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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Working capital management and firm's profitability: Evidence from Czech certified firms from the EFQM excellence model

Muhammad Yousaf^{1*}, Petr Bris¹ and Ismat Haider¹

Abstract: Working capital management (WCM) is one of the most important decisions for all firms. The main components of WCM are days sales outstanding (DSO), days inventory outstanding (DIO), days payable outstanding (DPO), and cash conversion cycle (CCC). Using a sample of 332 Czech firms, including 20 certified firms from the EFQM (European Foundation for Quality Management) Model, the current study explored the effects of the main components of WCM on firms' profitability. We used two different regression models to test the hypothesis, i.e. pooled regression and maximum likelihood estimation (MLE). The findings of the research revealed all the components of WCM have a negative impact on firm profitability. On the other hand, the interaction terms of the EFQM certified firms with the components of WCM showed a positive impact on firms' profitability which means that there is a positive relationship between the components of WCM of the certified firms and profitability. However, it is examined that the quality certificate/award from EFQM Excellence Model decreases the firm's profitability. The outcomes of the current research will be beneficial to academics, managers, leaders, and directors of the firms to improve their firm's profitability.

Subjects: Economics; Economic Forecasting; Corporate Finance

Keywords: working capital; firm profitability; CCC; EFQM; Czech firms

1. Introduction

EFQM (European Foundation for Quality Management) was established in October 1989 in Belgium. The Model had been known as EQA (European Quality Award) in the past. According to Hides et al. (2004), the first EQA was held in 1992. The Model itself was updated and modified in 1999, 2003, 2010, 2013, and 2020. However, the Model is well-known and famous not only in European

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PUBLIC INTEREST STATEMENT

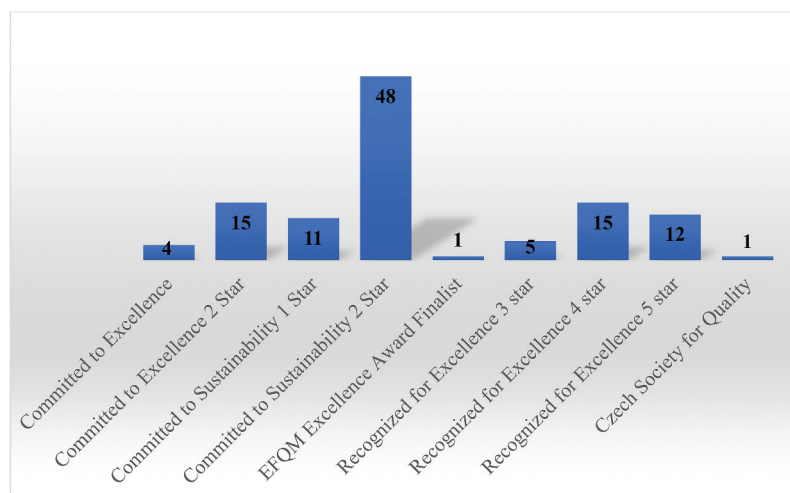
Working capital management is a challenge for every firm as each firm intends to maintain the optimum level of working capital. We employed the four most important components of working capital management in the current research. We examined the impacts of the components of working capital management on firm profitability. This research also investigates the impacts of quality certificates/awards from the EFQM Excellence Model on firm profitability. Therefore, this study will be fruitful for policymakers, managers, and academicians.

organizations but also in global organizations. Westlund (2001) exposed that the Model had become the most popular Model among European firms to implement total quality management. Giménez Espín et al. (2020) claimed that the Model could be used to improve a holistic overview of any organization and the Model helped managers, organizers, and directors to recognize the main aspects to improv for attaining excellence.

