

## The Relationship between Working Capital and Profitability of Companies Operating in the Food Industry in the Czech Republic

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### Abstract

The aim of this article is to determine the relationship between working capital and profitability of companies operating in the food industry in the Czech Republic and then find out how working capital affects the profitability of these companies from 2009 to 2019. In the first part of the research we estimate the links between working capital measured by variables such as cash conversion cycle, current assets ratio, current liabilities ratio, working capital ratio and corporate profitability measured by return on sales. In the next part of the research, we estimate the effect of working capital measured by variables such as cash conversion cycle, current assets ratio, current liabilities ratio, working capital ratio on corporate profitability measured by return on sales. Correlation analysis and the GMM method will be used to determine the relationship between working capital and the profitability of companies and how working capital affects the profitability of these companies. The results of the correlation analysis showed statistically significant links between return on sales and variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio. The results of the GMM method showed a statistically significant effect of variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio on the profitability of companies measured by the return on sales indicator. All mitigated effects have been demonstrated for companies operating in the food industry as a whole, as well as in the production of food products and beverages.

### Keywords

Cash conversion cycle, current assets ratio, current liabilities ratio, profitability, working capital.

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### Introduction

The manufacturing industry can include metallurgy, engineering, but also the chemical, wood, textile and many others. The manufacturing industry makes a significant contribution to the creation of the Czech Republic's gross domestic product and its production is also a significant component of Czech exports (Ministry of Industry and Trade, 2019). The main branches of the Czech manufacturing industry include the production of food products, including the production of beverages. The sector is strategic in order to feed the population.

The Czech Republic is characterized by high quality food production, with emphasis on health and food safety in the first place. The production of food products is linked to agriculture, but also cooperates with other branches of the processing industry. The majority of production is realized

mainly through retail chains. Wide demand and strong competition in the food market puts strong pressure on innovation, resulting in a diverse range of fresh and durable foods for different categories of consumers.

As far as the production of beverages is concerned, it is not a food supplement, but a separate production, sales and consumption segment, which represents an economically smaller dimension within the processing industry. Drinks, like food, must meet strict health criteria, and some drinks, such as mineral waters from spas, provide certain health benefits. However, beverages also to some extent complete the lifestyle of most consumers, with beer dominating in this respect. It is known that the Czech Republic is characterized by high consumption of this beverage, not only produced by large breweries, but also mini-breweries, which before 2020, together with wineries, expanded the business sector in the field of beverage

production. Unlike beer, however, the decisive volume of wine is imported mainly from wine-growing countries such as France and Italy. However, government measures related to the covid-19 pandemic in 2020, especially in the gastronomy and tourism sector, significantly slowed down the production and sale of the main commodity, ie beer on the domestic and foreign markets. As for the consumption and production of soft drinks and mineral waters, it is significantly dependent on the weather, but also on other factors such as marketing, etc. If dry and warm periods prevail during the year, consumption increases and thus production, which then reflected in higher capacity utilization. Despite certain fluctuations, beverages generally maintain efficiency and competitiveness even in the differentiation between productions and companies (Institute of Agricultural Economics and Information, 2020). Companies in the food sector belong to the processing industry, where inventory and working capital management is very important. Companies thus have a significant part of the funds stored in inventories, receivables, which can affect their performance or profitability. It is therefore very interesting to find out the links between working capital and the profitability of companies operating in the food industry in the Czech Republic.

Many authors have concluded in their studies that the elements of managerial decision making and capital structuring are two areas that have an impact on business performance. Some authors have examined the relationship between business profitability and working capital management (inventories, receivables, payables). According to Deloof (2003), working capital management has a significant impact on business performance.

According to Howorth and Westhead (2003), some research has shown that cash management firms are larger firms dealing with lower cash sales and cash problems. While smaller businesses focused more on inventory management, less profitable businesses focused on managing their loans. It can be seen from the above that there is a strong relationship between the money transfer cycle in the company and its profitability. The three different components of the cash conversion cycle (liabilities, receivables and inventories) can be managed in a variety of ways to maximize business profitability or to increase company growth.

Lazaridis and Tryfonidis (2006) investigate the relationship of corporate profitability and working capital management from 2001

to 2004. The authors tried to establish using correlation analysis and regression analysis a relationship that is significant between profitability, the cash conversion cycle and its components. The results of research showed that there is statistical significance between profitability, measured through gross operating profit, and the cash conversion cycle. Authors found a negative relationship between profitability (measured through gross operating profit) and the cash conversion cycle which was used as a measure of working capital management efficacy. Authors also found that lower gross operating profit is associated with an increase in the number days of accounts payables. The above could lead to the conclusion that less profitable firms wait longer to pay their bills taking advantage of credit period granted by their suppliers. The negative relationship between accounts receivables and firms' profitability suggests that less profitable firms will pursue a decrease of their accounts receivables in an attempt to reduce their cash gap in the cash conversion cycle. Likewise the negative relationship between number of days in inventory and corporate profitability suggests that in the case of a sudden drop in sales accompanied with a mismanagement of inventory will lead to tying up excess capital at the expense of profitable operations. The authors believe that for this reason managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each different component (accounts receivables, accounts payables, inventory) to an optimum level.

Padachi (2006) claims that working capital management will contribute positively to creating a company's value. In his study, he examined the impact of working capital management on corporate performance across industries over the period 1998 to 2003 using a panel regression analysis. Key variables used in the analysis were inventories days, accounts receivables days, accounts payable days and cash conversion cycle. The regression results show that high investment in inventories and receivables is associated with lower profitability.

