

DOI: [10.52950/ES.2023.12.1.008](https://doi.org/10.52950/ES.2023.12.1.008)

# PERFORMANCE OF SLOVENIAN LISTED FIRMS DURING COVID-19 OUT-BREAK

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## **Abstract:**

This research aims to estimate the determinants of firm performance during the COVID-19 pandemic. For this purpose, a sample of Slovenian non-financial listed firms operating in the period 2017-2021 is used. Firm performance is expressed through both market-based and accounting-based performance measures, including Tobin's Q, ROA, and ROE, while potential determinants encompass several firm-specific variables. These include firm size, liquidity expressed through the current ratio, leverage, tangibility, sales growth, firm age, as well as a COVID-19 dummy variable. The results of the dynamic panel analysis disclose that liquidity, leverage, sales growth, and the COVID-19 dummy are statistically significant in explaining firm performance. Specifically, liquidity and leverage are found to be significant in explaining Tobin's Q, sales growth is a statistically significant determinant of both ROA and ROE, while the latter is also negatively impacted by leverage and the COVID-19 dummy.

## **Keywords:**

firm performance; dynamic panel analysis; Tobin's Q; ROA, ROE; listed firms, COVID-19, Slovenia

**JEL Classification:** L25, G30, C23

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## **Citation:**

TOMISLAVA PAVIC KRAMARIC (2023). Performance of Slovenian Listed Firms during COVID-19 Out-break. International Journal of Economic Sciences, Vol. XII(1), pp. 146-160., 10.52950/ES.2023.12.1.008

## Introduction

Determinants of the financial performance of companies are an inexhaustible source of research. During the last decades, papers that deal with the determinants of performance have been published focusing on individual industries such as manufacturing (e.g. Hansen and Wernerfelt, 1989; McDonald, 1999; Goddard, Tavakoli and Wilson, 2005; Lee and Min, 2015; Pervan, Pervan and Ćurak, 2019), banking (e.g. Bonin, Hasan and Wachtel, 2005; Phan et al., 2020; Chen, Chen and Huang, 2021; Zhao et al., 2022) insurance industry (e.g. He, Sommer and Xie, 2011; Ma, Pope and Xie, 2014; Chen, Lin and Lee, 2019; Griffith and Liebenberg 2021) or listed firms (Lee, 2009; Guo and Kga, 2012; Johl, Kaur and Cooper, 2015; Lazăr, 2016; Boshnak, 2022; Yang, 2022).

Recently, taking into account current events, a large number of papers have arisen considering the effect of the COVID-19 pandemic. Besides its adverse effects on human life and health, it represents "one of the biggest threats to the global economy and financial markets" (Aslam et al., 2020). Moreover, it caused extreme uncertainty (Ashraf, 2020) while Goodell (2020) adds that it created "economic destruction on an unprecedented scale".

Shen et al. (2020) examine the influence of the COVID-19 outbreak on firm performance of listed Chinese firms. For this purpose, the authors have used the financial data from 2013 – 2019 period to foresee firm performance in  $t + 1$  period, as well as quarterly financial data from 2014 to 2020 to quantify the pandemic influence. Total revenue and investment growth rate are used as moderating variables in the pandemic–performance relationship while controls encompass firm size, revenue growth rate, leverage, free cash flow, Herfindahl index indicating the share held by the top ten shareholders and trade receivable turnover. Results suggest that the pandemic negatively affects the net profit return rate while its negative impact is more evident when the company's investment scale or sales revenues are lower. Furthermore, the negative impact of the COVID-19 pandemic on firm performance is more noticeable in highly-impacted geographic regions as well as industries. Another study is conducted by Zheng et al. (2021) who investigate the impact of the COVID-19 pandemic on financial performance also using the sample of Chinese listed firms as well as the potential moderating effects of corporate culture and corporate social responsibility of the pandemic outbreak on firm performance which is expressed with ROA, ROE, asset turnover and revenue growth rate. Although the authors find the negative effect of the COVID-19 outbreak on corporate financial performance, it is more evident when presented with revenue growth rates. Moreover, industries including travel, airlines, and entertainment as well as the Hubei region are seriously affected whereas the opposite is found for the medical industry. The authors also find that corporate social responsibility and corporate culture moderated the negative effects of the COVID-19 outbreak on Chinese listed firms' financial performance.

