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LIQUIDITY AND PROFITABILITY OF MEAT PROCESSING ENTERPRISES IN POLAND

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Abstract

The research aimed to identify changes in the level of liquidity and profitability of meat industry enterprises and determine the relationship between liquidity and profitability in this industry. The authors made a hypothesis that there is a positive relationship between the liquidity and profitability of meat enterprises, which means that along with the increase in financial liquidity the profitability of enterprises increased. The research used information from meat processing and preservation companies, except poultry, employing more than nine persons. The analysis covered companies that were obliged to submit financial statements to the National Court Register. In 2007, there were 467 such enterprises in Poland and 316 in 2018. The descriptive statistics, Pearson correlation coefficient, and linear regression analysis were used in the data analysis. The analyses show that the number of meat businesses in Poland is decreasing as a result of their consolidation and winding-up due to the difficult financial situation. The average current liquidity ratio of the enterprises analyzed between 2007 and 2018 remained at a satisfactory level from 1.054 to 1.49. The research shows a significant correlation between current and quick liquidity ratios and returns on assets and equity. The highest level of correlation occurred between the quick liquidity ratio and the asset profitability ratio. The profitability of meat enterprises in the long term is associated with maintaining financial liquidity. In turn, maintaining the ability to meet current obligations requires a rational management of profit and working capital.

Keywords: enterprises, quick and current liquidity, profitability, correlation, meat industry.

JEL codes: L21, M21, O12.

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Introduction

Poland is a major producer of meat and meat products. In 2016, the value of the country's meat and meat products was EUR 14.4 billion, which accounted for 6.9% of the EU's share and ranked Poland sixth in the single internal market after Germany, France, Italy, Spain, and the UK. At the same time, 2683 companies were registered in Poland, employing 118226 workers (PKO BP, 2018). However, meat processing considerably varies in the country, given the size of the farms. In addition to strong capital groups with annual returns ranging from PLN 1 to 1.5 billion, there are a large number of medium-sized and small family businesses with sales not exceeding PLN 20 million. Most of the companies that are the largest players on the market have foreign investors, for example Animex belongs to the WH Group, while Sokołów to the Danish Crown Amba.

After Poland's accession to the European Union, the meat industry was one of the fastest growing sectors of the Polish economy. Both meat consumption and domestic market demand increased. The turnover of foreign trade in meat and meat products also increased significantly. Polish companies therefore had to meet certain requirements in order to sell their products in other countries of the European Union. This was associated with high investments, which contributed to modernizing production and increasing production opportunities, but also increased the debt ratio of many companies.

Currently, meat industry companies use various competitive strategies, but the basic ones are price competition (very low margins, on the verge of profitability), advertising wars, introduction of new products, and optimization of production processes (Misiołek, 2013). Price competition leads to the deterioration of the situation of the entire sector and contributes to the consolidation of entities. The consolidation processes are also accelerated by retail chains, which are setting higher and higher requirements for producers in terms of both quality and supply volumes. In this situation, smaller family businesses, which often face a lack of suitably qualified management staff and do not have access to capital, fall out of the market.

The development of meat processing enterprises is hampered by changes in raw material prices and exchange rate fluctuations. Recently, high employment costs and rising energy prices have also been a major problem. Since 2014, the situation in the meat industry has been further complicated by the spread of African swine fever (ASF). Many countries have introduced an embargo on Polish pork for the detection of this virus. As a result, pig exports to the customs union of Belarus, Russia, and Kazakhstan, as well as to countries such as China, Japan, and South Korea have been totally suspended. As a result of the development of African swine fever, the difficulties in continuing to produce pigmeat are aggravated by, among other things, the increase in biosecurity costs. As a result, the number of pigs in the country is falling. All these factors affect the financial situation of the meat industry, its ability to generate profits, and regulate current liabilities.

Business liquidity and profitability research should be perceived in the context of business objectives. In general, their primary goal is to maximize profit or otherwise

increase the value of a business. In order to achieve this objective effectively and successfully, it is essential to ensure the security of operations related to the company's ability to meet its current obligations (Sierpińska and Wędzki, 1997). The relationship of liquidity and profitability is particularly important in the meat industry environment, which is characterized by low profitability and the greatest threat is the risk of loss of liquidity. The research results on this issue in the meat industry are limited and do not provide a ground for general conclusions formulation. In this situation, the aim of the research was to identify changes in the levels of liquidity and profitability of the meat processing industry and determine the relationship between liquidity and profitability in this sector. The authors made a hypothesis that there is a positive relationship between the liquidity and profitability of meat enterprises. It means that along with the increase in financial liquidity, the profitability of enterprises increased.

