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Research Article

Capital Structure and SMEs Operational and Financial Performance: Evidence from Egyptian SMEs

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ABSTRACT

This study investigates the impact of capital structure on the financial and operational performance of small and medium-sized enterprises (SMEs) in Egypt. Using a panel dataset of 103 SMEs observed from 2018 to 2022, the research analyzes the relationships between leverage ratios—specifically, short-term debt to total assets and debt-to-equity ratios—and performance metrics, including return on assets (ROA), return on equity (ROE), and cash conversion cycle (CCC). For financial performance, the findings reveal (i) a significant negative relationship between leverage and ROA, supporting the pecking order theory, and (ii) a significant positive relationship with ROE, consistent with agency cost theory. These results indicate that increased debt can enhance returns to equity holders despite diminishing asset efficiency. Additionally, the findings show that leverage has a significant positive relationship on CCC. This result shows the complexities of working capital management in SMEs. This research contributes to the understanding of capital structure dynamics in a developing market context, addressing a gap in existing literature that predominantly focuses on larger firms in developed economies focusing only on financial performance of firms. The study offers critical insights for policymakers and business leaders seeking to improve financial and operational effectiveness in a challenging economic landscape.

Keywords: Capital Structure, SMEs, Operating Performance, Financial Performance, Egypt

1. Introduction

In recent years, small and medium-sized enterprises (SMEs) have attracted significant attention from both policymakers and researchers due to their vital role in the global economy. SMEs are instrumental in driving employment, fostering innovation, and promoting economic development, particularly in emerging economies like Egypt, where they account for over 90% of private sector activity and employ more than 47 million people. Despite their importance, SMEs often face substantial barriers to accessing finance, which can hinder their growth and resilience to economic fluctuations (Holmes and Kent,1991; Baker & Martin, 2011).

Capital structure is the choice of debt and equity to finance a firm's operations. It is an important aspect of financial management for SMEs. The management of capital structure can significantly influence SME's financial health, growth potential, and ability to navigate economic challenges. Multiple corporate finance theories have indicated that there is a link between the capital structure of the firm and its performance (Modigliani & Miller, 1963; Jensen & Meckling, 1976; Kraus & Litzenberger, 1973).

While substantial empirical research exists on the relationship between capital structure and firm performance, much of this work has focused on developed economies and larger, publicly listed firms. Moreover, most of the empirical studies tend to focus on firm financial performance using traditional financial metrics like return on assets (ROA) and return on equity (ROE). However, the interplay between capital structure and operational performance remains underexplored. Operational performance can also give important insights into the performance of the firm. Operational performance can be effectively measured through Working Capital Management (WCM). The latter is how the firm manages its short term liabilities and assets (Filbeck & Krueger, 2005). The relationship between capital structure and operational performance is complex, particularly regarding debt financing. While leveraging debt can provide liquidity to support operational activities, excessive reliance on debt may lead to increased financial strain (Graham & Leary, 2011).

This study aims to address these gaps by exploring the relationship between capital structure and both financial and operational performance among Egyptian SMEs. The findings of this research will contribute to the theoretical framework of corporate finance while offering practical implications for SME owners, managers, and policymakers in Egypt.

Our research on financial performance shows that there is a significant negative relationship between capital structure and ROA. This finding aligns with previous studies conducted in various countries, including Egypt (Hussein, 2020; Ebaid, 2009), Turkey (Toraman et al., 2013; Hamid et al., 2015; Tifow and Sayilir, 2015), Vietnam (Le et al., 2017), Nigeria, Jordan, and India (Dawar, 2014). All of these studies indicate that higher leverage negatively affects ROA. However, when we looked at ROE, the results were different. We found a significant positive relationship between capital structure and ROE. This supports the findings from Ahmad et al. (2012) in Malaysia, Abor (2005) in Ghana, and Forte and Tavares (2019) in nine European countries.

Regarding operational performance, our results show a significant positive relationship between leverage and a firm's operational performance. This supports the findings of Wang et al. (2019), which suggest that increasing short-term leverage can increase the length of cash conversion cycle.

2. Literature Review and Hypothesis Development

Key theories in corporate finance focusing on the relationship between capital structure and firm performance include the Modigliani and Miller theorem, trade-off theory, agency cost theory, pecking order theory, market timing theory, and signaling theory.

