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RESEARCH ARTICLE

Financial Performance Analysis of Engineering Companies: An Empirical Study during the COVID-19 Pandemic in Bangladesh

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Abstract

As the largest crisis of the current world, the global pandemic "COVID-19" has wreaked havoc on the global economy, disrupting people's lives and wreaking havoc on financial markets and business industries. This scenario is almost the same in engineering companies. Due to the lockdown, a significant portion of construction activities were mostly restricted in the previous year, which had a massive impact on this sector. The pandemic's impact has caused numerous setbacks in this sector around the world. This study focused on 40 engineering firms and analyzed data from the COVID-19 period of 2019-2021. The key purpose of this study was to analyse the financial performance based on the determinants that have the most influence on the financial performance of the company. The findings of generalized linear model (GLM) show that, during the COVID-19 period, LNGPR had a positive impact on LNFP in engineering firms in Bangladesh, indicating that a 1% increase in LNGPR can increase LNFP by 0.80%. The variables LNLR and LNNPR have a positive impact on LNFP in engineering firms in Bangladesh, with estimated coefficient values of 0.44 and 1.22, respectively. LNDR has a significant impact on LNFP in engineering firms and a 1% increase in LNDR can enhance LNFP by 0.76 percent. However, variable sales growth has a negative impact during the COVID-19 pandemic. It is a positive sign that most of the variables have a significant and positive association with financial performance, except for sales growth. The authority should implement policies to restore sales growth and consistency in production distribution across countries.

Keywords: COVID-19; Engineering Companies; Financial Performance; Profit Ratio; Sales Growth

Introduction

The Corona virus (COVID-19) pandemic has brought significant challenges to the development of the world economy and has had an unprecedented impact on the construction industry (Yilmazkuday, 2022). According to Ogunnusi et al. (2020), COVID-19 has disrupted many industrial sectors, but the construction industry has been particularly hard hit. Construction site employees and professionals are at a high risk of exposure to aerosol and droplet contamination as well as infection. The COVID-19 crisis has stakeholders concerned about the construction sector's stagnation (Gamil & Alhagar, 2020). Pathirana (2020) noted that because the virus prevented all humans from participating in any industrial work, the construction sector was initially targeted. According to Bsisu (2020), the "restrictions placed on construction projects as a result of the pandemic crisis have slowed economic growth, increased unemployment, disrupted the supply chain for construction materials, and increased investment losses." These effects are all due to the negative effects of COVID-19. As a result, this year's growth in the construction industry has been reduced from 3.1% to 0.5% (Global Data, 2020). Due to the corona virus pandemic, Bangladesh's engineering industry is currently experiencing difficult times, including a decline in the economy, haphazard development efforts, and the loss of jobs for workers. According to Financial Express, the construction industry is one of the 15 sectors that contribute to Bangladesh's GDP (gross domestic product). According to data from the "Bangladesh Bureau of Statistics (BBS)," the construction industry made up 7.8% ($16.686 billion) of Bangladesh's overall GDP in the 2019–20 fiscal years. In the event of employment, this is yet another massive sector that will generate job opportunities. According to the labor force survey, BBS (2017), the published that in the fiscal year,

