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THE IMPACT OF WORKING CAPITAL MANAGEMENT ON THE PROFITABILITY OF FIRMS IN SELECTED INDUSTRIES IN THE REPUBLIC OF CROATIA

The aim of the paper is to detect the impact of working capital management (WCM) on the profitability of Croatian firms which belong to manufacturing, trade, and information and communication industries. The time frame of interest is from 2008 to 2015, and the final sample consists of 19.355 firms, i.e. 116.002 firm-year observations. The data sources are the databases of the Financial Agency and Croatian Bureau of Statistics. In order to test research hypothesis, among other methods, panel regression analysis is used. The study results show that, after controlling for firm characteristics and macroeconomic conditions, aggressive WCM has a significantly positive effect on the profitability of small firms from selected industries and for medium-sized manufacturing firms. Moreover, the results imply the existence of a significantly convex quadratic dependence and overall downward trend, marked by the increasing marginal returns of profitability with the extension of working capital cycles. The latter indicates that a more aggressive strategy significantly increases the profitability of firms at increasing rate. In other words, the managers of those firms should strive to shorten the working capital cycles in order to increase profitability.

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The limitations of the research are: the impossibility of spatial and temporal generalization of identified results, limited possibility of explaining identified directions and the significance of the influence of observed indicators of variables, as well as detection of reasons for agreement or contradiction with previous research results, unavailability of certain data, and omission of potentially significant variables and/or their alternative indicators. Scientific contribution can be summarized as follows: a comprehensive and systematic review of previous research; in addition to dominant linear impact testing, testing of nonlinear quadratic relation between the observed variables, which, is beginning to appear in the relevant literature and, accordingly, is generally poorly represented in all the previous studies, and has not been conducted in the Republic of Croatia; respectable spatial and temporal coverage; the expansion of coverage from listed and large firms to private firms and small and medium-sized firms.

Keywords: *WCM, profitability, impact, manufacturing industry, trade, information and communication, Croatia*

1. INTRODUCTION

In this paper, the term WCM means, the overall management of net operating working capital in the narrow sense. The latter is defined as the overall, i.e. integrative management of inventories, trade receivables and trade payables, i.e. as the management of firms' investments in net working capital in the narrower sense.

In general, the stated should strive to achieve optimal size, structure and circulation of working capital, which largely contribute to achieving the fundamental goal of the firm, i.e. maximizing its present value (Deloof, 2003; Raheman & Nasr, 2007). Consequently, the goal of WCM is to establish and maintain optimal business liquidity understood in the context of the best match between profitability and risk, i.e. the match that best reflects on the creation of the firm value. Recognizing the importance of WCM, and in order to achieve the goal of WCM, firms define and implement a WCM strategy based on consideration of the interdependence of risk and profitability and in accordance with risk preferences. The basis for the conceptualization of the WCM strategy are the different levels of investment in current assets and the ways of their financing. Accordingly, it is possible to distinguish between aggressive, conservative and moderate current asset management strategy and current asset financing strategy. (Moyer et al., 2006; Van Horne & Wachowicz, 2008; Nwankwo & Osho, 2010; Brigham & Ehrhardt, 2011) Considering the interdependence of the mentioned strategies, in the context of an aggregate

approach to management, one can speak of an aggressive, conservative and moderate overall working capital strategy.

The effectiveness of the WCM strategy depends on the balance that the firm manages to establish between profitability and liquidity through its application. (Filbeck et al., 2007) The effectiveness and efficiency, i.e. the optimality of WCM strategies can be described and evaluated by identifying and quantifying the costs of WCM and the contribution to the achieved profitability and the value of the firm.

Investments in net operating working capital in the narrower sense result in costs that increase and costs that decrease as the investments increase. Their existence suggests that decisions to invest include trade-offs between these costs and implies the existence of optimal level of investment that minimizes the sum of observed costs, that is balances costs and benefits, and maximizes the profitability and consequently the value of the firm. (Nobanee, 2009; Baños-Caballero et al., 2012a; Kwenda & Holden, 2014) Given that any excessive or insufficient investment compared to the optimal level reduces the profitability and the value of the firm, an effective and efficient, i.e. optimal WCM strategy in this case is precisely the one that resulted in achieving the optimum, which in a particular situation may be relatively more aggressive or conservative depending on the relationship between costs that increase and costs that decrease with the level of investment. Furthermore, the higher the costs that increase with investments compared to the costs that decrease with them, the lower the optimal level of investment, i.e. the relatively more aggressive WCM strategy is optimal. The reverse is true for the conservative strategy.

Finally, given that the optimal level of investment is a function of several factors specific to the firm, but also external factors, it should be noted that we cannot talk about one strategy that is necessarily optimal for all firms, regardless of their specificities, in all time periods. Namely, establishing a balance between risk and profitability is a difficult task for financial managers because the amounts of necessary investments in current assets, as well as the financing of the same, are constantly changing (Sharma, 2009). Kolay (1991) therefore emphasizes the importance of proactive working capital strategy which, depending on the situation, needs to be constantly re-evaluated and adjusted.

2. A REVIEW OF PREVIOUS RESEARCH ON THE IMPACT OF WCM ON THE FIRM'S PROFITABILITY

Ever since Smith (1980) suggested that WCM is important because of its impact on the profitability and risk of a firm, and consequently on its value, the

aforementioned idea has gained significant research interest. Moreover, in the effort to evaluate and ex-post determine the optimality of WCM strategies in the last twenty years, highlighted by the recent economic crisis, there is a noticeable increase in the research on the impact of WCM on firms' profitability and performance, and as a result, albeit to a much lesser extent, research of determinants of working capital. Following pioneering studies in the field, such as those conducted by Jose et al. (1996), Shin and Soenen (1998), Deloof (2003), Lazaridis and Tryfonidis (2006) and García-Teruel and Martínez-Solano (2007) a large number of replicated studies with very similar research settings have been published.

The analysis by countries shows a wide geographical representation of the studies. Observed according to the categorization of the United Nations (UN/DESA et al., 2015), the selected studies are conducted on samples of both developed and developing countries. If other studies have been considered, in addition to the ones that are, it can be noticed that the researchers in general paid somewhat more attention to developing countries.

Building on the above, the studies focus on samples of firms from only one country, and only a small number of studies deal with comparative analyzes of WCM of firms from several countries (Bieniasz & Gołaś, 2011; Rehn, 2012; Uchenna et al., 2012; Thapa, 2013). The countries in which a large number of selected surveys are concentrated are: the USA, Pakistan, Portugal, Turkey and the United Kingdom. In the recent past in the Republic of Croatia, with the exception of final, graduate, postgraduate specialist and master's theses, only a few studies of the linear impact of WCM or liquidity on profitability have been conducted: Lončar and Ćurak (2008a), Lončar and Ćurak (2008b), Barać Aljinović et al. (2013), Mamić Sačer et al. (2013), Tušek et al. (2014).