The earlier studies exposed that award-winning firms perform better than their competitors' firms (Augustyn et al., 2019; Boulter et al., 2013; Subedi & Maheshwari, 2007; Yousaf & Bris, 2020; Zhang & Xia, 2013). Figure 1 and Figure 2 illustrated the detail for category-wise and sector-wise of the EFQM certified Czech firms. According to Figure 1, only one Czech-based firm was a Finalist for the EFQM Global Award. Nevertheless, there are around 95 Czech organizations that have obtained a quality certificate (some firms have obtained a different certificate at a different time, so altogether the number of firms is 112) from the EFQM (Figure 1 and Figure 2). The EFQM Excellence Model is quite famous globally, but the Czech firms are not implementing this Model. Nenadál et al. (2018) have mentioned the fact that the Czech organizations don't participate in the quality awards like EFQM, as a result, the organizations don't receive the awards. However, the current study has selected a sample of 332 Czech firms, including 20 certified firms from the EFQM. To the best of our knowledge, not much is known about the WCM practices among Czech firms. Therefore, the current research is going to fulfill this gap. The main aim of this study is to explore the relationship between WCM and firm profitability of the Czech firms, including the certified Czech firms from the EFQM.

Earlier research on WCM has been extensively examined the impacts on firm profitability at empirical levels (Högerle et al., 2020; Sharma et al. 2020; Singh & Kumar, 2017). WCM has gained importance in recent years, as academicians, managers, and policymakers have known the relevance of efficient WCM in the survival of a firm, specifically after the global financial crises (Prasad et al., 2018). Therefore, in the last two decades, the empirical literature analysing the relationship between firm profitability and WCM has become exceedingly popular among academics. Fernández-López et al. (2020) claimed that about 13 of the 20 most important studies on the subject were published after 2010. This is the fact that inefficient management of working capital (WC) is the main factor for the bankruptcy of small and medium-sized (SMEs) firms compared to large firms. WCM includes the manager's skills, time, and attention in handling short-term investments as one of the main objectives of WCM is to rise the shareholders' value, profitability, and liquidity of the firms.

Figure 1. EFQM Certified Czech Organizations by Award Category (Source: EFQM.org).



The current study explores the empirical relationship between WCM and firm profitability of Czech firms. The objectives of the research are as follows:

- (1) to analyze the effect of WCM components on the firm profitability of Czech firms.
- (2) to explore the impacts of the quality certificate from the EFQM Excellence Model on firm profitability.
- (3) to examine the effect of WCM components of the certified firms from the EFQM Excellence Model on firm profitability.

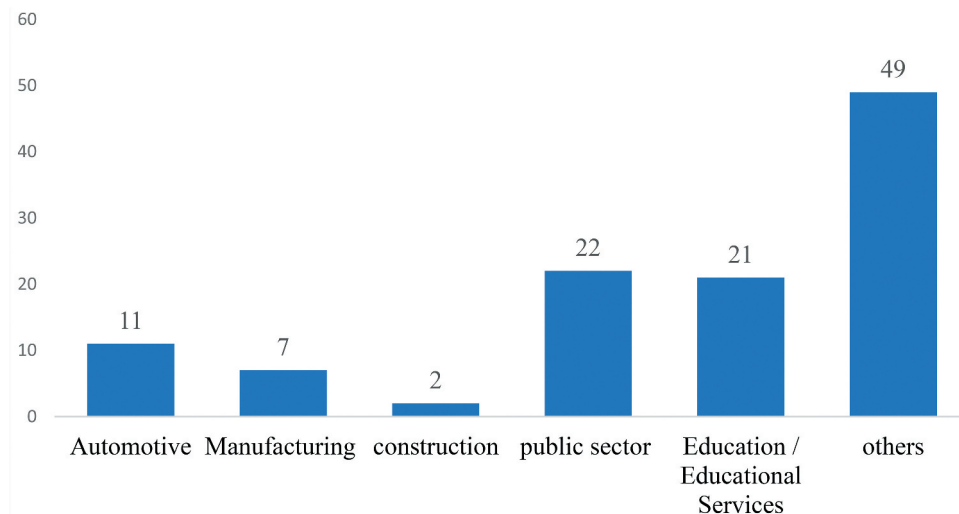
To study the relationship between components of WCM (DSO, DIO, DPO, and CCC) and firm profitability, we took a sample of 332 Czech firms from three sectors: automobile, construction, and manufacturing. These sectors play an essential role in the Czech economy. In 2019, the share of the industry was 31.43%, and the share of the manufacturing sector was approximately 22.38% in GDP (gross domestic product) of the Czech economy (World Bank statistics). We began pooled regression and MLE (maximum likelihood estimation) techniques for empirical analysis.

