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RESEARCH ARTICLE

The COVID-19 Pandemic's Impact on the Performance of Firms on the BIST 100 Index

Meltem Altın[1], **Mustafa Özgün Atalay**[2]

Abstract

The coronavirus (COVID-19) pandemic that affected the world has caused a decline in most companies' financial performance. This study aims to analyze the effects of the COVID-19 pandemic on the financial performance of companies traded in Türkiye's Borsa Istanbul 100 (BIST 100) index for 2019-2021. Pooled ordinary least squares (OLS) regression was applied as the basic method to determine the effects of the COVID-19 pandemic on the financial performance of companies listed on the BIST 100 index. The study's findings show the COVID-19 pandemic to have had effects on the profitability of companies listed on the BIST 100 index. The results reveal net working capital, size (total assets), and financial autonomy ratios to be the ratios that affect return on assets (ROA), with the return on equity ratio (ROE) being affected only by size. These results show the BIST 100 index to have adapted to a certain extent to the uncertainties caused by the pandemic, so the shock has not been devastating. This study provides valuable insights that can assist investors, managers, creditors, and other stakeholders in making informed decisions that lead to positive outcomes.

Keywords

COVID-19, firm performance, BIST 100, Türkiye

Introduction

The COVID-19 pandemic devastated the global economy in early 2020. Even when compared to past events such as the Great Depression and the 1918-1920 flu pandemic, the market's reaction to the COVID-19 pandemic is regarded as exceptional (Baker et al., 2021). COVID-19's effects began as a regional crisis but quickly escalated into a global economic downturn due to the interconnectedness of financial systems. Alongside the pandemic, financial market instabilities occurred, as well as interruptions in supply chains, delays, restrictions, and interruptions in production. This led to a decrease in demand from both commercial customers and consumers, resulting in a decrease in companies' sales, earnings, and productivity (Cavlak, 2020). These micro-level disruptions also had an effect at the macro level, re-

1 **Corresponding Author:** Meltem Altın (Lecturer Dr.), Bursa Uludag University, Vocational School of Orhaneli, Bursa, Turkiye. E-mail: meltemaltin@uludag.edu.tr ORCID: 0000-0001-6673-3627

2 Mustafa Özgün ATALAY (Res. Asst.), Karadeniz Technical University, Faculty of Economics and Administrative Sciences, Trabzon, Turkiye. E-mail: ozgun_atalay@ktu.edu.tr ORCID: 0000-0001-6208-4834

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sulting in a decrease in many countries' gross domestic product (GDP), as well as a decrease in exports, imports, and general economic activity.

COVID-19 may not have been equally damaging to all companies and industries. While most industries suffered and their stock prices plummeted, some may have benefitted from the pandemic and the ensuing lockdown (Mazur et al., 2021). Companies and governments have to consider which sectors will be affected by unusual events such as a pandemic, as well as how they will be affected. Furthermore, because such extreme circumstances have an impact on developing country markets (Topcu & Gulal, 2020), conducting these types of studies there is even more critical. Furthermore, a lack of research is found examining how the COVID-19 pandemic has changed companies' actions in terms of determining their degree of performance (Achim et al., 2022). Accordingly, the study primarily focuses on firm performance in the face of the COVID-19 pandemic by assessing several key changes in the activities of various organizations. The sample of this study includes 86 of the 100 companies listed on the Borsa Istanbul (BIST 100) index traded under the ticker symbol XU100, which can be considered an emerging market. These companies can also be considered representative of Türkiye's largest companies.

The remaining sections of this work are structured as follows. Following the Introduction is a literature review on the issue. The third section describes the paper's data and methods. The fourth section contains the results and discussion, and the fifth section provides the conclusions.

Literature Review

A number of studies have emerged over a short time examining the COVID-19 pandemic's effects on stock market returns and volatility (Ali et al., 2020; Salisu et al., 2020; Mazura et al., 2020; Papadamou et al., 2020; Zhang et al., 2020), exchange rate (Iyke, 2020), and companies' performances (Achim et al., 2022) by country groups or by countries. Mazura et al.'s (2020) study found stocks in the health, food, natural gas, and software sectors to have provided high returns during the March 2020 stock market crash, while stocks in the crude oil, real estate, entertainment, and accommodation sectors dropped significantly, losing more than 70% of their market value. COVID-19 increased the vulnerability of all sectors to the crisis with the exception of information technology, pharmaceuticals, and basic food sectors (Allianz, 2020; Euler Hermes, 2020). In a poll performed in Türkiye, the majority of sector representatives stated the pandemic to have had a significant impact on their sector (KPMG, 2020). According to United Nations Conference on Trade and Development (UNCTAD, 2020) data, a 37.3% drop has occurred in the world's general commodity prices, 55% in the energy sector, 18% in industrial metals, 7% in agriculture, 15% in animal husbandry, and 5% in metal prices. Furthermore, metal products, machinery, sports, insurance, and banking were among the hardest-hit industries.

