The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

IMPACT OF THE COVID-19 CRISIS ON FIRM PERFORMANCE: AN EMPIRICAL INVESTIGATION IN THE TUNISIAN STOCK MARKET

INES BEN FLAH

Assistant Professor, University of Tunis, GEF2A-Lab, Higher Institute of Management.
Email: inesbf@hotmail.fr, ORCID ID: https://orcid.org/0009-0001-6708-8305

AZHAAR LAJMI *

Associate Professor, University of Tunis, GEF2A-Lab, Higher Institute of Management.
*Corresponding Author Email: azhaar.lajmi@isg.rnu.tn, azhaar_lajmi@yahoo.fr,
ORCID ID: https://orcid.org/0000-0002-7841-8402

Abstract

Using financial data from Tunisian companies listed on the Tunis Stock Exchange (TSE), we study the impact of COVID-19 on firm performance. We show that COVID-19 has a negative impact on performance of the company. The empirical study uses panel data regression analysis, to examine data from 34 companies listed on the Tunis Stock Exchange during the period from 2016 to 2021. The results highlight the negative impact of the COVID-19 health crisis on company performance as approached by three measures (ROA, ROE and Stock Market Performance).

Keywords: Firm Performance, COVID-19, Size, Capital Structure, Conjuncture, Risk Equity, Free Cash-Flow.

Jel Classification: G30, I18, L21, L25.

1. INTRODUCTION

The coronavirus pandemic (COVID-19) has generated a significant spike in uncertainty and far-reaching implications for healthcare, population mobility and economic growth (Baek et al. 2020). Population mobility fell sharply as a result of the containment policy, leading to a fall in purchasing power and near-total economic stagnation.

On a macroeconomic scale, the COVID-19 epidemic triggered the worst global recession since 1930. Many countries experienced severe business failures and job losses (Fu and Shen 2020). At company level, the COVID-19 epidemic affected stock markets worldwide (Liu et al. 2020) and company performance in developing and emerging countries.

On February 19, 2020, the US stock market hit an all-time high, as measured by the S&P 500 index. In just 15 trading days, the index had collapsed by more than 20% from its peak. It was the fastest U.S. stock market crash of the last century. As for Europe, most European markets and indices lost more than a third of their current value last March, and their annual performances are still in the red. Over the past few months, stock market trends have been rather hesitant, due to uncertainties linked to the resurgence of the pandemic worldwide. The FTSE 100 has underperformed by 21% since the beginning of the year. The CAC 40 is down 17% for the year. As for the German DAX, it has held up well since the start of the year (+2%).

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

In Tunisia, after a start to the year disrupted by political negotiations around the formation of the first post-election government of 2019, the market has been in a panic since the discovery of the first positive case of COVID-19 in Tunisia (early March). Selling pressure peaked during the sessions of March 13, 16 and 17, when the Tunindex fell by 10%. In fact, the decree announced on March 22, 2020, of the general confinement, the loosening of monetary policy (reduction of the key rate by 100 basis points to 6.75% and easing of prudential rules and refinancing policy) and the announcement of exceptional measures by the government and the BCT in favor of companies and individuals helped restore investor confidence in listed equities. Above all, it was the market authorities' decision to shorten trading sessions and reduce the amplitude of price variations to ± 3% per session (compared with ± 6% previously) that limited the market chill. Much of the literature on COVID-19 focuses on the effect of the pandemic on financial markets, including stock market volatility (Baek et al., 2020), liquidity (Just and Echaust, 2020), risk (Rizwan et al., 2020) and corporate returns (Shen et al., 2020). Yet it is interesting to study the impact of an epidemiological crisis of this magnitude on corporate performance, and more specifically on listed companies, since they are the cornerstone of the national economy. It is in this context that this study aims to test the impact of covid on the performance of Tunisian listed companies.

Our paper will be structured as follows: First, we present our literature review and hypotheses development, followed by the research design, in wihch, we define our data, methodology and model specifictaion. The results are discussed in the penultimate section and finally, in section 5, we conclude.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In the context of a health crisis such as COVID 19, declining corporate profitability may indicate problems with the ability of companies to meet their obligations in general, including payment of employees, suppliers, taxes, etc. As a result, companies may seek refuge in debt (Derco, 2022). The level of corporate indebtedness would increase with the spread of the pandemic. According to Ellis (2021), the ability of companies to repay their debts is in doubt, given the current operating cycle and the increase in indebtedness. Several studies have been carried out to explore the impact of past crises on the financial performance of firms. Examples include the 1997-1998 Asian financial crisis (Ha, 2022), the 2008 global financial crisis (Tran and Tran, 2023) and the SARS pandemic (Kung et al., 2022). All the studies carried out on the subject have demonstrated the largely negative impact of these crises on the global economy and firm performance. Research findings on the COVID-19 pandemic and its impact on corporate performance have been conducted in a variety of contexts, including developing countries (Chen et al., 2022), emerging economies (Ghosh and Bhattacharya, 2022; Nguyen et al., 2022; Wang et al., 2022). The impact of this pandemic has also been tested in specific regions, such as the G20 countries (El Khoury et al., 2022). In addition to regions, the impact of covid 19 has also been tested according to companies' sector of activity. In this respect, we cite the work of Ghosh and Bhattacharya (2022) in the tourism sector, the research of Sang et al. (2022) in the construction sector, logistics (Nguyen, 2022), telecommunications (Muftiasa et al., 2023) and banking (El-Chaarani et al., 2022a; Nguyen et al., 2022).

