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THE PORK MARKET IN POLAND AGAINST THE BACKGROUND OF THE EUROPEAN UNION

Key words: pork, market, production, cost, herd size, efficiency

ABSTRACT. The aim of the study was to evaluate the live pig market in Poland against the background of the EU. The analysis included the production volume, foreign trade turnover of pork, consumption level, pork purchase prices and cost production. The study used CSO storage and Eurostat data. A valuable source of information was the literature of the subject. Comparative and correlation analysis were used in the study. The analysis show that Poland is one of the most important producers of pork in the European Union. In terms of pork production Poland takes 4th place in the EU after Germany, Spain and France. In Poland, pork also has a dominant position in the structure of meat consumption. In 2017, the average consumption of this type of meat was about 40 kg per person, and was higher than the EU average. The sector of live pig production in Poland is very fragmented. In such countries as Germany or Denmark the production of live pig has greater concentration. The price of live pig in Poland is based on EU prices. They are lower than in Germany, but higher than in Denmark. National pork production is compensated by import. Since mid-2007, Poland is a net importer of pork in terms of meat. In addition, the import of live animals, especially from Germany, the Netherlands and Denmark is increasing. The economic situation on the live pig market from 2014 year was hindered by African swine fever. In order to increase competitiveness, it is necessary to concentrate production and improve its efficiency.

INTRODUCTION

The market is one of the basic economic categories. In economic literature, the term “market” has many definitions [Zakrzewski 1969, Kamerschen et al. 1994, Mynarski 1987, Nojszewska 1995, Wilczyński 1995]. One of the most general theories is presented by Czesław Pietras [2005], for whom the concept of market means “general economic conditions, in which there are exchange transactions between sellers offering goods and services and buyers representing needs backed with certain funds”.

The basic elements of the market are: demand, supply and price. The interaction of demand, supply and prices and the cause-effect relationship occurring between them in the short and long run create a market mechanism. The essence of this mechanism is that demand and supply dependencies are formed through prices between business entities seeking to achieve economic benefits by making voluntary purchases and sales of goods and services [Pietras 2005].

The pork market is the most important segment of the meat market, although its importance in the last twenty years has decreased in favour of poultry meat [Szymańska 2017]. In 2018, pork production amounted to 114.6 million tons and accounted for 43% of total meat production. The largest producer and consumer of pork in the world is China, which accounts for about 50% of global production (54.8 million tons). The European Union, with the production of 23.8 million tonnes in slaughter weight [KOWR 2019], is ranked second. A factor influencing the development of the market in this region are primarily feed prices that affect the profitability of farming. Its absence leads to the fall of less efficient entities and growth in the concentration of inventory in larger farms. Another important factor determining the functioning of this industry is the requirements on animal welfare and environmental protection. The largest producers of pork in the EU are: Spain, Germany, France, Denmark, the Netherlands, Italy and Poland. These countries together account for 2/3 of production in the Community [Copa Cogeca 2017]. The aim of the study was to evaluate the pork market in Poland against the background of the EU.

MATERIAL AND METHODS

The analysis took the volume of production, foreign trade turnover of pork, level of consumption, pork purchase prices and cost production into account. The study used data storage statistics from the Polish Central Statistical Office (GUS) and Eurostat. As for the costs of pork production, the basis for analysis was data from InterPig and the Institute of Agricultural and Food Economics of the National Research Institute. InterPig is a network of economic organisations from 17 countries, mostly from Europe, but also from the USA, Brazil and Canada. In order to compare the cost of pork production in different countries, this group has developed a specific methodology for data collection, defined parameters and harmonized calculation in time. The study compared the cost of pork production in eight EU countries. Unfortunately, none of the economic organizations in Poland belongs to the InterPig network. The basic source of knowledge about pork production in Poland is the database of the Farm Accountancy Data Network (FADN), which in 2016 gathered financial data on 12,100 farms. In this group, there were only 55 farms specializing in pig production. Due to limited access to individual entities in the FADN database, it was impossible to determine the cost of pork production. In this situation, for comparative purposes, account was taken of data from 120 pig farms covered by the analysis of the Institute of Agricultural and Food Economics in the National Research Institute. These data come from farms with a different production scale but the calculations assume average sizes. Calculated costs are not representative of the entire number of pig farms in Poland, but include all cost categories provided by the InterPig network, and therefore were considered suitable for comparison.