Furthermore, with regard to distribution by activities, it can be concluded that studies are not limited to certain activities. Moreover, the studies deal with a wide range of different activities, among which the most represented are those from the secondary sector, specifically, the manufacturing industry. Due to business and accounting specificities, firms from the financial activity were often left out of the samples of the observed studies. In addition, the focus of most studies is on samples of firms from several different industries (multi-sector samples), which indicates an attempt to compare the results among them. Finally, the subject of the studies are predominantly listed firms, and in the context of size, these are predominantly firms of a larger size or all sizes. In the last few years there has been a noticeable trend of increasing the number of studies focusing on small and small and medium-sized firms. Methodologicaly, studies using correlation and regression analysis prevail.

2.1. A review of previous research on the linear impact of WCM on firm's profitability

The first studies on the impact of WCM on the profitability, i.e. the business performance of the firm assume that this impact is linear and mostly give strong statistical support for its significance. Given the direction and significance of the linear impact of working capital investment indicators on the firms' profitability and performance, these studies can be divided into those that consistently or dominantly show a significantly negative linear impact of working capital investment, that is speak in favor of the aggressive WCM strategy, and are more numerous, and those that consistently or dominantly indicate this impact is significantly positive and speak in favor of the conservative WCM strategy. In addition, groups of studies consistently or dominantly do not find the existence of a significant impact or detect the divided results of the same. Inconsistency and division in the results of several studies are manifested in different effects of WCM variables on firms' profitability detected for subsamples of different firms and for different specifications of regression models, given the indicators of the variables they include and the applied model estimators, both within and among studies.

Studies conducted by Lazaridis and Tryfonidis (2006), García-Teruel and Martínez-Solano (2007), Lončar and Ćurak (2008a), Lončar and Ćurak (2008b), Nobanee and AlHajjar (2009), Silva (2011), Archavli et al. (2012), Enqvist et al. (2012), Yazdanfar and Öhman (2014), Pais and Gama (2015), Tingbani (2015) and Lyngstadaas and Berg (2016) are just some of the studies conducted in developed countries[1], which consistently support the thesis of a significantly positive impact of aggressive WCM strategy. Besides the above studies, which consistently demonstrate a significantly negative impact of the working capital cycles on the firm's profitability, studies conducted by Jose et al. (1996), Shin and Soenen (1998), Ganesan (2007) and Rehn (2012) also dominantly show the existence of a significantly negative impact.

Although empirical studies on the linear impact of WCM on firm's profitability, which support the thesis that an aggressive WCM strategy is profit-maximizing are more numerous, there are studies (Nobanee, 2009; Gill et al., 2010; Uchenna et al., 2012; Akoto et al., 2013; Ahmad et al., 2014; Angahar & Alematu, 2014; Muscettola, 2014) whose results consistently suggest just the opposite.

Contrary to most empirical studies that detect that WCM significantly affects the firm's profitability, a few studies consistently (Padachi, 2006; Bhunia & Das, 2012; Vučak, 2012; Aljinović Barać et al., 2013; Russo, 2013; Tušek et al., 2014) or

[1] According to (UN/DESA et al. 2015).

dominantly (Eljelly, 2004; Baveld, 2012; Jamil et al., 2015) indicate that the stated influence is statistically insignificant. Studies by Karadagli (2012) and Vural et al. (2012) equally reveal significantly positive and significantly negative impact of working capital cycles on firms' profitability. Finally, studies conducted by Deloof (2003), Filbeck et al. (2007), Uyar (2009), Charitou et al. (2012), Huynh (2012) and Tahir and Anuar (2016) comparatively indicate a significant and insignificant impact of WCM on the firm's profitability.

2.2. A review of previous research on the non-linear impact of WCM on firm's profitability

Unlike the majority of studies on the impact of WCM on firm's profitability, which, although discussing the existence of optimal level of working capital assume the existence of a linear relationship between the observed variables, more recent studies (Silva, 2011; Baños-Caballero et al., 2012a; Gomes, 2013; Russo, 2013; Thapa, 2013; Baños-Caballero et al., 2014; Aktas et al., 2015; Pais & Gama, 2015; Afrifa, 2016; Afrifa & Padachi, 2016; Lyngstadaas & Berg, 2016) assume and/or detect that this relationship is nonlinear. The results of all these studies, except those conducted by Russo (2013), Pais and Gama (2015) and Lyngstadaas and Berg (2016), imply the existence of a non-monotonic concave relationship and optimal level of working capital that maximizes profitability, and demonstrate robustness when it comes to the industry, the firm's size, age, location and financial constraints, and various indicators for measuring the observed variables.

Contrary to the presented results of most studies on the nonlinear quadratic impact of WCM on the firm's profitability (Silva, 2011; Baños-Caballero et al., 2012a; Gomes, 2013; Baños-Caballero et al., 2014; Aktas et al., 2015; Afrifa, 2016), the results of studies conducted by Pais and Gama (2015) and Lyngstadaas and Berg (2016) demonstrate significant quadratic dependence and the existence of relevant profitability minimums for cash conversion cycle and some of its components. This minimums are achieved for large values of the observed variables, which indicates a general trend of decreasing return on assets as these variables, i.e. indicators increase. Furthermore, since previous studies of the nonlinear quadratic relation of variables in focus identify a negative value of the coefficients with a maximum reached for low values of independent variables, the same studies, despite differences in quadratic function, also indicate a declining trend in return on assets with increasing values of independent variables. Based on that, Pais and Gama (2015) and Lyngstadaas and Berg (2016) conclude that the practice of aggressive WCM generally increases firm's profitability. Finally, unlike the studies

that reveal the existence of a significant quadratic relationship between WCM and firm profitability, the results of the study conducted by Russo (2013) consistently suggest the opposite, i.e. that the mentioned is statistically insignificant.

3. HYPOTHESES

The results of previous studies on the impact of WCM on the firm's profitability demonstrate the existence of a certain gap and inconsistency. The latter suggests that an understanding of how working capital is managed is not explicit, which with the fact that it is not possible to talk about one strategy that is necessarily optimal for all firms, regardless of their specificities, in all periods, in line with the renewed research interest, determines the permanent need to examine the impact of WCM on firm's profitability, and ist determinants.

Most of the previous studies, in accordance with the generally accepted idea, suggest that WCM significantly affects the profitability and risk of the firm. Therefore, the basic and related auxiliary hypotheses of this paper start from the above idea, with the aim of testing it for firms registered in manufacturing, trade, and information and communication activity sections in the Republic of Croatia. In accordance with the first and numerically significantly more represented empirical studies on the impact of WCM on firm's profitability, the hypothesis testing in this paper begins with the testing of the linear impact of WCM on the profitability of firms in selected industries. The first hypothesis therefore assumes that WCM has a significant effect on firm profitability in the selected industries in Croatia. The first auxiliary hypothesis, in line with the results of most empirical studies on the linear impact (Shin and Soenen 1998; Lazaridis and Tryfonidis 2006; García-Teruel and Martínez-Solano 2007; Nobanee and AlHajjar 2009; Şen and Oruç 2009; Zariyawati et al. 2009 and others) supposes the existence of a significantly positive impact of an aggressive WCM strategy on the profitability of the analyzed firms. The impact is examined with the control for other independent variables that previous studies have shown to have a significant impact on the firm profitability, and these are: firm profitability in the previous period, firm size, firm growth, investments in fixed assets of the firm, financial constraints of the firm, the activity and growth of real gross domestic product.

