UDC: 624:616.9(497.6)
DOI:10.5937/AnEkSub2200013T

Анали Економског факултета у Суботици – The Annals of the Faculty of Economics in Subotica
Vol. 59, No. 49, pp. 147-161
Received: 18/09/2022
Accepted: 30/11/2022
Published online: 14/12/2022

Original scientific article

Effect of the COVID-19 pandemic on the profitability of construction companies: evidence from Bosnia and Herzegovina

Утицај пандемије коронавируса на профитабилност компанија из области грађевинарства: искуство Босне и Херцеговине

Teodora Tica
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia, teodora.tica@ef.uns.ac.rs
https://orcid.org/0000-0002-7376-2124
Dragana Đorđević*
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia,
dragana.djordjevic@ef.uns.ac.rs https://orcid.org/0000-0002-5668-8647
Dušan Saković
University of Novi Sad, Faculty of Economics in Subotica, Subotica, Republic of Serbia,
dusan.sakovic@ef.uns.ac.rs https://orcid.org/0000-0003-2742-2388

Abstract: This paper aims to demonstrate the theoretical and empirical impact of the COVID-19 virus pandemic on profitability. The analysis was performed on a sample of 131 actively operating companies in Bosnia and Herzegovina between 2014 and 2020. Applying panel regression methodology, an empirical study was conducted. The assessment of fixed-effect model revealed the presence of a negative and statistically significant effect of the coronavirus pandemic on profitability as measured by return on total assets (ROA). The findings validated the curiosity of the construction sector in Bosnia and Herzegovina, suggesting that it is among several sectors with increased demand for its products - residential and non-residential buildings, throughout the pandemic crisis and recession at the beginning of 2020. The results of this study could help construction companies to develop operational performance and risk management in pandemic situations, and the flexibility of their actions in the face of future crises of a similar nature, given that the construction sector has played a crucial role in supplying construction of all types of residential buildings, buildings for industrial production, e.g. factories, workshops, assembly plants, parking garages, warehouses, schools, as well as, hospitals in challenging times and has met the increased demand.
Keywords: COVID-19, pandemic, profitability, construction industry, Bosnia and Herzegovina
JEL classification: C23, L25, L74

Сажетак: Овај рад има за циљ да прикаже теоријски и емпиријски утицај пандемије вируса Ковид-19 на профитабилност. Анализа је извршена на узорку од 131 активних друштава у Босни и Херцеговини у периоду од 2014. до 2020. године. Применом методологије панел регресије спроведено је емпиријско истраживање. Оцена модела са фиксним ефектима показала је присуство негативног и статистички значајног утицаја пандемије коронавируса на профитабилност мерену приносом на укупну имовину (ROA). Резултати су потврдили занимљивост грађевинског сектора у Босни и Херцеговини, указујући да је

* Corresponding author.

он међу неколико сектора са повећаном потражњом за својим производима - стамбеним и нестамбеним зградама, током кризе изазване пандемијом и рецесије почетком 2020. године. Резултати ове студије могли би да помогну грађевинским компанијама да развију оперативне перформансе и управљање ризиком у пандемијским ситуацијама, као и флексибилност њиховог деловања у суочавању са будућим кризама сличне природе, с обзиром на то да је грађевински сектор одиграо кључну улогу у снабдевању свих врста стамбених објеката, објеката за индустријску производњу, нпр. фабрика, радионица, монтажних погона, паркинг гаража, складишта, школа, као и болница, што је посебно значајно у изазовним временима, успевши и да задовољи повећану тражњу.
Кључне речи: Ковид-19, пандемија, профитабилност, грађевинска индустрија, Босна и Херцеговина
ЈЕЛ класификација: Ц23, Л25, Л74

Introduction

Since the declaration of the COVID-19 pandemic by the World Health Organization (WHO), many countries of the world have introduced measures to combat the virus, which included a complete lockdown. Such changes affected all spheres of life, reduced quality of life and weakened world economies. Success in dealing with natural disasters, such as climate change and pandemics, has so far been limited due to the fact that human powers in many areas are still quite limited (Radić et al., 2021). Figus (2021) states that coronavirus pandemic reminds us of the interconnection of medicine with other branches, where multiple disciplines converge. COVID-19 drastically affected narrowly specialized businesses that had to adopt new environmental requirements, such as construction industry (Sahaidak, 2021). Businesses that are flexible adapted their operations to home environment, while numerous economic branches, where the presence of workers is required, had to suspend their activities completely. The construction industry is a significant driver of the economic growth of every country, so the suspension of actions and the postponement of all projects until further notice, certainly had to leave consequences on the economy (Gamil & Alhagar, 2020).

