

IMPACT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY OF MACEDONIAN INDUSTRIAL COMPANIES

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Abstract

Efficient and effective working capital management is crucial given its impact on the company's profitability. The focus of the research in this paper is the impact of individual components of working capital on the profitability of industrial companies. The research was conducted on a sample of industrial companies listed on the Macedonian Stock Exchange using their accounting data for a period covering ten years 2010 - 2019 by applying a panel regression analysis. We found that corporate profitability increases with increasing account receivable period, account payables payment period, company size, sales growth, and volatility in net operating profit. Additionally, profitability increases with decreasing in the cash conversion cycle and financial leverage. Inventories conversion period and fixed financial assets do not show a statistically significant relationship with the company profitability.

Keywords: corporate finance, operating cycle, cash cycle, panel data analysis, North Macedonia

JEL Classification: G31; G32; E32

1. Introduction

Working capital management (WCM), which covers the management of current assets and current liabilities, is a very important area in corporate finance because it has a direct impact on

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the liquidity and profitability of the company. The current assets of a typical manufacturing company or even a trading company make up more than half of the total assets of the company. In the case of our analyzed sample, the average is 43%, and in some companies, it reaches up to 89%. Excessive levels of current assets can easily result in low return on investment. Also, companies that have too few current assets can jeopardize normal operating operations.

Profitability affects the achieved rate of return on investment. Vishnani and Shah (2007) state that large investments in current assets reduce the rate of return. The purpose of working capital management is to manage the current assets of the company in a way that will allow achieving a balance between return and risk (Ricci and Vito, 2000). Shin and Soenen (1998) state that effective working capital management is an integral component of the overall corporate strategy aimed at creating additional value for shareholders.

The different components of working capital management are the following: 1) account receivables period, which we take as a representative of the debt collection policy; 2) inventories conversion period, which is the representative of the inventory management policy; 3) account payables payment period, which we take as a representative for the supplier management policy. The connection between the three components can be represented in Figure 1.

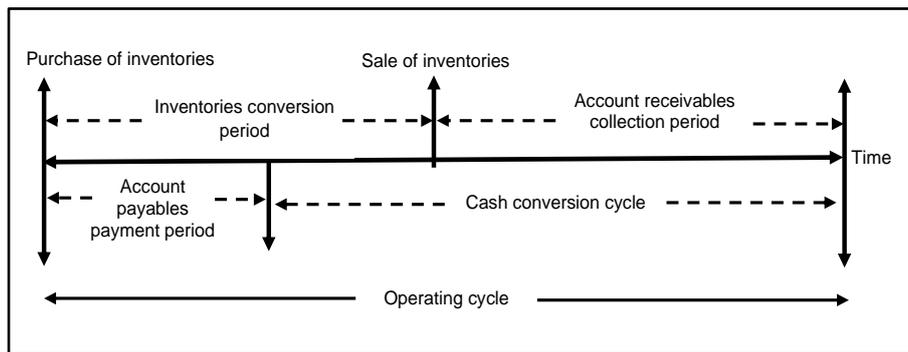
Effective working capital management means planning and controlling current assets and current liabilities in a way that will eliminate the risk of the inability of the company to meet due short-term liabilities, and on the other hand avoid investing in excess current level of current assets (Eljelly, 2004). Managers spend significant time on day-to-day problems involving working capital decisions (Raheman and Nasr, 2007). One reason for this is that current assets are short-lived investments that are continuously converted into other types of assets (Rao, 1989). The company is responsible for the timely settlement of current liabilities. Taken together, decisions about the level of the various components of working capital become frequent, repetitive, and time-consuming (Appuhami, 2008).

Working capital management is a very sensitive area in financial management. It includes decisions at the level and composition of current assets and how they are financed. Current assets include all those assets that in the normal course of business activities are converted into cash in a short period, usually up to one year, as well as those temporary investments that can be immediately

converted into cash if necessary. Among others, Smith (1980), Raheman and Nasr (2007) show that working capital management is important because of its effects on company profitability and risk, and consequently, on company value.

Figure 1

Operating cycle and cash conversion cycle



Source: Adapted from Ross, Westerfield, and Jordan (2022)

The way working capital is managed can have a significant impact on a company's liquidity and profitability (Deloof, 2003). For example, decisions that tend to maximize profitability tend to minimize the prospect of adequate liquidity. Conversely, a full focus on liquidity tends to reduce a firm's potential profitability. The traditional view of the relationship between a company's cash conversion cycle and profitability is that, while everything else is unchanged, a longer cash conversion cycle adversely affects profitability (Deloof, 2003; Smith, 1980). This paper aims to investigate the impact of the components of working capital management on the profitability of companies listed on the Macedonian Stock Exchange.