In accordance with the studies on the nonlinear quadratic impact of WCM on the firms' profitability or performance, the second auxiliary hypothesis assumes the existence of a significant concave quadratic relationship between WCM and the profitability of manufacturing, trade and firms in the information and communication activity section registered in the Republic of Croatia. In other words, it is

assumed that the indicators of WCM and firm profitability are positively related at lower and negatively at higher levels of working capital investment. This relationship is tested with control for other independent variables that in previous studies have shown to significantly affect the firm's profitability: firm profitability in the previous period, firm size, firm growth, investment in fixed assets of the firm, financial constraints of the firm, industry and growth of real gross domestic product.

Finally, starting from the second auxiliary hypothesis, the third and fourth auxiliary hypotheses postulate the robustness, i.e. the independence of the assumed concave quadratic relationship between WCM and firm profitability on the firm's size and industry. In this context, the assumption of a concave quadratic relationship between WCM and profitability for subsamples of the observed firms according to the firm's size and industry is tested. Thus, in addition to including firm size as one of the control variables, the models of the nonlinear quadratic relationship between WCM and profitability are estimated separately and for subsamples of small, medium-sized, and large firms. When it comes to the industry, separate testing was carried out for manufacturing, trade and firms in the information and communication activity section. Following the above-mentioned, it is postulated that the assumed concave quadratic relationship between WCM and firm profitability is robust, although at the same time it is postulated that the assumed optimal levels of WCM indicators for the mentioned subsamples of firms differ. The latter actually wants to point out that the firm's size and industry, although they do not change the character of the relationship, determine the WCM and the assumed optimal levels of WCM indicators. The firm's size and industry can therefore actually be considered as determinants of WCM.

4. METHODOLOGICAL FRAMEWORK OF EMPIRICAL RESEARCH

The chapter presents the sample design, data and variables used in empirical research, as well as the methods and model specification for the hypothesis testing.

4.1. Sample design

The research sample consists of firm-year observations, i.e. data on firms registered in the Republic of Croatia in one of the following activity sections according to the National Classification of Activities 2007: C (manufacturing),

G (wholesale and retail trade; repair of motor vehicles and motorcycles) and J (information and communication), which persist in the market, have employees, positive sales revenues, operating expenses, assets and capital and reserves in the period 2008-2015, and are recorded in the Financial Agency database.

In the context of independently creating a research sample, in the first phase, and considering the criterion of the firm's persistence in the observed period, the data set on all manufacturing, trade and firms in the information and communication activity section for period from 2008 to 2015 was balanced. After the balancing, the set of firms consisted of 25,076 firms, or 200,608 firm-year observations. Then, using the Stata 14 software package, the firm-year observations without employees (based on working hours), without positive values, i.e. with non-positive values of sales revenues, operating expenses, assets or capital and reserves were isolated from the mentioned set. After this step, 20,472 firms remained in the sample, i.e. 132,165 firm-year observations. In the final step, due to the presence of outliers, following the example of some previous studies (Baños-Caballero et al., 2012a; Baños-Caballero et al., 2014; Deloof, 2003; Lyngstadaas & Berg, 2016; Pais & Gama, 2015 among others) 1% of the minimum and maximum values for each observed indicator of the variable, except the annual growth of real gross domestic product, by subsamples of firms according to their size and industry were omitted[2]. Consequently, the final sample, which can be characterized as unbalanced, consists of 19,355 firms, or 116,002 firm-year observations. *Table 1* shows the structure of the final sample by industry and firm size, indicating the number of firms and the number of firm-year observations.

[2] Thus, 1% of the minimum and maximum values of all indicators of variables were excluded, except for the annual growth of real gross domestic product, for each of the subsample of firms according to their industry and size (small manufacturing firms, medium-sized manufacturing frims, large manufacturing firms, small trade firms, medium-sized trade firms, large trade firms, and small, medium-sized and large firms in the Information and communication activity section).

Table 1

SAMPLE STRUCTURE BY INDUSTRY AND FIRM SIZE
(NUMBER OF FIRMS AND FIRM-YEAR OBSERVATIONS)

Size / Industry	Small firms	Medium-sized firms	Large firms	Total
C (Manufacturing)	5.663 32.112	483 2.319	134 713	6.073 35.144
G (Wholesale and retail trade; repair of motor vehicles and motorcycles)	11.795 68.198	440 1.928	113 523	12.166 70.649
J (information and communication)	1.785 9.927	42 184	19 98	1.832 10.209
Total	18.552 110.237	944 4.431	265 1.334	**19.355** **116.002**

Source: Authors' systematization according to FINA data (FINA, 2017)

Note: The reason for the mismatch of the sums of numbers of firms by size and industry categories with the item *Total* arises from the fact that there are firms that change the size category and / or predominant industry in the observed period. Due to the latter, these firms are in several observed subsamples, so the sums of numbers of firms are logically, to a greater or lesser extent, larger than the item *Total*.

4.2. Data and variables used

The data used are secondary data on firms that form a defined sample and macroeconomic data. In particular, the data needed to calculate the indicators of variables at the firm level were obtained from the database of the Financial Agency, while the macroeconomic data where obtained from the databases of the Croatian Bureau of Statistics. The variables and its indicators used in the paper are those used in other similar studies, wherby their selection is determined by the theoretical basis, their significance in previous studies and preliminary empirical study, as well as by the availability of data needed for their calculation. Variables and indicators names, labels and methods of measurement are given in *Table 2*.

To test the basic hypothesis, i.e. the corresponding auxiliary hypotheses, the firm profitability is used as a dependent variable. The independent variables are divided into an independent variable of primary interest and independent control variables. The independent variable of primary interest is the WCM variable.

Independent control variables include firm profitability in the previous period, firm size, firm growth, investment in fixed assets, financial constraints, industry, and annual growth of real gross domestic product. Different indicators of a single variable are not included in a single model at the same time.

The indicators of variables at the firm level are defined for each firm-year. The industry indicator (dummy) variables, although usually specific and time-invariant for a particular firm, for some firms in the sample, and due to the identified transitions of firms between activities, are not. The annual growth rate of real gross domestic product changes over time, but is the same for all firms in each period or year. Finally, in order to reduce the impact of outliers and allow the adjustment of distribution to normal, as mentioned, for all variable indicators, except for annual growth of real gross domestic product, 1% of minimum and maximum values by subsamples of firms according to their size and industry were eliminated.

Table 2

VARIABLES AND INDICATORS NAMES, LABELS AND METHODS OF MEASUREMENT

Variable name and label	Indicator name and label	Method of measurement of indicator (variable)
Firm profitability (PRO)	Net return on assets (NROA) Gross operating return on assets (BOPRROA) Return on equity (ROE)	NROA = net profit / total assets BOPRROA = gross operating profit / total assets ROE = net profit /equity
WCM (WCM)	Cash conversion cycle (CCC) Net trade cycle (NTC) SQCCC i SQNTC are the corresponding squares of the above indicators	CCCC = (average inventories / operating costs + average trade receivables / sales revenue – average trade paybles / operating costs) * 365 NTC = (average inventories + average trade receivables – average trade payables)*365 / sales revenue
Firm size	Sales revenue (LN_SS) Firm size categories: small firms (S), medium-sized firms (M) and large firms (L)	LN_SS = ln (sales revenue of firm) Firm size categories: small firms (S), medium-sized firms (M) and large firms (L) defined by Financial Agency.

