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## Evaluation of the meat industry efficiency in Poland, in the years 2000-2013 (based on the data of the Central Statistical Office)

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**Evaluation of the meat industry efficiency in  
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of the Central Statistical Office)**

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## **Evaluation of the meat industry efficiency in Poland, in the years 2000-2013 (based on the data of the Central Statistical Office)**

**JEL Classification:** *D4, L1, O130*

**Key words:** food chain, efficiency evaluation, prices dynamics, meat products  
consumption pattern

**Abstract:** The paper presents the synthetic results of research on the evaluation of efficiency of selected food industries in Poland, in the years 2000-2013. A dynamic approach was applied to the studies which were based on the analysis of prices of raw materials, meat products and product assortments of meat processing companies. The mechanism of prices impact on the efficiency of management was examined using the term "food chain" in the meat industry, which comprises: agriculture- food processing-consumers. The reasoning of the influence of micro and macro factors on the economic efficiency in the pursuit of sustainable development was applied in the study as well as theoretical knowledge. This was the knowledge on the price structure, the impact of internal transformations (changes) of enterprises on the level of prices of goods offered by them in the meat industry studied.

### **Introduction**

According to M. Porter „... competitiveness of a particular company will be largely dependent on the four primary factors: 1. Available factors of production, 2. Demand factors, 3. Developing an appropriate industry

system (supporting and relating industries) of associated trades, 4. Conditions of creating, organizing and managing enterprises” (Goryń, 2009, p.72).

The efficient use of productive resources – competitiveness (competitive ability) of the economy depends not only on production factors that the economy has, but also on its efficient use, while the chance to hold the ability to compete depends on the efficient use of production resources.

Growing competition in respect of certain resources leads to **shortages and price increase**, which will have impact on the European economy. Resources should be managed more efficiently throughout their entire life cycle, from the time of their acquisition, through transport, transformation, consumption and waste disposal. The European Commission emphasizes the significance of “ effective management of resources”. **This means generating more value using fewer materials and a different method of consumption.** It will reduce the risk of shortages and maintain environmental impact on our planet within natural frames. It is the overriding principle applicable to all natural resources, including food, timber, biodiversity, energies, metals, soil, water, mineral resources, air and land. More efficient management of resources in Europe will contribute to achieving the objectives of economic, social and environmental politics in an easier and less expensive way.<sup>1</sup>

The Ministry of Economy has developed the strategy for innovation and efficiency of economy “Dynamic Poland 2020”. In this document **efficiency** is understood as maximization of effects using a specified number of resources or reaching the desired target by applying the smallest possible amount of resources (mainly capital, raw materials and material expenditures) or optimal allocated resources. Both increasing innovation and creating conditions for efficient operation and development of business activity is the key to raising the efficiency of management.<sup>2</sup>

Nowadays, the scientific problem in the field of efficient use of resources involves the evaluation of management not only at the level of a

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<sup>1</sup> The Materials of the European Commission „Efektywne gospodarowanie zasobami – biznesowa konieczność”(Effective management of resources-business necessity), April 2011,

[http://ec.europa.eu/environment/pubs/pdf/factsheets/resource\\_efficiency/pl.pdf](http://ec.europa.eu/environment/pubs/pdf/factsheets/resource_efficiency/pl.pdf)

<sup>2</sup> Ministerstwo Gospodarki, Strategia Innowacyjności i Efektywności Gospodarki "Dynamiczna Polska 2020" Warszawa 2013 (The Ministry of Economy. Strategy for innovation and efficiency of economy “Dynamic Poland 2020”).  
<http://www.mg.gov.pl/files/upload/17492/Strategia.pdf>

single company or the entire economy, but also at the level of enterprises **linked with one work theme.**

In the literature the organizational form of such a linkage of companies was defined in the food sector as food supply chain.<sup>3</sup>

**The aim of the research** is to investigate the mechanism of price impact on the management efficiency of enterprises connected<sup>4</sup> with one theme of work<sup>5</sup> in a selected food sector in Poland, in the years 2000-2013.