Despite the significant economic downturn, the food and beverage, wholesale and retail trade, and real estate investment sectors were the least affected by the outbreak (Öztürk et al., 2020). For instance, although the manufacturing sector experienced significant declines, other industries such as information technology, software, and social services saw increases in their respective market shares (Gu et al., 2020). The most interesting consequences of the pandemic are observed in the service industry sector. In some service areas such as the airline industry, a sudden drop occurred in demand and capacity was not at full use, while in other service areas such health services, a sudden rise in demand occurred that made meeting the demand impossible (Kabadayı et al., 2020).

The COVID-19 outbreak, which had numerous severe economic repercussions, was discovered to have a negative impact on the average returns of the BIST sector index. Goker et al.'s (2020) study investigated the impact of the COVID-19 pandemic on the BIST sector index's returns and found sports, tourism, and transportation to have been negatively affected while food, chemical, and banking were positively affected. Kılıc (2020) used the event study research approach to examine the returns on the BIST sector indices in order to determine the impact of the COVID-19 outbreak on Turkish financial markets. Despite the fact that the textile and tourist industries were said to have been the most negatively affected, the trade sector was positively affected by the pandemic. Goker et al. (2020) analyzed 26 sector indices of the BIST 100. By analyzing the cumulative average abnormal returns (CAAR) of the sectors using the event study approach, the study aimed to determine on which sectors the pandemic was having the greatest impact. The conclusion of their research determined the industries that were being most negatively affected by the pandemic process to be the sports, tourism, and textile industries, although this changed over time. In contrast, positive CAAR values were recorded in the food, chemical, and banking sectors, which are the largest consumer sectors. According to Xiong et al. (2020), at this exceptional moment, individuals were responding instinctively to satisfy their most fundamental needs, and companies with a strong financial position were also less affected by the COVID-19 outbreak's negative consequences. They found those companies to be more profitable and to have high growth potential, more short-term assets, and higher share values.

Demirhan's (2020) study concluded the pandemic to have caused volatility and this volatility in the stock market and CDS premiums to be closely related to the increase in the number of patients, which sheds light on individuals' investment decisions. Peker and Demirhan (2020) examined on a sectorial basis the returns of stocks traded on the BIST index and the effects of these returns on volatility. They concluded the effects of the global pandemic to vary according to sector. Bayraktar (2020) examined the impact of the COVID-19 pandemic on BIST 100 index's manufacturing sector stocks, with the results showing the manufacturing sector stocks that were traded on the BIST 100 to have generated more returns than in the period before the pandemic, thus the sector had eliminated the pandemic's negative

effects. Zhang et al. (2020) observed a never-before-seen traumatic downward movement to have occurred in the financial markets alongside the COVID-19 pandemic. Evidence from their research showed that systematic risks in the market had increased with the pandemic and found the reactions of China's stock markets to the pandemic to have been significant.

Baskan et al. (2022) compared the financial data of small- and medium-sized construction companies from 2019 to when the pandemic affected the world. A decrease in current assets was determined in 2020 for the companies they subjected to the study. On the other hand, when they analyzed the account class of fixed assets, no major change could be detected. They determined short-term liabilities to have decreased by approximately 24% on average, long-term liabilities to have increased by approximately 9% on average, and shareholder equity to have increased by approximately 14%. They found on average that companies' debt ratios went down, even if only by a small amount; at the same time the percentage of total liabilities went up for short-term liabilities and down for long-term liabilities.

Laing (2020) evaluated the economic effects of the COVID-19 outbreak on the mining sector alongside the economic effects that were expected to occur in the mining sector and stated that prices and production would be affected in the short term and that the sector's profitability would decrease, with the medium- to long-term effects being completely uncertain. Kızıl & Aslan's (2019) study used the ratio method to examine the financial performances of airline companies traded on BIST 100 (i.e., THY and Pegasus). According to the results from their analysis, Pegasus was concluded to be in a better position than THY in terms of liquidity ratios, both companies to be operating effectively, and their profitability fluctuations to closely resemble one another. The dynamic panel data analysis results from Demirhan & Sakin's (2021) study showed the COVID-19 pandemic to have both negative and positive effects on the profitability ratios of companies listed in Türkiye.

Research Model and Data

Data

The sample of this study includes 86 of the 100 companies listed on the BIST 100 index (ticker symbol XU100). These companies can be seen as the representatives of the largest companies in Türkiye. Of the remaining 14 companies, they were either bank, which were excluded from the research due to their unique balance sheet arrangements, or companies that did not publish financial statements in 2019, 2020, or 2021.

