American Journal of Humanities and Social Sciences Research (AJHSSR)
e-ISSN : 2378-703X
Volume-10, Issue-04, pp-10-18
www.ajhssr.com
Research Paper Open Access

The Business Performance of Listed Firms in Vietnam Across the Phases of the COVID-19 Pandemic

[1]Nguyen Thi Hang Nga, [2]Ho Minh Trang, [3]Tran Thi Linh , [4]Nguyen Bui Ty Na , [5]Dao Thi Loan , [6]Ngo Thi Khanh Linh
[1,2,3,4] *Student, School of Economics, Vinh University, Nghe An, Vietnam.*
[5] *Lecturer, School of Economics, Vinh University, Nghe An, Vietnam.*
[6] *Lecturer, School of Economics, Vinh University, Nghe An, Vietnam.*

ABSTRACT: This study examines the variation in business performance of listed firms in Vietnam across three phases of the COVID-19 pandemic: the pre-pandemic period (2017–2019), the pandemic period (2020–2021), and the post-pandemic period (2022–2024). Using a dataset of 1,887 firm-year observations and performance indicators including return on assets (ROA) and return on equity (ROE), the study employs non-parametric tests, namely the Kruskal–Wallis and Wilcoxon rank-sum tests, due to the non-normal distribution of the data. The empirical results reveal statistically significant differences in firm performance across the three periods. Notably, the findings indicate a lagged effect of the pandemic, whereby business performance did not experience an immediate and substantial decline during the outbreak phase (DURING), but instead deteriorated most markedly in the post-pandemic phase (POST). This phenomenon can be attributed to firms' initial resilience and government support policies, which helped maintain temporary stability in the early stage of the crisis. However, as prolonged disruptions in supply chains, rising input costs, and accumulated debt pressures intensified over time, financial performance exhibited a more pronounced decline in the medium term. Based on these findings, the study provides important implications for financial risk management, particularly regarding capital structure, and underscores the need for more sustained and long-term policy support to facilitate economic recovery.

***KEYWORDS*:** *Business performance; COVID-19; Listed firms; Non-parametric tests; Lagged effects*

I. INTRODUCTION

The COVID-19 pandemic, which emerged in late 2019, rapidly spread across the globe and generated severe shocks to the world economy. Containment measures such as lockdowns, social distancing, and mobility restrictions disrupted global supply chains, weakened trade activities, and significantly altered consumer behavior. In this context, firms' production and business operations faced substantial challenges, including declining revenues, rising operating costs, and heightened uncertainty in the business environment. These disruptions have made the assessment of the pandemic's impact on firm performance a topic of considerable interest in recent economic and financial research.

In Vietnam, although the economy has been recognized for its relatively strong resilience compared to many other countries, the COVID-19 pandemic has still exerted significant adverse effects on corporate activities. Disruptions in global supply chains, contraction in market demand, and domestic containment measures have intensified pressures on firms' production and business operations. Many firms have been compelled to scale down their activities, adjust business strategies, or restructure their finances in response to the rapidly changing environment. Such impacts are likely to be reflected in variations in key indicators of firm performance.

Business performance is commonly evaluated using accounting-based measures that capture a firm's profitability. Among these, return on assets (ROA) and return on equity (ROE) are widely used indicators to assess operational efficiency and profitability. ROA reflects the effectiveness with which a firm utilizes its assets to generate earnings, while ROE measures the returns generated for shareholders. Therefore, analyzing changes in these indicators can provide important evidence regarding fluctuations in firm performance in response to economic shocks.

A growing body of international literature has examined the effects of the COVID-19 pandemic on firm performance and financial markets. Empirical evidence generally indicates that the pandemic has heightened business uncertainty and significantly affected firm profitability across countries and industries. In the

Vietnamese context, several recent studies have begun to investigate the impact of COVID-19 on firms, primarily focusing on stock market reactions, stock price volatility, or corporate financial risk during the pandemic period. Other studies have analyzed the impact of COVID-19 on firm performance using regression models with dummy variables representing the pandemic period. However, these studies mainly concentrate on identifying the existence of the pandemic's impact, while paying limited attention to direct comparisons of firm performance across different phases of the pandemic.

