



## Examining the effect of Covid-19 on Firm Performance: Pakistan Perspective

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### Abstract

The coronavirus has significantly and noticeably impacted the global economic system, wealth, and Pakistan's economy. By considering 6 significant corporate sectors (economic groupings) of the Pakistani economy and analyzing business performance, this study and analysis aim to analyze the effects of the COVID-19 epidemic and infestation on the especially non-sector of Pakistan. The study makes use of 60 firms' quarterly firm-level data for the 2020Q2–2021Q4 period, along with data on total overall cases, active cases, and deaths from the coronavirus accessed through the National Command Operation Center (NCOC) website. It also examines the role played by Pakistan's healthcare system during this pandemic. The baseline Regression Model was employed in this study's analysis to gauge the impact's magnitude. In this study, researchers employed a baseline regression model to assess the scope of COVID-19's impacts on our business sector, both good and negative.

**Keywords:** COVID-19, Firm Performance, Corporate Sector, Healthcare System, Domestic Credit

### 1. Introduction:

Coronaviruses are a large and diverse family of viruses. People often feel cold after many of them. Others affect a variety of animals, including cattle, camels, and bats. Numerous questions regarding the origin of SARS-CoV-2 have been raised, however none of them have had a significant impact. The virus originated in bats (severe respiratory syndrome) that causes MERS and SARS. The virus first appeared on a modest scale in November in 2019, with the first significant cluster appearing in the Chinese city of Wuhan in the previous month, December of the same year. SARS-CoV-2 was especially designed to target residents of the open-air "wet markets" in Wuhan, China. Later iterations said that it was created in a Chinese laboratory as a biological weapon. People who had no intimate interaction with animals or bats were afflicted by SARS-CoV-2 as it spread both inside and outside of the People's Republic of China. As a result, the virus

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spreads from one individual to another. Even though it is happening in the USA, this is now starting to happen across the world, which suggests that people are unwittingly getting the coronavirus and paying for it. What is currently an epidemic is now characterized by global transmission. If we're talking about the evolution of the coronavirus, coronavirus was first discovered in a human in 1965. Research in the same decade revealed others related both human and animal viruses, that they named "Crown Viruses" in honor of the appearance of the queen. There are seven main coronavirus types that can harm humans. The virus responsible for this sickness originally surfaced in the southern region of China in the year 2002, and it quickly spread to another 28 countries. By the end of July 2003, around 8,000 people had contracted the disease; 774 of them were unable to battle it and perished. There were only four further occurrences in the minor pandemic in 2004. This coronavirus causes influenza, headaches, and bronchial problems including coughing and breathing difficulties. MERS was originally discovered in Saudi Arabia in the year 2012. Most of the over 2,500 cases are caused by people who reside in or travel to the Middle East.

The Chinese city of Wuhan is where this human illness was initially identified. According to an examination of the primary 41 instances of COVID-19 that were submitted to the Lancet in the January month of 2020, the earliest symptom onset date was on December 1st, 2019. As per official WHO publications, the first symptoms appeared on December 8th, 2019. The WHO and Chinese authorities will have confirmed human-to-human transmission by January 20, 2020. By December 2019, human-to-human transmission accounted for virtually all disease transmission. The number of COVID-19 cases in the Chinese province of Hubei swiftly increased, reaching a high of 60 cases until December 20 and a low of 266 cases until December 31. During the first three weeks of January 2020, the virus spread to other Chinese districts thanks to emigration associated with the Lunar New Year and Wuhan's importance as a transportation hub and major railway junction. China reported over 140 new instances on January 20th, from which two were in Beijing and one in Shenzhen. Later, according to official figures, 6,174 people experienced symptoms up to that point, with more perhaps affected. A report is issued by Lancet on January 24th that focused on person-to-person transmission, displayed an extremely worrying scenario, urged protective equipment for physicians, and indicated that screening for and protecting against the disease was required owing to its "pandemic potential." On January 30, the WHO declared COVID-19 a Public Medical Emergency of Global Concern. The virus has multiplied by a ratio of 100 to 200 throughout this period. The first verified occurrences in Italy occurred on January 31, 2020, involving two Chinese tourists. On March 19, 2020, Italy overtook China as the nation with the greatest number of fatalities. On March 1, 2019 Pakistan is being effected by Covid-19 when Government Health Officials confirmed that two cases of Covid-19 is reported in Karachi and Rawalpindi. Both of the resident are travelled to Iran for religious purposes and then return to their origin with symptoms of Covid-19. Pakistan is one of the country in world who have been severely affected by Covid during 2020 and 2021, till August 15, 2022 a total of 1,562,307 cases were reported along with 30,523 deaths. The novel coronavirus pandemic has had a detrimental and severe impact on the economics of all nations. In a manner similar to that, Pakistan's Gross Domestic Product (GDP), which fell to 263.7 billion USD in 2020 from USD 278.2 billion in 2019, is comparable. Initial estimates indicate that the economy will lose \$1.3 trillion. Prior to the outbreak, one-third of Pakistan's population already lived in poverty; by June 2020, this number is projected to increase to about 40%. Pakistan is also feeling the negative consequences of the world economy. Due to the sharp decline in global textile demand, exporters are suffering order