### **Methodology of the research**

The evaluation of management was based on the analysis of changes in the prices of raw materials and a selected assortment of the meat industry products. The data from the yearbooks of the Central Statistical Office (GSO) including the years 2000-2013, was used in the paper.

**The food chain links in the meat industry included- agriculture, food processing, products distribution and consumers.**

The assessment of the factor impact on the level of prices in the agricultural production was performed on the basis of indicators including farmlands in the years 2000, 2005-2013k ha; animal production (livestock) in the years 2000, 2005, 2010-2013 in Poland, thousand heads; animal production (pigs) in the years 2000, 2002, 2005, 2010-2013 in Poland, thousands heads; the dynamics of compound feeds prices in the years 2000, 2005-2013, for 1 decitonne; the dynamics of the average purchase prices of major agricultural products of animals for slaughter in the years 2000, 2005-2013, PLN/kg.

The analysis of prices of selected assortments of food processing was conducted on the basis of the meat industry by index: the dynamics of the retail prices of selected assortments of meat processing production in the years 2000, 2005-2013, PLN/kg.

The analysis of demand and production pattern of the meat industry was conducted by index: supply of certain consumer foods on the market in the years, 2000, 2005-2013, thousands tonnes.

The selection of indicators describing consumer behaviour included: the dynamics of household expenditure on meat consumption in the years

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<sup>3</sup> The study presents the food chain in the meat industry.

<sup>4</sup> The study assumes that the enterprises can be formally and informally connected with various forms of organizations: business cooperation, horizontal or vertical integration.

<sup>5</sup> The objects of work can include raw materials or materials, in this study it is meat, semi-finished products for manufacturing products.

2005-2013, PLN per capita; average monthly household expenditure on raw meat, including poultry, cold meat and other meat products in the years 2005-2013, kg/per capita; meat consumption by the household in the years 2005-2013, kg/per capita; average monthly consumption of raw meat, cold meat and meat products by the household in the years 2005-2013, kg/per capita.

The evaluation of the food chain economic efficiency was carried out on the basis of knowledge on the economic theory of predictable and unpredictable, balanced and unbalanced inflation according to P. Samuelsson.

### **Theoretical knowledge on evaluation, value added in the structure of prices, and the influence of evaluation on the management efficiency**

Nowadays, companies manufacturing products with higher value added will become a competitive force on the market.

**The price structure** includes intermediate consumption and value added.

Value added is the difference between the company gross proceeds from sales of its goods and services, and the sum paid for raw materials and to the external providers of services. In other words, the value added includes all the costs of all the efforts of the business activity and full compensation for them. All the measures the company put in the final product and the assessment of its efforts by the market are counted (Drucker, 1998, p.88).

Within the price structure one can distinguish intermediate consumption and value added. On the other hand, value added includes staff remuneration and social security insurance, depreciation, taxes and profit norm.

The analysis of the added value is necessary to find the optimal value of expenses in the form of remuneration. Value added as an economic category exists in business even when there is no tax on that value introduced by the state. Value added is the target, according to which a business entity is created. The company directs its activity to obtain a profit, but to achieve this goal it must generate value added (Немцов, Довгань, 2002, p.129).

**The structure of value added: staff remuneration and social security; depreciation; taxes; profit standard.**

Everything that is within the scope of business entity activity is the generation of **value added** (profit) on the basis of purchased materials, raw

materials, energy and necessary services (intermediate consumption). In some types of activities one can generate new value from zero without purchasing essential material components or services.

Added value must be sufficient to:

- remunerate the staff,
- depreciate the worn part of fixed assets to exchange them in the future;
- clear various types of liabilities;

The remaining part of value added should be sufficient to obtain the expected profit (НЕМЦОВ & ДОВГАНЬ, 2002, p.129).

