agro-ecosystems; Soil science and plant cultivation; Animal production; Marine fisheries, Fisheries; and Veterinary.
Polish Academy of Sciences • ***Fourteen institutes*** specialised in biology and agriculture science: Agrophysics; Biochemistry; Experimental biology; Animal genetics; Mammalian biology; Botany; Bioorganic chemistry; Physiology and animal feeding; Plant physiology; Plant genetics; Animal reproduction; Agricultural and forest environment; Zoology; and Parasitology. • ***Three institutes*** indirectly involved in research for agriculture development***:*** Rural and agricultural development; Geography and spatial organisation; and Environmental engineering.
EXTENSION
National Farm Advisory System • Current structure established in 2004 and includes Agricultural Advisory Centre (AAC) and 16 Regional Agriculture Advisory Centres (RAAC). The AAC is directly controlled by MARD and provides services for RAAC regarding advisory techniques improvement and central agriculture development programmes. RAAC together with local branches institutionally depends on regional administration authorities and employs about 5000 officers. The budget of RAAC comes mainly from regional administration and national budgets. Most of the services are provided free of charge however in 2012 the number of paid services increased.
Farmers' Chamber • This has rights to provide advisory services without MARD accreditation.
Commercial services • Commercial services are mostly provided by companies that sell farm equipment and private offices (about 200 and some of them cooperating under Polish Agricultural Advisory group) supporting farmers in project proposal preparation and application for rural development support programmes. However private institutions must possess accreditation from MARD.

[3] http://www.minrol.gov.pl/pol/Rynki-rolne/Zintegrowany-System-Rolniczej-Informacji-Rynkowej/

EDUCATION

Ministry of Agriculture and Rural Development (MARD)

- ***Public agricultural schools***: 45 technical schools with experimental farms across the country.

Ministry of National Education (MNA)

- ***Vocational schools***: 20 schools of agricultural technologies, 20 schools specialised in agribusiness, 12 specialised in landscape, five specialised in mechanisation of agriculture, three specialised in horticulture.

Ministry of Science and Higher Education

- Six universities located in cities of multiregional importance covering agriculture technologies, bioscience and food processing.

Non-public education

- Eight higher education schools of which one is specialised in agriculture and others in environment management and nutrition.

SUPPORT SYSTEMS

Agricultural Chambers and Associations of Producers

Agencies under the Ministry of Agriculture and Rural Development

- Agency for Restructuring and Modernisation of Agriculture; Agricultural Market Agency; Agricultural Property Agency.

Foundation of Assistance Programmes for Agriculture (FAPA)

- Supports actions (projects, analyses, publications, information services) aimed at the development of agriculture, rural areas and agricultural markets.

Polish National Rural Network (KSOW)

- National Network Unit (within the MARD) and 16 Regional Network Units.

Central Agricultural Library

Business and innovation centres in the area of biotechnology and food processing[4]

- Technological parks; Technology incubators; Business incubators; Pre-incubators and academic business incubators; Centres for technology transfers; Seed capital funds; *Business angels* network.

Source: authors' compilation

[4] According to A. Bąkowski and M. Mażewska (eds) 2012: Ośrodki innowacji i przedsiębiorczości w Polsce: Raport 2012 [Innovation and entrepreneurship in Poland: Report 2012]. Warszawa: PARP.

The AKIS in Hungary

Reflecting the continuing importance of agriculture in the Hungarian economy, the four components of AKIS are all, in terms of the numbers of institutions, strongly represented (Table 2). The AKIS remains dominated by the public sector, with little private sector involvement in education (there are no private sector universities or agricultural colleges) or research (where the Ministry of Rural Development (VM) and Hungarian Academy of Sciences institutes predominate). Most farm advisory services are provided by the public sector Farm Advisory System and the Farm Information Service which is publically (mostly EU) funded. Private sector business in the agri-food chain represent a significant 'market' for innovation, but very often have their own 'in-house' research departments. A detailed description of the AKIS in Hungary has been prepared by Nemes and High (2013).

Table 2: **The major components of AKIS in Hungary.**

RESEARCH
Ministry of Rural Development (VM) • ***Nine institutes*** covering: Agricultural economics; Animal breeding and nutrition; Small animal breeding and nutrition; Forests; Fisheries; Food; Biotechnology; Agricultural Engineering; Geodesy, Cartography and Remote Sensing.
Hungarian Academy of Sciences • ***Six institutes*** relevant to agricultural producers covering: Agriculture; Pest management; Soils and agrochemicals; Veterinary; Biological Research; Agricultural economics.
Other state owned institutions • ***Nine institutes*** covering: Meat market; Peppers; Vegetables; Milk economy; Fruit and ornamental plants; Grain.
Ministry of National Resources • ***21 institutes*** belonging to agricultural universities and colleges.
Private sector • ***Various institutes***
EXTENSION
Farm Advisory System (FAS) • Set up in 2007; maintained, regulated and controlled by the VM and the Rural Development, Training and Consultancy Institute (NAKVI) and mainly funded by the EAFRD; 687 registered active (and a further 263 inactive) advisors in 2011; seven Regional Advisory Centres and 97 Territorial Advisory Centres (of which just 33 are active) selected by tender which deliver upon-payment advice to farmers.
Farm Information Service (FIS) • Set up in 2007; managed by the Hungarian Chamber of Agriculture; financed 71% by the EAFRD; provides free information to farmers about the Common Agricultural Policy and direct payments; 205 consultants.
Network of village agronomists • The Central Agricultural Office, which is directed by the NÉBIH, has a long-established network of village agronomists (576 in 2012) who have public administration tasks and also provide free advice to farmers.
Commercial services • Provided by professional advisers such as input suppliers, project proposal writers; in place since before 2007.

EDUCATION

Ministry of National Resources

- ***Universities***: major agricultural, horticultural and veterinary teaching centres in Budapest; Debrecen; Gödöllő; Kaposvár; Keszthely; Mosonmagyaróvár and Szeged.
- ***Higher education colleges***: major agricultural and horticultural centres in Gyöngyös; Kecskemét; Nyíregyháza; Mezőtúr and Szarvas.

Ministry of Rural Development (VM)

- ***Vocational schools***: 17 institutes which are run by the VM covering agriculture, horticulture, food and related topics[5].

SUPPORT SYSTEMS

Producers' associations

- Hungarian Chamber of Agriculture (11,000 members); MOSZ and MAGOSZ.

Product boards

- Covering: Poultry; Fruit and vegetables; Meat; Grain and feed etc.

Background institutes of the Ministry of Rural Development (VM)

- ***Agricultural and Rural Development Agency*** (ARDA) is the sole paying agency of EAGF and EAFRD funds and national funds;
- ***Hungarian National Foodchain Safety Authority*** (NÉBIH) delivers regulatory, monitoring and accreditation services through local offices;
- ***National Agricultural Advisory, Educational and Rural Development Institute*** (NAKVI) coordinates, implements and evaluates rural development programmes.

Hungarian National Rural Network (MNVH)

- Umbrella network of existing private and public networks. The Network Support Unit operates within NAKVI.

Source: authors' compilation

[5] It was announced in early August 2013 that a further 43 agricultural training institutions (agrár-szakképző intézmény) are to be set up, bringing the total to 60, and that the network would henceforth be overseen by NAKVI.

Polish and Hungarian AKIS in the European Union context

The composition of the AKIS in Poland and Hungary show marked similarities, not least in the continuing dominance of the public sector. No major privately owned farm advisory organisation has emerged in either country, for example. Székely and Halász (2010) observed that in Hungary there is simply very little demand for paid-for farm advice from the private sector.

Several links between the components of the Hungarian AKIS can be identified, which in theory should facilitate the flow of information and knowledge (Table 3), but previous research has shown that there is clear scope for further improvement. Tóth (2005) remarked that 'extension ought to… start to establish and improve relations between organisations' while Székely and Halász (2010) noted the need 'to strengthen the relationships among the participants, to conduct research adjusted to the needs, to ensure stricter co-operation between education, research and advising'. Furthermore, these links are in themselves far removed from the level of cooperation between AKIS actors that will be expected in the EIP, as described in the following sections of this chapter.

Table 3: **Examples of links between the different components of AKIS in Hungary.**

• The VM controls the FAS, and funds both that and the FIS mainly via EU funds, and the Network of Village Agronomists from its own budget (*support systems-extension*);
• The universities are the locations of the seven Regional Advisory Centres of the FAS and (with the colleges) are also the locations of some of the Territorial Advisory Centres (*education-extension*);
• Some of the FAS advisors are university and college staff or teachers of agricultural vocational schools (*education-extension*);
• The Hungarian Chamber of Agriculture manages the FIS and the territorial chambers run 20 of the Territorial Advisory Centres (*support systems-extension*);
• 21 research institutes are part of the state universities and colleges (*education-research*);
• The VM owns nine research institutes, supervises the ARDA and HNRN and runs some of the vocational schools (*support systems-research; support systems-support systems; support systems-education*);
• The research institutes of the VM have their own extension activities (*research-extension*);
• At some universities students can study advisory services as an optional subject for two years (*education-extension*).

Source: authors' compilation

Kania *et al*. (2011) conclude that the links between the different components of AKIS in Poland are weak and that this results in the inefficient utilisation of available resources. There is a lack of coordination of research efforts and improper administration of public extension services that are rather indirectly stimulated to transfer innovations to agriculture. Also there is a concentration of agricultural information systems on market information.

The AKIS in Poland and Hungary may be described as 'post (political and economic) transition AKIS' in view of the lack of restructuring, liberalisation and privatisation compared to that seen in many western EU Member States (see e.g. SCAR, 2012). Even so, in each country it is continuing to evolve. For example, in 2013 the Hungarian Parliament adopted Law No CXXVI relating to the Chamber of Agriculture, which is now known as the Hungarian Chamber of Agriculture, Food and Rural Development. All farmers (i.e. natural persons) and businesses active in the agricultural sector are obliged to become members (this also applies to the food processing industry) and the potential membership is in the region of 250-350,000. In its new form, the Chamber has signed an agreement with the Hungarian Government allowing it to take control of all public sector farm advisory services in 2014. The idea is that agricultural extension will be more effectively coordinated and the government funded extension activities and the market-driven FAS can complement each other.

The European Innovation Partnership 'Agricultural Productivity and Sustainability'

On 29 February 2012, the EC adopted a communication on the European Innovation Partnership (EIP) 'Agricultural Productivity and Sustainability' (EC, 2012). This EIP aims to foster a competitive and sustainable agriculture and forestry that 'achieves more from less' input. For achieving this aim, the EIP will build bridges between research and technology and stakeholders. Innovation Partnerships, as set out in the 2010 EC communication 'Innovation Union' (EC, 2010b), aim to achieve synergies and European Union (EU) value-added through basing themselves on existing policies and fostering co-operation among partners in order to exploit the potential for innovative breakthroughs.

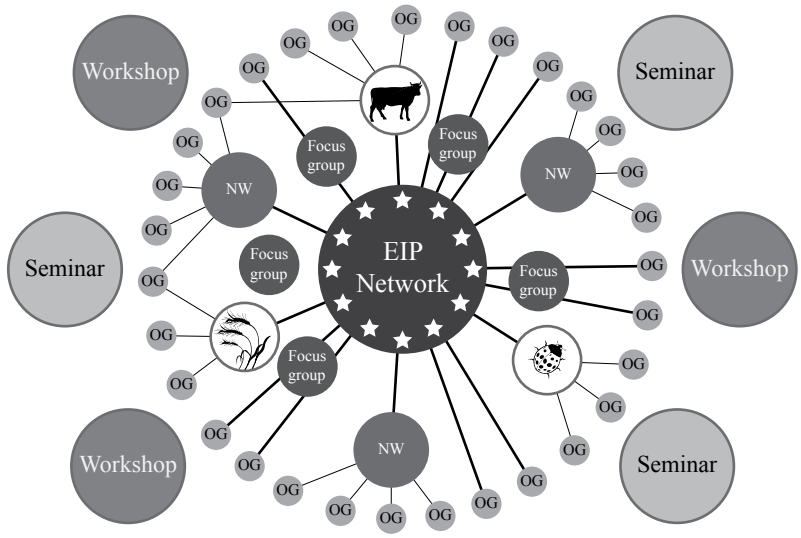
The aims of the EIP were set out in Article 61 of EC (2011a), *viz*. to:

- promote a resource efficient, productive, low emission, climate friendly and resilient agricultural sector, working in harmony with the essential natural resources on which farming depends;
- help deliver a steady supply of food, feed and biomaterials, both existing and new;
- improve processes to preserve the environment, adapt to climate change and mitigate it;
- build bridges between cutting-edge research knowledge and technology and farmers, businesses and advisory services.

It will seek to achieve these aims by:

- creating added value by better linking research and farming practice and encouraging the wider use of available innovation measures;
- promoting the faster and wider transposition of innovative solutions into practice;
- informing the scientific community about the research needs of farming practice.

Figure 3: **Proposed structure of European Innovation Partnership 'Agricultural Productivity and Sustainability'.**



Source: European Commission

The EIP governance structure consists of a High Level Steering Board (HLSB), which has prepared a Strategic Implementation Plan, and an EIP network facility ('Service Point'). The latter will collect and disseminate information, provide a helpdesk function and encourage the setting up of Operational Groups (OGs) (Figure 3). Member States are welcome to set up specialised EIP networks but there is no obligation to do so (EC, 2013a).

Two major forums being used by the EU for consultation about the EIP, both set up in June 2012 are (a) the (renewed) *SCAR Collaborative Working Group (CWG) on AKIS* and (b) the *Focus Group on Knowledge Transfer and Innovation* (KT&I). The latter is investigating how the EIP can effectively promote KT&I through the new Rural Development Programmes (RDPs) and what the role of National Rural Networks (NRNs) and advisory services could be in, for instance, facilitating the emergence of EIP OGs. It is composed of representatives from EU Member States' national administrations, NRNs, and EU organisations and academics.

Details of the implementation of the EIP are still being finalised both at EU and Member State level. However, with a deadline of 26 April 2013, EU Commissioner with responsibility for Agriculture and Rural Development, Dacian Cioloş, asked each Member State to provide answers to the following questions:

1. What will be the objectives with regards to innovation in the RDPs in your country? What will be the areas for intervention?
2. What will be the key stakeholders for the implementation of the EIP in the RDPs?
3. How do you intend to involve these stakeholders in the preparatory phase of the RDPs?
4. Do you see any particular bottlenecks in your country for the implementation of the EIP via the RDPs?
5. What measures [with reference to EC, 2011a] are you considering to achieve your objectives with regard to innovation and knowledge transfer?
6. Do you already have particular views on whether you will create a special national or regional EIP network or whether you would integrate this networking function in the National Rural Development Network?

The key points of the official responses to this request are summarised in the following sections together with additional relevant information.

Organisational preparations in Poland

Poland has two representatives on the Focus Group on KT&I, drawn from FAPA. In its rural development planning, the Ministry of Agriculture and Rural Development (MARD) is focusing on preparing the legal basis that on the one hand would comply with EU regulations and on the other would fit to national institutional resources. MARD has answered the six questions posed by Dacian Cioloş as follows:

Question 1: Based on national strategies and the framework of the Polish RDP for 2014-2020 two main objectives relating to innovation have been formulated:

- Improvement of links between agriculture and research, and enhancement of innovation in the food chain;
- Building partnerships for innovation cooperation, promotion of good practices, animation and working out of methods of cooperation, improving the qualifications of key AKIS partners.

Question 2: The direct recipients of aid, i.e. academic institutions, scientific research, farmers, entrepreneurs, public and private extension services, and consumers' organisations, will play a key role in the EIP through their participation in OGs. In terms of the institutional support to the implementation, in addition to a managing authority, which is yet to be named, the selection and evaluation of projects will be done by the KSOW as the implementing institution. KSOW will have an 'animation' role, while innovation brokers will help to ensure effective implementation of actions.

Question 3: Preparations have included consultations with different groups of AKIS stakeholders who have taken part in subgroups supporting the activities of the working group on the preparation of the RDP. Representatives of the extension services, research and public administration have provided their opinion and expectations related to OGs and the legal framework for their activities. New drafts of the RDP are posted on the MARD website. MARD together with the MNA has organised meetings to discuss barriers to innovation transfer in agriculture and the food sector. MARD has staged a series of workshops for representatives of research institutions, agricultural advisory and farmers to stimulate the setting up of OGs. A series of workshops across Poland to provide information on the EIP for farmers and rural areas business people is planned.

Question 4: The following factors may hinder the implementation of the EIP in Poland:

- Cooperation until now has been rather one-sided: scientists have proposed the implementation of research results that have not always reflected the needs of agriculture;
- The establishment of innovation brokers that will penetrate the scientific community, entrepreneurs, farmers, and even consumers to identify and facilitate the articulation of ideas for innovation is essential;
- The agricultural advisory service must act as an interpreter in the dialogue between farmers and scientists in order to provide a clear indication of the needs of the target group;
- It is difficult to define the concept of innovation, and existing, recognised standards, especially the 'Oslo Manual' (OECD, 2005) must be adopted to ensure the transparency of the implementation process;
- Poor cooperation between AKIS actors resulting from stereotyping, different expectations, and lack of communication and understanding of each others' needs;
- The short time period (seven years) and the lack of established OGs.

Question 5: Projects will be implemented by OGs under the measure *cooperation*. Support will be provided as part of the measures *knowledge transfer and information actions* and *advisory services,* and *farm management and farm relief services* in order to strengthen innovation activities. Complementary activities will be conducted by the KSOW.

Question 6: The Polish EIP network will operate within the KSOW, and will finance projects related to the activation of potential beneficiaries, promote OGs, disseminate examples of good projects, develop innovative sourcing methodologies and identify best practices in the function of partnerships for innovation. Both the EIP network and the KSOW will work with networks in other EU Member States in order to attract international partners. It has not yet been decided whether within the EIP thematic sub-networks will be defined according to the needs articulated by the stakeholders.

Organisational preparations in Hungary

Hungary was one of only two eastern EU Member States (the other being Estonia, along with Turkey) to participate in the original SCAR CWG on AKIS from May 2010 to March 2012. Unfortunately, Hungary is not taking part in the renewed CWG, although AKI remains on the CWG mailing list and is closely monitoring its work. By contrast, Hungary has five representatives on the Focus Group on KT&I, two each from the VM and the MNVH and one from NAKVI. This arises from the fact that one of the VM representatives is also a member of the ENRD Coordinating Committee that set up the Focus Group. One Focus Group representative from the MNVH participated in the conference 'The EIP on Agricultural Productivity and Sustainability – Priorities and Delivery Mechanisms' held in Brussel on 19 November 2012, together with two persons from AKI. Two persons from the VM took part in the seminar 'Programming Innovation in Rural Development' held in Madrid on 26-27 June 2013.

Planning for the Hungarian RDP for 2014-2020 is taking place in nine VM thematic working groups. The working group on the topic *Research and development and innovation, knowledge transfer and education* includes two of the five representatives on the Focus Group on KT&I, one in the capacity of secretary. Following the Madrid seminar and the preparation of a position paper, the VM convened a meeting to seek ideas about the EIP from the participants of all of the working groups, including invited experts.

Hungary recognises that the EIP can contribute to the creation of a knowledge-based, innovation-building, competitive and successful rural economy, and to respond to such challenges as climate change, conservation of biological diversity, sustainable management of resources (especially water and energy) and safe food supply. The questions posed by Dacian Cioloş were answered as follows:

Question 1: The overall objective will be to support improvements in knowledge capital and innovation capabilities; and the extensive dissemination and utilisation of innovation results in all sectors of agriculture. Specific targets are as follows:

- Utilisation of R&D and innovation results through producer cooperation in order to improve the competitiveness and sustainability of the agricultural sector;
- Increased innovation activity and adaption of results in the agricultural sector and rural areas in order to improve the use and quality of ICT;
- Expansion of knowledge capital in order to improve the economic and environmental performance of agricultural enterprises; and
- Strengthen the relationship and cooperation between research and innovation, agriculture and food chain actors, in particular to knowledge and technology transfer.

Question 2: The list of actors in the AKIS that will participate in the implementation of the EIP in Hungary has not been finalised; the issue is awaiting management approval. It is proposed that in innovative collaboration activities and projects the producers and companies will be the interactive collaborators, and there will be research institutes, universities and the professional background institutions of the VM on the input side. Organisations and networks which are already participating in knowledge transfer may have an intermediary role and there may be a role for such organisations established later for this purpose.

Question 3: The intended participants have been involved in the preparatory phase of the RDP. The members of all nine VM thematic working groups include representatives of the policy-making level, research and management expertise as well as appointed expert representatives.

Question 4: The efficient operation of the EIP is under the influence of various factors in the Hungarian innovation system. Strengthening collaboration among the actors, and the development of the relationships among research centres, knowledge transfer bodies and enterprises are the primary requirements for the successful participation in the EIP.

Question 5: Measures envisaged in relation to innovation and knowledge transfer are as follows: *knowledge transfer and information actions*; *advisory services, farm management and farm relief services*; *cooperation*; and *investments in physical assets*.

Question 6: Whether the Hungarian EIP network will be a separate entity, or be integrated in a currently active organisation is awaiting management approval. Researchers consider that the latter will be more effective in terms of diffusion of innovation. OGs will be selected through an accreditation process and only accredited OGs will benefit from EAFRD funding. The final decision about particular conditions of the grant will be determined later in the design phase.

Polish and Hungarian preparations in the European Union context

A summary of the replies by the Ministers of the 19 EU Member States that had responded to the request for information by Dacian Cioloş was published at the Madrid seminar (EC, 2013b). The answers submitted from Poland and Hungary are consistent with the general content of the responses from across the EU, which were as follows:

- The importance of innovation in agriculture and forestry is recognised;
- A broad range of AKIS stakeholders should be involved in the implementation of the EIP;
- These stakeholders should play an essential role in the preparation of programming documents to encourage bottom-up initiative and successful implementation;
- While it is too early to enter into specific discussions with stakeholders, many Member States have already organised workshops for information and consultation;
- There are several bottlenecks, in part due to the fact that the EIP is a new concept;
- There are no final decisions as to which rural development measures will be used, although it is likely that emphasis will be given to the *cooperation* measure;
- Some Member States will develop EIP networks that are based on their National Rural Networks, but others are considering setting up standalone EIP networks.

Unlike Poland and many other EU Member States, Hungary has not yet organised any consultation and information workshops to date. The proposed use of an accreditation process is in conflict with the 'bottom-up' approach to forming OGs envisaged by the EU, and is likely to encounter practical problems over the establishment of international OGs. However, this point is not unique to Hungary, and most if not all other EU Member States have yet to finalise their procedures for choosing which OGs to fund (Inge van Oost, pers. comm.).

Experience of innovation partnerships

Operational Groups are expected to be the main 'delivery mechanism' under the EIP. Using the 'participatory' network approach to forming partnerships, OGs will result from bottom-up initiatives that link farmers, advisors, researchers, businesses and other actors around concrete problems or opportunities. This 'multi-actor approach', in line with the expectations of the Horizon 2020 regulations (EC, 2011b), 'will ensure the necessary cross-fertilising interactions' between actors in the AKIS. The EC will not impose obligations in terms of composition of operational groups, of their functioning, of themes covered, etc. The members of the OGs will decide on the elaboration of the project and OGs are expected to disseminate the results of their project, in particular through the EIP network.

There will not be stand-alone funding for concrete innovative actions; the EIP will be mainly funded through actions that are supported by two EU policies:

- Rural Development policy will provide co-funding for actions of OGs. The key measures include *cooperation* (Article 36 in EU, 2011a) which can provide support for setting up *and* funding of the activities of the OGs, *knowledge transfer and information actions* (Article 15), *advisory services* (Article 16), *quality schemes for agricultural products and foodstuffs* (Article 17), *investments in physical assets* (Article 18) and *farm and business development* (Article 20);
- EU Research and Innovation Policy ('Horizon 2020') will play an important role in providing the knowledge base for innovative actions on the ground. Actions feeding into the EIP include applied research projects, cross-border and cluster initiatives, multi-actor approaches, pilot or demonstration projects, as well as supporting innovation brokers and innovation centres.

The EU sees a complementarity between these policies resulting from the fact that actions under the former are normally applied within the boundaries of programme regions, whilst research policy would go beyond this scale by co-funding innovative actions at the cross-regional, cross-border, or EU-level. Other policies, namely Cohesion and Education Policy, might offer additional opportunities for funding.

The renewed SCAR CWG on AKIS identified examples in Belgium, Denmark, France, Italy, Spain and the UK of groups of farmers that currently work with other stakeholders on innovation, and that under the new EU policy would be examples of OGs. Here we provide some good examples for Poland and Hungary of innovation partnerships between actors from different parts of the AKIS.

Innovation partnerships in Poland

There are several forms of innovation partnerships in Poland including clusters, technology parks, technology incubators, academic pre-incubators and business incubators, centres of technological transfer, seed funds and *business angels* networks. However a relatively limited number of innovation partnerships directly refer to the food sector. Most are stimulated by the availability of funds and orientated firstly on stimulation of demand for their products and secondly on knowledge and the development of physical resources (Kufel and Figiel, 2012). Three examples of innovation partnerships which have adopted forms of cooperation which may be similar to the proposed OG approach are as follows:

The **Beef Cluster** (Klaster Wolowiny; http://www.klaster-wolowiny.pl/), led by the *Polish Society of Beef Meat Producers* and *Warsaw University of Life Sciences*, integrates representatives of research, extension, education, producers and support systems as well as producers' organisations and rural development NGOs. The innovative concept of the cluster is to establish direct communication from consumers to producers with the assurance of traceability of origin and processing of meat. The consumption of beef is relatively low in Poland due to consumer preferences and a general perception of unstable beef quality. Therefore an integral part of the project is the permanent monitoring of consumer preferences and the establishment of mechanisms of direct adjustment of production supported with information about the unique nutritional value of the product. The universities are responsible for the elaboration of communication platforms between consumers and the processing sector. Technical universities provide the most efficient processing technologies concerning consumer's expectations of the final product and preserving nutritional value. In this partnership there is a strong relationship between research and producers, but the innovative character of partnership is mostly related to consumer market development.

The **'Bioactive food' consortium** consists of *universities* carrying out medical, agricultural, economic and biology research aiming at the development of innovative food production technology that will have a positive impact on reduction of human diseases. The results will be directly implemented in the food processing sector, thus close cooperation with *processing sector* as well as with *consumers* is an integral part of the consortium's activities. Surveys of consumers' expectations and market analysis conducted by economic universities provide the evidence base for biology and food researchers that select the desired active ingredients and develop food production technology. The latter is tested at the semi-industrial scale and the products are analysed regarding their composition, safety and nutritional value. The functional characteristics of innovative food are then verified in selected clinics and by market analysis of most promising products. In this partnership the weak connections with extension services are compensated for by direct consultations with final consumers and producers regarding innovative technologies. The high market value of the research results is expected to attract the processing sector and further cooperating farmers.

The **Organic Food Valley Cluster** (Dolina Ekologicznej Żywności Klaster; http://www.dolinaeko.pl/) lists among its main goals improvement of access to information and knowledge of production, processing and marketing of organic products. It is an initiative of the *Institute of Institute of Soil Science and Plant Cultivation* that gathered together *NGOs*, *producers* and *educational* partners. Among other actions the partnership collects innovative solutions regarding new or improved products and services and transfers them to its members. Research partners are responsible for conducting studies and analyses regarding production, processing and marketing of organic products including adaptation of new technologies to local conditions. What characterises this partnership is that it has direct contact with agricultural schools which facilitate knowledge transfer to new and existing producers. Regional consolidation of producers here helps with the implementation of innovative sales channels and the elaboration of marketing strategies.

Innovation partnerships in Hungary

Three examples from Hungary of innovation partnerships between actors from different parts of the AKIS which have adopted forms of cooperation that may be similar to the proposed OG approach are as follows:

The objective of the **Innovatív Élelmiszeripari Klaszter Kft** (Innovative Food Cluster Ltd; www.pharmapiek.hu/) is to develop a market-driven system of collaborative innovation that can generate high value-added industry exploitable research results and products in the field of functional foods. The knowledge base of the *universities in Debrecen and Kaposvár*, together with the network of cooperating enterprises (including the *local government of Debrecen*, the *Chamber of Commerce and Industry of Hajdú-Bihar County*, the *Pick Salami Factory* and many *small and medium-sized food industrial enterprises*), has become a significant innovation axis in agriculture and food industry even at (Carpathian) Euroregional level. The new Department of Asian Traditional Medicine at the University of Debrecen carries out research on extraction methods and chemical entities of plant products. The cluster provides services in the fields of management, marketing and project management and organises various types of training. In addition, at project level it provides (R&D) services in food product development and medical tourism, and carries out food safety analyses, while the university curricula include the topics of industrial food product development, dietetics and thermal medicinal tourism.

The **RÓNA-JUH Klaszter** (RÓNA-SHEEP Cluster; http://ronajuh.hu/) was set up in 2007 by *sheep breeding and raising companies*, and *educational and research institutions*. The bottom-up cooperation was motivated by the demand for innovation and organised operation which was lacking in the sheep sector. The founding members realised that they can only increase the volume of homogeneous commodities – which are marketable both on the domestic and foreign markets – by

joint efforts and cooperation. The cluster supports and coordinates innovation within the sector of the North Great Plain Region. In order to increase the economic potential of the members the cluster generates innovation processes, organises training and benchmarking clubs, presents new professional experience to the members and reveals new market potentials to which a corresponding professional marketing team is connected. Furthermore, it tries to provide homogeneous and excellent quality commodities of lamb for the processors. The cluster bridges the gap between the agricultural enterprises and knowledge bases. Only some of the farmers can provide the funding for the professional work, so a major task of the cluster is to generate the financial resources for their work.

The **Tisza Valley International Agricultural Research and Development Cluster** is an example of international partnership that is a Hungarian initiative. It was formed in February 2013 with the collaboration of 34 *Council*, *university* and *other organisations* from Romania, Ukraine, Slovakia, Hungary and Serbia. The primary objectives of the Cluster are to establish common food production systems, to improve the level of food security and to create jobs. The Cluster would like to show results in creating jobs by the summer of 2014 and to create 20 thousands jobs, especially in rural areas, over three years. In the first phase the aim is to establish, with public benefit goals, an integration of international production of the basic foods of the region (bread, meat, milk, vegetables and fruits) in the geographical area of the Tisza river basin. This would improve the quality of public supply to the residents of the area. Within the cluster delivery of goods is based on a non-profit system, so intermediary bodies in the delivery system that decrease the benefit of producers are not allowed.

Lessons learned from existing innovation partnerships

The six examples described above are bottom-up initiatives based on cooperation between farmers, advisors, researchers, businesses and other actors that are designed to address concrete problems or opportunities through innovation. They demonstrate that in Poland and Hungary it is possible to set up OG-like partnerships amongst actors drawn from different parts of the AKIS. These partnerships can even have an international dimension.

One concern expressed about the three Polish innovation partnership examples is the strong representation of *research* institutions, although their role in fostering innovation to agricultural producers differs and depends on the expectations of other partners. By contrast, the AKIS elements *support systems* and *education* are only weakly integrated, and similarly the potential of *extension services* is only weakly explored. Equally, *universities* are clearly the driving forces in at least two of the Hungarian examples. These examples suggest, therefore, that the initiative to set up OGs is more likely to come from researchers (such as research institutions and universities) than from farmers or farmers' organisations.

The Focus Group on KT&I collected 68 examples from across the EU of current RDP experiences in support to knowledge transfer and innovation, and these are described in Annex 1 of ENRD (2013). The five case studies from Hungary cover the topics listed below. Of these, four used Leader funding, the exception being the cooperation of the advisory services with a research institute which was funded from Measure 114:

- The promotion of renewable energy in rural communities;
- A new form of entrepreneurial education for rural schools;
- The cooperation of the advisory services with a research institute;
- A new form of vocational training in renewable energy and resource management;
- The development of a network to improve the tourist services in a sub region of Hungary.

Of the three case studies from Poland, two were funded from Measure 121 while the centre for practical training was financed from Technical Assistance money:

- The exploitation of solar energy by an agricultural holding;
- The establishment of a centre for practical training in small-scale processing;
- The instalment of anti-hail equipment in a blueberry orchard in Poland.

Whilst these eight projects can indeed be considered as innovative, and many involved some form of partnership, most only had one clear beneficiary, such as an individual farmer or institute. They may be termed 'micro interventions', with relatively minor economic or environmental impacts compared to that envisaged for OGs. Even so, the Focus Group on KT&I (ENRD, 2013) deducted several relevant lessons from the case studies it collected as part of its own activities that are of wider relevance to the establishment of future OGs:

- *Animating the potential innovators*. Very often the stakeholders have already conceived a possible innovation but they lack knowledge and support in order to proceed;
- *Advisory services and 'innovation brokers' play a key role in the innovation process*, acting as facilitators in a process with a high level of complexity and multiple actors involved;
- *Good communication and cooperation and building trust between the various actors are fundamental for success* in this interactive process;
- *Assessing market needs is a precondition for innovation*. Understanding the market changes and trends is an important condition for identifying the domains for innovation;
- *Combining different funds and different measures* enables implementing more complex projects and making use of different options available;
- *Building the right partnership* is important by bringing together the right partners who have the motivation, skills, knowledge on the subject and are willing to invest into a successful partnership;
- *A local business model is required*, which will be adapted to the local specificities and incorporates the economic, social, and cultural characteristics of the area;
- *Ensuring the flexibility of authorities and regulations*, on how the rural development policy is implemented and supports the innovation process;
- *Managing risk and handling failure*, as risk taking and the possibility of failure are integral parts of the innovation process;
- *A clear framework for innovation* is also important for defining the measures and conditionality which can lead to innovation.

Conclusions and recommendations

Gorton *et al*. (2009) and Swain (2013) have pointed out that EU agricultural policy has been tailored to the predominance of (medium-sized) family farms, but that agriculture in the eastern EU Member States is characterised by a historical absence of such farms. Thus it remains to be seen if the EIP can be effectively implemented in post-transition AKIS such as in Poland and Hungary but, if problems are encountered, this can be attributed in part to the failure of the eastern EU Member States (with the exception of Estonia) to systematically engage in and influence the debate that has been ongoing since the establishment of the first SCAR CWG on AKIS in May 2010. In future, Poland and Hungary, in their own interests, must participate fully in the designing, and not just the implementing, of such initiatives so that they effectively meet the needs of their farming sectors.

In March 2013 the Focus Group on KT&I made a number of initial policy recommendations related to six intervention areas (ENRD, 2013). These six intervention areas and the most relevant recommendations are as follows:

- Simplify rural development regulations: minimise the ***administrative burden*** related to all innovative projects;

- Connect RDP networks, innovation networks and EIP networks: invest in good ***communication on and coordination within the EIP*** at the EU and MS level;
- Enable a climate for innovations – also considering complex innovation processes: allow for ***risk and failure***; follow a 'step-wise' approach in planning and in funding; learn from the experience and share the knowledge acquired;
- Promote wide stakeholder involvement: ***start informing*** relevant actors on the objectives and opportunities of the EIP Operational Groups for 2014-2020 already in 2013 with the support of the National Rural Networks;
- Strengthen the already existing AKIS: ensure the actors in AKIS are informed on the potential of the ***EIP Operational Groups***;
- Support relevant networks in an emerging stage: ***challenge the Community Led Local Development (CLLD) groups or LAGs*** in the next programming period to initiate and support innovation at micro-regional and transnational levels and make use of the EIP.

In Hungary the direct link (via shared membership) between this Focus Group and the VM Planning Group should ensure that Hungarian policy for priority 1 of the new RDR fully incorporates the necessary provisions for the implementation of the EIP. A satisfactory level of awareness of the EIP exists in the VM and its background institutes. However, the Focus Group recommendations about informing other actors in the AKIS about the potential of OGs (the fourth and fifth points in the above list) have still not (as of mid-July 2013) been acted upon. Outside of the VM, therefore, awareness of the EIP and its related structures is probably still very limited, although in the case of the 'new' Chamber of Agriculture it will clearly help that one of the authors of this chapter (S.E.) has recently taken a job with them.

No Hungarians are presently (as of mid-July 2013) members of the EIP High Level Steering Board but several organisations with links to Hungary (e.g. COPA-COGECA, CEJA and the European Association of Chambers of Agriculture) are represented. We have found no evidence to show that information about the EIP has been communicated through those channels either. In Hungary, a consultation and information workshop on the EIP should be an urgent priority.

Both the Polish and Hungarian responses to the fourth question posed by Dacian Cioloş cited poor cooperation between AKIS actors as a very important potential bottleneck to the implementation of the EIP and some other EU Member States expressed the same view (EC, 2013b). Also, the examples of innovation partnerships listed in this chapter suggest that farmers are rarely the driving forces behind such initiatives. At the Madrid seminar, the concern was raised that cuts in public funding will encourage the development of projects that are 'supply' (researcher) rather than 'demand' (farmer) driven. Taken together, these factors represent a potentially serious threat to the success of the EIP in addressing the needs of farmers in Poland and Hungary. Two possible approaches to mitigating this threat are as follows.

Firstly, the role of 'innovation brokers' in setting up OGs cannot be stressed too strongly. This point is regularly made by the EC and was one of the lessons arising from the work of the Focus Group on KT&I (ENRD, 2013). Innovation brokering involves discovering innovative ideas, articulation of demands, connecting partners, finding funding and preparing a project proposal. The broker may be, but is not necessarily, involved in the project itself. The advisory services are often cited as examples of potential innovation brokers (EC, 2013a).

Secondly, in Hungary the new Agricultural Chamber has expressed its interest in managing the EIP network, although it should be stressed that no decision has been made on this question. The implications of such an arrangement would need to be fully worked out but there is clear logic in the idea of the network being managed by the representative of the intended major group of beneficiaries.

In Poland, by contrast, MARD will oversee the implementation of the EIP, to ensure that the organisational solutions will be in line with the RDP and related regulations. There is so far no model of Operational Groups in Poland and the indication is that a relatively small amount of RD funds will be allocated to these actions. Despite strong theoretical evidence of the role of innovation in economic development, to agriculture and rural development stakeholders the opportunities arising from the EIP are not yet fully apparent. The funding will therefore be used to gradually integrate innovation processes arising from direct communication between these stakeholders into mainstream development. The successful creation of OGs will depend on the flexibility of existing partnerships and the interest of farmers' organisations and their perception of the potential benefits.

In 2007, Mark Zuckerberg, the founder of Facebook, was asked by the head of a powerful news company 'How can we start a community like yours?' He answered: 'You can't: you don't start communities. Communities already exist. They're already doing what they want to do. The question you should ask is how you can help them do that better. Bring people "elegant organisation"'. "Elegant organisation" of the EIP in Poland and Hungary can be the key to unlocking agricultural innovation through improved stakeholder cooperation. In terms of planning, the two countries have made significant progress, but major challenges to the effective implementation of the EIP remain to be overcome.

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Agricultural insurance support schemes

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Introduction

Government support for agricultural insurance is a common practice for helping farmers to have better access to risk management tools especially as, under certain conditions, the support for insurance can be regarded as a Green Box measure within the Word Trade Organization (WTO) agreements (OECD, 2009). The World Bank conducted a survey of agricultural insurance programmes in 65 countries and found that almost two-thirds of the surveyed countries provide agricultural insurance premium subsidies, with subsidies usually of the order of 50 per cent of the original gross premium. Governments also provide public reinsurance (32 per cent of surveyed countries), subsidies on administrative and operational expenses (16 per cent) and loss adjustment subsidies (6 per cent). At the same time governments can also provide support via legislation and research, development and training (Mahul and Stutley, 2010).

The aim of this chapter is to describe the development and particularities of the Hungarian and the Polish agricultural insurance systems. The chapter is organised as follows: The next section highlights the major theoretical aspect of agricultural insurances. This is followed by the presentation of the Polish and Hungarian agricultural systems and the chapter ends with concluding remarks and discussion.

Theoretical problems of agricultural insurance

Agriculture is particularly exposed to adverse natural events, such as floods and droughts, and the economic costs of natural risks may even increase in the future because of climate change. Agricultural insurance is one of the possible financial tools that agricultural producers can use to cope with increasing risks in their activity. Experience accumulated in insurance markets demonstrates that the development of a proper agricultural insurance product cannot be reached without government intervention, mainly due to systemic risk and information asymmetries. The systemic risk takes place when a risk affects a large number of farmers simultaneously. Therefore the systemic component of agricultural risks can generate major losses for agricultural insurers (Mahul and Stutley, 2010). The information asymmetries in the case of agricultural insurance are derived from adverse selection and moral hazard. Both are connected to the difficulties associated with measuring risk and monitoring farmer behaviour.

Adverse selection arises owing to the lack of information about the nature of the risk being insured, which in turn results in inaccurate premium rates that make high risk farmers more likely to purchase insurance. This can lead any insurance plan to be unprofitable and eventually fail. Avoiding adverse selection requires a successful insurance programme to identify, acquire and skilfully use data that discriminate among different risks (Moschini and Hennessy, 2001).

Moral hazard occurs when insured farmers alter their production practices in some way that changes their underlying risk and which is not easily observable by the insurers. Typically this involves a failure to use good farming practices, to care for the crop, or to apply adequate fertiliser or water. The implications of the moral hazard problem are not as clear as intuition might suggest (Moschini and Hennessy, 2001). The producer may decide to reduce input intensity in the knowledge that he/she will be compensated for some of the consequences of low input use. On the other hand, if

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input use is risk increasing then a high risk environment may cause the producer to use fewer inputs. Consequently the existence of insurance in mitigating risk may encourage input use. In this way risk sharing and moral hazard effects may oppose each other.

Risk continues to have the potential of adversely affecting farmers' welfare, as well as having implications for the long-run organisation of agricultural production and for the structure of resource ownership in the agricultural sector. Therefore the role of insurance in risk management of agricultural production has long been a centre of attention for researchers and policy makers. Agricultural insurance products were originally offered by private companies, firstly in Europe and then in the United States (Smith and Glauber, 2012), and these followed different development paths in each agricultural insurance market (Székely and Pálinkás, 2009). The development of agricultural insurance markets implied the increasing role of government due to the persistence of moral hazard, adverse selection and systemic risks problems in agricultural production. Today, almost 90 per cent of global agricultural premium volume is collected in high income countries where agricultural insurance products are heavily subsidised by governments (Mahul and Stutley, 2010).

The development of the agricultural insurance markets

The specific features of agricultural insurance listed above strongly influenced the development of crop and livestock insurance markets across the world. There are only a few examples of markets where a considerable percentage of the national area is insured despite the fact that there is no government support. In most cases insurance policies in these countries cover a very limited range of risks, mainly hail risk (Goodwin and Smith, 2012). Hail risk is the most common example of a threat which can be successfully transferred from agricultural producers to insurers on a commercial basis. Crop hail insurance is provided by private insurers in almost every country where this risk endangers agricultural production. But this kind of insurance policy is rather exceptional since hail risk, unlike drought or frost risk, transfers are not disturbed by informational asymmetry and hail risk is taken place at a limited regional level so this is a typical non-systemic risk.

Thanks to the desirable characteristics of hail risk, crop hail insurance was the first to be offered to farmers. The history of agricultural insurance begins over 200 years ago in Germany, where small mutual companies provided firstly crop hail and then livestock insurance (Mahul and Stutley, 2010). By the late 19th century agricultural insurance was available in many European countries (Germany, Netherlands, Sweden, Austria-Hungary) and the United States. The coverage was limited to single perils. Attempts to sell multiple peril crop insurance ended in failure (Gardner and Kramer, 1986).

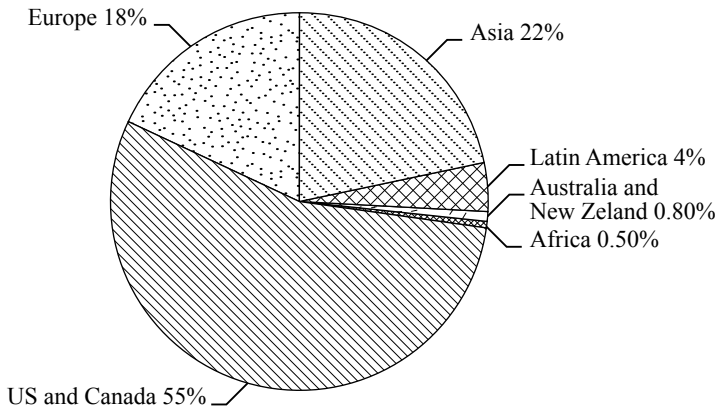
Government involvement in agricultural insurance started in the United States, where in 1939 more than 160,000 insurance contracts covered about 7 million acres (approximately 2.8 million hectares) of the wheat area against multiple risks. Japan implemented a similar programme at the same time. Canada started its multiple peril insurance schemes in 1959. During the next three decades numerous multiple peril crop insurance schemes were introduced in Latin America, Asia and Europe (Mahul and Stutley, 2010). The performance of most of these public sector schemes was evaluated as controversial (Mahul and Stutley, 2010; Antón *et al.*, 2011). In many countries the level of participation was considered to be low relative to the amount of budgetary resources spent on these programmes.

The poor performance of agricultural insurance schemes started a debate about the effectiveness of such risk management support instruments. Successive analyses have shown that most of the functioning subsidised agricultural insurance schemes are costly and can distort agricultural markets in many ways. Subsidies induce farmers to take more risks. They expand the production of crops for which they are subsidised and in this way the insurance coverage is becoming cheaper for insurance companies. Subsidised insurance increases the use of environmentally sensitive lands (Goodwin *et al.*, 2004) and

reduces the use of alternative risk management tools such as diversification or pesticides (Smith and Glauber, 2012). On the other hand, the insurance can be an adequate measure for adaptation to climate change (de Bruin *et al.*, 2009) and, if the risk and the goal targeted by the insurance are well defined, this measure can be effective (Antón *et al.*, 2011). Also the cost of insurance subsidies is very low if compared with the yearly costs of the national catastrophe funds (Burgaz, 2003).

Despite the controversies about the efficiency of this measure, more and more countries have decided to subsidise crop and livestock insurance in recent decades. According to Kalra and Xing (2013), between 2005 and 2011 agricultural insurance premiums worldwide almost tripled from an estimated USD 8 billion to USD 23.5 billion. The regional distribution of insurance premiums in agriculture is shown in Figure 1.

Figure 1: **Regional distribution of agricultural insurance premiums worldwide in 2011.**

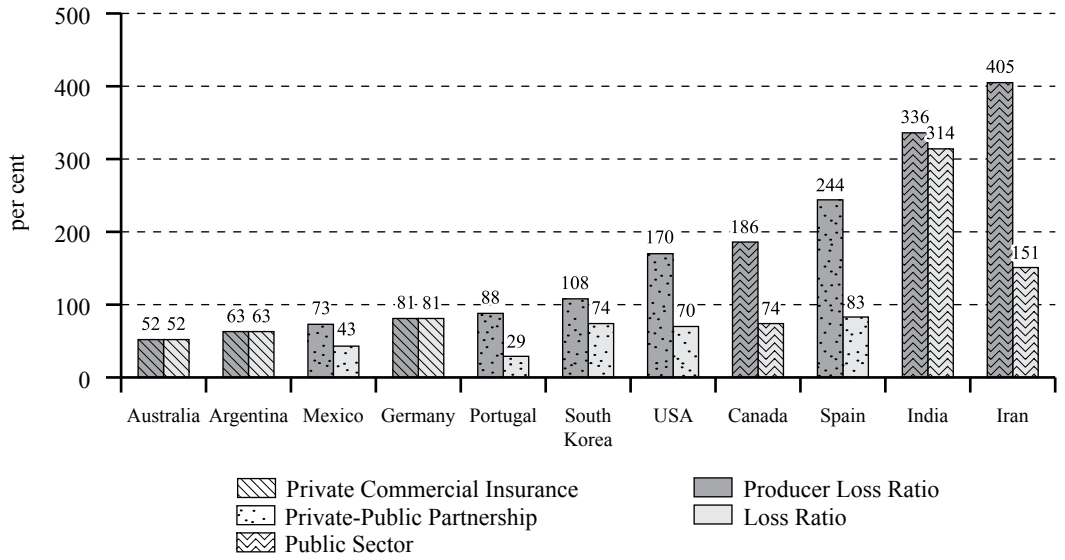


Source: Kalra and Xing, 2013

The significant growth of the agricultural insurance market is a direct effect of the increasing budgetary resources spent on popularising crop and livestock insurance policies. Although it is a much debated measure, agricultural insurance schemes have one important advantage. Those which meet some criteria outlined in the Uruguay Round Agreement on Agriculture can be treated as a Green Box policy, which is excluded from reduction commitments, under the WTO. Since agricultural insurance schemes implemented by most countries exceed some specified threshold of maximum indemnities they are notified as Amber Box support. Still they are treated as non-product-specific tools and in most cases are not added to a country's Aggregate Measurement of Support. So, very often agricultural insurance schemes are not treated as risk management support tools but rather as a convenient method of supporting agricultural incomes. This is the case in the USA and Canada (Kalra and Xing, 2013). It can be easily observed by analysing the producer loss ratio, which relates indemnities received by farmers to premiums paid by them. If the producer loss ratio exceeds 1 in the long run it means that the insurance scheme becomes an income support system instead of being a risk management tool. This happens quite often when there is a public intervention (Figure 2), but is very rarely seen in market-oriented insurance, since it would soon cause insurer insolvency[4].

[4] The rationale of the insurance subsidies is grounded by the opportunity cost of the subsidies for the national catastrophe fund in the case of Spain (Enesa, 2003). The operation of any catastrophic fund is a Green Box tool.

Figure 2: **Accumulated producer loss ratio (darker tone) and loss ratio (lighter tone) in selected private, public-private and public crop insurance sectors in 2003-2007.**



Source: Mahul and Stutley, 2010

There are many ways of implementing agricultural insurance schemes that will be attractive to farmers. Premium subsidies are the most common form of public intervention. In 2008 the World Bank conducted a survey of crop and livestock insurance in 65 countries. About 60 per cent of these countries subsidised insurance premiums. Premium subsidies account for two thirds of the total public cost of agricultural insurance programmes (Mahul and Stutley, 2010). Government can also provide public reinsurance, subsidies on administrative and operational expenses or subsidies on loss adjustment expenses. Research, development and training support can also be provided. It is also worth mentioning that nowadays compulsory insurance is rather exceptional, especially in high income countries, although buying insurance can be required if a farmer does not want to be excluded from post-disaster assistance programmes.

The two most common forms of agricultural insurance policies are termed named-peril policy and multiple-peril policy. The first reimburses losses caused by specified perils. This is a traditional type of agricultural insurance tool and due to its low-cost damage-based indemnity system it is still the predominant form of insurance coverage in countries where public intervention is absent. It is offered in 45 out of the 65 countries investigated in the World Bank survey (Mahul and Stutley, 2010). Hail and frost insurance policies are the most common types of named-peril insurance.

Multiple-peril insurance policies which provide coverage against a basket of risks are far more convenient for farmers. They reimburse every loss in agricultural production. For example, indemnity can be paid if a reduction in yield is larger than some specified threshold defined mostly as a percentage of the historical average yield. It provides better coverage than a named-peril policy. But since it is very costly for the insurer (it is subject to adverse selection and moral hazard problems) and usually performs very poorly, it hardly operates on a commercial basis. Most agricultural insurance programmes which provide multiple-peril crop insurance are heavily subsidised. In fact South Africa is the only country in which unsubsidised multi-peril crop insurance is offered to farmers (Mahul and Stutley, 2010).

Recently, insurance tools covering losses related not only to production risk but also to price risk have been receiving more and more attention. These are crop revenue insurance policies that

combine crop yield based insurance with protection against loss of market price. This kind of insurance coverage is available in USA and Canada, where agricultural commodities futures prices are quoted on derivatives markets. The existence of agricultural commodities futures markets is one of the requirements for implementing agricultural revenue or income insurance.

Index-based insurance policies are another form of agricultural insurance. They are innovative products with different indemnity payment mechanisms. Payments are based not on individual losses but on a specially designed index which is used as a proxy for farmers' losses in a given region. Weather parameters such as rainfall, soil moisture, temperature or aggregate production ratio in a given area (such as aggregate crop yield or aggregate livestock mortality) can be used as an index. Owing to its construction, index-based insurance is not exposed to informational asymmetries. The insurer has no need to conduct individual loss adjustments. These advantages make index-based insurance well matched to agricultural sectors in less developed countries, where there is no informational infrastructure collecting data from individual farms.

This kind of insurance is especially well suited to such risks as excessive rainfall or drought in crops (one of the biggest sources of losses in agriculture). Although index insurance solves many problems of traditional insurance products they still have to deal with systemic risk and create one additional challenge. Indemnity payments are not directly connected but only correlated with loss occurrence on the farm. This is called basis risk and is a result of the index insurance structure. This insurance tool can only perform if the basis risk is small enough to attract potential buyers, but this can be the case only for small territories (Musshoff *et al.*, 2005). The implementation of index insurance in agriculture is quite new and the aggregate premium volume remains low.

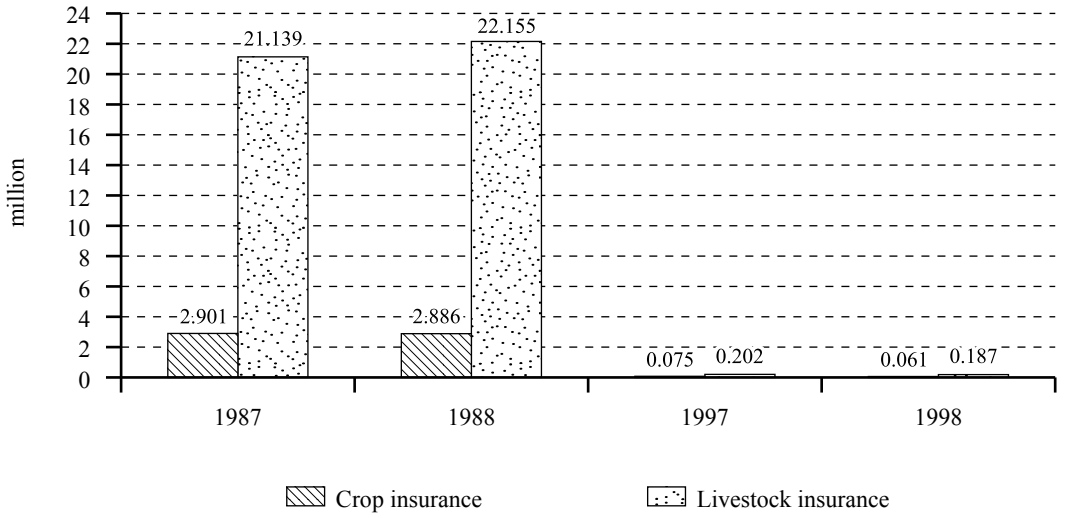
The World Bank survey indicated that the total value of crop insurance policies exceeds animal insurance policies in the world agricultural market. From USD 6.6 billion of worldwide agricultural insurance premium, which constitute 44 per cent of agricultural premium, USD 5.8 billion was allocated to crop insurance and USD 0.8 billion went toward subsidies of livestock insurance premiums. Livestock insurance in most countries covers only individual animal accidents. Insurance against epidemic losses is available only to farmers in highly developed countries. Still, the penetration rates of livestock insurance programmes are generally low, with a few exceptions such as China, Germany and Spain (Mahul and Stutley, 2010; Székely and Pálinkás, 2009).

Agricultural insurance in Poland

The history of widespread agricultural production insurance in Poland started in 1951. Before the Second World War agricultural producers could purchase insurance coverage on a voluntary basis but in Poland insurance was not commonly used as a risk management tool in agriculture. Insurance policies were generally offered by small mutual companies that provided coverage against a limited range of risks, mostly hail damage. In 1951 the communist regime introduced compulsory crop (rye, maize, barley and wheat) insurance covering damage caused by hail. In 1956 compulsory crop insurance coverage was extended to flood risk as well. Meanwhile, in 1954 losses in cattle and horses started to be reimbursed under the national compulsory agricultural insurance programme.

When the communist regime collapsed, all production of cereals, forage, potatoes and sugar beet was covered by compulsory insurance. Animal production was insured as well. Agricultural producers were also obliged to purchase insurance covering losses in buildings, machinery, fertiliser in stock and other facilities. Insurance premiums were calculated on the basis of rye prices and were considered to be very low. More than 90 per cent of all agricultural producers purchased insurance. The insurance market was practically monopolistic as insurance policies were provided by the national insurer Państwowy Zakład Ubezpieczeń (PZU).

Figure 3: **Number of crop and livestock insurance policies purchased by Polish farmers in 1987-1988 and 1997-1998.**



Source: Rojewski, 2012

Everything changed when the economic 'shock therapy' that began the transformation of the planned economy into a market economy was implemented. The government abolished compulsory agricultural production insurance, leaving only obligatory buildings and civil liability insurance. The number of purchased insurance policies fell dramatically and remained very low during the last decade of the 20th century (Figure 3).

At the very beginning of the 1990s, many producers were not aware that their crops and livestock were not covered by insurance. A considerable percentage of farmers thought that they were buying a policy when paying their taxes (Szymańska, 1998). But soon everyone became familiar with the new market conditions and the reason for not purchasing an insurance contract was a desire to minimise short term costs rather than lack of knowledge.

During the 1990s the agricultural production insurance market remained undeveloped. About 4 per cent of farmers purchased any kind of insurance covering losses in agricultural production. Adverse selection problems drove insurance premiums to a high level. The fall in farmers' incomes at the beginning of the 1990s was another cause of low demand for insurance cover. Insurers afraid of claim accumulation did not offer insurance cover against drought risk as drought causes the most severe losses in crop production in Poland. PZU, the monopolist insurer in the planned economy, remained the biggest player in the agricultural insurance market, collecting about 70 per cent of the premiums paid by purchasers of agricultural insurance.

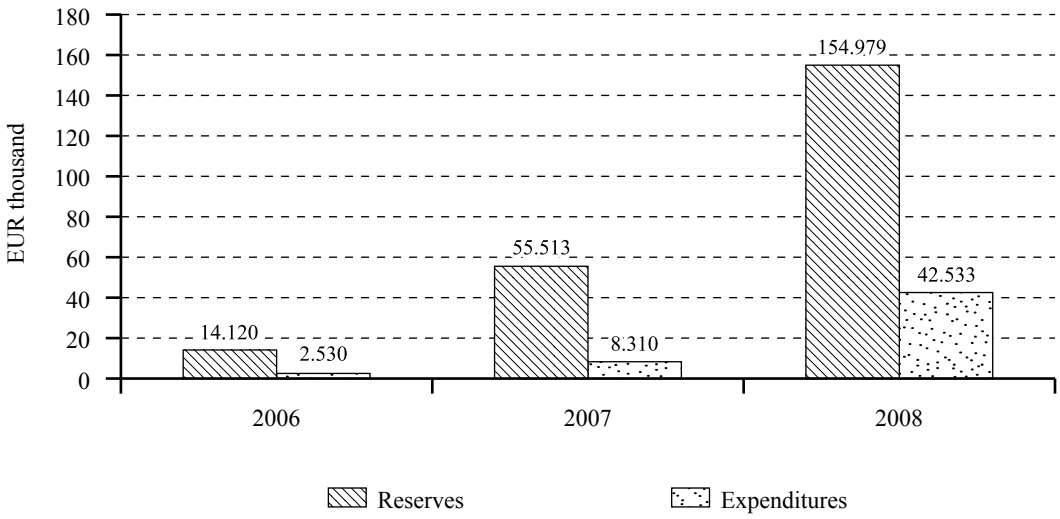
Although hardly anyone purchased insurance cover at that time, farmers did not carry the whole risk. A large amount of production risk was transferred to taxpayers since after every large natural catastrophe the government launched a post-disaster aid programme. Especially costly support was introduced after floods in 1997 and 2001 and after drought in 2000 and 2003. This post-disaster aid programme soon became a burdensome element of budgetary expenses. In 2001-2003 the government spent about PLN 650 million on such aid. The most significant component of post-disaster programmes was subsidies (PLN 390 million) on interest rates on post-disaster recovery loans provided by banks that had concluded specific agreements with the Agency of Restructuring and Modernisation of Agriculture. During that period, wheat delivered to farmers that suffered from flood losses was worth PLN 108 million.

Although the value of state aid can be considered as low when compared to losses caused by natural disasters, it still reduces the demand for insurance cover. Furthermore these kinds of expenses that appear randomly are always burdensome to budget for in advance. The rising cost of governmental disaster aid in consecutive years and the growing agricultural catastrope risk led decision makers to search for a systemic solution. In 2003 the Ministry of Agriculture and Rural Development (MARD) appointed a group of experts to prepare proposals about a future subsidised agricultural production insurance scheme. After several months of debate guidelines were ready and discussion among policy makers started.

The final result of these proceedings was the *Subsidies to Crop and Animal Production Insurance Act* passed on 7 July 2005, which came into force on 9 September 2005. The new law allowed up to 50 per cent of the insurance premium paid by farmers for animal production policies and up to 40 per cent of the premium for crop insurance to be subsidised from budgetary resources. Insurance policies were provided by private insurance companies, but every policy was precisely specified by the regulations. It was decided that all cereals, maize, rapeseed, potatoes and sugar beet were eligible crops to insure. Farmers could also buy insurance against losses in cattle, horses, goats, sheep and pigs. In the case of crop production subsidised policies covered losses cause by, among others, drought, flood, tornadoes, hail, excessive rain, fire, lightning and freezing. The insurance policy can be subsidised if the premium set by the insurer is not higher than 3.5 per cent of the estimated production value of insured crops. In the case of animal production this threshold price cannot exceed 0.5 per cent of the insured animal production value. MARD also appointed a special commission which assesses and accepts insurance policies offered by private insurers.

The first amendment to the Act took place in 2006. It broadened the list of eligible production with the addition of hop, fruit and vegetable production and poultry and fish production. Also, fire and explosion risks were removed from the list of threats.

Figure 4: **Budgetary funds assigned for and actually spent on subsidising insurance of agricultural production in Poland.**



Source: Szelągowska, 2012

Although subsidies were worth almost half of the whole insurance cover price, hardly any new producer bought crop or especially animal production insurance. Farmers still considered insurance cover to be an expensive and unnecessary risk management tool. There were only 10,738 crop insurance policies sold in 2006, and 28,412 in 2007. At the same time only 318 and 416 animal production insurance policies were sold in 2006 and 2007 respectively. The difference between the funds reserved for and spent on subsidies during the first three years is shown in Figure 4. The low demand for subsidised insurance cover and the still growing post-disaster aid needs led policy-makers to change the regulations once again. Two further amendments were passed in 2007 and 2008. These were the last changes to the Act for the time being. The most important elements are as follows.

The name of the regulation was changed to the presently valid *Crop and Animal Production Insurance Act*. The most significant modification turned the previously voluntary programme into an obligatory insurance scheme. Under Polish law purchasing insurance cover is obligatory for every agricultural producer who receives direct payments. An agricultural producer is obliged to cover 50 per cent of their crop production against at least one specified risk. Farmers who refuse to buy insurance are obliged to pay a EUR 2 fine for every hectare eligible for direct payments. But still the system of control does not work efficiently, as shown not only by the number of subsidised insurance policies purchased (about 140 thousand crop policies in 2011) but also by the numbers of other obligatory insurance (such as civil liability or agricultural buildings insurance) policies. Implementing compulsory insurance cover was intended to reduce insurance premiums and reduce the need for disaster aid. These aims have not been achieved since many farmers still do not buy mandatory insurance cover. In many cases it is easily understandable given that more than 25 per cent of all agricultural household owners do not sell their production.

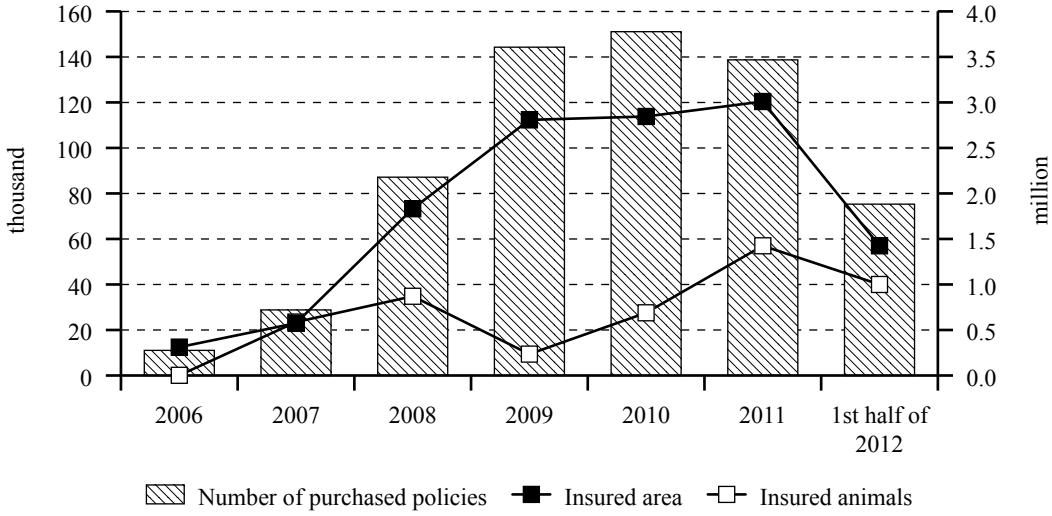
Another important change relates to the public reinsurance of risk received by private insurance companies. About 70 per cent of all agricultural land in Poland is exposed to a high drought risk. Only the southern part of Poland does not suffer from drought losses but, in turn, this region is highly exposed to flood risk. Even so drought causes the most severe damage in agricultural production. Legislators created an instrument to encourage insurers to offer drought insurance policies. In the case of claims accumulation caused by drought, when indemnities exceed the value of premiums collected, the government will compensate private insurers by 60 per cent of the difference between the value of indemnities and 90 per cent of the collected premium. This new tool was especially needed after severe droughts in 2006 (about PLN 4 billion losses) and in 2008 (more than PLN 2 billion losses) (Rojewski, 2012). After the latter, insurance companies paid claims worth about PLN 170 million. The government had to pay to private insurers more than PLN 80 million in the form of reimbursements, which constituted more than 50 per cent of all funds spent on the agricultural production insurance scheme. As a result of high losses, prices of drought insurance increased and less than one thousand farmers purchased drought insurance in 2010. Drought insurance premiums are between 2 and 20 per cent of the value of insured crops. The maximum threshold of the insurance premium eligible for subsidies is 6 per cent and, as a consequence, private insurers being afraid of high losses rarely offer drought insurance.

Another important change was the rising threshold of insurance premiums. Since 2007 the maximum insurance premium has been 5 per cent for, among others, winter rapeseed, hop, vegetable and fruit production, and 3.5 per cent for cereals, maize, spring rapeseed, potatoes and sugar beet. If insurance premiums are higher than defined thresholds subsidies are reduced, but only if they are lower than 6 per cent of the insured crops value. The subsidy equals 50 per cent for both animal and crop production.

The legislator set the maximum level of deductible at 10 per cent. Insurers still can fix it at a lower level. The claims have to be paid when losses exceed 25 per cent of normal production levels for drought insurance and 10 per cent of production for other risks.

Discussed amendments also broaden the list of entitled crops. Farmers can now cover leguminous plants and strawberry production by obtaining insurance. The legislator also regulated which part of the crops should be the subject of insurance cover. There were some changes in the regulation of risk against which farmers can insure their production. In particular, how to measure the occurrence of drought and when MARD can announce the drought condition in particular regions were regulated. On behalf of MARD the Drought Monitoring System for Poland is provided by the Institute of Soil Science and Plant Cultivation. It was also specified that every insurance cover should last 12 months.

Figure 5: **Number of insurance policies purchased (in thousands; left scale), insured animals (in millions; right scale) and insured area (in million hectares; right scale) in Poland (2006-2012).**



Source: Ministry of Agriculture and Rural Development

From the statistics related to the level of participation in subsidised agricultural production insurance schemes it is clear that although insurance cover is mandatory for every direct payment beneficiary, most producers do not buy any agricultural production insurance cover (Figure 5). There are about 1.4 million farmers who receive direct payments in Poland. The subsidised insurance scheme started only in 2009 and in 2010 the number of purchased insurance policies exceeded 140,000, which constitutes 10 per cent of farmers.

The total number of policies sold hides the disparity in the number of crop and animal production policies. The number of crop policies as well as the value of insured crop production is very high compared to animal production insurance cover (Table 1). So, it could be stated that only crop insurance performs quite well. But even crop production is not covered against the most popular and most dangerous risks. Most agricultural producers purchase only hail insurance (Figure 6). A significant percentage of farmers cover their crops against winter and spring freezing risk. Since 2009 flood and drought risks, which cause the most significant losses in agriculture, are generally not insured at all. In practice most insurance policies protect against losses caused by a 'basket' of three different risks.

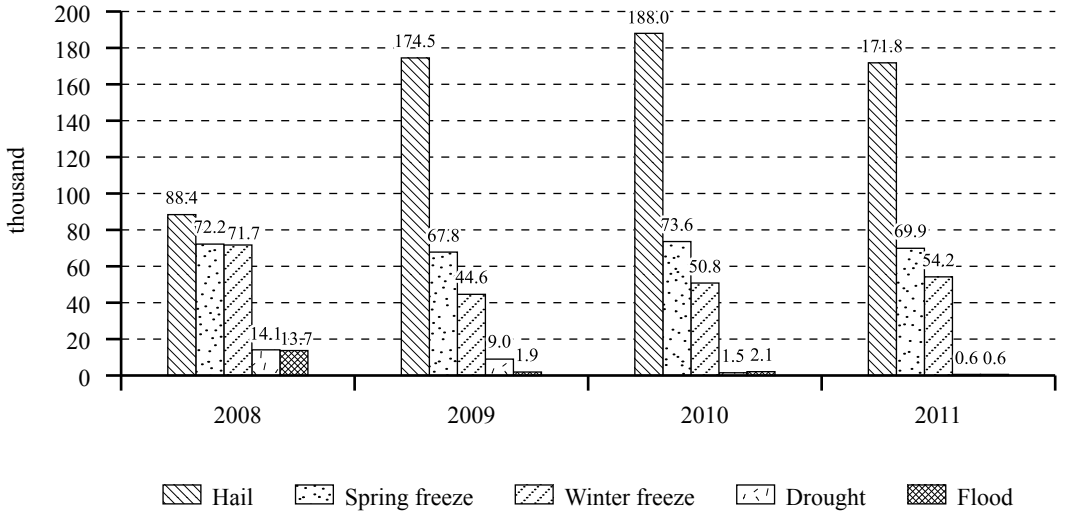
Table 1: **The number of policies and value of insured production in Poland in 2006-2010.**

EUR thousand

	Crop insurance policies	Value of insured crops	Animal production insurance policies	Value of insured animals
2006	10,738	188,687	318	7,376
2007	28,412	483,020	416	16,839
2008	87,150	1,097,324	220	12,913
2009	144,080	1,499,868	248	8,782
2010	150,833	1,963,602	279	12,243

Source: Ministry of Agriculture and Rural Development

Figure 6: **The number of policies covering losses caused by selected risks in Poland in 2008-2011.**



Source: Janc, 2012

Not only are farmers uninterested in subsidised insurance. From over 30 private insurance companies that offer non-life policies, only three are involved in the agricultural insurance market, from which PZU and Concordia (founded in 1997) are the major actors, and TUW TUW (Towarzystwo Ubezpieczeń Wzajemnych, founded in 1992) is the third insurer. In the past three other private insurers dealt with agricultural production insurance, but they did not continue. This can be seen as evidence that it is not the most profitable insurance market segment, especially since agricultural production risk seems to increase year by year. In 2008 insurance companies had to cope with huge drought losses. Claims again considerably exceed collected premiums in 2011 and in 2012. In 2011 rapeseed producers suffered huge losses caused by freezing. In the first part of 2011 the loss ratio assessed by Concordia was almost 400 per cent. The TUW TUW agricultural production insurance portfolio loss ratio was about 250 per cent. Since losses were not caused by drought private insurers could not count on government reimbursement.