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

In the light of previous international studies, the impact of the COVID 19 pandemic on firms' financial performance should be examined in the Tunisian context, an emerging country where the economy is strongly influenced by financial and health crises. So, we formulate our first hypothesis as follows:

H1: Covid negatively and significantly affects company's financial performance.

According to Devi et al. (2020), one of the most important factors impacting the performance of companies is the size of the company. Companies with a large size have the ability to better negotiate the value of their inputs and then reduce their average costs. This will result in higher profitability for the company. According to the signaling theory, the larger the size of the company, the more it will give a positive signal to the public or the market, which means that the company has better financial performance. There is a positive and significant effect on the financial performance which is represented by the ROA. Indeed, the larger the assets, the larger the market capitalization. This is likely to improve the financial performance of the company. According to Dey et al. (2022), the larger the size of the company, the greater its financial performance measured by the ROA. Based on the above description, we propose the following hypothesis:

H2: Size positively and significantly affects company's financial performance.

Khan et al. (2016) examines the capital structure and its impact on the financial performance.

They show that leverage, ROE, EPS and cash ratio have a positive effect on firm stock returns. According to them, the capital structure of a firm is positively related to shareholder wealth and firm performance whether measured by ROA, ROE or stock market performance (Mujahid and Akhtar, 2014). Thus, we formulate the third hypothesis as follows:

H3: Capital structure positively and significantly affects company's financial performance.

According to Zeitun and Goaied (2022), increased economic activity as indicated by GDP leads to better firm performance. Killins (2020) studied the relationship between GDP growth rate and the performance of Canadian life insurance companies, demonstrating that the relationship is significant and positive.

It is clear from the literature that firm performance is influenced by macroeconomic factors in many ways. Issah and Antwi (2017) demonstrated that the effect of GDP growth rate on firm performance varies across sectors.

In a manner consistent with the literature, we formulate the fourth hypothesis as follows:

H4: Conjuncture has a significantly negative effect on company's financial performance.

Recent research such as that conducted by Ali et al. (2018) shows that there is a "positive and significant relationship between FCF and the financial performance of the firm". An increase in a firm's cash flow leads to an equivalent increase in the firm's profits. Indeed, FCF can be reinvested in profitable investments capable of strengthening the firm's financial performance. Firms that hold excess cash have the possibility of making alternative decisions, for example, buying other firms or distributing dividends to shareholders. Firms can decide to keep the FCF

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

released in anticipation of profitable investments, capable of producing future value creation for the firm. We formulate our fifth hypothesis as follows:

H5: FCF has a positively and significantly effect on company's financial performance.

3. RESEARCH DESIGN AND VARIABLES DEFINITION

3.1. Sample

Our sample is made up of 34 Tunisian companies listed on the Tunis Stock Exchange (BVMT). Our database was reconstituted from the financial statements and annual reports of the various companies in our sample. The study covers a 5-year period (2016-2020).

3.2. Variables definition

3.2.1. Dependent variables

The dependent variable of our research, firm performance, was operationalized by three performance measures: stock market, financial and accounting performance (stock market performance, return on equity and return on assets).

Stock market performance

Given the nature of our sample, stock market performance remains a preferred indicator for measuring company performance. The criterion of a company's stock market listing is considered an indicator of its level of performance (Dharani et al., 2023).

According to shareholder theory, which is based on the maximization of shareholder wealth through management, companies unaffected by the pandemic and which have continued to work, generate a useful means of achieving this objective, and thus benefit from a higher stock market return than those affected by the crisis. The measurement of stock market performance is presented in the sense of stock market yield.

$$Stock\ Market\ Performance\ (SMP) = (Pi, t - Pi, t\text{-}1 + Divit) / Pi, t\text{-}1$$

Pi: share price

Divit: distributed dividend

Return on Assets

Asset profitability is often used in the literature to study accounting performance, like it was during the 2008 crisis (Dakhlaoui *et al.,* 2017; Lajmi *et al.*, (2021); Lajmi and Yab, 2022; Ben Flah et al., 2024).

$$ROA = Operating\ income / Total\ assets$$

Return on Equity

The return on equity approach to financial performance is widely used in the literature (Ghenimi et al., 2021).

$$ROE = Net\ income / equity$$

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

3.2.2. Explanatory variables

Covid-19

The COVID-19 variable is considered a binary variable. We have assigned a value of 1 if the company has been impacted by the covid and a value of 0 otherwise. These values are assigned after due diligence carried out by a consulting firm tasked with studying the extent of the impact of the health crisis on companies listed on the Tunisian market.

