

Assessing Depth of Social Media Presence on Financial Performance of SMEs: Evidence from Syrian SMEs. A Panel Fixed Effect Analysis

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How to cite this paper: Daood, R. M., Wang, J., & Oppong, E. O. (2024). Assessing Depth of Social Media Presence on Financial Performance of SMEs: Evidence from Syrian SMEs. A Panel Fixed Effect Analysis. *American Journal of Industrial and Business Management*, 14, 712-736.

<https://doi.org/10.4236/ajibm.2024.145037>

Received: March 27, 2024

Accepted: May 24, 2024

Published: May 27, 2024

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Abstract

This study examines the impact of social media adoption on the financial performance of small and medium-sized enterprises (SMEs) in Syria. Using data from 2010 to 2022 covering 40 registered SMEs under the Ministry of Trade, we employ a Panel Fixed Effect model to analyse the relationship between depth of social media usage and firm financial performance metrics such as profit growth, return on equity growth, and return on assets growth. Additionally, we utilise robust models, including the panel error correction model, panel dynamic least square regression, method of moment quantile, and difference-in-difference estimation, to ensure the reliability of our estimates. The findings of this study contribute to the growing literature on the impact of social media on SMEs in emerging markets, particularly in the context of Syria.

Keywords

Social Media Adoption, Financial Performance, ROE, ROA, Profitability, PCSE, FGLS, DOLSHM

1. Introduction

In the digital age, Social Media (SM) platforms have evolved from mere communication tools to pivotal economic growth and innovation drivers (Amoah et al., 2023; Mention et al., 2019). Their expansive reach and interactive nature have transformed how businesses operate, engage with customers, and achieve competitive advantage (Bruce et al., 2023). SM's role in fostering economic development and reducing unemployment has garnered significant attention from

scholars and practitioners alike (Batrancea et al., 2022; Gurria, 2018; Karadag, 2016; Surya et al., 2021). By facilitating direct communication, enhancing brand visibility, and enabling market expansion at minimal costs, SM platforms contribute substantially to the operational performance of SMEs, leading to economic growth and job creation.

Social media adoption enlarges the reach of Small and Medium-sized Enterprises (SMEs). These enterprises, which form the backbone of many economies, have significantly improved operational efficiency, customer engagement, and market penetration due to technology adoption (Amoah et al., 2023; Bruce et al., 2022; Vrontis et al., 2022). The linkage between SM and enhanced SME performance is increasingly becoming a focal area of research, given the ubiquity of digital platforms and their potential to level the playing field for smaller businesses against larger counterparts (Domma & Errico, 2023).

Previous studies confirm a positive relationship between SM adoption and customer service, customer satisfaction, customer loyalty and revenue growth. Despite the perceived benefits of social media adoption on the performance of SMEs, very few studies have explored its on the financial performance of SMEs. Previous studies assess the multifaceted benefits of SM, from marketing and customer service to innovation and collaborative opportunities. However, the impact of SM adoption on financial performance indicators, such as profit growth, return on assets (ROA), and return on equity (ROE), remain understudied, especially in developing economies (Domma & Errico, 2023). This study fills the gap by assessing the depth of SM presence of SMEs in Syria, a war-torn country, where SMEs are crucial for economic resilience and post-conflict recovery and development.

This study, leveraging panel data from 40 SMEs from 2010 to 2022, employs robust econometric models to assess the impact of SM adoption on financial performance of SMEs in Syria. Our findings affirm the positive effect of SM usage on profit, ROA, and ROE growth. Using depth of SM presence index to quantify engagement levels and employing models like Fixed Effect, Panel Correction Standard Error (PCSE), regression with correlated disturbances (XTGLS), and Method of Moment Quantile Regression (MMQR), the study also analyse how varying SM utilisation influences SME performance.

The remainder of the paper is structured as follows. Section 2 reviews the literature on impact of SM adoption on SMEs and performance. Section 3 describes the methodology used in the study, including the data collection methods, sampling strategy, and analytical techniques. Section 4 presents the analysis results, including the key findings on the impact of SM adoption on the financial performance of SMEs. Section 5 summarises the study's main findings and discusses the implications for policymakers, practitioners, and academia.

2. Literature Review

In today's digital landscape, social media has become ubiquitous in the workplace. Companies use the power of the internet to improve their online presence, con-

nect with clients and partners, encourage cooperation and knowledge sharing within the organisation, and enhance business prospects like marketing efforts (Nisar & Whitehead, 2016; Qalati et al., 2022). However, the absence of standardised metrics for evaluating various social media platforms (Durkin et al., 2013; McCann & Barlow, 2015) complicates the analysis of the impact of social media adoption on firm performance (Fernandes et al., 2016). Some research employs self-reported measures to tackle this issue (e.g., Parveen, Jaafar, and Ainin, 2015; Sasatanun & Charoensukmongkol, 2016). Moreover, many scholars contend that a more thorough examination of SM adoption and its effects on SMEs is needed. Olanrewaju et al. (2020) propose using a longitudinal approach to explore the relationship between variables. As a result, scholarly research on the relationship between social media adoption and firm performance presents a complex challenge to this day.

Multiple studies have identified a significant relationship between the adoption of social media and the performance of firms (Cette et al., 2020). According to (Zhang et al., 2017), social media adoption is common prevalent across various types and scales of businesses. This is primarily attributed to its potential to enhance communication, foster collaboration, and facilitate interactions between enterprises and their partners, ultimately leading to improved firm performance (Schniederjans et al., 2013). According to Freixanet et al. (2021), increased utilisation of social media, mainly through the active participation of the owner or manager, enhances businesses' financial and non-financial status.

Additionally, Dong and Yang (2020) reveal that social media adoption has a positive impact on market performance. This effect is more pronounced for SMEs than larger firms. Majumdar and Bose (2019) conducted a study in which they utilised the Compustat North America database to examine the influence of X adoption on Tobin's Q. The researchers employed a research design that combined propensity score matching (PSM) and difference-in-differences (DID) methodology. The authors conclude that the adoption of X by businesses positively impacts the firm's value. The use of social media has a significant impact on the performance of SMEs by improving marketing activities and customer relationships (Tajudeen et al., 2018). A recent study by Fan & Zhang (2021) found that SMEs can improve their performance by adopting social media and effectively distributing user-generated content. Tajvidi and Karami (2021) highlight the positive effects of social media use on the performance of UK hotels. Additionally, Qalati et al. (2022) provide empirical evidence supporting a positive correlation between social media adoption and various aspects of organisational performance, such as interactivity, reputation, relationships, visibility, and customer service, especially in SMEs operating in emerging economies.

The empirical evidence on the relationship between social media adoption and usage and SME performance is mixed. A study by Al Tenaiji and Cader (2010) examined the use of social media in business-to-business marketing and found that it did not significantly impact business performance. Similarly,

Al-Bakri (2017) analysed the travel and tourism sector in six Middle Eastern countries and found no statistically significant relationship between social media adoption and SMEs' competitive advantage. According to research conducted by Gavino et al. (2019) and Ahmad, Abu Bakar, and Ahmad (2019), the use of social media platforms by small businesses in the United States and the United Arab Emirates, respectively, does not have a significant impact on revenue performance. The insignificant effect of social media adoption on firm performance suggests that companies may adopt social media more as a response to trends rather than as a strategic decision that aligns with their business goals.

