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COVID-19 and firm's performance: A cross-economy comparison of developed, emerging, and underdeveloped markets

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Abstract

The aim of the study is to examine the impact of COVID-19 on the firm performance of underdeveloped, emerging and developed countries in order to determine which country was more affected. The sample period used in this study is from 2013-2023 and includes more than 300 businesses from 17 countries. This study employed a fixed effect model. The results show that COVID 19 has significantly impact the firm performance. These results are further supported by contrasting the predicted and real data. Whereas the investment growth did not moderate the relation. Compared to less developed and emerging countries, developed economies have been found to be more affected by COVID-19. Managers can now adjust their policies to be prepared for the post-endemic phase according to this study. It is beneficial for the state since it allows them to create policies that address the loss of all industries and sectors or assist them in advance by foreseeing the loss. It is beneficial for investors to rebalance portfolios by controlling risk to observe the variability of returns.

Keywords: Covid-19, Firms performance, Developed, Emerging and Underdeveloped economies

1. Introduction

Beginning in Wuhan, Huabi, China, in December 2019, COVID-19 (formerly known as 2019-nCoV by the WHO on February 11, 2020) spread throughout the world. The virus SARS-CoV-2 was the cause of it. Although China was once the epicenter of the epidemic, incidents are now being reported in numerous other nations. Because of the threat that COVID-19 poses to public health, the World Health Organization (WHO) declared a health emergency. On March 11, 2020, it proclaimed this outbreak to be a pandemic since illnesses had spread to 118,000

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people in 110 countries worldwide. Since it is extremely contagious and spreads throughcontact, most countries implement lockdowns (complete curfews or contact limitations); educational institutions are closed; concerts, sporting events, and marriages are prohibited in many states, allowing businesses to operate with fewer employees and work from home policies. Although these techniques were successful and significantly reduced the number of cases reported in some nations, they also hindered economies by slowing down production in businesses of all sizes and interfering with the world's supply chain. Additionally, because of the lockdown, transportation and other modes of mobility became more limited, which further slowed down economies. Numerous pieces of data demonstrated that infectious illness outbreaks impede the nation's economic growth. The expenses associated with such infectious diseases include grants and company losses as a result of employees' incapacity to work and companies' inability to meet demands. The coronavirus turned out to be the most deadly and propagated quickly. All economies—developed, emerging, and underdeveloped—were severely impacted by this pandemic. As of yet, no vaccination has been created. Lockdowns around the nation seem to be the only way to keep individuals safe thus far.

The implications of COVID-19 on the global economy are extremely severe. Due to an absence of investment and consumption, the world's GDP is estimated to have declined dramatically. Because they don't know how long this illness will last, many are only spending their salary on necessities to preserve money. India, China, and the United States were driving global consumption. Every economy in the world is impacted by declining consumption. Consequently, the firm's performance is impacted and its sales decline. Reinhart (2020) asserts that the COVID-19-induced financial crisis differs from other disasters in a number of ways, including a negative demand and supply shock. It caused slow growth and had a negative impact on the supply chain and demand (Ding et al., 2020). Globally, covid-19 significantly hurt the performance of the firm which caused decline in revenue and financial instability across industries.

Globally, COVID-19 has hurt almost every economy. China, Spain, Italy, Greece, and the United States of America are the countries most severely affected. In the first quarter of 2020, the GDP of several major economies, including the United States, the United Kingdom, Japan, and Germany, fell by 1.22%, 1.98%, 0.85%, and 2.22%, respectively (Fu & Shen, 2020). According to the International Monetary Fund (IMF), the growth rate of the world economy is predicted to drop to 3% in 2020, resulting in a worse downturn than the global financial crisis of 2008 and the lowest since the Great Depression of 1930. According to a report by China's National Bureau of Statistics, the services sector was one of the most negatively impacted. The first quarter of 2020 saw a more than sixteen percent decline in its revenues. The manufacturing sector has likewise seen a 10.7% decline. It caused firms to file for bankruptcy and caused job losses in many countries. It is projected that the economy of Sub-Saharan Africa will contract by 1.6%. African industry was brutally impacted by COVID-19, according to UNECA. The COVID-19 pandemic has caused significant disruptions to four out of five enterprises in Africa.

Covid-19 reduced China's industrial profits by 38.3% in the first two months of 2020, led to the layoff of 5 million people, and raised urban unemployment to 6.2% in February 2020

from 5.2% in December 2019. Infrastructure, machinery and equipment, and FMCG property sales all had declines of 24.5% and 29.5%, respectively, in economic growth. "China's slowdown in the first quarter of 2020 will be significant and will leave a deep mark for the year," the IMF said on March 20, 2020. China's economy shrank 6.8% in the first quarter compared to the same period last year. The news of the COVID-19 outbreak caused China's stock exchanges to collapse. The worst one-day shortfall was recorded by the Shenzhen and Shanghai indices, which are 3.25% and 2.75%, respectively. Due to the sharp decline in foreign direct investments (FDI), Indian stock markets experienced significant disruptions and will likely continue to do so in the future. The S&P BSE was trading at 42,273 points on January 20, 2020, and it had dropped to 29,894 points on April 8, 2020.