Notably, existing research has yet to provide a systematic analysis of changes in corporate profitability indicators across three critical phases: the pre-pandemic period, the pandemic period, and the post-pandemic period. Comparing firm performance across these phases is essential for assessing both the extent of deterioration and the recovery capacity of firms following the economic shock induced by the pandemic. Furthermore, statistical approaches designed to test differences in mean values of performance indicators across periods have not been fully exploited in prior studies. Consequently, there remains a lack of robust empirical evidence on whether the performance of listed firms in Vietnam differs significantly across the phases of the COVID-19 pandemic. This gap underscores the need for further empirical investigation into the dynamics of firm performance under pandemic-related shocks.

Motivated by this research gap, the present study aims to examine the business performance of listed firms in Vietnam across the phases of the COVID-19 pandemic. Specifically, the study compares the mean values of ROA and ROE across three periods: pre-pandemic, during the pandemic, and post-pandemic. By employing analysis of variance (ANOVA), the study tests whether statistically significant differences in firm performance exist across these phases. The findings are expected to provide additional empirical evidence on the impact of the pandemic in the context of emerging economies, while offering practical implications for managers and policymakers in enhancing firms' resilience to future economic shocks.

II. LITERATURE REVIEW AND RESEARCH HYPOTHESIS

According to economic shock theory and business cycle theory, major fluctuations in the macroeconomic environment can drastically alter the operational landscape for firms. Economic shocks typically precipitate disruptions in production processes, shift market demand, and exacerbate environmental uncertainty, thereby exerting a direct influence on corporate performance and profitability.

The COVID-19 pandemic is characterized as a global economic shock, having triggered widespread systemic disruptions across nations. In the context of Vietnam—an economy characterized by high trade openness and significant reliance on international commerce and global value chains (GVCs)—the suspension of international trade, dwindling demand from key export markets, and domestic social distancing measures have directly impeded the business activities of listed companies. Empirical evidence suggests that the pandemic has imposed substantial shocks on firm performance in Vietnam (Bui et al., (2022); Loc et al., (2021)). Given these shifts in the business environment, firm efficiency is expected to exhibit significant variations across the pre-, during-, and post-pandemic periods.

Based on these arguments, the following hypothesis is proposed:

H1: There are significant differences in the financial performance (ROA, ROE) of listed firms in Vietnam across the pre-, during-, and post-COVID-19 periods.

During the peak of the COVID-19 outbreak, containment measures—including lockdowns, social distancing, and mobility restrictions—severely disrupted corporate operations. Under the lens of economic shock theory, exogenous macroeconomic shocks alter firm conditions through supply chain bottlenecks, demand contraction, and escalating operating costs. However, recent literature emphasizes that the impact of such shocks may not be immediately reflected in financial indicators due to a shock lag. Firms often employ short-term absorption mechanisms, such as cost realignment, utilization of internal reserves, or operational restructuring (Ding et al., 2021).

Consequently, profitability metrics such as ROA and ROE—which reflect the cumulative outcome of revenues, expenses, and capital structure—may not show an instantaneous decline during the initial phase of the shock. Instead, the deterioration becomes evident only when negative impacts persist or surpass the firm's adaptive capacity. Empirical studies confirm the intertemporal heterogeneity of the pandemic's impact. For instance, Shen et al. (2020) documented a decline in the performance of Chinese firms, noting that the magnitude varied across stages and firm-specific characteristics. Similarly, Bui et al. (2022) found that while Vietnamese listed firms were adversely affected, the decline was non-uniform and contingent upon firm groupings.

In Vietnam, this impact is further moderated by specific factors, including high trade dependency and timely government interventions aimed at mitigating pandemic-induced losses. These factors may "flatten" or defer the decline in short-term performance. Therefore, rather than assuming an immediate collapse, this study anticipates a downward trend in performance during the pandemic relative to the preceding period, albeit reflecting a cumulative and lagged effect.

H2: The financial performance (ROA, ROE) of listed firms in Vietnam is negatively associated with the pandemic period compared to the pre-pandemic era, though the full extent of this impact may exhibit a time lag.

As the pandemic was gradually brought under control, economic activities resumed and the business climate showed signs of improvement. However, according to business cycle theory and dynamic adjustment models, recovery following an economic shock is rarely instantaneous due to an adjustment lag. Firms require a transitional period to restructure operations, restore supply chains, re-establish output markets, and absorb cumulative losses incurred during the crisis.