The Existing Body of Literature on Firm Profitability

Profitability is a significant financial performance indicator for firms, as it assesses their ability to generate profits through effective resource utilisation and sound management practices (Fonseca et al., 2022). Various research fields have conducted theoretical and empirical investigations into the factors influencing firm profitability, including economics, management, accounting, and finance (Nunes et al., 2009). These studies can be classified into two primary groups, with research in this area focusing primarily on external factors that encompass market, business, and economic conditions in which firms operate (Hawawini et al., 2003). The literature often includes macro-level determinants such as Gross Domestic Product (GDP), the unemployment rate, and financial market returns, which are responsible for considering the state of the economy and are expected to influence the profitability of firms by affecting overall demand and supply.

Various industry-specific factors, such as concentration levels, product differentiation, and barriers to market entry, also impact a firm's overall profitability. Nonetheless, the explanatory power of firm characteristics is extensive, particularly regarding industry affiliation (Prahalad & Hamel, 1997). Another area of research focuses on internal factors influenced by managerial choices (e.g., McGahan & Porter, 2002). Standard micro-level variables, like firm size, age, growth, leverage, and liquidity (Pattitoni et al., 2014), are taken into account, along with the inclusion of lagged profitability to capture dynamic adjustments (Goddard and Wilson, 1999). Research in social media implementation and its effects on a company's profitability is limited. However, Mohammadian and Mohammadreza (2012) suggest that employing social media as a marketing tool can positively impact customer relationships, business interactions, and overall sales and reputation. Seth (2012) further asserts that social media's ability to reach a vast global audience can aid internationalisation and increase sales and profitability. In the context of libraries in Spain, González-Fernández-Villavicencio (2014) explores how social media and digital marketing plans can enhance profitability and return on investment. Nisar, Prabhakar, and Strakova (2019) also suggest that social media can improve employee knowledge sharing and ultimately contribute to the firm's profitability.

Although there is some understanding in the economic literature about the relationship between social media and a company's profitability, there is a lack of research specifically focused on financial performance of SMEs. Troise et al. (2022) suggest that digital technologies are crucial to the success of SMEs. The ability to anticipate and adapt to external changes, driven by technological advancements and digitalisation, is essential for the competitiveness and sustainability of these firms. Therefore, our econometric analysis aims to assess social media adoption's impact on SMEs' financial performance in Syria.

3. Methodology

This section presents the data and econometric estimations used to estimate the impact of SM usage on firm financial performance among SMEs in Syria. Following the limited studies on the impact of social media usage on the financial performance of SMEs, we proxy SM usage with two indicators. First, a binary variable measuring SM usage where we assign firms with SM presence in a year 1 and 0 if a firm has no SM presence in a particular year. Next, we construct an index of Syria's four most popular SM platforms (Facebook, X, Instagram and WhatsApp). This index represents the depth of SM presence of an SME at time t .

3.1. Data Characteristics

The study adopted yearly panel data on 40 SMEs in Syria from 2010 to 2022. The availability of data, reliability and the readiness of firms to release these data influenced the number of SMEs employed in our study. Table 1 explains the dependent and independent variables and their expected sign.

3.2. Constructing the Depth of SM Presence

To estimate the depth of SM presence of firm i , we employ Multiple Correspondence Analysis (MCA) to compute the SM index of SMEs in Syria following the work of (Oppong et al., 2024a). We adopt MCA instead of Principal Component Analysis (PCA) because the variables used in computing our index variables are binary and take values of 1 and 0. 1 if a respondent uses the underlying social media platform, and 0 otherwise. The SM index function is of the form:

$$\text{Depth of social media presence}_i = f(O_{ij})$$

where (O_{ij}) is a function of all SM platforms considered under the study (Facebook, X, Instagram and WhatsApp). The full model for the MCA is of the form:

$$\text{Socialmedia inde } x_i = P_{i1}W_1 + P_{i2}W_2 + P_{i3}W_3 + P_{i4}W_4 \quad (1)$$

3.3. Estimation Techniques

To assess the impact of SM adoption on SME's financial performance, we

Table 1. Variable definition and their expected signs.

Variable	Definition	Sign
ROE growth	Growth in Return on Equity of an SME	
ROA growth	Growth in Return on Asset of an SME	
Profit growth	This measures the change in profit of an SME. It is measured as the current year's profit minus the previous year's	
Manufacturing	This refers to SMEs registered as a manufacturing company under the ministry of Economy	
Service	This refers to SMEs registered as a service company under the ministry of Economy	
Technology	This refers to SMEs registered as a technological company under the ministry of Economy	
Social media	A binary variable indicating if a firm has an SM presence in a particular year	±
Depth of SM presence	The depth of social media SM presence. An index calculated from four SM platforms	±
War	A binary variable measuring if the period is a post-Syrian war	-
Growth	This is the growth in revenue of an SME	+
Expense	The expenses of an SME in a year	±
Age	The current year minus the year of establishment	+
Leverage	Total debt as a ratio of total assets	±
Working capital	The current asset minus the current liability of a firm	+
Debt sustainability	Interest paid to total debts	±
GDP growth	The GDP growth rate of Syria	+

Source: Authors'.

employ a panel fixed effects regression model. This approach addresses potential unobserved firm-specific factors that may influence performance outcomes (Greene & Hensher, 2003), ensuring that the estimated effects are attributable to SM engagement rather than other unobservable characteristics. The panel fixed effects model is specified as follows:

$$Y_{it} = \beta_0 + \beta_1 \gamma_{it} + \delta_{it} + \varepsilon_{it} \quad (2)$$

where Y_{it} is a vector of our dependent variables measuring firm performance. These variables are ROA growth, ROE growth and profit growth of SMEs in Syria.

γ_{it} is our SM presence and depth of SM presence variables.

δ_{it} is a vector of control variables employed in our study. These control variables are firm growth, expenses, leverage, debt sustainability (DS), age of firm (Age), post-war (war), working capital (WC) and GDP growth (GDP). The full model is of the form:

$$Y_{it} = \beta_0 + \beta_1 \gamma_{it} + \beta_2 \text{growth}_{it} + \beta_3 \text{Expense}_{it} + \beta_4 \text{Leverage}_{it} + \beta_5 \text{DS}_{it} + \beta_6 \text{Age}_{it} + \beta_7 \text{War}_{it} + \beta_8 \text{WC}_{it} + \beta_9 \text{GDP}_{it} + \varepsilon_{it} \quad (3)$$

3.4. Robust Check

To ensure our estimations are robust, we adopt panel-corrected standard errors

(PCSE) to ensure reliable estimation. This estimator is considered a viable method for estimating panel data as it addresses econometric challenges often encountered in the Fixed effect approach. These challenges include multicollinearity, heteroskedasticity, and autocorrelation (Greene, 2018). We started by employing panel fixed effects to evaluate the impact of SM use on the financial performance of SMEs in Syria. To investigate spherical errors, we utilised the Wooldridge test to assess the presence of serial correlation and the Breusch-Pagan/Cook-Weisberg test to check heteroskedasticity. Based on Pesaran's (2015) cross-sectional dependence test, the dataset does not exhibit cross-sectional independence.

