

COST AND REVENUE OF FARM PRODUCTS: POLISH AND HUNGARIAN COMPARISON*

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Agricultural producer prices in Hungary and Poland are generally lower than in the EU-member countries. Poland generally produces on lower cost, and achieves higher margins than Hungary, though it should be stressed that member countries themselves also significantly diverge in producer prices even in case of products like cereals, milk, cattle etc. After the accession of Poland and Hungary to the EU, producer price level will not necessarily achieve the EU-average. The larger gap in producer prices can be beneficial, considered especially the declining trend of producer prices in the EU. It is possible that low production cost of both Poland and Hungary will attract European multinationals to invest in downstream sectors, if other necessary conditions will be met.

KEYWORDS: Agriculture; Production cost; Input prices; Poland; Hungary.

Agriculture is a critical issue for the possible eastward enlargement of the European Union (EU). Even in the Central European Free Trade Association (CEFTA), farm products constitute a critical field in the co-operation of member countries. Both Poland and Hungary are active founding members of the CEFTA, and aspirants to the EU, which facts might underline the significance of the comparative analysis of their agricultural sectors.

Both countries, Poland of 38 million population and Hungary of 10 million inhabitants, pay a special attention to the agriculture from different reasons. The greatest significance of the sector lies in employment in Poland and in exports in Hungary. In the GDP, it has not a high share, as it stays around 6 percent in both countries, but while in Hungary there was a sharp decline at the start of the 1990's, Poland shows a relatively stable contribution in the 1990's. Employment issues are obviously different. In Hungary, agriculture lost the majority of its active population within a few years, and decreased to a level below 7 percent. In Poland, a quarter of the active population is still working in

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this sector. Due to the greater importance in employment, Poland subsidises the agriculture double more than Hungary: the Polish Producer Support Estimate (PSE) varied from 17 to 25 percent in the second part of 1990's, while the Hungarian level oscillated from 8 to 14 (Agricultural Policies; 1999).

The contribution to foreign trade is similar in the two countries, however opposite trends are emerging. In Hungary, the agri-food export is rather stable, about USD 2.7-2.8 billion. Nevertheless, it composes a descending share in total exports in the 1990's (from 25 to 15 percent), while in Poland there is a stable share (11-14 percent) with an increasing value: from USD 2 to over 3 billion. As to the imports, similarly in both countries, upward trends are appearing. In both countries, the agri-food imports have doubled in the 1990's: in Hungary, from USD 0.6 to 1.2 billion, and in Poland from USD 2 to nearly 4 billion. Nevertheless, the share of the agri-food imports both in Hungary and Poland slowly fell, in the former from 6 to 5, in the latter from 12 to 9 percent. It follows that Hungary is a net exporter and Poland is a net importer country. Furthermore, Poland has lost its net exporter position already in the 1980's, and Hungary is the only one among Central and Eastern European countries (CEECs), which has not only maintained (as the other Bulgaria), but also expanded its net agri-food exports.

The doubling agri-food imports in both countries predict a challenge, especially if admission to the EU would soon be taken place, and the domestic suppliers would not be ready to match for the strong European agri-food chains at the free competition. Nevertheless, the current EU policy, with floating the date of accession, makes quite impossible to elaborate and execute an adjustment strategy for the Polish and Hungarian agriculture. The lack of strategy would be especially harmful, if 'the permanent five-year distance from the membership' continued for long. Obviously, there is quite a limited space for such an adjustment strategy, even if all information were given about the length of the pre-accession period, due to the GATT/WTO agreement on agriculture in force (The Uruguay round, 1995; Agricultural policies, 2000). However, commitments of WTO-member CEECs show quite different level of protection, and in this regard Poland has more possibilities than Hungary, which is expressed in a higher stability of agricultural prices.

Surveys for farm products by production cost and revenue

Both Hungary and Poland have detailed surveys on the main agricultural products, compiled every year by the Research and Information Institute for Agricultural Economics (RIIAE – Budapest) and the Institute of Agricultural Economics (Warsaw). In Poland, individual (family-) holdings are surveyed, in Hungary both agricultural enterprises (farming co-operatives and companies) and individual holdings are surveyed since several decades (Kertész; 1994–1999), (Rátkai; 1994–1999). (In Hungary 1400 enterprises and 11 000 individual holdings are surveyed which means 1.5-2 percent sampling proportion in the case of enterprises and 0.8-1.2 percent sampling proportion in the case of individual holdings.) The structure of the Polish and the Hungarian surveys are similar. In both cases, direct costs are surveyed in a detailed breakdown. The breakdown provides similar or the same items, like the cost of seeds, fertilisers, chemicals, farm services, hired labour, insurance, etc. However, the Polish breakdown is more detailed, where string at crops and the specific home feeds (potatoes and other root plants, hay, green forage, and silage) and purchased feeds

(grain and bruised grain, bran, complete mixtures and concentrates, protein and mineral feeds, fodder and other feeds) are identified. In Hungary, only purchased and home feeds are broken down. In the Hungarian agricultural enterprise survey, there are own services (made by the specialised branch of the farm) and bought services, as well as some specific services are distinct. In Poland, due to the family-holding character of the survey, only purchased services are reviewed. In the Polish survey 'veterinary services, medicines and insemination' are included in a specific item (with a considerable part of the costs), while in Hungary only medicines are listed among the cost of 'materials'. Evidently, the excess data have to be omitted in the comparison. At the end, 7 items of the direct costs are used, among them 'other direct cost' for those, which could not be harmonised.