Recent empirical research indicates that post-pandemic recovery tends to be gradual and uneven. Ding et al. (2021) argue that corporate resilience and recovery trajectories depend on pre-crisis financial vulnerability and adaptive capacity during the crisis. In emerging economies, while government support policies may provide short-term relief, the actual recovery of firm efficiency requires a gestation period to be fully captured in financial statements.

In the Vietnamese context, despite fiscal stimuli, interest rate reductions, and economic recovery programs, the rebound of listed firms remains constrained by global market volatility and protracted supply chain fractures. Thus, ROA and ROE may not recover immediately in the post-pandemic phase but rather improve incrementally over time.

H3: The financial performance (ROA, ROE) of listed firms in Vietnam tends to improve in the post-pandemic period relative to the pandemic period, yet the recovery magnitude may be gradual due to the existence of an adjustment lag.

III. METHODOLOGY

3.1 Empirical data

This study employs secondary data systematically gathered from firms listed on the Vietnamese stock exchange. Corporate financial information was extracted from the FiinPro database—a leading financial data provider in Vietnam—and cross-referenced with audited annual financial statements. The dataset comprises key financial metrics, including net income, total assets, and shareholders' equity, which serve as the basis for calculating firm performance indicators.

The observation period is strategically partitioned into three distinct phases to capture the full trajectory of the COVID-19 pandemic:

The pre-pandemic period (2017–2019): Serving as the baseline for normal economic conditions.

The intra-pandemic period (2020–2021): Representing the peak of global and domestic disruptions.

The post-pandemic recovery period (2022–2024): Reflecting the phase of economic reopening and adjustment.

This temporal segmentation allows for a robust comparative analysis of shifts in the corporate operating environment across different stages of the crisis.

To ensure data integrity and the reliability of statistical inferences, a rigorous screening process was applied. Specifically, observations with missing critical information or extreme outliers that could bias the empirical results were excluded from the sample. Following these adjustments, the final unbalanced/balanced panel dataset [chọn 1 trong 2 tùy vào dữ liệu thực tế của bạn] consists of listed enterprises with continuous financial disclosures throughout the investigated period..

3.2 Research Variables

In this study, corporate financial performance is operationalized through two widely recognized metrics in the corporate finance literature: Return on Assets (ROA) and Return on Equity (ROE). These indicators reflect the firm’s profitability and its efficiency in utilizing both total assets and shareholders' funds.

Specifically, ROA is defined as the ratio of net income to total assets, representing the firm's capacity to generate earnings from its resource base. Conversely, ROE is calculated as the ratio of net income to total equity, serving as a measure of how effectively the firm generates profits from the capital invested by its shareholders.

In addition to the performance metrics, a categorical variable is employed to partition the dataset into three distinct groups corresponding to the phases of the COVID-19 pandemic. This variable is structured to represent the pre-pandemic, intra-pandemic, and post-pandemic periods, allowing for a comparative analysis of the pandemic's evolving impact on corporate operations.

Table 1. Summary of Variable Definitions and Data Sources

Variable	Symbol	Measurement	Source
Return on Assets	ROA	Net Income / Total Assets	FiinPro, Statements
Return on Equity	ROE	Net Income / Shareholders' Equity	FiinPro, Financial Statements

COVID-19 Period	PERIOD	PRE = Pre-COVID (2017–2019); DURING = Intra-COVID (2020–2021); POST = Post-COVID (2022–2024)	Author's compilation

3.3 Statistical Analysis Procedures

To analyze the shifts in corporate performance across the different phases of the COVID-19 pandemic, this study adopts a quantitative approach, integrating descriptive statistics with non-parametric tests to accommodate the specific distributional characteristics of the dataset.

First, a descriptive statistical analysis is conducted to provide a comprehensive overview of the dataset. Key metrics, including the mean, standard deviation, minimum, and maximum values, are computed for the performance proxies (ROA and ROE). This preliminary step facilitates the identification of initial fluctuation trends, the degree of dispersion, and elective differences between the investigated periods.

Subsequently, to evaluate the normality assumption, the Shapiro–Wilk test is performed for each variable across the three stages (pre-, intra-, and post-COVID-19). As the test results indicate that the data do not follow a normal distribution, non-parametric methods are prioritized to ensure the appropriateness and reliability of the empirical findings.

On this basis, the Kruskal–Wallis test is applied to assess the overall differences in operational efficiency among the three periods. As a non-parametric alternative to one-way ANOVA, this method allows for the comparison of dependent variable distributions across multiple independent groups when normality assumptions are violated. The results of this test determine whether statistically significant variations in ROA and ROE exist between the periods.