Relations between liquidity and profitability in enterprises in the literature

One of the main factors affecting the profitability of the company is the profit. However, profit growth is not always accompanied by an increase in liquidity. If an enterprise postpones payments or sells on credit, increasing profitability does not necessarily mean improving liquidity (Skoczylas, 2004). According to A. Neto (2003), the greater the amount of funds invested in current assets, the lower the profitability, and at the same time the less risky the working capital strategy. In this situation, the returns are lower in the case of a greater financial slack in comparison to a less liquid working capital structure. Conversely, while sacrificing the safety margin of the company by raising its insolvency's risk, a smaller amount of net working capital positively contributes to the achievement of larger return rates, since it restricts the volume of funds tied up in assets of lower profitability. This risk-return ratio works in a way that any change in liquidity has its consequences for profitability.

K.V. Smith (1980) was the first to point out the impossibility of maximizing liquidity and profitability at the same time. His research shows that the unit's decision to increase the profitability of the company simultaneously means a reduction in liquidity. Increased liquidity is again associated with a decrease in profitability. Such a relationship was confirmed by the studies of H. Shin and L.A. Soenen (2000), carried out on a sample of 1000 enterprises between 1975 and 1994. They demonstrated a negative correlation between profitability and liquidity, with liquidity being examined as the net business cycle length. A.M. Eljelly (2004) empirically examined the relation between profitability and liquidity as measured by the current ratio (CR) and the cash conversion cycle (CCC) in Saudi companies. Using correlation and regression analysis, the study found a significant negative relation between a firm's profitability and its liquidity level as measured by the current ratio. This relationship is more evident in firms with high current ratios and longer cash conversion cycles. M.L. Jose et al. (1996) conducted studies in the American market and found that an aggressive liquidity management policy has a positive influence on profitability, and thus, the lower the liquidity, the higher the profitability. I. Lazaridis et al. (2006)

conducted an analysis of the relationship between liquidity and profitability in the Greek market and used the operating profit margin as the profitability measure and the cash conversion cycle as the liquidity measure, and they found that there was a statistically significant relationship between them, and managers should shape the components of the CCC at an optimum level. J.A.C. Marques and R. Braga (1995) confirmed this inverse relationship between liquidity and profitability for a sample of food companies. A. Blatt (2001) also called a negative relationship between liquidity and profitability, measured by Dynamic Model and profitability. When examining the relationship between liquidity and profitability, exemplified by 1555 Japanese and 379 Taiwanese companies from 1985-1996, Y.-J. Wang (2002) noted that an excessive liquidity reduction (shortening the cash conversion cycle) could contribute to reducing profitability. A similar relationship between these variables was confirmed in a research conducted by Q. Saleem and R.U. Rehman (2011) in Pakistani listed companies. C.K. Ashraf (2012) examined the effect of working capital on the profitability of the 16 Indian firms. The study found strong negative relationship between working capital and profitability. Moreover, debt used by the firm, inventory turnover, average collection period, average payment period, and cash conversion cycle have a considerable negative relationship with profitability.

In Poland, the negative impact of liquidity on profitability was shown by M. Bolek and W. Wiliński (2012) on the basis of construction companies listed on the Warsaw Stock Exchange (GPW). In other researches, they reported that, together with a decrease in liquidity, neither the return on equity nor the return on assets of an enterprise is increasing (Bolek and Wolski, 2010). A. Bieniasz, D. Czerwińska-Kayzer, and W. Gołaś (2007) examined the relationship between profitability and working capital of 30 branches of firms in the food industry in Poland over the period of 2005-2009. The findings showed that there is a strong impact of length of inventory and liabilities cycles on profitability. This indicates that the shortest the CCC, the higher the return on assets. Furthermore, research carried out in Polish agriculture from 2007-2009 shows that an increase in the return on assets causes an increase in the quick liquidity ratio (Zawadzka et al., 2011). A similar relationship was detected by Pawlak and Paszko (2014) in fruit and vegetable processing enterprises. In agriculture (the sample based on FADN farms), Bereźnicka (2014) showed a statistically significant relationship between liquidity and profitability. However, due to low correlation rates, it was not possible to clearly indicate the direction of this relationship. The indicated results from the food-related sectors contradict the theory of substitutability of profitability and liquidity. However, it cannot be ruled out that positive correlations result from low liquidity levels in the sectors studied and/or narrow periods of research. They can also determine the specific nature of these sectors. In turn, Jaworski et al. (2018) conducted research in the food manufacturing enterprises. The authors did not identify a statistically significant relationship between the profitability and liquidity of 1046 entities from this industry over the period of 2012-2015. They showed a positive relationship only in the range of small liquidity values.

In the meat industry, the relationship between liquidity and profitability in enterprises was analyzed by T. Pawlonka (2011). His research concerned the period of 2002-2008 and covered only 12 deliberately selected meat enterprises. The research showed that most of the surveyed enterprises (9 out of 12) represented a low, medium, and high correlation between the asset profitability ratio and the current financial liquidity ratio. This relationship was positive and parabolic. Therefore, due to the different results in the relationship between profitability and liquidity of enterprises, there is a need for further research in this area.