The companies in the study's sample are grouped into their respective industries, six in real estate, 10 in chemicals, 12 in holdings, 27 in manufacturing, six in retail, seven in energy and gas, four in technology (including IT and R&D), and 14 in "other services". Again, the

companies not included in any of the sectors mentioned above were grouped under the category of "other services" for being relatively few in number (e.g., only one company operating in the financial institutions sector, only two companies operating in the transportation sector).

Variables

Table 1 lists the variables used in this study and their descriptions. The dependent variables (i.e., companies' return on equity [ROE] and return on assets [ROA] rates) are widely used indicators of firm performance. Working capital ratios, capital structure ratios, and size proxies are the study's independent variables affecting the ROE and ROA indicators. Size proxy is comprised of the indicator total asset; working capital is comprised of net working capital, quick ratio, and cash ratio assets; and capital structure is comprised of financial autonomy rate and debt equity rate (Vătavu, 2015; Afrifa, 2016; Chaudhuri, 2016; Nizam et al., 2019; Ramzan et al., 2021; Nasrallah & El Khoury, 2022).

Table 1
Variable of the Models

Variables	Expression	Description	Measurement
Dependent Variables			
Performance Measures (PM)	Return of Assets (ROA)	Shows whether the company is using its assets profitably.	Net Income/Total Shareholder's Equity
	Return of Equity (ROE)	Shows profit earned on equity. Express whether the resources are used efficiently or not.	Net Income/Total Assets
Independent Variables			
Size (SIZE)	Total Assets (TA)	Represents the sum of a company's current economic resources.	Logarithm of Total Assets
Working Capital (WC)	Net Working Capital (NWC)	The difference between a company's current assets and short-term liabilities. Essential indicator of company's credibility.	Net Working Capital/Total Assets (%)
	Quick Ratio (QR)	Excluding inventories from a company's current assets and dividing them by short-term liabilities. Represents the companies' ability to pay its short-term debts.	(Cash+Marketable Securities+Account Receivables)/ Current Liabilities (%)
	Cash Ratio (CR)	Representing how much of the company's short-term debts can be paid through its liquid assets.	(Cash+Marketable Securities)/ Current Liabilities (%)
Capital Structure (CS)	Financial Autonomy Rate (FAR)	Indicating the degree to which a company's economic resources are covered by its sources.	Shareholder's Equity/Total Assets (%)
	Debt Equity Ratio (DER)	Whether and to what extent a company financing its operations with its own funds or debt.	Total Depts / Total Assets (%)

All financial data have bene obtained from the 2019–2021 yearly financial statements published on Türkiye's Public Disclosure Platform (KAP; www.kap.org). Before examining

the market- and sector-based evaluations, Türkiye's current situation must be addressed. The manufacturing sector of Turkish companies has an import-dependent structure. The value of the Turkish lira has decreased dramatically against foreign currencies over the last five years. This decrease has gained momentum in the USD/TRY currency pair since 2019. Table 2 shows the relative changes in sales revenue during the 2019–2021 period.

Table 2
Relative changes (%) in the sales revenue during 2019-2021 period

Sectors	Sales (2019, USD)	Sales (2020, USD)	Sales (2021, USD)	Changes in Sales (%) 2019-2020	Changes in Sales (%) 2020-2021
Real Estate	1.757.641.365	1.653.087.642	1.721.872.405	-5,94%	4,16%
Chemistry	16.861.696.155	13.950.949.352	25.312.295.926	-17,26%	81,43%
Holdings	36.113.413.331	36.271.069.903	48.390.399.109	0,01%	33,41%
Manufacturing	36.477.580.618	43.594.212.213	57.223.480.711	19,50%	31,26%
Retail	16.393.317.469	21.019.660.180	21.090.180.358	25,78%	0,01%
Energy	4.361.511.951	4.806.886.852	5.271.030.326	9,17%	9,65%
Technology	2.674.355.296	3.846.250.341	3.840.328.539	43,81%	0,00%
Other Services	59.055.079.008	36.387.803.715	43.506.763.129	-38,38%	19,56%
Total	173.494.595.193	161.529.920.198	204.732.423.626	-7,00%	26,74%

In studies dealing with companies' performances, sector-based analyses have yielded detailed and consistent results. Table 2 demonstrates how the COVID-19 pandemic affected companies' sales revenues in the relevant sectors during the 2019–2021 period. In comparison to 2019, total market sales had decreased by 7% by the end of 2020. Companies in the real estate, chemical, and other services sectors had had average respective decreases in sales of 5.94%, 17.26%, and 38.38% in the 2019-2021 period. These sectors can safely be assumed to have been the sectors most negatively affected by the COVID-19 pandemic. In particular, the transportation sector, which has been included in "other services", had a dramatic decrease in sales of 40.50% during the analyzed period. Due to the pandemic, travel restrictions on intercity travel and curfews had been introduced at certain times in Türkiye. These restrictions had a negative impact on the transportation sector. Despite the COVID-19 pandemic, the manufacturing, retail, energy, and technology sectors respectively increased their sales by 19.50%, 25.78%, 9.17%, and 43.81%. Due to the COVID-19 pandemic, many new entertainment programs were started on digital platforms. In addition, many face-to-face activities started taking place on digital platforms. These changes have led to a growth in the technology sector.

