Economic Situation and Development Perspectives of Farms in Poland

An Analysis Based on Survey Data from Selected Polish Voivodships and a Comparison with German Farms

MARTIN PETRICK, GRZEGORZ SPYCHALSKI, MICHAŁ ŚWITŁYK, EWA TYRAN

Wirtschaftliche Situation und Entwicklungsperspektiven landwirtschaftlicher Betriebe in Polen – Eine Analyse von Befragungsergebnissen aus ausgewählten polnischen Woiwodschaften und ein Vergleich mit deutschen Betrieben

Der Beitrag stellt die Ergebnisse einer Analyse von einzelbetrieblichen Kennzahlen vor, die im Rahmen einer Befragung von 464 polnischen Landwirten im Jahre 2000 erhoben wurden. Die Analyse stützt sich auf den Vergleich von landwirtschaftlichen Betrieben in drei polnischen Woiwodschaften und zwei deutschen Bundesländern. Die Ergebnisse zeigen, dass die polnischen Betriebe deutlich geringere Gewinne erzielen als ihre deutschen Vergleichspartner. Der Unterschied im Einkommensniveau zwischen Beschäftigten in der Landwirtschaft ist wesentlich höher als der zwischen durchschnittlichen Arbeitnehmern in beiden Ländern. Das Einkommensniveau innerhalb des polnischen Agrarsektors liegt im Nordwesten höher als im Südosten des Landes. Die Analyse legt nahe, dass die geringere Rentabilität der Betriebe in Polen auf zwei Ursachen zurückgeht. Zum einen beziehen Unternehmen in den deutschen Regionen wesentlich höhere Subventionsbeträge. Zum anderen weisen polnische Betriebe deutliche Strukturdefizite als Konsequenz eines ungünstigen Verhältnisses zwischen Arbeitskraftbesatz und Nutzfläche auf. Darüber hinaus sind sie weniger produktiv und weniger spezialisiert als die untersuchten deutschen Betriebe. Polnische Landwirte zeigen eine allgemein konservative Haltung, sie ziehen eine Fortsetzung der Tätigkeit als Landwirt einer außerlandwirtschaftlichen Beschäftigung vor. Dennoch werden vor allem in den südlichen Regionen landwirtschaftliche Einkommen weithin durch nichtlandwirtschaftliche Einkommensquellen ergänzt.

Wir ziehen als allgemeine Schlussfolgerung, dass sich die polnischen Betriebe inmitten eines regionalen, wirtschaftlichen und sozialen Ausdifferenzierungsprozesses befinden, der in erster Linie durch die großen Unterschiede im Einkommensniveau zwischen ländlichen und städtischen Bevölkerungsgruppen verursacht wird. Allerdings wird dieser Prozess durch effektive institutionelle Hindernisse, besonders im Hinblick auf den ländlichen Arbeitsmarkt, stark verlangsamt oder sogar zum Stehen gebracht. Diesen Hindernissen sollte durch künftige Politikmaßnahmen angemessen begegnet werden, um weitere soziale Verwerfungen im Laufe des polnischen EU-Beitritts zu vermeiden.

Schlüsselwörter: Landwirtschaft; einzelbetriebliche Kennzahlen; Befragungsdaten; Polen; Deutschland

Abstract

The aim of this paper is to present an analysis of farm-level data collected in a survey of 464 Polish farms in 2000. Performance indicators of farms in three Polish voivodships are compared with farm accountancy data from two German Länder. The results show that Polish farms are much less profitable than their German counterparts. The gap in income levels is much higher between persons employed in the agricultural sector than between average working persons in the two countries. Living standards of the Polish farm population in the north-west exceed those in the south-east of the country. The analysis suggests that the lower profitability of farms has two major reasons. First, farms in the German regions receive much higher levels of subsidies. Second, there are pronounced structural deficiencies due to a quite unfavourable workforce-land ratio on Polish farms. These farms are less productive and less specialised than the German farms analysed. There is a generally conservative attitude among Polish farmers that prefers the continuation of farming over leaving the sector. Nevertheless, income from agriculture is to a substantial extent complemented by off-farm employment in the southern regions.

Our overall conclusion is that Polish farms currently are in the midst of a regional, economic, and social differentiation process fuelled by severe imbalances in terms of income levels between rural and urban population groups. This process is however seriously slowed down or even halted by a number of effective institutional barriers, particularly with regard to rural labour markets. These barriers should be properly addressed by a formulation of future policies in order to avoid further social frictions in the course of the Polish EU accession.

Key-words: agriculture; farm performance; survey data; Poland; Germany

1 Introduction

In current debates on the EU enlargement process, the role of Poland's agricultural sector is discussed controversially both in the existing member states and in Poland. This is for a number of reasons (see the instructive collection of articles in MILDENBERGER, 1999). First, fears loom large among EU farmers that their markets, after accession, will be flooded by cheap products from the East. Due to a much lower price level for some inputs, e.g. labour, Polish farms are assumed to have a distinct cost advantage over their Western competitors. Furthermore, as a consequence of the enlargement process, politicians and bureaucrats are afraid of potential direct payments for a myriad of small and smallest farms in Poland to impose a heavy burden on the EU budget. Polish farmers in turn fear a substantial import pressure as a result of the common market and a sellout of land to Western investors and speculators. Finally, severe social frictions between winners and losers, urban and rural regions within Poland are anticipated due to a perceived backwardness of the farm sector, which accounts for a much higher share of the total population than in most Western economies. Some analysts are afraid that these frictions might trigger a wave of migrants to be poured out on (Western) European labour markets, which is why long-lasting interim regulations for free access to the labour market are demanded. All these reasons have led to the widespread belief that the farm sector is one of the major stumbling blocks on Poland's way into the EU (see e.g. BUSSE, 2001; STYCZEK, 2000).

However, *facts* about the situation of Polish agriculture are currently much less widely circulated than *opinions*. Even the Polish government is ossasionally supposed to have no clear picture of its own farm sector (MAGUIRE,

2000). Particularly, it is uncertain how many of those Polish citizens registered as farmers do in fact practice agricultural production or participate in product markets to a significant extent. Due to a number of governmental subsidies, there are strong incentives to attain the formal status of a 'farmer' without ever intending to produce anything at all (BACHMANN, 1999). Though the results of the agricultural census carried out in 1996 shed some light on these issues (GUS, 1998; 1999), they do only provide a limited picture of the actual performance of Polish farms in terms of economic success and accounting results.

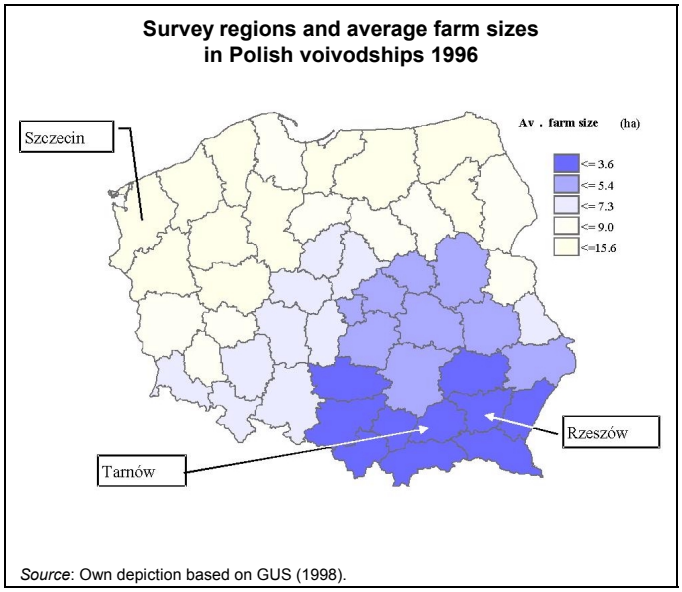
The aim of this paper is to fill, if only in some respect, the existing knowledge gap by providing an analysis of previously unpublished farm-level data collected by the authors in a survey of three former Polish voivodships. The database consists of a random sample of 464 farms of different production structures and organisational forms and allows a very detailed examination of their economic situation. In the following, we are also able to provide a comparison with farm accountancy data from two German regions. Finally, a novelty of the analysis is that the data include a number of interesting items on the innovative behaviour of farmers, the structure of investment activities, access to finance, and alternative income generation opportunities which allow some further-reaching conclusions about farm development perspectives.

