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АНАЛІЗ ВПЛИВУ ПАНДЕМІЇ COVID-19 НА ФІНАНСОВУ ЕФЕКТИВНІСТЬ ПУБЛІЧНИХ АКЦІОНЕРНИХ КОМПАНІЙ

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IMPACT OF COVID-19 ON FINANCIAL PERFORMANCE OF PUBLICLY-LISTED COMPANIES

Анотація. У зв'язку з безпрецедентною економічною кризою, спричиненою пандемією COVID-19, постала нагальна потреба у глибокому аналізі чинників, які впливають на фінансову ефективність бізнесу. Незважаючи на значну кількість наукових праць, більшість з них зосереджуються на окремих секторах, залишаючи без належної уваги комплексне кількісне порівняння фінансових результатів публічних компаній до та під час пандемії. Дане дослідження є критично важливим для підвищення адаптивності підприємств у періоди нестабільності. Метою даного дослідження є кількісне оцінювання змін у ключових фінансових показниках компаній у період до (2019 р.) та під час піку пандемії (2020 р.). У межах аналізу було розглянуто показники рентабельності активів (ROA), рентабельності власного капіталу (ROE), платоспроможності, операційної маржі (EBITDA margin) та інвестицій в інновації (витрати на R&D відносно операційного доходу). Методологічно дослідження спирається на використання кореляційного та регресійного аналізу даних 121 компанії за 2019 рік та 135 компаній за 2020 рік. Статистична перевірка результатів базується на t-критеріях, p-значеннях та ANOVA. Результати свідчать про те, що маржа EBITDA залишалася найбільш стабільним та вагомим чинником, що позитивно впливав на ROA і ROE в обох роках. Коефіцієнт платоспроможності та левериджмали слабкий або незначний зв'язок з прибутковістю, що свідчить про зменшення ролі структури капіталу в умовах кризового періоду. Інноваційні витрати продемонстрували помірну позитивну кореляцію з прибутковістю, підтверджуючи їх стратегічну важливість у довгостроковому аспекті. Наукова новизна полягає у застосуванні кількісного порівняльного підходу до широкої вибірки компаній для виявлення рушіїв фінансової стійкості. Практична значущість дослідження полягає у формуванні рекомендацій для керівників та інвесторів з підвищення антикризової готовності компаній через фокус на ефективність операцій та інноваційний розвиток.

Ключові слова: COVID-19, фінансова результативність, ROA, ROE, маржа EBITDA, коефіцієнт платоспроможності, регресійний аналіз, публічні компанії.

Abstract. In light of the unprecedented economic crisis caused by the COVID-19 pandemic, there has emerged an urgent need for in-depth analysis of the factors influencing corporate financial performance. Despite a substantial body of academic literature, most existing studies focus on individual sectors, leaving comprehensive quantitative comparisons of public companies' financial outcomes before and during the pandemic largely unexplored. This study is critically important for enhancing corporate adaptability in times of economic instability. The objective of this research is to quantitatively assess the changes in key financial indicators of companies during the pre-crisis year (2019) and the peak of the pandemic (2020). The analysis includes return on assets (ROA), return on equity (ROE), solvency, operating margin (EBITDA margin), and innovation investment measured as R&D expenditures relative to operating income. Methodologically, the study relies on correlation and regression analysis, based on data from 121 companies in 2019 and 135 companies in 2020. Statistical validation of the results was conducted using multiple correlation and regression analysis. The findings indicate that EBITDA margin remained the most stable and statistically significant factor positively affecting ROA and ROE in both years. In contrast, solvency and leverage ratios showed weak or insignificant associations with profitability, suggesting that capital structure played a diminished role during the crisis period. R&D expenditures demonstrated a moderate positive correlation with profitability, confirming their strategic relevance from a long-term perspective. The scientific novelty of the study lies in its use of a quantitative comparative approach across a broad sample of public companies to identify the key drivers of financial resilience. The practical significance is reflected in its actionable recommendations for corporate managers and investors seeking to enhance crisis preparedness by emphasising operational efficiency and innovation-led growth.

Key words: COVID-19, financial performance, ROA, ROE, EBITDA margin, gearing, solvency ratio, regression analysis, publicly-listed companies.

