Impact of Cash Conversion Cycle on Sales of Enterprises Manufacturing Machinery and Equipment in the Czech Republic

Zdeněk Motlíček, Pavlína Pinková, Dana Martinovičová

Abstract: The way of working capital management may have a significant impact on companies’ performance and their strategic plan. This is caused by an unambiguous effect of the size of working capital both on companies’ costs and companies’ sales. The impact on strategic planning emerges from the fact that setting up the structure of working capital determines the required size of storage and production capacities. However, working capital management options are determined by the impact of individual interest groups. With respect to a relationship between working capital and sales, the customers are a decisive interest group. This fact stems from the pressure of customers on time availability of required products and on payment terms that are associated with product delivery. The failure to comply the requirements may lead to fluctuation of customers and subsequently to fluctuation of sales.

The paper presents an empirical research on the extent of influence of the fulfilling customers’ needs on the size of sales. These variables have been quantified using the inventory turnover, which represents the availability of particular products for customers, and the average collection period, which represents the payment terms via provided maturity of receivables. The results presented in the paper quantify the degree of these impacts and thereby enable to the managers to quantify the impacts of individual optimization decisions on the size of sales in the following period. It allows the businesses to set such a level of working capital that maximizes the company’s performances.

Key words: Working Capital · Sales · Aggressive Management Policy · Conservative Management Policy · Inventory Turnover · Average Collection Period

JEL Classification: G32

1 Introduction

Working capital management is an integral part of financial management because it ultimately affects asset and capital structure, as well as business risk. Consequently, working capital management significantly influences corporate performance not only from the perspective of operational area, but also from the viewpoint of strategic area, since the planning of working capital affects strategic decision-making in the field of new investments. Working capital is comprised of inventories, receivables and financial assets (Kislingerová, 2010). Hence, working capital management relates to management of all these components (Pavelková & Knápková, 2009).

Tomek (2007) believes that the impact of working capital components on sales may be significant; particularly, time delivery of finished products, but also average age of accounts receivable, considerably affects the customer’s perception of delivered performance. According to Pavelková & Knápková (2009), it is primarily asset turnover that causes the impact of working capital management on corporate performance. This has been also confirmed by Kislingerová and Hnilica (2008). Režňáková (2010) states that aggressive working management policy increases corporate performance from the perspective of the owner through the shortening of cash conversion cycle. However, it can be assumed that these consequences may differ for different industries. According to Filbeck & Kruger (2005), these differences between industries should remain constant in time. Bellouma (2011) considers the shortening of cash conversion cycle as an opportunity for release of liquidity, which can subsequently serve as the source for financing of capital investments. The effect of such investments is then the reduced working capital need. In contrast, Banos-Caballero, García-Teruel & Martínez-Solano (2014) search for working capital optimum level. The authors suppose a concave link between working capital level and corporate performance; the curve optimum is determined using the derivative of the relationship. Nazir & Afza (2009a) has confirmed a rising part of the concave curve that has been described by previously mentioned authors. According to their research, a moderate asset management policy (i.e. a higher proportion of

1 Ing. Zdeněk Motlíček, Mendel University in Brno, Faculty of Business and Economics, Department of Business Economics, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: zdenek.motlicek@mendelu.cz
Mgr. Ing. Pavlína Pinková, Mendel University in Brno, Faculty of Business and Economics, Department of Business Economics, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: pavlina.pinkova@mendelu.cz
doc. Ing. Dana Martinovičová, Ph.D. Mendel University in Brno, Faculty of Business and Economics, Department of Business Economics, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: dana.martinovicova@mendelu.cz
current assets to total assets) results into higher profitability. Similar findings have been reported by Tufail (2013). Motlíček & Martinovičová (2014) have observed a strong positive correlation between size of sales and size of components of net working capital in a given year. However, the authors conclude that it would be probably more appropriate to consider time delays of individual effects for the measurement of the relationship.

Hill, Kelly & Higfield (2010) and Nazir & Afza (2009b) have noted a positive correlation between the working capital expenditures and the size of free cash flow. Hence, it can be assumed that businesses tend to invest money in working capital rather than in securities or other investment activities. Particular authors also mention the access of businesses to financial resources as an important factor, which is subsequently related to the size of cash balances held and the size of investments in working capital. According to Bigelli & Sánchez-Vidal (2012) these factors are mainly influenced by the firm’s size and firm’s marketability on the stock exchange. These conclusions have been supported by Al-Najjar (2013). Subramaniam, Tang, Yue & Zhou (2011) complement the findings by comprising the degree of production diversification and Aydin Ozkan with Neslihan Ozkan (2004) by comprising the influence of separation of ownership and management structures.