Golubeva (2021) explores firm-specific, finance-specific as well as country-specific determinants of performance during the COVID–19 outbreak using a sample of 5,730 firms operating in 13 countries from South and East Europe and Africa. Performance measures used in this study comprise labour productivity and share of companies temporarily closed, permanently closed, or opened. The findings confirm the significance of factors such as size, sector, export orientation, changes in demand, adjustments of services or production in response to the COVID-19 outbreak, buffer relating to the number of weeks that a company will be able to remain open if its sales ceased, equity (as the key source of financing) as well as the corporate governance infrastructure and the level of economic development. Similar findings are obtained when labour productivity is employed as a dependent variable with COVID-19 having a significant and negative impact on performance. Hu and Zhang (2021) estimate the impact of COVID-19 on corporate performance expressed with ROA using quarterly data from the first to the third quarter of 2020 while the sample encompassed comprises 16,148 companies from 107 countries. The authors employ firm controls including size, leverage, tangibility, cash holding, and cash flow while country-specific factors encompass health expenditure, domestic credit to the private sector, stock market capitalization (all as a percentage of GDP) as well as institutional development indicator and uncertainty avoidance relating to national culture dimension. The authors confirm that corporate performance worsens during the period of the COVID-19 pandemic, however, these adverse effects are not that evident in countries with more healthcare expenditure, better financial systems as well as better institutional quality. Lastly, uncertainty avoidance makes the adverse effect of the COVID-19 pandemic stronger.

This research contributes to the literature in a manner that it sheds additional light on the influence of the COVID-19 pandemic on corporate performance in a small, frontier economy such as Slovenian, according to the Morgan Stanley Capital International classification. The findings are obtained using the market-based performance measure, i.e. Tobin's Q as well as the accounting-based ones, i.e. ROA and ROE, making the results more robust. This research also controls for the effects of firm-specific characteristics on corporate financial performance.

The remainder of the manuscript is structured in four sections. Section two relates to methodology providing data on the description of variables and their potential influence on performance based on previous research as well as the sampling method. The third section gives the research model design and data analysis. Results and discussion are provided in the fourth part while the final section concludes.

## **Materials and Methods**

Since the sample encompasses listed firms, performance is measured with market-based performance measure Tobin's Q. As stated by Connolly and Hirschey (2005), it has been broadly

used in empirical research in the field of economics and finance whose desirable characteristics are renowned among researchers. It is calculated by applying an approach employed by e.g. Goddard, Tavakoli and Wilson (2005) as follows:

$$Tobin's\ Q = \frac{\text{market value of equity} * \frac{\text{equity}}{\text{total assets}}}{\text{total assets}} \quad (1)$$

Moreover, dependent variables relating to performance are also accounting-based performance measures including ROA and ROE. ROA is calculated as profit before taxes over total assets following (Li, Niskanen and Niskanen, 2019). Similarly, ROE is calculated as the profit before taxes to equity ratio. Nyeadi, Ibrahim and Sare (2018) state that the accounting measures of performance possess the advantage in terms of emphasizing the level of economic performance whereas they only capture the past performance of the company and can be manipulated by management. The same authors add that the advantage of stock market measure arises from the fact that it cannot easily be manipulated, however, it incorporates only future expectations of the firm and the market views. In order to avoid biased results by providing a partial view of the corporate financial performance, the approach applied by Nyeadi, Ibrahim and Sare (2018) is implemented using both market-based and accounting-based performance measures since “the weaknesses of one measure may potentially be compensated for by the strength of the other.” Moreover, as noted by Cheng, Evans and Nagarajan (2008), Tobin’s Q is also a commonly used proxy for growth opportunities.

Control variables employed in the research encompass the size of the firm based on total assets, current ratio reflecting liquidity, leverage, tangibility, sales growth, age of the firm as well as COVID-19 dummy variable.

Size variable is frequently employed variable in the research dealing with determinants of firm performance. It is included in the research as a natural logarithm of total assets following Hansen and Wernerfelt (1989), Bhagat and Bolton (2019), Merendino and Melville (2019), Shen et al. (2020) and Tran and Vo (2020). Since this variable measures inefficiencies arising from size or diversification (Hansen and Wernerfelt, 1989), a negative sign of this variable could be expected. However, since larger firms have more information resources as compared to their smaller counterparts, they could achieve greater financial performance and value (Zimon et al., 2021). The positive effect of size on firm performance is advocated by the neoclassical theory of the firm and its concept of economies of scale that arise due to various reasons including financial, organizational, technical, etc. (Pervan and Višić, 2012). It can be rationalised by the fact that larger