In the harmonisation of the data sets, however, some more adjustments had to be done. For instance, in the Hungarian system, the value of by-products (e.g. straw, calf, manure, etc.) is traditionally subtracted from total direct cost, while in Poland (like in the EU) they compose a part of the production value. Compensation of farms by insurance companies is similarly treated. Depreciation in Hungary is an element of the direct cost, but in Poland (in line with the EU accountancy), it should be financed by the margin (production value minus direct cost). To establish a comparable data set, adjustments were made where mainly Hungarian data were modified.

The outlook to the EU was based on selected data of the Sectoral Production and Income Model for Agriculture (in German acronym: SPEL), created and regularly improved by the University of Bonn see *Wolf* (1995). As mentioned before, in Poland and in Hungary the main traditional breakdown of costs contain direct and indirect (general) items. In the EU, the main items are variable and constant inputs. The SPEL data set comprises historical time series from 1961 for all the 15 member countries of the EU, and there are efforts to develop a similar system for CEECs too.

In this study a 6-year historical data series were used, from 1993 to 1998, in order to avoid the risk of using a single year.

Product coverage

In both countries, the most important products are surveyed in sample farms. Evidently, a significant product of a country might be negligible or missing in the other and vice versa. For instance, poultry, maize or grapes/wine are very important products in Hungary, while they are missing from the Polish surveys. At the end, nine agricultural products remained for comparison: wheat, (winter) barley, rye, rape-seeds, sugar beet, potatoes, milk, cattle and pigs.

In Poland there are survey results for each year for all the 9 products. In Hungary, some products are produced in a small quantity in the sampled farms, which results in a lack of relevant data for several years (rye and rape-seeds in the enterprise survey). The Hungarian survey of individual holdings contains only potatoes among the compared crops.

Competitiveness of agriculture and comparison of costs of farm products

Competitiveness of agriculture, in a global approach, is determined mainly by the food processing and retailing sectors. However, considering the poor international data avail-

ability of the downstream (processing and retail/distribution) sectors, which requires indirect analytical approaches in the competitiveness, the authors decided to stay on the farm level at the comparison. International companies, multinationals in processing and retailing sectors, have a great impact in the competitiveness of agricultural products, while their activity is not transparent. However, the authors assume that downstream sector prefers farms with low level of production cost. If it is true, investments to the downstream sectors are attracted by an environment where farm costs are low. It follows that production cost might be a significant element of competitiveness even at the farm level, provided if general macroeconomic conditions and (agri-food) sectoral incentives are present. Downstream sectors obviously prefer if farm products are available at a low level of prices; and that low level of prices are more secure if production costs are also low.

In this research, quality and other determinants of prices and production costs were not investigated, thus, standard qualities and conditions were assumed. Comparisons were based on the surveyed data and not on national statistics (even if available). In this course, not only production cost, but producer price, as the other main element of the margin, was also taken from the survey. (The authors compared survey data to those of national statistics, which do not appear in this article, however differences were not significant.) Where no survey data were available, they utilised the harmonised data sets of the Central European Institutes of Agricultural Economics³. In the following part, results are shown by commodities.

Cereals

Poland has three times larger area of cereals than Hungary, but due to lower average yields, the production is only twice, two and a half times more. It is common that *wheat* constitutes about a third of the production of cereals in both countries. Barley and rye are much more important in Poland than in Hungary, while maize is a great product in Hungary and negligible (not surveyed) in Poland. In the following, average yields are compared by the survey data, as any other parameter involved to the comparison.

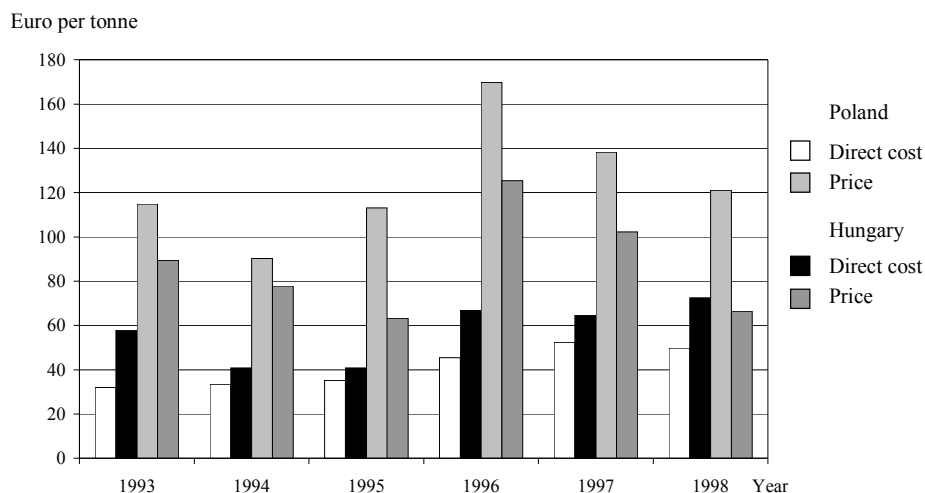
Wheat average yields were in two years lower and in four years higher in Hungary than in Poland. In the latter the typical average yields were 3.8 to 4.0 tonnes, the top has not reached 4.1 (1995), and the lowest slightly fell under 3.4 tonnes per hectare. In Hungary, much larger fluctuation has taken place: from 3.1 (1993) to 4.9 (1994), and in three years the average yield exceeded 4.0 tonnes per hectare (1995, 1997 and 1998). Wheat prices are much higher in Poland than in Hungary and the fluctuation is also much less. It was only in 1994 when Polish wheat prices were lower than 100 Euro; they oscillated between 110 and 130, and in one year (1996) even rose over 160 Euro per tonne. In Hungary, there were only two years when prices exceeded 100 Euro per tonne. In the rest, they fluctuated between 60 and 90.