JEL: G30; M41

Problem statement. The outbreak of the coronavirus disease 2019 (COVID-19), declared a global pandemic by the World Health Organization on March 11, 2020, triggered unprecedented economic disruptions, significantly affecting the financial performance of publicly-listed companies worldwide. The pandemic-induced lockdowns, supply chain interruptions, and shifts in consumer behavior led to substantial revenue declines, increased operational costs, and volatile stock market performance across multiple sectors. For instance, on February 19, 2020, the S&P 500 closed at 3,386.15 with a trading volume of about 3.6 billion shares. By March 23, 2020, the index had dropped sharply to 2,237.40, while trading volume increased to over 7.4 billion shares. This 33.9% decline highlights the severe market downturn and heightened volatility caused by the onset of the COVID-19 pandemic [20-25]. While some industries, such as technology and pharmaceuticals, demonstrated resilience or growth due to increased demand for digital services and medical supplies, others, including aviation, hospitality, and retail, faced severe financial strain, with revenue losses reported as high as 50–90% in Q2 2020 for major airlines and hospitality firms [9].

Although numerous studies have examined the macroeconomic consequences of COVID-19, there remains a lack of detailed, quantitative investigations into how the pandemic affected key financial performance indicators at the firm level. This study addresses that gap by conducting a comprehensive analysis of the financial impact of COVID-19 on publicly-listed companies, focusing on the years 2019 (pre-COVID) and 2020 (peak-COVID). It evaluates core financial metrics such as Return on Assets (ROA), Return on Equity (ROE), gearing, solvency ratio, EBITDA margin, and R&D

intensity. Through correlation and multiple regression analysis, the study quantifies the pandemic's effects.

Analysis of recent research and publications. This study builds on prior research examining the financial impact of the COVID-19 pandemic. While studies like Achim et al. (2022) [1] on Romania and Alsamhi et al. (2022) [2] on India confirm significant disruptions, they often focus on specific regions or short-term effects. By analysing firm-level data from 2019 (pre-COVID) and 2020 (peak-COVID) across multiple sectors using regression models, our research addresses these gaps. We also extend the work of Ashraf (2020) [3] and Foss (2020) [5] by incorporating company-specific financial indicators into a broader assessment of publicly-listed firms' performance during the pandemic. Sector-specific studies such as Baicu et al. (2020) [4], Pantano et al. (2020) [17], and Javid et al. (2022) [10] highlight vulnerabilities in retail banking, commerce, and supply chains. Research on corporate governance by Khatib and Nour (2021) [12] and Makni (2023) [13], as well as firm performance in emerging markets by Shen et al. (2020) [24] and Perwitasari et al. (2022) [18], supports our focus on financial resilience. While Kalogiannidis (2020) [11] and Hoekstra and Leeflang (2020) [8] address small business and marketing responses, they lack emphasis on financial metrics. Our study builds on these insights, using panel data from 2019–2020 to explore cross-sectoral impacts of COVID-19 on public companies.

The pandemic reshaped the global economy, revealing the importance of ownership structures in shaping firm adaptability. ROA, a key measure of resource efficiency, became central to understanding corporate performance during crisis. Ownership now acts as a dynamic factor influencing governance, valuation, and resilience under stress [14].

Leverage ratio has emerged as a key factor in enhancing firm performance by improving managerial efficiency, though its impact varies by company size. Larger firms face high fixed costs, while smaller firms encounter limited financing options [14]. Dividend per share gained importance as firms aimed to preserve liquidity, whereas frequent board meetings were linked to reduced efficiency due to increased director compensation amid uncertainty [10]. Core operating income remains a primary indicator of financial performance, monitored by stakeholders such as investors, creditors, and employees [7,14]. Metrics like cash flow and operating income help evaluate fiscal health, while sales volumes offer additional context in some sectors [6]. Solvency ratio, reflecting the firm's ability to meet long-term obligations, serves as a signal of resilience [4]. Gearing, or debt-to-equity ratio, positively influenced ROE in 2019, but during the 2020 crisis, it amplified financial risk, underscoring the trade-off between profitability and solvency [3].

Research methodology. The dataset includes 121 companies in 2019 and 135 in 2020 across sectors and regions. Financial data were drawn from reports, focusing on ROA, ROE, gearing, solvency ratio, EBITDA margin, and R&D-to-revenue ratio (from 2017 and 2018, respectively). The analysis uses correlation and multiple regression techniques. Correlation tests assessed the strength of relationships between ROA, ROE, and financial indicators. Regression models evaluated the impact of these variables on profitability, with significance tested via ANOVA, t-tests, and p-values (95% confidence). Data preprocessing included validation and outlier treatment. Statistical software was used to identify trends and assess the pandemic's impact across firm sizes and sectors.