The Modigliani-Miller theorem, introduced by Franco Modigliani and Merton Miller, suggests that in an ideal market without taxes, bankruptcy costs, and information asymmetry, a firm's capital structure does not influence its overall value and performance (Modigliani & Miller, 1958). However, when taxes are considered, as noted in their 1963 work, firms can benefit from debt due to tax shields from debt leading to a better financial performance (Modigliani & Miller, 1963). The trade-off theory, presented by Kraus and Litzenberger (1973), suggests that firms balance the tax advantages of debt against the potential costs of bankruptcy due to higher leverage. This theory suggests that there is an optimal debt size that can maximize value.

Agency cost theory, developed by Jensen and Meckling (1976), highlights that there are usually conflicts of interest between shareholders and the firm’s managers. Debt can mitigate these conflicts by limiting free cash flow to cover debt obligations and imposing performance pressures on managers (Jensen, 1986; Holmstrom & Tirole, 1997). The pecking order theory suggests that firms prefer internal financing as it is the cheapest form of financing followed by debt, and equity as a last option (Myers and Majluf,1984). Firms that use lower debt indicate that they have more internal financing and thus better financial performance. This suggests a negative relationship between leverage and performance (Frank & Goyal, 2003). Market timing theory, put forward by Baker and Wurgler (2002), emphasizes that firms strategically issue debt or equity based on market conditions, affecting their performance based on the timing of these decisions. Lastly, signaling theory, introduced by Spence (1974), suggests that firms may use debt to signal confidence in future earnings, impacting market perceptions and performance.

Empirical studies on the relationship between capital structure and firm performance yield mixed results, reflecting the complexity of this relationship. Financial performance is often assessed using accounting-based metrics such as ROA and ROE, as well as market-based indicators like Tobin's Q and earnings per share (EPS) (Abor, 2005; Salim & Yadav, 2012; Dawar, 2014). Findings reveal a positive relationship between leverage and financial performance in numerous studies, consistent with trade-off theory (e.g., Abor, 2005; Ajibola, 2018; Salim & Yadav, 2012). Conversely, some research indicates a negative relationship between leverage and performance (Ebaid, 2009; Dawar, 2014; Tifow & Sayilir, 2015), while other studies report insignificant relationships (Ajibola, 2018; Vuong et al., 2017; El-Sayed Ebaid, 2009).

Hypothesis 1: Capital structure has a significant impact on the financial performance of SMEs in Egypt.

Operational performance is the efficiency and effectiveness of a firm in utilizing its resources to achieve strategic objectives. Working capital Management (WCM) serves as a measure of operational performance, with metrics such as CCC, inventory turnover, and accounts receivable turnover providing insights into a firm's operational effectiveness (Filbeck & Krueger, 2005; Gitman, 2009). Debt financing can facilitate WCM by providing liquidity for operational needs, but excessive debt may lead to financial strain and impact long-term operational efficiency (Graham & Leary, 2011). A balance between debt utilization and effective management of working capital is critical for sustaining operational performance. To the best of our knowledge, there is limited research on the relationship between leverage and firm operational performance. Graham & Leary (2011) indicate that a well-structured capital structure can enhance operational metrics, such as productivity and the cash conversion cycle. The authors found that higher leverage can lead to improved operational efficiency. Companies with moderate levels of debt may be incentivized to optimize their CCC to meet interest obligations, thus enhancing overall performance. For SMEs in Egypt, understanding this relationship can provide insights into how financing decisions affect their day-to-day operations.

Hypothesis 2: Capital structure has a significant impact on the operational performance of SMEs in Egypt.

Moreover, the relationship between debt and firm performance can differ by industry type. Different industries present unique market dynamics, regulatory environments, and operational practices that can influence performance outcomes (Porter, 1980).

For instance, in capital-intensive industries, such as manufacturing or energy, companies often face substantial fixed costs related to infrastructure, equipment, and technology. These high fixed costs necessitate significant investment, which may lead firms in these sectors to adopt a greater reliance on debt financing. By using debt, firms can access the necessary capital to sustain operations and expand. However, this approach also increases financial risk, as firms must manage interest payments and principal repayments.

Baker & Sinkula (2005) suggest that industry context is a significant determinant of performance outcomes. Furthermore, distinct economic sectors in Egypt—such as manufacturing, retail, and services—demonstrate varied operational and financial characteristics (Geroski, 1995) that could impact performance.

Hypothesis 3: The impact of capital structure on the operational performance of SMEs in Egypt may differ according to industry type.

Hypothesis 4: The impact of capital structure on the financial performance of SMEs in Egypt may differ according to industry type.

