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Why is the Polish Farm Sector still so Underdeveloped?

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Abstract

This paper presents a comprehensive review of the Polish farm sector. The main objective is to analyse the causes of its backwardness and slow development. Low remuneration of farm work and the resultant low profitability are the largest problems of many farms. Several causes of the low profitability are evaluated. We show that all relevant causes are closely interrelated and that the extraordinarily high labour intensity has the largest impact. Subsequently, we analyse several causes of the extremely large share of agricultural employment in the Polish economy. Low skills of farm workers, the poor performance of the land market and the high level of subsidisation of the social security system for farmers (KRUS) are identified as the most important causes. Finally, some policy recommendations are given.

Keywords: Poland; agriculture; farms; development; structural change; labour supply

Introduction

Poland is the largest of twelve countries that have joined the EU in the course of its recent Eastern enlargements. The Polish farm sector is of particular importance — within Poland as well as within the EU — because agricultural employment accounts for an extraordinarily high share of Poland's total labour force, and Poland's utilised agricultural area (UAA) contributes almost 10% of the EU-27's UAA (European Commission, 2002, p. 6). However, almost twenty years after the start of the transition programme and a few years after EU accession, the Polish farm sector is still largely underdeveloped.

In this regard, this paper comprehensively analyses the situation of the Polish farm sector, the causes for its slow development and the reasons for the high share of agricultural employment. Its aim is threefold. First, it reviews and summarises the results of various studies analysing the farm sector and agricultural employment in Poland. Second, it presents a variety of references so the reader can easily find further literature providing more detailed information on specific issues. Third — and probably most important — the results of these studies are contrasted and evaluated, conclusions are drawn, and policy recommendations are given.

Situation of the Polish farm sector

Farm structure

During the period of socialism the farm sectors of most Central and Eastern European Countries (CEECs) were dominated by large state-owned or cooperative farms. However, small family farms were prevalent in Poland (Borzutzky and Kranidis, 2005, p. 628). They cultivated approximately 80% of Poland's utilised agricultural area (UAA) (Lerman and Schreinemachers, 2005, p. 682). Before transformation, the average size of private farms was about 5 ha (Borzutzky and Kranidis, 2005, p. 629), because private farms were not allowed to cultivate more than 20 ha and the law of succession further increased this fragmentation (Pacuszka, 2005, p. 5).

The number of farms with at least 1 ha decreased from 2.14 million in 1990 to 1.81 million in 2007 (GUS, 2007e, Table 8/13). This corresponds to an average annual decrease of approximately 1%. Furthermore, there are about 765,000 so-called household plots, with less than 1 ha (GUS, 2007e, Table 8/13) that are not considered in most agricultural statistics. The average size of private farms with at least 1 ha has increased only slightly during transformation (European Commission, 2002, p. 8) and is currently approximately 7.6 ha (GUS, 2007a, Table 41). However, while larger farms tend to grow, smaller farms become even smaller (Csaki and Lerman, 2001, p. 12, 2002, p. 315). Hence the number of average-sized farms (5–10 ha) decreased by 20%, whereas the numbers of very small farms (1–2 ha) and larger farms (≥ 15 ha) increased by 20% and 30% respectively (Gorton *et al.*, 2001, p. 446, European Commission, 2002, p. 8). This trend results in an increasing dualism of the Polish farm structure, with small (semi-)subsistence farms on one hand and large market-oriented farms on the other (European Commission, 2002, p. 8). Only 11% of the farm operators earn their income exclusively from farming, 30% earn their income mainly from farming, while almost 60% receive their income mainly from other sources (European Commission, 2002, p. 8). More than half of Polish farms are (semi-)subsistence farms that (almost) exclusively produce for own consumption, while only around 45% of the farms are market-oriented (Ministry of Agriculture and Rural Development of Poland, 2000, p. 14, Pouliquen, 2001, p. 62, European Commission, 2007, Table 3.3.5.ii). The farm structure is characterised by large regional differences. Larger farms are prevalent in the Northern and Western parts of Poland, whereas the other regions are dominated by smaller farms (European Commission, 2002, p. 8).

Land transactions are rather infrequent in Poland (Csaki and Lerman, 2001, p. 11, 2002, p. 313). Polish farms predominantly cultivate their own land; only about 20% of their total land is rented (Davidova *et al.*, 2005, p. 663, Wilkin, 2007, p. 9) and a great majority of the farms (83%) does not lease in land at all (Csaki and Lerman, 2001, pp. 14–15, 2002, p. 316). Because leasing accounts for nearly 70% of all land transactions in Poland (Csaki and Lerman, 2001, p. 14, 2002, p. 317), buying and selling of land is even less frequent. As

a result, the farm structure evolves very slowly. Even EU accession did not have a significant impact on farm structure (Wilkin, 2007, p. 7).

Employment

Surveys on the proportion of agricultural employment in Poland present varying results. While GUS (2006, p. 15) and Góra *et al.* (2006, pp. 20–21) report a proportion of approximately 17% for the year 2005, Dries and Swinnen (2002, p. 457), Lerman and Schreinemachers (2005, p. 682), Pacuszka (2005, p. 6) and the USDS (2006) report proportions between 25% and 29%. The average proportion of agricultural employment in rural areas is as high as 44% (Davidova *et al.*, 2002, p. 45) and in some NUTS-3 regions it even exceeds 50% (Baum *et al.*, 2006, p. 2). However, Orłowski (2001) points out that the definition of a farmer is much broader in Poland than in the EU-15 (Davidova *et al.*, 2002, p. 45). According to the EU's definition, the proportion would only be between 9% and 14% (Orłowski, 2001, cited in Davidova *et al.*, 2002, p. 45). In spite of this contradictory information, it is clear that the proportion of agricultural workers is considerably larger than in most other new EU member states and much larger than in the EU-25 (Góra *et al.*, 2006, pp. 20–21). As a result, Polish agriculture has one of the highest labour intensities in the EU with around 270 hours/ha (European Commission, 2007, Graph 2.3.1).