Consequently, we employed the Panel Corrected Standard Errors (PCSE) technique to address spherical inaccuracies, as (Beck & Katz, 1995) and (Parks, 1967) described. The PCSE estimator is considered superior to the Feasible Generalised Least Squares regression with correlated disturbances approach in cases where the cross-section dimensions (N) are at least twice as large as the temporal dimension (T) (Oppong et al., 2024a; Pickson et al., 2023; Reed & Ye, 2011; Romano & Wolf, 2017). Finally, we utilised the FGLS and Dynamic Ordinary Least Squares (DOLSHM) estimator to assess the robustness of the results obtained from the PCSE estimate technique (Oppong et al., 2024a).

3.4.1. Quantile Regression

The study employed the quantile regression (MMQR) model proposed by (Koenker & Bassett, 1978) to address distributional heterogeneity in our data. MMQR is resistant to the influence of extreme values and distorted data distributions when calculating gradient values at various distribution quantiles. The study identifies asymmetric impacts on company performance without depending on consistent attributes throughout the range by examining the connections between SM adoption and firm performance across different quantiles. The MMQR methodology allows for comparing the effects of SMEs adopting social media across the entire distribution, making estimations from the quantile regression more robust than linear regression techniques such as the Fixed effect, PSCE, and FGLS models. According to (Hao & Naiman, 2007), quantile regression expands on linear regression models to provide a more comprehensive understanding of the impact of regressors on a response variable across distribution. The conditional quantile γ_{it} given ∂_i condition is expressed as:

$$Q\gamma_{it}(\varphi|\partial_{it}) = \partial_{it}^{\varphi}\beta_{\varphi} \quad (4)$$

where φ_i is the quantile (for $0 < \partial_i < 1$) of the conditional distribution, ∂_{it} is the vector of the independent variables, and $Q\gamma_{it}(\varphi|\partial_{it})$ is the φ^{th} quantile.

3.4.2. Difference in Difference Estimation

Finally, we estimate the Average Treatment Effect on the Treated using the Difference-in-Difference technique. This captures the average effect of SM adoption on the performance of SMEs in Syria. Difference-in-Differences (DID) provides a valuable quasi-experimental approach for estimating the Average Treatment

Effect on the Treated (ATET) (Oppong, 2022). This is achieved by comparing changes over time in outcomes such as ROA, ROE, and profit, between the control group (non-adopters) and treatment group (adopters) (Angrist & Pischke, 2010; Oppong et al., 2024b), effectively controlling for any unobservable time and group characteristics that may impact the treatment effect on the outcome (Bertrand et al., 2004).

4. Analysis and Discussion

This section presents the estimated results and discussion of the impact of social media adoption on the financial performance of SMEs in Syria.

4.1. Descriptive Statistics

Our analysis begins by examining the systematic mean difference between adopters and non adopters of SM. The descriptive statistics provide a detailed and comprehensive picture of the consistent differences in the averages between the two groups. As shown in **Table 2**, the results indicate no significant difference in the averages between the two groups, suggesting that SMEs that have adopted SM and those that have not are comparable in terms of their business outcomes. Furthermore, all the variables have positive means, which means that the adoption of SM can positively impact the financial performance of SMEs in Syria. Companies that have adopted SM have higher mean values regarding return on assets growth (ROA), return on equity growth (ROE), leverage, firm age, working capital, and profit growth. On the other hand, companies that have not adopted SM have higher mean in terms of expenses and debt sustainability. In other words, adopting SM appears to have a positive impact on a company's financial performance. According to (Oppong, 2022), the mean difference between treated and untreated groups are not enough to evaluate the efficacy of a treatment hence, the study further assesses the impact of social media adoption using other statistical methods.

In **Table 3**, we performed a multicollinearity test on our independent variables (growth, working capital, expenses, age, leverage, debt sustainability and GDP growth). Multicollinearity occurs when the correlation between the independent variables in the regression model is high. Modelling and analysis can become complicated when a high correlation between variables exists. As presented in **Table 3**, the contingency coefficient test was performed before data analysis to diagnose collinearity and exclude independent variables significantly associated with each other. The low coefficients between the independent variables confirmed that the variables used in our study did not have multicollinearity.

4.2. Stationarity Test

The Unit root test null hypothesis was rejected for all our variables at 1% and 5%. This implies that our variables are stationary at level, hence integrated at

Table 2. Summary statistics of variables.

Variable	Group		Adopters		Non-Adopters		Difference	t
	Obs	Mean	Obs	Mean	Obs	Mean	Mean	
Expense	520	12.19833	268	12.1767	252	12.1986	0.0219	0.8227
Profit growth	520	287.8194	268	251.7944	252	326.1317	74.33734	2.6922
ROA growth	520	4.2159	268	4.3078	252	4.1168	0.1910	1.4352
ROE growth	520	4.2125	268	4.2480	252	4.1748	-0.0733	0.5561
Growth	520	6.3632	268	6.3143	252	6.4152	0.1009	0.8972
Working capital	520	4.9055	268	4.9147	252	4.8958	-0.0190	0.1374
Age	520	12.0115	268	12.2537	252	11.7540	-0.4998	1.2855
Debt sustainability	520	0.2730	268	0.2703	252	0.2758	0.0055	1.4624
Leverage	520	0.4496	268	0.4502	252	0.4489	-0.0013	0.1750

Source: Authors' computation.

Table 3. Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1) Growth	1.000									
2) Working capital	0.495	1.000								
3) Expenses	0.028	-0.096	1.000							
4) Age	-0.045	-0.037	0.055	1.000						
5)Debt sustainability	-0.051	-0.096	-0.003	0.049	1.000					
6) Leverage	-0.036	-0.013	0.040	-0.018	0.143	1.000				
7) Social media	-0.039	0.006	-0.036	0.056	-0.064	0.008	1.000			
8) War Relocation	0.053	0.114	0.013	0.106	-0.125	-0.030	0.049	1.000		
9) GDP growth	-0.007	-0.064	-0.040	-0.056	0.099	0.025	0.030	-0.601	1.000	
10) Depth of SM presence	-0.020	-0.039	0.018	0.028	0.094	0.033	0.162	-0.003	0.000	1.000

Source: Authors' computation.

order 0. The stationary variables indicate that our econometric estimations are reliable and consistent. Hence, non-spurious. The stationarity test results are presented in **Table 4**.

4.3. Impact of SM on the Performance of SMEs in Syria

To assess the impact of SM on SMEs in Syria, we utilised profit, ROA and ROE growth as performance proxies. The results are presented in **Table 5**. In columns 2 through 4, SM was measured using a binary variable where firms with an active SM presence in a year were assigned a value of 1, while those without were 0. Columns 5 through 7 employed the depth of SM presence in estimating the effect of SM on the financial performance of SMEs in Syria.

Table 4. Stationarity test results.