The new situation created a disruption in the supply of raw materials, as well as in their transportation. Sharif et al. (2020) analyzed the Dow Jones 30 index and concluded that COVID-19 had a great impact on US geopolitical risk and economic uncertainty, as well as that the COVID-19 pandemic affects the price of oil, citing restrictions on movement and transport as one of the factors such influence. Delivery delays are a major challenge impacting construction projects. Based on recent surveys, the most common factors that cause delays are deficiencies of materials, lack of trained labour, price soars in the market, delays in obtaining permits from authorities, etc. (Alenezi, 2020). Thus, even after the termination of measures prescribed by government bodies that restricted the movement of people, there would still be many obstacles slowing regular business down. The slowdown in the transport industry caused a stoppage in the delivery of necessary raw materials, without which business could not be possible. In a period of shortage of new material, the one already in stock became more valuable, which could lead to rapid price rises. Consequently, an increase in the prices of services and finished products would arise. The slow performance of the construction industry led to a reduced supply of construction facilities. The unstable economic situation during the pandemic also reduced the demand for construction facilities, which put the construction sector in an unfavourable situation.

Furthermore, the problem of unemployment has risen. In industries where it is not possible to adapt to work from home conditions, a large number of workers have lost their jobs, which is the case with construction industry, when in the first months of the pandemic they lost their jobs and the necessary income. In his research, where office workers and field workers of a construction company were interviewed separately Bsisu (2020) observed that almost 40% of field workers were worried about possible job loss.

Finally, the COVID-19 pandemic, like numerous other pandemics in the past, has left its mark on finances. Since the profitability of a company's operations is one of the conditions for its long-term survival and success on the market, it is necessary for it to be measured constantly (Mitrović et al., 2021). The economic crisis causes the decrease in the sales of products, as it is the case with the construction sector (Devi et al., 2020). The decline in total sales could undoubtedly have an impact on financial performance and profitability, and some companies may be liquidated due to financial difficulties (Bintang et al., 2019).

Based on the Annual Report on Construction Works in Bosnia and Herzegovina (Agency for Statistics of Bosnia and Herzegovina, 2021), it can be noted that in 2020 there was an increase in the number of working hours compared to 2019 by 1.7%. The number of workers increased by 1%, and also, the value of completed works in 2020 was 10.7% higher than in the previous year.

The purpose of this research is to investigate, from both a theoretical and an empirical standpoint, how the COVID-19 virus affects a company's profitability. The findings reaffirmed the unique characteristics of the construction business, demonstrating that it is one of the very few sectors to have increased its profitability despite the global financial crisis and economic downturn that began in the beginning of 2020 as a direct result of the pandemic.

This paper consists of three parts. The first part includes reviews of the results of previous research regarding the impact of the pandemic caused by the COVID-19 virus on financial performance, as well as the impact of other factors on the profitability of construction companies. Based on the literature review, hypotheses that will be tested in the rest of the work were derived. The following section presents a more detailed composition of the sample and the source of data used in the research and explains the chosen methodology that was implemented in order to confirm or reject the set hypotheses. The third part presents the results of the empirical research, followed by a discussion of the results.

1. Theoretical background

Although it is believed that the first cases of infection with the COVID-19 virus were confirmed in China, and subsequently in South Korea, the epidemiological situation in those parts of the world quickly improved, while the epicentre moved to Europe, and later to the USA. In this regard, since the beginning of 2020, authors around the world have analyzed the impact of the pandemic caused by the COVID-19 virus, considering different

markets, economies, as well as sectors. There are different points of view when it comes to the direction of the impact of the COVID-19 virus on financial performance, i.e. profitability and yield.

On the one hand, some authors established negative impact of the pandemic caused by the COVID-19 virus on the financial performance of companies belonging to different sectors, based in different countries of Europe and the rest of the world, while on the other hand there is a group of authors who managed to prove that the pandemic brought improvement and increased financial performance to certain sectors and economies.