3.2.3. Control variables

Size

The "Size" variable has been the subject of several empirical studies testing the impact of Covid-19 on company performance, notably the studies by Hu and Zhang (2021) and Shen et al. (2020). Thus, the size measure can take several forms, namely: Log (Assets), Log (CA). In this research, we will adopt this measure:

$$Size = Log\ (Sales)$$

Capital structure

Several studies have focused on the impact of capital structure on corporate financial performance. (Hu and Zhang, 2021 and Shen et al. 2020).

Capital structure (**LTD/EQU**) as a control variable is measured by the following ratio:

$$Capital\ structure\ ratio = Long\text{-}term\ debt\ /\ equity$$

Conjuncture

This variable will be measured by the annual GDP growth rate.

$$Conjuncture = Annual\ GDP\ growth\ rate$$

Free-Cash Flows (FCF)

Free cash flow measures what returns to shareholders and lenders. It is calculated as follows EBITDA - Change in WCR - Income tax - Capital expenditure net of fixed asset disposals.

Risk equity

The health crisis has had a major impact on managers' risk aversion levels. We measure risk of stocks by the standard deviation of their return.

$$\sigma(x) = \sqrt{V(x)} = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}}$$

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

3.3. Models' specification

We opted for econometric methods of estimation on panel data to estimate our model below.

$$\textbf{Performance} = \beta_0 + \beta_1 \textbf{ Covid} + \beta_2 \textbf{ Size} + \beta_3 \textbf{ Capital Structure} + \beta_4 \textbf{ Conjuncture} + \beta_5 \textbf{ Free cash flow} + \beta_6 \textbf{ Risk Equity} + \varepsilon_{it}$$

With:

- **Performance:** is measured by the three proposed measures.
- **Covid:** is a binary variable which takes the value 1 if the company is affected by the crisis and 0 otherwise.
- **Size:** Size of the firm which is measured by the logarithm of total sales.
- **Capital structure:** Capital structure is approximated by dividing Long-term debt by equity.
- **Conjuncture:** is measured by the annual GDP growth rate.
- **Risk Equity:** Risk equity is approximated by the standard deviation of their return.

In what follows, we present the descriptive statistics, and the tests conducted on our panel data.

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics

The table 1 below reports the descriptive statistics (mean, standard deviation, minimum and maximum) of each of the variables retained in our empirical study, namely the dependent, independent and control variables.

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	170	.0363062	.1273229	-1.200126	.4550536
ROE	170	.1047948	.303915	-1.808185	2.01625
SMP	170	-.0117709	.2399102	-.7320045	1.250099
Covid	170	.2	.4011817	0	1
Size	170	18.32484	2.103069	13.79605	22.04603
Capital Structure	170	2.378815	4.916136	-34.23515	16.5631
Conjuncture	170	.0555186	.0508323	-.0403981	.1082477
FCF	170	1.85e+07	6.10e+07	-1.41e+08	3.62e+08
Risk equity	170	1.51417	2.775168	.0543669	23.89951

4.2. Preliminary tests on Sectional-cross data

4.2.1. Correlation matrix and VIF test

Before moving on to the regression analysis stage, however, it is essential to establish the correlation matrix between the variables in each model separately, in order to test the relationships between the independent variables and avoid any problems of multi-colinearity

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

(see tables 2 and 3).

Table 2: Pearson correlation matrix

	ROA	ROE	SMP	Covid	Size	Capital Structure	Conjuncture	FCF	Risk equity
ROA	1.0000								
ROE	-0.2755	1.0000							
SMP	0.2173	-0.0444	1.0000						
Covid	-0.0700	-0.0943	-0.0147	1.0000					
Size	0.0487	-0.0177	0.0029	0.0245	1.0000				
Capital Structure	-0.0291	-0.2764	-0.1406	-0.0894	-0.2240	1.0000			
Conjuncture	-0.0796	0.1423	0.0133	-0.9462	-0.0146	0.0728	1.0000		
FCF	0.1507	-0.0034	-0.0020	0.1544	0.3500	-0.1567	-0.1384	1.0000	
Risk equity	-0.0024	0.0319	0.0751	-0.0232	0.0796	0.0416	0.0453	-0.0033	1.0000

Table 3: VIF Test

VARIABLE	VIF
COVID	**1.2**
CONJUNCTURE	**1.17**
Size	**1.19**
FCF	**1.18**
CAPITAL STRUCTURE	**1.07**
Risk equity	**1.02**
Mean VIF	**1.185**

4.2.2. Testing for individual effects

We are dealing with panel data with two dimensions: individual and temporal. In our model, we use an i notation for the individual (companies) and a t notation for time (2016-2020). The question of correlation and heteroscedasticity is therefore addressed in this case.