On January 25, 2020, the first case of COVID-19 was reported in Malaysia. Malaysia's tourism sector was most impacted. Over 170,000 hotel reservations totaling RM 68 million were canceled. The airline industry was similarly impacted by COVID-19; a drop in traveler numbers of 25.49 million resulted in a loss of about US $3.3 billion and the loss of around 169,700 jobs (IATA 2020[1]). The Central Bank of Sri Lanka reported that the Colombo Consumer Price Index (CCPI) showed a decline in March 2020. Since the year began, the Sri Lankan rupee and the US dollar have lost 9% of their value. "The outbreak of the virus is producing tough economic conditions in markets in Europe and possibly in the U.S." stated Sergi Lanau, Deputy Chief Economist at the Institute of International Finance (IIF). The worst portfolio setback ever experienced by developing economies has cost them about $100 billion, or 0.4% of GDP (IMF).

The Middle East and Central Asia were brutally struck. Compared to the 2008 financial crisis or the 2015 oil price shock, the progress rate was predicted to decline from 1.2% in 2019 to -2.8% in 2020 (IMF).

COVID-19 is a rare pandemic. There is a lack of research on COVID-19 and the success of businesses in various nations, and the findings are inconsistent. In addition to the scant research on new viruses, little is known about how they affect businesses and which developed, emerging, or underdeveloped nations are most impacted. In the following respects, this article adds to the body of literature. Adjusting policies to prepare for the post-endemic phase is beneficial for managers at all levels. It is beneficial for the all countries to create policies that address the loss of all industries and sectors or assist them in advance by foreseeing the loss.

2. Literature Review

2.1 Covid-19 and Firm Performance

COVID-19 has caused significant disruptions in global trade by forcing the closure of numerous enterprises, resulting in losses across all industries. Abedalqader and colleagues (2020) detailed the severe detrimental impact of COVID-19 on the financial operations of

[1] https://www.iata.org/en/iata-repository/publications/economic-reports/airline-industry-economic-performance-june-2020-report/

Chinese listed companies, which was reflected in a decline in investment and revenue. The cessation of commercial operations, production, and sales is indicated by a negative rate of return (Baral et al., 2023). According to an Indonesian study, there was a significant shift in the profitability and activity ratio between before and during the COVID-19 epidemic, but no discernible difference in the liquidity and leverage ratio. The construction and real estate sectors experienced declining liquidity and profitability ratios, whereas FMCG experienced an increase in these metrics. (Devi and others, 2020)

H1: COVID-19 has a significant impact on the firm performance.

2.2 Moderating Role of Investment and Revenues Growth

Because COVID-19 is a new idea and has a significant effect on economies. Because this topic is new, not much research has been done on it. As a result, the moderating effect of income and revenues on the model of the impact of COVID-19 on enterprises' capital structure and performance has not been previously examined. The idea of COVID-19's impact on business operations is related to "signaling theory" (Spence, 1973) and "real option theory" (Myers, 1977). Firm functioning increases as a result of increased investment (Jaewook Kim et al., 2020; Lee et al., 2020). Additionally, it was noted that a rise in sales or revenues has a major effect on the performance of the company (El-Khatib & Samet, 2020It is evident from the continuous debate about revenue growth and investment that both are dynamic and vulnerable to change over time. Therefore, the degree to which COVID-19 affects company performance and capital structure will depend on changes in investment and revenue levels. Thus, based on the discussion above, the following hypothesis has been developed:

H2: Growth in Investment during covid-19 moderate the relationship between COVID 19 and firm performance

3. Data and Model

In the conducted investigation, two models were used. First, performance and capital structure were predicted for the period t + 1 (2014–2023) using data from listed businesses during the first quarter of 2013–2023. The first quarter data from 2013 to 2023 was then selected to investigate the effects of the pandemic on capital structure and performance. The dataset is comprised to establish pre pendamic trends and compare it with performance during and after COVID-19 period. Panel data fixed effect has been used to analysis the results. 17 nations were chosen from the United Nations 2020 World Economic Situation and Prospects report into three categories: developed, emerging, and underdeveloped. The smallest indices of these nations were selected because it is not feasible to include all listed companies. Information was extracted from each company's website. Russia, China, and India were left off the list because China only provided a small number of the companies listed in the index with quarterly reports. India's quarterly reports lacked a balance sheet, while Russia's filings were all in Russian and included difficult-to-understand JPGs. Furthermore, a small number of companies' data for a few years was unavailable, thus they were also removed. The data was winorized at the 5% and 95% levels to reduce the impact of outliers.