There is also contradictory information about the changes in agricultural employment during the course of transformation. While the Labour Force Survey (LFS) shows a decrease of around 20%, other sources based on micro-censuses show an increase of around 7% (Kwiatkowski *et al.*, 2001, p. 9, Newell and Socha, 2005, p. 2). These variations are probably caused by different definitions of employment; the LFS counts the number of persons who work on the farm, while micro-censuses count the number of persons who are simply somehow linked to the operation of the farm — no matter whether they actually work on it or not (Kwiatkowski *et al.*, 2001, pp. 9–10). Furthermore, while the EU generally determines affiliation to a sector according to hours worked, the Polish LFS uses income shares (Ingham and Ingham, 2004, p. 215). Because farm work often generates low

incomes, the Polish LFS attributes many part-time farmers to a non-agricultural sector, even if they predominantly work on a farm (Ingham and Ingham, 2004, p. 215).

The changes in agricultural employment are characterised by considerable regional differences. While the number of agricultural workers decreased by around 30–50% in the Northern and Western regions, it even increased in the South-Eastern regions (Dries and Swinnen, 2002, p. 471, Macours and Swinnen, 2005, pp. 405, 407). In the course of transformation, the former state-owned farms have dismissed more than 860,000 workers, while the number of workers on private farms has increased (Ingham and Ingham, 2004, p. 214). Hence agricultural employment decreased much more in regions with a higher proportion of state-owned farms, and the stronger decline of agricultural employment in turn caused a higher unemployment rate in these regions (Dries and Swinnen, 2002, pp. 466–467). The often mentioned ‘buffer role’ or ‘shock absorber’ function (e.g. Wilkin, 1999, p. 24) of the agricultural sector was performed only by small family farms, which employed some of the workers who lost their jobs in the course of transformation (Dries and Swinnen, 2002, p. 469).

Polish farms predominantly rely on their own family labour (Davidova *et al.*, 2005, p. 663). About 66% of Polish agricultural workers are self-employed, approximately 25% are (unpaid) contributing family workers, and the remaining roughly 9% are paid employees (GUS, 2007b,c,d, Table 2.3).

Labour productivity and income

Many studies (e.g. Pacuszka, 2005; FAO, 2005) concordantly point out that the agricultural sector contributes only 3% to the Polish gross domestic product (GDP), despite the large proportion of agricultural workers. Generally, the large gap between the proportion of employment and the proportion of GDP indicates the low labour productivity of the Polish farm sector (e.g. Lerman and Schreinemachers, 2005, p. 678, USDS, 2006). Gross value added per agricultural worker in Poland is only 8.4% of the EU-15 average (Pouliquen, 2001, p. 35) and is the third lowest in the EU-27 (European Commission, 2007, Table 3.3.8.i). Davidova *et al.* (2002, p. 86, 2005, p. 669) compare Polish farms with farms in two regions

in the EU-15 and find that the net value added per agricultural worker in Poland is only 8.6% of the value in South-East England and 7.0% of the value in the Navarra region of Spain. This necessarily leads to a low remuneration of agricultural labour, and hence to low incomes from agricultural production. The resulting lack of profitability is a major problem for Polish farms (Davidova *et al.*, 2005, p. 665). While a large proportion of small subsistence farms experiences losses, most larger farms do earn profits, but their profits are mostly not sufficient to adequately remunerate family labour and invested capital (Pouliquen, 2001, pp. 51–52). If the opportunity costs of owned land and labour are subtracted, 91.3% of Polish farms experience losses (Davidova *et al.*, 2005, p. 665). Given their low profitability, the long-term survival of many farms is questionable (Davidova *et al.*, 2002, p. 86).

The proportion of household income that is generated by agricultural production depends greatly on the farm size. It increases from 3.4% for small farms (1–3 ha) to 80% for larger farms (50–100 ha) (Pouliquen, 2001, p. 51). However, in spite of a large proportion of non-agricultural income, the total income of farm households that cultivate less than 20 ha is generally not sufficient to cover their consumption expenditure (Zegar and Floriańczyk, 2003, p. 12).

The poor income situation of many farm households has been somewhat alleviated after EU accession, because the newly introduced direct payments considerably improve the financial situation of Polish farms (Wilkin, 2007, pp. 6–7). Since these payments are granted per hectare of cultivated land, operators of larger farms benefited from them primarily — in particular because larger farms have a lower labour intensity (Lerman and Schreinemachers, 2005, p. 675) and thus receive more support per agricultural worker. Hence the income situation of many households operating smaller farms — which are the majority in Poland — is still rather poor (Chaplin *et al.*, 2005, p. 14, 2007, p. 373).