The remaining part of the paper progresses as follows. Section 2 presents a literature review and research hypothesis about the components of the WCM and certified firms. Section 3 discusses the research methodology. The results of this empirical research described in Section 4, which includes descriptive statistics, the correlation between variables, and the estimation of variables. The final Section discusses the conclusions and implications.

2. Literature review and hypothesis development

Prasad et al. (2018) examined profitability as a proxy to measure the performance of a firm, which estimates the efficiency that transforms equipment, plant, and net current assets into profits. In previous literature, many proxies have been considered for the profitability of firms including return on asset (ROA), return on capital employed (ROCE), return on equity (ROE), and net operating income (NOI). There are a number of previous studies that described the impact of WCM on firm profitability by employing ROA as a proxy of profitability (Fernández-López et al., 2020; Olaoye & Okunade, 2020; Pham et al., 2020). There are a few studies that preferred ROCE as a proxy to measure the profitability of a firm such as Edi et al. (2010); Sharma et al. (2020); Högerle et al. (2020). ROE is also used to measure profitability (Rezaei & Pourali, 2015; Wang, 2002). Many

Figure 2. EFQM Certified Czech Organizations by Sector-wise
(Source: EFQM.org).



scholars addressed more than one proxies for the same purpose Kayani et al. (2020); Prasad et al. (2018); Afza and Nazir (2008). However, we employed ROA to investigate the relationship between WCM and firm profitability in the current research.

WCM can be characterized into four main components: days sales outstanding (DSO), days inventory outstanding (DIO), days payable outstanding (DPO), and cash conversion cycle (CCC). CCC is used by many scholars to investigate the relationship between working capital (WC) and firm profitability such as Olaoye and Okunade (2020); Prasad et al. (2018); Banos-Caballero et al. (2012), etc. However, various researchers used all the components of WCM to investigate the relationship between WCM and firm profitability. (Fernández-López et al., 2020; Högerle et al., 2020; Kayani et al., 2020; Pham et al., 2020; Tahir et al., 2016). The researchers have investigated the mixed results about the influence of WC on firm profitability. Sharma et al., (2020); Altaf and Shah (2018); Gill et al. (2010) reported a positive relationship between WC and firm profitability. Conversely, Fernández-López et al. (2020); Kayani et al. (2020); Akgun and Karatas (2020) explored a negative effect of WC on firm profitability.

In the following, the previous literature that has recently studied the impact of elements of WCM on firms' profitability is synthesized in a review to suggest the research hypotheses.

2.1. Days Sales Outstanding (DSO) and the firm's profitability

DSO is frequently determined on an annual, quarterly, or on monthly basis; it is a measure of the average number of days that takes a firm to collect payment after a sale has been made. It is important for a firm to collect its outstanding account receivables as fast as possible. According to Raheman and Nasr (2007), firms with longer periods of account receivables face higher opportunity costs which impact on declining their profitability. There are mixed findings of the impacts of DSO on the firm's profitability. For example, Enow and Brijlal (2014); Ademola (2014) investigated a positive relationship between DSO and the firm's profitability. On the other hand, most of the studies find out the negative impact of DSO on a firm's profitability like Javid and Dalian (2014), Mathuva (2012), Rezaei and Pourali (2015), and Fernández-López et al. (2020). Because of the mixed results of the previous studies, we set up the hypothesis about DSO and firm profitability as follows.

H_{1A}: There is a significant relationship between DSO and firm profitability.

H_{1B}: There is a significant relationship between the DSO of certified firms from the EFQM and firm profitability.

2.2. Days Inventory Outstanding (DIO) and firm's profitability

DIO specifies the average time in days that a firm takes to turn its inventory, including goods that are a work in progress, into sales. A smaller number of DIO is preferred because it shows a shorter duration to clear off the inventory. A higher number of DIO involves considerable costs such as warehouse cost, opportunity cost, and insurance cost, etc., and these costs might decrease the firm's profitability. Musau (2015), Fernández-López et al. (2020), Serrasqueiro (2014), and Jayarathne (2014) investigated a negative relationship between the DIO and firm's profitability. On the contrary, Pham et al. (2020), Kusuma and Bachtiar (2018), and Tahir et al. (2016) found a positive relationship between the variables. On the basis of previous studies, we propose the following hypothesis about the DIO:

H_{2A}: There is a significant relationship between DIO and firm profitability.

