

## **BENEFITS AND CONSTRAINTS OF VERTICAL INTEGRATION IN THE LIVE PIG MARKET IN POLAND**

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**Abstract.** Production of live pigs is one of the most important branches of agricultural production in Poland; however, it is highly fragmented. The aim of the study was to explore the benefits of integration for the producers of live pigs and constraints on its application. The study covered 110 agricultural holdings specializing in pig farming in 2014. The analysis shows that vertical integration in supply chains allows for strengthening the competitive position through improved quality, reduced costs and shortened delivery times. It is recommended that producers and processors of live pigs develop all forms of cooperation, especially under agricultural procurement contracts. The main constraint on this form of cooperation with meat processing companies is the instability of prices in the live pig market. Certainly, one of the most important advantages is providing an outlet for fattening pigs and the possibility of gaining a higher price.

**Key words:** pig farms, vertical integration, constraints, benefits.

**JEL code:** L14, L24, Q12, Q13

### **Introduction**

Production of live pigs is one of the most important branches of agricultural production in Poland. According to the Central Statistical Office of Poland, its share in the structure of global agricultural production in 2012 amounted to 11.7 % and to 14.2 % in commercial production, whereas in livestock production, pigs accounted for 29.8% of global production and 31.7 % of commercial production (Rocznik Statystyczny Rolnictwa, 2013). Poland is also one of the most important pork producers in the European Union, although the share of Polish pork in European markets is decreasing steadily, hitting 8.1 % in 2012. In turn, it is the imports of pork that increase, accounting for 818.9 thousand tons in 2013 while the exports stayed at the level of 705.6 thousand tones. Simultaneously, pork consumption remains fairly stable at around 35.5 kg per person.

A major problem in the pork market is a considerable fragmentation of pig farms and the ensuing constantly insufficient production scale, inhibiting satisfactory economic results and capital accumulation. In 2012 as many as 260.1 agricultural holdings were active in pig farming in Poland, and an average pig herd numbered 44.5 units of this species. In addition, the organization level of farmers producing live pigs in Poland is very low compared to other EU countries. According to the data from the Ministry of Agriculture and Rural Development (MRiRW), in December 2012 there were 199 pig producer groups. The same problem affects the meat production sector. According to the Polish General Veterinary Inspectorate (GIW), at the beginning of 2014 there were 617

domestic operators involved in slaughtering live pigs. Whereas the meat cutting and processing was done by 995 and 1001 companies respectively.

One way to reduce the weaknesses of live pig market and achieve a competitive advantage is to develop different forms of cooperation between operators in the supply chain, one of the most advanced being vertical integration which consists of combining all production stages, i.e. from raw material to the finished product. The aim of the study was to explore the benefits of integration for the producers of live pigs and constraints on its application.

### **Materials and methods**

The data analysis included the studies of Polish and foreign reference books and the data storage statistics from the Central Statistical Office of Poland, the Ministry of Agriculture and Rural Development and the General Veterinary Inspectorate of Poland. The primary data source was the research carried out in pig farms in 2014. The surveyed farms were selected according to the following criteria:

- rearing at least 10 sows in a farm or selling 200 fattening pigs a year;
- a farm specialising in live pig raising, which fact was determined basing on the share of live pigs in the revenues from sales and it being at a minimum of 60 %;
- a farmer's consent to participate in the research.

At the first stage of the study all provinces in the country were taken into account and the Agricultural Advisory Centre was addressed with a request to identify 10 agricultural holdings in each of the provinces that meet the adopted criteria. However, prompt was

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the farms identification, due to a limited number of suitable farms or the farmer's refusal to fill in the questionnaire, the study could not cover Swietokrzyskie and Malopolskie provinces. What is more, some of the remaining provinces provided for the data from a smaller number of farms than it had been expected. Eventually, it was the employees of the Agricultural Advisory Centres who filled in the questionnaires carrying an interview in 110 pig farms in the country. The study takes into account the resources of farms, organization and production costs of pig livestock and the benefits and limitations of the integration in the supply chain of pork, which were presented in this paper. The results of the analyses have been presented in a narrative and graphic forms.

