



The Impact of Working Capital Management on Firm Profitability: Evidence from Egypt

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Abstract

Effective working capital management is crucial for any company in order to run its day-to-day operations and meet its short-term obligations. Given its vital role in maximizing operational efficiency, working capital management (WCM) is a critical factor in enhancing firm profitability. Companies operating in emerging markets face many challenges that make effective WCM essential for a company's survival and continuity. This study aims to examine the impact of WCM on firm profitability in Egypt as an emerging market. The Generalized Least Squares (GLS) method is employed to analyze a sample of 29 Egyptian listed companies over the period 2019-2023. Return on assets (ROA), Tobin's Q (TQ), and net profit margin (NPM) are used as firm profitability measures, while WCM is represented by the net working capital to sales ratio (NWCR). The findings of this study reveal a significant negative impact of NWCR on all firm profitability variables, suggesting that a decrease in net working capital will lead to an increase in firm profitability. The results highlight the important role that WCM can play in enhancing firm profitability, and encourage corporate managers to avoid allocating excessive investments in working capital. This research adds to the limited studies on WCM in emerging markets, and contributes to working capital literature by providing empirical evidence on the impact of WCM on firm profitability from Egypt.

Subject Areas

Finance

Keywords

Working Capital Management, Firm Profitability, Egypt

1. Introduction

The idea of Working capital management (WCM) deals with how businesses manage their short-term capital with the goal of enhancing liquidity, profitability, and shareholder value [1]. WCM includes decisions about the amount, structure, and financing of a company's current assets and current liabilities [2]; it involves creating and implementing strategies for different features of a firm's operations, such as accounts receivable, accounts payable, and inventory management [3]. [2] stated that the company's ability to generate profit is mainly determined by how successfully its financial management can manage its inventory, accounts payable, and accounts receivable. Hence, WCM is an essential part of a company's financial management as it directly impacts its financial performance through profitability [4].

WCM involves a trade-off between risk and profitability; it is a key aspect of corporate finance that plays a vital role in a company's survival and value creation [5]. Companies need to maintain a specific level of liquidity at all times to avoid borrowing and to keep their operations running smoothly [2]. Managers look to their working capital to increase the liquidity of their company by decreasing the amount of capital invested in the operating cycle; therefore, effective WCM and improved strategies lead to increased cash flow from operations [3]. Working capital management is not only important for large companies, but small businesses also recognize its importance, because proactive attention to working capital management can help small companies avoid financial difficulties [4]. [6] stated that effective WCM is the cornerstone of a company's financial health because it affects its ability to maximize shareholder value, generate cash flow and fulfill short-term obligations. According to [7], an effective working capital management strategy is essential for companies operating in emerging markets to increase profitability, reduce financial risk, and improve liquidity.

Working Capital Management Policies:

Firms can adopt different working capital management policies based on their financing and investment objectives, such as aggressive and conservative working capital management policies; these different approaches have varying impacts on firm value, risk, liquidity, and profitability [8]. According to [9], the emphasis of conservative policy is to allocate large funds in current assets and to finance these assets through low short-term sources of current liabilities, while the focus of aggressive policy is to allocate a small amount of money in current assets financed by a large volume of short-term sources. Moreover, [10] explained that an aggressive WCM strategy focuses on investment activities, reducing the amount of current assets, and utilizing short-term financing through supplier credit terms; this strategy enhances value creation by making greater investments, but results in lower liquidity levels. On the other hand, a conservative approach involves holding a large amount of current assets and low levels of short-term liabilities; usually, this approach is used to reduce risk and increase short-term liquidity.

[11] referred to the consequences of aggressive and conservative WCM strate-

gies and stated that, under an aggressive working capital management policy, companies maintain a low level of working capital, which results in high returns but also a high degree of risk. Conversely, under a conservative working capital policy, companies hold a large amount of working capital, which results in low risk and low return.

Research Objective:

Effective working capital management is of critical importance to companies operating in emerging markets, where these companies face many challenges such as a lack of business financing, long cash conversion cycles, information asymmetry, and high market volatility. Although numerous studies have examined the relationship between WCM and firm profitability in developed countries, research on this topic in emerging markets is limited. The objective of this study is to examine the impact of WCM on firm profitability in Egypt as an emerging market. In order to fulfil the research objective, this study attempts to answer the following question:

How does working capital management impact firm profitability in Egypt?