The negative impact of COVID-19 on the construction sector was presented by Nguyen et al. (2021) who found that 80% of construction companies experienced a drop in profitability due to the pandemic. Only a small number of companies (0.81%) noticed an increase in profitability. The reason for this lies in the cost structure of construction companies, where 60-70% of costs are material costs, 10-20% labour costs, and the remaining 10-20% are machine costs (El-Gohari & Aziz, 2014). Research by Suiko (2020) on 45 construction projects completed during the pandemic revealed a productivity loss of around 7% as a result of labour shortages and the impact of social distancing. Devi et al. (2020) shows the negative financial impact of the pandemic on Indonesian construction companies through DER (Debt to Equity Ratio) and ROA (Return on Assets) indicators. The observed companies recorded an increase in DER indicator during the pandemic period, which indicates a decrease in the company's profitability. By analysing the ROA indicators, it is shown that the return on funds of the observed companies was significantly higher before the start of the pandemic than the return on funds during the pandemic. This decline in value also indicates financial problems caused by the health crisis. Liu et al. (2020) investigated the stock market indices of the countries most affected by the pandemic, such as Japan, Korea, Singapore, the USA, Germany, Italy, Great Britain and others, coming to the conclusion that stock market indices in large countries fell right after the outbreak of the virus, primarily due to the pessimistic view of investors on future yields and due to fear of uncertainty. After conducting an analysis of the impact of COVID-19 on various industries in China, Xiong et al. (2020) pointed out that the construction industry, along with tourism, transport and other similar industries, belongs to the group of VIND (vulnerable industries), which implies that the profitability of their business fell to a large extent the pandemic itself. The profitability of the company is also affected by cash flow, which can be damaged due to delays in construction activities. There are also problems with the payments to employees and suppliers on time due to the delay in the payment of realized activities (Pamidimukkala et al., 2021). From the point of view of Anh and Gan (2021), there is a negative impact of the daily increase in the number of cases infected with the COVID-19 virus on the return per share of companies based in Vietnam. Also, the study proves that movements on the Vietnamese stock market were in opposite directions before and during the country's quarantine. Although COVID-19 had a significant, negative impact on earnings per share prior to the closure, the introduction of quarantine, i.e. the ban on movement, had a significant positive impact on the performance of both individual company shares and the entire stock market in Vietnam, with the results showing that the financial sector was hit the hardest on the Vietnamese stock market during the outbreak of

the COVID-19 pandemic. A similar study was conducted by Ashraf (2020), where the results also showed the negative impact of the pandemic caused by the COVID-19 virus on stock market performance in 64 countries, that is, there is an inverse relationship between the increasing number of confirmed infected cases and returns per share.

Among the scientific works that show the positive impact of COVID-19 on the construction sector, several opinions could be emphasized. Firstly, research conducted by Gumble (2020) shows that after the pandemic, neither society nor industry will be the same anymore, and that it would be necessary to introduce more flexibility and new technologies in business of the construction industry. Tadić et al. (2019) state that flexibility, as a critical success factor, represents the internal strength of the company. Bailey et al. (2020) highlight the significant impact of the pandemic on the construction sector, but from the legal side. They consider that COVID-19 could be force majeure in contracts, allowing extensions of deadlines, without the obligation to reimburse costs. Additionally, Jones (2021) claims that the pandemic encourages the development of new technology in construction, and consequently greater efficiency of the workforce, increased productivity and reduced business costs.

Considering the problem and aim of the research, as well as the previous research conclusions of other authors, the hypothesis that will be tested in this paper is the following:

H1: The pandemic caused by the COVID-19 virus has a negative and statistically significant impact on the profitability of construction companies in Bosnia and Herzegovina.

2. Data and methodology

The purpose of this study is to examine the effect of the COVID-19 virus pandemic on the profitability of Bosnia and Herzegovina-based construction sector. In accordance with the Regulation on Classification of Activities (2010), the sample consists of companies registered in sector F - Construction, under activity code 41.20 - Construction of residential and non-residential buildings. The sample is composed of 131 active firms operating between 2014 and 2020, comprising 917 observations. The TP Catalyst database was utilized as a source of information for this study (Bureau van Dijk, 2022). Both dependent and independent variables of the model are presented in Table 1. The table additionally contains the variables' formulation and an overview of the leading scientists who applied the same variables.

Table 1: Summary of variable category, name, formulation, and source

Variable category	Variable name	Variable formulation	Source literature
Dependent variable	Profitability	ROA	Le & Phan, 2017; Chandra et al., 2019; Rababah et al., 2020; Shen et al., 2020; Vuković et al., 2020; Atayah et al., 2021
Independent variables	Liquidity	Current assets/ Current liabilities	Le&Phan, 2017; Mijić et al., 2018; Chandra et al., 2019; Nguyen H. T. & Nguyen A. H., 2020; Vuković et al., 2020
	Asset structure	Fixed assets/ Total assets	Le&Phan, 2017; Mijić et al., 2018; Chandra et al., 2019; Chang et al., 2019; Nguyen H. T. & Nguyen A. H., 2020;
	Capital structure	Total debt/ Total assets	Le&Phan, 2017; Abdullah & Tursoy, 2019; Chandra et al., 2019; Shen et al., 2020; Vuković et al., 2020
	Asset Efficiency	Sales/ Total assets	Denčić-Mihajlov, 2014; Abey & Velmurugan, 2018; Alarussi & Alhaderi, 2018; Vuković et al., 2020, Tušek et al., 2021
	Growth	$(Sales_t - Sales_{t-1})/ Sales_{t-1}$	Le & Phan, 2017; Mijić et al., 2018; Abdullah & Tursoy, 2019; Chandra et al., 2019; Vuković et al., 2020
Control variable	COVID-19 virus pandemic	COVID-19	Shen et al., 2020; Anh & Gan, 2021; Atayah et al., 2021; Devi et al., 2021

