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The impact of covid-19 on financial management: evidence from Romania

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ABSTRACT

The COVID-19 pandemic has disrupted every facet of life globally. Business and commerce are key areas where the monetary crunch has been acutely felt. This study aims to analyze the various key changes in entities' activities to evaluate the level of business performance in response to the COVID-19 pandemic. For this purpose, we use panel data analysis on 218 Romanian listed companies of different sizes (big and small) and belonging to different business sectors for the period June 30, 2019–June 30, 2020. We find that the net profits of the overall market decreased by 37.43% over the analyzed period. However, small companies engaged in agriculture, commerce, construction, IT R&D, and transport and storage witnessed better financial performance. In addition, our results show that equity financing, proper liquidity management, and an increased company size consolidate the economic performance of entities regarding return on equity and return on assets. Our findings are useful for policymakers such as managers and investors and can help them make the best decision for their managing or investing activities. Moreover, governments need to know how companies respond to the pandemic to identify the sectors of activity that are more vulnerable to the crisis' effects and the main financial management decisions that must be adopted by companies during times of crises.

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1. Introduction

The COVID-19 pandemic has caused significant difficulties for business environments globally. The lockdown measures and reduction in mobility have created many obstacles within the supply chain (Sharma et al., 2020) and have threatened the continuity of all companies' activities, on a broad range of types of entities, from listed

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companies (Rababah et al., 2020) to small and medium-sized enterprises (SMEs) (Kalemli-Ozcan et al., 2020).

At the time of our research (January 25, 2021), numerous papers had been published on the COVID-19 pandemic and business. Specifically, we found 2118 articles indexed in Scopus and 935 papers indexed in Web of Science for this research area. However, few studies (Dimson et al., 2020; Kalemli-Ozcan et al., 2020) have analyzed key changes in entities' activities to evaluate the level of business performance as responses to the COVID-19 pandemic. Our study intends to fill this gap in the literature by analyzing the effect of the pandemic on Romanian companies' business performance. We use 218 Romanian listed companies of different sizes (big and small) belonging to different business sectors. The subcategories of big and small subsampled listed companies is made according to international standardization, considering micro-entities and small entities as 'small' and medium-sized entities and large ones as 'big'. A series of key performance variables are determined based on the financial statements reported by these companies at the midpoint of 2019 and 2020 (June 30, 2019 and June 30, 2020, respectively).

Our results show that companies financed by equity with proper liquidity management and large company size consolidate their economic performance regarding return on equity (ROE) and return on assets (ROA). We note that the total net profits decreased by 37.43% by the middle of 2020 compared to the middle of 2019. Additionally, the total sales of the market decreased by 13.86% during the same period. However, small companies engaged in agriculture, commerce, construction, IT R&D, and transport and storage witnessed improved financial performance.

There are various aspects of this study that make it novel. First, a bibliometric analysis of the relationship between COVID-19 and business is conducted using a novel tool—VOSviewer software. Even though this tool was used before for the analysis of researches on the topic of COVID-19 (Yu et al., 2020; Hamidah et al., 2020), to our knowledge our work is the first study that analyses the relationship between COVID-19 and business performances using a bibliometric analysis with the help of the VOSviewer software. Second, important results on determinants of economic performance (return on equity and return on assets) are found after conducting multivariate data analysis on the panel data of our sampled companies. Thus, equity financing, proper liquidity management, and an increased company size consolidate the economic performance of entities regarding return on equity and return on assets. Third, we find significant changes in various financial indicators peculiar to the Romanian market, from the mid of 2019 compared to the mid of 2020, among companies of different sizes and in different business sectors in Romania. Thus, we find significant reductions in the return on equity and return on assets due to the increase of the level of indebtedness, reduction of total assets, reduction of net working capital, while the quick and cash ratios significantly decrease throughout the studied time period. Fourth, we find that the net profits of the overall market decreased by 37.43% on the mid of 2020 compared with the mid of 2019. However, we find that on average, small and medium-sized companies obtained higher growth rate of profits than big companies throughout the pandemic period, being more flexible to the new requirements imposed by the pandemic-impacted business world. More exactly, small

companies engaged in agriculture, commerce, construction, IT R&D, and transport and storage witnessed better financial performance on the period of crisis compared to the previous period.

The remainder of this paper is structured as follows: Section 2 presents a review of the literature on the COVID-19 pandemic and businesses. Section 3 describes the methodology, sample, and data used in our research, while Section 4 presents the results and discussions. The paper ends with the conclusions and limitations of our research and suggests avenues for future studies.

2. Literature review

Due to the numerous studies related to the COVID-19 pandemic, we first proceed with a bibliometric analysis to capture the main issues. These are analyzed directly and related to the relationship between the evolution of the COVID-19 pandemic and business activities globally. We review all the articles published on Web of Science that contain the word 'COVID' as their topic and then, using the VOSviewer software, we check for their strong links with the most used words, focusing on 'business'. Simultaneously, the information retrieved shows us how to visualize the results clearly in the form of scientific maps.

Using the keywords *COVID* and *business* we find 2118 Scopus indexed articles and 935 Web of Science indexed articles, at the time of our research (January 25, 2021). Figure 1 presents the graphical distribution of the number of occurrences and the links between the most used terms that are correlated with *COVID* and *business*, when Scopus indexed articles are used. The higher the bullets, the higher the occurrences of terms and the stronger the links between terms. Different colors refer to different clusters corresponding to the way in which the links are realized. Figure 2 runs the same type of map but for the Web of Science indexed articles. From Figures 1 and 2 one can observe that COVID-19 is associated with many issues related to citizens' activity. However, an important part of these terms is related to the area of business, management, performance, risks, business continuity, crisis, and depression. Regarding the areas of activity, from Figures 1 and 2 we observe terms such as food safety, tourism, and health as having high occurrences when it comes to the COVID-19 pandemic and businesses.

From Figures 3 and 4, we find that the largest number of papers related to COVID-19 and business are published in the United States, followed by the United Kingdom and China. Among European countries, Italy, Spain and Germany published the highest number of papers on this topic. However, this number is far away from the first three mentioned countries.

Nonetheless, from Figure 5, we see that the largest number of articles on COVID-19 and business are published in the journal Sustainability (23 papers), followed by Journal of Business Research (7 papers), Industrial Marketing Management (6 papers), and Science of Total Environment, Journal of Service Management, and IEEE Access (with 5 papers in each).

Many studies analyze the impact of the COVID-19 pandemic on businesses (Amankwah-Amoah et al., 2021; Bacq et al., 2020; Budda et al., 2020; Carracedo

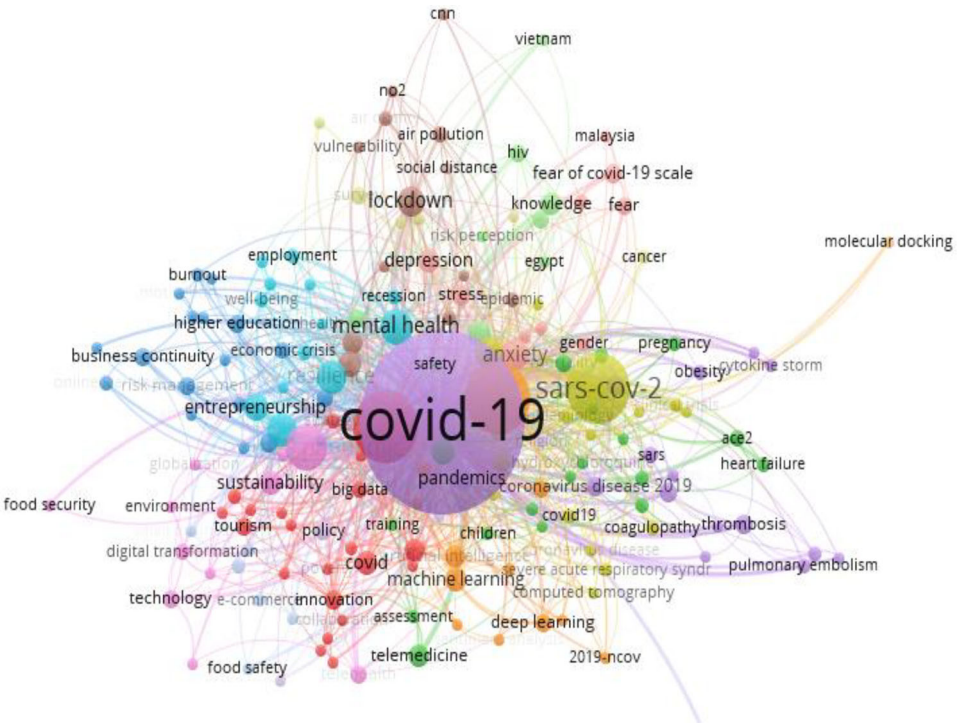

Figure 1. Map of the occurrences and links for terms related to the COVID-19 pandemic and business.
Source: Authors' processings in VOSviewer, using Scopus indexed articles

et al., 2020; Eggers, 2020; Krishnamurthy, 2020; Lin & Zhang, 2020; Mullins, 2020; Sharma et al., 2020; Anker, 2021; El-Sheekh & Hassan, 2021; Hossain, 2021; Shaikh, 2020; Mirza et al., 2020a; Agrawal, 2020; Rizvi et al., 2020a; Teng et al., 2021).

