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ROLE OF WORKING CAPITAL MANAGEMENT IN ACHIEVING PROFITABILITY IN SERBIA

Uloga upravljanja obrtnim kapitalom u ostvarivanju profitabilnosti preduzeća u Srbiji

Abstract

Most authors argue that working capital management has a significant role in achieving profitability. The aim of this research is to determine an influence of working capital management on the profitability of 141 Serbian companies with the highest level of business income that operate in the domestic manufacturing sector. Based on the applied System generalized method of moment (SYS-GMM) model, the authors show that the longer inventory conversion cycle has a negative and statistically significant impact on the profitability of the observed companies, while the other control variables, such as liquidity, financial leverage, activity and sales growth do not affect profitability. Based on the obtained results, the authors may conclude that the role of working capital management in achieving profitability in Serbian manufacturing companies is relatively significant during the period from 2016 to 2020. The obtained findings are significant for financial managers of manufacturing companies in the Republic of Serbia since they provide useful information about the intensity and direction of certain determinants of profitability. On the other hand, the results of this research are also of interest to wider public and policymakers, considering the fact that profitable manufacturing companies provide jobs, pay taxes, produce necessary goods and services and contribute to the creation of social well-being.

Keywords: *working capital management, profitability, manufacturing companies, Serbia*

Sažetak

Većina autora smatra da upravljanje obrtnim kapitalom ima značajnu ulogu u ostvarivanju profitabilnosti. Cilj ovog rada je da ispita uticaj upravljanja obrtnim kapitalom na profitabilnost 141 proizvodnog preduzeća sa najvećim poslovnim prihodima sa teritorije Republike Srbije. Na osnovu primenjenog sistemskog GMM modela, iz analize proizilazi da duže vreme trajanja jednog ciklusa vezivanja zaliha ima negativan i statistički značajan uticaj na profitabilnost posmatranih preduzeća, dok ostale kontrolne varijable, kao što su likvidnost, finansijski levridž, aktivnost i rast prodaje nemaju uticaj na profitabilnost. Na osnovu dobijenih rezultata može se zaključiti da je uloga upravljanja obrtnim kapitalom u ostvarivanju profitabilnosti proizvodnih preduzeća u Srbiji relativno važna u periodu od 2016. do 2020. godine. Dobijeni rezultati su značajni za finansijske menadžere pomenutih kompanija budući da obezbeđuju važne informacije o intenzitetu i smeru uticaja pojedinih determinanti profitabilnosti. Sa druge strane, nalazi ove studije mogu biti od koristi i široj publici, kao i donosiocima ekonomskih odluka, budući da profitabilne proizvodne kompanije obezbeđuju radna mesta, poreske prihode državi, proizvode neophodne proizvode i doprinose blagostanju šire društvene zajednice.

Ključne reči: *upravljanje obrtnim kapitalom, profitabilnost, proizvodne kompanije, Srbija*

Introduction

Working capital management (WCM) has a significant role in achieving and maximizing the companies' profitability with the aim of avoiding excessive investment in short-term assets, as well as maintaining optimal liquidity. Working capital management implies regulation level and structure of current assets in order to achieve an adequate balance between the risk and return. Efficient working capital management leads to higher level of profitability and, at the same time, it increases the value of the shareholders. It is recognized as a significant determinant of profitability during the economic crisis as an internal force for increasing profitability. Most of authors state that the role of working capital management in achieving profitability is significant and that the shorter cash conversion cycle, as a measure of the adequacy of working capital management, leads to profitability growth. According to Alsulayhim [5] the most frequent measures of working capital management include cash conversion cycle and its elements. Following research results and findings of Mazanec [22], Alvarez et al. [6], Kafeel et al. [20], Alsulayhim [5], Agegnew [2], Evci and Şak [16], Şamiloğlu and Akgün [28], Seyoum et al. [30] and Agha [3] the authors defined the following hypotheses:

First hypothesis: The role of working capital management in achieving profitability in Serbian manufacturing companies is significant.

Second hypothesis: There is a negative relationship between inventory conversion cycle as a component of working capital management and Serbian manufacturing companies' profitability calculated by ROE.

Third hypothesis: There is a negative relation between receivable collection period as a component of working capital management and Serbian manufacturing companies' profitability measured by ROE.

Fourth hypothesis: There is a positive relationship between payable conversion cycle as a component of working capital management and Serbian manufacturing companies' profitability calculated by ROE.