Previous research also indicates that these relationships can be sensitive to macroeconomic conditions. Economic growth, as measured by fluctuations in GDP, plays a crucial role in shaping a firm's operational capabilities, resource availability, and market demand (Barba Navaretti & Venables, 2004). In periods of strong economic growth, SMEs tend to have improved capacity to meet debt obligations and invest in operational improvements. Conversely, economic downturns can constrict financial resources and negatively influence operational decision-making. This relationship is supported by evidence that economic conditions can moderate the effect of capital structure on firm performance (Beck et al., 2005). Furthermore, GDP growth influences the relationship between capital structure and financial performance. Favorable economic conditions can enhance access to financing and improve market dynamics, thereby altering the effects of leverage on financial performance metrics (Gertler & Gilchrist, 1994; Cohen & Eimermann, 2020).

Hypothesis 5: The effect of capital structure on the operational performance of SMEs in Egypt varies according to the GDP growth rate.

Hypothesis 6: The effect of capital structure on the financial performance of SMEs in Egypt varies according to the GDP growth rate.

Finally, other factors such as firm size, age, asset tangibility, and sales growth are commonly included as control variables in studies examining firm performance. The relationship between firm size and performance varies, with larger firms often benefiting from economies of scale (Stigler, 1958; Scherer & Ross, 1990). However, larger firms can also face bureaucratic inefficiencies (Damanpour, 1991). Firm age can enhance performance through accumulated experience and established networks (Wiklund & Shepherd, 2003), although younger firms may exhibit higher growth rates (Davidsson & Gordon, 2016). Asset tangibility influences financing capability and operational efficiency. However, an over-reliance on tangible assets can slowdown innovation (Kraus & Fink, 2016). Lastly, sales growth is positively related with financial performance, but the relationship is not always linear as it can put pressure on resources and needs effective management to translate into profitability (Cohen & Levinthal, 1990).

3. Data and Methodology

3.1. Data

Data was sourced from financial statements provided by a banking institution in Egypt, covering the period from 2018 to 2022. The sample comprises 103 SMEs categorized according to the Central Bank of Egypt's (CBE) definition: small enterprises with annual sales turnover between EGP 1 million and EGP 50 million, and medium enterprises with turnover between EGP 50 million and EGP 200 million. The dataset is structured as balanced panel data, ensuring consistent observations across the firms during the specified timeframe. The sample includes 63 manufacturing firms and 40 that are non-manufacturing (traders, service providers, or contractors), with 70 small and 33 medium enterprises. The selection of 2018-2022 as the observation period was primarily dictated by data availability.

It's important to mention that during this time, Egypt and the world faced several big challenges. These included the COVID-19 pandemic, the start of the Russia-Ukraine conflict, the drop in the value of the Egyptian pound, and a shortage of foreign currency in Egypt. This tough period will help us better understand and analyze how SMEs were affected during these difficult times.

3.2. Empirical Framework

We use the Pooled Ordinary Least Squares (OLS) regression model. This model is widely utilized in business research for analyzing panel data, which consists of observations over time for multiple entities.

The basic model can be presented as follows:

$Y_{it} = \beta_0 + \beta_i X_{it} + \mu_{it}$

Y_{it} = Dependent variable for company *i* at time *t*.

Xit = K x 1 vector of explanatory variables.
βi = K x 1 vector of constants.
μit = Error term for company *i* at time *t*.

3.3. Choice of variables

There are four types of variables used in this study: dependent, independent, control and moderation variables.

3.3.1 Dependent Variables

i. Financial Performance

In corporate finance, the evaluation of a firm's financial performance is often based on various accounting-based metrics derived from its financial statements. Among these metrics, Return on Assets (ROA) and Return on Equity (ROE) stand out as two of the most prevalent indicators utilized in both academic research and practical applications. This study uses these two measures as proxies to evaluate the financial performance of Egyptian SMEs.

ROA is a financial ratio that assess a company's ability to make profits from its total assets. It is computed by dividing the net income of the firm by its total assets, as represented in the formula:

$$ROA = \frac{Net\ Income}{ToTal\ Asset}$$

This ratio is as a measure of the firm's ability to use its assets to produce earnings. A higher ratio indicates a more efficient use of assets, suggesting that the firm can convert its investments into profits in an efficient manner. Research suggests that firms with a higher ROA are typically more successful in their asset management (Higgins, 2012; Brigham & Ehrhardt, 2013).