2.1% of the total labor force was occupied in this sector, while it was 5.5% in the fiscal year 2017. Supporting this statement, Financial Express (2021) reported that around 3.5 million people are concerned in this sector, of which 100,000 are directly engaged in various professional activities like architects, graduate engineers, diploma engineers, and other human resources. Massive infrastructure development, including mega construction projects, has been undertaken by the country to become a developing country in 2026 (Yeasin, 2021; Aijaz et al., 2022). Business Standard (2021) published a report on the Real Estate and Housing Association of Bangladesh, where the findings showed that this pandemic situation has delayed around 50–60% of the construction projects, caused a delay in finishing projects, increased the budget for materials, and raised the issue of a workers' shortage. As a result of the adverse impact on the national economy of this virus, 3.24% of the budget allocation for the ongoing megaprojects has been reduced in the 2020–21 fiscal year (The Daily Star, 2020).For the engineering industry, determining the performance of engineering firms has become a research issue. The evaluation of a firm's performance as assess of the company's excellence includes two major aspects: financial performance and non-financial performance. When discussing the company's performance, several researchers, including Horta et al. 2018; Tripathi & Jha (2018) have focused on its financial performance. Since such an appraisal is crucial for a company's owners, shareholders, and financial institutions because it clearly defines the company's true status, performance reviews of engineering companies can offer an assessment of the business's operations. Due to the drastic pandemic, the construction sector is facing massive uncertainty. The effects of the COVID-19 pandemic on the world's construction industry have drawn important attention for research since the construction industry suffered from project setbacks, labor shortages, job cutbacks, increased costs, and financial uncertainty as a result of this crisis (Gamil & Alhagar, 2020). Several researchers have reviewed the effects of COVID-19 on the construction industry in their study. Gan and Koh (2021) reviewed the precautionary activities taken by the legal authority such as government, labour organizations, and trade union to protect the labor rights and maintain the minimum wage rate. Through a meticulous examination, Al Mansoori et al. (2021) found that the cost of labor and project prices is both increasing in the United Arab Emirates (UAE) due to COVID-19. Like other countries, in Bangladesh the pandemic has caused considerable delays in development projects across the country as the lockdown has limited both people and material supplies, causing many employees to lose their employment and others to be unable to work (Dhaka Tribune, 2022). According to a survey result, 90% of respondents felt that the pandemic was a curse on the construction sector, with roughly 51% of projects having partial stops and 40% experiencing total halts (Prothom Alo, 2022). Furthermore, this pandemic is pushing some engineering and construction enterprises to consolidate debt, pursue other sources of funding, or face bankruptcy. The current study aims to investigate the before and after effects of the pandemic (COVID-19) on the financial performance of Bangladesh's listed engineering companies. The study targets all companies listed under the engineering category on the Dhaka and Chittagong stock exchanges. However, the main objective of this study is to examine the financial performance of listed engineering companies in Bangladesh during the COVID-19 pandemic. The main aspects of the engineering industry and COVID-19's impact on it have been examined and cited with short descriptions. (a) To find out the significant determinants of the firm's financial performance of listed engineering companies during the pandemic period. (b) To find out the impact of determinants on the firm's financial performance of listed engineering companies during the pandemic period. In addition, this research has been following the structure where section two presents literature review, section three for methodology, section four for result analysis and discussion and section five for conclusion and recommendations.

Literature Review

Wuhan, the capital of central China, was the first place where COVID-19, a virus-borne infection brought on by the SARS-CoV-2 virus, struck. The World Health Organization (WHO) affirmed COVID-19 a global pandemic on March 11, 2020. The social, economic, and health sectors were particularly hard hit, and researchers found that the COVID-19 epidemic has slowed GDP growth and increased unemployment, inequality, and poverty nationwide (Kumar & Pinky, 2020; Amin et al., 2021; Ikram et al., 2021). The average GDP loss experienced by the 178 countries in the world as a result of COVID-19 was 83,765.17 million dollars. On average, the economies of these nations would contract 16.04% of their total GDP, and on average, their economies would degrade by 7.67 years in 2020. The global recessionary phase began when the world's GDP shrank by 17.07% of its overall value over a seven-year period, reflecting a sharply declining trend brought on by COVID-19. Lockdowns, domestic tourism margins, air

travel bans, unemployment, and changes in the human quality index as a result all had a negative impact on global economic growth (Rahman & Hossain, 2021; Majumder & Rahman, 2022). Before COVID-19, Bangladesh had a dynamic economy partaking in an exceptional increase in neediness decrease, instructive fulfilment, orientation uniformity, and other financial markets that upheld this turn of events. The GDP growth rate in FY 2019–20 was only 5.24%, down from 8.15% the previous year. However, the engineering sector of Bangladesh assumes an undeniably crucial role in the economy because of the progress of urbanization and a variety of huge framework projects attempted by the public authority. The development market is one of the 15 significant areas contributing to the GDP, and it includes projects such as infrastructure, transportation, trade and organization, energy and power plant development. The engineering sector posted 9.92% growth in 2017–18, up from 8.77% in 2017 and 7.50% in 2016–17. Because of the increased emphasis on urbanization and the numerous infrastructure projects undertaken by the government, the development industry in Bangladesh contributed to the pre-pandemic situation. There were also development projects undertaken by general individuals and individuals with a confidential interest in lodging, which contributed 9.6% to the development work. According to Voumik et al. (2022), during the pandemic period, the progress of these ventures generally ceased, as well as other ongoing megaprojects being redacted at Payra, Maheskhali, and Matarbari. Bangladesh has undertaken a few megaprojects to lay out a prepared and unhampered correspondence network in the nation, including the "metro rail projects, the Padma Bridge, the passage under the Karnaphuli Stream, and the Dhaka Raised Freeway from Hazrat Shahjalal International Air Terminal to the Kutubkhali Dhaka-Chattogram thruway" which are likewise stopped in this emergency. However, the public authority takes different approaches to supporting the development work of activities impacted by the Corona virus. Alongside mega projects, the infrastructural development of Bangladesh additionally relies on the land area, including different forward and reverse linkage businesses. The Financial Express (2021) revealed that the commitment by land area and alongside the forward and reverse linkage enterprises in gross domestic product was 8% of gross domestic product, while the gift goes up to 12–14%. However, because of the pandemic, this area took a gigantic hit during the primary lockdown, which caused devastation in the housing market. The obvious reason for this is that merchants began withdrawing properties from the market, anticipating lower costs, and property looking was dialled back and nearly slowed down as people became more concerned about their health security.