Despite the higher Polish prices, it is remarkable that direct cost per tonne in Poland is considerably lower than in Hungary. Nevertheless, there is an upward trend over the period, but Hungary paid every year higher direct cost on wheat. Moreover, the level of the Hungarian direct cost had a great fluctuation. It follows that Polish wheat producers

³ Last yearbook published by RHAE, 1998.

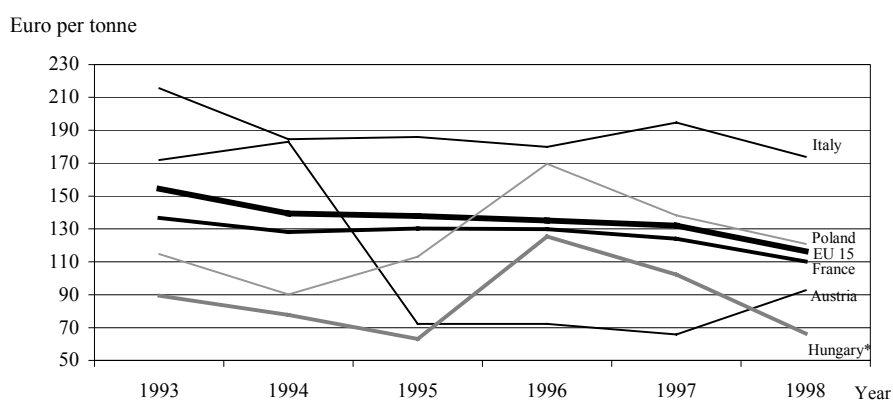
benefit a higher income (margin between the price and direct cost) than the Hungarian ones. Polish wheat costs less but is sold on higher price than in Hungary. Moreover, Polish government creates a higher stability for wheat prices (see Figure 1).

Figure 1. Direct cost and producer price of wheat



It merits attention to compare these prices to the level of EU-prices. As for the EU-survey, soft wheat and durum wheat are separately administered; we created weighted (by the harvested quantities) averages.

Figure 2. Producer prices of wheat



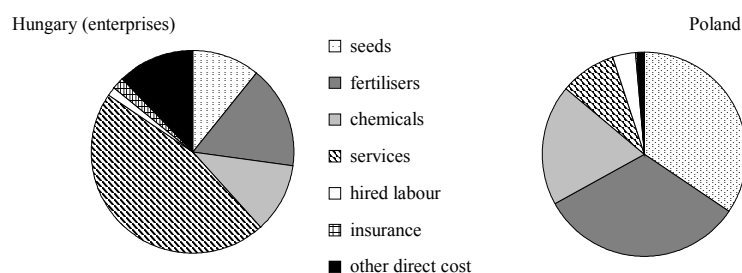
* Here and in the following: enterprises.

Producer price of wheat of the surveyed farms in Hungary is below the EU level by Euro 30 to 50 per tonne. The exceptional year is 1996, when the EU average was approached closely by Hungary. In this year Poland, even exceeded that level, and since

that it stays slightly over that. The price level, although, is far not single in the EU-markets, there are significant differences among the member countries. The wheat is the most expensive in Italy (due to the high share of durum wheat), almost achieving Euro 200 in the period under review. It is more striking that the cheapest wheat is produced by Austria where in the year of its accession it fell to the level of Hungary and since that it stays below Euro 90 per tonne. The French wheat prices are slightly below the EU mean, never exceeding that, slowly declining to Euro 120 in 1998 (see Figure 2).

The structure of direct costs (see Figure 3) expresses the different kinds of farms. The share of unpaid work is missing from the costs of individual holdings like in the Polish survey. At the same time Hungary surveys the wheat cost and income only in agricultural enterprises. In these circumstances, the Polish structure shows necessarily higher contribution of some cost items like seeds, which has triple, the fertilisers and chemicals, which have double share than in Hungary. The case of services is different: enterprises generally have own branch(es) for services, and its (their) higher contribution substitutes labour. As a result Hungary has more than double share of services, which covers nearly the half of the total direct costs. Labour input is very high in Poland, however a downward trend prevails itself: from nearly 90 hours per hectare it fell to 40 hours by 1998. On the contrary, the amount of hired labour is increasing from 2 to 6 hours by the end of the period. In Hungary, the labour input varies between 2 to 3 hours per hectare.