According to M. Bolek and B. Grosicki (2013), the nature of the relationship between profitability and liquidity depends on the period in which it is assessed. In the literature, there is a belief that in the short term there is no relationship between these categories. Short-term profit is most often used as a source of debt financing. It is therefore not a source of additional money, which may contribute to liquidity problems. In an effort to increase profitability, managers also reduce the level of current assets and increase their funding with cheaper foreign capital. This increases operational and financial risk. If the aim is to limit it by maintaining high liquidity, the proportion of more expensive equity frozen in assets should be increased, but this may lead to a decrease in profitability. In the long run, profit as a source of additional free cash flow enhances an enterprise's ability to pay its liabilities, thus increasing profitability has a positive effect on improving its solvency (Waściński and Kruk, 2010).

The nature and direction of the relationship between profitability and liquidity also depend on their level. In the case of low liquidity values, the level of profitability also increases. Once the profitability limit is reached, it will cease to have an effect on increasing liquidity. For high liquidity values, a further increase in liquidity results in a decrease in profitability. This relationship is illustrated by the Gentry curve (Fig. 1).

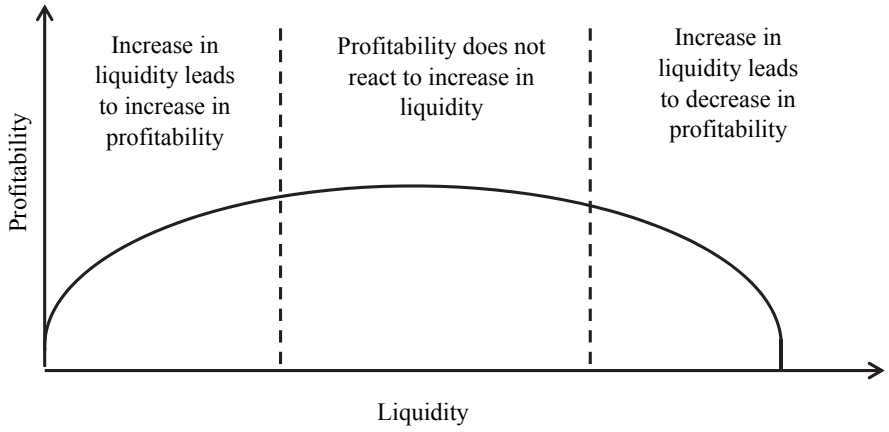

Fig. 1. Gentry curve of dependence between liquidity and profitability of a company.
Source: Gentry, 1976.

K. Padachi (2006) recommends that a company be required to maintain a balance between liquidity and profitability while conducting its daily operations. Liquidity is a precondition to ensure that firms are able to meet their short-term obligations. A firm can be very profitable, but if this does not translate into cash from operations within the same operating cycle, the firm would need to borrow to support its continued liquidity needs. Thus, the twin objectives of profitability and liquidity must be synchronized. Investments in current assets are inevitable to ensure delivery of goods or services to the ultimate customers and a proper management of same should give the desired impact on either profitability or liquidity.

The nature of the relationship between a company's liquidity and profitability is especially important to managers and investors. Generally, if both liquidity and profitability are growing, then the company is operating on the edge of liquidity. Crossing this breakeven point, the manager can choose between an aggressive, neutral, or conservative strategy. This dependence is presented in Figure 2.

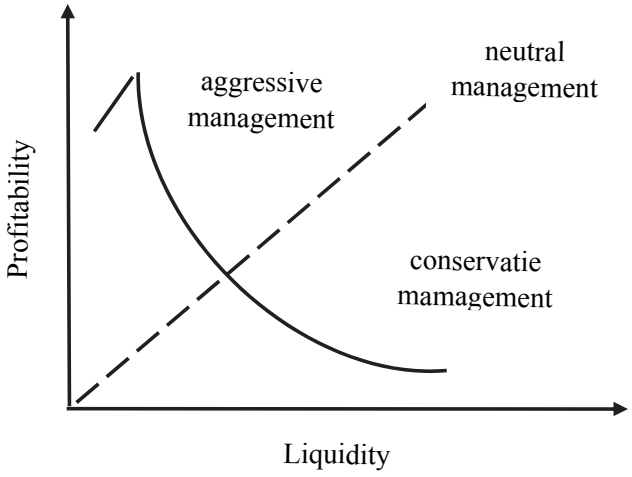

Fig. 2. The relationship between liquidity and profitability and the working capital strategy of a company.

Source: Gajdka i Walińska, 1998.

Information considered by managers in their decision-making processes may also be used by investors analyzing companies for the purpose of purchasing shares. According to Gamba and Triantis (2005), American and European CFOs suggest that the most important driver of firms' capital structure is the desire to attain and preserve financial flexibility, that is, the ability to restructure their financing at low costs. In turn, Faulkender and Wang (2006) report that the marginal value of liquidity is higher for firms with lower liquidity, greater investment opportunities, and higher external financing constrains.