A test for the presence of the individual effect is therefore required to determine the effect associated with each individual. More precisely, we need to identify the effect that does not vary over time, but which varies from one individual to another. It should be noted, however, that this effect may be random or fixed. This test (table 4) allows us to reject the zero hypothesis of no individual effect. This is then represented by an eigenvalue, Ui, for each individual, which must take the value of 0. We then seek to test the zero hypothesis H0: Ui=0 in the regression.

H0: no individual effect

H1: presence of an individual effect

ISSN 1533-9211

DOI: 10.5281/zenodo.13828004

Table 4: Test for the presence of individual effects

Chitest 10,88	
	(0.0010)

The table 4 above summarizes the result of the test for the presence of individual effects, showing that it is significant at the 1% level, so we can reject the zero hypothesis of the absence of individual effects. We then move on to the model specification stage, i.e. a fixed-effect or random-effect model.

4.2.3. The Hausman test

Once we've demonstrated the presence of individual effects, we need to decide on the type of model we're going to use, which can be either a fixed-effects or a random-effects model. We therefore need to estimate the model according to the fixed-effects hypothesis and the random-effects hypothesis, then choose the appropriate model using the results of the Hausman test.

***ROA model**

Table 5: Model estimation under fixed effects

ROA	Coef.	T	P>t
Covid	-.2367341	-3.38	0.001
Size	.1662025	2.97	0.003
Capital Structure	-.0093253	-3.17	0.002
Conjuncture	-1.532194	-2.91	0.004
FCF	-6.58e-12	-0.03	0.976
Risk equity	.0038087	0.68	0.500
_cons	-2.860378	-2.85	0.005
F(6.130) = 3.03	Prob> F = 0.0084		

Table 6: Model estimation under random effects

ROA	Coef.	z	P>z
Covid	-0.1381186	-2.20	0.028
Size	.0018715	0.26	0.793
Capital Structure	-.0030343	-1.34	0.180
Conjuncture	-.8932548	-1.79	0.074
FCF	2.55e-10	1.36	0.174
Risk equity	.0008932	0.21	0.832
_cons	.0804845	0.59	0.555

The two estimates above (Tables 5 and 6) show that the fixed and random effects models are statistically significant. Thus, to verify our choice, we will carry out the Hausman test in the following.

The Covid variable, structure and business conditions are negatively correlated with performance as measured by ROA.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

*** ROE model**

Table 7: Fixed effects estimation

ROE	Coef.	t	P>t
Covid	-0,3385736	1.70	0.092
Size	-.1776276	-1.12	0.266
Capital Structure	-.0333359	-3.98	0.000
Conjuncture	3.430316	2.29	0.023
FCF	-5.87e-10	-0.94	0.347
Risk equity	-.008511	-0.53	0.596
_cons	3.204708	1.12	0.264
F(6,130) = 5.26	Prob > F = 0.0001		

Table 8: Estimation under random effects

ROE	Coef.	z	P>z
Covid	-0.2497577	1.44	0.099
Size	-.0127018	-1.10	0.272
Capital structure	-.018758	-4.00	0.000
Conjuncture	2.825728	2.08	0.038
FCF	-2.79e-11	-0.07	0.944
Risk equity	.0041341	0.51	0.610
_cons	.1696004	0.71	0.477
Wald chi2(6) = 22.82	Prob > chi2 = 0.0009		

The above results presented in tables 7 and 8 indicate that the model under the fixed-effects and random-effects hypotheses is statically significant.

However, some explanatory variables are statistically insignificant. To validate which effect the model is suitable for, we will use the Hausman test.

Thus, the size variable is negatively correlated with performance expressed by ROE.

***Stock market performance model**

Table 9: Fixed effects estimation

SMP	Coef.	t	P>t
Covid	.0752134	0.46	0.648
Size	-.1989933	-1.52	0.132
Capital structure	-.0114147	-1.65	0.101
Conjuncture	.3876002	0.31	0.754
FCF	-9.20e-10	-1.79	0.076
Risk equity	.0179056	1.35	0.179
_cons	3.615281	1.53	0.128
F(6.130) = 2.19	Prob > F = 0.0478		

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

Table 10: Random effects estimation

SMP	Coef.	z	P>z
Covid	-.036425	-0.25	0.800
Size	-.0039175	-0.41	0.684
Capital structure	-.0076148	-1.95	0.051
Conjuncture	-.1826047	-0.16	0.872
FCF	-3.99e-11	-0.12	0.903
Risk equity	.0073131	1.09	0.277
_cons	.0852219	0.43	0.667
Wald chi2(5) = 22.82	**Prob > chi2 = 0.0009**		

Both the fixed-effects and random-effects models are statically significant (tables 9 and 10).

For the fixed-effects model, the explanatory variables are all non-statically significant. The same applies to the random-effects model. Having estimated the fixed-effect and random-effect models, we will now select the most appropriate model for our analysis between these two estimates, using the Hausman test.