Although the Polish agricultural production insurance scheme has to cope with many problems, year after year a growing percentage of agricultural production is covered by insurance. The increasing number of purchased policies seems to be the result of growing awareness of insurance needs among agricultural producers. The obligatory character of the crop and animal production insurance programme is not such an important factor since control procedures are highly ineffective. Financialisation of agricultural sector also plays a significant role in the growing demand for insurance because insurance cover is needed when a farmer applies for bank credit or post-disaster aid.

Still there are some unsolved problems. Insurance policies covering losses against the most severe risks such as flood or drought are not always available. There is a strong need to change this situation, although it can be very difficult. Drought and freezing cause high value losses that cannot be borne by private insurers. There is also no need to maintain compulsion for agricultural production insurance. For many small farmers there are many other more convenient risk management tools than insurance purchase. Taking into account the scale of their farms, production diversification or off-farm employment seems to be more appropriate method of dealing with income risk.

Progress in the Polish agricultural production insurance market measured by premiums collected is easily seen but still there are some reforms that can be implemented. Changes in European Union (EU) rural development policy gives the opportunity for every Member State to introduce domestic risk management support financed by the European Agricultural Fund for Rural Development. Taking into account that owing to WTO requirements agricultural insurance market support will soon become an accepted element of every European country's rural policy, legislators in Poland should make an effort to fulfil the necessary requirements to transform the present agricultural insurance into part of the Polish rural development policy subsidised by EU Funds.

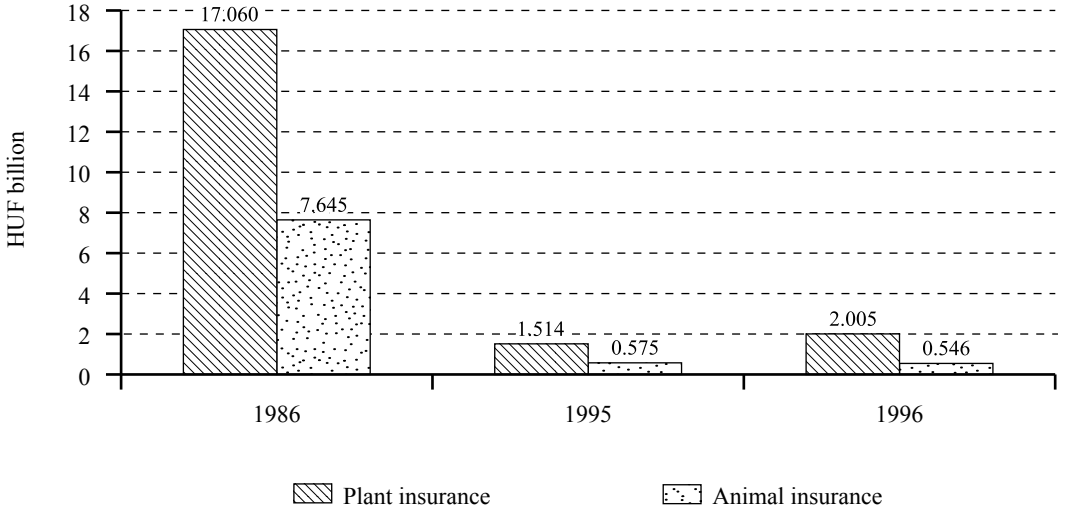
Agricultural insurance in Hungary

The history of the Hungarian agricultural insurance system began in the 19th century. Foreign insurance companies had already been in the country since 1832 but they dealt only with cargo insurance. The first voluntary mutual insurance fund which dealt with insurance against hail damage was founded in 1843 but this initiative soon disappeared. On 15 July 1857 the First Hungarian General Insurance Company was established and had a leading position on the market. The organic development of the Hungarian insurance market ended with the socialist takeover. The market players were nationalised and the State National Insurance Company was founded in 1949, which operated as a monopolistic player on the insurance business. Agricultural producers were compelled to purchase insurance covering losses in private property between 1952 and 1956, which has not previously been characterised. Between 1959 and 1961 the farm structure in Hungary changed drastically which caused a relevant alteration in the insurance system too. The small individual farms were forced by the state to amalgamate into large cooperatives. The previous individual insurance scheme was replaced by the combined crop and animal insurance system tailored to the needs of the big agricultural holdings.

After 1990 the production structure in agriculture has been changed completely: the majority of the cooperatives collapsed and the agricultural land cultivated by individual farms increased by 50 per cent (on the other part of the land was cultivated by corporate farms). The insurance market started to function again after 1986 with the apparition of new operators. There were five insurance companies in 1990 which provided agricultural insurance products and next to them appeared several voluntary insurance associations, although their share has not been significant since then, only 1 per cent.

The newly established individual farms typically did not purchase insurance and demand of in insurance also declined in the case of corporate farms so that the area of arable land covered by insurance decreased significantly. The situation of animal insurance was much worse: the ratio of livestock covered by insurance fell to 20 per cent. The declining insurance coverage is shown in the fall in agricultural insurance premiums (Figure 7).

Figure 7: **The value of crop and animal insurance premiums before and after the transformation in Hungary (in 1995 prices).**



Source: Mabisz (Association of Hungarian Insurance Companies)

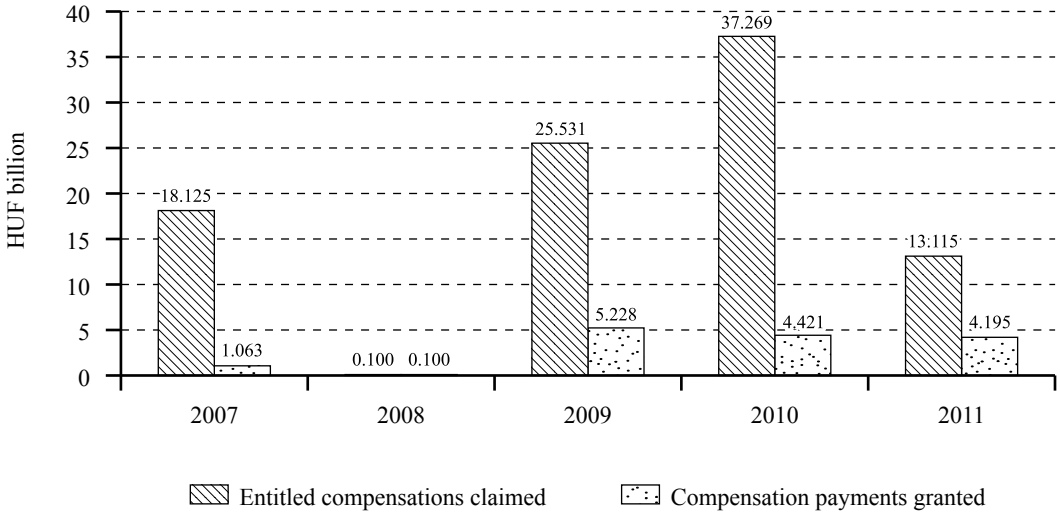
A further problem emerged: small farmers asked the government for help because of the huge losses that appeared almost every year and they usually obtained it at the expense of the state budget. For example in 1993 there was a severe drought and HUF 1 billion was paid to the farmers as compensation, the same amount as the crop insurance premium income for the insurance companies in that year. After 1990 a new compensation fund was established for mitigating the risks without any insurance contract in the market, but the amount was too small (HUF 200 million) compared to the annual losses caused by drought (HUF 20-50 billion).

A state support scheme was introduced in 1996 which replaced the earlier practice. This scheme targeted a 30 per cent premium support for all types of insurance (both animal and crop insurance) and prohibited the mitigation of damage from state funds for producers who do not have insurance. The compensation fund was abolished which was followed by the premium supporting fund. This system operated properly in the first years: the crop insurance premium was HUF 1.5 billion in 1995 and increased to HUF 4.4 billion in 2003 which represents a 20 per cent increase in real terms. In addition the agricultural area covered by insurance increased and reached 2 million hectares, 40 per cent of the Hungarian agricultural area. However, it also started harmful practices: in the case of animal insurance, the premium subsidy has not reached its goal because the insurance companies and the producers shared it and the animal insurance premium began to increase dramatically. Often the producers purchased insurance of a value much higher than the value of the livestock. The growth was clearly speculative without economic rationale. Naturally the *ad hoc* payments remained too for the producers who did not contract any insurance. The Hungarian government abolished the premium support scheme due to the anomalies and high fiscal burden in 2004. The system did not reach its goal: it did not actually increase the number of risks covered by insurance, but it was too expensive.

To solve the existing problems the Government introduced a new insurance scheme called the National Damage Mitigation System (in Hungarian: NAR) in 2007. The main purpose of NAR was to offer a solution to the plant growing farms to cover such significant damages as drought, internal water damage and spring freezing damage. The essence of the scheme was that the producer payments have been complemented by the same amount from the State budget and the newly formed financial fund paid the compensations.

This scheme did not solve the basic problem of risk management in Hungarian agriculture. It did not operate as an insurance but only as damage mitigation, allowing a small compensation for the damage incurred. Practice in recent years has shown that the producers were given 10 or 20 per cent compensation for those years in which major damage occurred but it depended on the number of farmers incurring agricultural damage in that year (Figure 8).

Figure 8: **Total compensation claim and benefits paid for under the NAR in Hungary.**



Source: MVH (Agricultural and Rural Development Agency)

Only very few producers contributed to the NAR, mainly fruit producers affected by spring freezing. The system was made mandatory in 2009 (except for the smallest producers and the huge agricultural holdings), thereby the penetration improved significantly, but the nature of the system (uncertain damage mitigation despite insurance) remained uncertain. Even so, the NAR can be considered successful in spite of the above-mentioned problems because it succeeded in abolishing the bad practice of *ad hoc* payments to uninsured farmers after serious agricultural damages.

The next development was the adoption of *Act No. 168/2011* which brought the compensation and the insurance activities into a unified system. The reason for the reform was twofold: on the one hand the number of companies offering agricultural insurance declined, while on the other it was very clear that the NAR alone would not be able to solve the problems. The system consists of two pillars: the first pillar represents the transformed damage mitigation system (NAR). This pillar is compulsory for all producers over a certain limit size (5 hectares vegetable and fruit; and over 10 hectares arable land), thus the number of producers in the NAR increased from 25 thousand to 75 thousand and the area of land covered against the covered losses increased from 1.5 million hectares to 3.5 million hectares. Another important change was that the producers can only receive full damage compensation if they have insurance for at least half of their crops. The governmental agencies are responsible

for the assessment of damage, judgement and payment of the compensation requests in this pillar. The second pillar is aiming to develop the insurance market by the re-introduction of the premium subsidy for new insurance categories. The government decided under which parameters A, B or C type insurance can be considered:

- Type 'A' includes, next to the usual hail-fire-storm-winter freezing damage, the drought, flood, rainstorm and spring freezing insurance too. This is a package insurance which can be purchased only the same time basically for the main arable crops (wheat, maize, barley, sunflower and rapeseed) and wine grapes and apples too;
- Type 'B' gives protection against hail, fire, storm and winter freezing damage for the intensive cultures such as field vegetables and fruits and the insurance contracts can be purchased separately for different risks;
- In the case of type 'C', producers can purchase insurance contracts for the risks considered in type 'A' separately but as insurance companies does not prefer to offer insurance contracts only for drought, it covers in most cases the hail-fire-storm-winter freezing insurance for arable crops.

The government allocated HUF 2.8 billion from the EU funds to the premium subsidies which can be used at firstly by type 'A', then type 'B' and finally type 'C' insurance up to 65 per cent of the premiums. If the funds would not cover the insurance premium support needs then the support intensity should be reduced in the first stage in case of insurance type 'C' to 30 per cent, then type 'B' to 40 per cent and finally type 'A1 to 55 per cent.

Type 'A' insurance was too risky for the insurance companies because it included drought and spring freezing damage (they were never insured for these in Hungary before the reform in 2012), so the government decided to fix the size of deductibles at a high level (50 per cent) (Table 2) but it did not limit the insurance premiums. The government provided the modelling calculations about the potential losses caused by drought, and spring freezing to the insurers as an effective support. The cost of insurance type 'A' calculated by the above-mentioned model in case of 50 per cent deductibles was 4-5 per cent of the production by arable crops and 15-20 per cent by plantations and fruits. Insurers sold the type 'A' about the calculated price. The reform did not deal with the problem of reinsurance of new risks, but the modelling of potential losses caused by drought, winter freezing and flood was enough to help the insurance companies to purchase reinsurance on the international market against the risks covered in insurance type 'A'.

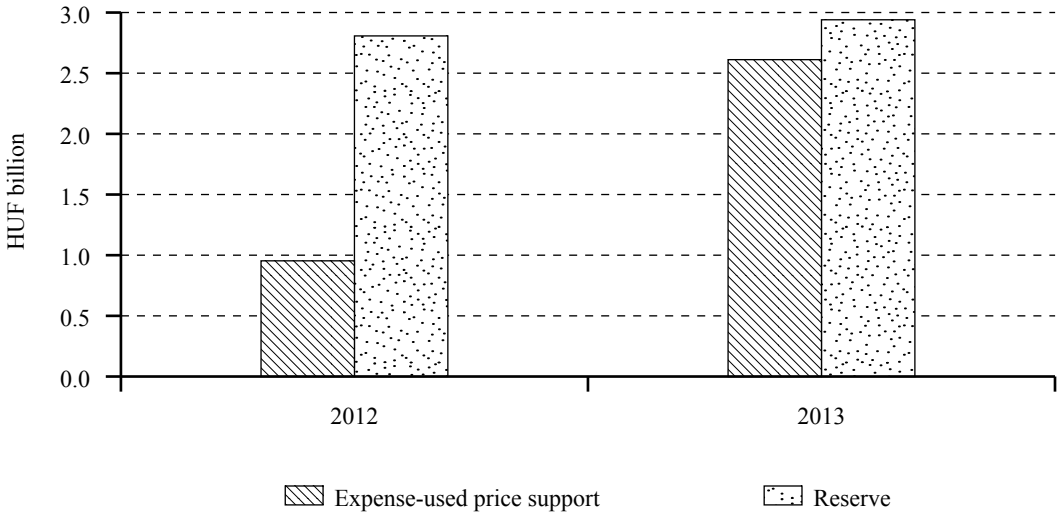
At the beginning of the programme in 2012, administrative difficulties delayed the sale of insurance but the results can be said to be very successful. The insurance companies started to sell new products and the producers have shown great interest in these products. There was a serious drought in Hungary in 2012 and it did not result in a huge growth in losses by the insurance companies. In 2013 the sale of the products continued, the prices did not increase but rather slightly decreased. In the second year of the programme the utilisation of available funds for insurance premium support payment could almost completely be used (Figure 9).

Table 2: **Quantitative and legislative conditions of the mitigation requirements and the subsidised insurances in Hungary.**

	Terms of indemnity in the case of type „A-B-C" insurance	Conditions for compensation	
	loss is larger than:	loss is larger than:	other conditions
Hail	30% per table	30% per farms	-
Fire	30% per table		if the European Commission approves
Storm	30% per table		-
Winter Freeze	50% per table		-
Drought	50% per crops		if the minister announces the drought until 31st October
Inland water	-		only 3-times from 5 years can be used by farmers
Rainstorm	50% per table		-
Spring freeze	50% per crops		-
Flood	50% per table		if the European Commission approves

Source: AKI, Financial Policy Department

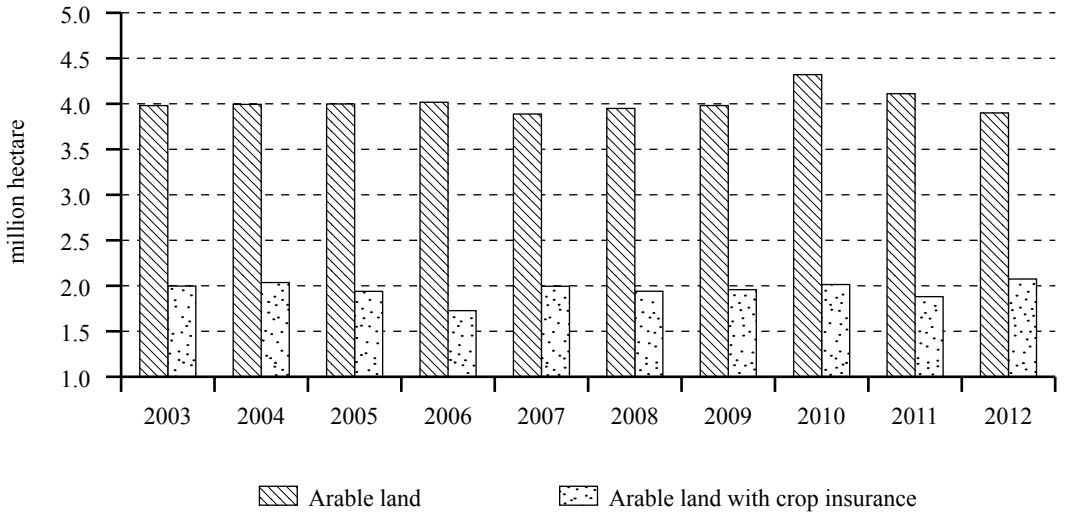
Figure 9: **The reserve and the amount of funds using to support insurance fees in Hungary.**



Source: Ministry of Rural Development

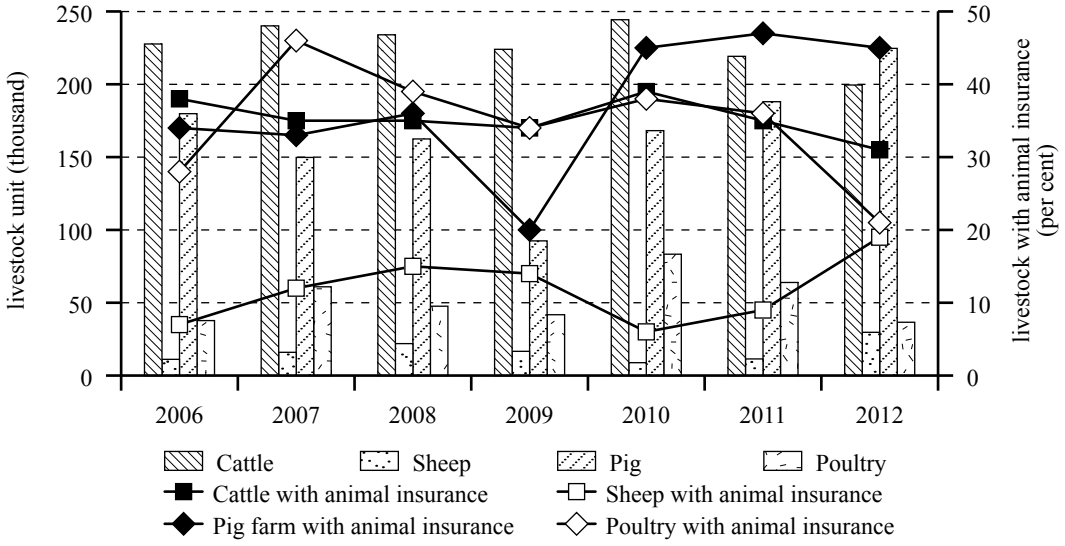
The overall conclusion is that at least the larger farmers have participated in insurance related risk management in past years thus this method of risk management was substantially known and widespread in Hungary. Nevertheless the reason for the favourable risk management situation was basically the high indebtedness of the Hungarian corporate farms where the debtors were required to insure the products they produced at the highest level possible. We do not have real information about the effective size of the secured agricultural area because these data are not collected by the insurance companies so we can only estimate it from the Hungarian Farm Accountancy Data Network (FADN) (Figures 10 and 11).

Figure 10: **Utilised agricultural area of FADN sample farms with crop insurance in Hungary.**



Source: FADN

Figure 11: **Number of livestock in FADN sample farms with animal insurance in Hungary.**



Source: FADN

The data from the Association of Hungarian Insurance Companies (in Hungarian: MABISZ) are required to complete the picture about the insurance penetration (Table 3). The new risk management scheme has resulted in a significant impact in its first year regarding the number and the fee for insurance but it appears as a major weakness that the new system does not deal with the issue of animal insurance. The fact that the income from insurance premium of insurance companies dropped to HUF 1 billion from HUF 2 billion shows the crisis in animal insurance very well. It means a 70 per cent decrease in real prices.

Table 3: **The number of policies and premium volume in Hungary (2006-2012).**

	Number of crop insurance policies	Premium of crop insurance policies in million HUF	Number of animal production insurance policies	Premium of animal production insurance policies in million HUF
2006	10,648	4,341	1,960	2,440
2007	10,287	5,158	1,942	2,342
2008	11,322	6,997	1,707	1,260
2009	10,467	6,582	1,664	1,096
2010	11,952	5,621	1,569	1,018
2011	11,475	7,211	1,586	802
2012	15,814	8,826	1,138	892

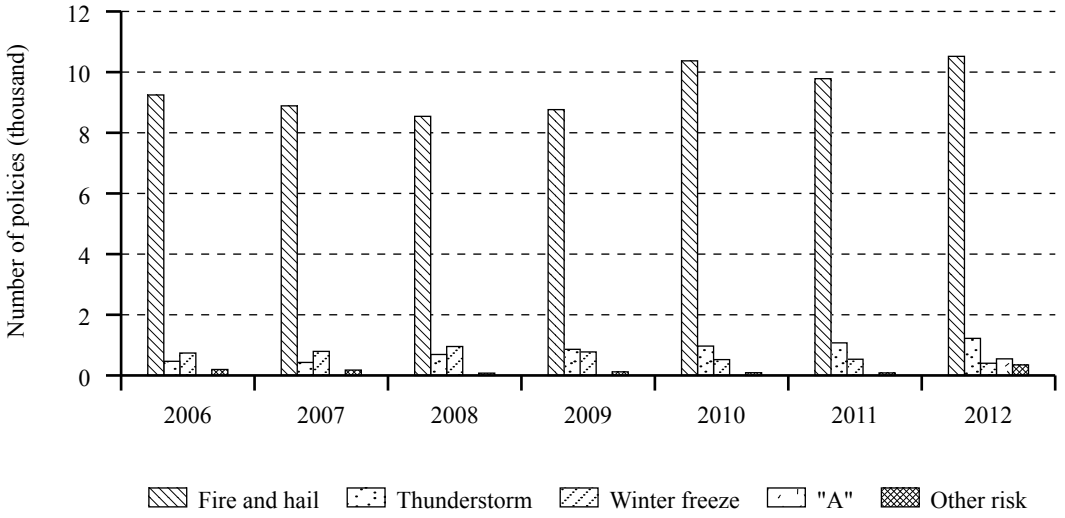
Source: Mabisz

There are many reasons for the crisis in animal insurance. Basically the general, high-cost insurance which paid compensation against all mortality has disappeared from the market. This is due to technological progress: animal breeding in Hungary is typically conducted in stables. There the damage can be prevented with the appropriate technology and medicines, thus significantly reducing the need for such insurance. Farmers typically purchase insurance to preserve their property (buildings, machinery and so on) against fire, storm and flood, and animals are insured against these natural events with this property insurance, too. Another reason is the prolonged crises in the livestock sectors. Fewer and fewer producers are engaged in animal husbandry and the remaining farmers are in serious financial difficulty. For them a cheap insurance is not an alternative. The third reason is that the system adopted in 2011 does not include supporting animal insurance. Overall, we can say that because of the technological reasons, the development of animal insurance cannot be expected in the future.

Another particularity of the Hungarian agricultural insurance system is the mismatch between the risks and the insurance. In Hungary the most harmful risk is drought, but the major part of the insurance contracts belongs to hail and fire insurance (90 per cent) in terms of the number and the value of insurance premiums (Figure 12 and Figure 13).

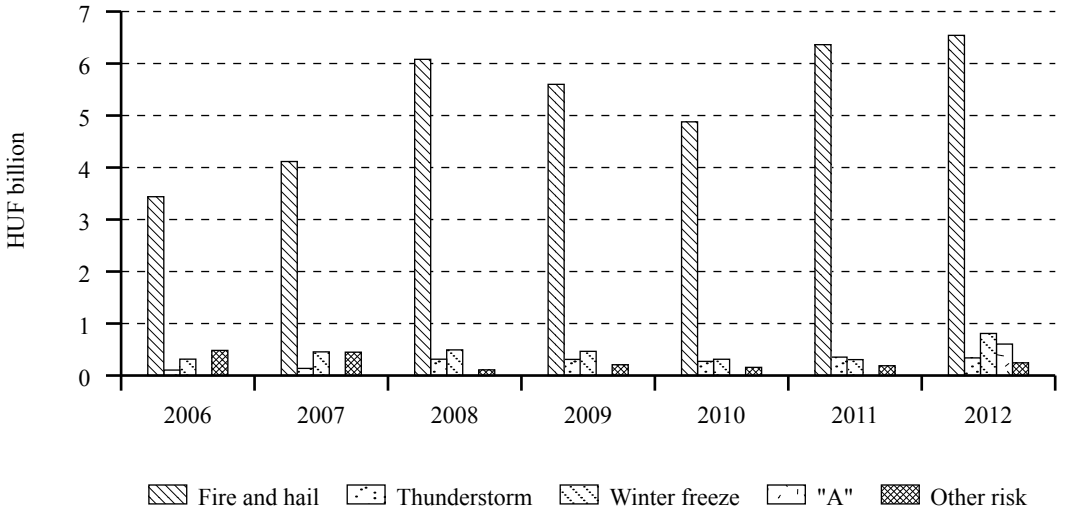
The first opportunity to purchase insurance against drought appeared in 2012 but this still represents a low level of contracted insurance policies compared to hail insurance. We can be optimistic because the three remaining insurance companies (Allianz, Generali and Groupama) and the other insurance associations vote of confidence that the product – during the great drought in 2012 – performed well (for farmers and insurance companies too) and similar results are expected in 2013 as well. Overall, the Hungarian agricultural insurance and damage mitigation situation has taken a positive turn in recent years.

Figure 12: **Number of policies covering losses caused by selected risks in Hungary (2006-2012).**



Source: Mabisz

Figure 13: **Value of insurance premiums covering losses caused by selected risks in Hungary (2006-2012).**



Source: Mabisz

Agricultural insurance has had a long tradition in Hungary since before the Second World War and these traditions were not completely lost during the socialist period either. The transformation in 1990 was followed by a dramatic fall but the remaining corporate farms had the practice of continuously purchasing insurance. The first premium supported period, between 1996 and 2003, was basically an unsuccessful story in the case of animal husbandry but it managed to reach a high level (40 per cent) of insurance for plant production. The new government reform in 2006 did not reach its goal to give an effective solution against the big risk factors such as drought, flood and inland

water but at least it stopped the bad practice of *ad hoc* supports. The reform in 2011 has broadened the producers' sphere belonging to NAR and built on each other the damage mitigation and insurance protection. The programme is considered successful in its early years: growing producer interest and the resources have already filled in the second year but in the future it will be necessary to further development of the programme.

Conclusion

A comparison of the Hungarian and the Polish developments shows many similarities, but significant differences can also be seen. In both countries a compulsory insurance scheme operated in the socialist era which covered nearly 100 per cent of the agricultural producers. Even the insurance against drought with high systemic risk exposure appeared in Poland while the high level of damage caused by drought in Hungary was mitigated in another way. The insurance market collapsed after the change of regime in both countries. In Hungary, the breakdown was not complete because the corporate farms cultivated about 50 per cent of the land continuously and they acquired considerable debt stocks with the condition of working capital to be covered at least by insurance against hail damage.

It was a major problem in both countries that *ad hoc* state supports were typically paid to mitigate agricultural damage. This has encouraged the governments to take meaningful steps to change the situation.

In 1996 the Hungarian government introduced a general, 30 per cent premium support scheme. This scheme significantly increased the willingness of producers to purchase insurance but the increasing speculation in the case of animal insurances and the necessity of damage compensation for the farmers without insurance ceased operating in 2003.

The Polish government introduced a new insurance premium support scheme in 2005 for crop and animal production (50 per cent subsidy rate for crop production and 40 per cent subsidy rate for animal production) covering a wide range of risks such as hail, fire, storm, winter freezing, drought, flood and spring freezing. The government also regulated the maximum amount of insurance premium (crops: 3.5 per cent, animals: 0.5 per cent) and the state reinsurance system (in the case of a higher damage compensation margin than 90 per cent, the state covers 60 per cent of the expenditure). The system did not achieve rapid success so it was modified in 2007-2008 when became compulsory for farmers to purchase agricultural insurance otherwise the producers have to pay a penalty. Moreover the maximum level of insurance premium in the case of some crops was increased (5 per cent), but the farmers are entitled to receive insurance premium support above this maximum limit up to 6 per cent. The insurance portfolio has grown rapidly although not as fast as to use the available financial sources for insurance premium support. Overall, the system can be considered successful because 10 per cent of the farmers contracted insurance instead of 4 per cent in the previous period.

The Hungarian government introduced the NAR in 2006 as the previous insurance premium subsidy system failed. In this way the categories of covered risks were extended to drought, spring freezing and inland water risks but the funds collected covered the compensation of 10-20 per cent of the damage. Producers have not joined the system according to expectations therefore participation became compulsory for the medium-size farms in 2009 and in 2011 for all producers above 5 hectares in case of vegetable and fruit and above 10 hectares in case of arable area.

A new agricultural insurance system started to operate in Hungary in 2012 owing to the shortcomings of the previous reform. Insurance premium support was introduced again for usual insurable risks at 65-30 per cent and for group insurance containing drought, flood and spring frost at 65-55 per cent subsidy intensity. The essence of this scheme is that the producers also receive compensa-

tion payment in case of damage from the first pillar of the NAR and from the insurance company. The animal insurance segment fell sharply because it did not belong into the supported circle and the insurance against hail dominates the market.

It can be seen that in both countries consistent measures were taken to improve the risk management system in agriculture which resulted on the increasing of the agricultural insurance penetration. However the measures implemented were different in Hungary and Poland. In the Hungarian agricultural insurance system the damage compensation of farmers is limited to 50 per cent to prevent the certain loss of insurance companies in the case of drought insurance. In the Polish agricultural insurance system the reinsurance provided by government plays a central role and farmers are faced with favourable low deductible rates (25 per cent and 10 per cent respectively) and insurance premium ceilings (3.5 per cent and 5 per cent respectively). Consequently Hungarian insurance companies are supplying insurance contracts for drought and both the insurance premium revenue and the number of contracts have doubled in the last year, while Polish agricultural insurance companies are not offering insurance contracts for drought in spite of the possibility of 60 per cent governmental support.

The Polish and Hungarian experiences show that under-regulation of the market (this was the case in the Hungarian premium subsidy scheme between 1996 and 2003) cause similar failure as overregulation (a good example is the Polish subsidised insurance against drought, which limited the premium level and also the level of deductibles). In the case of systemic risks like drought only the existence of disaster insurance can mitigate the damage of farmers in Hungary and Poland.

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The structure and development of the food retail sector in Poland and Hungary

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Introduction

The development of the food retail sector strongly determines the situation of its suppliers such as the food processing industry and agriculture. As the development trends in Hungary and in Poland since the 2000s have differed substantially, a comparison of the two countries is of interest. While making such a comparison, where possible the Hungarian and Polish data presented in this chapter are compared to international data published in the literature.

This chapter firstly reviews the general trends and rules in the food retail sector and then describes the history of development and the present structure of modern food retail activities in Hungary and Poland. Next it analyses the productivity and profitability of the sector in the two countries and also the reasons for its economic performance. In the following section, different aspects of the connections between retailers and suppliers, such as quality assurance systems, private labels, background conditions and the buying power of retailers are described. From the evidence presented, some general conclusions are drawn.

International trends and general rules of the food retail sector

Though food retail is usually believed to be one of the most profitable sectors, it traditionally operates with very moderate returns on sales (ROS). Even the largest food retail firms operate with low ROS, though in 2009 and 2010 their returns on assets (ROA) were more favourable than the ROS (Table 1). This is not only due to the global economic crisis, it is also explained by the normally low profitability of the sector. In 2009, when the crisis still strongly affected the sector (as indicated by the low rate of increase in sales) ROS were 1.8 per cent but they had reached only 2.4 per cent by 2010 when the crisis started to ease in the sector as evidenced by the increased rate of sales which was 6.1 per cent in that year.

According to Corstjens *et al*.[4] (2004), in the cost structure of retailers the cost of sold goods (inputs) is much higher and the fixed and variable costs are lower than is the case for food processors. This results in higher increases in profit gained from increasing sales volumes. Retailers can double their profits if their sales grow, while the profit of the food processors is more moderate because of their increasing variable costs. This is the reason for the continuous concentration in the retail sector: for the retailers the rate of profit can be increased by trading bigger volumes while for the producers this strategy does not bring a significant result (Table 2). The higher sales volumes and the lower supplier prices which can be achieved through bulk purchasing economies of scale are also increased as a result of the more effective use of logistics, IT and financial services.

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[4] Corstjens *et al*. (2004) has analysed the financial data of the 50 largest public companies operating in the food industry and food retail in North America and in Europe in the period 1993-2002. They published their first analysis of the cost-revenue structure of the firms in 2004 and later on their theory was completed with game theory and published in 2008.

Table 1: **The return on sales and return on assets of the top eight food retail firms of the world in 2009 and 2010.**

per cent

Retail firm	Increase in sales	Net profit margin/ Return on sales	Return on assets	Increase in sales	Net profit margin/ Return on sales	Return on assets
	2009			2010		
Wal Mart (US)	0.9	3.6	8.7	3.4	4.0	9.4
Carrefour (France)	-1.2	0.5	0.8	4.8	1.6	1.1
Tesco (UK)	4.8	4.1	5.1	6.7	4.4	5.7
Metro (Germany)	-3.2	0.8	1.5	2.8	1.4	2.7
Kroger (US)	1.0	0.1	0.2	7.1	1.4	4.8
Schwarz/Lidl (Germany)	1.4	n/a	n/a	9.4	n/a	n/a
Costco (US)	-1.5	1.5	4.9	9.1	1.7	5.6
Aldi (Germany)	3.8	n/a	n/a	5.2	n/a	n/a
Average of top eight food retail firms	**0.8**	**1.8**	**3.5**	**6.1**	**2.4**	**4.9**

Source: Deloitte, 2012

Table 2: **Comparison of the cost and profit structure of food processors and retailers in the case of increasing sales volume.**

per cent

Costs and profit types	Base		5 per cent increase	
	Processor	Retailer	Processor	Retailer
Sales	100.0	100.0	105.0	105.0
Cost of products/inputs	45.0	78.0	47.0	82.0
Fix operational costs	25.0	16.0	25.0	16.0
Variable operational costs	16.0	2.0	17.0	2.0
Profit before tax	14.0	4.0	16.0	5.0
Profit after tax	6.1	1.6	7.4	2.3
Change in profit			**20.8**	**40.6**

Source: Corstjens *et al*., 2004

The different cost structure explains why the food processors and retailers handle their consumer segments differently. Retailers, owing to their high cost of goods and low rate of profit, need to retain all of their consumers because their profits fall sharply with decreasing sales volumes. The most price sensitive consumers are therefore the reference points for the retailers.

Corstjens and Steele (2008) also analysed the possible strategies of retailers with game theory and found that the prisoner dilemma[5] model can be adapted to this case. When two retailers must decide between price cutting or differentiating strategies, only price cutting can be successful because − especially when considering the time factor − if one would choose differentiating and the other price cutting, the latter can immediately gain the market share of the former while it tries to alter its strategy due to the more favourable prices. Under these circumstances it is clear why most retailers choose price cutting in competitive situations. One conclusion of Corstjens and Steele (2008) is that concentration is essential in the retail sector. Another is that the price cutting achieved by the retailers does not increase their profit but is passed on to consumers due to the strong price competition.

The European Commission (EC, 2009) found the same correlation. Although there is strong concentration in the retail sector within the European Union, the sector is competitive. According to empirical research which were summarised in this study, the so-called buyer power (the international literature uses this phrase for the power of the retailer due to its bigger size and more powerful bargaining position) experienced in the sector did not result in higher profits for retailers but the more favourable purchasing prices created lower consumer prices. This was shown by the fact that the food prices have increased by less than the general inflation rate during the last 25 years. This means that due to the strong competition higher concentration in the sector does not lead to bigger profits, rather concentration is necessary because in the retail sector the net profit rate is so low that profitably is only achieved though higher volumes.

Factors influencing the productivity and profitability of the food retail sector

Concentration and competition in the retail sector

Within the EU the dispersion of the CR3 (*Concentration Rate[6]*) equivalent is high: while it is 80-90 per cent in some of the Scandinavian countries and Netherlands, there are countries with a CR3 below 20 per cent, such as Bulgaria, Romania and Poland. Concentration in the retail sector in Hungary is high compared to the concentration of the food industry or agriculture, but it is below the average of the EU (Figure 1).

The medium concentration means that the competition is high in the Hungarian food retail market. Until recently 12-13 strong actors were present in the Hungarian market, but their number has declined through acquisitions following the economic crisis (Figure 2). The high competition results in lower consumer prices but increases the pressure on the suppliers. The competition is even stronger in Poland where the concentration is especially low compared to other EU countries. In Poland there were 24 retailer companies with net sales over EUR 180 million in 2011. The turnover and the number of shops of the top eleven retailers with the highest turnover value are presented in Figure 3.

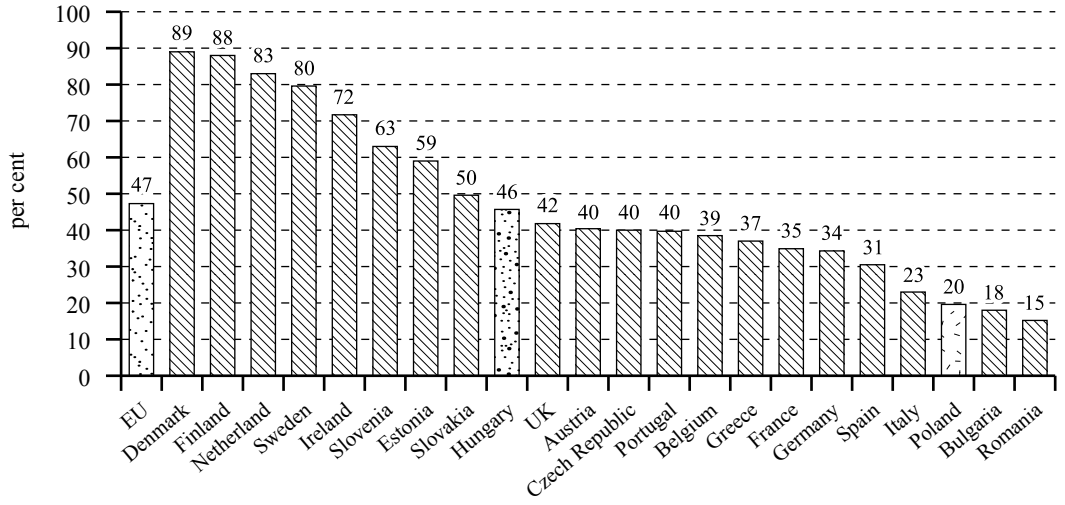
[5] The prisoner's dilemma is a canonical example of a game analysed in game theory that shows why two individuals might not cooperate, even if it appears that it is in their best interests to do so. It was originally framed by Merrill Flood and Melvin Dresher in 1950. Albert W. Tucker formalised the game with prison sentence rewards and gave it the name "prisoner's dilemma", presenting it as follows:
Two members of a criminal gang are arrested and imprisoned. Each prisoner is in solitary confinement with no means of speaking to or exchanging messages with the other. The police admit they do not have enough evidence to convict the pair on the principal charge. They plan to sentence both to a year in prison on a lesser charge. Simultaneously, the police offer each prisoner a Faustian bargain. Each prisoner is given the opportunity either to betray the other, by testifying that the other committed the crime, or to cooperate with the other by remaining silent. Here is how it goes:

- If A and B both betray the other, each of them serves two years in prison;
- If A betrays B but B remains silent, A will be set free and B will serve three years in prison (and vice versa);
- If A and B both remain silent, both of them will only serve one year in prison (on the lesser charge).

It is implied that the prisoners will have no opportunity to reward or punish their partner other than the prison sentences they get, and that their decision will notaffect their reputation in future. Because betraying a partner offers a greater reward than cooperating with them, all purely rational self-interested prisoners would betray the other, and so the only possible outcome for two purely rational prisoners is for them to betray each other. The interesting part of this result is that pursuing individual reward logically leads both of the prisoners to betray, when they would get a better reward if they both cooperated.

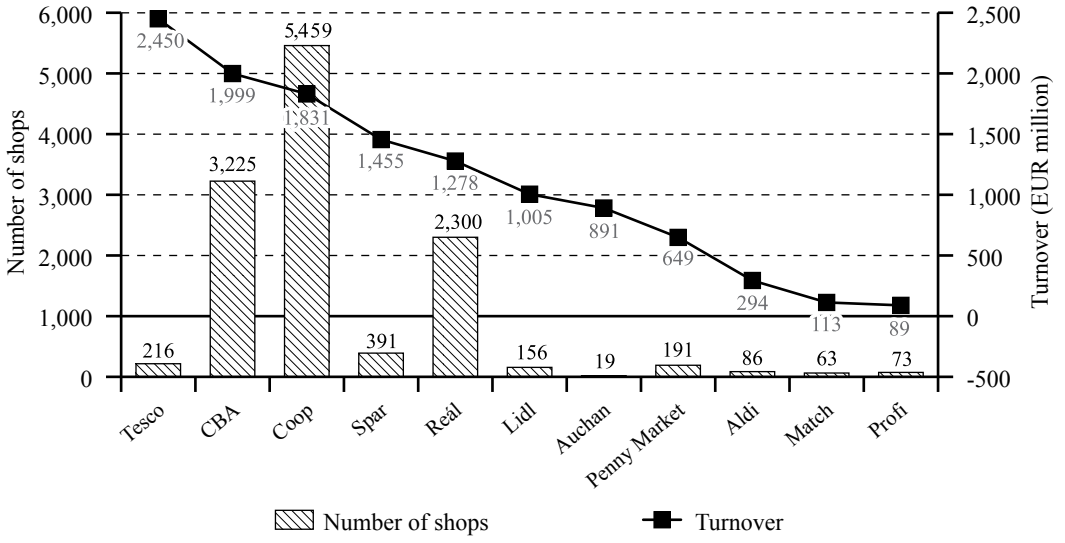
[6] Concentration rate is a simple equivalent calculated as the ratio of the income of biggest firms and the income of the whole sector. It can be calculated for the first 2, 3, 5 and 10 firms.

Figure 1: **CR3 in European Union countries, 2010.**



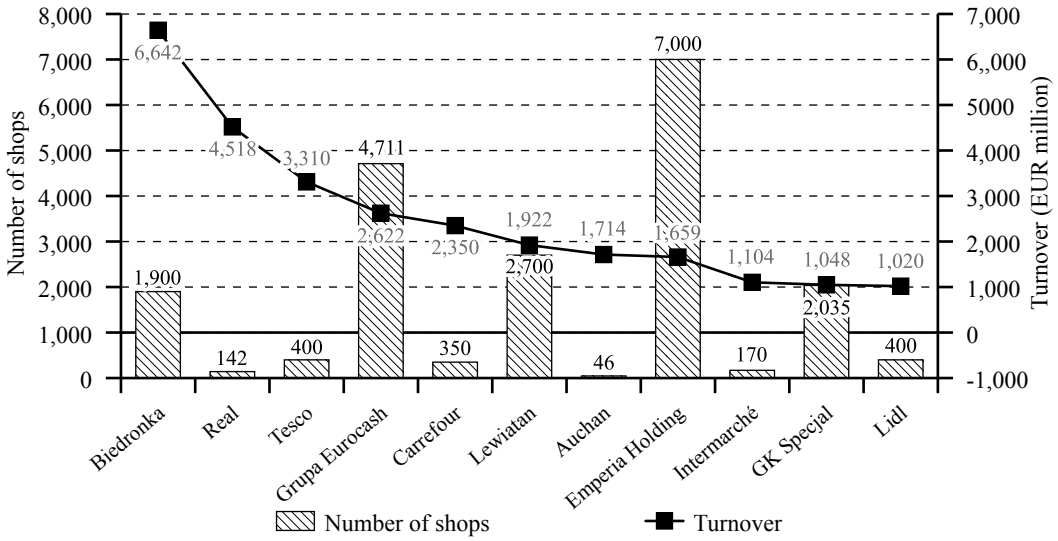
Source: Food and Drink Europe, 2011

Figure 2: **The number of shops and revenue of the top 11 retailers in Hungary, 2012.**



Source: AC Nielsen

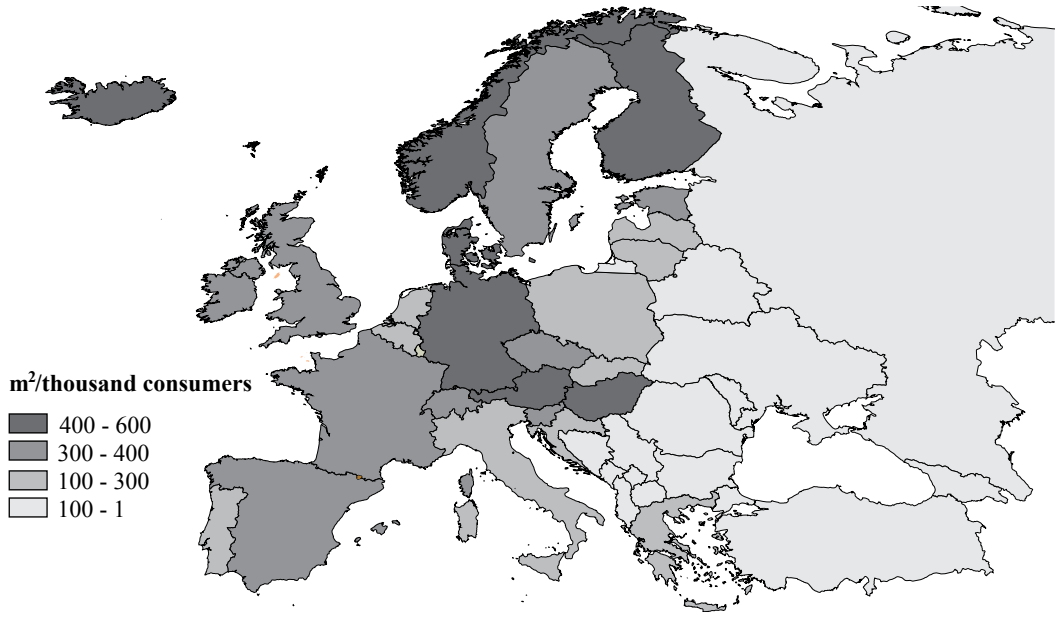
Figure 3: **The number of shops and revenue of the top retailers in Poland, 2012.**



Source: Polityka Magazine, Lista 500 Najwiekszych Firm In: Retail Foods in Poland, Gain Report, USDA, 12/24/2012

The Hungarian shop density is very high by international comparison, especially if the low purchasing power and traditions in the retail sector in Hungary are taken into account. High shop densities are typical in most Scandinavian and German speaking countries, while in the southern European countries, due to the more traditional shopping habits, and in the eastern European countries because of the lower purchasing power, a lower shop density is characteristic (Figure 4). But this fact only means higher competition in the sector as there are several retail chains in Hungary. In Poland the shop density is quite low but due to the high number of retailers the rate of competition is still high.

Figure 4: **Shop density in Europe.**



Source: METRO, 2013

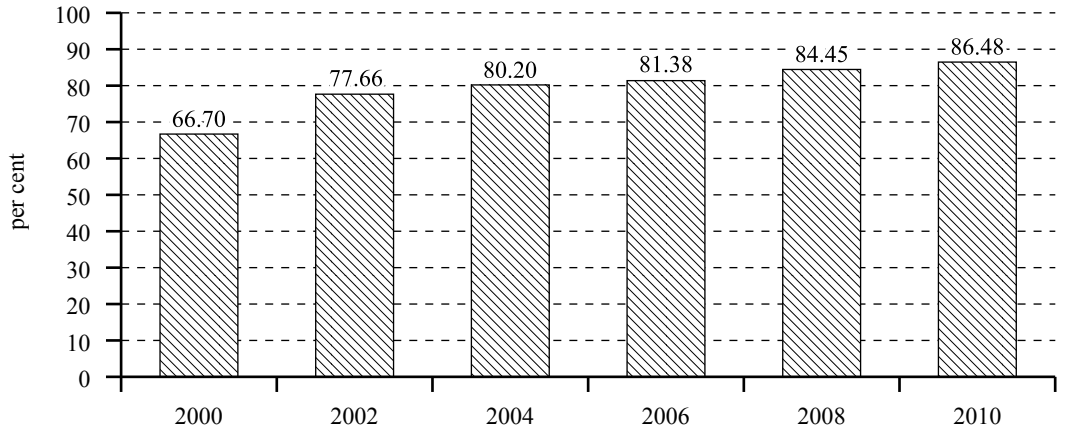
The history and the present structure of the food retail sector in Hungary

The political and economic transition at the beginning of the 1990s and the privatisation process had a significant effect on the food trade sector in Hungary. The sector was attractive for investors, especially foreign investors. Several international supermarket chains started operating in Hungary, either by reconstructing the existing supermarkets or via green field investments. Some hyper- and supermarket chains of Hungarian ownership were also created, and some of them developed very quickly, expanding also abroad. In spite of this, most Hungarian trading businesses are small- and medium-size enterprises, and short of capital. Concerning the changes in the Hungarian food trade we can distinguish five periods:

(1) Privatisation 1989-1994;
(2) Concentration begins 1995-2000;
(3) Accelerated concentration 2001-2004;
(4) 'Hard times' 2005-2008; and
(5) Even harder: crisis years 2009-.

In the period of privatisation the number of independent small shops increased and the first Foreign Direct Investment (FDI) appeared in the supermarket and cash and carry segment. Between 1995 and 2000 the concentration began; the period was characterised by the increasing role of modern retail formats and the development of the retailers' power in the supply chain. By 2000 the share of FDI was 66.7 per cent and it continued to increase, reaching 86.5 per cent in 2010 (Figure 5).

Figure 5: **The FDI share of the Hungarian retail sector, 2000-2010.**



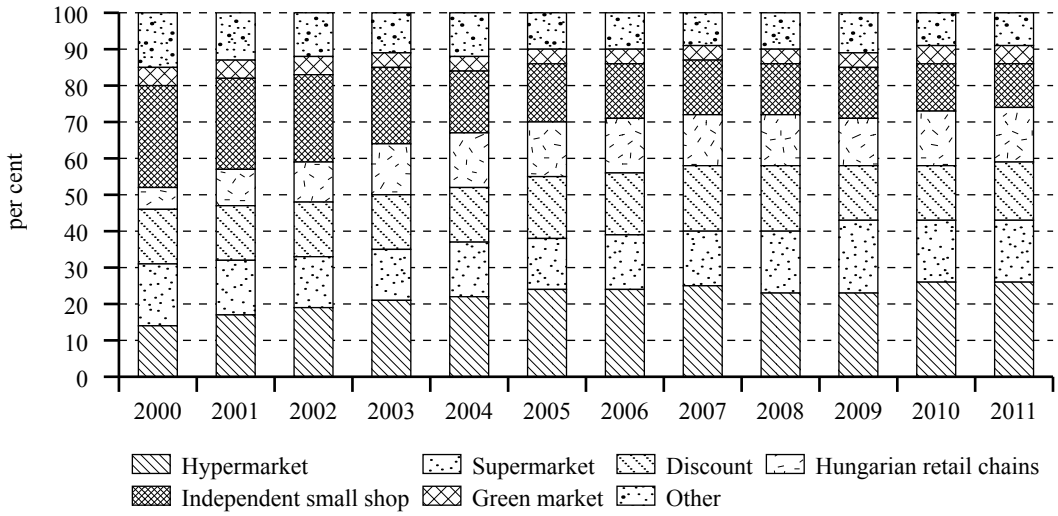
Source: based on data of the Hungarian National Tax Office

In the next period the dominance of hyper- and supermarkets increased, and independent shops joined the domestic 'franchise' chains (CBA, Coop) *en masse*. The market matured, which also meant that business relationships started to be based on mutual trust and certified values (for example quality assurance) became a competitive advantage for suppliers. Private Label (PL) products started to gain market presence. Retailers built regional and national distribution centres.

In the period 2005-2008 the number of small independent shops started to decrease. 'Hard discounters' (Lidl, Aldi) appeared as new competitors in the Hungarian retail market. PL products developed and became successful in terms of consumer acceptance. Centralised distribution centres and on-line procurement were introduced and price competition increased. Affordable consumer prices became the centre of the retailers' strategies. In this period the so-called modern food retail forms (hyper- and supermarkets, discounters) became dominant in the Hungarian retail sector. By 2008

these types accounted for almost 60 per cent of the total food sales in Hungary. This figure would be over 70 per cent if the Hungarian retail chains are included, and this situation has not changed significantly since (Figure 6).

Figure 6: **The share of the different shop types in the total food sales in Hungary, 2000-2011.**



Source: GFK Hungária, 2012

In the still on-going crisis period all the 'hard times' characteristics still apply to suppliers but the negative consequences of the economic crisis makes the supplier-retailer relationship even more difficult. PL products and hard-discounters have gained even more influence and the price war has increased. Hard discounters (Aldi, Lidl) use PL products – primarily imported from Germany – as the basis of their corporate strategy.

The number of shops belonging to the different chains changed significantly between 2000 and 2011 (Table 3). Some chains − primarily supermarkets such as Csemege-Match − did not change or reduce the number of shops, while some retail firms, especially the discounters, have expanded in recent years. The hypermarket chains were more careful, only Tesco increased its number of shops substantially. The Spar group took over the shops of Plus in 2009. The two Hungarian retailers, Coop and CBA increased their shop numbers by absorbing independent small shops into their franchises. This is a very different strategy from the policy of expanding chains as it did not require investment for these firms.

A law enacted by the Hungarian Government in 2012 (the so-called 'Plaza-stop law') prohibited the building of shops with a surface area greater than 300 m^2, although exceptions can be permitted upon application. The aim of the law was to support the Hungarian retail chains so it is not surprising that the numbers of shops of CBA and Coop started to increase in 2012.

Table 3: **Number of shops of the largest food retail firms in Hungary, 2000-2012.**

	2000	2005	2006	2007	2008	2009	2010	2011	2012
Aldi	**-**	**-**	**-**	**-**	**45**	**70**	**73**	**78**	**86**
Auchan	2	10	10	10	11	12	12	12	19
CBA	**800**	**-**	**3,182**	**2,924**	**2,780**	**2,904**	**3,072**	**3,077**	**3,225**
Coop	**1,991**	**4,963**	**5,286**	**5,283**	**3,066**	**3,116**	**5,250**	**5,225**	**5,459**
Cora[a)]	5	7	7	7	7	7	7	7	-
Csemege-Match	169	132	125	124	124	122	123	121	63
Metro	9	13	13	13	13	13	13	13	13
Lidl	**-**	**51**	**68**	**90**	**105**	**125**	**135**	**148**	**156**
Penny Market	**127**	**148**	**155**	**163**	**169**	**173**	**186**	**189**	**191**
Plus[a)]	108	165	165	165	172	-	-	-	-
Reál Hungária	-	2,290	2,310	2,310	2,311	2,311	2,320	2,140	2,300
Spar	**109**	**168**	**189**	**204**	**214**	**255**	**399**	**389**	**391**
Tesco	**43**	**89**	**99**	**122**	**144**	**167**	**205**	**212**	**216**

[a)] The shops of Cora and Plus were absorbed by Auchan and Spar.
Source: AC Nielsen

The numbers of the largest shops (over 2,500 m^2, i.e. hypermarkets, and 401-2,500 m^2) increased rapidly even after the start of the economic crisis. Assuming an average shop size of 2,500 m^2 in the largest category and 500 m^2 in the second group, the increase in the sales area was approximately 600,000 m^2 between 2000 and 2012. After the start of the crisis the sales area increased by 206,000 m^2 in the largest size categories. This expansion means that the food retail firms continued their competition even after the onset of the crisis even though it was a risky strategy (Table 4).

Table 4: **Number of shops according to their sales area in Hungary, 2000-2012.**

	2000	2008	2009	2010	2011	2012
Over 2,500 m^2	24	123	137	152	166	170
401-2,500 m^2	657	943	1,007	1,071	1,103	1,121
201-400 m^2	919	853	805	801	834	848
51-200 m^2	5,777	6,888	6,593	6,426	6,355	6,294
Below 50 m^2	17,859	12,533	11,393	11,451	11,111	11,111

Source: AC Nielsen

The history and the present structure of food retail sector in Poland

The development of the Polish retail sector in the last 20 years has consisted of four phases (Kosicka-Gębska *et al*., 2009; Pilarczyk and Stefańska, 2010):

- The first phase (1990-1995) of transition was characterised by a doubling of the number of sales outlets and the appearance of the first super- and hypermarkets;
- The second phase (1995-2000) was characterised by a decrease in the number and importance of traditional sales channels and the substantial development of multi-format retail outlets belonging to foreign chains. At the same time, Polish companies began to create their own chains (e.g. Bomi, Eco, Avita and Marcpol);
- In the years 2000-2005 (third stage) the processes of consolidation and acquisition were intensified and wholesalers started to lose their position on the market;

- After 2005 a modern network of convenience outlets and discounts through the franchise form of cooperation developed rapidly.

The development in the structure of retail trade is highly influenced by foreign direct investment (FDI). The position of foreign direct investment in the trade and repair sector amounted to more than EUR 40 billion 2011 (Table 5), almost eight-fold increase compared to 2000. This growth in the investments came to a halt after 2009. In 2011 only 3.9 per cent of the retail stores and petrol stations operated with foreign capital but even so they constituted a quarter of the retail space in Poland.

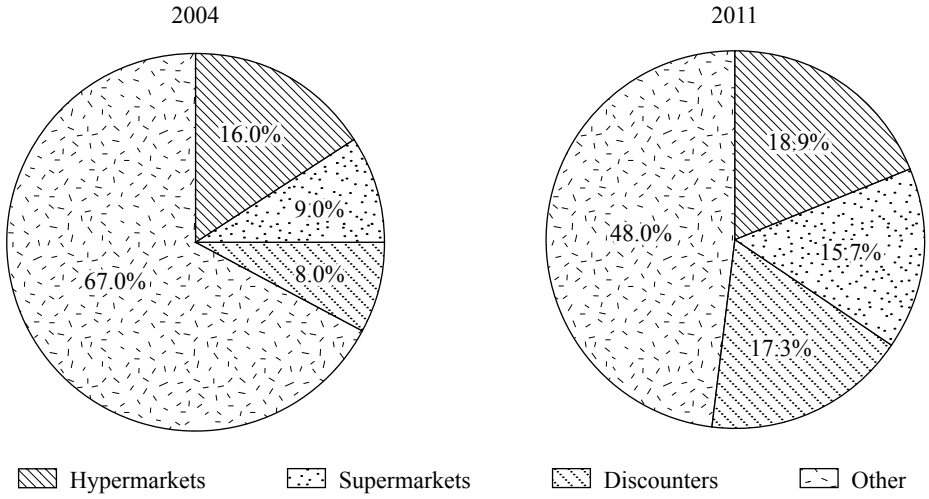
FDI has contributed to changes in the structure of Fast Moving Consumer Goods (FMCG) sales, including food sales. Modern distribution channels in Poland were estimated to account for about 52 per cent of the total sales of groceries in 2011 (Figure 7), a figure that has nearly doubled in the last decade. A slowdown in the growth of modern retail formats has been observed since the start of the economic crisis in 2008.

Table 5: **FDI in trade and repair sector and foreign ownership in the retail trade in Poland, 2000-2011.**

	2000	2005	2010	2011
Flows of FDI in the trade and repair sector (EUR million)	689.6	3,172.2	4,290.7	2,848.5
Position at the end of the year of FDI in the trade and repair sector (EUR million)	5,269.6	20,481.5	44,396.2	40,360.7
Share of the foreign ownership in the number of shops and petrol stations (per cent)	0.6	1.4	3.4	3.9
Share of the foreign ownership in the total sales area of shops and petrol stations (per cent)	6.6	15.5	24.1	24.8

Source: OECD and GUS

Figure 7: **The share of different modern retail formats in total groceries sales in Poland, in 2004 and 2011.**



Source: Euromonitor, 2013

There are different estimates concerning the share of particular types of modern channels in total food or FMCG sales in Poland. According to Roland Berger Report in 2011 hypermarkets, supermarkets and discounters had 12, 15 and 19 per cent respectively of the share in the sales of FMGC sector. The share of modern retail formats in terms of sales increased from 33 per cent in 2004 to 52 per cent in 2011 (Figure 7). The highest dynamic is observed in the discounts format and supermarkets.

In 2012 there were over 2600 discount shops in Poland, 2.6 times higher than in 2000. This increase is caused mostly by the expansion of the Biedronka (Jeronimo Martins Group) discount chain which, with over 2000 stores, is the biggest FMCG retailer in Poland. The low price strategy became an important competitive advantage of discount stores and increased their popularity among consumers. According to market research (see below), Polish consumers are very disloyal and most of them are price-driven. The second factor determining the development of this format is its proximity to the customer. It is estimated that nearly half of Poles live near to a discount shop.

With the expansion of modern retail channels the number of traditional shops has fallen. In 2010 the number of general groceries was one third lower than in 2000. However, Polish consumers make very frequent purchases and this allows a number of bakery shops, greengrocer's and off-licence shops to prosper (Table 6).

Table 6: **The number of general grocery stores and specialist shops in Poland, 2000-2010.**

Year	Stores with food products					
	general groceries	butchers	bakers and cake shops	greengrocers	off-license (with alcoholic beverages)	fishmongers
2000	142,257	14,045	3,681	6,678	2,350	1,506
2001	145,934	14,714	4,101	5,251	2,335	1,572
2002	145,238	15,041	4,374	5,308	2,294	1,570
2003	115,658	12,685	4,729	5,279	2,136	1,184
2004	112,301	12,456	5,446	4,778	2,268	1,053
2005	116,094	13,072	5,220	5,222	2,454	1,106
2006	120,455	12,002	5,430	4,451	2,510	942
2007	105,509	12,448	6,033	4,778	2,768	974
2008	98,460	11,966	6,508	4,407	2,723	932
2009	102,811	10,990	6,868	5,112	3,206	948
2010	91,753	11,353	7,398	5,721	3,860	1,004

Source: GUS

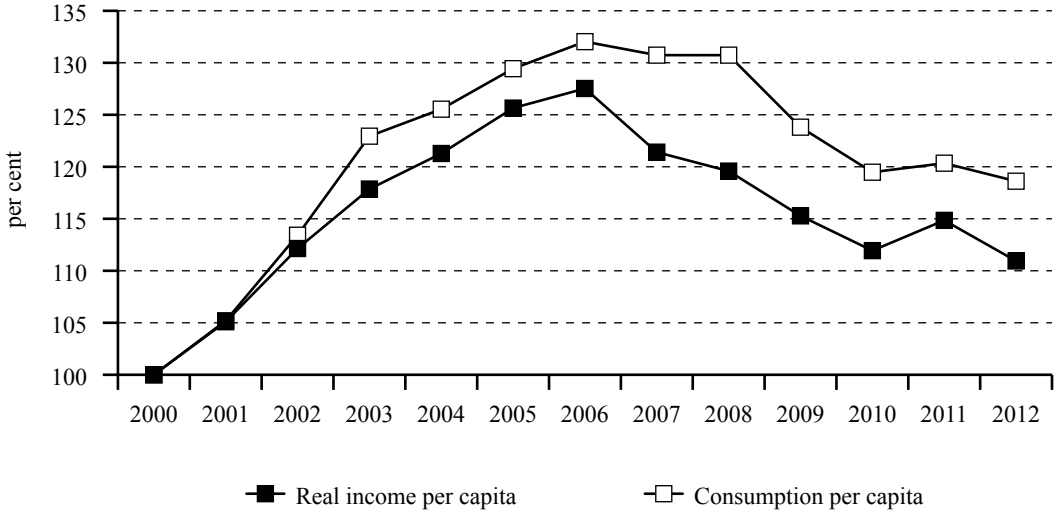
Factors influencing the demand for food

Consumer income and purchasing power in Hungary

The real income per capita of Hungarian consumers first started to decline in 2007 and this trend has since continued because of the ongoing economic crisis. In 2011 the rate of decrease eased because of the new tax allowances for families with children. In 2012 a decrease in real income per capita was again measured in most income groups, though the previous national calculation was suspended because of difficulties with the new tax system (KSH, 2013). The falling income resulted in lower consumption, although it is notable that the rate of overall consumption did not fall significantly until 2008 (Figure 8). This is probably due to the fact that increasing consumption amongst

the middle and upper income groups could balance the falling consumption of households with low income until 2008, but as the HUF exchange rate fell significantly, the crisis caused a serious reduction in disposable income even among higher income households due to the dramatically increased loan repayments of foreign currency credits which were widespread in Hungary.

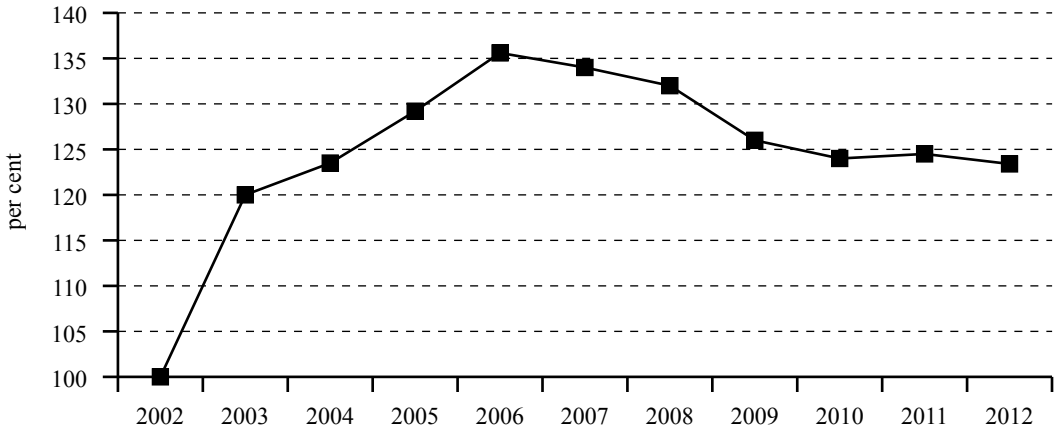
Figure 8: **Changes in real consumer income and consumption per capita in Hungary, 2000-2012 (2000=100%).**



Source: KSH

Though the purchase of foods value did not fall as much as the general consumption, a negative trend could be detected in the sales volume of the food retail sector from 2006, and especially from 2008 (Figure 9).

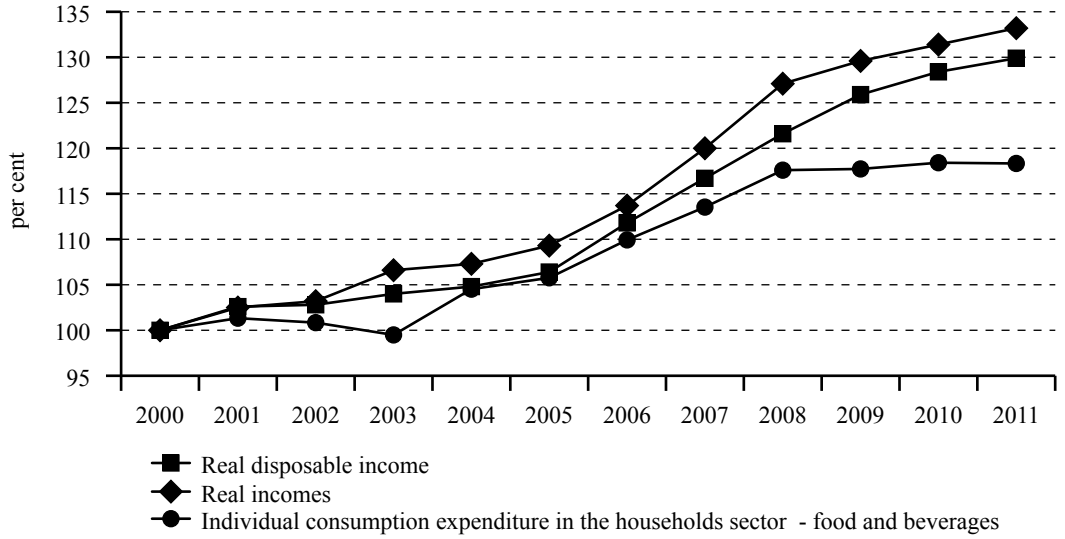
Figure 9: **Change in the value of food retail sales in Hungary, 2002-2012 (2002=100%).**



Source: KSH

Consumer income and purchasing power in Poland

Figure 10: **Changes in real consumer incomes and in the expenditure on food and beverages in Poland, 2000-2011 (2000=100%).**



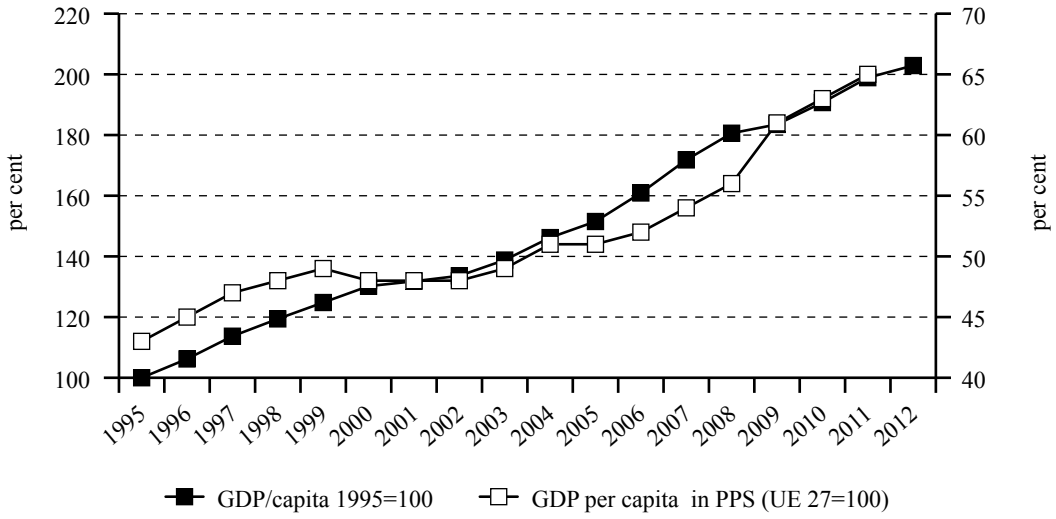
Source: GUS

Real incomes per capita in Poland in 2011 were 33 per cent higher than in 2000 (Figure 10). At the same time, there was a slightly lower (30 per cent) increase in disposable incomes. The most rapid rate of change in incomes took place during the first four years following the accession of Poland to the EU. In the period 2000-2011 expenditure on food and non-alcoholic beverages increased by 18 per cent. The difference is due to the lower income elasticity of expenditure on food compared to that on industrial products and services.