Based on the above mentioned findings, it is obvious that the manner of working capital optimization is a large issue that covers several research directions and questions. Hence, the authors of the paper focus their research on a comprehensive examination of the impact of working capital management on corporate performance. The presented results extend the previous study “Impact of working capital management on sales of enterprises focusing on the manufacture of machinery and equipment in the Czech Republic” published in the scientific journal Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis (see Motlíček & Martinovičová, 2014).

The objective of the present paper is to describe and quantify the degree of impact of inventory turnover and average collection period on the size of sales in the following period for the medium-sized enterprises located in the Czech Republic and manufacturing machinery and other equipment.

2 Methods

For the examination of the impact of working capital on sales, the data of only one industrial branch and only one size have been chosen. This technique is indispensable because the level of working capital held may significantly vary across the industries. Moreover, this level may significantly vary within one industry since firm’s size strongly affects the access to financing resources.

Data have been gathered from the Amadeus database and cover years 2011 and 2012. The study is aimed to medium-sized companies located in the Czech Republic. All the companies are focused on the manufacture of machinery and equipment, according to CZ-NACE classification they belong to section 28. The companies with incomplete entries for years 2011 and 2012 have been excluded from the sample. The final sample consists of 24 companies that have satisfied all criteria mentioned above.

In the context of empirical research, the relationship between sales of year 2012 and inventory turnover and average collection period of year 2011 has been investigated. It has been also assumed that the size of sales has a determining influence on the size of fixed assets. Firstly, data have been analysed using XY diagrams that have indicated a linear dependence. Next, the correlation analysis has been applied to verify if there exists a dependence relation between selected variables. Then, the data have been examined using regression analysis to determine the impact of above specified variables on the level of sales. The values of final accounts on balance sheets and profit and loss statements have been used to determine the size of sales and fixed assets for year 2012 and to calculate the inventory turnover and the average collection period for year 2011. Obtained regression models have been subjected to economic verification. Based on this verification, the model has been confirmed or adjusted. The following sections of the paper discuss only the verified models that belong to so-called BUE or BLUE estimators. Regression model and correlation matrix have been created in statistical software Gretl.

The following regression model has been used to investigate the data:

\[
S = \beta_0 + \beta_1 \text{INV\_turnover} + \beta_2 \text{REC\_turnover} + \beta_3 \text{FA} + \epsilon
\]  

where,
- \(S\) are sales of year 2012
- \(\beta_0, \beta_1, \beta_2, \beta_3\) are parameters to be estimated
- \(\text{INV\_turnover}\) is inventory turnover in year 2011
- \(\text{REC\_turnover}\) is average collection period in year 2011
- \(\text{FA}\) is size of fixed assets in year 2012
- \(\epsilon\) is the random error
Impact of cash conversion cycle on sales of enterprises manufacturing machinery and equipment in the Czech Republic

Equation A \[ \text{INV}_{\text{turnover}} = \frac{\text{INV}}{\text{OC}} \times 360 \] (2)

Equation B \[ \text{REC}_{\text{turnover}} = \frac{\text{REC}}{\text{s}} \times 360 \] (3)

where,
INV is size of inventories
OC are operating costs
REC is size of receivables

3 Research results

Considering the findings of aforementioned researchers, it can be concluded that there exists a strong dependence between corporate performance and approach to working capital management. Previous results of the authors of the study have confirmed a significant impact of receivables and inventories on the size of sales (Motlíček, Martinovičová, 2014).

The present research is specifically concerned with the impact of inventory turnover and average collection period on future size of sales. Using the transformation of the size of inventories and receivables into the days of their turnover, undesirable effects on the interpretation of regression model results have been eliminated.

Firstly, the data have been subjected to a correlation analysis. Obtained results are summarized in table 1. Correlation coefficients are significant at 5% significance level. In spite of the fact that values of correlation coefficients do not reveal a strong relationship, it is obvious that selected explanatory variables have a significant impact on the size of sales. The highest correlation coefficient can be observed in the case of inventory turnover variable, followed by average collection period variable. The correlation matrix further shows that there is no significant correlation between individual explanatory variables. Nevertheless, the results of correlation analysis do not allow quantify the degree of influence of particular independent variables on the dependent variable.