Although the importance of the agricultural sector for rural development is declining, it still has a significant influence on rural areas (Zegar and Floriańczyk, 2003, p. 13). Therefore, the low labour productivity and the resultant poor profitability of many Polish family farms raises a major problem for rural development. The low income of farmers and farm workers leads to a rural per capita income that is 30% below urban per capita income (Zegar

and Floriańczyk, 2003, p. 13) because a large proportion of the rural population works in the farm sector (see section ‘Employment’). GDP per capita in rural areas is only around half of the value in urban areas (European Commission, 2007, Table 3.2.3.a.i) and this gap is still increasing, as GDP per capita growth is much slower in rural than in urban areas (European Commission, 2007, Table 3.2.3.a.ii). The resultant low consumption expenditure slows growth of the non-agricultural sector in rural areas. Hence the low profitability of Polish farms is not only a major problem of the farm sector itself but also for rural development.

Causes of the low profitability of Polish farms

In the previous section the low profitability of many farms was identified as the most striking problem of the Polish farm sector. In this section we will systematically review possible causes of the low profitability to gain a deeper understanding of the problem and determine how political measures can tackle this problem.

Technology and investment

A possible cause of low profitability is low productivity; technology is considered to be one of the most important determinants of productivity in this scenario (Wolnicki *et al.*, 2006, p. 193). According to Borzutzky and Kranidis (2005, p. 647) and Pacuszka (2005, p. 6), the low labour productivity of Polish farms is caused by outdated technology, which is a result of lack of capital for investment. Gross fixed capital formation (as a share of gross value added) of Polish farms is one of the lowest in the EU-27 (European Commission, 2007, Table 3.3.9.ii). The investment of many farms is even lower than their depreciation, so these farms are decapitalising (Pouliquen, 2001, pp. 51–52).

Moosburger *et al.* (1999) and Puslecki (2000) explain the low investment of Polish farms by constrained access to the rural credit market. Petrick (2004a, p. 291) claims that the banks are too risk-averse, so almost half of the farmers obtain less (long-term) credit than

they seek.¹ In a survey by Chaplin *et al.* (2004), many farm households stated that loan guarantees and interest rate subsidies would stimulate investment in enterprise diversification. This might be an indicator of insufficient capital and lack of available credit (Chaplin *et al.*, 2004, p. 73).

In contrast, Danilowska (2004, 2005) and Zawojcka and Siudek (2005) found that the subsidisation of credit — mainly by cooperative banks — resulted in easy access to financial services for farmers. In this respect, Petrick (2000) explains the low investment of Polish farms by a lack of profitable investment opportunities. It was also found that credits granted were not fully spent on productive investment but used for other purposes as well, e.g. consumption (Petrick, 2004a, p. 291). Furthermore, the request for loan guarantees and interest rate subsidies can also indicate that investment is too risky or not profitable enough. Hence these policy measures are economically unjustifiable unless the investment has positive external effects.

Davidova *et al.* (2002, p. 84) and Davidova *et al.* (2005, p. 663) point out that the capital endowment per hectare of Polish farms is indeed less than in the EU-15, but higher than in Hungary and the Czech Republic. However, Latruffe *et al.* (2005, p. 293) state that many Polish farmers have made poor investment decisions, and therefore now have stocks of obsolete capital.

The study of Wiebusch (2005) shows that there is no simple answer regarding credit rationing in the Polish farm sector. She found out that some farmers are credit-constrained, while other farmers even have overinvestment. Banks use social networks to determine the credit worthiness of farmers and channel their funds preferably to efficient farms (Wiebusch, 2005).

The necessity of having a bank account to receive direct payments caused the proportion of farmers who had a bank account to increase from less than 20% in the late nineties to almost 90% in 2004 (Wilkin, 2007, p. 8). This will improve these farmers' access to financial services such as loans for investment (Petrick and Latruffe, 2006).

¹ In another paper, he found that farmers' access to short-term credit for working capital was also constrained (Petrick, 2004b).

Management skills

Poor management skills are another possible cause of low profitability. Polish farm workers have a much lower level of education than workers in non-agricultural sectors. Only 33% of them have basic vocational training (Sztanderska and Piotrowski, 1999, cited in Dries and Swinnen, 2002, p. 471) and 38.5% of them have basic or full vocational training (European Commission, 2007, Table 3.3.6). Similarly, farmers are the professional group with the lowest ownership rate and usage rate of PCs (Green and Kryszczuk, 2006, pp. 249–250), although modern farm management practices often rely on information technology. Furthermore, the agricultural sector has the lowest investment in continuing vocational training (Zelloth, 2002, p. 41). Moreover, the prevalence of part-time farming lowers the average management skills, because part-time farming reduces the dedication to farming (Latruffe *et al.*, 2005, p. 294) and the incentive to gather information about improving profitability. Although farmers had a wider economic independence than other professional groups during central planning, this experience does not help them run a business in a free market economy (Wilkin, 1999, pp. 21-22). Consequently, Latruffe *et al.* (2005, p. 293) find strong evidence of inefficient management practices and weak management decisions of Polish farmers.

Farm structure

Furthermore, the low profitability of many Polish farms can be explained by their small size. Agricultural income increases strongly with the size of the farm (Pouliquen, 2001, pp. 51–52). Farms up to 20 ha, which cultivate approximately 80% of the agricultural land, suffer particularly from low profitability (Pouliquen, 2001, p. 52). Furthermore, Lerman (2002, pp. 3–4) shows that labour productivity increases considerably with farm size, and Gorton *et al.* (2001, pp. 451, 455) show that smaller farms are less competitive than larger farms. The high degree of land fragmentation, which is closely related to the poor farm structure, further aggravates the problem of the Polish farm sector (Borzutzky and Kranidis, 2005, p. 651), because land fragmentation generally has a major negative influence on farm

productivity (Nguyen *et al.*, 1996). In this respect, Zillmer (2002, p. 3) concludes that Polish farms are simply too small to survive the competition of the European agricultural market.