The following model was used to forecast the capital structure and performance:

$$ROA_{it+1} = \beta_0 + \beta_1 Size_{it} + \beta_2 Gro_{it} + \beta_3 Liquidity_{it} + \varepsilon_{it} \quad (1)$$

$$Fp_{it} = \beta_0 + \beta_1 Inv\ Gro_{it} * Period_{it} + \beta_2 Inv\ Gro_{it} + \beta_3 Covid - 19_{it} + \beta_4 Size_{it} + \beta_5 Gro_{it} + \beta_6 FCF_{it} + \beta_7 Liq_{it} + \varepsilon_{it} \quad (2)$$

FP = Firm Performance which is measured by ROA, Inv Gro= Investment growth is measured through R&D divided by total assets; Rev= Revenue Growth is measured by current sales minus previous sales divided by previous sales Gr = Growth is measured by log of sales FCF= Free Cash Flow, ε = Error term. β is the coefficient. i is countries and t signifies time (2013-2023). To check the influence of Covid-19 on the company's functioning two moderators named Investment and Revenue are used. Econometric equation for Investment growth is following:

4. Empirical Results

4.1 Descriptive Statistics

Table 4.1 presents the descriptive statistics for each of the independent, dependent, and moderator variables. The data is collected from 267+ companies across 17 countries between 2013 and 2023, resulting in a total of 3047 observations. However, a small number of firms' quarterly reports were not available, therefore they were excluded from the sample. As a result, STATA adjusted the panel for regression, making it imbalanced. The study's first performance metric, ROA, has a mean of 0.023, meaning that each company's average return on assets is 2.3%. The highest value, 0.547, for the Dutch company ASM for 2013 indicates that the company is making 54.7% of its assets, while the lowest value, -0.234, for the Brazilian company Azul SA for 2020 indicates that the company is not making enough money from its assets. Period was used as a proxy to measure COVID-19. This variable is dummy. The average value of it is 0.5. The smallest value, 0, represents the years when there was no Covid-19 in the world, while the maximum value, 1, represents the years when all 17 of these countries were affected by the virus.

Table : Descriptive Statistics

	Mean	Std. Dev.	Min	Max	Skew.	Kurt.
ROA	.023	.031	-.234	.547	.604	1.796
ROE	.039	.068	-.794	.832	.498	2.645
Period	.156	.354	0.00	1.00	2.37	5.69
Inv growth	.137	.432	-1.003	4.003	.725	1.369
Revenue growth	.1	.537	-1.926	12.8	.48	3.621
Size	10.817	.933	8.081	13.717	.341	2.934
Liquidity	1.724	1.826	-2.472	24.826	.956	2.736
Growth	.039	.797	-4.614	5.303	.004	2.823
FCF	10.82511	9.18556	0	24.89397	-.269	1.1897

Note. N= 17, T = 11, obs. 3047

In this paradigm, revenue growth and investment growth served as moderators. Investment growth refers to the extent to which the increase of fixed assets has improved the correlation between COVID-19 and capital structure or COVID-19 and firm performance. Revenue growth is a measure of how much the rise in sales has improved the relationship between COVID-19 and capital structure, or COVID-19 and firm performance. The mean value of investment growth is.137, which indicates that, on average, enterprises' fixed assets have grown by 13.7% over the COVID-19 pandemic.

Table 1.2: Pearson Correlation Matrix:

Variables	Invgro	Rev gr	Size	Liq	Growth	FCF
Inv growth	1.000					
Revenue growth	0.237*	1.000				
Size	-0.026	-0.003	1.000			
Liquidity	-0.038*	-0.015	-0.13*	1.000		
Growth	0.075*	0.316*	0.015	-0.06	1.000	
Fcf	0.002	0.031	0.079*	0.047	0.036	1.000

Note. N= 17, T = 11, obs. 3047

4.2 Results

4.2.1 Performance Prediction

First, the model uses data from 2013 to 2019 to project the performance of 17 nations in three categories: developed, emerging, and underdeveloped. These predictions are made for the first quarter of 2020-2023. The accompanying graphs, which display both capital structure and individual performance metrics, reflect the predicted values. The x, or horizontal axis, displays the names of the countries. It is evident from the results that developed nations were most affected by COVID-19, except for Denmark, which showed remarkably positive results in comparison to the predictions. Conversely, those who were less developed were less affected by COVID-19. This is due to a few factors, such as the fact that most people in developed economies, such as those in Europe, are over 60. The elderly are more susceptible to COVID-19The second factor is that cold weather predominates in all developed economies, which makes matters worse. The temperature in underdeveloped nations is typically hot and dry; hence, few cases have been reported there. Furthermore, the policies used by less developed nations were significantly superior to those of developed ones. For example, the adoption of smart lockdown rather than a complete shutdown allowed the economy to continue. Thus, the H2 hypothesis is supported by all the graphs below.

In comparison to their expected performance, Kenya, Nigeria, and Pakistan—all underdeveloped economies—performed remarkably well. Governments took preventative action far in advance because the first case of COVID-19 was recorded considerably later than in other wealthy and rising economies. Furthermore, Africa's population is younger and fewer

elderly, making it more susceptible to viruses. They did well because the harsh, dry, and severe weather also prevented them from experiencing economic downturn. The graphics below display these facts.