Table 1 Correlation matrix

<table>
<thead>
<tr>
<th>Sales th CZK 2012</th>
<th>Fixed_assets_2012</th>
<th>receivables_turnover_2011</th>
<th>inventory_turnover_2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0000</td>
<td>0.2569</td>
<td>0.4938</td>
<td>0.5691</td>
</tr>
<tr>
<td>1.0000</td>
<td>0.1834</td>
<td>-0.0081</td>
<td></td>
</tr>
<tr>
<td>1.0000</td>
<td>0.3368</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ calculations

Further, the data have been analysed using regression analysis. The initial model has indicated verification problems relating to heteroskedasticity. Because of the non-fulfilment of the classical linear assumption, some of the other results of verification tests have been negative. However, if the model is tested at 10% significance level, the violation of the assumption would not be so serious. Consequently, this deficiency is solved by the model with corrected heteroskedasticity. The final model is illustrated in table 2.

Table 2 Regression model A

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const</td>
<td>15113.2</td>
<td>1.9484</td>
<td>0.06554 *</td>
</tr>
<tr>
<td>inventory_turnover_2011</td>
<td>582.734</td>
<td>3.4348</td>
<td>0.00262 ***</td>
</tr>
<tr>
<td>receivables_turnover_2011</td>
<td>727.206</td>
<td>3.0276</td>
<td>0.00665 ***</td>
</tr>
<tr>
<td>Fixed_assets_2012_int_tan_</td>
<td>0.739488</td>
<td>3.4790</td>
<td>0.00237 ***</td>
</tr>
</tbody>
</table>

R-squared 0.686694 Adjusted R-squared 0.639698
F(3, 20) 14.61178 P-value(F) 0.000029
Log-likelihood -42.51462 Akaikecriterion 93.02924
Schwarz criterion 97.74146 Hannan-Quinn 94.27939
Meandependent var 69628.54 Standard deviationofdependentvariable 52276.98
Sum squaredresid 3.45e+10 Standard. errorofregression 41541.79

Source: Authors’ calculations
Model is statistically significant at 5% significance level and it describes 68.7% variability of the sample. Also, all explanatory variables are statistically significant with the exception of the constant term, which is significant at 10% significance level. Since the error term is normally distributed, the model belong to so-called BUE estimators (i.e. best unbiased estimator).

The constant term of the regression model indicates that 15,113,200 CZK of sales are determined by variables not involved in the model. This value represents 21.705% of the average size of sales in the selected industry. The coefficient of the variable of fixed assets shows that an increase in fixed assets by 1 CZK leads to an increase in sales by 0.74 CZK. It may be explained by an increase in production capacities, which subsequently enables an increase in production and in sale. This sales growth, though, will be under-proportional, but it is still very important. It can be assumed that it will take more than one period.

Nevertheless, the objective of the paper is to explain and describe the impact of inventories and receivables on the size of sales. The results of model A indicate that if there is an increase in inventory turnover by one day, it will lead in the following year to an increase in sales by 582,700 CZK on average. In relative terms, this means a growth in sales by 0.837%. The authors believe that this growth may be caused by a better availability of finished products for customers. A longer cash conversion cycle can be arisen as a result of a higher level of stocks of finished products. Further, the results suggest that if there is an increase in average collection period by one day, it will lead in the following year to an increase in sales on average by 727,200 CZK. In relative terms, this expresses a growth in sales by 1.044%. In the opinion of the authors of present study, this effect may be caused by a longer maturity of receivables, which will be reflected in average collection period.

4 Conclusions
The objective of the present paper is to describe and quantify the relationship between company’s sales and inventory turnover and between company’s sales and average collection period in the case of medium-sized companies based in the Czech Republic. The research has included only the companies belonging to section 28 according to CZ- NACE classification, the manufacture of machinery and equipment. Based on the selected criteria (i.e. industry, size and completeness of the data), the sample consists of 24 companies. The data obtained from the Amadeus database have been analysed using a correlation matrix and a multivariate regression model.

The results of the regression model suggest that an extension of inventory turnover and an extension of average collection period have a positive impact on the size of sales in the following period. More specifically, the extension of inventory turnover by one day results in the following period into a growth of sales on average by 0.873%, the extension of average collection period by one day results into a growth in sales on average by 1.044% in the following period.

The findings of the research presented in this paper have confirmed the conclusions of its authors published in the past concerning that there exists a significant positive correlation between sales and working capital management in the company. This finding complements the existing literature and other previous evidence. The authors also believe that presented conclusions are important for the application of knowledge of financial management in practice. The current state of knowledge on financial management tends to recommend a shortening of cash conversion cycle. However, this does not always correspond to real behaviour of business entities. The results of the paper may help the managers in the optimization decision-making process since these results enable to quantify the impact of optimization decisions on the average size of sales.

Acknowledgement
This article was supported by the Internal Grant Agency of the Mendel University in Brno [grant number 43/2014].

References