Anojan et al., (2010) examined the effect of working capital management on the profitability of manufacturing companies over the period 2003-2007 using correlation analysis and regression analysis. He examined working capital management using the cash conversion cycle (CCC). It was found that cash conversion cycle (CCC) and

return on assets (ROA) are negatively correlated. It means that the growth of a cash conversion cycle reduces the profitability of companies measured by return on assets (ROA). Furthermore, the growth of inventory conversion period (ICP) was found to increase return on asset companies. The results suggest that managers can increase the profitability of companies by reducing the number of day inventories and number of day's accounts receivable. Working capital and its management plays a significant role in improved profitability of companies. Firms can achieve optimal management of working capital by making the trade-off between profitability and liquidity.

Chary et al., (2011), who believe that, working capital decision affects both liquidity and profitability, have also come up with this idea. Excess of investment in working capital may result in low profitability and lower investment may result in poor liquidity. Management need to trade-off between liquidity and profitability to maximize shareholders wealth. For this reason, in their study, they investigated the companies operating in the pharmaceutical industry for the period from 2003 to 2008 through correlation analysis, regression analysis, and Chi-square test. Furthermore, they also showed that the growth of inventories reduces the profitability of companies.

Baveld (2012) investigated how public listed firms in The Netherlands manage their working capital. A sample of 37 firms is used, which are among the fifty largest companies in The Netherlands. The working capital policies during the non-crisis period of 2004-2006 and during the Financial Crisis of 2008 and 2009 are compared. This comparison investigates whether companies have to change their non-crisis working capital policies when the economy is into a recession. The results of this study indicate that, in crisis periods, firms don't need to change their working capital policy concerning accounts payables and inventory, if their goal is to enhance profit. For the working capital policy managing accounts receivables this is not the case. This is because during a crisis accounts receivables have a positive effect on a firm's profitability of the next year. These results are on short-term basis. On the long-term, benefits of aiding customers during crisis periods are likely to grow, because future sales will still be there. Also the risks taken by these aiding firms are relatively low and for large reputable firms it is also relatively cheap.

Huynh (2012) examined the impact of working

capital management on the liquidity and profitability of non-financial corporations in the Netherlands. The research was conducted on 62 companies operating in the manufacturing and services sectors for the period 2006 to 2010. Pearson's correlation analysis and regression method (OLS method) were used to determine the relationship between working capital management and company profitability. Fixed Effect regressions indicate that company profitability in both sectors is all negatively influenced by number of day accounts receivable. In the meantime, regression analysis result in positive impacts of firm size and sales growth on company profitability. In addition, some other results are found specifically to each sector. Number of day inventory and cash conversion cycle are shown to negatively affect the profitability of companies operating in the manufacturing area that they have positive influences on profitability of service companies. In addition, manufacturing and service sectors respectively witness negative influences of number of day accounts payable and aggressive financing policy on their company profitability.

Rehn (2012) concluded that the efficiency of working capital management can be determined by the cash conversion cycle and the net trade cycle. It was found that Finnish and Swedish corporations can increase their gross operating profit by reducing the cash conversion cycle and net trade cycle. There is significant evidence that by effectively managing each portion of working capital, a company can increase its net present value (cash flows, thereby increasing shareholder value).

Golaś et al., (2013) examined the relationship between working capital and profitability of companies in Poland for the years 2005 to 2009. The effectiveness of working capital management were evaluated using a cycles of inventories, receivables, liabilities and cash conversion cycle. Profitability was further measured by the return on assets. Study have shown that in industries where these cycles are the shortest companies achieved the highest rate of return. The beneficial effect of shortening the cycle of working capital on profitability was verified by using regression analysis.

Motlíček et al. (2014) believed that working capital management significantly affects the performance of companies. In their view, this idea varies depending on the sector being monitored and the size of the companies. The authors tried to identify the links between net labor and company costs within medium-sized companies producing

machinery and equipment in the Czech Republic. The authors demonstrated the low impact of net working capital components on financial costs. They believe that receivables can affect the financial costs of their financing and the transaction costs associated with their collection. According to the authors, the influence of stocks is a very important and important factor. Inventories correlate strongly with the growth of short-term debts, especially trade payables.

The above studies are published mainly abroad. There are very few studies in the Czech Republic that deal with the issue of working capital. It is therefore very difficult to find such studies. On the other hand, a proctor opens here to expand publications on this topic.

The above literature review shows that there is a relationship between working capital and corporate profitability across different sectors. However, it is not clear what is the relationship between working capital and profitability in the food industry in the Czech Republic. For this reason, the aim of this article is to determine the relationship between working capital and profitability of companies operating in the food industry in the Czech Republic and then to find out how working capital affects the profitability of these companies from 2009 to 2019. In order to meet the goal.

- What is the relationship between working capital and profitability of companies operating in the food industry in the Czech Republic from 2009 to 2019?
- How does working capital affect the profitability of companies operating in the food industry in the Czech Republic from 2009 to 2019?

This article is divided into 4 parts. The first part is devoted to the introduction, where the aim of the article, the overview of relevant literature, including research questions based on the aforementioned literature review. The next part will focus on materials and methods, which will describe selected methods needed to meet the goal of the article, including the characteristics of the data used. The third part of the article will be devoted to the results and discussion, where the results of the research will be presented, including a discussion of the results. The last part will concern the conclusion, which will summarize the most important results or conclusions of the research, including the determination

of further steps for future research in this area.

## **Materials and methods**

Financial data from the Orbis database were used to fulfill the aim of the article. This database includes data from the annual reports of individual companies operating worldwide. The Orbis database is thus a source of company data and allows companies to be compared internationally. The annual financial data for the period 2009 to 2019 are used in this research. The data sample includes 3,000 companies operating according to the CZ-NACE classification in the manufacturing industry, specifically in the food industry, of which 2,000 companies operate in the food production industry and 1,000 companies operates in the beverage industry. These data are the basis for the use of correlation analysis and GMM method, which can be used to determine the relationship between working capital and profitability of companies operating in the food industry in the Czech Republic and then find out how working capital affects the profitability of these companies. All links and relationships are determined using the econometric software EViews. Other data, which are drawn from the Ministry of Industry and Trade of the Czech Republic from 2009 to 2019, are also used in the description of the development of selected variables.