### **Research results and discussion**

The two leading theories of vertical integration are the Transaction Cost Economics (TCE) approach of Williamson (1975, 1985) and the Property Right Theory (PRT) approach of Grossman and Hart (1986) and Hart and Moore (1990). Both approaches emphasize the importance of incomplete contracts and ex post opportunistic behaviour (hold up) on ex ante relationship-specific investments. The TCE approach views vertical integration as a way of circumventing the potential holdup problems. In particular, it predicts that vertical integration should be more common when there is greater specificity and holdup is more costly, and that vertical integration should enhance investments by all contracting parties. In turn, the PRT approach focuses on the role of ownership of assets as a way of allocating residual rights of control, and emphasizes both the costs and the benefits of vertical integration in terms of ex ante investment incentives.

From the economic perspective vertical integration means implementation of actions of successive chain stages from producer to consumer in a single company (Martinez S., 1999). It involves merging different areas of activity belonging to the same chain of production and sales (Kudelko J., 2007). According to Pierscionek (2003), vertical expansion should be adopted especially if the company has a strong but not the strongest competitive position and where the market growth stage is approaching saturation. This is the basis for limiting the development of specialization.

Vertical integration strategies involve identification of processes external to the core activities of the company and allow dividing the entities and individuals associated with the company into groups relevant to its

operations and interested in it and other units. The processes of merging with these units or taking over their operations lead to added value based on extending the value chain under the existing product-market system (Rajzer M., 2001).

According to W. Szymanski (1998), vertical integration in agriculture is a form of an economic and production tie between entities producing a given product from raw material to its finished form. The integrator, which is mostly an industrial or commercial company, tries to control (through various forms of contracting and cooperation) or to master part or the entire chain of production, from agricultural raw material through processing to food marketing.

Vertical integration in agriculture began to develop when the market started to predetermine the quality and specific terms of supply of agricultural production (Szymanski W., 1998). Good conditions for the development of vertical integration include: specialization, standardization, disappearance of local markets, development of supermarkets, changing demand for food. These factors inclined farmers to undergo some adjustments to meet the conditions of market integration. This process seems a necessary step to be taken in view of the lack of financial resources and modern means of production hindering effective operating on the market and limited marketing of produced raw materials.

Vertical integration can happen in two directions. Forward vertical integration happens when a company's former activity was limited to production and now it expands to successive stages of production and distribution towards customers (Figure 1). Backward vertical integration is initiated by a company which previously focused on the stages closer to the final consumer and now it takes activities within preceding stages of production or resources (Grega L., 2003).

If the manufacturing company engages in sales or after-sales industries it pursues forward integration strategy. This strategy is implemented when the company wants to achieve higher economies of scale and larger market share. Forward integration strategy became very popular with increasing internet appearance. Many manufacturing companies have built their online stores and started selling their products directly to consumers, bypassing retailers. Forward integration strategy is effective when (Jurevicius O., 2016):

- few quality distributors are available in the industry;

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- distributors or retailers have high profit margins;
- distributors are very expensive, unreliable or unable to meet firm's distribution needs;
- the industry is expected to grow significantly;
- there are benefits of stable production and distribution;
- the company has enough resources and capabilities to manage the new business.