A bibliometric analysis was conducted by Carracedo et al. (2020) to find the terms most commonly associated with *covid*, *coronavirus,* or *pandemic.* The results of that study showed that *firm, tourism,* and *financial* were the most significant terms. However, many terms such as *business*, *crisis*, *strategies*, *organization*, *market*, *innovation*, *supply*, *management*, *global,* and *work* were found to be correlated with *covid*, *coronavirus,* or *pandemic.*

Lin and Zhang (2020) suggest that the COVID-19 pandemic affects the global food supply and market differently. After a survey conducted in March–April 2020 on 122 agricultural export companies from a Chinese province (Fujian), Lin and Zhang found that although agricultural businesses reduced their exports, some agricultural products such as grain and oil witnessed recorded increases. Similarly, Nakat and Bou-Mitri (2021) conduct a substantially large literature review on studies that analyze the impact of the COVID-19 pandemic on the food industry (until June 5, 2020). They conclude with an acknowledgment of the significant challenges in the food sector due to the COVID-19 pandemic. These challenges are related to many factors such as consumer purchasing behavior, transportation network disturbances, labor absenteeism, and the closure of various food manufacturing industries.

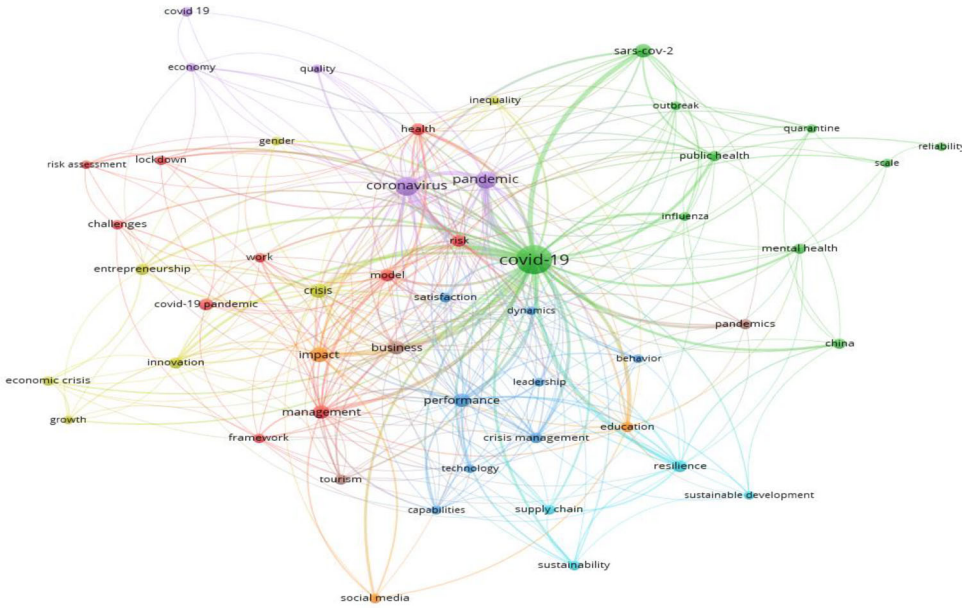

Figure 2. Map of the occurrences and links regarding the terms COVID-19 and business.
Source: Authors' processings in VOSviewer, using Web of Science indexed articles

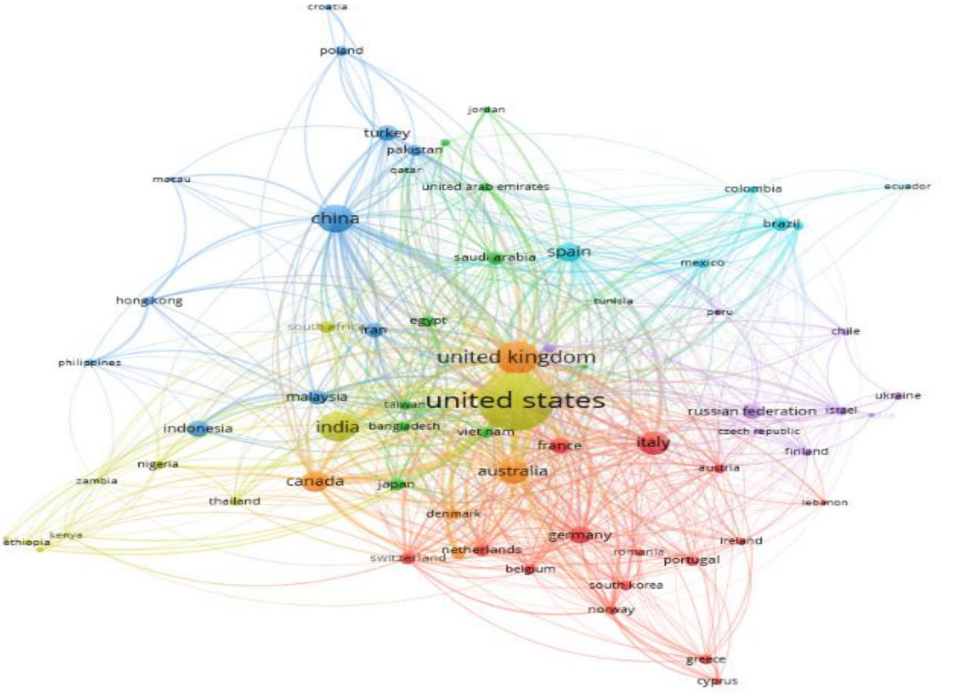

Figure 3. Map of the occurrence studies on COVID-19 and business, by countries.
Source: Authors' processings in VOSviewer, using Scopus indexed articles

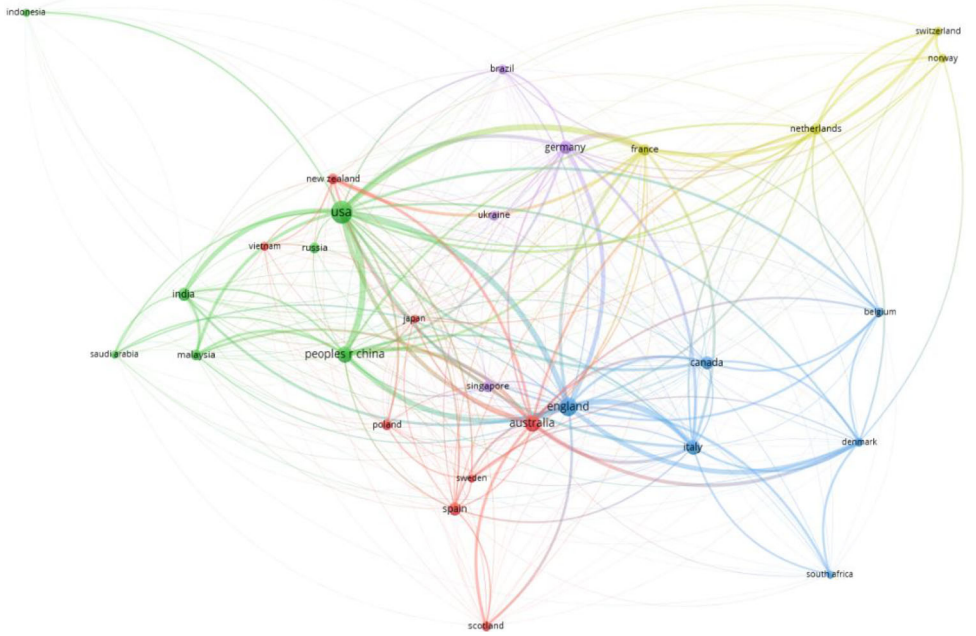

Figure 4. Map of the occurrence studies on COVID-19 and business, by countries.
Source: Authors' processings in VOSviewer, using Web of Science indexed articles