ROE focuses on the profitability of a company in relation to the equity injected by its shareholders in the business. It is calculated as presented in the formula:

$$ROE = \frac{Net\ Income}{Shareholders\ Equity}$$

This ratio shows how efficiently a firm can generate profits from its equity financing. The higher the ratio the better the company is in utilizing its equity efficiently to generate earnings, reflecting strong financial health. ROE is particularly significant for investors as it signals how well their invested capital is being utilized (Graham & Dodd, 2008; White, Sondhi, & Fried, 2003).

ii. Operational Performance

Operational performance is a crucial aspect of a firm's overall effectiveness and efficiency, often evaluated through the lens of the Cash Conversion Cycle (CCC). The CCC is a financial indicator that evaluates the effectiveness of a company's ability to transform its investments in inventory and other assets into cash from sales. It serves as an indicator of operational efficiency, where a shorter CCC signifies that a company can swiftly convert its inputs into cash, reflecting superior operational performance (Richards & Laughlin, 1980).

The formula for calculating the CCC is as follows:

$$CCC = Inventory\ days\ on\ hand + Accounts\ Receivables\ days\ on\ hand - Account\ payables\ days\ on\ hand$$

- Inventory Days quantifies the average duration that inventory remains unsold.
- Accounts Receivable Days assesses the average time taken to collect payments post-sale.
- Accounts Payable Days measures the average time a company takes to pay its suppliers.

The CCC provides a comprehensive view of how effectively a firm is managing its working capital and its operational processes.

3.3.2 Independent Variables

a. Capital Structure

To capture the capital structure of the firm, we use leverage ratios as per previous research studies. The two proxies we use are: Short Term Debt to Total Assets (STD) and Debt to Equity Ratio (D/E). Those proxies are in line with the academic literature (In addition to those two proxies, past research uses additional measure of leverage such as long-term debt to total assets and total debt to total assets. However, we only used STD as SMEs in Egypt are mostly reliant on short term debt (Abor & Biekpe, 2007).

The STD ratio is calculated as follows:

$$STD = \frac{Short\ Term\ Debt}{Total\ Assets}$$

The debt-to-equity ratio D/E provides insight into the proportion of debt financing relative to shareholders' equity. It is calculated as follows:

$$\frac{D}{E} = \frac{Total\ Debt}{Total\ Equity}$$

3.3.3 Control Variables

Alongside our primary variable of interest—capital structure—we incorporate several control variables. While these variables are not the central focus of our analysis, their inclusion enhances the precision of the regression and helps to isolate the impact of the independent variable on the dependent variable. The control variables utilized in our regression are based on existing literature and are recognized as factors that influence firm performance.

i. Firm Size

Firm size has been suggested to be a determinant of financial performance in multiple studies (Majumdar, 1997; Goddard et al., 2005). A positive correlation between firm size and performance has been consistently reported (Ebaid, 2009; Abor, 2005). In this study, firm size is represented as a dummy variable, where it equals 1 for medium enterprises (as classified by the Central Bank of Egypt) and 0 for small enterprises.

Previous research has shown that the size of a firm can influence its performance (Majumdar, 1997; Goddard et al., 2005; Serrasqueiro and Nunes, 2008; Lee, 2009; Isik and Tasgin, 2017, among others). A number of studies have found a notable positive correlation between firm size and financial performance (Ebaid, 2009; Abor, 2005; Teshome, Debela & Sultan, 2018; Ullah, Ali & Mehmood, 2017).

In this study, incorporating firm size into the regression models enables the analysis to account for the effects of size on the dependent variables. The size variable is defined as a dummy variable, where it takes the value of 1 for medium enterprises, as classified by the Central Bank of Egypt, and 0 for small enterprises.

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ii. Age

The age of a firm, defined as the number of years since its establishment, is an essential control variable. Research indicates that a firm's age can significantly affect its performance. Some studies found a negative correlation between age and performance, potentially due to the accumulation of inefficiencies over time (Serrasqueiro & Nunes, 2008). Including firm age in the regression allows for controlling this potential effect.

iii. Tangibility

The third control variable is tangibility. The latter is defined as the proportion of fixed assets to total assets, is recognized as a critical factor influencing financial performance (Titman & Wessels, 1988). It is calculated using the following formula:

$$Tangibility = \frac{Fixed\ Assets}{Total\ Assets}$$

iv. Sales Growth

The final control variable is Sales Growth. In fact, previous studies indicate a significant correlation between the sales growth of companies and their overall performance (Haque & Arun, 2016; Salim & Yadav, 2012). The sales growth rate is a proxy to measure firm growth. It is measured as the sales of year t and subtracting sales of the previous year (t-1) divided by the sales of the previous year as shown in the below formula:

$$Sales\ Growth = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$$

3.3.4 Moderation variables

Additionally, moderation variables, namely industry type and GDP growth, are analyzed to understand their influence on the capital structure-performance relationship.