As for technical performance parameters in the countries with the largest pork production, account was taken of data from the British organization AHDB (Agriculture and Horticulture Development Board), which refers to the indicators of the InterPig network. Due to a lack of data representative for Poland, the comparison was based on data from 420 pig farms gathered by Zygmunt Pejsak and his team.

The assessment of the relationship between pork purchase prices was made based on the Pearson correlation coefficient. The analysis comprised weekly prices within the period from 1 January 2016 to 30 July 2018 in six European Union countries: Germany, Spain, Denmark, France, the Netherlands and Poland.

RESULTS AND DISCUSSION

The European Union ranks second in the global production of pork. In 2015, the pig population in EU countries accounted for 148 million units, while the annual production of pork amounted to 23 million tons. In terms of the pig population, first place belongs to Spain, which, in 2015, had 28.4 thous. pigs (Figure 1). Second place was taken by Germany with a pig population of 27.7 thous. France's share in the pig population is 8.9%, and Denmark's and the Netherlands' 8.5% each. In terms of the number of pigs, Poland is ranked 6th in the EU-28 and Italy 7th with a share of 5.9%.

For years, the old continent's leader in the production of pork has been Germany with production of about 5.57 thous. tons. Every fifth carcass in Europe comes from this country. The second largest producer of pork in the EU is Spain, which in 2015 produced 3.90 thous. tons of pork. Along with Spain, Germany produces a total of 40% of European pork, therefore they dictate the current price conditions to consumers in the market. France is also a major producer of pork in the EU-28, with a share of 9.2%. Poland is ranked the fourth largest pork producer in the EU-28. Other major producers were Denmark (6.8%), Italy (6.6%), the Netherlands (6.2%) and Belgium (4.8%). Over recent years, there has been increased participation of Germany, Spain, Belgium, Italy and Denmark in the production of pork and that of: France, Poland, the Netherlands and the UK has decreased.

In Poland, the pig population is changeable. Back in 2006, the pig inventory in the country amounted to 18.9 million units, and during the next 10 years it declined to 10.9 million units. At the same time, there was a decrease in the number of pig farms from 664 thous. in 2007 [GUS 2007] to 172.2 thous. in 2017 [GUS 2016].

Despite a high share in the pig inventory and pork production, Polish pig farms are less competitive compared to the most important producers in the EU. The main reason

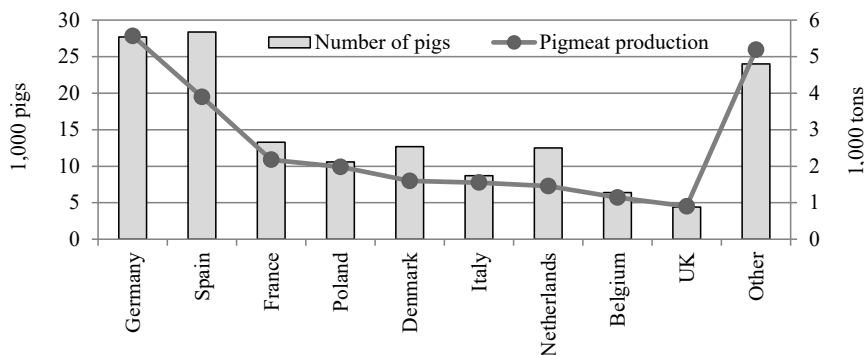


Figure 1. Pork production and pig population in the EU in 2015

Source: own study based on Eurostat data

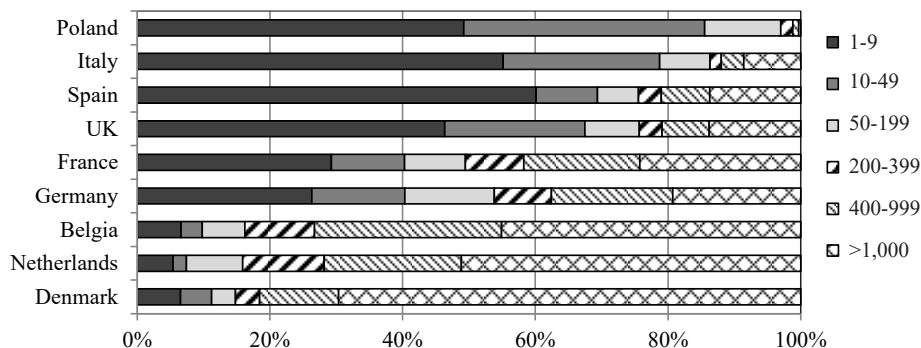


Figure 2. Herd size in the number of farms of selected EU countries in 2013

Source: [STATISTICS 2017]