2. Literature review

There are many papers and studies on this topic, which have been made over the years. Most of them focus on the components of working capital, primarily in terms of their impact on the profitability of the surveyed company or companies in the sample. Given that this is a very broad and important topic in terms of corporate finances, up to the level of the national economy, the topic of working capital management will be addressed in the future by many other authors, and the results will contribute to maximizing the value of the company.

In his work, *The Wealth of Nations*, Adam Smith (1776) emphasized the importance of working capital, where he made a clear distinction between "circulating capital" and "fixed capital". His definition of "circulating capital" was like today's understanding of working capital.

Mills (1996) found a relevant relationship between the determinants of external factors and working capital. He studied the impact of inflation on the budgeting process. He found that the impact of inflation is greater if the amount of net working capital is higher. Inflation has an impact on the behavior of the company, with inflation forcing companies to try to reduce the level of net working capital, changing their debt/asset ratio using more short-term debt, and increasing short-term loans compared to long-term loans.

Research linking WCM to external factors is less dominant. Most of the research so far is more focused on the impact of internal determinants of net working capital on companies' performance (Kieschnick et al., 2006; Chiou et al., 2006).

Padachi (2006) found that high investment in inventories and receivables is associated with lower profitability. In his research, he used the return on total assets as a measure of profitability and the relation between working capital management and corporate profitability is investigated for a sample of 58 small manufacturing firms, using panel data analysis for the 1998-2003 period.

Vishnani and Shah (2007) investigated the impact of working capital management policies on the corporate performance of the Indian consumer electronics industry case from 1994–95 to 2004–05. They found that working capital components play a significant role in corporate profitability. To this end, the managers concerned should pay due attention to the formulation of the policy in this regard, as well as to the implementation of such working capital policies. The corporate value increases when the return on equity (ROE) exceeds the cost of capital. Working capital management is equally important for large and small companies, but is especially important for small company managers.

The research of Raheman and Nasr (2007) and Naser et al. (2013) emphasize the importance of efficient working capital management in creating value for shareholders. In developing countries, the call to start with optimal working capital management practices is becoming increasingly pronounced, so the study on the impact of working capital on profitability in companies in Ghana in the

2005-2009 period shows some of the practices for WCM. Namely, according to this research, there is a need to reduce the account receivables period from customers to about 30 days. This paper identifies a positive relationship between the cash conversion cycle and the profitability of the surveyed companies in Ghana. The short period of cash conversion cycle is ideal for increasing its profitability, but also for creating shareholders' value.

Gill et al. (2010) made an investigation on a sample of 88 American firms listed on the New York Stock Exchange for a period of 3 years from 2005 to 2007 and found a statistically significant relationship between the cash conversion cycle and profitability, measured through gross operating profit.

Afza and Nazir (2008) in the case of Pakistani firms found significant differences in their working capital investment and financing policies across different industries. The aggressive investment working capital policies are accompanied by aggressive working capital financing policies. Also, they found a negative relationship between the profitability measures of firms and the degree of aggressiveness of working capital investment and financing policies. Abbadi and Abbadi (2013) in the case of the Palestinian companies found that the cash conversion cycle, return on assets, and operating cash flow are a significant determinant and positively related to the working capital requirements, while leverage and firm size are significant but negatively related to the working capital requirements. On the other hand, economic variables such as the interest rate and real GDP growth rate have no significant impact on the working capital.

Almazari (2013) found that the Saudi cement industry's current ratio is the most important liquidity measure which effected profitability, therefore, the cement firms must set a trade-off between these two objectives so that, neither the liquidity nor profitability suffers. It was also found, that as the size of a firm increases, profitability increases. In addition, when debt financing increased, profitability declined.

Tauringana and Afrifa (2013) investigated the effect of working capital management on the performance of listed small and medium enterprises by applying a panel data regression analysis on a sample of 141 Alternative Investment Market listed SMEs for eight years (2007–2014). The results show that for all SMEs, WCM components (inventory holding period, accounts receivable period, and accounts payable period) have concave relationships with performance. However, when the SMEs are split into 'small' and 'medium' firms, the

results suggest that WCM is relatively more important to the performance of 'small' firms than 'medium' firms. Previously, Garcia-Teruel and Martinez-Solano (2007) made an investigation on SMEs, and conclude that managers can create value by reducing their inventories and the number of days for which their accounts are outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability

Preve and Sarria-Allende (2010) summarize two approaches that define working capital. The first approach they call the "traditional definition of working capital" is that "working capital shows how much money (or liquid assets) is available to meet the short-term cash needs imposed by current liabilities." The other approach does not include short-term components and is defined as "working capital is the amount of capital committed to financing a firm's current assets". In this approach, the definition of working capital has no short-term components, but by incorporating strategic elements such as capital and fixed assets, they were intended to be linked to other alternative meanings and applications for working capital management.

