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**CHANGES IN PRICES OF LIVE LAMB
AND LAMB CARCASSES IN POLAND**

Key words: sheep, meat prices, lamb meat market, lamb carcasses, seasonality

ABSTRACT. The main objective of the study was to determine changes in the prices of live lamb and lamb carcasses in Poland and to indicate the occurring regularities. The specific objectives were to show the changes in the prices of live lamb and lamb carcasses after the accession to the EU, to identify the periods with the highest and the lowest prices and to define the occurring regularities in this respect. The sources of materials are data from EUROSTAT, the Central Statistical Office (CSO) and the Regional Union of Sheep and Goat Breeders in Białystok. The research period covered the years 2004-2020. Descriptive, tabular and graphical methods were used to analyse and present the materials, as well as fixed-base dynamics indicators. In Poland, prices of livestock and lamb carcasses did not change significantly during the several years after EU accession. There were short periods of price decreases and increases. Seasonal price fluctuations were also found. The highest prices for lamb carcasses were achieved from December to Easter, while the lowest prices were achieved during the summer months. The reason for this was the seasonality of both production and consumption. There were also regional disparities in the purchase prices of lamb livestock due to differences in sheep production and use.

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INTRODUCTION

Lamb meat is one of the delicatessen meats in Europe. The reason for this is the small sheep population, which also results in low production of lamb meat. The internal market does not meet demand, making imports necessary. The lamb meat market is the only meat market in the European Union (UE) where domestic production does not meet consumer demand [Rokicki 2008].

So-called reference prices are quoted for lamb sold by farmers. For lamb, these are given broken down into heavy and light lambs. The unit of reference in this case is the slaughter weight, and this is because a levy is received for lambs sold in this way in many EU countries. Production of heavy lambs weighing 23-40 kg is prevalent in France, the UK, Austria, Germany, and Poland, among others [Rokicki 2005b]. As a rule, the slaughter yield from slaughtered lambs is around 40-50% from the live weight of the animal. Of course, everything depends on the breed, the fattening method and other production-related aspects. A key factor influencing the prices achieved for lamb carcasses is the month of sale. Usually the highest demand is during the two biggest holidays, i.e. Easter and Christmas [Rokicki 2006b]. In contrast, the lowest prices paid to farmers at purchase, as by consumers, were during the summer months [Rokicki 2006a]. On the basis of reference prices for lamb carcasses, price competitiveness can be compared for different periods and in different countries or regions [Knecht, Środoń 2013]. Crop prices have been compared for Poland and other EU countries, but not for livestock and lamb carcasses [Matysik-Pejas 2007, Hamulczuk, Klimkowski 2011].

The research carried out fills a research gap. There is a lack of research on the economic aspects of sheep production, particularly concerning the Polish market. The development of lamb meat prices is very important from the point of view of farmers and the public administration units managing this area of agricultural production and agricultural markets. In addition, it is also important for consumers who would like to know when and why lamb meat prices change. Another justification for the research is to examine the period after Poland's accession to the EU, i.e. after the introduction of the Common Agricultural Policy. It is important to indicate how this has affected lamb meat prices and whether it has had a major impact on this market.

The main objective of the study was to determine changes in the prices of live lamb and lamb carcasses in Poland and to identify the regularities occurring. The specific objectives were to show the changes in the prices of live lamb and lamb carcasses after accession to the EU, to identify the periods with the highest and lowest prices, and to identify the regularities occurring in this regard.

The paper has one research hypothesis H_1 – the prices of live lamb and lamb carcasses in Poland fluctuated little, but there was noticeable seasonality and regionalisation.

MATERIAL AND METHODS

The article presents changes in the price of lamb meat in Poland in several statements. Therefore, different data were used. The sources of materials are EUROSTAT, CSO data and the Regional Union of Sheep and Goat Breeders in Białystok. The research period covered the years 2004-2020, i.e. after Poland's accession to the EU. Descriptive, tabular and graphical methods were used to analyse and present the materials, as well as dynamic indicators with a fixed and variable basis.