Finally, to identify specific differences between each pair of periods, the study employs post-hoc pairwise comparisons using the Wilcoxon rank-sum test (also known as the Mann–Whitney U test). This technique enables a granular comparison between specific dyads (PRE–DURING, DURING–POST, and PRE–POST), thereby elucidating the magnitude and direction of performance trends over time. The combination of Kruskal–Wallis and Wilcoxon rank-sum tests not only identifies global differences but also provides detailed evidence regarding the dynamic adjustments of firms under the impact of the COVID-19 pandemic, enhancing the robustness and validity of the research outcomes.

IV. RESULTS AND DISCUSSION

4.1 Descriptive Statistics and Normality Testing

Table 2. Descriptive statistics for profitability ratios (ROA, ROE) across COVID-19 phases

period	Variable	N	Mean	SD	Min	Max
PRE-COVID	ROA	1,861	0.0647163	0.0770848	-0.5172	0.8122
	ROE	1,861	0.135709	0.186135	-1.5484	5.2319
DURING-COVID	ROA	1,259	0.0590348	0.0710194	-0.227	0.5561
	ROE	1,259	0.1207117	0.1330681	-1.5141	1.4127
POST-COVID	ROA	1,884	0.0503245	0.0747326	-0.4836	0.6031
	ROE	1,884	0.0941909	0.1315305	-1.1882	1.0235
Total	ROA	5,004	0.0578683	0.0749575	-0.5172	0.8122
	ROE	5,004	0.1163042	0.1554786	-1.5484	5.2319

The descriptive statistics present the characteristics of the two performance indicators. ROA and ROE. categorized into three distinct phases: pre-. intra-. and post-COVID-19. During the pre-pandemic period. the mean value of ROA was 0.0647 with a standard deviation (SD) of 0.0771. In contrast. ROE exhibited a higher mean of 0.1357. albeit accompanied by greater volatility (SD = 0.1861). This disparity suggests that while firms achieved higher returns on equity relative to total assets. they also faced a higher degree of risk and variation in profitability.

In the intra-pandemic phase. both indicators experienced a noticeable decline. with ROA dropping to 0.0590 and ROE to 0.1207. Interestingly. the standard deviations for both variables also decreased (ROA: 0.0710; ROE: 0.1331). indicating a narrowing dispersion among firms. This convergence may be attributed to the pervasive and uniform impact of the global crisis on business operations across the board.

During the post-pandemic period. firm performance continued to show a slight downward trend. with ROA and ROE reaching 0.0503 and 0.0942. respectively. However. the standard deviation for ROA rebounded to 0.0747. while the volatility of ROE remained relatively stable at 0.1315. These findings imply that a performance divergence began to emerge as firms navigated the recovery process at varying rates.

Regarding the full sample. the overall mean values for ROA and ROE were 0.0579 and 0.1163. with corresponding standard deviations of 0.0750 and 0.1555. Furthermore. the range (min–max) for ROE was significantly wider than that of ROA. underscoring the higher volatility inherent in returns on equity throughout

the investigated period. Overall. the descriptive evidence provides a preliminary indication that the COVID-19 pandemic adversely affected corporate efficiency while simultaneously altering the degree of performance dispersion across the different stages of the crisis.

Following the descriptive analysis, the study proceeds to evaluate the normality assumption of the variables to determine the suitability of parametric tests for subsequent analytical steps. Specifically, the Shapiro–Wilk test is employed to assess the distributional fit of the two primary performance metrics, ROA and ROE. This statistical test was selected due to its high statistical power and reliability, particularly in empirical research involving medium-to-large sample sizes. Furthermore, the Shapiro–Wilk test remains a widely recognized and standardized approach in contemporary empirical literature for validating distributional characteristics.

Table 3. Shapiro–Wilk normality test results for ROA across COVID-19 phases

period	N	W	V	Z	p	p_display
DURING	631	0.8808403	49.46076	9.47501	0.000	<0.001
POST	633	0.8275002	71.80663	10.38188	0.000	<0.001
PRE	628	0.8448953	64.10358	10.10274	0.000	<0.001

Table 4. Shapiro–Wilk normality test results for ROE across COVID-19 phases

period	N	W	V	Z	p	p_display
PRE	628	0.8786876	50.13750	9.50604	0.000	<0.001
DURING	631	0.9421195	24.02499	7.72124	0.000	<0.001
POST	633	0.9341798	27.39904	8.04152	0.000	<0.001

The Shapiro–Wilk test results for both ROA and ROE across the pre-, intra-, and post-COVID-19 phases indicate that the data do not follow a normal distribution. Specifically, for ROA, the W-statistic ranges from 0.8275 to 0.8808, while for ROE, the values fluctuate between 0.8787 and 0.9421. Furthermore, the p-values in all cases are below the 1% significance level, suggesting a statistically significant deviation from normality for both performance metrics across all investigated periods.