Zariyawati et al. (2010) explain that the determinants of working capital are divided into internal and external. The internal factor is focused on solid features and specific factors while the external factor consists of macroeconomic factors. Effective working capital management should pay attention to internal and external factors, or both.

Makori and Jagongo (2013) investigating the impact of the WCM on the profitability of manufacturing and construction companies in Kenya, concluded that most Kenyan manufacturing companies have large amounts of cash invested in working capital. It can therefore be expected that the way working capital is managed will have a significant impact on the profitability of those firms. The study found that there was a negative relationship between ROA and the average account receivables collection period and cash conversion cycle. There is a positive correlation between the inventories conversion period and the account payables payment period. These results suggest that managers can create value for their shareholders by reducing the account receivable collection period and increasing the account payables payment period, as well as an inventories conversion period to a reasonable time.

Using more recent studies on this issue, Syeda (2021) conducted a random analysis of a sample of 15 listed companies on

the New York Stock Exchange, for a period of five years from 2015 to 2019. He found that there is a strong link between working capital management and corporate profitability. This means that if financial managers pay attention to liquidity it will lead to profitability. It is recommended that companies always maintain a sound debt collection policy and it is further suggested that managers be able to create value for their shareholders by reducing the account receivables collection period, increasing the account payables payment period and inventory period to a reasonable minimum. Also, the results of the analysis showed that companies can further strengthen their results if they manage their working capital in more efficient ways. Working capital management means managing current assets and current liabilities. If these companies effectively manage the cash, receivables, liabilities, and inventories, this will ultimately increase the profitability of these companies.

Mache and Omodero (2021) conducted a study, on the case of selected companies that produce consumer goods in Nigeria. They found that working capital management strategies have a significant impact on the financial performance of retailers. Thus, it can be concluded that the financial performance of South African retailers is a result of their working capital management components. South African companies can improve their financial performance by optimizing their working capital components, such as account receivables period, inventories conversion period, and account payables payment period, as much as possible without risking losing customers or suppliers.

3. Data and measurement

3.1 Data

The data for this research refer to companies listed on the Macedonian Stock Exchange for the 2010-2019 period. Data are collected from publicly available audited financial statements. Relying exclusively on listed companies is due to the greater reliability and accuracy of the data given that these companies have special reporting obligations, by the rules and conditions of the stock exchange. The sample of companies is from the domain of industry. According to Deloof (2003), all financial institutions, such as banks and other financial institutions, insurance, but also some commercial and service companies, as well as some other non-manufacturing companies are excluded from the analysis. The reason for their exclusion from the

analysis is their definition of working capital (Lazaridis and Tryfonidis, 2006). According to the criteria, the sample consists of 63 companies. Several filters were applied to refine the data. First, all those companies that have operating anomalies over the years, such as companies that have negative total assets, negative capital, and negative operating cycle, were removed from the analysis.

3.2 Measuring profitability

Different researchers use different measures of profitability. In this research, profitability is defined following Deloof (2003) as Gross Operating Profit Ratio, which we calculated as:

$$\text{Gross Operating Profit Ratio} = \frac{\text{Sales Revenue} - \text{Cost of Goods Sold} + \text{Depreciation and Amortization}}{\text{Total Assets} - \text{Financial Assets}}$$

3.3 Exogenous variables

Table 1

Exogenous variables measurement

Measurement	
Independent variables	
Account receivables collection period	Account receivables net / Sales revenues x 365
Inventories conversion period	Inventories / Cost of goods sold x 365
Account payables payment period	Account payables / Purchases x 365
Cash conversion cycle	Account receivables collection period + Inventories conversion period – Account payables payment period
Control variables	
Company size	$\ln(\text{Sales})$
Sales revenue growth	$(\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$
Financial leverage	$(\text{Short term loans} + \text{Long term loans}) / \text{Total assets}$
Fix financial assets	Fix financial assets / Total assets
Volatility of net operating profit	Standard deviation of the net operating profit in the analyzed 2010–2019 period

Source: Authors' presentation

4. Results of the analysis

4.1 Summary statistics

The average Gross Operating Profit Ratio for the 10 years of the selected companies in the sample is 23% and a median of 22%. Most of the companies in the sample were continuously profitable. The average account receivable collection period was 101.1 days on average, and the maximum of 1,620.50 days was realized by only one company. If we ignore it in this case and observe the other companies, we can notice that there is a relatively high correlation between the account receivable collection period and the account payables payment period.