Figure 3. Direct cost of wheat, 1998



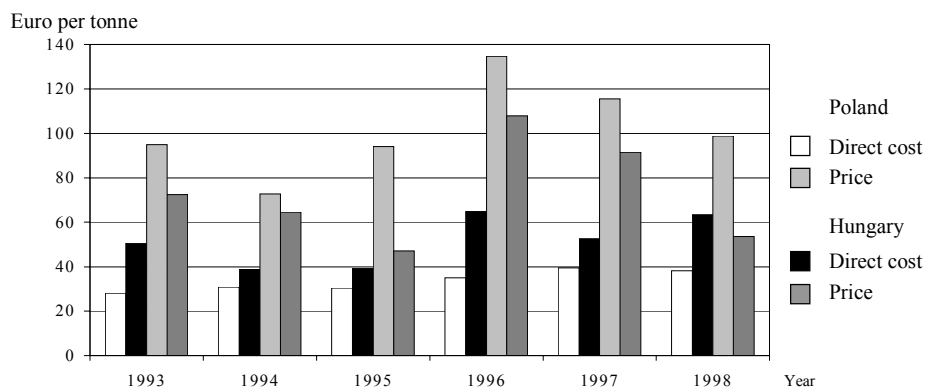
Rye can be compared only in the last two years of the period (1997 and 1998). The average yields of rye in Poland are higher, there were around 2.5, while in Hungary only 2.2-2.3 tonnes per hectare. Nevertheless, the same trend of wheat can be found here: prices are higher in Poland but direct costs are much lower.

Average yields of *barley* are generally lower in Poland than in Hungary. Polish average yields vary between 3.4 and 3.6 tonnes, only in one year (1994) fell to 3.1 tonnes. In Hungary, 4.2-4.4 tonnes were typical, but in two years (1993 and 1996) the average yields fell to 3.2-3.3, and only in a single year (1998) rose to 5.0 tonnes. Again, the same trend of prices and costs can be detected. Price and price stability is much higher in Poland, where direct costs are lower (see Figure 4).

It should be noted, that direct cost in Poland does not imply the non-paid labour, which is remunerated, by the margin. In Hungary, as only agricultural enterprises are surveyed for cereals, all paid and non paid labour is included in the costs. This phe

nomenon gives higher costs for Hungary. If Polish non-paid work valued and incorporated to the cost items, which is a dubious change in the calculation, Polish cereals would not be far so cheap.

Figure 4. Direct cost and producer price of winter barley

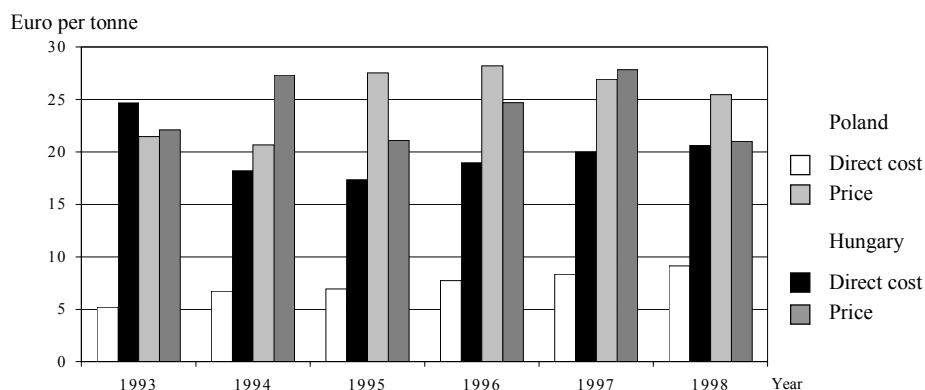


Other crops

The comparison of the following three crops shows somewhat different pattern from the case of cereals.

In case of the *rapeseed*, the less contrast can be found. Hungarian data, again, represent only the agricultural enterprises, and relevant surveys are available only for the last three years of the period. Average yields used to be considerably higher in Poland in a longer period, but from these years in 1996 and 1997 Hungarian average yields were higher, which were on a level of 1.7-1.8 tonnes per hectare. In Poland in 1998 average yield increased over 2.1. Hungarian direct cost was again much higher, and in the first two years prices are significantly lower, but in the last year, Hungarian prices slightly overtook the Polish level.

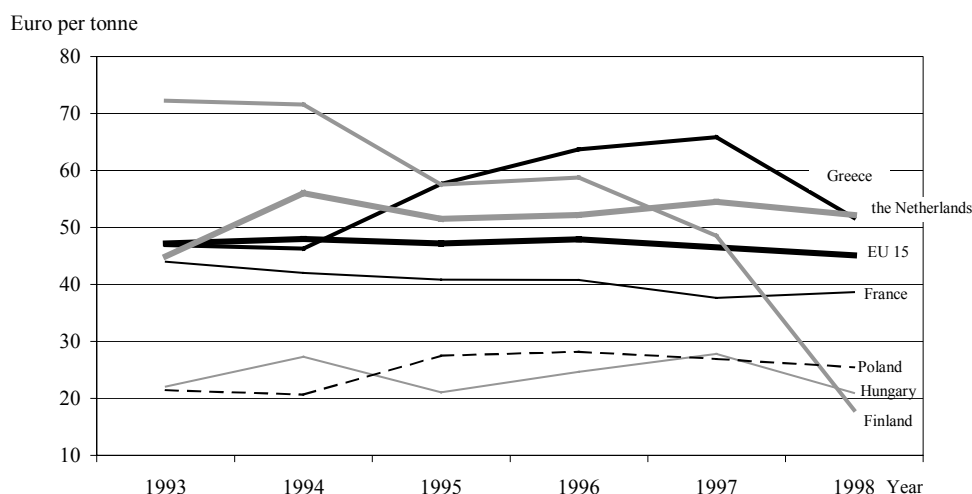
Figure 5. Direct cost and producer price of sugar beet