COVID-19 started to lose its effect in Türkiye after the second half of 2020 in particular (Topcu & Gulal, 2020). Economic activity that had slowed down due to the coronavirus started an upward trend with the decrease of the pandemic's effect. This upward trend started to show itself in the economy as well. The companies listed on the BIST 100 index grew by 26.74% from 2020 to 2021. As COVID-19 cases declined, curfews and travel bans/restric-

tions were abandoned or reduced. Lifting restrictions had a positive impact on the transportation sector (included in the "other services" sector). As a result of all these developments, the transportation sector, which had shrunk by 40.50% between 2019-2020, grew by 65.98% compared to the previous period. The considerable degree of fear, worry, and concern the pandemic had induced in the population decreased as the numbers of cases and daily deaths decreased, thus increasing the demand for products and services, which in turn caused the chemical, holdings, manufacturing, and energy sectors to grow by 81.43%, 33.41%, 31.26%, and 9.65%, respectively. No growing market was encountered in the technology sector. The reasons for this being factors such as online and digital environments no longer being as needed due to restrictions being lifted, as well as the preference for face-to-face activities over digital processes and applications. While the technology market did not grow in 2021, it did however retain its value, indicating that applications and processes for digital and online platforms were still being widely used in the Turkish market.

Table 3
Relative changes (%) in the current and fixed assets during 2019-2020 period

Sectors	Current Assets 2019	Current Assets 2020	Fixed Assets 2019	Fixed Assets 2020	Changes in Current Assets (%)	Changes in Fixed Assets (%)
Real Estate	4.451.570	3.835.882	4.159.820	3.669.180	-13,83	-11,79
Chemistry	8.212.062	8.331.669	7.615.631	7.548.357	1,46	-0,88
Holdings	56.945.964	90.896.415	60.391.325	84.034.142	59,62	39,15
Manufacturing	28.037.945	30.990.264	24.611.181	34.649.526	10,53	40,79
Retail	3.950.861	4.865.709	4.132.801	3.846.092	23,16	-6,94
Energy	1.923.853	1.690.439	8.005.902	7.291.413	-12,13	-8,92
Technology	2.808.973	3.250.386	2.049.598	2.056.877	15,71	0,08
Other Services	18.867.161	18.209.499	39.692.389	39.810.549	-3,49	0,3
Total	152.757.892	172.701.166	122.011.328	158.843.205	13,05	30,18

* The amounts indicates a thousand USD.

The 2019-2020 period for the sectors in Table 3 showed an increase in current assets of 13.05% in total, and an increase of 30.18% in fixed assets. An increase in current assets was observed in all sectors except the real estate, energy, and "other services" sectors. The sectors with the highest increase in current assets appeared as the holdings, retail, technology, and manufacturing sectors, in that order. When looking at fixed assets, increases occurred in all sectors' fixed assets except for the real estate, energy, retail, and chemical sectors.

Table 4 shows the total value of current assets between 2020-2021 to have declined by 12.91% and the value of fixed assets to have declined by 3.82%. Decreases occurred in fixed assets in all sectors except the retail and energy sectors. In addition, the ratio of current assets, which had increased significantly in the previous period when COVID-19 had been more common, now decreased in all but the chemical, energy, and "other services" sectors.

Table 4
Relative changes (%) in the current and fixed assets during 2020-2021 period

Sectors	Current Assets 2020	Current Assets 2021	Fixed Assets 2020	Fixed Assets 2021	Changes in Current Assets (%)	Changes in Fixed Assets (%)
Real Estate	3.835.882	2.443.926	3.669.180	2.772.943	-37,59	-24,42
Chemistry	8.331.669	9.217.351	7.548.357	5.719.565	11,27	-24,23
Holdings	90.896.415	86.695.894	84.034.142	70.886.926	-4,62	-15,64
Manufacturing	30.990.264	27.924.629	34.649.526	25.486.942	-9,89	-26,44
Retail	4.865.709	3.505.362	3.846.092	2.697.683	-27,95	29,85
Energy	1.690.439	1.838.039	7.291.413	4.734.408	8,03	35,06
Technology	3.250.386	2.321.369	2.056.877	1.837.559	-28,58	-10,66
Other Services	18.209.499	19.397.841	39.810.549	36.889.185	6,52	-7,33
Total	172.701.166	150.391.055	158.843.205	152.764.885	-12,91	-3,82

* The amounts indicates a thousand USD.