Table 1 presents the characteristics and description of the variables used, based primarily on the above literature review and studies.

Making a profit is one of the main goals of running a business. Profit can be measured in absolute terms or in relative terms using ratios. Company managers monitor various profitability indicators. A very important indicator in manufacturing companies and trading companies is especially the indicator of profitability of sales. Profitability of sales represents the ability to achieve income or profit on the basis of invested funds. This indicator can be used to determine the efficiency of the company. This indicator is often referred to as profit margin. The profitability of sales must be properly assessed in the context of the company's turnover and varies greatly between companies in different industries. A low or high value of the indicator does not necessarily mean that the company is successful or not. The low value of this indicator can be caused by a rapid inventory turnover with a high volume of sales. This is typical, for example, of shops and trading companies.

Abbreviation	Variables	Calculation	Expected relationship
ROS	Return on Sales	Operating Profit divided by Total Sales	
CCC	Cash Conversion Cycle	(Number of Days Inventory + Number of Days Accounts Receivables – Number of Days Account Payables)	+/-
CAR	Current Assets Ratio	Current Assets divided by Total Assets	+/-
CLR	Current Liabilities Ratio	Current Liabilities divided by Total Assets	+/-
WCR	Working Capital Ratio	Current Assets divided by Current Liabilities	+/-

Source: own proceeding

Table 1: Description and calculation of used variables.

On the other hand, a high value of sales profitability can be caused by slow inventory turnover and at the same time low sales volume. This can happen, for example, in manufacturing companies.

Cash conversion cycle show how many days you need to sell inventory and then how many days you need to collect debts and how many days the company needs to pay on average payables. To put it simply, cash conversion cycle means the time needed to convert short-term assets into cash and pay short-term liabilities. In a cash flow management context, the more the longer the cash conversion cycle is, the more resources are needed to finance short-term assets, and as a rule, funding is more expensive and vice versa. If the cash conversion cycle is positive, it means that the conversion cycle is greater than the maturity of payables. A positive cash conversion cycle expresses the time period in which the firm has to finance operating activities from sources other than personal liabilities (working capital, other short-term liabilities). If the cash conversion cycle is balanced, it means that the conversion cycle equals the maturity of payables. A balanced cash conversion cycle occurs when the maturity of liabilities is equal to the conversion cycle. If the cash conversion cycle is negative, it means that the conversion cycle is less than the maturity of payables. A negative cash conversion cycle expresses the condition when the maturity of liabilities is shorter than the conversion cycle. A negative cash conversion cycle often arises when a company finances negative working capital, or problematic short-term assets, etc. trade payables.

Current assets are mainly used to settle liabilities. They are constantly in motion, one form passes into another. The money is used to buy material, which is in the process of production from it to create finished products after delivery to customers, receivables arise and after their payment we have money again). Current assets

turnover is in the order of days (in the store) to weeks (in production). The faster current assets turn under the same conditions, the greater the profit. Therefore, the speed of its turnover is an important indicator of the use of current assets. Current assets represent the working capital of the company. Working capital consists of inventories, receivables and financial assets. If we deduct short-term liabilities from current assets, we get net working capital.

Current liabilities represent short-term capital due within one year. No organization can do without short-term commitments. They naturally result from the normal operation of the organization and repeated business dealings. Typically, they finance current assets or other operating needs. Short-term debt means all liabilities (debts) that the organization has to repay to third parties, but for some reason has not yet done so. This is not a bad thing, short-term liabilities are a natural phenomenon. These are, for example, unpaid invoices, short-term bank loans, unpaid wages or unpaid taxes. Current assets are used to settle liabilities, primarily money. If the company does not have money, it must also use other current assets. The volume of short-term capital affects the volume of working capital (current assets minus current liabilities) and current liquidity.

The working capital ratio determines whether the company has enough short-term external resources to cover short-term assets. The working capital ratio is used by the company's management, eg in working capital management. The financial manager manages the individual working capital maids, defines its optimal amount with regard to the volume and nature of sales, monitors the recoverability of receivables, and evaluates its individual components. From his position, the financial manager cannot influence individual items of working capital, his role is to encourage others to look for better solutions. If we subtract

current liabilities from current assets, we get the value of net working capital. This signals how much operating funds will remain available to us when we pay all our short-term liabilities. Net working capital should ideally be a low positive number. Zero or very low working capital means that the company has nothing to pay for the goods or services taken and, on the other hand, it does not receive any money on account from its customers, because the money received will result in an increase in the indicator to positive values. In this case, the company does not have sufficient capital for its operation. On the other hand, the higher the positive number, the more the company's operations are financed from long-term external sources or from own resources. It is therefore necessary to keep the level of net working capital at a level that ensures the smooth running of the company and at the same time does not mean unnecessarily high costs of financing from long-term or own resources. Optimal value of net working capital.

The above variables and their time series were the basis for the creation of panel data, which are further used in the correlation analysis and GMM method. According to Cohen (2014), the correlation analysis is a suitable method for the initial identification (estimation) of the functional relationship between a particular explanatory and explanatory variable. The correlation relationship can be expressed using the Pearson correlation coefficient, which may take the following form:

$$p = \frac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{(n-1)s_x s_y} = \frac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma(x_i - \bar{x})^2 \Sigma(y_i - \bar{y})^2}} \quad (1)$$

Where  $X$  represents the mean value of the enterprise solvency matrix represented by the selected enterprise liquidity indicator,  $Y$  is the mean of the matrix of the values of the individual financial indicators related to the structure of the sources of financing (explanatory variables) and  $n$  the number of observations. Pearson's correlation coefficient is based on the calculation by entering the covariance of the variables  $X$  and  $Y$  into the numerator, and then into the denominator the product of the standard deviations of the variables  $X$  and  $Y$ , which is defined as the root of the variance of the random variables  $X$  and  $Y$ . According to Evans (1996), the values of the correlation coefficient in different ranges signal different strengths of correlation (degree, level) or correlation relationship. Table 2 presents the range of values of the correlation coefficient and the strength of the correlation (degree, level)

or correlation relationship.