The paper is structured as follows. Chapter 2 gives some more information about the database used for the analysis. Chapter 3 provides a horizontal comparison of economic results between the three Polish regions Szczecin, Tarnów and Rzeszów, and the two German regions Mecklenburg-West Pomerania and Bavaria. Chapter 4 takes a closer look at the development perspectives of Polish farms based on additional information collected in the survey. Chapter 5 summarises the results and draws some conclusions.

2 Description of the database and methodological notes

The major data source for the analyses in this paper is the IAMO Poland farm survey 2000 (PETRICK, 2001). It is a cross-sectional farm survey conducted in the boundaries of the former Szczecin, Tarnów, and Rzeszów voivodships existing prior to the administrative reform of January 1st, 1999. The survey was carried out in 2000 and mainly contains data related to the economic outcomes of the year 1999. As Figure 1 shows, Szczecin has very particular characteristics in terms of farm sizes in comparison to Tarnów and Rzeszów.

Due to historical reasons mainly, the organisation and structure of agricultural production in Poland is in fact highly region-specific (as discussed e.g. in GÓRZ and KUREK, 1998; JAKSCH et al., 1997). In the southern and eastern parts of the country, a very small-structured peasant agriculture predominates, while the north and north-west of Poland is characterised by a more diverse farm structure with a higher share of large-scale farms. As a peculiarity for Central and Eastern Europe, under the socialist regime, agriculture in Poland never was completely collectivised. State farms in the north had been mainly established as a result of the re-organisation of former German estates after World War II and administrative land allotment in subsequent years (for a detailed analysis see PHILIPP, 1983). However, after transition to a market economy, these state farms were liquidated or turned into the property of the Agricultural Property Agency of the State Treasury (Agencja Własności Rolnej Skarbu Państwa, AWRSP). This agency in turn sells or leases out the land (for an analysis see e.g. MILCZAREK, 2000 and ZIETARA, 1995).



Source: Own depiction based on GUS (1998).

Figure 1

The survey design took this regional structure into account by choosing research regions from both the north and the south. It is based on a random sample of farms in the database of the official extension service ODR (Ośrodek Doradztwa Rolniczego, Extension Centre of Agriculture). In contrast to official statistics on individual farms published by the Central Statistical Office (Główny Urząd Statystyczny, GUS), the ODR database consists only of farms that show at least some degree of commercialisation and market integration and that account for the bulk of the traded agricultural produce in the research area. The final sample consists of 464 farms; 120 from Szczecin, 108 from Tarnów, and 236 from Rzeszów. Within the given geographic boundaries of the three voivodships, it is a stratified one-stage random sample. Further details on sampling issues, organisation of data collection and a reprint of the questionnaire can be found in PETRICK (2001).

The horizontal comparison of farm accounting data draws to some extent on the structure of analysis used in the German governmental report on agriculture ('Agrarbericht', see BML, 2000b). The data of the IAMO Poland farm survey 2000 is based on accountancy data from the single farms visited or, since roughly 60 percent of respondents did not have permanent book-keeping, on estimates by the farm managers. PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001) inform about the exact calculation of the indicators used and their respective equivatents in the German farm accountancy system.

A specific characteristic of the Polish data-set is that the distributions of many important variables are highly skewed and thus significantly deviate from a normal distribution. We therefore prefer the *median*, i.e. the 50% percentile, to the mean as a measure of central tendency, since it is much

more robust in the presence of outliers or highly skewed distributions (see DEATON, 1997, p. 59). Since the median is calculated separately for each of the indicators to be analysed, disaggregate indicators shown in the tables usually *do not add up* to the compound value.

Throughout the tables, missing values were row-wise excluded. Missing values for farm profit are also the reason for the 25- and 75-quartile subgroup sample sizes being smaller than 25% of the total sample size of a given region.

Monetary statements are made in Euro (€), by using the average annual exchange rate for 1999 issued by the National Bank of Poland (which is 1 € = 4.227 zł) and the fixed conversion factor for the Deutschmark (1 € = 1.956 DM).

For the statistics on the Polish regions, an Annual Work Unit (AWU) equals the labour input of a person employed full time over the whole year. In the survey, this was measured in days, such that 1 AWU equals 300 working days for on-farm work and 270 working days for off-farm employment. The abbreviation nAWU denotes non-paid Annual Work Unit (i.e. family labour force). Livestock Units (LU) were calculated according to fixed conversion factors for different types of livestock, for details see PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001).

All German statistics were taken without modification from BML (2000b; save the conversion into €), such that the calculation procedures outlined there also apply for this subset of data. The statistics shown below cover only full-time farms ('Haupterwerbsbetriebe') and family farms ('Einzelunternehmen').

3 Polish and German regions in horizontal comparison

3.1 Introductory remarks

The aim of this section is to assess the economic situation of farms in the IAMO Poland farm survey 2000 sample in comparison with farms from the German farm accountancy data network. Among the current EU member countries, Germany is probably the country closest to Poland in terms of natural conditions, crops under cultivation, and types of livestock kept. Furthermore, the dual farm structure existing in Poland (see Figure 1) has its analogy in eastern versus western regions of the reunified Germany. In some sense, on the territory of the former German Democratic Republic, similar problems of agricultural restructuring had to be resolved as on the other side of the border in north-western Poland. After a decade of different economic and legal environments, a comparison of these two regions appears to be quite instructive. In fact, the consolidated farm enterprises of Eastern Germany, at least those with a specialisation in crop production, are assumed today to be among the most competitive within the EU (FORSTNER and ISERMEYER, 2000). On the other hand, several regions of Western Germany also face problems of a relatively small-scaled agriculture in the midst of structural change, although on a much higher level of economic development than in Poland (see e.g. the analysis in BML, 2000a).

As comparative regions for the three Polish voivodships surveyed we chose the German Länder Mecklenburg-West Pomerania (M-WP) and Bavaria. M-WP was selected due to its direct neighbourhood to Szczecin voivodship and its to some extent comparable farm structure. Bavaria was chosen since it is among those Länder in Western Germany that struggle most with structural change. Bavaria had the lowest standardised farm income ('Standardbetriebseinkommen') and the smallest average farm size of all German fedral states in 1999 (BML, 2000a, appendix p. 21), which makes it a natural candidate for comparison with the small-structured voivodships Tarnów and Rzeszów in south-eastern Poland.

In this paper, we concentrate on indicators that show the structure and economic success of single farms. We will generally look at measures of *central tendency* within specified subgroups of the sample. The major analytical tool throughout the paper is thus the comparison of median and/or mean values. In addition, we will explicitly consider the distribution of certain indicators and frequencies of responses to closed questions or frequencies of membership in distinct categories of respondents. This paper only contains a selection of indicators calculated from the survey data, additional data analyses are presented in PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001).

All indicators referred to in the following are listed in Table 1, both for the three Polish voivodships investigated and the two German Länder. Distribution charts are given in Figure 2. Generally, we will regard all five regions jointly and try to highlight important differences or similarities. We first concentrate on the cross-country comparison of median/mean values, section 3.7 then summarises the results of a comparison of profit groups.

3.2 Factor endowment

Following the systematic of the German farm accountancy data network, information on factor endowment includes statements on land rent and stocks of land and labour.