Variable	Adjusted
ROE growth	-9.7998***
ROA growth	-9.9095***
Growth	-20.1563***
Profit growth	-17.3232***
Working capital	-16.2777***
Expense	-8.6340***
Age	-6.7304***
Debt sustainability	-9.0709***
Leverage	-13.9718***
GDP growth rate	-13.5357***

*** $p < 0.01$; Source: Authors' computation.

Table 5. Impact of social media adoption on SMEs in Syria.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	Profit	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA
Social media	-47.79*** (15.38)	-0.0143 (0.0276)	-0.0184 (0.0452)				-49.61*** (15.43)	-0.0156 (0.0277)	-0.0198 (0.0454)			
Depth of SM presence				1.408 (28.27)	0.193*** (0.0494)	0.138* (0.0796)				1.806 (28.27)	0.193*** (0.0494)	0.139* (0.0796)
Growth	109.3*** (18.87)	0.669*** (0.0338)	0.241*** (0.0579)	117.4*** (18.96)	0.660*** (0.0331)	0.235*** (0.0576)	106.4*** (18.99)	0.667*** (0.0341)	0.239*** (0.0582)	115.3*** (19.07)	0.658*** (0.0333)	0.233*** (0.0579)
working capital	154.2*** (7.026)	0.254*** (0.0126)	0.169*** (0.0210)	153.4*** (7.130)	0.259*** (0.0125)	0.173*** (0.0211)	154.5*** (7.024)	0.254*** (0.0126)	0.169*** (0.0211)	153.6*** (7.132)	0.259*** (0.0125)	0.173*** (0.0211)
Expense	-3.996 (25.53)	-0.115** (0.0458)	-0.0994 (0.0756)	4.576 (25.64)	-0.113** (0.0448)	-0.0925 (0.0743)	-2.583 (25.53)	-0.114** (0.0458)	-0.0988 (0.0757)	5.915 (25.67)	-0.112** (0.0449)	-0.0915 (0.0745)
Age	-0.647 (1.694)	0.00711** (0.00304)	0.00157 (0.00500)	-0.967 (1.709)	0.00670** (0.00298)	0.00112 (0.00499)	-0.659 (1.693)	0.00710** (0.00304)	0.00156 (0.00500)	-0.986 (1.709)	0.00669** (0.00299)	0.00111 (0.00499)
Debt sustainability	231.7 (172.6)	-0.102 (0.309)	1.532*** (0.507)	266.0 (174.8)	-0.206 (0.305)	1.492*** (0.503)	224.5 (172.6)	-0.107 (0.310)	1.522*** (0.508)	261.2 (174.9)	-0.211 (0.306)	1.484*** (0.505)
Leverage	-38.11 (88.43)	-0.358** (0.159)	-0.339 (0.254)	-45.85 (89.33)	-0.376** (0.156)	-0.366 (0.253)	-40.38 (88.39)	-0.360** (0.159)	-0.341 (0.254)	-47.85 (89.35)	-0.378** (0.156)	-0.368 (0.254)
War relocation	27.85* (14.70)	-0.159*** (0.0264)	-0.0143 (0.0432)	25.28* (14.83)	-0.161*** (0.0259)	-0.0158 (0.0430)	41.97** (18.36)	-0.149*** (0.0330)	-0.00527 (0.0520)	36.08* (18.47)	-0.151*** (0.0323)	-0.00715 (0.0516)
GDP growth							1.182 (0.922)	0.000842 (0.00166)	0.000820 (0.00262)	0.910 (0.928)	0.000847 (0.00162)	0.000794 (0.00260)
Constant	-1.142*** (332.2)	0.294 (0.595)	2.799*** (0.984)	-1.320*** (330.5)	0.240 (0.577)	2.687*** (0.956)	-1.138*** (331.9)	0.297 (0.596)	2.806*** (0.985)	-1.322*** (330.5)	0.239 (0.578)	2.687*** (0.957)
Observations	520	520	480	520	520	480	520	520	480	520	520	480
R-squared	0.602	0.716	0.233	0.594	0.725	0.238	0.603	0.717	0.233	0.595	0.725	0.238
Number of id	40	40	40	40	40	40	40	40	40	40	40	40

Source: Author's; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

From Columns 2 to 4, we find that SM usage has a statistically significant positive effect on the growth of SMEs' profits in Syria. According to (Zhang et al., 2017), SM helps SMEs communicate better with their customers and expand their reach, increasing revenue. The increase in revenue, coupled with a decrease in cost, especially from advertisements, leads to an increase in profit. (Fan & Zhang, 2021) also discovered that SMEs can leverage SM to enhance performance by generating user content. Furthermore, (Tajvidi & Karami, 2021) emphasised the positive correlation between SM use and the performance of hotels in the United Kingdom.

As our first robust analysis, we utilised the depth of SM presence to estimate the level of SM adoption on the financial performance of SMEs in Syria. The results are presented in column 5 to 7. We find that depth of SM presence has positive statistical significant effect on ROE and ROA growth of SMEs in Syria. Specifically, the impact on ROE was marginally stronger than on ROA. Next, in column 8, 9 and 10, we account for economic performance using GDP growth. With GDP growth rate introduced in our model, we still find that depth of social media presence has positive statistical significant positive effect on ROE and ROA. The findings demonstrate that SM adoption and depth of SM presence significantly influence financial performance of SMEs in Syria. These findings highlight the effectiveness of integrating SM into advertising strategies for SMEs, enabling them to gain deeper insights into customer perspectives and strengthen customer relationships. Consequently, this strategic approach translates into enhanced overall business performance leading to improved financials of SMEs.

In addition to embracing social media, our research reveals that a firm's age, working capital, and growth significantly contribute to the increased profitability of SMEs. In contrast, expenses have a statistically significant negative impact on the financial performance of SMEs in Syria. Additionally, our findings indicate that firm growth, debt sustainability, and working capital positively influence the performance of SMEs in Syria in terms of ROA and ROE.

4.4. Robustness Check

To ensure the robustness of our findings, we employed multiple econometric models, including, PCSE, FGLS and DOHLMs, to evaluate the impact of SM adoption and depth of SM presence among SMEs in Syria. While the results were consistent across all models, we focused on the PCSE estimates due to their superior ability to handle heteroskedasticity and cross-sectional dependence in panel datasets with $N > T$ (Oppong et al., 2024a; Reed & Ye, 2011; Romano & Wolf, 2017). The results are presented in **Table 6**.

Our analysis indicates that SM adoption and depth of SM presence significantly positively affect SME performance in Syria. The findings indicate that integrating SM into advertising strategies positively affects SMEs by enhancing their understanding of client viewpoints and customer relationships.

The positive impact of SM adoption on the financial performance of SMEs in Syria can be attributed to several economic and business factors. SM platforms

Table 6. Robust Checking of social media on SMEs.