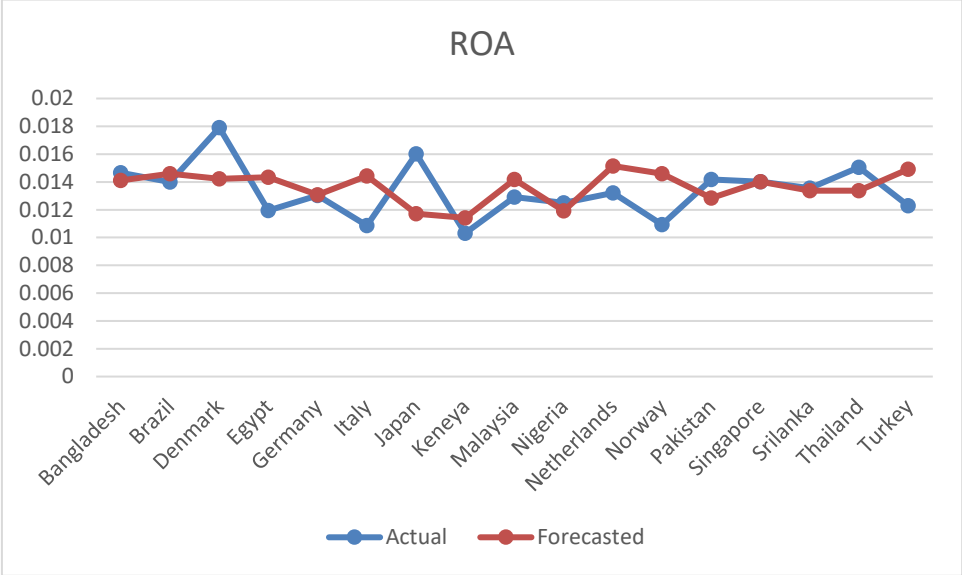

Figure 5.1 Actual and Forecasted ROA

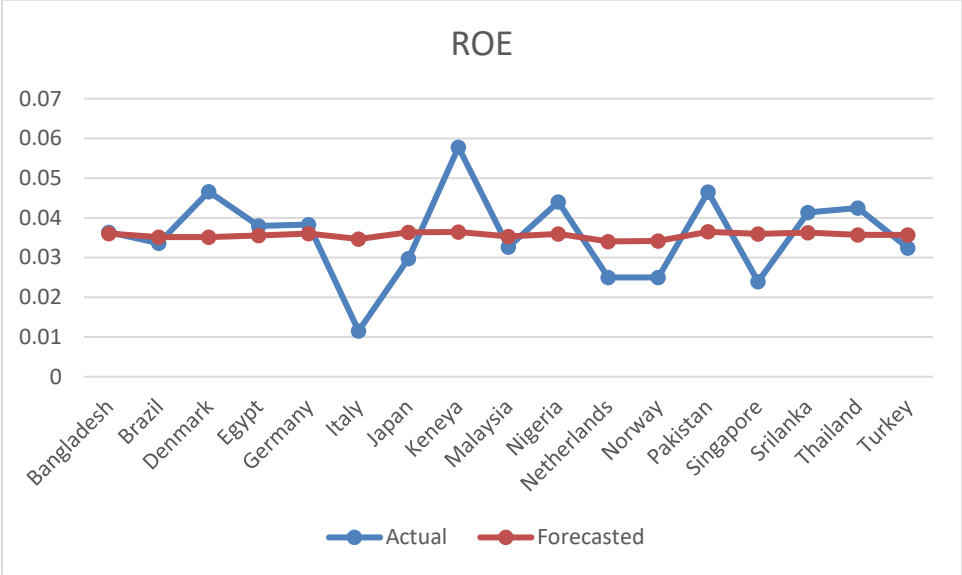

Figure 5.2 Actual and Forecasted ROE

4.2.2 Regression Results

The Return on Assets (ROA) regression findings are shown in Table 4.3. The model makes it clear that COVID-19 significantly and negatively affects return on assets in industrialized economies. At the 1% significance level, this is noteworthy. It agrees with Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in

economic activity; as demand declined, so did output. As a result, sales and net income fell, which in turn reduced ROA. ROA is significantly and favorably impacted by investment growth (chang, 2024). The significance level is set at 1%. It agrees with Lee et al. (2020) and Jaewook Kim et al. (2020).

Growth in investments indicates a rise in fixed assets. Therefore, once fixed assets rise, there will be more exploitation and, consequently, greater revenue creation. ROA is not significantly impacted by revenue growth. Literature does not support it. Although sales have increased in a few sectors, such as the pharmaceutical and biotech industries, lockdown measures have had a negative overall impact because the index is a basket of several shares of numerous sectors whose sales have decreased. The interaction phrase ROA is significantly yet negatively impacted by the investment growth during the period. At the 1% significance level, it is noteworthy. The results are not consistent with literature, it means that ROA and growth sales in revenue is not affaected by COVID 19.