H_{2B}: There is a significant relationship between the DIO of certified firms from the EFQM and firm profitability.

2.3. Days Payable Outstanding (DPO) and firm's profitability

Days payable outstanding (DPO) is a financial ratio that is frequently determined on an annual, quarterly, or monthly basis. DPO specifies the average time in days that a firm takes to pay its invoices and bills to its trade creditors. A firm with a high value of DPO can delay making payments and use the existing cash for short-term investments such as manufacturing more goods, managing operations, or earning interest instead of paying its invoices upfront. In this way, the firms rise their WC and free cash flow. Kayani et al. (2020), Pham et al. (2020), Musau (2015), and Mathuva (2012) found a positive impact of DPO on firms' profitability. On the other hand, Moussa (2018), Javid and Dalian (2014), and Serrasqueiro (2014) found a negative impact of DPO on firm profitability. Due to mixed findings of previous literature, we propose the hypothesis as follows.

H_{3A}: There is a significant impact of DPO on firm profitability.

H_{3B}: There is a significant relationship between the DPO of certified firms from the EFQM and firm profitability.

2.4. Cash Conversion Cycle (CCC) and firms' profitability

CCC expresses the time in days, and it converts the firm's investments in inventory and other resources into cash flows from its sale. It means that CCC represents how fast a firm can convert its invested cash from investment to returns. The lower value of the CCC is better. According to Prasad et al. (2018) and Vural et al. (2012), CCC is the most popular component and widely used to measure the WC. In the current study, CCC has obtained by subtracting the DPO from the sum of DIO and DSO, i.e. $CCC = DSO + DIO - DPO$.

Baños-Caballero et al. (2014) argued that the value of CCC offers an easy evaluation for further financing needs with favour to WC. Most of the previous literature highlighted the negative relationship between CCC and firms' profitability such as Pham et al. (2020), Nguyen et al. (2020), Kayani et al. (2020), Dalci et al. (2019), and Ponsian et al. (2014), etc. Conversely, Dhole et al. (2019); Altaf and Shah (2018) explored a positive relationship between the variables. Hence, we set up the hypothesis as:

H_{4A}: There is a significant impact of CCC on firm profitability.

H_{4B}: There is a significant impact of CCC of the certified firms from the EFQM on firm profitability.

To sum up all the above discussion, the previous studies reported a mixed relationship between components of WCM and firm profitability. The mixed findings encourage us to expose the impact of WCM on firm profitability in the context of Czech firms. Moreover, we are interested to explore the effects of WCM of certified firms from the EFQM on firm profitability. Hence, we employed dummy and dummy interaction terms with all components of WCM to investigate the empirical impacts of WCM on firm profitability.

Other than the above components of WCM, several researchers employed control variables to reveal the impact of WCM on firm profitability such as Kayani et al. (2020), Fernández-López et al. (2020), Högerle et al. (2020), Olaoye and Okunade (2020), and Pham et al. (2020). For instance, Kayani et al. (2020) used firm size, sales growth, and current ratio; Fernández-López et al. (2020) considered firm size, leverage, sales growth, a dummy variable; Pham et al. (2020) used firm size, leverage, current ratio, and sales growth as control variables. Therefore, we also employed leverage, tangibility, firm size, and current ratio as control variables in the current study.

3. Methodology

3.1. Source of data

The secondary data for the current research was taken from the Albertina database, which covers the time period from 2015 to 2019. Many authors have obtained the data from the Albertina database such as Vrbka (2020), Činčalová and Hedija (2020), Náglová and Pechrová (2019), and Chandrapala

Table 1. Summary of variables (source: authors' calculation)

Variables	Proxy	Measurements
Dependent variable		
Firm profitability	ROA (Return on Asset)	Earnings before Interest and Tax Total Assets
Independent variable		
Days Sales Outstanding	DSO	(Account Receivable) *365 Cost of Sales
Days Inventory Outstanding	DIO	(Inventory)*365 Cost of sales
Days Payable Outstanding	DPO	(Accounts payable) *365 Cost of sales
Cash conversion cycle	CCC	DSO + DIO—DPO
Dummy Variable	EFQM	EFQM = 1, if the firm obtained certificate from EFQM, Otherwise EFQM = 0
Interaction term 1	EFQM * DSO	EFQM * DSO
Interaction term 2	EFQM * DIO	EFQM * DIO
Interaction term 3	EFQM * DPO	EFQM * DPO
Interaction term 4	EFQM * CCC	EFQM * CCC
Control variables		
Leverage	LEV	Total Debt Total Assets
Tangibility	FATA (Fixed Assets to Total Assets)	Fixed Assets Total Asset
Size of Firm	SF	Log (Operating Revenue)
Current Ratio	CR	Current Asset Current Debt