The research was carried out in several phases. The first phase focused on lamb meat prices in the EU. First of all, the specifics of the markets and the differences between countries were presented. Changes in the prices paid for so-called heavy and light lambs were shown.

Stage two focuses on reference prices for lamb meat. These are needed to monitor the lamb meat market situation. Each country is obliged to report such prices. They make it possible to introduce intervention purchases of lamb carcasses in the event of a large fall in prices. Annual average prices were used for the analysis. In addition to the price run, dynamic indicators were calculated for prices for the whole period.

The third stage of the research focuses on showing the seasonality and fluctuations of lamb meat reference prices. Both monthly data for the entire study period were analysed. The fluctuation of prices from period to period was then visible. In addition, periods in which there were repeated increases and decreases in lamb meat prices were shown.

In the fourth stage, the purchase prices received by Polish farmers were analysed. These prices were different from the reference prices, because they concerned live weight and referred to the prices actually offered during purchases by intermediaries involved in the slaughter and trade in lamb meat. This is because in Poland, farmers are paid for live weight and not slaughter weight. These prices have been shown for the whole period in order to distinguish upward and downward phases. In addition, regional variations in the prices of live lamb in the various provinces of Poland have been shown. Differentiation according to the weight range of lambs sold was also shown. The higher the weight of the animal, the lower the price per kg.

RESULTS

LAMB MEAT PRICES IN THE EUROPEAN UNION

The price of lamb meat is an important aspect that can influence production, foreign trade, consumption of this type of meat and its popularity. It can be argued that it is a determinant for all parties. Producers, retailers and traders expect higher prices for lamb meat. Customers, on the other hand, would like to pay less. Lamb meat is one of the most expensive types of meat. In addition, the EU pays the highest prices in the world for this type of meat. For the sale of live animals, a distinction is made between light lambs (up to 22 kg live weight, produced for dairy sheep) and heavy lambs (over 22 kg live weight, produced for meat use). Between 2000 and 2020, there was a levelling off of lamb meat prices for the categories of lambs given (Figure 1). During this period, prices for light lambs increased by 41%, while heavy lambs decreased by 13%. As a result, prices in both categories were at the same level in 2020. At the same time, the differences between countries decreased, i.e. prices in Northern and Central and Eastern European countries increased, while they decreased in Southern and Western European countries.

The diversity of sheep utilisation systems also resulted in differences in the price of lamb meat. The tradition of eating this type of meat and the income level of the population were also important factors. In areas where sheep were used for dairy purposes, light lambs were obtained. Examples of countries where such production was carried out include the Mediterranean countries. At that time, lambs are sold after weaning at a weight of up to 20 kg. By contrast, in central and western European countries such as the UK, Ireland, Germany, France and Austria, heavy lambs were produced. There, meat-using

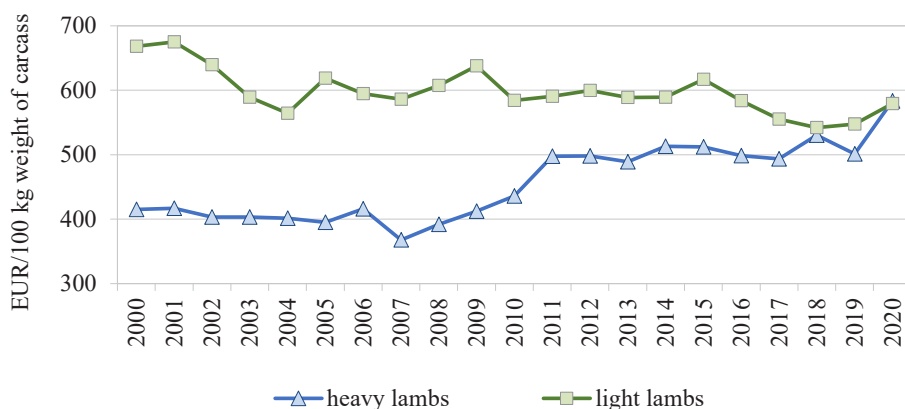


Figure 1. Average annual lamb meat prices in the European Union 2000-2020

Source: own compilation based on [EUROSTAT 2023]

ewes predominated, while lambs were fattened to a higher weight. The differences that occurred meant that each national lamb market would have to be considered separately. However, there were some common patterns to lamb meat prices.