companies are more likely to optimally exploit economies of scale as proposed by Ibhagui and Olokoyo (2018). Moreover, Lee (2009) refers to the conventional wisdom stating that larger companies are likely to be more profitable than smaller ones, either because of higher market power or efficiency gains. Pervan and Višić (2012) refer to alternative theories of the firm to explain the potential negative effect of size adding that larger companies are controlled by managers who give preference to their own utility. Or, as explained by Goddard, Tavakoli and Wilson (2005), grounded on the managerial theory of the firm, "managers are motivated by salaries, power, non-pecuniary benefits and prestige". Moreover, according to Zheng et al. (2021) larger firms are inflexible to changes, thus, they may not perform as well as their smaller counterparts from an uncertainty point of view. Taking into account previous research, Hansen and Wernerfelt (1989) have found a negative effect of size on performance as well as Bhagat and Bolton (2019). Moreover, Merendino and Melville (2019) find the size variable to be an insignificant determinant of firm performance whereas the influence of the size variable, documented in Shen et al. (2020), is not uniform taking both positive and negative signs depending on the model employed. Findings by Sami, Wang and Zhou (2011) indicate that size has a positive association with firm performance expressed with ROA and ROE whereas they find its negative association with firm value expressed with Tobin's Q. Positive impact of size variable on Tobin's Q is found also by e.g. Guest (2009) and Cheng, Evans and Nagarajan (2008). Therefore, the effect of firm size is not clear.

Liquidity is represented by the current ratio calculated as current assets over short-term debt. Lower values of the liquidity ratio indicate that a firm is facing difficulties in repaying its debts. On the other hand, high liquidity, as advocated by Zimon et al. (2021), suggests that a firm's liquidity "is not properly controlled and informs investors that a company does not use liquidity properly for profitability." Doğan (2013) confirms the positive effect of liquidity on performance as well as Goddard, Tavakoli and Wilson (2005). Thus, the positive potential effect of liquidity on financial performance is expected.

Leverage is a regularly employed variable in research on firm performance. It is representing the total liabilities to total assets ratio following Bhagat and Bolton (2019), Merendino and Melville (2019), Shen et al. (2020), and de Carvalho, Dal'bó and Sampaio (2021). The negative relationship between leverage and firm performance is expected, as advocated by Cheng, Su and Zhu (2012), due to the pecking order theory according to which firms prefer debt to equity because of lower information costs related to debt issues (Frank and Goyal, 2003). According to Zheng et al. (2021), citing Myers (1984), the issuance of debts may provide firms with tax shield benefits as well as help them avoid the dilution of their existing shareholders' benefits. On the other hand, financial distress is more likely when debts are overused while inefficient investment projects financed by debts can

be detrimental to firms' profits. Thus, following the static trade-off theory, it is essential to determine the optimal capital structure. Bhagat and Bolton (2019) document the negative influence of leverage in all models as well as Shen et al. (2020), while Merendino and Melville (2019) find it to be negative or insignificant.

Tangibility, reflecting an asset structure is calculated as the ratio of fixed assets over total assets following e. g. Nunes, Serrasqueiro and Sequeira (2009) and Dawar (2014). Nunes, Serrasqueiro and Sequeira (2009) assume that firms with higher investments in intangible assets are more prone to innovation, thus a negative influence of the share of tangible assets on firm performance might be expected. Deloof (2003) confirms it stating that firms with higher levels of assets in liquid form are more likely to explore long-term investment opportunities. However, since the tangible assets "are easily monitored and provide good collateral" tending "to mitigate agency conflicts between shareholders and creditors" (Dawar, 2014), a positive influence might be expected. The negative influence of tangibility on performance is found by Nunes, Serrasqueiro and Sequeira (2009), though Dawar (2014) findings support the opposite.

Sales growth is calculated as  $\frac{\text{sales revenue}_t - \text{sales revenue}_{t-1}}{\text{sales revenue}_{t-1}} * 100$ . It is employed in the analysis following e.g. Nunes, Serrasqueiro and Sequeira (2009), Lee (2009), Dawar (2014), Pattitoni, Petracci and Spisni (2014). (2014) and Ahmad, Bashir and Waqas (2022). As stated by the latter, sales growth positively affects performance since firms are able to achieve higher profits from their investments. Brush, Bromiley and Hendrickx (2000) add that sales growth may provide extra market power which companies can use to increase performance. On the other hand, Nunes, Serrasqueiro and Sequeira (2009, p. 695) argue that firm growth "can create negative expectations in employees, particularly concerning the possibility of company capital being opened up more to external owners, contributing to diminished employee productivity and consequently to diminished company profitability". Thus, the influence of sale growth on firm performance is not clear.