There are many possible scenarios of investors' decisions connected to the trade--off between profitability and liquidity. In a sector with higher rates of return relative

to risk, greater liquidity may be interpreted as an indicator of the company's good position because of its better ability to enter into new contracts. Profitability may be more important in traditional sectors, where the relations between companies and their subcontractors and customers are settled and stable. In technology- and innovation-driven businesses, such relations are more dynamic and it is better for a company to stay ready for unexpected market situations. Since the Polish market is represented by traditional businesses, one can hypothesize that profitability will be more important for investors than liquidity while evaluating companies.

Materials and methods

The research has used information from Statistics Poland for meat processing and preserving companies, with the exception of poultry meat, employing more than 9 workers. Due to the difficult access to the data of all meat companies, the selection of the facilities for the study was deliberate. The analysis covered companies which, under the applicable laws, due to the amount of income or legal status, were obliged to keep books of account and submit financial statements to the National Court Register. In 2007, there were 467 such enterprises in Poland and 316 in 2018.

Due to the limited availability of data, the analysis covered 2007-2018. Moreover, in this period, after the changes related to Poland's accession to the European Union, Polish enterprises were characterized by a certain functioning stabilization within the common market. The study analyzes the change in liquidity and profitability indicators among enterprises from 2007-2018. The source of information was also specialized literature on the topic. The study assesses the liquidity and profitability of enterprises based on the most commonly used indicators, the methodology of which is commonly known. It allows comparing companies in the sector and between sectors on the domestic and international market. All indicators used in the research and the method of their calculation are presented in Table 1.

In assessing the ability of the analyzed entities to settle short-term liabilities, the current liquidity ratio (CR), quick liquidity ratio (QR) were used. The current financial liquidity ratio informs about the company's ability to settle liabilities based on current assets. The quick liquidity ratio is a modified formula of the current liquidity ratio. The design of this indicator is based on the assumption that the least liquid component of current assets are inventories, which is why they are not included in current assets. In this way, the quick liquidity ratio informs about the ability to settle current liabilities with the company's liquid assets.

Table 1

Variables used in the study

No.	Variable	Definition
1	Current Liquidity Ratio (CR)	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
2	Qiuck Ratio (QR)	$\frac{\text{Cash \& Equivalents + Marketable Securities + Accounts Receivable}}{\text{Current Liabilities}}$
3	Cash Conversion Cycle (CCC)	Days of Inventory Outstanding (DIO) + Days Sales Outstanding (DSO) – Days Payables Outstanding (DPO)
4	Return on Sales (ROS)	$\frac{\text{Net Profit}}{\text{Sales Revenue}}$
5	Return on Asset (ROA)	$\frac{\text{Net Profit}}{\text{Total Assets}}$
6	Return on Equity (ROE)	$\frac{\text{Net Profit}}{\text{Equity}}$

Source: authors' own study.

However, current and quick liquidity ratios are considered too static (Largay and Stickney, 1980; Aziz and Lawson, 1989), so that it can be clearly determined whether the decrease or increase in their value has a positive or negative effect on the company's profitability. In this situation, the study also used the cash conversion cycle, which is considered one of the better measures of assessing the effectiveness of working capital management and its impact on the company's liquidity (Wędzki, 2003). The cash conversion cycle determines the time that elapses from the moment of the outflow of funds to settle liabilities until the inflow of funds from collected receivables (Sierpińska and Jachna, 2005). Three variables influence this cycle: receivables turnover cycle, inventory turnover cycle, and deferred liabilities period. In the model proposed by V.D. Richards and E.J. Laughlin (1980), the conversion cycle was determined by the days of inventory outstanding (DIO), days sales outstanding (DSO), and days payables outstanding (DPO).

The lower value of the conversion cycle indicates that the company recovers its cash invested in sold products faster and has more cash due to higher liquidity. On the other hand, the high value of the ratio indicates that the company recovers money in the long run and therefore liquidity problems may arise (Bolek and Wolski, 2010). In assessing the profitability of businesses, which is an ability to achieve positive financial results, three most commonly used in economic practice indicators were also employed, and namely,: return on sales (ROS), return on assets (ROA), and return on equity (ROE). The return on sales (ROS) informs how

much profit after tax is obtained from all revenues from operations (Sierpińska and Jachna, 2005). It reflects the company's pricing policy and the profit that a given entity generates by a given sales volume.

Return on assets ROA indicates the amount of net profit per unit of value of assets involved in the enterprise. It determines the ability of an enterprise's assets to generate a financial surplus. The value of this indicator is influenced by net sales profitability and the speed of asset rotation. The value of this indicator is influenced by net sales profitability and the speed of asset rotation. Poor asset utilization and maintenance of unnecessary assets reduce the return on assets. On the other hand, in a situation when an enterprise generates losses on sales, and at the same time achieves a positive result on overall activity, it may mean that the entity sells its own fixed assets to finance its core activity.

The return on equity ratio determines how much net profit is generated by the employed equity. Return on equity is of particular importance, which results from the company's strategic goal of maximizing benefits for owners. The higher expected relation of net profit to equity means at the same time a higher risk of obtaining the expected benefits as a result of changes in the external conditions of the enterprise and management imperfections (Bień, 2011). The return on equity ratio is synthetic and is related to, among others with the volume of sales, the activity of using the assets, and the size of the company's debt (Kruk, 2017).