REFERENCE PRICES FOR LAMB MEAT IN POLAND

The production of heavy lambs (23-40 kg live weight) dominates in Poland [Rokicki 2005a]. In practice, the carcass weight of slaughtered lambs accounts for about 40-50% of the live weight of the animal, so lamb carcass weights in Poland ranged from 10-20 kg. The slaughter yield depends, among other things, on the breed of the animal and the fattening method. An important factor differentiating lamb carcass prices is the month of sale. In most EU countries, the highest demand for lamb occurred around Christmas (Christmas, Easter) [Rokicki 2006a]. In contrast, the lowest prices for both buying and selling were recorded during the holiday period [Rokicki 2006b]. The reference prices of lamb carcasses allow a comparison of price competitiveness [Knecht, Środoń 2013].

Average annual lamb meat prices per 100 kg slaughter weight are presented for the years 2004-2020, as quotations for Poland started to be recorded from the first year of EU accession (Figure 2). Such price quotations are reported by Poland for comparison with other countries. In addition, on the basis of a sharp fall in these prices, intervention measures involving the purchase of lamb carcasses may be introduced in order to stabilise the market. There have been several periods of decreasing price levels in Poland, i.e. 2006-2007, 2013 and 2016. Between 2004 and 2020, lamb meat prices in Poland decreased by 41%. Generally, however, there was an increase in prices.



Figure 2. Average annual prices for lamb carcasses in Poland 2004-2020

Source: own compilation based on [EUROSTAT 2023]

SEASONALITY AND FLUCTUATION OF LAMB MEAT REFERENCE PRICES IN POLAND

The annual average prices do not show the substitution that demand fluctuations and seasonality are responsible for. Therefore, for the entire study period, prices were shown on a monthly basis (Figure 3). Price fluctuations in Poland were large. The largest price increase was between November and December 2009 (by EUR 82.45), while the largest decrease was between January and February 2011 (by EUR 63.38). Noteworthy is the price increase from mid-2018 and in the second half of 2020.

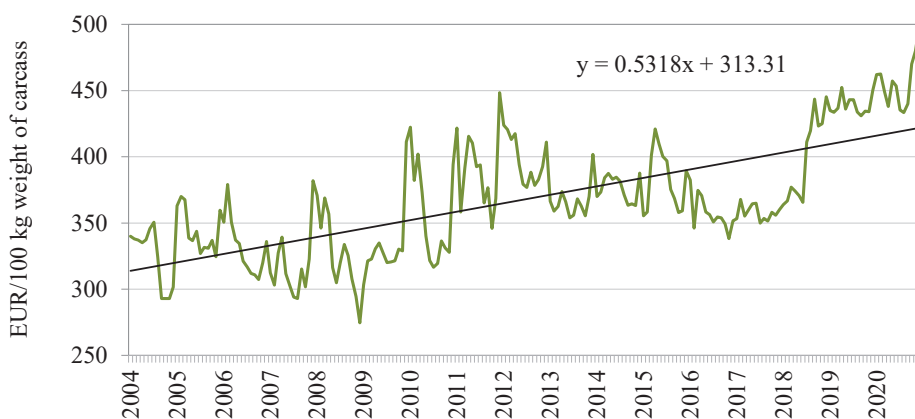


Figure 3. Average monthly prices for lamb carcasses in Poland 2004-2020 (EUR per 100 kg slaughter weight)

Source: own compilation based on [EUROSTAT 2023]

The changes on a monthly basis were then checked and the recurring annual periods of increase and decrease in lamb meat prices were identified. In Poland, prices were highest in the period from December to Easter (Figure 4). Seasonality analysis allows us to show the months, in which prices were higher and lower than the average monthly prices for the year. Prices higher than the average annual prices were usually offered from December (on average by 4.7%) to April (higher by 2.3%). In May, the average annual price level was reached. Prices were lower than average from June (on average by 1%) to November (by 3.1%). The lowest price level was recorded in October. The obtained results allow us to conclude that there was visible seasonality in the prices of lamb carcasses. There were some exceptions in 2019, when prices remained stable throughout the year. In contrast, in 2020, a sharp increase in lamb prices could be seen from October onwards. This was a period of operation under pandemic conditions, which initiated greater changes in the