Changes in income and expenditure are consistent with the evolution of GDP per capita. In 2011 real GDP per capita was nearly double that of 1995 and 53 per cent higher than in 2000 (Figure 11). The rate of development of the Polish economy was greater than that of the EU-27 average. In 1995 GDP per capita expressed in purchasing power parity was only 43 per cent of the EU-27 level, whereas in 2000 it was 48 per cent and in 2011 65 per cent.

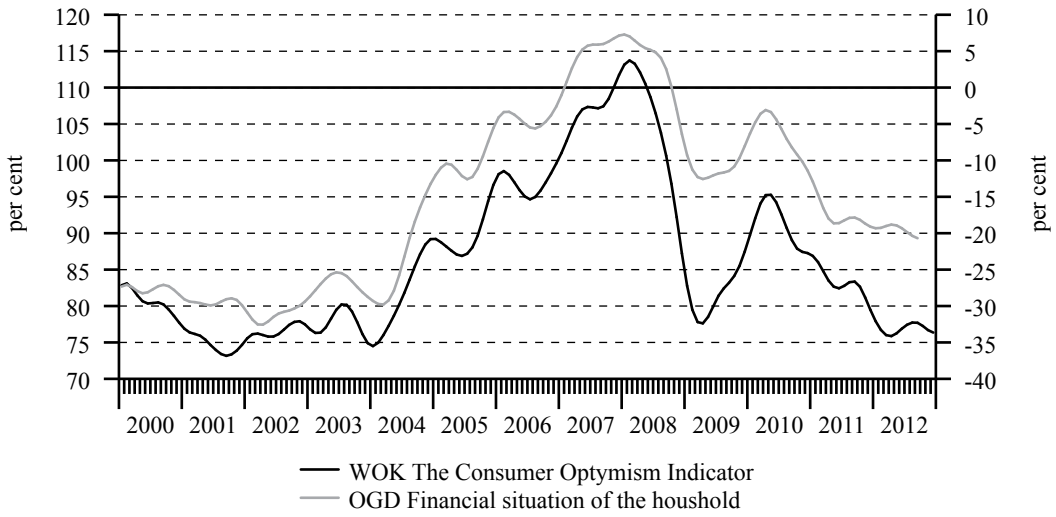
The period from the accession of Poland to the EU to 2008 was characterised by the rapid development of the Polish economy. The financial situation of Polish households as well as consumer optimism improved during this period (Figure 12). Although the Polish economy has slowed since the beginning of the economic crisis, there has been no recession. The financial situation of Polish households is still regarded as better than it was before May 2004. The impact of the crisis is frequently regarded as a crisis of confidence, as is visible in worsening consumer confidence indexes.

Figure 11: **Changes in real GDP per capita (left axis, 1995=100%) and GDP per capita in PPS (EU27=100%, right axis) in Poland, 1995-2012.**



Source: GUS

Figure 12: **Consumer Confidence Indexes (seasonally adjusted data) in Poland (per cent, possible range between 0 and 200, or -100/+100), 2000-2012.**



Source: based on Pentor Research International and IPSOS data

Consumer habits and preferences in Hungary

The economic crisis has modified the consumer habits in Hungary (AC Nielsen, 2009). The amount of disposable income has decreased for nine out of ten Hungarians because of the increasing cost of housing. Half of the population feels that the amount spent on food and household chemical products was higher in 2009 than earlier, whilst the other half feels that it has fallen, i.e. the discrepancy within society has increased. Nearly half of Hungarians have had to make significant economies even on food products, while the other half is trying hard to make savings wherever they can but do not economise on food products.

More than half of Hungarian households undertake weekly shopping trips less frequently than previously. In addition, the average shopper's 'basket' has become smaller since the start of the crisis. On the other hand, many consumers still think that saving time is important, which is why the hypermarkets are still very popular. The search for favourable prices is also indicated by the fact that in 2009 a majority of households visited several shops whilst doing their shopping – in order to find the best buys – so that the number of customers has increased in almost all types of retail channel. At the same time, the basket size has become smaller as shopping became a hunt for favourable offers. Because of the strong price sensitivity the importance of price/value ratio increased and this has resulted in the PL (private label) products becoming more and more popular. According to GFK Hungária (2012), in the last two years (2011-2012) even the amount of food purchased has decreased and this has caused further economic problems for the retail sector.

Consumer habits and preferences in Poland

This analysis of some of the basic phenomena associated with the purchasing habits and attitudes of Polish consumers is based on Pentor Research International (now TNS International) studies which have been conducted for more than ten years. A helpful tool is the omnibus studies which are based on 1000 personal questionnaires and which are a representative sample of Poles over the age of 15. According to the studies, factors determining consumer choice have hardly changed during the past ten years. The most important are low price, proximity to the place of residence and high quality goods. The research indicates that suppliers and manufacturers are required to expand the product portfolio with an assortment of items which will meet the needs of economy class. According to the studies conducted in 2010, around 70 per cent of Polish consumers have their favourite grocery stores. Those living in rural areas and small towns more frequently admit to having their favourite grocery stores for regular shopping. Most Poles are still inclined to shop near their homes.

The network of super- and hypermarkets has expanded each year and so has the number of Poles with a positive opinion of them. The percentage of those favouring supermarkets has increased from 30 per cent in 2001 to 47 per cent in 2010 while the percentage of their opponents has dropped from 29 per cent to 15 per cent. Poles up to the age of 49, with higher incomes, are the most likely to welcome the development of supermarket chains.

In line with growing support for the modern retail channels there has been an increase in the expenditure in self-service stores in recent years. In 1998 less than 30 per cent of Poles stated that they incurred most of their weekly expenses in self-service stores (Figure 13) but since 2006 the self-service stores have been dominant. In 2010 about 42 per cent of Poles reported that they spent most or all of their money in self-service stores. An additional 8 per cent stated that they spent slightly more in these stores than in traditional shops. In the same year only 25 per cent (compared to over 50 per cent in 2000) of respondents said that they spent more in a shop where the goods are served by a shop assistant. Customers who are loyal to traditional stores are mainly elderly people as well as those with the lowest incomes. These trends have slowed down in recent years.

The amount of time devoted to weekly shopping has declined since 1995 when the average time spent on shopping was 4.3 hours per week. In 2000 the time was 3.6, in 2005 3.3, and in 2010 only 3.0 hours. More and more consumers are buying everyday items once a week. There is also a clear increase in the number of respondents who shop less than two hours per week: in 1995 – 29 per cent, in 2000 – 36 per cent, in 2005 – 51 per cent and in 2010 – 49 per cent. 79 per cent of Poles state that they do not spend more than ten minutes on shopping during one visit.

Figure 13: **Declared allocation of normal each-week expenses.**

Source: Pentor Research International, 2011

In recent years the biggest profits are made by retailers on Friday afternoons and Saturdays – a time of the week in which a large group of consumers buy products for the following week. Only 2 out of 100 Poles do large amounts of shopping on a Sunday.

Economic results of the retail sector

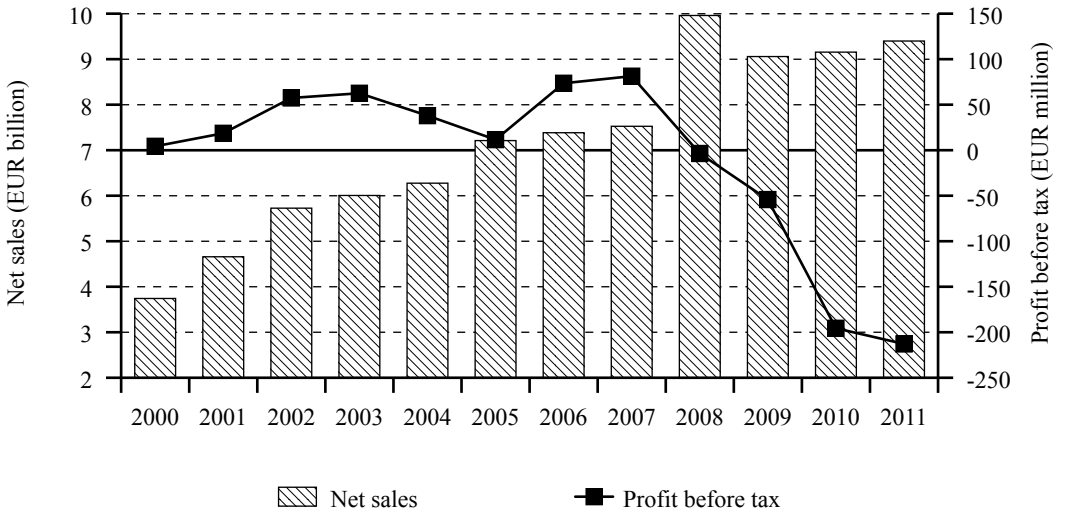
In this section, owing to differences in the availability of data, it was necessary to use different databases and methods for each country. In Hungary the main source of data was the tax returns of the joint ventures operating in the sector in the period 2005-2010, from the database of the Hungarian National Tax Office. The different size groups and different shop types were investigated separately during the analysis. We organised the retail firms into four shop types. Aldi, Lidl, Penny Market and Profi were put into the discount group, and Auchan, Cora, Spar and Tesco were placed in the hypermarket group. The remainder were divided into two groups according to the number of their employees. Those with ten or more employees were put into the group of 'supermarkets', while the others were classed as 'small shops'.

In addition to the analysis of financial data and indexes the different factors that influence the productivity and profitability of the sector, such as consumption, demand, consumer habits, competition and concentration were also studied. During this comparison the data of Hungarian Central Statistical Office (KSH) and published data of AC Nielsen were mainly used. For Poland, owing to the lack of detailed financial data, the Polish Central Statistical Office (GUS) was the main source of data and this organisation provided some data which describes the economic situation of the sector (such as gross operating rate, business condition indicator, etc.). Comparable data sets to Hungary were used to analyse the factors influencing the productivity and profitability of the retail sector in Poland.

Productivity and profitability of the retail sector in Hungary

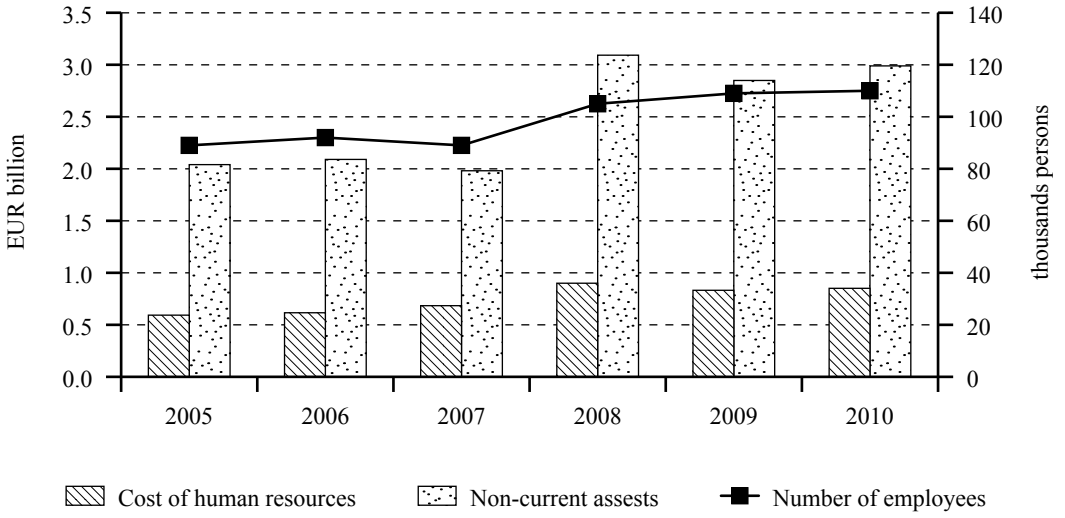
The expansion of the retail firms and the declining/stagnating consumption has strongly reduced the profitability of the Hungarian food retail sector. Though the volume of sales increased dynamically between 2000 and 2008, it then stagnated. The profit before tax started to fall heavily, becoming negative from 2008 (Figure 14).

Figure 14: **Sales and profit of food retail sector in Hungary, 2000-2011.**



Source: based on data of the Hungarian National Tax Office

Figure 15: **Financial data of the food retail sector in Hungary, 2005-2010.**

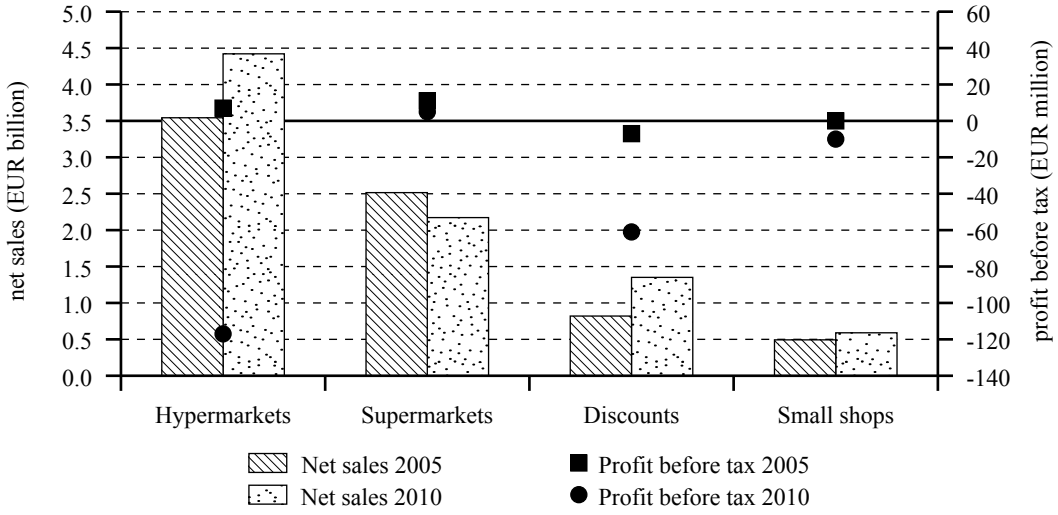


Source: based on data of the Hungarian National Tax Office

Two additional important factors have reduced the profit of the sector: increasing human resource costs (due to the higher number of employees) and the elevated amount of non-current assets which have also increased the sector's long-term credit and interest costs. Both were more significant in the case of discounters and hypermarkets because these shops have expanded the most in recent years (Figure 15).

The profitability and volume of sales differed between shop types. The discounts and hypermarkets increased their sales significantly between 2005 and 2010 due to their strong expansion policy but their profitability has fallen the most within the sector. Meanwhile the sales of the small shops and supermarkets were unchanged and their profits remained stable (Figure 16).

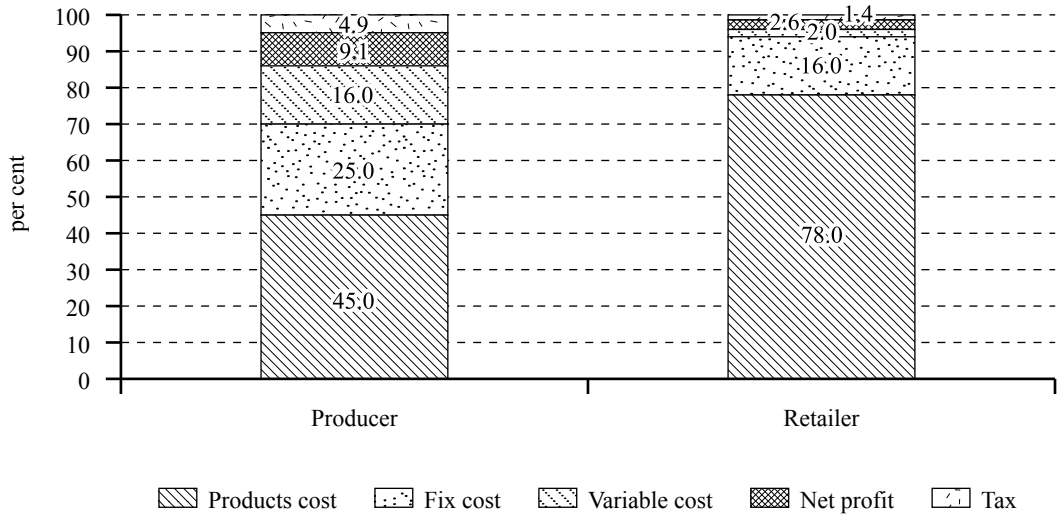
Figure 16: **Net sales and profit of food retail sector according to shop type.**



Source: based on data of the Hungarian National Tax Office

A deeper analysis of the financial data according to the shop types identified different factors as the reasons for low incomes in the different groups. The stagnating gross margin of the small food shops and supermarkets was responsible for the low income. The number of employees was excessive compared to the net sales except in the small food shops. Furthermore − again with the exception of small food shops − the rate of the increase in the labour costs was higher than the growth rate of the net sales per employee. In the case of hypermarkets and discounters the increasing rate of invested assets reduced the income, while the current assets management was poor in the case of hypermarkets, especially in 2010.

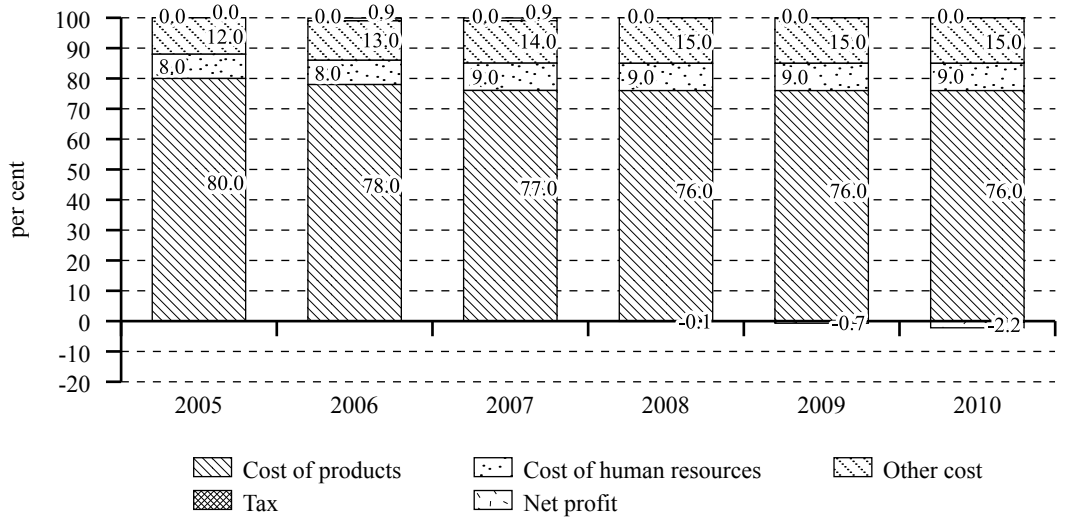
Figure 17: **Comparison of costs and revenue of food processors and food retailers in Europe, 2006.**



Source: Corstjens and Steele, 2008

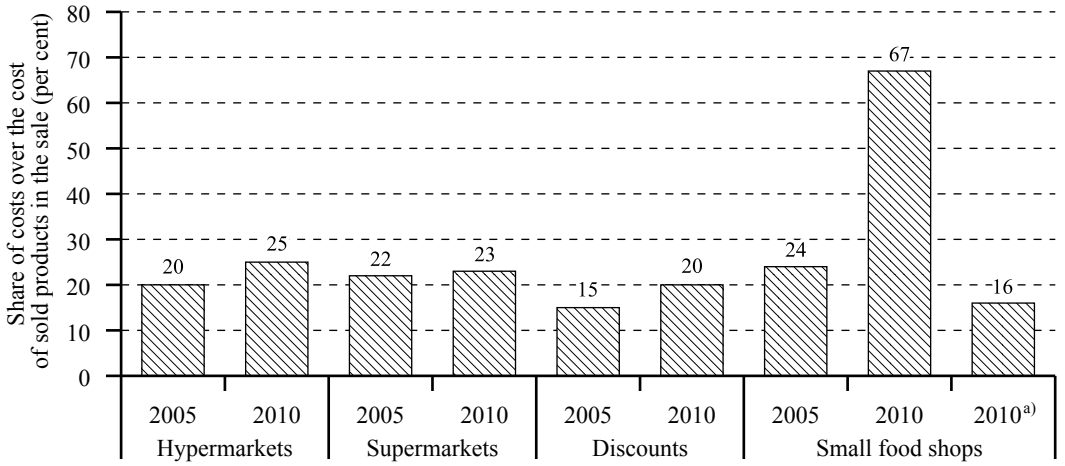
The productivity or efficiency of a food retailer can be measured by the share of their costs over the costs of the goods sold. If this share is low it means that the retailer has low fixed and variable operational costs. In the Hungarian retail sector the cost of goods is similar to the European rate (Figure 17) but the share of this cost decreased between 2005 and 2010 while those of other types of costs increased. This means that the efficiency and profitability of the Hungarian retail sector have fallen (Figure 18).

Figure 18: **Cost and revenue structure of the food retailers in Hungary, 2005-2010.**



Source: based on data of the Hungarian National Tax Office

Figure 19: **The share of costs over the costs of sold products in the sales of the different shop types in Hungary, 2005-2010.**



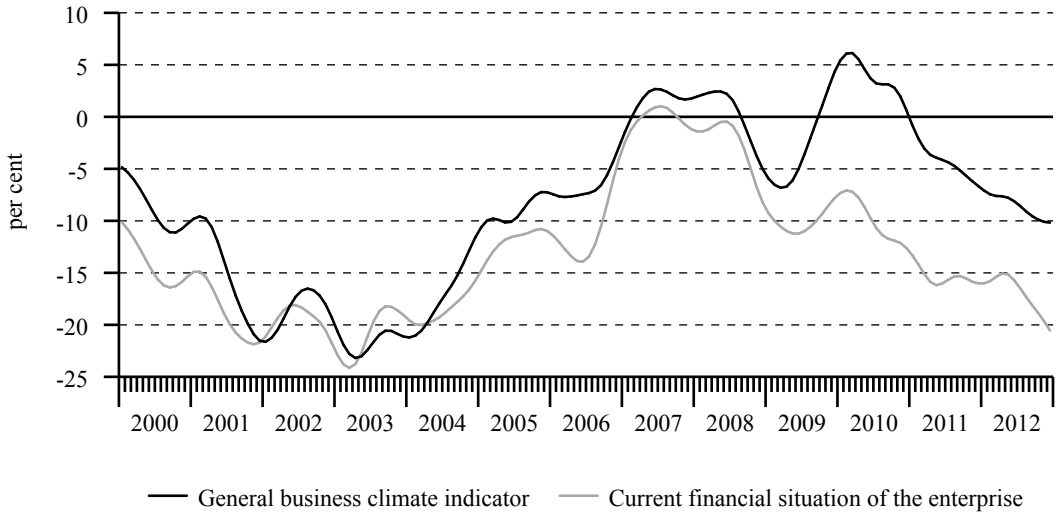
a) Excluding the shops with zero revenue.
Source: based on data of the Hungarian National Tax Office

The efficiency of the discounters and hypermarkets was higher than that of the supermarkets and small shops although their profitability was lower (Figure 19). This means that the low profitability of discounters and hypermarkets is probably only a temporary problem due to the strong expansion in a period when the consumption side was in poor condition. In the long term the investments will show a return for these firms (Jankuné Kürthy, 2012). Durieu (2008) has found similar results in German shops.

Productivity and profitability of the retail sector in Poland

The financial condition of the Polish retail trade enterprises is mostly influenced by the macroeconomic situation. Business indicators seem to be correlated with indexes of consumers' confidence in Poland (Figure 20). In the entrepreneurs' opinion the general business climate in the retail trade is now much better than in 2002-2003. The influence of the economic crisis is more perceptible in the financial situation of the enterprises which, as reported by entrepreneurs, has been systematically deteriorating since 2008.

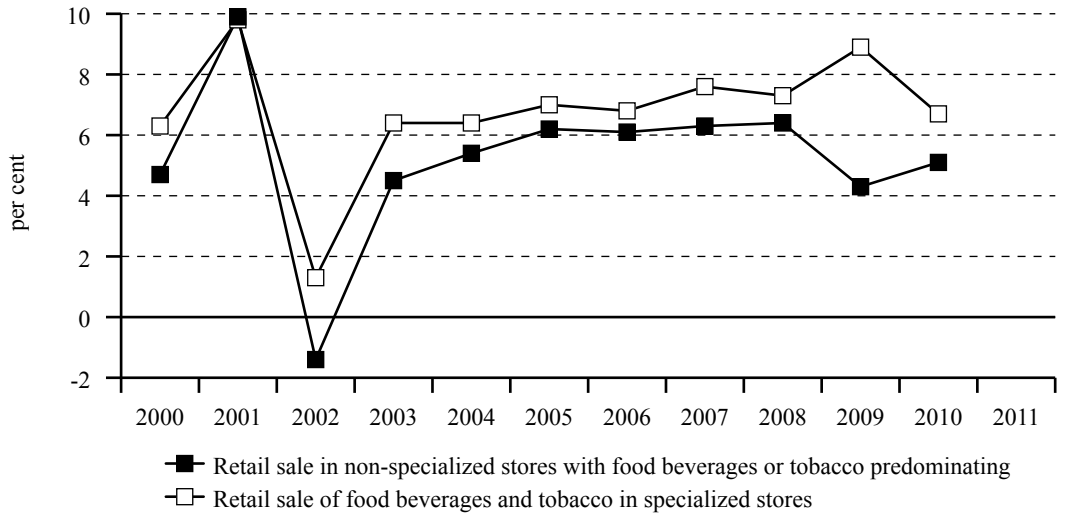
Figure 20: **Business condition indicators (seasonally adjusted and smoothed) in retail trade of food products in Poland, 2000-2012 (per cent, possible range between -100/+100).**



Source: GUS

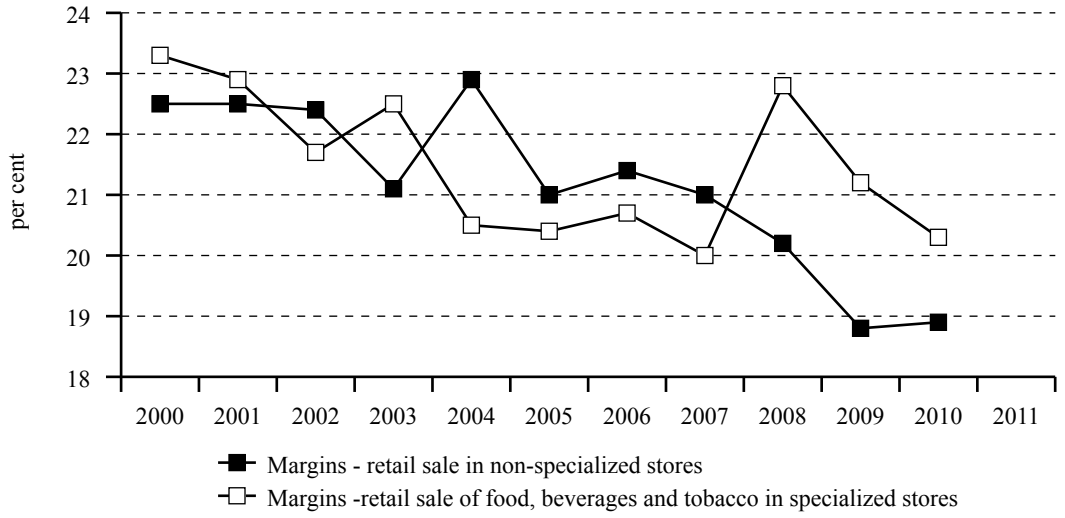
Changes in the gross operating rate (the ratio of gross operating surplus to turnover) provide another view of the financial situation of Polish retail trade enterprises. Gross operating surplus is defined as a total turnover minus personnel costs and it is generated by operating activities after the labour factor input has been recompensed. Turnover corresponds to the total value of market sales of goods and services. In general, the gross operating rate in commercial enterprises specialising in the retail sales of food is higher than in companies in which the sale of food is one of the elements of a commercial offer (Figure 21). The impact of the economic crisis on the financial results of retail trade enterprises in recent years is not particularly large. However, changes in the retail sales structure indicate that profitability may differ among different formats.

Figure 21: **Gross operating rate in retail sale of the food and non-alcoholic beverages in Poland, 2000-2011.**



Source: Eurostat, NACE classification

Figure 22: **Gross margins in retail sale in Poland, 2000-2011.**



Source: GUS

One of the indicators which shows the growing importance of retailing in a food chain is price. For the widening gap between the consumer (retail) prices and farm prices there are many plausible explanations, such as increases in processing and convenience of food, different rates changes in costs and productivity in the agriculture, industry and retail sectors, increases in food hygiene standards, globalisation and agricultural policy (Kuosmannen and Niemi, 2009).

Gross margins in retail sales of food and non-alcoholic beverages in Poland are falling (Figure 22). The growing farm-retail price gap for food products in Poland is not therefore caused mainly by increased margins at the retail level. However some researchers (e.g. Łukasik, 2011) indicate that the margins of distribution enterprises in the food chain are growing disproportionately fast compared to the margins of the farmers and processors.

Factors influencing the connection between retailers and suppliers

Quality assurance systems

In the last two decades the Hungarian agri-food sector has experienced a rise in the number and penetration of quality assurance systems. The obligatory and independent systems of HACCP and ISO 9000 have almost lost their market value simultaneously with their penetration in the industry. Owing to the increase in the buying power of the food retail trade, quality systems required by large customers (e.g. IFS, BRC) have already become the minimum (qualifying) condition of market entry. The quality systems widely implemented in the Hungarian agri-food sector have without doubt contributed to the improvement of the safety dimension of Hungarian food quality. On the other hand the current accumulation of systems does not lead to quality improvement anymore, while using up significant human and financial resources (Juhász *et al.*, 2010).

In order to investigate the practical experiences of quality assurance systems in the Hungarian food economy sector Juhász *et al.* (2010) carried out 26 face-to-face interviews with the experts of food industrial firms. The interviewed food processing enterprises cited the following as advantages of the quality assurance systems: more predictable contacts with suppliers, clear determination of the limits of responsibility, reductions in complaints about quality and simpler treatment of claims, and the change in the quality management related personal attitudes from the top management to the factory workers. In total the number of critical remarks was higher among the respondents. Moreover the 'one buyer-one quality system' situation (every retailer wants a different quality assurance system), which has already developed due to the large number of the schemes does not provide any added quality benefit, while implying serious additional employment and other costs for the food processing companies.

The Polish experiences with the implementation of quality assurance systems in the agri-food sector in recent years have some similarities with those of Hungary. Obligatory quality assurance systems such as Good Hygienic Practice (GHP) or Good Manufacturing Practice (GMP) are implemented in almost every food processing company; according to Morkis (2013) only 42 out of 4816 firms do not implement these systems. However, when analysing the scale of implementing the HACCP system there are significant differences between Poland and Hungary. Although HACCP is obligatory for every food processing company, due to insufficient supervision by the Polish State Sanitary Inspection, about 40 per cent of all firms have not implemented it. In particular, among companies processing animal products (meat, fish and milk) there is a large proportion of enterprises where HACCP conditions are not met. This problem concerns only small firms which operate in local markets and which do not have any incentive to implement the HACCP system. The biggest companies producing for the EU market have implemented all required quality assurance systems, although the widespread adoption of these systems has a negative impact on their market valuation.

Unlike in Hungary, agri-food sector companies in Poland are not widely interested in the implementation of non-obligatory quality assurance systems. The high costs (in terms of time and money) of implementation together with lack of information about potential benefits are among the most important factors for the small proportion of firms that implemented one of these optional systems. The most often introduced quality assurance systems are ISO 9001, ISO 22000 and BRC. BRC certificates as a share of the total of all certificates of this kind has risen significantly in recent years. There

were 505 companies that implemented the BRC standard in 2012. It is especially popular among fruit and vegetables processing and meat industry companies (Juhász *et al*, 2010).

Private labels

Private label production and trade is an emerging trend and a symbolic issue, representing the 'pros' (e.g. rapidly growing sales) and 'cons' (e.g. buyer power) effects of modern food supply chains. The share of private label sales in the food retail trade has increased remarkably during the past five years, taking 10 to 45 per cent of the total market from the manufacturer brands throughout Europe. Tesco and Lidl lead in the introduction of private label brands in Europe. Store brands are not spreading in a uniform manner in all product groups; they have the highest penetration in the so-called 'utilitarian' product category, where customers have no emotional attachment and therefore these products are suited to branding by manufacturers. These groups include pet food, frozen food, breakfast products, and basic milk and meat, where already almost half of the market is dominated by private labels. But even the category of 'hedonic' products, such as sweets and alcoholic drinks, previously considered a secure stronghold of the manufacturers, is no longer exempt from the competition of private labels.

PL products are generally cheaper than products branded by the producers, which mostly explains their success among consumers. However, PL products are currently on offer not only in big stores, but also in the traditional trade or delicatessens and they are now present in various price segments. The use of private labels has been listed among the commercial practices potentially threatening competition in the food supply chains (Juhász, 2010). Producing PL products puts the manufacturer, which is usually a small or medium-sized enterprise, in a situation of uncertainty as he/she becomes dependent on the commercial networks ordering production. If the share of this production in the total production is high, the termination of the cooperation could have disastrous consequences for the company.

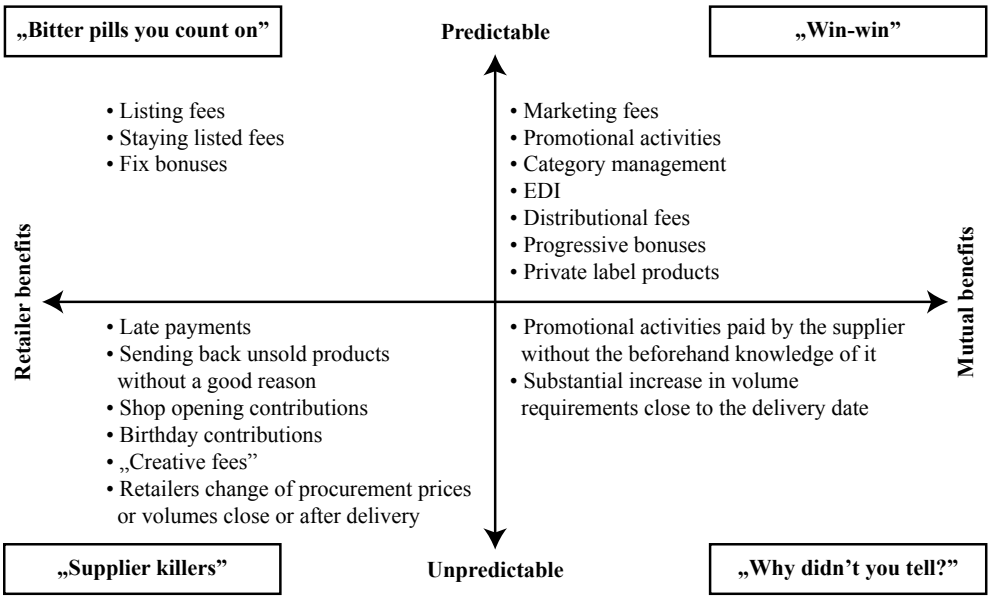
In the past few years in Hungary, the share of store brand products has already approached 25-30 per cent of the sales volume of the domestic market (Juhász, 2010). In 2010 the most frequently mentioned advantage of PL production in Hungary was the continuous and predictable large volumes, implying stable markets and utilisation of capacities. Several interviewees also listed among the benefits that suppliers do not have to incur marketing expenses and do not have to continuously check whether their products were really to be found on the shelves of the stores. Defencelessness and uncertainty have been cited most frequently as strong drawbacks, caused by the full replaceability of the product and of the manufacturer. The danger of replacing the supplier and of de-listing the product exists in the case of private labels without any reaction from the customers if there is no quality change. At the same time, losing a large volume order for PL products may cause serious difficulties for a supplier, especially if packaging material or even private label products are already manufactured which cannot sold to another retail partner.

In 2011 in Poland 16 per cent of FMCG were sold under a PL. Poland has one of the lowest shares of PL products amongst sales of FMCG in the EU (Metro, 2013). The market share of PL products have in general continued to grow, but there are huge discrepancies across the different purchase channels and across product groups. The highest share of PL products is observed in the discounters. The quality of own-brand products has increased: in 1997 over 23 per cent of products were questioned by the Central Inspectorate of Trade Inspection but in 2011 only 7.7 per cent of the controlled products were of doubtful quality.

Background conditions

Transactions between retailers and their suppliers have become more complex in the last two decades. In the 1980s, listing and slotting allowances were introduced in grocery supply chains. Apart from listing fees, practices such as payment delays, breaches of contract, changes in contract conditions without due notice, the threat to de-list, buyback requirements and fees for various contingencies (wastage, underperformance, listing, shelf-space or even having been a good customer) recur. Juhász *et al.* (2010) give an overview of these practices based on two dimensions: the parties benefiting and the degree of predictability (Figure 23).

Figure 23: **Management practices used in the retailer-supplier relationship grouped according the effect on suppliers.**



Source: Juhász *et al.,* 2010

The three most important and frequent complaint of suppliers were listing (slotting) fees, the requirement of refunds (back conditions) and late payment. In Hungary the multinational retail chains collect 'taxes' from their partners under many different titles (Györe *et al*., 2009). According to Dobos (2007) 64 per cent of the interviewed suppliers mentioned that their trading partners wish to have some form of refunds and suppliers on average paid five different types of refunds to one retail partner. The average refund rate was 16 per cent of the price. Czibik and Makó (2008) showed that 44 per cent of the customers always complied with the law (30 day time limit) for the payment period. Seven of the dealers always delayed, while the remaining 53 paid with varying lengths of delay.

The 30 day payment time was again investigated in Hungary in 2010 (Juhász, 2010). By then the payment period had been shortened in the case of the international food retail chains but there were still complaints about the practices of the Hungarian chains, especially CBA. Owing to the new regulations the number of background conditions were reduced to 3-5 allowable forms (marketing cost, logistic cost etc.), but the collected amount was more or less the same; only the name of the fee was changed. The conclusion of this research was that regulation can only moderately improve the conditions of suppliers.

Farmers are regarded as the weakest player in the food chain in Poland, too. The main problem is a political expectation that over one million farmers could live from agriculture. The consequence of the defragmented production is the defragmented supply and weak bargaining position and this leads

to low incomes for farmers. This, in turn, raises the problem of margins which hide the real, structural problems. A good example is the decline in pig production in Poland due to its low competitiveness in comparison to other EU countries.

Some political actions have been taken in Poland to regularise relations between the food producers and trade to ensure greater transparency throughout the entire chain. An Intergovernmental Panel on Improving Market Transparency of Agri-food Products and Improvement of the Food Chain Functioning was established with the task to review and evaluate business practices and legal regulations in the food chain, and to reduce to help unfair practices (Łukasik, 2011). Typical conditions for a supplier when entering retail chains are entry fees, price discounts; obligatory participation in promotional activities, slotting fees for placing each type of product on the shelf; fees for the 'display area' and little opportunity to influence the 'shelf price' level (USDA, 2012).

During recent years some changes in the food chain has been observed in Poland. To be more cost effective retailers try to omit the wholesale level when they stock up. The higher concentration of the retail trade is the more visible trend in the vertical integration observed (Ciechomski, 2010).

Conclusions

One conclusion was that the food retail sector started to develop similarly in Hungary and in Poland but eventually different structures were formed, leading to different levels of productivity and profitability in the sector in the two countries. The other main difference between the two countries is that the global economic crisis caused a substantial decrease in consumer income and thus reduced food sales in Hungary while in Poland the standard of living did not fall and consequently the food retail sector remained in a better condition. However the suppliers to the retail firms in the two countries have to face the same problems: background conditions, low prices and expansion of private label products.

According to the results of our analysis, the room for manoeuvre available to retail firms in Hungary is restricted by external factors and their profitability is, contrary to popular belief, very low. So the growing concentration is probably inevitable owing to the pressure for increasing their productivity and turnover. The sector has changed significantly owing to the privatisation that took place in the 1990s. In the millennium the so-called modern distribution channels have taken the lead role, suppressing the traditional retail forms. The turnover of the retail sector in Hungary has been decreasing since 2007, and although the decline in food sales has been smaller, the unfavourable trend can be observed there, too. The number and floor area of the food shops have also decreased, although behind this trend there has been a major restructuring: the big food stores have expanded at the expense of the smaller food shops. The effects of the expansion of some food retail chains, especially discount chains are clearly observable in the data of the KSH.

By international comparison the Hungarian shop density is very high, especially if the low purchasing power and traditions in the retail sector in Hungary are taken into account. The competition is also high. The concentration of the Hungarian food retail sector has been high since the millennium, although it does not exceed the average of the EU countries. Increasing concentration strengthens the buying power of the retailers.

The profit before tax of the food retail sector declined dramatically between 2005 and 2010. This can be explained by the fact that the competition is higher in the retail sector: the retailers have sacrificed part of their profit in order to increase or preserve their market share. It is possible that this phenomenon will survive the economic crisis because Hungarian consumers are increasingly price sensitive according to the market surveys of AC Nielsen, a fact that draws the consumers toward the hard discounters.

The development of the food retail sector operating on a market basis in Poland after the collapse of planned economy in 1989 went through the same phases as did the Hungarian sector. Until 2005 the nature and timing of changes were very similar in the two countries. But still there were significant differences, from which the scale of concentration processes – much weaker in Poland – is the most distinct example. Owing to the different overall economic situation in both countries there are significantly fewer similarities in retail sector development after 2005. In recent years the rapid development of a modern network of hypermarkets and discounters can be observed. This is especially true with regard to the growing number and market share of discounters, caused mostly by Biedronka (Jeronimo Martins Group). There was also significant growth of FDI in the trade sector.

Intensification of concentration processes is the result of a steady and satisfactory level of gross operational surplus in retail trade enterprises Poland. The economic crisis did not decrease profitability in Poland as much as it did in Hungary. Although entrepreneurs report that their financial situation has deteriorated in recent years, the financial results in Polish food retail sector are relatively good. This is a consequence of growing real disposable incomes and individual food and beverages consumption expenditure in the household sector, although since 2008 the growth in consumption expenditure has been slight.

Consumer perception of large self-service stores has changed strongly during recent years. More and more Polish consumers have a positive opinion about them. This is closely linked to reasons determining the consumer choice, of which low price is the most important. This also drives demand for private label goods.

There are two major conclusions from comparing Poland and Hungary. Firstly we can observe that concentration processes are inevitable in free market economies. Secondly, we can see how strongly the overall economic situation influences the development of the food retail sector.

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Structural changes in the Polish and Hungarian pig sector since EU accession

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Introduction

World pig meat production increased by almost 75 per cent between 1980 and 2011. Growth has been the most rapid in China, the world's largest producer (OECD, 2012). The European Union (EU) is the world's biggest exporter of pig meat and its second biggest producer, with 152 million pigs and a yearly production of around 23 million tonnes carcass weight. The EU has a self sufficiency of 110 per cent and exports around 12 per cent of its total production. More than half of the pig meat production in the EU comes from four countries, i.e. Germany, Spain, Denmark and France (Eurostat, 2010).

However globally pig production is increasing, the Hungarian and Polish production breaks from this trend. Despite this the pig sector is the most important livestock sector in Hungary and Poland. This chapter describes the evolution of the Hungarian and Polish pig sectors since EU accession in order to show the differences between the two countries. It discusses the developments in market regulations and processing performance, domestic demand and the black economy, foreign trade and also the marketing chain. Finally, the main consequences of these recent events are summarised.

The market for pig meat

Domestic demand

Average consumption of meat, meat products and offal in Hungary in 2011 was 54.3 kg per capita (in meat equivalent), of which 96 per cent related to raw meat and products, and the remaining part to offal (Table 1). Total meat consumption decreased significantly in the 1990s and 2000s, and the structure of consumption also changed at that time. Poultry consumption increased significantly and pig meat consumption declined dramatically. This resulted in a decrease in the total share of meat and offal consumption from 36 per cent at the beginning of the 1990s. The domestic demand for poultry meat increased during the 1990s and declined in the subsequent decade. In terms of consumption, pig meat and poultry meat are nowadays the most important types of meat in Hungary. Pig meat consumption in Hungary was fluctuating between 25-27 kg per capita (44 per cent) in the 2000s, lagging by around 48 per cent behind the EU-15, and by 58 per cent behind Poland.

The domestic sales of chopped pork (loin, rib and thigh) and half-carcasses fell significantly in 2011 due to the decline in demand. Seventeen per cent less chopped pork was sold, while sales of half-carcasses were 9 per cent less than in the previous year. This is to be attributed to domestic pig meat prices following closely the price trends in the major pig producing member states of the EU. Pig producer prices were HUF 403 per kg (warm carcass weight) in 2011, 12 per cent above the level in 2010. Rising prices can be explained by the weakening of the Hungarian forint, because the slaughterhouses purchased imported pigs at higher prices.

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Table 1: **Balance of meat consumption in Hungary, 2000-2011.**

kg of deadweight per resident

Specification	2000	2005	2011	2011 (per cent)	
				2000=100	2005=100
Total meat with offal	69.7	62.4	54.3	77.9	87.0
Including: meat	66.4	59.7	52.1	78.5	87.3
Including: pig meat	28.0	26.7	24.8	88.6	92.9
beef	4.3	3.1	2.7	62.8	87.1
poultry meat	33.7	29.8	24.4	72.4	81.9

Source: KSH

According to stakeholders, the incidence of the black economy in the pig sector is significant. The most common type of black marketing is where the product is sold by farmers to processors and by processors to butcheries or even to wholesale companies without a receipt. Reporting the export of live pigs or pig meat and claiming a VAT refund is also common, although the export transaction exists only on paper, and the animals are slaughtered and sold illegally on the domestic market (Varga *et al*., 2013.).

Average consumption of meat, meat products and offal in Poland in 2011 was 73.4 kg per capita (in meat equivalent), of which 95 per cent related to raw meat and products, and the remaining part to offal (Table 2). Total meat consumption, after a significant decrease in the 1990s (to ca. 62 kg per capita), increased continuously to a peak in 2007 (77.6 kg per capita), and then fell gradually by ca. 2-3 per cent per annum. The structure of consumption changed significantly at that time. Poultry consumption was increasing dynamically, with the marginalisation of beef consumption and relatively slight changes in the consumption of pig meat. This resulted in the reduction in the share of red meat in meat and offal consumption from nearly 80 per cent at the beginning of the 1990s to 60 per cent in 2011, while poultry meat consumption increased from 11 to 32 per cent. Pig meat is still the most important type of meat consumed in households.

Table 2: **Balance of meat consumption in Poland, 2000-2011.**

kg of deadweight per resident

Specification	2000	2005	2011	2011 (per cent)	
				2000=100	2005=100
Total meat with offal	66.1	71.2	73.4	111.0	103.1
Including: meat	62.0	66.8	70.1	113.1	104.9
Including: pig meat	38.7	39.0	42.5	109.8	109.0
beef	7.0	3.9	2.1	30.0	53.8
poultry meat	14.5	23.4	25.0	172.0	106.8

Source: Analizy rynkowe. Popyt na żywność. Stan i perspektywy, No 6 i 13, IERiGŻ-PIB, Warszawa, 2005, 2013.

Per capita consumption of pig meat in Poland was not subject to any major changes in the period in question. By 2006, periodically with the respective phases of the pig cycle, it decreased to 38-39 kg per capita, and in periods of increased supply it rose to 41-42 kg per capita. According to balance data, the strongest demand for pig meat was noted in 2007 (43.6 kg per capita) with a subsequent peak of the cycle and low prices and, additionally, the outbreak of avian influenza. In subsequent years, pig meat consumption in Poland stabilised at 42.5 kg per capita, which equalled 58 per cent of total meat consumption. The share of self-supply in pig meat consumption has decreased systematically, but it is still an important source of pig meat (ca. 10 per cent, though it exceeds 60 per cent within families supporting themselves by farming).

According to the study of household budgets carried out by the Polish Central Statistical Office (GUS, 2012), consumption of culinary (raw) pig meat increased dynamically between 2000 and 2003 to nearly 17 kg per capita annually, and then stabilised at about 16 kg per capita. The share of raw meat in total pig meat consumption in the whole period fluctuated between 38 and 41 per cent. Simultaneously, demand for processed products increased systematically – mainly high-quality cured meat and long shelf-life sausages, with a decrease of demand for other cured meat.

Between 2000 and 2011 the annual consumption of high quality cured meat increased by nearly 50 per cent to 7.8 kg per capita, and of other cured meat fell by 25 per cent to 12.2 kg per capita (Table 3). Increasing income levels and the levelling of price differences between more and less expensive products were the main factors affecting the change in pig meat consumption structure. The increase in wealth brought about a rise in demand for high-quality products (hams, sirloin, dry sausages, etc.). Their offer and availability were quickly extended, alongside a systematic decrease in demand for cheap products (e.g. luncheon meat, Vienna sausages, offal cured meat or sausages, e.g. *zwyczajna*, *śląska*, *toruńska*).

Table 3: **Consumption of pig meat and its products in Poland, 2000-2011.**

kg per capita, weight of product

Specification	2000	2005	2011	2011 (per cent)	
				2000=100	2005=100
Raw meat	14.28	16.08	16.20	113.4	100.7
High-quality cured meat and long shelf-life sausages	5.28	6.48	7.80	147.7	120.4
Other cured meat	16.44	13.92	12.24	74.5	87.9
Tinned meat	1.08	1.08	1.20	111.1	111.1

Source: GUS

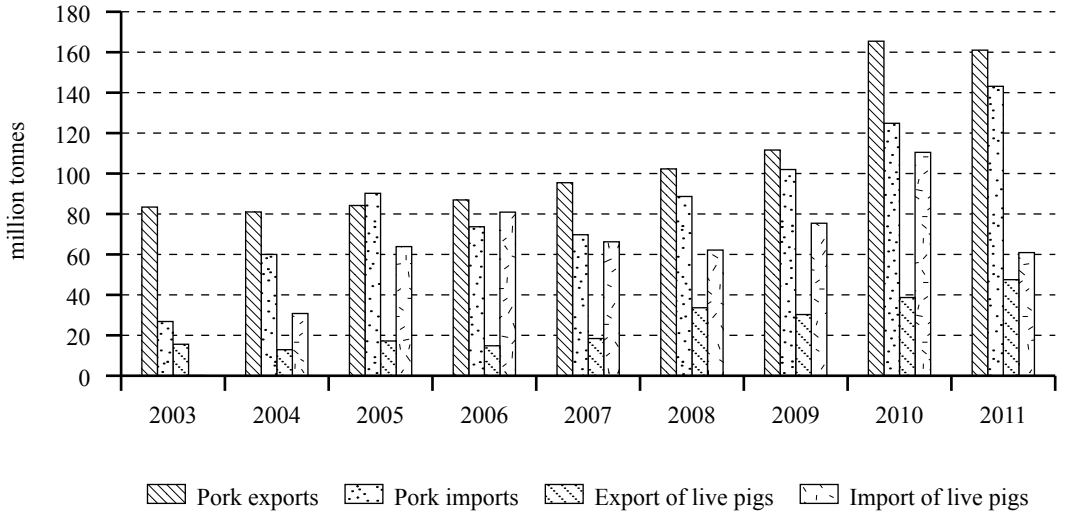
Foreign trade

Hungary exported 43 thousand tonnes of live pigs in 2011, an 11 per cent increase over the previous year. Live pigs are mainly exported to the neighbouring countries. Prior to 2004, there were almost no live pig imports, but in 2010 110 thousand tonnes were imported into Hungary. In 2011, owing predominantly to the depreciation of the Hungarian Forint, the weight of imported pigs was halved to 55 thousand tonnes. Half of the imported live pigs came from the Netherlands, but German, Czech, Polish, Italian and Slovakian pigs also appeared in increasing quantities in Hungary in 2011.

As for pig meat, Hungary imports cheaper parts which are mainly used for the production of processed meat products. This is why the trade balance of pig meat has remained more positive in value then in volume in spite of the high level of imports. Three quarters of the pig meat imports were from Germany, Poland and France. In 2011, the value of exports was EUR 346 million, while the value of imports was EUR 246 million (Figure 1).

Exports of pig meat in 2011 were 158 thousand tonnes in spite of the continually decreasing pig stock, which represents a 5 per cent decline from 2010. Hungarian pig meat exports typically include the chopped bone-in and boneless meat. Pig meat imports increased significantly in 2004, the year of Hungary's accession to the EU, but were still only 60 thousand tonnes. Pig meat imports increased from 125 thousand tonnes in 2010 to 144 thousand tonnes in 2011 which is probably related to the value of the HUF. Overall, Hungary was a net importer of live pigs and a net exporter of pig meat, but the imported pig meat was only 14 thousand tonnes less than the exported pig meat.

Figure 1: **Foreign trade in live pigs and pig meat in Hungary, 2003-2011.**



Source: KSH

In 2011 69 per cent of Hungarian pig meat exports were sold in the EU market. The most important market was Romania, where 30 thousand tonnes of pig meat were exported. Italy was second with 28 thousand tonnes, followed by the Slovakian and Japanese markets with shares of 14 to 15 thousand tonnes respectively. In previous years South Korea, to where 9.5 thousand tonnes of pig meat were exported in 2011, was also among the major buyers of Hungarian pig meat.

Exports of bone-in pork are increasing. Currently, about 25 per cent of the bone-in pork produced in Hungary is sold abroad, while 20 per cent of the domestic pig meat supply is imported. The sales of the market-leading organisations vary widely in domestic and foreign markets: 20-60 per cent of the chopped pork is sold domestically while the rest is sold abroad.

In Poland the surplus of supply of pig meat to the market between 2000 and 2003 was 4.1 per cent greater than consumption and was subject to intervention (Table 4). Meat from intervention stock was intended for export to CIS states. The supply surplus decreased to 3.5 per cent between 2004 and 2008, as its consumption was still increasing and production was greater on average only by 1 per cent per annum prior to Poland's accession to the EU.

As a result of 'opening' of markets in the EU, adjustment of meat plants to world standards and price competitiveness of domestic meat processing, pig meat exports increased 2.5 times (to 326.2 thousand tonnes per annum) as compared to the level in 2000-2004. Pig meat originated from the market supply which affected the level of prices obtained. Between 2004 and 2008 the average pig meat price in exports increased by ca. 34 per cent (to EUR 1.55 per kg). The increase of exports and consumption was possible due to imports which accounted for 12.9 per cent of market supply. Imports from the EU ceased to be limited by quotas. Simultaneously, industrial demand for large, uniform (in terms of quality) batches of pig meat increased. Domestic production, due to its low concentration, was unable to meet the expectations of the industry. Despite the increasing imports, the foreign trade balance in pig meat was positive and between 2004 and 2007 it amounted on average to ca. EUR 135 million per annum. A deficit in trade, to the amount of EUR 260.6 million, was noted in 2008 and increased to EUR 390 million per annum between 2009 and 2011 (Figures 2 and 3).

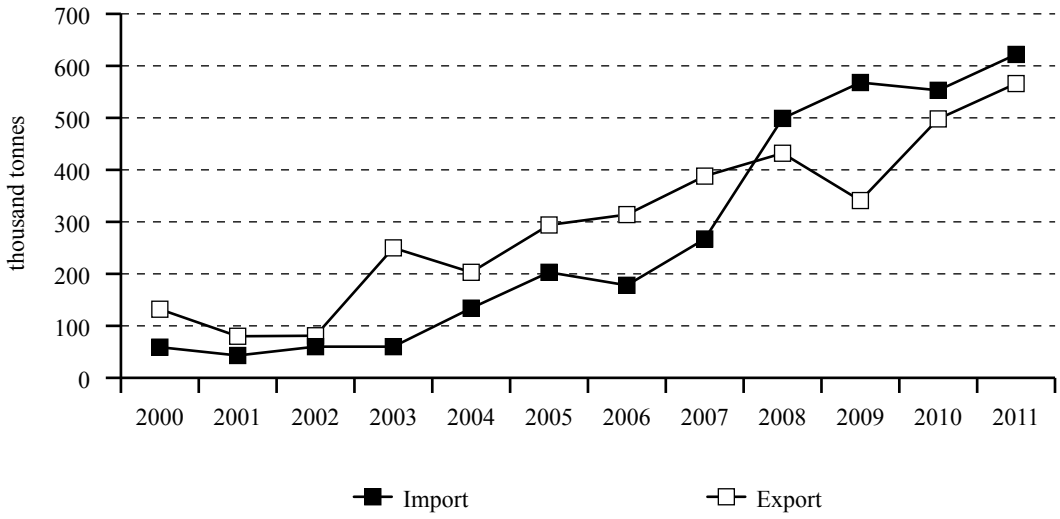
Table 4: **Foreign trade in pig meat in Poland, 2000-2011[a)].**

Specification		Annual average in periods		
		2000-2003	2004-2008	2009-2011
Pig meat production in cold weight (thousand tonnes)		2,032.7	2,051.8	1,889.0
Share of buying-in in production (per cent)		64.0	77.5	83.4
Import in meat equivalent (thousand tonnes)		55.5	256.2	581.0
Export in meat equivalent (thousand tonnes)		135.7	326.2	468.3
Domestic consumption (thousand tonnes)		1,952.5	1,981.8	2,001.7
Indicators (per cent)	Self-efficiency: relationship between production and domestic consumption	104.1	103.5	94.3
	Export specialisation: share of exports in production	6.7	15.8	24.8
	Import penetration: share of imports in market supply	2.8	12.9	29.0

[a)] Live pig exports and imports expressed in meat equivalent, meat and pig meat products.
Source: GUS

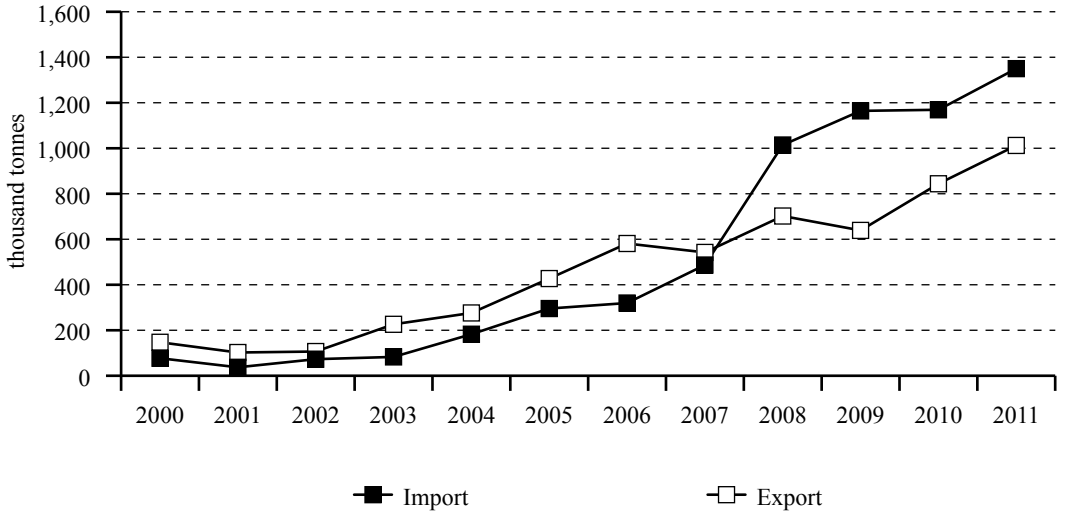
The increase in the pig meat trade deficit resulted from the declining self-sufficiency in pig meat production. The decrease in consumption was relatively low and the use of production capabilities of modern meat industry was low, which resulted in high imports. In Belgium, Denmark, the Netherlands and Germany carcass elements of high technological efficiency were mainly purchased (ham, bacon, blade). In 2009-2011 purchases of meat stood on average at 581 thousand tonnes per annum and were 126 per cent higher than in 2004-2008. Pig imports increased by ca. 384 per cent (to 2.3 million pigs per annum).

Figure 2: **Polish pig meat exports and imports in meat equivalent.**



Source: based on CIHZ, CAAC

Figure 3: **Polish pig meat exports and imports.**



Source: based on CIHZ, CAAC data

The value of pig meat exports in 2004-2011 increased by about 20 per cent per annum (to EUR 1012.4 million), and the value of imports by 33 per cent per annum (to EUR 1350.1 million). The trade balance in pig meat commodity groups varied. The positive balance of trade in pig meat products increased from EUR 79.5 to 302.8 million.

Export surplus over imports in the trade in pig meat products was unable to balance the increasing deficit in the live pig and pig meat trade. During 2004-2011, pig meat exports increased by around 112 per cent to 312.3 thousand tonnes with 150.8 thousand tonnes sold within the EU in 2011. Meanwhile, imports increased by 487 per cent (to 581.7 thousand tonnes) and originated mainly from the EU-15. Between 2009 and 2011 the negative balance of trade in pig meat amounted on average to EUR 589 million per annum as compared to the positive balance of EUR 40.5 million on average in 2004-2007. The surplus of exports over imports was affected by revenues on the sale of pig meat to the 'new' EU Member States and to third countries, which gradually ceased to cover expenditure on the purchase of meat in the EU-15. The negative balance of foreign trade in pig meat from the EU-15 increased from about EUR 100 million in 2004 to about EUR 990 million in 2011.

Pig production

Structural trends

In Hungary the pig sector has been severely impacted by the transition and the collapse of the COMECON (Council for Mutual Economic Assistance) market, and many farmers have quit production because they were unable to finance their losses. Since the 1990s, and even more since Hungary's accession to the EU, the productivity and output of the Hungarian pig sector have declined continuously, which led to lower incomes and the reduction in livestock numbers.

After Hungary's accession to the EU the profitability of livestock production declined rapidly compared to crop production. The discontinuation of direct payments, a small share in investment support, the lack of capital and the unpreparedness of the stakeholders in general were the factors which hit the pig sector the most. A generous support system before the EU accession and the lack of targeted agricultural policies were responsible for livestock production being inflexible and lag-

ging behind its competitors. The development of competitive and transparent product chains is also blocked by the strong presence of the black economy (Popp *et al*., 2008.).

The Statistical Department of AKI collects slaughtering data from slaughterhouses. In 2011 156 slaughterhouses reported that they had slaughtered 4,290 thousand pigs (Table 5). In 2011 slaughtering was more concentrated than in 2006 when 225 slaughterhouses had pig slaughtering permission, of which 210 plants actually reported slaughtering. In 2011 the five largest slaughterhouses slaughtered half of all pigs, but in the pig sector there are also many small slaughterhouses operating.

Table 5: **Pig population and pig meat production in Hungary, 2003-2011.**

Year	Pig population (thousand pigs)		Pig slaughter (thousand pigs)	Average weight at slaughter (kg)	Pig meat production in deadweight (thousand tonnes)
	total	Including: sows			
2003	4,913	327	4,561	116	421
2004	4,059	296	4,283	114	390
2005	3,853	277	4,256	113	385
2006	3,987	290	4,521	113	412
2007	3,871	259	4,759	114	437
2008	3,383	230	4,304	112	391
2009	3,247	226	4,299	113	389
2010	3,169	219	4,610	113	416
2011	3,025	210	4,290	111	387

Source: KSH and AKI

In Hungary pig breeding has a bipolar structure. There are partly self-sufficient producers and small factories, which sell only the surplus production, while on the other hand there are privatised former state owned companies and co-operatives with partly or fully modernised large plants with large numbers of livestock even in comparison with Europe as a whole. The EU is characterised by middle-sized producers, which are a missing segment in Hungary (Table 6). Lots of farms are staying at the forefront of technological and technical modernisation. As the results show, if they fail to do so, they are not able to produce a profit.

Table 6: **Share of farms in the pig population per the scale of breeding in Hungary, 2000 and 2010.**

Herd size in items	2000		2010	
	per cent of farms	per cent of population	per cent of farms	per cent of population
1-19	98.9	43.5	97.9	22.4
20-49	0.7	3.6	1.2	2.5
50-99	0.2	1.5	0.4	1.7
100-499	0.1	4.4	0.3	6.9
<500	0.1	47.0	0.2	66.5

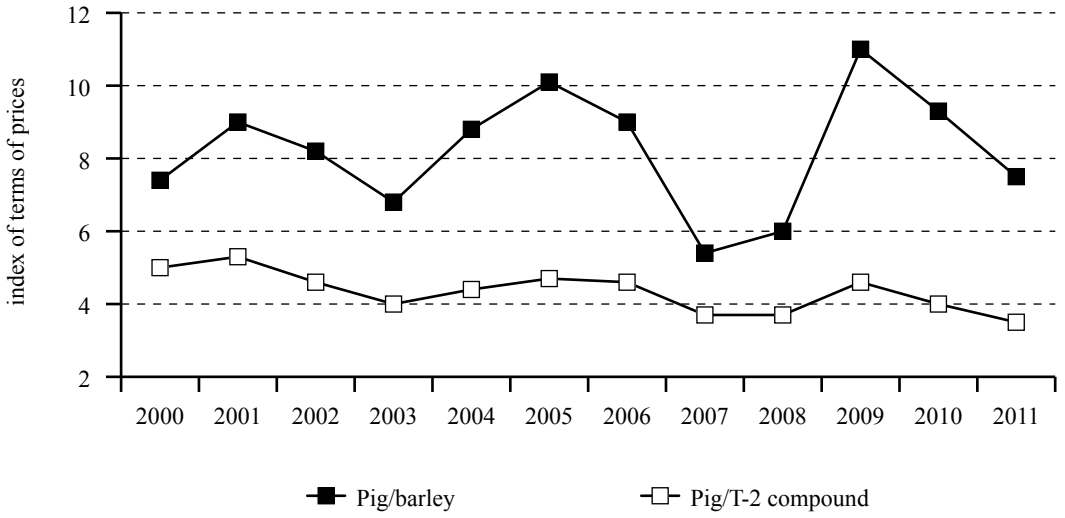
Source: KSH

Weak profitability in the sector has triggered concentration. The number of pigs kept by private farms dropped back to only half of the 1.7 million pigs in 2004 while around 70 per cent of the 3 million pigs were held by commercial enterprises in 2011. Vertical and horizontal integrations are rare and often inefficient, thus playing only a minor role in the pig meat supply chain. Business relationships can seldom be described as trustworthy; business decisions are often based on short term profit, not on long term mutual benefits, and this makes partners unpredictable and the forming of integration and cooperation rather difficult. (Popp and Potori, 2010).

Pig breeding in Poland has been implemented mainly in small-scale breeding farms. In 2000, farms having 1 to 50 pigs formed about 91 per cent of total amount of farms involved in this type of production, and their share in the pig population accounted for ca. 50 per cent.

Pig breeding on farms with relatively small populations depends on the demand and supply situation in the cereals market (Roeber *et al*., 2000). They produce live pigs mainly with their private resources. In 2004-2006 the supply of cereals was high, the prices were low and this encouraged the development of pig breeding. The market situation in cereals has changed dramatically since 2007, resulting in the deterioration of profitability of pig breeding, in particular on small farms. The relationship between prices of buying-in pigs (in live weight) and prices of buying-in of barley has decreased (Figure 4).

Figure 4: **Relationship between the prices of pig buying-in (live weight) and barley buying-in and the retail price of T-2 compound in Poland, 2000-2011.**



Source: GUS and Market analyses "Rynek Pasz" IERiGŻ, MRiRW and ARR

Pig meat has become increasingly expensive and production has become less profitable, resulting in a reduction of the pig population and a decrease in pig meat production. Between 2007 and 2011 the pig population decreased by ca. 6.6 million pigs (to 11 million pigs), including sows by ca. 651 thousand sows (to 936.2 thousand sows) (Table 7). Reduction of the population covered all age and use categories and weight of pigs slaughtered increased to 124 kg. The weight of pigs for fattening increased as well (from about 85 to 88 kg). However, this was not able to compensate for such a large decrease in pig population. Pig meat production between 2007 and 2011 decreased by ca. 13 per cent (to 1,876 thousand tonnes). Its share in the global animal production in 2011 was 24.7 per cent and was by ca. 10 percentage points lower than in 2000.

Table 7: **Pig population and pig meat production in Poland, 2000-2011.**

Year	Pig population (thousand pigs)		Pig slaughter (thousand pigs)	Average weight at slaughter (kg)	Pig meat production in deadweight (thousand tonnes)
	total	Including: sows			
2000	16,991.5	1,544.5	22,928	109	1,951
2001	17,494.0	1,672.5	21,958	109	1,883
2002	17,387.1	1,635.5	23,040	113	2,028
2003	18,439.2	1,704.5	25,293	112	2,230
2004	17,395.6	1,648.5	23,228	109	1,981
2005	16,840.6	1,613.8	22,736	111	1,991
2006	18,813.0	1,786.4	24,654	113	2,136
2007	17,621.5	1,587.4	24,677	112	2,165
2008	14,242.3	1,278.8	21,963	113	1,936
2009	12,330.5	1,176.3	19,008	116	1,717
2010	12,713.3	1,142.9	19,745	120	1,863
2011	11,009.1	936.2	19,674	124	1,876

Source: GUS and Market analyses "Rynek mięsa. Stan i perspektywy". IERiGŻ, MRiRW and ARR, Warszawa, p. 7.

Reduction of the population resulted in a decrease in the number of farms breeding pigs from 701.6 thousand in 2005 to 260.2 thousand in 2012, while their share in the total number of farms in Poland decreased from 25.6 to 11.5 per cent. The number of farms with 1-19 pigs decreased by ca. 73 per cent (to 169.7 thousand), and the number of farms with 20-49 pigs decreased by 17 per cent (to 51 thousand) (Table 8). Those farms produce for their private needs and for local markets and are unable to adjust production to the requirements of the industry as they have no direct contacts, while large meat enterprises are not interested in small batches of pigs for fattening. Pig producer groups provide a solution to this problem by facilitating the supply of larger batches of pigs for fattening, obtaining higher prices and purchase of cheaper means of production. In 2011, 145 such groups operated on the Polish market. Pig meat production and its standards have become determined by large farms with 200 and more pigs (Rycombel, 2007). In 2011, about 8 thousand of such farms operated, and their share in Polish domestic pig population was about 48 per cent. High prices of compound feeds made the farms reduce their unit costs. Demand for large batches of piglets weighing more than 20 kg increased. It is possible to produce similar quality batches of pigs for fattening with such piglets. In 2009, 24 farms had more than 500 sows, and 88.7 thousand had one sow. The number of piglets from one sow is 16, while it is about 27 piglets in Denmark and the Netherlands (Dybowski, Rycombel, 2011). National piglet supply has failed to meet the expectations of farms specialising in live pig production. The lack of interest in small batches of piglets and weaners was additionally deepened by the decrease of the sows' population.

Table 8: **Share of farms in the pig population per the scale of breeding in Poland, 2000 and 2011.**

Herd size in items	2000		2011	
	per cent of farms	per cent of population	per cent of farms	per cent of population
1-19	72.4	23.4	64.2	10.8
20-49	18.5	26.8	20.1	14.3
50-99	6.0	19.4	8.6	13.9
100-199	2.3	14.7	4.1	13.2
<200	0.8	15.7	3.0	47.8

Source: GUS

The concentration processes on farms were accompanied by the regionalisation of pig meat production in Poland, which is reflected by the deepening differences in animal density per 100 ha UAA. The greatest intensity was noted for pig breeding in Wielkopolskie Voivodeship (237.7 pigs/100 ha UAA) and Kujawsko-Pomorskie Voivodeship (152 pigs/100 ha UAA). In voivodeships with low-intensity of pig breeding a decrease was noted for the density per 100 ha of UAA.