The company cannot exert influence on the level of depreciation value, let us assume, and does not deduct it because of the fact that in the production processes or while providing services the fixed assets are constantly used. The company is required to make transfers to various funds according to established standards of deductions. No entrepreneur would like to resign from profit. Thus, there remains only one element that “allows itself” to be regulated and it is the expenditure on labour.

Therefore НЕМЦОВ and ДОВГАНЬ conclude that the level of remuneration of staff depends entirely on the level of added value generated in a month.

The amount of charged remuneration should not be higher than the level of value added allows you to do so. **The level of remuneration can be increased only through increasing labour productivity.**

The increase in productivity, apart from production growth, allows us to raise the average income and lower the prices of goods. The increase in productivity may release the necessary resources to finance collective units. It may also lead to a reduction in working time, without concomitant reduction in the total production (Bremond, 2005, p.313).

According to Mill’s theory of production labour „... profits from unproductive labour employment are simply transfers of income; unproductive labour force does not produce a net value added. He adds, however, that labour force services involving the acquisition of qualifications or the protection of property should be considered as productive. It is his purpose to demonstrate that the capital accumulation rate is the function of the contribution of labour force employed “productively” (Blaug, 2000, p.194).

The level of human labour efficiency should, to a large extent, affect innovations implemented in the company activities, and by contrast ... **innovation under conditions of perfect competition must lead to lower prices and increased production volumes.**

If demand is entirely flexible then the total proceeds from sales will grow and the employers will increase their consumption and investment

expenditure. However, if the demand will not respond to lower prices, the consumers will have unused purchasing power, which they will be able to direct towards other goods (Blaug, 2000, p.201).

Measuring productivity is the only criterion by which you can actually assess the competence of the management board and compare the management of different organizational units within the company, and also of different companies. Productivity includes all the efforts which contribute to achieving the results, and excludes everything that the company does not control (Drucker, 1998, p.87).

Labour productivity growth at a given level of pay leads to a decline in unit costs and allows the company to improve its competitiveness by reducing the sales price or increase the profitability of the capital invested as a result of profit enlargement (Bremond, 2005, p.312).

Otherwise, when no productivity growth is observed at the level of individual enterprises, and the prices increase steadily, one should expect decrease in efficiency of management or decrease in management efficiency with simultaneous repeated distribution of income at the level of all players on the market (Table 1).

Table 1. Inflation effects conditional on balance and prediction factors

Two dimensions of the inflation losses		
Inflation	Balanced <sup>6</sup>	Unbalanced
Predictable	Inflation does not contribute to losses	Reduction of economic efficiency
Unpredictable	Re-distribution of income and wealth	Reduction in efficiency and Re-distribution of income

Source: (Sammuelson, 1995, p.360)

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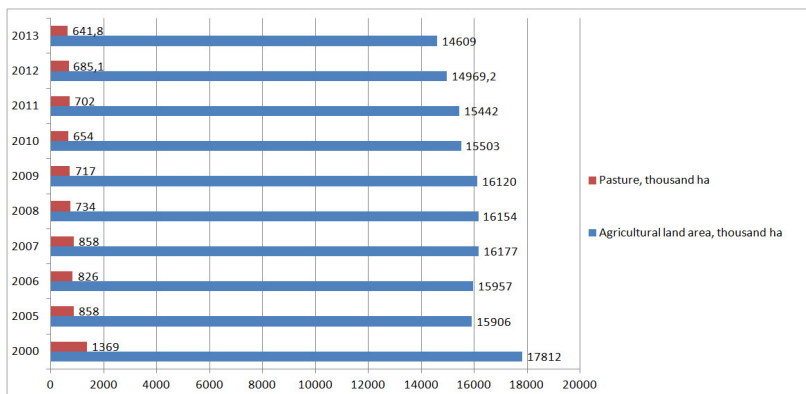
<sup>6</sup> Balanced inflation – prices relations remain largely unchanged (all the prices grow at the same pace).