Range of values of the correlation coefficient	Correlation strength within a correlation relationship
0 to 0.19	very weak correlation
0.2 to 0.39	weak correlation
0.4 to 0.59	middle correlation
0.6 to 0.79	strong correlation
0.8 to 1	very strong correlation

Source: own proceeding

Table 2: Correlation strength within a correlation relationship.

The statistical significance of the correlation coefficient, which can be tested at 1%, 5% and 10% significance, plays an important role in determining the relationship between variables. Using correlation analysis and the correlation coefficient, the relationship between the variables, including their resulting direction, ie whether they are positive, negative or zero correlations, can be determined. However, it is not possible to determine which variable affects another variable.

For this reason, a generalized method of moments (GMM method) will be used to determine the causal relationship between the variables and to determine the dependence of the endogenous variable on the exogenous variables. According to Prucha (2014), the problem of panel data is mainly when individual panel data are part of a shorter time series and are unsuitable for the use of least squares in terms of panel regression. According to him, the Generalized Method of Moments (GMM method) is a suitable method for examining the functional relationships between variables that are organized into such panel data. On the other hand, the disadvantage is the fact that it is not possible to test the given data within the basic assumptions of the smallest square method, ie heteroskedasticity, autocorrelation, normality and multi-collinearity and stationarity.

In order to ensure sufficient reporting ability, all variables will be tested for their statistical significance (for significance levels of 1%, 5% and 10%). In addition, the robustness of the model will be verified using Sargan / Hansen J-test, which determines to what extent the method is capable of delivering the same results even under load by slight parameter changes. The model is robust in this regard if the results of the Sargan / Hansen test are greater than 0.05. How working capital affects the profitability of companies operating in the food industry can be expressed using the equation below.

$$P_{it} = \alpha_1 + \beta_1 * \Delta P_{it-1} + \beta_2 * X_{1it} + \beta_3 * X_{2it} + \dots + \beta_n * X_{nit} + \varepsilon_{it}, \quad (2)$$

Where  $P_{it}$  shows the dependent variable (profitability of the company), which is represented by the indicator of gross operating profit (or other indicators capturing the profitability of companies), which captures the profitability of individual business performance of the  $i$ -th company in the Czech Republic over time  $t$ ,  $\Delta P_{it-1}$  is an explanatory variable that represents the delayed value of  $P$  from the previous year,  $X_{nit}$  includes explanatory variables that are considered to be elements of working capital that may have an impact on corporate profitability. These are mainly inventories, receivables, payables, inventory turnover time, receivables turnover time, liability turnover time and the cash cycle. The characters  $\alpha_1$  and  $\varepsilon_{it}$  represent the model constant and the residual component of the model within the generalized moment method (GMM method).

## Results and discussion

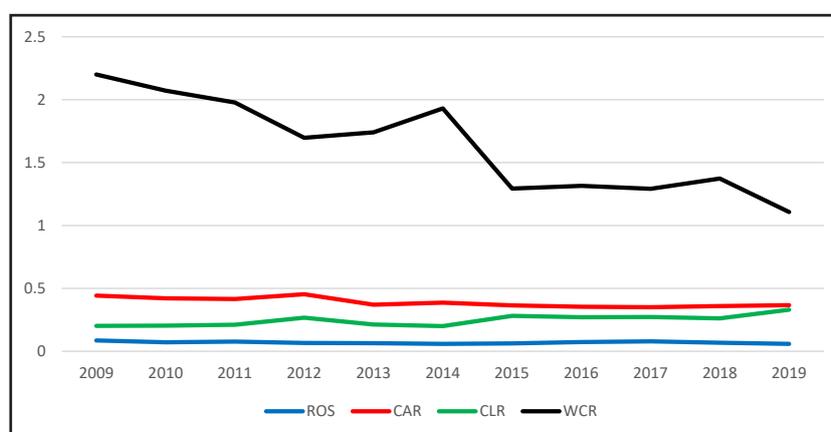
This part of the article will first show the development of the analyzed variables over time for the period 2009 to 2019. Subsequently, the relationship between working capital and profitability of companies operating in the food industry will be determined using correlation analysis. The GMM method will be used to determine how working capital affects the profitability of the above companies.

Figure 1 shows the development of variables such as return on sales, current assets ratio, current liabilities ratio and working capital ratio

for the period 2009 to 2019 within the food industry.