Liquidity is the only control variable that significantly affects ROA. ROA is significantly impacted by liquidity at the 1% significant level. The reason for this is that when short-term demands are met with money generated by business operations rather than outside investment, there will be more profitability. Additionally, liquidity expresses a company's ability to fund its short-term obligations with its present assets, while profitability expresses the profits generated by the activities of the business.

The Return on Equity (ROE) regression findings are shown in Table 4.4. The model makes it clear that COVID-19 significantly and negatively affects return on equity in industrialized economies. At the 1% significance level, this is noteworthy. It agrees with Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in economic activity; as demand declined, so did output (Baral et al., 2023). Sales and net income fell as a result, which in turn reduced ROE. ROE is significantly and favorably impacted by investment growth. The significance level is set at 1%. It agrees with Lee et al. (2020) and Jaewook Kim et al. (2020). Growth in investments indicates a rise in fixed assets. The literature does not support it. Although sales have increased in a few sectors, such as the pharmaceutical and biotech industries, lockdown measures have had a negative overall impact because the index is a basket of several shares of numerous sectors whose sales have decreased. Interaction phrase ROE is significantly yet negatively impacted by the investment growth * period. At the 1% significance level, it is noteworthy. It aligns with the findings of Shen et al. (2020). It is implied that the link between COVID-19 and ROA would deteriorate if fixed assets increased during that period. Moderator The period of revenue growth* has little effect on ROA.

Size is the only control variable that significantly affects ROE. At the 10% significant threshold, size significantly improves ROE. The reason for this is that size equals total assets. There will be more assets, more opportunities to utilize them, and more opportunities to generate income.

Table 4.3: Results of the Estimates of Regression Results (ROA)

Developed Economies

	Without Moderator			Inv growth * Period			Rev growth * Period		
Roa	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	-.013	-5.23***	.000	-.016	-4.01***	.000	-.008	-5.01***	0
Inv growth	.029	6.98***	.000	.028	6.32***	.000			
Revenue growth	0.003	0.19	.809				.004	0.76	.604
IP				-.032	-3.01***	.005			
RP							.008	0.81	.531
Size	-.014	-0.76	.496	-.010	-0.51	.732	.009	1.31	.432
Liquidity	.014	3.01***	.006	.004	2.91***	.006	.003	2.21**	.031
Growth	.012	0.96	.372	.006	1.32	.201	.003	1.22	.325
FCF	0.002	1.15	.196	0.03	1.31	.231	0.04	0.61	.897
Constant	.003	1.18	.208	.021	1.27	.222	.06	1.32	.331
R^2	0.5139			0.5678			0.4132		

**** p<.01, ** p<.05, * p<.1*

Table 4.4: Results of the Estimates of Regression Results (ROE)

Developed Economies									
	Without Moderator			Inv growth * Period			Rev growth * Period		
Roe	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	-.031	-4.99***	.000	-.03	-3.28***	.002	-.026	-3.96***	.000
Investment growth	.032	4.96***	.000	.024	5.86***	.000			
Revenue growth	.004	0.57	.756				.006	1.12	.248
IP				-.044	-3.57***	.000			
RP							-.021	-1.13	.278
Size	.003	0.32	.967	.003	0.71	.62	.022	1.76*	.096
Liquidity	.002	1.47	.245	.002	1.32	.18	.002	0.12	.371
Growth	.004	1.43	.236	.004	1.62	.12	.004	1.24	.157
FCF	0.01	1.36	.314	0	1.31	.189	0	0.71	.422
Constant	.013	0.41	.192	.010	0.41	.789	.006	0.18	.87
R^2	0.528			0.5230			0.4964		

**** p<.01, ** p<.05, * p<.1*

Table 4.5: Results of the Estimates of Regression Results (ROA)

Emerging Economies									
	Without Moderator			Inv growth * Period			Rev growth * Period		
ROA	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	-.011	-2.15**	.04	-.009	-2.24**	.031	-.009	-1.96**	.049
Investment growth	-.012	-0.81	.514	-.003	-1.10	.310			
Revenue growth	.013	2.61***	.008				.008	2.61***	.008
IP				.007	1.29	.342			
RP							-.004	-1.05	.295
Size	-.05	-5.01***	.000	-.04	-4.89***	.000	-.04	-4.99***	.000
Liquidity	.003	3.01	.0.00	.002	0.93	.412	.003	1.23	.218
Growth	.006	5.13***	.000	.007	5.37***	.000	.006	4.58***	.000
FCF	0	0.71	.531	0	0.59	.714	0	0.72	.470
Constant	.421	5.13	0	.412	4.24	0	.332	4.55	0
R2	0.578			0.582			0.591		

Note. N= 17, T = 8, obs. 751

**** p<.01, ** p<.05, * p<.1*

The Return on Assets (ROA) regression findings are shown in Table 4.5. The model makes it clear that COVID-19 significantly and negatively affects return on assets in emerging economies (Bose et al., 2022). At the 5% significance level, this is noteworthy. It agrees with Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in economic activity; as demand declined, so did output. As a result, sales and net income fell, which in turn reduced ROA. ROA is not impacted by investment growth. Literature does not support this. The profitability of the company is greatly impacted if fixed assets, sales, or revenues increase because there are more assets available to take advantage of and make money from. ROA rises as a result. Additionally, even while sales have increased in a few sectors, such as the pharmaceutical and biotech industries, lockdown measures have also had a negative overall impact because the index is a basket of several shares of numerous sectors whose sales have decreased. At the 1% significant level, revenue growth significantly and favorably affects ROA. The implication is that the profitability ratio rises in tandem with an increase in sales volume. It aligns with the findings of El-Khatib and Samet (2020).