VARIABLES	FGLS						PCSE						DOHMS					
	Social media			Index			Social media			Index			Social media			Index		
	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA	Profit	ROE	ROA	Profit
Social media	0.0463 (0.0336)	0.0893** (0.0430)	-30.78** (12.29)	0.156*** (0.0464)	0.225*** (0.0626)	-73.99*** (18.95)	0.295*** (0.0865)	0.241** (0.118)	41.99 (33.42)	-123.2*** (26.90)	0.430*** (0.0477)	0.410*** (0.0406)	221.6*** (46.88)	0.431*** (0.0811)	0.427*** (0.0671)			
Depth of SM presence	0.810*** (0.0178)	0.769*** (0.0215)	-11.15* (5.693)	0.777*** (0.0209)	0.720*** (0.0287)	9.653 (8.756)	0.773*** (0.0211)	0.721*** (0.0291)	11.09 (8.898)	6.146 (32.14)	0.757*** (0.0598)	0.730*** (0.0485)	3.506 (31.46)	0.775*** (0.0571)	0.743*** (0.0450)			
Growth	0.343*** (0.0136)	0.350*** (0.0209)	128.2*** (4.796)	0.370*** (0.0167)	0.353*** (0.0249)	140.6*** (6.303)	0.372*** (0.0164)	0.354*** (0.0248)	140.3*** (6.297)	138.7*** (12.31)	0.343*** (0.0242)	0.439*** (0.0186)	138.1*** (12.10)	0.335*** (0.0234)	0.434*** (0.0173)			
Working capital	-0.0508 (0.0590)	0.00385 (0.0778)	24.16 (20.41)	0.0763 (0.0807)	0.0845 (0.110)	21.57 (31.42)	0.0632 (0.0810)	0.0560 (0.111)	25.65 (31.67)	77.73* (43.08)	0.583*** (0.0783)	0.350*** (0.0650)	70.62* (42.47)	0.672*** (0.0752)	0.485*** (0.0608)			
Expense	0.00634 (0.00385)	0.00975** (0.00471)	-3.301** (1.397)	0.00230 (0.00555)	0.00211 (0.00752)	-4.701** (2.175)	0.00293 (0.00559)	0.00263 (0.00761)	-5.226** (2.207)	-12.38*** (2.916)	0.0146*** (0.00564)	0.0122*** (0.00440)	-10.21*** (2.837)	0.0182*** (0.00541)	0.0195*** (0.00406)			
Age	-0.223 (0.393)	0.843* (0.483)	-127.8 (144.7)	0.0163 (0.541)	1.593** (0.722)	300.2 (238.6)	-0.264 (0.542)	1.179 (0.727)	334.5 (240.3)	1.386*** (295.4)	2.094*** (0.534)	1.083** (0.446)	1.462*** (291.4)	1.110** (0.509)	-0.223 (0.417)			
Debt sustainability	-0.115 (0.197)	0.0298 (0.247)	-40.30 (75.65)	-0.0321 (0.280)	0.320 (0.372)	-60.19 (119.6)	-0.0323 (0.280)	0.343 (0.375)	-71.22 (120.7)	11.36 (152.9)	0.986*** (0.268)	0.659*** (0.231)	76.34 (151.3)	0.909*** (0.258)	0.525** (0.217)			
Lever age	-0.131*** (0.0340)	-0.135*** (0.0419)	-17.57 (12.44)	-0.218*** (0.0479)	-0.174*** (0.0631)	51.81*** (18.93)	-0.213*** (0.0480)	-0.171*** (0.0637)	48.92** (18.99)	141.5*** (21.20)	-0.335*** (0.0541)	-0.252*** (0.0320)	149.2*** (20.88)	-0.308*** (0.0521)	-0.262*** (0.0299)			
War relocation	-1.830** (0.724)	-2.728*** (0.949)	-480.1* (252.6)	-3.470*** (0.978)	-3.755*** (1.335)	-710.3* (396.4)	-3.305*** (0.978)	-3.322** (1.345)	-824.1** (402.2)									
Constant	520	480	520	520	480	520	520	480	520	480	520	360	320	360	320	360	320	360
Observations	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
R-squared	0.872	0.785	0.546	0.871	0.781	0.534	0.871	0.781	0.534	0.664	1.530	1.237	0.658	1.610	1.318	1.610	1.318	1.610
Number of ids	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Source: Author's.

provide SMEs with a cost-effective and accessible channel to connect with a vast customer base, expand their market reach, and promote their products and services. By engaging with customers on social media, SMEs gather valuable feedback, address customer concerns promptly, and tailor their offerings to meet customer needs better. This, in turn, leads to increased customer satisfaction and a stronger brand reputation, all of which contribute to enhanced financial performance. In conclusion, our research provides compelling evidence that SM adoption is a valuable tool for SMEs in Syria to improve their financial performance.

4.5. Industry-Specific Analysis of the Impact of Social Media Adoption on the Financial Performance of SMEs in Syria

Table 7 presents the impact of social media adoption on the performance of SMEs in various industries, specifically manufacturing, technology, and the service industry.

Our results show that SM adoption has a statistically significant positive impact on ROE, ROA and profit growth of SMEs under registered as service offering companies. We also find that SM adoption has positive statistically significant positive effect on the ROA and ROE growth of SMEs that are registered as technological companies. Finally, we find that SM adoption has positive statistical significant effect on profit growth of SMEs registered as manufacturing companies. While the effect on ROA and ROE growth for manufacturing firms is positive, the effects are statistically insignificant.

The positive significant positive effect of social media adoption across industries indicates SM adoption benefits SMEs financially through reduced marketing cost, expansion in customer reach and most importantly, brand building. This suggests that the adoption of SM is not merely a niche strategy but a powerful tool for enhancing the financial well-being of SMEs in Syria.

4.6. Quantile Regression

Finally, we employed the QR approach for robustness checks. The QR estimator controls for outliers and skewed distributions while estimating the pertinent distribution's gradient values at different proportion points (quantiles). The quantile regression analysis of SMEs in Syria reveals a statistically significant impact of SM adoption on their financial performance. From **Tables 8-10**, we present the impact of social media penetration on ROE, ROA and profit of SMEs, respectively. We find no significant positive effect at the 90th percentile. The study consistently demonstrates a positive relationship between SM engagement and return on assets (ROA), return on Equity (ROE), and profit across all quantile levels, from the 10th to the 75th percentile. This suggests that the adoption of SM is not merely a niche strategy but a powerful tool for enhancing the financial well-being of SMEs in Syria.

SM platforms provide SMEs with the opportunity to connect with and engage with a vast customer base at a fraction of the cost of traditional marketing

Table 7. Industry-specific effect of social media adoption on SMEs.

VARIABLES	Technology			Manufacturing			Services		
	ROE	ROA	Profit	ROE	ROA	Profit	ROA	Profit	ROE
Social media	0.164*** (0.0536)	0.164*** (0.0456)	22.09 (23.13)	0.0610 (0.0477)	0.0573 (0.0470)	53.08*** (19.78)	0.256*** (0.0648)	44.74*** (15.21)	0.126** (0.0571)
Growth	0.699*** (0.0241)	0.654*** (0.0207)	15.66 (10.69)	0.774*** (0.0224)	0.815*** (0.0203)	33.37*** (9.116)	0.765*** (0.0200)	5.942 (7.763)	0.920*** (0.0290)
Log working capital	0.370*** (0.0234)	0.366*** (0.0268)	114.8*** (8.855)	0.430*** (0.0205)	0.357*** (0.0181)	177.9*** (8.444)	0.345*** (0.0227)	100.7*** (6.173)	0.258*** (0.0224)
log expense	-0.244*** (0.0928)	-0.247*** (0.0882)	40.99 (35.23)	-0.175** (0.0838)	-0.260*** (0.0766)	-7.455 (31.42)	0.389** (0.153)	-69.42** (28.68)	0.229** (0.106)
Age	0.00497 (0.00618)	0.00866* (0.00495)	-10.01*** (2.846)	0.00754 (0.00507)	0.0205*** (0.00586)	-0.0620 (2.085)	-0.000878 (0.00657)	-9.775*** (1.982)	-0.00537 (0.00695)
Debt sustainability	-1.791** (0.710)	-0.286 (0.467)	-674.3** (300.1)	0.554 (0.504)	0.312 (0.544)	276.0 (223.9)	3.628*** (0.679)	-935.0*** (183.8)	0.378 (0.691)
Leverage	1.445*** (0.317)	1.725*** (0.234)	-21.08 (151.6)	-0.133 (0.291)	0.135 (0.352)	-46.99 (129.8)	-1.129*** (0.319)	8.252 (100.3)	-0.997*** (0.311)
war relocation	-0.0820 (0.0533)	-0.0686* (0.0394)	12.47 (23.21)	-0.103** (0.0465)	-0.316*** (0.0525)	-16.02 (20.85)	0.00305 (0.0584)	27.51 (18.05)	-0.164*** (0.0623)
Constant	0.668 (1.283)	0.358 (1.158)	-401.0 (477.4)	-0.771 (0.977)	0.277 (0.913)	-334.4 (374.3)	-7.600*** (1.988)	960.5*** (366.4)	-5.172*** (1.376)
Observations	142	127	142	225	215	225	138	153	153
Number of ids	37	37	37	40	40	40	40	40	40