- The general observation is that *factor endowment* in Tarnów and Rzeszów is similar, though generally much smaller than in the Szczecin region. Accordingly, *farm sizes* in Szczecin are – with roughly 50 ha – more than five times larger than those in the southern voivodships. While Bavarian farms are on average smaller than those in Szczecin but larger than those in the southern regions, farm sizes in M-WP exceed even those in Szczecin by more than four times.
- *Land rent* in Poland appears to be similar around 20 €/ha across regions, which is one fifth of the value for M-WP and less than one tenth of that for Bavaria. As will be seen below (Section 3.5), *average* profitability of farms on a hectare base substantially exceeds land rents in Poland. This may not be implausible if the value of the *marginal* product of land, on which no further information is available, is in fact low. Alternatively, little demand for rented land may be due to a liquidity problem, since funds are widely needed to serve basic income needs of the farm population (see Section 3.5). This appears plausible at least for the southern regions.
- *Labour force per farm* is roughly two AWU in the Polish regions analysed. As a rule of thumb, it is thus two thirds of that in M-WP, while in Bavaria it is two thirds of that

Table 1: **Horizontal comparison of farm performance indicators (Poland and Germany) for the cropping year 1998/99**

Code indicator	Unit	Szczecin Total	Szczecin Lowest profit quartile	Szczecin Highest profit quartile	Tarnów Total	Tarnów Lowest profit quartile	Tarnów Highest profit quartile	Rzeszów Total	Rzeszów Lowest profit quartile	Rzeszów Highest profit quartile	M-WP	Bavaria
		Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median
10 Farms	No	120	26	26	108	23	23	236	55	55	160	1868
Factor endowment												
27 Land rent	€/ha	20	21	19	20	20	13	20	55	55	95	224
30 Total land cultivated	ha	51.44	60.06	121.41	8.93	7.41	12.71	8.24	7.82	11.87	229.01	36.70
31 Arable land	ha	47.94	51.13	111.49	6.90	4.51	11.03	6.00	5.50	9.16	185.76	22.49
32 Pastures	ha	3.97	3.43	2.97	0.59	0.59	0.57	1.25	1.56	1.21	42.72	13.89
43 Permanent crops	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.31
70 Work force	AWU	2.32	2.00	2.95	2.00	2.00	2.26	2.00	2.00	2.29	3.00	1.53
71 Family work force (nonpaid)	nAWU	2.00	1.86	2.00	2.00	2.02	2.00	2.00	1.95	2.27	1.50	1.44
Work force per 100 ha	AWU/100ha	4.07	4.38	2.89	21.71	27.71	17.29	21.08	19.06	16.98	1.31	4.17
Production structure												
90 Total land cultivated	ha	51.44	60.06	121.41	8.93	7.41	12.71	8.24	7.82	11.87	226.85	35.97
91 Cereals	ha	32.18	30.29	86.25	4.00	3.15	7.16	4.00	3.87	6.60	108.37	12.32
96 Sugar beet	ha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.30	0.92
130 Livestock	LU/100 ha	19.8	21.8	16.0	80.7	69.0	93.9	91.5	83.9	85.5	37.2	166.0
131 Cattle	LU/100 ha	0.0	0.0	0.0	27.5	13.0	28.2	33.4	35.9	19.1	28.3	122.1
132 o.w.: Cows	LU/100 ha	0.0	0.0	0.0	12.5	8.0	11.1	20.8	19.5	11.6	12.6	57.3
134 Hogs	LU/100 ha	5.7	2.4	3.9	12.8	0.0	26.0	9.9	5.1	23.7	6.8	41.5
Physical output												
140 Cereals	dt/ha	39.5	39.5	47.7	34.2	34.1	43.9	35.0	36.4	36.8	62.4	62.8
146 Sugar beet	dt/ha	429.2	404.3	400.0	434.9	500.0	400.0	440.0	347.9	438.9	438.5	654.6
148 Milk	kg/cow	3678	3961	3671	3000	3000	3500	3000	3000	3750	6130	5559
Balance												
200 Fixed assets	€/ha	1537	1980	1232	3104	4223	3224	3640	5456	3135	1716	15605
201 Land	€/ha	651	690	709	650	487	772	672	881	672	536	11217
202 Buildings	€/ha	385	553	264	1152	1834	1151	1576	1674	1333	470	1899
204 Machinery and equipment	€/ha	503	625	328	1035	1774	1072	1035	1536	1015	632	1335
214 Livestock	€/ha	33	37	13	150	169	160	157	149	204	225	937
217 Inventories	€/ha	28	31	35	139	133	115	149	148	196	188	638
227 Total assets	€/ha	1829	2276	1493	4124	4925	4175	4332	6403	4222	2198	17198
231 Equity	€/ha	1581	2125	1208	4068	4733	4105	4070	5751	4064	872	15349
239 Liabilities	€/ha	141	145	179	157	127	442	115	130	154	1262	1744
Investment												
251 Gross investment	€/ha	12	10	15	18	81	22	52	154	56	263	573
267 Net investment	€/ha	–30	–46	–10	–75	–134	–83	–77	–74	–60	76	–396
Profit ans Loss												
300 Gross revenue	€/ha	467	363	580	720	382	1428	649	466	1041	856	2243
301 Plant production	€/ha	304	189	390	189	140	375	214	173	238	489	329
308 Livestock production	€/ha	160	179	157	402	264	951	441	255	744	363	1744
385 Input expenditures	€/ha	150	148	176	135	118	347	145	145	224	484	1020
440 Wage expenditures	€/ha	6	7	16	0	0	0	0	0	0	113	41
450 Depreciation	€/ha	53	76	36	124	198	126	147	232	127	161	437
460 Other expenditures	€/ha	80	106	73	137	188	145	148	184	156	293	845
483 Interest expenditures	€/ha	7	5	9	8	7	15	7	5	10	49	77
492 Tax expenditures	€/ha	11	13	11	15	18	17	14	18	13	12	18
501 Profit	€/ha	116	–39	290	194	–157	866	109	–332	435	220	747
502 Profit	€/nAWU	2552	–941	11297	1256	–858	4280	431	–1258	2597	33498	19071
500 Profit	€/farm	5847	–1791	21235	2491	–894	9217	943	–2112	5548	50304	27410
Profitability												
520 Returns on sales	%	3.0	–50.4	32.4	–34.7	–278.1	22.7	–94.5	–223.1	–2.0	5.2	–2.8
522 Returns on total capital	%	1.7	–6.0	14.5	–5.5	–14.8	7.4	–10.1	–12.3	–0.1	5.4	0.0
524 Returns on equity	%	1.4	–6.3	15.0	–5.0	–15.7	8.1	–12.1	–14.1	–0.5	7.9	–0.6
527 Value added/ tot. work unit	€/AWU	–110	–6494	5218	–751	–2908	2488	–928	–4798	487	23064	5799
Income												
552 Family income	€/family	7593	351	18625	3869	–140	10564	1612	–1475	6310	53486	32284
561 Profit contribution to family income	%	100.0	56.8	100.0	79.7	–35.5	94.5	73.7	–114.7	95.0	94.1	84.9

Notes: Code according to BML (2000b). For methodological notes see Chapter 2 and PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001).

Source: Own calculations based on results of IAMO Poland farm survey 2000 and BML (2000b).