The investment of farms also depends strongly on farm size; the investment of small farms is generally lower than their depreciation (Pouliquen, 2001, pp. 51–52). In 1996 the threshold size for farms with positive net investment was about 20 ha; this threshold increased to roughly 100 ha in 1999 (Pouliquen, 2001, pp. 51–52). Accordingly, a substantial structural change for family farms is necessary to produce a competitive farm structure (Zillmer, 2002, p. 3). Hence Zillmer (2002, p. 3) concludes that the lack of a competitive farm structure is the primary problem of the Polish farm sector.

Labour intensity

The low profitability of many farms can be caused by high labour intensity. If farmers deploy their excess labour (i.e. the part of their labour time that would earn a lower wage rate on the farm than the market wage rate) to their farm rather than to off-farm employment, the marginal value product of their labour declines below the market wage rate (Lerman and Schreinemachers, 2005, p. 680, for Poland; Carter and Wiebe, 1990, p. 1146, in general). The resultant low remuneration of farm work inevitably leads to low income from farming.

Polish farms have much less land per annual work unit (AWU) than other (old and new) EU member states (Davidova *et al.*, 2005, pp. 663–664). The ratio of labour to machinery or land is much higher in small family farms than in larger farms (van Zyl *et al.*, 1996, p. 35, Lerman and Schreinemachers, 2005, p. 675). Therefore, the general observation that small family farms have a lower labour productivity is also valid for transition countries such as Poland (Lerman and Schreinemachers, 2005, p. 675). Hence the problem of high labour intensity and the resultant low remuneration of farm work is mainly a problem of small family farms.

Efficiency

Low productivity and small or even negative profits can also be caused by inefficient agricultural production (Kumbhakar and Lovell, 2000, p. 2). Gains in efficiency were badly needed

to achieve competitiveness and stabilise farm incomes because agricultural production was rather inefficient before the transition to a market economy (Brooks *et al.*, 1991, p. 153). However, Zegar and Floriańczyk (2003, p. 14) state that low efficiency is still one of the main reasons for the poor economic situation of Polish farms.

A few studies on the efficiency of Polish farms can be found in the literature:² van Zyl *et al.* (1996), Lerman (2002) and Latruffe *et al.* (2005) analyse efficiency with the Data Envelopment Analysis (DEA); Munroe (2000, 2001) and Brümmer *et al.* (2002) apply a Stochastic Frontier Analysis (SFA).³ While Munroe (2000, 2001) uses a Cobb-Douglas production function, Brümmer *et al.* (2002) apply a Translog distance function.

Table 1. Efficiency of Polish farms

	time period	method	technical efficiency	scale efficiency	allocative efficiency	total efficiency
Brümmer <i>et al.</i> (2002)	1991–1994	SFA	76%	—	—	—
van Zyl <i>et al.</i> (1996)	1996	DEA	98%	98%	77%	73%
Munroe (2000, 2001)	1996	SFA	57%	—	—	—
Latruffe <i>et al.</i> (2005)	1996	DEA	76%	94%	—	—
Lerman (2002)	2000	DEA	25%	—	—	—
Latruffe <i>et al.</i> (2005)	2000	DEA	71%	92%	—	—

Note: The efficiency measures of Brümmer *et al.* (2002), van Zyl *et al.* (1996), and Latruffe *et al.* (2005) have been calculated as unweighted or weighted mean of the published values.

Source: see first column

These studies report varying results (see Table 1). For instance, values for the average technical efficiency range between 98% (van Zyl *et al.*, 1996) and 25% (Lerman, 2002). Neither a clear improvement nor a clear decrease in technical efficiency can be observed over time. Scale efficiency has been analysed only by van Zyl *et al.* (1996) and Latruffe *et al.* (2005), who report average values of 98% and around 93% respectively. Allocative

² In this paper we do not consider efficiency analyses of the pre-reform time (e.g. Brada and King, 1993, 1994) because these studies are not relevant to the current state of the Polish farm sector.

³ It is not clear whether the non-parametric deterministic Data Envelopment Analysis (DEA) or the parametric Stochastic Frontier Analysis (SFA) is more appropriate to analyse farm efficiency in transition economies. On one hand, a stochastic approach (such as the SFA) seems to be more appropriate than a deterministic one (such as the DEA) because data from transition economies are relatively noisy (Gorton and Davidova, 2004, p. 6). On the other hand, a non-parametric approach (such as the DEA) seems to be more appropriate because it — unlike a parametric approach (such as the SFA) — does not rely on the assumption that all farms apply the same technology, which is highly questionable for transition economies (Gorton and Davidova, 2004, pp. 6–7).

efficiency has been examined solely by van Zyl *et al.* (1996), who obtained an average value of 77%.

The results on the relationship between farm size and efficiency vary.⁴ Munroe (2000, 2001) reports that farms larger than 15 ha are less technically efficient. van Zyl *et al.* (1996, p. 34) also show that technical efficiency is higher for smaller farms (≤ 15 ha) than for larger farms (> 15 ha), while allocative efficiency and scale efficiency do not depend on the size of the farm. However, Latruffe *et al.* (2005, p. 287) find that most crop farms operate under increasing returns to scale, which means that these farms are too small. The results of Lerman (2002, p. 8) are somehow in-between; they indicate that the smallest farms (≤ 2 ha) and the largest farms (> 30 ha) achieve relatively high technical efficiency, while mid-sized farms are characterised by low technical efficiency. However, he also shows that 83% of the farms with up to 5 ha have increasing returns to scale (Lerman, 2002, p. 8), indicating that smaller farms are less scale-efficient.