The relationship between liquidity and profitability was determined on the basis of Pearson correlation coefficient r, which is considered to be the most important indicator of the force of linear dependence between two features. The general formula for calculating the value of the Pearson correlation coefficient for two variables x and y is given by the following formula (1):

$$r_{x,y} = \frac{\mathrm{cov}\,(Y,Y)}{s(X)*s(Y)} \tag{1}$$

It considers covariance between variables divided by the product of their standard deviations.

For the variables with the highest correlation coefficient, a linear regression analysis was performed in the following form (2):

$$y = bx + a \tag{2}$$

where:
y – dependent variable,
x – independent variables,
b – regression coefficients
a – intercept.

The regression equation allows to predict the value of the dependent variable y from the observed values of the independent variable x. The values of the equation parameters were determined by the least squares method (Goldberger, 1975).

Results and discussion

Data from Statistics Poland show that the number of meat processing and preserving businesses is declining, with the exception of poultry meat in Poland. In 2007, 404 entities with more than 9 employees were registered in the REGON register, and in 2018 only 274, which means that almost 1/3 of businesses in the sector ceased their activities. The decrease in the number of enterprises was mainly due to the difficult financial situation, which forced many entities to resign from further activities. It was also linked to business consolidation processes.

The most unprofitable enterprises at risk of bankruptcy were reported in 2008 (Fig. 3). It was related to the global financial crisis. In 2011, there was also a high percentage of unprofitable enterprises (22%).

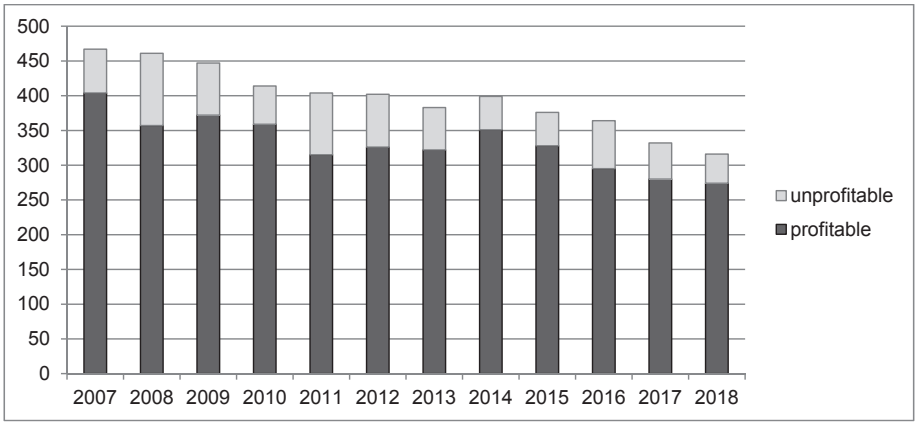

Fig. 3. Number of meat processing enterprises employing more than 9 workers in Poland in 2007-2018. Source: unpublished data from Statistics Poland.

The lack of profitability of many meat businesses was due to high commitments as a result of investments made in previous years. The number of such subjects has recently decreased. In 2016, 69 unprofitable enterprises were recorded and their share was 19.0%. In 2018, their number fell to 42, representing 13.3% of all meat processing enterprises in Poland. The reduction in the number of unprofitable enterprises was also linked to market consolidation processes, which led to an increase in market share and economies of scale (Szymańska, 2018).

The existence and development of meat processing companies determine liquidity. Their absence leads to a deterioration of the existing conditions of cooperation, shortening of payment deadlines, suspension of supplies and, in the event of delays in the settlement of taxes or other public and legal obligations, results in criminal and tax liability. In addition, it causes problems with the timely execution of concluded contracts, resulting in a delayed receipt of money from product customers. According to S. Baños-Caballero, P. García-Teruel, and P. Martínez-Solano (2012) the liquidity is essential for obtaining financial performance, maintaining and

improving the market position. G. Filbeck and T. Krueger (2005) found, however, that firms are able to reduce financing costs and/or increase the funds available for expansion by minimizing the amount of funds tied up in current assets.

The average value of current liquidity of the analyzed enterprises over the period of 2007-2018 ranged from 1.05 in 2008 to 1.49 in 2017, which meant that it was at a satisfactory level (Fig. 4). Moreover, the level of this indicator in the following years showed an upward trend.

