Cogent Economics & Finance

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/oaef20

Effects of working capital management on firm performance: Evidence from the EFQM certified firms

Muhammad Yousaf & Petr Bris |

To cite this article: Muhammad Yousaf & Petr Bris | (2021) Effects of working capital management on firm performance: Evidence from the EFQM certified firms, Cogent Economics & Finance, 9:1, 1958504, DOI: 10.1080/23322039.2021.1958504

To link to this article: https://doi.org/10.1080/23322039.2021.1958504

© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

Published online: 10 Aug 2021.

Submit your article to this journal

Article views: 148

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=oaef20

Yousaf & Bris, *Cogent Economics & Finance* (2021), 9: 1958504
https://doi.org/10.1080/23322039.2021.1958504

cogent economics & finance

FINANCIAL ECONOMICS | RESEARCH ARTICLE

Effects of working capital management on firm performance: Evidence from the EFQM certified firms

Muhammad Yousaf[1*] and Petr Bris[1]

Received: 10 March 2021
Accepted: 17 July 2021

*Corresponding author: Muhammad Yousaf, Department of Industrial Engineering and Information Systems, Faculty of Management and Economics, Tomas Bata University, Mostni 5139, Zlin 76001, Czech Republic
E-mail: yousaf@utb.cz

Reviewing editor:
David McMillan, University of Stirling, Stirling United Kingdom

Additional information is available at the end of the article

Abstract: The main aim of the current study is to explore the relationship between working capital (WC) and firm performance. We chose a sample of 326 Czech firms, including 20 certified firms from the EFQM (European Foundation for Quality Management) Excellence Model from the Albertina database. The sample of the Czech firms was taken from three sectors: manufacturing, automobile, and construction. We employed a two-step system generalized method of moment (GMM) technique to determine the results. The study results revealed a negative impact of WC on firm performance; moreover, the firms having a quality certificate from the EFQM Excellence Model perform better. The findings of previous research, which were held globally, and the current study results will encourage the directors, managers, and leaders of the Czech firms to participate in the quality award.

Subjects: Social Sciences; Economics, Finance, Business & Industry; Economics; Econometrics; Finance; Corporate Finance; Business, Management and Accounting

Keywords: EFQM Model; Albertina; GMM; Czech firms; dummy variable

1. Introduction

Working capital management (WCM) is interrelated to the operating activities of a firm. Working capital (WC) represents a firm's operating liquidity and it is measured as the difference between current assets and current liabilities. The effective WCM aims to avoid excessive investment in current assets while maintaining a firm's ability to achieve a good balance between profitability and liquidity. Therefore, the effective WCM system plays a significant role in maximizing profitability and obtaining a competitive advantage.

ABOUT THE AUTHORS

Muhammad Yousaf received MSc in Economics from University of Copenhagen, Denmark. Now he is a Ph.D. candidate at Tomas Bata University in Zlin, Czech Republic. His research interests in quality management, financial management, and macroeconomics.

Petr Bris received Ph.D. from Technical University of Ostrava, Czech Republic. He is Associate Professor at Tomas Bata University in Zlin, Czech Republic. His research interests in quality management.

PUBLIC INTEREST STATEMENT

Efficiently managing working capital is a challenge for every firm as each firm intends to maintain the optimum level of working capital. The excessive working capital creates an idle fund and an insufficient working capital interrupts the day-to-day operation of the business. For this purpose, it becomes much essential to investigate the certain impact of working capital on firm performance. The study also investigates the impacts of quality certificates/awards on firm performance. Therefore, this study will be fruitful to policymakers to design an optimum level of working capital and academician as it adds significantly to the existing body of knowledge.

cogent oa

© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

Previous literature showed that award-winner firms perform better than their competitors. Hendricks and Singhal (2001) investigated that the stock market responds positively when the firms obtain quality awards. Boulter et al. (2013) analysed the data of 120 firms. The scholars exposed that the awarded firms significantly have better results than other companies in terms of assets, profit, growth, shareholder value, etc. Many researchers took a small sample size of the awarded firms to explore the outcomes. For example, Przasnyski and Tai (2002) took 17 firms, Subedi and Maheshwari (2007) took 15 firms, and Jacob et al. (2004) took 18 firms as a sample size in their study. Zhang and Xia (2013) concluded that the award-winning firms perform better after receiving awards; the firms also have superior performance before the award.

EFQM (European Foundation for Quality Management) Excellence Model is very popular for European quality awards worldwide. According to Westlund (2001), the model has become the most popular model for European firms to implement total quality management. Asadi (2020) claimed that there are many achievements and advantages to implementing and applying the EFQM Excellence Model in firms, such as attention to customer demands, competitive advantage, and need in all dimensions.

To sum up, from the earlier research, it is clear that the firms having quality awards perform better than their competitors. The EFQM Excellence Model (formerly known as European Quality Award) is very popular in Europe and in the whole world. However, the Czech organizations are very little interested in implementing this model, so the result is that no one Czech firm has obtained the Global Winning/Prize Award from the EFQM from 1991 until now. This fact is also confirmed by Nenadál et al. (2018), as the authors argued that the Czech organizations don't participate in quality awards like EFQM and don't obtain quality awards.