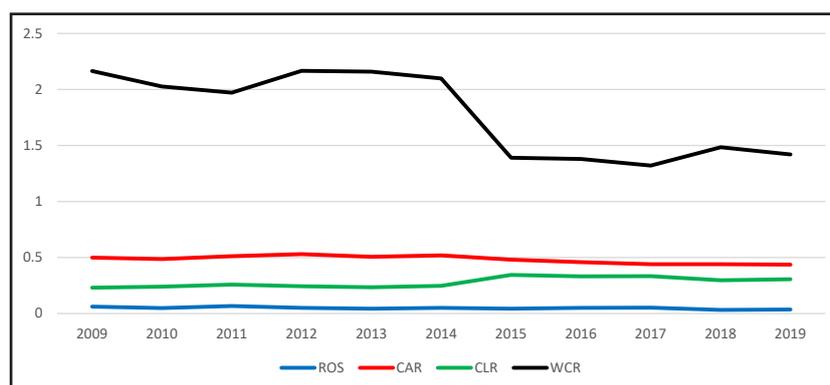
Figure 1 shows that variables such as return on sales, current assets ratio and current liabilities ratio showed a similar development trend throughout the analyzed period. There were no significant fluctuations in these variables throughout the period analyzed. However, a completely opposite development trend was found for variables such as working capital ratio. We see that this indicator showed an alternating development trend. In 2012, the value of the working capital ratio decreased due to the growth of current assets and current liabilities. On the contrary, in 2014 this indicator increased due to an increase in current assets and a decrease in current liabilities. After this year, however, the value of this indicator decreased due to a decrease in current assets and an increase in current liabilities. It can be stated that the development of the return on sales indicator corresponds to the development of indicators such as the current assets ratio and the current liabilities ratio. On the contrary, a completely inconsistent development was recorded for the return on sales indicator and the working capital ratio indicator. It is clear that companies operating in the food sector have a higher volume of current assets than current liabilities. In other words, current assets are higher than current liabilities of these companies. The development of these indicators of companies operating in the whole food sector was outlined within the method of comparison. However, for more detailed analyzes and conclusions, it is necessary to find out the development of these indicators also within individual food sub-sectors.

For this reason, Figure 2 represents the development



Sources: own processing from Orbis database and Ministry of Industry and Trade of the Czech Republic

Figure 1: Development of working capital indicators and profitability of companies in the food industry in the Czech Republic from 2009 to 2019.



Sources: own processing from Orbis database and Ministry of Industry and Trade of the Czech Republic

Figure 2: Development of working capital indicators and profitability of companies in the production of food products in the Czech Republic from 2009 to 2019.

of variables such as return on sales, current assets ratio, current liabilities ratio and working capital ratio for the period 2009 to 2019 only in the production of food products.

It can be stated that variables such as return on sales, current assets ratio and current liabilities ratio show a similar development trend, when the values of the return on sales indicator and the current assets ratio indicator develop almost evenly. A slight fluctuation was recorded in the current liabilities ratio, when the value of this indicator has increased since 2015. This was due to a decrease in current liabilities and an increase in total assets. As in the whole food sector, there was a non-corresponding development between the return on sales indicator and the working capital ratio in the production of food products. The values of the working capital ratio show an alternating uneven trend. A significant fluctuation in this indicator was recorded after 2014, when the assessment of this indicator decreased due to a decrease in current assets and an increase in current liabilities. Based on the comparison of Figure 1 and Figure 2, it can be stated that the above-analyzed variables develop in a completely similar way both within the whole food industry and within the production of food products. In Figure 3, it is possible to decipher the development of the analyzed variables in the production of beverages, which is part of the food industry as a whole.

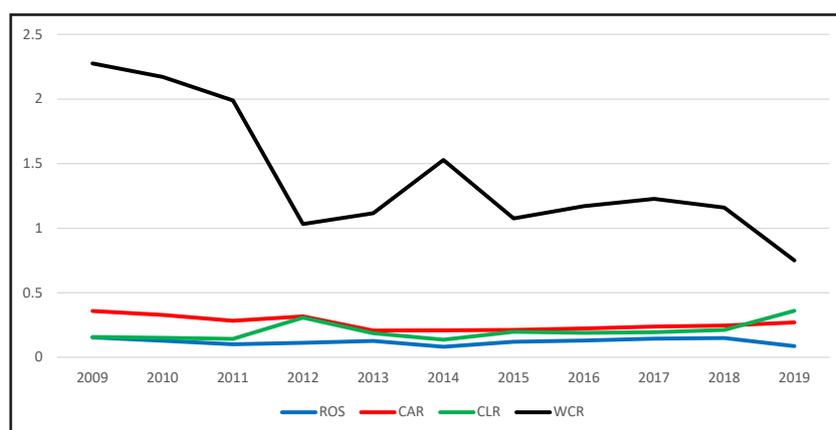
Figure 3 shows the development of variables such as return on sales, current assets ratio, current liabilities ratio and working capital ratio for the period 2009 to 2019 only in the production of beverages.

From figure number 3 it can be stated that within the production of beverages the values of the above variables differ slightly. Return on sales and current assets ratio show a steady trend, but current liabilities ratio fluctuated slightly around 2012 due to an increase in total assets. As for the working capital ratio, this indicator shows an alternating trend, as in the whole food sector and in the sector engaged only in the production of food products. In 2012, the value of this indicator decreased significantly due to the growth of current liabilities and the decrease in total assets. After this year, this indicator increased again due to an increase in total assets. After 2014, the value of the working capital ratio decreased again due to the growth of current liabilities.

In general, it can be stated that the only beverage industry shows a slightly different development trend than the food industry as a whole and the only food industry. It can be stated that the development of the current assets ratio and current liabilities ratio corresponds to the development of the return on sales indicator. On the contrary, the development of the working capital ratio does not correspond to the development of the return on sales indicator. These claims apply both to the food industry as a whole and to the food or beverage industry alone.

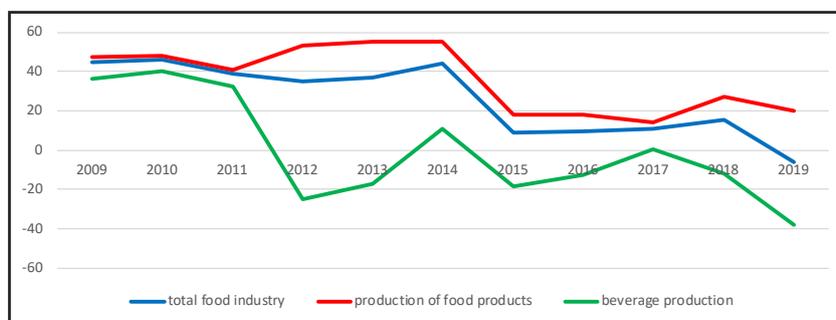
Figure 4 shows the development of the cash conversion cycle (CCC) in days for the whole food industry, for the production of food products and for the production of beverages for the period 2009 to 2019.