Table 5 presents the 2019–2021 summary statistics of all variables for the entire 86 Turkish companies sampled from the BIST 100 index. The purpose of this study is to examine these summary statistics that form the short panel's time dimension in order to assess the impact COVID-19 had on Turkish companies' climate and comprehend how companies adapted annually. The results indicate an increase in the average ROA and ROE values of the sampled companies between 2019-2021. These results imply the sampled companies to have used their assets and resources efficiently during the COVID-19 pandemic. In addition, a slight decrease as found in the proportion of debt equity rate, as well as a slight increase in the financial autonomy rate. Furthermore, the proportion of net working capital increased by 23.14%, with companies having increased their ability to pay short-term debts during the crisis. Finally, as mentioned before, companies had increased their total assets to become more adaptable to the COVID-19 pandemic.

Table 5
Summary Statistics of Selected Variables

Variable	Mean	Std. Dev.	Min	Max	Observations
ROA	99.856	111.689	-142.630	544.600	258
ROA (2019)	76.296	953.511	-142.630	365.219	86
ROA (2020)	89.605	104.691	-106.427	468.108	86
ROA (2021)	133.669	125.857	-123.800	544.600	86
ROE	209.799	405.003	-2.558.142	2.425.642	258
ROE (2019)	120.176	420.140	-2.558.142	800.725	86
ROE (2020)	198.337	452.061	-2.101.261	2.425.642	86
ROE (2021)	310.884	310.592	-1.290.400	1.265.600	86
Debt Equity Ratio	550.823	238.466	0.9385	1.004.707	258
Debt Equity Ratio (2019)	557.339	239.796	11.933	1.004.707	86
Debt Equity Ratio (2020)	551.350	237.108	0.9385	997.824	86
Debt Equity Ratio (2021)	543.780	244.449	11.400	970.400	86
Net Working Capital	139.462	233.662	-425.709	734.203	258
Net Working Capital (2019)	121.667	246.351	-425.709	713.939	86

Variable	Mean	Std. Dev.	Min	Max	Observations
Net Working Capital (2020)	144.618	234.795	-404.465	734.203	86
Net Working Capital (2021)	149.829	222.322	-276.900	701.100	86
Financial Autonomy Rate	411.079	231.910	-0.4965	990.614	258
Financial Autonomy Rate (2019)	405.341	229.796	-0.4965	9.880.665	86
Financial Autonomy Rate (2020)	412.214	230.726	0.2019	990.614	86
Financial Autonomy Rate (2011)	415.689	237.724	29.600	988.600	86
Total Assets	3.16×10^{10}	1.03×10^{11}	8.64×10^{7}	1.02×10^{12}	258
Total Assets (2019)	1.9×10^{10}	4.93×10^{10}	8.64×10^{7}	4.06×10^{11}	86
Total Assets (2020)	2.86×10^{10}	8.76×10^{10}	1.94×10^{8}	6.30×10^{11}	86
Total Assets (2021)	4.73×10^{10}	1.44×10^{11}	3.61×10^{8}	1.02×10^{12}	86
Quick Ratio	23.565	60.306	0.1152	594.017	258
Quick Ratio (2019)	25.338	69.152	0.1220	578.405	86
Quick Ratio (2020)	25.569	70.274	0.1152	594.017	86
Quick Ratio (2021)	19.784	35.420	0.1800	220.300	86
Cash Ratio	1.740.127	579.122	0.0914	5.707.779	258
Cash Ratio (2019)	1.907.434	6.642.834	0.0914	5.453.889	86
Cash Ratio (2020)	1.941.881	6.847.824	0.1828	5.707.779	86
Cash Ratio (2021)	1.371.067	3.190.065	13.200	2.048.910	86

Table 5 shows the correlation matrix between the study's chosen variables. Most variables are computed as percentages in order to perform regression modeling on the variables with the same units, the exception here being the size variable, which is the natural logarithm of the total assets. The direct and indirect relations the dependent variables ROE and ROA have with the independent variables are shown by the signs of their correlation coefficients.