Several studies explored the relationship between WC and firm performance. Most of the studies have been carried out in the United States, China, India, and advanced European countries. To the best of our knowledge, there is no study exploring the association between WC and profitability in the Czech Republic. So, this is the first study that will explore the impacts of WC on firm performance, including those firms with a quality certificate from EFQM. Around 112 Czech firms (until January 2020) have a quality certificate from the EFQM. The complete list by sector-wise and by certificate-wise could be seen in Table 1.

Table 1 shows the certified Czech firms by sector-wise and category-wise, where the total firms are 112. The first two columns represent the name of the sector and the frequency. The last two columns denote the award by category and its frequency. So, it could be observed from Table 1 that there are 11, 2, and 7 firms in the automotive, construction, and manufacturing sectors, respectively. Likewise, 5, 15, and 12 firms were recognized for excellence 3-star, 4-star, and 5-star, respectively. Overall, 112 Czech firms received the quality certificate/award from EFQM Excellence Model.

We selected 20 certified firms out of 112 firms. The total number of firms in the sample is 326, including 20 certified firms from the EFQM Excellence Model. The sample of non-certified firms is selected randomly. The sample is obtained from three sectors: automobile, construction, and manufacturing, as it is easy and logical to compare the findings in these sectors. The number of samples is taken in guidelines as suggested by Fleiss et al. (1969) and Krejcie and Morgan (1970). The selected sectors in the current study play an essential role in the Czech economy. For example, in 2019, the share of industry in GDP (gross domestic product) of the Czech Republic was 31.43%, and the share of the manufacturing sector was 22.38% (World Bank statistics).

After the introduction section, the remaining sections of this article are discussed as follows. Section 2 described a literature review and hypothesis development. Section 3 discussed the research design and methodology. The outcomes of this research are discussed in section 4, and the final section is devoted to conclusions and implications.

Table 1. EFQM global recognition excellence award sector-wise and category-wise for the Czech firms (Source: efqm.org)

Award by Sector-wise	Count of Sector	Award by Category-wise	Count of Category
Automotive	11	Committed to Excellence	4
Banking/Financial Services/Insurance	1	Committed to Excellence 2 Star	15
Construction	2	Committed to Sustainability 1 Star	11
Consultant	2	Committed to Sustainability 2 Star	48
Consumer Products	1	EFQM Excellence Award Finalist	1
Education/Educational Services	21	Recognized for Excellence 3 star	5
Government/Local authorities	11	Recognized for Excellence 4 star	15
Healthcare Services	3	Recognized for Excellence 5 star	12
Hotels/Hospitality/Leisure	1	Czech Society for Quality	1
Manufacturing	7		
Not for profit	4		
Other/Not Classified	11		
Public sector	22		
Retail	5		
Services	10		
Grand Total	**112**	**Grand Total**	**112**

2. Literature review and hypothesis development

An effective WCM is very important for an organization to sustain a certain level of WC. Nyeadi et al. (2018) argued that the WC does not have straight theories which elaborate the relationship with its management. But it could be explained in the context of theoretical underpinnings of capital structure. It is crucial to sustaining an optimal level of WC to minimize risks. However, this section is devoted to the literature review relevant to firm performance and WC.

Brigham and Ehrhardt (2013) revealed that WCM could be categorised into four major components: Average Collection Period, Average Payment Period, Inventory Conversion Period, and Cash Conversion Cycle. Many authors traditionally used the Cash Conversion Cycle to measure the impact of WC on firm performance (Baños-Caballero et al., 2012; Pham et al., 2020; Tahir et al., 2016). The authors have reported mixed results about the influence of WC on firm performance. For instance, Altaf (2020), Sharma et al. (2020), and Gill et al. (2010) found a positive relationship between firm performance and WC. On the other hand, Akgün and Memiş Karataş (2020), Fernández-López et al. (2020) investigated a negative impact of WC on firm performance. So, the mixed outcomes encourage us to find out the relationship between WC and firm performance in the context of Czech firms. Moreover, the empirical relationship has not been examined in the context of EFQM awarded firms. To the best of our knowledge, this is the first study that will empirically scrutinize the relationship between firm performance and WC in the context of Czech firms.