In accordance with the findings of Alvarez et al. [6], Alsulayhim [5], and Şamiloğlu and Akgün [28], the authors employ return on equity (ROE) as a measure of

Serbian manufacturing companies' profitability. After an introduction, the second section of this paper provides an extensive literature review in a field of the working capital management role in achieving the companies' profitability, including an overview of the widely used independent variables in the recent empirical literature. The third part of this study presents the description of the data used and the applied research methodology, while the fourth section discusses the obtained results, comparing them with the research results of other authors. Finally, the last part of this paper concludes, provides suggestions for future research and states the limitation of this study.

Literature review

The examination of the role of working capital management in achieving profitability has inspired numerous authors so far. In order to determining the empirical evidence about the impact of working capital management on the profitability of large non-financial Serbian companies in the period from 2016 to 2019, Milošev [23] conducts a study whose results show a non-linear relationship between two observed indicators. The obtained findings imply the existence of a net working capital optimal level. Consequently, it can be concluded that working capital increase has a positive effect on large non-financial Serbian companies' profitability up to the optimal level, above which the further growth of working capital has a negative effect on profitability. Similar to previous research, the purpose of the study conducted by Anton and Nucu [7] is to examine the relation between working capital and profitability in a sample of 719 Polish companies listed on the stock exchange in the period from 2007 to 2016. The authors use different panel data analysing techniques, and the empirical results reveal an inverted U-shaped relationship, which means that working capital has a positive effect on the profitability of Polish companies up to the optimal level. After the optimal level, the observed impact is negative. On the other hand, on the example of 362 Czech companies, including 20 companies with the EFQM (European Foundation for Quality Management) certificate, Yousaf and Bris [38] find a negative link between working capital and companies' profitability

during the period from 2015 to 2019. The authors employ the SYS-GMM model. Jaworski and Czerwonka [19] also contribute to the verification of theories that connect the companies' profitability with the working capital management by emphasising that the companies listed on the WSE (Warsaw Stock Exchange) should shorten the cash conversion cycle in order to increase profitability. Employing dynamic panel data model Arnaldi et al. [8] show a negative relationship between profitability of the 105manufacturing small and medium-sized companies (SMEs) in the Czech Republic, on the one side, and their cash conversion cycle, inventory conversion cycle and payable conversion cycle, on the other side, covering the period from 2014 to 2018. On the example of 141 Serbian companies, Milovanović et al. [25] show that the quality management system (QMS) certification to ISO 9001 has a positive impact on profitability. It is worth to mention that the following findings are not the same from all companies' size and industry types. Additionally, on the example of SMEs in Poland, Zimon and Hossein [39] conclude that the Covid-19 pandemic had no impact on the working capital management strategy; the companies with a high cash conversion cycle ratio had a higher level of profitability. Employing regression analysis Högerle et al. [17] show that shorter cash conversion cycle positively affects profitability of 115 companies listed on German Prime Standard in the period from 2011 to 2017.

Analysing Romanian coal mining companies, Batrancea et al. [11] show that there is a concave relation between variable costs and output, indicating that Romanian coal companies have an optimal production level that maximizes both variable; costs and their profitability. Vuković and Jakšić [36] support the hypothesis that almost all analysed working capital management variables have a statistically significant impact on companies' profitability. This research was conducted on the example of the food companies in the Southeast Europe, while the authors conclude that a more aggressive working capital management strategy is closely related to a higher profitability. Using panel data on the sample of the high-growth companies from the region of the Central, Eastern and South-Eastern Europe (the CESEE countries) in the period from 2006 to 2015, Boțoc and Anton [12] also tried to quantify an impact of