## The cause-and-effect analysis of price changes in the food chain from raw materials to the final product

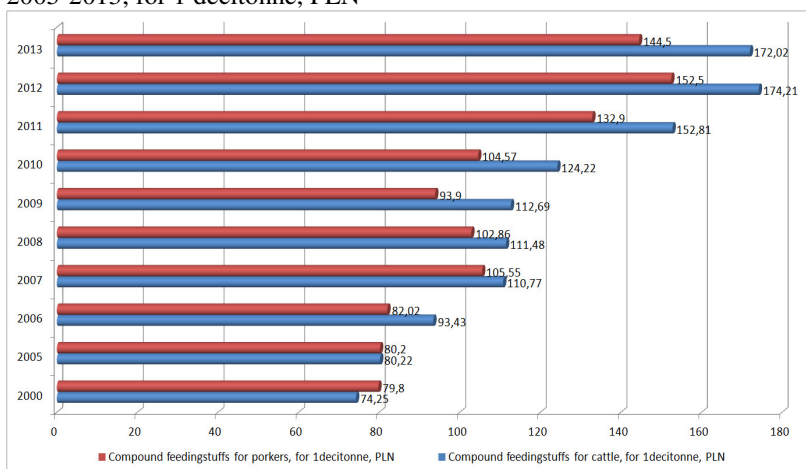
**Agriculture.** Since the year 2000 agricultural land area has decreased by 3203 thousand ha, in which pastures decreased by 727,2 thousand ha (Fig.1).

Figure 1. Agricultural land area in the years 2000, 2005 – 2013, thousand ha



Source: the author's study on the basis of Central Statistical Office data

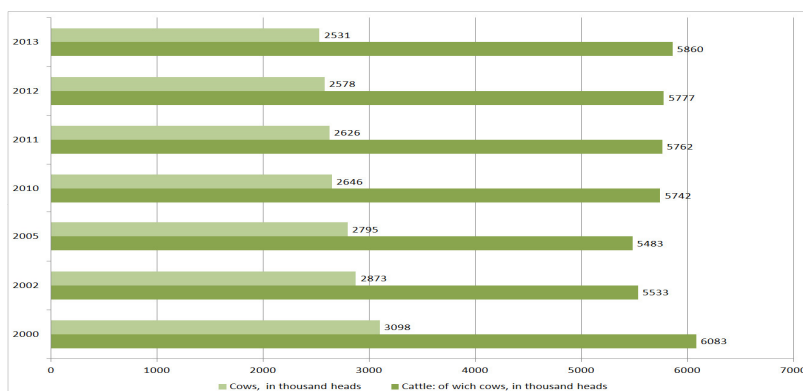
Figure 2. Dynamics of the retail process of compound feeds in the years 2000, 2005-2013, for 1 decitonne, PLN



Source: the authors study based on the Central Statistical Office (CSO) data

According to the statistical data, CSO recorded an increase in compound feeds for porkers from 2000 to 2013- 1,81 times, for compound feeds for cattle- 2,32 times (Fig.2).

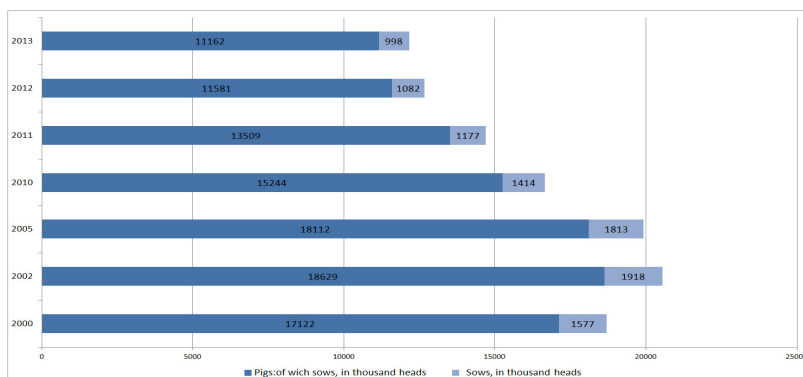
Fig.3. Animal output (cattle) in the years 2000, 2002, 2005, 2010-2013 in Poland, thousands of heads.