cancellations. The textile and apparel industry are expected to see substantial job losses as a result of the \$44 million overall financial impact that China's economy would have on the sector. Socioeconomic packages worth 1.3 trillion rupees have been introduced by the Pakistani government to aid in debt relief. The largest project the government undertook was the Ehsas program, which had a budget of \$900 million to distribute to low-income households. Nearly 5 lac textile employees have lost their employment since March 28, 2020, according to the Pakistan Workers Federation. A "green stimulus" program run by the government allows recently established people to donate \$10 billion to a tree-planting initiative. Additionally, helped are small enterprises and exporters.

The non-financial sector was chosen since it makes a significant contribution to Pakistan's GDP. According to Economic Survey 2017–18, Pakistan's non-financial sector, which accounts for 13.6% of GDP, is the country's economic engine (Rashid & Bilal, 2020).

The goal of this study is to define the consequence of the COVID-19 pandemic on Pakistan's non-financial sectors and corporate sectors, or economic groupings that are consistent with the country's depository financial institutions. According to the sectors chosen, we will examine if there is a good or negative influence. A total of six corporate sectors consisting of 10 PSX listed companies (national or Multinational) from each sector are being considered i.e., Textile Sector; Food Sector; Cement Sector; Fuel and Energy Sector; Chemicals & Pharmaceuticals; Trailers & Auto parts and Motor Vehicles.

## 2. Literature Review

A study conducted by (Hu & Zhang, 2021)s, the authors used data from global enterprises (16148 companies from 107 countries) from first quarter of 2020 to third quarter of 2020 to assess the impact of COVID-19 on performance of the businesses. It demonstrates how the COVID-19 has worsened company behavior. In nations with stronger institutions, more stable financial systems, and better health metrics, COVID19's detrimental effects on company operations are less obvious. Avoiding uncertainty also increases the bad perception of COVID-19 epidemic. Findings shows that the performance declined during epidemic, although the effect was fewer in the states with steady financial & health conditions. We demonstrate in the baseline regression that the severity of the COVID-19 pandemic, as measured by collective or confirmed cases, is negatively correlated with firms' return on assets (ROA). Despite the fact that businesses have struggled as a result of COVID-19, there are big differences between countries. As a result, we look at how national characteristics affect the potentially hazardous effects of COVID-19 pandemic on corporate sector. Firstly, all research has shown that increasing healthcare spending is helpful in reducing the adverse shock caused by COVID-19. Second, we found that countries with higher financial development, underpinned by better financial institutions, had fewer commercial effects from pandemics. Third, better organizational qualities in terms of openness, governmental effectiveness, regulatory excellence, and the legal system help businesses get through the COVID-19 slump. Finally, uncertainty avoidance exacerbates the detrimental effects of COVID-19. Second, we see that in countries with strong financial development, the effects of pandemics on businesses are less severe. Another factor aiding businesses in navigating the effect of Covid-19 is by improved institutional quality including transparency, rule of law, regulatory quality and government efficacy. Finally, uncertainty avoidance exacerbates the detrimental effects of COVID-19. Our research contributes to growing body of the knowledge regarding COVID-19 effects on actual economy. Majority of studies have been conducted soon after the COVID-19 pandemic started. At

the time, the only readily available indicator of corporate performance was stock returns. Additionally, since that financial data for recent quarters are available for empirical research and public consumption, it may be possible to examine the COVID-19 influence on company performance as measured by appropriate accounting indicators (Hu & Zhang, 2021).