Efficiency trends

In Hungary the efficiency of slaughtering pig production is lagging behind the competition. Fertility, daily gain, feed efficiency and farrowing rate are all lower, fattening time is longer, while the working time spent on the animals are higher. Official statistics show a substantial lag: 16 weaning piglets raised per sow per year and 3.7 kg feed / kg weight gain. Small farms often lack not only capital, but also appropriate knowledge of animal husbandry (Popp and Potori, 2009).

The Hungarian pig sector has very low feed efficiencies. Achieving 3.7 kg feed / 1 kg live weight gain is a considerable burden given the high feed prices in most of the past few crop years. Illegal production can distort efficiency indices, when more animals are fattened on the feed than the ones shown in the books, but there are real existing deficiencies which affect feeding productivity. Raising sensitive breeds with low stress tolerance in inadequate stalls, and using cheap and low quality feed components in inappropriate compositions with the aim to cut feeding costs results in low fertility and culling rates as well as in slow weight gain (Popp and Potori, 2009).

Most of the large pig farms operating in Hungary were designed and constructed in the 1970s. The technology and the construction usually allows every animal to be held in closed buildings, sometimes with open ranges for sows and for fattening pigs. Sows are held in group housing and without bedding. Piglets are weaned after 28 days, weaned piglets are held in groups in closed buildings with partly slatted concrete floors.

About 90 per cent of farms need to be renewed or renovated, since only one in ten is using up-to-date European technology. Most farms are not able to use wet by-products for feed, and in this way save on feeding costs, because just a few premises have a wet feeding system installed. The basic feeds are usually maize, not by-products, which favours meat quality, but higher quality is not always accompanied by a higher sale price. Changing the technology or renovating and restructuring buildings require huge investments. Many pig farmers do not have enough land of their own, or rented, to produce all of the necessary feeds and to dispose of manure, although both have a significant impact on the security and profitability of the operation.

Low productivity due to inappropriate technology has forced more and more farmers and enterprises to invest in replacing the outdated equipment with new Danish or German technology. New buildings are usually equipped with computer controlled air conditioning and ventilation systems. The new feeding systems can often work automatically: the water saving drinking troughs, nipples or bowls can save costs even for the manure handling. On some farms it is possible to feed sows with individual rations with the help of a computer controlled identification system, but it is still rare compared to group feeding.

Unlike in many leading pig producing countries, in Hungary most pig farms have not specialised, despite breeding and fattening requiring different technologies. Culled breeding animals are replaced by animals bred on the farm, which generally leads to reduced prolificacy and natural productivity. New genetic research and innovation are neglected and not applied in practice. Even if farmers use modern genetics and varieties they are often not able to ensure the necessary conditions which would allow the high genetic potential to be reached. Breeding stock in Hungary is heterogeneous; the basis of the selection is narrow (Popp and Potori, 2009).

On the other hand, more and more farms use modern, high-performance breeds, from which efficiency improvements can be expected. However the poor feed conversion is due to the difference feeding technology. In Hungary, the utilisation of by-products is less typical compared to the Netherlands. This is mainly due to the obsolescence feeding systems and because Hungary produces grain maize and wheat in excess quantities. Therefore maize and wheat-based feeding is ensured in the long term. There is an export market, namely South Korea which buys the Hungarian grain-fed pork explicitly.

In Poland, there are similar problems with the efficiency of pig production resulting from the limited reproductive potential of stocks of basic and rational feeding, which fundamentally affects the high production costs and determines the low competitiveness of the sector, both on domestic and external markets (Blicharski and Hammermeister, 2013) .

The lack of use of the reproductive and genetic potential can be illustrated, among others, by low ratio of the average number of weaning piglets raised per sow per year, which in Poland is 16, while in Denmark exceeds 27. This means that in Poland the burden of statistical pig by feed used in keeping sow might be nearly 2 - fold higher than in Denmark. At the same time it is also low efficiency of usage of feed per kilogram of body weight gain of pigs (porkers), which according to professional bodies is approximately 3.0 kg (with fluctuations from 2.5 to 3.5 kg), but calculated using empirical data of the Polish Agricultural Accounting (on sample of 143 households) is much higher with an average of 3.42 kg. A span of 3.22 kg in large farms with intensive production and 3.84 kg in households with small-scale production (Sakrzynska and Jablonski, 2012) .

High consumption of feed per kilogram of body weight gain of hops results from its quantity and quality used in feeding. In Poland still dominates feed own-produced on farm, which is unbalanced in terms of the compositions of essential nutrients, with a significant protein deficiency. The share of industrial feed (high protein concentrates, compound feedstuffs and mineral supplements) is only about 20-25%, while in countries such as Denmark, the Netherlands and France can be as high as 75%. The ongoing process of concentration and integration of pig breeding will enforce the rationalization of nutrition and increasing the use of industry feed in future.

Slaughtering and processing

Hungarian slaughtering and processing has significant over-capacity. Because of the decreasing Hungarian pig stock the slaughterhouses processed imported pig meat in order to better utilise their capacity. Some factories are operating in 100 year old buildings where expansion is not possible, and lack the necessary capital for green field investments. The Bonafarm Group, with a significant pig production background and with processing capacity, can be the first to overstep this dilemma. The company published a plan to build a new slaughterhouse in Mohács with a slaughtering capacity of 1 million head in one shift. The new and modern slaughterhouse could work with such low prices, even in case of contract slaughtering (slaughtering for third parties), that could be lower than the first cost at the small slaughterhouses (Máté, 2012). If the plan comes to fruition, considerable restructuring of the pig chain can be expected.

Before Hungary's accession to the EU many small private (farm) and municipal (local government) slaughterhouses could not undertake the necessary developments to comply with EU regulations. The rest of the small slaughterhouses shouldered the costs of obligatory qualifications. The modification of the Hungarian Regulation FVM 75/2003 (VII 4) about the qualification of the slaughtering animals improved the local supply and annulled the defencelessness of the producers. According to the amendments, sites slaughtering less than 200 pigs a week and the producers slaughtering from their own-produced pigs are exempt from qualification after slaughtering. This exemption was not applied in Hungary before, although it can be granted according to EU legislation. Implementing the amended regulation meant that in October 2012 72 slaughterhouses had to comply with the qualification after slaughtering, while 106 were exempt. According to some operators of large slaughterhouses that were obliged to carry out qualification, small slaughterhouses receive unfair advantage and the modifications made are against the transparency of the pig supply chain. The smaller abattoirs mostly only carry out slaughtering. They sell almost exclusively in the domestic market and sales of half-carcasses account for 80-90 per cent of the total revenue.

The biggest Hungarian processors usually have yearly written contracts with their most important suppliers for at least part of their needs. In the contracts they agree on payment conditions, and on volumes and quality to be delivered. Prices are decided weekly, based on pig and pig meat prices on the European market, and on the market conditions of the processed products (Popp *et al.*, 2008). Small processors do not contract in advance, they decide volume and agree on prices just a week before the delivery and the deal is usually an oral gentlemen's agreement. Slaughterhouses have a weak bargaining power compared to trading companies, but they have a better position than pig producers, purchase prices of pigs are rather dictated by them (Kartali 2009). Cooperation between processors and pig producers is rare; their relationship often even lacks basic loyalty.

Slow concentration can be noted among Hungarian processors and at the same time also specialisation. Although one third of the enterprises have both slaughtering and meat product manufacturing branches, processing and manufacturing of meat products is becoming more separated from slaughtering and cutting. Production of meat preparations is still offering higher profits than slaughtering.

The leading meat processing company in Hungary is Pick-Szeged Zrt. It sells its products under the brands of Pick, Herz, Délhús and Ringa, but also produces private label products for merchandising firms. Pick's market share is close to 30 per cent, the company itself slaughters over 350 thousands pigs a year, but also buys meat on domestic and foreign markets. The sale volume of meat products is around 45 thousand tonnes, the revenue is 60 billion HUF (EUR 300 million) of which exports give around EUR 55 million.

The share of buying-in in the live pig production in Poland increased from 64 per cent in 2000-2003 to 83.4 per cent in 2009-2011. Its increase resulted from the necessity to identify livestock as well as from the modification of sanitary and veterinary provisions on pig slaughter conditions. Local

slaughterhouses which failed to meet veterinary standards had to cease their businesses. The share of industrial slaughter in general pig slaughterhouses increased from ca. 71 per cent in 2000 to 87 per cent in 2007 and to ca. 93 per cent in 2011. The increase of this indicator resulted from a greater share in domestic pig population on farms specialised in the production of pig meat and import of pigs.

Concentration has occurred in the animal slaughter sector in Poland as the decrease in the pig population and slaughter resulted in the liquidation of numerous industrial slaughterhouses. In 2005-2011 their number decreased from 1,150 to 683. Mainly plants slaughtering more than 200 pigs a week were closed as well as plants with an annual slaughter volume from 10.4 to 40 thousand pigs. Simultaneously, the number of plants slaughtering 230 thousand pigs per annum increased.

Table 9: **Industrial slaughterhouses, production of pig products in plants employing more than nine persons as well as financial indicators in Poland, 2003-2011.**

Specification	2003	2007	2008	2009	2010	2011
Pig slaughter (thousand pigs)	18,009.6	21,509.7	18,859.6	16,507.2	18,166.7	18,423.7
Cured meat production (thousand tonnes)	685.4	754.9	708.7	623.5	684.2	746.3
Tinned food production (thousand tonnes)	-	48.1	59.5	72.3	93.8	103.3
Profitability indicator: net profit	0.85	2.34	1.42	1.52	3.25	1.95
current liquidity	1.03	1.05	1.04	1.17	1.20	1.24
rate of investment	2.22	1.68	1.41	0.93	1.18	1.24

Source: GUS and R. Urban „Przetwórstwo mięsa", [in:] „Rynek mięsa. Stan i perspektywy". Analizy rynkowe. IERiGŻ, ARR, MRiRW.

Despite the decreasing trend in pig population, the production value of meat industry plants increased. This resulted not only from high pig meat prices but also from imports of live pigs and pig meat allowing for greater use of the production capacity and production of cured meat and tinned meat. Net profit in 2011 was lower than in the previous year, but higher than that obtained in 2008-2009. Improvement of financial results allowed for an increase in investment (Table 9). Investment activity was carried out along greater financial liquidity of companies than between 2003 and 2007. At the time, investments were co-financed by SAPARD funds, companies took credits, financial liquidity indicator was lower by 1.2 – the level the banks considered safe.

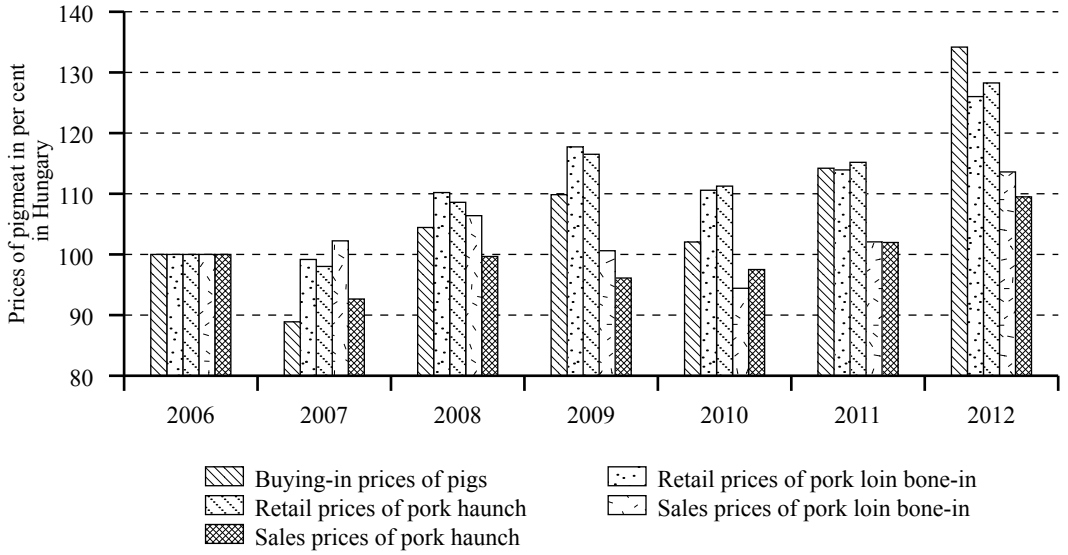
Prices along the value chain

In Hungary retail trade companies and retail chains are the major market forces. As their market share has grown, so has their bargaining position. They are offering huge sale volumes, however they are pressuring prices (Kartali, 2009). Retail chains are importing carcasses and meat preparations as well, to offer variety to the customers, and also to offer very cheap products.

The retail chains are demanding prices which are not leaving much profit for the sellers; however the meat processors are often forced to accept the offer in order to have their capacities utilised. Imports, even at dumping prices, are often more competitive than Hungarian production. Processors need to import not only to keep costs down: sometimes there would be an opportunity on the market but there are not enough quality pigs available. This often happens with bacon pigs. A shortage of heavy slaughtering pigs also makes it difficult to produce some traditional Hungarian products such as special salamis and sausages, and can be the reason for importing meat too. However, cheap imports are usually used for cheap meat preparations for the domestic market (Popp and Potori, 2009).

Between 2006 and 2012 the increase of pig meat retail prices was higher than the pig meat sales prices, but the buying in prices of pigs was the highest (Figure 5). Therefore, the number of slaughterhouses decreased significantly.

Figure 5: **Prices of pig meat in per cent in Hungary, 2006-2012.**



Source: AKI and KSH

Hungarian consumers are very price sensitive and this has been even more true since the start of the economic crisis. The price is the first on the preference list of the consumers: it is not easy to sell premium products on the Hungarian market. Retail chains have introduced private label products and brands and their market share is growing dynamically. Producing private label products for a retail chain company is often challenging for a processor. Some choose to sell the same quality as they assure for producer's label products, but quality is often the victim of the low prices (Popp and Potori, 2009).

In Poland the average annual pace of price growth of pig buying-in was 1.9 per cent between 2000 and 2011. It was similar to the pace of price growth of poultry buying-in (about 2 per cent) and 4.2 percentage points lower than the pace of price growth of cattle buying-in. The dynamics of buying-in of live pigs varied in that period. Prices decreased in 2000-2003 as well as in 2004-2007 by 13.3 per cent and 20.8 per cent respectively (Table 10). It was attributable to the cyclic nature of live pig production. The price of buying-in increased by ca. 11 per cent between 2008 and 2011 since the production had decreased and cyclic nature of breeding had been disrupted.

Between 2000 and 2003 the decrease of pig meat sales prices was higher than that of pigs, since intervention stock of pig meat was directed to wholesale trade and intended for export or the domestic market for the purposes of mitigation of outcomes of cyclic production fluctuations. Consumers failed to achieve large benefits from the decrease of buying-in prices and sales prices, since retail prices of numerous pig meat products decreased to an insignificant percentage.

Access to the EU markets and greater pig meat import and export possibilities had a big impact on the dynamics of prices in wholesale trade. Foreign trade moderated the cyclic production fluctuations. Sales prices depended not only on domestic production and prices of buying-in pigs, but also on pig meat imports. Owing to the continuing increasing tendency in export of pig meat products the dynamics of their sales prices differed from the dynamics of pig meat sales prices.

Between 2004 and 2007 the fall in pig meat sales prices was smaller than of prices of pig buying-in. Above all, its consumption and exports increased. Between 2008 and 2011 the increase of pig meat sales prices and its products in retail trade was smaller than of prices of pig buying-in, and the level of sales prices of certain meat products decreased. The development of sales prices resulted from the import of pig meat.

Table 10: **Annual average pace of increase and relative increases of varying basis of pig buying-in prices and sales prices as well as retail prices of pig meat and pig meat products in per cent in Poland, 2000-2011.**

Specification	Annual average pace	Relative increase of varying basis		
		2000-2003	2004-2007	2008-2011
Buying-in prices of pigs	1.90	-13.3	-20.8	11.3
Sales prices				
pork loin bone-in	0.46	-11.4	-5.2	-0.5
blade	0.62	-18.8	-6.3	10.9
cooked ham	1.10	-7.9	1.3	10.4
dry *krakowska* sausage	1.27	1.1	-2.4	3.3
toruńska sausage	1.12	-13.8	-3.0	8.7
Retail prices:				
pork loin bone-in	0.62	-10.0	-14.6	-0.3
blade	0.98	1.1	-11.2	3.9
cooked ham	1.47	-1.9	8.7	14.6
dry *krakowska* sausage	2.00	6.1	2.6	2.6
toruńska sausage	1.76	-4.6	9.3	17.2

Source: GUS

Table 11: **Indicator of retail prices and consumption services as well as indicator of meat retail prices in Poland, 2001-2011.**

previous year = 100

Specification	2001	2004	2007	2009	2011
Indicator of prices of commodities and consumption services	105.4	103.4	102.5	103.5	104.3
Pig meat	111.5	112.2	100.9	108.2	104.6
Beef	107.0	124.7	102.8	110.0	109.7
Poultry meat	103.7	110.3	119.4	109.8	112.8
High-quality cured meat and long shelf-life sausages	107.5	107.1	101.6	105.9	102.0
Other cured meat	109.7	108.7	102.0	110.1	103.3

Source: GUS

A fall in Polish retail pig meat prices occurred between 2004 and 2007 (Table 11). A slight increase in prices of goods and consumption services continued in that period. Since 2008 pig meat has started to be more expensive and the increase in its retail prices was greater than the increase of prices of goods and consumption services. Despite increased pig meat prices, they increased more slowly than retail prices of beef and poultry meat. Retail prices of high-quality cured meat noted a considerably lower increase than the above mentioned types of meat. Therefore demand for pig meat continued

and the decrease in its consumption was relatively small as compared to the level of production. Indicators of retail prices cover the whole commodity group of pig meat and cured meat. As regards certain meat products the scale of changes at the level of retail prices was greater than in the whole commodity group. Between 2008 and 2011 retail prices of central loin bone-in decreased by 4.6 per cent and increased in the case of blade by 3.9 per cent. Strong increases in the retail prices of cooked ham (by 14.6 per cent) and *toruńska* sausage (by 17.2 per cent) was noted.

Developments in market regulations and regimes

The decree No. 1323/2012 by the Hungarian government on 'the improvement of the situation in the pig sector' aims to double the pig population, presently around 3 million, in seven years. To reach this ambitious goal the government declares that small and mid-size as well as large farms shall coexist and they shall cooperate in order to increase their competitiveness and to facilitate successful rural development. According to the programme laid down by the decree No. 1323/2012, one of the main targets is to achieve a multifunctional and diversified agricultural production structure, with an emphasis on the restoration of the balance between crop and animal production, which has shifted strongly towards the former.

Investment support for pig farmers is possible under government regulation 114/2008 (IX. 5) (preferential credit fee and lease payment support). Under that regulation, support is available for agricultural enterprises for (a) purchasing farm machinery and technological equipment; (b) modernisation of livestock farms; (c) investments for processing of agricultural products; and (d) leasing of farm machinery and technological equipment.

Investment subsidies are mainly financed under the 2007-2013 Rural Development plan. Access to investment instruments depends on the outcome of the EU's Common Agricultural Policy (CAP) and the willingness of banks to finance investments. The lack of own capital is also causing problems in using investment possibilities.

Hungarian pig farmers mostly require funding for forward purchases of feed (soybean meal, maize). Of those farmers whose income comes from crop production, 60-70 per cent are able to finance their feed needs, but it is still popular to use factoring credits for the single area payment and agro-environmental payments, as well as structural funds subsidies.

As for investment financing, it should be noted that most large-scale pig farms operate as part of an agricultural holding. If their credit claims are validated separately from the other members of the holding, the banks occasionally refuse to finance the pig breeding subsidiary.

Conditions and interest rates depend on the independent evaluations carried out by the financing institutions. Since agriculture is considered to be a relatively sound sector, by tendering of banks farmers and agricultural companies can achieve conditions that are often more favourable than in the case of state subsidised credits, without the administration and strict regulation linked to the latter. In Hungary the interest rate has decreased slightly in the last couple of years but credit verification and audits have become more rigorous. HUF based credits are still less advantageous than the EUR based financing used by the competition. However, because of the unpredictable exchange rates Hungarian farmers have learned to be very cautious with foreign currency financing. Investments are usually financed 40 per cent from EU funds, 40 per cent from bank credit and 20 per cent from own sources.

Since the beginning of the market transformations the pig meat market in Poland has been considered sensitive and has been supported, mainly by intervention buying of pig half-carcasses, contrary to measures in the EU Member States (Swietlik and Seremak-Bulge, 2007). Protection of the national market against surplus imports was regulated by the minimum market access sum as part of the WTO agreements. In addition, rules of trade with the EU Member States were specified in the association

agreement and trade liberalisation agreements (2000-2003). *Ad valorem* tariffs, which stood at the same levels for all meat types, were applicable. Despite the possibility to support pig meat exports as part of limits set by the WTO, Poland failed to use this type of instrument. Since May 2004, domestic pig meat market regulation rules have been replaced by intervention mechanisms as part of the common organisation of agricultural markets.

The pig meat market regulation system in the EU was first introduced in 1967, and since then has often been changed and amended (Rowinski and Tereszczuk, 2008). The current pig meat market regulation system has been in place since 1 July 2008 pursuant to Council Regulation No 1234/2007 establishing a common organisation of agricultural markets and on specific provisions for certain agricultural products. Pursuant to this Regulation, instruments of the CAP applicable to the pig meat market include aid for private storage of pig meat and export subsidies as well as instruments affecting trade in pig meat: import and export licences, customs duties and tariff quotas. In general, the pig meat market in the EU has used the budgetary support and protection to an insignificant extent. Regulations regarding the market in cereals have an indirect impact on the market situation.

Under European Commission (EC) Regulation No 826/2008 of 20 August 2008 laying down common rules for the granting of private storage aid for certain agricultural products, Poland's accession to the EU meant abandonment of intervention to the advantage of private storage aid for pig meat and its possible further export to the third country markets with aid. Pig meat export subsidies are closely related to the storage aid programme, while they are a constant support instrument in the export of processed products. Pursuant to the EC Implementing Regulation No 342/2012 of 19 April 2012, export rates for products have been set at a zero level. The EC took the decision to launch the programme of payments to private storage in 2007. Polish meat plants purchased pig meat with their private funds, while the EU budget supported its storage. The support is, however, not largely used by Poland.

Adoption of the EU customs tariff by Poland also facilitated larger protection of the market against excess import of meat and its products from outside the Community, favouring intra-EU trade. The ad valorem tariff was replaced by a rate expressed in value terms, depending on the type of range imported. Trade between the EU Member States is regulated by sanitary and veterinary provisions, which resulted indirectly in fast modernisation of the domestic pig meat sector (production, processing and disposal).

The pig meat market in the EU is also directly supported by a number of other mechanisms. One of the most important instruments available to the Polish pig meat producers and processors are the funds for publicity and developing quality management systems[3]. The funds make it possible to win new markets and guarantee safe, identifiable, high and certified-quality products.

Conclusions

The meat consumption and the pig meat consumption were decreasing dramatically in Hungary in the 1990s and 2000s. Because of the negative economic impacts in 2012 there were less than 3 million pigs on the farms in Hungary and the slaughterhouses processed imported pig meat in order to better utilise their capacity. Since Hungary's accession to the EU, the productivity and output of the Hungarian pig sector have declined constantly, which is clearly shown by the lower income and the reduction in livestock. Hungary has lost its net exporter position and the volume of imported life pigs and pig meat is very high. In Hungary pig breeding has a bipolar structure, but the EU is characterised by middle-sized producers, which are a missing segment in Hungary. The Hungarian pig sector has very low efficiencies and the pig holders have to overcome difficulties originating

[3] Support for publicity and information measures on markets of selected agricultural products (Council Regulation (EC) No 501/2008). Co-financing information and publicity measures regarding high-quality food as part of Rural Development Programme Funds (Measure 133).

from the geographical location. Despite this weak profitability and the insecure outlook of the sector have triggered concentration. Low productivity due to inappropriate technology has forced more and more farmers and enterprises to invest in replacing the outdated equipment with new technology and lots producers are considering changing genetics in the future. The government has developed a programme for the pig sector which aims to double the pig population in seven years.

The meat processing sector in Poland was modernised and adjusted to the EU standards. The farm structure was characterised by low concentration of pig breeding, which became an obstacle in the way of genetic and breeding progress and hindered shortening the market chain. More extended relationships between the domestic pig meat sector and foreign markets upon Poland's accession to the EU and high prices of feed material revealed weakness of 'the domestic raw material base'. The confrontation resulted in the decrease of the pig population, liquidation of slaughterhouses and high imports of piglets and meat. The concentration and regionalisation of live pig production and animal slaughter was initiated. High prices of feed material will force technological progress and concentration of pig breeding, thus affecting the competitiveness of the sector (Dybowski and Rycombel, 2011). Market leaders are emerging and they will produce for the needs of large processing plants and exports. Regional changes in the pig population are characteristic of the process of segmentation of the domestic pig meat sector. Depending on the income situation of society, the share can increase on the internal market of pig meat from medium-sized holdings breeding pigs on an average scale and for the needs of specialised shops, where taste and health values of meat products are preferred and the consumer is able to pay a high price.

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Recent Developments in the Dairy Sector in Poland and Hungary

Piotr SZAJNER[1] and VŐNEKI Éva[2]

Introduction

This chapter describes the recent developments in the Polish and Hungarian dairy sectors. The dairy market is an important component of the Polish food sector: in 2011 milk accounted for the largest share (18 per cent) in the commodity structure of agricultural production. The production of milk is an important source of income and nourishment for about 400 thousand Polish farms and their families. In Poland the supply of raw material to the industry has increased, and the consumption of milk on farms and direct sales have decreased in recent years. However, structural changes in milk production are not yet complete. Accession to the EU revealed the competitive advantages of Polish dairy sector, which is confirmed by the large positive foreign trade balance. By contrast, since accession, the Hungarian milk sector has had serious problems. Domestic milk production has continuously declined, the foreign trade balance of milk and dairy products has deteriorated year after year and the degree of self-sufficiency has fallen below 100 per cent. However, since 2010 some positive changes in the Hungarian dairy sector could be observed. Owing to the increasing exports of raw milk and the favourable development of milk prices, both the number of cows and the level of milk production have slightly increased.

Milk and dairy product consumption habits are still basically determined by income levels (cheese consumption is growing more quickly in the world's more developed countries, while in the poor countries, principally liquid milk consumption is increasing) (DG AGRI, 2012). Thus in Poland and Hungary economic development since 1989 has clearly influenced the development of the sector. After reviewing the market regulation systems in the two countries, the main developments and structural changes in milk production and processing are described. In the following sections the domestic demand, the external trade and the price developments in the marketing chains are analysed. Finally, the main consequences of these recent developments are summarised.

Development of the system of market regulation

Since 1989 the dairy sectors of the two countries have operated in dynamically changing conditions in both the domestic and international markets. The most important changes were the transformation from a centrally planned economy to a market economy, liberalisation of the global trade of agricultural products, and developments related to accession to the European Union (EU) in 2004.

The common market organisation in milk and milk products has undergone successive reforms during the last decade. Building on the orientations of Agenda 2000, the 2003 reform started to loosen up the milk quota system in view of its end in 2015. This deadline was confirmed in 2008 by the Common Agricultural Policy (CAP) Health Check, which set out progressive increases of the quota levels, abolished aids for the seasonal storage of certain cheeses and the use of butter in pastry and ice cream. Direct payments have been decoupled from production while maintaining the possibility for the EU Member States to recouple them to address specific disadvantages affecting farmers in economically vulnerable or environmentally sensitive areas. Support measures for fragile areas and for the development of higher added value and quality products have also been strengthened under the rural development policy.

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The CAP 2020 reform move deeper into these aspects. The EU Member States will benefit from an extended flexibility to support certain fragile areas. On the other hand, a particular focus has been put on maintaining permanent pasture under 'greening' obligations, with a potential impact on milk production. As for market management mechanisms, the reform proposals keep those broadly unchanged for the milk sector, while strengthening the horizontal emergency measures which will enable a quicker response to general market disturbances. In addition, a set of measures is proposed on risk management, innovation, knowledge transfer and research cooperation, which should contribute to enhancing the long-term competitiveness of the sector.

The reform confirms the end of the milk quota system in 2015. For a sector that has been used to production limitations for more than 25 years, this creates challenges for economic operators. To prepare them for the new context, the European Commission has proposed measures aimed to strengthen the organisation of milk producers and their bargaining power and improve the cooperation and relationships between the different stages of the supply chain. The main elements of the so-called Milk Package are (1) producer organisations allowed to collectively negotiate contract terms with processors, (2) basic mandatory conditions for contracts in the Member States which decide to impose compulsory contracts, (3) stronger inter-branch organisations, reporting obligation of monthly milk deliveries and (4) possible supply regulation for cheeses benefiting from protected designations of origin and protected geographical indications (Ernst & Young, 2013).

In Poland the first market regulation system within the food sector was implemented in 1990-1991 and included tariff protection, intervention schemes and various forms of support for farmers and the food industry[3]. The scope and character of the market regulations had evolved into a system in force within the EU, so that by the day of Poland's accession the full EU system could be implemented. For the dairy market the regulations initially included only an intervention purchase for butter and skim milk powder (SMP) which was intended to mitigate seasonal fluctuations in supply. Intervention prices were stipulated by the Agricultural Market Agency on the basis of assessment of market conditions. In 1994-1998 the intervention prices for butter in blocks were EUR 0.88-1.64 per kg[4] (3.50-6.55 PLN/kg) and for SMP were EUR 0.66-1.00 per kg (2.65-4.00 PLN/kg). In 1999, the intervention purchase of SMP was replaced by an exports subsidy. Support for exports was a result of the Uruguay Round of the GATT/WTO. In 1995-2000 subsidised exports of SMP decreased from 45 thousand tonnes to 37 thousand tonnes per year and their value respectively from USD 8.2 million to USD 5.6 million. In subsequent years new instruments schemes were added to the system of regulation, most importantly the subsidies for the production of milk of 'extra' class. With the national budget allocated for this EUR 82 million. The introduction of statutory regulation of the market in 2002 created a legal basis for the construction of an institutional system to support the programmes that would regulate the market after Poland's accession to the EU[5]. Regulations introduced by Polish government were very similar to the regulation of the market in the EU, which allowed companies to prepare for accession and implement the EU regulations smoothly in 2004.

The Hungarian dairy sector also went through significant changes in past two decades. Before EU accession, prices for milk were supported by a system of guaranteed, intervention and guidance prices. For dairy products, output based payments were used to cover the gap between market prices and guidance prices. In addition, price premiums for high quality production were provided for milk (about EUR 2 per 100 kg in 2003). These instruments led to high market surpluses and costly exports

[3] Act of 7 June 1990 on the establishment of the Agricultural Market Agency (Journal of Laws 1997 No. 142, item. 951), Act of 11 March 2004 on the Agricultural Market Agency and organisation of some agricultural markets (Journal of Laws 2004 No. 42, item 386, as amended). Act of 29 December 1993 on the establishment of the Agency for Restructuring and Modernisation of Agriculture (Journal of Laws 1994, No. 1 item 2, Journal of Laws 2005, No. 31, item 264).

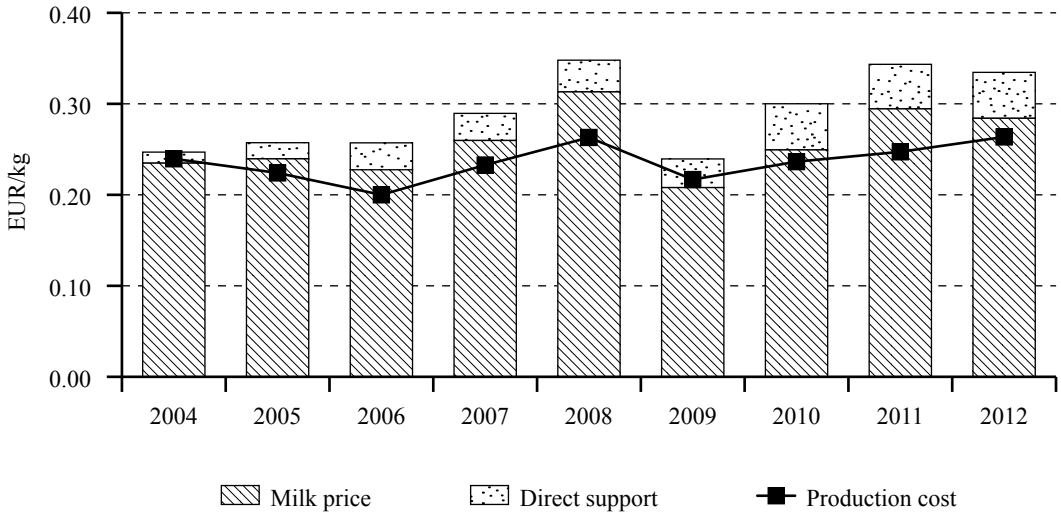
[4] Approx. exchange rate: 1 EUR = 4 PLN.

[5] Act of 6 September 2001 on the organization of the market in milk and milk products, which was replaced by the amended Act of 20 April 2004 regulating the market in milk and milk products, Journal of Laws No. 93, item. 897.

financed by the domestic producers and processors. In 1996, an output quota for milk was also introduced. However, none of these policy measures fully complied with the rules of the CAP (Popp and Potori, 2006).

Since 2004 the EU regulations have been applicable in the Hungarian milk and dairy products market. From 2005, milk producers received top-up payments linked to production from national funds, the so-called dairy premium. As from 2007 these supports have been decoupled from production on a historical basis (the milk quota of 31 March 2007). Between 2004 and 2012, direct payments of milk production have continuously increased, thus in 2012 Hungary was the EU Member State with the highest direct support among those which joined the EU in 2004 (Figure 1) (Jongeneel *et al*., 2011). According to the CAP reform, the possibility of a high level of support for milk production will remain in the coming years. The system of direct payments will change from 2015 and a larger share of the Pillar 1 funds, 13 per cent (and an additional 2 per cent for the protein crops) instead of the current 3.5 percent can be coupled to production[6].

Figure 1: **Milk prices, direct support and production cost in the Hungarian milk sector, 2004-2012.**



Source: FADN, 2013

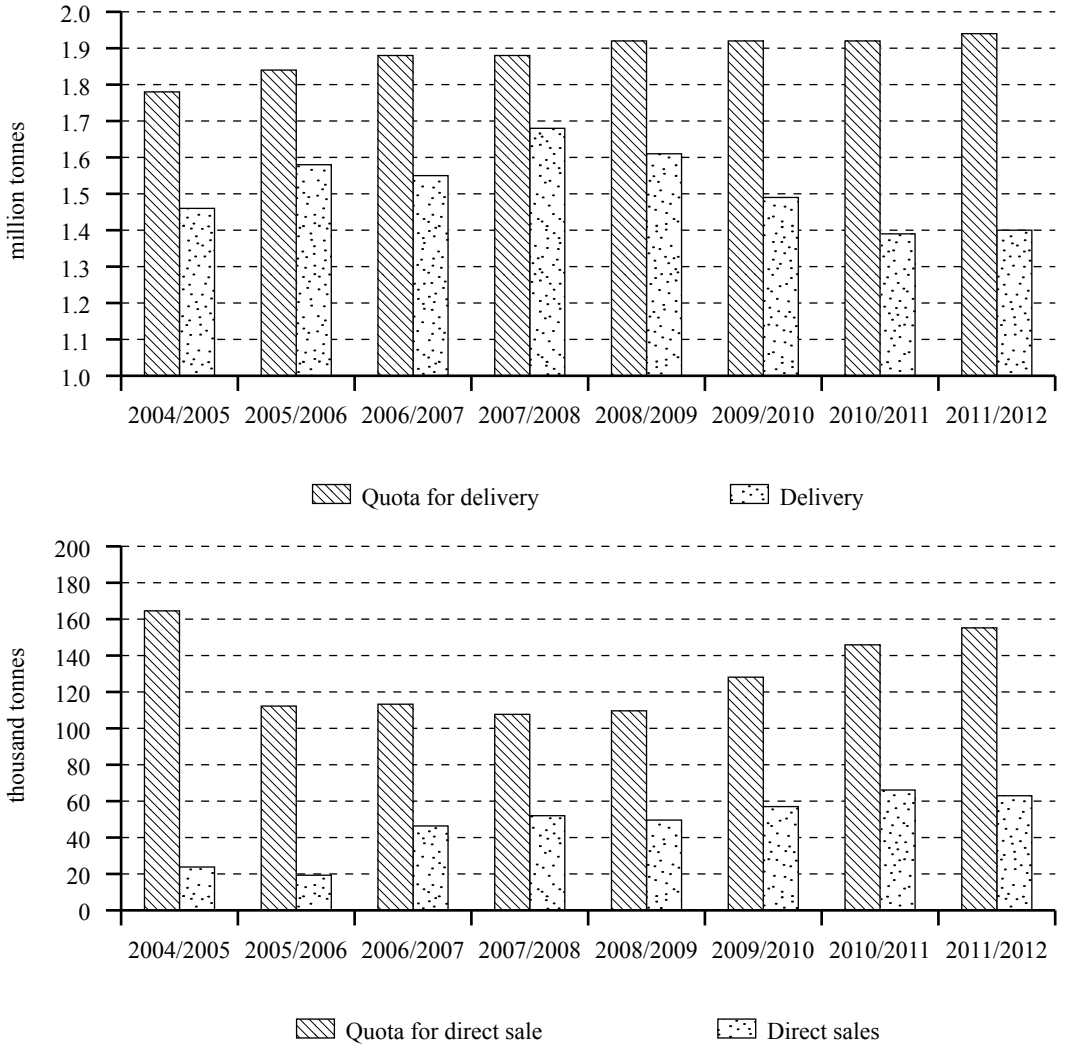
Poland negotiated a national reference quantity (national quota) with the EU of 9,380 thousand tonnes including: wholesale trade (supplies to dairy industry) 8,500 thousand tonnes, direct sales 464 thousand tonnes and a restructuring reserve of 416 thousand tonnes to be used from the marketing year 2006/2007. The negotiated level of quota is unsatisfactory, since it constitutes only 67 per cent of the limit proposed by Poland. The difference between the milk production level and the granted level of production quota amounted to almost 27 per cent in 2011 and was the highest in the EU (Szajner, 2009). This means that more efficient commercial farms were prevented from replacing the decreasing production of subsistence producers. The gradual increase of national production quota up to 10,056 thousand tonnes in the marketing year 2014/2015 will be only a slight improvement in this respect[7].

[6] Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers and support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009.

[7] In the season 2008/2009 milk quota in the EU increased by 2 per cent. Council Regulation (EC) No 248/2008 of 17 March 2008 amending Regulation (EC) No 1234/2007 as regards the national quotas for milk. In 2009-2013, the European Commission proposed five 1 per cent increases in production quotas.

Hungary negotiated a national quota of 1,947,280 tonnes (the requested quota amounted to 2.8 million tonnes), which included wholesale trade (delivery to dairy industry) 1,782,650 tonnes, direct sale 163,630 tonnes and a restructuring reserve of 42,780 tonnes to be used from the marketing year 2006/2007. The national reference fat content was 3.604 per cent by mass. At the end of the quota year 2011/2012, Hungarian producers had 1,936,160 tonnes of delivery quota and 155,208 tonnes of direct selling quota. The utilisation of the quota for delivery amounted to 1,401,426 tonnes and that of the quota for direct sales by producers to 62,973 tonnes. The rate of utilisation of the national quota amounted to around 70 per cent and, within it that of the quota for processing was only 72 per cent, showing that growth is not obstructed by the quotas at national level. Between the marketing years of 2004/2005 and 2011/2012, the direct selling quota has decreased by 6 per cent, while direct sales have increased by 164 per cent, thus the utilisation rate of this quota has increased from 15 to 41 per cent (Figure 2) (Stummer *et al.*, 2013).

Figure 2: **Utilisation of the milk quota in Hungary, 2004/2005-2011/2012.**



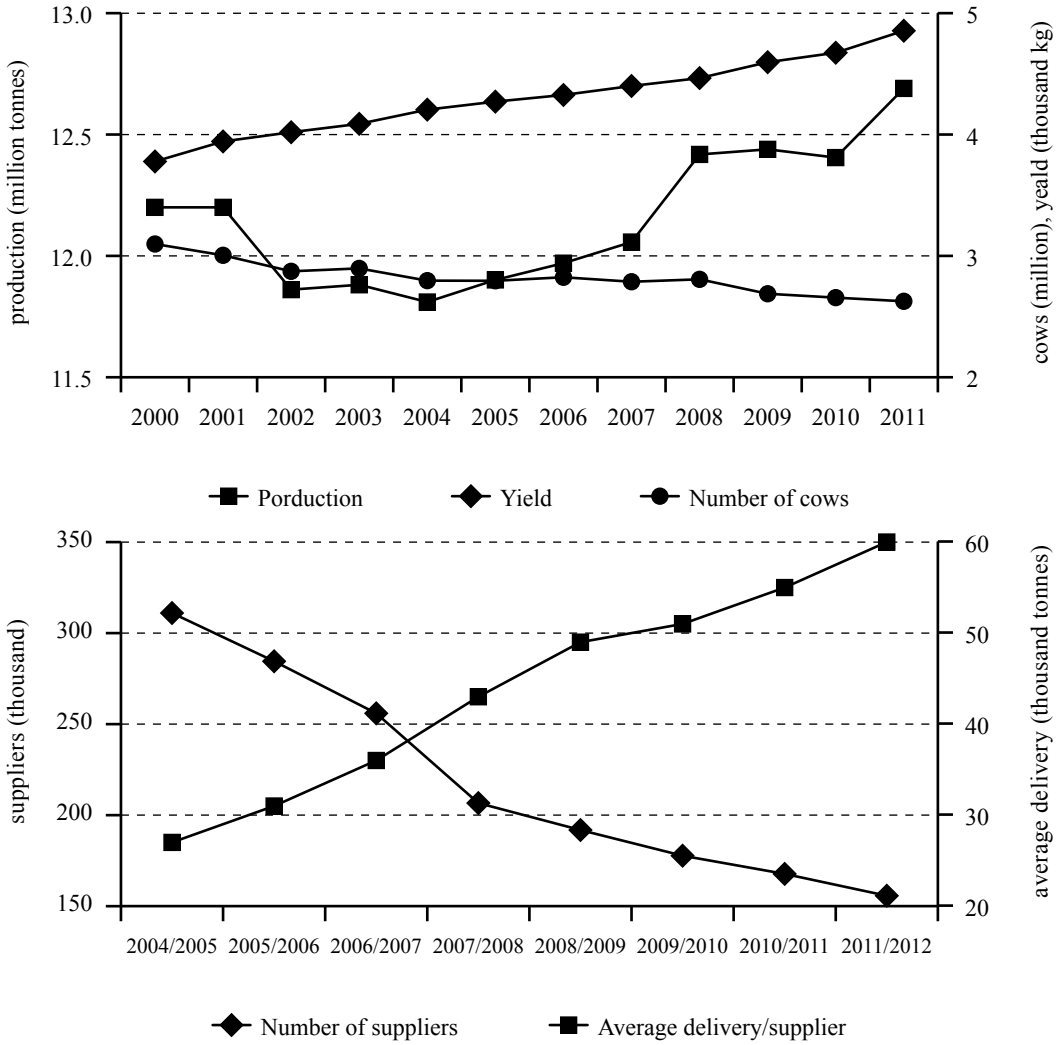
Source: EC, 2013

Milk production

Between 2000 and 2004 the Polish dairy sector underwent major restructuring and modernisation. The farms as well as the dairy industry achieved the veterinary standards which enabled them to sell their products on the EU market. The investments in modern technology made by the dairy industry have resulted in positive changes in the production structure and in the export of dairy products. An example is the modern production lines for cheese and cottage cheese, including powdered whey production lines. Many plants, including dairy cooperatives, invested in production lines for yoghurt and milk drinks. Consequently, the share of products with a high share of value added has increased.

Over the period 2000-2011 the level of raw milk production in Poland has fluctuated between 11.9 and 12.7 million tonnes. Owing to restructuring the dairy cow herd has decreased by about 15 per cent to 2,626 thousand head between 2000 and 2011. At the same time the average milk yield has increased by 28.5 per cent to 5,000 kg. The increased milk yield has compensated for the fall in the cow population and consequently milk production remained at about 12.5 million tonnes (Figure 3).

Figure 3: **Raw milk production in Poland, 2000-2011.**

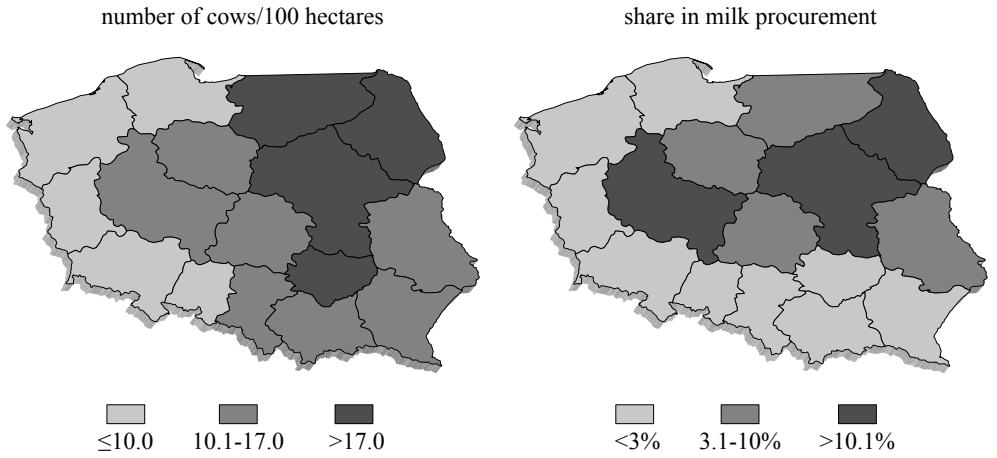


Source: GUS, AMA, 2013

There have been deep structural changes in milk production in Poland. The number of farms maintaining dairy cows decreased from 875 thousand in 2002 to about 400 thousand in 2012. The concentration process also resulted in a decreasing number of farms selling milk to industry. According to the Agricultural Market Agency (AMA)[8] the number of farms with milk quotas decreased by 50 per cent during this period to 155 thousand. The average quantity of milk sold from a farm to industry more than doubled to 60 tonnes per quota year. The farms maintaining 1-9 cows constitute 79 per cent of all farms with cows. Only 29 per cent of the national cow herd is maintained by the group of smallest farms. Small farms have a minor share in production and purchase, since they produce milk for own use or direct sale.

There have also been major changes in the regional structure. Milk production has developed in seven regions in central and north-eastern part of the country. In western regions of Poland there are large farms specialised in plant production. In the south-eastern part there are many small farms which produce milk for own use or direct sale (Figure 4).

Figure 4: **Dairy cow herd and share in milk procurement by regions in Poland, 2010.**



Source: based on GUS

As a consequence of the increasing concentration of dairy cow farms there have been positive changes in the distribution of milk production. Milk purchases are steadily increasing and at the same time the direct consumption of milk on farms and direct selling are decreasing. Milk supplies to the industry increased by 37 per cent to 9.3 million tonnes, representing 73 per cent of production between 2000 and 2011. In the same period direct sales decreased by 57 per cent, to represent about 6 per cent of production (Table 1).

As in other EU Member States, in Hungary the dairy cow stock has almost continuously declined in recent years; the figure of 253 thousand dairy cows as of 1 December 2012 is 71 per cent lower than ten years earlier (KSH, 2013a). The most significant changes were caused by the decreasing level of support and falling milk prices after Hungary's accession to the EU: milk production declined remarkably, amounting to just 1.75 million tonnes in 2012. The share of dairy cows amounted to 61 per cent of the total cow herd, while beef and dual-purpose cows represented 23 per cent and 16 per cent respectively.

[8] www.arr.gov.pl.

Table 1: **Raw milk production in Poland, 2000-2011.**

Year	Number of cows	Yield		Production	Procurement	Direct sales
		average	herds under recording			
	thousand heads	kg	kg	thousand tonnes	thousand tonnes	thousand tonnes
2000	3,098	3,891	5,540	12,120	6,780	1,680
2004	2,796	4,331	6,156	11,810	8,002	1,267
2005	2,795	4,399	6,513	11,901	8,842	1,018
2006	2,824	4,456	6,668	11,970	8,672	445
2007	2,787	4,532	6,693	12,057	8,631	581
2008	2,807	4,599	6,822	12,418	8,948	801
2009	2,688	4,734	6,940	12,439	9,144	779
2010	2,656	4,814	6,984	12,405	9,024	783
2011	2,626	5,001	7,139	12,690	9,314	731

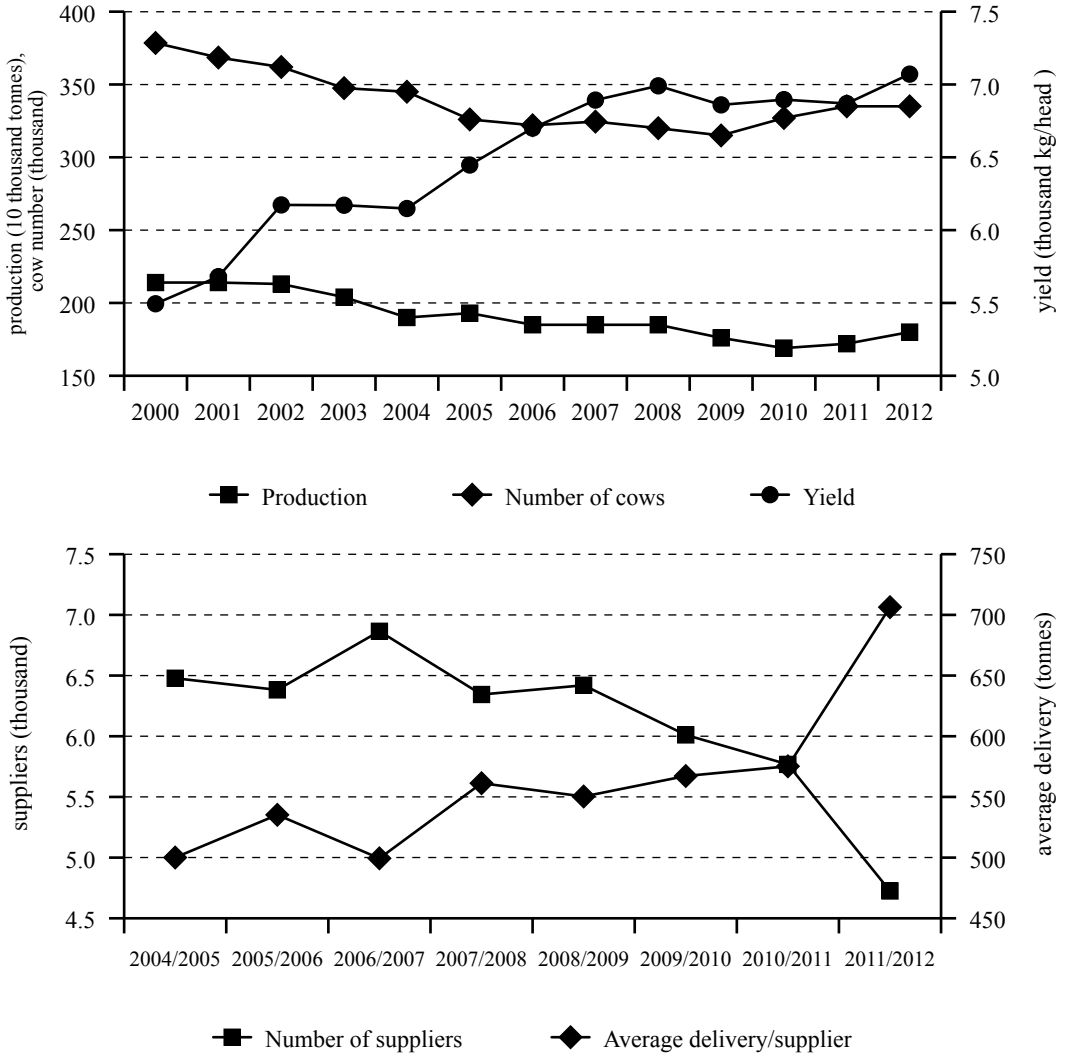
Source: GUS and Polish Federation of Cattle Breeders and Dairy Farmers, 2013

However, the stock of cows has slightly increased since 2010, mainly due to the increasing demand for beef and the favourable development of the raw milk prices. Between 2010 and 2012, the numbers of beef and dual-purpose cows has increased by 9 per cent and 41 per cent respectively and a slight increase of the dairy cow numbers could be observed (Figure 5). The yields per cow have been continuously increasing, thus since 2011 there has been some growth in production due to the increased number of cows and higher milk yields. In 2012 production increased by 7 per cent and deliveries by 6 per cent compared to 2010. Hungary has an average yield of 7,071 kg per cow in 2012, compared to an average of 6,618 kg per cow in the EU-27. Furthermore, the national average is above that of the central and eastern European neighbourhood countries including the Czech and Slovak Republics and Poland. Compared to the latter, the Hungarian average is 27 per cent higher.

According to the farm structure survey of 2010 (KSH, 2012), in that year there were 20,000 farms raising cattle in Hungary. Nearly 8,000 of them kept dairy cows. In all, 4,000 farms produced milk for processing. Lower prices, high production costs and tightening quality requirements have pushed out mainly small farms from the market (Forgács, 2009). The average delivery per supplier has increased especially since 2010 and amounted to 700 tonnes in 2012.

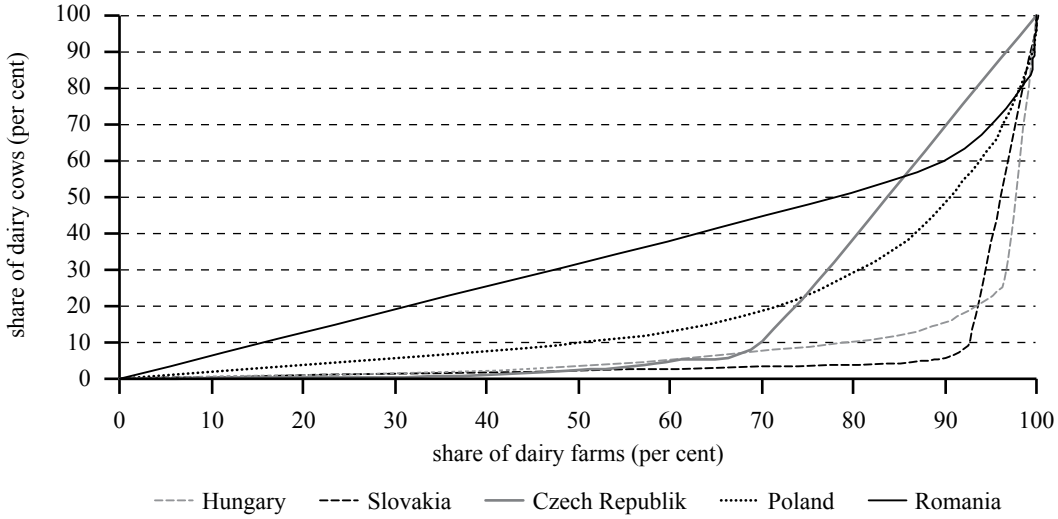
Milk is now produced predominantly by agricultural enterprises with relatively high milk yield and the dairy cattle concentration in Hungarian farms is high compared to other EU Member States (Figure 6). In 2011, 64 per cent of the cows were held by enterprises which gave 78 per cent of total milk production, while 36 per cent of cows were held by private farms representing 22 per cent of milk production. The overwhelming majority of the dairy cow population in Hungary (73 per cent) is held by cattle farms with a headcount 100 or more. In 2012 the average herd size was 22 dairy cows per holding (compared to fewer than six cows per holding in Poland). The Hungarian dairy farms are mainly large in terms of land; 70 per cent of the farms use more than 100 hectare of land for their business.

Figure 5: **Raw milk production in Hungary, 2000-2012.**



Source: KSH

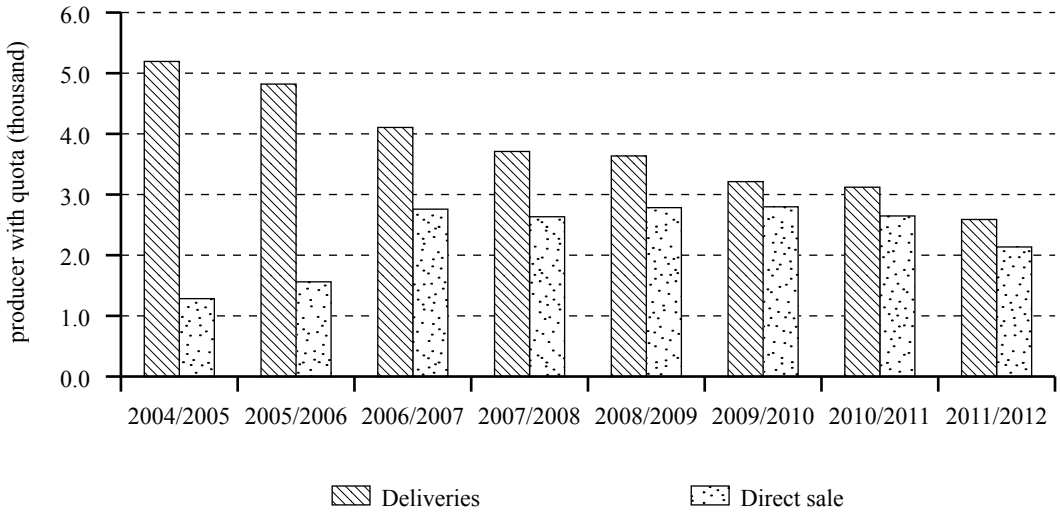
Figure 6: **Cow herd concentration in Hungary and neighbouring countries, Lorenz curve, 2010.**



Source: KSH and Eurostat, 2013

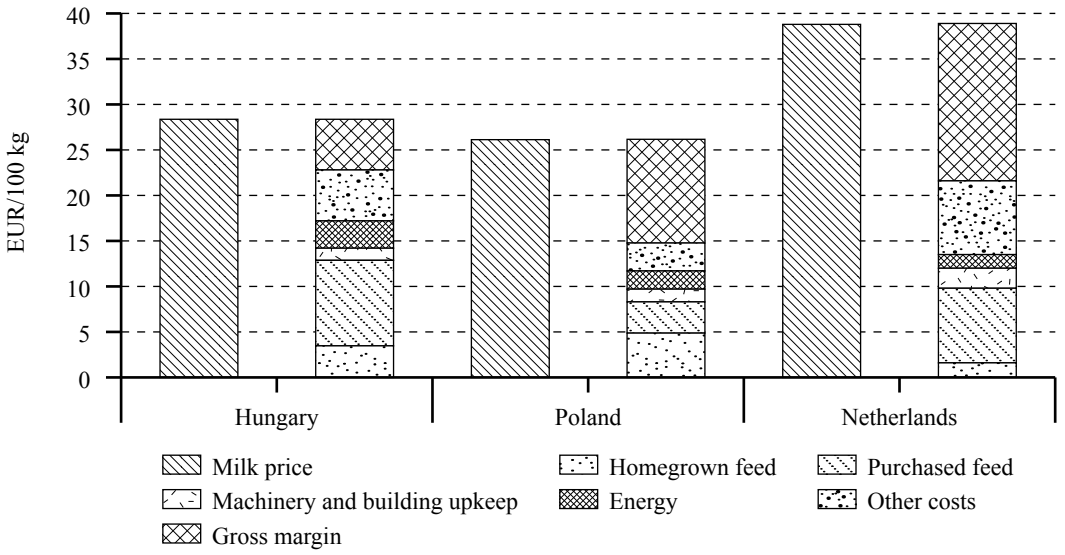
In Hungary, the total number of producers with quota has strongly decreased, but the number of producers with quota for direct sale has increased significantly since 2004 (Figure 7). At the production stage of the sector a single important producer organisation has recently been established: Alföldi Tej. With its quota of about 200 million kg, the enterprise had a 15 per cent share of total milk purchases in 2011.

Figure 7: **Number of milk producers with quota in Hungary, 2004/2005-2011/2012.**



Source: EC, 2013

Figure 8: **Cost structure of milk production in Hungary, 2011.**



Source: EC, 2013

The international comparison of milk production costs demonstrates well that, related to the protein and fat content, milk production is relatively expensive in Hungary. Feeding costs are the biggest item in the cost structure. Although there are notable differences among factories in this cost element, the majority of the Hungarian milk producers are at a disadvantage against competitors in respect of feed utilisation and of green fodder use (Figure 8). In addition, expenditure on animal health and various losses are also significant.

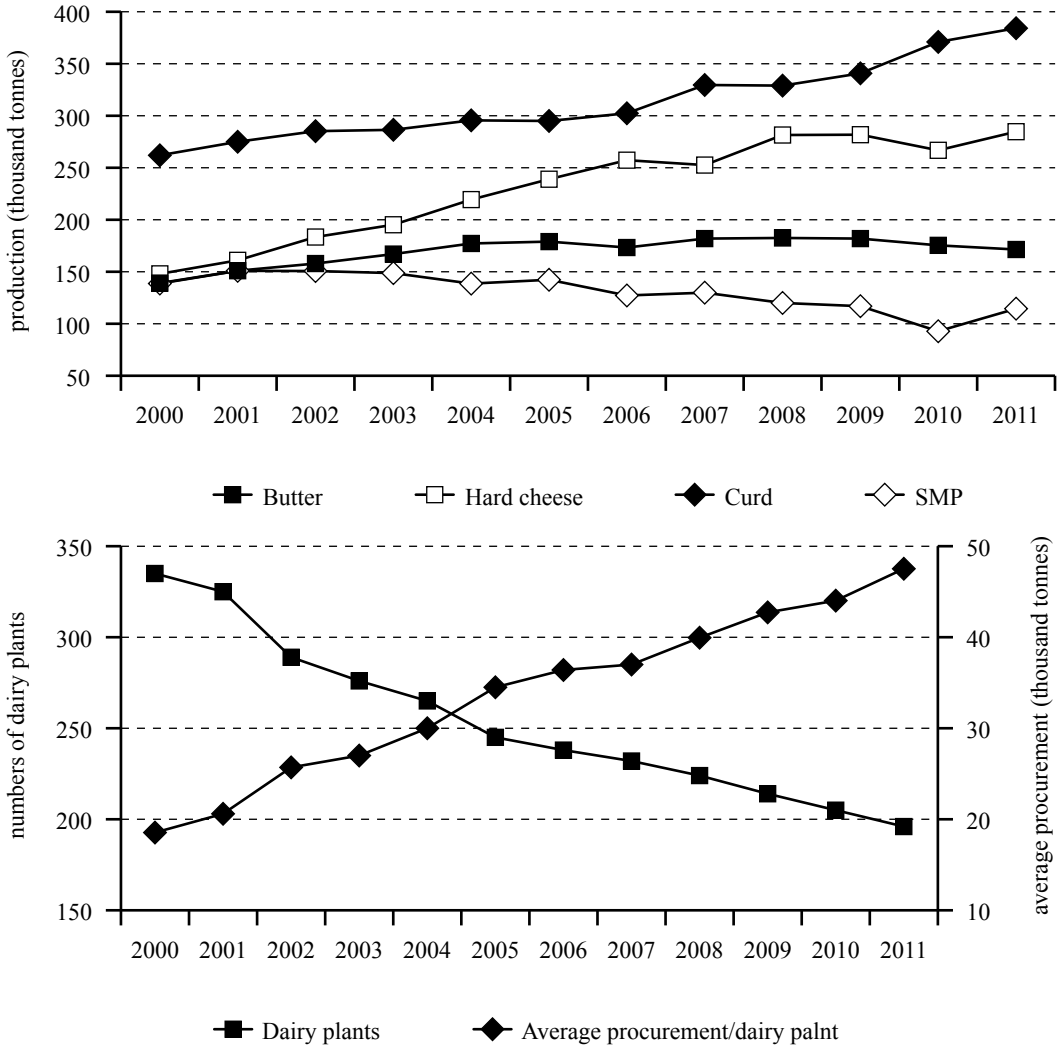
Milk processing

In Poland, the dairy industry accounts for around 15 per cent of the country's food industry output. It is a net exporter and in 2011 the positive trade balance increased to about EUR 0.9 billion from EUR 0.3 billion in 2003, confirming the international competitiveness of the Polish dairy sector.

There has been a process of profound restructuring, ownership transformation and modernisation in the industry. Until 1989, it operated only on the basis of cooperatives whose members were farmers (Smoleński, 1997; Pietrzak, 2006). In subsequent years some cooperatives merged into larger entities, some were taken over by domestic and foreign investors and others were excluded from production. Some new milk processors also appeared on the market. In general, the structural changes led to an increase of concentration of milk processing. In 2000-2011, the number of dairy companies fell from 335 to 196, while the average amount of milk processed per company increased from 18.5 thousand tonnes to 47.5 thousand tonnes (Figure 9). The dairy cooperatives still have the predominant share in milk purchase but companies with foreign capital dominate some product markets (e.g. yogurt and processed cheese).

As the result of intensive investment by the dairy industry during the analysed period (2000-2011), amounting to approximately EUR 2 billion, the production lines were modernised, the EU hygiene - sanitary and veterinary standards were met and the efficiency was improved. The capital investment led to a significant reduction in employment and increase of productivity (Urban, 2008).

Figure 9: **Production of dairy products in Poland, 2000-2011.**



Source: GUS, AMA, 2013

Increasing purchasing and processing of milk has resulted in a steady increase in the production of dairy products. At the same time there have been significant changes in the production structure. In the period 2000-2011, the production of yoghurts and milk drinks, cheese and cottage cheese as well as liquid milk and cream increased markedly. The production of butter and milk powder fell (Table 2). The Polish dairy industry abandoned the production of casein[9]. The increasing production of products with a big share in value added (cheese, yoghurt, soft drinks) is a positive phenomenon since it enables most profitable use of resources and benefitting from a big scale effect as well as it facilitates the promotion on external markets. Progress in modernisation is well illustrated by changes in the production structure, in which there has been a substantial increase in the share of final consumer products (long ripening cheese, yoghurts, and milk drinks, processed cheese, etc.).

[9] Casein is a product with a small share of value added, and its production requires a lot of raw material. Polish dairy plants are characterized by high production capacity and therefore prefer to process milk into products with a higher share of value added.

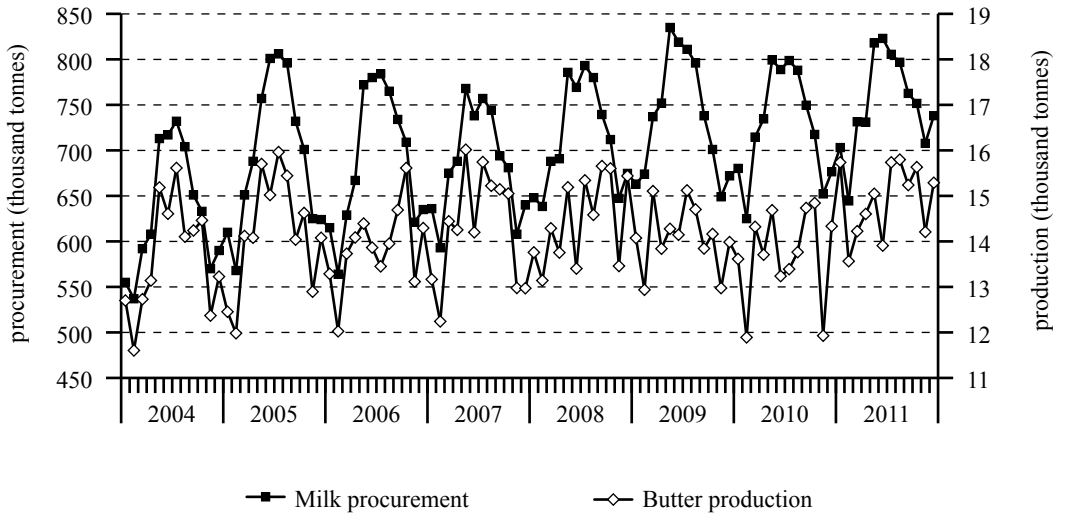
Table 2: **Production of dairy products in Poland, thousand tonnes, 2000-2011.**

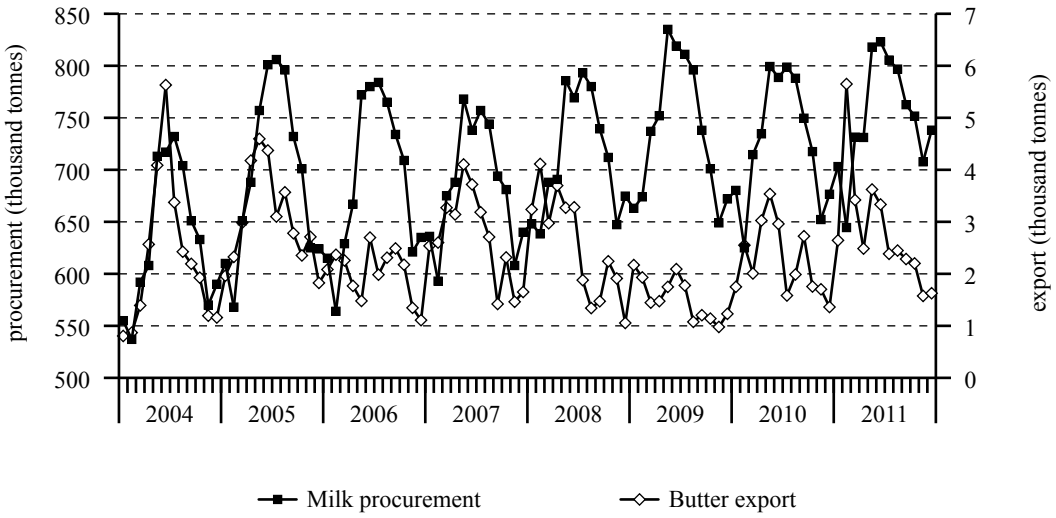
Items	2000	2005	2011	2011 (per cent)	
				2000=100	2005=100
Milk	1,803	2,291	2,812	156.0	122.7
Yoghurt	345	510	739	214.2	144.9
Milk powder	159	192	148	93.1	77.1
Cream	198	313	340	171.7	108.6
Butter	139	179	171	123.0	95.5
Curd	262	295	382	145.8	129.5
Hard cheese	148	239	285	192.6	119.2

Source: based on GUS

The regular seasonal pattern is a characteristic feature of milk production and processing as well as of export of milk products in Poland. Resulting from the abundance and quality of animal feed the production and purchase of milk in agriculture as well as the production levels of dairy products are at the highest from May to September. The purchase prices of raw material, the main item in the dairy products production cost structure (approx. 50 per cent), are usually the lowest during the summer time. This enables the companies to achieve a cost effective and cost competitive advantage on the international market (Pietrzak, 2002; Szajner, 2009). In the winter period a substantial decrease in milk purchases as well as falls in the production and export of dairy products are observed (Figure 10).