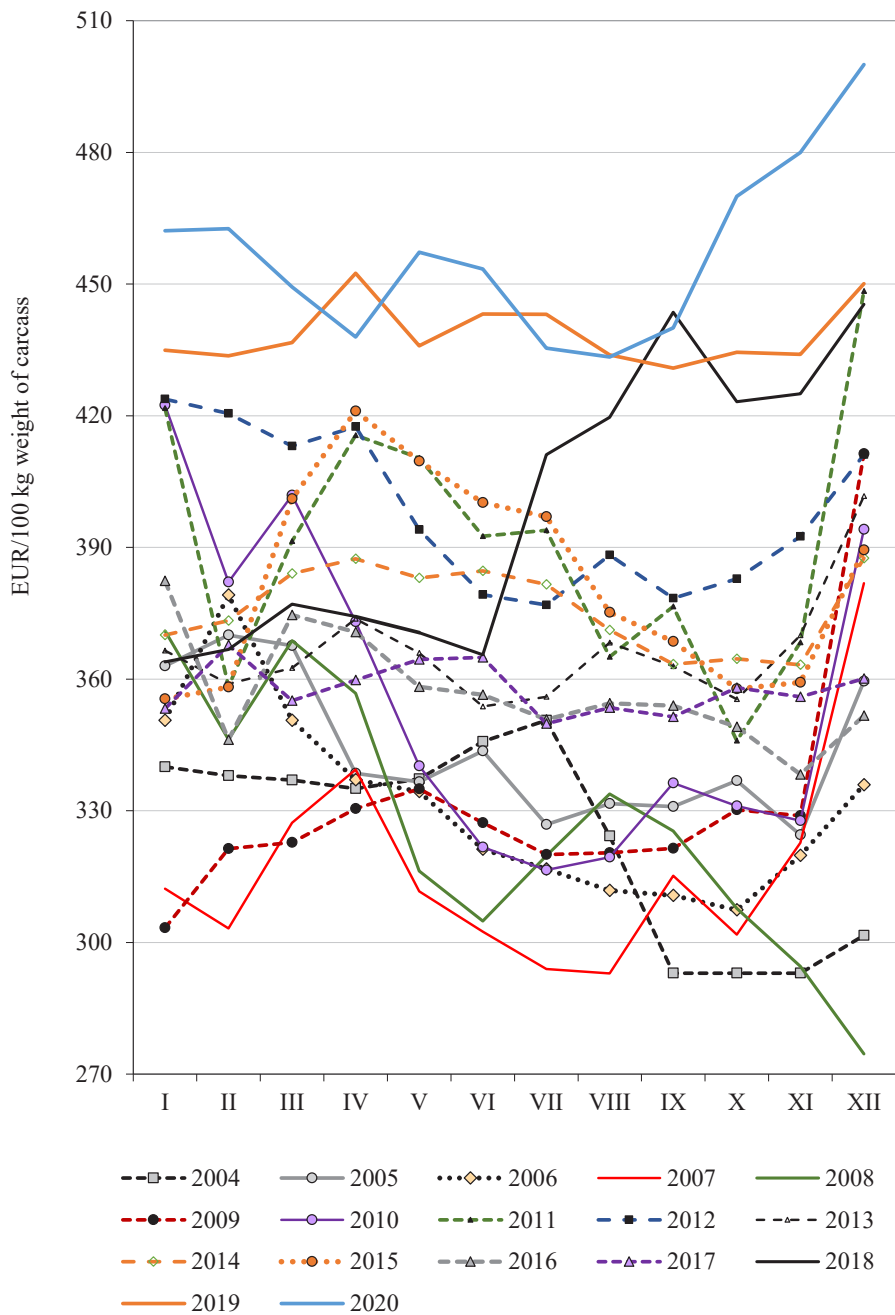


Figure 4. Average monthly prices for lamb carcasses in Poland 2004-2020

Source: own compilation based on [EUROSTAT 2023]