The test hypotheses are as follows:

H0: the random-effects model is suitable.

H1: the fixed-effects model is suitable.

Table 11: Hausman Test

Dependent variables	
ROA	**chi2(4) =13.77**
	Prob>chi2 = 0.0081
ROE	**chi2(4) = 13.86**
	Prob>chi2 = 0.0313
SMP	**chi2(4) = 11.76**
	Prob>chi2 = 0.0383

Hausman's result is significant for all three models, so we reject the null hypothesis and use H1 to select the fixed-effects model. This indicates that estimating our fixed-effects model will give us more significant results than those obtained from the random-effects model.

4.2.4. Heterosedasticity test

The Breush-Pagan test is used to validate the hypotheses of homoscedasticity of the error terms in our regressions. Its purpose is to determine the nature of the variance of the error term. If the variance is constant, then we have homoscedasticity. However, if it varies, we have heteroscedasticity. Furthermore, the present test is similar to White's (1980) test, whose hypotheses are:

H0: Var(u) = 0 homoscedasticity.

H1: Var(u) ≠ 0: heteroscedasticity.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

Table 12: Breusch-Pagan Test

Dependent variables	
ROA	chibar2(01)=109.12
	Prob > chibar2 = 0.0000
ROE	chibar2(01)=71.25
	Prob > chibar2 = 0.0010
SMP	chibar2(01)=0.052
	Prob > chibar2 = 0.0021

We detect heteroscedasticity according to the Breusch-Pagan test (table 12). The result of the latter test shows significant values of (> 0.05%) for all three models. Consequently, we can reject the zero hypothesis of homoscedasticity. A heteroscedasticity problem exists.

In this case, we'll move on to the second step, testing for inter-individual heteroscedasticity. The zero hypothesis of this test assumes that error variance is equal for all individuals. In other words, there is homoscedasticity between individuals.

$$\begin{cases} H0: \sigma^2 i = \sigma^2 i \ \forall \ i=1.....N \\ H1: \sigma^2 i \# \sigma^2 i \ \forall \ i=1.....N \end{cases}$$

Table 13: Modified Wald test for group wise heterosedasticy

Dependent variables	
ROA	chi2(34) =1.2e+05
	Prob>chi2 = 0.0000
ROE	chi2(4) = 65359.44
	Prob>chi2 = 0.0000
SMP	chi2(4) =886,24
	Prob>chi2 = 0.0000

According to table 13, we find that the result is significant at the 1% level. We therefore reject the null hypothesis and accept that of the existence of inter-individual heteroscedasticity. The problem is therefore one of heteroscedasticity.

4.2.5. Residual autocorrelation test

Serial autocorrelation test: this consists in testing the autocorrelation of residuals over time in accordance with the Woodridge test.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

Table 14: Woodridge Test

Dependent variables	
ROA	F(1,34) =1.915
	Prob>F = 0.4271
ROE	chi2(1,34) = 1.754
	Prob>F = 0,1632
SMP	chi2(1,34) =2.5818
	Prob>F = 0.1031

As the test is not significant at the 1% level, we accept H0: No serial autocorrelation (Table 14).

4.2.6. Contemporary autocorrelation test

This corresponds to a test of the autocorrelation of residuals between individuals in accordance with Pearson's test. The test has as its zero hypothesis the absence of correlation of residuals between individuals.

Table 15: The Pearson cross-sectional dependence test

Dependent variables	
ROA	Prob>chi2 = 0.0000
ROE	Prob>chi2 = 0.0002
SMP	Prob>chi2 = 0.0090

The results obtained in table 15 below show that the test is significant at the 1% level. In this case, we reject the null hypothesis of no correlation of residuals between individuals. We detect the presence of a contemporaneous correlation of residuals between individuals.

4.3. Estimation results

In the table 16 below, the estimates of our FGLS regressions provide a solution to the problem of heteroscedasticity.

Table 16: Results of the regression models testing the impact of covid on performance according to FGLS

Variables	ROA Model	ROE Model	SMP Model
Covid	-0.1357322	-0.278895	-0.036425
	0.032	0.034	0.796
Size	0.0127018	-0.011136	-0.0039175
	0.262	0.288	0.677
Capital structure	-0.018758	-0.0199113	-0.0076148
	0	(0.0000)	0.046
Conjuncture	-2.0825728	2.81428	-0.1826047
	0.034	0.031	0.869
FCF	3.53E-10	0.007986	-3.99E-11
	0.038	0.005	0.901
Risk equity	0.0012087	0.0040753	0.0073131

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

	0.778	0.599	0.267
Constant	0.1696004	0.1382756	0.0852219
	0.467	0.529	0.66
Chi2(34)	23.8	32.81	5
	0.0486	0	0.4155

After estimating company performance using the 3 measures (ROA, ROE, SMP) on our sample of 34 companies listed on the BVMT during the period of 5 years (2016-2020), the results of the estimations show that:

In all 3 models, we find a negative relationship between covid and performance. This implies that the crisis has had a negative impact on the performance of Tunisian companies. This result is to be expected, given that general confinement, curfews, health measures and government measures in 2020 only succeeded in worsening the situation. Teleworking did not add much value, as some companies did not expect to face such a crisis situation and did not have the time to set up suitable teleworking arrangements.