There are also some results regarding the relationship between efficiency and other factors. Latruffe *et al.* (2005, p. 287) show that crop farms are not as technically and scale-efficient as livestock farms. Moreover, Munroe (2000, 2001) finds a positive impact of the farmer's experience (measured as his age) and the modernisation level of the farm (measured as electricity and gas heating use) on technical efficiency.

Interrelations between the causes

The possible causes of low productivity and profitability are all directly or indirectly inter-related. These interrelations are illustrated in Figure 1. Strictly speaking, inefficiency is not a cause of but rather a measurement for low productivity and profitability. Inefficiencies can be caused by various circumstances, e.g. the other causes presented above. For instance, outdated technology leads to low technical efficiency, use of 'excess labour' decreases allocative efficiency, and the farm structure influences scale efficiency. The main source of inefficiencies are probably poor management skills (e.g. Latruffe *et al.*, 2005, p. 287, for Poland; Wu, 1977, and Stefanou and Saxena, 1988, in general), because they may result in

⁴ These findings must be interpreted with care because analyses of the relationship between size and efficiency are plagued by empirical as well as conceptual problems (Kislev and Peterson, 1996).

not using the best technology, not using the technology in the best way, not using the optimal set of inputs, not producing the optimal set of outputs, nor operating a farm of an optimal size.

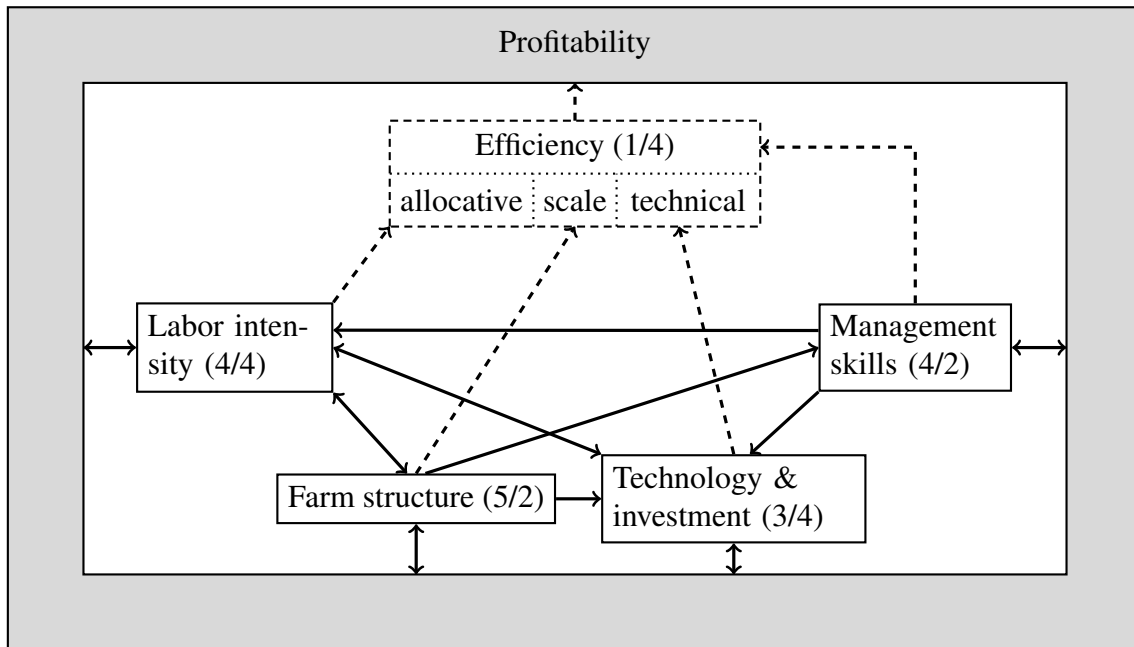


Figure 1. Interrelations between causes of low profitability (numbers in parenthesis indicate the number of outgoing/incoming arrows)

The farm structure influences

- investment and technology, because small farms generally invest less in new technology owing to the indivisibility of most modern machinery,
- labour intensity, because larger farms can adjust (reduce) their labour input more easily than smaller farms, because they generally have a larger proportion of hired labourers whom they can more easily dismiss or employ than family members, and
- average management skills, because larger farms often have better trained farm managers owing to decreasing average costs (per hectare or per animal) for (continued) vocational training and consultancy.

The labour intensity influences

- investment and technology, because lower opportunity costs of labour reduce the returns on investment in labour saving technology, and

- farm structure, because the more farmers leave the agricultural sector, the more farms are abandoned, and hence, the larger the average farm size.

Technology influences

- labour intensity, because the use of little and/or old technology requires the use of more labour (Borzutzky and Kranidis, 2005, p. 647).

Management skills influence

- labour intensity, because the time to do a certain task on the farm and the chance to get an off-farm job generally depend on the farmer's skills, and
- technology and investment, because more skilled farmers are more likely to make wise investment decisions.

Of course, the profitability of the farm is directly affected by all of the causes mentioned above. On the other hand, profitability directly affects

- decisions about abandoning the farm (farm structure),
- decisions about working on the farm or in the off-farm sector (labour intensity),
- the incentive for skilled persons to manage a farm (management skills), and
- the expectations for the returns on future investment and the availability of financial assets (technology and investment).