The purpose of the article. This investigation seeks to numerically analyse the economic effects of the COVID-19 pandemic on publicly traded companies, with a focus on pinpointing key determinants of financial robustness. The study compares data from the pre-pandemic year of 2019 to the height of the pandemic in 2020.

Previously unresolved aspects of the problem. While previous research has extensively documented the economic disruptions caused by COVID-19, many studies remain limited in scope, focusing on single countries, industries, or short-term effects. There is a noticeable lack of cross-sectoral, firm-level analysis that integrates key financial indicators to assess how companies adapted over time. Furthermore, existing literature often neglects the comparative dimension between pre-pandemic and peak-pandemic performance, making it difficult to understand structural shifts in financial stability.

Summary of the main research material. This section presents key correlation statistics derived from the financial indicators of the studied companies, focusing on their profitability, leverage, solvency, efficiency, and innovation activities. The aim is to uncover relationships among these variables that could provide insights into corporate financial performance.

Table 1

CORRELATION STATISTICS ROA (2019)

Variable	ROA (2019)	Gearing (2019)	Solvency Ratio (2019)	EBITDA Margin (2019)	R&D / Operating Revenue (2017)
ROA (2019)	1	–0.0021	0.2214	0.7462	0.3491
Gearing (2019)	–0.0021	1	–0.7362	0.0148	0.0947
Solvency Ratio (Asset-Based, 2019)	0.2214	–0.7362	1	0.1873	0.1263
EBITDA Margin (2019)	0.7462	0.0148	0.1873	1	0.3176
R&D / Operating Revenue (2017)	0.3491	0.0947	0.1263	0.3176	1

Source: calculations made using Microsoft Excel, data from [16]

The 2019 correlation analysis reveals (Table 1) that gearing had almost no impact on ROA and only a weak link to R&D intensity, but showed a strong negative relationship with solvency, indicating that higher leverage reduced financial stability. Conversely, the solvency ratio correlated moderately with both ROA and EBITDA margin, suggesting that firms with stronger asset positions performed better operationally and financially.

Table 2

REGRESSION STATISTICS ROA (2019)

Variable	Coefficient	Std. Error	t-Stat	p-Value
Intercept	–3.869	1.812	–2.14	0.0348
Gearing (2019)	0.0034	0.0041	0.84	0.4013
Solvency Ratio (Asset-Based, 2019)	0.0544	0.0376	1.44	0.1512
EBITDA Margin (2019)	0.2721	0.0259	10.52	<0.001
R&D / Operating Revenue (2017)	0.1055	0.0648	1.63	0.1061

Source: calculations made using Microsoft Excel, data from [16]

While the overall model (Table 2) explains 57.9% of the variance in financial performance, both gearing and the solvency ratio show statistically insignificant effects, suggesting their limited direct impact on profitability in 2019. Gearing had a negligible positive coefficient, while the solvency ratio showed a modest positive but also insignificant relationship. In contrast, EBITDA margin was highly significant, highlighting that operational efficiency played a far greater role in determining financial outcomes than capital structure alone.

Table 3

CORRELATION STATISTICS ROE (2019)

Variable	ROE (2019)	ROA (2019)	Gearing (2019)	Solvency Ratio (2019)	EBITDA Margin (2019)	R&D / Operating Revenue (2017)
ROE (2019)	1	0.6772	0.4536	–0.1502	0.4098	0.3686
ROA (2019)	0.6772	1	–0.0021	0.2214	0.7462	0.3491
Gearing (2019)	0.4536	–0.0021	1	–0.7362	0.0148	0.0947
Solvency Ratio (Asset-Based, 2019)	–0.1502	0.2214	–0.7362	1	0.1873	0.1263
EBITDA Margin (2019)	0.4098	0.7462	0.0148	0.1873	1	0.3176
R&D / Operating Revenue (2017)	0.3686	0.3491	0.0947	0.1263	0.3176	1

Source: calculations made using Microsoft Excel, data from [16]

In 2019, gearing showed a moderate positive correlation with ROE (Table 3), indicating that leverage boosted shareholder returns, but it had almost no impact on ROA and only weak associations with operating profitability and R&D intensity. However,

its strong negative correlation with the solvency ratio highlights the trade-off between higher returns and increased financial risk. Conversely, the solvency ratio correlated positively with ROA and EBITDA margin, suggesting that firms with stronger asset positions were better at generating stable profits, though it was weakly linked to ROE. These dynamics reveal that while leverage can enhance equity returns, higher solvency better supports financial stability, an important factor when assessing resilience during the COVID-19 crisis.