Source: the authors' research

3. Results with discussion

The results of descriptive statistics for all model variables are displayed in Table 2. When assessing average values, the median is used instead of arithmetic mean because of the possibility of extreme values. ROA has median value of 4.8%, implying an almost satisfactory degree of profitability of construction enterprises, considering that it is close to 5%. The median estimate of the liquidity parameter is 1.2, which verifies the presence of a lack of current liquidity, suggesting that the sampled enterprises have a reduced capacity to satisfy their short-term debt with available current funds. Further, the findings indicate that the asset structure is skewed slightly toward current assets, which is to be anticipated considering the nature of the industry. Construction companies in their balance sheets generally record high values of real estate, primarily land and construction sites, while they

do not possess high values of construction equipment, since it is common for modern construction companies to hire subcontractors for diverse activities. Moreover, supporting the results, construction companies have a small turnover of products, i.e. residential, and non-residential buildings, with large amounts of recorded receivables during whole year. For the same reason, the median value of asset efficiency is high, given that sales almost exceed total assets. Further, the capital structure median value confirms that the examined sector adheres to the conventional financing approach by keeping a balance between their own and borrowed resources. Growth measured by sales revenue is present in the median value of 4.7%, which is considered satisfactory.

Table 2: Results of descriptive statistics

Variable name	Number of observations	Median	Mean	Minimum	Maximum	Standard deviation
ROA	917	0.048	0.086	-0.131	0.734	0.104
Liquidity	917	1.222	1.840	0.057	25.828	2.203
Asset structure	917	0.454	0.455	0.000	0.995	0.206
Capital structure	917	0.512	0.518	0.034	2.226	0.234
Asset Efficiency	917	0.995	1.143	0.005	9.012	0.816
Growth	917	0.047	0.183	-0.006	32.212	1.216
COVID-19	917	1.000	0.857	0.000	1.000	0.350

Source: the authors' computations

The initial approximation about the direction and significance of the linear correlation among the variables would be derived from the Pearson's correlation matrix reported in Table 3. Correlation matrix reveals a statistically significant and positive linear correlation between profitability on the one side and liquidity, as well as asset efficiency on the other side. However, there is a negative and statistically significant linear correlation among the profitability on the one side, and asset structure and capital structure on the other. Relationship between COVID-19 pandemic and profitability was proved to be negative, but non-significant, which leads to the partly rejection of H1, claiming that the COVID-19 has a negative and statistically significant impact on the profitability of construction companies in Bosnia and Herzegovina.

Table 3: Overview of the Pearson's correlation matrix

Variable name	ROA	Liquidity	Asset structure	Capital structure	Asset Efficiency	Growth	COVID-19
ROA	1						
Liquidity	0.1023**	1					
Asset structure	-0.0838*	-0.2572**	1				
Capital	-0.2238**	-0.5056**	-0.1662**	1			

structure							
Asset Efficiency	0.2676**	-0.1135**	-0.2432	0.1515*	1		
Growth	0.1180**	-0.0347	-0.0467	0.0268	0.1363**	1	
COVID-19	-0.0408	-0.0372	-0.0049	-0.0034	0.0473	0.0311	1
** - level of significance 1%; * - level of significance 5%							

Source: the authors' computations

Using panel regression approach, the influence of the coronavirus pandemic and other corporate factors on the performance of construction firms based in Bosnia and Herzegovina, being active from 2014 to 2020. Formulation of regression model assessed in this paper is presented using the following equation:

$$ROA_{it} = \beta_{it} + \beta_1 LIQ + \beta_2 AS + \beta_3 CS + \beta_4 AE + \beta_5 GW + \beta_6 COVID19 + u_{it.}$$

The following is a list of abbreviations: *i* stands for each company i = 1, 2, 3,...); *t* stands for each year (t = 1, 2, 3...); ROA stands for return on assets, LIQ stands for liquidity, AS stands for the asset structure, CS stands for the capital structure, AE stands for asset efficiency, GW stands for growth, COVID19 stands for pandemic caused by the COVID-19 virus.

Prior to evaluation of panel regression model, it is required to validate the method's underlying assumptions. One of the primary fundamental requirements for the use of panel analysis is that the independent variables are not strongly correlated, or that multicollinearity is absent. Table 4 summarizes the assessment of multicollinearity of independent variables using Variance Impact Factors (VIF) and 1/VIF parameters.