Taking a look at all of these interrelations and their directions, we can see that the farm structure acts most often as cause (outgoing arrows in Figure 1) and the labour intensity has the largest total number of interrelations (outgoing plus incoming arrows in Figure 1). Hence farm structure and labour intensity seem to play the central role in explaining the low profitability of Polish farms.

Evaluation of the causes

All the potential causes of the low profitability of the Polish farm sector mentioned above are justifiable. The results of efficiency analyses could help to evaluate the relative importance of each cause, because these different causes correspond to different types of inefficiencies (i.e. technical, scale and allocative inefficiency, see section 'Interrelations between

the causes’). However, the close interrelationship between the causes makes it difficult (or maybe even impossible) to separate direct and indirect effects, and hence, to separate ‘real causes’ from ‘intermediate causes’ that are only a consequence of ‘real causes’.

The results for the average technical efficiency vary too much to clearly indicate whether outdated technology and poor management skills lead to low (average) productivity. The analyses of the farms’ capital endowments and their access to the credit market also present conflicting results. Hence a lack of capital is unlikely to be the primary cause for the low productivity and profitability of Polish farms. It is more likely that the outdated technology of small farms is an effect of high labour intensity and small farm size.

The moderate average total efficiency found by van Zyl *et al.* (1996) does not indicate an extraordinarily high prevalence of untalented farmers. Furthermore, low education levels of agricultural workers can be found in most countries — not only in Poland (see European Commission, 2007, Table 3.3.6). Therefore, poor management skills also are unlikely to be the primary cause for the low profitability of Polish farms compared with those in other countries.

Because van Zyl *et al.* (1996) do not analyse the sources of the (moderate) allocative inefficiency found in their study, it is not clear whether it stems from a sub-optimal amount of labour input.

The relatively high average scale efficiencies of Polish farms reported by van Zyl *et al.* (1996) and Latruffe *et al.* (2005) indicate that the farm size distribution is not a major source of inefficiencies. Hence the current farm structure does not cause low general productivity. However, the relatively high scale efficiencies do not mean that the farms are large enough to generate sufficient income. Hence the farm structure is not inherently a severe problem of the general productivity of the sector, but of the households that operate a farm which is too small to yield enough profit to make a living. This would not be a problem if the household were to deploy only the part of their labour time on their farm that earns at least the market wage rate, and supply their remaining labour time outside their farm. The excessive labour intensity is the real problem of the Polish farm sector, because many farms do not supply their excess labour outside their farms. Because labour is the most important source of

income, particularly for poorer people (Schulz-Greve, 1994, p. 1, Dries and Swinnen, 2002, p. 457), a more efficient allocation of labour and the resultant higher remuneration of labour would considerably improve the income of farm households.

Causes of the high labour input of Polish farms

The above considerations show that the excessively large number of agricultural workers is the most significant problem of the Polish farm sector. Generally, a country's economic development requires changing its resource allocation, and the speed of the resource adjustment crucially influences the speed and success of the development process (Larson and Mundlak, 1997, p. 295). In this respect, the migration of labour out of the agricultural sector is among the most important resource adjustments (Larson and Mundlak, 1997, p. 295). The very slow decrease of agricultural employment — if there was a decrease at all — (see section 'Employment') and the very low labour productivity in the Polish farm sector indicate an extremely low mobility of agricultural labourers. Hence a detailed analysis of the impediments to agricultural workers' mobility may lead to measures that accelerate the restructuring of the agricultural sector (Zillmer, 2002, pp. 3–4). Therefore, possible causes for the high labour input of Polish farms are scrutinised in the following sections.

Technology and capital market imperfections

Dries and Swinnen (2002, p. 466) and Borzutzky and Kranidis (2005, p. 647) explain the high labour intensity of Polish farms by a lack of capital due to capital market imperfections. If farms cannot invest in new technology, they have to use little and/or old technology, which requires more labour. However, investigations of farmers' access to the rural credit market report contradictory results (section 'Technology and investment').

Land market

Although the Polish legislation for agricultural land markets is one of the best among transition countries, land sales entail high monetary and non-monetary transaction costs (Csaki and Lerman, 2001, pp. 17–19, 2002, p. 319). Furthermore, the Polish land legislation is very

unfavourable to tenants (Pouliquen, 2001, p. 72). As a result, the general performance of the Polish land market is rather poor (Dale and Baldwin, 2000). This impedes sustainable farms from reducing their labour intensity by increasing their farm size. Moreover, land prices are rather low (Pouliquen, 2001, p. 66, Csaki and Lerman, 2001, p. 16, 2002, p. 318), which further reduces the incentive for farmers to sell or lease their land and leave the agricultural sector. Hence the poor functioning of the Polish land market impedes the reduction of the labour intensity of the farm sector.

Skills

Even if the labour market functions perfectly, the migration of farmers into other sectors is often problematic, because agricultural workers generally have a lower level of education than industrial workers (Dries and Swinnen, 2002, p. 471, Macours and Swinnen, 2005, pp. 407–408). For instance, farmers are the professional group with the lowest experience with PCs (see section ‘Management skills’), which is a prerequisite for many jobs. Several studies (e.g. Leiprecht, 1997, pp. 17f, 2000, pp. 140f, Chaplin *et al.*, 2002, 2003, 2004) have shown that education in particular has a strong influence on the chance to find non-agricultural employment, because a higher level of education increases the number of appropriate jobs, makes the individual more attractive to employers, and increases the incentive to take an off-farm job thanks to higher potential wages (Chaplin *et al.*, 2004, p. 70). Moreover, Lerman and Schreinemachers (2005, p. 678) and Góra *et al.* (2006, p. 20) claim that agricultural workers’ skills are rather specific and they rarely transfer to other jobs, which further decreases their chances in the non-agricultural labour market. A survey by Chaplin *et al.* (2004, p. 72) shows that 50% of the respondents consider insufficient knowledge or skills an important impediment to off-farm employment.

