

# **1 The PhD Summary, conclusions and recommendations**

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## **1.1 The research logic**

Starting with theoretical background on approaches to competitiveness (Chapter 2) and touching on the previous research into the competitiveness of the Polish agricultural sector (Chapter 3) the author proposed an eclectic framework for assessing the competitiveness of Polish agriculture (Chapter 4) in order to analyse the issue from a broader perspective, linking macro- and microeconomic fundamentals.

The primary objective of the study was to assess changes in the competitiveness of Polish agricultural producers in the 1990s because it is important for Poland's successful competition on the EU Common Market. The period of the country's transition initiated strong pressure on all Polish sectors by opening the economy up to international competition (trade liberalisation) and domestic rivalry between sectors for the best production factors. Besides, Poland took on various international commitments by joining the World Trade Organization (WTO) and started negotiations with the EU, which also called for serious adjustments. Agricultural producers had to face declining relative (output-input) prices, deteriorating terms of trade, then declining incomes and profitability of production and in consequence declining agricultural production and trade. The size of these challenges was significant and difficult to alleviate by policy interventions (Chapter 5).

According to the theory of dynamic comparative advantage (presented in Chapter 4), agricultural producers can either (i) resist the pressure and positively respond to it by improving their productivity and adjusting factor allocation (towards more optimal proportions); or (ii) expose themselves to the pressure and bare the consequences of declining competitiveness in the sector. As the study revealed, the latter was the case - productivity during 1996-2000 declined (Chapter 5) and hence also the competitiveness of the farm sector. However, because the farm sector is far from homogeneity (a peasant type of farming coexists with market oriented farming) changes in the productivity of particular groups of farms differed in terms of the direction of the changes, their extent and underlying causes.

As productivity is a main offsetting force in the hands of producers (given that changes in factor proportions are limited) it was crucial to investigate the determinants of productivity differences and their relative importance in explaining productivity performance (Chapter 6). Various variables suggested by theory and previous studies were tested in order to find out if they are important in determining productivity. We selected determinants which drive (boost) productivity and those which are obstacles to productivity and competitiveness improvements and assessed their relative importance. Finally, we compared productivity results of Polish farms with their counterparts in other CEE and EU countries (Chapter 6) and can now attempt to identify areas for possible policy actions.

## **1.2 Main findings**

I have tested four hypotheses which were complemented by additional research questions (see Table 1-1 below) and they led us to the following conclusions:

### Competitiveness of the farm sector declined over 1996-2000

Many signals indicated a deterioration of the Polish agricultural sector: declining relative agricultural prices, deteriorating terms of trade, declining incomes, the persistence of a trade balance deficit, etc. These were warning indicators of revealed competitiveness, though our research showed that the potential competitiveness of the sector also declined during the analysed period. Earlier, producers were not able to resist the pressure stemming from the appreciation of the real exchange rate (which hampered sectoral terms of trade) and from international markets (low commodity prices put pressure on domestic output prices) and failed to accommodate to them by improving their productivity (which would have allowed for a maintaining of profitability).

### Policy was able to reduce by half the pressure stemming from exchange rate appreciation and amplified by declining world agricultural prices

Sectoral policy effectively offset part of this pressure, in the sense that it prevented a further (twice as large) decline in real producer prices. One might ask whether the policy could have been more effective and reduce the pressure even further at that time? Although the author did not analyse the policy itself at that time (this falls beyond the scope of this research), in the author's opinion it seems quite unlikely given the fact that such pressure

was constant and of a fundamental (irreversible) character. Clearly, combination of exchange rate appreciation, declining world prices and the overall course of trade liberalisation made it almost impossible. What's more, it is questionable if it would be desirable to engage larger resources in order to remove the pressure as the only sustainable solution is to improve factor productivity and, there is surely a positive role for policy to play here. This situation represents the usual dilemma for agricultural policy in finding a balance between direct protection and other types of support leading to sustainable solutions.

Producers failed to improve their productivity mainly due to technical inefficiency and weak technological progress

Clearly, adjustment mechanisms did not work, in the sense that producers did not respond to competitive challenge and the competitiveness of the sector declined. This would not have happened if technical efficiency had increased considerably and technological advancement been quicker. However, technical efficiency over 1996-2000 declined on average (annually by 2.1%) and technological progress was weak (1.2%). All in all, total factor productivity was declining 1% annually. Only three groups of farms (large, crop oriented, and more specialised) were able to improve slightly in this respect. According to earlier studies by Brümmer, et al. (2002), productivity during 1991-1994 in the Polish farms sector also declined and even at a higher rate (5% annually), but due largely to technological regression and not technical inefficiency.