adequate working capital management on profitability. The high-growth companies are included in the panel due to the fact that they have a great potential for creating new jobs, introducing innovations, and influencing the economic development. According to the obtained results, the authors draw a conclusion that there is a concave relation between working capital management and profitability, namely the inverted U-shaped relation. This finding obviously indicates that the high-growth companies from the CESEE countries should have an optimal level of working capital that maximizes their profitability. Evci and Şak [16] discovered the existence of trade-off between working capital management and profitability on the example of 41 companies listed on the Borsa Istanbul Industry Index in the period from 2005 to 2016. Nguyen [26] shows that shorter cash conversion cycle positively affects profitability of 54 companies listed on Vietnam Stock Market from 2011 to 2016. Additionally, Şamiloğlu and Akgün [28] find a negative relationship between receivable collection period and profitability in the manufacturing companies in Turkey. The authors consider that managers can create value for the shareholders by reducing receivable collection period and cash conversion cycle. In addition, analysing a sample of 17 companies listed on the Bucharest Stock Exchange in the period from 2011 to 2015, Cristea and Cristea [14] find a negative relationship between the cash conversion cycle and profitability. Based on the results obtained from the analysis of companies listed on the Belgrade Stock Exchange, Barjaktarović Rakočević et al. [10] conclude that financial managers can increase profitability by reducing the receivable collection cycle. On the other hand, delay in paying to suppliers does not affect the profitability of the observed companies. Singhania et al. [31] reveal that the cash conversion cycle has a negative impact on profitability of Indian manufacturing companies. Following the obtained results, the authors claim that it is necessary to reduce the receivables collection cycle and to extend the time of payment of obligations to suppliers in order to increase profitability.

Ceylan [13] empirically proves that there was a unidirectional causal link between the brand value and corporate profitability in Turkey in the period from 2008 to 2018. Milošević Avdalović [24] examines the determinants

of profitability on the example of 62 industrial grinding companies listed on the Belgrade Stock Exchange in the period from 2008 to 2014 employing the ordinary least squares (OLS) method. According to these findings, variables such as leverage, number of shares and book value per share are inversely related to profitability, while the size and age of the observed companies have no influence on profitability. At the same time, Vučković [37] emphasizes that agricultural companies in Vojvodina, despite having similar arable land and operating in the same geographical area, may have different level of profitability due to the differences in their financial structure, asset structure, activity indicators and liquidity. The author claims that a positive effect on the profitability of the agricultural companies in Vojvodina can be attributed to a higher level of the equity capital in the total assets and a higher liquidity ratio. Janda et al. [18] believe that the success of the food processing micro-companies in the rural areas of the Eastern Europe is to the greatest extent related to the characteristics of the owner, that is, the manager itself. The key characteristic of the owner/manager is a risk-taking behaviour as the main motive for establishing the company. The characteristics of the company that determine profitability are caused by factors such as the company's location, the size and organizational form of the company, technological progress, and whether or not the company has products' certifications. These findings were obtained from the research conducted on 300 agricultural micro-enterprises in Poland for the period from 2002 to 2006.

Data description and employed methodology

With the intention of examining the role of working capital management in achieving profitability, the authors analyse a sample consisting of 141 companies in the manufacturing sector with the highest level of the business income from the territory of the Republic of Serbia. The time span of the research refers to the period from 2016 to 2020.[1] According to the authors' calculation on the basis of data

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1   The data used in the research were collected from the official financial reports of the observed companies in the period from 2016 to 2020, which are publicly available on the official website of the Serbian Business Registers Agency. Individual indicators are the result of the authors' calculations.

available on the official Serbian Business Registers Agency website, the average profitability measured by the ROA (Return on Assets) of the 141 largest companies from the Serbian manufacturing sector in the observed period was 6.5%, average ROE (Return on Equity) was 10.6%, average EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) was 10.2%, while the average net profit margin was 5.3%. Considering the effectiveness of working capital management, the authors came to the following results: the average inventory conversion cycle in the observed Serbian manufacturing companies was 126 days; the average receivable collection period was 66 days, while the average payable conversion cycle was 117 days covering the period from 2016 to 2020. In accordance with these results, the average cash conversion cycle for 141 observed Serbian manufacturing companies with the highest level of the business income in observed period was 74 days. On the other hand, when analysing the liquidity indicators of the Serbian manufacturing companies, as possible explanatory variables that may have an impact on the profitability of the observed companies, the authors conclude that the average current liquidity ratio was 2.1, while the average quick liquidity ratio was 1.3 covering the observed time interval. By statistical analysis of the observed companies' business activities, the authors concluded that the average total asset turnover in the period from 2016 to 2020 was 1.3. The examination of the financial leverage leads to conclusion that the average debt to equity ratio was 0.18, which means that the Serbian manufacturing companies with the highest level of the business income used 18% of debt on average during the observed period.