2. Literature Review

Many empirical studies have examined the impact of working capital management on firm profitability. Although these studies have yielded inconsistent results, most have shown that working capital management has a significant impact on firm profitability. In Denmark, [3] investigated the impact of WCM on firm profitability using a sample of 91 firms listed on the Danish stock exchange over the period from 2012 to 2017. He used a fixed effects regression model to analyze the association between WCM and firm profitability. The results revealed that there is a negative relationship between the cash conversion cycle and firm profitability. In the same vein, [12] in China examined the relationship between WCM as measured by the cash conversion cycle and firm profitability as measured by gross operating income. He used a large sample of 2000 Chinese listed companies during the period from 2010 to 2014. The results revealed a negative association between the cash conversion cycle and gross operating income.

In the context of African emerging markets, [2] developed their research using a sample comprising companies from the Egypt and South Africa exchanges during the period from 2007 to 2020 with the aim of examining the impact of WCM on firm performance. ROA, ROE, TQ and NPM were used as performance measures. They found that the average age of inventory, average collection period and cash conversion cycle have a significant negative relationship with firm performance, while the average payment period was found to have a positive relationship with firm performance. They concluded that more efficient management of working capital means better firm performance. Moreover, [4] in Vietnam examined how WCM impacts the financial performance of listed companies. They used a sample of 441 listed firms over the period 2012-2022. The results of their research showed a significant negative impact of working capital on firms' financial performance

as measured by ROA and ROE. Likewise, [5] studied the relationship between WCM efficiency and firm value using a sample of 1651 Chinese listed firms over the period 2004-2013. The efficiency of WCM was measured by the net trade cycle and its components, while the TQ ratio was used as a profitability measure. The results showed a negative relationship between net trade cycle and firm value.

On the contrary, [6] investigated the impact of WCM on firm profitability using a sample of 68 Egyptian listed companies over the period 2015-2023. They used the cash conversion cycle, inventory turnover, average collection period and average payment period as working capital management measures, while firm profitability was measured by gross operating margin and market value was measured by Tobin' Q. They reported a positive relationship between CCC and gross operating margin, while the relationship between WCM components and the market value was insignificant. Moreover, [1] examined the effect of firm characteristics, including profitability, on WCM in Sweden using a sample of 40 Swedish listed companies during the period 2007-2008. The results of their research showed a positive relationship between CCC and firm profitability as measured by ROA. They concluded that an increase in firm profitability leads to a longer CCC, indicating less effective WCM.

However, some studies revealed mixed findings regarding different variables of WCM. [13] investigated the effect of WCM on the performance of alternative energy companies in the UK over the period 2015-2022. In their study, receivable turnover, inventory turnover, and payable turnover were used as proxies of working capital management, while ROA was used as a measure of financial performance. Using the fixed effects method, the results revealed that receivable turnover has a positive and significant impact on ROA, payable turnover has a negative and significant impact on ROA, and inventory turnover has an insignificant impact on ROA. They concluded that increasing the net cash flow from operating activities is recommended for oil and gas companies to improve their financial performance.

Moreover, [14] examined how working capital management policies affect the profitability of manufacturing SMEs in the Czech Republic. They used a sample of 105 manufacturing firms during the period from 2014 to 2018. The results revealed that inventory management policy, days payable outstanding, and cash conversion cycle have a negative impact on profitability. They concluded that Profitability is unaffected by giving consumers longer extensions. Moreover, investing in inventory and gaining extensions from suppliers creates additional costs that negatively affect firms' profitability. Also, [15] analyzed the effect of WCM on firm profitability and value in Sri Lanka using a sample of 41 listed companies during the period 2014-2018. Using regression analysis, they found that the cash conversion cycle and accounts payable days have a negative impact on ROA as a measure of profitability, while accounts receivable days were found to have a positive impact on ROA. Moreover, they reported that all WCM variables, except inventory days, have an insignificant impact on firm value. Based on the results, they concluded that WCM has no

much impact on firm value as measured by Market Value Added.