Figure 10: **Seasonality: milk procurement, butter production and exports of Poland, 2004-2011.**





Source: based on GUS, CAAC data

In Hungary, the dairy sector accounted for 9.6 per cent of the food industry's production in 2011, a decrease of 2.4 per cent since 2007. In the last decade, the output of dairy products has decreased continuously. The high cost ratio of milk processors and their lag in economic efficiency have resulted in a significant drop in competitiveness. Between 2000 and 2011 the production of liquid milk declined by 16 per cent, that of butter by 21 per cent, that of cheese and curd by 2 per cent and that of fermented products by 21 per cent (Table 3).

Table 3: **Processing of dairy products in Hungary, 2000-2011.**

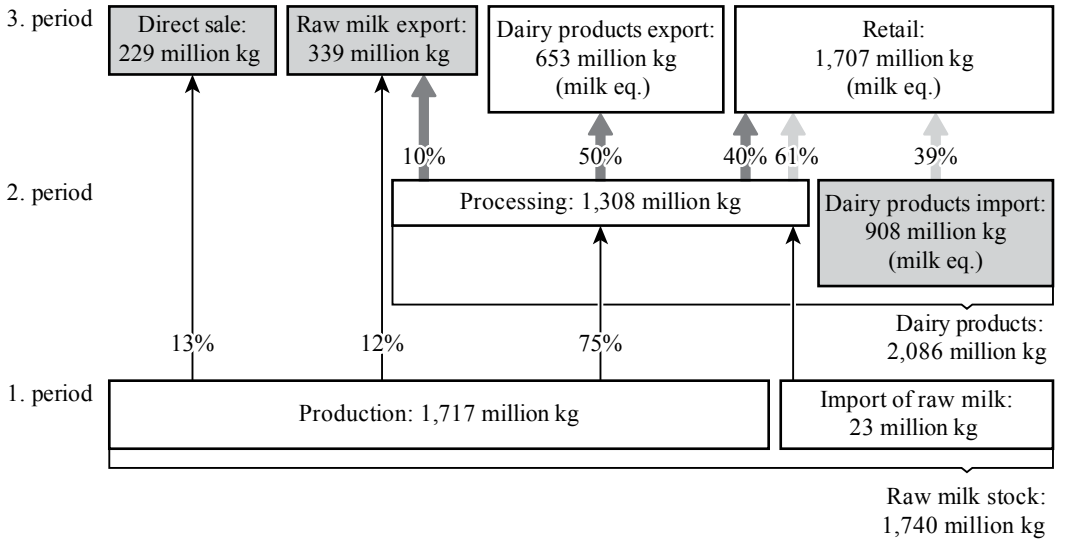
thosand tonnes

Products	2000	2004	2005	2006	2007	2008	2009	2010	2011
Liquid milk	591	563	560	487	478	527	536	562	496
Butter	12	10	9	8	10	11	11	10	9
Cheese and curd	96	118	109	107	99	105	108	97	94
Fermented products	202	154	146	160	158	153	155	159	160

Source: KSH

Since Hungary's accession to the EU its raw milk market can be characterised by a decreasing quantity of buying up and an increase in exports (Hockmann and Vőneki, 2008). In 2011 the processing companies purchased 75 per cent of the domestic raw milk production. Twelve per cent of the total domestic production was exported, mainly through producer owned organisations such as Alföldi Tej. About 10 per cent of the purchased raw milk was exported by the dairies. The imports of milk and dairy products calculated in milk equivalent amounted to 908 million kg, exceeding the exports of about 653 million kg. Twelve per cent of the raw milk production was sold direct to the consumers. In 2011 the volume of direct sales had increased by more than 30 per cent in one year (Figure 11).

Figure 11: **Channel mapping of the Hungarian dairy sector, 2011.**



Source: KSH

Even the smaller milk processors purchase milk from several dozens of producers, while the larger ones buy from up to 200 producers. The processing companies apply more or less uniform contractual basic prices, changing subject to the fat and protein content. The milk price is fixed quarterly for each producer. When establishing the basic price, a majority of the processors start from the national average price data regularly collected and published by the Research Institute of Agricultural Economics (AKI). Owing to the increasing amount of excess milk, processors are purchasing an increasing percentage, 10 to 30 per cent, of the total milk supplies on the spot market. The relatively weak quality parameters of milk and its low protein and fat contents spoil the competitiveness of processing and cause extra costs compared to Hungary's European competitors.

The changes in the processing sector during the political and economic transition period led to a quick consolidation of the Hungarian dairy industry. Much of the consolidation process relied heavily on foreign direct investment. Between 2004 and 2011, the number of dairies decreased from about 79 to 50. Despite the large number of processing companies, the degree of concentration is relatively high: the five largest processing enterprises have an approximately 58 per cent share of milk purchases (Table 4). With respect to these data Hungary holds the leading position among the Visegrad countries, but a much stronger concentration characterises milk processing in the EU-15 countries.

Table 4: **Top five dairy companies in Hungary, 2011.**

	Market share on milk purchase, per cent	**Purchase, thousand tonnes**	**Net revenues, HUF million**
Alföldi Tej	15.8	214	31,900
Sole-Mizo	15.5	210	35,900
Danone	12.5	170	28,900
Friesland Campina Hungaria	12.5	170	28,700
Tolnatej	11.0	150	21,100

Source: KSH

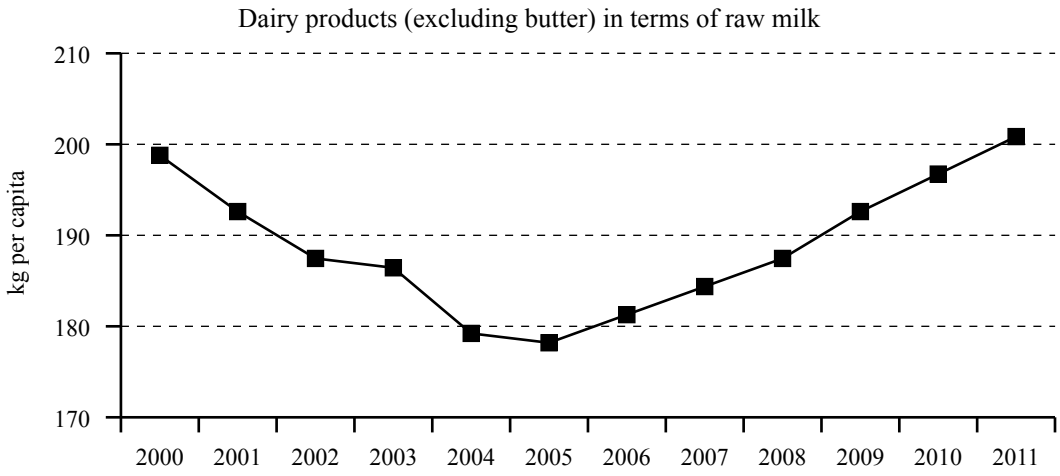
The multinational companies are characterised by strict co-operation between their subsidiaries; the importance of the international division of labour is increasing. However, the technology used in Hungarian dairies still lags behind that of the main competitors and there are handicaps in efficiency and product innovation. As a consequence, imports of dairy products have been increasing since Hungary‘s accession to the EU and the balance of foreign trade of dairy products has deteriorated year after year. Moreover, Hungarian consumption of dairy products is only about the half of the EU average.

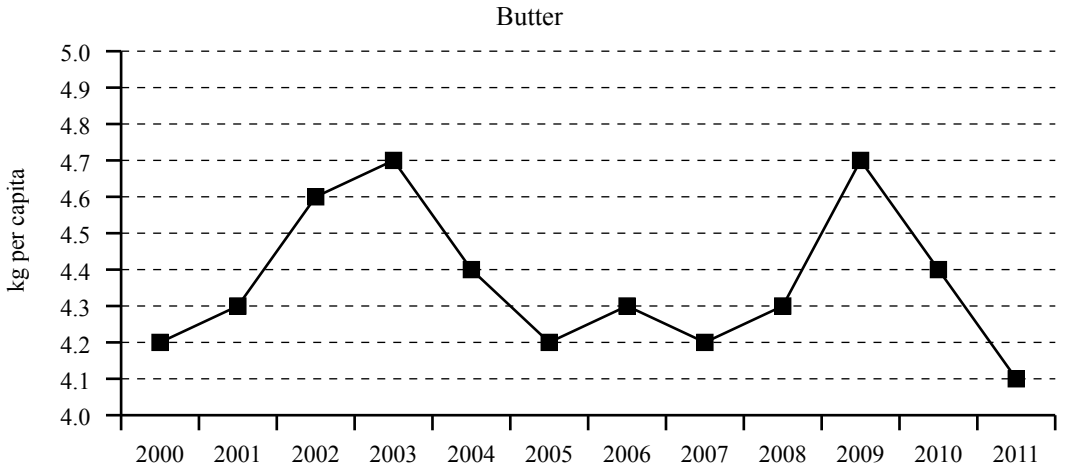
However, since about 2012, shortly before the abolition of the milk quota system, the restructuring process in the Hungarian dairy sector has speeded up. Due to the limited supply and the relatively high cost of raw milk, processors with less competitive product structures and small volumes have been ousted from the market. In contrast, companies with strong capital and stable owner background that are characterised by modern technology and product range, as well as by competitive production volume, are expanding production.

The demand on the domestic market

In Poland, the demand for dairy products on the domestic market has been characterised by high volatility. During the period 2000-2005 the consumption of dairy products terms of raw milk (excluding butter) declined to 179 kg/per capita in milk equivalent, but from 2006 to 2011 it recovered to the level of 2000 (220 kg/per capita) (Figure 12). In Poland, butter is included in fat articles and its consumption is analysed on the basis of changes in consumption of animal and plant fats. The consumption of butter fluctuated within the range of 4.1-4.7 kg/per capita during the period 2000-2011. Consumption was influenced both by changes in prices of milk products and also changes in consumer preferences and strong competition of substitute products (mostly by vegetable oils, but also by meat and sausages).

Figure 12: **Per capita consumption of dairy products in Poland.**





Source: based on GUS

In Poland the demand for milk and dairy products has lower income elasticity then the demand for food in general. The demand for products with a high share in value added (yoghurts and milk drinks, cheese and cottage cheese and butter) has the highest flexibility. Families with the lowest income level may treat them as luxury goods while the increase in income results in a more than proportional increase in consumption. The demand for drinking milk in all groups of households is characterised by a negative relationship: an increase in income is accompanied by a decrease in consumption (Kwasek, 2011). The reason for that is primarily the changing preferences of the consumer and the substitution of milk by yoghurts and milk drinks. The big share of liquid milk in the consumption structure and the negative flexibility of income results in the dairy products as a group being characterised by relatively low flexibility of demand.

There have been big structural changes in consumption of dairy products since 2000. The demand for yoghurts and milk drinks has increased most significantly (by about 46 per cent) from then until 2011. The consumption of long ripening cheese and cottage cheese increased by 12 per cent and 8 per cent respectively during this period while the consumption of liquid milk and cream has decreased most significantly (Table 5).

Table 5: **Per capita consumption of dairy products in Poland.**

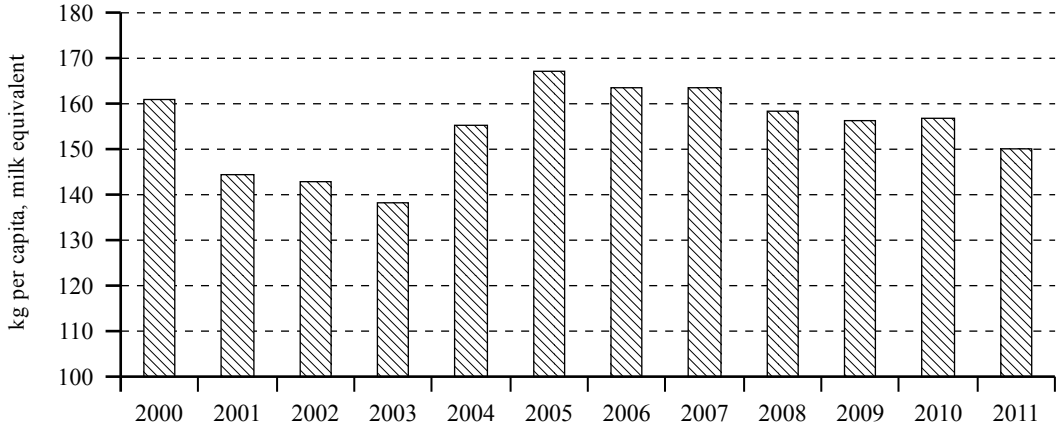
Items	Unit	2000	2005	2011	2011 (per cent)	
					2000=100	2005=100
Milk	l	61.3	53.2	41.0	66.9	77.1
Yoghurt	kg	6.7	7.1	9.8	146.3	138.0
Cream	kg	5.4	5.2	4.5	83.3	86.5
Butter	kg	4.0	4.2	4.1	102.5	97.6
Curd	kg	6.4	6.2	6.7	104.7	108.1
Hard cheese	kg	3.7	4.2	4.7	127.0	111.9

Source: based on GUS

Major differences in consumption of milk products occur between different groups of households. Farmers' families are characterised by the highest consumption of liquid milk (63.6 kg/capita), the reasons being a milk consumption model deeply rooted in tradition and the still significant share of self-supply in households keeping cows. It is estimated that the shares of self-supply in consumption of milk and cottage cheese in farmers households is 68 per cent and 32 per cent respectively, but these shares are lower than in 2000 (90 per cent and 65 per cent)[10]. The households of pensioners are also characterised by a high consumption of most of these products owing to a health-promoting consumption model. The families of self-employed persons receive the highest income and consequently represent a group of modern consumers looking for new products on the market. The result is high consumption of yoghurts and milk drinks as well as long ripening cheese and processed cheese.

In contrast to global trends, the consumption of milk and dairy products has slightly decreased in Hungary during recent years, remaining far below the level of the 1990s (Figure 13). Annual per capita consumption in milk equivalent in 2011 was about 150 kg while the average in the EU exceeded 260 kg. The biggest lag compared to the more developed EU Member States is in butter and cheese consumption.

Figure 13: **Per capita consumption of milk and dairy products in Hungary, 2000-2011.**



Source: KSH

In Hungary, consumption of liquid milk per capita amounted to 51.9 kg in 2011 20 per cent lower than in the EU-27 and 22 per cent higher than in Poland. Of the national population aged 15 and older, 84 per cent consumed milk at least once a week, but for everyday consumption the figure was only 41 per cent. Per capita cheese consumption (cottage cheese included) in Hungary amounted to 5.4 kg per annum 70 per cent lower than in the EU-27 and 53 per cent lower than in Poland. In 2011, cheese, in particular the traditional cheese *Trappista*[11], was the most popular food after meat and beer based on retail sales value. However, there is no tradition of quality cheese consumption in Hungary. In 2006 per capita butter consumption was just 0.7 kg in Hungary, 79 per cent lower than in the EU-27 and 81 per cent lower than in Poland. In Hungary, consumption of yoghurt, sour cream and other fermented products was 11.9 kg per capita in 2011, 39 per cent lower than in the EU-27 but 53 per cent higher than in Poland (Table 6). Between 2000 and 2008 this market segment showed a dynamic increase, but since then consumption has been slightly falling.

[10] "The market for milk. Status and prospects", IAFE-NRI, AMA, Ministry of Agriculture, No.-1-44, Warsaw, 1991-2013.

[11] *Trappista* is a ripened semi-hard fat cheese with fermentation holes. Its popularity in Hungary is mostly due to the simple production process, the wide range of consumption forms, the relatively low price and the mild flavour.

Table 6: **Per capita consumption of dairy products in Hungary and Poland, 2011.**

kg per capita

Dairy products	Hungary	Poland	EU-27	HU/POL	HU/EU-27
Liquid milk	51.9	42.4	64.8	1.22	0.80
Fermented products	11.9	7.8	18.6	1.53	0.64
Butter	0.8	4.2	3.9	0.19	0.21
Cheese	5.4	11.4	17.8	0.47	0.30

Source: KSH, IDF and Gorn, 2013

Hungarian consumers are very price sensitive in the case of dairy products. Consumers belonging to the richest income decile consumed 1.9 times more fluid milk, 3.4 times more butter, 4.0 times more fermented products and 4.5 times more cheese than those belonging to the poorest decile in 2012 (KSH, 2013b). As a consequence, with higher purchasing power increases in all categories of dairy products may be expected in Hungary. Owing to the weak tradition of cheese consumption (processed and semi-firm cheeses continue to be most in demand), there are still great opportunities in the cheese market: special products could fill market gaps. Loyalty to the Hungarian products is not specific; at most, consumers keep to some familiar old domestic brands, but are open towards the (cheaper) imported products preferred by the retail trade chains. Of course there are some Hungarian products that continue to be popular to such an extent that even discount stores that mainly rely on imported products cannot neglect them. These are clearly distinguished, highly processed and high added value products, principally yoghurts, bars and milk desserts. There are also unexploited market segments, for example lactose-free dairy products. Since every fifth Hungarian is lactose sensitive, demand for these products is high and only a few processors offer such products in Hungary. The direct sale of milk and milk products has increased significantly in recent years: approximately 4,500 producers sell their product directly to the consumer.

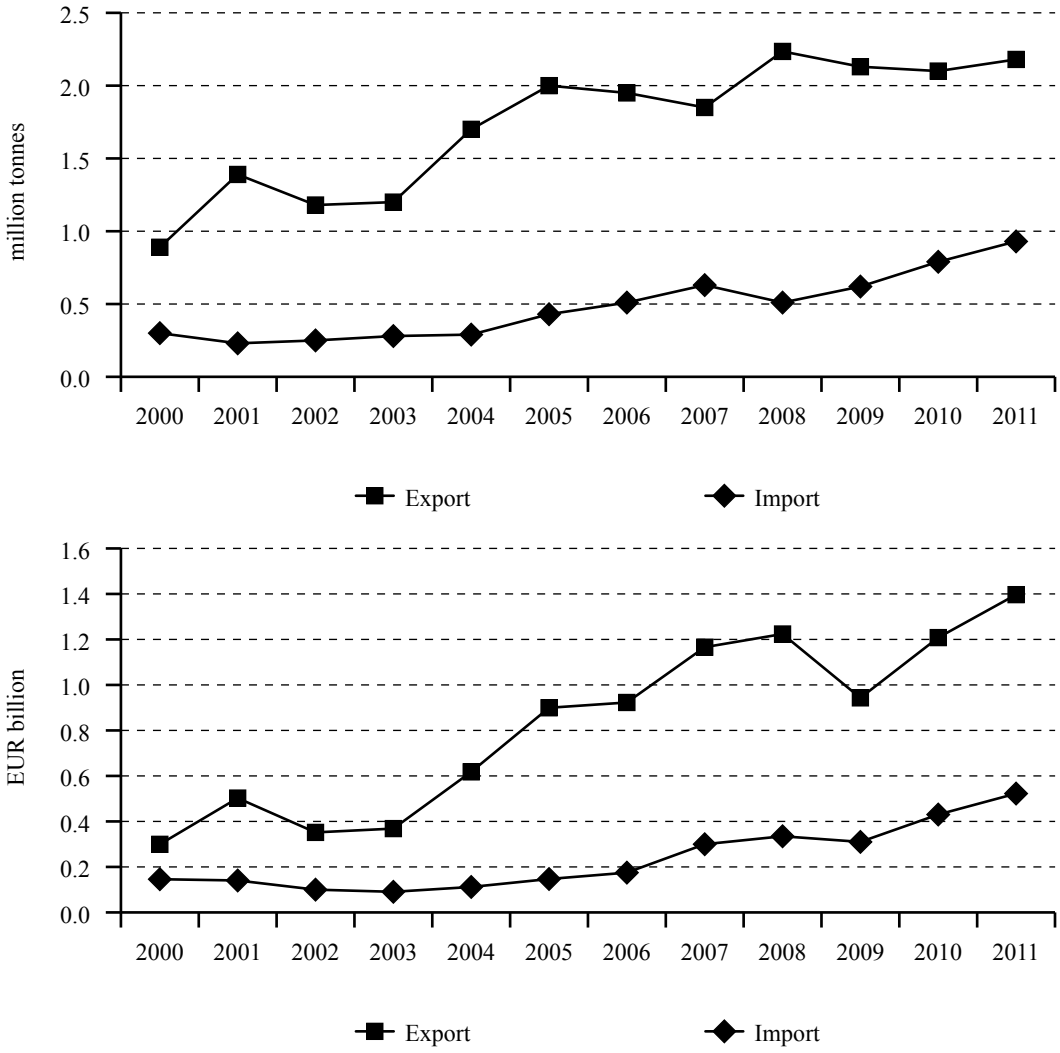
External trade

In Polish dairy market supply exceeds consumption; in recent years the self-sufficiency ratio, defined as the relationship of production to demand[12] on the internal market; has been 116 per cent. In the period following EU accession, when the consumption of dairy products was low, the self-sufficiency ratio was 122 per cent.

In the period 2000-2011 a systematic growth of trade turnover was recorded. Exports expressed in milk equivalent doubled to 2 million tonnes and the average annual increase in production was 0.1 million tonnes (Figure 14). In terms of value, exports increased almost five fold to EUR 1.4 billion. An important reason for such a large increase was not only the greater volume of exports but also a significant increase of global market prices[13]. Prior to EU accession the volume of imports was low; the increase in imports expressed in raw milk equivalent was observed in the period 2005-2011. Imports increased three-fold up to 0.9 million tonnes and their value more than tripled up to EUR 0.5 billion. The positive balance of trade in raw material equivalent increased from 0.6 million tonnes to 1.3 million tonnes and in terms of value from EUR 0.2 billion to 0.9 billion. The improvement in the trade results indicates a high competitiveness of Polish dairy products on the international market, mainly on the EU market (Szczepaniak, 2011).

[12] Domestic demand does not include the consumption of milk for feed on the farm, which is estimated at 0.5 million tonnes.
[13] FAO Food Price Index, http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/

Figure 14: **Foreign trade in dairy products in Poland, 2000-2011.**



Source: based on CAAC data

Exports are of great importance for the sector, since in terms of raw milk equivalent they constitute 18 per cent of milk production and 23 per cent of milk purchase. In terms of value, in recent years exports have constituted about 23 per cent of revenues from sales in the dairy market. Imports, despite the clear market increase, are still relatively insignificant in supplying the domestic market. The import penetration index, which is a measure of imports to production minus net exports, has increased from 3 per cent to 7 per cent (Table 7).

Table 7: **Foreign trade in dairy products in Poland, 2000-2011.**

Items		Average		
		2000-2003	2004-2008	2009-2011
Milk quota (million tonnes)		-	9.0	9.5
Raw milk production (million tonnes)		11.9	11.9	12.4
milk procurement (million tonnes)		7.3	8.5	9.4
Import in terms of raw milk (million tonnes)		0.3	0.3	0.7
Export in terms of raw milk (million tonnes)		1.2	1.9	2.2
Domestic use (million tonnes)		10.4	9.8	10.5
Indexes	Self-sufficiency – production/use	113.9	122.2	116.3
	Export orientation – share of exports in production	9.8	15.9	17.7
	Import penetration – share of imports in supply	2.8	3.0	6.7

Source: based on GUS

There were significant changes within the commodity structure which are a positive result of the modernising and restructuring process within the dairy industry. Trends in the commodity structure of exports have been similar to those in the production structure. Before Poland's accession to the EU the products used for secondary processing dominated. The total share in terms of value of milk and whey powder, liquid milk and cream as well as casein was 75-80 per cent. The main export product was by that time SMP which accounted for around 65 per cent of total exports. In the period 2004-2011 there was a significant increase in processed products with a high share in value added. The total share of cheese and cottage cheese, butter, yoghurts and milk drinks as well as ice cream is now 55-60 per cent. The main component of the export structure is cheese and cottage cheese with a share of 38 per cent.

Exports of cheese and cottage cheese are systematically increasing and in 2011 reached a record level of 150 thousand tonnes, i.e. 22 per cent of production. At the same time exports of concentrated whey increased to 170 thousand tonnes and this has had a positive influence on the profitability of cheese production. Whey exports are much greater than those of total milk powder (about 110 thousand tonnes). Milk powder and butter exports are determined by the demand and the price level on the global market. The Polish dairy industry exports about 35 thousand tonnes of butter which represents about 20 per cent of production.

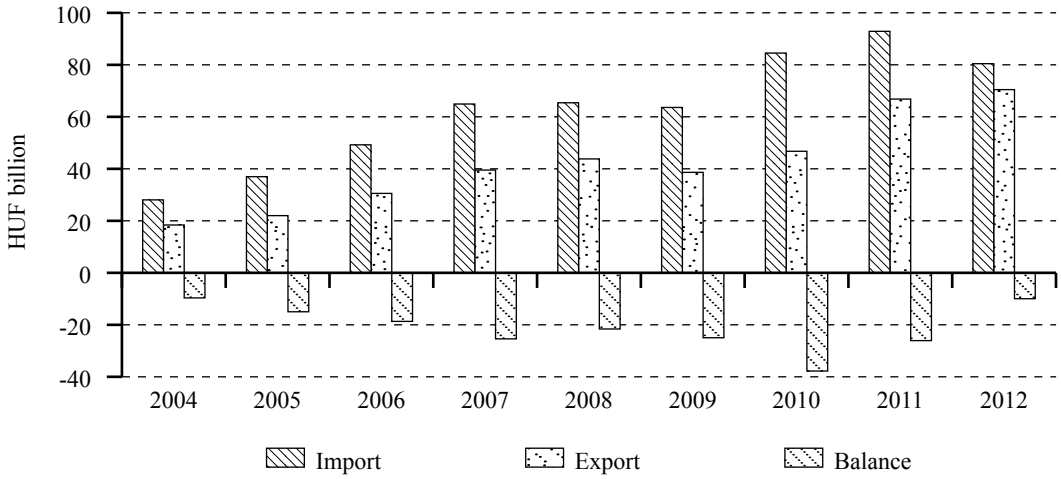
In the commodity structure of imports the final consumption products and products used in the secondary processing of food each have 50 per cent. The main imported item is cheese and cottage cheese, with a 33 per cent share in terms of value. Another major item is milk powder (20 per cent) which, under the conditions of high global prices may be re-exported. The same applies to the imported casein which is produced by Polish plants in negligible amounts. The long ripening cheese is mainly imported. Imports of milk powder are about 40-50 thousand tonnes and represent about 40 per cent of production. Poland imports about 10 thousand tonnes of casein, 40 per cent of each is re-exported.

The high integration level of the Polish dairy sector to the EU market shows the trade data. EU Member States buy about 70 per cent of the value of exports; 45 per cent in the case of EU-15 countries. Among the EU Member States the main trading partners are Germany, Czech Republic, Italy and the Netherlands. Other very important markets are the countries of Commonwealth of Independent States, CIS (8 per cent) and the economically developing countries (17 per cent). Russia

and Algeria, which announced governmental tenders for the supply of milk powder and butter, are also major export markets. The share of EU Member States in imports is even higher: about 90 per cent. The largest amounts of dairy products are imported from Germany as well as Lithuania, the Netherlands, France and Ireland. These are mainly milk and cream for processing, and milk powder imported from Lithuania. The main import from Ireland is milk powder. In addition, dairy products (mainly casein) are imported from the countries of CIS (8 per cent). The casein is imported from Belarus and Ukraine.

From 2004, Hungary has been a net importer both in volume and in value of milk and dairy products (Figure 15). Since the accession, integration between Hungary and the other Member States has strengthened due to intensification of the trade relations. Hungary exports principally to other EU Member States and to other European countries. Typically, only special products (mainly cheese varieties) are exported over greater distances (for example to the Arabian countries), where quality and personal relations are more important than price. Hungarian exports are mainly raw and skimmed milk rather than high added value products.

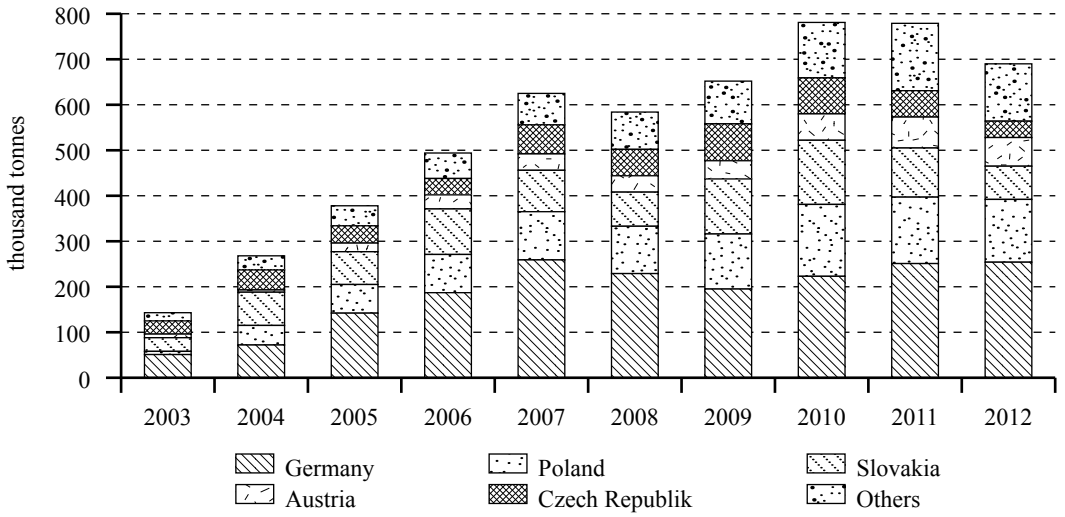
Figure 15: **Net dairy trade balance of Hungary, 2004-2012.**



Source: KSH

In recent years the main exporters of dairy products to Hungary were Germany and Poland with a share of 57 per cent of total Hungarian dairy exports in 2012. Slovakia, Austria and the Czech Republic with together an additional 25 per cent share were also important market players. Germany and Poland exported primarily cheese, cottage cheese and fermented milk products to Hungary, while Slovakia, Austria and the Czech Republic exported mainly packaged fluid milk (Figure 16). Since 2012, the Ministry for Rural Development in cooperation with the Hungarian Milk Marketing Board has more strongly controlled the pricing behaviour of the retail sector to prevent discriminative pricing of domestic dairy products in favour of import products. This has also contributed to the slightly increased sale of domestic liquid milk and to the decrease of the value of imported liquid milk products.

Figure 16: **Import of milk and dairy products of Hungary in milk equivalent, 2003-2012.**

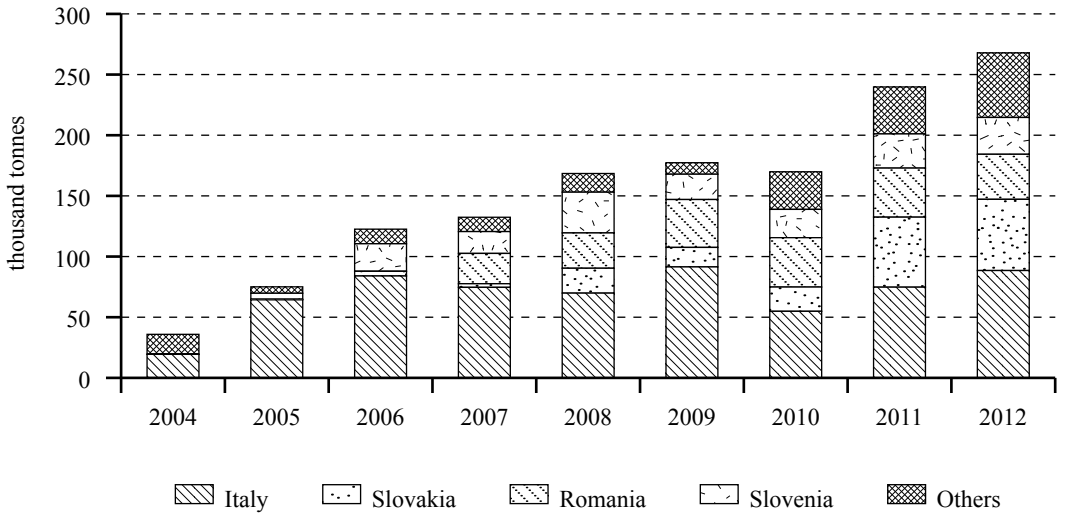


Source: KSH

In recent years, the main destinations of Hungarian dairy exports were Italy, Romania and Slovakia with a share of 65 per cent of total export expressed in milk equivalent. The rest were distributed among several countries. The most important export products of Hungary are raw milk and specialty cheeses. Raw milk exports have grown continuously since Hungary's accession to the EU, amounting to about 20 per cent of total milk production. Italy is the largest market, but Slovakia, Romania, Slovenia and Croatia also purchase increasing quantities of Hungarian milk (Figure 17).

Processing enterprises, especially companies with international relationships, also purchase small quantities of raw milk from abroad from time to time. The majority of the imports are however constituted of semi-finished products: cream, bulk butter and other additives required for the production of some products.

Figure 17: **Raw milk export of Hungary, 2004-2012.**



Source: KSH

Prices in the marketing chain

The analysis of prices in the dairy market covers all stages of the marketing chain: production of milk in agriculture, processing in the dairy industry and the prices of consumption products in retail trade.

The purchase prices of raw milk in Poland are amongst the lowest in the EU and this is considered to be a major competitive advantage (Szczepaniak, 2011). In the period 2000-2003 the purchase prices were 0.16-0.21 EUR/kg. After Poland's accession to the EU, due to the elimination of tariff barriers and export growth, purchase prices increased from 0.23 EUR/kg to 0.30 EUR/kg. The elimination of tariff barriers in trade resulted in the alignment of price levels. Before Poland's accession to the EU purchase prices in Poland were 45-55 per cent lower than in Germany, which is the largest market, and due to the geographical proximity the agro-climatic conditions are very similar. In 2004 the difference between Polish and German purchase prices decreased to 30 per cent, and in the following years it fell to 10-15 per cent (Szajner, 2009). This was caused by a higher purchase price dynamics in Poland and in individual years the EUR exchange rate had a serious impact on price relationships. In the analysed period the EUR exchange rate was characterised by high volatility in the range PLN 3.7-4.6.

The accession to the EU resulted in stronger integration of markets and a bigger influence of international price volatility on domestic prices. In periods of high global prices of dairy products the prices paid to Polish farmers also increased. These high purchase prices occurred in 2001, 2007-2008 and 2011. The impact of the situation in the global market is also evident in the volatility of market prices of dairy products. Selling prices show strong dynamics when the global prices are rising. In 2007 the selling prices of skimmed milk powder increased by 53.5 per cent, butter by 25 per cent and long ripening cheese by 20.5 per cent. A large increase in selling prices caused by the global economic situation was also observed in 2010 (Table 8). In 2004 the increase in selling prices was a result of Poland's accession to the EU, the high demand for the Polish products in the EU market as well as the beginning of the gradual process of levelling of prices.

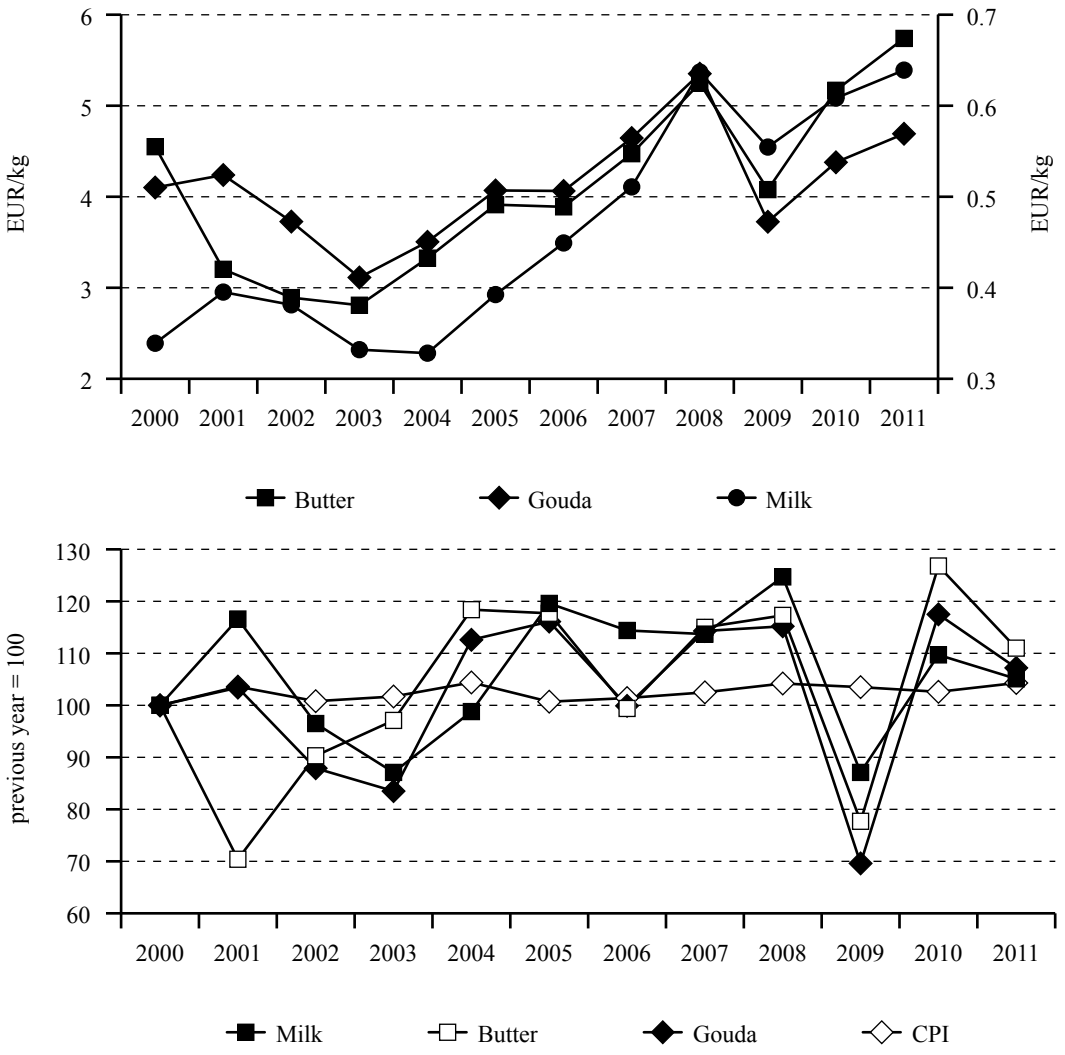
Table 8: **Procurement prices of raw milk and producer prices of dairy products in Poland, 2004-2011.**

Year	Raw milk	Butter in blocks	SMP	Gouda	Raw milk	Butter in blocks	SMP	Gouda
	EUR/kg				Previous year=100			
2004	0.19	2.53	1.83	2.67	118.8	123.4	128.0	116.1
2005	0.23	2.80	2.04	2.78	121.1	110.7	111.5	104.1
2006	0.24	2.65	2.15	2.97	104.3	94.6	105.4	106.8
2007	0.29	3.32	3.30	3.58	120.8	125.3	153.5	120.5
2008	0.29	2.95	2.42	3.50	100.0	88.9	73.3	97.8
2009	0.21	2.57	1.74	2.59	72.4	87.1	71.9	74.0
2010	0.27	3.51	2.28	3.21	128.6	136.6	131.0	123.9
2011	0.30	4.05	2.51	3.51	111.1	115.4	110.1	109.3

Source: based on GUS

Retail prices of dairy products are characterised by high volatility in comparison to inflation. In the analysed period, price volatility ranged from 0.8 to 4.6 per cent per annum (Figure 18). The volatility of retail prices of some dairy products in individual years was as high as 25 per cent. Retail prices increased steadily during the period 2004-2011, except in 2009 when in response to the global economic crisis the prices of dairy products dropped dramatically. In subsequent years the increase in retail prices has been determined by increasing global prices and a slow increase in demand on the domestic market.

Figure 18: **Retail prices of dairy products in Poland, 2000-2011.**

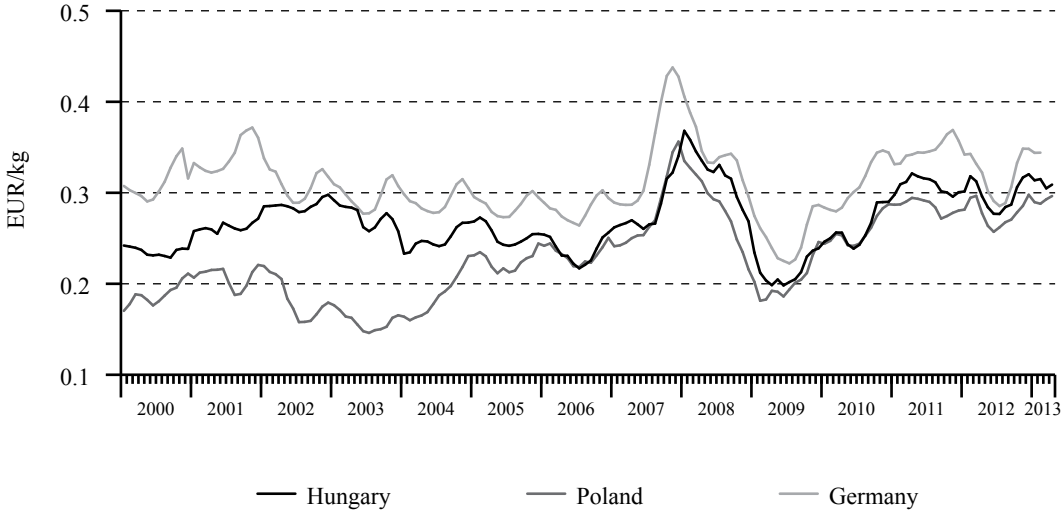


Source: based on GUS

Before 2004, Hungarian processors received export subsidies when they paid the guidance price for raw milk to the farmers. This system kept the domestic milk prices artificially high. The abolition of the national price support system at the beginning of 2004 led to a fall in raw milk prices. Since Hungary's accession to the EU, milk prices have been more affected by the changes in the international prices through the prices of the EU. Hungarian raw milk prices are moving very close to the prices of other EU Member States (Figure 19). Between 2007 and 2009, at the time of the milk

crisis[14], European milk prices showed high volatility. After reaching a record level at the beginning of 2008, Hungarian milk prices fell by more than 30 per cent during this period. Owing to the limited supply of the main exporters and the high demand for dairy products, the price level has been increasing since 2009 and the outlook concerning the price development in the international dairy markets is also favourable in the medium term (OECD-FAO, 2012).

Figure 19: **Producer price of raw milk in Hungary, Poland and Germany, 2000-2013.04.**



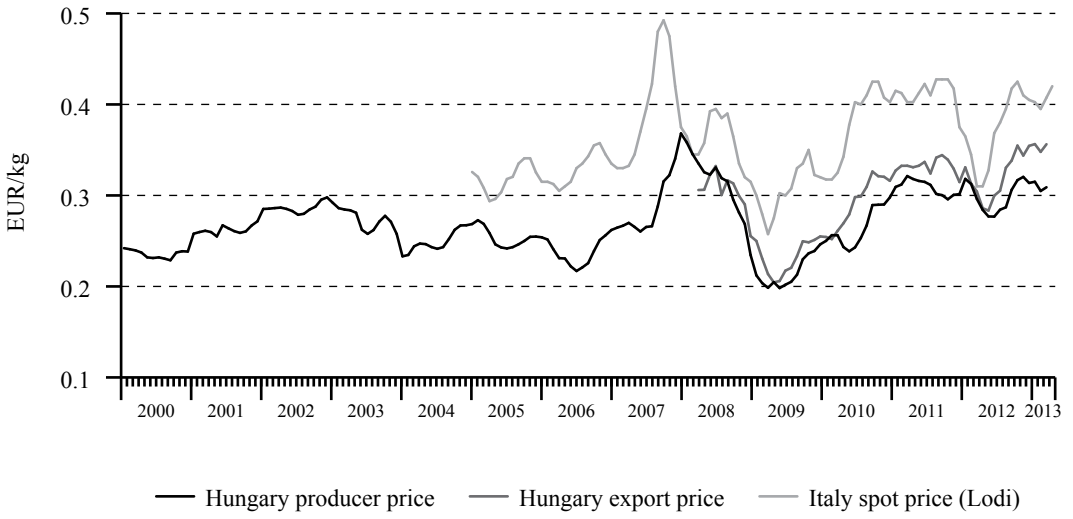
Source: AKI PÁIR, GUS and BLE-BMELV

The trends in the raw milk exports have a fundamental influence on the entire Hungarian dairy sector (Popp *et al.,* 2010). Beyond the indirect impact of the prices of the imported dairy products (especially liquid milk from the Czech Republic, Slovakia and Austria, and cheese from Germany and Poland), the purchase prices of milk in Hungary are mainly determined by the prices that can be obtained for Hungarian exports to Italy (Figure 20). The dynamic increase in raw milk exports is also illustrated by the fact that by 2008 Hungary had become the third largest raw milk supplier to Italy – after Germany and France – even though in 2000 it was not a supplier to Italy at all.

The retail level has followed a different path from the upstream levels of the sector. Owing to several factors (privatisation, the emergence of multinational retail chains, high number of small private entrepreneurs) at the beginning of the transition period, the number of retail units has decreased significantly. This trend was reversed after 2000 with a fast concentration process, the main actors of the retail level becoming the super- and hypermarkets. Now, Hungary has a relatively high retail concentration amongst the eastern EU Member States, being close to the EU average (Bakucs *et al*., 2010).

[14] In the period from 2007 to 2009, exceptional developments took place in the milk and milk products sector markets, which ultimately resulted in a price collapse in 2008/09. Initially, extreme weather conditions in Oceania brought about a significant decline in supplies, leading to a rapid and significant increase in prices. Although world supplies started to recover and prices started to return to more normal levels, the subsequent financial and economic crisis negatively affected EU dairy producers, aggravating price volatility. Higher commodity prices resulted in a significant increase in feed and other input costs including energy. Subsequently, a drop in worldwide, as well as EU, demand, including demand for milk and milk products, during a period when Union production remained stable, led Union prices to fall to the lower safety net level. This sharp decline in dairy commodity prices failed to fully translate into lower dairy prices at consumer levels, generating, for downstream sectors, a widening in the gross margin for most milk and milk sector products and countries, and preventing demand for them from adjusting to low commodity prices, slowing down price recovery and exacerbating the impact of low prices on milk producers, the viability of many of whom was put at serious risk.

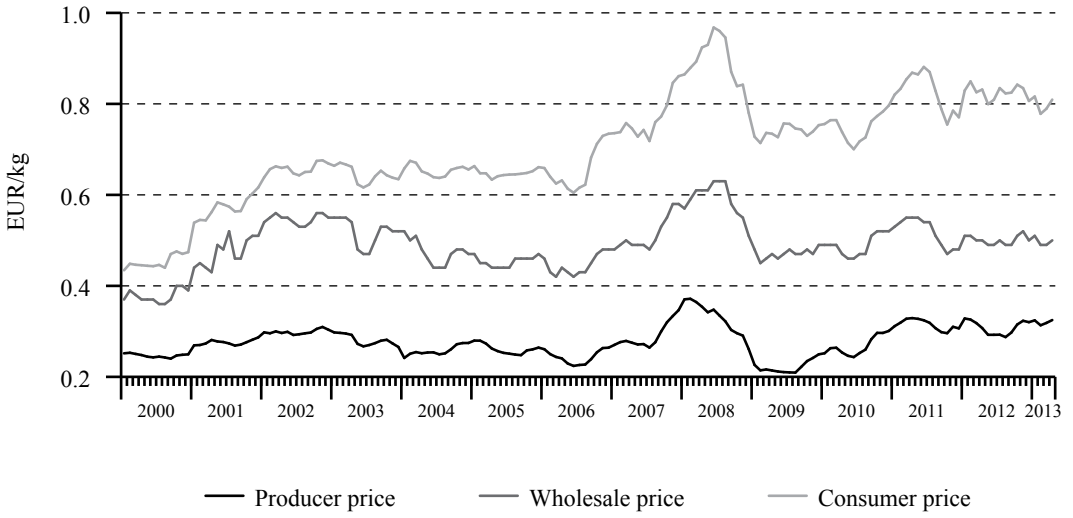
Figure 20: **Raw milk price and export price in Hungary, 2000-2013.04.**



Source: AKI PÁIR and CCIAA di Lodi

As a consequence of the direct commercial relationship, changes in the dairy product prices in other EU Member States strongly affect the Hungarian market for dairy products. By importing from other countries, the retail chains compel the Hungarian dairy industry to adapt. Between 2000 and 2012, retail prices of cheese were more volatile than wholesale prices. In this period the retail price of liquid milk (2.8 per cent fat content) increased by 83 per cent, much more than wholesale price (34 per cent) or the producer price of raw milk (29 per cent). This illustrates the relatively strong bargaining power of the retail chains in the Hungarian food sector (Figure 21).

Figure 21: **Producer, wholesale and retail price of milk in Hungary, 2000-2013.04.**



Source: AKI PÁIR and KSH

In addition, since the marketing year of 2011/2012 the Milk Product Council has published a yearly, quarterly adjusted recommendation for the average milk price and in the last two years this has contributed to a more balanced development of the milk producer price in Hungary.

Summary and conclusions

Poland's accession to the EU has had a positive impact on the development of its dairy sector. The farms and dairy industry underwent a process of major restructuring which still is not complete. The economic structure is still very fragmented in comparison to EU-15 Member States. EU accession provided access to a large market in which the consumers have a high purchasing power. Investment has enabled the required veterinary standards and quality to be achieved and production to be adapted to changing demands. The problem of Polish dairy sector is still the production quota which is lower than the production and processing potential. The effective/efficient use of the potential is also limited by the large number of small farms producing milk for their own use and direct sale.

The development of the Polish dairy sector is supported by a good situation on the global market. According to OECD-FAO (2011) the dairy market will be one of the fastest developing food markets in the period of 2011-2020. In the domestic market there are still opportunities to increase the consumption which is still lower than in EU-15 Member States. Poland has good agro-climatic conditions for milk production and has price-cost competitive advantages. These conditions as well as liberalisation of the market regulation system after 2014/2015 create good opportunities for the domestic dairy industry. Continued concentration and modernisation which will result in improved management efficiency is the prerequisite for building sustainable competitive advantages in the international market.

The Hungarian milk sector has faced serious problems of competitiveness after accession. Production has continuously decreased and the foreign trade balance in milk and dairy products has deteriorated. The rate of utilisation of the national quota hardly reaches 70 per cent. However, recently not only have the imports of milk and dairy products increased, but so have the milk exports: today, 20 per cent of the produced raw milk is sold abroad. As a consequence, the purchase price of the raw milk in Hungary is mainly determined by the price of the raw milk realisable from exports. The consumption of milk and of dairy products has slightly decreased in recent years. The largest lag in comparison to the more developed EU Member States is in butter and cheese consumption. In the future, principally an increase in the demand for all dairy products may be expected, assuming however that the purchasing power of the Hungarian consumers will increase.

The Hungarian dairy industry is under pressure from two sides; the commercial sector depresses prices because of the strong competition for consumers, while processors are competing with each other and with exporters for raw materials and for the better utilisation of their capacities. The Hungarian dairy industry has a disadvantage against competitors in terms of efficiency and technology.

The gradual increase in the milk quotas and the abolition of the quota system in the EU directly concerns Hungary, because as a consequence milk and dairy production is growing in certain Member States (e.g. Germany, Italy and the Netherlands). Through the continuing concentration of the EU's milk production the large specialised factories will gain further market share, resulting in a decrease in the production costs at EU level. In the long term – and subject to the trends in feed prices and to climate change – milk production may shift towards the Member States with abundant precipitation and excellent grass yields, thus allowing production of cheap mass fodder.

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Developments in the fruit and vegetables sectors in Poland and Hungary

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Introduction

The demand for fruits and vegetables has been increasing globally because of their nutritional trait; therefore the production of functional foods has become more important. Juices and foods with high fruit content are in high demand with customers. World fruit production increased from 470 million tonnes in 2000 to 587 million tonnes in 2009 (FAO, 2010). However, not all fruit categories show this increasing trend. While fresh fruit consumption has seen a significant growth in the past few years, consumption of canned fruits and frozen fruits has declined during this period. Fruit and vegetable juice and juice drink consumption has remained flat (Abate and Peterson, 2005).

This chapter compares and analyses the most typical attributes of the Hungarian and Polish fruit and vegetable sectors. We introduced the basic features of Hungarian and Polish fruit and vegetable sector as production data, the main characteristics of the processing organisation, foreign trade, and consumption in this respect. These themes were examined from the perspective of both countries. The time frame for the analysis was the period 2000-2011; however, the available database was incomplete in case of per capita annual consumption and vegetable area (outdoor and greenhouse) in Hungary. Our analysis was based on data available from the Central Statistical Offices of both countries (the *Główny Urząd Statystyczny* in Poland, abbreviated as GUS, and the *Központi Statisztikai Hivatal*, abbreviated as KSH), from the Hungarian Interprofessional Organisation for Fruit and Vegetables (FruitVeB), from Eurostat, from Ministry of Agriculture and Rural Development, Ministry of Finance in Poland and Foreign Trade Data Centre.

Characteristics of the fruit and vegetable sector

While fruit and vegetable production is increasing globally, production in Hungary differs from this trend. During the last two decades, the sector has faced several challenges such as the change of political system, Hungary's accession to the European Union (EU) and the effects of globalisation, and has been unable to adapt itself to these (Erdész *et al*. 2009). Hungary's accession to the EU in 2004 brought new opportunities along, i.e. free access to new markets but, in the same time, competitors from other Member States appeared on the domestic market. Membership also opened access to new funds, which would eventually help the sector to face the new challenges.

In Hungary the total agricultural area is 5.3 million hectares, from which vegetable areas occupied 76 thousand hectares (1.5 per cent), and fruit orchards occupied 92 thousand hectares (1.7 per cent) in 2011. Until accession the area of fruits and vegetables showed an increasing trend which was then reversed (Figure 1). In the vegetable sector this is valid for both outdoor and protected crops. As for the area of outdoor vegetables, the decrease can mainly be explained by the pressure of imports and natural disasters (floods, inland inundations) against which no modern and efficient prevention system has been developed yet.

Vegetable production has also decreased after EU accession. In the period 2008-2011 the annual output averaged to 1513 thousand tonnes, a 25 per cent decline compared to the average of the period 2004-2007. The fruit harvest has been fluctuating conisderably due to weather extremes in the past decade; however, the average production in 2004-2007 and 2008-2011 were almost the same.

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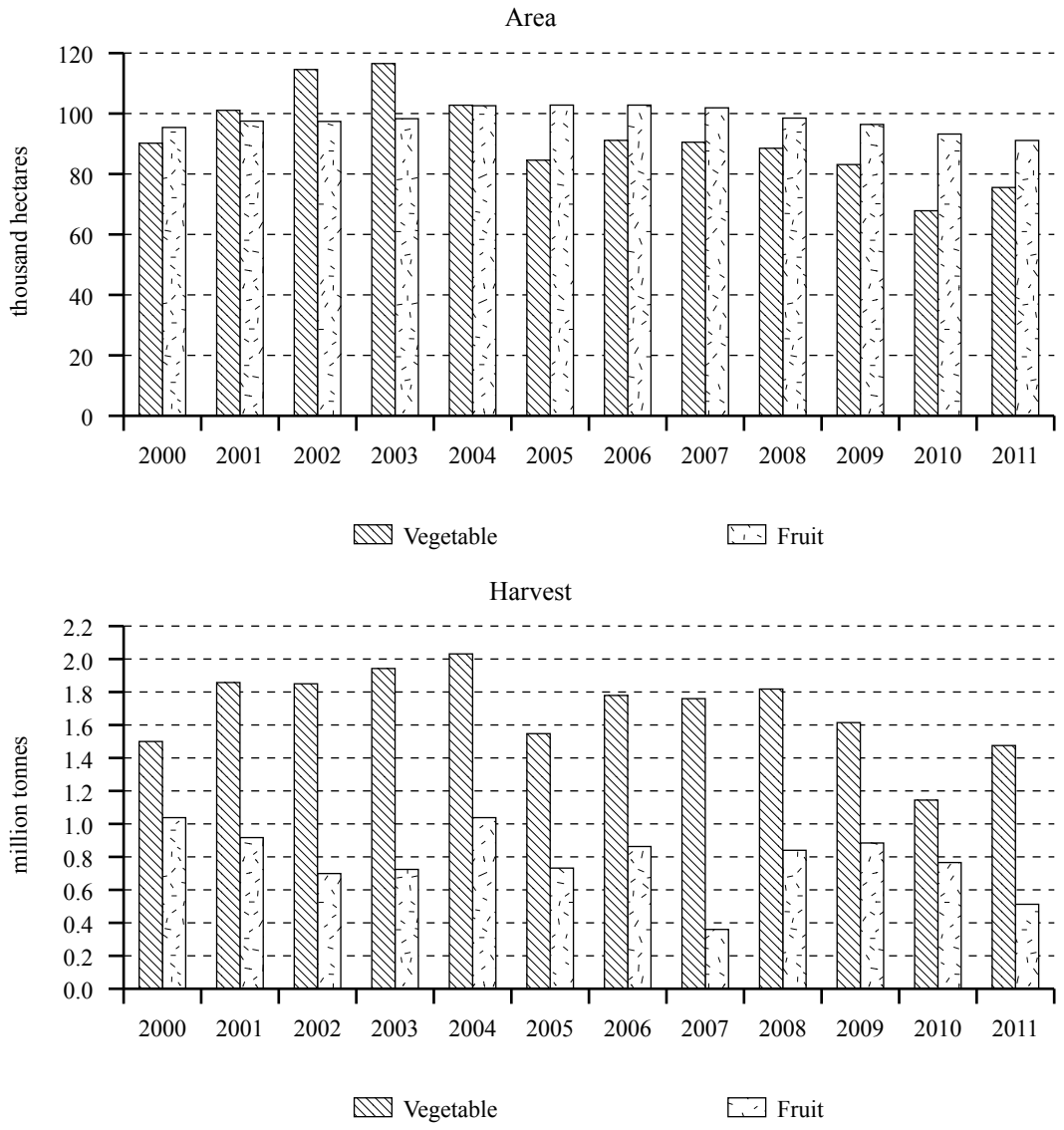
Figure 1: **Area and harvest of fruit and vegetables in Hungary, 2000-2011.**



Source: KSH

According to FruitVeB data, sweet corn production accounts for 45 per cent of the total outdoor fresh vegetable production in Hungary in 2011, and the country's sweet corn production (427 thousand tonnes) is the fourth highest in the world. Other important crops are watermelon (203 thousand tonnes), peas (99 thousand tonnes) and field tomatoes (70 thousand tonnes), however, the production of the latter has declined in the past four years. The most important species produced under glass are pepper (151 thousand tonnes) and tomato (99 thousand tonnes). As far as fruit species are concerned, apples are produced in the largest quantity (292 thousand tonnes, however, it was a bad year, because the average apple production is approximately 500 thousand tonnes). Sour cherries are the second with 61 thousand tonnes. The production of plums (37 thousand tonnes), peaches (41 thousand tonnes) and apricots (24 thousand tonnes) are similar, whereas pears reach a lower output level (17 thousand tonnes). Lack of capital and increase in energy costs have caused the greenhouse

area to decrease by 24 per cent, although the use of renewable energy resources (mainly geothermal energy) could eventually reverse this process, as Hungary has fairly advantageous circumstances in this regard (Table 1).

Table 1: **Vegetable area (outdoor and greenhouse farms) in Hungary, 2001-2011.**

hectares

Year	Outdoor	Greenhouse	Total
2001	87,357	5,145	92,502
2002	103,445	5,170	108,615
2003	105,077	5,185	110,262
2004	89,973	5,764	95,737
2005	76,159	5,260	81,419
2006	83,958	5,385	89,343
2007	83,030	5,270	88,300
2008	79,485	4,528	84,013
2009	69,769	4,243	74,012
2010	58,200	4,075	62,275
2011	76,012	3,920	79,462

Source: FruitVeB

In Poland, apples account for about 70 per cent of the fruit output. Cherries, strawberries and currants are of major importance, their share in the harvests in 2008-2011 being more than 5 per cent on average (cherries 5.2, strawberries 5.3, and currants 5.6). Amongst the vegetables cabbage, carrots, onions, tomatoes and cucumber are still of key importance. The total share of these in the 2008-2011 was 72 per cent of the total vegetable production.

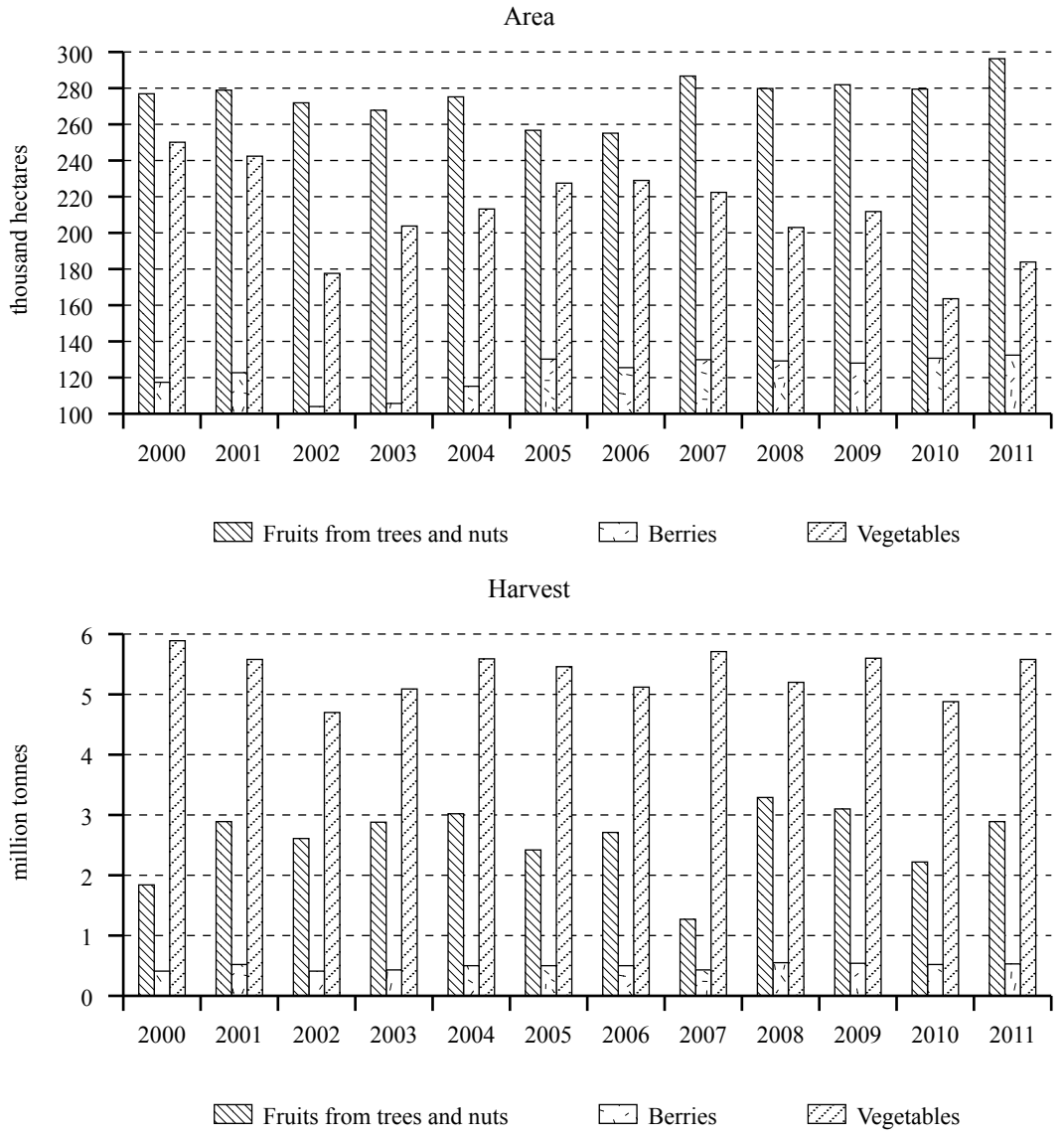
In 2000-2011, the average annual growth rate of the area of orchards and plantations in Poland was of 0.8 per cent and the fruit production increased by 3.9 per cent. The highest growth has been occurred in the area and production of raspberries, respectively on average between 7.2 per cent and 10.1 per cent[3], it was due to the increase in domestic demand but especially in foreign markets. Positive growth also occurred in the area and harvested output of apples (1.0 and 5.1 per cent) and black and red currants (1.6 and 0.2 per cent). The growth of yields resulted in a positive (2.1 per cent) rate of cherry production in 2000-2012. However, the area of cherry orchards decreased at a rate of 1.3 per cent per annum on average. In the 2000-2011 period, the harvest area and yields of other fruit, especially pears and gooseberries, decreased. The demand for pears in Poland is mainly met by imports. The average annual total harvest output of fruit in the 2008-2011 period, increased by an average of 14 per cent compared to average of 3.4 million tonnes between 2000 and 2003. Apple production increased by 16 per cent to 2.9 million tonnes, and more than doubled for raspberries (to 94 thousand tonnes), while it increased by 10 per cent to 190 thousand tonnes for currants. Plum production decreased in the 2008-2011 period (compared to 2000-2003).

Between 2000 and 2011 there was a systematic decrease in the harvested area and yields of most vegetables grown in the open, and the largest rate of decline being noted for the area and production of cabbage (respectively 5.6 and 3.9 per cent on average). A positive growth rate was observed only in area and output of vegetables grown in the open, which have a less significant share in production, in particular leguminous vegetables, peppers, Chinese cabbage, sweet corn and broccoli. The decrease in production of most vegetables was the result of a systematic decrease in domestic consumption, which was not compensated by an increase in exports. In the 2000-2011 period, a big

[3] There was significantly higher growth in the production areas and yields of walnuts and hazelnuts (mainly due to the EU subsidies to their area).

increase occurred in the area and production of vegetables grown under cover, mainly tomatoes and cucumbers. The demand for these vegetables (especially tomatoes) is increasing in the domestic market as well as on foreign markets. Between 2008 and 2011, the total area of vegetables grown under cover was 21 per cent higher than the 2000-2003 average. The production of vegetables grown under cover increased by 39 per cent to 756 thousand tonnes in the 2008-2011 period, compared to 2000-2003. The vegetables area and production grown in the open declined respectively by 13 per cent and 4.0 per cent to 185,500 hectare and 4.56 million tonnes (Figure 2).

Figure 2: **Area and harvest of fruit and vegetables in Poland, 2000-2011.**



Source: GUS

Characteristics of the fruit and vegetable processing industry

The food industry plays an important role in the Hungarian economy. The number of participants in canning and deep-frozen industry decreased after the EU accession. Canning and refrigeration industry is processing 66 per cent of the fruit production, and 25 per cent of the vegetable production. The high rate in the fruit sector is mainly due to the apple production, which is responsible for approximately 80 per cent of total processed volume. Nearly 100 per cent of the maize production, and some 96 per cent of the pea production is being processed, while no other vegetable shows such significant levels of processing.

Uninterrupted processing requires, steady provision of raw products and special circumspection should be assured in case of quickly decomposing products. Processing plants often face the problem that the raw product is not available in the required quantity or quality. Vegetable production is decreasing, moreover the quantity issue is less characteristic there than in the fruit segment, especially the labour-intensive fruit species (e.g. raspberry, blackberry, strawberry). The mutual reliability between the producer and buyer is extremely important, because the processing company makes an annual contract with the supplier about the quantity and price. Nevertheless this is rare in practice. The processing firms frequently make contracts with producers of a specific growing area, but in this case the purchase price can fluctuate depending on the market pressure. However, the lack of modern storage system is a huge problem for the processing industry, for example, in Hungary, there is a shortage of ultra-low oxygen (ULO) system stores.

The lack of capital limits technological development of Hungarian-owned small and medium-sized enterprises. There is real danger that these manufactories will be out of business without modernisation. According to the tax authority database, the number of vegetable and fruit processing organisations has not decreased considerably yet, but a slow diminution can still be noticed between 2008 and 2011. Being well-capitalized and using modern technologies are mainly characteristics of foreign investors (Table 2).

Table 2: **Main characteristics of the Hungarian vegetable and fruit processing organisations.**

Designation	2008	2009	2010	2011
Number of organisations	175	163	165	161
Net sales income (EUR million)	1,057	879	752	684
Net export sales income (EUR million)	521	439	353	311
Result before taxes (EUR million)	-5	24	16	8

Source: AKI, Financial Policy Department

Sales income has decreased by 30 per cent including export. According to the vegetable and fruit production data, the quantity of prepared and preserved juices increased between 2008 and 2009, then in 2011, the output fell back to a similar level as in 2008. In the period 2008 and 2011, the quantity of preserved vegetables (potatoes excluded) decreased by 18 per cent (Table 3).

Table 3: **Total amount of production (natural units) in Hungary, 2008-2011.**

	2008	2009	2010	2011
Fruit and vegetable juices (thousand litre)	129,385	194,117	150,700	131,804
Processed and preserved vegetables (exl. potato) (tonnes)	679,259	603,333	400,439	554,571
Processed and preserved fruits and walnuts (tonnes)	149,821	129,957	155,569	169,148

Source: KSH

Processed fruit exports rose by 5 per cent between 2008 and 2011. In the same period, the export of processed vegetables decreased by 16 per cent (see table 4). In 2011, processed maize (frozen or canned) gave 48 per cent, sugar-pea (frozen or canned) 21 per cent, and apple juice 7 per cent of the total processed fruit and vegetable exports.

Table 4: **Foreign trade of processed vegetables and fruits in Hungary, 2008-2011.**

tonnes

		2008	2009	2010	2011
Processed and preserved vegetables	Import	119,222	109,056	130,004	147,069
	Export	446,322	348,298	396,325	378,986
Processed and preserved fruits	Import	113,356	87,406	95,664	92,303
	Export	163,899	182,676	173,855	172,807

Source: KSH

The cumulated exports value of vegetable and fruit did not change significantly as the 13 per cent export value increase in processed fruits compensated for the 10 per cent decrease in processed vegetable export value (Table 5).