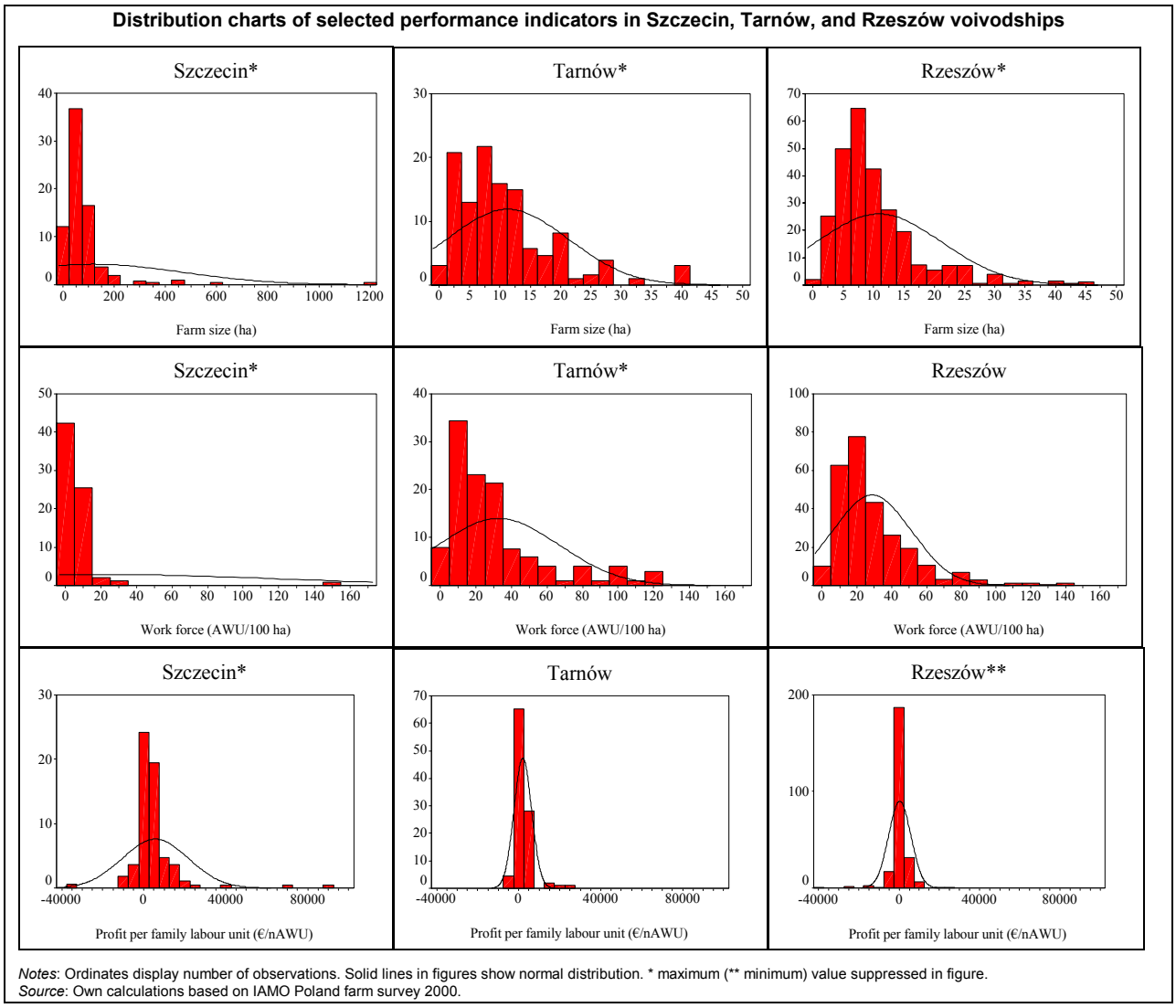
in Poland. *Labour intensity* with respect to land is in Szczecin even lower than in Bavaria, though it is still three times as high as in M-WP. In the southern Polish regions it is tremendously higher than in all other regions.

These results can be further extended by looking at the statistical distributions of indicators on the regional level. Histograms on farm sizes and labour intensity for the Polish regions show that only in Szczecin, there are farms that reach the size of the average farm in M-WP (Figure 2). In contrast to that, in the southern regions, farms accumulate in size classes of less than 20 ha per farm. Furthermore, the charts illustrate that there is a particularly wide spread of labour intensities in the southern regions.

3.3 Structure of production

To analyse the structure of production figures arable land use and livestock are investigated in the following. Furthermore, we present yields of crop and animal production.

- With regard to the *structure of crop production* the table shows that the share of cereals varies between one third in Bavaria and almost two third in Szczecin. Sugar beet production is less important in Poland than in Germany.
- There are also substantial regional differences in *livestock density*. In Szczecin voivodship, cattle production is generally of little importance (although there are a number of specialised livestock producers). Hog density is similar to that in M-WP. The two southern regions show higher livestock densities. However, even in the southern regions, cow density is less than half and hog density only around one quarter of that in Bavaria.
- With respect to the key products *cereals* and *milk*, productivity in the Polish regions is only about half of that in the German regions, with little differences across Polish regions. Milk output per cow is , however, slightly higher in Szczecin than in the southern regions of Poland. Yields of *sugar beet* are almost the same in Poland as in M-WP.



Notes: Ordinates display number of observations. Solid lines in figures show normal distribution. * maximum (** minimum) value suppressed in figure.
Source: Own calculations based on IAMO Poland farm survey 2000.

Figure 2

While there are important differences in livestock densities across Polish and German regions, the structure of crop production as represented by the data is more similar. Substantial productivity gains appear yet exploitable in Poland, although a regional comparison should of course take into account differences in agro-climate and soils. To do justice to this is beyond the scope of this paper. The only tendencies we want to mention at least are that (a) overall differences between Szczecin and M-WP should be relatively small due to their spatial proximity, (b) the same applies to Tarnów as compared with Rzeszów, (c) with regard to average soil quality and rainfall distribution the three Polish regions show no major differences (JAKSCH et al., 1996, pp. 116; 121), and (d) Bavaria is more difficult to compare with the other regions due to its internal agro-climatic heterogeneity. As a result, at least with regard to M-WP and the three Polish regions, differences in agro-climatic conditions are unlikely to severely bias the comparison of productivity measures.

3.4 Balance structure and investment

The balance structure in Table 1 shows the total value of assets and their composition:

- In the balance structure, Szczecin has many similarities with M-WP. This includes the *book value of land* on a per hectare basis, which is rather the same across Polish regions and even slightly higher than in M-WP. There are two key differences between Szczecin and M-WP. One is the much lower *degree of leverage* in Szczecin (i.e. liabilities in percent of total assets, this is around 8% in Szczecin but more than 50%) in M-WP, the other is the lower *livestock value* per hectare, which reflects the lower livestock density.
- In the southern regions of Poland, the higher importance of livestock implies a higher *capital stock* per hectare. However, though capital intensity with regard to land is twice as high as in Szczecin, it is still only one fifth of that in Bavaria. Furthermore, the *degree of leverage* is particularly small in southern Poland (with less than 5%; in Bavaria around 10%).

With regard to investment, we distinguish between gross and net investment per hectare. The latter is somewhat restricted in its meaning due to the difficulty of finding appropriate depreciation rates[1]).

1) Net investment equals gross investment minus depreciation. We calculated depreciation as an annual fraction of the stated value of machinery

– *Gross investment* is particularly small in Szczecin. Generally, in Poland, it is only about 5% (Szczecin) to 20% (Rzeszów) of that in M-WP and about 2 to 10% of that in Bavaria.

– The situation appears to be even more extreme with regard to *net investment*: there is a common tendency of net disinvestment in all Polish regions, which is particularly pronounced in the southern regions. There is however even stronger disinvestment in Bavaria.

Apart from M-WP, agricultural production capacity in all regions concerned was thus shrinking in 1999. In fact, this general observation may only conceal an ongoing process of differentiation into larger, commercial farms on the one hand and smaller ones, with the perspective to give up farming, on the other. In addition, it remains to be seen *what kind of investment* was undertaken by farmers, since substantial funds might have flown into non-productive assets such as residential buildings (see discussion in 4.2).

3.5 Profitability and income

This section examines the profit and loss statements of farms on a per hectare base and a number of derived measures of farm profitability.