The decline in technical inefficiency stemmed mainly from 'pure' technical inefficiency rather than scale inefficiency

The decline in the technical efficiency of Polish farms was due mainly to the decline in 'pure' technical efficiency (2% annually) rather than scale efficiency decline, as the latter was negligible (0.1%). 'Pure' technical inefficiency can potentially be explained by the existence of X-inefficiency. This inefficiency may result from bad management practices, inappropriate work norms, distorted motivation (principal-agent dilemma), transaction costs, etc. Although analyses of the precise reasons for 'pure' technical inefficiencies in Polish farms falls beyond the scope of this analysis, in the light of our findings some reasons seem more probably than others. For example, bad management practices seem very probable given the low education of farmers, something which can cause labour management problems but also improper management of new technologies (introduction of

technical, chemical, and biological technology requires special skills and education). A principal-agent problem is less probable given our finding of a positive correlation between productivity and off-farm resources, but it may occasionally occur in farms which rely more on off-farm labour. According to many studies, reliance on family labour is generally more efficient in transition sectors (Latruffe, et al. 2003). Certainly, a more probable obstacle to 'pure' technical efficiency is high transaction costs, given the proved distortions in the functioning of agricultural input markets in transition countries, and Poland is not exempt (World Bank, 2001). Negative changes in scale efficiency also contributed to a decline in overall technical efficiency, although relatively by far less. In Poland, this most often means that farms size should increase because most Polish farms (and especially crop oriented) operate under increasing returns to scale (Latruffe, et al. 2003).

#### The small size of farms and their fragmentation hamper productivity

Our study confirms the existence of a significant and positive relationship between productivity and farm size. As was discussed earlier, various studies deny the significance or existence of a relationship between farm efficiency and size in Poland (van Zyl, et al, 1996) or show a negative relationship (Munroe, 2001). However our study confirms the positive returns to scale, like those by Davidova, et al (2002), Latruffe, et al. (2003) and Mech (1999). Generally speaking, potential gains from land consolidations are large because individual Polish farms are still very small (7 ha) and structural changes are very slow (the average size of individual farm increased by less than 1 ha over 10 years) (GUS, 2001a). However, the fragmented farm structure had historical causes (private ownership and the hereditary farming tradition), so increasing farm size was never going to be easy. Although fragmentation of land slightly but significantly contributes to a decline in productivity performance it causes waste of resources (fuel, time) and organisational problems.

#### Fragmentation of farm structure also hampers relative prices in the sector

The small size of farms imply high transaction costs in market operations and undermines farmers' bargaining position vis-à-vis up- and downstream industries (activities). This negatively contributes to relative prices in the sector and aggravates the problem of deteriorating sectoral terms of trade, although the effect is of a reversible character. This

issue has not been the subject of an insightful analysis in this thesis, though the economic literature (theoretical and empirical) suggests its significance as well.

#### Specialisation does not help productivity unless it takes account of risk

Specialisation proved generally positive for productivity, although we observed that in the group of the most specialised farms (with single activity) changes in productivity were negative, while in the group of farms with slightly lower specialisation (farms with distinguishing activity) the changes were positive. This led to the conclusion that farms which specialise, but at the same time diversify the risk of production, perform better than those which depend solely on one type of production. The importance of risk management was probably amplified during the transition period because it was a time of rapid changes, but after EU accession, the more stable economic environment will further favour specialisation with its positive effects on productivity.

#### Poor land quality is another significant and strong impediment to productivity

Land quality has proved to be one of the most significant and influential determinants of farm factor productivity. Unfortunately, most of the farm land in Poland is of medium and poor quality and regional variations are considerable. However, low land quality may be compensated by progress in biological (genetics) and chemical technology.

#### The relative insignificance of external financing in determining factor productivity indicates serious problems with crediting agricultural investments

In order to finance investments farms need access to credits. The fact that credits for productivity in the sector were low does not mean that crediting investments is not generally important for productivity improvement, but that crediting of investments in the Polish agricultural sector does not work. In other words, it indicates a malfunctioning of the credit market. Due to lack of credits, investments are postponed, and this is unsustainable. It is also a serious obstacle for productivity improvement and, as stated earlier, the problems lie on both the demand and supply side of the market.

#### Low agricultural education restrains a rapid improvement in management and implementation of new technologies

Our study confirms findings from previous studies, which pointed to problems with the low education of Polish farmers. According to these studies, low education hampers technical efficiency (Latruffe, et al. 2003) so also productivity. In our study we also revealed problems with 'pure' technical inefficiency which usually result from low education. We showed that lack of agricultural education may have a more significantly negative impact on productivity than, for example, the fragmentation of land.