Table 5: **Foreign trade of processed vegetables and fruits in Hungary, 2008-2011.**

EUR thousand

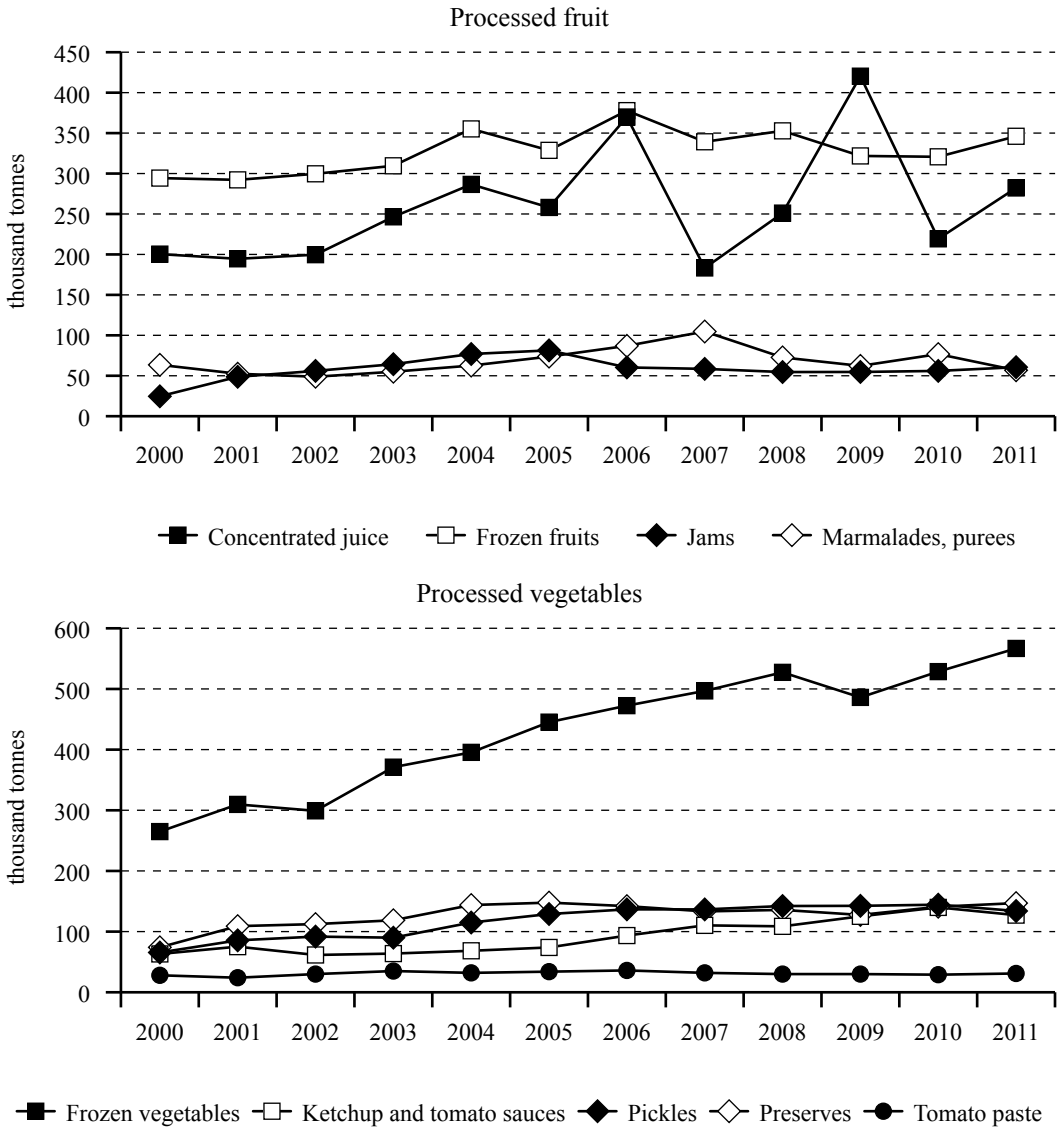
		2008	2009	2010	2011
Processed and preserved vegetables	Import	110,779	99,741	117,371	135,069
	Export	398,277	319,750	349,836	358,902
Processed and preserved fruits	Import	116,882	90,616	97,285	116,640
	Export	181,782	164,897	169,213	205,617

Source: KSH

The structure of demand for Polish products on foreign markets is decisive for the prevalence of the production of processed juice concentrates and frozen fruits and vegetables. On average, in 2008-2011 the share of these products in the total production of processed fruit and vegetable products (excluding juices, nectars and drinks) was as high as 60 per cent. The total share of jams, preserves and purees was 6.4 per cent, of canned and pickled vegetables 14 per cent, and processed tomatoes products (ketchup, concentrates and sauces) around 8.1 per cent.

In 2000-2011 the production of jams made from tropical and processed nuts increased the most in Poland (average annual growth of around 15 per cent). Dynamic growth of the production of these processed products took place after the accession to the European Union following an increase in imports of raw materials necessary for their production. For the same reason, the volume of production of vegetable pickles maintained the growth rate of about 7 per cent per year. The same growth rate was observed for ketchup and tomato sauces made from imported tomato paste. Also, the increase of frozen vegetables production in 2000-2011 remained at the rate of 7.2 per cent. Among frozen vegetables the followings are major importance frozen onions, cauliflower, broccoli, leguminous vegetables and vegetable mixes (Figure 3).

Figure 3: **Production of selected processed fruit and vegetables products in Poland, 2000-2011.**



Source: GUS

In 2000-2011 the average annual increase in production of canned vegetables amounted to 6.4 per cent, of pickled vegetables 3.4 per cent, of jams, preserves, marmalades and purees 2.6 per cent, of juice concentrates 3.2 per cent, of frozen fruits 1.5 per cent, and of tomato paste around 1 per cent. The low increase in tomato paste production was a result of increasing import of this product after the EU accession, while in case of frozen fruits the reason was a systematic decline in production of frozen strawberries, which was a dominant tendency in the overall structure of frozen fruit production in Poland. The decrease in production of frozen strawberries is a consequence of the price competitiveness of the supply to the European market of frozen food from non-European countries, mainly from China, Morocco and Egypt. Production of frozen raspberries increased dynamically in Poland, and the production of frozen cherries and currants increased as well. On average, in 2008-

2011 in relation to 2000-2003 total production of canned fruit and processed nuts increased in Poland almost six times. Production of vegetable pickles, pickled vegetables, frozen vegetables, ketchup and tomato sauces and dried fruits grew by more than 50 per cent. Production of dried fruits and tomato paste did not change significantly. The production of these products was also lower in 2008-2011 as compared to the preceding four-year period. In that time, the total production of jams, marmalades, purees, frozen fruit and vegetable preserves also declined.

Boost in the production of most of fruit and vegetable products was the result of increased access to foreign raw materials after the accession to the European Union, a clear upward trend in consumption in the internal market and increasing export of most its products, mainly frozen food, ketchup and fruit juice concentrates. In 2008-2011 preserves made from fruits and vegetables from other climate zones and tomato paste accounted for approximately 15-20 per cent of the total volume of production of processed fruits and vegetable products, as compared to 7-8 per cent in 2000-2003. The share of supplies for processing in the supply of vegetables has increased in these periods from 20 per cent to over 35 per cent, and in case of fruit remained at approximately 55-60 per cent (Table 6).

Table 6: **Production of processed fruit and vegetable products in Poland, 2000-2011.**

thousand tonnes

Specification	2000-2003 Average	2004-2007 Average	2008-2011 Average	2008-2011	
				2000-2003=100	2004-2007=100
Processed fruit products	**634.8**	**857.7**	**883.7**	**139**	**103**
Juice concentrates	210.3	274.5	293.3	139	107
Jams	48.4	69.3	56.5	117	82
Marmalades, preserves, jams, purees	55.0	82.0	67.1	122	82
Frozen food	299.0	350.3	335.4	112	96
Dried fruits	3.5	2.5	5.6	159	227
Other preparations	18.7	79.3	125.9	675	159
Drinking juice, nectars and drinks	**1,031.0**	**1,402.0**	**1,588.1**	**154**	**113**
Processed vegetables	**664.0**	**913.1**	**1,041.7**	**157**	**114**
Tins	103.6	141.7	137.8	133	97
Marinades	83.3	129.3	140.8	169	109
Pickles	14.7	16.9	22.1	151	131
Dried vegetables	23.6	23.7	23.3	99	99
Tomato paste	29.3	33.5	30.0	103	90
Frozen food	311.2	452.5	527.2	169	117
Ketchup and tomato sauce	65.9	86.5	125.3	190	145
Other preparations	32.6	29.0	35.1	108	121

Source: IAFE-NRI and GUS

Food safety and consumption of fruit and vegetable

Food safety

The question of food-security is getting more and more attention throughout the world, and has already gained priority in the EU. Many consumers are concerned about pathogens and chemicals (including remains of pesticides and animal drugs, as well as additives and harmful contaminations) possibly present in our food. Others fear the result of new technologies, and are concerned about the market presence of genetically modified foods (NÉBIH-ÉKI, 2012).

The famer bears the responsibility to ensure that the materials used and the products marketed by him are safe as aliments and seeds, thus ensuring one of the goals of the European agricultural policy, i.e. the consumer's right to healthy aliments of adequate quality. The safety of aliments could only be ensured if all of the store holders in the food chain (i.e. farmers, processors, packers, and retailers) involved in the lifecycle of a given product can be identified. Beside the identification, the involvement of the individual players is to be determined: what actions do they perform in relation to the product, what materials do they use in producing or processing.

Consumption

The future of the fruit and vegetable sectors depends on the capability of the growers to produce high quality marketable products through the utilisation of professional technologies.

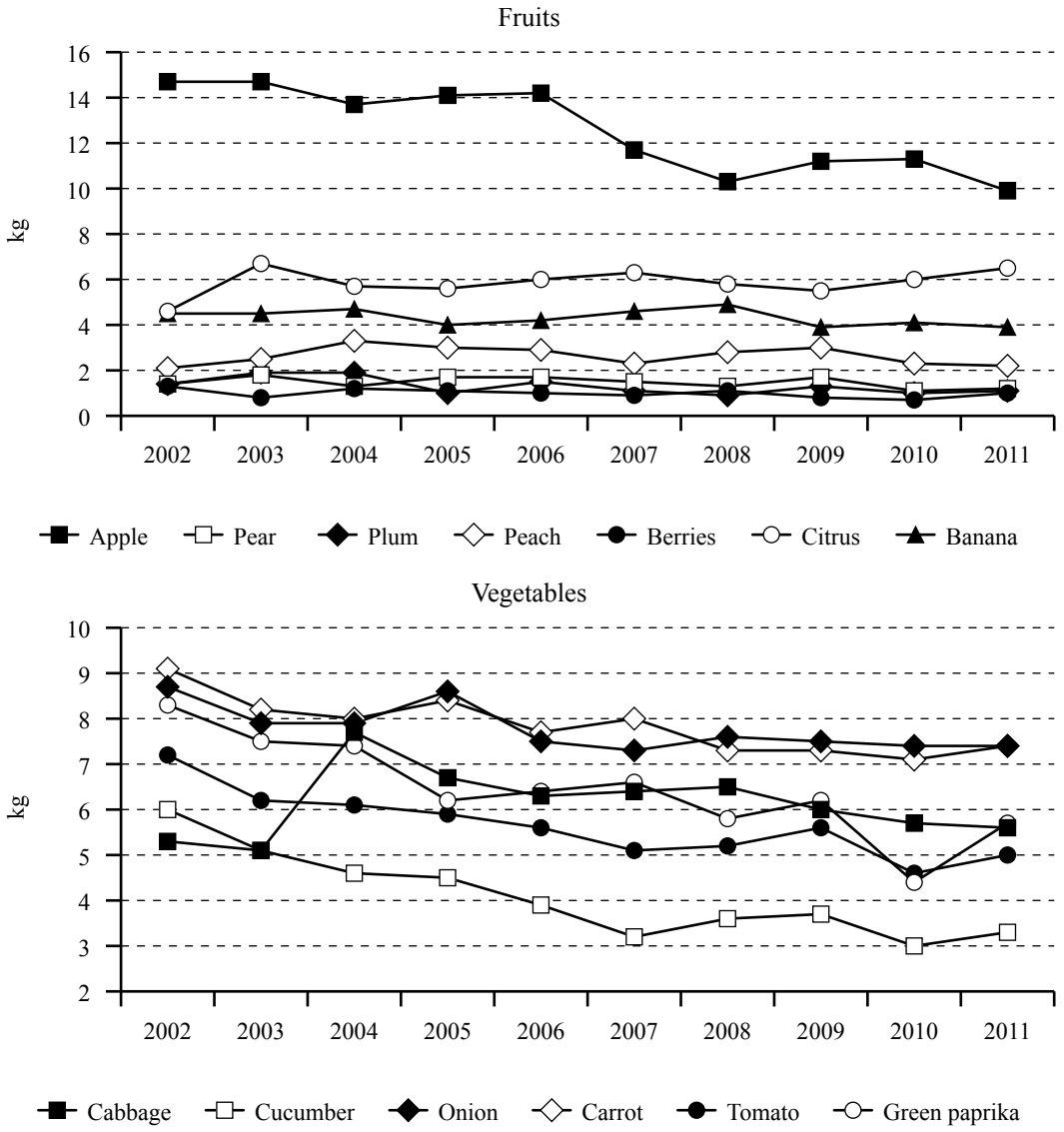
Consumption of fresh fruit and vegetable has increased during last few years, while demand for canning and freezing products has dropped. The Hungarian processing industry is not sufficiently competitive in the field of these products, including convenience goods (e.g fresh-cut, prepared, and washed fruits and vegetables). Generally costumers prefer buying larger fruits and vegetables, for example watermelon or pumpkin, which are pre-cut into halves or quarter pieces. According to Faye (2004), healthier snacks gain ground due to the increase of obesity. A growth can be observed in value-added packaging, such as celery with dips, cut fruit, "no-time" products, and snack packs. Innovative companies have introduced fruit and vegetable snacks with dips, such as baby carrots with fat free ranch or dill dips, sliced apples with caramel dip, sliced apple snack packs for school lunches, etc.

Because of the rising demand for uniform products, retail chains face a higher risk when buying from small producers, since their goods are often not uniform (Brown and Sander, 2007). Most food retail chains are using product order systems optimally aligned to customer demand; OTD (on the delivery) system has mainly spread in case of products requiring cooling. This ordering system means that in order to reduce warehouse handling to its minimum, the ordered quantities are only sufficient to meet the actual demand, eventually by ordering daily.

Vegetable and fruit consumption depends highly on the production, more precisely on the weather and on import opportunities. Part of the fruits and vegetables can be considered as essential products, others are luxuries that can eventually be replaced by other, less expensive products. Root crops, onion, garlic are products for which demand is stable, because they are hard to substitute, but easy to store. On the other hand, early and primeur products (for example cocktail tomato, strawberry) are seasonal products, so their price and the demand varies throughout the year.

Per capita annual consumption of fruits and vegetables in Hungary has declined in the past 10 years (Figure 4).

Figure 4: **Per capita annual consumption of selected fruit and vegetables in Hungary, 2002-2011.**



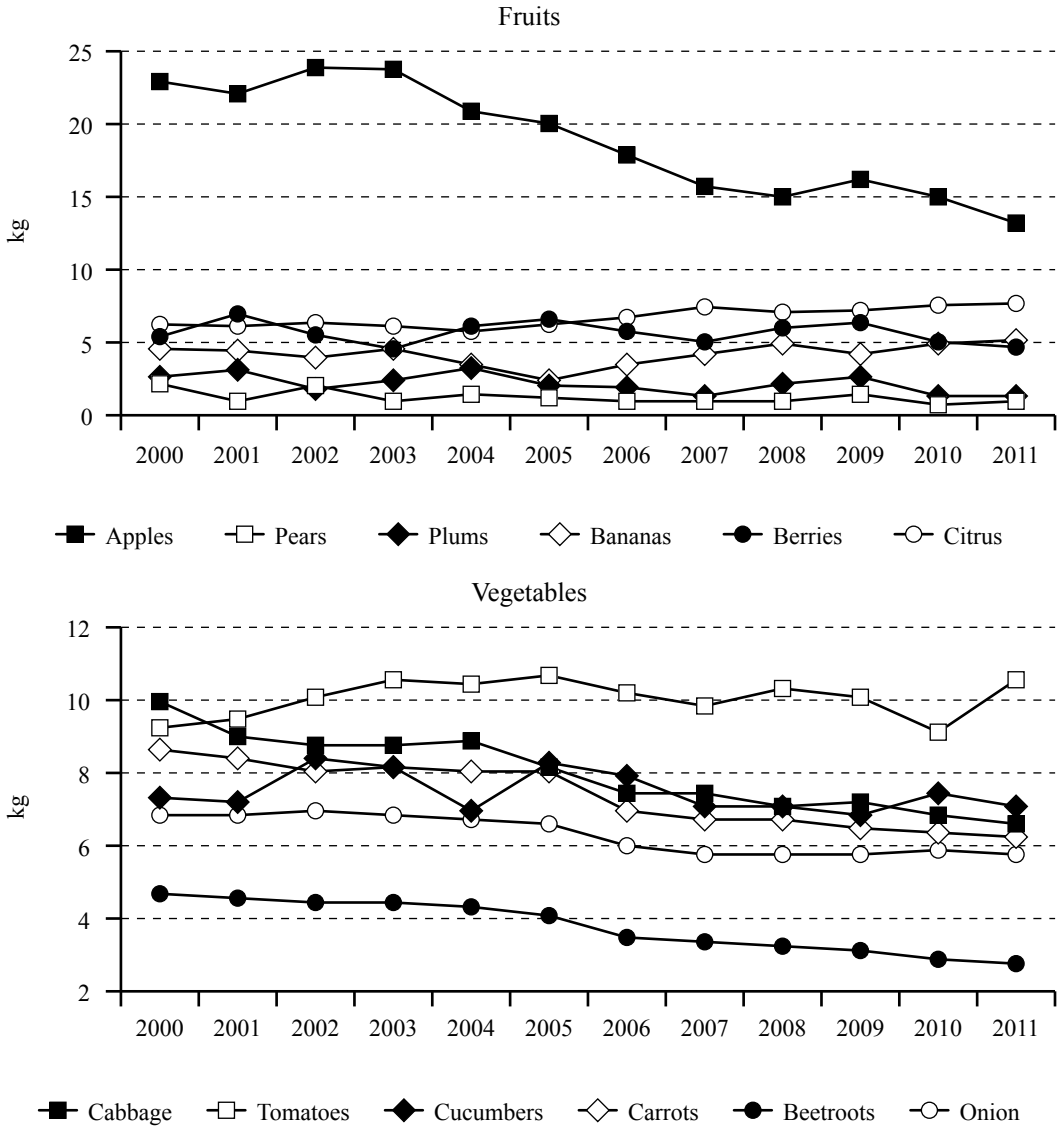
Source: KSH

While the per capita fresh fruit and vegetable consumption in 2002 was 152 kg, it decreased to 119 kg in 2011. The consumption of southern fruits decreased by 26 per cent, the consumption of vegetables by 18 per cent. With 10 kg per capita consumed a year, apples are the most popular of the fruits in Hungary, however, their consumption decreased by 13 per cent in the past, whereas banana consumption increased by 16 per cent. The most consumed vegetables in Hungary are onions and carrots, but the consumption of all analysed vegetables decreased in the given time period.

After the accession to the European Union, significant changes have been observed in Poland in the level and structure of consumption of fruits, vegetables and of their processed products. The share of tropical fruits, tomatoes, cauliflower and broccoli, and products made from fruit and vegetables from other climate zones increased. On average in 2008-2011 citrus fruit and bananas accounted

to approximately 30 per cent of the total consumption of fresh fruit, as compared to 22 per cent on average in 2000-2003. Share of tomatoes in fresh vegetable production increased from 16 to 19 per cent, and cauliflower and broccoli from 3 to 4 per cent. Consumption of almost all other fresh fruit and vegetables declined steadily in 2000-2011. Most (more than 4 per cent annually on average) decreased the consumption of pears, plums, beetroots, and still dominating in the structure of consumption, apples and cabbage consumption. Lower consumption of fruit and vegetables of the temperate zone tended to reduce the total consumption of fresh horticultural products. On average, in 2008-2011 the consumption of fresh fruits was by 15 per cent lower than in 2000-2003, and fresh vegetables by 14 per cent and amounted to respectively 41.1 and 51.8 kg per capita.

Figure 5: **Average annual per capita consumption of selected fruit and vegetables in Poland, 2000-2011.**



Source: GUS

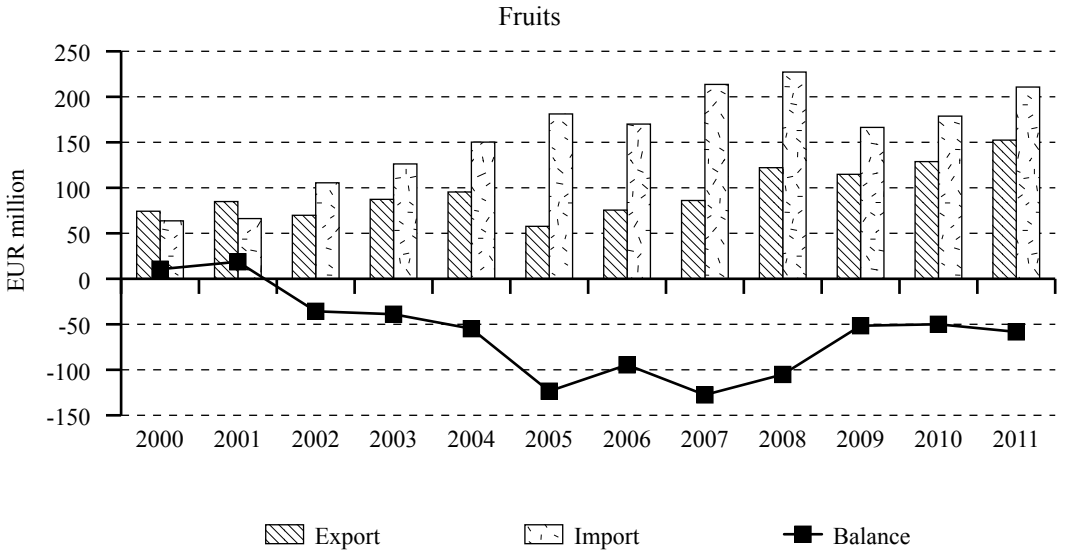
The consumption of processed fruit products increased in 2000-2011 at a rate of 6.5 per cent annually, and processed vegetable products at a rate of 4.5 per cent on average. The consumption of canned food made from tropical fruits, frozen vegetables and processed tomatoes increased the most. Only the consumption of pickled vegetables (mainly cabbage) decreased steadily and did not change the consumption of pickled vegetables. On average, in 2008-2011, the total consumption of processed fruit and vegetable products was 9.4 kg per capita and was by more than 90 per cent higher than in 2000-2003. The consumption of drinking juices increased in those periods by 26 per cent to 11.7 kg. For the increase in consumption of fruit, vegetables and juices there are promotional campaigns financed by the European Union, but also by the participants of the horticultural market.

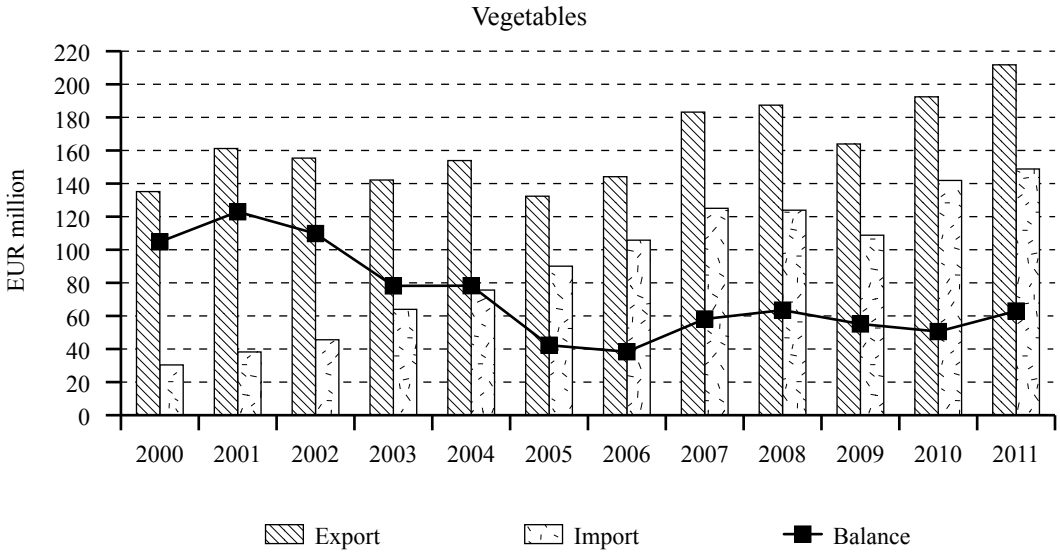
Foreign trade

Although EU access has brought a lot of new chances and opportunities, Hungary's agriculture was not well prepared for the challenges of free trade between the member states and the elimination of custom charges: although the export-import balance of vegetables was positive in the years, the imports increased after EU accession. The export-import balance of fruits first turned into negative, but has shown a slow increase since 2009 (Figure 6).

The largest amount of export products was stone fruits in 2000-2003; it represented a 41.5 per cent share of total amount. Berries were the second (17 per cent), and the others were had similar shares. In 2004-2007 pome fruits exports showed a threefold increase. In this period, tropical fruits exports was launched, giving 12.6 per cent of the total amount. The period 2008-2011 indicated growth in the exports of these products. Tropical fruits exports also increased significantly, however, this is only re-export (Figure 7).

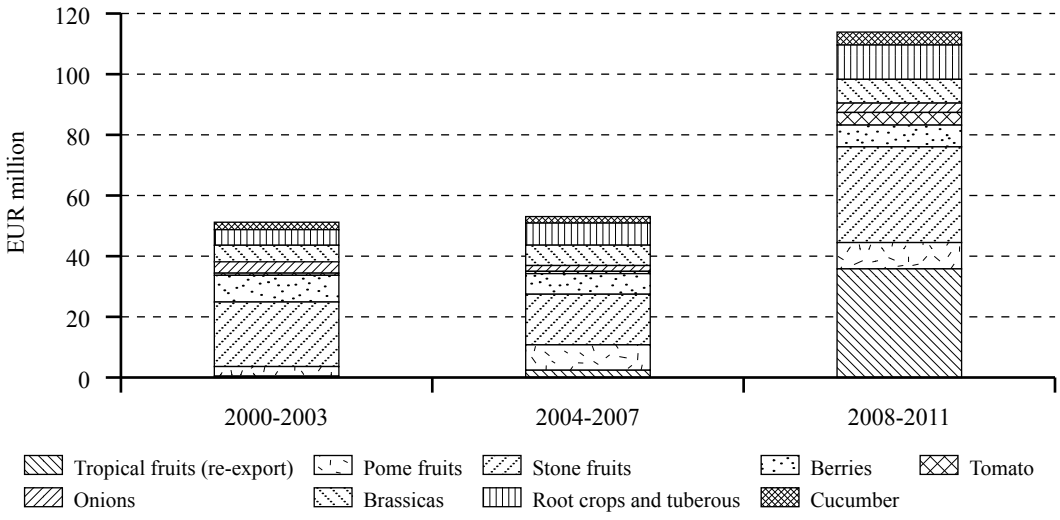
Figure 6: **The foreign trade of fruits and vegetables in Hungary, 2000-2011.**





Source: KSH

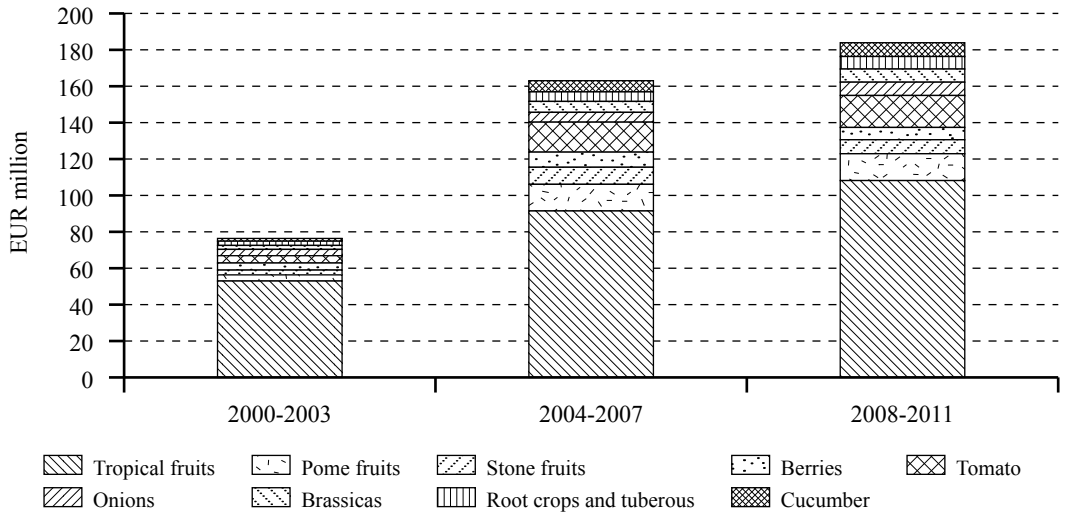
Figure 7: **The Hungarian export of important fruits and vegetables, 2000-2011.**



Source: KSH

In the analysed period, the average values between 2004 and 2007 show a significant rise, 213 per cent, compared to the values of the 2000-2003 period. A 12 per cent rise can be seen in 2008-2011 in comparison to the average values of 2004-2007. Regarding the annual average values, the most significant import product is tropical fruits and the value of import tropical fruits is growing continuously. The import of other products also grew between 2004 and 2007. Pome fruits, tomato and cucumber has quadrupled, the import of stone fruits has risen by 350 per cent, cabbages by 250 per cent, while berry fruit, root crops and tuberous have doubled compared to the average values of the 2004-2007 period. There is no sign of such a big rise in the years 2008-2011 (Figure 8).

Figure 8: **The Hungarian import of important fruits and vegetables, 2000-2011.**



Source: KSH

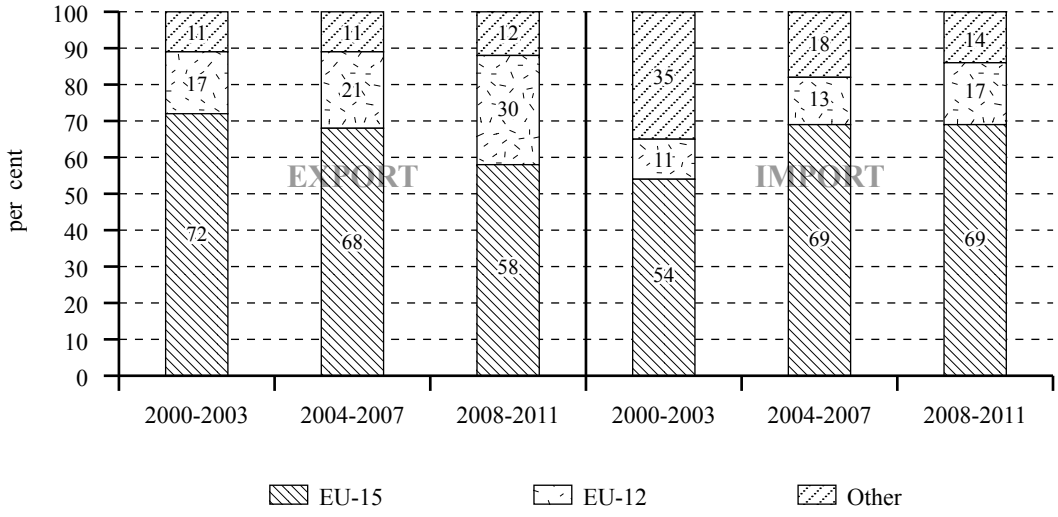
"The home of pepper" – this is an image some foreigners still may have about Hungary, yet it is getting untrue as more and more pepper is being imported nowadays: the export-import ratio used to be 6 to 1 before EU accession, whereas today it is 2:1, and it is expected to drop.

In the past few years, imports were similar, except in 2007 and 2011 due to bad weather circumstances. Similarly in 2007 and 2011, the exports volume also changed. Generally the main export products are fresh fruits, such as apple, sour cherry and plum. One part of the export is re-exported, these are tropical fruits. The least part of exports is frozen fruits, mainly sour cherries, plums and berries. The main imported goods are tropical fruits (banana, orange and tangerine). Fresh fruits (excl. tropical) are the second highest volume of imports; these are mainly apple, pear, peach and strawberry. The third highest are frozen fruits. The main frozen fruits imported, are strawberries, the second are sour cherries and third are raspberries. Dried fruits come to the last place.

Much of Hungarian foreign trade were directed to EU-15 countries; export was 72 per cent between 2000 and 2003. This ratio decreased by 14 per cent to 2011, in parallel the Hungarian fruits and vegetable export increased by 13 per cent to EU-12. The share of import from EU (EU-15 and EU-12) was 83 per cent between 2004 and 2007, which increased mildly in average of the period 2008-2011 (Figure 9).

In 2008-2011, the value of fruits and vegetables exports constituted nearly 14 per cent of overall income from the exports of agricultural and food products in Poland, against 23 per cent in the 2000-2003. The share of import of horticultural products was respectively 16 and 22 per cent (Table 7).

Figure 9: **The geographical structure of Hungarian trade of fruits and vegetables, 2000-2011.**



Source: KSH

Table 7: **The turnover of foreign trade of fruits, vegetables and their products in Poland, 2000-2011.**

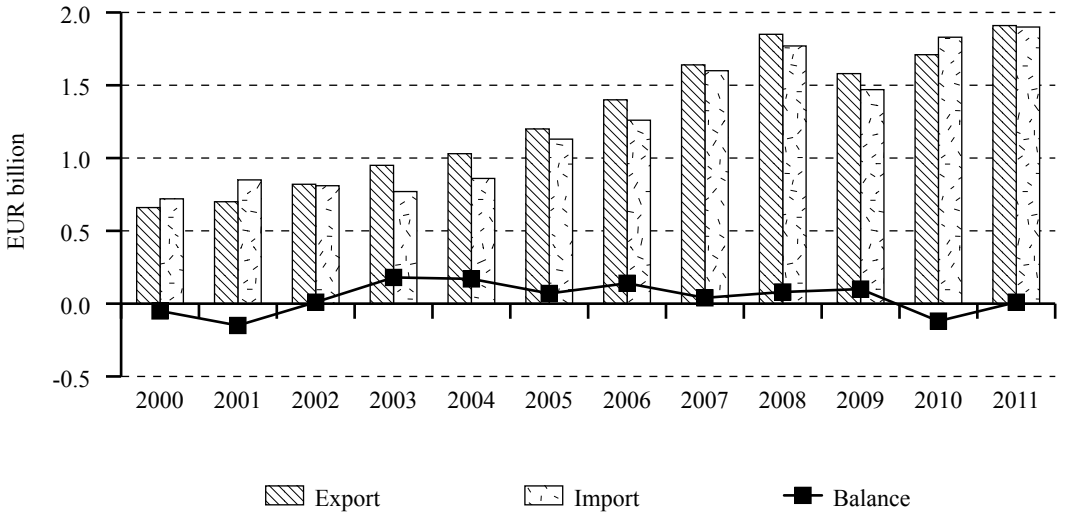
Specification	2000-2003		2004-2007		2008-2011	
	thousand tonnes	EUR million	thousand tonnes	EUR million	thousand tonnes	EUR million
			Export			
Total	**1,457.8**	**784.7**	**2,164.4**	**1,317.8**	**2,464.2**	**1,761.9**
Fresh fruit	386.6	111.7	630.1	238.1	834.1	364.6
Fresh vegetables	275.9	54.1	422.1	146.0	436.6	197.2
Processed fruit	512.3	476.9	682.6	697.4	703.6	867.5
Vegetable products	283.0	142.0	429.6	236.3	489.9	332.6
			Import			
Total	**1,357.3**	**787.1**	**1,715.7**	**1,210.9**	**2,095.6**	**1,743.8**
Fresh fruit	948.7	481.2	1,091.5	663.5	1,179.1	844.2
Fresh vegetables	173.1	92.9	239.2	164.4	417.0	313.8
Fruit processed products	160.5	148.7	267.8	287.0	298.5	399.5
Vegetable processed products	75.0	64.3	117.2	96.0	201.0	186.3

Source: based on data from the Science Center of Foreign Trade (CIHZ), MF (Ministry of Finance) and the Analytical Centre of Customs Administration (CAAC)

The average annual growth rate of export of fruit, vegetables and their products in 2000-2011 was 10.1 per cent and import 9.3 per cent. The export growth rate of sales of fresh vegetables (16.9 per cent) and fresh fruit (12.5 per cent) was the highest. In import the fastest was the growth of import of fresh vegetables (14.9 per cent) and vegetable products (11.9 per cent).

The positive balance of fruit, vegetables and their products in 2008-2011 averaged EUR 18.2 million (only in 2010 it was negative at the level of EUR 119.3), and in 2004-2007 reached EUR 106.9 million. In 2000-2003 trade balance was negative and amounted to an average EUR 2.4 million (Figure 10).

Figure 10: **The foreign trade of fruit, vegetables and their preserves in Poland, 2000-2011.**



Source: based on CIHZ, MF and CAAC data

In Polish export of horticultural products, frozen fruit and vegetables and juices prevail. The total sales of frozen food in 2008-2011 accounted for 29 per cent of the value of horticultural products export, against 42 per cent in 2000-2003. The share of concentrated and drinking juices was respectively 22 and 25 per cent. Apples hold the third position with the share of 11 and 6 per cent.

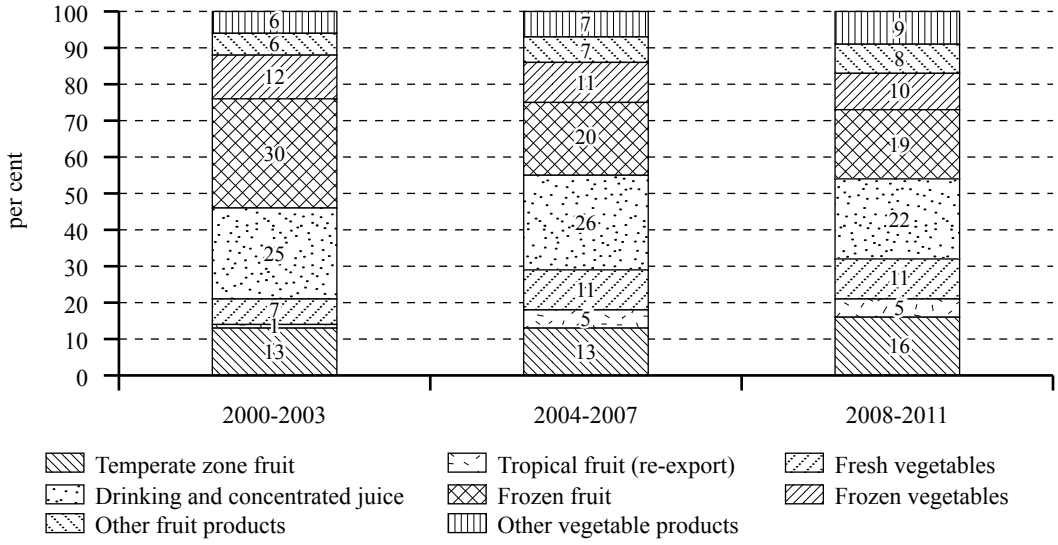
The average annual growth rate of export value of frozen food in 2000-2011 stood at 5.5 per cent, juices 10.6 per cent, and apples 17.3 per cent. Among other horticultural products the highest growth rate was the rate of export value of processed tomatoes products (27.1 per cent), canned vegetables (23.3 per cent), canned fruit (20.9 per cent), pears (32 per cent), sauerkraut from the group of others – mostly Chinese cabbage (30.8 per cent) and tomatoes (25.7 per cent).

The value of Polish import of horticultural products is dominated by tropical fruit, with a share in 2008-2011 amounting to: 45 per cent, as compared to 59 per cent in 2000-2003.

Average annual growth rate of tropical fruit imports in 2000-2011 was 9 per cent, temperate zone fruit 17.2 per cent, and fresh vegetables 14.9 per cent. The average annual growth of imports of processed fruit products stood at 14.4 per cent (soon increased import of frozen fruit), and vegetable products 11.9 per cent.

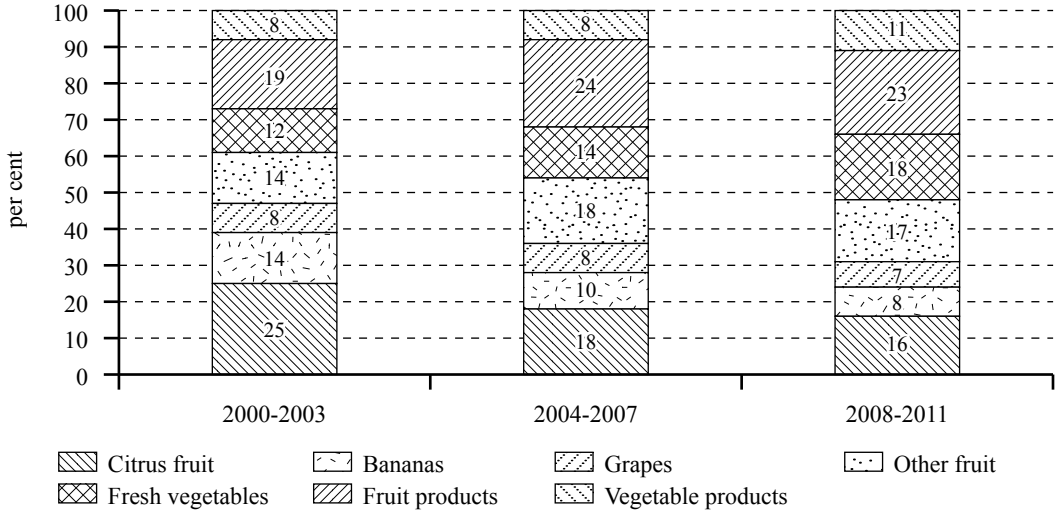
The main recipients of Polish horticultural products are the EU-15 countries. In 2008-2011, their share in the total value of export of fruit, vegetables and their products was an average of 59 per cent, compared to 70 per cent in 2000-2003. After the Polish accession to the European Union, the share of the EU-15 countries decreased due to an increase in export to new European Union Member States and the CIS countries (especially Russia). To the EU-15 countries, Poland directs primarily frozen fruit and vegetables, apple juice concentrates, canned fruit, jams, canned and dried vegetables, tomatoes and their products, onion vegetables and raspberries, strawberries, apples and cherries. Its main customers are Germany, Great Britain, the Netherlands, Austria and France.

Figure 11: **The structure of Polish export of fruit, vegetables and their products, 2000-2011.**



Source: based on CIHZ, MF and CAAC data

Figure 12: **The structure of the value of Polish import of fruit, vegetables and their products, 2000-2011.**



Source: based on CIHZ, MF and CAAC data

The share of the new Member States (especially the Czech Republic, Slovakia and Hungary) was 4 per cent to 7 per cent in 2000-2003. To new Member States primarily frozen fruit and vegetables, cabbage, tomatoes and tomato products, canned fruit and juices are exported. In 2008-2011 the share of CIS countries was 22 per cent, as compared to 10 per cent in 2000-2003. To CIS countries Poland re-exports mainly tropical fruit and exports apples, tomatoes, cabbage, frozen food, canned fruit and canned vegetables.

The import of horticultural products is dominated by EU-15 countries, the share of which in 2008-2011 was 57 per cent, as compared to 53 per cent in 2000-2003, and EU-12 countries respectively 4 and 7 per cent. The share of CIS countries increased from 1 to 2 per cent, and other countries (mainly Turkey, Ecuador, Brazil, Costa Rica, Morocco and China) declined from 39 to 36 per cent.

The countries of the "old" EU (mainly Spain, Italy, Germany and the Netherlands) provide for the Polish market mainly such products as citrus fruit, grapes, peaches and nectarines (fresh and canned), fresh vegetables (especially tomatoes), and frozen, canned and processed tomato products, and EU-12 countries (mainly Hungary and the Czech Republic) – canned and frozen corn, juice, tomato paste and watermelons.

Figure 13: **The geographical structure of Polish trade of fruit, vegetables and their products, 2000-2011.**

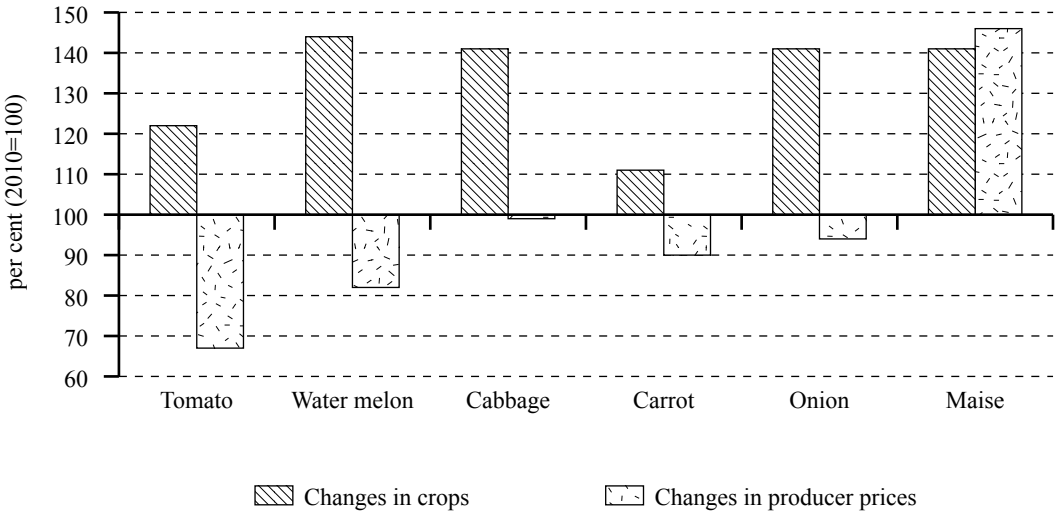
Source: based on CIHZ, MF and CAAC data

Price situation

The E-Coli panic started in Germany in 2011 had a very strong impact on the fruit and vegetable markets in Europe; the confidence in the fresh fruits and vegetables has suffered a lot. Considerable volumes of different vegetables were destroyed, and the decline in prices led to a decrease in producers profit. The Russian Federation banned imports from the EU based on plant health concerns, which again resulted in a pressure on producers prices.

The produced quantity increased from 2010 to 2011 for most major vegetables, but only the producer price of sweet corn was able to increase. Due to the E-Coli panic, the sales of tomatoes got more difficult, which resulted in a price decrease. The producer price of the storage vegetables produced in 2011 also decreased – 10 per cent in the case of carrots, 1.2 per cent for cabbage and 5.9 per cent for onions (compared to the 2010 prices). The overall price for watermelon was 18 per cent lower than the previous year (Figure 14).

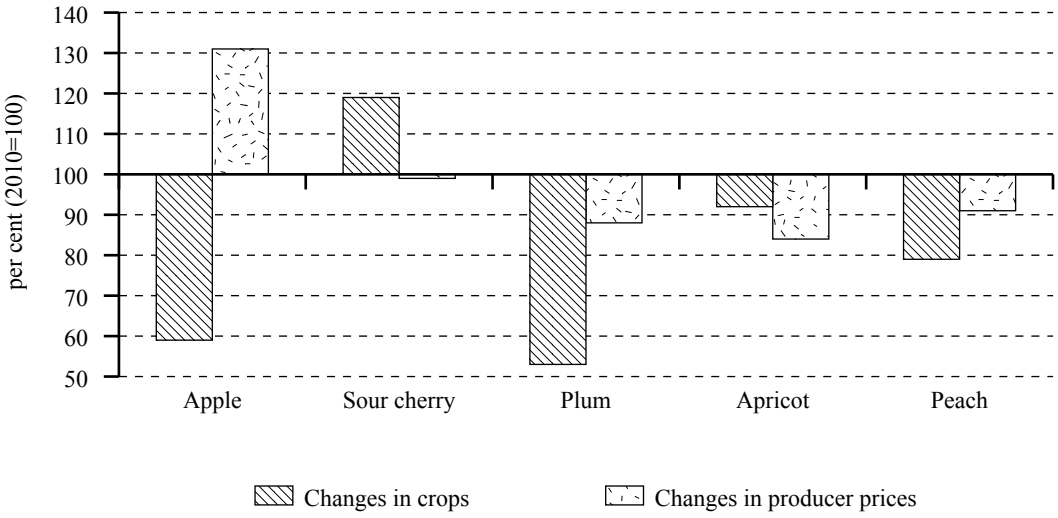
Figure 14: **Change in the produced quantities and producer prices of the most important vegetables in Hungary, 2011.**



Source: KSH

Shrinkage of plantation surfaces and unfavourable climatic conditions resulted in a 4 per cent production decrease in case of apples (in 2011), but producer prices showed a 30 per cent increase compared to 2010. Peach production decreased by 21 per cent from 2010 to 2011 because of the inland flooding and frost, while the producer price also decreased by 8.8 per cent. In 2011, apricot price decreased by 16 per cent, plum price by 12 per cent (compared to 2010). The producer price of sour cherry did not change significantly, but the rise in the production surface induced bigger production (Figure 15).

Figure 15: **Change of the most important fruits (produced quantities and producer prices) in Hungary, 2011.**



Source: KSH

The increase in cost of production, resulting in a large degree of adjustment of the Polish fruit and vegetables to the European Union quality requirements, leads to higher prices of these products, both domestically and in the foreign market offers. On average, in 2001/02-2010/11 there was the highest price growth for direct consumption of: apples, plums and cherries (10 per cent), and of vegetables: carrots (17 per cent), tomatoes (7 per cent) and parsley (6 per cent). The price of white cabbage and onions decreased.

The purchase price of fruit and vegetables intended for processing also increased, and in the seasons 2001/02-2010/11 the average annual rate of increase in the prices of industrial apples, cherries and plums was the highest. During this period prices of: black currants, green beans, tomatoes, carrots, beetroots, onion and cabbage declined. The rate of increase in purchase prices of most fruit and vegetables in Poland was higher than in most European Union countries (especially in the EU-15 countries), thus decrease the price differences of Polish horticultural products (procurement, wholesale and retail) and processed fruit and vegetables products in Poland and in the Community. As a result, Poland has been gradually losing price competitiveness of horticultural products and their products on the European market. Alignment of the price level in Poland and in the EU-15 countries, but also in some of the "new" Member States is not a matter of the near future.

Despite a significantly lower investment in horticultural farms in Poland than in the "old" EU, and the use of yield-boosting measures, the volatility of fruit and vegetables (at all levels) is not greater than in the other countries of the Community. Crop variability resulting from weather conditions is the decisive factor in tipping price volatility. In Poland the relation between purchase prices and retail prices of fruit and vegetables is relatively stable and in 2008-2020 it ranged from 16 per cent (raspberries) to 68 per cent (strawberries).

Cost-effectiveness of fruit and vegetable production has been fluctuating strongly in subsequent years. This makes it difficult to make rational productive decisions by horticultural holdings operators. In case of markets for fruit processing, adjusting acreage to the size and structure of the markets demand is hindered by the small scale of vertical linkages producers and processors.

Support for horticultural sector and investments in the sector in Poland and Hungary

Support

Polish and Hungarian fruit and vegetables sector make extensive use of Community support under the common organisation of horticultural sector and various forms of horizontal assistance financed from the Rural Development Programme (structural funds).

Within the framework of the common organisation of the horticultural market support pertains mainly to the financial support from EU funds to the operational fund of producer organisations and support for producer groups in covering the expenditure on the creation of such groups and covering some costs relating to the implementation of investments listed in plans for approval. Costs of eligible investments are in 50 per cent borne by EU funds and in 25 per cent by the national budget. Since 2004 to 30 September 2013 producer organisations were granted financial aid in the amount of about EUR 3.1 million, and producer groups – about EUR 1.4 billion in Poland.

Hungarian producer organisations were provided EUR 26.5 million by the EU and EUR 8.3 million from the national fund. Producer groups were granted EUR 91.8 million by the EU and EUR 25.2 million from the national budget between 2004 and 2013 (calculated with an average exchange rate of 270 HUF/EUR, based on the exchange rates of the given period).

Since 2008 producers of strawberries and raspberries for processing in Poland and Hungary (and Bulgaria, Lithuania and Latvia) may take the advantage of transitional assistance (until the end of 2013) in the amount of EUR 400 per hectare (where in Poland EUR 170 per hectare come from the State budget).

In the member states, only 37.6 per cent of the possible EUR 90 million was down in the academic year 2009/2010, which corresponds to 5 million students. There are many reasons for the initial failure. The Commission regulation was issued too late, some of the member states could not prepare their programs accordingly. Some other member states could not take part in the program because they could not assure co-financing. Another difficulty was that the "School fruit webpage" was launched with delay, and the professional group was also formed too late. The states taking part in the program claim the community funds yearly based on their strategy. According to the repartition of the community funds of the school fruit program, Poland received 9223 thousand EUR per school year (2009/2010, 2010/2011 and 2011/2012), EUR 27.7 million in total. Hungary's share in these three school years was EUR 9.9 million in total (Stummer *et al*., 2012).

Under the structural funds' assistance producers of horticultural products, as other agricultural producers, make use mainly of financial assistance under Measure "Modernisation of agricultural holdings". Absorption of funds (mainly EU funds, but also national funds) for the promotion of fruit, vegetables and their preserves is increasing (Measure – Promotion and Information). Support under this measure is mainly targeted at the production of apple and apple juice.

Fruit and vegetable producers are also beneficiaries of direct support under the Single Area Payment Scheme. Subsidies in the form of co-financing of the interest on investment loans are financed exclusively from national funds.

The funds of the actors of the horticultural sector gathered in the Fruit and Vegetables Promotion Fund are used to finance numerous campaigns promoting domestic horticultural products and their preserves on the domestic and international market (e.g. "Jedz witaminy i wracaj do zdrowia" [„Eat fruit and regain your health"], „Pora na pomidora" [„Tomato time"], „Jabłka wysokiej jakości" [„High quality apples"]). The fund (as the other eight funds used for promoting other agri-food products) is administered by the Agricultural Market Agency in Poland. There were campaigns to propagate Hungarian horticultural products on the domestic and international market in Hungary. The Ministry of Rural Development involving Agrármarketing Centrum separated EUR 53.7 thousand in consideration of the unfavourable situation of the watermelon in Hungary in 2011. Furthermore large-scale paprika promotion was realised by FruitVeB Hungarian Interprofessional Organisation for Fruit and Vegetables and DélKerTÉSZ Cooperative, 'School fruit and vegetable nutritional program' or 'Eat 3×3 fruits and vegetables a day' program.

Under the new EU financial perspective (2014-2020) support for the horticultural sector from EU resources will be mainly of horizontal nature. Horticultural sector as such will be covered by the EU programme promoting the consumption of fruit, vegetables and their preserves at schools.

Investments

There is no data concerning investment expenditure in Polish horticultural holdings. It should be assumed, however, that the growth rate of investments in these farms is similar to the one for the complete Polish agriculture. Polish agriculture in 2010 recorded investment outlays at the level of about EUR 0.9 billion and was higher than in 2000 by nearly 80 per cent, including outlays on machines, technical equipment and tools almost doubled – to the level of about EUR 0.35 billion. Calculated at the rate per 1 hectare of agricultural land, investment outlays in agriculture increased in that time by 105 per cent - to EUR 60.

Despite of the fact support conditions were so favourable in 2009 in Hungary, volume of agricultural investments decreased by 25.5 per cent in 2010. The value of investments was 758 million EUR at current prices. This amount was 4.8 per cent of total national economy. Amount of investments increased by 17.6 per cent in case of companies with more than four people and all financial, social insurance, non-profit organisations in 2011, including outlays on machines expanded by 33.8 per cent and construction investments by 1.6 per cent.

The level of technical equipment and use of revolving assets both in Polish horticulture and in the whole agricultural sector in Poland remains considerably lower than in most EU-15 countries and lower than the EU average. Pursuant to the data from the National Liaison Agencies of FADN, agricultural holdings covered by the agricultural accounting network showed the gross value of investments in Poland in 2009 lower than the EU average - by 60 per cent.

Summary and Conclusion

In this chapter, we analysed the situation of the Hungarian and Polish fruit and vegetable product lifecycles from different aspects. Based on statistics, we analysed the evolution of the production parameters (area and production). We examined the fruit and vegetable processing industry's importance in Hungary and in Poland. We also took into account the different factors influencing consumption. We studied the impact of the EU accession on the external trade processes, as well as the effects of the support and investment systems on the horticultural sector.

According to the statistical data, the production areas of both the vegetable and fruit sectors have decreased in Hungary since the EU accession. Fruit production considerably decreased in 2007 and 2011 due to weather circumstances. Vegetable production has dropped severely since the EU accession. In Poland, the growing area significantly decreased in 2002 and 2010.

The importance of the processing industry has decreased in Hungary. The canned and deep frozen industry used to process 25 per cent of the vegetable production and 66 per cent of the fruits. This high processing rate was mainly due to the processing of apples, where 80 per cent of the crop used to be processed. In the vegetable sector, nearly 100 per cent of the maize production was processed, as well as 96 per cent of the pea production. The 18 per cent decrease in the processed and preserved vegetables is the most obvious compared to the change of the vegetable and fruit juices and processed and persevered fruits.

The requirement of a processing industry is to have a constant supply of good quality products, but it has happened many times that the quantity and quality of the products was inadequate. Furthermore, the lack modern storage facilities for the storage of the processed products also contributed to the decrease.

Compared to the demand for processed products, the demand for fresh vegetables and fruits increased, but the domestic consumption still declined from 152 kg per capita in 2002 to 119 kg per capita in 2011. The demand for root crops, red onion and garlic is stable, mainly because of their easy storage. On the other hand, the demand and price of early products is unbalanced throughout the year because of the seasonality.

Despite the fact that the export-import balance of vegetables was positive in the given timeframe, imports of these products increased after the accession to the EU. As for the fruits, a decline can be identified after the accession, followed by an increase from 2009 onwards. The biggest part of the exports is given by stone fruits, followed by berries (between 2000 and 2003). The export of pome fruits tripled in the 2004-2007 period. The export (re-export) of tropical fruits began in the same period.

After the Polish accession to the EU the import of products from other climate zones and their products increased. Higher imports allowed for the boost in the production of processed fruit and vegetables and an increase in re-exports of both fresh and processed products. Due to the lower domestic prices in Poland than in most EU countries, imports of those products which are direct competitors of domestic products remained at a relatively low level. After the Polish accession there was no significant increase in exports to the EU-15 countries due to the high saturation of these markets, the competition of cheaper supplies from non-EU countries, and a low concentration of supply in Poland and still poor organisation of foreign trade. However, the sales to the new EU Member States, and especially to the countries of the CIS, increased. Higher use of the advantages of the price of Polish horticultural products and products of their processing requires greater efficiency of production and higher importance of non-price competition instruments, including an increase in the scale and significance of the links between vegetable producers, but mainly between fruit producers and fruit processing plants. Higher exports and supply of processed fruit and vegetables products is necessary in the light of the systematic decrease in their domestic consumption. Greater foreign marketing of fresh and processed horticultural products in cooperation with all participants of the horticultural market are the basic conditions for boosting the area and production of horticultural products.

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Development of the sugar sector in Poland and Hungary

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Introduction

Sugar has played an important role in the global economic development which has involved changes in agriculture, food industry, foreign trade and the structure of demand for food. Sugar cane is listed as one of the six plants that changed the face of the world (Hobhouse, 2001). Owing to its importance for trade, sugar is considered to be one of the first global products. The sugar and spirits industries were the drivers behind the transformation of the German economy into a capitalist superpower in the 19th century. A similar role was played in England by metallurgy and tobacco sectors, since sugar was imported from the colonies (Sombart, 1983). The development of European sugar sector is closely related to Polish and Hungarian agriculture. In 1801, F. Achard opened the first plant in Poland producing sugar from sugar beet in Konary, Lower Silesia (Marki, 1993). In Hungary Sámuel Tessedik began experiments with sugar beet growing, bringing the first seeds from Germany around 1790. Sugar production on an industrial scale began in Hungary in 1830.

This chapter contrasts the development of the sugar sectors of Poland and Hungary. In both countries, sugar is made from sugar beet and this is the main sweetener used in households and in secondary food processing. The sugar market is among the most directly regulated food markets in the European Union (EU) and a protectionist policy towards that sector has much impact on its functioning. From 2000 to 2011, sugar industry underwent deep restructuring, much influenced by the reform of the EU market regulations in 2006-2010. The overall results of this reform differed between countries. Though the planned outcome should have been based on pure economics and competitiveness, as it turned out it was influenced by many other factors, such as in the cases of Poland and Hungary. The sugar sector in Hungary especially has been transformed dramatically. However in parallel with the erosion of its beet sugar production, Hungary has become the largest isoglucose producing country among the EU Member States. We also chose the sugar sector as a subject for comparison since the industry is facing another challenge with the elimination of EU quotas in 2017.

Evolution of the market regulation system

Regulation of the sugar market in Poland has a long-standing tradition, since the first statutory regulations entered into force as early as in 1925[3]. At the time of the planned economy, the sugar market, being a strategic industry, was fully controlled by the state. During the political and economic transformation, a market regulation system[4] based on the system applicable in the EU was introduced.

The EU sugar market regulation system has been effective since 1968. It was intended to stabilise the market, ensure prices at the levels that guaranteed viability of the cultivation and processing of sugar beet, and provide funds for other market regulation instruments. The system underwent minor changes and proved effective, because since its introduction there has been no need to carry out intervention purchase of surplus supply. Market regulation was a self-financing system and the funds for the support of exports originated from contributions made by growers and producers of sugar. The EU regulations were criticised for high prices on the internal market and for the strongly supported exports that disturbed competitiveness on the international market. The World Trade Organi-

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[3] Act of 22 July 1925 on sugar trade regulation, Dz.U. No. 90, item 630. Decree of the President of the Republic of Poland on the regulation of sugar and beet cultivation of 3 December 1935, Dz.U., No. 85, item 548.
[4] Act of 26 August 1994 on sugar market regulation and ownership transformation in sugar industry, Dz.U. of 1994 No. 98, item 473.

sation (WTO) forced the EU to reduce export subsidies[5]. The European Commission, taking into account the need to improve competitiveness, the commitments made earlier to some preferential partners, the WTO position and the interests of market participants, introduced a reform of market regulations in 2006-2010[6]. The quota system was simplified and, considering the market needs and the obligations towards the WTO, a reduction of the EU production by 5 to 6 million tonnes was proposed in return for financial aid in the restructuring process. The aim was to cultivate sugar beet in the most appropriate agro-climatic regions. As a result of those administrative procedures, 73 of the 179 factories operating in the EU before the reform were closed. 5.8 million tonnes of sugar quota were renounced but additional quotas for beet sugar, isoglucose and inulin were distributed. The Polish sugar quota of 1,672 thousand tonnes and the purchased additional quota (100.6 thousand tonnes) were reduced to 1,405 thousand tonnes. The Hungarian sugar quota of 402 thousand tonnes and the purchased additional quota (5 thousand tonnes) were cut to 105 thousand tonnes (Agrosynergie, 2011).

The minimum buying-in price for sugar beet was reduced by 40 per cent to EUR 26.29 per tonne. The sugar intervention price (EUR 631.9 per tonne) was replaced by a reference price of EUR 404.4 per tonne. Lower buying-in prices resulted in a drop in growers' revenues, ca. 60 per cent of which is compensated from direct payments (the so-called sugar payments). To this end, Poland obtained EUR 154 million per year. The reduction in sugar prices resulted in the restructuring of the industry and some of the plants were excluded from production. In order to mitigate the social and environmental impacts of closing such factories, a restructuring fund was established. The fund's resources originated from fees collected from sugar producers over three seasons. Under this support, ca. 10 per cent of funds were reserved for the growers. In regions particularly affected by the restructuring, additional funds were provided, a so-called aid for diversification. The balance of restructuring aid was adverse, since sugar conglomerates paid about EUR 650 million of restructuring contributions, while the aid paid out was just EUR 322 million (Szajner, 2009).

The reform much affected the international trade, because the level of exports of the out-of-quota[7] sugar and the amount of export refunds decreased, but the importance of imports in market supply increased. The mechanisms supporting market balance were slightly modified. The out-of-quota sugar may be sold without export subsidies to third countries, used for non-food purposes in the industry (such as chemicals or pharmaceuticals), or allocated to quota production in the next season. The regulation system provides for the support of private storage and for possible intervention purchases.

In Hungary, sugar tax was first implemented in 1849 and tax level was raised gradually until 1888 when new tax reform measures made domestic sugar production profitable, which resulted in investments in the sugar industry. As in Poland, at the time of the planned economy the Hungarian sugar market supply chain was controlled by the state. Sugar production was decided by central planning, the consumer price of sugar was fixed by the government, and the sugar trade was a state monopoly. Sugar production developed continuously, the only setback occurring between 1969 and 1974 when Hungary imported raw sugar from Cuba as part of a state aid programme. Although the Hungarian sugar processing sector did not receive any special treatment, and was not the beneficiary of any development programs, it managed to maintain the level of production and was considered a relatively efficient and advanced technically among Comecon countries.

[5] European Communities - Export Subsidies on Sugar, AB-2005-2, Report of the Appellate Body, World Trade Organization.

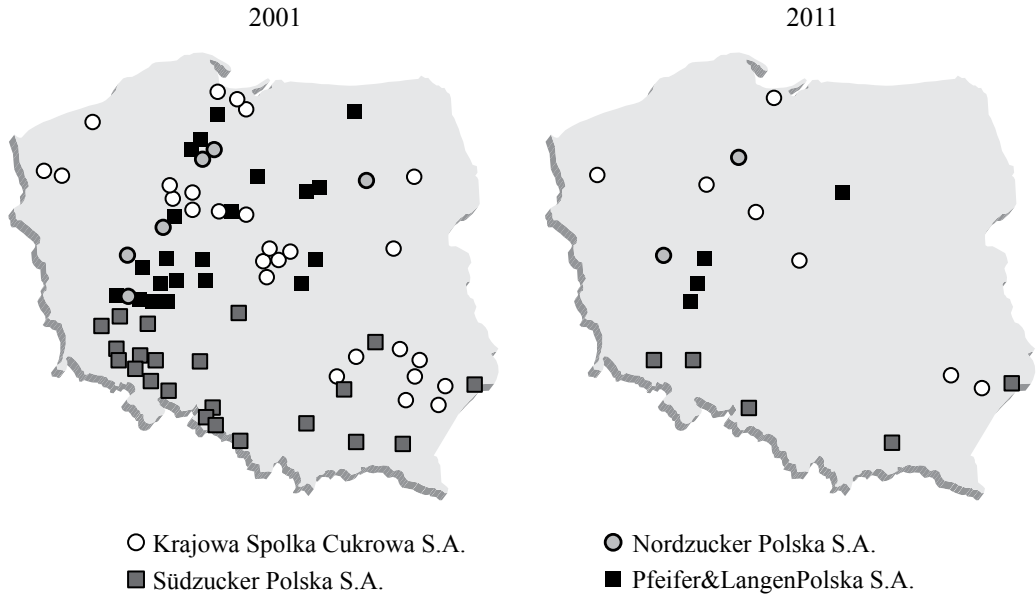
[6] Council Regulation (EC) No 318/2006 of 20 February 2006 on the common organization of the markets in the sugar sector. Council Regulation (EC) No 319/2006. of 20 February 2006 amending Regulation (EC) No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers. Council Regulation (EC) No 320/2006of 20 February 2006 establishing a temporary scheme for the restructuring of the sugar industry in the Community and amending Regulation (EC) No 1290/2005 on the financing of the common agricultural policy.

[7] Out of quota sugar: Sugar produced over the national quota.

Restructuring of the processing sector

The Polish sugar sector underwent a process of deep restructuring and modernisation both in terms of agriculture and sugar industry. Unlike in Hungary structural and ownership transformations proceeded slowly, despite the statutory regulations that had been effective since 1994. Partly due to the early implementation of EU-like sugar regime, sugar beet was still processed in 2001 in all 76 sugar factories that operated at the time of the planned economy (Figure 1). Direct investments of foreign sugar conglomerates, accession to the EU and the reform of the EU market regulation system were the main factors stimulating restructuring of the sector. The number of operating sugar plants dropped to 18 entities operating under the structures of four sugar conglomerates. The larger producer is a company where the State Treasury is a majority shareholder (ca. 40 per cent). With regard to the three other companies, majority shares are held by German sugar conglomerates with total market share of ca. 60 per cent. Sugar market is an oligopoly, that is characterised by lack of price competition and producers compete in other domains (quality, advertising, additional services etc.), as well as by large entry and exit barriers. Oligopolistic enterprises may form informal institutional structures, which improves their position (Samuelson, 2004). Regulation of the EU sugar market is based on production quotas assigned to conglomerates preventing new entities from entering the sector. In the context of the oligopolistic market structure and five competitive forces, production quotas significantly reduce the risk of new entries and thus reinforce the competitive position of the sugar industry (Porter, 2006).

Figure 1: **Number of sugar plants in operation.**

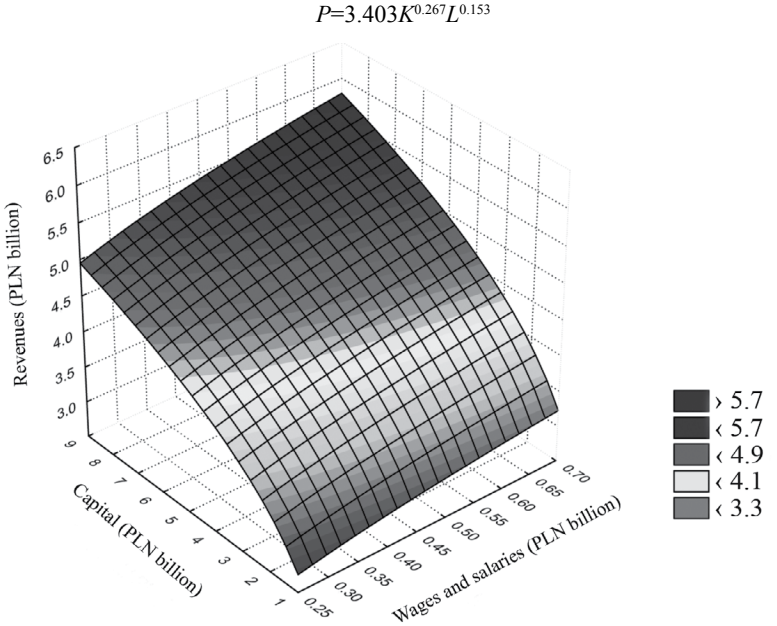


Source: IERiGŻ-PIB

The reduction of the number of operating sugar plants did not result in a drop of the sector's production potential, estimated at ca. 1.9 million tonnes. Under the restructuring process, ineffective plants were excluded from production and the remaining factories were modernised. In 2000-2011, total value of investments amounted to EUR 800 million, which improved the effectiveness of management and resulted in sugar production growing five-fold per plant. Capital investments caused a considerable drop in employment (up to 3.3 thousand persons), offset by increased productivity and effectiveness of labour. Technical labour productivity measured by sugar production per one

employee increased five-fold to 550 tonnes in 2011. Labour effectiveness measured by the ratio of revenues to wages and salaries cost increased over three times, with simultaneous drop of labour inputs (wages and salaries).