Table 6
Correlation matrix of Selected Variables

Variables	ROE	ROA	TA	DER	FAR	NWC	QR	CR
ROE	1							
ROA	0.5749	1						
TA	-0.1135	-0.3943	1					
DER	-0.1807	-0.5369	0.3408	1				
FAR	0.1727	0.5750	-0.3981	-0.9067	1			
NWC	0.3338	0.5597	-0.2618	-0.6663	0.5348	1		
QR	0.0582	0.2745	-0.1854	-0.4852	0.4178	0.3914	1	
CR	0.0394	0.2209	-0.1556	-0.4634	0.3875	0.3635	0.9953	1

Statistical Techniques

The study models the balanced panel data using simple regression analysis utilizing the pooled ordinary least squares (OLS) method in order to evaluate the influence of the BIST 100 companies' key measures on their performance. To establish which of these measures has the biggest influence on the tested companies, the following equations serve as the foundation for the more intricate models that were created:

$$ROE_{i,t} = \beta_0 + \beta_1 NWC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 DER_{i,t} + \beta_4 SD_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = \beta_0 + \beta_1 NWC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 FAR_{i,t} + \beta_4 SD_{i,t} + \varepsilon_{i,t} \quad (2)$$

As shown in Equations 1 and 2, a company's financial success is based on the independent variables given in Table 1, where $SD_{i,t}$ is the dummy variable that accounts for variations between industries and $\varepsilon_{i,t}$ is the residual. Creating dummies is vital for the activity fields in order to assess the effects of the pandemic on the sampled organizations.

The fixed effects and random effects methods were also applied alongside the pooled OLS method for panel data. Fixed effects can eliminate the effect of time-invariant variations among companies, allowing for an analysis of the predictors' net effects on the outcome variable. Meanwhile, random effects models assume that variations among companies are both random and uncorrelated with the model's independent variables.

Results and Discussion

Regression Results

Table 7 shows the first main findings of the investigation. The influence of the COVID-19 pandemic on the performance of 86 Turkish companies from a variety of activity sectors was examined for the 2019-2021 period. The dependent variables are the ROA indicators (Models 1-4") and the ROE indicators (Models 5-8").

Model 1 estimates the influence of net working capital on company ROA, which is expected to be positive based on the correlation matrix of these variables (Table 6). The difference between a company's current assets and short-term liabilities is its net working capital. The less companies operate their activities with debt, the higher their performance in terms of ROA. As a result, a positive net working capital indicates that a company can pay its short-term liabilities and show good performance. A one-unit increase in a company's net working capital increases its ROA by 0.27 on average, while everything else remains constant. The net working capital explains 31.33% of the variance in ROA. Model 2 adds a variable with a direct relationship to company performance. As a result of the OLS regression in Table 7, an increase in company size decreases the company's performance. Companies' performances declined as their sizes increased mainly because larger companies were unable to manage their assets well during this period. They were unable to act flexibly or quickly during the pandemic due to their complex organizational structures and thus could not adapt to market changes. On the other hand, small companies performed better because their organizational structures are simpler, they could behave more flexibly during the pandemic, and they were able to adapt to changing conditions.

Table 7
The performances of companies, full sample, with ROA (models (1)-(3")) and ROE as dependent variables (models (4)-(6")

				ROA		
Performance	**Model 1 OLS**	**Model 2 OLS**	**Model 3 OLS**	**Model 4 OLS**	**Model 4' FEM**	**Model 4" REM**
Constant	6,25***	48,34***	29,40***	15,18	-108,66***	-3,46
NetWorkingCapital	0,27***	0,23***	0,16***	0,15***	0,13***	0,16***
Size		-4,21***	-2,84***	-1,71**	10,50***	0,28
FinancialAutonomyRate			0,16***	0,18***	0,32***	0,22***
D_REAL				0,64		-2,41
D_CHEM				4,61		2,59
D_HOLD				-1,79		-5,11
D_MANU				2,38		-0,02
D_RETA				6,88		5,03
D_ENRG				-0,93		-2,55
D_TECH				8,49		6,64
D_OTHR				0,61		-2,26
R^2	0,3133	0,3792	0,4469	0,5027	within R^2=0,29	within R^2=0,17
Adjusted R^2	0,3106	0,3743	0,4404	0,4804	between R^2=0,08	between R^2=0,53
Obs	258	258	258	258	overall R^2=0,11	overall R^2=0,43
Hausmann Test					Prob > chi2 = 0.0000 H1: FEM is optimal.	
				ROE		
Performance	**Model 5 OLS**	**Model 6 OLS**	**Model 7 OLS**	**Model 8 OLS**	**Model 8' FEM**	**Model 8" REM**
Constant	12,91***	29,01	28,38	6,96	-244,43*	-2,41
NetWorkingCapital	0,58***	0,57***	0,66***	0,64***	0,53	0,63***
Size		-1,61	-2,52	-0,27	29,03**	0,96
DebtEquityRatio			0,15	0,08	-0,52	0,05
D_REAL				3,21		1,63
D_CHEM				10,07		9,41
D_HOLD				-3,55		-5,29
D_MANU				2,15		1,21
D_RETA				11,27		10,8
D_ENRG				0,98		0,47
D_TECH				15,12		14,47
D_OTHR				0,78		-0,62
R^2	0,1114	0,1122	0,1163	0,1296	within R^2=0,07	within R^2=0,04
Adjusted R^2	0,108	0,1052	0,1058	0,0907	between R^2=0,02	between R^2=0,25