Both "ROA, ROE" models present the performance well and explain it correctly, as each is significant with a probability of less than 0.05.

Contrary to our expectations, Model 3 was not significant, so we subsequently eliminate it from our analysis since probability>chi2=0.4155. We then retain the two ROA and ROE models.

There is a negative relationship between covid and company performance. This means that covid negatively affected the performance of Tunisian listed companies. This result corroborates the findings of El Idrissi and Allami (2021).

The COVID-19 pandemic seems to have affected the industry in different ways. Hotels and restaurants, transport, textiles, clothing and leather are the sectors most affected by the crisis, as they are the most vulnerable to the containment measures put in place by the Tunisian authorities. Other industries were indirectly affected because of their close links with the three above-mentioned industries. It is therefore clear that the health crisis affected all sectors. This is confirmed by a study carried out by the United Nations Development Program (UNDP) in Tunisia in 2020.

We can therefore conclude that the first hypothesis is validated by the ROA and ROE model.

Larger firms appear to be able to achieve greater competitiveness than their smaller competitors thanks to superior access to resources, greater market clout and more economies of scale.

However, we were unable to show this in our model insofar as the size variable is positively correlated in the ROA model and negatively correlated in the ROE model, but insignificant in both models. In this case, hypothesis 2 is not valid.

The capital structure variable showed a negative correlation with performance in both ROA and ROE models. The higher the debt ratio, the lower the performance. In other words, less-indebted companies appear to generate more performance than more-indebted companies. In this respect, according to Jensen and Meckling (1976), debt is useful for managing conflicts of

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

interest insofar as it constitutes a constraint for managers in optimizing investment decisions taken to meet their commitments on time.

However, the theory of hierarchical financing stipulates that the more profitable a company is, the less debt it takes on (Myers, 1984). This is because profitable companies reinvest their earnings, while less profitable companies borrow and thus increase their leverage, resulting in a negative relationship between profitability and indebtedness. The priority given to self-financing would therefore be at the root of the negative relationship between debt and performance (Mouatassim et al., 2015). The third hypothesis is therefore not validated.

Since the revolution of January 14, 2011, the economic climate in Tunisia has been unstable. Many investors have left the country. The advent of the health crisis has only exacerbated the economic situation, negatively impacting company performance.

The fourth hypothesis is therefore validated for the ROA model.

The results show that there is a positive relationship between FCF and performance. This means that the more positive FCF a company generates, the more profitable it is.

We validate the fifth hypothesis for both models

5. CONCLUSION

Our paper analyzes the effects of the COVID-19 pandemic on the financial performance of Tunisian companies by implementing three models for measuring this performance, namely ROA, ROE and stock market performance. The empirical study was carried out on a sample of 34 companies listed on the Tunis Stock Exchange over the last 5 years.

It emerges that for the 3 performance models studied, we find a negative relationship between covid-19 and the financial performance of listed Tunisian companies. This result is predictable in a country like Tunisia, a country with an emerging economy that is very sensitive to financial and health crises. The state of general confinement between the meridian of March 2020 and May 2020 largely affected all sectors of the economy and only worsened the economic crisis in the country.

Our results show that the two performance models ROA and ROE are globally significant. On the other hand, the third performance measurement model based on stock market performance was not significant.

Through these models, we show the existence of a negative relationship between covid-19 and company performance. In addition to COVID which was used as an independent variable, we implemented control variables and tested their impact on the performance of Tunisian companies listed on the financial market. The operationalized variables are size, capital structure, economic conditions, equity risk and free cash flow. It follows that size affects company performance. If performance is measured by ROA, size is positively correlated with company performance. On the other hand, when it is measured by ROE, size is negatively correlated with performance. However, the relationship between size and performance is insignificant for both models.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

The capital structure variable showed a negative correlation with performance in both ROA and ROE models. The higher the debt ratio, the lower the performance. We deduce that less indebted companies seem to generate more performance than more indebted companies.

Like all countries in the world, Tunisia has not been spared by the health crisis. The country has been widely affected and impacted on the social and economic levels, resulting in a significant drop in GDP. Our results corroborate the economic reality of the country and its financial market. We find a negative relationship between GDP and the financial performance of companies when it is measured by ROA. Our empirical study also shows that there is a positive relationship between FCF and performance. This means that the more positive FCF a company generates, the more profitable it is. This result is validated in both ROA and ROE performance measurement models.

This study is useful to help governments, shareholders and business owners understand how COVID-19 affects the financial performance of companies listed on the Tunisian financial market.