The COVID-19 pandemic forced the entire world to visage it, which inevitably led to significant changes in all regions, from economics to social (Chen & Yeh, 2021). Every business sector and industry suffered as a result of the COVID-19 epidemic on a global scale (Brodeur et al., 2021). Policies were implemented to reduce the impact of the COVID-19 lockdown and social distancing measures (Wang et al., 2020). Khatib and Nour (2021) saw that the corona virus pandemic altogether affects a few parts of business, for example, execution, administration, construction, liquidity, and influence level. Shen et al. (2020) examined the effects of Corona virus on organizational execution using financial data and discovered that Corona virus had a negative impact on organizational execution. In India, Das and Patnaik (2020) found that different enterprises like telecom, the travel industry, avionics, the auto industry, and transportation are the most affected by the current crisis. Various researchers examined the association between COVID-19 and economic performance through their studies (Goswami et al., 2021; Debata et al., 2020). According to Fu and Shen (2020), COVID-19 has had a significant negative impact on the performance of China's energy industries. "The listed companies' poor performance immediately following COVID-19 may be attributed to organizational culture in dealing with challenges and crises." According to Forbes (2002), the company's financial performance may have been negatively impacted by the low income level of the population at the time of the pandemic. Because of the extreme pandemic development, the area is confronting enormous vulnerability. According to the International Monetary Fund (IMF), the global GDP will fall by up to 3% in 2018 due to the ongoing pandemic situation. The corona virus threatens a wide range of laborer occupations around the world. In the event of a pandemic, limited human development has had a negative impact on development efficiency as well as development firm execution, which unavoidably falls. To decrease the frosty impact of the corona virus pandemic, the government was compelled to stop numerous development projects. During this present circumstance, numerous enormous development organizations as well as little development organizations confronted financial misfortunes. Jallow et al. (2020) showed that challenges in overseeing exercises, bringing about delays. In Ghana, development projects experienced a decreased work rate, delays in instalments, and an expansion in material expenses during the

pandemic time frame (Agyekum et al., 2021). In India, Alsamhi et al. (2022) found a massive contrast in complete pay, net deals, net benefit, profit per share, and weakened profit per share when the pandemic hit the travel industry, neighbourliness, and shopper areas. The review added that a massive distinction was made in complete pay-net deals when the pandemic was in developing and food areas, whereas there was no huge contrast between net benefit, profit per share, and weakened income per share when the pandemic was in building and food areas. Besides, Endrijatno and Surjandari (2022) found that in Indonesia, the pandemic condition didn't essentially influence the decrease in that frame of mind of the development organization, where the organization could make do with its capacities and keep up with its presentation. According to a survey response by 28% of individuals from the Associated General Contractors of America (AGC), ventures in the United States were also delayed or stopped.