Variable name and label	Indicator name and label	Method of measurement of indicator (variable)
Firm growth (GRS)	Firm growth (GRS)	GRS = (sales revenue$_t$ – sales revenue$_{t-1}$) / sales revenue$_{t-1}$)
Investment in fixed assets (FATA)	Investment in fixed assets (FATA)	FATA = fixed assets / total assets
Financial constraints (FCON)	Financial leverage (LEV) Probability of financial distress (ZSCORE)	LEV = total debt / total assets The probability of financial distress is quantified by adjusting Altman's (1968) Z-Score estimate for private firms (Altman, 2000), according to the following expression: $Z\text{-Score}_{it} = 0.717*X_1 + 0.847*X_2 + 3.107*X_3 + 0.420*X_4 + 0.998*X_5$ where X1 = net working capital / total assets; X2 = retained earnings / total assets; X3 = profit (earnings) before interest and taxes / total assets; X4 = book value of capital / book value of total liabilities; X5 = sales revenue / total assets.
Annual growth rate of real gross domestic product (GDPGR)	Annual growth rate of real gross domestic product (GDPGR)	The source of data on annual growth rates of real gross domestic product are the databases of the Croatian Bureau of Statistics.
Industry (IND)	The industry is defined as the activity section of the National Classification of Activities 2007. The survey covers three activity sections: C (manufacturing), G (wholesale and retail trade, repair of motor vehicles and motorcycles) and J (information and communication).	Industry is measured by indicator variables. Since the industry variable has three modalities, two indicator variables were introduced. One indicator variable (IND_{iG}) takes the value 1 if the firm belongs to activity section G, and 0 otherwise, while the other indicator variable (IND_{iJ}) takes the value 1 if the firm belongs to activity section J, and 0 otherwise.

Source: Authors' work

Notes: Due to the unavailability of data on the cost of goods sold, data on the firm's operating costs are used in calculation of inventory conversion period and payables deferral period.

4.3. Methods and model specification

In this paper, different specifications of panel regression models are tested[3]. They differ with respect to the indicators of the variables they include and with respect to the functional form of the WCM indicators. Starting from the following general function:

*firm profitability** = f (WCM, firm characteristics (*profitability in the previous period, size, growth, investment in fixed assets, financial constraints*), economic conditions (*growth of real gross domestic product*), industry) (1)

and given the large number of combinations, i.e. regression models that can be formed taking into account the number of different indicators of dependent and independent variables, for the purposes of this empirical research, multifactor models with one indicator of each variable are observed. Considering the latter, and given that one dependent variable with 3 indicators, one independent variable of primary interest with 2 indicators, which manifest in one or two functional forms (level and square), and 7 control variables with a total of 10 indicators are defined, according to the product rule, in total 24 models, 12 models of linear influence, for testing the first auxiliary hypothesis, and 12 models of nonlinear quadratic influence, for testing the second, third and fourth auxiliary hypotheses are created and analyzed.

Variables, especially the firm profitability in the previous period, whose inclusion determines the dynamic specification of the model, as well as functional forms of variables in models, are defined on the basis of theoretical and empirical findings behind the basic hypothesis and the corresponding auxiliary hypotheses. Considering theoretical knowledge from the subject area, previous studies and the results of (preliminary) empirical study, it is evident that in the models of examining the impact of WCM on firm profitability there is a problem of endogenity determined primarily by the existence of reverse causality and by bias caused by omitted variables, or unobserved heterogeneity. In the conducted empirical study, unobserved individual effects can be defined as characteristics of an individual firm, for example, management style, organizational structure, organizational culture, financing structure, technology, etc.

In order to control the problem of endogeneity, regardless of how it is determined, if justified, a dynamic specification of the panel regression model can be used. This, moreover, corrects the problems of sample inhomogeneity due to the presence of outliers (Vural et al., 2012). The latter is, given the dynamic character

[3] The error composition is the same for all tested, i.e. estimated model specifications.

of the profitability of the observed firms, also the most relevant for examining the impact of WCM on their profitability. This is consistent with the results of some relevant previous studies which also find that firm profitability is a dynamic category that persists (Nobanee, 2009; Baños-Caballero et al., 2012a; Vural et al., 2012; Gomes, 2013; Russo, 2013; Tahir & Anuar, 2016). The consequent endogeneity problem (time-invariant unobserved individual effects correlated with regressors, i.e. with dependent variable with time shift) is solved by adequate estimators (e.g. Arellano-Bond and Arellano-Bover/Blundell-Bond estimators) which by first-order differentiating eliminate time-invariant unobserved individual effects and in the model include instrumental variables that control the correlation between the difference of the dependent variable and other endogenous variables with model error. (Depken, 2015)

In accordance with the above, the defined model specifications are tested as linear dynamic panel models with individual fixed effects. In order to test the first auxiliary hypothesis, for the entire sample of firms, the mentioned 12 linear impact models are tested as linear dynamic panel models with individual fixed effects according to Equation (2).

$$\begin{aligned} PRO_{it} = {} & \beta_0 + \beta_1 * PRO_{it\text{-}1} + \beta_2 * WCM_{it} + \beta_3 * LN\_SS_{it} + \beta_4 * GRS_{it} \\ & + \beta_5 * FATA_{it} + \beta_6 * FCON_{it} + \beta_7 * GDPGR_t + \beta_8 * IND_{iG} \\ & + \beta_9 * IND_{iJ} + \eta_i + \varepsilon_{it} \end{aligned} \tag{2}$$

In the above expression, the symbol *i* denotes the firm, and the symbol *t* the year. Firm profitability, WCM and control variables are defined in the manner set out above. β_0 represents a constant, η_i accumulates unobserved heterogeneity, i.e. time-invariant unobserved individual effects specific to a particular firm *i*, and ε_{it} symbolizes a random error.

In order to test the second, third and fourth auxiliary hypotheses, for the whole sample of firms and subsamples of firms by size (small, medium-sized and large) and by industry (manufacturing, trade and information and communication), and additionally also for subsamples of firms simultaneously determined by industry and size, nonlinear quadratic influence models are tested as linear dynamic panel models with individual fixed effects according to Equation (3). In total, therefore, each of the 12 models of nonlinear quadratic impact is tested for the whole sample and 15 different subsamples. Therefore, in total, 192 (12 models * 16 (sub)samples) estimates of the nonlinear quadratic models are conducted.

$$\begin{aligned} PRO_{it} = {} & \beta_0 + \beta_1 * PRO_{it\text{-}1} + \beta_2 * WCM_{it} + \beta_3 * \mathrm{WCM}_{it}^2 + \beta_4 * LN\_SS_{it} \\ & + \beta_5 * GRS_{it} + \beta_6 * FATA_{it} + \beta_7 * FCON_{it} + \beta_8 * GDPGR_t \\ & + \beta_9 * IND_{iG} + \beta_{10} * IND_{iJ} + \eta_i + \varepsilon_{it} \end{aligned} \tag{2}$$

In the above Equation (3), the meanings of the symbols and the definitions of the variables are equivalent to those previously defined.