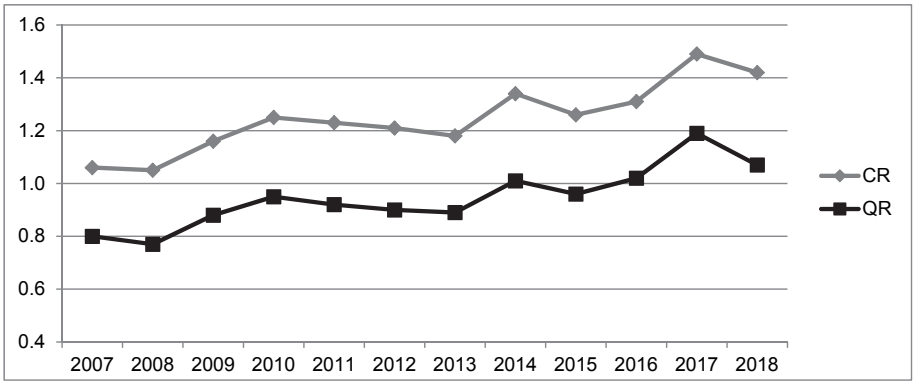

Fig. 4. Liquidity ratios in the Polish meat processing industry from 2007-2018.
Source: unpublished data from Statistics Poland.

A similar situation was observed for the quick liquidity indicator. It ranged from 0.77 in 2008 to 1.19 in 2017. The difference between current and quick liquidity points to a significant share of inventories in the value of current assets. In addition, the quick liquidity ratio of less than 1 between 2007 and 2013 illustrates the difficulties of the meat processing industry in meeting their current commitments during the reporting period.

The cash conversion cycle in the enterprises under review has changed over the analysis period. Initially, it was 19-20 days from 2007-2010 (Fig. 4). Then, from 2011-2013, the cycle fell to 16-17 days. A shorter cycle of cash conversion at that time enabled higher operating results, notably by reducing the amount of capital needed to finance receivables and inventories.

Profitability indicators were also characterized by considerable variability (Fig. 5). They showed a downward trend from 2007-2009. The financial situation of the companies at that time, in addition to the effects of the financial crisis in the form of a more restrictive bank lending policy and suppliers' payment problems, was influenced by the costs of investments resulting from the need to comply with the EU rules.

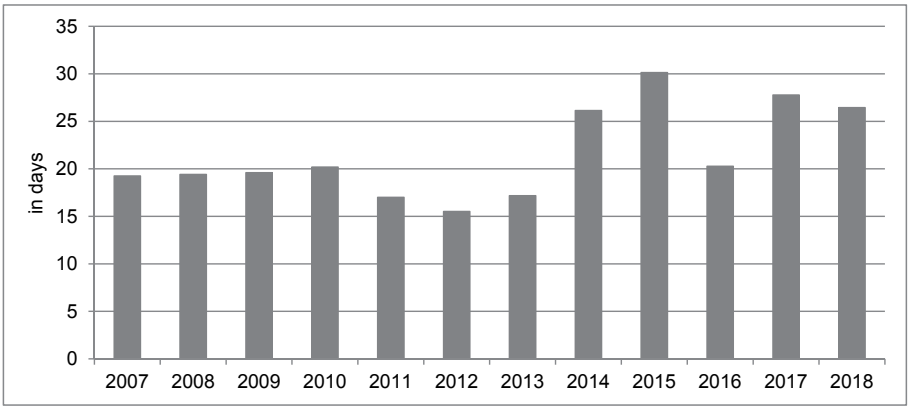

Fig. 5. Cash conversion cycle in the Polish meat processing industry from 2007-2018.
Source: unpublished data from Statistics Poland.

A different situation occurred after 2013. From 2014-2018, with the exception of 2016, an average of 26 to 30 days passed between the time when the funds for the settlement of liabilities and the time of the receipt of funds from the receivables passed, which means that return period for the invested assets was longer.

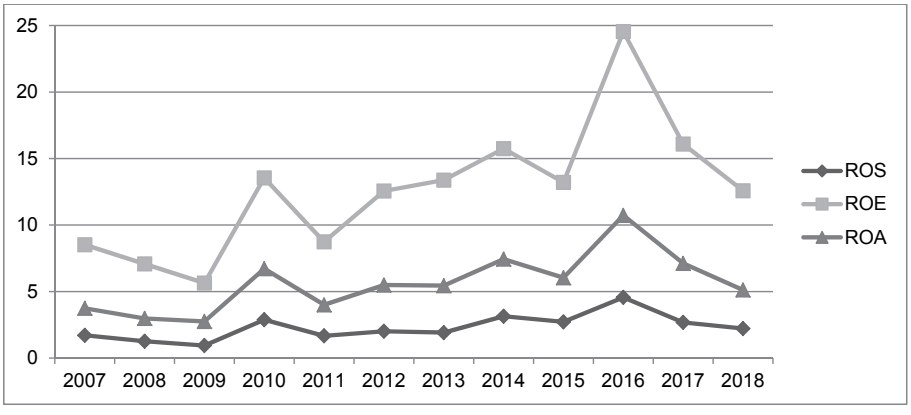

Fig. 6. Indicators of profitability of meat processing enterprises from 2007-2018.
Source: unpublished data from Statistics Poland.