i. Industry type

Different industries present unique challenges and opportunities that can significantly impact the performance of SMEs. The industry type is a dummy variable taking the value of 1 of the firm is in the manufacturing sector and 0 otherwise. This distinction allows us to better understand the effect of differences between sectors on the relationship between leverage and firm performance.

ii. GDP growth

During periods of GDP growth, consumer confidence tends to rise, leading to increased spending on goods and services. This uptick in demand can directly benefit firms, enabling them to increase sales and revenue. As noted by Barba Navaretti and Venables (2004), a growing economy encourages firms to invest more in capacity and innovation, which can enhance their competitive positioning.

This variable is included to assess how macroeconomic conditions can alter the relationship between the capital structure and firm performance. It is measured as the difference between the GDP of year t and the previous year (t-1) divided by the GDP of year (t-1).

$$GDP\ Growth = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$$

4. Key Findings

4.1 Descriptive and Correlation Analysis

The sample comprises 103 SMEs from diverse sectors, primarily manufacturing, observed over the period from 2018 to 2022, resulting in 513 observations. Notably, the average debt-to-equity ratio stands at 0.62 indicating a preference for debt over equity as a financing tool.

The average short-term debt to total assets ratio is 22.28%, reflecting a predominant reliance on short-term financing and supporting our focus only on short term debt. These findings are consistent with patterns observed in similar contexts across developing economies (Demirguc-Kunt & Maksimovic, 1999; Nathan & El Hadidi, 2020).

	Debt Equity Ratio	Short term debt to total assets	CCC	ROA	ROE	Industry	GDP Growth Rate	Size	Age	Sales growth	Tangibility
Mean	0.62	0.22	164.67	27.76	41.96	0.61	4.70	0.32	14.98	27.74	0.20
Median	0.48	0.23	154.00	25.48	38.56	1.00	5.31	0.00	13.30	20.34	0.14
Std. Deviation	0.82	0.17	91.82	15.05	21.08	0.48	1.05	0.46	7.69	34.20	0.23
Minimum	0.00	0.00	-178.00	-2.19	-3.43	0.00	3.30	0.00	4.80	-75.73	0.00
Maximum	14.89	1.55	1009.00	90.90	123.38	1	5.80	1.00	44.20	224.96	3.11

In terms of performance metrics, the average ROA is 27.77%, and for the ROE 41.97%. The high ROE indicates an over-reliance on debt financing. The average CCC is notably lengthy at 164.6 days.

The correlation analysis indicates a negative correlation between leverage and ROA suggesting that increased debt may negatively affect asset efficiency. In contrast, leverage ratios positively correlate with ROE, aligning with the Dupont Identity, which implies that debt can enhance returns on equity if returns on investments exceed debt costs. Additionally, the CCC's positive correlation with leverage may reflect the operational pressures faced by firms in case of higher debt obligations.

4.2 Analysis

Before conducting the regression, we assessed multi-collinearity using the Variance Inflation Factor (VIF) analysis. Multi-collinearity occurs when independent variables are significantly correlated, potentially affecting the statistical significance of regression coefficients. A VIF value above 5 suggests a substantial correlation, while a value exceeding 10 indicates a need to reconsider variable selection (Wooldridge, 2012; Gujarati and Porter, 2009).

The VIF results indicate no significant multi-collinearity in our regression model:

Variable	VIF
Short term debt to total assets	1.056
Debt/Equity ratio	1.173
Age	1.077
Sales growth	1.076
Size	1.074
Tangibility	1.056
GDP growth	1.033
Mean VIF	**1.077**

4.2.1 Impact of Capital Structure on Financial Performance

The regression models 1 & 2 indicate that both short-term debt and debt-to-equity ratios have a significant negative impact on ROA. In both models, firm size, age and tangibility are all statistically significant negative predictors of profitability, whereas sales growth positively impacts ROA (Sulaiman et al., 2019).

These results align with existing literature in the field. A variety of empirical studies from both developed and developing nations have consistently demonstrated a negative relationship between ROA and leverage ratios, evaluated through different proxies (Hussein, 2020; Toraman et al., 2013; Le et al., 2017; Chinaemerem & Anthony, 2012; Soumadi & Hayajneh, 2011; Abor, 2005; Ebaid, 2009). For example, Hussein (2020) examined the effects of capital structure on corporate performance in Egypt, analyzing data from 168 companies over the period from 2012 to 2016. His findings indicated that a higher ratio of short-term debt to total assets negatively impacts ROA. In a related study, Toraman et al. (2013) examined how capital structure choices impact profitability in the manufacturing industry of Turkey, finding that a higher ratio of short-term liabilities to total assets negatively influences ROA.