Source: the authors study based on the CSO data

From 2000 to 2013 the headage of cattle decreased from 6088 to 5860 thousand heads (Fig.3). The headage of pigs considerably decreased from 17 122 thousand heads to 11162 (Fig.4).

Fig. 4. Animal output (pigs) in the years 2000, 2002, 2005, 2010-2013 in Poland, in thousand of heads



Source: the author's study based on the CSO data

Reducing the supply of animal output (cattle and pigs) caused fluctuation in purchase prices of agricultural products in the years studied. The prices increased in 2013 in comparison to 2000 for agricultural products: cattle -1.68 times, calves-1.62 times and pigs- 1.86 times (Fig. 5).

Figure.5. Average procurement prices of major agricultural products of animals for slaughter in the years 2000, 2005 – 2013, PLN/kg



Source: the author's study based on the CSO data

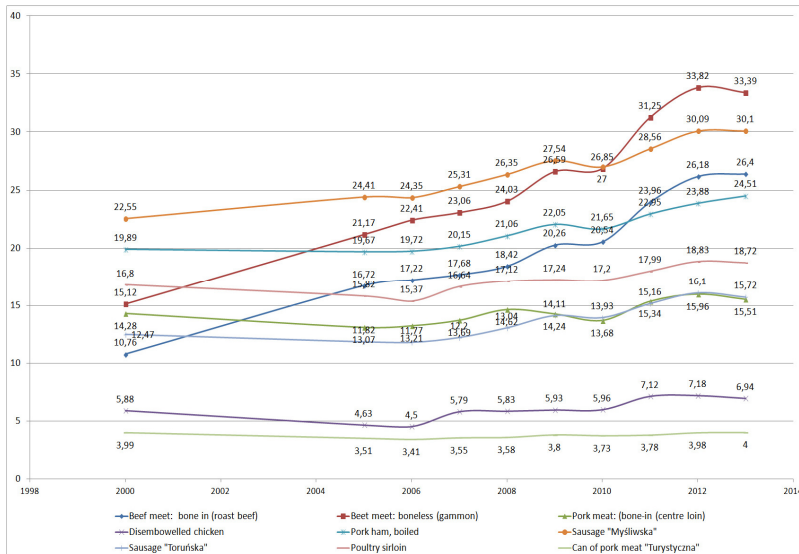
**Meat processing.** According to the data of the Central Statistical Office (CSO) the value of the fresh meat and meat products market (measured by the value of the sold output of the industry for this sub-sector) was in 2010 almost PLN 33.3 billion (while in 2005 it was 19 billion), which constituted about 30% of the value of the entire food sector. In the meat industry there operate more than 4000 companies.

The product range of large companies is quite diverse and includes more than 200 sorts of products. Expenditure on purchasing fresh meat and spices constitute 50% of the manufacturing costs. The growth of enterprises in this industry largely depends on the suppliers of meat.

Among the selected assortments (Fig.6) of the meat industry in the studied years 2000, 2005-2013 a general trend of increase in prices of these products was observed. The price of the canned meat "Turystyczna" was the only one that was reduced from PLN 3.99 in the year 2000 to PLN

3.98 in 2012, and in 2013 the weighted average price of this product was PLN4.

Fig. 6. Dynamics of retail prices of major assortments of meat processing output in the years 2000, 2005 – 2013, PLN/kg