The *sugar beet* is a highly labour intensive product, which explains the great difference between the high Hungarian and low Polish direct cost. The interval of price fluctuation does not significantly differ between Hungary and Poland. In contrast with the previous crops, in three years the Hungarian and in three years the Polish prices are higher (see Figure 5).

In comparison with EU-prices, both Polish and Hungarian sugar beet can also be considered very cheap. However, Finnish prices are remarkably high, as after the accession they fell quickly, and by 1998 Finland was the cheapest producer, on a level slightly even below the Hungarian and Polish prices. French sugar beet is also cheaper than the EU mean in every year and the gap is growing, however, it is significantly more expensive than Polish and Hungarian products (see Figure 6).

Figure 6. Producer prices of sugar beet



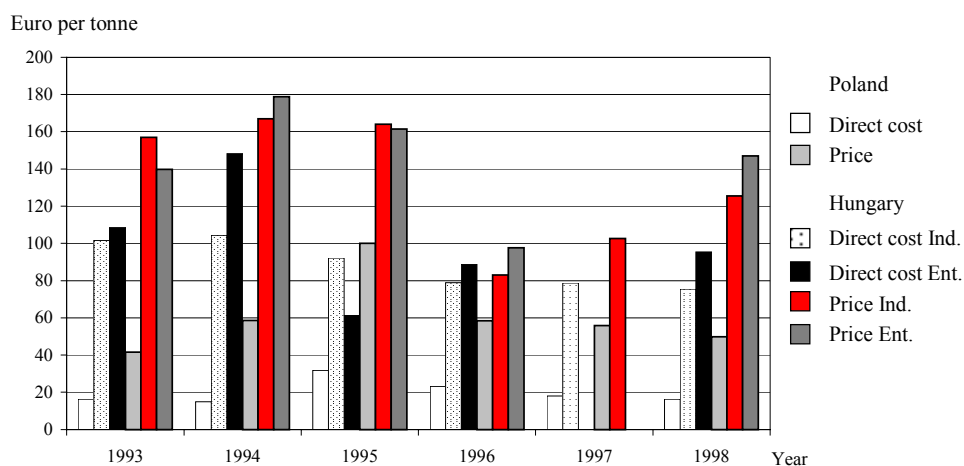
Polish average yields are generally higher, with the exception of two years when they fell far below 40 tonnes per hectare, they vary from 41 to 43. In Hungary, there is an upward trend, from 26.2 to 42.7 tonnes per hectare, but only in 1998 exceeded the level of 40.

In Hungary, labour use varies from 15 to 35 hours per hectare. In Poland, the paid labour is about 40, and the non-paid labour is diminishing from 400 to 176 (in 1998). It should be noted again, that in Hungary, only enterprises are sampled, which use, in a great extent, labour saving technology, especially in the harvest while in Poland mainly individual holdings are sampled. The difference of the results can be accounted for this fact.

For *potatoes*, Hungary has surveyed not only enterprises but individual holdings too (see Figure 7). Hungarian average yields at enterprises are generally higher than in Poland, where they vary from 13 to 22 tonnes per hectare. In Hungarian individual holdings, there is a steady increasing trend from 15 to 22 tonnes per hectare. Labour use at individual holdings falls mainly in an interval of 280 to 300 per hectare hours in Poland, 260-280 hours per hectare in Hungary. Despite these moderate differences, it is surprising that direct costs of Hungarian individual holdings are multiple of Polish holdings.

Enterprises have even lower direct cost than this high level. In contrast to other crops, potato prices are much higher in Hungary than in Poland.

Figure 7. Direct cost and producer price of potatoes



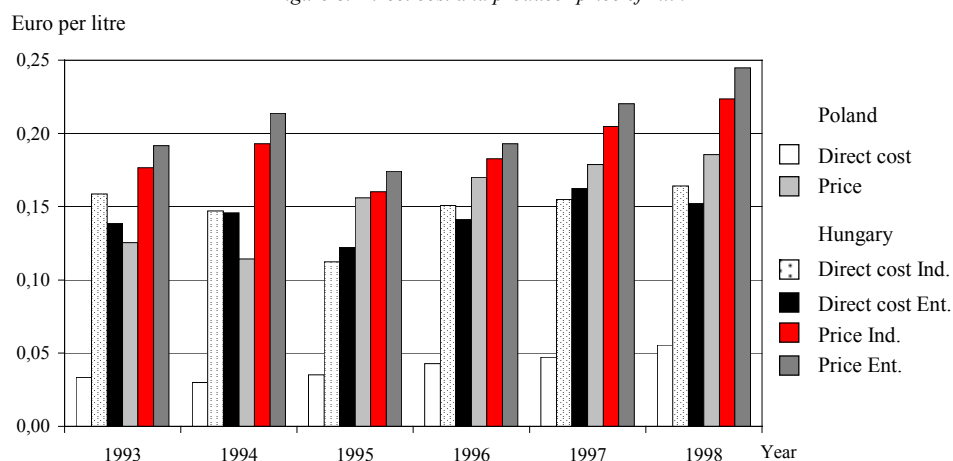
Remark. Here and in the following: Ind. – Individual holdings; Ent. – Enterprises.