The results found for ROA are aligned with the pecking order theory proposed by Myers and Majluf (1984). The theory suggests that firms prefer internal financing as it is the cheapest form of financing followed by debt,

and equity as a last option. Firms that use lower debt indicate that they have more internal financing and thus better financial performance.

Model 3 & 4 reveal a significant positive relationship between short-term debt and ROE and an insignificant positive relationship with debt-to-equity ratios. These results align with previous studies. Abor (2005) using 22 companies from Ghana in the period between 1998 – 2002 found a significant positive relation between leverage and ROE. Moreover, Forte and Tavares (2019) using nine European countries (48,840 companies) during the period 2008-2013, found that short term debt positively affects ROE.

The results on ROE are consistent with the agency cost theory. This theory posits that debt constitutes a binding commitment that the company is required to fulfil by paying interest and principal. These obligations are believed to limit any actions by management that could lead to excessive use of the company's financial resources, particularly by appropriating any available free cash flow. Also short-term debt can enhance ROE if the company can invest the borrowed funds in profitable projects that yield returns greater than the cost of debt. This leverage can amplify returns to equity holders.
This discrepancy in the effect of leverage on ROA and ROE is rooted in the fact that ROA measures how well a company uses its total assets to make profits. If a company takes on more debt but uses it for operational costs instead of buying more assets, its total assets may not grow much. This can lead to higher interest payments without a significant boost in profits, causing ROA to decline. On the other hand, ROE measures how well a company generates profits compared to the money invested by shareholders. When a company uses debt effectively, it can increase its profits without needing to raise more equity. This can improve ROE, especially if the company generates enough returns to cover its debt costs.

	ROA Model 1	**ROA Model 2**	**ROE Model 3**	**ROE Model 4**
	Coefficient (Sig.)			
Constant	42.029 (.000)***	40.533 (.000)***	54.878 (.000)***	55.193 (.000)***
Short term debt to total assets	-22.862 (.000)***		9.492 (.067)*	
Debt – Equity ratio		-4.792 (.000)***		2.453 (.019)
Size	-6.855 (.000)***	-7.255 (.000)***	-10.181 (.000)***	-10.105 (.000)***
Age	-.297 (.000)***	-.365 (.000)***	-.518 (.000)***	-.487 (.000)***
Sales Growth	0.043 (0.18)	.058 (.001)***	.081 (.002)**	.074 (.004)**
Tangibility	-18.840 (.000)***	-18.368 (.000)***	-31.880 (.000)***	-31.913 (.000)***
R square	.211	.216	.191	.194
Adjusted R square	.203	.209	.183	.186
No of observations	513	513	513	513

4.2.2 Impact of Capital Structure on Operational Performance

Short term debt ratio and age have a significant positive impact on CCC, while faster sales growth and higher asset tangibility shorten the cash cycle. Size is statistically insignificant.
Higher debt ratios can lead managers to adopt conservative working capital policies, which may negatively impact the CCC and overall operational efficiency. Financing choices, especially taking on more debt, can significantly impact the CCC. The results suggest that debts could be poorly managed which can increase carrying costs and extend CCC (Gitman, 2009). High levels of debt may force companies to buy more inventory to boost sales and meet their financial commitments, which can extend the inventory conversion period because it becomes harder to sell off excess stock (Deloof, 2003).
Moreover, a higher level of debt might also compel companies to tighten credit terms if cash flows become strained, which could increase accounts receivables days on hand if customers are unable to pay promptly (Harris & Raviv, 1990).
Furthermore, the use of debt can alter a company's approach to managing payables. Firms may choose to extend their payables to improve cash flow, which can lead to an increase in account payables days on hand leading to a longer CCC. Managing accounts payable also becomes more critical when debt levels rise. To meet their debt responsibilities, firms might postpone payments to suppliers (Fazzari & Petersen, 1993).
During the observation period, Egypt and the global communities experienced multiple shocks, including the COVID-19 pandemic, the Russia-Ukraine conflict, the devaluation of the Egyptian pound, and a scarcity of

foreign currency. During those difficult times, some suppliers refuse to sell on credit requesting to be paid the full amount. Utilizing higher levels of short-term debt allowed companies to promptly settle its obligations to suppliers, thereby decreasing the days payable outstanding and enabling an increase in inventory levels. This approach can lead to an extended cash conversion cycle, resulting in diminished operational efficiency. This situation is particularly relevant in Egypt, where multiple currency devaluations and lack of foreign currency have prompted SMEs to import and stockpile inventory in anticipation of further devaluation.
This aligns with Wang et al. (2019) and Gitman (2009), who note that higher debt levels can lead to inefficient inventory management and prolonged cash cycles. Conversely, the debt-to-equity ratio's influence on CCC is insignificant (Model 6).