These findings imply that the distributions of ROA and ROE exhibit notable skewness or kurtosis, reflecting non-uniformity in corporate operational efficiency. This is consistent with the research context, where the COVID-19 pandemic generated asymmetric shocks, leading to severe negative impacts on some firms while others maintained or even enhanced their performance. Notably, ROE tends to exhibit higher volatility than ROA, suggesting that returns on equity are more sensitive to risk factors and capital structure dynamics.

From a methodological perspective, although a large sample size might allow for the application of parametric tests based on the Central Limit Theorem, the non-normal distribution observed in this study provides a robust justification for selecting non-parametric methods. Consequently, the employment of the Kruskal–Wallis and Wilcoxon rank-sum tests in subsequent analytical stages is appropriate, enhancing the reliability and robustness of the statistical inferences.

4.2 Non-parametric Analysis of Corporate Performance across Phases

Since the Shapiro–Wilk test results indicated that the research variables deviate significantly from a normal distribution, the application of parametric tests, such as one-way ANOVA, was deemed inappropriate. Consequently, the Kruskal–Wallis H test was selected to evaluate the performance differences across the pre-, intra-, and post-COVID-19 phases. As a non-parametric alternative, this method does not require the assumption of normality and is particularly well-suited for skewed distributions. Therefore, the adoption of this approach ensures the robustness and reliability of the analytical results within the specific context of this study.

Table 5. Kruskal–Wallis test results for ROA differences across COVID-19 phases

period	Obs	Rank sum
DURING	631	610,476.50
POST	633	541,022.00
PRE	628	639,279.50

chi2(2) = 29.550 Prob = 0.0001

chi2(2) with ties = 29.550 Prob = 0.0001

Table 6. Kruskal–Wallis test results for ROA differences across COVID-19 phases

period	Obs	Rank sum
DURING	631	615,330.00
POST	633	524,441.00

PRE 628 651,007.00

chi2(2) = 48.363 Prob = 0.0001

chi2(2) with ties = 48.363 Prob = 0.0001

The Kruskal–Wallis non-parametric test results reveal statistically significant differences in corporate performance across the pre-, intra-, and post-COVID-19 phases for both ROA and ROE. Specifically, for ROA, the Chi-square statistic reaches 29.550 (p = 0.0001), while for ROE, the Chi-square value is 48.363 (p = 0.0001). These findings provide robust empirical evidence that firm efficiency fluctuated significantly over time under the pandemic's influence. Consequently, hypothesis H1, regarding the existence of performance disparities across the defined periods, is supported.

A more granular analysis based on rank sums identifies a consistent downward trend in both metrics. The pre-pandemic (PRE) phase recorded the highest rank sums (ROA: 639,279.50; ROE: 651,007.00), followed by the intra-pandemic (DURING) phase, with the post-pandemic (POST) period exhibiting the lowest values. This trajectory suggests that profitability not only suffered during the height of the crisis but continued to deteriorate in the aftermath. Thus, the empirical evidence does not support hypothesis H2 in the sense of a sudden, isolated drop during the pandemic compared to the prior period; instead, it indicates a cumulative negative impact that intensified over time.

Furthermore, the results provide no evidence of a performance recovery in the post-pandemic era. On the contrary, the fact that ROA and ROE reached their lowest rank sums during the POST phase implies a sustained contraction rather than a rebound. Therefore, hypothesis H3, predicting a recovery trend in the post-pandemic period, is rejected.

These findings suggest that the impact of COVID-19 on corporate performance is dynamic and characterized by a "shock lag." During the DURING phase, although firms began to experience adverse effects, the magnitude of the decline was partially mitigated by cushioning factors, such as accumulated financial reserves, short-term cost adjustments, and timely government support interventions. However, moving into the POST phase, as support measures were phased out and cumulative challenges—including dampened demand, supply chain disruptions, rising cost pressures, and financial risks—fully materialized, the erosion of corporate efficiency became more pronounced.