market and had a positive impact on the prices paid to farmers. During the period under review, demand and supply factors were the most important drivers of lamb meat prices. As a rule, prices were lowest during the holiday period due to lower demand in urban centres as a result of holidays and holidays. It is also important to remember the seasonality in sheep production. During periods of high lamb supply, prices fall and when there is a shortage of animals, prices are higher. In countries with low lamb consumption and small sheep populations, such as Poland, it is very difficult to establish a regular market for lamb meat.

PROCUREMENT PRICES FOR LIVE LAMB IN POLAND

When researching the price of lamb meat, it is also important to look at other aspects of sheep production. In Poland, the main product obtained from sheep is meat. Wool is of marginal importance and milk is local. Lamb meat prices in Poland are quoted on the basis of purchases made. Between 2000 and 2020, lamb meat prices in such terms increased by only 28% (Figure 5). However, they were not subject to major fluctuations. Several years of decreases alternated with periodic increases. It can also be concluded that the increase in the price of lamb meat did not keep pace with changes in the price of agricultural inputs (increase by 90%) or changes in the price of consumer goods (increase by 51%). In such a situation, the profitability of production may have declined [GUS 2000-2020].

The purchase prices of live lamb were also presented by province (Figure 6). Thus, it is possible to compare differentiation and disproportion between various regions of Poland. In addition, prices also refer to extreme years in the studied period, i.e. 2000 and

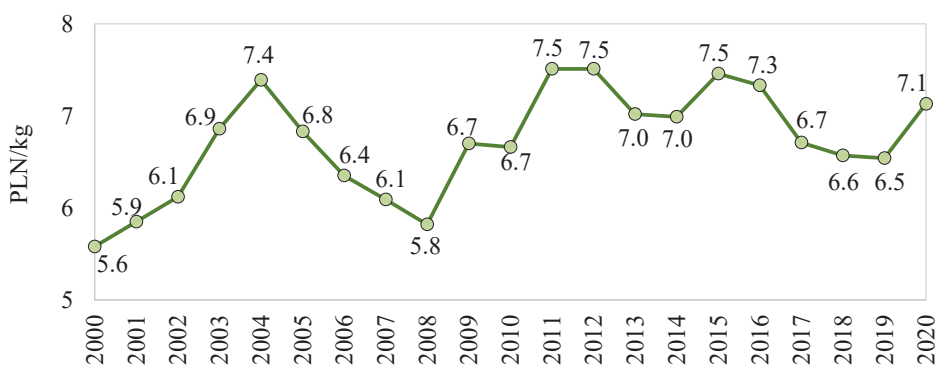


Figure 5. Average annual purchase prices of live lamb in Poland between 2000 and 2020

Source: own compilation based on the Statistical Yearbook of the Republic of Poland of the Central Statistical Office [GUS 2000-2020]