for it is a lower scale of production. Approximately 49.2% of pig farms in the country are represented by holdings rearing only a few units of this species (Figure 2). Another large group are holdings with stocks ranging from 10 to 49 units (36.3%). Only 0.9% of farms have from 400 to 999 pigs, while only 0.3% keep herds of 1,000 units or more. In subsequent years the process of concentration of pig breeding in large farms in Poland enhanced.

In Denmark, the share of holdings with 1000 pigs and more is up to 69.6%, in the Netherlands 51.2% and in Belgium 45.1%. Whereas the percentage of the smallest holdings that keep a few pigs is 5.4 to 6.5% in these countries. Italy also has a lot of farms with small-scale production (55.2% of holdings are represented by farms keeping a few pig units, and 23.6% have 10 to 49 pigs), but this is connected with a long fattening period in order to obtain the country's specific pork. In Germany, the structure of herds is more diverse. Approximately 26.3% accounts for the smallest farms, 18.3% of farms have herds ranging in size from 400 to 999 units, while the greatest holdings represent 19.3%.

The European Union is also one of the largest exporters of pork. In 2015 it exported 3264 million tons (carcase weight) of this type of meat and products derived from it. In this way, the EU's foreign trade balance of pork meat and products was positive and amounted to 3.9 trillion euros. The main exporters to global markets, i.e. outside the EU, were such countries as: Germany, Denmark, Spain, the Netherlands and France.

The economic situation on the live pig market from 2014 is hindered by African swine fever. The emergence of this disease in pigs in the country caused an embargo on Polish pork by Russia, the Ukraine, Belarus, China, Korea and Japan. As a consequence of the decline in the pig population in Poland, a rapid increase in the import of pigs for fattening and piglets, and their meat can be observed [Szymańska et al. 2018]. Since mid-2007, Poland is a net importer of pork in terms of meat (Figure 3). The import of pigs increased from 233 thous. units in 2006 to 5,447 thous. units in 2015. Due to the high import of young livestock production of live pigs, in 2006 it decreased by only 161 thous. tons and in 2016 it amounted to 2,613 thous. tons.

The European Union is also a leader in the consumption of pork. The share of pork in meat consumption in the Community is around 48%. The average consumption of this kind of meat in the EU accounts for 32.5 kg per capita but is regionally differentiated. The

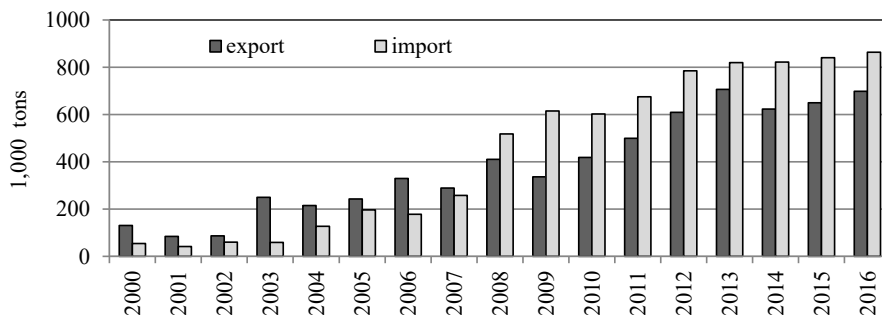


Figure 3. Foreign trade turnover in pork in meat equivalent in the years 2000-2016

Source: [Zawadzka ed. 2017]

largest consumption is in Spain, Denmark and Germany. In Poland, pork consumption in recent years has fluctuated between 38-42 kg per person per year and has accounted for over 60% of meat consumed in the country.