Table 1 shows the annual indicators of the business activity of all Serbian manufacturing companies (sector C) in the period from 2016 to 2020. The data from Table 1 indicate that in the observed period there was a decrease in the number of the registered companies in this sector from 16,978 in 2016 to 15,613 in 2020, which represents a drop of about 8%. Despite this, there was an increase in the value of their production from 2,503,550 million RSD in 2016 to 3,089,134 million RSD in 2020, which represents a growth of 24%. At the same time, the value added of these companies increased by as much as 38%,

indicating a possible increase in their productivity, business efficiency and improvement of overall business performance. However, these trends were also accompanied by a decrease in the share of the manufacturing industry in the country's GDP by 1.5%, pointing to the conclusion that in the observed period some other sectors of the economy might contributed greatly to its generation and growth. In addition, in the meantime, the real growth rate of companies from the manufacturing industry dropped from 3% in 2016 to only 0.5% in 2020. Among other things, this trend could have been influenced by the 2020 Covid-19 pandemic, which is widely known to have slowed down the economic activities worldwide. The pandemic also triggered a consequent reduction in demand for the products of the manufacturing industry. Finally, in the period from 2016 to 2020, the gross salaries and wages of the employees increased by as much as 53%, while this trend was followed by the growth of the total number of the employees in the manufacturing industry by 23.2%.

Table 2 summarizes the most recent empirical studies that examine the relationship between profitability and working capital management. It can be concluded that

Table 1: Annual indicators on business activities of companies in the Republic of Serbia – sector C

Year	Number of enterprises	Production value (mil RSD)	Value added (mil RSD)	Share of GDP (%)	Real growth rates (%)	Gross salaries and wages (mil RSD)	Number of persons employed
2016	16,978	2,503,550	578,998	14.8	3	256,325	336,075
2017	15,797	2,826,522	656,230	15.1	4.5	289,041	356,817
2018	15,831	3,015,600	699,974	14.5	1.5	317,371	377,984
2019	15,678	3,134,343	744,029	13.7	0.1	362,668	400,710
2020	15,613	3,089,134	798,723	13.3	0.5	392,273	414,078

Source: [32]

Table 2: The role of working capital management in achieving profitability

Author(s)	Measure of WCM	Profitability measures	WCM and profitability
Mazanec [22]	*Inventory turnover, Accounts receivable turnover, Current liabilities turnover, Days inventory outstanding, Days current assets outstanding, Days receivable outstanding, Days payable outstanding, Cash conversion cycle*	ROA	Different results
Demiroj et al. [15]	*Inventory conversion cycle* *Receivable collection period* *Payable conversion cycle* *Cash conversion cycle*	Negative Negative Negative Negative	ROA
Stoiljković et al. [33]	$WCM = Inventory\ turnover\ cycle + Average\ collection\ period - Account\ payable\ period$	ROA	No effect
Milošev [23]	$$WKCR = \frac{Inventory + Account\ Receivables - Account\ Payable}{Sales}$$ $$WKCR_{sq} = \left(\frac{Inventory + Account\ Receivables - Account\ Payable}{Sales}\right)^2$$	ROA	Inverted U shape
Anton and Nucu [7]	$$WKCR = \frac{Inventories + Debtors - Creditors}{Sales}$$ $$WKCR_{sq} = \left(\frac{Inventories + Debtors - Creditors}{Sales}\right)^2$$	ROA	Inverted U shape
Jaworski and Czerwonka [19]	$CCC = Inventory\ turnover\ cycle + Average\ collection\ period - Account\ payable\ period$ $$Working\ capital = \frac{Current\ assets - Current\ liabilities}{Sales\ revenue}$$	ROA	Negative Positive
Alvarez et al. [6]	*Inventory conversion cycle, Receivable collection period, Payable conversion cycle, Cash conversion cycle*	ROA ROE	Positive
Arnaldi et al. [8]	*Inventory conversion cycle* *Receivable collection period* *Payable conversion cycle* *Cash conversion cycle*	EBITDA	Negative Negative No effect Negative