In 2010, there was an increase in return on sales and its subsequent decline. This was the largest number of unprofitable enterprises in 2011. In 2015, there was also a significant decrease in profitability. At that time, meat producers were particularly affected by the embargo from Russia and the restrictions on exports to Asian countries. Therefore, the meat industry had to change its strategies significantly by promoting and seeking new markets more intensively. The highest increase in profitability indicators was recorded in 2016. The following years witnessed a decline

again. This was due to the high variation in market prices for pigs, the increase in production costs, and the incidence of African swine fever in the country. In 2018, the level of profitability was even lower than in 2015. However, the relationship between the ROS <ROA <ROE ratios was maintained throughout the analyzed period, confirming the correct asset management situation and the appropriate use of foreign capital.

In the analyzed period, the sales profitability indicator ranged from 0.94 in 2009 to 4.56 in 2016, which means that in 2009 the company earned PLN 1 from sales only PLN 0.94 profit. In 2016, the profit was almost five times higher. The return on assets ranged from 2.75 to 10.73. The return on equity was the highest. In 2009, PLN 1 was worth PLN 5.64, compared to PLN 24.55 in 2017. From 2016-2018, the value of all profitability indicators decreased.

The distribution of observation values for individual indicators is presented in Table 2. The high value of the standard deviation for the cash conversion cycle (CCC), return on asset (ROA) and return on equity (ROE) indicated high diversification of these variables. In the case of the liquidity ratios, the median value was close to the arithmetic mean. The biggest difference between the minimum and maximum values was related to the indicator – return on asset (ROA).

To determine the relationship between the variables, Pearson's linear correlation coefficients were calculated for each pair of indicators (Table 3). The calculated factors confirmed an almost complete linear correlation between the profitability ratios of net sales, assets and equity. They also showed a very strong relationship between current and quick liquidity. The moderate correlation r = 0.645 occurred between the current liquidity ratios and the cash conversion cycle.

Table 2

Descriptive statistics of the research sample

Variable	Mean	Median	Standard deviation	Minimum	Maximum
Current Liquidity Ratio (CR)	1.25	1.24	0.13	1.05	1.49
Qiuck Ratio (QR)	0.95	0.94	0.11	0.77	1.19
Cash Conversion Cycle (CCC)	21.58	19.90	4.57	15.51	30.14
Return on Sales (ROS)	2.31	2.12	0.93	0.94	4.56
Return on Asset (ROA)	12.64	12.90	4.81	5.64	24.55
Return on Equity (ROE)	5.63	5.47	2.14	2.75	10.73

Source: authors' own study.

The relationship between return on assets and equity and quick liquidity (r = 0.632) was also moderate. In both cases, these correlations are positive, which means that, as liquidity has increased, corporate profitability has also increased. There was a lower correlation between these profitability ratios and quick liquidity (r = 0.604). Furthermore, the return on sales correlated only with quick liquidity of r = 0.584. There was

no statistically significant relationship between the cash conversion cycle and profitability indicators. This may be due to the fact that profitability indicators are static, while the money conversion cycle provides some prediction of future liquidity.

Table 3

Pearson's linear correlation factor for business liquidity and profitability indicators

Variables	CR	QR	CCC	ROS	ROE	ROA
CR	1.000	0.989	0.642	0.561	0.604	0.604
QR	0.989	1.000	0.645	0.584	0.621	0.632
CCC	0.642	0.645	1.000	0.359	0.280	0.301
ROS	0.561	0.584	0.359	1.000	0.960	0.981
ROE	0.604	0.631	0.280	0.960	1.000	0.988
ROA	0.604	0.632	0.301	0.981	0.988	1.000

Source: authors' own study.

The presented correlation coefficients showed the greatest correlation between the quick liquidity ratio and the asset profitability ratio (r = 0.632). In this situation, a linear regression model was developed for these variables. The quick liquidity ratio (y) was adopted as the dependent variable, and the asset profitability ratio (ROA) was adopted as the independent variable (x).

$$y = 0.0328 \times x + 0.7619$$

The constructed model allows for explaining about 43% of the variability of the modeled dependent variable. The value of the F statistics (8.5973) and the corresponding level of test probability p (0.0166) confirm a statistically significant linear relationship between the quick liquidity ratio and the asset profitability ratio.

Table 4

Estimation results of the regression model

Statistics	Value
Multiple R	0.698969
Multiple R2	0.48855
Adjusted R2	0.431731
F	8.59730
p	0.0166994
Estimation standard error	0.0861726

Source: authors' own study.

Moreover, the values of the t-statistic for the intercept (t = 10.406) used to evaluate the significance of the intercept, and the corresponding probability levels p (0.000) confirm that these parameters are significantly different from zero. Interpreting the estimated value of the individual model parameters, it can be concluded

that the average increase in the value of the return on assets by 1% between 2007 and 2018 resulted in an increase in the quick liquidity ratio by 0.03%. The presented data confirm the statistically significant relationship between profitability and liquidity of analyzed enterprises.