Many scholars included the control variables to estimate the causal effect of WC on firm performance. Saini and Singhania (2018) and Fernández-López et al. (2020) investigated that leverage has a negative impact on firm performance. On the other hand, Altaf (2020) reported a positive

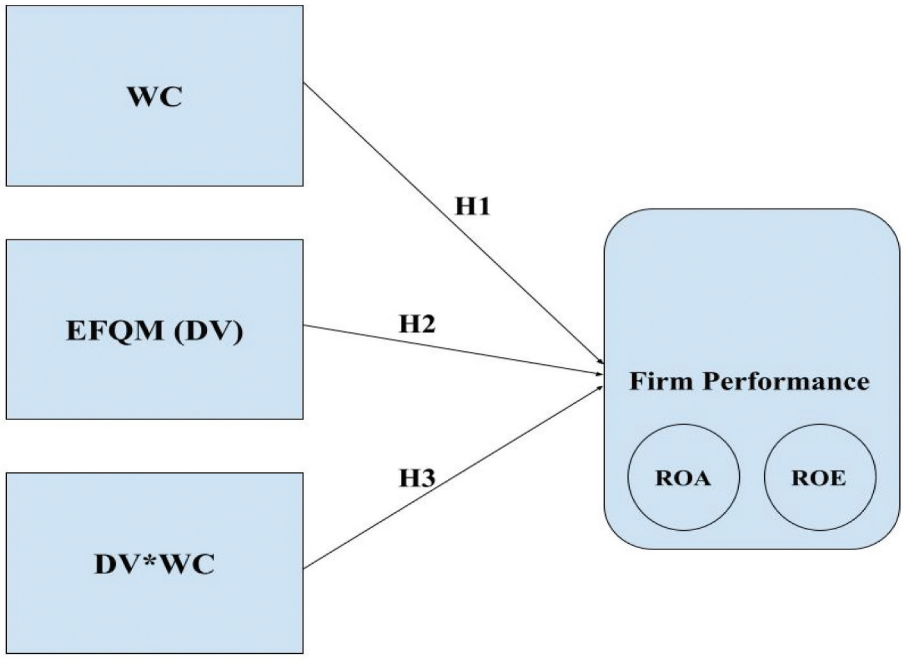

Figure 1. Conceptual framework (Source: Authors).

relationship between leverage and firm performance. Saini and Singhania (2018) explored that firm size is positively correlated with firm performance. The same results reported by Fernández-López et al. (2020), Gharaibeh and Bani Khaled (2020), and Chandrapala and Knápková (2013) and stated that large firms perform better than small firms. Altaf (2020) find out that the current ratio has a positive effect on firm performance. We also included four control variables in the current study: leverage, tangibility, firm size, and current ratio to explore the impacts of the selected control variables on firm performance.

The main aim of the current study is to explore the empirical relationship between firm performance and WC. WC is essential for all firms because neglecting WC may impact firm performance and survival. However, the objectives of the study are:

(1) To analyse the effect of WC on the firm performance of the Czech firms for 2015–2019.
(2) To investigate the impact of the quality certificate from the EFQM Excellence Model on the firm performance.
(3) To study the relationship between the WC of the certified firms and firm performance.

Figure 1 pointed hypothesis and objectives of the current research. According to the above objectives, we formulated the hypothesis as follows:

H_1: WC is significantly associated with firm performance.

H_2: There is a significant impact of the certificate from the EFQM Excellence Model on the firm performance.

H_3: The WC of the certified firms from the EFQM Excellence Model is significantly associated with firm performance.

cogent economics & finance

Table 2. Summary presentation of selected variables (Source: Authors' calculations)

Variables	Symbols	Measurements	Citation
Dependent variables			
Return on assets	ROA		Kayani et al. (2020); Pham et al. (2020); Nyeadi et al. (2018); Dalci et al. (2019)
Return on Equity	ROE		Kayani et al. (2020); Wamugo Mwangi et al. (2014)
Independent Variables			
Lag of dependent variable	LFP		Fernández-López et al. (2020)
WC	WC	Log (WC)	Altaf (2020)
Dummy variable	DV	DV = 1, if the firm obtained a certificate from EFQM, otherwise DV = 0	
Interaction term	DV*WC (interaction term)	DV*WC	
Control Variables			
Leverage	LEV	Total Debt / Total Assets	Fernández-López et al. (2020); Saini and Singhania (2018); Akgün and Memiş Karataş (2020),
Tangibility	FATA (Fixed Assets to Total Assets)	Fixed Assets / Total Assets	Sharma et al. (2020); Altaf (2020);
Firm Size	FS	Log (Total Operating Revenue)	Ahmed and Bhuyan (2020)
Current Ratio	CR	Current Assets / Total Assets	Pham et al. (2020); Altaf (2020); Akgün and Memiş Karataş (2020),

3. Methodology

The methodology is a research strategy that explains the method of how research should be undertaken. This section presents an overview of the source of data, variables' information, and regression equations used in the current study.

3.1. Source of data

The secondary data was obtained from the Albertina database for all the variables. Many authors have used the secondary data from Albertina database to complete their research such as Chandrapala and Knápková (2013), Činčalová and Hedija (2020), Vrbka (2020), and Náglová and Pechrová (2019), etc. The final sample was 326 Czech companies, including 20 Czech firms that have the certificate from the EFQM. The data covered the time period of 2015 to 2019, and it is obtained from three main sectors: manufacturing, automotive, and construction.