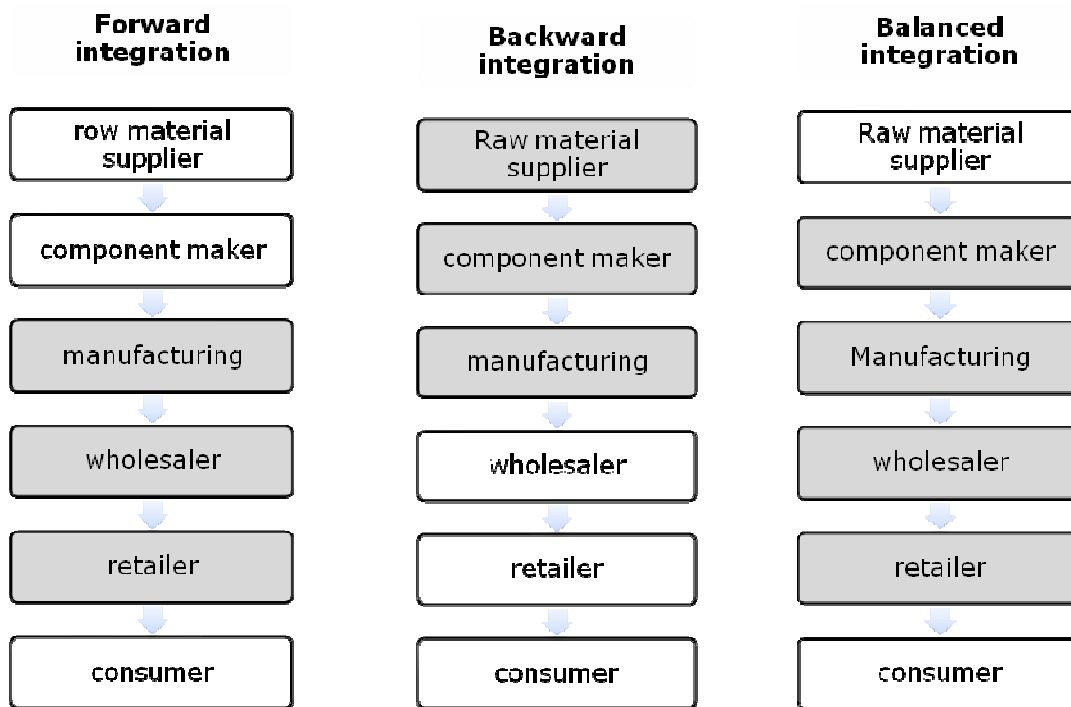
When the same manufacturing company starts making intermediate goods for itself or takes over its previous suppliers, it pursues backward integration strategy. Companies implement backward integration strategy in order to secure stable input of resources and become more efficient. Backward integration strategy is most beneficial when (Jurevicius, O., 2016):

- a company's current suppliers are unreliable, expensive or cannot supply the required inputs
- there are only few small suppliers but many competitors in the industry
- the industry is expanding rapidly

- the prices of inputs are unstable
- suppliers earn high profit margins
- a company has necessary resources and capabilities to manage the new business.

In the agriculture the integrators are farmers or horizontal associations of farmers (such as producer groups, cooperatives or capital companies). In turn, the forward integration is to integrate different production stages by food-processing establishments, trade companies (wholesalers, chain stores), stock exchanges and even banks and financial institutions (Lacka I., 2012).

The complete integration involves the creation of agro-industrial establishments combining production and distribution of products. The success of the biggest groups of companies like Animex and Sokolow (with foreign capital) or PKM DUDA shows that complete integration allows establishments to achieve strong competitive advantage as well as growth and development in the long term.



Source: author's construction

Fig. 1. Types of vertical integration

The vertical integration may not always be the best choice for an organization due to a lack of sufficient resources that are needed to venture into industry. Sometimes the alternatives offer more benefits. The available choices differ in the amount of investments required and the integration level. For example, short-

term contracts require little integration and much less investments than joint ventures.

One form of vertical integration in agriculture is an agricultural procurement contract between companies purchasing agricultural raw materials and farmers. A farmer entering into negotiations with the integrator signs a contract according to which he/she undertakes

to provide agricultural products in the agreed quantity, quality and at specified time in return for the product marketing, and the use of a credit, instruction and provided means of production. Contracting is first of all a guarantee that the agreed production volume will be marketed on predetermined conditions.

Vertical integration has numerous advantages and allows achieving some economies. First of all it allows building competitive lead through (Drazek Z., Niemcynowicz, B. 2003):

- the security of supply. This is particularly important in the case of a highly captive market of suppliers;
- the cost leadership, e.g. owing to an access to cheap raw materials. An important element is not just security of supplies but also their low cost, which can be achieved by having one's own supply area;
- the security of entering the market. In the case of a high competition on the market having one's own distribution network can be very helpful in introducing new and maintaining existing products on the market;
- differentiation that is standing out among the competitors in what is relevant to the customer. Where an operator takes up the entire production chain, it can be based either on the product or on the sale system or service that is preferred by the client;
- achieving a higher quality, as there is a possibility to control it more effectively and efficiently and to select proper materials and components.