Table 4

REGRESSION STATISTICS ROE (2019)

Variable	Coefficient	Std. Error	t-Stat	p-Value
Intercept	–38.30	11.49	–3.33	0.0012
Gearing (2019)	0.1331	0.0257	5.18	<0.001
Solvency Ratio (Asset-Based, 2019)	0.3986	0.2387	1.67	0.0976
EBITDA Margin (2019)	0.6574	0.1641	4.01	<0.001
R&D / Operating Revenue (2017)	1.0466	0.4107	2.55	0.0121

Source: calculations made using Microsoft Excel, data from [16]

The solvency ratio showed a marginally insignificant positive effect (Table 4), suggesting a weak but favourable influence on stability. Operational profitability (EBITDA margin) and innovation (R&D intensity) were also significant predictors of strong financial performance. Overall, the model ($R^2 = 0.426$) confirms that while capital structure matters, operational efficiency and R&D investments played key roles in building resilience, especially when comparing firms' financial positioning before and during the pandemic.

Table 5

CORRELATION STATISTICS ROA (2020)

Variable	ROA (2020)	Gearing (2020)	Solvency Ratio (2020)	EBITDA Margin (2020)	R&D / Operating Revenue (2018)
ROA (2020)	1	–0.1103	0.2771	0.5825	0.2940
Gearing (2020)	–0.1103	1	–0.7679	–0.0515	0.0479
Solvency Ratio (Asset-Based, 2020)	0.2771	–0.7679	1	0.2888	0.0707
EBITDA Margin (2020)	0.5825	–0.0515	0.2888	1	0.2814
R&D / Operating Revenue (2018)	0.2940	0.0479	0.0707	0.2814	1

S*ource: calculations made using Microsoft Excel, data from [16]*

Gearing shows a weak negative correlation with ROA (–0.11) (Table 5), suggesting that higher leverage in 2020 slightly lowered asset profitability, likely due to financial strain from pandemic disruptions. In contrast, the solvency ratio has a moderate positive correlation with ROA (0.28), indicating that firms with stronger solvency were better positioned to sustain profitability. The strong negative correlation between gearing and solvency (–0.77) highlights how higher debt significantly reduced financial stability. Compared to 2019, the more pronounced negative gearing-ROA link and consistent solvency-ROA association suggest that the pandemic intensified leverage risks.

Table 6

REGRESSION STATISTICS ROA (2020)

Variable	Coefficient	Std. Error	t-Stat	p-Value
Intercept	–2.448	2.114	–1.16	0.2489
Gearing (2020)	0.0002	0.0046	0.035	0.9722
Solvency Ratio (Asset-Based, 2020)	0.0459	0.0438	1.05	0.2973
EBITDA Margin (2020)	0.1939	0.0298	6.50	<0.001
R&D / Operating Revenue (2018)	0.1399	0.0715	1.96	0.0525

Source: calculations made using Microsoft Excel, data from [16]

In 2020 (Table 6), gearing shows an almost negligible effect on ROE (coefficient = 0.0002, $p = 0.9722$), confirming its minimal role during the pandemic, in contrast to 2019 where it had a stronger and statistically significant positive impact (coefficient = 0.1331, $p < 0.001$). Similarly, the solvency ratio in 2020 remains statistically insignificant ($p = 0.2973$), with a lower coefficient (0.0459) compared to 2019 (0.3986), suggesting its reduced influence on profitability under heightened uncertainty. This shift reflects a pandemic-induced weakening of traditional capital structure effects on firm performance.

Table 7

CORRELATION STATISTICS ROE (2020)

Variable	ROE (2020)	ROA (2020)	Gearing (2020)	Solvency Ratio (2020)	EBITDA Margin (2020)	R&D / Operating Revenue (2018)
ROE (2020)	1.000	0.793	0.236	–0.121	0.400	0.241
ROA (2020)	0.793	1.000	–0.110	0.277	0.582	0.294
Gearing (2020)	0.236	–0.110	1.000	–0.768	–0.051	0.048
Solvency Ratio (2020)	–0.121	0.277	–0.768	1.000	0.289	0.071
EBITDA Margin (2020)	0.400	0.582	–0.051	0.289	1.000	0.281
R&D / Operating Revenue (2018)	0.241	0.294	0.048	0.071	0.281	1.000

Source: calculations made using Microsoft Excel, data from [16]