Author(s)	Measure of WCM	Profitability measures	WCM and profitability
Högerle et al. [17]	*Cash conversion cycle*	ROCE	Negative
Kafeel et al. [20]	*Inventory conversion cycle, Receivable collection period, Payable conversion cycle, Cash conversion cycle*	ROA	Positive
Alsulayhim [5]	*Receivable collection period* *Inventory period* *Account payable period*	ROA ROE ROCE GOP/NOP	Positive
Agegnew [2]	*Inventory conversion cycle, Receivable collection period, Payable conversion cycle, Cash conversion cycle*	ROA	Negative
Boțoc and Anton [12]	$$WKCR = \frac{Stocks + Debtors - Creditors}{Sales}$$ $$WKCR_{sq} = \left(\frac{Stocks + Debtors - Creditors}{Sales}\right)^2$$ *CCC = Account receivable + Inventory − Payable* *CCC$_{sq}$ = (Account receivable + Inventory − Account payable)^2*	ROA ROIC	Inverted U shape
Evci and Şak [16]	*Inventory conversion cycle* *Payable conversion cycle* *Cash conversion cycle*	ROA	Negative Positive Negative
Şamiloğlu and Akgün [28]	*Inventory conversion cycle, Receivable collection period, Payable conversion cycle, Cash conversion cycle*	ROA ROE OPM NPM	Different results
Seyoum et al. [30]	*Inventory conversion cycle* *Receivable collection period* *Payable conversion cycle* *Cash conversion cycle*	ROA	Negative Negative No effect Negative
Singhania et al. [31]	*Cash conversion cycle*	GOP	Negative
Agha [3]	*Creditors turnover ratio, Debtors turnover ratio, Inventory turnover ratio*	ROA	Negative

Note: The presented abbreviations refer to the following profitability indicators: ROA – Return on Assets, NPR – Net Profit Ratio, ROE – Return on Equity, EBITDA – Earnings before interest, taxes, depreciation and amortization, ROCE – Ratio of the Return on Employed Capital (liabilities and equity), GOP – Gross Operating Profit, NOP – Net Operating Profit, ROIC – Return on Invested Capital, OPM – Operating Profit Margin and NPM – Net Profit Margin.
Source: The authors' systematization.

there is no consensus about the role of working capital management in achieving profitability. However, most of authors argue that the shorter cash conversion cycle has positive impact on profitability of the company. However, some authors prove that there is an inverted U shape between working capital and profitability. Inverted U shape relationship means that there is an optimal level of working capital. Namely, below that level, the growth of working capital has a positive impact on profitability, while above its optimal level further growth of working capital has a negative impact on profitability. As is the case of the most empirical studies, the authors assume that a longer cash conversion cycle has a negative effect on profitability.

According to Alsulayhim [5] the most frequent measures of working capital management are the cash conversion cycle (CCC) and its main elements (inventories, receivables, and payables). Many authors have used the same measures, such as Mazanec [22], Demiroj et al. [15], Alvarez et al. [6], Kafeel et al. [20], Alsulayhim [5], Agegnew [2], Evci and Şak [16], Şamiloğlu and Akgün [28], Seyoum et al. [30], Agha [3] and Taurianga and Adjapong [34]. Consequently, in this paper, the authors use:

- the inventory conversion period (ICP),
- receivable collection period (RCP), and
- payable conversion period (PCP).

as approximate indicators of working capital management. The cash conversion cycle is not included in the estimated model due to the fact that this variable is collinear with the ICP, RCP and PCP. Following Alvarez et al. [6], Alsulayhim [5] and Şamiloğlu and Akgün [28] the authors employ return on equity (ROE) as a measure of Serbian manufacturing companies' profitability.

Jaworski and Czerwonka [19], Anton and Nucu [7], Arnaldi et al. [8], Boţoc and Anton [12] and Afrifa and Padachi [1] estimate dynamic panel model, such as GMM, in order to control for endogeneity. Consequently, to examine the role of working capital management in achieving profitability in the manufacturing companies in the Republic of Serbia the authors employ the following System Generalized Method of Moments (SYS-GMM) estimation model:

$$y_{i,t} = \beta y_{i,t-1} + \theta'(L)WCM_{i,t} + \varphi'(L)x_{i,t} + \gamma_t + \alpha_i + \varepsilon_{i,t}$$

for

$$i = 1,\ldots,N \text{ and } t = q + 1,\ldots,T$$

where

$y_{i,t}$ – is the profitability of the manufacturing company i at time t,

$WCM_{i,t}$ – are the measures of working capital management of the manufacturing company i at time t,

$x_{i,t}$ – is a vector of other explanatory variables,

$\theta(L)$ and $\varphi(L)$ – are vectors of associated polynomials in the lag operator,

q – is the maximum lag length,

γ_t – is the time-specific effect,

α_i – is an unobserved country-specific effect, and

$\varepsilon_{i,t}$ – is the white noise error term.