Our paper has some limitations. Our sample is relatively small. Indeed, we were only able to collect data, particularly relating to COVID, for 34 companies. A larger sample would allow us to better generalize our results. Future research can also integrate the sector of activity effect since not all sectors have been affected by COVID-19 to the same extent.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

1) Ali, U., Ormal. L., & Ahmad, F. (2018). Impact of Free Cash Flow on Profitability of the Firms in Automobile Sector. Journal of Economics and Management Sciences, 1(1).

2) Baek,S. Mohanty, S.K. & Glambosky, M. (2020). COVID-19 and stock market volatility: An industry level analysis. Finance Research Letters, 37, 101748.

3) Ben Flah, I., Lajmi, A. et Hlioui, Z. (2024). How does innovation moderate the CSR impact on financial performance? An exploratory study and an empirical validation in the Tunisian context. *Journal of Financial Reporting and Accounting,* Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JFRA-07-2023-0397.

4) Chen, Y. & Wu, Z. (2022). Taking risks to make profit during COVID-19. *Sustainability*, 14(23), 15750. doi: 10.3390/su142315750.

5) Dharani, M., Hassan, M.K., Huda, M. (2023). Covid-19 pandemic and stock returns in India. *Journal of Economics and Finance,* 47, 251–266. https://doi.org/10.1007/s12197-022-09586-8

6) Dakhlaoui, M., Lajmi, A. and Gana, M. (2017). Financial information quality and cost of equity capital: Evidence from Tunisia. *Journal of Applied Economics and Business Research*, 7(1), 38-58

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

7) Derco, J. (2022). The impacts of the COVID-19 pandemic on the tour operator mar-ket: The case of Slovakia. *Journal of Risk and Financial Management*, 15(10), 466. doi: 10.3390/jrfm15100446.

8) Devi, S., Warasniasih, N. M. S., Masdiantini, P. R & Musmini, L. S. (2020). The impact of Covid-19 pandemic on the financial performance of firms on the Indonesia stock exchange. *Journal of Economics, Business, and Accountancy Ventura,* 23(2), 226-242. http://dx.doi.org/10.14414/jebav.v23i2.2313

9) Dey, A.K., Hoque G.T., Das K.P. & Panovska I. (2022). Impacts of COVID-19 local spread and Google search trend on the US stock market. *Physica A*, 589, 10.1016/j.physa.2021.126423

10) El-Chaarani, H., Abraham, R., & Skaf, Y. (2022a). The impact of corporate governance on the financial performance of the banking sector in the MENA (Middle Eastern and North African) region: An immunity test of banks for COVID-19. *Journal of Risk and Financial Management*, 15(2), 82. doi: 10.3390/jrfm15020082.

11) El Idrissi, I., & Alami, Y. (2021). The financial impacts of board mechanisms on performance: The case of listed Moroccan banks. *International Journal of Financial, Accounting, and Management*, *3*(2), 93-113. https://doi.org/10.35912/ijfam.v3i2.536

12) El Khoury, R., Nasrallah, N., Harb, E., & Hussainey, K. (2022). Exploring the performance of responsible companies in G20 during the COVID-19 outbreak. *Journal of Cleaner Production,* 354, 131693. doi: 10.1016/j.jclepro.2022.131693.

13) Ellis, C. (2021). How should risk professionals think about the rise in corporate indebtedness? *Journal of Risk Management in Financial Institutions*, 14(2), 161–172.

14) Fu, M. & Shen H. (2020). COVID-19 and corporate performance in the energy industry. *Energy Reserach. Letters.* 1:12967. doi: 10.46557/001c.12967.

15) Ghenimi, A., Chaibi, H. & Omri, M. A. (2021). Liquidity risk determinants: Islamic vs conventional banks. *International Journal of Law and Management,* 63(1), 65-95. doi: 10.1108/ijlma-03- 2018-0060

16) Ghosh, S., & Bhattacharya, M. (2022). Analyzing the impact of COVID-19 on the financial performance of the hospitality and tourism industries: An ensemble MCDM approach in the Indian context. *International Journal of Contemporary Hospitality Management*, 34(8), 3113-3142. doi: 10.1108/IJCHM-11-2021-1328.

17) Ha, T. (2022). Economic crises and fiscal measures in South Korea: Asian financial crisis, global financial crisis, and COVID-19. *Journal of Asian Public Policy. Advance online publication.* doi: 10.1080/17516234.2022.2075220.

18) Hu, S. & Zhang, Y. (2021). COVID-19 pandemic and firm performance: Cross-country evidence. International Review of Economics & Finance, 74, 365-372

19) Issah, M., & Antwi, S. (2017). Role of macroeconomic variables on firms' performance: Evidence from the UK. *Cogent Economics & Finance*, 5(1), 1405581. https://doi.org/10.1080/23322039.2017.1 405581

20) Jensen, M.C. and Meckling, W.H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics,* 3, 305-360. Just, M., & Echaust, K. (2020). Stock market returns, volatility, correlation and liquidity during the COVID-19 crisis: Evidence from the Markov switching approach. *Finance Research Letters, 37*, 101775.