The average account payables payment period is 151.4 days. Again, the extreme of the maximum of 4,419.1 days applies to the same company, which is to be expected given the rather long account receivables collection period.

Table 2

Descriptive statistics

	Mean	Median	Maximum	Minimum	Standard deviation
Gross operating profit	0.23	0.22	1.04	-0.86	0.22
Account receivables period	101.1	76.8	1.620.5	2.8	162.0
Inventories period	225.1	101.8	4.264.6	5.7	432.0
Account payables payment period	151.4	98.2	4.419.1	5.4	422.3
Cash conversion cycle	174.8	131.3	3.875.0	-2.311.8	457.8
Company size	21.2	20.93	24.31	17.85	1.29
Sales growth	0.16	0.02	16.04	-0.96	1.56
Financial leverage	0.33	0.33	0.93	0.00	0.24
Fixed financial assets	0.02	0.01	0.32	-0.13	0.06
Volatility in net operating profit	0.10	0.04	0.64	0.01	0.15

Source: Authors' own calculations

The inventories conversion period covers the period from the purchase of the stock of raw materials to the moment of the sale of the stock of finished products and their exit from the company, and on average it is 225.13 days. The cash conversion cycle averages 174.85 days, resulting from the previous three variables. In the control variables, the size of companies presented as a natural logarithm of

sales revenue has an average value of 21.23, while the average growth of sales revenue is 16% per year. If we make a comparison with the average GDP growth which is 4.9%, then it indicates that the manufacturing companies in the sample have achieved much higher growth than the economy as a whole. The sample companies are not very indebted. Total debt (short-term plus long-term) is 33% of total assets. The fixed financial assets indicator shows that the share of fixed assets in total assets is on average 2%. The volatility of the net operating profit is 10%.

The companies from the analysed sample have ineffective working capital management, which ultimately contributes to moderate growth of companies and relatively low profitability. The companies on average have a very long account receivables period, which could have an economically logical justification only if the companies liberalized their credit policies to increase the credit sales, but in the case of the analysed companies, this period is long due to low current liquidity and the difficulty for timely collection of receivables, negatively impacting the profitability. Companies also show inefficient inventory management, measured by inventories period which is very long. Holding large volume of inventory may be justified to ensure growth in production and sales, but too much inventory leads to increased holding costs and other related operating costs, leading to reduced profitability. What's more, the long inventory conversion period may be due to the storage of outdated stocks. The operating cycle, which is the sum of account receivables period and inventory period, is quite long and amounts to 326.2 days. The long operating cycle affects companies to have lower turnover and lower profitability (according to the DuPont formula). As a result, the cash cycle, which is the difference between the operating cycle and the account payables period, is long and amounts to 174.8 days. It is actually the period from the moment of payment for purchases to the moment of collection of receivables. It is actually the period in which the company uses money to finance business operations from certain sources, which leads to costs for that financing and additionally has a negative impact on profitability. All elements of the working capital are not efficiently managed and all of them individually do not have a satisfactory impact on growth and profitability, although account payables period is longer than account receivables period. Corporate managers need to redesign their operating policies and improve working capital management practices to ensure greater profitability and greater corporate growth.

4.2 Correlation analysis

The correlation analysis, as the second segment of this research, consists of determining whether there is a correlation between the variations of the observed phenomena and if so, to what degree or intensity. Table 3 in the Appendix shows the Pearson correlation coefficients between the observed variables. From the results obtained in the correlation analysis, we can see that there is a very low negative correlation between gross operating profit and part of the components of working capital, i.e., account receivables period, account payables period, but also to some of the control variables, such as financial leverage, fixed financial assets and the volatility of net operating profit. The results of the correlation analysis are completely consistent with those obtained by Deloof (2003) in the case of Belgian companies.

4.3 Regression analysis

In further research, we will apply panel regression analysis. To determine which model is most appropriate for the analysis (pooled regression model, fixed effect model, or random effect model), it is necessary to perform a Hausman test. The test assesses the consistency of the estimator when compared to an alternative, less efficient estimator already known to be consistent. It helps to assess whether the statistical model corresponds to the data. The basis of the Hausman test consists of starting from the linear model $y = Xb + e$, where y is the dependent variable and X is the regressor vector, b is a vector of coefficients and e is a random error. Here are both estimators for b : b_0 and b_1 . The two hypotheses are:

H0: Random effect model is appropriate

H1: Fixed effect model is appropriate

According to the results obtained from the Hausman test, we accept the null hypothesis, i.e., the fixed effect model is appropriate and accepted for further research.