3.2. Dependent, independent, and control variables

Return on assets (ROA) and return on equity (ROE) are the dependent variables, and these variables are proxies to measure the firm performance in the current study. Many researchers have used only ROA as a proxy to measure the firm performance, like Pais and Gama (2015), Singh and Kumar (2017), and Nyeadi et al. (2018). Several authors have used both variables: ROA and

ROE as proxies to measure firm performance, such as Kayani et al. (2020), Akgün and Memiş Karataş (2020), and Samo and Murad (2019). We also employed both proxies of firm performance in the current study to explore a comprehensive relationship between WC and firm performance.

The independent variables are the lag of ROA/ROE, WC, dummy variable (DV), and an interaction term in this study. If the firm is certified/awarded from the EFQM Model, then DV will be 1; otherwise, the value of DV will be zero. The dummy interaction term (DV*WC) denotes the WC of certified firms. Leverage, tangibility, firm size, and current ratio are the control variables. According to Hünermund and Louw (2020), the relationship between the control variables and main independent variables in regression can be complex. However, we included these control variables in analyses to estimate the causal effect of WC on firm performance. The complete detail about the variables and their measurement is given in Table 2.

3.3. Regression equations

We estimate the following regression equation to explore the relationship between WCM and the firm's performance.

$$FP_{it} = \alpha + \beta 1(LFP_{it-1}) + \beta 2(WC_{it}) + \beta 3(DV_{it}) + \beta 4(DV * WC_{it}) + \beta 5(Control_{it}) + \eta_i + \varepsilon_{it} \quad \text{(Eq1)}$$

Where FP denotes the firm performance, LFP denotes the lagged value of a dependent variable, WC represents working capital (objective 1), DV is the dummy variable (objective 2), DV*WC is the dummy interaction term (objective 3), i = 1, 2, 3, …., n (number of firms), t = 2015, 2016, 2017, 2018, and 2019. α represents the intercept, β values denote the regression coefficients of the independent variables, ηi and εit are unobserved firm-specific effects and error term for firm i at time t, respectively.

We can write Eq 1 in two different Models according to proxies of firm performance.

$$\boldsymbol{ROA_{it}} = \alpha + \beta_1(ROA_{it-1}) + \beta_2(WC_{it}) + \beta_3(LEV_{it}) + \beta_4(FATA_{it}) + \beta_5(FS_{it}) + \beta_6(CR_{it}) + \beta_7(DV_{it}) + \beta_8(DV*WC_{it}) + + \eta_i + \varepsilon_{it} \textbf{ Model 1}$$

$$\boldsymbol{ROE_{it}} = \alpha + \beta_1(ROA_{it-1}) + \beta_2(WC_{it}) + \beta_3(LEV_{it}) + \beta_4(FATA_{it}) + \beta_5(FS_{it}) + \beta_6(CR_{it}) + \beta_7(DV_{it}) + \beta_8(DV*WC_{it}) + + \eta_i + \varepsilon_{it} \textbf{ Model 2}$$

4. Empirical results

The obtained secondary data of the Czech firms were scrutinised using descriptive statistics, correlation analysis, and a two-step System GMM. STATA 16.0 software was used to estimate the empirical results. The descriptive statistics of the certified firms, non-certified firms, and combined firms are presented in Table 3.

Table 3 has been divided into three groups: all firms (combined), certified firms from EFQM, and non-certified firms. The mean values of ROA and ROE of all the selected firms are 5.15 and 9.81, respectively. These results of ROA and ROE show that the Czech firms have remained profitable throughout the analysis period. It could be observed that the certified firm from the EFQM earned more profits than non-certified firms because the mean values of ROA and ROE of the certified firms are higher than non-certified firms. The values of mean and standard deviations of ROA, ROE, and interaction term are slightly different from each other in all three categories. However, the mean and standard deviations of other variables in the three groups are almost the same. The mean and standard deviation values of the WC of the combined group are 5.08 and 0.56.

Table 4 displays the correlation coefficients of the selected variables. The two measures of firm performance (ROA and ROE) have a positive correlation with WC. However, FS and WC have

Table 3. Descriptive statistics (Source: Authors' calculations)

	Combine firms			Certified firms from EFQM			Non-certified firms		
stats	Mean	SD	N	Mean	SD	N	Mean	SD	N
ROA	5.15	6.57	1400	7.63	6.97	83	5.00	6.51	1317
ROE	9.81	13.00	1400	12.96	12.45	83	9.61	13.01	1317
WC	5.08	0.56	1180	5.59	0.45	68	5.05	0.55	1112
LEV	0.13	0.12	1388	0.14	0.15	87	0.13	0.12	1301
FATA	0.44	0.16	1402	0.47	0.18	87	0.44	0.16	1315
FS	5.83	0.44	1402	6.23	0.41	87	5.80	0.42	1315
CR	11.13	7.34	1404	12.03	8.38	87	11.07	7.27	1317
DV	0.06	0.24	1404	1	0	87	0	0	1317
DV*WC	0.27	1.20	1404	4.37	2.36	87	0	0	1317

a strong positive correlation that is 0.75. LEV and FATA have a negative correlation with WC. DV is positively correlated with all the selected variables except FATA.