As far as the whole food sector is concerned, it can be stated that the value of the cash conversion cycle showed an alternating development trend.



Sources: own processing from Orbis database and Ministry of Industry and Trade of the Czech Republic

Figure 3: Development of working capital indicators and profitability of companies in the production of beverages in the Czech Republic from 2009 to 2019.



Sources: own processing from Orbis database and Ministry of Industry and Trade of the Czech Republic

Figure 4: Development of cash conversion cycle in the food industry in the Czech Republic from 2009 to 2019 (in days)

For almost the entire period analyzed, this indicator reached positive values, which means that the company must finance its operating activities from sources other than trade payables during this period. Only in 2019 did the value of the cash conversion cycle reach negative values. This means that after this year, companies operating in the food sector finance their negative working capital or problematic short-term assets from trade payables. This indicator reached its highest values in 2014 due to a decrease in the turnover time of liabilities and an increase in the turnover time of receivables. After this year, there was the most significant decrease due to a decrease in the turnover time of receivables and a significant increase in the turnover time of liabilities. If we look in more detail at the partial part of the whole food industry, specifically at the industry dealing only with the production of food products, we see that the value of the cash conversion cycle shows a fluctuating trend throughout the analyzed period.

Throughout the analyzed period, the value of this indicator reached positive values. The most significant fluctuation occurred in 2015, when the value of the cash conversion cycle decreased significantly due to a decrease in the turnover time of receivables and an increase in the turnover time of liabilities. Regarding the beverage industry, it can be stated that the development of this indicator shows the most significant alternating or fluctuating trend of all 3 analyzed industries. The value of this indicator reaches negative values for almost the entire analyzed period. In 2012 and 2015, this indicator decreased mainly due to an increase in the turnover time of liabilities. In 2014 and 2017, on the other hand, the cash conversion cycle indicator increased. After 2017, the value of the cash conversion cycle decreased due to a decrease in the turnover time of liabilities and an increase in the turnover time of receivables. Table 3 presents the results of the correlation analysis for the whole food industry.

	CCC	CAR	CLR	WCR
ROS	-0.335*	-0.1853*	-0.3616*	+0.4651*

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 3: The results of the correlation analysis for the whole food industry.

	CCC	CAR	CLR	WCR
ROS	-0.1695**	-0.2402*	-0.2185*	-0.0424***

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 4: The results of correlation analysis for the production of food products.

	CCC	CAR	CLR	WCR
ROS	-0.2764*	-0.0684***	-0.6822*	-0.0671**

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 5: The results of the correlation analysis for beverage production.

The results of the correlation analysis show that there is a relationship between the profitability of companies operating in the food industry measured by the return on sales indicator and the variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio. We see that for all analyzed variables, a statistically significant dependence was found at the significance level of 1%. The results of the correlation analysis showed a negative weak correlation between return on sales and variables such as cash conversion cycle and current liabilities ratio. Furthermore, a negative very weak correlation between return on sales and current assets ratio was demonstrated. This means that if the period for which the company has to finance operating activities from sources other than trade payables (CCCs) increases, the return on sales is likely to decline. Similar conclusions apply to the relationship between return on sales and current liabilities ratio. If current liabilities and current assets increase with constant assets, the company is likely to see a decline in return on sales. On the contrary, a positive middle correlation between working capital ratio and return on sales was demonstrated. If the company has a higher volume of working capital, it will increase the return on sales. Table 4 presents the results of correlation analysis for the production of food products.

Table 3 presents the results of correlation analysis for the entire food industry. It must be stated that

the food industry is divided into the production of food products and the production of beverages. For this reason, Table 4 presents the results of the correlation analysis only in the production of food products. The results of the correlation analysis showed a negative link for all analyzed variables. A negative very weak correlation at the level of statistical significance of 5% 10% was demonstrated between return on sales and variables such as cash conversion cycle (5% statistical significance) and working capital ratio (10% statistical significance). A 1% statistically significant negative weak correlation was demonstrated between return on sales and variables such as current assets ratio and current liabilities ratio. Table 5 presents the results of the correlation analysis for beverage production.

Table 5, on the other hand, presents the results of the correlation analysis only in the context of beverage production. We see that the resulting relationships in this field of business are developing similarly to the production of food products. The results of the correlation analysis showed negative binding at the level of 1%, 5% and 10% statistical significance for all analyzed variables. It can be stated that a negative very weak correlation between return on sales and variables such as current assets ratio and working capital ratio was demonstrated. Middle correlation was demonstrated between the return on sales and cash conversion cycles. On the contrary,

a strong correlation was demonstrated between the return on sales and current liabilities ratio. Table 6 presents the results of the GMM method for the whole food industry.

The results of the correlation analysis showed the dependence between return on sales and variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio. However, correlation analysis does not determine the effect of independent variables on the dependent variable. In other words, correlation analysis cannot determine how the cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio affect return on sales. For this reason, the GMM method was used to determine how working capital affects the profitability of companies in the food industry. The results of the GMM method (Table 6) showed a negative effect of variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio on return on sales. This means that if the values of these variables increase, there will be a decrease in profitability measured by return on sales. As all the resulting relationships have been shown to be statistically significant, company managers should focus on the above independent variables. Therefore, if managers want to achieve higher profitability, they should reduce the values of cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio over a longer period of time. The robustness of the model is also indicated by the resulting

J-statistic value, which is higher than 0.05. All resulting relationships were demonstrated at the 1% level of significance. Table 7 presents the results of the GMM method for the production of food products.