	CCC Model 5	**CCC Model 6**
	Coefficient (Sig.)	
Constant	130.730 (.000)***	162.748 (.000)***
Short term debt to total assets	167.132 (.000)***	
Debt – Equity ratio		3.068 (.527)
Size	-5.503 (.505)	3.661 (.670)
Age	1.453 (.004)***	1.792 (.001)***
Sales Growth	-.330 (.004)***	-.396 (.001)***
Tangibility	-73.461 (.000)***	-88.207 (.000)***
R square	.165	.078
Adjusted R square	.156	.069
No of observations	513	513

4.2.3 Moderation Analysis

The moderation analysis examines the interaction between an independent variable (capital structure) and a dependent variable (performance), influenced by a moderating variable. Using a Pooled Ordinary Least Squares (OLS) regression model, the analysis includes the moderating variable(M) and an interaction term (Leverage*M), which helps assess how capital structure's impact on performance varies with different levels of the moderating variable. This approach allows for a comprehensive understanding of both the direct effects of capital structure and the modifications brought by the moderating variable. We use two moderation variables: Industry and GDP growth.

In terms of industry type, the findings reveal that it does not significantly affect financial performance metrics such as ROA and ROE. Notably, the interaction term between short-term debt and industry type is insignificant, indicating that the impact of short-term debt on financial performance remains consistent across manufacturing and non-manufacturing sectors. However, the debt-to-equity ratio does exhibit varying impacts on financial and operational performance across industries. Specifically, the negative coefficient for the CCC suggests that the relationship between the debt-to-equity ratio and operational performance weakens in the manufacturing sector, while a positive interaction term implies that the debt-to-equity ratio has a stronger positive impact on ROA for manufacturing firms compared to their non-manufacturing counterparts. The analysis further highlights that increased short-term debt levels significantly diminish ROA, underscoring the performance pressures SMEs face as debt levels rise, irrespective of industry classification (Forte & Tavares, 2019; ELbekpashy & ELgiziry, 2018).
When examining the moderating effect of GDP growth rates, the findings indicate that macroeconomic conditions do not significantly alter the relationship between capital structure and firm performance. The interaction between short-term debt and GDP growth proves insignificant. Additionally, GDP growth does not influence CCC, suggesting that the operational management of working capital among SMEs remains largely unaffected by economic fluctuations (Rodeiro-Pazos et al., 2023). The stability in operational practices despite economic shifts may reflect the limited integration of SMEs into macroeconomic trends or their constrained capacity to adapt due to resource limitations. This finding emphasizes the need for strategies that boosts SME resilience through tailored support rather than broad economic policies (Jacobs-Mata et al., 2021; Ronoowah & Seetanah, 2023).

	ROA Model 7	**ROE Model 8**	**CCC Model 9**
	Coefficient Sig.		
Constant	42.763 (.000)***	56.562 (.000)***	120.451 (.000)***
Short term debt to total assets	-21.974 (.000)***	3.643 (.610)	125.969 (.000)***
Short term debt * industry	.408 (.956)	14.048 (.177)	42.057 (.351)
Industry	-2.070 (.328)	-4.357 (.147)	30.415 (.020)**
Size	-7.213 (.000)***	-10.454 (.000)***	1.501 (.855)
Age	-.288 (.000)***	-.526 (.000)***	1.227 (.013)**
Sales Growth	.041 (.024)**	.084 (.001)***	-.282 (.012)**
Tangibility	-17.266 (.000)***	-30.032 (.000)***	-101.905 (.000)***
R square	.215	.194	.203
Adjusted R square	.204	.183	.192
No of observations	513	513	513