However, some studies reported a nonlinear impact of working capital level on firm profitability. In the context of the MENA region, [9] examined the non-linear impact of net working capital level on firm profitability using a sample of 134 consumer-goods listed companies from 12 MENA countries. They used ROA and ROE as profitability measures and net working capital level as an independent variable. The findings showed that there is a non-linear impact of net working capital levels on ROA, while the results were statistically insignificant when using ROE as a measure of profitability. Also, [16] examined the impact of WCM on firm profitability in Poland using a sample of 719 Polish listed companies from 2007 to 2016. They reported a nonlinear (a concave) association between the level of working capital and firm profitability. In the United Kingdom, [17] investigated the potential impact of cash flow on the relationship between working capital and firm performance. The results highlighted the importance of cash flow, showing a concave relationship between net working capital and firm performance in its absence. However, when cash flow is considered, the relationship becomes convex. These findings suggest that managers should consider cash flow when determining working capital investment. [18] studied the relationship between WCM and firm performance. A large sample of US firms during the period from 1982 to 2011 was used in their study; they showed that a decrease in working capital over time leads to increased firm performance. They suggested that firm managers should target an optimum level of working capital and avoid having unnecessarily too much cash locked up in working capital.

3. Methodology

3.1. Research Sample and Data Collection

This study examines the impact of working capital management on firm profitability in Egypt using a sample of Egyptian listed companies. A total of 217 companies from different sectors were listed on the Egyptian Stock Exchange till December 2023. These companies represent 18 different sectors. The final sample used in this study includes balanced panel data for 29 listed companies with 145 observations for a five-year period from 2019 to 2023. All companies included in the research sample are nonfinancial companies belonging to major sectors including Health Care, Food and Beverages, Real Estate, Building Materials, Trade and Distributors, Textile & Durables and Basic Resources. Financial companies are excluded due to their special nature, which differs from traditional companies in many aspects, including working capital structure and financial statements. The main source of the data used in this study was the firms' websites and the financial website Mubasher Info. For the purpose of analysis, this study uses secondary data that were collected from annual reports, audited financial statements, and the historical stock prices of the sampled companies. The collected data is analyzed using Microsoft Excel, SPSS and Eviews software.

Research Variables:

In this study, working capital management is measured by the net working capital to sales ratio (NWCR). Firm profitability is measured by return on assets (ROA), Tobin's Q (TQ), and net profit margin (NPM). In addition, firm age, firm size, liquidity (as measured by the current ratio), and tangibility are used as control variables.

Working Capital Management:

Net working capital to sales ratio (NWCR) is used in this study as a proxy for working capital management. The net working capital to sales ratio has been used in previous studies in the working capital management literature (e.g., [16]-[20]). According to [16], net working capital to sales ratio reflects the amount of money engaged in the operational cycle rather than cash conversion cycle or the net trade cycle that reflect a length of time. [17] referred to two contradicting perspectives regarding net working capital. One perspective suggests that increased net working capital can boost sales, avoid production disruptions and improve the company's long-term relationship with its clients, all of which could lead to better business performance. The other perspective implies that increased net working capital may be a key factor in firms' bankruptcy. This is because working capital investments represent the amount of money that could have been used for profitable projects.

In this study, NWCR is calculated as the ratio of accounts receivable plus inventory minus accounts payable divided by sales at the end of each year.

$$\text{NWCR} = [(\text{Accounts receivable} + \text{inventory} - \text{accounts payable})/\text{sales}]$$

Firm Profitability Variables:

This study uses ROA, TQ, and NPM as profitability variables.

1) ROA

ROA measures the ability of a corporation to use its assets to generate profits; this is considered a key factor when taking into consideration the corporation's future investments [21]; it is commonly used as an accounting performance indicator because it reflects the efficiency of the methods in which a company's assets are allocated and managed [22]. ROA is calculated as net income divided by total assets.

$$\text{ROA} = \text{net income}/\text{total assets}$$

2) Tobin's Q

Tobin's Q ratio is a market-based value measure that compares the market value of a company with its book value [6]. Firms with a Tobin Q ratio greater than one are considered to be using limited resources well, while firms with a Tobin Q ratio less than one are considered to be using resources poorly [23].