Figure 2: **Production function of sugar industry in Poland.**

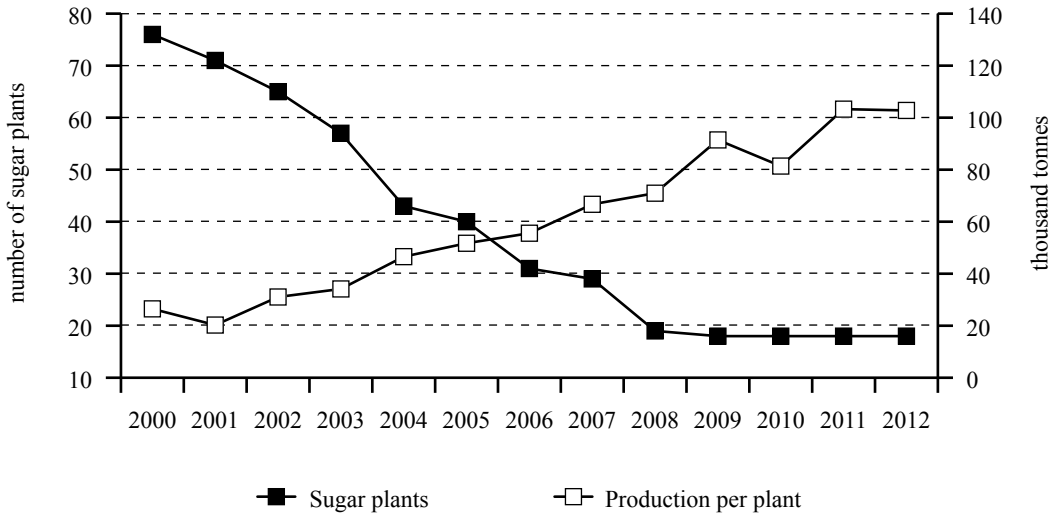


Source: calculations by IERiGŻ-PIB based on GUS data

Effectiveness of the sugar industry was analysed on the basis of the Cobb–Douglas production function (Jesus and Adams, 2005). The econometric analysis confirmed that capital is decisive for the production process. Marginal productivity and capital elasticity are higher than labour. Increase in capital inputs by 1 per cent results in an increase in production by ca. 0.3 per cent (*ceteris paribus*). Substitution of labour with capital, i.e. a capital input unit, can substitute 2.21 labour units. A reverse ratio, i.e. substitution of capital with labour, is only 0.45 (Figure 2). In other words, increasing employment and thus labour charges is not economically viable. Reasonable capital investments would bring more profit. This is confirmed by the decreasing economies of scale depicted by total elasticity of inputs. Increasing labour and capital inputs by 1 per cent respectively would cause an increase in revenues by mere 0.4 per cent (Szajner, 2012).

The considerable increase in production concentration reflects positive results of restructuring processes. In 2011 and 2012, average sugar production per plant grew four times to reach 105 thousand tons, but it is still lower than in Germany. As a result of restructuring and concentration, 18 operating plants have a similar production potential as the 76 plants in 2000 (Figure 3).

Figure 3: **Number of plants and sugar production per plant in Poland.**



Source: calculations by IERiGŻ-PIB based on GUS data

The majority of the 12 sugar plants that operated in Hungary at the time of political and economic transition in 1990 had been funded in the period 1880-1912. Only one factory had been built more recently, at Kaba in 1979. The Kaba plant was financed by the Polish State and built by Polish workers: Poland built the factory to pay back some state debt to Hungary. Kaba with its Polish technology was not only the most modern sugar processing facility in Hungary but it was also the largest. Its capacity (at that time slightly over 7000 tonnes of beet per day) was comparable to its Western European counterparts.

After the change of the regime the food industry was one of the first sectors to be privatised. The Hungarian food industry lost the former Soviet market and carried the burden of the out of date overcapacity. Structural changes and modernisation were necessary, which required new capital. Since the Hungarian State struggled with the largest foreign debt in comparison to the GDP among the Eastern European countries and a growing foreign trade deficit, it needed all the money it could get. Selling state assets offered a quick solution. In the food industry finding a buyer was not difficult; foreign processors were eager to take a share of the opening market. The seven largest of the twelve sugar factories were sold to foreign investors between 1991 and 1993. These investors did not immediately become the majority shareholders; they gained management rights and had options to increase their shares. Because of the lack of capital, lately neither the state nor the management was able to raise capital. Questionably, the Hungarian state also gave up all the controlling shares in the following years. Eridania-Beghin Say gained full control of the factories in Hatvan, Selyp, Szolnok and Szerencs, Eastern Sugar operated the plant at Kaba and Agrana became the majority owner of the Kaposvar and Petohaza facilities.

The remaining five factories were sold as a single holding in 1995 to a group formed by the managements and the beet supplying farms of these plants, while Hungarian state kept a significant share of just below 50 per cent. Though the five plants had smaller capacities than those bought by foreign companies, they were still accounting for about one third of the Hungarian sugar market and the holding achieved a positive operating margin in each of the following years. But even though the operation was profitable, the holding could survive independently for only a few years because the financing was not settled and could not be settled.

In Hungary, from 1990 to 2002 the sector worked without an official sugar regime or interprofessional agreements. Quotas and beet delivery rights were officially allocated only just before the accession to the EU in 2004. According to industry sources a gentlemen's agreement helped the supply chain to avoid serious market disturbances but the lack of a sugar regime made the sector unpredictable and also prevented banks from financing the operation of the holding of the five small sugar factories. A few years after the formation of the holding, and after many attempt to find a financing partner, Agrana took control of the company. By the time the sugar regime was implemented[8] at the end of 2001 all five factories had been closed. Agrana closed Ercsi (1997), Sarvar (1999) and Acs (2002), while Eastern Sugar bought and immediately closed Mezohegyes (1997) and Sarkad (1998).

Eridania-Beghin Say ended sugar production at the Selyp plant in 1998. In 2002 Nordzucker took over the Hungarian subsidiary of Eridania and soon made the decision to close Hatvan followed by the 2003/2004 campaign, just before EU accession, though the facility continued to be the logistic centre and headquarters of the company. It was last act of the first restructuring period. At the time of the EU accession the Hungarian sugar sector and its five remaining plants was controlled by three strong players of the European sugar market: Agrana, Nordzucker and Eastern Sugar, a Tate and Lyle subsidiary. Hungarian beet producers, former Hungarian management and the Hungarian State through ownership had no direct influence on the later development of the Hungarian sugar production, and on future management decisions.

The Hungarian sugar sector had three complete years under the untouched EU sugar regime. The sector benefited from the secure market conditions, and the weather was favourable. Thanks to modernisation, better capacity utilisation and the good beet production, the five operating plants could produce around 90 per cent of the sugar (517 thousand tonnes in 2005) than the former 12 plants ten years earlier (563 thousand tonnes in 1996), while processing beet coming from half of the previous area.

The sugar reform of the EU initiated a second more dramatic restructuring in the Hungarian sugar sector. In the first wave Eastern Sugar announced the closure of all of its beet sugar processing factories in Eastern Europe and renounced the quotas. It meant that following the 2006 campaign the company closed the plant at Kaba, the biggest and newest processing facility in Hungary. With this step (renouncing a quota for 108 thousand tonnes of sugar, 27 per cent of the total) Hungary almost completed the compulsory production reduction. However, when the "reform of the reform" launched offering even higher compensation the stakeholders, processors and farmers agreed that Hungary should reach 50 per cent quota reduction. Since Agrana and Nordzucker remained in the industry each with two factories, decision was made that each would close one plant and return ca. 50 thousand tonnes of sugar quotas. Agrana closed Petohaza and Nordzucker closed Szolnok. As it turned out the 2007/2008 campaign was the last for the factory at Szerencs, too. Nordzucker could not offer high enough prices to the farmers to get them to maintain sugar beet production and to refuse the compensation. During the restructuring process Agrana bought 5 thousand tonnes of supplementary quotas. When the decision on Szerencs had become irreversible, an additional 270 tonnes of quota was returned, so the decrease of the Hungarian quota reached 75 per cent, leading to higher diversification payments. As a result the Kaposvar plant of Agrana, the smallest of the original five, remained alone on the Hungarian sugar market with a production quota of 105 thousand tonnes of sugar (Table 1).

[8] Regulation of the Hungarian Ministry of Agriculture No. 88/2001 (X. 29.) on the supply chains of the natural sweeteners.

Table 1: **Quota renunciation in Hungary.**

thousand tonnes

	Factories	Quota 2006	Quota renounced	Quota bought	Quota 2008
Nordzucker	Szolnok, Szerencs	146.50	146.50	0.00	0.00
Eastern Sugar	Kaba	108.10	108.10	0.00	0.00
Agrana	Petohaza, Kaposvar	147.08	46.70	5.00	105.38
Total		401.68	301.30	5.00	105.38

Remarks: Total renounced 75.01%.
Sources: CTOSZ, 2010

Concerning financial measures, the Hungarian sugar sector received as a one-off compensatory payment for quota renunciation EUR 270 million, of which EUR 91.5 million went to farmers. The three companies had to pay EUR 108 million to the restructuring fund. A EUR 40 million fund was opened for co-financing diversification. Farmers who supplied sugar beet to the closed factories had been granted the separate sugar payment every year, EUR 13 per tonne of beet delivered in the reference period of 2004-2006. It is ongoing from 2008 and will end when the new CAP enters into force. Hungary was also allowed to subsidise sugar beet production by EUR 11.1 per tonne for five years.

Sugar beet production and processing

In Poland in 2000-2011 the area of cultivation of sugar beet decreased by 42 per cent to ca. 190 thousand ha. At the same time, the area of arable land decreased by 25 per cent, which illustrates the deep changes in the sugar market. The share of sugar beet in total area of arable land decreased from 5 to 2.5 per cent. The regional structure much changed, because many planting regions were excluded from cultivation. In accordance with the assumptions of the EU sugar market regulations reform, cultivation of sugar beet was limited to regions with the best agro-climatic conditions. Sugar beet can be cultivated in the best soil but, unlike Western European countries, which are its main competitors in sugar production in Europe, Poland has mostly medium and poor soil. The share of soil classes IV, V and VI in total area of agricultural land is ca. 75 per cent[9]. Poland has a temperate climate, but it is much affected by continental climate. Growing season is relatively short (190-230 days), and low annual rainfall in the Central and Northern part of Poland (500-700 mm/m^2) is one of the main problems for agriculture. For these reasons sugar beet cultivation is less competitive than in the Western Europe.

Crops concentration reflects the decreasing number of growers and the growing area of average plantation size. The number of farmers contracted for sugar beet dropped by 68 per cent to just 35.9 thousand. The average sugar beet area almost doubled to 5.29 ha per farm. The structure of the sugar industry resource base is still fragmented, compared to the main EU-15 competitors, which results from the fragmented structure of Polish agriculture. According to CIBE estimates, the number of EU growers amounts at present to ca. 158 thousand, and the average plantation area is 10 hectares.[10] The share of Polish growers in the total number of the EU growers is 22.3 per cent and the average plantation area is two times smaller. In France and in Germany, which are the largest sugar producers in the EU, average plantation area is 14.5 hectares and 11 hectares respectively, and such farms to a greater extent benefit from the economies of scale.

[9] *Statistical Yearbook of Agriculture*, GUS, p. 171, Warsaw 2012.
[10] International Confederation of European Beet Growers (CIBE) – 2011/2012 Harvest Estimate & 2012/13 Beet Area Estimate, D.085a/23.4.2012.

Concentration of crops in regions with the best soils and in large and effective farms resulted in an increase in average crop yields and improvement of their quality. In 2000-2011, the average yields increased by 50 per cent to 60 tonnes per hectare. Average annual growth rate of crops was estimated on the basis of the analysis of trend function regression and with the use of the compound interest (Luderer, 2009). In absolute terms, crops increased by 1.77 tonnes per hectare annually, and in relative terms, by 3.7 per cent per annum. The yields obtained by Polish growers are among the lowest in the EU due to poorer soils, lower annual rainfall and lower production intensity measured by consumption of mineral fertilisers and plant protection products. Yield of recoverable sugar per hectare is a ratio that takes into account the crops of roots and their quality, measured by sugar content. In the analysed period, a distinct upward trend could be observed with regard to yield of recoverable sugar (up to 9.7 tonne/hectares), but in respective years, due to changing weather conditions, considerable variations were reported (Table 2).

Table 2: **Sugar beet production in Poland, 2000-2011.**

Year	Area	Yield	Beet production	Sugar yield	Number of growers	Average area of plantation
	thousand hectares	tonne/ hectare	million tonnes	tonne/ hectare	thousand plantations	hectares
2000	333	39.4	13.13	6.0	111.9	2.98
2001	317	35.8	11.36	4.9	99.4	3.19
2002	303	44.3	13.43	6.7	91.5	3.31
2003	286	41.0	11.74	6.8	85.9	3.33
2004	292	42.7	12.50	6.9	77.9	3.81
2005	286	41.6	11.91	7.2	70.7	4.05
2006	262	43.8	11.48	6.0	63.2	4.15
2007	247	51.3	12.68	7.4	60.7	4.07
2008	187	46.5	8.72	5.5	40.9	4.57
2009	191	56.7	10.85	8.8	40.0	4.75
2010	195	50.9	9.96	7.7	38.2	5.03
2011	193	60.0	11.61	9.7	35.9	5.29

Source: GUS and Sugar Beet Growers in Poland (KZPBC)

Sugar production in Poland is characterised by great variations which to a large extent result from changing weather conditions that affect the quantity and quality of sugar. Also the system of production quotas, which determines the contracts for sugar, plays an important role in this process. In 2000-2011, sugar production varied between 1.4 and 2.1 million tonnes and it often exceeded the production quota (Figure 4). Due to high supply of out-of-quota sugar, it was mainly managed through exports.

Figure 4: **Sugar production in Poland.**

Source: calculations by IERiGŻ-PIB based on GUS data

Hungarian sugar beet and sugar production are affected firstly by the modernisation, concentration and restructuring process prior to EU accession and secondly by the adverse consequences of the EU sugar reform.

Pre-reform modernisation led to the closure of seven of the 12 factories, but the competitiveness of the sector was improved by the higher capacity utilisation, by the longer campaign and by the exclusion of the poorest lands from beet production. The reform hurt the industry. Changes in regional distribution and yield development of beet production, as well as in volumes of beet sugar production in Hungary cannot be assessed without being aware of the changes in available quotas and of market regulations i.e. regulation on out of quota production.

Climatic and environmental conditions for beet production are less favourable in Hungary than in the big producing EU Member States. As in Poland precipitation rather than soil quality is the most limiting factor. The annual precipitation in Hungary is 500-750 mm, but there are big differences between different regions, not only in the long term but also within a growing season. Distribution of precipitation during a year is also uneven, often leaving months without any moisture in the middle of the year. Hungarian sugar beet production, like in Poland, is more volatile and less competitive than in Western Europe. (Table 3).

Table 3: **Production of beet in Hungary for domestic processing 2000-2012.**

Year	Area	Yield	Beet production	White sugar yield	Number of growers	Average area of plantation
	thousand hectares	tonne/ hectare (16%)	thousand tonnes	tonne/ hectare		hectares
2000	54.6	36.8	2,010	4.9	1,013	54
2001	67.6	45.8	3,095	6.3	1,071	63
2002	55.5	43.0	2,385	6.2	752	74
2003	48.0	37.7	1,813	5.3	795	60
2004	64.6	53.3	3,445	7.7	809	80
2005	58.3	59.0	3,441	8.4	809	72
2006	46.0	51.2	2,352	7.6	809	57
2007	36.2	42.4	1,537	6.1	679	53
2008	6.5	67.3	440	10.2	74	88
2009	14.0	54.5	763	9.2	114	123
2010	14.0	60.1	841	8.1	155	90
2011	13.0	60.2	783	8.8	173	75
2012	17.1	48.1	822	6.6	221	77

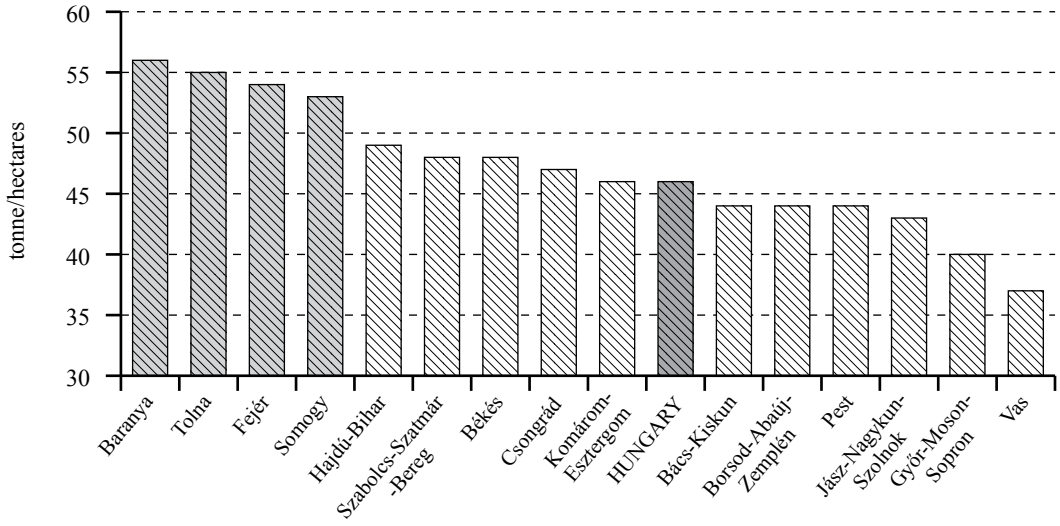
Sources: CEFS, 2013

Competitiveness of sugar beet growing can be judged by white sugar yield per hectare. This depends on beet yield, digestion (sugar content) and overall beet quality. In Hungary white sugar yield is relatively low and shows large fluctuations. The last five year average is 8.6 tonnes per hectare, higher than the pre reform figures and equal with the Polish values, but lower than those reported by the big producers. In France, the Netherlands and Belgium white sugar yield per hectare ranges between 12-13 tonnes, in Germany and in the UK it is around 11 tonnes. This gives a dominating advantage over Hungarian production.

Low productivity cannot be blamed on efficiency of scale. Hungarian beet farms are on average among the largest in the EU, around five times bigger than the EU average (around 10 hectares) and 15 times bigger than in Poland or in Austria (ca. 5 hectares).

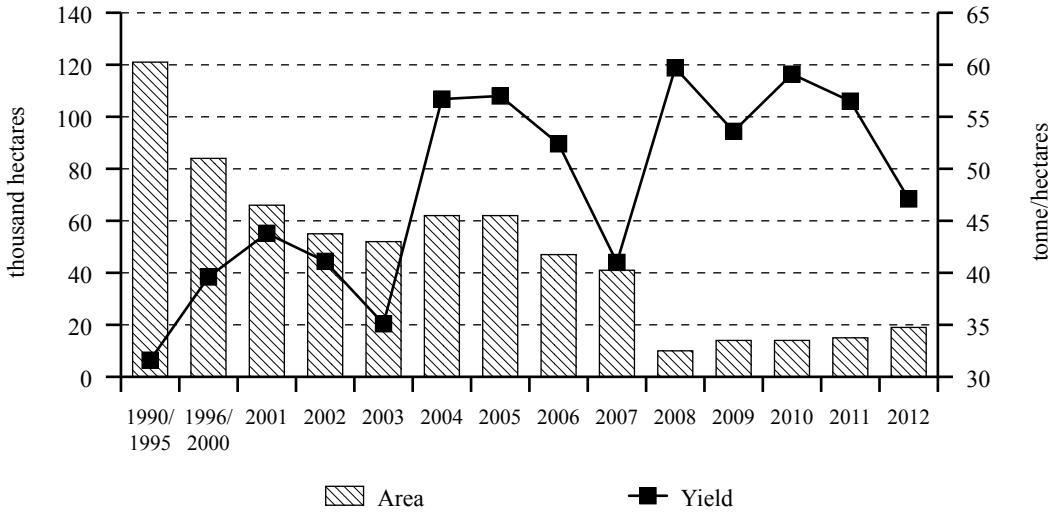
Prior to 2008 sugar beet growing took place in every (NUTS 3) county of Hungary, but differences in average annual precipitation and soil quality determined the results of production (Figure 5). The four best performing counties (Baranya, Tolna, Fejer and Somogy) were the main suppliers of the Agrana plant at Kaposvar, which explains why the survival of this plant was preferred both by the processor and the farmers. Following the reform sugar beet production was concentrated in the four counties surrounding the only remaining plant, providing over 50 per cent of the annual beet production. Since mostly weaker areas fell out, the average yield has improved (Figure 6).

Figure 5: **Regional sugar beet yields in the average of 2000-2006 in Hungary.**



Source: KSH

Figure 6: **Beet area and beet yield in Hungary 2000-2012.**



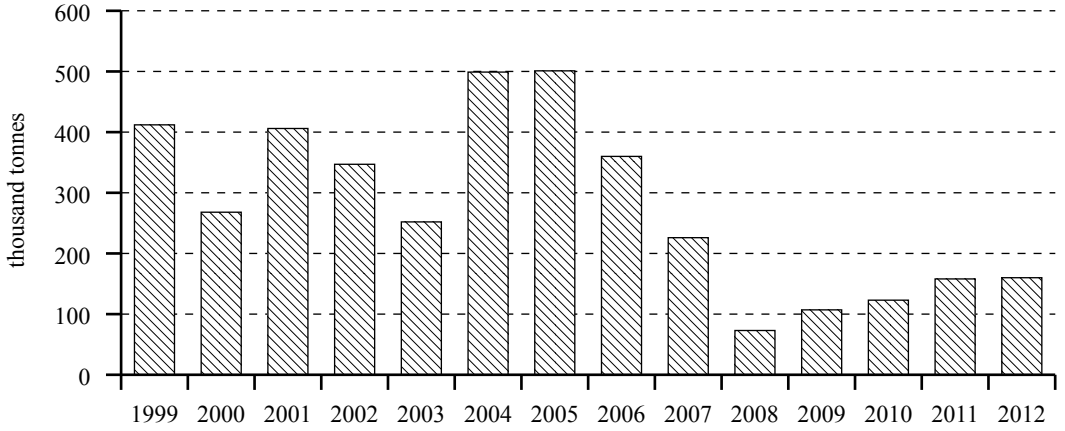
Source: KSH

Farmers from the south-western regions, where the four counties are situated, supply not only the Kaposvar plant but also deliver sugar beet to Croatian factories (Virovitica, Osijek) and before its closure in 2007 to a Slovenian factory near the border (CTOSZ, 2013). Sugar beet exports peaked at close to 300 thousand tonnes in 2005. The contracted volume was approximately 150 thousand tonnes in the last few years, equalling 15-20 per cent of the total Hungarian beet production.

Hungarian sugar production has not exactly followed the quota decline (Figure 7). Although the Hungarian production quota was set at 105 thousand tonnes, every year since 2009 10-20 thousand tonnes of out-of-quota sugar is also processed at the Kaposvar plant (DG AGRI, 2013). Additionally, the factory started sugar refining. According to industry sources the refined quantity was close to 30 thousand tonnes both in the 2011/2012 and in the 2012/2013 marketing years,

which is considerably above the experimental levels. Even if refining helps to use idle capacity out of the beet campaign, further expansion cannot be predicted because profitability was low. In order to restore (at least partly) self-sufficiency it would be necessary to expand sugar beet growing and production, but the outlook of the Hungarian industry also depends on market conditions, described later in the chapter.

Figure 7: **Sugar production in Hungary (quota and out-of-quota beet sugar and refining).**



Remark: figure for 2012 estimated by AKI.
Source: Eurostat, 2013

Demand on the domestic market

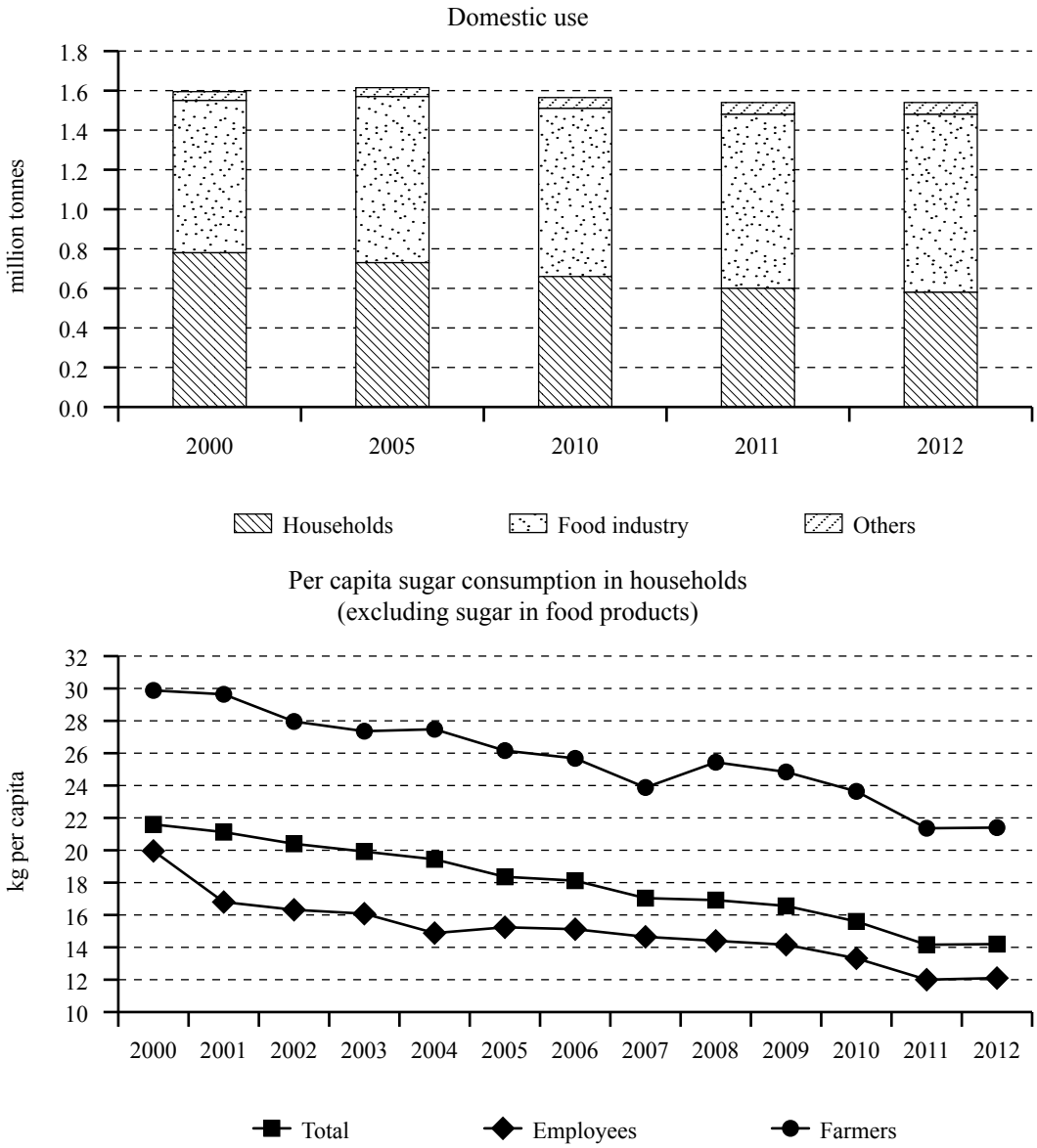
In Poland, consumption of sugar is varies only slightly, from 1.55 to 1.60 million tonnes annually. Significant changes occurred, however, in the structure of demand, which is created by households, food industry and other branches of the economy. The balance consumption of sugar, as it is the case in most industrialised countries, equals 39 to 41 kg *per capita.* The role of sugar in industrial food products in the consumption structure is still growing.

In Poland, household consumption decreased by 26 per cent between 2000 and 2011 to 580 thousand tonnes as a result of adverse demographic developments and changing consumer preferences. Household demand is characterised by very low income elasticity. Depending on the income group, coefficients of the income elasticity of demand are between -0.01 and -0.04 and are significantly lower than the 0.2-1.1 values for confectionery products (Kwasek, 2011). Sugar is referred to as an inferior good, since increased income is accompanied by decreased consumption (Engel's law). Average consumption of sugar in households (excluding sugar contained in industrial food products) decreased by 34 per cent to 14.2 kg *per capita.* Considerable differences remain in the level of consumption in respective types of households. The highest consumption is reported in farmers' and pensioners' households (about 21.5 kg *per capita*), which have a long tradition of baking homemade cakes and making fruit preserves. The lowest consumption is reported in the families of the self-employed and employees (12-13 kg *per capita*), which form a group of modern consumers with relatively high income.

In the analysed period, sugar consumption in food industry increased by 17 per cent to 900 thousand tonnes (Figure 8). This resulted from the growing demand for processed products on the internal market and from the dynamically developing food exports. The largest quantities of sugar are used for the production of soft drinks (390 thousand tonnes), confectionery products (340 thousand tonnes), dairy products (70 thousand tonnes) and fruit preserves (50 thousand tonnes). The growing consumption of sugar in food industry is positive for the entire food sector, since it increases the

benefits from the value added and economies of scale. In other branches of the economy (pharmaceuticals, apiculture) consumption is low, but still growing (ca. 60 thousand tonnes). The decisive factor in this respect is the possibility to manage part of the out-of-quota sugar.

Figure 8: **Sugar use in Poland.**



Source: calculations by IERiGŻ-PIB based on GUS data

While demand for sugar in Hungary did not show extreme year by year fluctuation, it has a continous declining trend since the beginning of the new millennium. Annual consumption per head, at slightly above 38 kg, was about the same in 1990 as in 1999, but in 2000 it dropped to 33 kg and never recovered, gradually falling to 28 kg in 2011 (KSH, 2013). In parallel, overall domestic demand fell from 359 thousand tonnes in 2000 to 322 thousand tonnes in 2007 (KSH, 2008) and to below 290 thousand tonnes by 2010 based on the presumably estimated *per capita* consumption.

Increasing isoglucose consumption in products would be the easy answer if someone looks for the reasons, but isoglucose was on the Hungarian market previously. Even if isoglucose extended its market share, it is just part of the answer. While in Poland the growing sugar consumption of the food industry stabilised the market, in Hungary it could not be the case.

Sugar consumed by the households in Hungary (excluding sugar in processed products) was 125 thousand tonnes in 2011, 30 per cent lower than the 178 thousand tonnes measured in 2000 in the COICOP survey (Figure 9, KSH, 2013). It can be assumed that higher income, a higher share of processed products in the consumers' basket and lower popularity of making home-made preserves are all impacting on sugar consumption. Concerning distribution, in 2012 most sugar (15 kg *per capita* per year), was bought by households with medium income level (third quintile). Households from the first quintile had the lowest consumption with 9.5 kg, while the households with the highest income bought only 12.5 kg annually.

Figure 9: **Sugar use in Hungary 2000-2011.**

Source: based on Eurostat and KSH

The Hungarian food industry and services consumed 155 thousand tonnes of sugar in 2000 and 2011. The highest industrial consumption occurred in 2006 when it reached 185 thousand tonnes. As food industry subsectors using beet sugar as basic material, among them manufacturing of confectionary, or of prepared food products, have lost around 20 per cent of their production volume since 2000, it is still surprising that food industry consumption avoided the decline measured in households consumption. Non-food industry consumption of sugar in Hungary is marginal, as in Poland.

Foreign trade

The Polish sugar sector is a net exporter. A slightly adverse balance of trade occurred only in 2009 due to a very low level of production in the 2008/2009 campaign. Nevertheless, the market regulation reform had a great impact on the foreign trade. Firstly, it reduced the self-sufficiency of production and much increased the role of imports in market supply. The self-sufficiency ratio has dropped to 103.6 per cent in recent years, and the import penetration ratio increased to 11.9 per cent (Szajner, 2011). Under such circumstances, export-oriented production declined to 18.2 per cent (Table 4). These developments in foreign trade resulted from regulations limiting the sales of out-of-quota sugar on the domestic market. The production quota of Poland is lower by ca. 200 thousand tonnes

than domestic consumption and such quantities must be imported to cover the shortfall. At the same time, since 2010 EU-12 Member States may import on preferential conditions sugar for refining[11]. Sugar refining allows for better use of capital and labour resources by the conglomerates.

Table 4: **Foreign trade in sugar of Poland.**

Items		Average		
		2000-2003	2004-2006	2007-2011
Production quota, thousand tonnes		1,620.3	1,613.9	1,431.1
Sugar production, thousand tonnes		1,879.1	1,931.0	1,648.6
Out-of-quota sugar:				
	thousand tonnes	258.8	317.1	217.5
	per cent	116.0	119.6	115.2
Import, thousand tonnes		70.1	54.2	181.5
Export, thousand tonnes		339.1	595.7	300.6
Domestic use, thousand tonnes		1,593.8	1,616.7	1,591.0
Indexes	Self-sufficiency – production/use	117.9	119.4	103.6
	Export orientation – share of exports in production	18.0	30.9	18.2
	Import penetration – share of import in supply	4.4	3.9	11.9

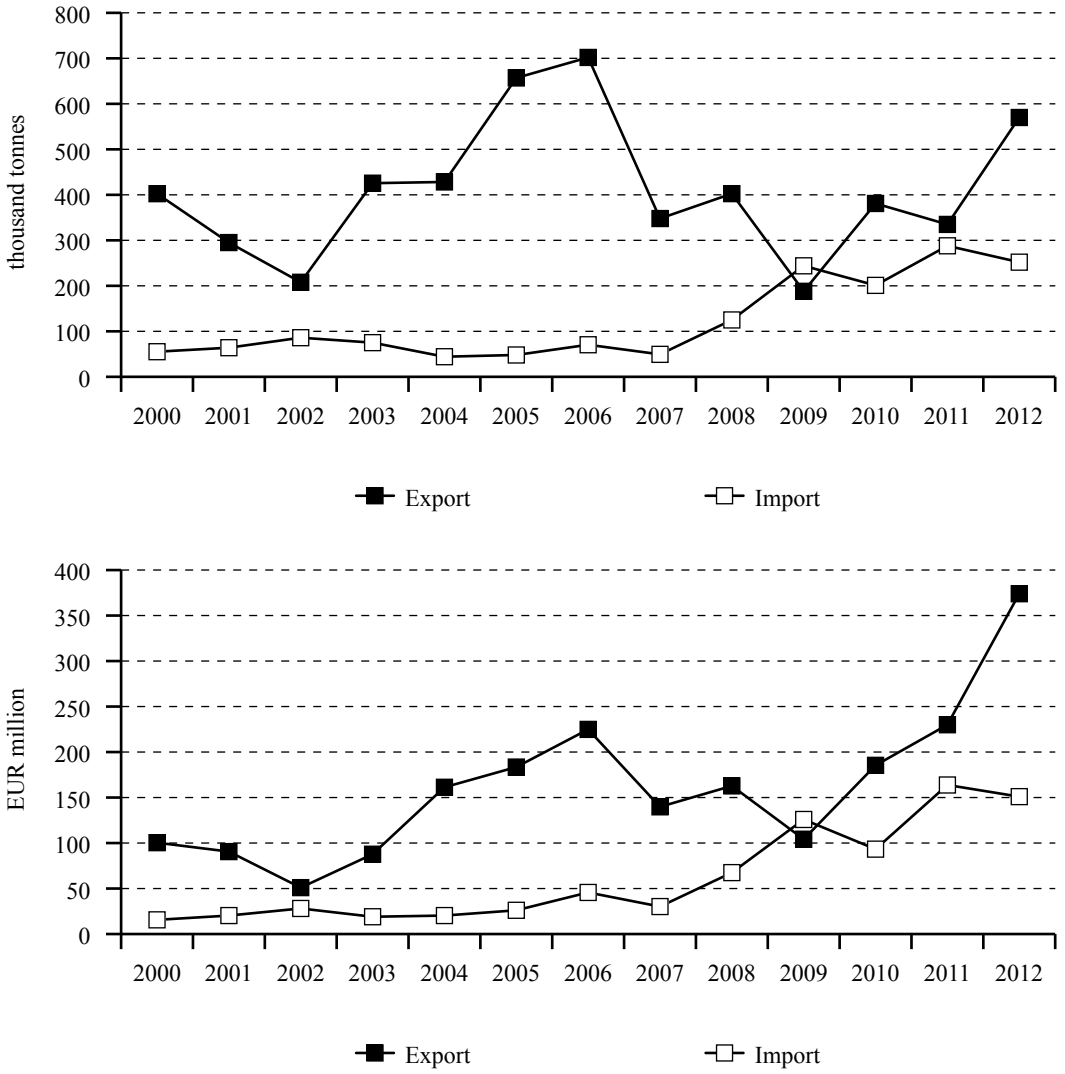
Source: calculations by IERiGŻ-PIB based on CAAC data

The Polish sugar market is becoming more connected with the EU and global markets. A large share of German conglomerates in the sugar industry had a great impact on the market; moreover, out-of-quota sugar is exported by companies registered in other EU Member States[12]. Global market prices much affect trade profitability. In recent years agricultural and food product prices have followed a strong upward trend, but with considerable fluctuations (Mitchell 2008). In 2011 the Food Price Index amounted to 228 per cent of the reference period 2002-2004, including sugar prices (369 per cent)[13]. From 2009 to 2012, global prices of sugar peaked at USD 600-800 per tonne. Such a surge resulted from the growing demand in the dynamically developing Asian countries (China and India). Transmission of energy carrier prices and speculative actions on the commodities exchanges played an important role in this respect. At the times of high oil prices, Brazil, which is the largest sugar producer in the world, allocated considerable quantities of sugar cane to bioethanol production. The surge in prices was also driven by the EU reform, which resulted in reduced production and subsidised exports. Reduced supply of EU sugar on the global market with simultaneous increase in imports to the EU contributed to the rise in prices.

High prices on the global market were reflected in the increased value of trade despite relatively immaterial changes in volume. In 2012, exports amounted to 570 thousand tonnes, and its value was a record EUR 374 million (Figure 10). Such a good output resulted from high production levels in the 2011/2012 and 2012/2013 campaigns, as well as high prices on the international market.

[11] Commission Regulation (EC) No 828/2009 of 10 September 2009 laying down detailed rules of application for the marketing years 2009/2010 to 2014/2015 for the import and refining of sugar products of tariff heading 1701 under preferential agreements.
[12] Commission Regulation (EC) No 951/2006of 30 June 2006 laying down detailed rules for the implementation of Council Regulation (EC) No 318/2006 as regards trade with third countries in the sugar sector.
[13] Food Outlook Global Market Analysis, FAO, May 2012.

Figure 10: **Foreign trade in sugar in Poland.**



Source: calculations by IERiGŻ-PIB based on CAAC data

Over the period 2000-2011 the geographical destinations of exports of Polish sugar changed considerably. Prior to EU accession, sugar was exported mostly to Arab countries and the Commonwealth of Independent States (CIS). These exports were triggered by export refunds[14] and the obligation to sell out-of-quota sugar beyond the state borders. The shares of the EU-15 and CEFTA countries[15] in exports were low because there was also a surplus supply on their domestic markets and trade took place solely under small preferential quotas. The geographical destinations of exports significantly changed after EU accession, with a considerable increase in the share of exports to other EU Member States (Germany, the Czech Republic and Slovakia). This development was also supported by the market regulation reform, which led to abandonment of sugar production by five Member States and to many others becoming importers. However, in times of high production any

[14] Schedule LXV - Poland"; Part IV – Agricultural products – Commitments limiting subsidization; Article 3 of the Agreement on Agriculture, Section II: Export Subsidies: Budgetary Outlay and Quantity Reduction Commitments, www.wto.org.
[15] Countries signed the Central European Free Trade Agreement.

surpluses must be exported outside the EU. Such a situation occurred in Poland in 2005-2006 and in 2011-2012, when large quantities of sugar were sold to Asian countries and to the Middle East.

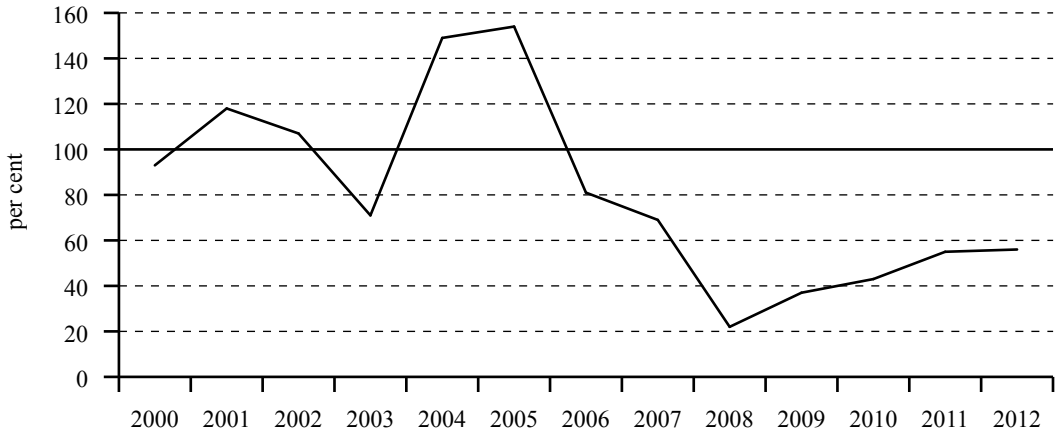
Poland's trade partners in imports are mainly EU sugar conglomerates. In 1995-2000, the EU-15 exported sugar to Poland with the use of export refunds and Polish businesses imported it under the preferential quota. Certain CEFTA countries which had been granted lower duty import quotas (such as Romania) were also important partners in imports. Since EU accession Poland's integration with the EU sugar industry has become even closer, which is reflected in high imports from EU Member States, which currently amount to ca. 90 per cent by value. Since 2010 Poland has also imported sugar to refine from developing countries.

Foreign trade is much concentrated in terms of geography, being carried out with only a few countries. The 20 leading countries in respective years accounted for almost 100 per cent of the value of exports and imports. Businesses from Russia, Uzbekistan, Lithuania and Germany have long been the main recipients of Polish sugar. In times of high exports, incidental important recipients also included Pakistan, Sri Lanka and Ukraine, as well as Syria and Israel. In imports, the main partners were the EU Member States with high production: Germany, France, the United Kingdom and the Czech Republic. Imports from ACP (Specific Asian, Caribbean and Pacific Countries) and LDC (Least Developed Countries in this case Cuba, Jamaica and Zambia) have recently increased.

In Hungary foreign trade has traditionally played a less significant role than in Poland. The Hungarian sugar industry was usually able to cover the domestic sugar demand but significant surplus production occurred only occasionally. The efficiency of production as well as the applied national regime has not supported export-oriented production. It also adversely impacted the Hungarian businesses that Hungary joined to the EU with no 'B' quota allocation, due to previous WTO commitments.

The pre-reform foreign trade was balanced, as average annual net exports were only 28 thousand tonnes in the period of 1995-2004 and only 8 thousand tonnes from 2000 to 2005. In normal years, neither imports nor exports exceeded 50 thousand tonnes. Net exports were higher than usual in the calendar years of 1998 and between 2005 and 2007 followed by years when beet production peaked. While degree of self-sufficiency averaged a moderate 105 per cent from 2000 to 2007, it has also extremes as it increased to 149 and 154 per cent in the 2004/2005 and in the 2005/2006 marketing years respectively (Figure 11).

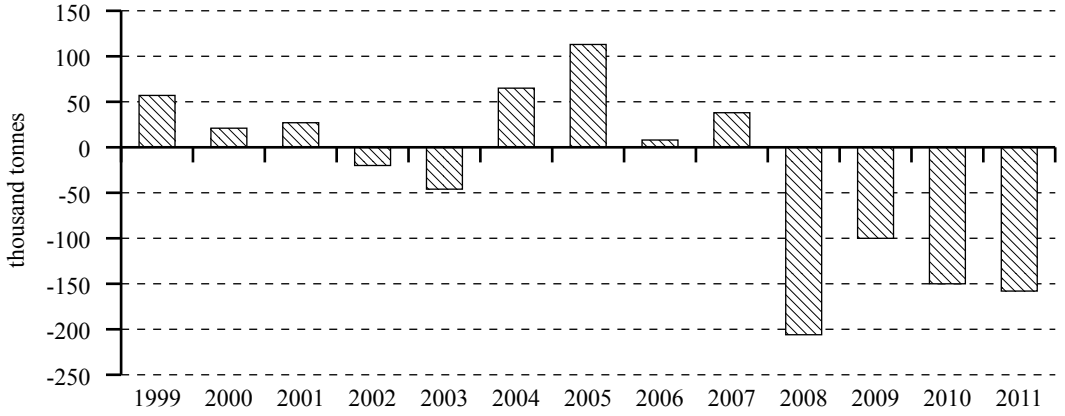
Figure 11: **Degree of self sufficiency of Sugar in Hungary.**



Source: Eurostat

Following the reform, production capacity and production dropped, and consequently self-sufficiency and the trade balance declined considerably (Figure 12). Since quota production was limited to 105 thousand tonnes, in reality domestic demand depended on 200 tonnes of annual imports. Refining raw sugar at the Kaposvar plant and out of quota sugar production could only mitigate the extent of this import dependency in recent years.

Figure 12: **Trade balance by marketing years in Hungary.**



Source: Eurostat

The Eurostat figures are based on estimated data. The official foreign trade data give an entirely different picture (Figure 13). Against all economic rules and common sense, the virtual trade balance does not reflect the drop in production.

The official KSH data show extremely high foreign trade turnover after 2007 and even higher since 2010. Both import and export volumes rose to new high levels. The high imports can partly be explained with the reduced domestic production. It can also be assumed that some white sugar arriving in the EU from Croatia and Serbia under preferential agreements are crossing the Hungarian border and being registered first as Hungarian imports before re-exported to other Member States, which process can also raise both import and export levels.

While trade activities raise some questions even on the import side, it is not comparable to the size of the statistical discrepancy distorting export data. No economic reason can explain the high exports reported to KSH by Hungarian enterprises in recent years. In 2010, 2011 and 2012 the volume of sugar reportedly exported from Hungary was around 250 thousand tonnes, while in parallel the volume of imports was between 250 and 330 thousand tonnes. As a result, despite the drop of sugar production and the low self-sufficiency, the trade balance deficits in recent years were much lower than expected, between 50 and 75 thousand tonnes, and the high exports even led to a trade surplus in 2010 (Figure 13).

Figure 13: **Foreign trade balance by calendar years in Hungary.**

Source: KSH

Based on the data it can be concluded that since 2008 a large part of the sugar exports are fictitious, carried out only to avoid Value Added Tax (VAT) payments, or as an object for application of VAT refund. Consequently, these virtual exports have made official Hungarian foreign trade statistics less reliable, therefore it is difficult to compile a balance sheet with them. Representatives of the only remaining Hungarian sugar factory at Kaposvar estimate the market share of sugar in Hungary that is subject of VAT-fraud recently reached 80-90 per cent (Gulyás, 2014). The statement might overestimate the penetration, but cross checking against Eurostat foreign trade statistics can confirm the large scale of errors.

Sugar is a storable, homogenous, bulk commodity and is usually offered in simple packages to consumers who have no market preferences toward any brands. All of these features are perfectly suited for VAT fraud. The sugar reform caused large turmoil on the Hungarian sugar market: old business relationships ceased and new marketing channels had to be developed. Furthermore, the rate of VAT levied on sugar was raised to 20 per cent at the end of 2006 (and is now 27 per cent), which also encouraged VAT fraud. Although illegal activities are present in other sectors of the economy and in other agri-food supply chains in Hungary, they are more visible in the sugar sector since the production side and extra-EU trade are strictly regulated.

Concerning Hungary's foreign trade relations, no established partners can be identified on the export side before 2008. Export destinations changed year by year, transactions seemed to be rather opportunistic. Important partners were usually the neighbouring countries, Slovakia, Romania, Austria and Italy. Occasionally Hungarian sugar was also shipped to more exotic markets such as Bosnia and Herzegovina, Syria and Tajikistan. In terms of sugar imports Hungary's business partners showed similar diversity in the pre-reform period. The largest quantities of imports often arrived from Croatia, Poland, the Czech Republic or from Austria.

Following the sugar reform, the registered Hungarian exports have become more stable in terms of trade relationships. Generally at least half of the exports were destined to Slovakia and Romania. In 2010 60 per cent of the total exports reported by Hungarian enterprises were delivered to Slovakia; the volume reached 164 tonnes, 50 per cent higher than the Hungarian quota production! It has to be restated that a significant share of the reported exports existed only on paper. In the last couple of years some sugar exports from Hungary have been registered towards the Austrian, Slovenian and Italian markets as well.

In terms of sugar imports, since 2008 the major partners were Croatia and Serbia which sold sugar under the preferential agreement signed with the EU. Austria was the third most important partner, followed by Slovakia. The Slovakian imports confirm that trade in this respect is not based on price advantage. The Kaposvar factory began to import raw sugar for refining from Mozambique, Brazil and Swaziland; share of raw sugar in imports is growing but still negligible.

Prices in the market chain

Sugar prices are analysed on three basic levels: farm gate price (i.e. sugar beet), sales price in the sugar industry and retail price of sugar. Domestic prices are determined by various factors, the most important of which are the EU market regulation system, business conditions on the global market and supply and demand on the internal market.

Buying-in prices for sugar beet are specified in contracts. Detailed terms and conditions of buying-in and delivery of sugar in the sugar sector used to be regulated by the nationwide industrial agreement which was terminated in 2008 by the National Union of Sugar Beet Growers. In 2012, sugar conglomerates concluded regional agreements with growers, specifying the terms and conditions of contracts. An important role in determining buying-in prices is played by the minimum buying-in price of EUR 26.29 per tonne, effective in the EU. The EUR exchange rate has a great impact on the minimum price and sugar payment. In 2006-2011, the exchange rate agreed upon for settlements was between PLN 3.37 and PLN 4.34. At times of PLN appreciation, the minimum price and sugar payments denominated in Polish currency decreased, which affected the profitability of sugar beet cultivation. Buying-in prices had high volatility, due to the EU accession and the subsequent changes in the minimum price (Table 5). In 2004, after adoption of the EU market regulation system and the minimum price of EUR 43.63 per tonne, prices paid to farmers and the profitability of cultivation increased significantly. Another surge in buying-in prices occurred in 2011, after PLN depreciation, good trading conditions on the sugar market and the good financial situation of the sugar industry. In the period 2000-2011 buying-in prices increased by 151.7 per cent, i.e. above inflation. However, there were years when the buying-in prices dropped in nominal terms and the profitability of cultivation was very low.

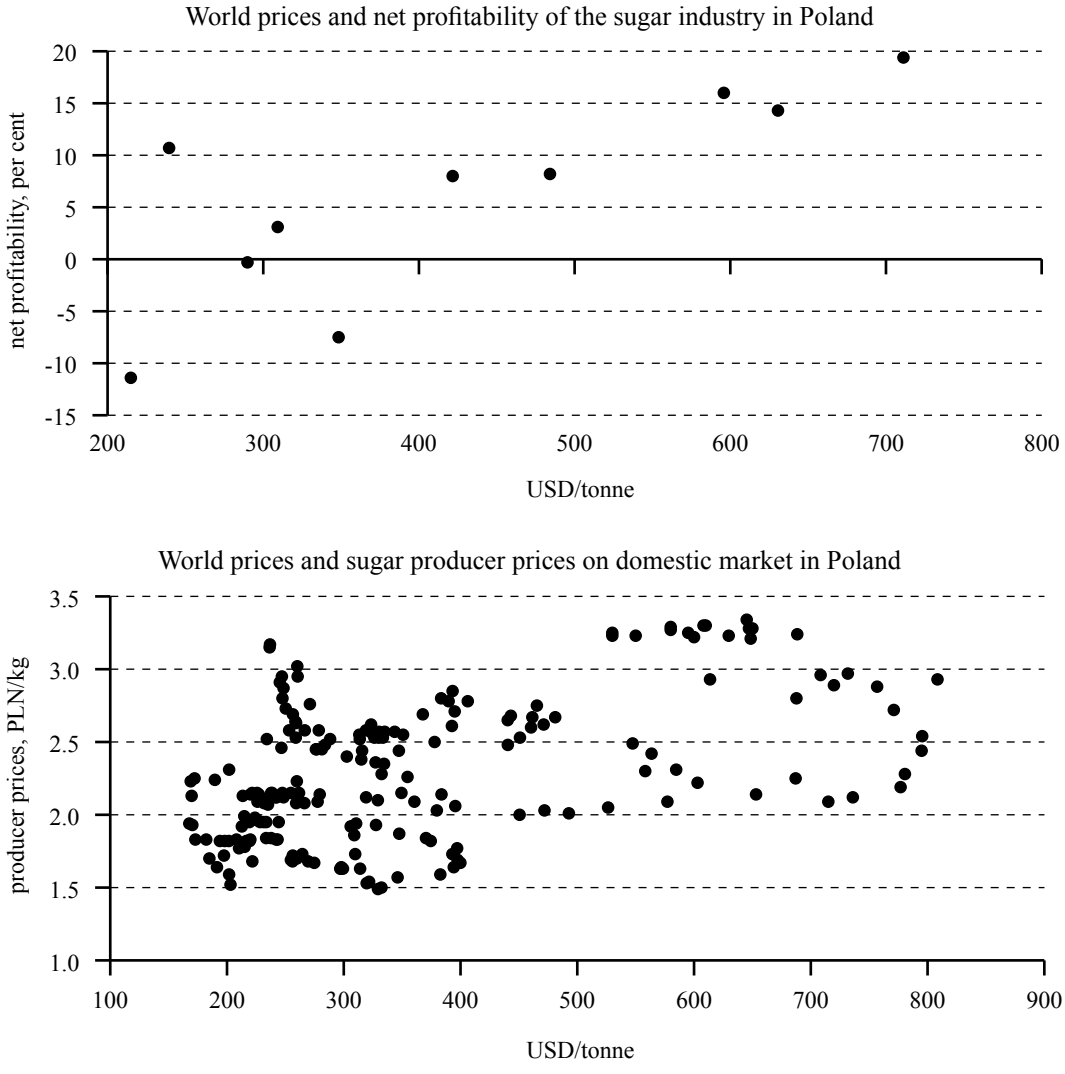
Table 5: **Sugar prices along the market chain in Poland.**

Year	Prices			Price indexes, previous year = 100			
	sugar beets	producers	retail	sugar beets	producers	retail	CPI
	EUR/tonne	EUR/kg					
2000	25.4	0.59	0.74	100.0	100.0	100.0	100.0
2001	30.3	0.58	0.69	119.3	97.8	92.8	108.5
2002	29.1	0.54	0.59	95.9	94.7	86.1	103.6
2003	28.2	0.41	0.49	97.1	76.0	82.7	100.8
2004	40.9	0.57	0.69	144.9	138.5	140.5	101.7
2005	43.5	0.64	0.78	106.4	111.8	113.2	104.4
2006	33.1	0.68	0.80	75.9	105.7	103.0	101.4
2007	28.7	0.66	0.80	86.7	97.6	99.5	102.5
2008	29.5	0.62	0.77	102.9	94.1	96.7	104.2
2009	26.7	0.58	0.72	90.7	93.5	93.6	103.5
2010	28.3	0.54	0.68	105.9	92.4	94.8	102.6
2011	36.1	0.74	1.02	127.5	137.8	149.3	104.3

Source: GUS

Sugar sales prices mainly depend on the business conditions on the market. During the reform, the intervention price of EUR 631.9 per tonne was replaced by the reference price set at EUR 404.4 per tonne. In the analysed period, sales prices were higher than the intervention price and then the subsequent reference price. Prices surged in 2004-2006 and in 2011, contributing to the considerable improvement of the financial results of the sugar industry. In 2001-2003 and 2007-2010, sales prices translated into EUR dropped in nominal terms. Sales prices were correlated with the prices of white sugar on the London exchange (contract No. 5). The Pearson product-moment correlation coefficient was R=0.51 and it was statistically significant (Figure 14). Accumulated sales prices increase ratio amounted to 126 per cent and was lower than inflation ratio due to the abovementioned nominal drops in sales prices.

Figure 14: **Impact of world prices in the domestic market of sugar in Poland.**



Source: calculations by IERiGŻ-PIB

Retail prices were highly volatile. They surged in 2004 before Poland's accession to the EU. Consumers, expecting an increase in prices after the accession, reacted with larger purchases of sugar supplies; consequently, prices rose by 40.5 per cent. A similar situation occurred in 2011 when, due to the very low production of 1,465 thousand tonnes in 2010, the supply decreased and consumers started buying supplies of sugar. As a consequence of the surge in demand and record-breaking prices on the global market, retail prices rose by 49 per cent. The accumulated retail prices increase ratio of 38 per cent was lower than inflation due to the nominal drops in prices in 2001-2003 and 2007-2010.

Although the same regime regulated the sugar market chain in Hungary as in Poland and in the other EU Member States, there are some differences.

The sugar market is usually oligopolistic globally. In Hungary at the time of EU accession there were only three companies producing sugar, of which only one remained after the policy reform. This strongly limits industrial data availability in the sugar sector because, according to regulations on statistics, no aggregated data can be published if the number of reporters is less than four in order to protect individual business interests.

Later, subsidies had a bigger impact on the price development of sugar beet in Hungary than in other EU Member States. At the same time changes in the global and regional sugar prices affected the Hungarian sugar price less directly due to non-market factors, most of all the market distortions mentioned above.

Sugar beet growing has been mostly profitable in Hungary. According to the cost-income analyses of AKI, producing sugar beet was more profitable than the benchmark cereal production in almost every year, although this relative income advantage was mitigated by the cereal price surges that occurred since the 2006/2007 campaign. It is also worth mentioning that sugar beet is usually planted on the best fields meaning that, firstly, comparing profitability to general cereal production can be misleading and, secondly, an extension of sugar beet growing would inevitably lead to a worsening of average growing conditions.

An interprofessional agreement provides a framework for price negotiations between sugar processors and beet growers. CTOSZ16, the organisation representing Hungarian sugar beet farmers, also negotiated contracts with the Croatian factories buying sugar beet from the south-western region of Hungary. The official sugar beet procurement prices published by KSH (Table 6) are corrected using CTOSZ information because between 2008 and 2010 KSH did not account for subsidies coupled to sugar beet production.

[16] CTOSZ – Cukorrépa Termesztők Országos Szövetsége – Association of Hungarian Sugar Beet Producers.

Table 6: **Sugar prices along the market chain in Hungary.**

Year	Prices			Price indices, previous year = 100			
	sugar beet	gross retail	net retail	sugar beets	gross retail	net retail	CPI
	EUR/tonne	EUR/kg					
2000	26.3	0.56	0.50	100.0	100.0	100.0	109.8
2001	30.3	0.70	0.62	115.0	125.1	125.1	109.2
2002	34.6	0.77	0.69	114.1	110.4	110.4	105.3
2003	35.5	0.71	0.63	102.7	92.3	92.3	104.7
2004	41.7	0.83	0.73	117.5	117.5	114.5	106.8
2005	41.3	0.80	0.70	98.9	96.1	96.1	103.6
2006	36.3	0.82	0.71	88.0	102.4	102.4	103.9
2007	30.4	0.91	0.76	83.8	111.0	106.3	108.0
2008	41.7	0.83	0.69	112.0	91.3	91.3	106.1
2009	40.7	0.77	0.64	91.5	92.1	92.1	104.2
2010	37.3	0.70	0.56	99.9	91.0	87.3	104.9
2011	44.8	1.07	0.86	143.7	154.1	154.1	103.9
2012	47.5	1.04	0.82	106.0	96.5	95.0	105.7

Source: based on KSH and CTOSZ (sugar beet prices 2008-2010)

Sugar beet growers who stayed in production were among the beneficiaries of the sugar reform. Since Hungary renounced over 50 per cent of its original quota, the remaining beet growers have received EUR 7.10 per tonne of production coupled support from EC sources for a fixed period of five years (from 2008/2009 to 2012/2013 marketing years), based on decision 73/2009 EC[17]. The EC also authorised Hungary to supplement this support by EUR 4.00 euro per tonne from national sources in the same period. Thanks to these supports, after deducting production levies, the minimum sugar beet price was EUR 36.55 per tonne in Hungary, instead of the reduced EU-wide minimum sugar beet price of EUR 26.26 per tonne. Depending on the EU market price of sugar in the actual year Agrana could also share its profit and promote growers with a premium of EUR 4-9 per tonne to secure the necessary sugar beet supply.

There is no information available on sugar producers' prices of in Hungary so the margin of production is also unknown and cannot be calculated. It is believed however that as the end of the quota system in 2017 approaches, not much support from price development can be expected. When the sugar reform was elaborated, the EC looked forward to lower sugar prices in the internal market and a narrowing of the gap between global and EU price levels. It has not happened, but the market has become more volatile.

Concerning the Hungarian sugar market it should be mentioned that the VAT rate on the retail price of sugar is presently 27 per cent and the high tax level is fuelling VAT fraud. The result of the black market and illegal activities linked to foreign trade referred to above are resulting in lower market prices. Calculation made by Agrana and by the Hungarian Sugar Production Council showed that sugar is not only offered at a lower customer price in Hungary than in the neighbouring countries, but the net retail price is sometimes lower than the wholesale/factory gate selling price of any sugar companies and factories operating in the region.

Thus the sugar producer is under pressure from two sides, firstly from producers and secondly from the unpredictable and distorted market prices. This market situation could be discouraging for any company considering future investment in the Hungarian sugar industry.

[17] COUNCIL REGULATION (EC) No 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers, amending Regulations (EC) No 1290/2005, (EC) No 247/2006, (EC) No 378/2007 and repealing Regulation (EC) No 1782/2003.

Conclusions

The sugar market is one of the most closely regulated food markets in the EU and it has an oligopolistic structure. The market regulation reform introduced in 2006/2007 had both a positive and negative effect on the Polish sugar industry. The main problem is that the production quota is much lower than the sector's production potential. Consequently, problems occur with the management of the out-of-quota sugar. Moreover, the reform assumed that there would be an increased share of imports in market supply.

The reform accelerated the restructuring process in the sector. Sugar beet is cultivated on medium and large farms and in regions with the most suitable soils and climate. Sugar is produced in 18 modernised sugar refineries which have increased their production potential and improved their effectiveness. The negative effect of the reform was the adverse balance of the restructuring contributions paid and the aid obtained.

Improved business conditions on the global and domestic markets caused an increase in sugar prices, which supported the improvement of the economic condition of the Polish sugar industry. Demand for sugar on the domestic market is stable, but its structure is changing. Sugar consumption in households is decreasing and consumption by the food industry is growing.

Investments in the Polish sugar sector have led to an improvement of effectiveness, which is the foundation of sustainable competitive advantage.

The Hungarian sugar industry has also undergone deep changes during the last two decades. The privatisation and the late implementation of the EU-like market regime have had a strong impact on the later development of the sector. Pre-reform restructuring led to concentration and to increased efficiency both in sugar beet growing and in the industry. The 2006/2007 sugar reform in Hungary closed with a positive balance from a short-term financial point of view; however, it resulted in the dismantling of the majority of the production capacity and a drastically changed industry and market structure. Consequently, the country lost its self-sufficiently in sugar and was left with one operating sugar refinery.

Our comparison has not revealed large differences in the two countries concerning sugar beet growing conditions and could not identify major advantages concerning efficiency of sugar processing. The different development paths of the Polish and Hungarian sugar sectors followed by the EU accession is evidence that market factors and past events can be more determining than pure natural conditions and industrial efficiency.

The CAP reform and the abolition of the quota system in the coming years will create new challenges for the European sugar sector. The Polish industry is looking forward to exploiting idle capacities and the offerings of the opening market. Hungary will have a chance to rebuild its processing capacities, but it definitely requires the creation of fair market conditions. In order to sustain the profitability of sugar beet cultivation and to assure the viability of the sugar sectors targeted agricultural policy measures need to be put in place in both countries.

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Development of the Polish and Hungarian food industry from 2000 to 2011

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Introduction

The food industry is one of the largest and most important manufacturing sectors in the European Union (EU). Europe's food market is made up of about 287,000 companies and 4.25 million employees. With a market share of 12.9 per cent, the food industry is the largest manufacturing sector in value added terms; its contribution to the whole EU economy is 1.9 per cent (FoodDrinkEurope, 2012).

The industry's relatively limited but stable growth in production (2.6 per cent since 2008) and negative employment growth rates have yielded positive rates of productivity growth. Employment in the food industry represents about 15.0 per cent of the total manufacturing sector. Germany, France, Italy, Spain and the UK account for about 65 per cent of the turnover of the EU-27 whereas the twelve Member States that joined the EU in 2004 or later account for only 10.5 per cent. The share of the Polish food industry is 5.3 per cent of the turnover and 5.1 per cent of GDP of the EU-27, while the figures for Hungary are 0.86 per cent and 1.1 per cent respectively (FoodDrinkEurope, 2012).

The food industry is a key part of the national economy. By transforming agricultural raw materials into value-added products it provides farmers with markets for their products. The success of food manufacturers depends on the availability of an appropriate quantity of good quality, competitively priced raw materials. Farmers also rely heavily on an efficient food processing industry. A competitive agro-food industry requires a well functioning food supply chain. This chapter aims to document the evolution of the Polish and Hungarian food industry throughout the period 2000-2011. It discusses the developments in production and investments as well as changes that have occurred in the financial and economic situations.

Development of the food industry

Development of the Polish food industry

In the period 2000-2011 the value of Polish food industry output (in nominal prices)[3] has nearly doubled from PLN 92.9 billion to PLN 182.6 billion (Figure 1). There was particularly dynamic growth between 2003 and 2007, which was initially related to the prospect of Poland's entry into the EU and the increase in food prices, and later was primarily the result of increased agri-food product exports and growing domestic demand.

The global economic crisis that began in the second half of 2008 affected the Polish food industry. The economic downturn that in most EU countries turned into a short-lived recession contributed to a halt to the rapidly growing Polish food industry output. While its value in current prices increased by 23.9 per cent from PLN 147.4 billion in 2007 to PLN 182.6 billion in 2011 this was mainly due to the last year, in which the value of output increased by 12.5 per cent.

The value at current prices of the output of food industry enterprises (excluding micro-companies) increased from PLN 85.1 billion to PLN 175.1 billion in the period 2000-2011, i.e. 6.8 per cent per year (Table 1). Real growth in the value of output was 50.4 per cent (from PLN 85.1 bil-

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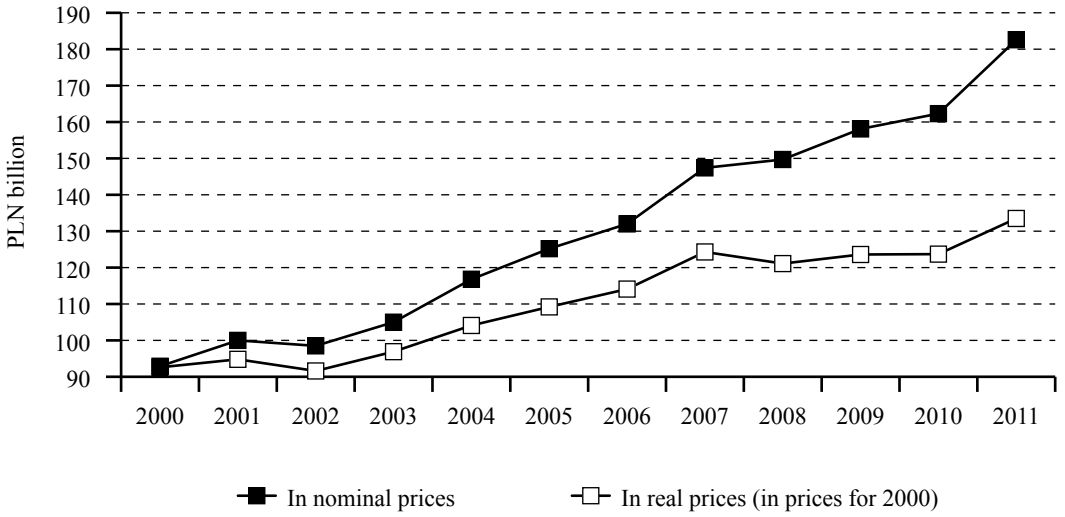
[3] Value of production sold is calculated in basic prices, which are lower than the actual transaction prices (sale) by the value of indirect taxes (i.e. excise and VAT).

lion to 128.0 billion), or 3.8 per cent per year. All branches increased sales and, in comparison with industry as a whole, higher annual rates of output growth occurred in the meat and poultry (8.2 per cent), confectionery (8.1 per cent), bakery (7.6 per cent) and dairy (7.1 per cent) sectors. A small decline in the real value of output occurred in the sugar industry (0.8 per cent per year) while higher real rates of decline in output (2.1 and 2.5 per cent per year) were observed in the tobacco and wine industries respectively.

Figure 1: **The value of food industry production sold in Poland (including micro-companies) in basic prices.**



Source: calculations based on data from GUS Statistical Yearbooks 2001-2012

Table 1: **The output of food industry enterprises in Poland (excluding micro-companies)[a].**

Sector of industry	Output (PLN billion)			Annual change 2000-2011 (per cent)	
	in nominal prices		in real prices	nominal	real
	2000	2011	2011		
Food industry (including the tobacco sector)	85.1	175.1	128.0	6.8	3.8
Including:					
Meat and poultry	20.0	47.5	34.7	8.2	5.2
Dairy	10.8	23.1	16.9	7.1	4.1
Milling and starch	3.3	6.3	4.6	6.2	3.2
Fruit and vegetables and potato	5.6	8.3	6.1	3.6	0.7
Sugar	3.9	4.9	3.6	2.0	-0.8
Confectionary	4.8	11.3	8.3	8.1	5.0
Bakery	4.7	10.5	7.7	7.6	4.6
Spirits	1.7	3.0	2.2	5.7	2.8
Wine	1.1	0.7	0.5	-2.9	-3.7
Brewing	4.9	8.2	6.0	4.9	2.0

[a] Conversion of the nominal value at current prices to real prices was done with the aid of the inflation indicators, i.e. retail prices of goods and services (in prices for 2000).
Source: calculations based on unpublished GUS data

Food consumption in Polish households (in value terms) showed an upward trend over the past decade, with its highest growth rate in the years following Poland's accession to the EU (Table 2). In the period 2003-2007, the consumption of food, soft drinks, alcoholic beverages and tobacco products (in current prices) grew at a rate of 6.1 per cent per year, i.e. 2.5 times faster than in the period 2000-2003.

During the global economic crisis (2008-2011), the growth rate of total household food consumption decreased to 5.2 per cent per year, and for the entire last decade stood at 4.8 per cent per year. In all periods of growth, the annual consumption of alcoholic beverages and tobacco was 0.8 to 1.6 percentage points higher than that of food and non-alcoholic beverages, but they accounted for about one quarter of the total expenditure on food.