A study by (Ahmad et al, 2021) used data from May 2019 to April 2021 (on daily basis). For Europe uses S&P Global Ratings, which includes 186 components. For Japan and the UK, respectively, the Nikkei-225 and FTSE-350. 503 S&P-500 stocks are evaluated for the US market. All of the sample data have citations to (Ahmad et al., 2021). The International Review of Financial Analysis was given by Thomson DataStream. Intriguing tendencies are shown by the stock (company) level investigation about the effects of the coronavirus outbreak. The following are some ways that our investigation and study design can add to the body of literature. First, model of linearity & non-linearity structural fractures was employed, help pinpoint key moments in the coronavirus outbreak, such as the Black Swan occurrences noted in the first two weeks of March 2020 and the recovery phase of 2021. The analysis of event technique then shows that stock markets in the sample countries are significantly impacted by coronavirus pandemic events. This research focuses on the effects of this outbreak's initial and second waves on the USA, the UK, Europe, and Japan. However, when we separated the businesses into two categories based on staff count and firm size, the findings became much more fascinating. Findings suggest that there are substantial differences between the various stages of the coronavirus panic, which starts in February 2020. We examine organizational dynamics and demonstrate how coronavirus outbreaks impact both large and small organizations, as well as the unique danger each poses. The analysis found that each organization had a different level of impact from coronavirus pandemic events. The second wave which started in March 2020 and will remain until April 2021, has a greater impact than the first wave. The impact of the epidemic is decreasing, and the second wave research indicates signs of recovery (Ahmad et al., 2021).

## ***2.2. COVID-19 and Firm Performance:***

An international health emergency might be COVID-19. Worldwide, more than 522 million people have received a diagnosis since January 2020, and the disease has expanded to a number of additional countries and regions. The high infectiousness of COVID-19 necessitates quarantine precautions by nations. These actions have a significant effect on overall demand, particularly on exports and consumption. On the one hand, congested locations like shopping malls were closed and individuals were advised to drive less. However, in order to stop the virus from spreading, numerous nations implemented import restrictions, which had a detrimental effect on China's export-oriented industries. China's GDP decreased 6.8% during first half of 2020 as a result. Numerous researches have looked relationship between COVID & crude oil prices. The impact of COVID-19 on the performance of public companies has not been extensively studied. According to the crucial options hypothesis, managers prefer to delay investing when uncertainties arise, which might lead to lost lucrative opportunities. The COVID-19 increases external risks, which forces management to only increase their cash reserves in times of crisis. Additional cash retention drains investment and hinders a business' ability to grow sustainably. Maslow's hierarchy of needs states that during a crisis, a consumer's need for health and wellbeing is more important than their need for social connection, which will cause a short-term decrease in market share. These elements affect company income, which has a negative impact on corporate performance. Businesses' productivity and income significantly decreased once the Emerging Markets regulations went into

effect, which had a negative impact on their performance (Shen et al., 2020). Following hypotheses were formulated derived from empirical research:

**Hypothesis 1:**

H0A: Company's performance has not been affected by Covid-19

H1A: Company's performance has been negatively affected by Covid-19

***2.3. Health ratio during COVID-19 and Firm Performance:***

According to (Raghupathi & Raghupathi, 2020), the development of human capital, an increase in productivity, and improved economic performance may all be aided by spending money on health. Examining a nation's medical cost phenomenon is crucial as a result. From 2003 to 2014, they used eye inspection to gather economic and clinical data from Bureau of Labor Statistics and Bureau of Economic Analysis. Overall, the findings unequivocally demonstrate the relationship between health care spending and economic indicators including income, GDP, and labor productivity. Healthcare costs have a negative correlation with multifactor productivity but a positive correlation with labor productivity, consumer spending, and GDP indicators. According to this study, rising health-care costs are closely tied to financial achievement. There are more state-to-state differences that require further investigation. The notion that improve public health contributes to a strong economy overall is one of the policy implications based on this and preceding studies.

**Hypothesis 2:**

H0B: Company's performance has not been affected by health care sector.

H1B: Company's performance has been positively affected by health care sector

***2.3. Firm Performance and Domestic Credit:***

According to (Olowofeso et al., 2015), for reducing parameter bias resulting from prior workshop, we examined the impact of private sector financing on profitable development in Nigeria. This analysis utilized the (Gregory & Hansen, 1996) co-integrating test, which accounted for structural breakdowns and endogeneity challenges. Daily data from 2000Q1 to 2014Q4 were fed into the system, and the model sections were estimated using a significantly modified ordinary least places method. We show a long-term connection between affair and its indicated factors despite the structural gap in 2012Q1. The error repair period demonstrated, among other things, that high lending rates impede economic growth whereas private sector credit has large beneficial impact on economy (Emmanuel et al., 2015).

**Hypothesis 3:**

H0C: Company's performance has not been affected by domestic credit.

H1C: Company's performance has been positively affected by domestic credit.

#### **2.4. Firm Size:**

There are companies in the sector of various sizes. There are different production expenses for these enterprises of different sizes. Economists are interested in a business segment's suitable scale, or the company with the lowest average cost per unit of output. Beacham stated that in an ideal society, all businesses should grow until they reach a stage where they are optimizing the most efficient and cost-effective utilization of valuable capacity. Additionally, Meiryani, Jajat Sudrajat, Olivia and Zaidi Mat Daud authored an essay titled "Leverage and firm Performance: New evidence on the influence of company size". According to this study, major businesses will often either garner more attention or become well-known to the public. The signal to the general public is better the bigger the firm. This is in line with the signal hypothesis, which states that the stronger the signal of a firm's financial success, the bigger the company it comes from. (Meiryani et al., 2020).