– *Gross revenue per ha* is smallest in Szczecin, where it is about one half of that in M-WP. The southern regions take a mean position between these two. Bavaria has by far the highest revenue per ha. The latter is due to the importance of livestock production in this region, which earns almost three quarters of total revenue per ha. This structure is similar for the Polish southern regions, although on a much lower level (around one quarter in revenue per ha). In contrast to that, in Szczecin and M-WP, most revenue is generated from crop production.

– *Expenditure on intermediate inputs* in Szczecin is about one third of gross revenue, while it is roughly one half in the German regions. In the southern Polish regions, it is even less than one quarter of gross revenue. Input expenditures thus account for a substantially lower share of revenue in Poland as compared with Germany.

– In comparison with Germany, *wage expenditures* per ha are very low in Szczecin and almost zero in Tarnów and Rzeszów. *Tax expenditures* paid per ha, however, are roughly similar in all regions concerned.

– Compared with M-WP, Tarnów achieves almost the same *profit per ha*, while in Szczecin and Rzeszów it is only about half the value. If this is taken as a measure of the efficiency of factor use, it may indicate some scope for improvement in the latter regions. However, due to the heterogeneous structure of farms in the various regions and to the different level of public support (see section 3.6), it is difficult to draw further reaching conclusions from this indicator.

– There are substantial differences in *profit per unpaid work unit* in all regions examined: The Polish regions range from 2,552 €/nAWU in Szczecin to only 431 €/nAWU in Rzeszów. Tarnów with 1,256 €/nAWU lies in between. Profits per nAWU in M-WP exceed those in Szczecin by a factor of 13, while in Bavaria they exceed those in the southern Polish regions by a factor of 20 to 50. The difference is somewhat less pronounced with regard to *profit per farm*, which is caused by the higher intensity of family labour in the Polish regions.

To put the values for profit per unpaid work unit in perspective, consider the difference in the general wage level in both countries. For Germany we may take the official figures for the salary earned in industrial occupations ('Gewerblicher Vergleichslohn') presented in the annual report on the state of agriculture ('Agrarbericht'). In 1999, this annual salary was 26 284 € (BML, 2000b, p. 116). A comparison with the average yearly wage for all sectors in Poland in 1999, which is 4 818 € (GUS, 2000, p. 158), shows that the off-farm wage in Germany was roughly five times the level in Poland. As the previous paragraph sets out, the difference between Germany and Poland in remuneration of labour *in the agricultural sector* is thus substantially higher than in other sectors. In comparison with the national average, remuneration and productivity of farm labour is quite low. This is usually labelled as *hidden unemployment*.

Figure 2 illustrates that the distribution of profit per family labour unit within the Polish regions is rather concentrated around the median, particularly in southern Poland. The previous statements can thus be generalised to be valid for most of the actual farms analysed.

A similar picture of the profitability of agricultural production is drawn by the following indicators of farm performance:

– *Returns on sales* as a measure of profitability after remuneration of family work force are in Szczecin only slightly below the value for M-WP. *Returns on capital* and *returns on equity*, which both are calculated after family labour has been paid, are worse in Szczecin than in M-WP but at least still positive. In contrast to that, all these figures are deeply negative for the southern Polish regions, and even worse for Rzeszów than for Tarnów. However, also Bavarian farms do not yield positive values for these indicators.

– After equity has been paid, *value added per total work unit* is generally negative in the Polish regions under investigation[2]). The implication is that profits are not only insufficient to generate an acceptable income for family labour, but even cannot pay the market interest rate.

Hence, although there is a lower relative burden of input and wage costs in the Polish regions, many farms achieve lower profits per ha than their German counterparts. A much more substantial difference is however due to the unfavourable man/land ratio in Poland which quite negatively affects those indicators that take the remuneration of unpaid labour into account. The general conclusion holds that there is a huge gap in terms of profit per farm between German and Polish regions under investigation.

and buildings. Machinery is linearly depreciated over 14 years; buildings are linearly depreciated over 25 years.

2) The interest allowance for equity was 10% p.a. according to annual interest for 12-month deposits.

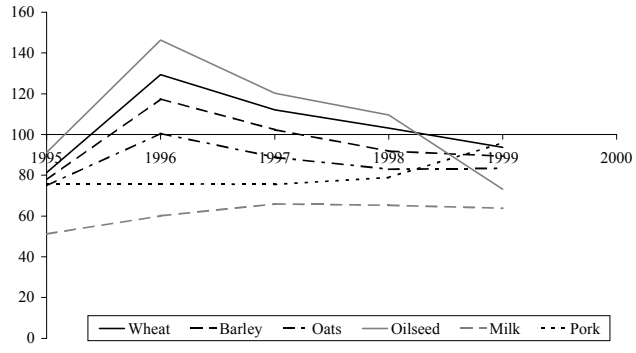
In our analysis of the income situation of Polish farmers, we investigate the magnitude of income and the shares that agricultural production activities contribute.

- *Family income* figures differ between Szczecin and M-WP by a factor of around seven, between the southern Polish regions and Bavaria by a factor of around 10 to 15.
- The *share of off-farm contributions* to family income is higher in the southern Polish regions than in all other regions examined. In Szczecin, the median farm household generates all its income from agriculture.

The difference in income levels between farms in the German regions on the one hand and Polish regions surveyed on the other is thus less dramatic than the profitability gap. However, it is still substantially larger than for the average working person in Germany and Poland.

3.6 Prices and public support

The question may arise whether differences in income levels between Poland and Germany are the result of widely varying price levels for agricultural goods in both countries. To investigate this conjecture, Figure 3 illustrates the price developments in Poland relative to Germany for a number of important agricultural products in the period 1995 to 1999. We use national average prices since the survey results suggested that there are no major price differences across regions. It becomes clear that prices in Poland by and large converged to those in Germany for that period. Significant differences are displayed for milk, which continuously ranges at about two third of the German reference over recent years, and oilseed, where a remarkable price disadvantage compared with Germany materialised in 1999.



Source: Own calculations based on BML (2000c), GUS (1999), GUS (2000), and IAMO data.

Figure 3

We have seen that cereals production tends to be more important in the north, while livestock production is concentrated in the south (Section 3.3). In fact, the survey results suggest that the most important crop in the north in terms of area under cultivation is wheat, while by far the largest share of revenue from livestock production in the south is generated by the pig sales. These two products are those with the least difference to Germany. Other important crops such as barley and oats also show only modest deviations from the German price levels. It is therefore fair to say that low product prices cannot be held responsible for the exorbitant profitability gap between Germany and Poland. This is qualified only for those farms that to a substantial extent have engaged in oilseed production in 1999, and generally for those regions where cow density is high. Note however that the displayed milk prices are not adjusted to a standard quality.

Polish input prices, on the other hand, are likely to be much more heterogeneous than those in Germany. Particularly land rent, wages and capital costs are likely to differ from those in Germany. However, these prices are implicitly considered in a number of indices presented in Table 1. Prices for intermediate inputs such as fertiliser or pesticides or even agricultural machinery are unlikely to be much higher than in Germany and can hardly be regarded as decisive for the substantial profitability gap between both countries.

Although the price structure is not largely disadvantageous for Polish farmers, a second question concerns the influence of public support *not* associated with prices. Overall subsidies are in fact substantially higher in the German regions, which are subject to the Common Agricultural Policy (CAP) of the EU. In 1999, reported percentage Producer Support Estimate (PSE), i.e. PSE in percent of the value of total gross farm receipts, amounted to 49 for the EU, while it was only 25 for Poland (OECD, 2000, pp. 205; 237). The major difference comes from direct payments based on area planted or livestock numbers. These payments amounted to 247 €/ha in M-WP and 172 €/ha in Bavaria (BML, 2000a, appendix p. 42). There were no comparable payments in Poland in 1999. This difference is certainly responsible for a major part of the profitability gap between the investigated regions.