Table 4: Overview of Variance Impact Factor results

Variables	VIF	1/VIF
Liquidity	1.64	0.6091
Asset structure	1.32	0.7588
Capital structure	1.54	0.6495
Asset Efficiency	1.12	0.8927
Growth	1.02	0.9799
COVID-19	1.00	0.9950

Source: the authors' computations

Given that the VIF coefficients for all indicators are below 10 and the TOL coefficient (1/VIF) is greater than 0.1, it is possible to assume that there is no multicollinearity in the hypotheses-testing model. The absence of heteroskedasticity and autocorrelation, other two fundamental premises of the panel approach, were examined in Table 5.

Table 5: Overview of heteroskedasticity and autocorrelation test results

Test	Test statistic value	p - value
Wooldridge test	11.094	0.0011
Breusch-Pagan / Cook-Weisberg test	339.68	0.000

Source: the authors' computations

Considering that the outcomes of the Wooldridge test indicate that the p-value is less than the 5% significance criteria, autocorrelation has been proven. The Breusch-Pagan / Cook-Weisberg test was employed to determine the existence of heteroskedasticity. Since results showed that p-value is less than the 5% level of significance, the existence of heteroskedasticity is verified. According to a breach of the core premises, it is required to modify the model in order to conduct an appropriate assessment. Table 6 presents the altered regression model whose evaluation would lead to the acceptance or rejection of H1 hypothesis.

Table 6: Overview of the evaluation of transformed model

Variables	ROA	
	Coefficient	p
Liquidity	-0.0070	0.024
Asset structure	-0.1500	0.000
Capital structure	-0.1657	0.033
Asset Efficiency	0.0658	0.002
Growth	0.0032	0.327
COVID-19	-0.0222	0.008
Constant	0.1957	0.000
Number of observations	917	
R^2	0.1997	
F test	5.62	
p value (F)	0.000	

Source: the authors' computations

The outcomes of the F test ($p<0.01$) show that the assessed model is statistically significant. Further, given the coefficient of determination value, it could be stated that the 13.55% of variation in profitability is explained by variations in the independent variables in model. The results of the assessment of the adjusted model reveal that the coronavirus pandemic has a negative effect on the profitability of construction sector of Bosnia and Herzegovina. Hence, H1 is accepted. The results align with the findings of Devi et al. (2020), who examined the impact of the COVID-19 pandemic on firms' financial performance which are divided proportionally into nine sectors or 49 sub-sectors, and

concluded that the profitability ratios of the construction industry have declined. These results are in line with the research of Nguyen et al. (2021), who emphasize the multilevel nature of the consequences of the epidemic in the construction sector, highlighting decreased profitability during the coronavirus crisis period. . Moreover, authors believe that the epidemic would diminish the salaries and mental health of construction workers, as well as delay and increase the cost of projects. Furthermore, the outcomes of the transformed model imply that liquidity, asset structure, capital structure and asset efficiency are statistically significant factors of profitability measured by ROA. However, result indicated that growth are not statistically significant determinants of profitability.

To further prove the relevance of the effect of the COVID-19 crisis on the profitability of construction firms, a placebo test was conducted to assess whether construction enterprises in Bosnia and Herzegovina have worse financial performance as a consequence of the shift in financial year. The test was performed so that financial data for 2020 was omitted from the population, and 2019 was labelled as the epidemic period. Table 7 presents the outcomes of the performed placebo test.

Table 7: Placebo test

Variables	ROA	
	Coefficient	p
Liquidity	-0.0010	0.660
Asset structure	-0.0188	0.320
Capital structure	-0.1409	0.000
Asset Efficiency	0.0367	0.000
Growth	0.0081	0.002
COVID-19	-0.0172	0.054
Constant	0.1374	0.000
Number of observations	917	
R^2	0.2269	
F test	7.82	
p value (F)	0.000	

Source: the authors' computations

It could be confirmed that the COVID-19 virus has a significant negative effect on the profitability of construction firms from Bosnia and Herzegovina when interpreting the results of evaluation of the transformed model and of the placebo test performed in Table 7. In the transformed regression model, including the epidemic year 2020, the results indicate a statistically negative effect of the pandemic on profitability, whereas the placebo test, which omits 2020, also revealed a negative but not statistically significant impact of the COVID-19 pandemic.