#### **2.5. Leverage:**

Leverage is the process of using borrowed funds to boost the return on an investment or project. According to industry standards, leverage ratios below 1 are desirable, and a number of 0.5 is optimal as no more than 50% of a company's assets should be financed by debt. Potential lenders and investors may see a firm with a leverage ratio above 1 as a dangerous venture, while a leverage ratio above 2 is concerning.

Ibhagui and Olokoyo (2018) examines empirical relationship between leverage and enterprise performance using Hansen's criteria regression model and a new threshold variable, firm size. They inquired about the existence of maximum business size beyond which leverage on a firm's operations and performance is influenced by or dependent on size of company, they analyzed the panel data from 2003 to 2007 of 101 company listed in Nigeria. If business size influences the nature of leverage's effect on profitability. The finding indicates that as a company expands, the detrimental effect diminishes, indicating that the negative impact of debt on firm operational value is most pronounced & significant for SMEs.

#### **2.6. Tangibility:**

Tangible assets are often in tangible form and have genuine transaction value. The majority of a company's overall assets are often made up of fixed assets. Tangibility refers to a company's assets, which often have a physical form and a limited monetary worth. The finest tangible investments are in land, property, and equipment. Spending money on them is therefore better.

According to Irungu et al. (2018), the Government of Kenya made significant efforts in tandem with private businesses and people to create a conducive business climate. As a result, during the past 10 years, some NSE-listed enterprises have increased their productivity whereas others have lost funds or were delisted from the NSE. A non-experimental panel survey research design was used in this investigation. The poll covers all 64 companies listed on the Nairobi Stock Exchange and ANOVA was used. The study found a positive and significant correlation between the availability of physical assets and the financial success of both financial and non-financial organizations.

## 2.7. *Cash Holding:*

Firms' cash holdings include both cash and short-term investments. Cash on hand is another phrase for money that is available for consumption by people or corporations rather than investment. The ideal range for the cash holding ratio should be less than 9.93% in order to confirm that the business is operating profitably.

The study by Yun et al. (2021) demonstrate how various companies-specific factors, including government ownership, ownership concentration and corporate governance characteristics, contributes to clarify the correlation between cash reserve and firm performance. The examination of a sample of Chinese firms conducted in this study highlights that the company-specific attributes notably attenuate the association between cash reserves and performance. According to this study, businesses that practice sound corporate governance perform better when they have cash on hand.

## 3. *Data and Research Design:*

### 3.1. *Sample:*

A sample of 60 non-financial firms operating in Pakistan (national or multinational) is compiled for examination using quarterly financial statement of the selected companies for their website or from Pakistan Stock Exchange (PSX) within a period from second quarter of 2020 to fourth quarter of 2021. These financial data were supplemented with information on active Covid-19 cases, recoveries and death obtained from NCOC (National Command Operation Center). The sample encompasses of sixty companies from six different sector (10 companies from each), includes Cement, Motor vehicle and Auto-parts, Fuel and energy, Chemical Products and Pharmaceuticals, Food and Textile sector (Appendix A).

### 3.2. *Variable measurements:*

COVID-19 is gauged by logarithmic measures of confirmed, active, recovered cases, and deaths. Health Ratio is the percentage of GDP spent on healthcare. Domestic Credit is private sector credit as a percentage of GDP. Firm Size is the logarithm of total assets. Leverage is total debt divided by total assets. Tangibility is tangible assets divided by total assets. Cash Holding is cash and short-term investments divided by total assets. Return on Asset is net income divided by total assets. Return on Equity is net income divided by shareholder's equity. Data for control variables are collected quarterly from second quarter of 2020 to fourth quarter of 2021, from Federal budget 2020-21 and Pakistan economic survey 2020-21(Finance Division, 2020)(Pakistan Economic Survey 2021, 2022)

### 3.3. *Estimation Technique and Model:*

The 'Baseline regression test' is used to examine the influence of Covid on firm performance. The associated baseline model is employed to evaluate the adverse effects of Covid pandemic on performance of the companies.

$$Performance_{it} = c + \beta_1 COVID_{ct} + \gamma Firm\ controls_{it-1} + \delta_i + \delta_{jt} + \varepsilon_{jt}$$

where i, j, c, and t denote firm, industry, country/economy, and year-quarter, respectively.