Both interaction terms Revenue growth * Period and investment growth * Period have no discernible effects on ROA. This is not supported by literature. ROA was significantly impacted by both moderators, Shen et al. (2020). The lockdown has slowed economic growth considerably and hindered the expansion of fixed assets. As a result, ROA is little affected. The products are also in lower demand, which has an impact on revenue growth and, eventually, profitability. Emerging economies are less developed than developed ones. They are going through a transition. more affected as a result than in wealthy economies. Liquidity and free cash flow have not had a significant effect on ROA in emerging economies. ROA is significantly yet negatively impacted by size by 1%. It contradicts the findings of Abeyrathna and Priyadarshana (2019). Any increase in a company's size indicates that its assets are growing, which leads to increased asset exploitation to enhance revenue and profitability. At the 1% significant level, operational income growth also has a major effect on ROA.

The Return on Equity (ROE) regression findings are shown in Table 4.6. The model makes it clear that COVID-19 has a negligible effect on return on equity in emerging economies. It contradicts the findings of Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in economic activity; as demand declined, so did output. Sales and net income fell as a result, which in turn reduced ROE. ROE is unaffected by revenue or investment growth. Literature has nothing to do with this. This is because, despite sales growth in select industries, such as pharmaceutical and biotech, lockdown measures have little influence on the firm's profitability when fixed assets and sales expand. Terms of interaction Growth in investments, period, and revenue Period has no discernible effect on ROE. It does not align with the findings of Shen et al. (2020). This is since developing economies are in a transitional phase, in contrast to advanced economies. They're not fully formed. Sales fell as demand and purchasing power declined, unaffected by an increase in fixed assets. Furthermore, lockdowns and quarantines impeded the expansion of fixed assets, which is why they continue to have an influence. Growth is the only control variable that significantly affects emerging nations' ROE. At a 10% significant level, growth has a considerable positive impact on ROE, suggesting that a firm's profitability rises whenever its operating income does.

Table 4.6: Results of the Estimates of Regression Results (ROE)

Emerging Economies									
	Without Moderator			Inv growth * Period			Rev growth * Period		
Roe	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	-.022	-1.44	.151	-.021	-1.45	.147	-.02	-1.42	.156
Investment growth	-.001	-0.13	.900	.001	0.14	.885			
Revenue growth	.005	0.76	.447				.011	1.32	.186
IP				-.007	-0.04	.968			
RP							-.031	-1.52	.130
Size	-.01	-1.53	.125	-.01	-1.43	.154	-.009	-1.30	.195
Liquidity	.001	0.44	.658	.001	0.39	.699	.001	0.39	.699
Growth	.009	1.92*	.055	.01	2.13**	.033	.009	1.88*	.060
Fcf	0	0.11	.914	0	0.14	.892	0	0.19	.851
Constant	.144	1.63	.104	.143	1.61	.107	.137	1.55	.122
R2	0.4618			0.4613			0.4637		

Note. N= 17, T = 8, obs. 751

**** p<.01, ** p<.05, * p<.1*

Table 4.7: Results of the Estimates of Regression Results (ROA)

Under Developed Economies									
	Without Moderator			Inv growth * Period			Rev growth * Period		
ROA	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	-.005	-3.21***	.003	-.004	-2.75***	.006	-.005	-3.54***	.003
Investment growth	0	0.31	.814	.002	0.74	.612			
Revenue growth	.002	2.97***	.006				.002	2.41**	.023
IP				-.006	-0.78	.456			
RP							.009	2.18**	.030
Size	-.022	-5.46***	.000	-.02	-4.59***	.000	-.021	-5.34***	.000
Liquidity	.002	3.41***	.002	.002	2.67***	.007	.002	3.20***	.001
Growth	.004	5.51***	.000	.004	6.31***	.000	.004	5.43***	.000
Fcf	0	1.21	0.51	0	1.51	.178	0	1.27	.204
Constant	.123	4.51	.000	.182	4.12	0	.141	4.43	0
R2	0.8174			0.812			0.8071		

Note. N= 17, T = 8, obs. 646

**** p<.01, ** p<.05, * p<.1*

The Return on Assets (ROA) regression findings are shown in Table 4.7. The model makes it clear that COVID-19 significantly and negatively affects return on assets in less developed economies. At the 1% significance level, this is noteworthy. It agrees with Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in economic activity; as demand declined, so did output. As a result, sales and net income fell, which in turn reduced ROA.