We applied the Fisher-type test to check the panel unit root of all the dependent, independent, and control variables to avoid spurious regression results. Many scholars such as Wamugo Mwangi et al. (2014), Singh and Kumar (2017), and Sharma et al. (2020) have reported the panel unit root before running the regression. According to Wamugo Mwangi et al. (2014), the Fisher-type unit root test has more advantages than any other tests because this test requires the specification of Dickey–Fuller to test whether a variable has the unit root. Maddala and Wu (1999) claimed that the Fisher test is the best unit root test as it has the power to distinguish between the alternative and the null hypothesis. The authors discussed that there are two advantages to carry out the Fisher test. (i) the Fisher test does not need balanced panel data, so anyone can apply different lag lengths in the individual augmented Dickey–Fuller (ADF) regression. (ii) the Fisher test can be applied for any unit root test derived. To check the unit root of dependent and independent variables, we formulated the null hypothesis as, "all panels contain unit roots." The unit root test for the data series has been applied in two ways: without time trends and time trends. Table 5 shows the results of the unit root test.

After observing the results of Table 5, it is clear that all the selected variables in the current study are stationary with and without time trends. DV*WC is also stationary with the time trend, so we can proceed further.

The system GMM and difference GMM estimators often use for the econometric investigation of dynamic economic relationships in panel data. The characteristics of such panel data is "small T and large N". Various researchers, such as Blundell and Bond (2000), Bobba and Coviello (2007), Baltagi (2008), and Grohmann (2015) argued that the system GMM estimator gives better results than the difference GMM estimator in dynamic panel models, particularly when T is small and N is large. Moreover, the most recent studies by Saini and Singhania (2018), Fernández-López et al. (2020), Kayani et al. (2020), and Sharma et al. (2020) have employed two-step System GMM. Therefore, we also used the two-step System GMM in the current study. The outcomes of the GMM are presented in Table 6.

In Table 6, coefficients are presented without parentheses. The p-value of working capital (WC) is significant at the 0.01 level (Model 1, ROA). The sign of the coefficient of WC is negative, which means that WC's negative impact on firm performance. If one unit increase in WC, then ROA will decrease by 9.784 units, holding all other variables constant. There is a significant impact of WC on ROA, which means that we should not reject H_1. The

Table 4. Correlation coefficients of the variables (Source: Authors' calculations)

	ROA	ROE	WC	LEV	FATA	FS	CR	DV	DV*WC
ROA	1								
ROE	0.91	1							
WC	0.28	0.14	1						
LEV	−0.15	0.03	−0.26	1					
FATA	−0.07	−0.08	−0.22	0.28	1				
FS	0.23	0.18	0.75	−0.15	−0.02	1			
CR	−0.02	−0.09	0.20	0.02	−0.01	0.05	1		
DV	0.10	0.08	0.22	0.04	−0.01	0.20	0.07	1	
DV*WC	0.11	0.08	0.24	0.03	−0.02	0.22	0.08	1.00	1

coefficients of DV are statistically significant and positive in both proxies of firm performance, which means that we should not reject H_2. The firms with certificates from the EFQM are significantly associated with firm performance. It means that having a quality certificate from the EFQM Model increases performance. Both coefficients of DV*WC are −3.652 and 3.948, which are statistically not significant at the 0.01, 0.05, and 0.10 significance levels. These non-significant outcomes indicate that the WC of certified firms and non-certified firms do not significantly differ from each other. Therefore, we should reject H_3 as the p-values are not statistically significant.

Considering control variables results, the coefficient of LEV is significant at 0.05 level. Lev has a positive impact on firm performance (Model 1, ROA) which means that whenever an increase in LEV by one unit, ROA will increase by 0.99 units ceteris paribus. On the other hand, both coefficients of FATA are statistically significant. The signs of the coefficients are negative, which means that the relationship between FATA and firm performance is negative. FS is statistically significant at a 0.10 significance level (Model 1, ROA). The negative sign of the coefficient of FS revealed that Czech SMEs (small and medium enterprises) perform better than large firms. Regarding the lagged dependent variable, both lagged variables are significant at 0.01 level and have a positive relationship with dependent variable. The constant is significant in both ROA and ROE, suggesting a positive impact on firm performance. However, constant-term outcomes point towards a weak positive relationship with ROE as it is significant at the 0.10 level.