## 4. Results

### 4.1. Descriptive Statistics

Fast descriptive coefficients known as descriptive statistics are used to quickly summarize or characterize a set of facts, such as the population as a whole or a population trend. Descriptive facts are distinguished from measurements of compelling trend or measures of variability (unfold).

**Table 1: Descriptive Statistics**

	Mean	Std. Deviation	Maximum	Minimum	Observations
<b>Covid Active cases</b>	4.49	0.36	5.03	3.95	420
<b>Covid Deaths</b>	4.13	0.30	4.46	3.64	420
<b>Covid Recoveries</b>	5.72	0.36	6.10	5.00	420
<b>Health Ratio</b>	0.08%	0.09%	0.30%	0.01%	420
<b>Domestic Credit</b>	12.37%	0.51%	13.06%	11.60%	420
<b>Firm Size</b>	10.12	0.71	12.01	8.20	420
<b>Leverage</b>	50.90%	28.94%	197.32%	5.25%	420
<b>Tangibility</b>	39.87%	20.66%	91.83%	1.69%	420
<b>Cash Holding</b>	9.52%	13.76%	66.93%	0.001%	420
<b>ROA</b>	3.95%	6.60%	30.38%	-30.80%	420
<b>ROE</b>	9.94%	28.26%	237.31%	-304.48%	420

Based on 420 observations, Table 1 present the descriptive statistics for various variable utilized in the analysis. For Covid active cases in Pakistan, the logarithmic value range from 3.95 to 5.03, with a standard deviation of 0.36. The independent variable, Covid deaths in Pakistan, had logarithmic value ranged from 3.64 to 4.46, with a standard deviation of 0.30. Covid recoveries in Pakistan, had logarithmic value ranging from 5.0 to 6.10, with standard deviation of 0.36. In Pakistan, the Health Ratio ranged from 0.01% to 0.30% between second quarter of 2020 to last quarter of 2021, with a standard deviation of 0.09%. Domestic credit to the private sector ranging from 11.60% to 13.06%, with a standard deviation of 0.51%.

The logarithmic value of firm size of Pakistani enterprises in the non-financial sector ranging from 8.20 to 12.01, with standard deviation of 0.71. Leverage in Pakistan's non-financial sector from 5.25% to 197.32%, with standard deviation of 28.94%. Tangibility of enterprises ranged from 1.69% to 91.83%, with standard deviation of 20.66%. Cash holding ranged from 0.001% to 66.93%, with standard deviation of 13.76%. These variables provide insights into the wide range and distribution of values across different aspects of the economy.

ROA ranged from -30.80% to 30.38%, with standard deviation of 6.60%. Whereas, ROE ranged from -304.48% to 237.31%, with standard deviation of 28.26%, These metrics demonstrate the variability in performance outcomes among Pakistan's non-financial sector. The diverse range of values underscores the complexity of factors influencing business performance and highlights the need of nuanced analysis in understanding their economic impact.



In summary, Table 1 provide a detailed overview of the distribution of values for different variables related to the performance and operation of businesses in Pakistan. From Covid-19 metrics to financial indicators such as cash holding and leverage, these statistics offer valuable insights into the economic landscape of the country. By examining the distribution of values, policymakers and researchers can better understand the range of outcome and tailor interventions to address specific challenges and opportunities within the economy.

#### 4.2. Correlation:

**Table 2: Correlation**

	ROA	ROE	Firm Size	Leverage	Tangibility	Cash Holding	Covid Active cases	Covid Deaths	Covid Recoveries	Health Ratio	Domestic Credit
<b>ROA</b>	1										
<b>ROE</b>	0.536	1									
<b>Firm Size</b>	0.254	0.206	1								
<b>Leverage</b>	-0.326	-0.116	-0.033	1							
<b>Tangibility</b>	0.268	-0.074	-0.159	-0.017	1						
<b>Cash Holding</b>	0.296	0.063	0.156	-0.225	-0.249	1					
<b>Covid Active cases</b>	-0.013	-0.053	-0.010	0.009	-0.004	0.025	1				
<b>Covid Deaths</b>	-0.178	-0.103	-0.033	-0.029	-0.035	0.101	0.25	1			
<b>Covid Recoveries</b>	0.165	0.111	0.031	-0.030	0.033	-0.102	0.393	-0.976	1		
<b>Health Ratio</b>	0.067	0.096	-0.013	0.023	0.013	0.071	-0.611	-0.568	0.729	1	
<b>Domestic Credit</b>	0.194	0.060	0.012	-0.009	0.014	0.035	-0.073	-0.257	0.148	0.303	1

The correlation coefficient for the variables analyzed in the study is presented in the above Table 2. The table illustrates several significant correlations between the key variables. For instance, there is a positive correlation of 0.536 between ROA and ROE, suggesting a consistent relationship between these variables. Additionally, companies in non-financial sector of Pakistan exhibit a positive correlation between ROA and Firm Size which is 0.254.