ROA is not impacted by investment growth. Literature does not support this. The profitability of the company is greatly impacted if fixed assets, sales, or revenues increase because there are more assets available to take advantage of and make money from. ROA rises as a result. Additionally, even while sales have increased in a few sectors, such as the pharmaceutical and biotech industries, lockdown measures have also had a negative overall impact because the index is a basket of several shares of numerous sectors whose sales have decreased. At the 1% significant level, revenue growth has a significant and positive impact on ROA, suggesting that a firm's profitability increases as revenues rise. It aligns with the findings of Shen et al. (2020).

Interaction phrase ROA is not significantly impacted by investment growth * period. Literature does not support this. Both moderators had a considerable effect on ROA, according to Shen et al. (2020). Economic growth has significantly slowed as a result of the lockdown, which has also reduced expansion in fixed assets. Consequently, ROA is not much impacted. At a 5% significant level, revenue growth * period significantly affects ROA. Its β value of 0.008 indicates that ROA increased in tandem with the 1 unit increase in sales during the COVID-19 pandemic. It aligns with the findings of Shen et al. (2020). Thus, it improves the bond between COVID-19 and ROA. It is implied that the impact can be lessened if sales rise during COVID-19. Size has a significant negative influence on ROA of 1%. It aligns with the literature. At the 1% significant level, liquidity significantly and favorably affects ROA. It suggests that a company may easily pay its debts if it has greater current assets. More current assets allow the company to invest more, which raises revenues and has an indirect impact on ROA. At the 1% significant level, operational income growth also has a major effect on ROA. It aligns with the literature. It suggests that if operating income rises, net income will follow, leading to a rise in ROA.

The model makes it clear that COVID-19 significantly reduces return on equity in less developed economies. At the 1% significance level, this is noteworthy. It agrees with Shen et al. (2020) and Abedalqader et al. (2020). Lockdowns and quarantines are to blame for the decline in economic activity; as demand declined, so did output. Sales and net income fell as a result, which in turn reduced ROE. ROE is not significantly impacted by investment growth. Literature has nothing to do with this. This is because lockdown measures have no effect on the profitability of the firm even though sales in certain sectors, such as the pharmaceutical and biotech sectors, have increased. However, since the index is a basket of many shares of numerous sectors where sales have decreased, the overall impact is tarnished. At the 1% significant level, revenue growth significantly and favorably affects ROE. It goes without saying that when sales rise, so does profitability. It aligns with the findings of Shen et al. (2020).

Table 4.8: Results of the Estimates of Regression Results (ROE)

Under Developed Economies									
	Without Moderator			Inv growth * Period			Rev growth * Period		
Roe	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
Period	.008	-3.18***	.003	.002	-2.61***	.011	.009	-3.14***	.003
Investment growth	-.006	-0.97	.341	-.005	-0.63	.571			
Revenue growth	.031	8.21***	.000				.031	9.01***	.000
IP				.032	0.117	.291			
RP							-.024	-0.82	.475
Size	-.08	-4.40***	.000	-.071	-3.91***	.000	-.084	-5.14***	.000
Liquidity	0	-0.31	.851	-.004	-1.41	.192	0	-0.18	.875
Growth	.02	3.51***	.002	.041	5.21***	.000	.02	3.43***	.001
FCF	0	0.16	.936	0	0.35	.726	0	0.25	.876
Constant	.91	2.87	.006	.81	2.76	.008	.914	2.84	.006
R2	0.6125			0.5335			0.5835		

Note. N= 17, T = 8, obs. 646

**** p<.01, ** p<.05, * p<.1*

Interaction phrase Growth in investments, period, and revenue Period has no discernible effect on ROE. It aligns with the literature. The reason for this is that less developed economies are less developed than advanced economies. The link between COVID-19 and ROE is not strengthened nor weakened by these moderators. Sales fell as demand and purchasing power declined, unaffected by an increase in fixed assets. Furthermore, lockdowns and quarantines impeded the expansion of fixed assets, which is why they continue to have an influence.

At the 1% significant level, size has a negative but significant impact on ROE. It doesn't fit with the literature. In contrast to COVID-19, when there was a lockdown as a preventive measure, there was no growth in assets, hence ROE was unaffected. A rise in size implies that assets are expanding, so revenues must also increase. At the 1% significant level, there is a strong correlation between operating income growth and ROE. It aligns with the literature. The reason for this is that higher operational income will result in higher net income and, thus, higher ROE. The ROE of less developed economies is not significantly impacted by liquidity or FCF.

5. Conclusions

The aim of this research is to examine how COVID-19 affects businesses that use it as a moderator for revenue and investment growth. Additionally, it was meant to determine which economies—developed, emerging, or underdeveloped—were most impacted by COVID-19. Results are mixed; some are backed up by literature, while others are unimportant because there was no prior literature.

This study's initial section anticipated and contrasted the performance of various countries' enterprises. The graphs demonstrated that, in terms of ROA and ROE, developed economies underperformed. Furthermore, less developed economies fared better than expected. The previous section already explains the reason.