Source: Author's; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8. Quantile regression of the impact of social media penetration on ROE.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	location	scale	10%	25%	50%	75%	90%
Depth of SM presence	0.295*** (0.0928)	0.129** (0.0585)	0.532*** (0.165)	0.389*** (0.117)	0.276*** (0.0900)	0.178** (0.0886)	0.0952 (0.104)
Growth	0.773*** (0.0222)	0.0725*** (0.0140)	0.640*** (0.0388)	0.721*** (0.0292)	0.784*** (0.0215)	0.839*** (0.0214)	0.886*** (0.0253)
Working capital	0.372*** (0.0197)	-0.0626*** (0.0124)	0.488*** (0.0344)	0.418*** (0.0258)	0.363*** (0.0191)	0.316*** (0.0189)	0.275*** (0.0224)
Expense	0.0632 (0.0823)	-0.145*** (0.0519)	0.331** (0.146)	0.169 (0.104)	0.0418 (0.0798)	-0.0681 (0.0786)	-0.162* (0.0922)
Age	0.00293 (0.00570)	0.00317 (0.00359)	-0.00291 (0.0102)	0.000617 (0.00710)	0.00340 (0.00552)	0.00580 (0.00542)	0.00784 (0.00633)

Continued

Debt sustainability	-0.264 (0.560)	-0.630* (0.353)	0.897 (1.000)	0.196 (0.702)	-0.357 (0.543)	-0.833 (0.534)	-1.239** (0.625)
Leverage	-0.0323 (0.297)	-0.183 (0.187)	0.305 (0.530)	0.101 (0.370)	-0.0594 (0.288)	-0.198 (0.282)	-0.316 (0.330)
Depth of SM presence	0.295*** (0.0928)	0.129** (0.0585)	0.532*** (0.165)	0.389*** (0.117)	0.276*** (0.0900)	0.178** (0.0886)	0.0952 (0.104)
War relocation	-0.213*** (0.0490)	-0.00202 (0.0309)	-0.210** (0.0876)	-0.212*** (0.0610)	-0.214*** (0.0475)	-0.215*** (0.0466)	-0.217*** (0.0545)
Constant	-3.305*** (1.024)	2.316*** (0.645)	-7.572*** (1.815)	-4.996*** (1.307)	-2.963*** (0.993)	-1.211 (0.980)	0.283 (1.152)
Observations	520	520	520	520	520	520	520

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Source: Author's.

Table 9. Quantile regression of the impact of social media penetration on ROA.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	location	scale	10%	25%	50%	75%	90%
Depth of SM presence	0.241* (0.124)	0.0715 (0.0817)	0.118 (0.175)	0.184 (0.132)	0.244* (0.124)	0.299** (0.148)	0.359* (0.195)
Growth	0.721*** (0.0274)	0.0753*** (0.0180)	0.591*** (0.0401)	0.661*** (0.0295)	0.723*** (0.0273)	0.781*** (0.0326)	0.845*** (0.0441)
Working capital	0.354*** (0.0274)	-0.102*** (0.0180)	0.529*** (0.0415)	0.435*** (0.0298)	0.350*** (0.0270)	0.271*** (0.0325)	0.185*** (0.0451)
Expense	0.0560 (0.111)	-0.217*** (0.0733)	0.429*** (0.160)	0.228* (0.119)	0.0477 (0.111)	-0.119 (0.133)	-0.301* (0.177)
Age	0.00263 (0.00756)	0.00169 (0.00498)	-0.000271 (0.0107)	0.00129 (0.00805)	0.00270 (0.00758)	0.00400 (0.00902)	0.00541 (0.0119)
Debt sustainability	1.179 (0.722)	-0.265 (0.476)	1.636 (1.019)	1.391* (0.770)	1.169 (0.725)	0.965 (0.862)	0.742 (1.135)
Leverage	0.343 (0.383)	-0.280 (0.253)	0.826 (0.542)	0.567 (0.409)	0.333 (0.384)	0.117 (0.458)	-0.119 (0.603)
War relocation	-0.171*** (0.0640)	-0.0506 (0.0422)	-0.0835 (0.0905)	-0.130* (0.0683)	-0.173*** (0.0642)	-0.211*** (0.0764)	-0.254** (0.101)
Constant	-3.322** (1.399)	3.320*** (0.922)	-9.038*** (2.032)	-5.964*** (1.504)	-3.195** (1.396)	-0.638 (1.668)	2.150 (2.240)
Observations	480	480	480	480	480	480	480

Source: Author's; Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10. Quantile regression of the impact of social media penetration on profit growth.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	location	scale	10%	25%	50%	75%	90%
Depth of SM presence	41.99 (64.93)	52.25 (75.04)	13.57 (29.59)	-0.164 (22.80)	14.67 (31.34)	83.01 (121.3)	159.7 (229.3)
Growth	11.09 (16.57)	35.58* (19.15)	-26.74*** (7.124)	-17.62*** (5.560)	-7.516 (7.775)	39.02 (29.87)	91.23 (55.53)
Working capital	140.3*** (11.96)	-6.144 (13.82)	146.9*** (5.476)	145.3*** (4.216)	143.5*** (5.785)	135.5*** (22.40)	126.5*** (42.43)
Expense	25.65 (57.51)	25.59 (66.46)	-1.554 (26.32)	5.009 (20.27)	12.27 (27.81)	45.74 (107.7)	83.29 (204.0)
Age	-5.226 (4.043)	-3.983 (4.672)	-0.992 (1.834)	-2.013 (1.415)	-3.144 (1.947)	-8.353 (7.529)	-14.20 (14.22)
Debt sustainability	334.5 (455.1)	562.9 (526.0)	-263.9 (204.3)	-119.6 (158.0)	40.25 (218.0)	776.3 (842.1)	1602 (1586)
leverage	-71.22 (216.5)	17.33 (250.2)	-89.64 (99.38)	-85.19 (76.49)	-80.27 (104.9)	-57.62 (406.2)	-32.19 (769.9)
war relocation	48.92 (37.44)	74.85* (43.26)	-30.65* (16.23)	-11.46 (12.64)	9.793 (17.63)	107.7 (67.80)	217.5* (126.4)
Constant	-824.1 (732.7)	-532.5 (846.7)	-258.0 (333.2)	-394.5 (256.9)	-545.7 (353.2)	-1242 (1366)	-2023 (2584)
Observations	520	520	520	520	520	520	520

Source: Author's; Standard errors in parentheses; *** $p < 0.01$, * $p < 0.1$.

channels. This enhanced reach and engagement translate into increased sales, improved customer satisfaction, and reduced marketing expenses, ultimately boosting ROA, ROE, and profit. Furthermore, SM empowers SMEs to build stronger brand awareness, fostering customer loyalty and repeat business. By actively interacting with customers on SM platforms, SMEs can address customer concerns promptly, gather valuable feedback, and tailor their products and services to meet customer needs better. This, in turn, leads to increased customer satisfaction, reduced churn rates, and a stronger brand reputation, all of which contribute to enhanced financial performance.