Notably, ROE exhibited greater volatility than ROA, as evidenced by its higher Chi-square value and more substantial rank sum disparities. This underscores that returns on equity are more sensitive to economic shocks, primarily due to the amplification effect of financial leverage. As firms increased debt levels to maintain operations amidst the crisis, rising financing costs squeezed net margins, leading to a more severe contraction in ROE.

In summary, the Kruskal–Wallis test not only confirms statistically significant performance shifts across the periods but also provides evidence of a systematic and prolonged decline in corporate efficiency. These findings highlight that the impact of a major economic shock is not instantaneous but tends to accumulate and manifest more severely over time, implying that the corporate recovery process may be more protracted than initially anticipated and heavily influenced by both internal resilience and macroeconomic conditions.

4.3 Post-hoc Pairwise Comparisons and Discussion of Temporal Dynamics

While the Kruskal–Wallis test provides evidence of statistically significant differences in corporate performance across the three investigated periods, this omnibus test does not specify which particular pairs of phases differ from one another. In other words, the Kruskal–Wallis test reflects only the overall disparity among multiple groups without indicating the magnitude or direction of differences between specific pairs of observations.

Consequently, to further elucidate the nature of these variations, the study employs the Wilcoxon rank-sum test (Mann–Whitney U test) as a post-hoc procedure for each pair of phases (PRE–DURING, DURING–POST, and PRE–POST) regarding both ROA and ROE. This approach enables the identification of specific stages where statistically significant shifts occur, thereby providing more granular evidence of the fluctuation trends in firm performance under the impact of the COVID-19 pandemic.

Table 7. Descriptive metrics (Mean and SD) for profitability indicators across periods

period	Variable	N	Mean	SD
PRE-COVID	ROA	1,861	0.0647163	0.0770848
	ROE	1,861	0.135709	0.186135
DURING-COVID	ROA	1,259	0.0590348	0.0710194
	ROE	1,259	0.1207117	0.1330681
POST-COVID	ROA	1,884	0.0503245	0.0747326

ROE | 1,884 0.0941909 0.1315305

Table 7 presents the mean and standard deviation (SD) for the two primary financial performance indicators, ROA and ROE, across the pre-, intra-, and post-COVID-19 phases. During the pre-pandemic period, ROA reached an average of 0.0647 with an SD of 0.0771, while ROE exhibited a higher mean of 0.1357 alongside greater volatility (SD = 0.1861). This pattern reflects a higher return on equity relative to total assets, albeit accompanied by a broader dispersion among the sampled firms.

During the intra-pandemic phase, both metrics recorded a noticeable decline, with ROA dropping to 0.0590 and ROE to 0.1207. Concurrently, the standard deviations for both ROA (0.0710) and ROE (0.1331) decreased compared to the previous period, suggesting that the performance gap between firms narrowed amidst the crisis, likely due to the uniform systemic impact of the pandemic.

In the post-pandemic stage, the downward trend persisted, with ROA and ROE further declining to 0.0503 and 0.0942, respectively. Notably, the standard deviation for ROA rose slightly to 0.0747, whereas the SD for ROE continued to fall to 0.1315, implying that a performance divergence began to re-emerge as firms navigated the recovery process at varying rates.

Overall, the statistical results indicate a consistent deterioration in corporate efficiency across the investigated phases, particularly pronounced in the case of ROE. Furthermore, the fluctuations in standard deviations reflect the diverse adjustment dynamics and varying degrees of resilience among firms under the pandemic's influence.

While the comparison of mean values illustrates a clear downward trajectory in performance metrics, these findings remain primarily descriptive. Therefore, to determine whether the observed variations between specific pairs of periods are statistically significant, the study proceeds with post-hoc tests.

Table 8. Wilcoxon rank-sum test: Pre-pandemic vs. Intra-pandemic performance

Comparison	roa_z	roa_p	roe_z	roe_p
PRE vs DURING	-1.605	0.108	-1.942	0.052
DURING vs POST	3.636	<0.001	4.718	<0.001
PRE vs POST	-5.339	<0.001	-6.817	<0.001

The Wilcoxon rank-sum test was employed to conduct a granular analysis of the differences between specific pairs of phases, thereby elucidating the nature and dynamics of corporate performance fluctuations under the impact of COVID-19. Regarding the comparison between the pre-pandemic and intra-pandemic periods (PRE vs. DURING), the results indicate no statistically significant differences for either ROA ($z = -1.605$, $p = 0.108$) or ROE ($z = -1.942$, $p = 0.052$), as both p-values exceed the 5% significance threshold. Although the negative sign of the z-statistics suggests a slight downward trend during the DURING phase, the magnitude of this shift was insufficient to achieve statistical significance. These findings imply that the initial stage of the pandemic did not substantially alter corporate efficiency, thus failing to support hypothesis H2.