Table 5. Fisher type unit root test (Source: Authors' calculations)

Variables	Without trends	p-values	with trends	p-values
ROA	−15.26	0.00	−7.31	0.00
ROE	13.47	0.00	−7.22	0.00
WC	−8.44	0.00	−11.55	0.00
LEV	−13.14	0.00	−15.55	0.00
FATA	−12.24	0.00	−14.97	0.00
FS	−4.63	0.00	−10.27	0.00
CR	−19.96	0.00	−13.18	0.00
DV	-	-	-	-
DV*WC	1.51	0.93	−4.26	0.00

Table 6. Two-step system GMM estimation (Source: Authors' calculations)

Independent Variables	ROA (Model 1)	ROE (Model 2)
Lag of Dependent variable	0.311*** (0.112)	0.344*** (0.089)
WC	−9.784*** (3.471)	1.873 (3.617)
LEV	99.014** (49.258)	1.053 (15.850)
FATA	−53.350** (20.872)	−22.709* (11.987)
FS	−18.382* (9.967)	−21.598 (14.098)
CR	−0.373 (0.508)	0.252 (0.256)
DV	50.461** (21.310)	22.554** (10.236)
DV*WC	−3.652 (5.542)	3.948 (3.703)
Constant	173.200*** (62.602)	126.641* (74.430)
Wald chi2 P-value	51.450 0.000	260.58 0.000
AR (1) P-value	−3.35 0.001	−4.31 0.000
AR (2) P-value	1.29 0.197	−0.44 0.658
Sargan Test P-value	15.32 0.053	17.28 0.100
Hansen Test P-value	6.21 0.568	13.49 0.262

Standard errors are in parentheses; P-values denote *** p < 0.01, ** p < 0.05, * p < 0.1

Considering post-estimation tests, AR (1) coefficients are significant, and AR (2) are insignificant of both dependent variables. Roodman (2009) claimed that the Arellano–Bond test (AR (2) statistic) for autocorrelation is valid for any dynamic panel model. The scholars suggested that AR (2) statistics should be insignificant. According to Table 6, AR (2) statistic confirms the lack of second-order serial correlation in the residuals. Hansen test (Hansen, 1982) is employed to check over-identifying restrictions in the model, and the probability values in Table 6 reject the assumption of overidentified restrictions. Sargan test is used to check the autocorrelation/serial correlation of the error term. It tests the null hypothesis that the differenced error term is first and second-order serially correlated. Failure to reject the null hypothesis of no second-order serial correlation implies that the original error term is serially uncorrelated and the moment conditions are correctly specified. According to Table 6, the p-values of the Sargan test are not significant at 0.05 level, so we can't reject the null hypothesis.

5. Conclusion

The current study is carried out to examine the effects of WC on firm performance in the context of certified firms from the EFQM. We employed ROA and ROE as proxies to measure firm performance. We obtained the secondary data of 326 Czech firms, including 20 certified firms from the EFQM (European Foundation for Quality Management) Excellence Model, from the Albertina database. The gained data covered the time period from 2015 to 2019. A two-step system GMM is chosen to develop

the model and identify the significant variables affecting the firm performance of Czech firms. The previous literature showed that there are mixed results of the relationship between firm performance and WC. However, current study results identified that a significant and positive impact of WC on firm performance. The results of the dummy variable revealed that the firms with quality certificates from EFQM perform better than non-certified firms. This study also confirms the findings of previous studies that the firms with awards/certificates perform better than comparison firms. However, we could not find a statistically significant relationship between the WC of certified firms and firm performance. So, we conclude that the impact of WC of certified firms and non-certified firms are the same on the firm's performance.

Most of the results of the current research are the same as previous studies. For example, the outcomes of the relationship between WC and firm performance are the same as investigated by Gill et al. (2010), Altaf (2020), and Sharma et al. (2020), etc. However, the outcomes of leverage, firm size, and tangibility are not the same as Saini and Singhania (2018), Altaf (2020), and Fernández-López et al. (2020), etc. These conflicting results offer future research scope, which can conduct with the help of more conclusive variables to make the outcomes more interesting. Much can be done about WC and firm performance in the future by taking different sectors, different countries, different quality awards, and covering more time-period.

The empirical results of the study provide theoretical and practical implications. The study contributes theoretically by extending WC and firm performance literature, including the certified firms from the EFQM. Practically, the outcome of the research will be useful for managers, leaders, and directors of the firms to encourage them to participate in the quality awards and implement the EFQM Excellence Model within the firms.

There are some limitations of the current study. The study was conducted in a single country and focused on only three sectors, implying that the sample size is small of the quality award firms. Therefore, future studies should investigate the role of WC in firm performance in other countries by using larger samples of awarded firms to provide comparable results.

Funding
This work is supported by the Internal Grant Agency (IGA) of Tomas Bata University in Zlin, the Czech Republic, under the projects No IGA/FAME/2021/008 and IGA/FAME/2021/014;

Author details
Muhammad Yousaf[1]
E-mail: yousaf@utb.cz
ORCID ID: http://orcid.org/0000-0003-4183-9251
Petr Bris[1]
E-mail: bris@utb.cz
ORCID ID: http://orcid.org/0000-0001-7027-1648
[1] Department of Industrial Engineering and Information Systems, Faculty of Management and Economics, Tomas Bata University, Mostni 5139, Zlin 76001, Czech Republic.

Disclosure statement
The authors declare no conflict of interest.