An additional effect of such a system is the possibility to maintain complete secrecy of the used technology. In addition, vertical integration can reduce transaction costs, i.e. expenses occurring as a result of the relations between two entities. These costs include:

- the costs of identifying and negotiating with companies on starting the cooperation;
- the costs of communicating and obtaining information when concluding contracts;
- the costs of lost opportunities and necessary renegotiation if the concluded contract did not cover the changing situation;
- the start-up costs of additional assets arising from specific provisions in the contracts.

Vertical integration, however, also carries certain threats. The primary ones include:

- increasing the risk, i.e. reducing the financial security of the company due to the same economic chain;
- elimination of market forces;
- limited company flexibility;
- difficulties in managing a complex business;
- overcoming entry barriers in new markets, if the integration is carried out by internal methods;
- difficulty in obtaining the optimum production, especially with suppliers who have no external markets;
- the need for large capital to be involved.

The pig market in Poland is characterised by a considerable fragmentation of production, processing and distribution and limited domestic integration ties. Therefore, the producers of live pigs were asked to comment on the causes of such situation. In the study group, 91.8 % of respondents indicated to limited number of concluded procurement contracts. Only 8.2 % of the surveyed farmers did not mention any constraints, 2.7 % of which had not signed any procurement contracts with meat plants. As many as 60.9 % of respondents pointed to the price volatility as one of the major constraints in the live pig market (Figure 2). Farmers who find the price situation precarious are not willing to sign any contracts. Entrepreneurs react similarly. The second top constraint indicated by the farmers is the necessity to sale fattening pigs at a specified price. The producers of live pigs are particularly concerned about being obliged by contract to sell fattening pigs at a lower price compared to the one at the current market. For 30.9 % of the respondents an important factor restraining them from entering into a contract was the meat plants' failure to fulfil their contractual obligations, since when lower prices were reachable, entrepreneurs often did not keep agreements and bought livestock from other producers who were not bound by a contract or they import raw material from abroad.

More than 1/5 of respondents pointed to the lack of state intervention in the pork market. In their view, state institutions cannot be counted on in crisis situations. A similar percentage of respondents stated that the relations with meat companies were marked by the meat plants' unwillingness to enter into a long-term cooperation. It is especially in the case of falling market prices of live pigs that entrepreneurs tend to look for opportunities to reduce purchase costs of raw materials. According to 21.8% of respondents, another

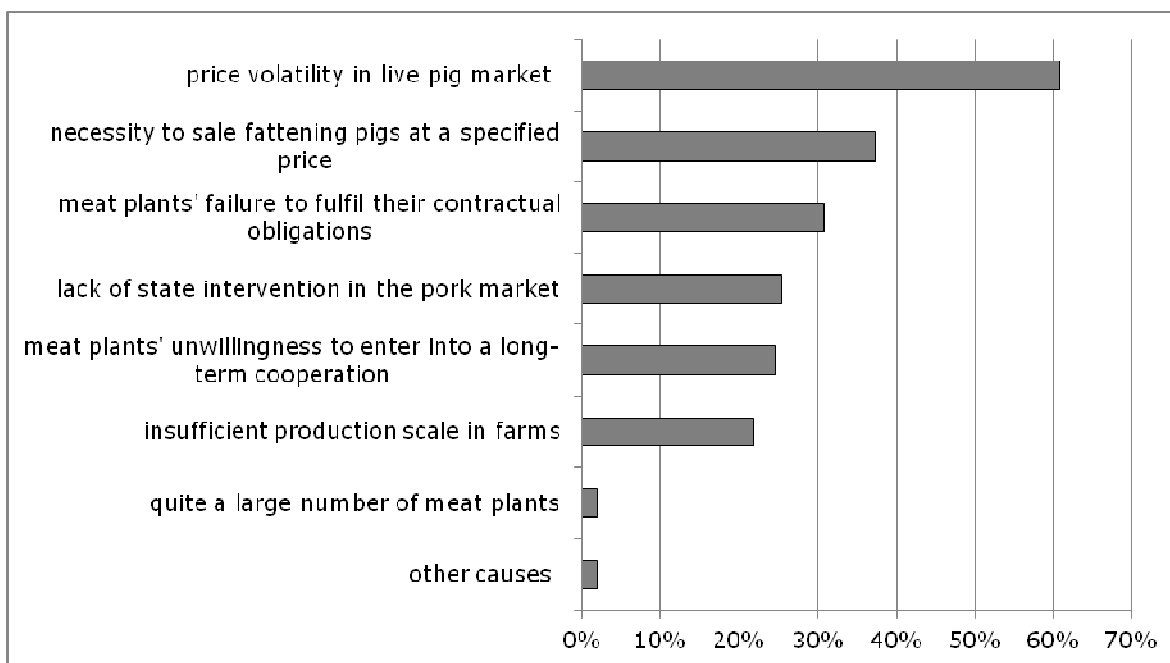
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factor limiting the signing of agricultural procurement contracts is an insufficient production scale in farms, whereas large meat plants require regular supplies of large lots of standardized quality fattening pigs. Likewise, producers who buy piglets for further raising look for a large number of piglets of the same origin. Only 1.8% of respondents said that the market displayed quite a large number of meat plants, which did not facilitate their choice of a company to cooperate with. The same percentage of respondents pointed to other causes limiting signing procurement contracts with meat companies.