The next step is to examine which variables are statistically significant and how they affect a company's profitability. For that purpose, we will set up several models that will represent a different combination of independent variables and will show us which of them is and which is not, statistically significant for the profitability of the examined companies. To answer the question of how working capital management affects the company's profitability, gross operating profit

is shown as a function of the three basic measures of working capital management in addition to other characteristics of the company.

In the analysis itself, five fixed-effect regression models were modelled, as follows:

$$GOP = f \{ARCP, ICP, APP, CCC, Size, Rev.increase, LEV, FXA, VAR\}$$

Model 1

$$GOP_{it} = \alpha_0 + \beta_1 ARCP_{it} + \beta_2 Size_{it} + \beta_3 Rev.Increase_{it} + \beta_4 LEV_{it} + \beta_5 FIX_{it} + \beta_6 VAR_{it} \quad (1)$$

Model 2

$$GOP_{it} = \alpha_0 + \beta_1 ICP_{it} + \beta_2 Size_{it} + \beta_3 Rev.Increase_{it} + \beta_4 LEV_{it} + \beta_5 FIX_{it} + \beta_6 VAR_{it} \quad (2)$$

Model 3

$$GOP_{it} = \alpha_0 + \beta_1 APP_{it} + \beta_2 Size_{it} + \beta_3 Rev.Increase_{it} + \beta_4 LEV_{it} + \beta_5 FIX_{it} + \beta_6 VAR_{it} \quad (3)$$

Model 4

$$GOP_{it} = \alpha_0 + \beta_1 CCC_{it} + \beta_2 Size_{it} + \beta_3 Rev.Increase_{it} + \beta_4 LEV_{it} + \beta_5 FIX_{it} + \beta_6 VAR_{it} \quad (4)$$

Model 5

$$GOP_{it} = \alpha_0 + \beta_1 ARCP_{it} + \beta_2 ICP_{it} + \beta_3 APP_{it} + \beta_4 Size_{it} + \beta_5 Rev.Increase_{it} + \beta_6 LEV_{it} + \beta_7 FIX_{it} + \beta_8 VAR_{it} \quad (5)$$

where *GOP* is Gross operating profit ratio, *ARCP* is account receivables collection period, *ICP* is inventories conversion period, *APP* is account payables payment period, *Size* is company size, *Revenue Increase* is an annual increase in sales revenue, *LEV* is financial leverage, *FIX* is fix financial assets ratio; and *VAR* is the volatility in net operating profit.

In all five models, the dependent variable is the gross operating profit as a representative of profitability. The other variables are independent and control variables of analysis. The analysis was made with the Fixed Effect Model using the Ordinary Least Squares method.

In the first model, a regression of the account receivables collection period about the gross operating profit was performed. The second is the inventories conversion period. In the third is the account payables payment period. In the fourth is the cash conversion cycle. In the fifth, the three measures of working capital management (*ARCP*, *ICP*, and *APP*) are set back. *CCC* is omitted here to avoid the problem

of multicollinearity between variables displayed via variance inflation factors VIFs.

Control variables included in the analysis are: company size, sales revenue growth, financial leverage, fix financial assets, and volatility of net operating profit.

Table 4 in the Appendix presents the results of the regression analysis using the Fixed effect model that provides more detailed information on the relationship between management with working capital and profitability.

In the first model, where the account receivables collection period is taken as an independent variable, we can see that statistically significant variables are all variables included in the model, except the control variable fixed financial assets.

In the second model, where the inventories conversion period is taken as a dependent variable, has four statistically significant variables, namely: company size, sales revenue growth, financial debt, and the variability of net operating profit.

In the third model, where the account payables payment period is taken as an independent variable where except for the control variable fixed financial assets, all other examined variables are statistically significant.

In the fourth model, where the independent variable is the cash conversion cycle and has the same construction of statistically significant variables as the previous statistically significant independent variable and three of the control variables.

Finally, the fifth model, which is in a way a summary model that incorporates all three components of working capital, shows that no independent variable is statistically significant, except for four statistically significant control variables: company size, growth of sales revenues, financial leverage, and volatility of net operating profit.

The account receivables collection period has a statistically significant positive relationship with the company's profitability. That is, for a 1-day increase of the collection period, the profitability increases by 0.0276%. This is contrary to financial logic which suggests that receivables should be collected faster and liabilities paid off as late as possible. Faster collection of receivables will allow us to get to the cash faster than we can invest in a new production cycle. Therefore, we would expect a negative relationship with profitability. The detected positive relationship is explained by the fact that the companies in the Macedonian economy have a practice of selling with deferred payment,

i.e., credit sales, to stimulate sales. Greater sales lead to greater profitability. At the same time, the account receivables collection period is much shorter than the account payables payment period.