A number of empirical researches have been demeanour to explore the impacts of COVID-19 on different sectors in Bangladesh's economy. In light of both essential and optional information, Islam (2020) concentrated on the effect of Corona virus on the piece of clothing area in Bangladesh, and found that because of Corona virus, the piece of clothing area in Bangladesh confronted a 3.18 billion dollar drop in orders, the store network of unrefined substances was seriously upset, and the products of the RMG area are 11.43% lower compared with the earlier year, but 72.4% lower than the earlier month in July 2020. This concentrate additionally added that the month-to-month development pace of the commodities in the RMG area was negative in FY 2019–20. In her review, Elahi and Rahman (2021), Rahman & Dilanchiev, (2021) distinguished the eruption of the worldwide inventory network as the fundamental explanation that is seriously impacted by the time period. Because of work in Bangladesh, Islam (2020) cantered that because of Corona virus, the economy's development rate dropped sharply, causing the financial emergency and a large number of individuals lost their positions, all the more explicitly, 11 million positions were lost amid the time of lockdowns, and consequently, the economy suffered by 3% of the workforce losing their positions, of which a portion of 1,000,000 positions were looted. In his review, Saha et al. (2020) saw the danger of joblessness because of the Corona virus. The researcher discovered that the global and local economic downturns are to blame for a shortage of jobs in the clothing, transportation, travel industry, banking, security, and training sectors. On account of the RMG sector, the orders from worldwide purchasers were contracted, industrial facilities stayed shut, and laborers' contracts were ended. Genoni et al. (2021) saw that the labor market in Bangladesh, both at the broad and concentrated edges, including significant variety across regions and orientations, is impacted by the Corona virus. At the same time, long-term outcomes of neediness, food security, and future income are also influenced by market laborers' long-term job losses. This pandemic is additionally connected with elevated degrees of vulnerability in the gig market, producing pressure and tension that might cause wellbeing and mental issues.

Observing the socioeconomic impact of COVID-19 and its policy inferences for Bangladesh Pak et al. (2020) found specific sectors, including the leather, textile, and apparel sectors, have suffered reduced output, while agriculture product, manufacturing, services, and other sectors have been faced a reduction of output. The result is supported by other studies. During the period of the COVID-19 pandemic, "garments and knitwear products, petroleum, cement, and other non-metallic mineral products declined sharply while drug and pharmaceutical products increased." In addition, "the nominal wage rates in the industry and service sectors declined, the export of goods, imports of goods, and service payments had fallen, and the exports of the RMG sector had fallen largely due to the COVID-19 pandemic" (Hossain & Alam, 2022). Horaira (2021), Sufian and Hoque (2022) and Nekmahmud et al. (2022) added that because of the pestilence, both domestic and guests dropped their visits, and many flights have been cancelled due to different travel limitations. Therefore, organizations lose cash and laborers lose positions. According to Mohiuddin (2020), the per capita daily pay of metropolitan slums and provincial poor has dropped by 80% as a result of the current countrywide closure authorized by the government, where a large portion of this population (40 percent to 50 percent) took credit to meet day-to-day expenses in Bangladesh. Once more, Ali et al. (2021), Elahi and Rahman (2021), Majumder and Rahman (2022) concentrated on the effects of Corona virus on Bangladesh's economy, where he found that because of Corona virus in Bangladesh, the Gross Domestic Product, trade volume, and settlements had a slump of 18.09%, 18.08%, and 19.73% separately, causing a downgrade of $40,984.34 million, $6540.97 million, and $3941.45 million in the year 2020, respectively, and this downturn went on for 3 years, 2 years, and 2 years from 2019 separately. Once again, the global unemployment rate would rise by 1.38%, while in Bangladesh it would rise by 2.43%. Shahriar et al. (2021) saw that the corona virus caused an unfavourable effect

on Bangladesh's economy, which impacted the lives of a large number of individuals when their pay sources were hampered. Furthermore, it was normal that the yearly misfortune of 53 million dollars was raised because the pace of the graduate joblessness rate expanded from 47% to 58% in 2020. Ali et al. (2021) added that understudies at Bangladeshi colleges have been experiencing unlimited mental stress side effects as the fear of academic postponement has progressed throughout the Corona virus time frame.

However, from the literature review, it can be said that existing studies focused on the impacts of COVID-19 on the manufacturing, engineering, construction, and service sectors of Bangladesh and the economy as a whole. In these studies, the researchers analyzed the effect of COVID-19 on the financial performance of selected factors based on secondary data and explained it qualitatively. These studies are too narrow in scope to draw any firm conclusions about the effects of COVID-19 on a specific sector of Bangladesh. Because the urban informal economy, particularly the construction sector, has been severely impacted by COVID-19, the urban informal economy is seriously affected by the lockdowns. As a result, this study was the first to examine the impact of COVID-19 on the performance of listed engineering companies in Bangladesh during the pandemic period.

Methodology of the Study

Scope and Data

The study considers the engineering sector listed on the Dhaka Stock Exchange (DSE). The time period studied is 2019–2021. Secondary data were obtained from the Dhaka Stock Exchange website, journals, theory books, and so on. This study's cross-sectional unit is engineering firms listed on the DSE. While the data used in this study is listed on the Dhaka Stock Exchange and the Chittagong Stock Exchange in 2018–2021, the Company's selection process used a simple selection process based on random process. The criteria used for selecting the cross section units are as follows: (a) selected companies listed on the Dhaka Stock Exchange before 2019. (b) Selected companies publish financial and annual reports on the Dhaka Stock Exchange consecutively from 2019 to 2021. (c) Selected companies are not delisting. (d) Companies that provide complete data according to the required variables.