and Knápková (2013), etc. The sample was taken 332 Czech firms, including 20 certified firms from the EFQM, from three sectors. All estimations were performed using STATA 16.0.

3.2. Independent, dependent, and control variables

Return on assets (ROA) is the dependent variable that is used as a proxy to measure the firm's profitability in the current study. Many authors have used ROA as a proxy to measure the firm's profitability such as Pham et al. (2020), Nyeadu et al. (2018), Singh and Kumar (2017), Pais and Gama (2015), and Tahir et al. (2016). In the current research, the independent variables are components of WC, dummy variables, and dummy interaction terms. Leverage, tangibility, firm size, and current ratio are the control variables. The complete detail about the variables is given in Table 1.

3.3. Dummy variable and interaction terms

EFQM is a dummy variable and EFQM*DSO, EFQM*DIO, EFQM*DPO, and EFQM*CCC are different interaction terms that used in this study. If a firm is certified from the dummy variable takes value 1; otherwise, the value of the variable will be zero for non-certified firms. The complete detail about the variables, proxies, and their measurements has been explained in Table 1.

3.4. Regression equations

We used four different models to test the hypothesis in the current study. The regression equations are given below.

$$\text{Model 1: } ROA_i = \alpha + \beta_1(DSO_i) + \beta_2(EFQM_i) + \beta_3(EFQM_i \cdot DSO_i) + \beta_4(CntI_i) + \eta_i + \varepsilon_i$$

Table 2. Descriptive statistics of the selected variables (source: authors' calculation)

Variables	Mean	Median	SD	Max	Min	Skewness	Kurtosis	N
Combine Firms								
ROA	5.05	4.31	9.49	71.52	-69.25	-0.39	12.68	1409
DSO	200.51	174.24	128.59	1720.10	-215.15	3.43	26.38	1409
DIO	228.65	191.82	174.05	1714.50	-95.69	2.92	17.40	1404
DPO	121.74	101.18	154.00	3519.21	-2239.00	7.59	229.29	1407
CCC	306.78	273.71	247.38	2074.50	-3102.78	-0.79	37.13	1409
LEV	0.14	0.09	0.14	1.07	0.00	1.88	7.88	1383
FATA	0.44	0.44	0.17	0.95	0.00	-0.03	2.48	1402
SF	5.84	5.81	0.51	8.16	3.97	0.73	5.03	1408
CR	24.82	5.89	118.84	3315.37	0.07	18.05	446.37	1383
EFQM Firms								
ROA	7.96	5.42	8.92	34.07	-9.55	0.91	3.43	87
DSO	188.74	175.76	125.89	562.94	7.27	1.09	3.95	87
DIO	170.33	137.84	133.30	603.22	3.54	1.06	3.34	87
DPO	122.64	107.61	56.07	268.30	11.61	0.73	3.06	87
CCC	236.42	219.47	184.53	783.84	-145.56	0.77	3.58	87
LEV	0.16	0.06	0.17	0.58	0.00	0.96	2.64	87
FATA	0.47	0.50	0.19	0.77	0.13	-0.13	1.76	87
SF	6.45	6.27	0.75	8.16	5.34	0.82	2.81	87
CR	50.61	6.66	181.29	1311.43	0.86	5.36	33.20	87

$$\text{Model 2: } ROA_{it} = \alpha + \beta_1(DIO_{it}) + \beta_2(EFQM_{it}) + \beta_3(EFQM * DIO_{it}) + \beta_4(Cntl_{it}) + \eta_i + \varepsilon_{it}$$

$$\text{Model 3: } ROA_{it} = \alpha + \beta_1(DPO_{it}) + \beta_2(EFQM_{it}) + \beta_3(EFQM * DPO_{it}) + \beta_4(Cntl_{it}) + \eta_i + \varepsilon_{it}$$

$$\text{Model 4: } ROA_{it} = \alpha + \beta_1(CCC_{it}) + \beta_2(EFQM_{it}) + \beta_3(EFQM * CCC_{it}) + \beta_4(Cntl_{it}) + \eta_i + \varepsilon_{it}$$