The Polish pork market is more or less under the influence of global firms and global markets. The European market, however, has the biggest influence on Polish pig prices, especially after Polish integration with the EU. Since then, due to the common agricultural policy and free trade, similar trends in price changes over time can be observed. Data shows that, in the second half of 2017, in EU countries with the largest pork production, purchase prices of pigs dropped, and, in the first half of 2018, after significant changes, they stabilized at a similar level (Figure 4). The highest prices of pork are in Germany. In the period from January to July 2018, the prices per kg of pig carcass in class E in this country ranged from 134.3 to 156.8 euros. In Denmark, a kg of the same class of meatiness was paid for from 124.96 to 130.27 euros. In Poland, through the analysed period, prices were lower than in Germany and higher than in France, the Netherlands or Denmark. The biggest changes in prices, however, were recorded in Spain. At the beginning of 2018, the local price of 1 kg of pig carcass in class E was 125.0 euros and, at the end of July 2018, it reached the level of 152.1 euros.

In order to determine the relationship between prices of pork in selected EU countries, correlation coefficients were calculated. These show that the largest correlation between pig prices expressed in Euro exists between prices in Poland and then, successively, prices in Germany and the Netherlands, and Denmark. In the period from January 2016 to July 2018, the correlation coefficients for these prices were $r = 0.99$, $r = 0.98$ and $r = 0.95$, respectively. The correlation coefficients between the prices of pork in Poland and those in Spain and France were relatively high, but lower compared to prices in Germany, the Netherlands and Denmark. During the considered period, these correlation coefficients were $r = 0.92$ and $r = 0.94$, respectively. This is probably a consequence of Poland's trade relations. They are stronger with Germany, the Netherlands and Denmark than Spain and France. This is due, among others, to the proximity of Germany, the Netherlands and Denmark, which undoubtedly makes it easier to trade and generates lower transport costs [Holst 2013].

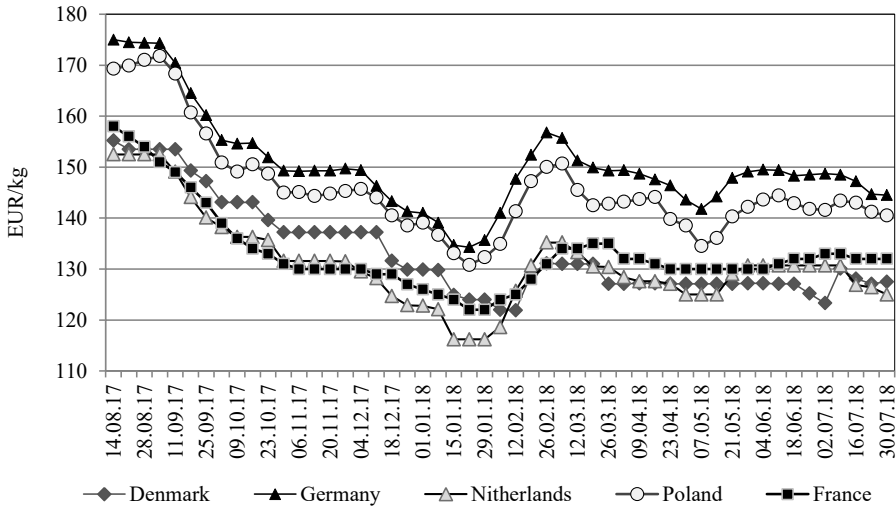


Figure 4. Prices on pig carcass in selected EU countries (class E in EUR/100 kg carcass)

Source: own study based on European Commission data [EC 2019]

In recent years, characterized by increasing liberalization of trade, price competitiveness in the global pork market basically comes down to the competitiveness of production costs. The result of this is a growing concentration of production in places with the lowest costs. The InterPig network data shows that, in 2016, producers in Spain had the lowest production costs of 1.13 £/kg [AHDB 2017]. The pork sector in this country is very well organized and production costs are among the lowest in the European Union. Slightly higher costs were seen in Denmark, Belgium and France, where they averaged between 1.17 and 1.19 £/kg (Figure 5). In Germany and the UK pig production costs were higher and amounted to 1.26 and 1.29 £/kg, respectively. The highest production costs of this species are in Italy (1.51 £/kg), which is connected with the high weight of slaughtered finishers and a long period of fattening.