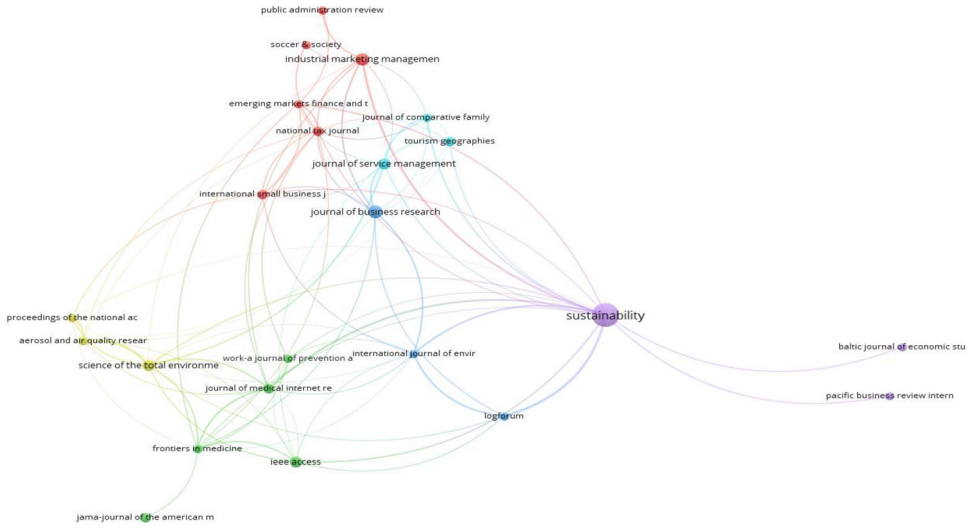

Figure 5. Map of the occurrence of studies on COVID-19 and business, by journals.
Source: Authors' processings in VOSviewer, using Web of Science indexed articles

Regarding the airline sector, Budda et al. (2020) research conducted for the period March–May 2020 highlights airline companies' most important responses to the pandemic, especially in the context of drastic reduction in flights. The most common responses of airline companies have been changes in flight operations, rationalizing fleets, reducing staff members, and reconfiguring their networks. Moreover, Agrawal

(2020) analyses the impact of the pandemic upon the airline industry in India. The paper includes a detailed financial analysis of airline companies between 2010-2019, focusing on their performances, profitability and Altman Z scores. Indeed, this sector has been strongly affected by the pandemic and their paper projects the operating losses amid Covid-19 impact on various regression scenarios. The author concludes that the viability of this sector depends on the recovery of variable expenses and minimizing losses.

Several studies (Nepal, 2020; Skare et al., 2021; Sigala, 2020) analyze the impact of the COVID-19 pandemic on the tourism industry. Skare et al. (2021) reveals a large destructive impact on travel and tourism industries and suggests the adoption of a private and public policy partnership to support and develop new risk management methods for dealing with the crisis. Additionally, Sigala (2020) critically reviews past and emerging literature and discusses the major impacts, behaviors, and experiences that the three major tourism stakeholders (tourism demand, supply and destination management organizations, and policymakers) experience during the three stages of the COVID-19 pandemic—response, recovery, and reset.

The study of Mirza et al. (2020a) conducted on the impact of COVID-19 on the solvency of 12,387 non-financial listed companies in the 15 EU member states finds that manufacturing, mining, and retail firms are more susceptive to solvency issues due to a decline in market capitalization. These sectors are found to be more expose to the probability of default and to face a significant decline in cash flow sufficiency compared to other sectors of activities. Furthermore, Rizvi et al. (2020a) assesses the impact of the COVID-19 pandemic on the valuation of non-financial firms in 10 EU member states using a stress testing scenario approach. Using a generous sample of 5342 listed non-financial entities, their findings show a significant loss in valuations across all sectors due to a possible decline in sales and increase in cost of equity. The authors estimate that average entities in some sectors might lose up to 60% of their intrinsic value in one year, as a crisis effect. Then, there are studies such as Yarovaya et al. (2020a) that conduct stress tests on quarterly data to assess the impact of Covid-19 upon loan portfolios of 255 credit institutions from 10 EU member states. Their findings reveal that the quality of their assets and capital adequacies deteriorated, increasing their probability of default. Bigger banks seem to be more sensitive to enhanced stress scenarios, so the threat of a systemic meltdown is present under pandemic conditions.

The research literature paid interest to the effects of the current crisis upon the evolution of mutual funds as well. As such, Yarovaya et al. (2021) investigates the impact of human capital efficiency, mainly that of mutual funds' portfolio managers, upon funds' performance, during this period of extreme stress created by the COVID-19 pandemic. Their findings prove that the equity funds that were ranked higher in human capital efficiency outperformed their counterparts during the COVID-19 outbreak. Further on, their analysis for different stages of the outbreak revealed some interesting findings, concluding that human capital investments results in efficiency and funds' performance during uncertain periods. Moreover, Rizvi et al. (2020b) evaluates the preliminary effects of the pandemic across various categories of European mutual funds, by dividing the January-May 2020 time period into three evolutionary phases. The only rather stable category of funds from the point of view of

investment styles proved to be that of social entrepreneurship funds. This study's conclusions highlight the fact that the market recorded transitions from riskier to relatively safer options as investment strategies and sizes. Then, investments moved to non-cyclical sectors and from countries with higher infection rates to those with relatively smaller rates. Supporting the same idea, Mirza et al. (2020b) also work with a sample of European actively managed funds, for the first six months of the year 2020, proving that social entrepreneurship funds outperformed their counterparts during that time, so the researchers recommend social entrepreneurship funds as resilient and 'a viable contender in investment portfolios especially during periods of high volatility'. On regional subsamples of mutual funds, Mirza et al. (2020c) study the effects of the pandemic upon the massively impacted Latin American countries from the point of view of the risk-adjusted performance of equity funds. By ranking these equity funds as per their human capital efficiency using 2019 as the base year, the researchers demonstrate the superior performances of higher human efficiency ranked funds as opposed to their counterparts. Yarovaya et al. (2020b) validate Islamic equity funds to have been more resilient to the initial COVID-19 shock, since they outperformed non-Islamic counterparts in terms of their risk-adjusted performance.

Another group of studies (Dimson et al., 2020; Eggers, 2020; Kalemli-Ozcan et al., 2020) focus on how big and small companies are managed during times of crisis. Small and medium-sized companies are more severely affected by a crisis than big companies due to the supposed liability of smallness and their lack of resources (Eggers, 2020). Eggers (2020) research includes a bibliometric study on 69 papers examining SMEs during previous crises and proposes ways to overcome economic downturns in the areas of finance, strategy, and institutional environment. A large study conducted by Dimson et al. (2020) in August 2020 on more than 2,200 SMEs from five European countries (France, Germany, Italy, Spain, and the United Kingdom) reveals that the vast majority of analysed SMEs have registered decreases in their revenues. In Italy, Spain, and the United Kingdom this decrease is of approximately 30%-33% while in France and Germany it is much lower (at 27% and 23% respectively). Another large study by Kalemli-Ozcan et al., Kalemli-Ozcan et al., Kalemli-Ozcan et al., (2020) on seventeen countries estimates an increase of the failure rate of SMEs by approximately 9 percentage points in the pandemic context. Service sectors such as accommodation and food services, arts, entertainment and recreation, and education are among the most affected sectors.

The existence of a financial equilibrium in the form of net working capital has an impact on company performance, risk, and value (Smith, 1980; Baños-Caballero et al., 2016; Panda & Nanda, 2018; Achim et al., 2016; Mirza et al., 2020a; Rus & Achim, 2020; Rizvi et al., 2020a). Having good cash-flow management is imperative, especially during a crisis such as the COVID-19 pandemic. There are numerous indicators of a business which suggest an insufficient amount of working capital, such as *late payments* (inability to pay bills in a timely manner), *late deliveries* (because the organization cannot maintain sufficient stocked inventories, it buys materials from suppliers only after receiving orders for them from customers, and this period of delivery implies delays), and *short credit* (the organization requires cash in advance from its customers to finance the good's production) (Brag, 2015, p.139).

In this view, Mullins (2020) provides four simple tools to help any business owner effectively manage cash flow in the context of the COVID-19 pandemic. A positive working capital requirement needs to be financed both from own resources and outsides resources (using leverage) that can be attracted in the long term. The decision to finance a company impacts its overall performance; therefore, companies need to carefully consider the positive and negative aspects of each financing method for its operations. The same, Teng et al. (2021) consider financial flexibility to be a strong advantage for the sustainable development of enterprises. They work with a sample of Taiwanese listed companies, analyzing their data for the first two quarters of 2020, estimating a significant and positive effect of financial flexibility upon companies' Return on Assets, also revealing that Taiwan's asset-light manufacturing industry suffered the most from the COVID-19 crisis. Their robustness checks section uses Return on Equity as an alternate dependent variable proxy.