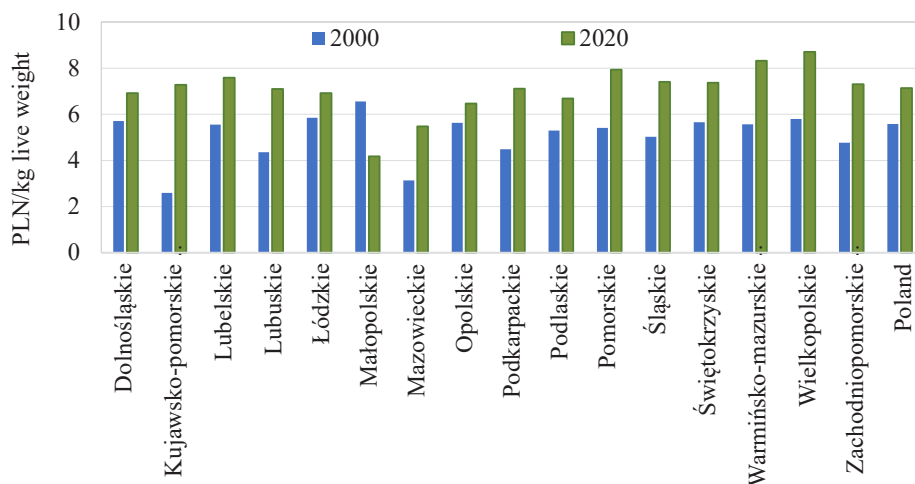


Figure 6. Purchasing prices of live lamb by province in 2000 and 2020

Source: own compilation based on the Statistical Yearbook of the Republic of Poland of the Central Statistical Office [GUS 2000-2020]

2020. In 2000, the lowest purchase prices were in the Kujawsko-Pomorskie (2.59 PLN/kg), Mazowieckie (3.13) and Lubuskie voivodships. On the other hand, the highest prices were obtained in the Małopolskie (6.56), Łódzkie (5.85) and Wielkopolskie (5.79) voivodships. Thus, there were large disproportions. One of the factors determining such disparities was the weight of lambs slaughtered, but also regional demand and the way in which sales were organised. In 2020, the lowest purchase prices were paid for lambs in the provinces of Małopolska (4.17), Mazowieckie (5.48) and Opolskie (6.47). On the other hand, the highest prices were recorded in the Wielkopolskie (8.70), Warmińsko-Mazurskie (8.32) and Pomorskie (7.93) provinces. Disparities between the provinces narrowed slightly. Prices in 2020 were higher than 20 years earlier in all voivodships except Małopolskie (down 36%). The largest price increases were recorded in the Kujawsko-Pomorskie (181%), Mazowieckie (75%) and Lubuskie (63%) voivodships.

Table 1. Average live lamb prices obtained by sheep farmers in Podlaskie Province

Weight ranges [kg]	Average live lamb prices over the years [PLN/kg]	
	2003	2004
13-16	8.13	9.20
17-22	7.32	8.37
23-30	6.65	7.57
31-35	5.85	6.60
36-40	5.29	5.73

Source: own compilation based on data from the Regional Union of Sheep and Goat Breeders in Białystok

Prices also varied according to the weight of the lambs. For example, in 2003, the average prices obtained by producers for lambs weighing 13-16 kg exported to the Italian market were 7.00-8.40 PLN/kg, while for lambs weighing 36-40 kg they were 5.10-6.40 respectively. As an example, the average prices of live lamb obtained by sheep farmers in the Podlaskie Voivodship in 2003 and in the first 5 months of 2004 are presented (Table 1) [RZHOiK 2004, Rokicki 2004]. In the case of purchase prices of lamb livestock, one should also bear in mind the seasonality that occurs. The average annual price does not take into account the fluctuations that occur. In summary, the problem in the lamb meat market is the seasonality of demand and supply and regional disproportions which affect price formation.

DISCUSSION

Gurkan Bozma et al. [2023] compared the prices of lamb and beef carcasses in Turkey. They showed that between 2006 and 2021, lamb carcass prices showed more volatility than beef carcass prices. They also pointed out the relationship between the sheep population (supply) and the demand reported by the larger human population due to migration (demand). Our study also indicated the action of demand and supply forces in the price formation of lamb carcasses. Faruk Urak et al. [2023], based on the analysis of the situation in 2005-2019 in Turkey, pointed out the impact of exchange rates and lamb import periods on the prices of live sheep. In addition to the above factors, Akay Melek [2021] also points to oil prices. We did not consider this in our research. On the Polish market, imports were small. Charlie Hufton et al. [2009] pointed to the example of New Zealand and the system used there of pricing lamb carcasses based on carcass weight and fatness. This type of system could be applied in Poland because there are large regional differences in carcass size and fatness (depending on breed and nutrition). However, our study found that there is a simplification of the system and a single price rate is offered. This arrangement does not favour producers supplying less fatty lambs from meat breeds. Huw Jones et al. [2003] based on the UK market highlighted seasonal pricing for lamb carcasses. In our study we also showed seasonal price variation. Tomasz Rokicki et al. [2020] compared the variability in lamb carcass prices in Poland and Austria. In Poland, prices were lower and had higher variability than in Austria. However, there was a similar seasonality pattern. Veronika Fenyves et al. [2010] compared slaughter lambs in Hungary Italy and Greece. They showed a high seasonality in prices, as they were highest at Easter and Christmas. In our study we obtained the same patterns.