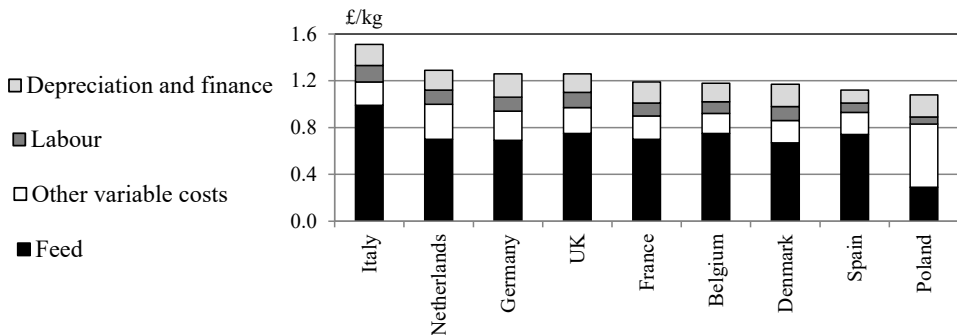


Figure 5. Production costs of live pigs in selected EU countries in 2016

Source: own study based on InterPig and IERiGŻ-PIB data

Table 1. Selected parameters of production efficiency of pig farms in EU countries in 2016

Indicators	Belgium	Denmark	France	Germany	United Kingdom	Italy	Netherlands	Spain	Poland
Pigs weaned/sow/year	30.13	32.10	27.48	29.07	24.83	24.30	29.80	27.00	17.74
Pigs sold/sow/year	27.91	30.08	25.72	27.35	23.22	22.93	28.39	25.02	16.82
Litters/sow/year	2.38	2.27	2.33	2.33	2.28	2.22	2.36	2.34	1.89
Finishing Daily Liveweight Gain [g/day]	608	950	819	824	850	687	808	706	603
Finishing Feed Conversion Ratio	2.83	2.69	2.78	2.81	2.65	3.79	2.59	2.48	3.25
Average liveweight at slaughter [kg]	114	111	120	122	107	170	119	110	109

Source: own study based on InterPig data

The cost structure of live pig production is dominated by feed. In 2016, its share ranged from 54.3% in the Netherlands to 66.1% in Spain. In turn, the lowest cost of labour are characteristic for the production of pigs in Spain 0.08 £/kg and the highest in Italy 0.14 £/kg. The share of other variable costs ranged from 14.4% in Belgium to 23.3% in the Netherlands. In Poland, in the group of farms monitored by the Institute of Agricultural and Food Economics, the costs of pork production in 2016 amounted to 1.08 £/kg. Their structure was dominated by other variable costs, whose share was 50%. These costs mainly included the purchase of livestock, in order to differentiate the herd. In turn, own feed costs and purchase costs accounted for only 19.6%.

An important factor in the competitiveness of pig farms is technical efficiency determined by various parameters. In this regard, differentiation between the largest producers of pork in the EU is small. The InterPig data for 2016 show that the largest number of piglets are weaned over the year from one sow in Denmark – 32.1 piglets (Table 1). Slightly lower results are achieved by producers in Belgium (30.1 piglets), the Netherlands (29.8 piglets) and Germany (29.1 piglets). In the UK and Italy, annually about 24 piglets per sow are weaned.

The number of sold fattening pigs per sow is the highest in Denmark and amounts to about 30 units. In the Netherlands and Belgium, on average, 29 fattening pigs from one sow a year are sold. The fewest fattening pigs per sow are sold in the UK and Italy. The number of litters per sow, in the analysed countries, ranges from 2.22 in Italy to 2.38 in Denmark. Daily gains are also the highest in Denmark, where they amount to 950 g. In the Netherlands, France, Germany and the UK they are, on average, from 808 to 850 g per day. Substantially lower daily gains of 808 g are observed in Belgium and Italy – 687 g. Whereas the feed conversion rate (feed intake per 1 kg of livestock growth) in the country, in

2016, amounted to 3.79. The rate above 2.80 occurred in Belgium and Germany. Its lowest level was recorded in Spain – 2.48.