The regression coefficients along with the indicators of the WCM variable (in level and square) enable the determination of the x-coordinate of the the parabola vertex, i.e. the turning point in relation of the corresponding indicator of the WCM variable and the firm profitability, which is calculated according to Equation (4), for each analyzed model and the associated (sub)samples.

$$breakpoint\ WCM = \frac{-\beta_2}{2\beta_3} \tag{4}$$

All defined models for all associated (sub)samples are estimated by using a two-step robust Arellano – Bover/Blundell – Bond linear dynamic panel model estimator. The reason for choosing the Arellano – Bover/Blundell – Bond estimator lies in its suitability, especially since this estimator is designed for panel cases with several time periods and a large number of individual entities (small T, large N), with a linear functional relationship, with one dynamic dependent variable that depends on its past realizations and with independent variables that are not strictly exogenous, that is they are correlated with past and possibly with the current realizations of random error, then for situations with fixed individual effects which are implying the existence of unobserved individual heterogeneity, and finally for those panels with *within*, but not *between* heteroskedasticity and autocorrelation (Baum, 2013). Besides, the subject estimator is an extension of the Arellano-Bond estimator that corresponds to large autoregressive parameters and a large ratio of panel effect variance, i.e. unobserved individual effects and idiosyncratic error variance. (StataCorp., 2015) The Arellano – Bover/Blundell – Bond estimator was used, for example, in the following studies: Nobanee (2009), Vural et al. (2012), Baños-Caballero et al. (2012a), Russo (2013), Baños-Caballero et al. (2014) and Tahir and Anuar (2016).

5. RESULTS AND DISCUSSION

Tables 3 – 5 present results of the panel regression models' estimations with net return on assets as an indicator of dependent variable for the whole sample and for subsamples by size and those by industry. All other estimates are available upon request[4].

[4] Due to the extensiveness, statistical printouts of all the tests performed are available upon request in separate appendices. The results were characterized as significant at the usual significance levels of 1%, 5% or 10%.

Table 3

SUMMARY OF THE RESULTS OF THE ESTIMATIONS OF PANEL REGRESSION MODELS OF THE LINEAR AND NONLINEAR QUADRATIC IMPACT OF WCM ON THE NET RETURN ON ASSETS FOR THE WHOLE SAMPLE

	AB L111	**AB L112**	**AB L121**	**AB L122**	**AB N111**	**AB N112**	**AB N121**	**AB N122**
L.NROA	0.321*** (27.38)	0.310*** (26.56)	0.321*** (27.42)	0.310*** (26.62)	0.319*** (27.78)	0.310*** (26.93)	0.319*** (27.79)	0.310*** (26.91)
CCC	-0.0000199*** (-2.73)	-0.00000698 (-0.96)			-0.000103*** (-6.95)	-0.0000687*** (-4.72)		
SQCCC					9.04e-08*** (7.37)	6.71e-08*** (5.71)		
NTC			-0.0000188*** (-2.74)	-0.00000705 (-1.04)			-0.0000985*** (-7.10)	-0.0000655*** (-4.77)
SQNTC							8.01e-08*** (7.47)	5.86e-08*** (5.58)
ln_ss	0.0321*** (14.79)	0.0297*** (13.94)	0.0323*** (14.85)	0.0297*** (13.95)	0.0318*** (15.12)	0.0292*** (14.02)	0.0317*** (15.05)	0.0290*** (13.95)
GRS	0.0489*** (8.00)	0.0511*** (8.42)	0.0508*** (8.17)	0.0531*** (8.63)	0.0513*** (8.65)	0.0520*** (8.87)	0.0524*** (8.80)	0.0530*** (8.99)
FATA	-0.0786*** (-9.47)	-0.0613*** (-7.31)	-0.0785*** (-9.47)	-0.0607*** (-7.26)	-0.0878*** (-10.59)	-0.0685*** (-8.10)	-0.0880*** (-10.56)	-0.0683*** (-8.02)
LEV	-0.0343*** (-5.31)		-0.0351*** (-5.42)		-0.0373*** (-5.90)		-0.0377*** (-5.96)	
ZSCORE		0.00810*** (7.71)		0.00832*** (7.91)		0.00794*** (7.71)		0.00809*** (7.82)
GDPGR	-0.0262** (-1.99)	-0.0272** (-2.21)	-0.0296** (-2.23)	-0.0304** (-2.44)	-0.0291** (-2.27)	-0.0273** (-2.26)	-0.0313** (-2.44)	-0.0293** (-2.42)

	AB L111	AB L112	AB L121	AB L122	AB N111	AB N112	AB N121	AB N122
Industry=G	0.00372 (0.35)	0.00856 (0.81)	0.00266 (0.25)	0.00791 (0.75)	0.00652 (0.63)	0.00875 (0.85)	0.00456 (0.44)	0.00749 (0.73)
Industry=J	0.235*** (9.67)	0.189*** (8.45)	0.233*** (9.66)	0.185*** (8.36)	0.216*** (9.28)	0.174*** (8.07)	0.212*** (9.11)	0.170*** (7.88)
Constant	-0.421*** (-12.38)	-0.434*** (-12.46)	-0.423*** (-12.46)	-0.435*** (-12.55)	-0.407*** (-12.31)	-0.419*** (-12.24)	-0.403*** (-12.22)	-0.416*** (-12.21)
Obs.	92946	92946	92946	92946	92946	92946	92946	92946

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4

SUMMARY OF THE RESULTS OF THE ESTIMATIONS OF PANEL REGRESSION MODELS OF THE NONLINEAR QUADRATIC IMPACT OF WCM ON THE NET RETURN ON ASSETS FOR SUBSAMPLES OF FIRMS BY SIZE

	AB N111M	AB N112M	AB N121M	AB N122M	AB N111S	AB N112S	AB N121S	AB N122S	AB N111V	AB N112V	AB N121V	AB N122V
L.NROA	0.315*** (27.28)	0.307*** (26.01)	0.315*** (27.22)	0.306*** (26.00)	0.393*** (9.88)	0.377*** (9.52)	0.391*** (9.81)	0.376*** (9.49)	0.437*** (6.81)	0.403*** (5.98)	0.429*** (7.10)	0.395*** (5.94)
CCC	-0.000113*** (-7.68)	-0.0000727*** (-4.76)			-0.000242*** (-2.85)	-0.000185** (-2.10)			-0.000173 (-1.09)	-0.0000391 (-0.25)		
SQCCC	9.77e-08*** (7.86)	7.20e-08*** (5.89)			0.000000256 (1.55)	0.000000223 (1.27)			0.000000139 (0.26)	-0.000000258 (-0.46)		
NTC			-0.000113*** (-7.62)	-0.0000723*** (-4.68)			-0.000237*** (-2.87)	-0.000173** (-2.10)			-0.000137 (-0.95)	-0.0000164 (-0.11)
SQNTC			9.42e-08*** (7.90)	6.91e-08*** (5.82)			0.000000240 (1.60)	0.000000191 (1.26)			-9.64e-08 (-0.23)	-0.000000413 (-0.92)