The absence of a pronounced difference between the PRE and DURING phases can be explained by both measurement and contextual factors. From a measurement perspective, ROA and ROE are aggregate indicators reflecting performance over an accounting period; consequently, they often exhibit a recognition lag in responding to short-term economic shocks. Contextually, during the early stages of the pandemic, many firms maintained operational efficiency by leveraging prior financial cushions, as well as implementing temporary adjustments in costs and production activities. Furthermore, industry-level heterogeneity likely mitigated the average impact, as certain sectors remained resilient or even benefited from the crisis, preventing the severely affected industries from dominating the entire sample.

Conversely, the comparison between the intra-pandemic and post-pandemic phases (DURING vs. POST) reveals a highly significant statistical disparity for both ROA ($z = 3.636$, $p < 0.001$) and ROE ($z = 4.718$, $p < 0.001$). Similarly, the PRE vs. POST comparison shows a stark contrast, with z-statistics of -5.339 (ROA) and -6.817 (ROE), both significant at the 1% level. These results demonstrate that corporate performance in the post-COVID-19 era deteriorated significantly compared to both preceding periods, thereby providing no support for hypothesis H3 regarding a post-pandemic recovery.

Notably, the magnitude of the disparity was greater for ROE than for ROA, as evidenced by the higher absolute z-values in all comparisons involving the POST phase. This suggests that return on equity is more sensitive to economic shocks, particularly as firms increased their reliance on financial leverage to sustain operations. As interest expenses rose and net margins contracted, the impact on ROE was more severe than on ROA, which primarily reflects the efficiency of total asset utilization.

In summary, the post-hoc results indicate that the impact of COVID-19 on corporate performance is non-linear and characterized by a distinct time lag. While the pandemic's influence was not statistically evident in its early stages, the negative effects accumulated and manifested more aggressively during the post-COVID-19 period. This not only reinforces the Kruskal–Wallis findings but also provides detailed evidence of pairwise disparities, enhancing the robustness of the study's conclusions.

From a causal perspective, the initial organizational resilience played a crucial role in buffering the pandemic's negative impact. Early on, many firms sustained performance through accumulated financial reserves and macro-policy supports, such as tax deferrals, interest rate reductions, and economic stimulus packages. However, as the pandemic persisted, challenges began to outpace firm adaptability. Supply chain disruptions escalated costs and reduced asset efficiency; dampened market demand led to revenue erosion while fixed costs remained inelastic; and mounting financial pressure from debt dependency increased interest burdens and financial risks.

Furthermore, the post-pandemic recovery has been uneven across firms and industries, leading to increased performance divergence. Many enterprises continue to face liquidity shortages, market loss, or heavy debt overhangs, while the post-COVID-19 macroeconomic environment remains fraught with uncertainties, including inflationary pressures and interest rate volatility. In this context, ROE proved particularly vulnerable to financial risks, explaining its sharper decline relative to ROA.

Overall, the findings suggest that the impact of COVID-19 was not instantaneous but tended to be cumulative, manifesting clearly in the medium term. This emphasizes the critical role of temporal dynamics and lags when assessing the influence of systemic economic shocks on corporate efficiency..

V. CONCLUSION AND IMPLICATIONS

This study provides consistent empirical evidence that the COVID-19 pandemic exerted a significant negative impact on corporate performance, as evidenced by the sustained decline in both ROA and ROE over time. The Kruskal–Wallis test confirms statistically significant disparities across the pre-, intra-, and post-pandemic phases, while the Wilcoxon rank-sum test clarifies that the deterioration became most pronounced and statistically significant during the post-COVID-19 era. These findings underscore the "shock lag" nature of the economic crisis, where adverse effects did not manifest immediately but accumulated progressively to reveal greater severity in the medium term. Furthermore, the sharper decline in ROE relative to ROA highlights the role of financial leverage in amplifying risk, making returns on equity more sensitive to macroeconomic fluctuations.