Conversely, Leverage and ROA displays a negative correlation of -0.326, implying an inverse relationship between them. Tangibility and ROA shows a positive correlation of 0.268, which indicates a favorable association. Furthermore, Cash holdings and ROA demonstrate a positive correlation of 0.296, suggesting a beneficial link between them. However, ROA exhibits a negative association with Covid Active cases, Covid Deaths with correlation value -0.013 & -0.178 respectively and there is a positive correlation between ROA and Covid Recoveries with a value of 0.165.

Similarly, ROE correlates positively with Firm size ( $r=0.206$ ) but negatively correlated with leverage ( $r=-0.166$ ) in non-financial sector of Pakistan. Covid active cases and ROE are inversely correlated with value of -0.053, while Covid Recoveries and ROE have a positive correlation of 0.111. Additionally, Tangibility show adverse association with Leverage ( $r=-0.017$ ) and Cash holding (-0.225).

Furthermore, Covid active cases exhibit a negative correlation with Tangibility where  $r=-0.004$  but a positively correlated with Covid Deaths where  $r=0.101$  and a negative association with Covid Recoveries where  $r=-0.102$ . Covid Deaths in Pakistan have an inverse relationship with Health Ratio ( $r = -0.568$ ) and domestic credit to private sector are negatively correlated ( $r=-0.257$ ). Conversely, Covid Recoveries exhibit a positive correlation with Health ratio with a value of 0.729 and also positively correlated with domestic credit to private sector ( $r=0.148$ ).

Key finding from the table 2 is that its show a positive correlation between ROA and ROE, indicating consistency in performance. Additionally, Leverage exhibit negative relationship with ROA and ROE, which suggesting potential risk. Tangibility and Cash holding both are positively and negatively correlated with different variables, reflecting diverse impact on the performance of firm. Covid related variables show mixed correlation with financial variables, resulting in the complex interplay between health and economics factor of the country. Overall, these findings show the importance of understanding multifaceted relationship in shaping business outcome and economic resilience, especially in the context of external shock/ epidemic like Covid-19.

#### **4.3. Regression Analysis:**

Regression analysis is a statistical technique used in banking, investing, and other industries to assess the nature and strength of a correlation between a single fixed variable (often denoted by the letter Y) and a number of independent variables. Financial and investment managers may value assets and understand the relationships between many factors, such as the prices of commodities and the stocks of firms that deal in those commodities, with the use of regression.

**Table 3: Regression**

	<b>ROA</b>	<b>ROE</b>
<b>Covid Active cases</b>	-0.243*	-0.194*
	-1.929	(-0.379)
<b>Covid Deaths</b>	-0.396**	-0.448
	-2.611	-0.468
<b>Covid Recoveries</b>	.279**	0.329*
	(-2.446)	(-0.355)
<b>Health Ratio</b>	0.648**	0.148*
	-3.006	(-0.818)
<b>Domestic Credit</b>	0.036	0.154*
	-0.381	-0.153
<b>Firm Size</b>	0.187***	0.197***
	-4.448	-3.067
<b>Leverage</b>	-0.288***	-0.135**
	(-6.782)	-2.775
<b>Tangibility</b>	0.204***	0.027
	(-4.745)	(-0.578)
<b>Cash Holding</b>	0.133**	0.043*
	-3.002	-0.859
<b>Companies</b>	60	60
<b>Observations</b>	420	420
<b>R2</b>	0.304	0.082
<b>F-Value</b>	19.858	4.06

The above Table 3 of regression analysis, shows finding derived from employing the baseline regression methodology. Initially, our analysis centers on the dual facets of Return on Assets (ROA), drawing insights from the dataset comprising of 60 publically listed companies in PSX, totaling of 420 observations. The regression model focus on ROA, utilizing thr logarithm of Covid Active cases as the independent variable, shows a discernible negative correlation, although approaching significance level at 5%. This suggests that as the count of covid active cases escalates, there's a corresponding downturn in businesses' Return on Assets (ROA). Notably, a computed coefficient of -0.243 implies at 10% surge in Covid active cases could potentially precipitate a noteworthy 24.3% dip in Return on Assets (ROA). Likewise, the regression analysis concerning Covid Deaths as the independent variable showcases a statistically significant negative correlation, indicating that an upsurge in Covid Deaths is associated with decrease in Return on Assets (ROA). With a projected coefficient of -0.396, at 10% increase in Covid deaths is anticipated to translate into a substantial 39.6% reduction in ROA. Conversely, when examining Covid Recoveries as the independent variable, the analysis reveals a statistically significant positive correlation, implying that an increase in Covid Recoveries is conducive to rise in ROA. The derived coefficient of 0.279 suggests that a 10% augmentation in Covid Recoveries could potentially yield a commendable 27.9% enhancement in ROA.