TQ is calculated as follows:

$$\text{TQ} = (\text{Market value of a firm's equity} + \text{total debt})/\text{total assets}$$

3) Net Profit Margin

Net profit margin is an important measure of a company's profitability and indicates the percentage of profit a company generates from its revenue; it is a crucial metric for a company's financial health and growth.

NPM is calculated as net income divided by total revenue.

$$\text{NPM} = \text{net income} / \text{total revenue}$$

Control Variables:

Firm age (AGE), firm size (SIZE), liquidity (CR), and tangibility (TANG) are used as control variables. AGE is defined as the natural logarithm of the number of years since the establishment of a firm, SIZE is calculated as the natural logarithm of total assets, CR is calculated as current assets divided by current liabilities, and TANG is calculated as fixed assets divided by total assets (See **Table 1**).

Table 1. Research variables and measurements.

Variables	Symbol	Measurements
Return on assets	ROA	Net income/Total assets
Tobin's Q	TQ	(Market value of a firm's equity + total debt)/Total assets
Net Profit Margin	NPM	Net income/Total revenue
Net working capital ratio	NWCR	(accounts receivable + inventory – accounts payable)/Sales
Firm age	AGE	The natural logarithm of the number of years since the establishment of a firm
Firm size	SIZE	The natural logarithm of total assets
Current ratio	CR	Current assets/current liabilities
Tangibility	TANG	Fixed assets/total assets

Conceptual Framework:

Figure 1 indicates the conceptual framework of this study that examines the impact of working capital management on firm profitability. In the proposed framework, working capital management is represented by the net working capital to sales ratio (NWCR), while ROA, TQ and NPM are used as profitability measures. Moreover, firm age, firm size, current ratio and tangibility are used as control variables.

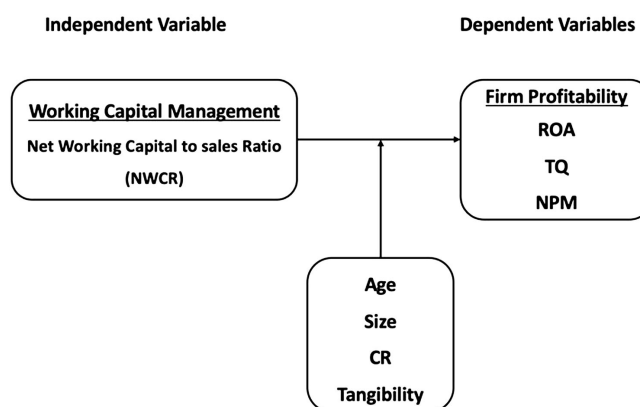


Figure 1. The conceptual framework of this study.

Research Hypotheses:

Based on the conceptual framework of this study, the following hypotheses can be proposed:

H1: Working capital management has a significant impact on firm profitability.

H1a: Net working capital to sales ratio (NWCR) has a significant impact on ROA.

H1b: Net working capital to sales ratio (NWCR) has a significant impact on TQ.

H1c: Net working capital to sales ratio (NWCR) has a significant impact on NPM.

3.2. Research Model

Panel data regression models will be used in this study in order to test the research hypotheses. Each firm profitability variable (return on assets, Tobin's Q, net profit margin) will be regressed against the net working capital to sales ratio and control variables, which are Firm age, firm size, Liquidity and Tangibility.

$$ROA_{it} = \beta_0 + \beta_1 NWCR_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 CR_{it} + \beta_5 TANG_{it} + E_{it} \quad (1)$$

$$TQ_{it} = \beta_0 + \beta_1 NWCR_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 CR_{it} + \beta_5 TANG_{it} + E_{it} \quad (2)$$

$$NPM_{it} = \beta_0 + \beta_1 NWCR_{it} + \beta_2 AGE_{it} + \beta_3 SIZE_{it} + \beta_4 CR_{it} + \beta_5 TANG_{it} + E_{it} \quad (3)$$

where:

ROA: return on assets, **TQ:** Tobin's Q, **NPM:** net profit margin, **NWCR:** net working capital to sales ratio, **AGE:** firm age, **SIZE:** firm size, **CR:** current ratio (liquidity), and **TANG:** tangibility.