Following Mazanec [22], Alvarez et al. [6], Alsulayhim [5], Vuković and Jakšić [36], Boţoc and Anton [12], and Stoiljković et al. [33], the authors include liquidity as a control variable in the model due to the fact that this variable may have an impact on profitability. According to Kuč [21] the largest companies in Serbia were overextended with an unfavourable term structure during the period from 2008 to 2014. Following Mazanec [22], Milošev [23], Jaworski and Czerwonka [19], Alvarez et al. [6], Högerle et al. [17], Vuković and Jakšić [36], Milošević Avdalović [24], Boţoc and Anton [12] and Şamiloğlu and Akgün [28] the authors introduce a financial leverage as a possible determinant of Serbian manufacturing companies' profitability. Furthermore, following Mazanec [22], Alarussi and Alhaderi [4] and Stoiljković et al. [33] the authors introduce an activity measure as a control variable in the model. Finally, following Milošev [23], Högerle et al. [17] and Boţoc and Anton [12] the authors employ a sales growth as a possible determinant of Serbian manufacturing companies' profitability. Table 3 presents in detail the independent variables introduced in the estimated model, their measures as well as the expected signs.

In accordance with the available theoretical and empirical literature, the authors reasonably expect that

Table 3: Independent variables and expected signs

Variable	Measure	Expected sign
Profitability*	$Return\ on\ Equity = \dfrac{Net\ income}{Shareholders'\ equity}$	+
Inventory conversion period	$Inventory\ conversion\ period = \dfrac{365}{Inventory\ turnover}$	-
Receivable collection period	$Receivable\ collection\ period = \dfrac{365}{Account\ receivable\ turnover}$	-
Payable conversion period	$Payable\ conversion\ period = \dfrac{365}{Account\ payable\ turnover}$	+
Liquidity	$Quick\ ratio = \dfrac{Current\ assets - Inventory}{Current\ liabilities}$	+
Financial leverage	$Debt\ to\ equity = \dfrac{Debt}{Shareholders'\ equity}$	-
Activity	$Total\ asset\ turnover = \dfrac{Revenues}{Total\ assets}$	+
Sales growth	$Revenues\ growth = \dfrac{Revenues_t - Revenues_{t-1}}{Total\ assets}$	+

*Note: The authors employ the lag of profitability measured by ROE as an independent variable.

higher profitability from the previous period positively affects the profitability in a current year. In order to investigate the issue of the influence of the working capital components on profitability, the authors assume that the inventory conversion cycle and receivable collection period negatively affect profitability, while the payable conversion cycle has a positive impact on Serbian manufacturing companies' profitability. These assumptions concerning the working capital components imply that a shorter cash conversion cycle has a positive effect on profitability. Regarding the controlling variables, the authors assume that the higher liquidity, lower level of debt and higher growth of sales revenue positively affect profitability. It is important to mention that Mazanec [22], Milošev [23], Yousaf and Bris [38], Jaworski and Czerwonka [19], Alvarez et al. [6], Tomašević et al. [35], Vuković and Jakšić [36], Milošević Avdalović [24], Şamiloğlu and Akgün [28] and Stoiljković et al. [33] employ the companies' size as a possible determinant of profitability. However, in this paper, the authors decide not to include the companies' size as a control variable in the model bearing in mind that

most of the mentioned authors showed that this variable does not have any effect on profitability. Furthermore, this variable is proved to be highly correlated with the sales growth hence, the authors decide to eliminate it. The majority of researchers use the internal variables as determinants of profitability, which is also the case in this study. Contrary to that, Milošev [23] and Jaworski and Czerwonka [19] employ an external variable such as GDP growth as a control variable in the estimated model. Although the authors of this paper had an intention to introduce an inflation and GDP growth rate as control variables in the model, they still did not employ them taking into account that these variables had a unit root even in the third order differential.