	AB N111M	AB N112M	AB N121M	AB N122M	AB N111S	AB N112S	AB N121S	AB N122S	AB N111V	AB N112V	AB N121V	AB N122V
ln_ss	0.0351*** (15.57)	0.0331*** (15.30)	0.0354*** (15.57)	0.0333*** (15.29)	0.0101 (1.38)	0.00769 (1.04)	0.00992 (1.34)	0.00795 (1.10)	0.00301 (0.39)	-0.00139 (-0.16)	0.000468 (0.06)	-0.00404 (-0.49)
GRS	0.0517*** (8.60)	0.0500*** (8.65)	0.0519*** (8.62)	0.0502*** (8.68)	0.0428*** (3.66)	0.0503*** (4.01)	0.0426*** (3.60)	0.0497*** (4.06)	0.0819*** (4.03)	0.0677*** (3.46)	0.0809*** (4.35)	0.0667*** (3.58)
FATA	-0.0833*** (-9.97)	-0.0601*** (-6.33)	-0.0839*** (-10.00)	-0.0605*** (-6.33)	-0.0772*** (-3.16)	-0.0332 (-1.19)	-0.0778*** (-3.17)	-0.0350 (-1.28)	-0.0761*** (-3.09)	-0.0417 (-1.37)	-0.0767*** (-3.00)	-0.0385 (-1.24)
LEV	-0.0350*** (-5.53)		-0.0353*** (-5.58)		-0.0240 (-1.56)		-0.0230 (-1.50)		-0.0831*** (-3.67)		-0.0817*** (-3.61)	
ZSCORE		0.00818*** (6.27)		0.00821*** (6.29)		0.0110** (2.53)		0.0106** (2.53)		0.0195*** (3.56)		0.0196*** (3.67)
GDPGR	-0.0199 (-1.53)	-0.0155 (-1.26)	-0.0212 (-1.62)	-0.0164 (-1.34)	0.00533 (0.15)	-0.0239 (-0.62)	0.00583 (0.16)	-0.0216 (-0.57)	0.0410 (0.71)	0.0443 (0.75)	0.0366 (0.62)	0.0426 (0.75)
Industry=G	0.00548 (0.53)	0.00895 (0.89)	0.00531 (0.52)	0.00878 (0.87)	-0.0365*** (-2.84)	-0.0327** (-2.54)	-0.0368*** (-2.85)	-0.0327** (-2.53)	-0.0162 (-0.96)	-0.0442*** (-2.67)	-0.0171 (-1.00)	-0.0452*** (-2.97)
Industry=J	0.200*** (8.74)	0.183*** (8.52)	0.198*** (8.66)	0.183*** (8.46)	-0.0527** (-2.05)	-0.0455* (-1.67)	-0.0531** (-2.03)	-0.0455 (-1.62)	-0.0450* (-1.78)	-0.0455 (-1.55)	-0.0450* (-1.72)	-0.0447 (-1.56)
Constant	-0.448*** (-13.04)	-0.473*** (-13.82)	-0.451*** (-13.04)	-0.475*** (-13.81)	-0.0860 (-0.59)	-0.107 (-0.74)	-0.0822 (-0.57)	-0.110 (-0.77)	0.0545 (0.34)	0.0445 (0.26)	0.105 (0.66)	0.0969 (0.61)
Obs.	88413	88413	88413	88413	3461	3461	3461	3461	1072	1072	1072	1072

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5

SUMMARY OF THE RESULTS OF THE ESTIMATIONS OF PANEL REGRESSION MODELS OF THE NONLINEAR QUADRATIC IMPACT OF WCM ON THE NET RETURN ON ASSETS FOR SUBSAMPLES OF FIRMS BY INDUSTRY

	AB N111C	**AB N112C**	**AB N121C**	**AB N122C**	**AB N111G**	**AB N112G**	**AB N121G**	**AB N122G**	**AB N111J**	**AB N112J**	**AB N121J**	**AB N122J**
L.NROA	0.319*** (18.16)	0.301*** (16.97)	0.318*** (18.12)	0.300*** (16.91)	0.364*** (24.45)	0.347*** (22.67)	0.364*** (24.49)	0.348*** (22.78)	0.325*** (10.34)	0.306*** (9.34)	0.327*** (10.41)	0.305*** (9.35)
CCC	-0.000174*** (-7.87)	-0.000146*** (-6.43)			-0.0000998*** (-7.37)	-0.0000425*** (-2.84)			-0.000246*** (-3.34)	-0.000199*** (-2.72)		
SQCCC	0.000000129*** (5.74)	0.000000110*** (4.83)			8.17e-08*** (7.11)	4.84e-08*** (4.29)			0.000000168* (1.89)	0.000000142* (1.71)		
NTC			-0.000168*** (-7.56)	-0.000140*** (-6.23)			-0.000100*** (-7.41)	-0.0000437*** (-2.91)			-0.000195*** (-2.87)	-0.000148** (-2.09)
SQNTC			0.000000118*** (5.37)	9.96e-08*** (4.58)			7.92e-08*** (7.27)	4.71e-08*** (4.34)			0.000000106 (1.37)	8.26e-08 (1.06)
ln_ss	0.0210*** (8.49)	0.0206*** (8.88)	0.0214*** (8.60)	0.0208*** (8.96)	0.0268*** (12.02)	0.0252*** (11.79)	0.0267*** (11.92)	0.0252*** (11.70)	0.0335*** (3.92)	0.0320*** (3.89)	0.0351*** (4.14)	0.0333*** (4.09)
GRS	0.0361*** (4.97)	0.0382*** (5.39)	0.0371*** (5.05)	0.0389*** (5.46)	0.0583*** (8.09)	0.0549*** (7.96)	0.0582*** (8.07)	0.0549*** (7.95)	0.0693*** (3.37)	0.0694*** (3.46)	0.0710*** (3.40)	0.0712*** (3.49)
FATA	-0.109*** (-10.41)	-0.0860*** (-7.14)	-0.109*** (-10.32)	-0.0850*** (-7.03)	-0.0825*** (-9.19)	-0.0502*** (-4.82)	-0.0834*** (-9.27)	-0.0514*** (-4.91)	-0.186*** (-5.20)	-0.156*** (-4.13)	-0.185*** (-5.16)	-0.151*** (-3.97)
LEV	-0.0144 (-1.53)		-0.0151 (-1.60)		-0.0392*** (-5.80)		-0.0392*** (-5.81)		-0.0250 (-1.01)		-0.0231 (-0.93)	
ZSCORE		0.00749*** (3.79)		0.00774*** (3.90)		0.00973*** (6.97)		0.00956*** (6.84)		0.00926** (2.15)		0.0101** (2.36)
GDPGR	-0.0109 (-0.53)	-0.0231 (-1.17)	-0.0146 (-0.70)	-0.0263 (-1.32)	-0.00651 (-0.44)	-0.00454 (-0.32)	-0.00692 (-0.47)	-0.00447 (-0.32)	-0.107** (-1.99)	-0.117** (-2.26)	-0.103* (-1.91)	-0.116** (-2.25)
Constant	-0.223*** (-6.29)	-0.255*** (-7.17)	-0.228*** (-6.41)	-0.260*** (-7.30)	-0.320*** (-10.01)	-0.362*** (-10.97)	-0.318*** (-9.89)	-0.360*** (-10.84)	-0.329*** (-2.79)	-0.362*** (-3.13)	-0.355*** (-3.04)	-0.388*** (-3.39)
Obs.	28345	28345	28345	28345	56475	56475	56475	56475	8126	8126	8126	8126