3.3. Data Analysis

In this study, descriptive statistics are used to summarize and describe the key features of the research variables. Moreover, correlation analysis is used to determine the strength of the association among the research variables. Further, the Ordinary Least Squares regression (OLS) method is used to examine the potential impact of working capital management on the profitability of the sampled companies.

According to [24], under specific assumptions, the ordinary least squares (OLS) method has some very attractive statistical characteristics that make it one of the most powerful methods of regression analysis. Therefore, the research models were tested for multicollinearity, heteroscedasticity, autocorrelation and Serial Correlation. Multicollinearity was tested using the variance inflation factor (VIF). The results revealed that all independent variables are not collinear with each other as VIF values are less than 10, implying that Multicollinearity problem does not exist.

Further, Breusch-Pagan-Godfrey and white tests were conducted to test for heteroscedasticity. The results confirmed the existence of heteroscedasticity in the research models, as p-values were less than 0.05. Moreover, the Durbin-Watson test values for the research models were 1.5, 1.2, and 1.4, respectively, confirming the presence of autocorrelation. In addition, the Breusch-Godfrey Serial Correlation LM Test indicates the presence of serial correlation since the

p-value for all the research models was less than 0.05. The Hausman test was performed to select the suitable model between the fixed effects model and random effects model. The results of the Hausman test for model 1 and model 2 support the fixed effects method (p-value < 0.05), while the result for model 3 supports the random effects method (p-value > 0.05). However, when fixed effects models were tested for heteroscedasticity, the results confirmed the presence of heteroscedasticity.

Based on the results of previous tests, it is clear that the assumptions of the Ordinary Least Squares method are not met. Therefore, the Generalized Least Squares (GLS) method was chosen as an appropriate method to test the research hypotheses. [25] explained that when there is a violation of the ordinary least squares assumptions, such as heteroscedasticity and autocorrelation, GLS is the appropriate method and provides the best estimate of the regression model. Moreover, [26] stated that when there is a serial correlation in the residuals, the generalized least squares technique is commonly utilized to improve the estimation efficiency.

4. Results

4.1. Descriptive Analysis

Table 2 shows the summary statistics of the research sample that includes 29 Egyptian listed companies during the period 2019-2023. The table shows that the average value of ROA is 9% and ranges from 43% to -22%. The mean value of TQ in this study is 1.37, which indicates, relatively, the good performance of the majority of companies in the sample and is considered a good signal for the expected future performance. Net profit margin ranges from -0.316 to 0.422, with a mean of 0.088. The average value of NWCR accounts for 25.6%, meaning that, on average, 25.6% of each EGP in sales is tied up in net working capital. Different ratios of NWCR are reported in other studies. For example, [19] reported 19.7%, while [17] reported 16.2%.

Table 2. Descriptive analysis.

Variable	ROA	TQ	NPM	NWCR	AGE	SIZE	CR	TANG
Mean	0.094	1.370	0.088	0.256	1.579	8.952	2.083	0.390
Median	0.087	1.143	0.086	0.257	1.591	8.895	1.546	0.364
Maximum	0.434	4.846	0.422	0.831	1.908	10.203	36.286	0.961
Minimum	-0.215	0.173	-0.316	-0.417	1.041	7.688	0.077	0.088
Std. Dev.	0.099	0.827	0.094	0.204	0.169	0.544	3.139	0.183
Observations	145	145	145	145	145	145	145	145

4.2. Correlation Analysis

The correlation matrix for the research variables is presented in **Table 3**. The table

summarizes the correlation results for the research variables. As can be seen in the table, the correlation coefficients between the independent variables are lower than 0.70, which means there is no multicollinearity problem. Moreover, NWCR was found to have a negative relationship with all profitability measures (ROA, TQ, NPM). The results of the correlation analysis indicate, in most cases, that there is a significant relationship between the NWCR and the firm profitability variables, which supports the hypotheses of this study.

Table 3. Correlation analysis.