Results and discussions

In the first step, a correlation analysis was conducted with the aim of revealing a potential problem of multicollinearity between the observed variables, which can lead to a wrong interpretation of the estimated parameters, as well as

Table 4: Correlation matrix

	ROE	Inventory	Receivables	Payables	Liquidity	Leverage	Activity	Growth
ROE	1.000000	-0.050751	-0.021360	0.052401	0.049045	-0.608736	0.096520	0.002274
Inventory	-0.050751	1.000000	0.040394	0.321520	0.108614	-0.015014	-0.427302	-0.006918
Receivables	-0.021360	0.040394	1.000000	0.159812	0.231783	-0.017169	-0.300088	0.049428
Payables	-0.052401	0.321520	0.159812	1.000000	-0.170807	0.018795	-0.278733	0.215351
Liquidity	0.049045	0.108614	0.231783	-0.170807	1.000000	-0.143173	-0.053772	-0.059660
Leverage	-0.608736	-0.015014	-0.017169	0.018795	-0.143173	1.000000	-0.022304	0.016388
Activity	0.096520	-0.427302	-0.300088	-0.278733	-0.053772	-0.022304	1.000000	0.032817
Growth	0.002274	-0.006918	0.049428	0.215351	-0.059660	0.016388	0.032817	1.000000

Source: The authors' calculation based on the Serbian Business Registers Agency database, EViews 12 program.

Table 5: Cross-section dependence and unit root tests

Variables/Tests	Pesaran CD test	Im, Pesaran and Shin t-bar statistics	
		Individual intercept	Individual intercept and trend
ROE	2.241693 (0.0250)	-2.48049 (0.0000)	-5.51587 (0.0000)
Inventory	1.758401 (0.1197)	-2.37508 (0.0000)	-6.73680 (0.0000)
Receivables	2.135862 (0.0327)	-2.17524 (0.0000)	-3.61448 (0.0000)
Payables	0.812437 (0.4165)	-2.76108 (0.0000)	-5.96939 (0.0000)
Liquidity	1.518967 (0.1288)	-1.74217 (0.0000)	-2.2e+11 (0.0000)
Fin. leverage	1.804159 (0.0952)	-4.0e+13 (0.0000)	-1.9e+13 (0.0000)
Activity	2.008101 (0.0407)	-2.4e+11 (0.0000)	-1.6e+12 (0.0000)
Growth	0.765124 (0.3785)	-1.57598 (0.0036)	-4.09687 (0.0000)

Note: Pesaran CD test Null Hypothesis: No cross-section dependence.
Note: IPS Null Hypothesis: Unit root (individual unit root process). Exogenous variables: Individual effects, automatic selection of maximum lags, Automatic lag length selection based on SIC.
Source: The authors' calculation on the base of the Serbian Business Registers Agency database, EViews 12 program.

their corresponding standard errors and p-values. Based on the data from Table 4, it can be concluded that there is no correlation between the observed variables, which implied the absence of multicollinearity in the estimated regression model.

In the next step, the authors employed Pesaran CD cross-section dependence test in order to detect the cross-sectional dependence. Such a choice was made taking into account the fact that this test is suitable for almost all types of panel data, as well as dynamic heterogeneous short panels with a small number of observed time periods (T) and a large number of cross-sectional units (N) [27]. As can be seen from Table 5, there was no cross-sectional dependence between the observed variables. Therefore, the authors employed the first-generation unit root test. According to Barbieri [9] the Im, Pesaran & Shin (IPS) unit root *t-bar* statistic has a higher power than Levin, Lin & Chu unit root statistic for panels with short observed time periods (T). Consequently, in this paper the IPS test was used in order to examine the stationarity of the observed indicators. The results from Table 5 show that all observed variables are stationary.

Based on the obtained results of the evaluated SYS-GMM model shown in Table 6, the authors may draw a conclusion that the shorter inventory conversion cycle, i.e. accelerating inventory turnover has a positive impact on the Serbian manufacturing companies' profitability. On the

Table 6: SYS-GMM model estimation

Variable	Coefficient	p-value
ROE (-1)	0.213440	0.3875
Inventory	-0.001796	0.0327
Receivables	-0.000669	0.7297
Payables	0.000344	0.7805
Liquidity	0.031889	0.4980
Fin. Leverage	-0.001145	0.6666
Activity	0.129558	0.1997
Growth	0.017084	0.2829
Diagnostic tests		
AR(2) (p-value)	-0.176817	0.1032
Sargan test (p-value)	6.543230	0.256886

Note: The Null Hypothesis of the AR(2) test implies that there is no second-order serial correlation in first differences. The Null Hypothesis of Sargan test implies that overidentifying restrictions are valid.
Source: The author's calculation based on the Serbian Business Registers Agency database, EViews 12 program.

other hand, other explanatory variables have no influence on profitability. Namely, although the coefficients of the remaining observed explanatory variables have a sign in accordance with the authors' expectations their p-values indicate that they do not have a statistically significant impact on profitability of the Serbian manufacturing companies. It is worth to mention that, based on the applied diagnostic tests (AR(2) and Sargan test), it can be concluded that the model is well specified. In other words, in the estimated model, there is no second-order serial correlation in first differences, and the over-identifying restrictions are valid.