The inventories conversion period is not a statistically significant variable in the regression analysis of the particular sample examined, however, it shows a negative correlation with the profitability of the company. The negative correlation between GOP and inventories conversion period is consistent with most research as in Deloof (2003), Lazaridis and Tryfonidis (2006), Padachi (2006), and Naumoski (2019). The negative relationship indicates the fact that the shorter the inventory days (of raw materials, production in progress and finished products) the higher the profitability would be, as a result of the reduced cost of holding inventories.

In model 3 there is a statistically significant positive relationship between account payables payment period and the company's profitability. For each increase in the account payables payment period for 1 day, the profitability of the companies increases by 0.0078%. This is a logical relation and is explained by the fact that more profitable companies wait longer to pay their obligations to suppliers. Thus, they have at their disposal the cash to finance new inventories that will lead to new sales and GOP growth. The results obtained for the account payables payment periods are consistent with the crucial rule that companies should strive to delay the payment of liabilities to suppliers as much as possible, while taking care not to jeopardize good business relations with them.

The cash conversion cycle in model 4 shows a negative relationship with the company's profitability. Shin and Soenen (1998) and Naumoski (2019) also found a negative relationship. A negative relationship is expected. Namely, the size of the CCC depends on the operating cycle (inventory period plus account receivables period) and account payables payment period. The shorter the operating cycle, the higher the turnover and the higher the profitability of the company (according to the DuPont equation). Furthermore, CCC is the period in which we use money provided from other sources, and this causes costs to the company. For example, if the money is secured by a loan, we will have to pay interest. A lower CCC would mean less working capital investment, and if the CCC were zero, it would mean that suppliers fully fund current assets.

According to Shin and Soenen (1998), the negative relationship between CCC and profitability can be explained by market power, i.e.,

market share. This would mean that the shorter CCC period is due to the bargaining power of suppliers and/or buyers, but also greater profitability due to market dominance. In addition, the negative relationship between these variables can also be explained by the fact that minimizing working capital investment can increase profitability. This means that cash in the form of money is not kept in business for too long and that free cash is used to invest and increase the company's profitability. In this case, to reduce one day of the cash conversion cycle, the company would have higher profitability of 0.014%.

All control variables of the analysis, except fixed financial assets, are statistically significant in all five models.

In all five models, there is a positive statistically significant relationship between company size and profitability. Large companies are usually companies in a mature stage, with established market power and an established reputation with customers. On the other hand, they have easier access to the market for the supply of raw materials, but also to the financial markets where they provide funds for financing at lower costs, both due to greater creditworthiness and also due to the economy of scale in purchases and borrowing. Here, the costs of issuing debt or equity that are fixed, are lower for larger issues. All of these circumstances lead to a range of cost-effectiveness for large companies and greater profitability.

The next control variable, which in all regression models has a positive statistically significant relationship with profitability, is the growth of sales revenue. This positive relationship is very logical because the profitability of the company is represented by the gross operating profit, which is also represented by the following formula: $(\text{sales revenue} - \text{the cost of goods sold} + \text{depreciation and amortization}) / (\text{total assets} - \text{financial assets})$, so hence it can be seen that any increase in sales revenue will mathematically increase the company's profitability.

The third control variable, financial leverage has a pronounced negative statistically significant relationship with the profitability of companies. That is, this statement is logical because the more indebted a company is, the lower its profitability will be. Debts cause interest costs and low profitability. Unlike financial debt, the volatility of net operating profit has a statistically significant but positive relationship with the company's profitability in all models of analysis.

The only control variable that is not statistically significant is fixed financial assets, but in most cases, it still has a negative relationship with profitability. The reason for this lies in the fact that a company's fixed assets represent a higher cost for it because they aim to be used longer than working capital. To this end, any increase in them will result in a decrease in the company's profitability.

In the conducted regression analysis, we can see that in all five models, F-statistics is significant which indicates a good specification of the model, and the adjusted coefficient of determination is 62%, which indicates that the working capital variables largely explain the profitability of the company.

5. Conclusion

Working capital management is one of the crucial issues in corporate finance. The managers of the company, who are agents appointed by the shareholders, have the task to generate the required returns for their shareholders and increase the value of the company's share. In this context, effective and efficient management of working capital is an essential issue that should contribute to achieving the ultimate goal of the company.

Working capital is a complex category that consists of several components such as inventories, and receivables, but also liabilities to suppliers. To show the relationship between them and profitability, in this paper, we have used a sample of 33 manufacturing companies listed on the Macedonian Stock Exchange, for a period of ten consecutive years (2010-2019). To answer the question of whether and how working capital affects the profitability of selected companies, we conducted a panel regression analysis.