The age of the firm is included in the analysis to see whether younger whether older firms perform better. It is calculated as the natural logarithm of the number of years since the foundation as applied by Bandyopadhyay (2006). Mallinguh, Wasike and Zoltan (2020, p. 12) find a positive influence of firm age on performance rationalizing it with the fact "that younger firms may be riskier, less experienced, with limited tangible and intangible resources than older enterprises". Rossi (2016, p. 221) argues that "aging should decrease costs because of various learning effects within the firm and learning spillovers from other firms in the same or in other industries" adding that the uniform opinion on the influence of longevity on performance has not been achieved. Oxelheim and Randøy (2003) find a both insignificant and significant and negative impact of firm age on

performance such as Waelchli and Zeller (2013). A negative effect of firm age is found by Kim (2005) whereas Kagzi and Guha (2018) document a positive or insignificant influence of firm age. Since our sample encompasses 2017 – 2021 period, i.e. it includes the years affected by the COVID-19 pandemic, its influence is considered in the paper by including the COVID-19 variable. Specifically, following Shen et al. (2020), the author introduces a dummy variable to reflect COVID-19 pandemic circumstances. It takes the value 1 in the year 2020, i.e. in the year of the outbreak of the pandemic and zero otherwise. Although the pandemic conditions remained in 2021, one has to bear in mind that stocks are anticipative in their nature as well as the fact that the lockdown and restrictions that might lead to a higher uncertainty risk prevailed in 2020. Logically, the negative influence of this variable is expected as found by e.g. Shen et al. (2020) and Zheng et al. (2021) who proxied financial performance with ROA, ROE, asset turnover as well as revenue growth rate. The research sample comprises non-financial listed firms. Financial firms are omitted from the analysis due to the substantially different structure of their financial reports arising from their specific activities. Moreover, corporations that reported negative capital were also excluded as well as those whose shares were not traded in some of the observed years. Variables were calculated using financial reports publicly available on the web pages of the Ljubljana Stock Exchange (LJSE).

### Empirical Data and Analysis

To perform econometric data analysis, dynamic panel data analysis was employed in the research. The dynamic panel data was estimated using Arellano-Bond (1991) estimator. Arellano and Bond dynamic panel estimator with independent variables is shown by the following equation:

$$y_{it} = \mu + \gamma y_{i,t-1} + x'_{it}\beta + \alpha_i + \varepsilon_{it}, \quad i = 1, \dots, N, t = 1, \dots, T \quad (2)$$

where  $y_{it}$  is the dependent variable presented with Tobin's Q, ROA and ROE,  $y_{i,t-1}$  is the lagged dependent variable,  $x'_{it}$  is matrix of type  $1 \times K$  independent variables which are discussed above.  $\alpha_i$  stands for an unobserved individual effect and  $\varepsilon_{it}$  is an unobserved white noise disturbance while  $\gamma$  and  $\beta$  are regression coefficients.

Descriptive statistics for all individual variables in the considered period of research are given in Table 1.

**Table 1. Descriptive statistics**

Variable	Obs	Mean	Std. dev.	Min	Max
Tobin's Q	68	0.9679	0.4211	0.3404	2.6821
ROA	70	5.2978	4.7935	-4.7453	16.8371
ROE	70	7.5704	7.2125	-18.5339	21.0114
LIQ	70	2,3843	2,2108	0,1957	11,9892
LEV	70	34,9240	18,4634	1,4025	86,2801
TANG	70	39.7914	21.4070	0.5101	76.4931
Growth	70	-0.4139	21.5117	-77.6564	52.0988
ln_age	70	4.1571	0.5556	3.0910	5.0562
Covid-19	70	0,2000	0,4029	0,0000	1,0000

Source: Author's calculation.

In order to test the potential problem of multicollinearity, the matrix of Pearson correlation coefficients is employed. The correlation matrix for independent variables is given in Table 2 and it is evident that the multicollinearity problem does not occur between any of the variables used.