Citation information
Cite this article as: Effects of working capital management on firm performance: Evidence from the EFQM certified firms, Muhammad Yousaf & Petr Bris, *Cogent Economics & Finance* (2021), 9: 1958504.

References

Ahmed, R., & Bhuyan, R. (2020). Capital structure and firm performance in Australian service sector firms: A panel data analysis. *Journal of Risk and Financial Management*, *13*(9), 214. https://doi.org/10.3390/jrfm13090214

Akgün, A. İ., & Memiş Karataş, A. (2020). Investigating the relationship between WCM and business performance: Evidence from the 2008 financial crisis of EU-28. *International Journal of Managerial Finance*. https://doi.org/10.1108/IJMF-08-2019-0294

Altaf, N. (2020). WC financing, firm performance and financial flexibility: Evidence from Indian hospitality firms. *Global Business Review*, 097215092096137. https://doi.org/10.1177/0972150920961371

Asadi, R. (2020). Investigating the role of excellent model in the competitive market with impact on the economy. *Journal of Economic Development, Environment and People*, *9*(2), 38. https://doi.org/10.26458/jedep.v9i2.664

Baltagi, B. H. (2008). *Econometric Analysis of Panel Data*. Wiley.

Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2012). How does working capital management affect the profitability of Spanish SMEs? *Small Business Economics*, *39*(2), 517–529. https://doi.org/10.1007/s11187-011-9317-8

Blundell, R., & Bond, S. (2000). GMM Estimation with persistent panel data: An application to production functions. *Econometric Reviews*, *19*(3), 321–340. https://doi.org/10.1080/07474930008800475

Bobba, M., & Coviello, D. (2007). Weak instruments and weak identification, in estimating the effects of education, on democracy. *Economics Letters*, *96*(3), 301–306. https://doi.org/10.1016/j.econlet.2007.01.018

Boulter, L., Bendell, T., & Dahlgaard, J. (2013). Total quality beyond North America: A comparative analysis of the performance of European Excellence Award winners. *International Journal of Operations & Production Management*, *33*(2), 197–215. https://doi.org/10.1108/01443571311295635

Brigham, E., & Ehrhardt, M. (2013). *Financial Management: Theory & Practice (Book Only)*. Cengage Learning.

Chandrapala, P., & Knápková, A. (2013). Firm-specific factors and financial performance of firms in the Czech Republic. *Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis*, *61*(7), 2183–2190. https://doi.org/10.11118/actaun201361072183

Činčalová, S., & Hedija, V. (2020). Firm characteristics and corporate social responsibility: The case of Czech transportation and storage industry. *Sustainability*, *12*(5), 1992. https://doi.org/10.3390/su12051992

Dalci, I., Tanova, C., Ozyapici, H., & Bein, M. A. (2019). The moderating impact of firm size on the relationship between WCM and profitability. *Prague Economic Papers*, *28*(3), 296–312. https://doi.org/10.18267/j.pep.681

European Foundation for Quality Management. *EFQM Excellence Model*. Public and Voluntary Sector, Brussels.

Fernández-López, S., Rodeiro-Pazos, D., & Rey-Ares, L. (2020). Effects of WCM on firms' profitability: Evidence from cheese-producing companies. *Agribusiness*, *36*(4), 770–791. https://doi.org/10.1002/agr.21666

Fleiss, J. L., Cohen, J., & Everitt, B. S. (1969). Large sample standard errors of kappa and weighted kappa. *Psychological Bulletin*, *72*(5), 323. https://doi.org/10.1037/h0028106

Gharaibeh, O., & Bani Khaled, M. H. (2020). Determinants of profitability in Jordanian services companies. *Investment Management and Financial Innovations*, *17*(1), 2020. https://doi.org/10.21511/imfi.17(1).2020.24

Gill, A., Biger, N., & Mathur, N. (2010) The effects of capital structure on profitability: Evidence from United States. *Business and Economics Journal*, https://www.researchgate.net/publication/281004540

Grohmann, T. (2015). *Estimating dynamic panel model: A case of Acemoglu, et al. (2008). Proceeding in The Econometrics of Economic Consultancy Interpreting Regression Estimates for Policy Makers*, October, 2015.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, *50*(4), 1029. https://doi.org/10.2307/1912775

Hendricks, K. B., & Singhal, V. R. (2001). The long-run stock price performance of firms with effective TQM programs. *Management Science*, *47*(3), 359–368. https://doi.org/10.1287/mnsc.47.3.359.9773

Hünermund, P., & Louw, B. (2020). *On the nuisance of control variables in regression analysis*.