Table 2: **The value of food consumption in households in Poland.**

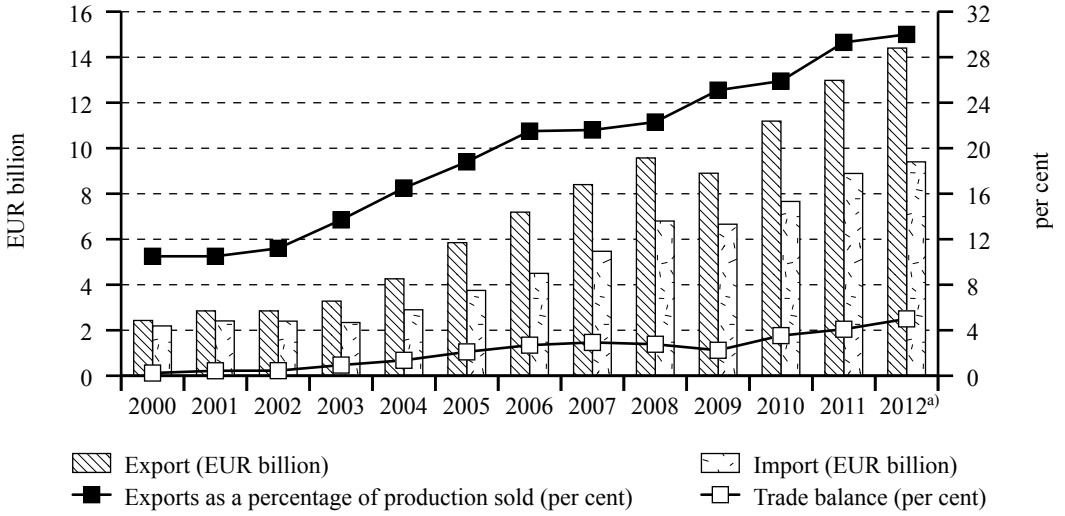
Specification	2000	2003	2007	2011	Growth per year (per cent)			
	(PLN billion)				2001-2003	2004-2007	2008-2011	2001-2011
	in current prices							
Food and non-alcoholic beverages	107.3	115.0	144.6	174.3	2.3	5.9	4.8	4.5
Alcoholic beverages and tobacco	32.6	35.7	46.5	59.5	3.1	6.8	6.4	5.6
Total	139.9	150.7	191.1	233.8	2.5	6.1	5.2	4.8
	in prices for 2000							
Food and non-alcoholic beverages[a)]	107.3	113.4	121.6	123.4	1.9	1.8	0.4	1.3
Alcoholic beverages and tobacco[a)]	32.6	33.2	38.7	38.4	0.6	3.9	-0.2	1.5
Total	139.9	146.6	160.3	161.8	1.6	2.3	0.2	1.3

[a)] Current values adjusted with indicators of individual consumption in the household sector.
Source: calculations based on data from GUS Statistical Yearbooks 2006, 2009 and 2012

The real rate of growth of consumption of food and non-alcoholic beverages in households was 1.9 per cent per year in the period 2001-2003, with a moderate increase in consumption of alcoholic beverages and tobacco products of 0.6 per cent per year. Total food consumption has increased at a rate of 1.6 per cent per year. In the period 2004-2007, the real growth in total food consumption accelerated to 2.3 per cent per year, including food and non-alcoholic beverages to 1.8 per cent per year, and alcoholic beverages and tobacco to 3.9 per cent per year. During the economic crisis there was a 0.2 per cent per year increase in food consumption in households; this was mostly evident in non-alcoholic beverages and tobacco (down by 0.2 per cent per year). Consumption of basic foods and soft drinks increased at a rate of 0.4 per cent per year. Throughout the past decade, the real growth in consumption of food and non-alcoholic drinks, as well as alcoholic beverages and tobacco, in households was similar, i.e. 1.3 per cent and 1.5 per cent per year, but at different times their consumption was subject to large fluctuations.

Poland's accession to the EU revived the trade in food industry products (Figure 2). In the period 2000-2012 exports of Polish food industries increased from EUR 2.4 to 14.4 billion and imports increased from EUR 2.2 to 9.4 billion. Thus the positive trade balance increased from EUR 0.2 to 5 billion.

Figure 2: **Development of foreign trade in the products of the Polish food industry.**



[a] Preliminary data.
Source: calculations based on unpublished data of the Analytical Centre of Customs Administration

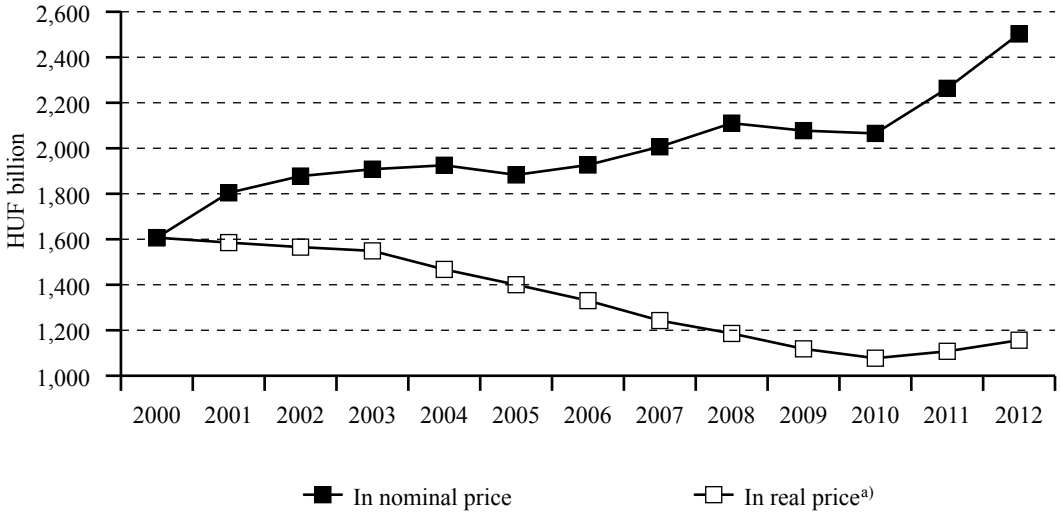
Before entering the EU, exports of Polish food products averaged about EUR 2.9 billion a year (2000-2003) and the positive trade balance ranged from EUR 0.2 to 1 billion. In 2003-2008, exports increased from EUR 3.3 to 9.6 billion. Importantly, the growth rate was higher than imports. The economic crisis caused a slight decrease in food industry exports and the stagnation of imports but this applied only to 2009; in subsequent years the rates of growth of exports and imports recovered to the levels prior to 2008, increasing the positive balance of trade. The dynamic growth of Polish food product exports which took place in the last decade, and especially after 2004, allowed exports to account for 30 per cent of food industry output in 2012, compared to only 10.5 per cent in 2000. It is a definite success of the Polish food industry, which has embraced the opportunity that arose after Poland's accession to the EU.

Development of the Hungarian food industry

In production value terms, the food industry, production of food, beverage and tobacco products, represents one-tenth of the manufacturing industry in Hungary. It is the third leading manufacturing sector of 13 industries.

The output of the food industry grew both in 2011 and 2012, reversing the downward trend of the preceding years. High prices contributed to a double digit increase in the production value in both years. After a slight decline during 2009-2010, turnover increased in 2011 and 2012 by 9.6 per cent and 10.6 per cent respectively. Sales volume stagnated in 2011 but was 4.5 per cent higher in 2012. The positive developments were primary driven by exports that increased by 18 per cent in 2011 and 2012 (Figure 3). Meanwhile, domestic demand expanded by only 5.5 per cent and 6.8 per cent during the same period. The volume of domestic sales saw a modest rise in 2012, breaking the negative trend of the previous years. The export volume grew in ten out of twelve years from 2000 to 2012. Growth accelerated in recent years and even exceeded 10 per cent in 2012. The improvement of exports is great in comparison to domestic sales. The rate of exports increased to over 36 per cent from 20 per cent of total sales between 2000 and 2011.

Figure 3: **The value of output in the food sector, 2000-2012.**



[a)] Calculated on the basis of domestic food CPI.
Source: KSH

The gross production value of the food industry in current prices grew by 10 per cent in 2012 versus 2011. In nominal terms, the production value of the food industry increased by an average of 3.8 per cent per annum during 2000-2012. In contrast, the production value in real terms shrank by 2.6 per cent per year during this period. Consumer prices doubled and significantly exceeded the growth of production value in nominal prices. The price spike disguised the poor performance of the food industry: while output in value terms jumped by 57 per cent, the production volume fell by 27 per cent. The most dramatic falls were recorded in the tobacco industry which averaged a decline of 8 per cent (-14.5 per cent in real terms) per year. The milling and confectionery production values also fell in nominal terms. In the period 2000-2012, above average output growth occurred in the production of meat and poultry, fruit and vegetables, and soft drinks and mineral water (Table 3).

Food consumption in Hungarian households rose steadily, but with a slowing rate between 2000 and 2011. Expenditure on food products saw an overall 81 per cent expansion at the current price level in this period. In the first few years an average growth of 9.8 per cent was recorded per year. This rate declined to 6.3 per cent between 2004 and 2007, and finally stalled in the last few years. Expenditure on alcoholic beverages and tobacco products saw an even greater decline, in contrast to the period before 2008 when it expanded at above average rates. In nominal terms expenditure leapt 62 per cent over the period.

The consumer price index of food products more than doubled between 2000 and 2011. This was the reason behind the 15 per cent decline in food consumption in real prices. Sales of alcoholic drinks and tobacco products fell by one quarter in real terms over the corresponding period.

Table 3: **Development of output in the branches of the food industry, 2000-2012.**

HUF billion

Sector of industry	Production sold (HUF billion)			Annual change 2000-2012 (per cent)	
	In nominal prices		In real prices[a)]	nominal	real
	2000	2012	2012		
Food industry (including the tobacco sector)	1,604.3	2,524.1	1,166.2	3.8	-2.6
Including:					
Meat and poultry	405.8	653.8	302.1	4.1	-2.4
Fruit and vegetables	127.1	205.6	95.0	4.1	-2.4
Dairy	197.8	222.4	102.7	1.0	-5.3
Milling and starch	93.0	85.5	39.5	-0.7	-6.9
Bakery	72.9	108.3	50.0	3.4	-3.1
Confectionery	44.6	38.8	17.9	-1.2	-7.3
Animal feed production	96.6	161.9	74.8	4.4	-2.1
Alcoholic beverages	21.5	24.4	10.2	1.1	-6.0
Wine	42.7	55.2	23.0	2.2	-5.0
Brewing	75.9	86.3	35.9	1.1	-6.0
Soft drinks and mineral water	75.5	161.7	74.7	6.5	-0.1
Tobacco	68.2	25.2	10.5	-8.0	-14.5

[a)] For the food processing sectors real prices were calculated on the basis of the food price index, for alcoholic drinks and tobacco goods the basis of calculation was the related price index.
Source: KSH

There have been great changes in food consumption habits in the past decade. Demand for meat products fell by 20 per cent while eggs, sugar, coffee and wine consumption suffered a similar rate of decline. Until 2007 the consumption of alcohol and tobacco products rose gradually but the economic crisis prompted a downward trend in sale of these products as the result of falling purchasing power and rising excise taxes (Table 4).

Table 4: **The value of food consumption in households in Hungary industry, 2000-2011.**

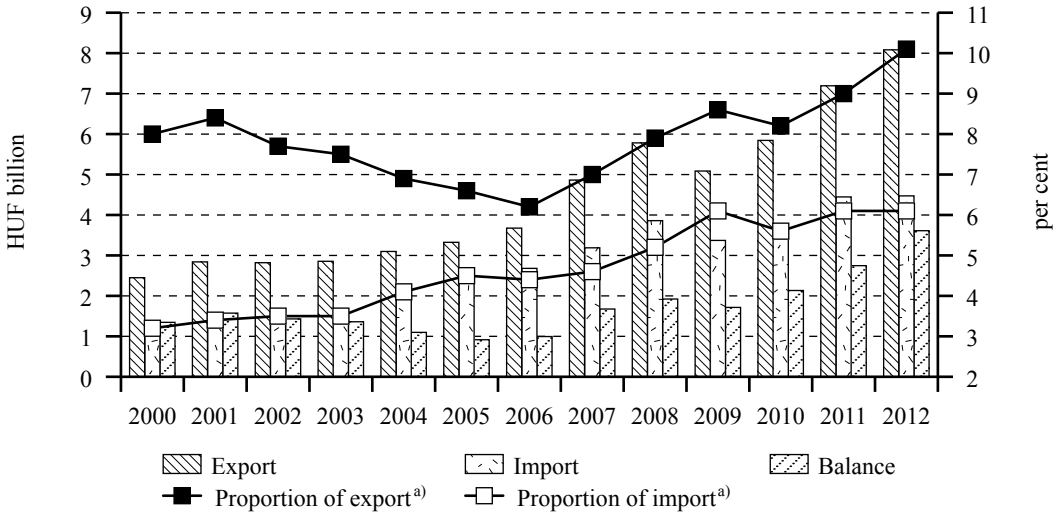
HUF billion

Specification	2000	2003	2007	2011	Growth per year (per cent)			
					2000-2003	2004-2007	2008-2011	2000-2011
	in current prices							
Food and non-alcoholic beverages	1,420	1,882	2,349	2,572	9.8	6.3	0.4	5.5
Alcoholic beverages and tobacco	600	856	1,159	971	12.6	9.4	1.2	4.5
Total	2,020	2,738	3,508	3,543	10.7	7.3	0.6	5.2
	in prices for 2000							
Food and non-alcoholic beverages	1,420	1,528	1,455	1,258	2.5	-0.8	-4.1	-1.1
Alcoholic beverages and tobacco	600	634	671	455	1.8	4.4	-3.9	-2.5
Total	2,020	2,162	2,125	1,714	2.3	0.7	-4.1	-1.5

Source: KSH

At the turn of the century, food industry exports accounted for 8 per cent of all Hungarian exports. The corresponding figure for imports was 3.5 per cent. After Hungary's accession to the EU the share of exports fell and that of imports increased. Foreign trade in the food industry has always shown a surplus but the balance between exports and imports worsened in the years after EU accession. Since 2007 the trade surplus has recovered and seen growth, in particular during 2011-2012. The trade in agri-food products has increasingly contributed to the net surplus of the national economy, the trade balance increased over the whole period from EUR 1.3 to 3.6 billion (Figure 4).

Figure 4: **Development of foreign trade in the products of food industry, 2000-2012.**



a) The rate of food products in total national export and import.
Source: based on KSH

A comparison of agri-food products according to their level of processing reveals that all types of products expanded in terms of export value. However, the growth rate of raw material exports – particularly cereals and oilseeds, significantly exceeded that of processed products including semi-processed and finished products. The share of raw materials rose 10 percentage points to 40 per cent of the total agri-food exports. By contrast, over the twelve years to 2012 raw materials had a 20-25 per cent share of agri-food imports. The proportion of semi-processed products fell, while finished products rose in the same period.

Structure of the food industry

Structure of the Polish food industry

Food processing is characterised by high fragmentation and a low level of concentration. This is due to a lower level of technical development of this sector and the nature of the object of labour, determined by the variability of processed agricultural products. Other significant characteristics of the food industry include its high relationship to local and regional markets, assortment diversity and relatively short production series and short expiry dates of products. These features promote activity by micro-, small and medium-sized companies. The food industry is therefore a branch of the economy that is particularly predisposed to the development of small and medium-sized enterprises (SMEs).

In 2011, production activity was carried out by nearly 15.7 thousand economic entities (Table 5), including:

- Nine thousand micro-companies (employing up to nine persons), constituting 59.5 per cent of food companies and whose share in employment was 15.0 per cent, but in sales only 5.9 per cent;
- 4.7 thousand small enterprises (employing from 10 to 49 persons), constituting 31.1 per cent of the total, with shares of employment and sales of 20.4 and 15.1 per cent respectively;
- 1,156 medium-sized companies (employing from 50 to 249 persons), i.e. 7.6 per cent of the total, whose share in employment was 27.6 per cent and in sales – 26.1 per cent;
- 278 large companies (employing over 249 persons), constituting just 1.8 per cent of the total, but with a share in employment of 38.3 per cent and in sales – 54.6 per cent.

Throughout the transition period, which saw the adaptation of the food industry to the market economy, economic globalisation and integration with the EU, together with the change of ownership structure, production, potential of manufacturing, retail and others, there were also changes in the industry's business structure. We can distinguish three stages:

- 2000-2003: in-depth restructuring of sectors and firms, and accelerated adjustment processes to compete in the Single European Market, in conditions of fragmentation and dispersion of activity;
- 2004-2007: integration with the EU and high recovery; and concentration processes with the development of specialised production;
- 2008-2011: initial slowdown in economic growth (as a result of the economic crisis) and then an upturn (overcoming crisis phenomena), while maintaining a relatively stable business structure.

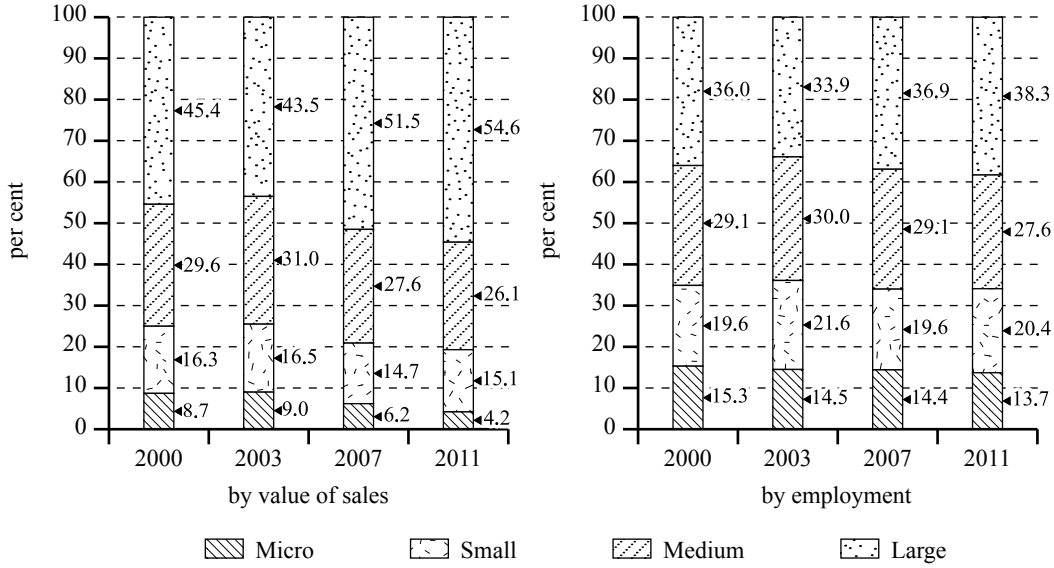
Changes in the period 2000-2011 were partly a continuation of systemic transformation, but were mostly associated with the need to meet the demands posed by globalisation and integration with the EU. As a result, up to 2003, the numbers of all groups of enterprises decreased; that of micro- and small companies to the greatest extent (by over 2.2 thousand). To a lesser extent, the numbers of medium-sized enterprises (by 144) and large companies (by 79) decreased too. Throughout this period, in terms of income from sales the position in the sector of medium-sized companies improved by nearly 1.5 percentage points, that of large companies decreased by nearly 2 percentage points, and the position of the smallest companies remained basically unchanged (Figure 5). In the period 2003-2007, the numbers of micro- and small, and medium-sized companies fell (by nearly 2.8 thousand and 23 respectively), similarly to their share in employment and sector turnover. Meanwhile, the number and position of large companies increased; in the period 2003-2007, their number increased by 18, i.e. nearly 7 per cent, reaching 51.5 per cent of the share in sales of the whole sector. In the four subsequent years, the numbers of all groups of companies decreased by several per cent; in the structure of value of sales the significance of large companies increased (to 53.4 per cent in 2009) at the expense of other groups of companies.

Table 5: **Business structure of the Polish food industry according to the number of employed persons.**

Specification	2000	2003	2007	2009	2011
Number of enterprises					
Total	21,977	19,516	16,727	15,686	15,185
Including:					
Micro (up to 9)	14,960	12,638	10,469	9,601	9,035
Small (10-49)	5,269	5,353	4,738	4,622	4,716
Medium-sized (50-249)	1,399	1,255	1,232	1,183	1,156
Large (over 249)	349	270	288	280	278
Average employment (thousand persons)					
Total	492.2	456.4	462.7	458.5	453.3
Including:					
Micro (up to 9)	75.4	66.5	66.7	68.7	61.9
Small (10-49)	96.6	98.4	90.7	95.3	92.6
Medium-sized (50-249)	143.0	137.0	134.5	127.2	125.1
Large (over 249)	177.2	154.5	170.8	167.3	173.7
Production sold (current prices, PLN billion)					
Total	89.2	101.7	141.8	154.9	179.3
Including:					
Micro (up to 9)	7.8	9.1	8.8	9.1	7.5
Small (10-49)	14.5	16.8	20.9	22.3	27.1
Medium-sized (50-249)	26.4	31.5	39.1	40.8	46.8
Large (over 249)	40.5	44.2	73.0	82.7	97.9

Source: calculations based on GUS Industry Statistical Yearbooks 2004-2012

Figure 5: **The business structure of the Polish food industry (by value of sales and employment, in per cent).**



Source: calculation based on GUS Industry Statistical Yearbooks 2004-2012

In the Polish food industry the tobacco, brewing, confectionary and oil (since 2005) sectors have the highest levels of globalisation and the highest shares of foreign capital. Since 2005 a high degree of globalisation has also been evident in the feed, soft drinks, alcohol and food concentrates sectors. In other sectors the degree of globalisation is low (Table 6).

In the sugar and confectionery industry, sectors with a very high degree of globalisation, the share of transnational corporations (TNCs) in sales did not change much in the period 2003-2011. The change was at the level of ca. 4 per cent in the tobacco and brewing industries. The biggest changes occurred in the oil industry where the share of TNCs increased by over 30 per cent due to the entry of foreign capital into Polish companies.

Table 6: **Transnational corporations' share of the value of sales of individual sectors of the food industry in Poland[a)].**

per cent

Sector of industry	2003	2005	2007	2011
Sectors with a very high degree of globalisation				
Tobacco	94.9	97.2	97.1	99.3
Brewing	82.8	83.5	84.6	86.4
Oil milling	55.4	86.4	86.5	92.1
Confectionary	73.3	72.3	72.5	72.6
Sugar	60.7	60.1	61.4	61.9
Sectors with a high degree of globalisation				
Spirits	18.1	46.6	49.3	37.6
Non-alcoholic beverages	32.3	46.1	49.0	51.2
Feed	31.8	32.1	34.8	48.6
Food concentrates	66.8	68.1	39.1	43.4
Sectors with a low degree of globalisation				
Fruit and vegetable	8.3	19.5	20.4	20.8
Dairy	12.0	14.4	15.3	18.9
Meat	15.7	13.8	12.8	17.5
Milling	11.4	13.5	10.8	15.1
Fish	7.0	5.6	3.6	4.2

[a)] Companies providing financial reporting; does not include baking and wine industry, where no TNC is operating.
Source: based on Chechelski, 2013

In the coming years, the industries with the highest level of globalisation are unlikely to undergo major changes, because they are dominated by the world's 3-4 largest TNCs. However, oligopolistic activities can already be observed in these sectors, especially in the tobacco and oil industry. There were major changes in sectors with a high degree of globalisation in the analysed period. They were mainly the result: in food concentrates – of a change in the Polish Classification of Activity in the first period, and after 2007, of the rapid growth of production in TNCs due to organic growth; in the spirit industry – of a weaker production performance of TNCs, which were more focused on the sale of imported branded products than the production and export of domestic products; in the feed industry – of restructuring, consolidation and modernisation of the facilities acquired by TNCs. In sectors of low globalisation there has been a steady increase in the share of TNCs in production. This process was fastest in the fruit and vegetable, and dairy and meat industries, resulting mainly from the growth of production with a higher degree of processing and the investment in existing plants.

The changes related to the functioning of Poland within the EU and in the conditions of economic globalisation significantly altered the direction of development of business structures in the food industry. The processes of production concentration, consisting of an overall decrease in the number of active enterprises, mainly the smallest ones, and an increase in the number of large enterprises and their share in production and employment, were resumed. After more than eight years of EU membership, the business structure of the Polish food industry has approached the structure found elsewhere in the EU.

The processes of concentration are common in all sectors of the food industry. In recent years, they have occurred the fastest in the sugar, dairy, pasta, feed, spirits and brewing sectors. In several sectors (tobacco and brewing, and partly also oil and alcohol) the business structure is oligopolistic, as it is dominated by several groups of companies. Concentration processes proceed slowly in industries with a dispersed structure of manufacturers. This applies in particular to the meat and bakery industries, as well as the fruit and vegetables, sugar and cereal and milling industries.

The processes of concentration will continue in the Polish food industry and large enterprises, including transnational corporations, will gain more and more importance. The position of micro- and small and medium-sized enterprises, which due to the nature of the sector are an important and permanent component of the business structure of the Polish food industry, but which are less able to participate in the Single European Market, will gradually decrease. Also the current difficult market conditions will be a major restriction for SMEs.

Structure of the Hungarian food industry

In the Hungarian food industry the enterprises are typically small and micro-enterprises. Between 2000 and 2011 the number of micro-enterprises more than doubled (Table 7). There is a similar trend in employment. In 2000, 3.8 per cent of employees in the food industry worked in micro-enterprises; in 2011 the figure was already more than 8 per cent. By contrast, at the beginning of the examined period large firms employed 55.1 per cent of workers in the sector, while at the end of the period the figure was only 35.6 per cent. The numbers of small and medium-size businesses dropped, but their role in employment increased between 2000 and 2011.

Table 7: **Business structure of food industry according to the number of employed persons.**

	2000	2003	2007	2011
	Number of enterprises			
Micro (up to 9)	1,797	2,257	2,971	3,605
Small (10-19)	860	917	998	1,030
Medium (50-249)	300	347	328	300
Large (over 249)	116	118	74	60
	Average employment			
Micro (up to 9)	4,544	5,252	6,651	7,435
Small (10-19)	18,801	19,410	21,769	21,963
Medium (50-249)	30,811	33,171	32,165	29,680
Large (over 249)	66,483	65,754	39,724	32,678
	Revenue (HUF billion)			
Micro (up to 9)	53.3	73.1	91.7	118.4
Small (10-19)	156.4	186.4	314.0	387.9
Medium (50-249)	387.4	494.6	701.8	882.9
Large (over 249)	1,261.5	1,780.2	1,445.4	1,577.4

Source: based on data from National Tax and Customs Administration of Hungary

Although micro-enterprises have increased their share of industry revenue from 2.9 to 4.0 per cent, the large companies still retain more then half of the sector's income (67.9 per cent in 2000 and 53.2 per cent in 2011). The share of small enterprises was 13.1 per cent in the final examined year, and that of the medium-size enterprises nearly 30 per cent.

Independently from years the company size depends on the nature of the branch activity. There are few micro-enterprises in the tobacco industry, margarine production and sugar production, but they are more common in the wine industry, bread production and in other fruit and vegetable processing. The number of small enterprises is determining in meat processing and packing, and in wine industry and bread production. Medium-size firms are rare in fish processing, but more frequent in meat processing. The number of large enterprises is determining in poultry meat processing and dairy production.

Table 8: **The size and composition of share capital by firm size.**

Company size	Year	Share capital	From this: foreigner	From this: domestic company	From this: domestic individual
		HUF billion	HUF billion	HUF billion	HUF billion
Micro (up to 9)	2000	20.7	6.2	3.7	9.3
	2003	19.1	4.6	4.2	9.7
	2007	45.2[4]	5.9	26.4	12.6
	2011	22.2	2.5	7.1	12.4
Small (10-19)	2000	22.7	7.0	4.5	9.5
	2003	25.3	7.6	5.1	11.0
	2007	41.8	16.3	11.5	13.6
	2011	39.9	12.9	12.7	14.0
Medium (50-249)	2000	51.5	14.9	19.2	12.0
	2003	49.0	13.9	18.0	13.6
	2007	61.8	19.1	18.9	19.3
	2011	63.7	21.8	23.2	14.3
Large (over 249)	2000	300.7	219.5	63.1	9.8
	2003	356.7	259.2	80.6	9.9
	2007	150.8	109.8	32.1	5.2
	2011	129.2	106.4	18.6	4.0
Total	2000	395.6	247.6	90.5	40.6
	2003	450.0	285.3	107.8	44.2
	2007	299.6	151.2	88.9	50.7
	2011	243.7	133.3	60.7	44.7

Source: based on data from NAV

It is not possible to draw conclusions based only on the numbers of enterprises because there are some branches where just one or two firms cover the market. The structure of the sector is dual – there are micro- and small enterprises with extremely low output, and dominant large companies are simultaneously present.

[4] The reason of outstanding value is a public limited company being voluntary liquidation. Its share capital is HUF 17 billion.

The total share capital in the food industry has declined by nearly 40 per cent between 2000 and 2011 (Table 8). The presence of foreign capital is dominant. In 2000, more than 60 per cent of the total share capital came from abroad, and it exceeded 50 per cent even in 2011. Around the time of Hungary's accession to the EU, significant efflux of capital from large firms was evident. There were more branches where the share capital decreased by half in one or two years, for example in poultry meat processing, fruit and vegetable, tobacco and brewing. The main reasons for this were (a) changes in regulations, (b) changes in market relationships, and (c) rearrangements within the branches.

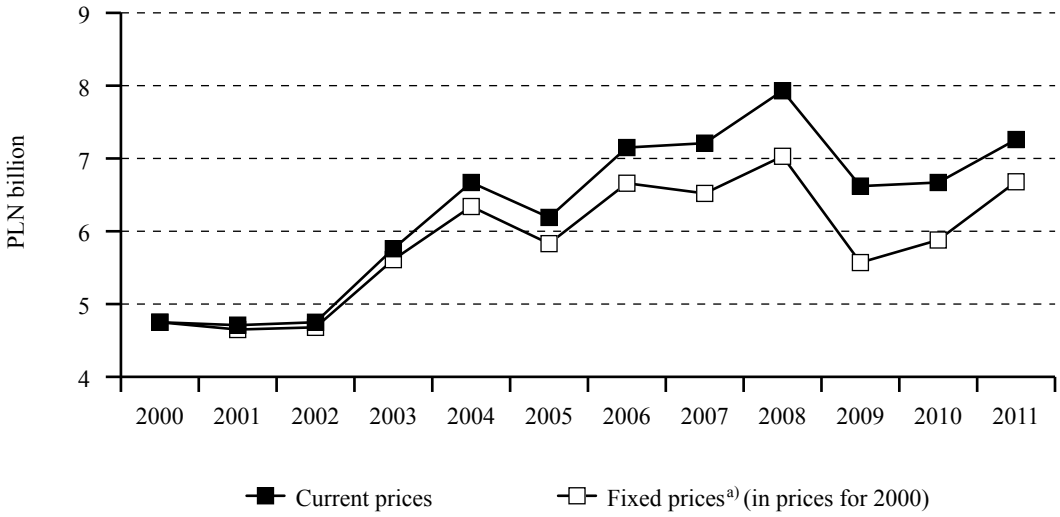
The presence of foreign capital is typical in big companies and increased from 73.0 per cent of total share capital in 2000 to 82.4 per cent in 2011. Characteristically, large firms with a foreign background have survived in the food industry. Share capital in micro- and small enterprises was typically provided by domestic private persons, and in medium enterprises by domestic companies.

Investments in the food industry

Investments in the Polish food industry

The perspective of Poland's entry to the EU resulted in increased capital expenditure in its food industry. From 2000 to 2003 investments increased by nearly 20 per cent (from PLN 4.8 to PLN 5.7 billion). Significant increases also took place in 2004, when capital expenditure amounted to PLN 6.7 billion and was nearly 20 per cent higher than in 2003. This high rate of investment has since been maintained. The global economic crisis slowed this trend: in 2009, investment decreased by 17.5 per cent to PLN 6.6 billion, though it was still 40 per cent higher than in the period 2000-2002 (Figure 6).

Figure 6: **Investment outlays of the Polish food industry.**



a) Current prices corrected by the investment goods index.
Source: calculations based on unpublished GUS data

During the economic downturn, processing companies made more sensible investments and financial institutions (banks) were more rigorous in analysing credit applications and recovery plans of enterprises. Investment restrictions were not dictated by lack of financial resources, as in the 2009-2010 period profits from the food industry amounted to ca. PLN 7.9 billion, the highest in the past decade. The uncertainty on the market stopped new investments. In 2009-2010, investment in the

food industry amounted to ca. PLN 6.7 billion per year. With economic recovery, companies began to make bolder investments and in 2011 investment expenditure amounted to PLN 6.5 billion, i.e. it returned to the level of before the economic crisis.

In the period 2000-2011, the highest capital expenditure was incurred by the meat and poultry industry (PLN 12.8 billion), which accounted for 18.6 per cent of all investments in the food industry (Table 9). This was followed by the dairy sector (PLN 8.3 billion), brewing sector (about PLN 6.9 billion), fruit and vegetables including potato (PLN 4.4 billion) and the confectionary and bakery sectors (about PLN 3.0 billion). The increase in investment outlays of the Polish food industry in the period of EU integration resulted, above all, from the need by processing plants to meet the EU veterinary, sanitary and hygiene standards. These adjustments also contributed to the improvement of competitiveness of Polish enterprises as compared to those from other EU Member States and third countries.

Table 9: **Value of investments in companies of the Polish food industry that submit financial reports.**

PLN million

Sector of industry	2000	2003	2007	2011	Total 2000-2011
Food industry (with the tobacco sector)	4.222	4.938	6.867	6.534	68.646
Including:					
Meat and poultry	566	1.089	1.335	1.103	12.773
Dairy (without ice cream)	482	622	956	676	8.334
Milling and starch	116	182	177	247	2.096
Fruit and vegetable and potato	225	276	453	521	4.419
Sugar	94	161	224	281	2.952
Confectionary	132	225	406	412	1.175
Bakery	217	145	240	324	2.938
Spirits	48	80	147	59	954
Wine	21	22	42	34	119
Brewing	722	650	625	361	6.850

Source: calculations based on unpublished GUS data

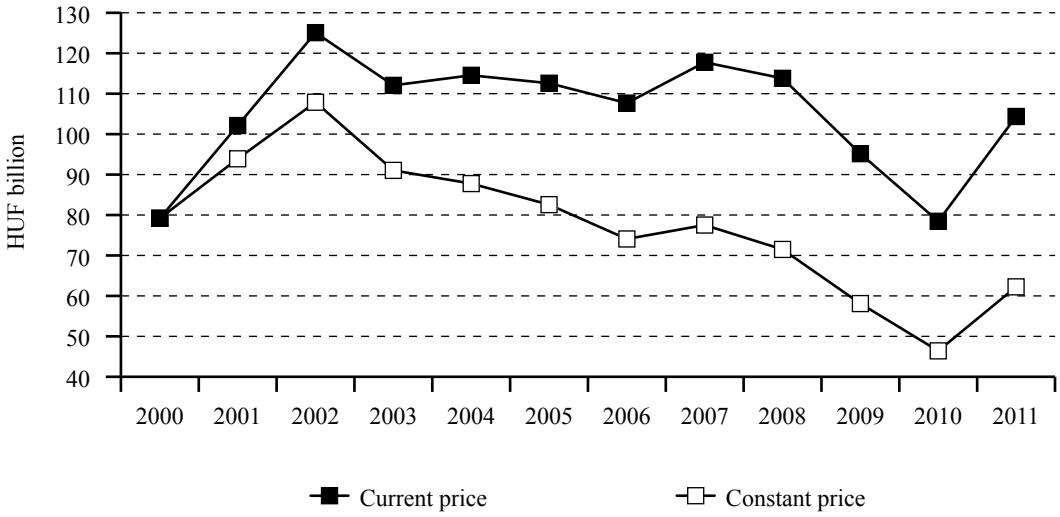
Investments in the Hungarian food industry

Investments have increased in nominal value almost one and a half times (146.6 per cent) between 2000 and 2011. Taking into account the 67.7 per cent increase in the price of investments during the same period, the real value of investments decreased by 12.6 per cent. The value of the investments increased by more than 60 per cent in the first two years, from HUF 77.0 billion (about EUR 256.7 million) in 2000 to HUF 124.4 billion (EUR 414.7 million) in 2002. There was a turning point in respect of the food industry in 2002, from this time onwards the value of investments essentially stagnated until 2008, fluctuating between HUF 117.1 billion (EUR 390.3 million) and HUF 121.8 billion (EUR 406.0 million). After 2008 spending on the development of food industry assets dropped back almost to the level of 2000 in nominal value. There was an increase again in 2011 (Figure 7).

The data clearly show that these changes do not primarily relate to Hungary's accession to the EU, but rather to the movement of foreign capital, as well as the economic crisis. Foreign property increased steadily until 2002 when its proportion exceeded 60 per cent (Rontóné, 2005). Foreign

investments were of great importance in the sector, not only from the point of view of capital adequacy, but through them technological development was ensured. The growing trend was broken in 2002 and since than the foreign capital has been in more or less steady decline. Hungary's EU accession influenced the food industry via the changed opportunities for support. The Common Agricultural Policy (CAP) has reduced the subsidies in the sector to a large extent. Previously, significant support was granted to the food industry under agricultural subsidies. Since EU accession the only way of supporting the sector is under the rural development programmes, where financial sources are limited.

Figure 7: **Investments in the Hungarian food industry.**



Source: calculations based on National Tax and Customs Administration of Hungary (NTCA) data

Table 10: **Investments of main food industry branches.**

current price, HUF billion

Denomination	2000	2002	2008	2010	2011	Total 2000-2011
Food industry total	79.2	125.1	113.8	78.5	104.4	1,262.8
From:						
Meat and poultry	16.9	26.8	13.5	14.8	18.4	249.4
Milk	5.6	8.3	8.0	6.9	8.8	98.3
Fruit and vegetable (including potato)	9.8	18.6	7.6	6.7	7.2	123.2
Cereal and starch	6.0	4.5	4.1	3.9	4.9	89.3
Confectionary	2.0	7.9	4.5	3.0	14.2	53.2
Bakery	8.7	11.8	10.8	12.0	13.1	138.3
Wine	5.3	6.1	0.0	7.9	10.8	38.3
Beer	5.0	8.4	0.0	1.2	1.3	8.0

Source: calculations based on NTCA data

The decline in 2008 and in the following years is the consequence of the global economic crisis, as a result of which the financial sources of development became increasingly narrow, while the necessity of investments became uncertain because of the deterioration of customers' payments and solvency.

The investment share of meat and poultry processing is the highest among the main food industry branches, characteristically 16.9 to 26.8 per cent. In this branch the turning point was in 2005. Until then the value of investments increased constantly, but from then until 2010 the value of investments declined, and only began to rise again in 2011 (Table 10). Investments in confectionary have been decreasing since 2002. (The outstanding value of 2011 is due to great investment of a large company in another sector that is classified under confectionary by its main activity). In the bakery sector and pastry production the amount spent on development grew moderately but steadily in the investigated period. In the remaining branches of the sector investments mostly stagnated or decreased.

Labour productivity

Labour productivity in the Polish food industry

Labour productivity is one of the crucial elements of competitiveness of the enterprise, the industry or the overall economy. It depends on many factors, including on qualifications and experience of the employees, the technical condition of machinery and equipment, their modernity and the organisation of work and incentive pay system and bonuses. Productivity improvements throughout the Polish food industry in 2000-2011 were primarily the result of increased output which coincided with a slight decline in employment. During this period the output value increased from PLN 92.9 to 182.6 billion (in real terms by 44 per cent), while the number of employees decreased by 12.2 per cent from 500.2 to 439.2 thousand people[5].

Table 11: **Labour productivity in the Polish food industry (excluding micro-companies) measured by the output value.**

Sector of industry	Labour productivity (PLN thousand/person)			Growth per year in 2000-2011 (per cent)	
	nominal prices		real prices[a)]	nominal	real
	2000	2011	2011		
Food industry (with the tobacco sector)	199.6	444.6	325.0	7.5	4.5
Including:					
Meat and poultry	192.2	427.4	312.4	7.5	4.5
Dairy	222.4	664.3	485.6	10.4	7.4
Milling with starch	308.5	665.2	486.3	7.2	4.2
Fruit and vegetable with potato	174.6	341.1	249.3	6.4	3.3
Sugar	190.4	1,386.3	1,013.4	19.8	16.4
Confectionary	137.8	392.1	286.6	10.0	6.9
Bakery	74.7	130.9	95.7	5.2	2.3
Spirits	236.1	726.0	530.7	10.7	7.6
Wine	294.7	505.0	369.2	5.0	2.1
Brewing	359.4	1,070.0	782.6	10.4	7.3

[a)] Conversion of the nominal value at current prices to real prices was done with the aid of the inflation indicators, i.e. retail prices of goods and services (in prices for 2000).
Source: calculations based on unpublished GUS data

[5] Average employment in the food industry decreased by 10.2 per cent from 446.8 thousand in 2000 to 419.2 thousand in 2011.

Improvement in productivity has been widespread in the Polish food industry in the past decade and has affected all sectors, although the rate of growth of labour productivity was very different (Table 11). In the period 2000-2011, labour productivity in food industry companies (excluding micro-companies), measured with the value of production sold at current prices, increased from PLN 199.6 to 444.6 thousand per employee, and in real terms by 63 per cent from PLN 199.6 to 325.0 thousand per employee. The nominal rate of improvement in labour productivity was 7.5 per cent and in real terms 4.5 per cent per annum.

The fastest growth in labour productivity occurred in the following sectors: sugar (19.8 per cent), spirits (10.7 per cent), dairy and brewing (10.4 per cent each). The real growth in labour productivity in those sectors ranged from 7.3 per cent to 16.4 per cent per annum.

Labour productivity in the Hungarian food industry

The nominal rate of productivity (output value) per employee increased from HUF 16.5 million in 2000 to HUF 34.9 million in 2011, a 7 per cent annual increase (Table 12). The fastest growth came in the tobacco industry, the most labour productive sector. The production value of cigarette manufacturing reached HUF 140 million per employee in 2011. Great improvements in productivity were also seen in the production of beverages, such as brewing, soft drinks, distilled alcoholic drinks, fruit and vegetable, and in milling and feed products. The lowest rate of productivity was registered in bakeries (HUF 8 million production value per employee) and those of preserved bakery products and meat processing also lagged far behind other branches. The main reason for this is that bakery is dominated by micro firms.

Table 12: **Labour productivity in the food industry, 2000-2011.**

Sector of industry	Gross production value (HUF/thousand employee)			Change by year 2000-2011 (per cent)	
	nominal price		real price[a)]	nominal price	real price
	2000	2011	2011		
Food industry (with the tobacco sector)	16,456	34,872	17,062	7.1	0.3
Including:					
Meat and poultry	44,506	84,019	41,109	5,9	-0.7
Fruit and vegetables with potato	34,887	96,389	47,162	9,7	2.8
Production of milk products	26,154	38,504	18,840	3.6	-2.9
Milling products	16,932	63,716	31,175	12.8	5.7
Animal feed production	26,775	80,158	39,220	10.5	3.5
Bakery	4,522	8,219	4,021	5.6	-1.1
Confectionery	17,816	35,223	17,234	6.4	-0.3
Alcoholic beverages	17,832	46,365	21,738	9.1	1.8
Wine	12,251	26,327	12,343	7.2	0.1
Brewing	22,552	70,223	32,924	10.9	3.5
Soft drink and mineral water	21,092	48,013	23,492	7.8	1.0
Tobacco	38,294	140,735	65,983	12.6	5.1
Food industry (with) tobacco	16,456	34,872	17,062	7.1	0.3

[a)] The calculation based on domestic CPI.
Source: NAV

The gaps in productivity rates have increasingly widened among the various branches. The most labour productive sectors recorded the highest gains and the labour intensive sectors registered the lowest growth in terms of productivity rates in the period 2000-2011.

Economic and financial situation of the food industry

Economic and financial situation of the Polish food industry

It is already clear that Poland's entry into the EU in 2004 has been beneficial for the Polish food industry. Food producers have made the most of competitive advantages, most of which relate to price and quality; they have significantly increased production and exports, and consequently improved their economic and financial situation. The improvement of the condition of the food industry was also significantly affected by the public support given to the sector in connection with the Polish accession to the EU (both in the pre-accession period and in the period of Polish membership).

An improvement in the financial performance of the food industry was evident directly after the accession of Poland to the EU (Table 13). In 2004-2005, the net profit generated in the industry exceeded PLN 4 billion per year, a three-fold increase compared to the pre-accession period. The increase in net income also meant an increase in Rate of return on net revenue (ROR) and Rate of return on equity (ROE) – respectively to 3.5 per cent and 12 per cent in 2005. Thus, the profits in the food industry resulted in higher returns than other uses of capital, such as bank deposits or government bonds.

Table 13: **Financial results of enterprises of the Polish food industry.**

Specification	2000	2003	2005	2007	2009	2011	2012
Net profit in PLN billion	0.2	1.6	4.4	6.5	7.9	6.5	7.9
Rate of return on net revenue[a)] in per cent	0.24	1.56	3.54	4.25	4.67	3.38	3.75
Rate of return on equity (ROE)[b)] in per cent	-	5.31	11.99	14.15	14.95	10.79	12.14
Rate of liquidity[c)]	1.19	1.19	1.27	1.30	1.33	1.37	1.36
Debt ratio[d)]	-	0.50	0.47	0.46	0.46	0.53	0.52

[a)] Net income as percentage of net revenue, [b)] net income as percentage of equity, [c)] ratio of current assets to current liabilities, [d)] ratio of total liabilities (short and long term) to total assets.
Source: calculations based on unpublished GUS data

The effects of the increased production and exports of food producers in subsequent years have also been reflected in the financial results of the food industry. In 2007, the net profit rose to PLN 6.5 billion, and in 2009 to PLN 7.9 billion. At the same time, there was an increase in all profitability ratios. In 2009, the return on net revenue was 4.7 per cent and return on equity nearly 15 per cent. These indicators were an average 3 percentage points higher than in 2007 and several times higher than in the pre-accession period.

In recent years, the financial results of food industry enterprises have still been very good. In 2011 there was a slight decline in profits, as a result of which the profitability of net revenue decreased to 6.5 per cent and return on equity to 10.8 per cent, but in 2012 the net profit returned to the level of 2009-2010. This was followed by an increase in all profitability ratios – return on net revenue to 3.8 per cent, and return on equity to 12.1 per cent.

Table 14: **Net profit and rate of return on net revenue by sector in the Polish food industry.**

Sector of industry	Net profit (PLN million)					Rate of return on net revenue (per cent)				
	2000	2003	2007	2011	2012	2000	2003	2007	2011	2012
Meat	-95	166	695	680	891	-0.56	0.85	2.34	1.95	2.12
Poultry	-18	36	149	174	152	-0.54	0.70	1.67	1.21	1.03
Dairy (including ice-cream)	13	176	726	535	442	0.10	1.20	3.17	1.93	1.57
Milling and starch	87	100	286	242	156	2.51	2.69	5.75	3.71	2.28
Sugar	294	-495	137	1,270	1,670	6.66	-11.39	3.06	19.42	21.92
Confectionary	31.7	163.7	57.3	557.8	690.1	0.52	2.95	5.99	4.09	4.56
Fruit and vegetables[a)]	-327	107	407	348	618	-4.76	1.17	3.10	2.67	4.49
Potato	-20	21	66	61	78	-1.83	1.47	3.66	3.89	4.31
Bakery	41	35	274	395	489	1.79	1.32	6.12	5.98	6.74
Spirits	-49	39	238	-326	199	-2.47	1.71	7.07	-9.43	4.92
Wine	-9.4	-4.6	30.2	25.1	45.1	-1.15	-0.39	2.61	3.05	4.77
Brewery (with malt)	55	440	1,073	936	846	1.05	6.72	15.24	9.93	8.54

[a)] Together with the industry producing juices and fruit and vegetable drinks.
Source: calculations based on unpublished GUS data

Throughout the period under review the financial liquidity of food industry companies was also satisfactory and secure. In addition, the current liquidity ratio demonstrated a rapid upward trend – from 1.19 in 2000 to 1.30 in 2007 and 1.36 in 2012. The food industry therefore had no difficulty in the timely execution of its current financial obligations.

According to common standards, in companies that have a balance between foreign capital and equity, the debt ratio should be around 0.50. Therefore, there was a financial balance in the enterprises of the food industry throughout the period. From among the various branches, the most dependent on foreign capital were tobacco, spirits and poultry enterprises, while the least dependent were the sugar, confectionery and potato processing companies.

Table 15: **Financial ratios of the main sectors of the Polish food industry.**

Sector of industry	Rate of return on equity (per cent)				Rate of liquidity					Debt ratio			
	2003	2007	2011	2012	2000	2003	2007	2011	2012	2003	2007	2011	2012
Meat	5.14	12.89	10.96	13.28	0.87	1.03	1.05	1.24	1.22	0.55	0.50	0.52	0.54
Poultry	6.42	12.81	11.47	8.56	1.02	1.03	1.14	1.17	1.24	0.63	0.54	0.66	0.63
Dairy (including ice-cream)	5.44	16.24	7.51	5.99	1.19	1.29	1.41	1.47	1.53	0.48	0.44	0.49	0.47
Milling and starch	8.31	17.40	11.20	7.20	0.99	1.11	1.17	1.35	1.21	0.59	0.53	0.52	0.54
Sugar	-20.43	3.58	23.56	26.43	1.06	1.07	1.99	3.01	3.48	0.53	0.33	0.37	0.32
Confectionary	7.40	14.34	7.50	8.24	1.28	1.33	1.49	1.68	1.66	0.41	0.37	0.43	0.40
Fruit and vegetables[a)]	3.79	9.32	8.95	11.27	1.12	1.23	1.32	1.44	1.60	0.56	0.55	0.66	0.55
Potato	3.27	6.35	8.05	9.23	1.08	1.43	3.75	1.52	1.64	0.37	0.19	0.41	0.39
Bakery	4.80	22.35	20.91	23.70	1.24	0.96	1.27	1.25	1.21	0.47	0.48	0.48	0.51
Spirits	4.06	16.18	-12.85	11.82	1.47	1.37	1.29	1.12	0.99	0.54	0.50	0.72	0.78
Wine	-2.10	6.90	5.79	10.13	1.09	1.06	1.49	1.68	1.71	0.67	0.55	0.52	0.55
Brewery (with malt)	13.32	36.56	36.85	49.41	1.11	0.67	0.66	0.81	0.57	0.45	0.48	0.64	0.77

[a)] Together with the industry producing juices and fruit and vegetable drinks.
Source: calculations based on unpublished GUS data

There has been a large variation in the financial performance of the food industry by sector. In 2012, the highest profits were generated in the sugar (in this case they were actually record-breaking), meat, brewing, fruit and vegetables, dairy and bakery sectors (Table 14). The sugar industry had also the highest return on net revenue (21.9 per cent); this indicator was also high in the brewing industry (8.5 per cent), and the bakery (6.7 per cent), spirits (4.9 per cent), fruit and vegetables (4.5 per cent) and potato (4.3 per cent) sectors. Slightly different was the distribution of the return on equity. In this case, the highest rates were found in the brewing industry (49.4 per cent), and then in the sugar (26.4 per cent), bread (23.7 per cent), meat (13.3 per cent), spirits (11. 8 per cent) and fruit and vegetables (11.3 per cent) sectors (Table 15).

There was a significant improvement in the financial performance of most of the basic sectors of the food industry in the past decade. The greatest improvements were in the sugar, brewing, baking and fruit and vegetables sectors. In other industries, there were fluctuations between years, but generally the trend was more or less clearly upward.

Enterprises of individual industries lead diversified financial strategies of operation and increasing profits do not always mean improvement in their liquidity. This is evidenced by the low correlation between changes in the profits and profitability and liquidity. The increase in profits was accompanied by increased liquidity in industries such as confectionary, fruit and vegetables and potato, dairy, and meat and poultry. At the same time, there was a decrease in the current liquidity ratios in the brewery and spirits sector, and these ratios were relatively stable in the baking industry.

The good economic and financial situation of the Polish food industry and its individual sectors in the past decade, despite a slight slowdown in its growth during the global economic crisis, shows that the industry has proved to be quite resilient. Entities in the sector successfully survived the difficult period and after a temporary slowdown maintained their good financial standing.

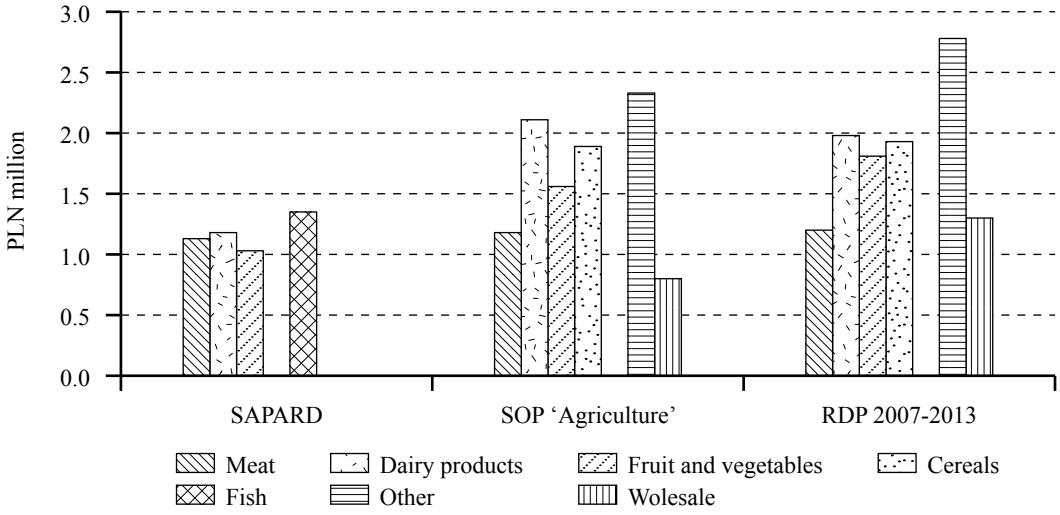
Support for the Polish food industry under the Common Agricultural Policy

The CAP instruments having the strongest impact on the food industry include aid schemes launched in Poland both in the pre-accession period (SAPARD[6]), as well during Poland's membership in the EU (SOP 'Agriculture', RDP 2007-2013), and also support following from implementation of the market mechanisms (production aid, consumption and promotion support, market intervention and export subsidies for agri-food products).

The value of investments in 2000-2011 amounted to almost PLN 69 billion. However, the share of the EU aid funds (co-financed from SAPARD, SOP 'Agriculture', RDP 2007-2013) in this amount was slight and totalled only PLN 4.0 billion (i.e. ca. 5.8 per cent of the total value of investments implemented in the food sector in this period) (Figure 8).

[6] Special Accession Programme for Agriculture and Rural Development

Figure 8: **Average value of State aid under the implemented investment projects according to food industry branches.**



Source: M. Wigier's calculations based on the data of the Agency for Restructuring and Modernisation of Agriculture

In 2002-2006 investments in the food industry focused mainly on adjustments to the EU sanitary and veterinary standards. Because of these requirements ca. 80 per cent of the value of investments implemented at that time in the meat and dairy industries concerned such activities. In the following period (SOP 'Agriculture') the majority of investments (45 per cent of their value) concerned improvement of the production quality and marketing of new products, and the resources available under the RDP 2007-2013 enabled the implementation of investments mainly resulting in increasing the value added (45 per cent of the value) and marketing of new products. Such a change in the nature of investments attests to the prioritisation of measures increasing competiveness of enterprises. The EU funds after Poland's accession to the EU were used by entrepreneurs from almost all branches of food industry. The major aid beneficiaries were the following industries: meat, fish, dairy and fruit and vegetable (for which the aid has been launched first, i.e. together with SAPARD programme 2002-2006). Thus State aid played a significant but less and less prominent role in the shaping of investment pace and trends in the food industry. Most definitively, it helped to develop investment activity, increase export and strengthen the competitive position of the Polish food industry, mainly on the EU market.

Support to agricultural markets, and indirectly also to the food industry, had different forms, e.g. interventions, production aid and consumption and promotion support, as well as export support (export subsidies). The funds spent in 2004-2011, amounting to ca. PLN 10 billion (67 per cent from the EU budget) for support to the agri-food sector, attest to the fact that the Polish enterprises actively participated in these market activities. Financial support to the agri-food sector in Poland in 2004-2011 differed in respective years and branches. Apart from the EU support following from the CAP mechanisms, some measures were supported from the national budget under national mechanisms (Table 16).

Table 16: **Expenditure executed under the Common Agricultural Policy from the EU and national budgets.**

PLN million

Description	2004	2005	2006	2007	2008	2009	2010	2011	2004-2011
Market intervention (100% EU)	0.1	744.1	714.9	159.3	13.5	1,550.8	289.0	255.9	3,727.5
Export subsidies (100% EU)	117.6	420.4	581.5	308.1	388.0	99.4	44.9	58.3	2,018.3
Production aid	0.3	210.2	254.0	356.9	421.4	445.8	611.0	364.3	2,664.0
Consumption and promotion support	2.2	16.0	49.3	100.5	333.5	509.0	275.7	193.9	1,480.1
Total	120.2	1,390.7	1,599.7	924.8	1,156.4	2,605.0	1,220.6	872.4	9,889.9
EU budget share (per cent)	100	86.6	85.0	48.9	53.9	76.1	41.8	47.6	67.4

Source: based on the data from the Agricultural Market Agency (AMA)

In 2004-2011 the greatest amount of financial support (37 per cent of total support) was allocated to intervention measures (PLN 3.7 billion) and these were targeted at restructuring aid on the sugar market and intervention purchases on the cereal, sugar and butter markets. Another important instrument supporting food industry was export subsidies. They played an important role in the first years of Poland's EU membership. The support amount totalling over PLN 2 million (20 per cent of total support) influenced better price competitiveness of the Polish products on the third country markets, as well as indirectly the food industry development. The greatest financial support in 2004-2011 was granted for exporters on the market of: sugar – PLN 1,180.4 million (58 per cent of the total refunds paid), milk and dairy products – PLN 334.1 million (16 per cent), beef and veal – PLN 176.2 million (9 per cent), pork – PLN 136.5 million (7 per cent) and processed products Non-Annex I – PLN 129.1 million (6 per cent). The amount allocated to production payments increased from year to year. Recently, more and more money has been allocated to consumption and promotion support, their share amounted to 15 per cent. Promotional programmes are now more and more important support elements of the agri-food branch. Promotional activities subsidised by the EU are used, primarily, to strengthen the position of the Community food products in the global market, and thereby increase the demand for specific products by encouraging their consumption.

The above-mentioned CAP mechanisms and regulations have an indirect or direct impact on respective branches of the agri-food industry. Owing to the investments made in the field of adjustment of Poland's meat, dairy and fruit and vegetable processing plants to the EU requirements they are presently considered as some of the most advanced in the European Community.

Economic and financial situation in the Hungarian food industry

The Hungarian food industry's decline is reflected in the falling operating profit even in current prices (Table 17). In addition, the rate of obligations in the sector is very high: values have been growing and in 2011 exceeded 60 per cent. Around the time of Hungary's EU accession the indebtedness of the sector was high because of interest-subsidised loans and other factors. The loan repayment obligation was very heavy for enterprises, so the results of financial operations showed significant losses. As a result of financial losses, the values of the profit after tax were low – mostly in the two most recent years.

Table 17: **Financial results of enterprises of the food industry.**

Denomination	2000	2003	2007	2011
Net profit (result after-tax) in HUF billion	63.33	70.94	17.83	28.26
Rate of return on net revenue in per cent	3.41	2.80	0.70	0.96
ROE	10.31	8.57	2.49	4.05
Rate of liquidity	1.25	1.21	1.23	1.13
Debt ratio	0.50	0.53	0.58	0.61

Source: based on NAV data

Equity ratio – from the structural indicators – shows a nearly stagnant value, on average 10 percentage points higher than the critical 30 per cent. Increasing values would be really favourable. The profit after tax fell significantly – in some branches they were negative. Between 2003 and 2007 the equity also fell, but less than the after-tax profit. Owing to this the value of ROE fell too. The rate of liquidity of the sector is close to the minimum required value of 1.3.

In 2000, after both the results of operating activities and net income indicated positive values, all the examined branches yielded promising results (Table 18). The brewery sector generated the highest profit. The poultry meat and the meat products achieved particularly high results of operating activities compared to their net income. The reason for this is the extraordinary profit generated by a small number of companies from the related sectors. The equity ratios reached sufficient levels in all branches. The highest value in debt ratio was recorded in the production of preserved pastry foods and cakes (Table 19); the standard deviation of other branches is not significant. The rate of return on equity (ROE) was low, but remained positive in all the examined branches. The liquidity reached the appropriate level in most branches, with the exception of bread and fresh baker's good, where the rate was lower than 1. The brewing sector shows an outstanding liquidity rate.

Table 18: **Results of the main sectors of the food industry.**

HUF billion

Sectors	Operating profit				Profit after taxation			
	2000	2003	2007	2011	2000	2003	2007	2011
Meat	6,595	5,387	2,617	6,694	2,159	2,195	388	2,100
Poultry meet	3,222	-6,244	6,122	5,410	5,348	-12,765	3,461	2,485
Meat products	2,041	2,358	3,803	90	2,536	1,586	3,827	-6,974
Potatoes	2,506	1,212	321	-534	2,175	905	141	-571
Fruit-vegetable juice	2,466	4,019	1,634	-1,273	1,302	3,133	1,302	-2,534
Other fruit and vegetable	8,896	7,226	4,450	6,992	3,207	3,648	413	2,694
Dairy product	5,810	-2,744	3,157	-2,125	4,739	-7,503	612	-6,834
Cereal	5,044	5,115	6,199	6,707	1,460	1,953	3,032	4,534
Bread and fresh baker's goods	1,204	3,655	840	2,603	374	2,837	616	1,535
Preserved pastry foods and cakes	1,973	3,850	2,304	2,490	1,505	3,326	1,991	1,941
Pasta	1,197	564	1,613	2,432	834	1,254	1,415	3,743
Sugar	4,774	3,600	-3,040	4,111	879	1,902	-3,600	4,118
Wine production	2,194	1,345	2,888	3,000	1,107	1,331	1,695	576
Beer production	8,173	15,735	3,689	3,563	6,170	18,035	1,136	-1,032

Source: based on NAV data

In 2003, the results of operating activity indicated negative values in the poultry meat processing and the dairy sectors, and the financial losses and results from extraordinary events on profit made them even worse. Beer production remained the most profitable sector. In this branch and in pasta production the net income exceeded the level of the result of operating activities due to the extraordinary profit.

The value of the debt ratio was favourable but increased in some branches compared to 2000. But there were a number of branches – particularly the meat processing and poultry meat processing sectors – that faced particularly high debt ratios. ROE became negative in some sectors, of which the poultry meat processing recorded the lowest value. The liquidity rate did not reach 1.3 in some branches.

The efficiency of the brewing sector had declined by 2007. Among the examined branches only sugar production had a negative value in the result of operating activities. Some sectors – for example meat processing or potato processing – achieved rather good results of operating activities, but experienced low profit after taxation at the same time. These sectors faced high debt ratios and suffered considerable financial losses.

In 2011 the results of operating activities were negative in more branches. The brewery and the meat product production sectors had the poorest financial performances, because the results of operating activities were positive but the profit after taxation were negative. The reason for the high profit after taxation of the pasta production was the financial profit, not the effect of extraordinary events. The debt ratio continued to rise and exceeded 50 per cent in most sectors. This rate of the meat processing and the dairy products are close to 50 per cent while in brewing it is over 70 per cent.

The values of ROE became negative as a result of the poor net income. Liquidity can be considered to be sufficient only in the meat product processing, sugar and wine sectors.

Table 19: **Financial ratios of the main sectors of the food industry.**

Sectors	ROE				Rate of liquidity				Debt ratio (per cent)			
	2000	2003	2007	2011	2000	2003	2007	2011	2000	2003	2007	2011
Meat	0.04	0.04	0.01	0.05	1.27	1.26	0.92	0.96	50.58	61.34	64.47	69.79
Poultry	0.11	-0.4	0.06	0.06	1.18	0.8	1.28	0.93	54.58	73.11	49.78	61.2
Meat products	0.14	0.06	0.11	-0.19	1.1	1.02	1.33	1.43	56.59	59.73	60.46	55.22
Potatoes	0.41	0.14	0.05	-0.23	1.15	1.1	1.4	1.18	58.06	55.25	62.54	52.46
Fruit-vegetable juice	0.09	0.16	0.07	-0.12	1.47	1.61	1.51	1.2	50.66	43.22	42.91	52.7
Other fruit and vegetable	0.08	0.05	0.01	0.05	1.19	1.13	1.06	1.19	55.06	58.16	64.76	59.48
Dairy product	0.18	-0.11	0.01	-0.21	1.17	1.01	1.38	1.21	57.84	52.3	56.26	68.89
Cereal	0.05	0.06	0.08	0.13	1.16	1.18	1.03	1.24	57.98	56.01	58.25	51.63
Bread and fresh baker's goods	0.02	0.1	0.02	0.05	0.94	0.99	0.95	0.95	51.74	50.86	55.54	52.65
Preserved pastry foods and cakes	0.09	0.23	0.22	0.11	1.39	1.89	1.2	1.01	23.88	28.22	47.83	49.79
Pasta	0.15	0.14	0.12	0.21	1.49	1.3	1.45	1.14	48.45	50.35	47.69	49.83
Sugar	0.03	0.05	-0.44	0.18	1.12	1.21	1.67	1.77	52.19	45.6	46.93	47.4
Wine	0.03	0.03	0.02	0.01	1.51	1.59	1.77	1.71	51.02	46.72	48.63	48.04
Beer	0.15	0.34	0.03	-0.11	1.92	1.61	1.11	0.77	40.95	43.92	50.56	73.34

Source: based on NAV data

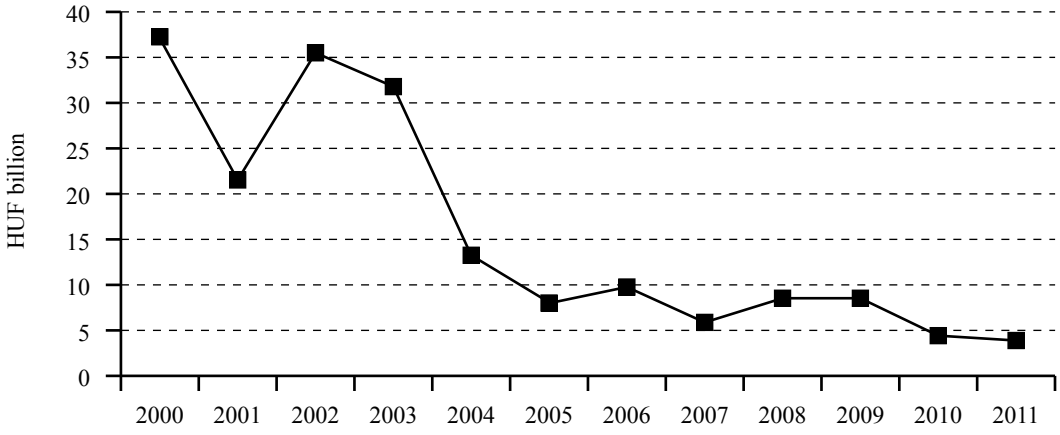
Supports of the Hungarian food industry in the examined period

The support system that was changed after Hungary's EU accession has significantly contributed to the decline in profit in the Hungarian food industry. Earlier, as the processing sector of agricultural raw materials, the food industry received significant income subsidies in the framework of agricultural funding. As a result the food industry seemed to be profitable, but these grants masked the absence of efficiency and technological development. However, this also meant that many investments that would have been necessary in order to prepare for EU membership were unfulfilled.

The amount of this support strongly declined after the accession, from in excess of HUF 35 billion before EU accession to les than HUF 5 billion in 2011. It present takes the forms of export subsidies and market supports (Figure 9).

The sector could implement investments that were not carried out before EU accession with the help of investment subsidies within EU programmes. Like Poland, state aid for the Hungarian food industry enterprises was available in the framework of three rural development programmes in the investigated period: SAPARD in the pre-accession period, ARDOP (Agricultural and Rural Development Operative Programme) and NHRDP (New Hungary Rural Development Programme) after EU accession. In each programme one or two measure served the interest of food industry investments. Only primary agricultural product processors could participate in these programmes. (For secondary processors investments subsidies were available in other operative programmes). The objective of these investments were the modernisation of food processing technology, the related logistic, storage and warehousing capacities and IT background, increase food safety and hygiene, and compliance with environmental standards of the EU. The amount of investment subsidies paid within these programmes until the end of 2012 was about HUF 70 billion (EUR 233 million), that is about 5 per cent of investments. The share of sources allocated for food industry within the three programmes has decreased from about 25 per cent in SAPARD and 13 per cent in ARDOP to about 6.7 per cent in NHRDP. The small and decreasing proportion of food industry supports shows that the Hungarian economic policy was mainly agricultural-oriented and food processing has not received enough attention. The highest rate of payment was implemented in the meat industry and to a smaller extent in the winery, dairy and the fruit and vegetable processing sectors.

Figure 9: **Change of income supports of the Hungarian Food Industry.**



Source: based on NTCA data

Discussion, conclusions and recommendations

Reviewing the Polish and Hungarian food industry's main processes in the last ten years opposing trends can be seen in the two countries. The development of the Polish food industry is a 'success story', while the Hungarian sector has declined and fallen into crisis.

Poland was well prepared for accession to the EU, so its food industry could take advantage of EU membership. The accession significantly accelerated the development of the Polish food industry. Its condition in the first years of EU membership was better than expected. Concerns that the Polish food industry would not be able to handle the competition of food manufacturers from highly developed European countries, that it would reduce or even end the production of certain food products, and that the bankruptcy or liquidation of a number of food industry companies would follow, proved to be unfounded. After the accession, progress has been made both in the food industry as a whole and in each of its branches. The need for adaptation to operate within the European Community and comply with EU standards has caused large investments. There has been a significant increase in production and productivity, while the sector saw the return of concentration of production and consolidation of entities.

Above all, the Polish membership of the EU has allowed the advantages of Polish food producers in foreign trade to be shown via the rapid growth of exports and an improving foreign trade balance. Acceleration of the development of the food industry was not the result of any discernible development of the domestic food market, but rather the growth of Polish export orientation and the strengthening of the position of Polish producers in the EU market. This translates into a notable improvement in the economic and financial situation of the Polish food industry, and can be considered a huge success.

State aid played an important role in shaping the pace and direction of development of the food industry. Most definitively, it helped to develop investment activity, increase exports and strengthen the competitive position of the Polish food industry in the EU market.

In contrast, Hungary was not prepared for EU membership. The decline in the food industry had already begun one year before accession. The causes were mainly domestic, such as the lack of collaboration between vertical players, inadequate protection of interests or the absence of strategic thinking both in food policy and in companies. The favourable income situation because of income supports hid these problems, so the sector was in very weak condition when Hungary joined the EU. Foreign capital started to effuse from 2002, which indicated the difficulties of the food industry. The domestic sources could not substitute for foreign capital, so a substantial drop in the capital of food industry has taken place.

The effect of EU accession was unfavourable in two respects. Firstly, the above mentioned financial support for the food industry has fallen dramatically, and in essence has ceased. However, the CAP provides only limited sources under rural development programmes for the food industry, primarily for investment purposes. Secondly, since the EU accession supermarkets have had a greater opportunity within the EU to sell cheaper products – and sometimes goods of poorer quality –, squeezing out some domestic items from the Hungarian market. As a result, the balance of trade has been declining. In addition, the share of high value-added products has increased in imports, and decreased in exports. The lower domestic consumption and the rising imports have forced food companies to raise export sales, but this activity was not sufficient to substitute for the loss of the internal market. Moreover, in recent years the prices of agricultural products have risen significantly, but the food industry could not pass these on through its output prices because, due to the economic crisis, the purchasing power of domestic consumers has decreased significantly. The Hungarian food industry has found itself gradually being squeezed from two sides: from the side of raw material producers and from the side of domestic consumers. As a result the Hungarian sector suffered significant financial losses.

The difference in the sizes of the two countries' food industries significantly contributed to the opposing trends. In terms of GDP the Polish food industry is five to six times larger than that of Hungary. Consequently, the Polish companies could take advantage of economies of scale and were able to produce in larger quantities at lower prices, and could become more competitive at the international level. Because of their size they were more attractive targets for foreign capital investment by multinational companies.

To summarise, the last ten years of the Polish food industry can be described in terms of positive trends. The sector has responded well to Poland's accession to the EU. With a continuation of the current policy the Polish food industry will be able to maintain its development in the next programming period, too. By contrast, in the Hungarian food sector fundamental changes are needed. Data show that in the last decade the food industry has not received adequate attention. In order to develop the sector, it is very important to work out a development strategy. Increasing food processing and food security should be one of the main objectives of the CAP between 2014 and 2020.

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