Moreover, it's noteworthy that higher healthcare spending pre-pandemic appears to attenuate the adverse repercussions of COVID-19 pandemic on business performance, as evidence by the positive and statistically significant correlation discerned between Covid-related metrics and healthcare parameters, Additionally, domestic credit demonstrates a positive correlation with

return on assets, suggesting that economies equipped with robust credit structure tend to exhibit superior business performance during epidemic.

Transition to the analysis of Return on Equity, our examination involves 420 observation from 60 PSX listed companies. The regression model incorporating Covid Active Cases as the independent variable shows a significant negative correlation, indicating that return of equity decline with an increase in the numbers of Covid Active Cases. With a projected coefficient of -0.194, an increase of 10% in Covid Active cases could potentially precipitate a notable drop of 19.4% in Return on Equity. Similarly, regression analysis involving Covid Deaths as an independent variable present negative correlation but lacking significance. Conversely, the regression pertaining to Covid Recoveries reveal significant positive correlation, suggesting that an increase in Covid Recoveries is associated with rise in Return of Equity. The coefficient of 0.329 implies that an increase of 10% in Covid Recoveries could potentially lead to an enhancement of 32.9% in Return of Equity.

Furthermore, it's pertinent to note that investment directed towards bolstering healthcare infrastructure in the past appear to mitigate the adverse ramification of COVID-19 epidemic, as explain by the significant positive associations between Covid related metrics and healthcare parameters. Additionally, domestic credit displays a positive correlation with Return on Equity, indicative of a scenario where credit accessibility serves as a buffer against the negative/adverse effects of epidemic on the business sector.

R-Square values underscore the extent to which independent and control variables collectively account for the variability observed in both Return of Assets and Return on Equity. Specifically, the R-Square value of 0.304 for Return of Assets signifies that out suite of independent and control variables collectively explain approx. 30.6% of the variance observed in Return on Assets, while for Return of Equity the R-Square value of 0.082 suggest that these variables collectively elucidate roughly 8.2% of the variance observed in Return on Equity.

The Inclusion of F-values provides additional insights into the robustness of our regression analyses. In the case of ROA, the F-value of 19.858, coupled with a significance level of 0.00, underscores the exceedingly low probability of the null hypothesis hold true. Similarly, for Return on Equity, the F-value of 4.060, along with a significance level of 0.00, accentuates the implausibility of the null hypothesis. Therefore, we accepted the alternative hypothesis developed in the study.

Overall, the comprehensive examination presented in Table 3 elucidates the intricate interplay between COVID-19 metric, healthcare parameters, and economic indicators, underscoring the multifaceted nature of the epidemic impact on the performance of business.

#### ***4.4. Discussion:***

The aim of this research is to shed light in how the COVID-19 epidemic has affected the performance of companies listed on the Pakistan Stock Exchange (PSX). To assess this impact, we focus on two key financial metrics: Return on Assets (ROA) and Return on Equity (ROE). These metrics provide a clear picture of company's profitability relative to its invested capital and shareholder equity.

Table 2 plays a crucial role in understanding the relationship. It details how various factor, categorized as independent and control variables, influence the performance metrics (dependent variables) we are focusing on. Here, the independent variables are specifically related to COVID-19, including the number of active cases and deaths. Control variables encompass other factors that can influence company performance.

The initial analysis reveals a concerning trend. There appears to be a negative correlation between the number of active COVID-19 cases and deaths (independent variables) and both ROA and ROE. In simpler term, as the epidemic intensified with more active cases and deaths. The probability of listed companies, measured by ROA & ROE, seems to have declined. This initial observation points towards a potential detrimental effect of the epidemic on the Corporate sector of Pakistan.

However, the story does not end there. Table 2 also presents a glimmer of hope. The analysis uncovers a positive correlation between the number of COVID-19 recoveries and both ROA and ROE. This suggests that as the recovery rate from the pandemic improved, the profitability of the listed companies also showed signs of improvement.

To further solidify these findings, we move on the regression analysis, presented in Table 3. This statistical technique allows us to confirm the relationships observed earlier. The regression analysis strengthens the evidence for a negative correlation between the COVID-19 variables (active cases and deaths) and the business performance variables (ROA & ROE). This statistically negative correlation supports our primary hypothesis, labeled H1a. The epidemic overall impact on the corporate sector appears to be negative.