The result shows that working capital affects the profitability of the company through the following variables: account receivables period, inventories conversion period, account payables payment period, cash conversion cycle, company size, and sales revenue growth. Statistically significant results were obtained for the specific variables in this paper and for that reason, the specific companies should actively focus on managing all components of working capital, but with special emphasis on the listed variables.

This analysis was conducted on a sample of industrial companies. The same analysis can be performed on individual sectors, or at the level of all companies, to get a different view of WCM's impact

on profitability. The same analysis can be repeated for a shorter period and the observations can give us a deeper knowledge of what is specifically happening from year to year and how the measures taken to manage working capital have contributed to the increase of the company's profitability. In this way, companies will receive information on business decisions regarding more efficient and effective management of working capital with the ultimate goal of increasing the profitability of companies.

Specifically, we found that the profitability of Macedonian industrial companies grows with the increase in account receivable collection period, account payables payment period, company size, sales growth, and volatility in net operating profit. Additionally, profitability increases with decreasing cash conversion cycle and financial leverage. The inventories conversion period and fixed financial assets do not affect the profitability of the company. From all the above, we can conclude that, by means of the effective and efficient management of the components of working capital, we can contribute to improving the profitability of companies.

References

1. Abbadi, S. M., and Abbadi, R. T. (2013). The Determinants of Working Capital Requirements in Palestinian Industrial Corporations. *International Journal of Economics and Finance*, 5(1): 65-75
2. Afza, T., and M. S. Nazir (2008). Working capital approaches and firm's returns. *Pakistan Journal of Commerce and Social Sciences* 1(1): 25-36.
3. Almazari, A.A. (2013). The Relationship between Working Capital Management and Profitability: Evidence from Saudi Cement Companies. *British Journal of Economics, Management & Trade*, 4(1).
4. Appuhami, B.A.R. (2008). The impact of firms' capital expenditure on working capital management: An empirical study across industries in Thailand. *International Management Review*, 4: 8-21.
5. Chiou, J.R., Cheng, L., and Wu, H.W. (2006). The determinants of working capital management. *Journal of American Academy of Business*, 10(1): 149-155.
6. Deloof, M. (2003). Does working capital management affect profitability of Belgian firms. *Journal Business Finance & Accounting*, 30: 573-588.
7. Eljelly, A.M.A. (2004). Liquidity-profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Management*, 14: 48-61.

8. Garcia-Teruel, P.J. and Martinez-Solano, P. (2007). Effects of working capital management on SME profitability. *International Journal of Managerial Finance*, 3: 164-177.
9. Gill, A., Biger, N., and Mathur, N. (2010). The relationship between working capital management and profitability: Evidence from the United States. *Business and Economics Journal*, 10(1): 1-9.
10. Kieschnick, R., Moussawi, R., and LaPlante, M. (2006). Corporate working capital management: determinants and consequences. *International Journal of Managerial Finance*, 3(2): 164-177.
11. Lazaridis, J. and D. Tryfonidis, (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of Financial Management and Analysis*, 19: 26-35.
12. Mache, V.O., and Omodero, O.C. (2021). Working Capital Management and Firms' Profitability (A Study of Selected Consumer Goods Manufacturing Companies in Nigeria). *Acta Universitatis Danubius*, 17(5), 182-205.
13. Makori, D.M., & Jagongo, A.O. (2014). Working Capital Management and Firm Profitability: Empirical Evidence from Manufacturing and Construction Firms Listed on Nairobi Securities Exchange. *International Journal of Accounting and Taxation*, 1 (1), 1-14.
14. Mills, G. T. (1996). The Impact of Inflation on Capital Budgeting and Working Capital. *Journal of Financial and Strategic Decisions*, 9(1): 79-87.
15. Naser K, Nuseibeh R, and Hadeya AA, (2013). Factors Influencing Corporate Working Capital Management: Evidence from An Emergency Economy. *Journal of Contemporary Issues in Business Research*, 2(1), 11-30
16. Naumoski, A. (2019). The impact of working capital management on profitability of the listed companies in emerging European countries, *Book of Proceedings of 13th RSEP International Conference on Business, Economics & Finance*, Kadir Has University, Istanbul, 11-13 June 2019, 22-32.
17. Padachi, K. (2006). Trends in working capital management and its impact on firm's performance: An analysis of Mauritian small manufacturing firms. *International Review of Business Research Papers*, 2: 45-58.
18. Preve, L., and Sarria-Allende, V. (2010). Working Capital Management. Oxford Scholarship Online, DOI:10.1093/acprof:oso/9780199737413.001.0001
19. Raheman, A. and Nasr, M. (2007). Working capital management and profitability – Case of Pakistani firms. *International Review of Business Research Papers*, 3(1), 279- 300.