The impact of COVID-19 on financial performance was examined in the study's second section. Measures of financial performance for industrialized, emerging, and underdeveloped economies were all greatly impacted by COVID-19, supporting the idea that the virus has a major detrimental effect on business performance. The cause of these findings is that COVID-19 has reduced people's purchasing power, which has lowered demand and, consequently, sales, thereby impeding profitability. It aligns with the findings of Hassan and Riveros (2020).

For all developed, emerging, and underdeveloped nations, the interaction term investment growth period has a negligible effect on the link between COVID-19 and business performance. It doesn't fit with the literature. Although sales in select industries, such as the pharmaceutical and biotech sectors, have increased because of lockdown measures, the overall impact has been tarnished because the index is a basket of many shares of other industries where sales have decreased. Furthermore, because they are less developed than industrialized economies, emerging economies were subject to lockdowns and quarantines. Consequently,

the idea that investment growth significantly affects financial success is rejected. It contradicts the findings of Shen et al. (2020) and Pinglin et al. (2020).

An additional moderator, the period of revenue growth has a considerable impact on the link between COVID-19 and business performance, hence diminishing it. It suggests that the impact of COVID-19 may be mitigated if sales continue to rise because of government assistance and subsidies. Therefore, it is accepted that their relationship is moderated by income increases during COVID-19.

Insightful suggestions for post-pandemic strategies are offered by this study to decision-makers. The government must offer subsidies to entrepreneurs, new businesses, and publicly traded enterprises at the macroeconomic level who are most affected by pendamic. Firms should also incorporate pandemic related risk into their strategies and prepare contingency plans. Investors should monitor the yield flow during COVID-19 to assess the risks.

The research was limited by the inability to obtain data for certain companies and the need to exclude three developing nations—China, India, and Russia—from the sample. No company in every nation was served due to time constraints. Therefore, it is necessary to include these companies to expand the scope of the investigation.

Future suggestions include conducting a sector-level analysis to determine which industries are most impacted by the pandemic. It is important to examine the effects of COVID-19 on ownership dilution and concentration. The economic policies of the government during COVID-19 should be analyzed and contrasted with those of other nations. It is important to look at how financial institutions responded to the economic development agenda under COVID-19. Only the first quarter is covered by this study. Since the globe has been dealing with the effects of COVID-19 for a year, data from the second quarter or the year can also be used to assess how the virus has affected performance. Future research can also include macroeconomic factors to more thoroughly examine the effects.

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Appendix 1

Country	Stock Exchange	Index	Companies
		Developed	
Germany	Frankfurt Stock Exchange	DAX (Deutscher Aktienindex)	30
Italy	Borsa Italiana	FTSB MIB	40
Japan	Tokyo Stock Exchange	Topix core 30	30
Norway	Oslo Stock Exchange	OMX Oslo 20	20
Netherlands	Euronext Amsterdam	Aex 25	25
Denmark	Nasdaq Copenhagen	OMX Copenhagen 20	20
		Emerging	
Malaysia	Bursa Malaysia	FTSE Bursa Malaysia KLCI, also known as the FBM KLCI	30
Turkey	Borsa Istanbul	BIST30	30
Brazil	Brasil Bolsa Balcão	Bovespa Index also known as Ibovespa	60
Singapore	Singapore Exchange	ftse straits times index	30
Thailand	Stock Exchange of Thailand	SET 50	50
		Under Developed	
Pakistan	Pakistan Stock Exchange	KSE30	30
Nigeria	Nigeria Stock Exchange	ISX Main 60	60
Sri Lanka	Colombo Stock Exchange	S&P SL20	20
Bangladesh	Dhaka Stock Exchange	DSEX 30	30
Egypt	Egyptian Exchange	EGX30	30
Kenya	Nairobi Securities Exchange	NSE 20	20

Appendix 2:

Comparative Impact under Developed Economies		
Variables	Proxies	
Dependent Variable	ROA	Net Income / Total Assets
	ROE	Net Income / Total Equity
Independent Variable		
Covid-19	Period	Dummy variable of "outburst time"
Investment growth	Inv Gro	(Fixed Asset $_{t}$– Fixed Asset $_{t-1}$) / Fixed Asset $_{t-1}$
Revenue Growth	Rev	(Sales $_{t}$– Sales $_{t-1}$) / Sales $_{t-1}$
Moderator		
Investment Growth*Period	Inv Gro* Period	((Fixed Asset $_{t}$– Fixed Asset $_{t-1}$) / Fixed Asset $_{t-1}$)* Period
Revenue Growth*Period	Rev*Period	((Sales $_{t}$– Sales $_{t-1}$) / Sales $_{t-1}$))* Period
Control Variables		
Size	Size	ln (Total assets)
Liquidity	Liq	Current Asset / Current Liabilities
Growth	Gro	(Oper Income t– Oper Income t-1) / Oper Income t-1
Free Cash Flow	FCF	Net Cash generated by Operating activities + Net Cash Generated from Investing Activities