Variable Justification and Calculation Process

a. Sales Growth: The primary source of capital for the businesses is sales revenue. Additionally, sales revenue affects the financial health of manufacturing companies (Wamiori et al., 2016; Rahman & Majumder, 2021).

b. Liquidity Ratio: Current ratio is a "measure of relative liquidity that takes into account differences in absolute size. It is used to compare companies with different total current assets and liabilities". Current ratio can be measured by the formula:

CR = ($Current\ Assets/\ Current\ Liabilities$) x 100.

c. Debt Policy: Debt policy is a choice made by the company's executive management regarding the amount of external funding obtained through debt as a source of command and control funding for the business (Enekwe et al., 2014; Harahap et al. 2020). The following formula can be used to gauge debt policy.

DER = $Total\ Liabilities\ /Total\ Equity$

d. Gross Profit Ratio: GPR calculated by using the formula (Gross Profit or Income / Sales) x 100.

e. Net Profit Ratio: NPR calculated by using the formula (Net Profit or Income / Net Sales x 100) where net profit determined by Total Sales – Sales Returns.

f. Financial performance: Financial performance serves as the study's dependent variable. An analysis of financial performance is done to determine whether the company's rules regarding the proper and correct use of finance are being followed (Fatihudin, 2018; Oskouei, 2019). Creating a report that complies with "General Accepted Accounting Principles (GAAP)" requirements. Financial performance can be measured by the formula.

ROA = ($Earnings\ after\ Tax\ /Tot\ $) x 100.

Generalized Linear Model (GLM)

Multivariate regression analysis is important where we have used GLM to see how the independent variables affect the dependent variable. An analysis known as multivariate regression analysis links the dependent variable to two or more independent variables (Rahman et al., 2022; Rahman & Habib, 2021; Majumder & Rahman, 2020; Rahman & Majumder, 2022). To understand how the independent variable affects the dependent variable, use the GLM regression analysis. Equations 1 and 2's error terms' normal distribution was followed by the GLM.

$$\mu_{it} = \delta_0 + \delta_1 x_{it} \quad (1)$$

$$y_i \sim N(\mu_i, \varepsilon) \quad (2)$$

However, the econometric model of selected variables is presented in equation 3 to 5.

$$FP = F(DR, GPR, LR, NPR, SG) \quad (3)$$

$$FP_{it} = \delta_0 + \delta_1 DR_{it} + \delta_2 GPR_{it} + \delta_3 LR_{it} + \delta_4 NPR_{it} + \delta_5 SG_{it} + \varepsilon_{it} \quad (4)$$

$$LnFP_{it} = \delta_0 + \delta_1 LnDR_{it} + \delta_2 LnGPR_{it} + \delta_3 LnLR_{it} + \delta_4 LnNPR_{it} + \delta_5 LnSG_{it} + \varepsilon_{it} \quad (5)$$

Where i indicates cross unit, ε is error term, and the t is the time. Ln= Natural Log for all the selected variables, FP = Financial Performance, δ_0 = Constant, δ_1 to δ_5 = Regression coefficients, LnDR = Debt Policy, LnLR = Liquidity Ratio, LnSG = Sales Growth, LnGPR= Gross Profit Ratio and LnNPR= Net Profit Ratio.