Conclusions

The number of businesses processing and preserving meat is declining, with the exception of poultry meat in Poland. Between 2007 and 2008, 1/3 of the enterprises that employed more than 9 people closed down. The reduction in the number of meat processing enterprises was due to the difficult financial situation caused by increasing production costs, repayment of investment obligations, strong competition in the market, and pressure from retail chains to lower prices and reduce pork exports due to the development of African swine fever in Poland.

The main objective of each economic unit, regardless of the size of the enterprise, size or level of development, is to maintain financial liquidity. The average current liquidity ratio of the analyzed enterprises from 2007-2018 was at a satisfactory level, from 1.05 in 2008 to 1.49 in 2017 and showed an upward trend. By contrast, the quick liquidity was lower, indicating a significant share of inventories in the value of current assets. In addition, the quick liquidity ratio of less than 1 from 2007-2013 indicates the difficulties of meat businesses in meeting their current commitments during this period.

Poland's meat industry is characterized by low profitability and therefore the companies are trying to increase the production scale. This also applies to meat companies in other EU countries (Pawlonka, 2017). From 2007-2018, the rate of return of sales ranged from 0.94 to 4.56. The rate of return on assets ranged from 2.75 to 10.73, the ratio of return on equity was even higher, reaching 24.55 in 2017. Throughout the analyzed period, the relationship between the ROS <ROA <ROE indicators were maintained, confirming the correct situation in asset management and the appropriate use of foreign capital.

The calculated Pearson correlation coefficients confirmed an almost complete linear correlation between the profitability ratios of return on sales, assets and equity in meat processing enterprises. They also showed a very strong relationship between current and quick liquidity. The relationship between return on assets and equity and quick liquidity was also high. There was a lower correlation between return on assets and equity and current liquidity. In both cases, these correlations are positive, which means that corporate profitability has increased as liquidity increases. The statistically significant relationship between the quick liquidity ratio and the asset profitability ratio was also confirmed by the linear regression analysis. On this basis, it can be concluded that the research hypothesis formulated in the paper has been confirmed.

The presented results confirm the relationship between liquidity and profitability of economic entities, but unlike most of the studies mentioned in the article (Smith, 1980; Shin and Soenen, 2000; Eljelly, 2004; Lazaridis et al., 2006;

Saleem and Rehman, 2011; Marques and Braga, 1995) suggest its positive character. An important reason for the differences in this respect may be the choice of various indicators of measuring the liquidity and profitability of economic agents. Similar results concerning the agricultural sector in Poland were presented by Zawadzka et al. On this basis, it can be assumed that the differences in dependence between liquidity and profitability of enterprises may also result from the specific nature of different sectors and their changes over time. The research shows that the profitability of meat enterprises in the long term is associated with maintaining financial liquidity. In turn, maintaining the ability to meet current obligations requires rational management of profit and working capital.

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PŁYNNOŚĆ FINANSOWA I RENTOWNOŚĆ PRZEDSIĘBIORSTW PRZETWÓRSTWA MIĘSNEGO W POLSCE

Abstrakt

Badania miały na celu identyfikację zmian w poziomie płynności finansowej i rentowności przedsiębiorstw przemysłu mięsnego oraz określenie zależności pomiędzy płynnością finansową a rentownością w tym przemyśle. Autorzy postawili hipotezę, że istnieje dodatni związek pomiędzy płynnością finansową a rentownością przedsiębiorstw mięsnych, co oznacza, że wraz ze wzrostem płynności finansowej rośnie rentowność przedsiębiorstw. W badaniach wykorzystano informacje z zakładów przetwórstwa i konserwowania mięsa, z wyjątkiem drobiu, zatrudniających powyżej dziewięciu osób. Analizą objęto spółki, które zostały zobowiązane do składania sprawozdań finansowych do KRS. W 2007 roku w Polsce było 467 takich przedsiębiorstw, a w 2018 roku 316. Do analizy danych wykorzystano statystkę opisową, współczynnik korelacji Pearsona oraz analizę regresji liniowej. Z przeprowadzonych analiz wynika, że liczba przedsiębiorstw mięsnych w Polsce zmniejsza się w wyniku ich konsolidacji i likwidacji w związku z trudną sytuacją finansową. Średni wskaźnik płynności finansowej bieżącej analizowanych przedsiębiorstw w latach 2007-2018 utrzymywał się na zadowalającym poziomie od 1,054 do 1,49. Badanie wskazuje na istotną korelację pomiędzy wskaźnikami płynności finansowej bieżącej i szybkiej oraz rentownością aktywów i kapitału własnego. Najwyższy poziom korelacji wystąpił pomiędzy wskaźnikiem płynności szybkiej a wskaźnikiem rentowności aktywów. Długoterminowa rentowność przedsiębiorstw mięsnych wiąże się z utrzymaniem płynności finansowej. Z kolei utrzymanie zdolności do wywiązywania się z bieżących zobowiązań wymaga racjonalnego gospodarowania zyskiem i kapitałem obrotowym.

Słowa kluczowe: przedsiębiorstwa, płynność finansowa szybka i bieżąca, rentowność, korelacja, przemysł mięsny.

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