Debt is an important mechanism for solving the problems of companies where there is a separation between ownership and control. Managers have incentives to increase its value, because the higher the value of their company, the more it directly contributes to an increase in their power, prestige, and remuneration. In this context, debt is used as a disciplinary mechanism to reduce agency costs by aligning the interests of shareholders and managers, according to the 'control hypothesis' (Jensen & Meckling, 1976). Similar results are seen in Cremers and Nair (2005) study, which concludes that a strong corporate governance system generates a higher level of debt by employing leverage to increase business performance. Furthermore, Driffield et al. (2007) show that higher levels of concentration of holdings are associated with higher levels of debt, regardless of the type of ownership structure (Achim & Borlea, 2013, p.99). However, some studies find opposite results (Frydenberg, 2011; Lenka, 2017). Frydenberg (2011) finds that lower indebtedness increases returns when companies prefer to finance themselves from retained earnings rather than debt financing. For Czech companies, Lenka (2017) finds a negative relationship between ROE and indebtedness in the vast majority of business sectors (agriculture, fishery, and forestry; construction, wholesale, and retail trade, motor vehicles and motorcycles repair; professional, scientific and technical activities; administrative and support service activities).

Nonetheless, Bieliaieva et al. (2020) analyze the current business situation and state that for enterprises, crisis may arise earlier than for the entire country or world economy, due to internal disruption. Their paper focuses on crisis management as a solution to overcome crisis, with long term effects upon a company's sales and profits. The new trends the businesses adapted to, as a response to the pandemic, envisaged e-commerce and new opportunities for development, in order to avoid being closed down. Another interesting idea they sustain is that that the cost of a crisis continues long after it has actually ended, for dimensions ranging from employees and their families, to the countries and the entire world, too.

3. Methodology and data

3.1. Data

Our sample consists of 218 companies, out of the 300 companies that are active on the Romanian market and are listed on the Bucharest Stock Exchange (BSE). Of these

300, we excluded 82 companies for one of the following reasons: they did not report mid-year financial statements, or they presented financial statements for only one year.

The companies in our sample are divided into the following categories:

Small entities: 36 Micro-entities and 71 Small entities—a total of 107 small entities.

Big entities: 75 Medium-sized entities and 36 Large entities who submit their balance sheet in Bucharest (according to international standards)—a total of 111 big entities.

We also group companies based on their activity fields: *Agriculture* (4 entities); *Commerce* (12 entities); *Constructions* (17 entities); *Extractive* (3 entities); *Tourism* (including hotels and restaurants, 14 entities); *IT* (including IT and R&D, 9 entities); *Manufacturing* (81 entities that include: 8 *Foods* (Manufacturing-foods entities), 6 *Pharma* (Manufacturing-pharmaceutics entities), 7 *Textiles* (Manufacturing-textiles entities) (the 60 remaining are other manufacturing entities except for the previously mentioned ones—labelled *Manufacturing*); Other services* (2 entities); *Real estate* (43 entities); and *Transport (*including Transport and storage) (13 entities).

3.2. Variables

The description of the variables is presented in Table 1. Our dependent variables are well-acknowledged proxies for the accounting-based measures of company performance, the ROE and ROA rates of companies, further explicated through several independent variables: working capital ratios like the net working capital ratio to the total assets of companies, the quick ratio or the cash ratio; capital structure ratios like the debt to equity ratio and the financial autonomy rate; and size proxies such as the total assets of a company, according to specialized literature (Brag, 2015; Achim, 2017; Teng et al., 2021; Panda & Nanda, 2018; Achim et al., 2016; Mullins, 2020; Cremers & Nair, 2005; Driffield et al., 2007; Frydenberg, 2011; Lenka, 2017).

All the financial data are taken from the half-yearly financial statements for 2019 and 2020, which are provided by the Bucharest Stock Exchange (www.bvb.ro). The impact of the COVID-19 pandemic on the main financial data is obvious from the Appendix A.

We note that the total sales of the market decreased by 13.86% by the middle of 2020 compared to the middle of 2019. However, the small companies have had an average increase in sales of 25.59% compared to a 14.75% decrease in sales registered by the big companies. Additionally, the increase in the total net profit on the small market is 60.44% while the big market registers a 37.73% decrease in its net results. After we analyze the evolution of the components of financial positions, we find that small companies have been more adaptable to the crisis. Thus, small companies have reduced their fixed assets and increased their current assets, focusing on a more pronounced exploitation activity and lower investment. As a result, shareholders' equity for small companies increased by 6.79% in the middle of 2020 compared with the middle of 2019, while this increase is lower for big companies (at only 3.58%).

We consider the sector-based/size-based analysis to be the best approach in order to mark the novelty of our study in specialized literature. By analyzing the financial

Table 1. Key financial indicators—description and source.

Variables	Expression	Description	Formulas
Dependent variable			
Accounting-based measures of performance	Return on Equity (ROE)	It reflects the efficiency in using shareholders' capital (Achim, 2017, p.83)	Net Income/Total Shareholders' Equity.
	Return on Assets (ROA)	It measures the profitability of the entire capital determined as the contribution of total assets invested in the entity to obtain net profit. (Achim, 2017, p.85).	Net Income/Total Assets
Independent variables			
Size	Total Assets	It represents the sum of economic resources available to a company.	Unit value (lei)
Working capital	Net Working Capital	It represents the currents assets remaining with the entity, namely the current assets that remain after paying for the current obligations. For comparability reasons, this indicator is often used as a weight within total assets. It is also a measure of a company's liquidity. (Achim, 2017, p.50).	Net working capital/Total Assets (%)
	Quick Ratio	It is a liquidity ratio that measures the ability of current assets with high and very high liquidity to cover the current liabilities of a company (Achim, 2017, p.50).	(Cash + Marketable securities + Account receivables)/ Current Liabilities (%)
	Cash Ratio	It is a liquidity rate that shows a company's ability to cover its short-term obligations using only cash and cash equivalents (Achim, 2017, p.50).	(Cash + Marketable securities)/ Current Liabilities (%)
	Receivables Turnover Ratio	It reflects the company's effectiveness in collecting its receivables or money owed by clients.	Sales/Average account of Receivables (times)
Capital structure	Financial Autonomy Rate	It shows the extent to which the economic resources of a company is covered by its sources (Achim, 2017, p.70).	Shareholders' Equity/ Total Assets (%)
	Debt Equity Ratio	It shows the extent to which the economic resources of the company are covered by external capital (Achim, 2017, p.70).	Total Debts/ Shareholders' Equity (%)

Source: Authors' processings.

Table 2. Summary statistics.

Variable	Mean	Std. Dev.	Min	Max	Observations
ROE	−0.6163	18.6046	−261.369	84.2946	N = 436
ROE_2019	0.2979	13.9491	−57.595	84.2946	N = 218
ROE_2020	−1.5306	22.307	−261.369	74.2492	N = 218
ROA	−0.127	10.4077	−36.5278	168.7168	N = 436
ROA_2019	−0.2322	7.0084	−30.9663	60.1173	N = 218
ROA_2020	−0.0217	12.9614	−36.5278	168.7168	N = 218
DebtEquityRatio	53.0753	305.8779	−2680.71	3177.765	N = 436
DebtEquityRatio_2019	55.3375	360.7269	−2680.71	3177.765	N = 218
DebtEquityRatio_2020	50.8131	239.6238	−1342.27	1641.404	N = 218
FinancialAutonomyRate	63.1329	44.703	−289.909	227.2304	N = 436
FinancialAutonomyRate_2019	61.9617	44.9695	−259.862	99.6157	N = 218
FinancialAutonomyRate_2020	64.304	44.5074	−289.909	227.2304	N = 218
NetWorkingCapital	9.6168	41.6061	−331.787	227.2274	N = 436
NetWorkingCapital_2019	7.8368	41.9997	−331.787	90.1692	N = 218
NetWorkingCapital_2020	11.3968	41.2283	−205.247	227.2274	N = 218
TotalAssets	3.2×10^8	3.01×10^9	873.979	4.53×10^{10}	N = 436
TotalAssets_2019	3.12×10^8	2.92×10^9	873.979	4.28×10^{10}	N = 218
TotalAssets_2020	3.27×10^8	3.09×10^9	1015.44	4.53×10^{10}	N = 218
rReceivables	2.8576	4.1371	−0.6091	49.4474	N = 425
rReceivables_2019	2.9402	3.7685	−0.6091	32.1221	N = 213
rReceivables_2020	2.6805	3.3285	0	17.6826	N = 212
QuickRatio	296.3965	630.6333	−0.3681	8958.896	N = 436
QuickRatio_2019	256.0807	432.1101	−0.3681	4122.279	N = 218
QuickRatio_2020	336.7122	779.259	0	8958.896	N = 218
CashRatio	133.896	332.5721	−81.5196	2481.238	N = 436
CashRatio_2019	114.5681	286.4192	−81.5196	2247.916	N = 218
CashRatio_2020	153.2239	372.7352	−15.0804	2481.238	N = 218

Source: Authors' processings.

results based on the activity domains, we find large decreases in sales and net profits in all domains except for small companies engaged in agriculture, commerce, construction, IT R&D, and transport and storage. Among big companies, those that engaged in food and textiles register the biggest increases in the middle of 2020 compared to the middle of 2019. In contrast, big companies engaged in agriculture, IT R&D, commerce, and extractive are the most affected in terms of decreases in both their sales and net profits. However, irrespective of the size, all companies in the service sector, such as hotels and restaurants, pharmaceuticals, and real estate, registered significant decreases during the analyzed period.