Result Analysis

This study has considered several factors, such as debt policy, liquidity ratio, sales growth, and gross and net profit ratios, to measure the financial performance of engineering companies during the COVID-19 period because those factors play a key role in ensuring the performance of a company. However, Table 1 displays descriptive statistics results using several criteria, including mean, maximum and minimum value, standard deviation, and skewness with kurtosis value and sum sq. deviation. However, the estimated mean value of the variable LNFP is -2.55, the median value is -3.17, the maximum value is 2.50 with a minimum value of -8.08, the skewness is 0.34 with a kurtosis value of 3.24, the standard deviation is 2.37, and the sum sq. deviation is 264.37. The mean value of the variable LNDR is 0.06, the median value is 0.09, the maximum value is 2.16, the minimum value is -2.28, the skewness is -0.27 with a kurtosis value of 2.94, and the sum sq. deviation is 44.01. The anticipated mean value of the data LNGPR is -1.59, the median value is -1.54, the maximum value is -0.89 with a minimum value of -2.55, the skewness is -0.48 with a kurtosis value of 2.62, the standard deviation is 0.42, and the sum sq. deviation is 8.20. The estimated median value of the data LNLR is 0.41, the mean value is 0.46, the maximum value is 2.20, the minimum value is -0.86, the skewness is 0.81 with a kurtosis value of 2.62, the standard deviation is 0.55, and the sum sq. deviation is 14.26. However, the estimated mean value of the variable LNNPR is -2.92, the median value is -2.86, the maximum value is -1.45, the minimum value is -5.09, the skewness is 0.54 with a kurtosis value of 3.22, the standard deviation is 0.87, and the sum sq. deviation is 35.41. The anticipated mean value of the variable LNSG is -1.76, the median value is -1.89, the maximum value is -0.69 with a minimum value of -3.85, the skewness is -0.14 with a kurtosis value of 3.21, the standard deviation is 0.90, and the sum sq. deviation is 38.02.

Table 1: Descriptive Statistics of the Variables

	LNFP	LNDR	LNGPR	LNLR	LNNPR	LNSG
Mean	-2.55	0.06	-1.59	0.46	-2.92	-1.76
Median	-3.17	0.09	-1.54	0.41	-2.86	-1.79
Maximum	2.50	2.16	-0.89	2.20	-1.45	0.69
Minimum	-8.08	-2.28	-2.55	-0.86	-5.09	-3.85
Std. Dev.	2.37	0.97	0.42	0.55	0.87	0.90
Skewness	0.34	-0.27	-0.48	0.81	-0.54	-0.14
Kurtosis	3.24	2.94	2.62	5.32	3.22	3.21
Sum Sq. Dev.	264.37	44.01	8.20	14.26	35.41	38.02

Source: Authors Estimation

Table 2: Correlation Matrix among the Variables

	LNFP	LNDR	LNGPR	LNLR	LNNPR	LNSG
LNFP	1	0.164	0.288	0.221	0.489	0.020
LNDR	0.164	1	-0.325	-0.405	-0.050	0.221
LNGPR	0.288	-0.325	1	0.551	0.478	0.119
LNLR	0.221	-0.405	0.551	1	0.339	-0.102
LNNPR	0.489	-0.050	0.478	0.339	1	0.252
LNSG	0.020	0.221	0.119	-0.102	0.252	1

Source: Authors Estimation

Table 2 shows the correlation matrix, where the statistics show the correlation between the variables. There is some positive and negative correlation among the variables. LNFP and LNDR, for example, have a positive relationship with a correlation value of 0.164; LNFP and LNGPR have a positive relationship with a correlation value of 0.288; LNFP and LNLR have a positive liaison with a correlation value of 0.221; LNFP and LNNPR have a positive association with a correlation value of 0.489; and LNFP and LNSG have a positive link with a correlation value of 0.020. LNDR and LNGPR have negative relations, and the correlation value is -0.325; LNDR and LNLR have negative relations, and the correlation value is -0.405; LNDR and LNNPR have negative relations, and the correlation value is -0.050; and LNDR and LNSG have positive relations, and the correlation value is 0.221. LNGPR and LNFP have a positive relation, and the correlation value is 0.288; LNGPR and LNNPR have a positive relation, and the correlation value is 0.478; and LNGPR and LNSG have a positive relation, and the correlation value is 0.119. LNLR and LNFP have positive relations, and the correlation value is 0.221; LNLR and LNNPR have positive relations, and the correlation value is 0.339; LNLR and LNSG have negative relations, and the correlation value is -0.102. LNSG and LNGPR have a positive association, with a correlation of 0.119; LNSG and LNNPR have a positive relationship, with a correlation of 0.252. A test for equality between the series has been presented in Table 3. Anova F-test and Welch F-test are used to continue the test, where the tests are significant at the 1% level to show mean equality between the series.