Concluding remarks

The majority of the authors agree with the fact that efficient working capital management is important for achieving the profitability of companies in the long run. At the same time, it can be concluded that there is no consensus among them about the role of working capital management in achieving profitability. However, the most authors claim that the shorter cash conversion cycle has a positive impact on the profitability of the companies all around the world. Still, some authors prove that there is an inverted U shape between working capital and profitability. Inverted U shape relationship means that there is an optimal level of working capital. As is the case in most of the empirical studies, the authors of this article assume that a longer cash conversion cycle has a negative effect on profitability. The aim of this research is to determine an influence of effective working capital management on the profitability of the Serbian companies that operate in the domestic manufacturing sector. The considered sample consists of 141 domestic companies from the manufacturing sector with the highest level of the business income. According to Alsulayhim [5] the most frequent measures of working capital management are the CCC and its main elements. Many authors have used the same measures, such as Mazanec [22], Demiroj et al. [15], Alvarez et al. [6], Kafeel et al. [20], Alsulayhim [5], Agegnew [2], Evci and Şak [16], Şamiloğlu and Akgün [28], Seyoum et al. [30] and Agha [3]. Consequently, in this paper, the authors use: the inventory conversion period,

receivable collection period, and payable conversion period as the approximate indicators of working capital management. The cash conversion cycle was not included in the estimated model due to the fact that this variable is collinear with the ICP, RCP and PCP. Following Alvarez et al. [6], Alsulayhim [5] and Şamiloğlu and Akgün [28] the authors employ return on equity (ROE) as a measure of Serbian manufacturing companies' profitability. Following Jaworski and Czerwonka [19], Anton and Nucu [7], Arnaldi et al. [8], Boţoc and Anton [12] and Afrifa and Padachi [1] in order to examine the role of working capital management in achieving profitability in the manufacturing companies in the Republic of Serbia the authors employ the SYS-GMM estimation model.

In accordance with the available theoretical and empirical literature, the authors defined four hypotheses that cover the period from 2016 to 2020. Considering the First hypothesis the authors may conclude that the role of working capital management in achieving profitability in the Serbian manufacturing companies is relatively significant. This claim stems from the fact that only one component of working capital management has an impact on profitability. Regarding the other hypotheses, the authors can make the following statements. There is a negative relationship between the inventory conversion cycle as a component of working capital management and Serbian manufacturing companies' profitability calculated by ROE. This fact implies that the longer inventory conversion cycle reduces the profitability. According to obtained results, the authors show that there is no relation between the receivable collection period and payable conversion cycle as two other components of working capital management, on one side, and Serbian manufacturing companies' profitability computed by ROE, on the other side. Although the coefficients of both variables have the expected sign, their p-values show that they have no effect on profitability. Based on the obtained results of the System GMM model, it may be concluded that the shorter cash conversion cycle has a positive and statistically significant impact on the profitability of the observed companies covering the period from 2016 to 2020. On the other hand, the other control variables included in the model, such as liquidity, financial leverage, activity and sales growth, have no impact on Serbian manufacturing companies' profitability. Besides, the diagnostic tests indicate that the used SYS-GMM model was adequately specified and valid.

The wider implications of this study refer to the fact that it contributes to expanding the base of the theoretical and empirical knowledge of working capital management. The obtained findings are significant for the financial managers of the manufacturing companies in the Republic of Serbia, since they provide useful information about the intensity and direction of the certain determinants of profitability. On the other hand, the results of this research are also of interest to wider public and policy makers, considering the fact that the profitable manufacturing companies provide jobs, pay taxes, produce necessary goods and services and contribute to the creation of social well-being.

The objective limitation of this study is related to the data availability on the official website of the Serbian Business Registers Agency. For further research, the authors suggest an examination of the existence of an inverted U shape relationship between working capital and profitability in the Serbian manufacturing sector.

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