	ROE					
Performance	**Model 5 OLS**	**Model 6 OLS**	**Model 7 OLS**	**Model 8 OLS**	**Model 8' FEM**	**Model 8" REM**
Obs	258	258	258	258	overall R^2=0,03	overall R^2=0,13
Hausmann Test					Prob > chi2 = 0.0012 H1: FEM is optimal.	

*** represents the 1%, ** represents the 5%, and * represents the 10% significant coefficients.

Model 3 adds the independent variable of financial autonomy rate, which has a direct correlation with firm performance due to its estimated coefficient being positive and significant. Model 4 contains sectoral dummies that provide a minor estimation basis for their relationship to the performance of Turkish companies during the COVID-19 pandemic. As shown in Model 4, no industries were negatively or positively affected by the COVID-19 pandemic. This result indicates industrial dynamics to have had no impact on companies' performances. The fixed effects models (FEM Model 4') and random effects models (REM Model 4") are the primary alternatives to the default estimate method of OLS estimation. As expected, the independent variables apart from size kept their signs and significances, with their coefficients in Model 4' being extremely similar. In Model 4", the influence of the size variable on ROA was insignificant. These results indicate size to have had a varying effect on ROA under different contexts. The Hausman test confirmed the FEM model to be the optimal one.

The effect of net working capital on ROE for the sampled companies was modeled and estimated using Model 5. As predicted by the correlation matrix in Table 6, a positive connection can be observed, with the net working capital's impact on ROE. A one-unit increase in net working capital rates increased companies' ROE ratios by an average of 0.58 units. Thus, the less debt a company uses to finance its operations, the greater its success in terms of its return on shareholders' equity. Models 6 and 7 show surprising results when adding size and debt equity ratio to the independent variables, as these variables showed no significant positive or negative effect on ROE. Model 8 adds sectoral dummies to the formation of Eq. 2; however, industrial dynamics showed no significant effect on ROE. The fixed effects model (FEM Model 8') and the random effects model (REM Model 8") have also been applied. The effect of the variable of size on ROE is significant and positive in Model 8'; however, it had no significant effect on ROE in Model 8". As previously indicated, this result demonstrates the impact of company size on ROE to vary depending on context. Net working capital has a significant and positive effect on ROE in Model 8". The Hausman test indicates the optimal estimation technique to be the fixed effects model.

Robustness Checks

This section examines whether the overall finding still holds when re-estimating the model in light of potential endogeneity issues and alternative conditions. As a result, the study

utilizes regression modeling of cross-sectional variations from 2019-2021 to estimate Equations 1 and 2 using the variations in the size, debt equity ratio, net working capital, financial autonomy rate, and sectorial dummy variables as factors explaining the variance in ROA and ROE. Table 8 largely reemphasizes the main results from Table 7.

Table 8

Robustness checks. The performances of companies, full sample, with ROA (models (1)-(4)) and ROE as dependent variables (models (5)-(8)

			ROA	
Performance	**Model 1**	**Model 2**	**Model 3**	**Model 4**
	OLS	**OLS**	**OLS**	**OLS**
Constant	6,16***	27,59**	7,22	-3,46
NetWorkingCapital	0,27***	0,26***	0,17***	0,16***
Size		-2,15***	-0,75**	0,28
FinancialAutonomyRate			0,19***	0,22***
D_REAL				-2,41
D_CHEM				2,59
D_HOLD				-5,11*
D_MANU				-0,02
D_RETA				5,03*
D_ENRG				-2,55
D_TECH				6,64
D_OTHR				-2,26
Within R^2	0,13	0,08	0,17	0,19
Between R^2	0,38	0,47	0,53	0,6
Overall R^2	0,31	0,36	0,43	0,49
Obs	258	258	258	258
			ROE	
Performance	**Model 5**	**Model 6**	**Model 7**	**Model 8**
	OLS	**OLS**	**OLS**	**OLS**
Constant	12,81***	21,39	21,07	-2,41
NetWorkingCapital	0,59***	0,58***	0,66***	0,63***
Size		-0,86	-1,66	0,96
DebtEquityRatio			0,13	0,05
D_REAL				1,63
D_CHEM				9,41
D_HOLD				-5,29
D_MANU				1,21
D_RETA				10,8
D_ENRG				0,48
D_TECH				14,47
D_OTHR				-0,62
Within R^2	0,03	0,03	0,03	0,04
Between R^2	0,21	0,21	0,23	0,25
Overall R^2	0,11	0,11	0,12	0,13
Obs	258	258	258	258