20. Rao, R. (1989). *Fundamentals of Financial Management*. 3rd Ed., Macmillan publishers, USA., pp: 550-644.
21. Ricci, C., and Vito, N (2000). International working capital practices in the UK. *European Financial Management*, 6(1), 69-84. <https://doi.org/10.1111/1468-036X.00112>
22. Ross, A., Westerfield, R.W., and Jordan, D.B (2022). *Fundamentals of corporate finance*, 13th edition, McGraw Hill LLC, New York, USA
23. Shin, H.H. and Soenen, L. (1998). Efficiency of working capital management and corporate profitability. *Financial Practice and Education* (8): 37–45.
24. Smith, K. (1980). Profitability Versus Liquidity Tradeoffs in Working Capital Management. In: *Readings on the Management of Working Capital*, Smith, K.V. (Ed.). St. Paul, MN, West Publishing Firm, USA., pp: 549-562.
25. Syeda, R. (2021). Impact of Working Capital Management on Profitability: A Case Study of Trading Companies. In the book: *21st Century Approaches to Management and Accounting Research*.
26. Tauringana, V. and Afrifa, G.A. (2013). The relative importance of working capital management and its components to SMEs' profitability. *Journal of Small Business and Enterprise Development*, 20(3): 453– 469.
27. Vishnani, S., and Shah, B.K. (2007). Impact of working capital management policies on corporate performance – an empirical study. *Global Business Review* 8(2): 267–281. doi:10.1177/097215090700800206
28. Zariyawati, M. A., Annuar, M. N., Taufiq H., and Abdul Rahim A.S. (2009). Working capital management and corporate performance: Case of Malaysia. *Journal of Modern Accounting and Auditing*, 5 (11), 47 – 54.

Correlation analysis

	Gross operating profit	Account receivables period	Inventories period	Account payables payment period	Cash conversion cycle	Company size	Sales growth	Financial leverage	Fixed financial assets	Volatility in net operating profit
Gross operating profit	1									
Account receivables period	0.02	1								
Inventories period	0.01	0.04	1							
Account payables payment period	-0.02	0.91	0.17	1						
Cash conversion cycle	0.03	-0.45	0.80	-0.44	1					
Company size	0.16	-0.24	-0.09	-0.09	-0.09	1				
Sales growth	0.04	-0.08	0.90	0.05	0.78	-0.01	1			
Financial leverage	-0.05	-0.12	0.24	-0.05	0.22	-0.15	0.21	1		
Fixed financial assets	-0.06	-0.06	-0.04	-0.03	-0.04	-0.11	-0.01	0.38	1	
Volatility in net operating profit	-0.10	-0.03	0.36	-0.01	0.33	-0.23	0.29	0.10	0.06	1

Source: Authors' own calculations

Table 4

Results of the regression analysis

Independent variable	Dependent variable: Gross operating profit				
	Model 1	Model 2	Model 3	Model 4	Model 5
C	-8.7604* (1.1591)	-6.8019* (1.0975)	-7.9926* (1.0682)	-7.3894* (1.0091)	-8.2082* (1.4314)
Account receivables collection period	0.0003* (0.0001)				0.0003 (0.0003)
Inventories conversion period		-0.0002 (0.0001)			-0.0002 0.0001
Account payables payment period			0.00008* (0.00004)		-0.0001 (0.0001)
Cash conversion cycle				-0.0001* (0.0001)	
Company size	0.4190* (0.0529)	0.3333* (0.0505)	0.3845* (0.0490)	0.3574* (0.0467)	0.3948* (0.0651)
Sales growth	0.0345* (0.0101)	0.0911* (0.0367)	0.0337* (0.0103)	0.0662* (0.0160)	0.0897* (0.0385)
Financial leverage	-0.3332* (0.1216)	-0.3725* (0.1221)	-0.3466* (0.1230)	-0.3247* (0.1234)	-0.3070* (0.1229)
Fix financial assets	-0.0632 (0.3646)	0.0236 (0.3724)	-0.0637 (0.3696)	-0.0509 (0.3659)	-0.0216 (0.3642)
Volatility in net operating profit	1.80212* (0.3607)	1.1689* (0.2981)	1.6482* (0.3509)	1.6046* (0.3218)	1.7068* (0.3671)
R ²	0.6789	0.6659	0.6708	0.6763	0.6892
Adjusted R ²	0.6202	0.6048	0.6106	0.6171	0.6232
F-statistics	11.563	10.900	11.1402	11.4245	10.4381

Note: Standard errors in parenthesis; * indicates the coefficients that are statistically significant with a confidence level of 5%

Source: Authors' own calculations