Table 6 presented the resulting relationships between return on sales and working capital in the food industry. The GMM method has now been used to find out how the analyzed variables will affect the profitability of companies only in the food-only sector. Using the GMM method, it has been shown that variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio have a negative effect on the profit of companies operating in the production of food beverages. If the variables in the company decrease, return on sales can be expected to increase. Again, the robustness of the model is also indicated by the resulting J-statistic value, which is higher than 0.05. All resulting relationships were demonstrated at the 1% level of significance. Table 8 presents the results of the GMM method for beverage production.

Based on Table 8, it can be stated that the effect of working capital on the profitability of companies engaged in the production of beverages was similar to the companies engaged in the production of food products throughout the analyzed period. It was found that if the company tries to reduce the value of variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio, there will be an increase in return

	CCC	CAR	CLR	WCR	J-statistic
ROS	-0.0192*	-0.0344*	-0.5224*	-0.0861*	34.7392

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 6: The results of the GMM method for the whole food industry.

	CCC	CAR	CLR	WCR	J-statistic
ROS	-0.2759*	-0.5707*	-0.1659*	-0.00941*	18.2428

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 7: The results of the GMM method for the production of food products.

	CCC	CAR	CLR	WCR	J-statistic
ROS	-0.0263*	-0.0193*	-0.0841*	-0.5385*	29.2083

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level, \*\*\* denotes significance at 10% level  
Source: authors' calculations

Table 8: The results of the GMM method for beverage production.

on sales. As in the production of food products, in the production of beverages, the robustness of the model is indicated by the resulting value of J-statistic, which is higher than 0.05. All resulting relationships were demonstrated at the 1% level of significance.

### **Discussion**

As mentioned above, the results of the GMM method have shown that variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio have a negative effect on the return on sales of food industry companies. The decline in these variables is likely to cause food business enterprises to see an increase in return on sales. Aggressive working capital policies for food businesses can increase business performance. However, this effect is reduced if the company manages to reduce the cash conversion cycle (CCC). Reducing the cash conversion cycle (CCC) increases the value for its shareholders as working capital requirements decrease. Thus, the need to finance operating activities from sources other than trade payables is reduced. These findings are consistent with studies such as Lazaridis and Tryfonidis (2006), Anojan et al. (2010), Huynh (2012), Rehn (2012) and Golaš et al. (2013).

The current assets ratio, which is important for the company in particular because current assets represent the company's working capital, can be viewed in a similar way. Working capital represents the active items of the cash cycle (these are mainly items such as inventories, receivables and financial assets). The main problem in managing working capital is to determine the optimal level of investment in current assets and to find ways to finance it properly. Working capital is a part of working capital that is constantly circulating in the company and therefore works. The results of the GMM method showed that if the share of current assets in the balance sheet total in the company decreases, companies in the food industry may experience an increase in return on sales. On the other hand, the constant growth of current assets and their surplus causes unnecessary costs for their financing, which has a negative impact on the economic result. Every company should strive for an optimal level of working capital. The resulting solution is always a compromise between profitability and risk. The optimal option for companies would be to achieve the highest profitability at the lowest possible risk. It is quite evident that there is a link between working capital and return on capital. The working

capital ratio, which is closely related to working capital, can be used to determine how many times a company can repay its current liabilities with its current assets. It has been shown that if companies want to increase return on sales, they should focus on reducing the values of this indicator. A company that generates a lower working capital ratio is likely to manage with lower cash, which the company may have tied up in stocks, which will increase sales and possibly also profit upon sale, which will be reflected in an increase in return on sales. This is in line with the Padachi study (2006).

On the contrary, if a company wants to support return on sales growth, it should focus on reducing the share of short-term liabilities in the balance sheet total. If an enterprise increases its current liabilities, for example from trading, it is likely that this will be reflected in the growth of inventories. If these stocks accumulate in stock and are not sold, this will have an impact on the decline in return on sales. This idea is consistent with the study by Lazaridis and Tryfonidis (2006) or Anojan et al. (2010).

As mentioned above, working capital management is a very key area for companies. In further research, it would be appropriate to examine the effects of individual components of working capital not only on the profitability of companies, but also on the economic added value of companies. It would be interesting to select companies according to the working capital management policy (aggressive working capital management policy, etc.). It is also necessary to eliminate significant difficulties, such as the fact that a company may have a significant share of receivables, but these receivables may be old. This may signal that customers are paying these corporate receivables more slowly, which may be hidden in the working capital. Some receivables may also be considered written off. There is also a need to focus on assets and liabilities. For example, if inventory cannot be sold and inventory accumulates, the results may be skewed and interpreted. The current working capital ratio may thus look favorable, but the company may be heading for failure.

### **Conclusion**

The main branches of the Czech manufacturing industry include the production of food products, including the production of beverages. The sector is strategic in order to feed the population. The Czech Republic is characterized by high quality food production, with emphasis on health and food safety

in the first place. The production of food products is linked to agriculture, but also cooperates with other branches of the processing industry. The majority of production is realized mainly through retail chains. Wide demand and strong competition in the food market puts strong pressure on innovation, resulting in a diverse range of fresh and durable foods for different categories of consumers.

The aim of the article was to find out the relationship between working capital and profitability of companies operating in the food industry in the Czech Republic and then to find out how working capital affects the profitability of these companies from 2009 to 2019. The first part of the research estimated the links between working capital measured cycle, current assets ratio, current liabilities ratio, working capital ratio and corporate profitability measured by return on sales. The next part of the research estimated the impact of working capital measured using variables such as cash conversion cycle, current assets ratio, current liabilities ratio, working capital ratio on corporate profitability measured by return on sales. Correlation analysis and the GMM method were used to determine the relationship between working capital and the profitability of companies and how working capital affects the profitability of these companies.