*** represents the 1%, ** represents the 5%, and * represents the 10% significant coefficients.

Equations 1 and 2 have been re-estimated utilizing the recomputed independent variables. As anticipated, the results confirm the study's main findings. Between 2019-2021, variations in net working capital showed a positive effect on financial performance as measured by the variations in ROA (Models 1-4) and ROE (Models 5-8) of the 86 companies, whereas the variations in size showed a negative effect on ROA (Models 2 and 3) and no significant effect on ROE (Models 6-8). The rate of financial autonomy showed a positive effect on ROA (Models 3-4). However, variations in the debt equity ratio showed no significant effect on ROE. Model 4 demonstrates the negative effects of variations in ROA of the holdings sector and the positive effects of variations in ROA on the retail sector (significant at the 10% level). Supported by the robustness tests, the study's main findings validate the applicability of Equations 1 and 2 in explaining the variations in ROE and ROA for Turkish companies between 2019-2021.

Conclusions

The rapid spread of COVID-19 seriously affected the global economy with disruptions in companies' activities and fluctuations in asset prices and exchange rates. As in the past, the negative financial effects of such events are severe and global. Consequently, and similar to other national economies, the COVID-19 outbreak has had a significant impact on the Turkish economy and its companies and industries. Profitability is one of the most important indicators in evaluating a firm's performance. Identifying the variables that are the determinants of profitability and revealing their relations with profitability have the potential to benefit companies and the economy in general at the macro level, as well as contributing to the literature. In order to investigate the factors affecting companies' profitability during the COVID period, this study has intended to evaluate the level of firm performance in reaction to the COVID-19 pandemic by analyzing numerous major changes in companies' activities. The sample of this study includes 86 of the 100 companies listed on the Borsa Istanbul (BIST) 100 index (ticker symbol XU100), which can be considered an emerging market. This research has also tried to fill the gap in the existing literature regarding studies examining key changes in company activities to assess companies' performance levels in response to global pandemics.

The COVID-19 pandemic affected companies' sales revenue in the related sectors during the 2019–2021 period. In comparison to 2019, total market sales had decreased by 7% by the end of 2020. When considering total company sales, the manufacturing, retail, energy, and technology sectors can be safely assumed to have been positively affected by the COVID-19 pandemic and the real estate, chemical, and "other service" sectors to have been negatively affected. In particular, the transportation sector (included in "other services") experienced a dramatic decrease in sales of 40.50% during the analyzed period. Due to COVID-19 pandemic, travel restrictions on intercity travel and curfews were introduced at certain times in

Türkiye. These restrictions had a negative impact on the transportation sector. A number of monetary policies such as providing liquidity support to the market, low-interest loan options, and changes in policy interest rates were put into effect in 2020 in order to combat the pandemic and reduce its negative economic effects for the real estate sector. An increase in real estate sales occurred between 2020-2021.

The short-balanced panel data results from this paper show the COVID-19 pandemic to have impacted the profitability ratios of listed companies in Türkiye. The percentages for net working capital, size, and financial autonomy rate appear to have affected their ROA values. However, only size appears to have had an effect on their ROE ratio, whereas the net working capital and debt equity ratios did not. The robustness test did not alter the study's main findings. In addition, the findings from the robustness test revealed the holdings sector to have been negatively affected by the global pandemic, while the retail sector performed well during this this period.

These results show the companies on the BIST 100 index to have adapted to a certain extent to the uncertainties the pandemic had caused, resulting in the shock not being so devastating. This study reveals results from which investors, managers, creditors, and all other stakeholders can benefit with regard to their decisions for helping them make the right decisions. The worst-affected industries and companies needed help from governments in the form of financial support, such as rescheduling or delaying loans, subsidies, and possible tax breaks to help them get back on their feet. In addition, companies should enhance their financial planning and concentrate on policies to be implemented in the aftermath of the pandemic. Investors must also avoid speculative investments and make well-informed decisions regarding their portfolios. As a result of speculation, the value of financial instruments may decline even further in the market.

Evidently, governments, banks, regulators, and central banks must work together to tackle the financial and economic repercussions of the COVID-19 crisis. They should also produce thorough plans to deal with the consequences of future crises. A number of steps may be taken to help the worst-affected industries, such as providing loans or restructuring current debts.

This paper has some limitations. First, it focused on the sectors included in the BIST 100 index (ticker symbol XU100). Future studies can include other sectors. Secondly, the effects on sector performance can be explained more comprehensively by adding the effects of different financial ratios to the independent variables. In addition, different performance measures can be used as dependent variables.

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