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results of testing the linear impact of WCM on the profitability of the entire sample of firms imply that extensions of the cash conversion cycle and the net trade cycle result in dominantly significantly lower profitability measured by net return on assets, and consistently significantly lower profitability measured by gross operating return on assets and return on equity, and vice versa. The results in the case of net return on assets dominantly, and in the case of gross operating return on assets and return on equity consistently speak in favor of an aggressive WCM strategy as profit-maximizing. The latter is in line with the results of the most previous empirical studies (Jose et al., 1996; Shin & Soenen, 1998; Lazaridis & Tryfonidis, 2006; García-Teruel & Martínez-Solano, 2007; Raheman & Nasr, 2007; Lončar & Ćurak, 2008b; Nobanee & AlHajjar, 2009; Zariyawati et al., 2009; Singhania et al., 2014; Pais & Gama, 2015; Lyngstadaas & Berg, 2016; among others).

Provoking the correctness of the linear impact models resulted in testing the nonlinear quadratic impact of WCM on firm profitability. The results, contrary to expectations, generally imply the existence of a relevant convex quadratic dependence and a minimum of appropriate profitability indicators achieved for large values of the cash conversion cycle and net trade cycle, which with negative coefficients of the latter and the fact that the number of firms with cycles above those for which minimums are achieved is relatively small, suggest an overall declining trend with increasing marginal returns of profitability indicators due to increased WCM indicators for the whole sample, the subsample of small firms, the subsample of manufacturing firms, the subsample of trade firms and the subsample of firms in the information and communication activity section, and in the context of subsampling by both firms' size and industry, for the subsamples of small firms from all three observed activity sections and for the subsample of medium-sized manufacturing fims. In other words, the results indicate that for the mentioned (sub)samples, practicing a more aggressive WCM strategy significantly increases the firm profitability at a growing rate. This was not identified for the subsample of medium-sized firms, i.e. for the subsamples of medium-sized trade firms and medium-sized firms from the information and communication industry, and for the subsample of large firms, i.e. for the subsamples of large firms from all three industries.

The existence of a convex quadratic dependence and the overall declining trend characterized by increasing marginal returns of profitability indicators with increasing WCM indicators for the defined (sub)samples of firms is in line with the results of studies conducted by Pais and Gama (2015) and by Lyngstadaas and Berg (2016). Additionally, although studies conducted by Silva (2011), Baños-Caballero et al. (2012a), Gomes (2013), Thapa (2013), Baños-Caballero et al. (2014), Aktas et al. (2015) and Afrifa (2016) detected the existence of significant concave quadratic relations and maximums of profitability, given that the latter were iden-

tified for low values of WCM indicators, they also suggest a declining trend of profitability with increasing the latter, and suggest aggressive WCM strategy as profit maximizing.

If we compare the lengths of the cash conversion cycle and the net trade cycle where the relevant minimums of profitability indicators are achieved, then in the context of subsamples by firm size it can be seen that they are, as a rule, longer for small firms compared to medium-sized ones, while in terms of subsamples by industry they are significantly comparable to each other. For subsamples of firms according to both their size and industry, the cycles in question are generally longer for subsamples of small manufacturing, trade and information and communication firms than for the subsample of medium-sized manufacturing firms. The presented reveals a more pronounced influence of firm size compared to the predominant industry of the firm, and it is consistent with the Kieschnick et al. (2006) statement on the influence of market power, i.e. the degree of concentration, and to a lesser extent, in the context of industry, on the influence of other factors, such as the nature of products and production technologies, on the lengths of the cash conversion cycle and the net trade cycle.

Furthermore, in the context of (in)significance of the identified nonlinear quadratic relationship for categories of firm size and industry, on the one hand, statistically insignificant nonlinear quadratic relationship between WCM and profitability for medium-sized firms, i.e. for medium-sized trade firms and firms in the information and communication activity section and for large firms, i.e. for large firms from all three observed industries, is very likely the result of a smaller number of firms in these subsamples. On the other hand, potential reasons for the significance of the impact of WCM on the profitability of small firms and medium-sized manufacturing firms are higher cash flow volatility and longer cash conversion cycles and net trade cycles compared to other subsamples. Namely, more volatile cash flows emphasize the importance of WCM and result in the significance of an aggressive WCM strategy. Besides, the predominantly higher median values of the cash conversion cycle and the net trade cycle and the minimum profitability achieved for higher values of this cycles, additionally argue the significance of the respective impacts for small and medium-sized manufacturing firms.

Regarding the (in)significance of the observed relationship for the categories of firm size, Gomes (2013) identified similar results in his study. The mentioned author noticed the existence of a significant concave quadratic relation for micro and small firms, while for medium-sized and large firms he stated that it is not possible to determine the existence of a statistically significant nonlinear relation. In addition to the mentioned author, Lončar and Ćurak (2008a), however for a linear relationship, find that the latter is significantly negative for small and medium-sized firms, and positive, but insignificant in the case of large firms.

Considering the presented results of testing the linear and nonlinear quadratic impact of WCM on profitability for the entire sample of firms, the first auxiliary hypothesis that aggressive WCM has a significantly positive effect on profitability cannot be rejected. Moreover, although the models of the linear impact of WCM on profitability have been tested exclusively for the entire sample of firms that potentially obscure specificities by subsamples and consequently ignore the effects of size and industry on profitability, other independent variables and interactions between them, the results of estimates of linear effects and, with the exception of medium-sized firms, in general also of nonlinear quadratic effects in nonlinear quadratic models confirm the postulate, i.e. speak in favor of an aggressive strategy as profit maximizing for subsamples of small and medium firms, and for subsamples of firms from all three observed activities in general, i.e. for subsamples of small firms from all the activities, as well as for the subsample of medium-sized manufacturing firms. Additionally, although consistently or dominantly insignificant, the impact of an aggressive strategy in question is often or usually of assumed direction also for the remaining subsamples of the firms.