3.7 Horizontal comparison between profit groups

In a final step we now look at several subgroups of farms according to their economic performance. Table 1 shows for each Polish region not only the overall median values, but also the median values of, respectively, the least and most successful farms. These latter two groups represent the 25% worst or best farms in terms of profit per farm. It is thus possible to investigate some relations between structural indicators and economic performance.

Going through the table from top to bottom, one may observe the following. Within the Polish regions, farms are the more successful the lower the land rents they pay, the more land they cultivate, the lower their labour intensity per ha, the lower (higher) their livestock intensity per ha in northern (southern) Poland (i.e. the higher the degree of specialisation), the higher the yields of cereals and milk (exception: Szczecin), the lower their capital intensity per ha, the higher their degree of leverage, the higher their interest expenditures, the lower the degree of disinvestment (exception: Tarnów), the higher the revenues per ha, and the higher their family incomes. Furthermore, successful farms are those with sufficient profits to pay equity, i.e. with positive value added per total work unit.

Table 2: **Further indicators in profit group comparison (Poland) for the cropping year 1998/99**

Code indicator	Unit	Szczecin Total Median	Szczecin Lowest profit quartile Median	Szczecin Highest profit quartile Median	Tarnów Total Median	Tarnów Lowest profit quartile Median	Tarnów Highest profit quartile Median	Rzeszów Total Median	Rzeszów Lowest profit quartile Median	Rzeszów Highest profit quartile Median
Indicator	Unit	Frequency or median values			Frequency or median values			Frequency or median values		
Farms	No	120	26	26	108	23	23	236	55	55
Future plans										
Increase farm	%	52	50	56	35	32	46	31	29	45
Specialise in certain branches	%	30	38	38	50	32	81	45	35	58
Exit farming and work off-farm	%	7	10	0	8	8	4	10	22	4
Invest in certain assets	%	39	38	37	22	7	42	20	18	30
Pass on farm to next generation	%	26	21	36	23	12	15	37	38	40
Don't plan any changes	%	24	13	25	32	30	17	38	42	28
Investmentstructure										
Land	%*	14,8	11,5	13,5	3,7	6,3	3,8	3,5	2,1	5,3
Residential buildings	%*	13,2	13,8	3,6	25,6	24,3	17,8	17,7	16,4	13,2
Farm buildings	%*	7,4	10,2	7,4	12,0	9,1	19,4	17,5	20,9	19,2
Car	%*	9,5	9,1	10,9	6,7	11,6	2,9	14,3	11,9	15,2
Tractor	%*	18,9	13,7	29,1	17,0	5,4	21,5	8,0	6,0	8,9
Agricultural machinery	%*	21,8	26,0	21,7	7,7	4,4	9,0	10,1	7,3	15,5
Livestock	%*	4,9	6,2	5,1	4,0	2,9	6,0	5,8	9,3	11,1
Personal computer	%*	1,4	1,0	1,2	2,7	6,4	2,6	1,8	1,7	1,1
Modernise telephone network	%*	0,2	0,4	0,0	4,2	1,6	0,1	3,3	2,5	1,6
Modernise heating system	%*	2,6	0,7	5,8	2,1	4,2	0,3	4,0	5,0	1,6
Agrotourism	%*	1,5	0,0	1,3	7,6	12,5	11,4	2,3	1,6	1,5
Other	%*	3,9	7,5	0,5	6,8	11,2	5,3	11,8	15,3	6,0
Access to finance										
Applicant unconstrained	%	48	60	50	34	25	44	44	48	55
Applicant partially constrained	%	46	40	50	33	26	39	36	28	40
Applicant fully constrained	%	0	0	0	2	0	4	1	0	2
Non-applicant unconstrained	%	4	0	0	26	45	7	15	20	2
Non-applicant discouraged	%	2	0	0	5	4	7	5	4	2
Alternative income										
Share of income from...										
Agriculture	%*	89	74	99	63	42	87	56	45	77
Off-farm employment	%*	4	9	0	19	34	8	23	35	8
Transfers	%*	4	11	0	12	14	3	16	13	10
Non-agr. businesses	%*	3	4	1	2	6	0	2	3	2
Sale of assets	%*	0	1	0	0	0	0	0	1	0
Other	%*	0	1	0	2	4	1	2	2	2
Off-farm income per AWU employed off-farm	€/AWU	994	1126	.	1013	1291	1302	567	467	628
Households receiving remittances	%	2	3	0	16	26	16	12	13	17

Notes: Mean share in the respective subgroup. For further methodological notes see Chapter 2 and PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001).

Source: Own calculations based on results of IAMO Poland farm survey 2000.

These ratios can be regarded as the *conditions* that allow profitable farming in Poland. In most cases economic success and structural conditions mutually reinforce each other, at least in the longer term (as is the case with farm size, specialisation, physical productivity, and investment). In those cases, however, where structural parameters are widely exogenous to farm decision making they can be regarded as a direct *cause* of higher farm profits. This holds true with regard to land rent and labour intensity, in the short term also with regard to farm size and degree of specialisation.

4 Indicators on the development potential of farms in the Polish regions

In this chapter, we will examine a number of further indicators that are not usually reported in farm accountancy data analyses (Table 2). They are believed to be quite relevant for the economic success of agricultural producers and the welfare levels attainable in rural areas not only in the past but also with regard to the future. As such they can be regarded as referring to key preconditions for the further development of Polish agriculture. In addition to comparing measures of central tendency as in Chapter 3 we also compare frequencies of responses to closed questions or frequencies of membership in certain categories of respondents. With regard to investment structure and alternative income sources we resorted to mean instead of median values, since otherwise the table would have shown mostly zeros in these rows. As a side-effect, adding-up property of row values is guaranteed when using the mean, which eases interpretation in these cases.

4.1 Innovative behaviour of farm managers

Innovative behaviour in our analysis includes primarily an examination of future plans of farm managers. Additional indicators are given in PETRICK, SPYCHALSKI, ŚWITŁYK, and TYRAN (2001).

- The intention to *enlarge* the farm in terms of land resources is particularly pronounced in Szczecin voivodship where farm sizes already exceed those of other regions. Farmers in the south, to the contrary, are more willing to *specialise* their enterprise. The general readiness to invest is higher in Szczecin than in the southern regions, while at the same time comparatively less farmers in the north expressed an unwillingness to plan any changes at all. In all subgroups, there are more farmers who want to pass on their farm to the next generation than farmers who intend to give up farming.
- The willingness to increase the farm, to specialise, and to invest in certain assets as well as the intention to pass on the farm to the next generation are positively correlated with profits (with one exeception: in Szczecin, farmers with the lowest profits show a slightly higher willingness

to invest than those with the highest profits). To the contrary, the desire to abandon farming correlates negatively with profits.

– While in Szczecin farmers with the highest profits are those with the lowest intention to change anything on their farms, this relation is reverse in the southern regions. In Tarnów and Rzeszów, farmers with the lowest profits also are those who do not intend to change anything on their farms. Interestingly, in Tarnów, both the highest and lowest profit quartiles seem less inclined to hand down their farms to the next generation than the total set of farmers.

In summary, Polish farmers tend to be conservative, with a general attitude that prefers the continuation of farming (even across generations) to leaving the sector. A substantial share of farmers in the north intend to increase their farms and in the south to specialise. However, the farms with the worst economic performance are those with their managers expressing the lowest willingness to change anything on their farms.

4.2 Structure of investment activities

In Section 3.4 it was shown that gross investment levels in all Polish regions are quite low, and that net investment generally is negative. Yet it might be of interest to further analyse the structure of investment activities, even if their overall level is low. For this purpose, Table 2 shows the *shares of specific investment activities* in per cent of total investment expenses made in 1997–1999.