The low skills of many agricultural workers meet a (too) small demand for low-skilled workers. Hence agricultural workers often have only poor prospects on the non-agricultural labour market (Macours and Swinnen, 2005, pp. 407–408) and therefore do not have the opportunity to leave the agricultural sector.

Labour market

In contrast, other studies (e.g. Lerman and Schreinemachers, 2005, p. 680) explain the high labour intensity of small family farms by a lack of functioning labour markets. Henning and Henningsen (2007b,a) show that the rural labour market in Poland is plagued by market imperfections due to different types of transactions costs and heterogeneity of labour. On one hand, there are too few jobs outside agriculture in rural areas (Wilkin, 1999, pp. 25-26). In a survey by Chaplin *et al.* (2004, p. 72), all interviewed persons without off-farm employment agreed that high regional unemployment was an important impediment to finding off-farm jobs. On the other hand, a poor infrastructure may prevent a well functioning labour market. For instance, Chaplin *et al.* (2002, 2003, 2004) have shown that a short distance to public transport and frequent connections increase the probability that members of agricultural households are employed outside their farms. However, the survey by Chaplin *et al.* (2004, p. 72) shows that only 9% of the respondents consider insufficient public transport an important impediment to off-farm employment. Furthermore, Zegar and Floriańczyk (2003, p. 17) point out that the unemployment rate is also high in urban areas,⁵ so the rural population has only poor chances to find jobs even there. In this respect, it is not only the situation of the rural labour markets but also the general macroeconomic employment situation that has an important influence on labour use on family farms.

Preferences

A high labour intensity and slow structural change in the farm sector can be explained by individual preferences for agricultural jobs (e.g. Lopez, 1980, 1984, Henrichsmeyer and Witzke, 1991, p. 384, OECD, 1994, pp. 53-54, Henning, 1994, pp. 191ff). Other authors (e.g. Bishop, 1956, p. 401, Lee, 1965, p. 88, Waldo, 1965, p. 1241) doubt this and state that individual preferences do not have a significant impact on off-farm labour supply. However, Polish farmers have an exceptionally strong relationship to their jobs and their farms, because they were the only class in the Soviet block who struggled successfully for their

⁵For instance, the unemployment rate in 2005 was about 18.4% in rural areas and 15.5% in urban areas (European Commission, 2007, Table 3.2.7.a.i). Between 2000 and 2005 the unemployment rate declined in rural areas, whereas it increased slightly in urban areas (European Commission, 2007, Table 3.2.7.a.ii).

ideals and properties against communism (Pacuszka, 2005, p. 5). For instance, a large share of Polish farm households indicates that they want to concentrate on farming rather than diversifying their farms or taking an off-farm job (Chaplin *et al.*, 2004, p. 72).

Policies

It is generally accepted (see e.g. Balmann, 1996, p. 371, Frohberg and Weber, 2002, p. 11, Berthold and Neumann, 2003, p. 15) that subsidisation of the agricultural sector generates incentives to use an excessive amount of inputs in agricultural production. Hence this subsidisation constrains intersectoral structural change. While the OECD (2006b, p. 185) determines only a very low agricultural Producer Support Estimate (PSE) in Poland before EU accession, Pouliquen (2001, p. 43) points out that the subsidisation of the social security system for farmers and their dependants (KRUS) is not included in the PSE, although the KRUS receives two to three times more public funds than direct support of agricultural production. Only 8.6% of the budget of the KRUS is financed by farmers' social security contributions, whereas the remainder is financed mainly by public funds (Davidova *et al.*, 2002, p. 46). This subsidisation reduces the contribution rate to the KRUS to roughly one-sixth of the contribution rate to the regular (non-agricultural) social security system (ZUS), although both systems offer similar benefits (World Bank, 2001, p. vi). The different contribution rates imply an implicit taxation of migrating from the agricultural to the non-agricultural sector (OECD, 2006a, p. 9). Only farmers with at least 1 ha of agricultural land are eligible for participating in the KRUS (Gorton *et al.*, 2001, p. 447, Latruffe *et al.*, 2005, p. 293), so the high subsidisation of the KRUS creates incentives to remain in the agricultural sector in spite of very low remuneration of farm work. Owing to this subsidisation and the regulation that owners of farms with more than 2 ha of arable land are not allowed to register as unemployed, there are approximately 1 million 'hidden' unemployed persons in the Polish agricultural sector (Pacuszka, 2005, p. 6).

Since Poland joined the EU in 2004 Polish farmers have received direct payments from EU funds. Although these direct payments were introduced in the course of accession and have been continuously increased thereafter, the Polish state raised its expenditure for

agriculture support at the same time and grants complementary (top-up) direct payments (Wilkin, 2007, p. 6). This resulted in considerably rising support for Polish farms.