Table 3: Test for Equality of Means between Series

Method	df	Value	Probability
Anova F-test	(5, 597)	131.10	0.00
Welch F-test*	(5, 245)	299.92	0.00

Source: Authors Estimation

Figure 1: Representation of Data Dimensions/Growth during the Time Period

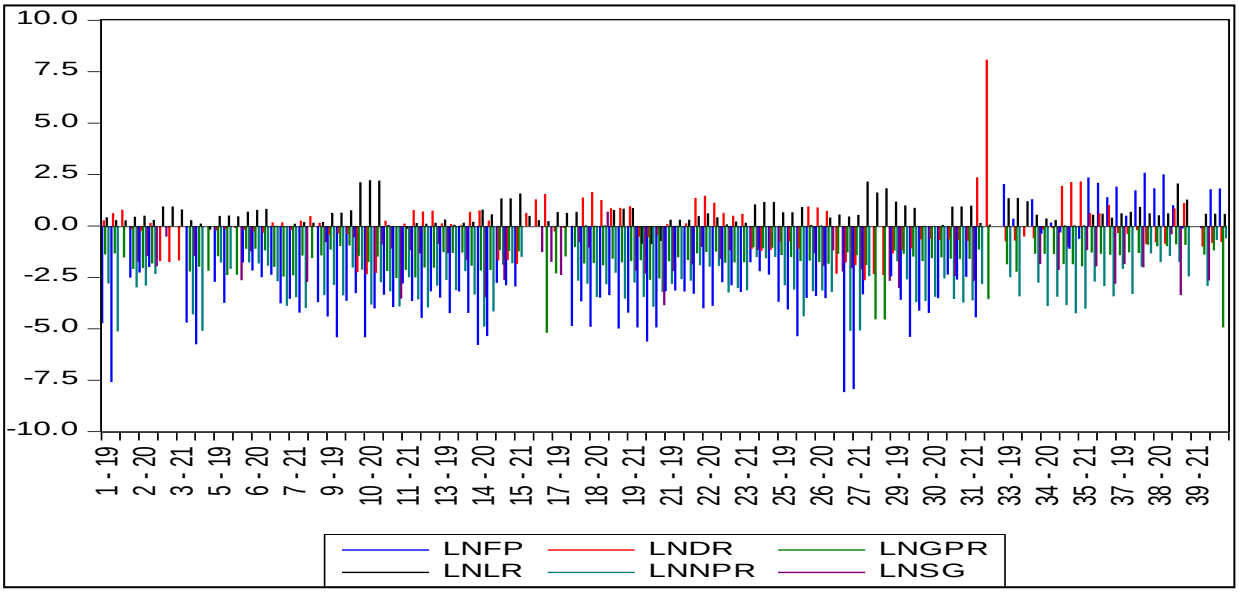

Figure 1 shows the data dimensions and growth during the COVID-19 time period of 2019–2021 to estimate the econometric model; the variables are in log form. However, the maximum variables are showing a negative trend over the time period. Using negligible variables and the selected cross-section unit, firms have negative growth for selected variables. However, the results of the generalized linear model (GLM) have been presented in Table 4, where the dependent variable is financial performance (LNFP). During the COVID-19 period, engineering companies in Bangladesh have played a vital role in ensuring sustainable growth and development. The independent variable, such as LNDR, has a significant impact on LNFP in engineering companies, and the estimated value of the coefficient is 0.76, which indicates that a one percent increase in LNDR has been able to boost LNFP by 0.76 percent. There is a positive interlink between the variables LNDR and LNFS; this sign is expected for a company. However, the pandemic crisis did not hamper the maintenance of the relation between those variables, which is suggested by the accounting theories.

Table 4: Results of Generalized Linear Model (GLM)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Dependent variable: LNFP				
LNDR	0.76	0.35	2.16	0.03
LNGPR	0.80	0.95	0.84	0.40
LNLR	0.44	0.70	0.63	0.53
LNNPR	1.22	0.41	2.97	0.00
LNSG	-0.44	0.36	-1.23	0.22
C	1.26	1.71	0.74	0.46
Model Fit Evidences				
Mean dep. var	-2.55	S.D. dep. var		2.37
Akaike info criterion (AIC)	4.40	Schwarz criterion (SIC)		4.64
LR statistic	20.66	Prob(LR statistic)		0.00
Pearson SSR	177.20	Pearson statistic		4.22

Source: Authors Estimation

Table 5: Confidence Interval Estimation of Generalized Linear Model (GLM)

Variable	Coefficient	90% CI		95% CI		99% CI	
		Low	High	Low	High	Low	High
LNDR	0.76	0.17	1.36	0.05	1.48	-0.19	1.72
LNGPR	0.80	-0.80	2.40	-1.12	2.72	-1.77	3.37
LNLR	0.44	-0.74	1.61	-0.97	1.85	-1.45	2.32
LNNPR	1.22	0.53	1.91	0.39	2.05	0.11	2.33
LNSG	-0.44	-1.05	0.16	-1.17	0.29	-1.42	0.53
C	1.26	-1.62	4.13	-2.19	4.70	-3.35	5.87