– The main focus of investment differs between the northern and the southern regions. While in Szczecin farmers particularly invested in *agricultural machinery including tractors and land*, in Tarnów and Rzeszów funds were mainly spent on *residential and farm buildings*. There is thus a tendency in the southern regions to invest in assets that have only secondary value for production, if they imply any productivity increases at all. However, investment in agrotourism as an innovative income generation activity has some importance in Tarnów as well.
– A general observation is that the more successful farms invest more in *productive assets* (i.e. machinery, farm buildings, land) than the overall median farm. Farms in the lowest profit quartile put very much emphasis on modernising their residential buildings.

All these remarks are qualified by the very low absolute level of investment in general. The overall conclusion of this section however is that the structure of investment activities indicates a process of differentiation dividing the farm population into two broad groups. The first group consists of more or less commercial *producers* with moderate to good prospects for the future. This group currently tends to be more profitable and is mainly located in the north. The second group includes *stagnating farms* that sooner or later will leave the sector; these farms are currently less profitable and primarily located in the south.

4.3 Access to finance

The survey investigated the single farm's access to finance by directly asking respondents about their experience with bank credit as follows. Credit recipients were asked whether they would have liked to borrow more at the same interest rate. If so, they were classified as *'partially constrained'* borrowers. If their application was rejected altogether, they were classified as *'fully constrained'*. Non-applicants were asked if there was a time in the past when they thought of applying for credit but changed their mind because they feared rejection. Those who answered positively were classified as *'discouraged'*. Those who were not discouraged and those who did not want to borrow more than they obtained were classified as '*applicants or non-applicants unconstrained'*. For more details on this methodology and other empirical applications see e.g. FEDER et al. (1989) and MUSHINSKI (1999)[3]).

Table 2 summarises the central tendency of responses for several subgroups of the sample:

– While in Szczecin almost all farmers have *successfully applied* for credit in the previous three years, there is a share of 20% of farmers in Rzeszów and 30% in Tarnów who *did not apply*. Among the non-applicants, the largest share *did not need any credit* at all. Uniformly across regions, of those who applied, a larger share obtained *as much credit as desired*, while a smaller share was *partially constrained*. Generally, there are almost no farmers who were *completely rejected* by the banks.
– In Szczecin, higher profits imply a higher probability to be *partially credit constrained*. The fact that leverage is already higher on the more profitable farms may be an explanation for this. The picture is less clear in the southern regions: Among the high-profit farms, there is both a higher percentage of unconstrained and partially constrained farms, since the share of applicants is higher in general.

It may thus be concluded that access to finance appears not to have been a major bottleneck in the past, though a number of farmers did not obtain as much credit as desired.

4.4 Alternative sources of income generation

In this section, we consider the *composition* of total family income and the *level* of average income from off-farm employment (i.e. off-farm income in short) as the most important non-agricultural income source. Values given in the table are *mean* shares of the various sample subgroups displayed for the reason mentioned above. Based on this information, the average annual off-farm income was calculated (see PETRICK, 2001). In addition, qualitative information about the reception of remittances from abroad is given in the table.

– While in Szczecin *agriculture* accounts for almost 90% of the family income, in the southern regions this is only about 60%. In the latter regions, income from off-farm employment and public transfers play an important role.
– Generally, the *share of income from agriculture* increases with higher profits, while it falls to less than 75% (Szczecin) or 50% (southern) for the low-profit farms. In the southern regions, *off-farm employment* accounts for

3) Agricultural finance in Poland is the topic of the doctoral thesis of the senior author of this paper, for a further discussion see PETRICK, SPYCHALSKI, and ŚWITŁYK (2001).

more than one third of total income for the low-profit farms.

- *Average off-farm income* of the median farm is approximately equal in Szczecin and Tarnów, while it is substantially lower in Rzeszów region. This is, however, still only one fifth (Szczecin and Tarnów) or one eighth (Rzeszów) of the average wage in Poland (all sectors; see Section 3.5 above).
- In Szczecin, the low-profit farms yield a higher *average off-farm income* than the overall median farm in the region, while in the high-profit group no farm has any family member working off-farm at all. This situation is reverse in the two southern regions, where high-profit farms also tend to yield higher off-farm incomes.
- *Remittances* have almost no importance in the north, while in both southern regions clearly more than 10% of the households receive transfers from abroad on a regular base. In Tarnów, a relatively higher share of farms in the less profitable group receive remittances. In Rzeszów, more farms in the higher profit group receive remittances, though in this region differences between groups are less pronounced.

The official unemployment rates of relatively modest 10.2% in Małopolska and 14.5% in Podkarpackie voivodships in 1999[4]) do not allow the conclusion that a *lack* of job offers is the only reason for the observed low opportunity costs of the farm labour force. A more plausible reason could be that *in the relevant market segment* (i.e. less sophisticated and with agricultural background) salaries are substantially below the average wage.

In Szczecin and Tarnów low-profit farms earn higher off-farm incomes than the overall median farm in the respective voivodship. This might indicate that in the low-profit group of farms income pressure has already induced a specialisation with respect to off-farm income generation (in terms e.g. of qualification, intensity of job search, time allocation). In turn, this allows to achieve (and also necessitates) higher salaries than the overall median farm, which receives a still higher share of income from agriculture. An alternative interpretation is that farm households in the lowest profit segment only recently were forced by economic hardship to generate some income from agriculture, though traditionally they are not engaged in farming (WEINGARTEN, 1999, p. 12). Their lack of farming experience and their closer relation to the non-farm labour market would then explain their comparatively lower profits from agriculture and higher off-farm salaries.

Remittances are of some importance in the south, where in one region – in the lowest profit group – more than one quarter of all households receives some transfers from abroad. This allows a conclusion regarding migration of farm household members, which obviously must have taken place in the past. It is not known from the survey data at what time family members migrated and for what reasons. However, the observation of significant reception of remittances especially in the southern regions, and at least for Tarnów with regard to less profitable farms, are in line with the fact that (partly temporal) labour migration has increasingly become important for Polish rural households with lower incomes (see OKÓLSKI, 2000 and the references quoted therein).

5 Final assessment and conclusions

The aim of this final chapter is to consolidate the results of previous sections and to provide an overall assessment of the economic situation and the development potential of Polish farms. First, we take the German situation as a benchmark and summarise some general findings of the study. Our comparative analysis of 1999 farm accountancy data allows the following conclusions:

1. Farms in the Polish regions surveyed were *much less profitable* than farms in the two German regions and achieved *much lower levels of income*. While the two countries differed in their overall living standards in terms of average salary of a working person by a factor of five, the remuneration of family labour in agriculture in Germany was about thirteen to fifty times higher than in Poland, depending on the regions compared. Farm household income levels differed by a factor of seven to fifteen.
2. A major reason for the divergence in profitability is the *different access to government subsidies* in the German versus the Polish regions. Percentage PSE in Poland is only half of that in the EU. However, varying profits are not a result of lower product prices. Taking the production structure as given, already a cut in revenues of the German farms in the size of direct payments based on area planted and animal numbers would drive average farm profits down below zero. In 1999, there were no comparable direct payments in Poland.
3. Furthermore, low profitability is a consequence of serious *structural deficiencies due to a quite unfavourable man/land ratio on Polish farms*. Compared to Germany, farm sizes are (still) too small, which is one reason for relatively low profits per enterprise. Labour intensity in turn is too high, which leads to comparatively low profits per family labour unit. This does not necessarily imply an inefficient labour allocation since both marginal return on labour and effective opportunity costs are assumed to be close to zero.
4. *Capital intensity* with regard to land is seen to be too high, since profit does not suffice to pay the market interest rate. This also coincides with our assessment of farm sizes in terms of land being too small given the existing capital stocks[5]). Only for some producers, the capital stocks currently in use yield still sufficient (sometimes probably even increasing) returns to size such that further investment is in fact profitable. To avoid Bavarian conditions of a too high capital intensity with regard to land as well, a more promising strategy to improve capital remuneration on farms would be to in-

4) After the administrative reform in Poland, Małopolska includes most parts of former Tarnów voivodship, Podkarpackie includes former Rzeszów, and Zachodniopomorskie includes former Szczecin voivodship. The figure for Zachodniopomorskie is 18.1%, the national average 13.1%. All figures based on GUS (2000).