21) Khan MN, Nadeem B, Islam F, Salman M. & HMIS (2016). Impact of dividend policy on firm performance: an empirical evidence from Pakistan Stock Exchange. *Am J Econ Finance Manag,* 2(4):28–34.

22) Killins, R. N. (2020). Firm specific, industry-specific and macroeconomic factors of life insurers' profitability: Evidence from Canada. *The North American Journal of Economics and Finance*, 51, 101068. https://doi. org/10.1016/j.najef.2019.101068.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13828004

23) Kung, Y. A., Lee, K. M., Chiang, H. J., Huang, S. Y., Wu, C. J., & Shih, S. R. (2022). Molecular virology of SARS-CoV-2 and related coronaviruses. *Microbiology and Molecular Biology Reviews*, 86(2), e0002621. doi: 10.1128/mmbr.00026-21

24) Lajmi, A., Khiari, W. & Ouertani, O. (2021). Legal audit quality and fraud risk: the case of Tunisian listed companies. *International Journal of Accounting and Finance Review*, 6 (2),1-15. https://doi.org/10.46281/ijafr.v6i2.1039.

25) Lajmi, A. & Yab, M. (2022). The impact of internal corporate governance on audit report lag: evidence from Tunisian listed companies. *Euromed Journal of Business*, 17 (4), 619-633. https://doi.org/10.1108/EMJB-05-2021-0070

26) Liu, H., Manzoor, A., Wang, C., Zhang, L., & Manzoor, Z. (2020). The COVID-19 outbreak and affected countries stock markets response. *International Journal of Environmental Research and Public Health,* 17(8), 1–19.

27) Mouatassim Lahmini, H. & Ibenrissoul, A. (2015). Impact de la décision de financement sur la performance de l'entreprise marocaine : Cas des sociétés cotées des secteurs Immobilier et Matériaux de Construction. *Colloque et séminaire doctoral international ISEOR-AOM 2015 sur les méthodologies de recherche,* Jun 2015, Lyon, France. Actes du colloque international de l'ISEOR/AOM 2015, 2015.

28) Muftiasa, A., Wibowo, L. A. & Rahayu, A. (2023). Is intellectual capital related to telecommunications industry financial performance during COVID-19? *International Journal of Learning and Intellectual Capital,* 20(1), 29-46. doi: 10.1504/ IJLIC.2023.127696.

29) Mujahid, M. & Akhtar, K. (2014). Impact of Capital Structure on Firms Financial Performance and Shareholders Wealth: Textile Sector of Pakistan. *International Journal of Learning & Development*, 4 (2).

30) Myers, S.C. (1984). The Capital Structure Puzzle. *Journal of Finance*, 39, 575-592. http://dx.doi.org/10.2307/2327916

31) Nguyen, N. T. H., Kim-Duc, N., & Freiburghaus, T. L. (2022). Effect of digital banking-related customer experience on banks' financial performance during Covid-19: A perspective from Vietnam. *Journal of Asia Business Studies*, 16(1), 200-222. doi: 10.1108/JABS-09-2020-0366

32) Nguyen, H. T. X. (2022). The effect of COVID-19 pandemic on financial performance of firms: Empirical evidence from Vietnamese logistics enterprises. *Journal of Asian Finance*, *Economics and Business,* 9(2), 177–183. doi: 10.13106/jafeb. 2022.vol9.no2.0177.

33) Rizwan M.S., Ahmad G. & Ashraf D. (2021), "Systemic risk: the impact of COVID-19". *Finance Research. Letters.36.*101682.

34) Sang, M., Zhang, Y., Ye, K., & Jiang, W. (2022). Moderating effects of internationalization between corporate social responsibility and financial performance: The case of construction firms. *Buildings,* 12(2), 185. doi: 10.3390/buildings12020185.

35) Shen, H., Fu, M., Pan, H. & Yu, Z. (2020). The Impact of the COVID-19 Pandemic on Firm Performance. *Emerging Markets Finance and Trade*, 56(10), 2213-2230 DOI:10.1080/1540496X.2020.1785863

36) Tran, M. H., & Tran, M. (2023). Value-at-risk and the global financial crisis. *Journal of Risk Model Validarion*, 17(1), 41–83. doi: 10.21314/JRMV.2022.030

37) Wang, Z., Dong, Y., & Liu, A. (2022). How does China's stock market react to supply chain disruptions from COVID-19? *International Review of Financial Analysis*, 82, 102168. doi: 10.1016/j.irfa.2022.102168.

38) Zeitun, R., & Goaied, M. (2022). The nexus between debt structure, firm performance, and the financial crisis: Non-linear panel data evidence from Japan. *Applied Economics,* 54(40), 4681-4699. https://doi.org/10.1080/00036846. 2022.2033680