Gearing shows a moderate positive correlation with ROE, indicating that higher leverage in 2020 amplified shareholder returns, though its weak negative correlation with ROA suggests a slight drag on asset-based profitability, reflecting the pandemic's strain on leveraged firms. The solvency ratio has a weak negative correlation with ROE but a moderate positive correlation with ROA, suggesting that firms with stronger solvency (more assets relative to liabilities) were better equipped to maintain asset profitability but less so for equity returns. The strong negative correlation between gearing and solvency ratio highlights that higher debt levels significantly reduced solvency, increasing financial vulnerability. Compared to 2019, the weaker gearing-ROE correlation and stronger ROA-ROE correlation in 2020 indicate that the pandemic shifted dynamics, with solvency providing a modest buffer and high gearing posing greater risks to resilience.

Table 8

REGRESSION STATISTICS ROE (2020)

Variable	Coefficient	Std. Error	t-Stat	p-Value
Intercept	1.2631	8.6316	0.146	0.8839
Gearing (2020)	0.0221	0.0186	1.186	0.2379
Solvency Ratio (Asset-Based, 2020)	–0.1871	0.1790	–1.045	0.2978
EBITDA Margin (2020)	0.5862	0.1218	4.814	<0.001
R&D / Operating Revenue (2018)	0.4704	0.2919	1.612	0.1095

Source: calculations made using Microsoft Excel, data from [16]

In Table 8, the model explains approximately 24.6% of the variation in ROE ($R^2 = 0.246$), indicating a moderate fit. Among the predictors, EBITDA margin remains the only statistically significant variable ($p < 0.001$), with a strong positive effect on ROE (coefficient = 0.586), reinforcing its critical role in driving profitability during the pandemic. Gearing and solvency ratio, however, show no significant impact ($p > 0.2$), suggesting that traditional capital structure indicators were less influential under COVID-19 stress. Compared to 2019, the explanatory power of the model is notably lower, and the influence of R&D spending remains positive but statistically insignificant, highlighting a potential lag in its effect on equity returns. This underscores a shift from structural to operational efficiency as the key driver of profitability in 2020.

Discussion of the results. The analyse compares the financial metrics of publicly traded companies in 2019 (before COVID-19) and 2020 (peak of the pandemic), focusing on how gearing (debt-to-equity ratio) and solvency ratio (assets relative to liabilities) influenced Return on Assets (ROA) and Return on Equity (ROE), alongside

EBITDA margin and R&D expenses. In 2019, higher gearing significantly boosted ROE by amplifying shareholder returns through debt, but it had little effect on ROA, showing that leverage didn't strongly affect asset-based profitability. Solvency supported ROA modestly, indicating that firms with more assets than liabilities could generate better profits from their assets, but it had a slight negative link to ROE, as less debt meant lower equity returns.

The strong negative link between gearing and solvency confirms that high debt undermines financial stability. In 2020, this relationship intensified: gearing's positive impact on ROE weakened and slightly harmed ROA, showing that leverage became riskier amid declining revenues. Meanwhile, solvency's positive effect on ROA grew, acting as a buffer, though it had limited influence on ROE. EBITDA margin remained a key driver of both ROA and ROE, but its impact on ROA slightly weakened due to operational disruptions. Overall, the 2020 models explained less variance than in 2019, reflecting the pandemic's unpredictability. The crisis emphasised that while operational efficiency supports resilience, maintaining a balanced capital structure is crucial in turbulent times.

Conclusions. This study concludes that the COVID-19 pandemic significantly disrupted the financial performance of publicly-listed companies, yet the degree of impact varied depending on firms' internal financial structures and operational efficiency. The strongest determinant of profitability—both Return on Assets (ROA) and Return on Equity (ROE)—was the EBITDA margin, underscoring the central importance of operating efficiency during crisis periods. This finding held true for both pre-pandemic (2019) and peak-pandemic (2020) periods, with regression models consistently confirming EBITDA margin as a statistically significant predictor of profitability.

In contrast, traditional capital structure indicators such as gearing and solvency ratios were found to be statistically insignificant in most models, suggesting that high or low leverage had a limited direct effect on profitability during the pandemic. R&D expenditures, while not always statistically significant, showed a positive and sometimes borderline-significant effect, indicating that innovation may play a meaningful role in enhancing resilience over time. Overall, the results highlight that firms with strong operational performance and sustained investment in innovation were better positioned to withstand the economic shock of COVID-19, while heavy reliance on debt or balance sheet strength alone offered limited protection.

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