The summary statistics for our independent and dependent variables are presented within Table 2 for our entire sample of 218 Romanian companies, with the available data for the period 2019–2020. We analyze these summary statistics separately for the two years that comprise the time dimension of our short panel to evaluate the impact of the COVID-19 pandemic on the Romanian business environment and to appreciate the annual business evolution. We notice that the average ROE of the sampled companies has decreased between periods, while the ROA has increased. Instead, the proportion of shareholders' equity and debt used to finance a company's assets has decreased in 2020 as compared to 2019 (opposed to this, the financial autonomy rates have increased on average from 2019 to 2020). Additionally, on average, the total assets of companies and the net working capital, quick, and cash ratios have increased in 2020 compared to the previous year. However, due to the pandemic, the average receivables' turnover decreased in 2020.

Table 3. Correlation matrix of variables.

	ROE	ROA	Total Assets	Debt Equity Ratio	Financial Autonomy Rate	Net Working Capital	rReceivables	Quick Ratio	Cash Ratio
ROE	1								
ROA	0.4946	1							
Total Assets	0.0241	0.0289	1						
Debt Equity Ratio	−0.3971	−0.0136	0.0031	1					
Financial Autonomy	0.0322	0.3277	0.0061	0.0313	1				
Net Working Capital	0.049	0.37	0.0085	0.1465	0.758	1			
rReceivables	0.0585	0.0375	−0.012	−0.0415	−0.0219	−0.0384	1		
Quick Ratio	0.0774	0.1231	−0.014	−0.0128	0.2122	0.2278	−0.0359	1	
Cash Ratio	0.0574	0.0975	−0.0091	−0.0378	0.213	0.2188	0.0611	0.8409	1

Source: Authors' processings.

Table 3 projects the correlation matrix between our variables. To perform regression modelling on variables of the same units, most variables are computed as percentages, with the exception of the size variable, which is computed as the natural logarithm of total assets. The direct and indirect relationships that exist between ROE and ROA on the one hand and other independent variables on the other are depicted from the positive or negative signs of their correlation coefficients.

3.3. Statistical techniques

Our unbalanced panel data are modelled through simple regressions using the pooled ordinary least squares (pooled OLS) method to estimate the impact of various financial ratios specific to our sampled companies based on their economic and financial performance. The resulting complex model has the following baseline equation:

$$\begin{aligned} \text{Companies'\_Performance}_{it} = {} & \beta_0 + \beta_1 \text{Capital\_Structure}_{it} + \beta_2 \text{Working\_Capital}_{it} \\ & + \beta_3 \text{Size}_{it} + \beta_4 \text{Domain\_dummies}_i + \varepsilon_{it} \end{aligned} \quad (1)$$

where:

Companies'_Performance$_{it}$ – proxy for the financial performance of company *i* in year *t* (*Return on Equity* or *Return on Assets*);

Capital_structure$_{it}$ – proxy for the capital structure of company *i* in year *t*; it is measured alternatively as: Debt Equity Ratio $_{it}$ and Financial Autonomy Rate$_{it}$ – the proportion of Total Shareholders' Equity within the Total Assets of company *i* in year *t*;

Working_Capital$_{it}$ – proxy for the working capital of company *i* in year *t*; it is measured alternatively as: Quick ratio, Cash ratio, Net Working Capital, Receivables turnover;

Size$_{it}$ – the natural logarithm of Total Assets of company *i* in year *t*;

Domain_dummies$_i$ – several dummy variables of company *i* in year *t* accounting for their sector domain;

ε_{it} - the residual.

According to Eq (1), the independent variables, well-grounded throughout the specialized literature, that would explicit the financial performance of companies are

indebtedness indicators such as their Debt to Equity Ratio or their Financial Autonomy Rate, working capital indicators, and size proxies measured as a natural logarithm of their Total assets. In the context of the current pandemic, we consider it important to define activity field dummies and try to interpret their significance, to capture the crisis' effects on the sampled companies. All variables are added through forward estimation in the decreasing order of their explanatory power, considering multicollinearity aspects as well.

Moreover, as the pooled OLS technique for panel data represents a baseline method, we also analyze our panel data with the fixed effects and random effects techniques. Generally, fixed effects remove the effect of time-invariant differences between the entities (such as the field dummies), so we assess the net effect of the predictors on the outcome variable. However, random effects models assume the variation across companies to be random and uncorrelated with the independent variables included within the model.

4. Result and discussions

4.1. Main results

The first main results of our study (main results 1) are presented in Table 4. As such, Table 4 contains the estimations of simple and multiple regression modelling applied to our unbalanced short panel dataset. Our data covers 218 Romanian companies from various activity domains, analyzed over the 2019–2020 period, to capture the effect of the COVID-19 pandemic on their business development. The dependent variables are the ROE indicators (models (1)–(4″)) and ROA indicators (models (5)–(8″)) respectively.

Model (1) estimates the effect of the debt to equity ratio on the ROE of companies, a negative correlation as expected from the correlation matrix of these variables (Table 3). This indebtedness indicator has the highest explanatory power (its correlation coefficient is −0.3971). When the debt to equity ratios of companies increase by one unit, their ROE ratios reduced on average by 0.0241, everything else remaining unchanged. The amount of variance in the ROE explained by the debt to equity Ratio is $R^2 = 0.1563$. The more companies finance their activities throughout debt, the less is their performance with respect to return on shareholders' equity. Model (2) adds the net working capital independent variable, with a positive effect on ROE: for each additional unit of net working capital, ROE increases on average by 0.0501, ceteris paribus. Model (3) adds the size proxy to the formation of Eq. 1, with a direct relationship to company performance, as the estimated coefficient of size is positive and significant (model (3)). Model (4) includes the sectorial dummies, which although not significant within this complex model, provide a slight estimation basis of their relationship to Romanian companies' performance in the recent years: the IT sector and the textile industry seem to be inversely correlated to business performance, while all the other sectors (agriculture, commerce, constructions, hotels and restaurants, any manufacturing companies except for textile ones, other services, real estate, and transport and storage) would have been positively related to financial performance measured as ROEs. This could be because these latter companies may have

retained some sort of inertia, from previous periods, and only the textile, and IT and R&D industries have felt the unpleasant effects of the COVID-19 pandemic from the very beginning. Thus, it has affected their 2020 performance the most, compared to the other activity domains. The main alternatives to the baseline OLS estimation method from model (4) are the fixed effects model (FEM; model (4′)) and the random effect model (REM; model (4′′)). As expected, all the previously validated independent variables from models (1)–(4) keep their signs and significances (except for size in model (4′)), with approximately the same estimated impact through their coefficients. The Hausman test indicates the FEM model is optimal, although the dummy variables are omitted here due to collinearity.

The right side of Table 4 deals with the estimation of ROA through Eq 1. Model (5) estimates the effect of the financial autonomy rate on the ROA of our sampled companies. A positive correlation is seen, as expected from the correlation matrix of these variables (Table 3), and this rate is the one with the highest explanatory power (its correlation coefficient to ROA is 0.3277). When the financial autonomy rates of companies increase by one unit, their ROA ratios are higher on average by 0.0758 units, ceteris paribus (model (5)). Thus, the more companies finance their activities throughout shareholders' equity, the better their performance on assets as measured by ROA. Models (6)–(8) add independent variables to form Eq. 1, similar to the left side of this table. Model (6) adds the net working capital independent variable, with a positive effect on ROA, which is maintained throughout the remaining models as well. Model (7) adds the size proxy, with a positive effect on company performance (models (7), (8), and (8")). Model (8) includes the sectorial dummies which are not significant within this complex model. Except for the IT sector, which is indirectly related to ROA, the other sectors (agriculture, commerce, constructions, hotels and restaurants, all manufacturing sectors, other services, real estate, and transport and storage) are directly related to ROA. The fixed effects model (FEM; model (8′)) and the random effect model (REM; model (8′')) are also estimated, and the optimal estimation technique is FEM, indicated by the Hausman test, bolded out in model (8′). Most previously validated independent variables from models (5)–(8) keep their signs and significances (except for Financial Autonomy Rate in model (8") and size in model (8′)).