Based on these results, the study offers several critical implications linking macroeconomic policy and corporate governance. For policymakers, it is essential to design support measures that go beyond short-term responses, focusing instead on medium- and long-term stability and recovery, especially given the lagged impact of the crisis. The flexible maintenance and adjustment of fiscal and monetary tools—such as tax deferrals, interest rate subsidies, or investment stimuli—should be aligned with the actual corporate recovery cycle rather than being withdrawn prematurely. Additionally, policies should aim to enhance the resilience of the corporate sector by improving the business environment, supporting digital transformation, and facilitating access to capital. For enterprises, the findings suggest the vital importance of proactive risk management in uncertain environments, including optimizing capital structures, maintaining financial leverage at prudent levels, and improving asset utilization efficiency. Moreover, firms should develop flexible adaptation strategies, diversify revenue streams, and strengthen supply chains to mitigate the impact of future shocks.

Despite its contributions, this study is subject to certain limitations that provide avenues for future research. First, while the use of accounting-based metrics like ROA and ROE effectively reflects internal firm efficiency, they do not encompass market-based perspectives, potentially overlooking investor reactions or fluctuations in firm value. Second, although non-parametric testing ensures robustness under non-normal distributions, it limits the ability to simultaneously control for multiple confounding factors, such as industry characteristics, firm size, or financial structure. Furthermore, the scope of the study—focused on a single country and a specific timeframe—may not fully capture variations across different institutional contexts or types of crises.

Consequently, future research could expand by integrating market-based measures, such as Tobin's Q or stock returns, to provide a more comprehensive view of corporate performance. Additionally, the application of advanced econometric models, particularly panel data models, would better control for confounding variables and clarify causal relationships. Expanding the research scope to other countries or conducting cross-country comparisons would also provide deeper insights into the role of institutional environments and policies. Finally, examining moderating factors such as corporate governance, leverage levels, or digital transformation capabilities would contribute to elucidating the mechanisms of impact and corporate adaptability in the face of future economic shocks.

REFERENCES

[1] Bui. T. H.. NGUYEN. H. T.. Pham. Y. N.. Nguyen. T. T. T.. LE. L. T.. & LE. G. T. T. (2022). The impact of covid-19 pandemic on firm performance: empirical evidence from vietnam. *The Journal of Asian Finance. Economics and Business*. *9*(7). 101-108.

[2] Ding. W.. Levine. R.. Lin. C.. & Xie. W. (2021). Corporate immunity to the COVID-19 pandemic. *Journal of financial economics*. *141*(2). 802-830.

[3] Donthu. N.. & Gustafsson. A. (2020). Effects of COVID-19 on business and research. *Journal of business research*. *117*. 284-289.
[4] Fama. E. F.. & French. K. R. (2000). Forecasting profitability and earnings. *Journal of Business*. 73(2). 161–175.
[5] He. Q.. Liu. J.. Wang. S.. & Yu. J. (2020). The impact of COVID-19 on stock markets. *Economic and political studies*. *8*(3). 275-288.
[6] Lộc. T. Đ.. Lê Trần Mẫn Di. N. T.. My. D.. & Ánh. T. N. Ảnh hưởng của dịch COVID-19 đến hiệu quả hoạt động kinh doanh của các công ty thương mại và dịch vụ niêm yết trên thị trường chứng khoán Việt Nam.
[7] Nurjanah. S.. Wijaya. S. N.. Komara. A.. & Mahadianto. M. Y. (2025). Financial Performance Evaluation: The Role of ROA and ROE in Increase Company Value. *International Journal of Business. Economics. and Social Development*. *6*(2). 264-270.
[8] Pilipenko. Z. A. (2020). Shock Theory: Financial Mechanisms of Economic System Destabilization. In *Social. Economic. and Environmental Impacts Between Sustainable Financial Systems and Financial Markets* (pp. 150-174). IGI Global Scientific Publishing.
[9] Shen. H.. Fu. M.. Pan. H.. Yu. Z.. & Chen. Y. (2021). The impact of the COVID-19 pandemic on firm performance. In *Research on Pandemics* (pp. 81-98). Routledge.
[10] Xu. J.. & Jin. Z. (2022). Exploring the impact of the COVID-19 pandemic on firms' financial performance and cash holding: New evidence from China's agri-food sector. *Agronomy*. *12*(8). 1951.