Livestock products

Similar trends can be discovered in livestock products as well. Fortunately, for all the three products Hungarian data exist both for enterprises and individual holdings.

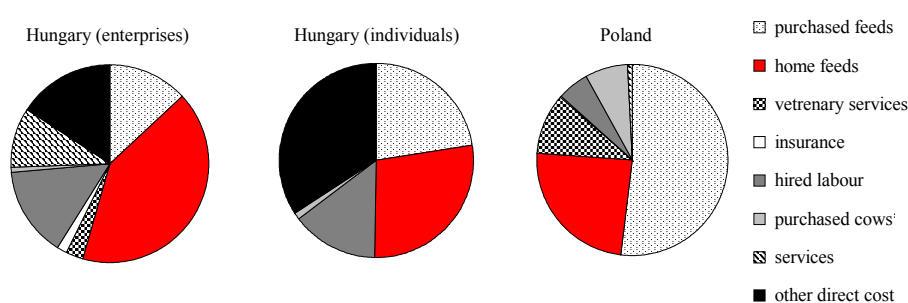
Direct cost of *milk* in Hungary is again multiple of the Polish level, and Hungarian enterprises sometimes have a little lower direct cost than individual holdings. Prices are considerably higher than in Poland (see Figure 8).

Figure 8. Direct cost and producer price of milk



The highest share of direct costs is spent for feeds. In Poland more than three quarters of the direct costs compose feeds, in Hungary there is a lower part: enterprises use 55 and individual holdings 60 percent. There is a larger difference in the proportion of home and purchased feeds. Obviously, Hungarian enterprises use more home feeds (with a slightly increasing trend from 38 in 1993 to 42 percent in 1998) than Polish individual holdings (about a quarter of total direct cost). However, it is more surprising that Hungarian individual holdings, similarly to enterprises, also use home feeds in a great extent, in about 30 percent of the direct cost (see Figure 9).

Figure 9. Direct cost of milk, 1998



Another notable feature is that both Hungarian enterprises and individual holdings, as well as Polish holdings use the same share of direct cost on services: about 10 percent during the entire period.

Both Poland and Hungary have significantly lower milk prices than the EU. Nevertheless, there are also great differences in milk prices among the member countries of the Union. The highest producer prices are in Greece and Italy, and the lowest ones in the United Kingdom, which, after a slightly increasing trend, fell to the level of Hungary. Austrian milk price also merits greater attention, since it sharply fell after the accession and in 1989 it is below the British level (see Figure 10).

Figure 10. Producer prices of milk

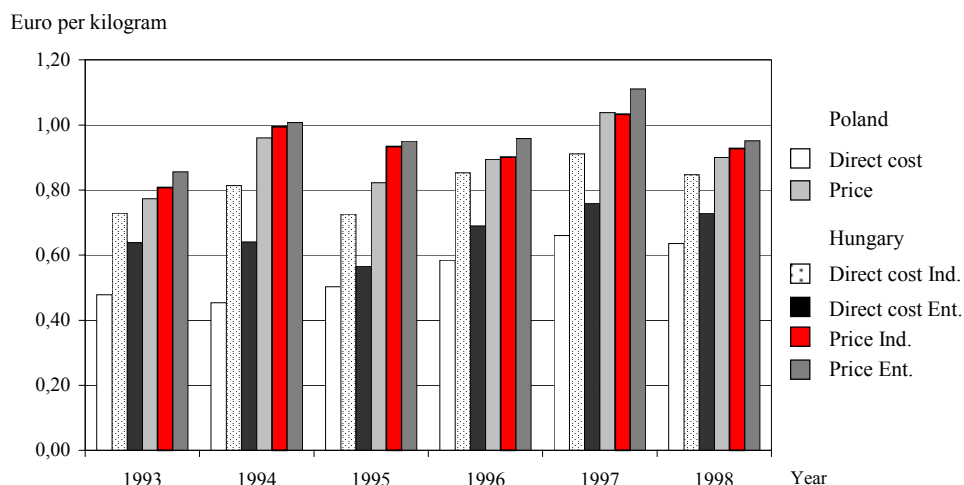


Milk average yields are higher in Hungary than in Poland. Polish dairy farms, however, increased their average yields from 3300 to 3900 litres per cow. Hungarian individual holdings also expanded the average yield from 3400 to 4300, while enterprises from 5400 to 6100. The labour use of the enterprises is not too high and diminishing: from 110 to 90 hours per cow. In Poland, the non-paid labour fell from 350 to 270. Hungarian individual dairy producers have also rationalised the labour use but from an extremely high level: from 750 to 670 hours. This low productivity comes together with a high level of direct cost.