CONCLUSIONS

The following conclusions can be drawn from the research carried out.

1. Carcass prices for heavy and light lambs in the EU have been moving towards equalisation since 2004, which occurred in 2020. In Poland, reference prices for lamb carcasses have risen quite slowly. Several years of increases were also followed by periods of price decreases. Particularly large price increases have been recorded since 2018. The rate of increase of these prices in Poland was at a similar level to carcasses from light lambs and higher than for carcasses of heavy lambs.
2. The amplitude of price fluctuations for lamb carcasses was definitely high in Poland. On a month-to-month basis, prices fluctuated by as much as plus €82 or minus €63. In Poland, prices were highest from December until Easter. The reason for this was the lower supply due to the seasonality of production and the increased demand reported especially during the two major holidays. The lowest prices for lamb carcasses were during the summer months, due to a greater supply of lambs and lower demand resulting from the holiday period and out of town trips.
3. The purchase prices of lamb livestock in Poland were not subject to major changes, with slight increases. There were differences between provinces due to the nature of sheep production in the regions concerned. An important reason for this variation is also the different demand and supply and the distance from slaughterhouses and main markets.
4. The research hypothesis regarding the low variability of live and lamb carcass prices and the occurrence of seasonality (for carcasses) and regionalisation (for live) was confirmed. Several periods of decreasing price levels for lamb carcasses could be distinguished, i.e. in 2006-2007, 2013 and 2016, and increasing in the remaining years. These periods did not coincide with the price formation of lamb livestock. The reason for this was the high averaging of reference prices compared to live prices. In addition, there may have been differences in the meat yield of lambs, which also caused differences in the prices presented.
5. In the first years after accession, price differentiation according to lamb weight was used. This type of system was used for a very long time. It was only when the fattening of lambs to higher weight standards became more widespread that the method of setting the price for live lamb was standardised. It is important to emphasise that the changes taking place on farms and in the market influence the price setting mechanisms for live lamb and lamb carcasses in Poland.

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ZMIANY CEN ŻYWCA I TUSZ JAGNIĘCYCH W POLSCE

Słowa kluczowe: owce, ceny mięsa, rynek mięsa jagnięcego, tusze jagnięce, sezonowość

ABSTRAKT. Głównym celem badań było określenie zmian cen żywca i tusz jagnięcych w Polsce i wskazanie występujących prawidłowości. Celami szczegółowymi było ukazanie zmian cen żywca i tusz jagnięcych po akcesji do Unii Europejskiej, zidentyfikowanie okresów z najwyższą i najniższą ceną i określenie występujących prawidłowości w tym zakresie. Źródła materiałów stanowiły dane EUROSTAT, GUS i Regionalnego Związku Hodowców Owiec i Kóz w Białymstoku. Okres badawczy obejmował lata 2004-2020. Do analizy i prezentacji materiałów zastosowano metody opisową, tabelaryczną, graficzną i wskaźniki dynamiki o podstawie stałej. W Polsce ceny żywca i tusz jagnięcych nie zmieniły się znacząco podczas kilkunastu lat po akcesji do UE. Występowały krótkie okresy spadku i wzrostu cen. Stwierdzono też występowanie sezonowych wahań cen. Najwyższe ceny tusz jagnięcych osiągnęto w okresie od grudnia do Świąt Wielkanocnych, a najniższe w miesiącach letnich. Przyczyną takiej sytuacji była sezonowość zarówno produkcji, jak i konsumpcji. Występowały także regionalne dysproporcje w cenach skupu żywca jagnięcego, co wynikało z różnic w sposobie produkcji i użytkowania owiec.

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