The results showed that return on sales and variables such as cash conversion cycle, current assets ratio, current liabilities ratio followed a similar trend across the food industry and within the production of food products and beverages. An alternating trend was recorded within the working capital ratio, when the values reached higher and alternating values. The results of the correlation analysis showed statistically significant links between return on sales and variables such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio both in the whole food sector and in the sector dealing only with food and beverage production. All links were estimated at 1%, 5% and 10% statistical significance. The results of the GMM method showed a statistically significant effect of variables

such as cash conversion cycle, current assets ratio, current liabilities ratio and working capital ratio on the profitability of companies measured by the return on sales indicator. All mitigated effects have been demonstrated for companies operating in the food industry as a whole, as well as in the production of food products and beverages.

In conclusion, it can be stated that the food and beverage industry is one of the most active industries in the Czech Republic. Warehouse technology requirements are particularly high in this industry. Food is very prone to spoilage unlike other products. Therefore, it is important to ensure safe storage to keep the food fresh. The requirements for freshness and hygiene, the possibility of cooling, the setting of different temperature zones, the observance of continuous cooling chains during transport and the observance of the date of minimum durability are special conditions for companies for storage, handling and picking equipment. Regardless of whether the goods are sold in the traditional way or through online sales channels, the goal of the food and beverage industry is to ensure an ideal flow of goods from storage, through picking, to transport to the customer. From the above, it is clear that these companies must have a certain amount of inventory and must constantly pay attention to the management of inventories, receivables, liabilities and working capital. All this must be monitored by companies with regard to their liquidity and profitability. Only fresh food and the highest quality brings long-term satisfied customers and helps companies create a sustainable competitive advantage.

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## References

- [1] Anojan, V., Arulalan, N. and Nimalathasan, B. (2010) „Working Capital Management and Its Impact on Profitability: A Study of Selected Listed Beverage, Food and Tobacco Companies in Colombo Stock Exchange“, *The International Journal Of Business & Management*, Vol. 1, No. 6, pp. 15-20. ISSN 2321-8916.
- [2] Baveld, M. B. (2012) „Impact of Working Capital Management on the Profitability of Public Listed Firms in the Netherlands during the Financial Crisis“. [Online]. Available: <https://essay.utwente.nl/61524/> [Accessed: June, 18, 2021].
- [3] Chary, S. T., Kastury, R. and Kumar, K. S. (2011) „Relationship between working capital and profitability - a statistical approach“, *International Journal of Research in Finance and Marketing*, Vol. 1, No. 7. ISSN 2231-5985.
- [4] Cohen, J. and Cohen, P. (2014) „*Applied Multiple Regression/Correlaion Analysis for the Behavioral Sciences*“, London, Psychology Press, 736 p.. ISBN 0-89859-268-2.
- [5] Deloof, M. (2003) „Does Working Capital Management Affect Profitability of Belgian Firms“?, *Journal of Business Finance & Accounting*, Vol. 30, No. 3-4, pp. 573-588. ISSN 1468-5957. DOI 10.1111/1468-5957.00008.
- [6] Gołaś, Z., Bieniasz, A. and Czerwińska-Kayzer, D. (2013) „The relationship between working capital and profitability in food industry firms in Poland“, *Journal of Central European Agriculture*, Vol. 14, No. 1, pp. 52-63. ISSN 1332-9049. DOI 10.5513/JCEA01/14.1.1155.
- [7] Howorth, C. and Westhead, P. (2003) „The focus of working capital management in UK small firms“, *Management Accounting Research*, Vol. 14, No. 2, pp. 97-111. ISSN 1044-5005. DOI 10.1016/S1044-5005(03)00022-2.
- [8] Huynh, N. T. (2012) „*The influence of working capital management on profitability of listed companies in the Netherlands*“. [Online]. Available: [https://essay.utwente.nl/62755/1/Master\\_thesis\\_-\\_Ngoc\\_Trinh\\_Huynh\\_-\\_final\\_version.pdf](https://essay.utwente.nl/62755/1/Master_thesis_-_Ngoc_Trinh_Huynh_-_final_version.pdf) [Accessed: June 18,2021].
- [9] Institute of Agricultural Economics and Information (2020) „*Panorama of the Food Industry 2019*“, Prague, Ministry of Agriculture. ISBN 978-80-7434-588-3.
- [10] Lazaridis, M. and Tryfonidis, D. (2006) „Relationship between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange“, *Journal of Financial Management and Analysis*, Vol. 19, No. 2, pp. 26-35. ISSN 0970-4205.
- [11] Ministry of Industry and Trade (2019) „*Panorama of the Czech Manufacturing Industry 2018*“, Prague, Ministry of Industry and Trade. ISBN 978-80-906942-6-2.
- [12] Motlíček, Z., Matějková P. and Martinovičová, D. (2014) „Influence of Components of Net Working Capital on Costs of Companies Manufacturing Machinery and Equipment in the Czech Republic“, *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, Vol. 63, No. 1, pp. 263-270. ISSN 2464-8310. DOI 10.11118/actaun201563010263.
- [13] Padachi, K. (2006) „Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms“, *International Review of Business Research Papers*, Vol. 2, No. 2, pp. 45-58. ISSN 1832-9543.
- [14] Prucha, I. R. (2014) „Instrumental Variables/Method of Moments Estimation“, In: Fisher, M. M. and Nijkamp, P, eds. „*Handbook of Regional Science*“, Heidelberg: Springer. ISBN 978-3-642-23430-9. DOI 10.1007/978-3-642-23430-9\_90.
- [15] Rehn, E. (2012) „*Effects of Working Capital Management on Company Profitability*“. [Online]. Available: <https://helda.helsinki.fi/bitstream/handle/10138/32507/rehn.pdf>. [Accessed: June 18, 2021].