In contrast, for the observed (sub)samples of firms, and given the identified relevant convex quadratic dependence and the presence of minimums of profitability, the second, third and fourth auxiliary hypotheses are rejected. Contrary to the hypothesized concave quadratic dependence, and as mentioned, the results of the analysis for the whole sample and for the identified subsamples of firms indicate the existence of a convex quadratic dependence and an overall declining trend characterized by increasing marginal returns of profitability indicators with the prolongation of the cash conversion cycle and net trade cycle. That is, the results indicate that the aggressive strategy is profit-maximizing with increasing marginal profitability. The latter, however, was not identified for the subsample of medium-sized firms, i.e. for the subsamples of medium-sized trade firms and firms from information and communication activity section, and for the subsample of large firms, i.e. for the subsamples of large firms from all three observed activity sections. Besides, despite the rejection of the third and fourth auxiliary hypotheses, the results clearly indicate the independence of convex quadratic dependence and the overall declining trend with increasing marginal returns of profitability indicators with increasing WCM indicators, that is the independence of aggressive strategy as profit-maximizing with increasing marginal profitability, on industry, and that observed for samples of all firms and for subsamples of small firms from the observed industries, but not on firm size and on the firm size and industry simultaneously.

Finally, and respecting that the results of estimates of linear impact models and linear and nonlinear impacts in nonlinear quadratic impact models speak in favor of an aggressive strategy as profit-maximizing, and the latter, except for

medium-sized firms in general, also in favor of the existence of increasing marginal profitability of the agressive strategy for the whole sample of firms, the subsamples of small and medium-sized firms, and for the subsamples of firms from all three observed activity sections in general, i.e. for the subsamples of small firms from all activity sections, as well as for the subsample of medium-sized manufacturing firms, the basic hypothesis cannot be rejected, but it is, despite the fact that the research results reject the second, third and fourth auxiliary hypothesis, partially accepted.

In addition to considering the impact of interest for testing the auxiliary hypotheses, all control variables, except the indicator variable for trade, for the sample of all firms and for the subsample of small firms as well as for the subsample of medium-sized manufacturing firms, show a consistently or dominantly significant impact on profitability. On the one hand, firm profitability dominantly or consistently significantly increases with the firm profitability in the previous period and the Z-score, and with the firms' size and growth, respectively. The impact of the indicator variable for the information and communication activity section can also be characterized as statistically significantly positive. While, on the other hand, firm profitability dominantly or consistently significantly decreases with leverage and with investment in fixed assets and the annual growth rate of real gross domestic product, respectively.

6. CONCLUSIONS

The presented results and discussion, in accordance with the first auxiliary hypothesis, imply that the practice of a more aggressive WCM strategy, except for medium-sized trade firms and medium-sized firms in the information and communication activity section and for large firms in all three observed activity sections, significantly increases profitability at the increasing rate. In other words, due to the dominance of holding costs resulting in the suitability of an aggressive WCM strategy, managers of small firms from all three industries and managers of medium-sized manufacturing firms should strive to shorten the cash conversion cycle and net trade cycle. Thus, given that in the context of diagnosed industry independence, the results suggest that despite significant differences in the cash conversion cycles and the net trade cycles between industries, their relations with profitability are the same for all industries, specifically that for samples of all firms from the observed industries and for subsamples of small firms from the observed industries, firms, primely small firms and medium-sized manufacturing firms, regardless of the selected industry, should reduce investments in net operating working capital in the narrower sense, especially in the absence of cash flow.

However, this should not be interpreted unconditionally because excessively aggressive WCM due to rising costs of shortening the cycle, or costs that decline with the level of investment in net operating working capital in the narrower sense, may result in reduced profitability. In support of the above, although the predominant activity of the firm does not change the character of the relationship between WCM and firm profitability, the existence of significant differences in the cash conversion cycle and net trade cycle, as well as previously noted differences in consistency of significant results between industries, suggest that the latter determines WCM, and accordingly can be considered one of the WCM determinants.

Finally, respecting the scientific contribution of the paper, it is necessary to acknowledge the existence and warn of certain limitations. These are primarily manifested in the impossibility of spatial and temporal generalization of identified results, findings and implications, and then in the limited possibility of explaining the identified directions and significance of the impact of the observed variable indicators, as well as in detecting reasons for agreement or contradiction of the results of this study with the results of the previous studies. Also, and partly due to the unavailability of certain data, the restriction is also the omission of potentially significant variables and/or alternative variable indicators. Following the above, it is recommended that future research in the field be aimed at mitigating and eliminating the identified limitations.

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UTJECAJ UPRAVLJANJA OBRTNIM KAPITALOM NA PROFITABILNOST PODUZEĆA U ODABRANIM DJELATNOSTIMA U REPUBLICI HRVATSKOJ

Sažetak

Cilj rada jest detektirati utjecaj upravljanja obrtnim kapitalom na profitabilnost prerađivačkih, trgovinskih i poduzeća u području djelatnosti Informacije i komunikacije registriranih u Republici Hrvatskoj. Vremenski horizont razmatranja je razdoblje od 2008.-2015., a finalni uzorak sastoji se od 19.355 poduzeća, odnosno 116.002 poduzeće-godina opažanja. Izvor podataka su baze podataka Financijske agencije i Državnog zavoda za statistiku, a u radu se, uz ostale metode, koristi panel regresijska analiza. Rezultati ukazuju da, nakon kontrole za obilježja poduzeća i makroekonomske uvjete, agresivno upravljanje obrtnim kapitalom signifikantno pozitivno utječe na profitabilnost malih poduzeća iz odabranih djelatnosti te srednje velikih prerađivačkih poduzeća. Štoviše, rezultati impliciraju postojanje signifikantne konveksne kvadratne ovisnosti te sveukupni opadajući trend s rastućim graničnim prinosima profitabilnosti s produljenjem ciklusa obrtnog kapitala navedenih poduzeća. Potonje upućuje da prakticiranje agresivnije strategije upravljanja obrtnim kapitalom povećava profitabilnost po rastućoj stopi. Drugim riječima, menadžeri navedenih poduzeća trebali bi u cilju povećanja profitabilnosti težiti skraćivanju ciklusa obrtnog kapitala.

Ograničenja istraživanja su: nemogućnost prostorne i vremenske generalizacije identificiranih rezultata, nalaza i implikacija; ograničena mogućnost objašnjenja identificiranih smjerova i signifikantnosti utjecaja promatranih pokazatelja varijabli, kao i detekcije razloga suglasja odnosno kontradikcije s rezultatima dosadašnjih sličnih istraživanja; nedostupnost određenih podataka; izostavljanje potencijalno signifikantnih varijabli i/ili alternativnih pokazatelja istih. Znanstveni doprinos može se sažeti kako slijedi: sveobuhvatni i sistematizirani pregled dosadašnjih istraživanja; osim dominantnog ispitivanja linearnog utjecaja, testiranje i nelinearnog kvadratnog odnosa između promatranih varijabli što se, uostalom, tek pojavljuje u relevantnoj literaturi te je shodno tome generalno slabo zastupljeno u svim dosadašnjim istraživanjima, a u Republici Hrvatskoj nije provedeno; respektabilan prostorni i vremenski obuhvat; širenje obuhvata s listanih poduzeća i poduzeća velike veličine na privatna poduzeća te mala i srednje velika poduzeća.

Ključne riječi: upravljanje obrtnim kapitalom, profitabilnost, utjecaj, prerađivačka industrija, trgovina, Informacije i komunikacije, Republika Hrvatska