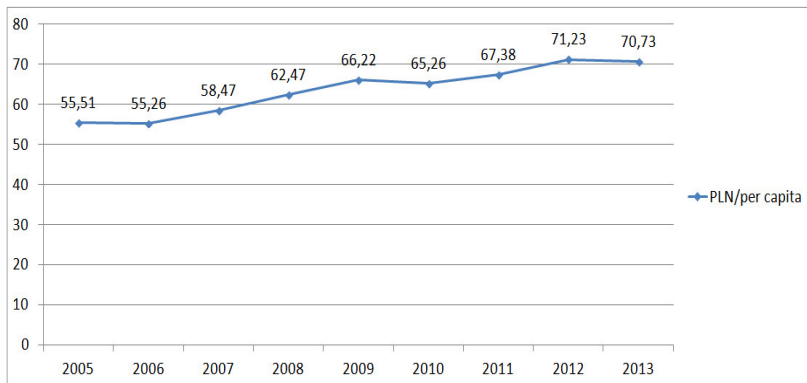


Source: the author's study based on the CSO data

**Consumer response to increase in production prices.** Household expenditure on consumption of meat and meat products in 2005 was 55.51 PLN/per capita. The monetary value growth of expenditure was observed and in 2013 it was 70.73 PLN/per capita (Fig. 7).

Whereas the natural values (Fig.8) of monthly consumption of meat and meat products by a household in 2013 was 5.26 kg/per capita and in comparison to the year 2005 it dropped by 0.22 kg/per capita. The monthly pattern of expenditure and the pattern of consumption of meat and meat products by a household in the examined period is illustrated in Figures 9 and 10.

Fig. 7. Average monthly expenditure on consumption of meat and meat products in the years 2005-2013, PLN/per capita



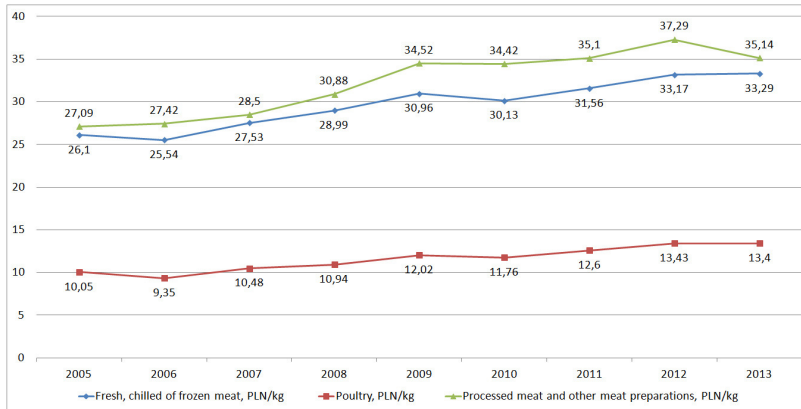
Source: the author's study based on the CSO data

Fig. 8. Monthly consumption of meat and meat products by a household in the years 2005 -2013, kg/per capita



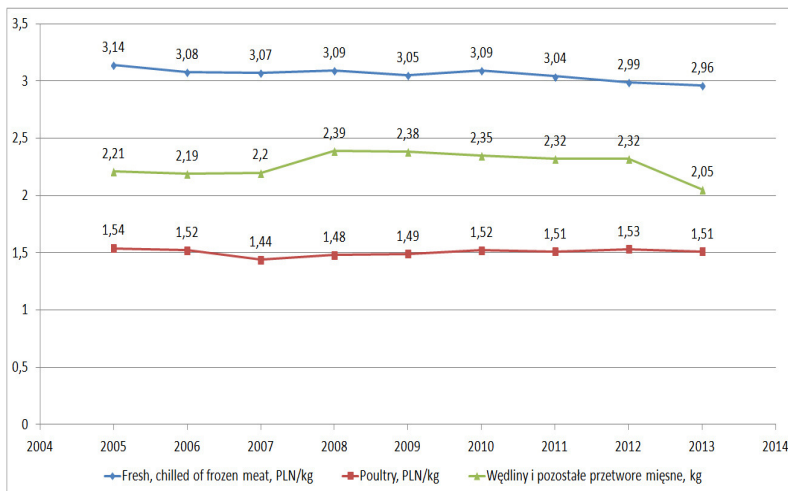
Source: the author's study based on the CSO data

Fig. 9. The pattern of average monthly expenditure of households on particular assortments of meat products, in the years 2005-2013, PLN/kg