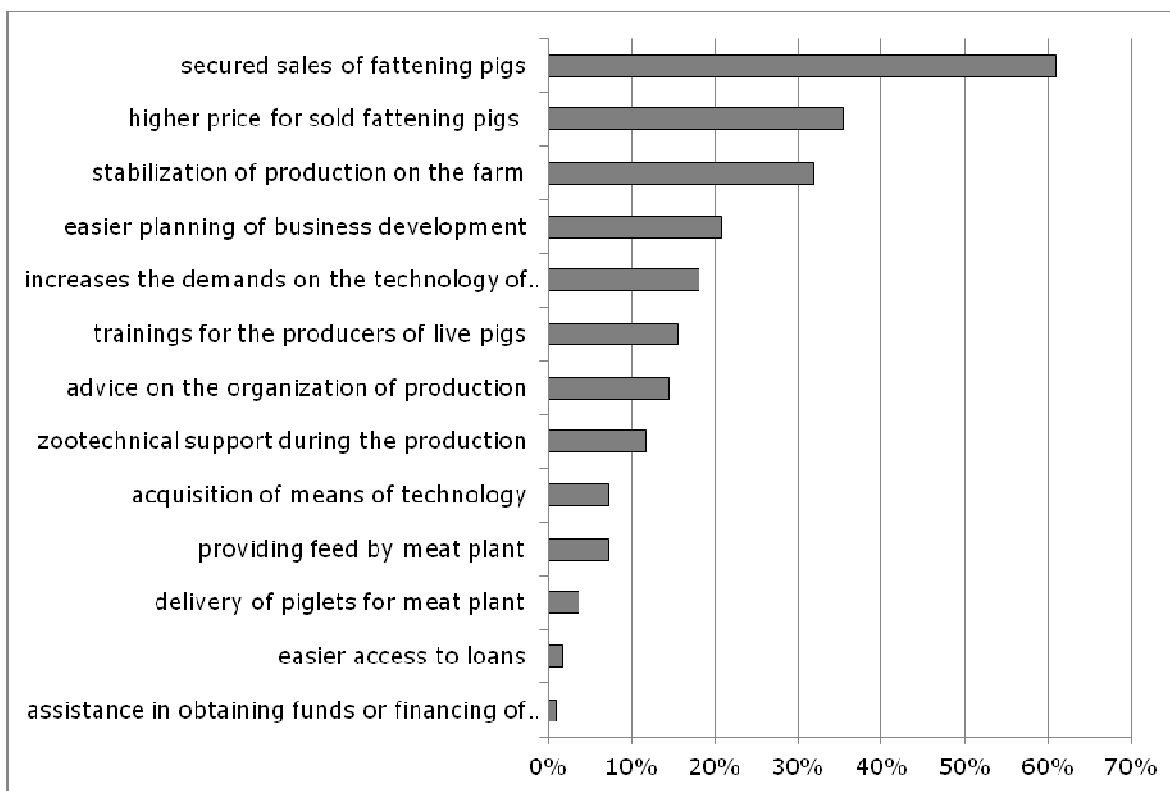
The producers of live pigs, especially those who cooperate with meat plants under contracts recognize some related benefits. The primary one, in the respondents' opinion (60.9%), is secured sales of fattening pigs (Figure 3). In turn, 35.5% of