4.6.1. Quantile Analysis of the Impact of Social Media Adoption on ROE Growth

Figure 1 from the quantile regression analysis provides a comprehensive understanding of the factors that influence the growth of ROE among businesses. The results show that social media adoption consistently impacts ROE growth across all quantiles, with a particularly strong effect in the middle to upper quantiles. Additionally, revenue growth and working capital show a uniformly positive

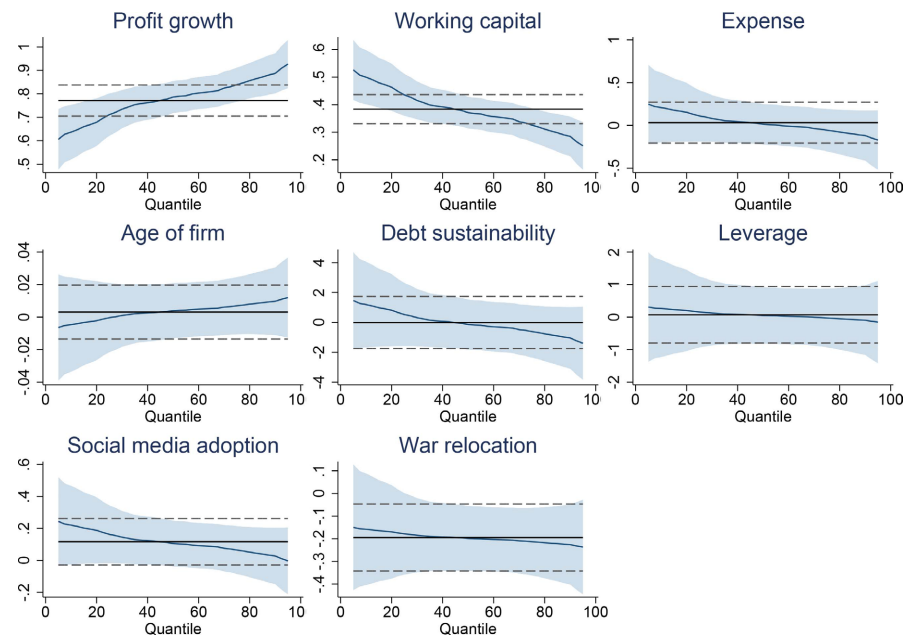


Figure 1. Social media adoption on ROE growth. Source: author.

relationship with ROE growth, although the latter has a slightly reduced influence in the upper quantiles. Conversely, higher expenses are associated with reduced ROE growth, highlighting the cost pressures businesses face. The age of a firm has a modest and somewhat negative association with ROE growth, especially in the lower quantiles. Debt sustainability generally aligns negatively with ROE growth, with a slightly reduced negative effect in higher quantiles. Leverage has less impact, negatively affecting ROE growth, especially at the extremes of the profitability distribution. The context of war or the need for relocation emerges as a negative factor, exerting a stronger drag on ROE growth for businesses at the lower end of the profitability scale. These results demonstrate the complex interplay between internal management and external pressures, with social media adoption as a crucial positive driver of financial performance across varying levels of firm profitability.

4.6.2. Quantile Analysis of the Impact of Social Media Adoption on ROA Growth

In **Figure 2**, the impact of social media on Return on Assets (ROA) is displayed through quantile regression across different profitability levels of firms. Results show that social media adoption positively influences ROA across all quantiles, particularly in the mid to higher profitability quantiles. Additionally, revenue growth positively affects ROA, with a stronger impact in the higher profitability quantiles, indicating sustained higher ROA for firms with robust revenue growth. Working capital has a steady positive effect across all quantiles, with a slightly reduced impact as profitability increases. Conversely, higher expenses are correlated with a decrease in ROA, highlighting the importance of cost management across the profitability spectrum. The age of a firm displays a minor negative association with ROA, more so at the lower profitability end. Debt

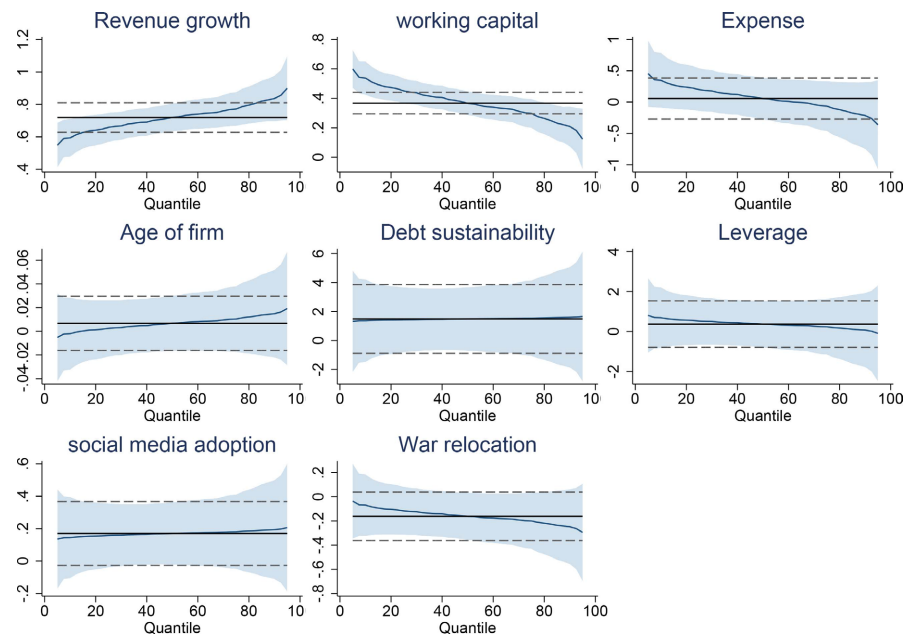


Figure 2. Quantile analysis of the impact of social media adoption on ROA growth. Source: Author.

sustainability is also negatively correlated with ROA, with a less pronounced effect as profitability improves. The impact of leverage on ROA is generally negative, with notable adverse impacts in the extreme quantiles. War or relocation is also negatively associated with ROA across all quantiles, with the most significant adverse effect occurring at the lower end of the profitability scale, emphasising the detrimental impact of external instability on asset returns. Overall, the findings highlight the importance of growth, effective capital management, and social media engagement as drivers of asset performance while also reflecting the challenges posed by expenses, debt, and external instability.