#### Reliance on labour-intensive techniques is generally less productive

Labour intensive types of production proved generally less productive than, for example, land intensive ones, although the techniques of production are correlated with farm size, certain type of production, etc. and therefore in this analysis with all the effects which make it an important determinant. What we have observed in the sector, however, is a switch from labour-intensive techniques towards more capital- and land- intensive ones. This indicator of productivity improvement contributes to an enlargement of the persistently excessive labour force in the farm activities (indicated by registered and hidden unemployment, which is already much larger if we compare it with other countries), however. Policy will have to address the problem that improvement in productivity aggravates the problem of the excessively large labour force in the sector.

#### Compared to other CEECs, the productivity problems of Polish farms result from an excessively large labour force, the persistence of small farms and their overcapitalisation

The most distinct features of Polish farms compared to other farms in the region (e.g. the Czech and Hungarian) which hamper their productivity is overcapitalisation of farms (given the relatively small size of farms capital is used inefficiently and is mostly obsolete). Besides, the fact that the farms are much smaller means they cannot utilise economies of scale. Another distinct feature is also low labour productivity, which, to some extent, results from the fact that agriculture has played the role of a social 'safety net' for those who have become unemployed and migrated from the cities. Generally speaking, therefore, labour and capital productivities are lower than in other CEECs, but at the same time this means that the potential for improving productivity of Polish farm sector in that respect is larger, if the obstacles to both are removed.

**Table 1-1 Summary of Hypotheses with evaluation**

<i>Hypothesis</i>	<i>Evaluation</i> Positive evaluation means that the Hypothesis proved true	<i>Chapter /Page</i>
<p><b><i>Hypothesis 1: Relative agricultural (output-input) prices deteriorated during the analysed period mainly due to the strong pressure stemming from macroeconomic adjustment which was too strong to be offset by sectoral policy interventions.</i></b></p> <p><b><i>Research questions:</i></b> Which pressure on relative prices was larger, that stemming from low international prices or real exchange rate appreciation? To what extent did intervention offset the pressure? In which periods was the policy successful (in the sense that it prevented a decline in real output prices)?</p>	<p style="text-align: center;"><i>Positive</i></p> <p>Real Exchange Rate appreciation had a stronger effect than declining world prices Only by half over the 1990s When international prices were increasing</p>	<p style="text-align: right;">CH.5 p.103</p>
<p><b><i>Hypothesis 2: Changes in total factor productivity (TFP) did not offset the pressure of deteriorating relative prices during the analysed period and hence the competitiveness of the sector declined in the analysed period.</i></b></p> <p><b><i>Research questions:</i></b> Were the changes in TFP positive or negative? Were the changes in TFP strong or weak? What were the primary causes of the TFP changes?</p>	<p style="text-align: center;"><i>Positive</i></p> <p>TFP declined over 1996-2000 The decline was weak ‘Pure’ technical inefficiency</p>	<p style="text-align: right;">CH.5 p. 114</p>
<p><b><i>Hypothesis 3: There are significant differences in characteristics between productive and unproductive farms and both have unique profiles (i.e. combination of features determining factor productivity).</i></b></p> <p><b><i>Research questions:</i></b> Which factors had significantly positive and which negative influence on TFP?</p> <p>What is a profile of productive versus unproductive farms?</p>	<p style="text-align: center;"><i>Positive / Negative (profiles are not unique)</i></p> <p><u>Positive</u>: farm size, specialization, high quality of land and education, land intensive techniques, some amount of hired labour and rented land <u>Negative</u>: Poor quality of land, low education, land fragmentation, capital-intensive techniques</p> <p>There are <u>no unique profiles</u> but productive farms tend to be on average larger, more specialized in crop production, less labour-intensive and owners have better agricultural education</p>	<p style="text-align: right;">CH.6 p.151</p>
<p><b><i>Hypothesis 4: There are several significant determinants of TFP, but they differ largely in terms of the strength of their impact on TFP.</i></b></p> <p><b><i>Research question:</i></b> Which factors had the strongest impact on TFP?</p>	<p style="text-align: center;"><i>Positive</i></p> <p>Specialization, quality of land, level of education, techniques of production, and size</p>	<p style="text-align: right;">CH.6 p.151</p>

### **1.3 Policy Recommendations**

**Policy aimed at increasing competitiveness of the agricultural sector should primarily focus on supporting improvement in factor productivity of farms...**

Agricultural policy, especially during the transition period, seems to have been unable to effectively offset the external adjustment pressure faced by the sector. This pressure is of an irreversible character because it results from changes in the economy's fundamentals and to a large extent from long-term trends in international markets (important for a small open economy). So the policy aimed at sustainable and efficient solutions should focus on supporting the adjustment of the sector and not only offsetting pressure in the sector. Hence, policy should primarily focus on supporting improvement of factor productivity in the sector.