Variable	ROA	TQ	NPM	NWCR	AGE	SIZE	CR	TANG
ROA	1							
TQ	0.235**	1						
NPM	0.833**	0.178*	1					
NWCR	-0.168*	-0.163*	-0.0561	1				
AGE	-0.187*	-0.069	-0.070	0.368**	1			
SIZE	0.042	-0.068	0.131	0.150	0.255**	1		
CR	-0.030	-0.012	-0.040	-0.160	-0.131	-0.325**	1	
TANG	-0.179*	0.136	-0.166*	-0.175*	-0.154	0.077	0.114	1

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

4.3. Regression Analysis

Table 4 presents the results of the Generalized Least Squares regression for the research models. The results confirm the significance of these models, as the probability of the F-statistic is 0.0000 for all the research models. The adjusted R-squared values for the research models are 0.734, 0.789, and 0.800, respectively. This means that the first model explains about 73% of the variation in ROA, the second model explains about 79% of the variation in TQ, and the third model explains about 80% of the variation in NPM. As the table illustrates, the regression results reveal a significant negative impact of NWCR on ROA, TQ, and NPM, which means that H1a, H1b and H1c are accepted. The results suggest that a decrease in investment in working capital will increase firm profitability as measured by ROA, TQ and NPM, and vice versa.

Table 4. Regression analysis.

Variable	Model 1 (ROA)	Model 2 (TQ)	Model 3 (NPM)
NWCR	-0.14831	-1.09673	-0.06284
Sig.	0.0004	0.0003	0.0900
AGE	1.11585	10.54048	0.30227
Sig.	0.0001	0.0000	0.1554
SIZE	-0.02578	-0.39112	0.02244

Continued

Sig.	0.3618	0.0005	0.3255
CR	0.00196	-0.02700	-0.00145
Sig.	0.6304	0.0039	0.6223
TANG	-0.06473	0.46024	-0.06114
Sig.	0.0182	0.0003	0.0087
R-squared	0.79568	0.83756	0.84616
Adjusted R-squared	0.73494	0.78926	0.80042
F-statistic	13.09913	17.34268	18.50033
Prob(F-statistic)	0.00000	0.00000	0.00000
Durbin-Watson stat.	1.99516	1.86404	1.89697

As shown in the table, NWCR is found to have a negative and significant impact on ROA and TQ at the 1% level, while it is found to have a negative and significant impact on NPM at the 10% level. This reflects the strength of the statistical significance of the impact of NWCR on both ROA and TQ, compared to its effect on NPM. Regarding control variables, firm age is found to have a significant positive impact on ROA and TQ at the 1% level and an insignificant impact on NPM. The results reveal that firm size has a negative significant impact on TQ, while it is found to have an insignificant impact on ROA and NPM. Likewise, the current ratio has a negative significant impact on TQ and an insignificant impact on ROA and NPM. Tangibility was found to have a negative significant impact on ROA and NPM and a positive significant impact on TQ. The results of this study are in line with previous studies that found a negative effect of working capital management measures on firm profitability (e.g. [2]-[5] [12]). However, the current results are contradictory with [6] and [1] who reported a positive effect of working capital management measures on firm profitability.

5. Conclusions and Discussion

This study examined the impact of working capital management on firm profitability in Egypt empirically using a sample of 29 listed Egyptian firms over the period 2019-2023. The Generalized Least Squares method was applied to test the research hypotheses. The findings revealed a negative and significant effect of working capital management, as measured by the net working capital to sales ratio (NWCR), on all firm profitability variables (ROA, TQ, NPM). This implies that reducing net working capital can increase firm profitability. These findings highlight the important role that working capital management can play in enhancing firm profitability and encourage corporate managers to avoid allocating excessive investments in working capital.

In summary, the results of this study reveal that working capital management has a significant impact on the profitability of companies in the Egyptian context, which emphasizes the importance of working capital management for Egyptian

companies. The results suggest that companies can improve profitability by decreasing net working capital and following effective working capital management.

This study adds to the limited research on working capital management in emerging markets and contributes to the working capital literature by providing empirical evidence on the impact of working capital management on firm profitability in Egypt. This study could help financial managers to better understand the relationship between working capital management and firm profitability, and to adopt effective working capital management strategies to enhance firm profitability.

Conflicts of Interest

The author declares no conflicts of interest.

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