According to official statistics of Bosnia and Herzegovina (Agency for Statistics of Bosnia and Herzegovina, 2021), the construction sector was one of the few that had the potential to increase profitability during the coronavirus crisis due to rising construction activities and demand. In response to the increased demand, growing prices of raw materials, decreased delivery times, and the adoption of preventative epidemic measures, the construction industry was able to adapt to the new circumstances on the national and international markets in a short period of time. In addition to great efforts, the construction industry managed to take advantage of the period of the pandemic, when natural persons, as well as investors, were willing to invest money in buildings and objects of various purposes. However, it was not enough to achieve the positive impact of the pandemic on profitability.

Conclusion

The problem caused by the COVID-19 epidemic highlighted the fragility of all sectors, particularly in the purchase of basic resources and delivery of produced goods to final consumer. Hence, the purpose of this paper was to examine the influence of the coronavirus pandemic on the profitability of the construction industry, given that the demand for residential and non-residential construction buildings in Bosnia and Herzegovina grew in 2020, the year the pandemic started.

This study aimed to evaluate, from both a theoretical and an empirical perspective, how the COVID-19 virus affects a company's financial performance in order to comprehend how it might be controlled. The empirical research was conducted applying Pearson's matrix and panel regression analysis. The findings demonstrated a negative and statistically significant relationship between the COVID-19 virus and the profitability of active construction enterprises in Bosnia and Herzegovina, actively operating from 2014 to 2020. The analysis revealed that the construction industry is one of the relatively few sectors to have enhanced its profitability despite the worldwide financial crisis and economic slowdown that began in the beginning of 2020 as a direct consequence of the pandemic. This was illustrated by the fact that the construction industry was one of the few sectors to have accelerated its profitability.

Although many authors examining different industrial sectors in other countries or regions have come to similar conclusions, the aim of this paper was to ascertain whether the negative impact of the pandemic has also affected the construction industry, considering that it is one of the few in Bosnia and Herzegovina that managed to maintain the demand for its products, i.e. buildings, as well as achieve an increase in activities and sales. However, despite increased operations and construction work, the coronavirus has had a negative impact on return on assets. The main cause that could lead to this situation is disruption in the supply chain, and consequently price increase of raw materials. The construction industry is specific due to the procurement of different types of metal, wood and building materials from different countries, which are influenced by trends from the world markets. Additionally, factors such as slower turnover due to the lockdown period, as well as a need for increased number of workers for production without interruption in order

to respect epidemiological measures, reduced the financial performance of construction companies.

A constraint of the conducted analysis is that, in the moment of evaluating of transformed model, coronavirus epidemic continued, and its future trend has been unpredictable. This study could serve as the foundation for a more in-depth examination of a similar problem, along with the development of new, alternative profitability evaluations in a demanding and rapidly shifting environment. This paper enhances the current knowledge base regarding the COVID-19 virus pandemic by providing further findings despite its limitations. In this approach, construction companies could begin to concentrate on creating alternative business strategies that are even more robust to market volatility, with the potential for a quicker response. Moreover, investors might utilize the reported information to anticipate changes and trends in the amount of return on assets in construction firms, particularly during slowdowns and world market fluctuations.

References

Abdullah, H., & Tursoy, T. (2019). Capital structure and firm performance: evidence of Germany under IFRS adoption. *Review of Managerial Science*, 15. Doi: https://doi.org/10.1007/s11846-019-00344-5

Abey, J., & Velmurugan R. (2018). Determinants of profitability in Indian automobile industry. *International Journal of Pure and Applied Mathematics, 119*(12), 15301-15313. Retrieved from https://acadpubl.eu/hub/2018-119-12/articles/6/1418.pdf

Agency for Statistics of Bosnia and Herzegovina. (2021). Construction Works in Bosnia and Herzegovina Annual Report in 2020, Legal Units. Retrieved from https://bhas.gov.ba/Calendar/Category?id=17&page=3&statGroup=17&tabId=0

Alarussi, A. S., & Alhaderi, S. M. (2018). Factors affecting profitability in Malaysia. *Journal of Economic Studies, 45*(3), 442-458. Doi: https://doi.org/10.1108/JES-05-2017-0124

Alenezi, T. A. N. (2020). COVID-19 causes of delays on construction projects in Kuwait. *International Journal of Engineering Research and General Science, 8*(4), 35-39. Retrived from: http://pnrsolution.org/Datacenter/Vol8/Issue4/5.pdf

Anh, D. L. T. & Gan, Ch. (2021). The impact of the COVID-19 lockdown on stock market performance: evidence from Vietnam. *Journal of Economic Studies 48*(4), 836-851. Doi: https://doi.org/10.1108/JES-06-2020-0312

Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: cases or fatalities?. *Research in International Business and Finance*, 54. Doi: https://doi.org/10.1016/j.ribaf.2020.101249