**...which requires supporting land consolidation...**

As economies of scale matter, policy should aim to facilitate land consolidation and aim at reducing land fragmentation. In the light of the newly enacted bill on the agricultural system (11<sup>th</sup> April, 2003), which established the range of individual farm size between 1 ha to 300 ha, it seems that additional measures may be needed in order to encourage the creation of farms with efficient scale within this range (as for example the measure called 'structural rents', introduced in 2001, imposed a minimum size of new or enlarged farm at 15 ha.

**...facilitating access to higher education...**

Revealed problems with education cannot be resolved solely at the level of sectoral policy. This calls for integrated action at the local, regional and central levels. Education reforms must remove 'invisible' barriers of entry to higher schools and universities. Better education is also a must if farmers are to benefit from various EU programmes that target structural problems (the second pillar of the CAP and structural funds) in the sector.

**...and advisory...**

Not only school knowledge, but also certain agricultural advisory services should be strengthened and integrated. There is an important question of the role to be played by Agricultural Extension Services (ODRy) and EU information points. It seems that there is

also room for NGOs and other organisations which can carry out broadly defined advisory and training activities.

**...supporting technological progress...**

Various institutions may play a vital role in supporting technological progress as well, though the key is that they are well co-ordinated. Some studies, however, have showed a weaknesses in the co-ordination of various programmes aimed at supporting technological progress between institutions (OECD, 1995a,b). Strong links should be established and co-ordinated between research institutes (Research and Development), information centres and producers (Adoption and Diffusion). Policy can also help in supporting technological progress by facilitate the raising of capital for new investments in agriculture e.g. by delegating sources for co-financing certain EU programmes (oriented towards technology creation and diffusion).

**...and capital productivity...**

Overcapitalised and obsolete machinery are features of many Polish farms and both these problems should be addressed by policy as well. Land consolidation, promoting joint use of machinery (mechanisation circle) and supporting the development of mechanical services for the sector may help in the diminishing capitalisation per farm. Dealing with obsolete capital will require encouragement for farmers to replace at least some of it with new ones, but this will be possible if incomes in the sector increase or prices of new machinery (expressed in agricultural output prices) decline.

**...as well as an outflow of excessively large labour force from agricultural activity...**

This is certainly one of the most serious and difficult problems which calls for an integrated strategy to resolve it. Development and quick growth of the whole economy will help in sucking out labour from agriculture, but at the same time there should be programmes proposing effective diversification of economic activities of farmers and rural areas, creating new jobs there, training people so that they can become competitive on the wider labour market. Given the size of registered and hidden unemployment, job creation in the non-farm sector seems vital.

**Specialisation will bring positive effects if policy becomes more predictable and more effective in stabilising farm markets...**

Generally, specialisation helps in gaining higher productivity, though only holds if certain risks can be avoided. As such, policy should be predictable and effective in stabilising markets (i.e. effectively contribute to stabilisation of the relative prices floating around their long-term trends). Unfortunately, Polish intervention policy in farm markets generally has not met this standards very well, as is usually backward looking, under strong pressure from lobbies and is therefore used to sending the wrong signals to the markets.

**...and this will be possible under the Common Agricultural Policy....**

Integration with the common EU market provides itself greater stability due to its size. In addition, the Common Agricultural Policy is more stable and predictable than the current Polish agricultural policy. CAP interventions, despite also being distorting, seem more transparent (the financial framework for policy is usually set for 6 years in advance and guidelines for future changes in policy interventions are publicly known), which allows for better decision making of farms because they can be based on longer term perspectives. This generally helps in better allocation of investments in the sector.

**...which should bring also other opportunities for supporting productivity...**

Apart from production support and market stabilisation, EU membership offers measures which are designed, more or less directly, for improvement in productivity. Already in the first years of the membership, Poland will be allowed to choose from the broad offer of measures of rural development policy (the second pillar of CAP) and structural funds. These measures range from investment grants for farms and the processing sector in infrastructure to promotion of non-farm income sources, early retirement schemes, etc.

All in all, any policy actions aimed at solving the aforementioned problems should be integrated, in the sense that they must match the problems with competent institution(s), policies (if necessary) and appropriate instruments during implementation, because, as we have showed, many of those problems are very complex and are impossible to be solved at the sectoral level alone. The theory of integrated rural development suggests that integrated policy implies: territorial (engaging all levels of competence starting from local to central), sustainable, subsidiary (what can be done at a lower level of competence should not be shifted to the central level), based on partnership (all the agricultural stakeholders should be involved in policy, including farmers' organisation, government agencies, relevant ministries, etc.), integral (the policy should be integrated with other policies, e.g. educational reform, pension reform, etc.) (Marsden and Bristow, 2000; and Scott, 2002).