In pig production, what is equally important is the period of livestock fattening and the associated weight of sold finishers. The heaviest fattening pigs are sold in Italy, where they reach a weight of 170 kg. In the Netherlands, France and Germany, the average weight of fattening pigs in 2016 amounted to about 120 kg. In Spain, Denmark, the UK and Belgium, the average weight of sold fattening pigs ranged from 107 to 114 kg. In Poland, according to research conducted by Zygmunt Pejsak [2015], technical efficiency in pig production is much lower compared to leading EU countries. On average, 17.7 piglets are weaned from a sow and only 16.84 fattening pigs are sold. The number of litters per year is 1.89, and the average gains are just 603 g per day. The feed conversion ratio is 3.25 and the weight of sold fattening pigs – 109 kg.

CONCLUSIONS

The sector of pig production in Poland is extremely fragmented. Small scale production in most farms reduces competitiveness on the national and EU pork market. Small farms cannot benefit from economies of scale. The quality and originality of production can be an element of competitiveness in small farms. In such countries as Germany, Belgium or Denmark, the production of live pigs has a greater concentration.

National pork production is compensated by import. Since mid-2007, Poland is a net importer of pork in terms of meat. In addition, the import of live animals, especially from Germany, the Netherlands and Denmark is increasing. This is due to a lack of an adequate supply of piglets in the country. Therefore, it is advisable to support the breeding of piglets on a larger scale in Poland.

Due to the common agricultural policy in the EU and free trade, similar trends in price changes in the Community can be observed. The price of live pigs in Poland is based on prices in the EU and the exchange rate of the PLN in relation to the Euro. They are lower than in Germany, but higher than in Denmark. The biggest interdependence of pig prices can be found between prices in Poland and those in Germany or the Netherlands, followed by Denmark's prices. This is probably a consequence of Poland's trade relations with these countries.

Price competitiveness in the global pork market basically comes down to the competitiveness production costs. The result of this is a growing concentration of production in places with the lowest cost. Among EU countries, the lowest cost of pig production is in Spain, which appears to be associated with low labour costs. In Poland, a significant proportion of production costs represent the costs of purchasing livestock.

Production efficiency is an important element of the competitiveness of pig farming in the EU. Of significant importance is the yearly number of litters per sow, the number of piglets born and reared from one sow, daily livestock gains and feed consumption per kg of growth. The level of these indicators depends on genetic and environmental factors. The indicators achieved by Polish producers are lower than in Denmark, Spain or Germany and require improvement.

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RYNEK WIEPRZOWINY W POLSCE NA TLE UNII EUROPEJSKIEJ

Słowa kluczowe: wieprzowina, rynek, produkcja, wielkość stad, efektywność

ABSTRAKT

Celem badań była ocena rynku wieprzowiny w Polsce na tle Unii Europejskiej. W analizach uwzględniono wielkość produkcji, ceny skupu żywca wieprzowego, obroty handlu zagranicznego wieprzowiną, poziom konsumpcji, efektywność produkcyjną oraz koszty produkcji. Wykorzystano dane statystyki masowej GUS oraz Eurostat. Cennym źródłem informacji była także literatura przedmiotu. W badaniach zastosowano analizę porównawczą i analizę korelacji. Z analiz wynika, że Polska jest jednym z najważniejszych producentów wieprzowiny w UE. Pod względem produkcji żywca wieprzowego zajmuje 4. miejsce w UE, po Niemczech, Hiszpanii i Francji. W Polsce wieprzowina zajmuje także dominującą pozycję w strukturze spożycia mięsa. W 2017 roku przeciętna konsumpcja tego gatunku mięsa wyniosła około 40 kg na osobę i była wyższa od średniej w UE. Sektor produkcji wieprzowiny w Polsce jest bardzo rozdrobniony. W krajach, takich jak Niemcy, Belgia i Dania produkcję żywca wieprzowego cechuje większa koncentracja. Ceny żywca wieprzowego w Polsce są uzależnione od cen w UE i są niższe niż w Niemczech, ale wyższe niż w Danii. Krajowa produkcja wieprzowiny jest uzupełniana importem. Od połowy 2007 roku Polska jest importem netto wieprzowiny w ekwiwalencie mięsa. Ponadto zwiększa się import żywych zwierząt, szczególnie z Niemiec, Holandii i Danii. Sytuację ekonomiczną na rynku wieprzowiny od 2014 roku utrudnia afrykański pomór świń. W celu zwiększenia konkurencyjności gospodarstw trzodowych w Polsce konieczne jest zwiększenie koncentracji produkcji oraz poprawa jej efektywności.

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