Beef production has diminished in both countries. Hungarian production now does not take more than one eighth of the Polish production. Direct cost in Hungary is much higher than in Poland, even if there is no multiple difference. The enterprise level of the direct cost exceeds the level of Hungarian individual holdings in every year. Hungarian prices generally do not exceed the Polish prices. Hungarian individual producers use again too much labour. Without a downward trend, they exercise 600 to 1000 hours per tonne of beef output. Polish producers reduced the non-paid labour use from 700 to below 500 hours, and the amount of hired labour is insignificant. Hungarian enterprises also use extremely high labour, even if this diminished from 1600 to 1000 hours.

Pork production has diminished in Hungary by 40 percent in the decade of the 1990's. In the same period, Poland has expanded the production by 10 percent and produced three times more than Hungary. Hungarian individual pork producers have much higher direct cost. Furthermore, enterprises have every year considerably lower level of direct cost, in spite of the fact, as mentioned before, that their cost fully implies labour input, in contrast with individual holdings (see Figure 11). Nevertheless, the surveyed individual labour input in Hungary, was fluctuating between 310 and 360 hours per tonne of pig output, while in Poland, it significantly diminished from 500 to below 200 hours. Hungarian enterprises varied labour input around 220 and 240 hours. Like in the case of beef, prices in Hungary are again slightly higher than in Poland.

Figure 11. Direct cost and producer price of pork



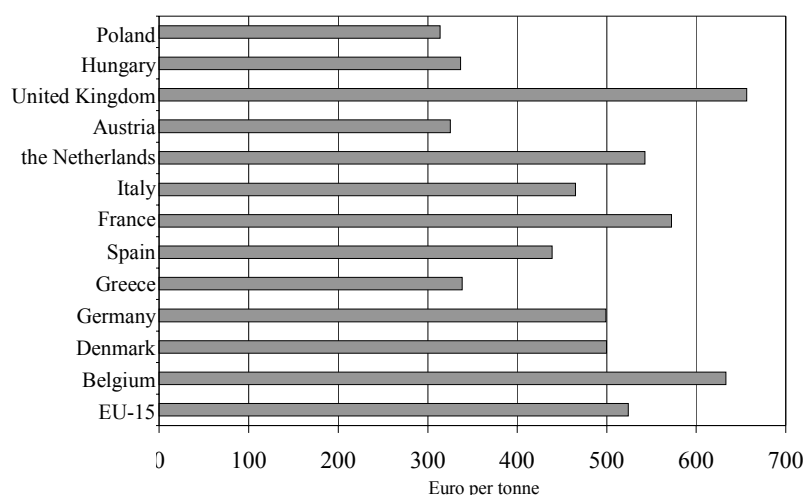
Trends, simulations

It should be noted that Polish and Hungarian trends in farm prices are generally lower than in the EU but there are some surprising exceptions, especially in some cases of individual member-countries. The established Polish–Hungarian data set provides the possibility of different simulations. Such results might call attention to various weaknesses, instabilities, which might be more important when accession to the EU would take place. However, both policy makers and farm organisations would benefit from such simulations even without accession.

The accession to the EU would certainly change significantly the agricultural input prices. Such changes would deeply modify the costs and incomes of agricultural producers in both countries. For instance, fertiliser or feed prices could be changed in a shorter term after the accession, while the cost of the hired labour would be changed in a longer term. The analysis of these possible structural changes is extremely important to provide a fair orientation for the adjustment. This shows the necessity of the continuation of our research.

However, some predicted changes can easily be slower and less extensive than it is generally expected. For instance, a huge increase in the prices of chemicals and fertilisers is often anticipated for the years after the possible accession. Nevertheless, the analysis of our data set would not support such unambiguous statements. Fertiliser prices in the EU are quite different; they depend on the local demand, required composition by soils, transport costs, etc. The mean of the EU exceeds Euro 500 per tonne (in active ingredients), which is indeed much higher than the Hungarian and Polish level of Euro 300–320 (see Figure 12). Surprisingly, the fertiliser is the cheapest in Austria, and its price is close to the Hungarian and Polish level. In this light, the expansion of fertiliser prices has no chance. Moreover, agri-environmental policies try to cut the intensive technologies, which might temper the demand in the entire Community.