Table 5, entitled Main results 2, displays the additional main results. As an alternative to working capital proxies, compared to Table 4, our estimations validate the quick ratio of the sampled companies as an explanatory variable for their ROE (models (1)–(4′')) and ROA (models (5)–(8")). The quick ratio is used instead of the net working capital from Table 4 (models (2)–(4′') and models (6)–(8")). The other working capital rates as presented in Table 1, primarily the receivables' turnover rate and the cash ratio, have not proved significant as explanatory variables within Eq. 1.

Models (1)–(4") validate the indirect impact of the debt to equity ratio on the ROE of companies. The magnitude, sign, and significance of the estimated coefficients is constant throughout these models: the more companies finance their activities throughout debt capital, the less is their performance with respect to shareholder equity. Model (2) adds the quick ratio independent variable, with a positive effect on ROE. The magnitude and significance of the estimated coefficient for the quick ratio

Table 4. Main results 1. The *performances of companies*, full sample, with *ROE* (models (1)-(4″)) and *ROA* as dependent variables (models (5)-(8″)).

	ROE						*ROA*					
Performance	Simple regression (1) OLS	Multiple regression (2) OLS	Multiple regression (3) OLS	Multiple regression (4) OLS	Multiple regression (4′) FEM	Multiple regression (4″) REM	Simple regression (5) OLS	Multiple regression (6) OLS	Multiple regression (7) OLS	Multiple regression (8) OLS	Multiple regression (8′) FEM	Multiple regression (8″) REM
constant	0.66	0.2325	−22.7472***	−28.0714*	−58.8326	−29.2876**	−4.9147***	−2.5188**	−9.8345**	−12.696*	−40.9805	−13.0576*
DebtEquityRatio	−0.0241*	−0.0251***	−0.0259***	−0.0247***	−0.0181***	−0.0241***						
FinancialAutonomyRate							0.0758***	0.0271*	0.0289*	0.0264	0.1034*	0.026
NetWorkingCapital		0.0501**	0.0566***	0.0715***	0.2183***	0.081***		0.0705***	0.0709***	0.0782***	0.2571***	0.0823***
Size			1.3391***	1.422***	3.3327	1.4673***			0.4199*	0.4767*	1.8599	0.4898*
D_agriculture				3.5188		3.699				0.8909		0.9519
D_commerce				3.0005		3.2343				0.2424		0.3298
D_constructions				2.602		2.9053				1.2851		1.4067
D_tourism				2.5399		2.9146				0.8453		0.9917
D_IT				−1.1132		−0.9712				−0.7827		−0.7159
D_manufacturing*				4.3089		4.6549				2.4185		2.552
D_man_foods				11.7843		12.6288				3.8378		4.0871
D_man_pharma				2.8941		2.9385				1.7523		1.7765
D_man_textile				−10.537		−10.3937				1.0925		1.1502
D_other services				3.4013		3.7505				1.1225		1.2548
D_real_estate				6.6097		6.9727				3.4244		3.5653
D_transport				0.544		0.6979				0.0938		0.1514
R^2	0.1563	0.1686	0.1861	0.2204	within R^2 = 0.1325	within R^2 = 0.0981	0.1563	0.1420	0.1475	0.1603	within R^2 = 0.3372	within R^2 = 0.3369
Adjusted R^2	0.1544	0.1648	0.1804	0.1925	between R^2 = 0.0781	between R^2 = 0.2839	0.1544	0.1380	0.1416	0.1302	between R^2 = 0.1523	between R^2 = 0.1708
Obs	436	436	436	434	overall R^2= 0.0834	overall R^2= 0.2199	436	436	436	434	overall R^2= 0.1467	overall R^2= 0.1603
Hausman test					Prob > chi2 = 0.0166 • H1: FEM is optimal.						Prob > chi2 = 0.0001 • H1: FEM is optimal	

Note: *** designates the 1% significant coefficients, ** designates the 5% significant coefficients and * designates the 10% significant coefficients.
D_manufacturing* represents the dummy variable for companies acting in the manufacturing sector, except for foods, pharmaceuticals and textiles.
Source: Authors' processings.

Table 5. Main results 2. The *performances of companies*, full sample, with *ROE* (models (1)-(4″)) and *ROA* as dependent variables (models (5)-(8″)).

	ROE						*ROA*					
Performance	Simple regression (1) OLS	Multiple regression (2) OLS	Multiple regression (3) OLS	Multiple regression (4) OLS	Multiple regression (4′) FEM	Multiple regression (4″) REM	Simple regression (5) OLS	Multiple regression (6) OLS	Multiple regression (7) OLS	Multiple regression (8) OLS	Multiple regression (8′) FEM	Multiple regression (8″) REM
constant	0.66	0.0196	−21.7283***	−23.2202*	−47.9556	−23.6264*	−4.9147***	−5.0201***	−12.4521***	−14.3406**	−79.9969**	−14.5075*
DebtEquityRatio	−0.0241*	−0.024***	−0.0247***	−0.0234***	−0.0196***	−0.0229***						
FinancialAutonomyRate							0.0758***	0.073***	0.0748***	0.0814***	0.3267***	0.0824***
QuickRatio		0.0021*	0.0024*	0.0027*	0.0041*	0.0029**		0.0009	0.001	0.0014*	0.0026*	0.0014*
Size			1.2654***	1.2392**	2.7515	1.2556**			0.4254*	0.4383	3.4127*	0.4426
D_agriculture				3.1046		3.1844				0.9488		0.9713
D_commerce				1.6354		1.6775				−0.5642		−0.5475
D_constructions				0.8859		0.9388				1.4605		1.5081
D_tourism				−1.213		−1.2631				−2.2588		−2.2612
D_IT				−2.0719		−2.0543				−0.3389		−0.3058
D_manufacturing*				2.3984		2.4569				1.8365		1.8736
D_man_foods				8.2495		8.4744				3.8743		3.9664
D_man_pharma				2.829		2.8475				2.4479		2.4692
D_man_textile				−11.2652		−11.2261				1.5573		1.5875
D_other_services				−0.091		−0.1332				−2.1928		−2.2044
D_real_estate				4.2141		4.2542				1.3806		1.3933
D_transport				−0.2816		−0.2486				−0.3459		−0.3333
R^2	0.1563	0.1616	0.1774	0.2051	within R^2 = 0.0725	within R^2 = 0.0692	0.1061	0.1093	0.1149	0.129	within R^2 = 0.2582	within R^2 = 0.2463
Adjusted R^2	0.1544	0.1578	0.1717	0.1766	between R^2 = 0.1852	between R^2 = 0.2772	0.1040	0.1051	0.1088	0.0978	between R^2 = 0.1306	between R^2 = 0.1539
Obs	436	436	436	434	overall R^2= 0.1461	overall R^2= 0.2050	436	436	436	434	overall R^2= 0.1096	overall R^2= 0.129
Hausman test					Prob > chi2 = 0.7191 • Ho: REM is optimal						Prob > chi2 = 0.0001 • H1: FEM is optimal	

Note: *** designates the 1% significant coefficients, ** designates the 5% significant coefficients and * designates the 10% significant coefficients.
D_manufacturing* represents the dummy variable for companies acting in the manufacturing sector, except for foods, pharmaceuticals and textiles.
Source: Authors' processings.

is maintained throughout models (3)–(4”), which, similarly to Table 4, add the size proxy with a direct relationship to company performance (model (3)) and the sectorial dummies (model (4)).

The right side of Table 5 deals with the estimation of ROA through Eq. 1. Models (5)–(8”) estimate the effect of the financial autonomy rate on the ROA of our sampled companies: a positive impact of about the same magnitude, significant at 1% level. Beginning with model (6), the quick ratio is added as an independent variable, with a positive effect on ROA, significant at 10% level throughout the latter models (8)–(8”), as expected. Model (7) adds the size proxy, with a positive effect on company performance (models (7) and (8′)).

The sectorial dummies provide a better reflection of the effects of the COVID-19 pandemic on companies acting within specific activity domains that have reduced their businesses as a direct effect of the pandemic. For example, tourism, IT, the textile companies, other services, and transport (models (4), (4”), (8), and (8”)). Although these dummies are not significant, they provide a glimpse of the inverse relationship these business sectors had as a response to the stringent measures adopted during the pandemic. Our short panel data contains mid-year data for 2019 and 2020. Up to the middle of 2020, some domains might have been able to maintain their business due to a certain inertia in those fields, pre-orders or pre-contracts, and because the first COVID-19 measures had been adopted in Romania only in the first half of March 2020.

The main alternatives to the baseline OLS estimation method from models (4) and (8) are the fixed effects model (FEM; models (4′) and (8′)) and the random effect model (REM; models (4′’) and (8”)). The Hausman test indicates the REM model (4”) and FEM model (8′) are optimal.