Atayah, O. F., Dhiaf, M. M., Najaf, K. & Frederico, G.F. (2021). Impact of COVID-19 on financial performance of logistics firms: evidence from G-20 countries. *Journal of Global Operations and Strategic Sourcing*, *15*(2), 172-196. Doi: https://doi.org/10.1108/JGOSS-03-2021-0028

Bailey, J., Bouchardie, N., & Madalena, I. (2020). COVID-19: The current impact on construction and engineering projects. *White & Case*. Retrieved from https://www.whitecase.com/publications/alert/covid-19-current-impact-construction-engineering-projects

Bintang, F. M., Malikah, A., & Afifudin, K. (2019). Effect of previous year's audit opinion, debt default, liquidity ratio, leverage ratio ongoing concern audit opinion. Retrieved from http://riset.unisma.ac.id/index.php/jra/article/view/4387

Bsisu, K. (2020). The impact of COVID-19 pandemic on Jordanian civil engineers and construction industry. *International Journal of Engineering Research and Technology, 13,*. 828-830. Doi: https://doi.org/10.37624/IJERT/13.5.2020.828-830

Chander S, & Aggarwal P. (2008). Determinants of corporate profitability: an empirical study of Indian drugs and pharmaceutical industry. *Paradigm, 12*(2), 51-61. Doi: https://doi.org/10.1177/0971890720080206

Chandra, T., Junaedi, A. T., Wijaya, E., Suharti, S., Mimelientesa, I., & Ng, M. (2019). The effect of capital structure on profitability and stock returns: empirical analysis of firms listed in Kompas 100. *Journal of Chinese Economic and Foreign Trade Studies, 12*(2). Doi: https://doi.org/10.1108/JCEFTS-11-2018-0042

Chang, C. C., Batmunkh, M. U., Wong, W. K., & Jargalsaikhan, M. (2019). Relationship between capital structure and profitability: evidence from four Asian tigers. *Journal of Management Information and Decision Sciences, 22*(2), 54-65. Doi: https://doi.org/10.2139/ssrn.3411977

Denčić-Mihajlov, K. (2014). Profitability during the financial crisis evidence from the regulated capital market in Serbia. *South-Eastern Europe Journal of Economics, 12*(1), 7-33.

Devi, S., Warasniasin, N. M. S., Masdiantini, P. R., & Musmini, L. S. (2021). The Impact of COVID-19 Pandemic on the Financial Performance of Firms on the Indonesia Stock Exchange. *Journal of Economics, Business, and Accountancy Ventura, 23*(2), 226-242. Doi: https://doi.org/10.14414/jebav.v23i2.2313

El-Gohary, K.M. and R.F. Aziz. (2014). Factors influencing construction labor productivity in Egypt. *Journal of management in engineering*, *30*(1), 1-9. Doi: https://doi.org/10.1061/(ASCE)ME.1943-5479.0000168

Figus, A. (2021). Social evolution in times of COVID-19 between politics, economics, and health. *Strategic Management, 26*(1), 66-72. Doi: https://doi.org/ https://doi.org/10.5937/StraMan2101066F

Gamil, Y., Alhagar, A. (2020). The impact of pandemic crisis on the survival of construction industry: a case of COVID-19. *Mediterranean Journal of Social Sciences, 11*(4). Doi: https://doi.org/10.36941/mjss-2020-0047

Gumble, C. (2020). Making the best of a bad situation. *Construction Manager*, May. Retrieved from https://www.constructionmanagermagazine.com/wpcontent/uploads/2020/06/Construction_Manager_May_2020.pdf

Hanisah, N., Said, M., Labanihuda, N., Abdull Rahman, N. L., Mutalib, H., Sharida, N., & Shah, B. (2021). Profitability performance analysis on Malaysian hotel industry during COVID-19 pandemic. *Journal of Academia 9,* 84-92. Retrieved from https://myjms.mohe.gov.my/index.php/joa/article/view/14397

Jones, L., Palumbo, D., and Brown, D. (2021). Coronavirus: How the pandemic has changed the world economy. *BBC News*. Retrieved September 10, 2022, from https://www.bbc.com/news/business-51706225.

Le, T. P. V., & Phan, T. B. N. (2017). Capital structure and firm performance: empirical evidence from a small transition country. *Research in International Business and Finance, 42,* 710-726. Doi: https://doi.org/10.1016/j.ribaf.2017.07.012

Liu, H., Manzoor, A., Wang, C., Zhang, L. & Manzoor, Z. (2020). The COVID-19 outbreak and affected countries stock markets response. *International Journal of Environmental Research and Public Health, 17*(8), 2800. Doi: https://doi.org/10.3390/ijerph17082800

Mijić, K., Nuševa, D., & Jakišić, D. (2018). The determinants of SMEs profitability in the wholesale and retail sector in Serbia. *Teme, XLII*(1), 97-111 Doi: https://doi.org/10.22190/10.22190/TEME1801097M

Mitrović, A., Knežević, S., & Milašinović, M. (2021). Profitability analysis of hotel companies in the Republic of Serbia. *Menadžment u hotelijerstvu i turizmu, 9(1)*, 121-134. Doi: https://doi.org/10.5937/menhottur2101121M.