Where ROA denotes the firm's profitability, DSO is days sales outstanding, DIO represents days inventory outstanding, DPO is days payable outstanding, and CCC symbolises cash conversion cycle, Cntl represents the control variables which are leverage, tangibility, size of the firm, and current ratio. EFQM is a dummy variable; it takes value 1 for the EFQM certified firm; otherwise, its value is zero. EFQM*DSO, EFQM*DIO, EFQM*DPO, and EFQM*CCC are interaction terms, $i = 1, 2, 3, \dots, n$ (number of firms), $t = 2015, 2016, 2017, 2018, \text{ and } 2019$. α represents intercepts, β values represent the regression coefficients of the independent variables, η_i and ε_{it} are unobserved firm-specific effects and error term for firm i at time t , respectively.

To check the stationarity of the variables, we applied the Fisher-type unit root test. Mwangi et al. (2014) claimed that the Fisher-type unit root test has more advantages than any other unit root test as this test requires the specification of the Dickey-Fuller test to check if the variable has a unit root. We found that all the variables are stationary as all the results are significant of the selected variables. We estimated the outcomes with the help of the Pooled Regression and Maximum Likelihood Estimation (MLE). Hsiao et al. (2002) claimed that MLE appears to be very good in almost all cases, in addition, the MLE performs remarkably well as compare to the generalised method of moments (GMM) and fixed effect estimation (FEE) when the sample size is small. This fact is also confirmed by Binder et al. (2005) that the MLE performs much better even when the sample size is small, and the data are generated by non-normal disturbance.

4. Empirical results

In Table 2, the Czech firms' descriptive statistics are presented in two groups: combined firms and certified firms from EFQM. During the study period, the mean, median, and standard deviation of ROA for combined firms are 5.05, 4.31, and 9.49, respectively. The mean and standard deviation of CCC for the EFQM firms are 236.42 and 184.53, respectively. The values of mean and standard deviations of DIO, DSO, and DPO are slightly different from each other in the selected groups. According to Simon et al. (2017), to test the normal distribution assumption, Skewness should be within the range ± 3 , and the Kurtosis value should be within range ± 10 . On the contrary, Malhotra and Dash (2016) suggested the range should be ± 1 for Skewness and ± 3 for Kurtosis. However, most values of Skewness and Kurtosis in Table 2 are showing the normal distribution.

Table 3 illustrates the correlation coefficients of the variables of all combine 332 Czech firms from three sectors. The four components of WCM, LEV, and FATA have a negative correlation with ROA. On the other hand, SF, CR, and EFQM are positively correlated with ROA. CCC is positively correlated with DSO and DIO. On the contrary, CCC and DPO are negatively correlated with each other. CCC is negatively correlated with LEV, FATA, SF, and EFQM.

The results of the pooled regression are presented in Table 4. The results exposed that most of the selected variables are statistically significant, except CR. The outcomes of all the components of WCM are statistically significant at a 0.01 level. The coefficient signs of the components showed that there is a negative relationship between components of WCM and firm profitability. These statistically significant findings supporting H_{1A} , H_{2A} , H_{3A} , and H_{4A} . However, the magnitudes of all components of WCM are quite small. LEV and FATA are statistically significant in all four models, and both variables have a negative impact on firm profitability. On the other hand, SF is statistically significant at a 0.01 level and has a positive impact on firm profitability in all four models. The positive coefficients of FS exposed that larger Czech firms earn more profits.