4.2. Robustness checks

Our Robustness checks section includes separate determinations for the differences in indicators between 2020 and 2019 as cross-sectional observations of our sampled companies and correspond to our Main results 1 and 2. As such, simple and multiple regression modelling of cross-sectional variations from 2020 to 2019 are used to re-estimate Eq. 1, including the variations of debt to equity ratio, net working capital, and sectorial dummies as explanatory variables for the variations in ROE and the variations of the financial autonomy rate, net working capital, and sectorial dummies as explanatory variables for variations in ROA, in Table 6. Table 7 estimates the same models as Table 6, but the variations in the quick ratio are used instead of variations in net working capital, as the second explanatory variable. The variation of the size variable is no longer included in Tables 6 and 7 as it would have halved its number of observations because its variations were negative and the logarithm function is only defined on the positive domain.

Table 6 comprises our Robustness checks 1 estimations on the cross-sectional series of observations computed as simple variations of each variable between 2020 and 2019, predominantly re-emphasizing our main results 1 from Table 4. Equation 1 is re-estimated (except for the variation in size variable) on our recomputed

Table 6. Robustness checks 1.The *performances of companies,* full sample, with *ROE* (models (1)–(3)) and *ROA* as dependent variables (models (4)–(6)).

	ROE			*ROA*		
Performance	Simple regression OLS	Multiple regression (2) OLS	Multiple regression (3) OLS	Simple regression (4) OLS	Multiple regression (5) OLS	Multiple regression (6) OLS
constant	−1.9149	−2.7292*	−2.2596	−0.5451	−0.9598	−1.5489
DebtEquityRatio	−0.0191***	−0.0176***	−0.0175***			
FinancialAutonomyRate				0.3226***	0.0894*	0.091*
NetWorkingCapital		0.2305***	0.2161***		0.2699***	0.2681***
D_agriculture			2.782			1.7555
D_commerce			1.9659			1.6496
D_constructions			−1.2963			−2.5373
D_tourism			1.2086			0.9805
D_IT			−2.9867			2.8899
D_manufacturing*			1.1143			2.0101
D_man_foods			8.3101			2.5901
D_man_pharma			−0.0225			0.9619
D_man_textile			−38.8516***			−5.7947
D_other services			1.7258			0.9746
D_real_estate			−0.3973			−1.7168
D_transport			2.7777			2.2426
R^2	0.0570	0.1370	0.2483	0.2371	0.3380	0.3576
Adjusted R^2	0.0527	0.1289	0.1963	0.2336	0.3318	0.3131
Obs	218	218	217	218	218	217

Note: *** designates the 1% significant coefficients, ** designates the 5% significant coefficients and * designates the 10% significant coefficients.
D_manufacturing* represents the dummy variable for companies acting in the manufacturing sector, except for foods, pharmaceuticals and textiles.
Source: Authors' processings.

Table 7. Robustness checks 2. The *performances of companies,* full sample, with *ROE* (models (1)–(3)) and *ROA* as dependent variables (models (4)–(6)).

	ROE			*ROA*		
Performance	Simple regression OLS	Multiple regression (2) OLS	Multiple regression (3) OLS	Simple regression (4) OLS	Multiple regression (5) OLS	Multiple regression (6) OLS
constant	−1.9149	−2.3089	−2.1289	−0.5451	−0.7773	−1.0443
DebtEquityRatio	−0.0191***	−0.0193***	−0.0186***			
FinancialAutonomyRate				0.3226***	0.3161***	0.3173***
Quick ratio		0.0048*	0.0045*		0.0031*	0.0033**
D_agriculture			2.7892			0.8757
D_commerce			1.5348			0.9472
D_constructions			−1.124			−1.6018
D_tourism			−0.9721			−1.2277
D_IT			−3.1968			1.9949
D_manufacturing*			2.2154			2.2204
D_man_foods			6.8186			2.3072
D_man_pharma			−0.3298			0.7849
D_man_textile			−40.1704***			−6.4258
D_other_services			−0.0043			−1.038
D_real_estate			0.3215			−2.7205
D_transport			2.7987			2.0129
R^2	0.0570	0.0736	0.1934	0.2371	0.2505	0.2744
Adjusted R^2	0.0527	0.065	0.1375	0.2336	0.2435	0.2241
Obs	218	218	217	218	218	217

Note: ***designates the 1% significant coefficients, **designates the 5% significant coefficients and *designates the 10% significant coefficients.
D_manufacturing* represents the dummy variable for companies acting in the manufacturing sector, except for foods, pharmaceuticals and textiles.
Source: Authors' processings.

independent variables and, as expected, the results confirm our main results: there's a negative effect of the variations in the debt to equity ratio on financial performance measured as the variations of ROE for each company (models (1)–(3)), between 2020 and 2019 and a positive effect of the variations in the financial autonomy rate on financial performance measured as the variations of ROA for each of the 218 companies (models (4)–(6)). The variations in net working capital have a positive impact on performance (models (2), (3), (5), (6)). For the sectorial dummies, which have retained their values of 1 for the companies acting in the sector they represent, the negative influences of the variations in performance of the construction sector, tourism, other services, and the textile manufacturing sector (significant at a 1% level) are revalidated through models (3) and (6), with supplementary negative effects for the IT and pharmaceuticals sectors in model (3) and real estate in model (6).

Table 7 contains our Robustness checks 2 and it predominantly supports our main results 2 from Table 5: there is a positive impact of the variation in financial autonomy rates on the variations in ROA (models (4)–(6)) and a negative impact of the variation in the debt to equity ratio on the variations in ROE (models (1)–(3), significant at 1% level. The variations in the quick ratios have positive effects upon the variations in ROE (models (2)–(3)) and ROA (models (4)–(5)), significant at various levels. For the sectorial dummies, similar to that of Table 6, the estimated coefficients would suggest negative influences of the variations in the performance of the construction, tourism, other services, and textile manufacturing sectors (significant at a 1% level) in models (3) and (6), with supplementary negative effects for the IT and pharmaceuticals sectors in model (3) and real estate in model (6). The signs of the other estimated coefficients of the dummy variables suggest a potential positive effect, although these coefficients are not significant as well.

Our main results, supported by our robustness checks, sustain the validity of Eq. 1 in explicating the variations of ROE and ROA of Romanian companies in the last two years. The debt to equity rates come with a negative impact on entities' performance (expressed as ROE, in Tables 4–7) while the financial autonomy rate has a positive effect on the performance of companies (mirrored by ROA, in Tables 4–7). Thus, for the Romanian companies, during a crisis, a higher level of financing their activities from their own resources rather than from outside debt, helps consolidate companies' economic performance under ROA and ROE. These results are consistent with other studies such as those of Frydenberg (2011) and Lenka (2017) which also have a negative relationship between indebtedness and returns. Thus, Frydenberg (2011) finds that lower indebtedness levels increase the returns, when companies prefer to finance themselves from their retained earnings rather than through debt financing. For Czech companies, Lenka (2017) finds a negative relationship between ROE and indebtedness for the majority of business sectors (agriculture, fishery, and forestry; construction, wholesale and retail trade, motor vehicle and motorcycle repair; professional, scientific and technical activities; administrative and support service activities).

The net working capital ratios and quick ratios have a positive effect on performance, showing that liquidity has helped Romanian companies deal with the crisis generated by the COVID-19 pandemic (Tables 4–7). The findings are similar to those of

Smith (1980), Panda and Nanda (2018), Achim et al., (2016), Rus and Achim (2020), and Mullins (2020), which validate the important role played by liquidity in the relationship between company performance and risk.

Further, our empirical results highlight that the size of entities is positively related to company performance, helping improve ROE and ROA (Tables 4 and 5). An increase in their total assets consolidates the economic performance mirrored through ROE and ROA ratios. However, additionally, we find that on average, small companies resisted better than big companies during the pandemic by increasing their net profits by 60.44% compared with big companies which reduced their net profits by 37.73%.

However, as shown in the Appendix A and in our sectorial dummies from Tables 4–7, certain activity sectors have been affected by the COVID-19 pandemic.

5. Conclusions

Our study aims to analyze the key changes in company performance in various sectors to evaluate the level of business performance in response to the COVID-19 pandemic. Therefore, we use a multivariate panel data analysis on 218 Romanian listed companies of different sizes (big and small) that belong to different activity sectors for the period June 30, 2019 - June 30, 2020.

Our results reveal that equity financing, proper liquidity management, and an increased company size consolidate the economic performance of entities regarding return on equity and return on assets. We find that the total net profits of the market decreased by 37.43% during the analyzed period. In addition, irrespective of the size, on average all service sectors such as hotel and restaurants, pharmaceuticals, and real estate registered significant decreases during the analyzed period. However, we find that small companies engaged in agriculture, commerce, constructions, IT R&D, and transport and storage registered significant improvements in their financial net profits on the period of pandemic compared with the previous period.