4.6.3. Quantile Analysis of the Impact of Social Media Adoption on Profitability

In **Figure 3**, the analysis of quantiles provides a detailed view of the impact of various factors on profit growth for firms with different performance levels. The results show that social media adoption has a positive relationship with profit growth across all quantiles, indicating its crucial role in enhancing profits among SMEs in Syria. This effect is most pronounced in mid to higher quantiles, demonstrating that firms with better performance benefit even more from social media. Likewise, revenue growth has a generally positive relationship with profit growth, particularly in higher quantiles, indicating that growing firms tend to experience even greater increases in profitability. Efficient working capital management is consistently associated with profit growth across all quantiles, suggesting its importance for firms of all sizes. In contrast, expenses are negatively related to profit growth throughout the quantile spectrum, emphasising the significance of cost control in driving profitability. Lastly, the age of a firm has a

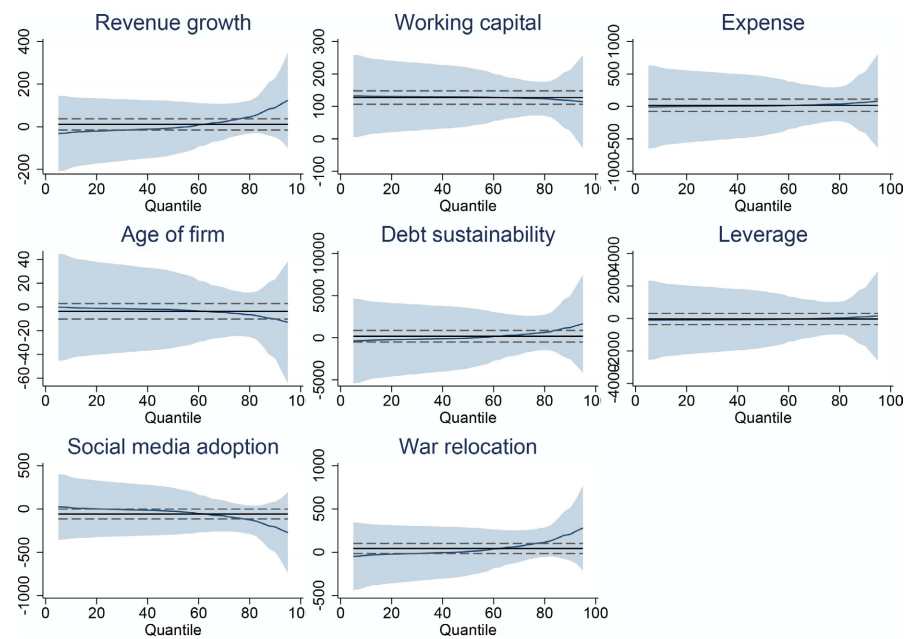


Figure 3. Quantile analysis of the impact of social media adoption on profitability. Source: Author.

slightly negative but mostly flat relationship with profit growth, implying that the firm's maturity has little impact on its ability to grow profits.

Furthermore, the study suggests that firms with sustainable debt levels may not immediately see profit growth, particularly at the lower and middle quantiles. War relocation consistently negatively impacts profit growth, with the most significant effects seen at the lower end of the distribution. These results highlight the crucial role that internal management practices and external environmental factors play in a firm's profit growth. In particular, social media adoption is a significant positive contributor to business landscape of SMEs in Syria.

4.7. Average Treatment Effect Analysis

To investigate further the impact of SM adoption on SMEs' performance in Syria, we employed a Difference-in-Differences (DID) estimation approach to assess the average treatment effect of social media adoption on adopters and non-adopters. This quasi-experimental method allows us to compare the changes in performance outcomes for SMEs that adopted SM with those that did not since changes over time can minimise the influence of unobservable factors that may effect of a treatment (Oppong, 2022).

Our Average Treatment Effect on Treated (ATET) analysis presented in **Table 11** shows a consistent positive relationship between SM adoption and financial performance of SMEs, as measured by ROE, ROA, and profit growth. These findings suggest that SMEs that adopted SM experienced a significant improvement in their financial performance compared to those that did not. On Return on Equity, adopting SM by SMEs in Syria increases the returns on Equity by 0.143 and 0.217 on Return on Asset. We find that SMEs' highest effect of SM is

Table 11. Average treatment effect on treated and average treatment on untreated.

	(ROE)	(ROA)	(Profit)	(ROE)	(ROA)	(Profit)
VARIABLES	ATET	ATET	ATET	ATU	ATU	ATU
SM adoption	0.143** (0.00394)	0.217** (0.00371)	71.92** (7.521)	0.105* (0.004)	0.162* (0.001)	57.074 (4.79)

Source: Author; Robust standard errors in parentheses; ** $p < 0.05$, * $p < 0.1$.

on the profit growth of SMEs operating in Syria. The DID estimation approach provides a robust and reliable method for evaluating the causal impact of SM adoption on SME performance. By controlling for unobservable factors and focusing on changes over time, we can isolate the effect of SM adoption on the financial outcomes of SMEs.

Next, following the work of (Oppong, Yu, and Mazonga Mfoutou, 2024b), we estimated the Average Treatment Untreated (ATU) effect for our three profitability proxies. We find that the effect of social media adoption on the untreated groups is less compared to the treated groups. We also find that the effect of social media adoption on profit growth among the unadopted groups is insignificant while significant for the treated groups. The practical implication of these results is that the adoption of social media significantly enhances the financial performance of SMEs in terms of ROE, ROA, and profit. Firms that have adopted social media see substantial benefits in their financial metrics, and even those that have not adopted social media yet have the potential to experience significant improvements if they do so. This underlines the importance of social media adoption for SMEs aiming to improve their financial outcomes and suggests that policymakers and business advisors should encourage and support SMEs in adopting social media strategies.

5. Summary and Conclusion

The rise of social media has significantly impacted the business world, transforming how firms interact with customers, employees, and stakeholders. With its ability to create global connections, boost brand reputation and enable real-time communication, social media has improved marketing strategies, customer service and collaboration practices. While there are studies on factors affecting social media adoption, a gap remains in the literature on the impact of SM adoption on the financial performance of SMEs.

To address the gap, this study uses financial data on 40 SMEs from 2010 to 2022 assesses the impact of SM adoption among Small and SMEs in Syria. The data was analysed using Panel Fixed Effect, Panel Corrected Standard Error, Feasible Generalised Least Square, Dynamic Ordinary Least Squares, Quantile Regression, and DID. The findings consistently affirm the statistically significant positive effect of social media adoption on profit growth, ROA and ROE growth for SMEs in Syria, a war-torn economy whose economy depends on SMEs. We

also examined how a company's financial performance is affected by its level of SM usage. To do this, we created a depth of social media presence index using Multiple Correspondence Analysis. Our findings showed that deeper engagement on social media platforms positively and significantly impacts the performance of SMEs in Syria. The findings highlight the importance of utilising various SM channels to engage with customers effectively and improve performance. Our findings highlight the significance of firm age, working capital, and growth in driving profit growth for SMEs.

Based on the findings of this study, we suggest that small and medium-sized enterprises (SMEs) incorporate social media into their advertising and customer engagement tactics. Proactively engaging on multiple social media platforms enables SMEs to expand their reach and gain valuable insights into consumer behaviour. By consistently and genuinely interacting on social media platforms, SMEs can cultivate their brand and foster customer loyalty, ultimately bolstering their long-term sustainability.

Declarations

Our work has not been published in any journal.

Availability of Data and Materials

Data and relevant files are available upon reasonable request.

Conflicts of Interest

We declare no competing or conflict of interest.

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