Table 3. Correlation coefficients of the variables (source: authors' calculation)

	ROA	DSO	DIO	DPO	CCC	LEV	FATA	SF	CR	EFQM
ROA	1									
DSO	-0.03	1								
DIO	-0.21	0.11	1							
DPO	-0.26	0.19	0.12	1						
CCC	-0.03	0.49	0.73	-0.37	1					
LEV	-0.14	-0.13	-0.05	0.10	-0.16	1				
FATA	-0.11	-0.25	-0.23	0.02	-0.31	0.25	1			
SF	0.19	0.12	-0.15	0.02	-0.06	-0.14	0.01	1		
CR	0.04	0.01	-0.02	-0.01	0.00	-0.18	-0.13	-0.02	1	
EFQM	0.08	-0.02	-0.09	0.00	-0.08	0.04	0.05	0.31	0.06	1

Table 4. Estimation results of the effects of WCM on ROA: pool regression analysis, (source: authors' calculation)

Variables	Model 1		Model 2		Model 3		Model 4	
	A	B	A	B	A	B	A	B
DSO	-0.007*** (0.001)							
EFQM*DSO		0.027*** (0.001)						
DIO			-0.013*** (0.000)					
EFQM*DIO				0.024*** (0.000)				
DPO					-0.019*** (0.000)			
EFQM*DPO						0.020 (0.227)		
CCC							-0.003*** (0.007)	
EFQM*CCC								0.020*** (0.000)
LEV	-5.691*** (0.002)		-5.820*** (0.002)		-4.250*** (0.020)		-5.600*** (0.003)	
FATA	-4.941*** (0.001)		-7.913*** (0.000)		-4.524*** (0.002)		-5.471*** (0.000)	
SF	3.078*** (0.000)		2.786*** (0.000)		3.174*** (0.000)		3.108*** (0.000)	
CR	0.001 (0.692)		-0.001 (0.797)		0.001 (0.523)		0.000 (0.971)	
EFQM	-3.951** (0.033)		-3.246** (0.036)		-1.302 (0.575)		-3.651** (0.032)	
Constant	-8.661*** (0.005)		-3.909 (0.223)		-8.693*** (0.004)		-8.999*** (0.005)	

(Continued)

Table 4. (Continued)

Variables	Model 1		Model 2		Model 3		Model 4	
	A	B	A	B	A	B	A	B
P- value	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
R ²	0.0672		0.1122		0.1215		0.0669	
Adj R ²	0.0625		0.1076		0.1170		0.0621	
N	1378		1373		1376		1378	

Note: Coefficients and P-values, where p-values in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

The outcomes of dummy variables (EFQM) are statistically significant, except Model 3, and the significant results of the dummy variable revealed a negative impact on firms' profitability. It means that there is a negative impact of having a quality certificate from the EFQM Model on firm profitability. All the interaction terms of the EFQM are statistically significant except EFQM*DPO. The coefficient of EFQM*DPO is 0.020 with a p-value of 0.227, which is statistically not significant (not supporting H_{3B}). However, the statistically significant findings of EFQM*DSO, EFQM*DIO, and EFQM*CCC are supporting H_{1B} , H_{2B} , and H_{4B} . The magnitudes of coefficients of dummy interaction terms are also very small. There is a positive impact of the dummy interaction terms on firm profitability. For example, one increase in DSO will increase the profitability of certified firms by 0.027 units as compare to non-certified firms, and a total increase in profitability of certified firms will be $0.027 - 0.007 = 0.020$ units. Using the same explanation, one unit increase in DIO and CCC of the certified firms will rise the firm's profitability by 0.011 and 0.017 units, respectively.

Table 5 represents the outcomes of MLE and it shows that the components of WCM except CCC are statistically significant and showing a negative impact on firms' profitability. These significant results are supporting H_{1A} , H_{2A} , and H_{3A} , however, the p-value (0.841) of CCC is not statistically significant (not supporting H_{4A}). Like the pooled regression results, LEV and FATA are also statistically significant and exploring a negative impact on ROA in all models. However, LEV is not significant in Model 3 as the p-value of LEV is 0.193. SF is statistically significant, and the variable has a positive impact on firm profitability. The positive coefficient of FS exposed that the large Czech firms earn more profit.

The p-values of dummy variables (EFQM) are indicating that the dummy variable is not significant in all four models. It means that the quality certificate from the EFQM Model doesn't help to improve profitability. Therefore, the profitability of certified firms and non-certified firms are the same. The interaction terms of EFQM are only statistically significant in the case of DIO (supporting H_{2B}), and it is showing a positive impact of DIO of certified firms on ROA. Hence, we can conclude that one unit increase in DIO will rise ROA of certified firms by 0.020 units as compared to control firms, in this way total increase in ROA of the certified firms will be $0.020 - 0.011 = 0.009$ units. The interactions terms EFQM*DSO, EFQM*DPO, and EFQM*CCC are not statistically significant. Hence, the findings do not support H_{1B} , H_{3B} , and H_{4B} .