Source: Authors Estimation

On the other hand, the independent variable, LNGPR, has also had a positive impact on LNFP in engineering firms in Bangladesh during the COVID-19 period, and the estimated value of the coefficient is 0.80, indicating that a 1% increase in LNGPR can enhance LNFP by 0.80 percent. There is a positive correlation between the variables LNGPR and LNFS, which is a positive sign for a company. However, the pandemic crisis did not prevent the accounting theories from maintaining the relationship between those variables, such as LNGPR and LNFS. The variables LNLR and LNNPR have a positive impact on LNFP in engineering firms in Bangladesh during the COVID-19 period, and the estimated values of the coefficients are 0.44 and 1.22, where LNNPR is significant at the 1% level but LNLR is insignificant. There is a positive correlation among the variables LNLR, LNNPR, and LNFS; this is strength for a company. However, the pandemic crisis did not

prevent the accounting theories from maintaining the relationship between those variables, such as LNLR, LNNPR, and LNFS. The coefficient of the variable LNNPR is 1.22, which means a 1% increase in LNNPR enhances LNFP by 1.22 percent. However, the variable sales growth has a negative impact during the COVID-19 pandemic situation. In Bangladesh, sales growth in the engineering sector faces a crisis because of the pandemic crisis, lockdown, and other restrictions. The coefficient of variable sales growth is negative to explain the financial performance, but this result is not significant. The model fit evidence shows no inconsistency, and the probability value of the LR statistic is significant at the 1% level when considering the minimum SIC and AIC criteria. In addition, the results of the confidence interval estimation of the GLM model presented in Table 5 consider 90%, 95%, and 99% intervals to justify the coefficient estimates and impact of the selected variables on the financial performance of engineering companies.

Conclusion and Recommendation

Due to the fact that businesses can now be run anywhere in the world, financial performance is the main criterion used by investors worldwide. In order to fulfil commitments and accomplish the objectives set by the organization's top management, management used financial performance techniques. The share price and investor interest will significantly rise as the company's financial performance improves. Financial performance gives investors and creditors crucial information they can use to decide whether to trust a company with their money. Financial performance is one of many indicators that can be used to assess an organization's present state and future potential. The stakeholder must examine the factors that affect financial performance. Management should be aware of the factors affecting a company's financial performance because it matters to both investors and internal stakeholders. Financial performance measures the company's overall financial health, including the effectiveness of the top management's leadership. The COVID-19 pandemic has negatively impacted the performance of many businesses and the economy as a whole in Bangladesh. Despite the fact that it experienced steady growth for the previous five years, the engineering sector is not immune to the recession. The goal of the current study is to determine how the pandemic (COVID-19) has affected the financial success of some engineering sectors in Bangladesh. All companies listed on the Dhaka Stock Exchange in Bangladesh are the subjects of the study. This study considered 40 engineering firms and analyzed data from the COVID-19 period of 2019–2021. Key findings during the COVID-19 period indicate that LNGPR has a positive impact on LNFP in engineering firms in Bangladesh, and the estimated value of the coefficient is 0.80, indicating that a 1% increase in LNGPR can increase LNFP by 0.80 percent. During the COVID-19 period, the variables LNLR and LNNPR have a positive impact on LNFP in engineering firms in Bangladesh, with estimated coefficient values of 0.44 and 1.22, respectively. LNDR has a significant impact on LNFP in engineering firms, and the estimated value of the coefficient is 0.76, indicating that a 1% increase in LNDR can boost LNFP by 0.76 percent. During the COVID-19 pandemic, however, variable sales growth has a negative impact. Since the financial performance of engineering firms during the COVID-19 pandemic has not yet been examined in the context of Bangladesh, the study is distinctive in that it does so. Additionally, by examining Bangladeshi sectors, this study offers useful insights to regulators and policymakers about the adverse effects on industries as a result of the pandemic. Because COVID-19 has had a major effect on sales growth, the authority should concentrate on maintaining that growth. Government initiatives on domestic production and distribution would be a great addition to helping the country recover from this crisis. The key limitation of this study is the lack of updated data availability to compare post-COVID-19 scenarios. A future study should focus on the total number of firms and the post-COVID-19 evaluation of financial performance.

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