respondents pointed to the possibility of obtaining a higher price for sold fattening pigs as some companies offer additional margins arising from supplies for signing and execution of an agricultural procurement contract. For 31.8% of respondents a major benefit is the stabilization of production on the farm. In view of the mechanism referred to as a pig cycle, which manifests in cyclical fluctuations of supply and related prices, maintaining a stable production level represents an important basis for live pig producers. According to 1/5 of respondents, agricultural procurement contracts enhance an easier planning of business development since they ensure stabilization to some extent. In opinion of 18.2% of respondents, entering into a contract increases the demands on the technology of fattening. As a result, it helps increase the efficiency of production.



Source: author's construction based on own research

Fig. 2. Factors limiting signing contracts according to the live pig producers



Source: author's construction based on own research

Fig 3. Benefits related to signing contract according to live pig producers

Approximately 15.5 % of the respondents pointed to the training organised for the producers of live pigs as a benefit arising from the conclusion of the procurement contract. Thanks to it farmers acquire the latest knowledge on pig farming. For a similar proportion of respondents (14.5 %), it was essential that they were advised on how to organise production, which would enable higher performance. In turn, 11.8 % of respondents indicated that in the case of agricultural procurement contracts they could count on zootechnical support during the production. Among the benefits of concluding a contract with a meat plant some of the producers of live pigs mentioned the acquisition of means of technology (7.3 %) and feed provisions (7.3 %) guaranteed by the meat company. It was by far less common for the farmers to cooperate with meat plants for the supply of piglets for further fattening. However, this more advanced form of cooperation is gaining in importance especially in case of large companies that want to have an impact on the quality of raw materials. Very few producers have found that one of the benefits of signing an agricultural procurement contract is the meat company's assistance in obtaining funds or co-financing their activities. The research shows that this form of compensation for the

execution of the agreement requires further development.

### Conclusions, proposals, recommendations

- 1) Vertical integration in the supply chains allows for discounting a strong and stable competitive position by the acquisition of profits of the producers of raw material and components for their own products and it also enables strengthening the competitive position by improving quality, reducing costs and shortening delivery times.
- 2) Vertical integration may be performed in various directions and take various forms. There can be found such forms as a top-down and bottom-up integration or full and partial integration. The full integration involves the development of a company whose activities cover the production of raw materials, their processing and distribution. Indirect integration, in turn, results from contractual relationships that protect the economic and legal separation of the partners.
- 3) Production of live pigs in Poland is highly fragmented and the majority of farms are characterised by a small scale of production, which hinders its competitive strength on the European market. What is more, the absence of capital tie-

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ups between farmers and the meat industry does not facilitate integration in the supply chain. Therefore it is recommended to develop all forms of cooperation, especially under procurement contracts between producers and recipients, i.e. processors of live pigs.

4) According to the producers of live pigs, the cooperation with processing companies is constrained because of various obstacles. The major constraints on signing procurement contracts include price volatility on the market of live pigs, the necessity to sell fattening pigs at a lower price in comparison to the one dictated by the economic situation and the meat plants' failure to fulfil their contractual obligations. Therefore it is important to take actions to reduce these limitations.

5) Farmers who rear pigs are also aware of the benefits of working with meat processing companies. The most important would be providing an outlet for fattening pigs, stabilization of production on the farm and the possibility of obtaining a higher price for the sold fattening pigs as the meat companies offer additional margins from supplies for signing and execution of an agricultural procurement contract.

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