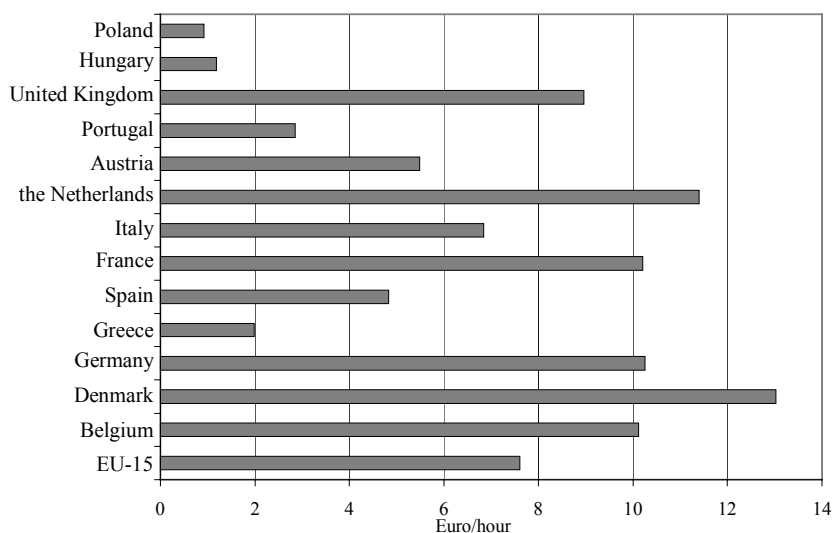
Figure 12. Fertiliser prices, 1997



Another critical input factor is the labour, which makes the prospective of the possible Eastward enlargement of the EU disturbing for some agricultural communities in the current member-countries. Our data set alone was not sufficient to analyse the dimension of this problem. Both the Polish and Hungarian surveys provide data for the paid and nonpaid labour use, as well as its cost. However, the SPEL data set, from which the correspondent data for the member countries were taken, does not include such information. We took the necessary data from the Farm Accountancy Data Network (FADN) which represent the commercial holdings (Agricultural Situation, 2000). The updating of this data set usually takes a longer time. At closing this paper, 1997 data are not available yet for every member countries. From the Southern countries only Greece is missing, but such countries like Germany or Sweden are not updated yet. Under this condition, the latest year to analyse the agricultural wages is 1996.

Agricultural wages are as high as nearly 8 Euro per hour in the EU. There is a great variety among the member countries. Far the lowest wages are paid in the Greek agriculture (2 Euro), the Portugal level is also low with 3 Euro, and a still moderate level prevails itself in Spain, Austria and Italy (5-7 Euro). 10 Euro is paid in Belgium, Germany and France, and nearly 12 in the Netherlands, and far the highest (13 Euro) in Denmark for an hour. In this environment, wages in Hungary with more than one Euro and Poland with less than one Euro per hour seem to be in a great distance from the member countries. Even in Greece double and in Portugal triple wages are paid.

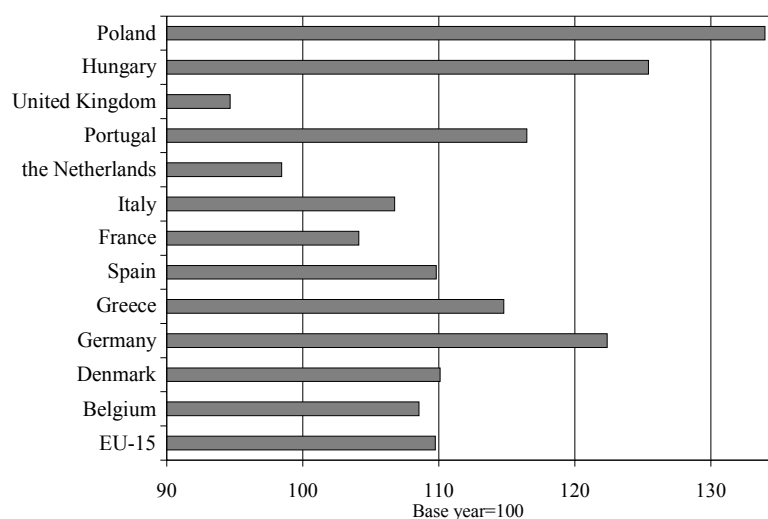
Figure 13. Agricultural wages, 1996



Although, it cannot be given a clear message for the future from this situation. First of all, in the single market, different levels of wages are operating: from 2 to 13 Euro per hour, due to the conditions of the local markets. Even in the founding member-countries, wages vary from 7 to 12 Euro. It shows that even multiple differences can prevail for long in the single market.

Moreover, there is a strong increase of agricultural wages both in Poland and Hungary, especially in the second part of 1990's. The available data sets provide a chance to compare two-year increment of wages, even if the period is not the same: in member-countries 1994–1996 and for Poland and Hungary 1996–1998. This comparison shows that both countries expanded the wages: Poland by 35 and Hungary by 25 percent. In the EU only 10 percent increase was realised within two years, and only three member-countries exceeded this average. It is notable that not only Greece and Portugal (15 percent) but also Germany belongs to this group, the latter with a more than 20 percent increase. There was a slow increase in France (4 percent) and Italy (6 percent), and a fall in the Netherlands (-2 percent) and in the United Kingdom (-5 percent).

Figure 14. Two-year increment of agricultural wages*



* In EU 1994-1996; in Hungary and Poland 1996-1998.

Conclusions

Both countries produce principal agricultural products on lower production cost than the EU average (EU-15), and than the level of most member countries. Producer prices are generally lower than in the member countries. Poland has got nearer to EU-prices than Hungary in cereals and some other crops. In livestock products Hungary has slightly higher prices than Poland. Poland generally produces on lower cost, and achieves higher margins than Hungary.

Before concluding on possible post-accession margins of agricultural products, it should be underlined that member countries themselves also significantly diverge in producer prices even in case of products (e.g. cereals, milk, cattle etc.) where the Common Market Organisation provides broad intervention prices. It follows that Poland and Hungary having accessed to the EU will not necessarily achieve the EU-average. The larger gap in producer prices can be beneficial, especially considering the declining trend of

producer prices in the EU. Nevertheless, the low production cost of both Poland and Hungary certainly will attract European multinationals to invest in downstream sectors, if other necessary conditions will be met.

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