Nguyen, H. T., & Nguyen A. H. (2020). The impact of capital structure on firm performance: evidence from Vietnam. *Journal of Asian Finance, Economics and Business*, *7*(4), 97-105. Doi: https://doi.org/10.13106/jafeb.2020.vol7.no4.97

Nguyen, V. T., Nguyen, B. N., Nguyen, T. Q., Chu, A. T. (2021). The Impact of the COVID-19 on the construction industry in Vietnam. *International Journal of Built Environment and Sustainability, 8*(3), 47-61. Doi: https://doi.org/10.11113/ijbes.v8.n3.745

Ogunnusi, M., Hamma-Adama, M., Salman, H. & Kouider, T. (2020). COVID-19 pandemic: the effects and prospects in the construction industry. *International journal of real estate studies.* Retrieved from https://rgu-repository.worktribe.com/output/1000407/covid-19-pandemic-the-effects-and-prospects-in-the-construction-industry

Pamidimukkala, A., & Kermanshachi, Sh. (2021). Impact of COVID-19 on field and office workforce in construction industry. *Project Leadership and Society*, *2.* Doi: https://doi.org/10.1016/j.plas.2021.100018

Rababah, A., Al-Haddad, L., Sial, M. S., Chunmei, Z. & Cherian, J. (2020). Analyzing the effects of COVID-19 pandemic on the financial performance of Chinese listed companies. *Journal of Public Affairs, 20*(4). Doi: https://doi.org/10.1002/pa.2440

Radić, N., Radić, V., & Grujić, B. (2021). Economic impact of the coronavirus pandemic on air traffic. *Ekonomika*, *67(2)*, 59-68. Doi: https://doi.org/10.5937/ekonomika2102059R.

Sahaidak, M., Prokhorova, Y., Sobolieva, T. (2022). Entrepreneurs' strategic response to COVID-19 limitations: Ukrainian experience. *Anali Ekonomskog fakulteta u Subotici*, *58*(47), 3-13. Doi: https://doi.org/10.5937/AnEkSub2247003S.

Sharif, A., Aloui, C. & Yarovaya, L. (2020). COVID-19 pandemic, oil prices, stock market, geopolitical risk and policy uncertainty nexus in the US economy: fresh evidence from the wavelet-based approach. *International Review of Financial Analysis*. Doi: https://doi.org/10.1016/j.irfa.2020.101496.

Shen, H., Fu, M., Pan, H., Yu, Z. & Chen, Y. (2020). The impact of the COVID-19 pandemic on firm performance. *Emerging Markets Finance and Trade, 56*(10), 2213-2230. Doi: https://doi.org/10.1080/1540496X.2020.1785863

Suiko (2020). COVID-19 causing extra 15% productivity loss on UK sites. *Construction Manager*. Retrieved from https://www.constructionmanagermagazine.com/covid-19-causing-extra-15-productivity-loss-on-uk-sites/

Tadić, J., Jevtić, J., & Jančev, N. (2019). Modeling of critical profitability factors: Empirical research from food industry in Serbia. *Ekonomika poljoprivrede, 66*(2), 411-422. Doi: https://doi.org/10.5937/ekoPolj1902411T

TP Catalyst. Bureau van Dijk. Retrieved from www.tpcatalyst.bvdinfo.com

Tušek, B., Ježovita, A., & Halar, P. (2021). The profitability determinants of the global pharmaceutical & biotechnology companies during the COVID-19 pandemic. *DIEM: Dubrovnik International Economic Meeting,* *6*(1), 43-54. Doi: https://doi.org/10.17818/DIEM/2021/1.5

Vuković, B., Milutinović, S., Mirović, V., Milićević, N. (2020). The profitability analysis of the logistics industry companies in the Balkan countries. *Promet – Traffic & Transportation*, *32*(4), 497-11. Doi: https://doi.org/10.7307/ptt.v32i4.3311

Xiong, H., Wu, Z., Hou, F., & Zhang, J. (2020). Which firm-specific characteristics affect the market reaction of Chinese listed companies to the COVID-19 pandemic? *Emerging Markets Finance and Trade.* *56*(10), 2231-2242. Doi: https://doi.org/10.1080/1540496X.2020.1787151