	ROA Model 10	**ROE Model 11**	**CCC Model 12**
	Coefficient Sig.		
Constant	44.227 (.000)***	53.515 (.000)***	121.273 (.000)***
Debt equity ratio	-10.193 (.000)***	6.872 (.043)**	39.244 (.010)***
Debt equity*industry	6.141 (.013)**	-4.688 (.183)	-45.314 (.004)***
Industry	-5.124 (.005)*	1.028 (.693)	73.739 (.000)***
Size	-7.220 (.000)***	-10.617 (.000)***	9.453 (.263)
Age	-.360 (.000)***	-.473 (.000)***	1.535 (.003)***
Sales Growth	.056 (.002)***	.072 (.005)**	-.334 (.004)***
Tangibility	-17.369 (.000)***	-30.464 (.000)***	-123.115 (.000)***
R square	.229	.198	.152
Adjusted R square	.219	.187	.140
No of observations	513	513	513

	ROA Model 13	**ROE Model 14**	**CCC Model 15**
	Coefficient Sig.		
Constant	38.273 (.000)***	53.441 (.000)***	168.254 (.000)***
Short term debt to total assets	2.378 (.881)	28.621 (.205)	-8.306 (.934)
GDP Growth rate	.825 (.418)	.334 (.818)	-8.099 (.206)
Short term debt * GDP	-5.608 (.097)	-4.299 (.370)	38.589 (.069)
Size	-6.766 (.000)***	-10.171 (.000)***	-6.599 (.427)

Age	-.291 (.000)***	-.512 (.000)***	1.426 (.005)**
Sales Growth	.042 (.019)**	.082 (.002)**	-.321 (.005)**
Tangibility	-19.383 (.000)***	-32.369 (.000)***	-70.307 (.000)***
R square	.217	.193	.170
Adjusted R square	.206	.182	.159
No of observations	513	513	513

	ROA Model 16	**ROE Model 17**	**CCC Model 18**
	Coefficient Sig.	Coefficient Sig.	Coefficient Sig.
Constant	43.907 (.000)***	54.299 (.000)***	194.658 (.000)***
Debt Equity ratio	-8.235 (.067)*	9.878 (.121)	-35.078 (.238)
GDP Growth rate	-.694 (.400)	.137 (.907)	-6.527 (.232)
Debt to Equity * GDP	.687 (.438)	-1.488 (.236)	7.618 (.194)
Size	-7.305 (.000)***	-10.318 (.000)***	3.375 (.696)
Age	-.365 (.000)***	-.483 (.000)***	1.790 (.001)***
Sales Growth	.060 (.001)***	.074 (.004)***	-.378 (.002)***
Tangibility	-18.386 (.000)***	-32.118 (.000)***	-88.201 (.000)***
R square	.217	.198	.081
Adjusted R square	.207	.187	.069
No of observations	513	513	513

5. Conclusion

In conclusion, this study contributes to the understanding of the impact of capital structure on the financial and operational performance of SMEs in Egypt by analyzing a sample of 103 unlisted SMEs from various sectors between 2018 and 2022 in Egypt.

Our analysis reveals a nuanced relationship between capital structure and performance. Specifically, we find a significant inverse relationship between leverage and financial performance, as measured by ROA, supporting the pecking order theory (Hussein, 2020; Toraman et al., 2013; Le et al., 2017; Abor, 2005; Ebaid, 2009). Conversely, we observe a positive relationship between leverage and ROE, consistent with agency cost theory (Ahmad et al., 2012; Forte & Tavares, 2019). This discrepancy in the results suggests that increased debt can enhance ROE while potentially diminishing asset efficiency, as reflected in ROA.

For operational performance, short term debt and debt equity ratio have a significant positive impact on CCC. This aligns with findings from Wang et al. (2019), indicating that higher leverage can complicate cash management practices.

The contributions of this research extend to both empirical literature and practical applications. By shifting the focus from larger firms in developed economies to unlisted SMEs in a developing market context, we address a significant gap in the literature. Our emphasis on operational performance, alongside traditional financial metrics, offers a broader perspective on firm performance.

However, this research is not without its limitations. The sample size, while insightful, may not be representative of the broader SME landscape in Egypt. The five-year study period, marked by significant economic challenges, may also influence the findings, requiring caution when generalizing results. Additionally, the reliance on secondary data from unlisted SMEs raises concerns regarding the accuracy and completeness of financial indicators. Given these limitations, several areas for future research emerge. Comparative studies involving larger and more diverse SME samples across different developing countries could offer richer insights into the capital structure-performance relationship. Longitudinal analyses extending beyond five years would enhance understanding of how capital structure impacts performance across various

economic cycles. Furthermore, qualitative methods, such as interviews with SME owners and managers, could provide deeper insights into the motivations behind financing choices.

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