Our findings are useful for various policymakers such as managers and investors, in order to help them make the best decisions for their managing and investing activities. Moreover, governments need to know how companies respond to the pandemic, to know which activity sectors are more vulnerable to the crisis' effects and the main financial management decisions to be taken by companies during a crisis. These results have an international echo as well, as worldwide governments have implemented supporting measures for the pandemic vulnerable economic sectors.

The present study has some limitations regarding the short period of analysis due to the limited reported financial data at the time of our study. In future studies we intend to extend our data to annual financial data as soon as the financial statements for 2021 are reported. However, to substantiate our findings, different regressions could be conducted separately for subsamples of big and small companies. Another future research direction could use a dynamic panel approach, in order to be able to include the lagged variables within the models, once we'd have enough available data. Nonetheless, cluster analysis might also prove useful, grouping companies according to their sectorial sensitivity for the COVID-19 pandemic.

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Appendix A – relative changes (%) in the main financial indicators (mid-2020 compared to mid-2019)

Domain	Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGRICULTURE	Small	−3.23	−3.29	−3.24	1.65	3.26	23.95	−25.17	0.00	−6.22	−0.55	23.53	−17.26	−6.81	−21.27	−54.42	−4.75	12.02	8.18	26.98	41.32
AGRICULTURE	Big	1.04		0.93	0.00	2.63	36.11	−28.99		40.01	2.02	−20.77	6.94	4.46	−18.74		9.93	−279.57	14.63	9.60	−228.70
COMMERCE	Small	7.67	−22.67	10.50	17.05	−13.19	−9.99	−29.47	27.45	−4.16	2.13	14.20	−14.53	2.96	9.32	−38.68	1.90	−3.38	28.81	2.35	55.54
COMMERCE	Big	−2.49	25.13	−3.17	−0.11	10.66	−13.92	17.25	−6.52	42.19	2.44	14.75	6.51	−0.42	31.23	10.44	−0.75	−24.43	−56.68	5.34	−9.29
CONSTRUCTIONS	Small	−24.39	−51.38	−27.04	−14.31	0.53	−8.57	22.68	143.84	−38.94	−9.72	−36.28	−810.00	38.74	−23.63	−33.1	69.63	1333.12	89.95	−28.77	29.48
CONSTRUCTIONS	Big	−1.15	45.27	−1.93	5.59	29.06	31.01	31.31		17.83	13.34	13.48	−68.99	14.39	65.98	−35.53	6.47	−11.93	1.08	12.90	−9.27
EXTRACTIVE	Big	1.29	−1.28	0.72	6.76	20.89	−4.18	27.66		25.50	5.87	23.37	16.62	4.30	20.11	2.49	3.46	−12.28	−17.47	−1.87	−41.24
HOTELS AND RESTAURANT	Small	−5.15	−88.54	1.10	−53.76	13.52	−18.06	5.52	−23.34	37.06	−2.74	8.25	21.65	−0.65	212.13	−4.99	−0.79	−33.80	−20.93	−12.62	−335.39
HOTELS AND RESTAURANT	Big	2.49	73.34	2.61	0.38	−18.19	−28.58	−51.45	−2.31	0.23	−1.45	−18.63	−21.44	0.36	8.17	−22.57	0.06	−61.88	−50.88	−32.78	−92.16
IT R&D	Small	28.86	39.77	15.42	0.81	0.44	−31.47	−11.22	81.84	26.79	8.21	−56.45	30.41	27.96	5.50	−6.69	47.76	−29.47	27.44	−4.68	12.32
IT R&D	Big	−13.35	−7.98	−13.42	4.74	−13.31	2.03	−40.42	−8.65	44.81	−13.36	−17.22	−2.88	−12.23	−49.99	23.44	−10.34	111.19	14.50	38.19	−162.30
MANUFACTURING	Small	−9.70	−77.64	−7.51	−11.80	15.40	17.96	10.23	51.52	18.69	−6.09	13.34	9.43	−4.94	−65.04	−2.9	−5.14	−13.40	−14.91	1.45	62.64
MANUFACTURING	Big	3.14	3.77	4.36	−11.03	−2.37	−5.63	−8.27	3.88	62.91	0.52	−15.92	−120.53	17.11	77.37	18.76	6.09	−26.32	−31.51	−12.12	−571.16
MANUFACTURING-FOODS	Small	−7.64	0.38	−8.95	2.89	−0.73	−23.41	20.57	−93.05	40.60	−5.68	4.24	7.36	−33.03	−0.08	0	22.78	−30.19	−20.17	−18.78	−14.08
MANUFACTURING-FOODS	Big	−1.07	3.26	−1.90	3.07	−40.84	−50.60	−25.61	0.00	7.92	−16.91	−32.02	142.26	−5.74	2.44	−4.91	−9.23	−8.01	−28.30	12.50	38.06
MANUFACTURING-PHARMACEUTICS	Small	−3.02	9.02	−3.86	0.00	6.27	13.31	2.71		203.32	2.78	0.16	2.60	3.65			3.65	21.49	22.31	25.03	−209.01
MANUFACTURING-PHARMACEUTICS	Big	4.63	−4.64	4.84	10.83	6.62	5.71	9.00		4.14	5.49	−1.29	13.03	7.38	21.27	0.1	1.77	−15.51	−22.28	6.99	−38.69
MANUFACTURING-TEXTIL	Small	−10.09	−32.80	−10.10	9.27	−8.80	−5.32	−1.75	−54.80	−3.00	−9.29	32.73	−17.72	−15.14	50.35	−9.36	−15.28	−25.60	−36.18	−28.42	−158.03
MANUFACTURING-TEXTIL	Big	−1.69	−35.88	−1.56		−4.10	8.29	−22.12	0.00	11.54	−2.82	−16.47	17.64	2.89	−9.32	−10.84	4.37	−32.24	−44.58	−7.23	149.83
OTHER SERVICES	Small	−1.16	−31.34	−1.06	0.35	3.80	471.76	11.04		−8.75	−0.80	−15.88	−40.76	0.92		−6.55	0.92	−11.17	−52.87	−7.98	−23.69
OTHER SERVICES	Big	1.55	48.57	7.14	−0.13	−15.19	−24.70	−5.43		−44.83	−3.65	−41.98	−14.39	−2.86			−2.86	14.81		25.97	−1303.28
REAL ESTATE	Small	−0.75	−99.09	0.67	5.30	−29.67	−1.43	−39.66	−11.59	−24.38	−4.65	−32.37	−40.54	0.35	−15.58	−5.16	9.83	−17.69	−34.76	−1.70	−49.54
REAL ESTATE	Big	13.62	4.21	14.75	1.82	−4.32	−20.41	−37.75	15.84	119.89	11.36	−6.97	−3.14	12.75	11.45	58.33	12.74	−9.93	−12.50	−6.95	−87.47
TRANSPORT AND STORAGE	Small	18.73	−99.90	2.55	394.39	76.08	−25.79	97.14		64.75	29.06	39.06	76.16	28.59	78.99	0	25.03	−6.85	3244.75	421.49	6188.81
TRANSPORT AND STORAGE	Big	27.60	37.68	3.15	114.47	−18.97	4.94	24.58	−90.84	−32.25	8.87	5.20	−18.36	16.20	201.05	−97.54	3.61	−7.02	−12.40	8.51	9.71
TOTAL MARKET	Small	−5.50	−42.93	−4.23	−3.60	1.49	3.48	0.38	10.37	−1.31	−5.50	2.01	2.25	0.94	−11.63	−12.28	6.79	25.59	−4.01	−1.89	60.44
TOTAL MARKET	Big	4.35	14.74	1.73	8.93	7.98	−3.94	16.88	−52.48	16.63	4.35	3.61	14.66	6.69	60.60	10.54	3.58	−14.75	−24.21	−2.66	−37.73
TOTAL MARKET		3.80	13.90	1.37	8.03	7.75	−3.63	16.17	−50.23	16.24	3.80	3.48	14.92	6.46	53.10	3.95	3.95	−13.86	−23.67	−2.62	−37.43

Legend: 1 Total Non-current Assets. 2 Intangibles assets. 3 Tangible assets. 4 Long-term financial investments. 5 Total Current Assets. 6 Inventories. 7 Receivables. 8 Short-term Financial Investments. 9.Cash. 10. Total assets. 11 Short-term liabilities. 12 Net Current Assets / Net Current Liabilities. 13 Total Assets Less Current Liabilities. 14 Long-term liabilities. 15 Deferred Income. 16 Total Shareholders' Equity. 17 Sales. 18 Cost of raw material and consumables. 19 Personnel expenses. 20 Net profits.
Source: Authors' processings.