The analysis in both tables reveals positive influence on company performance as well. The health ratio, which serves as an indicator of the healthcare sector's strength, show a positive correlation with both ROA and ROE. This suggest that companies operating in or reliant on robust with our hypothesis H1b, which proposes that a string healthcare sector has a beneficial influence on the performance of companies.

Similarly, the analysis shows a positive correlation between domestic credit availability and both financial indicator (ROA & ROE). This suggests that company with easier access to domestic credit lines might have better equipped to weather the financial challenges brought on by the epidemic. This aligns with our Hypothesis H1c.

## 5. Conclusion:

This study investigates the impact of COVID-19 on the profitability/performance of the non-financial sector companies listed on PSX. We analyzed factors beyond just COVID-19 to better understand the picture. This study focuses on six industries and 60 companies across seven quarters starting from second quarter of 2020 to fourth quarter of 2021 to gain a comprehensive perspective. We also examine the role of Pakistan healthcare spending and domestic credit availability in mitigating the epidemic effects in businesses. The main goal is to understand how a strong healthcare system and access to credit can help companies weather crises.

Financial reports and specific financial ratios like ROA and ROE are used to assess the company performance. Statistical test like regression and correlation help us in identifying the relationship between these variable and different factors, including COVID-19 cases, deaths,

recoveries, company size and tangibility. The finding of the study shows that COVID-19 cases and deaths have a negative impact on profitability, while the recoveries have a positive correlation. This aligns with the idea that epidemic has been detrimental to corporate sector of Pakistan.

Interestingly, the analysis of the study highlights the positive influence of domestic credit and a strong healthcare system on profitability suggested that these factors can act as a buffer during epidemic. The results support our alternative hypothesis, suggest that the countries should invest in healthcare sector to strengthen it and credit sector to be better prepared for the crisis or epidemic in future. A robust healthcare system might benefit specific sectors during epidemic, but the overall economic impact can be negative.

The potential investor can get insights or benefit from the study to identify Pakistan's company that have managed the epidemic effectively and offer potentially good returns. By the help of this information the investor can easily makes informed decisions and increase their investment in these type of companies during future crises.

While the epidemic has negatively affected so many businesses, but in real some sectors like pharmaceuticals have actually get benefitted from the pandemic. This highlights the importance of the early risk prediction for effective decision making and for developing business strategy. The study acknowledges limitation and suggest that future researcher can address these limitations to better provide a more comprehensive understanding.

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### Appendix A

Sectors	Companies
Cement Sector	Attock Cement Pakistan Limited
	Cherat Cement Company Limited
	D.G. Khan Cement Company Limited
	Fauji Cement Company Limited
	Fecto Cement Limited
	Gharibwal Cement Limited
	Kohat Cement Limited
	Lucky Cement Limited
	Pioneer Cement Limited
	Thatta Cement Company Limited
Fuel & energy Sector	Arshad Energy Limited
	Engro PowerGen Qadirpur Limited
	K-Electric Limited
	Kohinoor Energy Limited
	Kot Addu Power Company Limited
	Mari Petroleum Company Limited
	Nishat Chunian Power Limited
	Oil & Gas Development Company Limited
	Sitara Energy Limited
	The Hub Power Company Limited
Motor Vehicle and Auto-parts Sector	Agriauto Industries Limited
	Baluchistan Wheels Limited



Sectors	Companies
	Bolan Castings Limited
	Dewan Farooque Motors Limited
	Exide Pakistan Limited
	Loads Limited
	Ghandhara Nissan Limited
	Hinopak Motors Limited
	Atlas Honda Limited
	Indus Motor Company Limited
Textile Sector	Ali Asghar Textile Mills Limited
	Allawasaya Textile and Finishing Mills Limited
	Azgard Nine Limited
	Bhanero Textile Mills Limited
	Bilal Fibres Limited
	Blessed Textiles Limited
	Colony Textile Mills Limited
	The Crescent Textile Mills Limited
	Faisal Spinning Mills Limited
	AN Textile Mills Limited
Food Sector	Al-Shaheer Corporation Limited
	Bunny's Limited
	Fauji Foods Limited
	Matco Foods Limited
	Murree Brewery Company Limited
	National Foods Limited
	Nestlé Pakistan Limited
	Pakistan Oil Mills Limited
	Quice Food Industries Limited
	Unity Foods Limited
Chemical Products & Pharmaceuticals	Abbott Laboratories (Pakistan) Limited
	AGP Limited
	Archroma Pakistan Limited
	Colgate-Palmolive Pakistan Limited
	Descon Oxychem Limited
	Ferozsons Laboratories Limited
	GlaxoSmithKline Consumer Healthcare Limited
	Highnoon Laboratories Limited
	Otsuka Pakistan Limited
	Sanofi-Aventis Pakistan Limited