5) Note however that the opportunity costs of fixed capital are likely to be very low, which might serve as a partial explanation for slow adjustments of capital stocks and low capital remuneration (see the discussion e.g. in GARDNER, 1992).

crease land resources. Currently, however, most Polish farms in fact disinvest.

5. Farms in the Polish regions are *less productive* than farms in the German regions, since physical yields of key products are substantially lower. This can hardly be attributed to differences in agro-climatic and soil conditions alone, as their variability seems to be not pronounced. Differences in productivity may be due to the use of outdated technology such as machinery or breeding material, or deficient management skills. However, they also may be a rational response to prevailing price relations. A general observation is that Polish farms are less specialised than their German counterparts.

These statements are correct if Szczecin is compared with Mecklenburg-West Pomerania. If the southern regions Tarnów and Rzeszów are compared with Bavaria, the same is valid but several times more dramatic, and even worse for Rzeszów as against Tarnów. From our comparison of profit groups within regions, a very similar picture can be drawn:

6. Within the Polish regions, more profitable farms are larger in terms of land under cultivation, show a lower labour and capital intensity with regard to land, are more productive and more specialised, and, in addition, finance their operations to a higher extent by debt.

A novelty of our approach was to include a number of additional indicators of farm performance and development potential into the analysis that are not usually available from standard book keeping data. What kind of additional information do these indicators provide and what does their analysis suggest for the further development of Polish agriculture?

7. There is a generally *conservative attitude* among farmers that prefers the continuation of farming (even across generations) to leaving the sector. A sobering finding is that the farms with the worst economic performance are those with their managers expressing the lowest willingness to change anything on their farms.
8. Income from agriculture is to a substantial extent *complemented by off-farm employment* in the southern regions (in some groups adding one third or even more to total income), while agriculture generates the bulk of income in the north. However, average *off-farm wages* are generally low as compared with the average wage for all sectors; they are nevertheless higher on high-profit farms.
9. There are remarkable *regional differences* in future plans concerning the development of farms. A substantial share of farmers in the north intends to enlarge their farms by size, while a significant share of farmers in the south intends to specialise into certain branches. However, the general willingness to develop farms appears to be more pronounced in the northern region. *Access to finance* was a problem especially for the most profitable farms in the north, since they did not obtain as much credit as desired.

Our overall conclusion is that Polish farms currently are in the midst of a regional, economic, and social differentiation process which is fuelled by the huge imbalance in terms of living standards between the rural and urban population. This process is however seriously slowed down or even halted by a number of *effective institutional barriers*.

In our view, the most important barrier to structural change is the *lack of alternative employment opportunities for the present farm population*. Labour productivity is comparatively low both on- and off-farm. The low opportunity costs of labour imply substantial hidden unemployment. As long as this situation persists, the agricultural sector will continue to be the labour force buffer of the whole Polish economy.

Further barriers to structural change are in part direct consequences of the difficult situation on the labour market, and in part result from government policy. Persistently 'stored' labour force on comparatively inefficient farms with little income generation potential also acts as a regional *land* buffer that impedes the development of commercially oriented farms. Due to this lock-in situation, farm growth has so far been modest. As a result, all but the most profitable farms are forced to generate a substantial share of their income from off-farm sources, which in turn increases the pressure on the labour market.

The market for *capital* is highly distorted by interest subsidies the government grants on agricultural credit. While the subsidies drive credit interest below the market rate for savings (see PETRICK, SPYCHALSKI, and ŚWITŁYK, 2001) they do not much increase productive investment. As compared with Germany the general level of investment is quite low and net investment is even uniformly negative across regions. Interest subsidies ensure that the relatively low capital remuneration achieved in the agricultural sector appears to be still sufficient to attract bank credit. Consequently, also with regard to capital, the farm sector ties up resources that could be used more efficiently in other sectors of the economy.

Any forces that push agricultural structures into an equilibrium that accounts for economy-wide scarcities are thus largely kept in check. Under these circumstances, structural change only proceeds very slowly.

Finally, a number of tentative conclusions can be drawn with respect to the issues raised in the first paragraph of the introduction to this paper. In our view, as a consequence of the limited availability of land in the south, but particularly due to the difficult economic situation of many farms in Poland including those in the northern region, there is little scope for a significant expansion of agricultural production after Poland has acceded the EU. With regard to most products, there will be no flood of cheap Polish farm products on EU markets (see also FROHBERG, 2001). The precise conditions under which Poland will be integrated into the CAP are of course subject to political bargaining. In case that the result will be a further shift away from market regulations and price support, import pressure for Polish agricultural producers in fact may increase. On the other hand, as far as the availability of structural funds improves in the course of EU accession, these funds also may tend to conserve the current farm structure, by stocking up farm budgets and not resulting in improved off-farm employment opportunities. The extent to which social frictions in Poland will become more visible in the near future is thus largely dependent on the negotiation outcomes. However, a new wave of migrants into the EU emerging from collapsing

Polish farms is regarded as rather unlikely for two major groups of reasons. First, currently, migration appears already to be a reality for a number of mainly poorer households in the southern regions. In these regions, clearly more than 10 percent of the surveyed households receive remittances on a regular base, in one group more than 25 percent. Consequently, already today, members of these households are active on Western labour markets. By the way, many of these emigrants do not compete with job-seeking native citizens, since they often serve an entirely different segment of the labour market (mostly low-paid but labour intensive activities in agriculture, catering, nursing and the like, see OKÓLSKI, 2000). Second, with regard to the surveyed majority who currently lives in Poland permanently, social adhesion expressed by a widespread absence of a willingness to change living circumstances, the desire to continue farming over generations, and apparently little innovative capacity appear to widely prevent structural change and the potential consequence of emigration. This might be valid to a lesser extent for members of the economically most marginalised and subsistence oriented types of farms that are not covered in this study. However, we still expect at best a slight increase in labour migration after Poland has joined the EU.

Policy makers in Poland and the EU presently face a difficult task. They have to weigh up measures that accelerate structural change for the immediate benefit of few (the most advanced farms in the north) but imply social hardship for many, against measures that widely paralyse these changes, supposedly avoid the severest hardships, but also do not open perspectives for anybody. It remains to be seen what policy outcomes will be the result of the ongoing accession talks. We hope that this paper has provided more insight into the current situation of the sector and thus helped to pave the way for a more realistic discussion of the complex issues involved.

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Authors:

Dipl.-Ing. agr. MARTIN PETRICK, Institute of Agricultural Development in Central and Eastern Europe (IAMO), Theodor-Lieser-Straße 2, D-06120 Halle (Saale), Phone: (0345/) 29 28 127, Fax: (0345/) 29 28 199 (E-Mail: petrick@iamo.uni-halle.de),

Dr. habil. GRZEGORZ SPYCHALSKI, Agricultural University of Szczecin, Department of Economics, Ul. Żołnierska 47, PL-70-466 Szczecin, Phone: (091/) 487 69 49 (E-Mail: gspychalski@ns1.ekon1.ar.szczecin.pl),

Prof. Dr. habil. MICHAŁ ŚWITŁYK, Agricultural University of Szczecin, Chair of Farm Management, Ul. Monte Cassino 16, PL-70-466 Szczecin, Phone: (091/) 42 31 012, Fax: (091/) 422 46 52 (E-Mail: mswitlyk@tarski.erl.ar.szczecin.pl),

Dr. EWA TYRAN, Agricultural University of Cracow, Department of Agrobusiness, Al. Mickiewicza 21, PL-31-120 Cracow, Phone: (012) 662 43 71, Fax: (012) 633 62 45 (E-Mail: rutyran@cyf-kr.edu.pl)

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