Source: the author's study based on the CSO data

Fig. 10. Average monthly consumption by a household according to the structure of the examined meat products in the years 2005-2013, kg/per capita

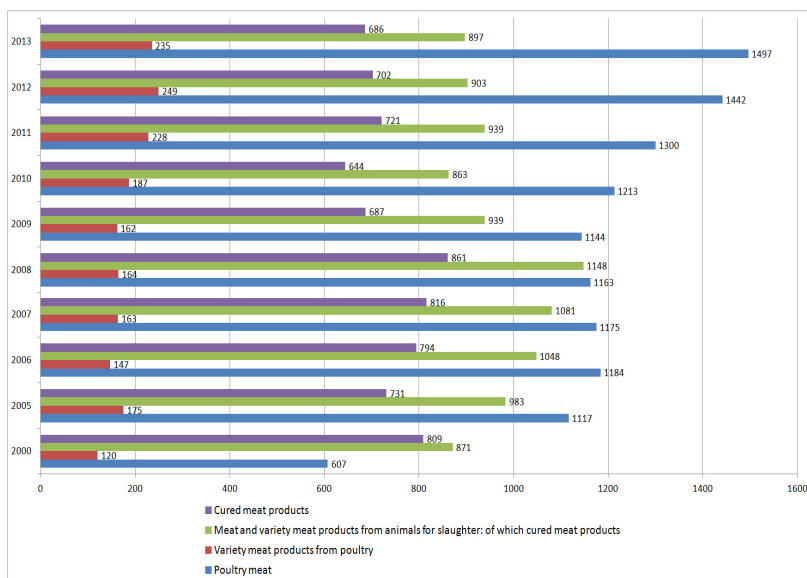


Source: the author's study based on the CSO data

**Changes in the output pattern.** The pattern of consumer goods changed quite unfavourably for consumers. Consumers preferred to a larger extent less expensive products (canned meat and poultry). From 2000

to 2008 the consumption of processed meat products and slaughter animal offal, including cold meats, increased. From 2008 to 2010 the consumption of these products dropped and back in 2011 the consumption rose and in the subsequent years there was a fall in this output supply on the market.

Fig. 11. Supply of selected consumer goods on the market in the years 2000, 2005-2013, thousands of tonnes



Source: the author's study based on the CSO data

## Conclusion

Price is a very important signal of the market condition in terms of the products sold. An increase or decrease in prices and sales volumes of output indicates the market power of a particular company in the economic sector. Price analysis in terms of dynamics at different stages of economic processes in the examined food chain in the meat industry indicates an increase in the growth rate in the initial links (agriculture) and reduction in the rate of price increase in the final products (intended for sale to consumers).

In Poland, in the years examined every year the agricultural land area diminishes, including land used for grazing. Reduced profitability of the fragmented farms and higher prices of fuel, energy, and fertilizers

determine the growth of compound feeds prices, which in turn is reflected in an increase in prices of raw meat.

Referring to the fact that meat consumption per capita has not increased, and a steady growth of prices of almost all assortments of the meat processing output (except for the canned pork meat “Turystyczna”), one can state that manufacturing companies of the industry studied face difficult operation conditions.

## **Summary**

In the years studied the pattern of consumption of meat and meat products counts against consumers. The general trend of rapid growth of prices of investigated products ranging from raw material to final product indicates a reduction in the efficiency of the entire meat industry food chain. On the basis of theoretical assumption of Samuelson (Samuelson, 1995, p. 360) and taking into account the volatility of the market, the crisis since 2008, an unexpected increase in the exchange rate in 2015, one should expect a decrease in efficiency and re-distribution of revenue at the level of individual companies.

Referring to the study of Lesisz (Lesisz, 2012, p.5), in order to avoid an increase in consumer food prices along with the economic recovery, it is extremely important to improve the functioning of the food chain.

Companies with higher market power, offering innovative products, satisfying largely consumers' needs in terms of production quality will have a strategic advantage. The increase in prices for such products will be justified.

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