Furthermore, many agricultural households receive social transfers, which contribute roughly 70% of their non-agricultural income (Pouliquen, 2001, p. 43). Chaplin *et al.* (2002, 2003, 2004) have shown that high unearned income (i.e. mainly social security payments such as retirement pensions, disability benefits or unemployment compensation) reduce the probability that agricultural households supply off-farm labour. However, it may be that this statistical relation does not come from a causal relation. For instance, fitness for work certainly influences both social security payments and off-farm labour supply so that these variables are statistically correlated, even if social security payments do not influence off-farm labour supply.

A study by Chaplin *et al.* (2004, see p. 73) shows that farm households perceive price guarantees and direct payments for agricultural production as the most important policies for reducing their motivation to start non-agricultural activities. However, the perception of the farm households might be biased, because subsidisation of the social security system is less visible than price guarantees and direct payments.

Evaluation of the causes

All of the causes mentioned above seem to be justifiable and probably have a significant impact. To the knowledge of the author, there are no studies that quantitatively analyse and compare the effects of the individual causes. Hence the relative importance of each cause cannot be determined exactly. However, the considerations above suggest that the poor skills of farm workers in connection with the small demand for low-skilled workers in rural areas, the poor performance of the land market, and the high level of subsidisation of the agricultural sector (and in particular of the KRUS) are the most important impediments to off-farm employment and hence to the development of the Polish farm sector.

Conclusion

The primary problem of the Polish farm sector is the low profitability of most farms and the low remuneration of farm work. Various causes for the low profitability have been identified. This analysis shows that all causes are closely interrelated. The excessively high labour intensity, which is closely connected to the poor farm structure, is identified as the most central cause. In short, ‘there are too many people farming on too small land areas’ (Chaplin *et al.*, 2002, p. 12).

Hence political measures should focus on increasing the off-farm labour supply of farm households. This would improve the income situation both of households that supply more labour outside their farms and of households that continue to concentrate on farming. While the first group earns additional income from employment and possibly from leasing or selling their land to other farms, the latter group has the possibility to increase their farm income by augmenting the size of their farms. Furthermore, off-farm employment may also be an expedient income diversification for sustainable farms (Schulz-Greve, 1994, p. 1).

Because it is impossible to implement targeted measures without knowing the causes for the high labour intensity, we have identified and analysed various impediments to off-farm employment. All of the identified causes probably have a significant impact, whereas poor skills of farm workers, the poor performance of the land market and the high level of subsidisation of the social security system for farmers and their dependants (KRUS) are probably the most important impediments to off-farm employment.

Therefore, an important political measure would be the improvement of the education and human capital of agricultural labourers, because it increases their opportunities in the off-farm labour market (e.g. Dries and Swinnen, 2002, p. 472, Latruffe *et al.*, 2005, p. 294). Furthermore, this would also improve the profitability of the farms that stay in business (Latruffe *et al.*, 2005, p. 294). However, increasing human capital of farmers is a difficult long-term task, because it cannot be achieved by a single simple policy measure (Latruffe *et al.*, 2005, p. 294). Hence the ‘question of how to improve human capital [...] remains pressing’ (Gorton and Davidova, 2004).

The effect of education can be increased by measures that improve the performance of the land market, because it is more attractive for operators of small farms to switch to off-farm work if they can more easily sell or lease their land. Furthermore, if well-educated operators of sustainable farms can more easily buy or lease land, they could use their knowledge on larger acreages. Political measures to improve the performance of the land market may include adopting land legislation that is more favourable to tenant farmers (Pouliquen, 2001, pp. 67, 82), reducing transaction costs for land sales (taxes and notary fees), streamlining and simplifying land registration, and creating incentives for voluntary land consolidation (Csaki and Lerman, 2001, pp. 19–20, 2002, p. 321).

From an economic perspective, the most reasonable measure seems to be a phase-out of the high subsidisation of the KRUS, because this creates a major incentive to stay in the agriculture sector despite very low profitability. However, while most studies assume that high employment in agriculture is generally negative, Schultz (1964) points out that even farm work always generates a positive output. Hence declining agricultural employment — *ceteris paribus* — results in reduced agricultural production. Considering this, Lerman and Schreinemachers (2005, p. 693) conclude that in the case of insufficient non-agricultural job opportunities, it might be better to retain relatively many workers in the agricultural sector, because generating a small income from agriculture is generally better than being unemployed and generating no income at all. Because the positive and negative effects have not been quantified yet, it is unknown whether the negative effects of remaining in the agricultural sector outweigh the positive effects of avoiding unemployment.

A large share of Polish farmers is more than 50 years old (European Commission, 2002, p. 8), and hence most of them will not take up off-farm employment — no matter what political measures are implemented. However, these farmers will retire in the medium term. This process could be accelerated by early retirement payments. Since the retirement of farmers decreases the number of farm workers only if the retired farmers do not have a successor, an effective measure would be to introduce additional benefits for retired farmers who terminate their farm and lease or sell their land to sustainable farms. These farming discontinuation incentives could improve the farm structure and the income situation of

retired small-scale farmers at the same time (Hagedorn and Klare, 1985, 1986; Mehl, 2002). Furthermore, it is even more important to encourage young members of farm households not to start farming but to obtain a good education that qualifies them for off-farm jobs, because it is much easier (and cheaper) to start a non-agricultural education directly after school than to switch from farming to a non-agricultural job later. This goal can be reached by providing good schools and higher educational institutions in rural areas and by integrating new farmers in the regular (non-agricultural) social security system (ZUS) instead of the highly subsidised KRUS.

However, one should not expect that political measures can rapidly solve the severe problems of the Polish farm sector, though a wise selection of measures may gradually alleviate these problems.

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