Jacob, R., Madu, C. N., & Tang, C. (2004). An empirical assessment of the financial performance of Malcolm Baldrige Award winners. *International Journal of Quality & Reliability Management*, *21*(8), 897–914. https://doi.org/10.1108/02656710410551764

Kayani, U. N., De Silva, T. A., & Gan, C. (2020). WCM and firm performance relationship: An empirical investigation of Australasian firms. *Review of Pacific Basin Financial Markets and Policies*, *23*(3), 3. https://doi.org/10.1142/S0219091520500265

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Maddala, G. S., & Wu, S. (1999). Oxford bulletin of economics and statistics. A Comparative Study of Unit Root Tests with Panel Data and A New Simple Test. *61*(Suppl.ary), 631–652. https://doi.org/10.1111/1468-0084.0610s1631

Náglová, Z., & Pechrová, M. Š. (2019). Subsidies and technical efficiency of Czech food processing industry. *Agricultural Economics (Czech Republic)*, *65*(4), 151–159. https://doi.org/10.17221/234/2018-AGRICECON

Nenadál, J., Vykydal, D., & Waloszek, D. (2018). Organizational excellence: Approaches, models and their use at Czech organizations. *Quality Innovation Prosperity*, *22*(2), 47–64. https://doi.org/10.12776/qip.v22i2.1129

Nyeadi, J. D., Sare, Y. A., Aawaar, G., & McMillan, D. (2018). Determinants of working capital requirement in listed firms: Empirical evidence using a dynamic system GMM. *Cogent Economics and Finance*, *6*(1), 1–14. https://doi.org/10.1080/23322039.2018.1558713

Pais, M. A., & Gama, P. M. (2015). WCM and SMEs profitability: Portuguese evidence. *International Journal of Managerial Finance*, *11*(3), 341–358. https://doi.org/10.1108/IJMF-11-2014-0170

Pham, K. X., Nguyen, Q. N., Nguyen, C., & Van. (2020). Effect of WCM on the profitability of steel companies on Vietnam stock exchanges. *The Journal of Asian Finance, Economics and Business*, *7*(10), 741–750. https://doi.org/10.13106/jafeb.2020.vol7.n10.741

Przasnyski, Z. H., & Tai, L. S. (2002). Stock performance of Malcolm Baldrige national quality award winning companies. *Total Quality Management*, *13*(4), 475–488. https://doi.org/10.1080/09544120220149287 Taylor & Francis Group

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, *9*(1), 86–136. https://doi.org/10.1177/1536867x0900900106

Saini, N., & Singhania, M. (2018). Corporate governance, globalization and firm performance in emerging economies: Evidence from India. *International Journal of Productivity and Performance Management*, *67*(8), 1310–1333. https://doi.org/10.1108/IJPPM-04-2017-0091

Samo, A. H., & Murad, H. (2019). Impact of liquidity and financial leverage on firm's profitability – An empirical analysis of the textile industry of Pakistan. *Research Journal of Textile and Apparel*, *23*(4), 291–305. https://doi.org/10.1108/RJTA-09-2018-0055

Sharma, R. K., Bakshi, A., & Chhabra, S. (2020). Determinants of behaviour of WC requirements of BSE listed companies: An empirical study using co-integration techniques and generalised method of moments. *Cogent Economics & Finance*, *8*(1), 1720893. https://doi.org/10.1080/23322039.2020.1720893

Singh, H. P., & Kumar, S. (2017). WC requirements of manufacturing SMEs: Evidence from emerging economy. *Review of International Business and Strategy*, *27*(3), 369–385. https://doi.org/10.1108/RIBS-03-2017-0027

Subedi, D., & Maheshwari, S. (2007). Impact of total quality management (TQM) on profitability and efficiency of Baldrige Award. *Delhi Business Review X*, *8*, 1.

Tahir, M., Binti, M., & Anuar, A. (2016). The determinants of WCM and firms performance of textile sector in pakistan. *Quality & Quantity*, *50*(2), 605–618. https://doi.org/10.1007/s11135-015-0166-4

Vrbka, J. (2020). The use of neural networks to determine value based drivers for SMEs operating in the rural areas of the Czech Republic. *Oeconomia Copernicana*, *11*(2), 325–346. https://doi.org/10.24136/OC.2020.014

Wamugo Mwangi, L., Stephen,, Makau,, & George Kosimbei, M. (2014). Effects of WCM on

performance of non-financial companies listed in NSE, Kenya. *Global Journal of Contemporary Research in Accounting, Auditing and Business Ethics*, *1*(2), 72–90.

Westlund, A. H. (2001). Measuring environmental impact on society in the EFQM system. *Total Quality Management*, *12*(1), 125–135. https://doi.org/10.1080/09544120020010147

World Bank. https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=CZ

Zhang, G. P., & Xia, Y. (2013). Does quality still pay? A reexamination of the relationship between effective quality management and firm performance. *Production and Operations Management*, *22*(1), 120–136. https://doi.org/10.1111/j.1937-5956.2012.01341.x

cogent oa

© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:
Share — copy and redistribute the material in any medium or format.
Adapt — remix, transform, and build upon the material for any purpose, even commercially.
The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:
Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.
You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

***Cogent Economics & Finance* (ISSN: 2332-2039) is published by Cogent OA, part of Taylor & Francis Group.**

Publishing with Cogent OA ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a Cogent OA journal at www.CogentOA.com