5. Conclusion

The main aim of this research is to explore the relationship between working capital management (WCM) and firm profitability of the Czech firms, including the certified Czech firms from the EFQM (European Foundation for Quality Management). We selected a sample of 332 Czech firms, including 20 certified firms, from three sectors: construction, automobile, and manufacturing. We used two different estimations, pooled regression, and maximum likelihood estimation (MLE) to test the hypothesis and to conclude the main aim of the study. The overall results of the pooled regression showed that all the components of WCM have a negative impact on firm profitability which are partly consistent with those of previous studies (Kayani et al., 2020; Kusuma & Bachtiar, 2018; Nguyen et al., 2020). Leverage and tangibility also have a negative impact on firm profitability. However, firm size and firm profitability are positive correlated with each other in all four models. The findings of the dummy variable showed a negative relationship between EFQM certified firms and firm profitability. Therefore, the results of the dummy variable exposed that the quality certificate from EFQM Model decreases the firm's profitability. The findings of the current research are not consistent with the previous literature as the former studies exposed that the firms with quality awards/certificates perform better than non-certified firms. Hence, the Czech firms don't implement EFQM Excellence Model. All the interaction terms of the EFQM with the components of WCM have a positive impact on firms' profitability which means that there is a positive relationship between the WCM of the certified firms and their profitability. According to MLE findings, most of the components of WCM have a negative impact on firm profitability. The results of leverage and tangibility also have a negative impact on firm profitability which are consistent with pooled regression. The DIO (days of inventory outstanding) of the certified firms has a positive impact on firm profitability.

Table 5. Estimation results of the effects of WCM on ROA: MLE estimations, (source: authors' calculation)

Variables	Model 1		Model 2		Model 3		Model 4	
	A	B	A	B	A	B	A	B
DSO	-0.005** (0.022)							
EFQM*DSO		0.002 (0.868)						
DIO			-0.011*** (0.000)					
EFQM*DIO				0.020** (0.040)				
DPO					-0.013*** (0.000)			
EFQM*DPO						0.012 (0.488)		
CCC							0.000 (0.841)	
EFQM*CCC								0.002 (0.725)
LEV	-3.844* (0.081)		-3.613* (0.096)		-2.786 (0.193)		-3.720* (0.092)	
FATA	-10.153*** (0.000)		-11.096*** (0.000)		-8.770*** (0.000)		-9.075*** (0.000)	
SF	4.536*** (0.000)		4.185*** (0.000)		4.169*** (0.000)		4.647*** (0.000)	
CR	0.000 (0.960)		0.000 (0.869)		0.001 (0.628)		0.000 (0.883)	
EFQM	-0.161 (0.948)		-3.566 (0.147)		-1.167 (0.673)		-0.486 (0.843)	
Constant	-15.397*** (0.002)		-11.484** (0.022)		-13.424*** (0.004)		-17.609*** (0.000)	
P- value	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
N	1378		1373		1376		1378	

Note: Coefficients and P-values, where p-values in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

Most of the results of components of WCM of the current study are consistent with the findings of prior studies such as Rezaei and Pourali (2015), Serrasqueiro (2014), and Fernández-López et al. (2020). However, the results of the WCM's components of the certified Czech firms from the EFQM Model are contradictory, and these conflicting findings offer scope for future research. We included only one country and a limited time period in the current study. However, further research can be conducted to explore the relationship between WCM and firm performance with more time periods, different sectors, different quality awards/certificates, and different countries.

The quantitative results of the current study propose not only theoretical but also practical implications. Theoretically, this research contributes by extending the literature on quality management of the awarded organizations as the findings of the research revealed that having a quality certificate from EFQM Model decreases the firm's profitability. Practically, the outcomes of this research will be valuable for policymakers, managers, and directors of the firms as they make policies and decisions to improve the financial performance of the firms. Therefore, this study recommends firms to give importance to their WCM to improve their profitability and sustainable growth.

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Conflicts of interest

The authors declare no conflict of interest.

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