**Table 2. Correlation matrix**

	LIQ	LEV	TANG	Growth	ln_age	Covid-19
LIQ	1.0000					
LEV	-0.6095*	1.0000				
TANG	-0.2756*	0.2893*	1.0000			
Growth	-0.3536*	0.2604*	0.1856	1.00		
ln_age	0.0107	0.1304	0.3474*	0.18	1.0000	
Covid-19	0.1167	-0.0705	-0.0048	-	0.0168	1.0000

\* p<10%

Source: Author's calculation.

After examining the potential multicollinearity problem, Arellano and Bond dynamic panel estimator was used in the research. Table 3 presents the results of the dynamic panel data analysis. In the same table, the results of the Sargan test and Arellano-Bond test for autocorrelation are provided as well. Based on the p value of Sargan's test in each model it can be concluded that the instruments are not correlated with the residuals and that there is no endogeneity problem in the models. Based on the p value of the m2 test (Arellano-Bond test for autocorrelation of the second order), the null hypothesis of no correlation is not rejected. Consequently, it can be concluded that there is no autocorrelation problem in the model.

Table 3. Parameter estimates of the dynamic panel model

Variables	Tobin's Q	ROA	ROE
L1 (lagged variable)	2.920859* (1.632375)	0.4598356* (0.2423504)	0.4722987** (0.1967932)
LIQ	-0.0673622* (0.035241)	0.065951 (0.7384131)	0.3908847 (0.9766352)
LEV	0.0124611** (0.0052647)	-0.0342629 (0.0832361)	-0.2855248** (0.1334482)
TANG	-0.010171 (0.0067542)	0.0714635 (0.138882)	-0.0932504 (0.1650069)
Growth	-0.0001087 (0.00223338)	0.0717382*** (0.0270823)	0.1404752*** (0.0421092)
ln_age	1.719342 (1.765014)	-1.119097 (18.15781)	-16.91742 (25.7347)
Covid-19	-0.0265169 (0.866435)	-1.119097 (18.15781)	-2.907385* (1.618506)
cons	-8.759715 (8.225172)	6.211308 (76.3245)	88.9608 (111.2296)
Number of instruments	10	10	10
Number of groups	14	14	14
Sargan test	p value = 0.5845	p value = 0.2443	p value = 0.5845
Arellano-Bond test for autocorrelation - order 2	p value = 0.6974	p value = 0.4342	p value = 0.6974

\*Statistically significant at the 1% level. Robust standard errors are between parentheses.

Source: authors' calculation.

### Results and Discussion

As presented in Table 3, variables liquidity, leverage, sales growth, and COVID-19 dummy are proven to be significant determinants of the market performance of Slovenian listed firms. Specifically, liquidity negatively impacts Tobin's Q whereas leverage has a statistically significant and positive influence on Tobin's Q. Nevertheless, it takes a negative sign when performance is

expressed with ROE. Sales growth is found to be positive and significant in both models with ROA and ROE, while the COVID-19 dummy shows a statistically significant yet negative impact on performance expressed with ROE. Other variables, including size, firm age, and tangibility are not significant in explaining firm performance.

Contrary to expectations, a negative sign of liquidity on Tobin's Q is reported. Husna and Satria (2019) suggest that firms with higher levels of current ratio are not necessarily performing well due to the fact that a higher current ratio can also arise "due to lack of effective cash and inventory management". Moreover, Tsuruta (2015) reports the negative impact of liquidity expressed with the current asset ratio on trade payables as well as on bill discounts and trade receivables for both financially distressed and non-distressed companies. It is also worth noting that Eljelly's (2004) findings of general regressions show a negative and significant effect of the current ratio on firm performance.

While investigating the impact of the outside and inside number of directors on firm performance separately, Guest (2009) finds a positive effect of leverage on Tobin's Q. Furthermore, the positive influence of leverage on Tobin's Q is also documented by Ibhagui and Olokoyo (2018) as well as by Sulong et al. (2013). Specifically, leverage has been viewed as a useful instrument for mitigating the agency problem (Sulong et al., 2013). The same authors refer to Jensen (1986) stating that higher leverage diminishes agency costs thus improving a company's financial performance. However, it takes a negative direction in the model with accounting-based performance measure, i.e. ROE.

The positive influence of sales growth on both ROA and ROE measures suggests that sales growth and profitability go together when it comes to success in business. Moreover, the results, showing a positive effect, support the findings of Nunes, Serrasqueiro and Sequeira (2009), Lee (2009) and Pattitoni, Petracchi and Spisni (2014).

In line with expectations, the results confirm the negative impact of the COVID-19 dummy variable on the stock performance of listed Slovenian companies. This is also documented by Shen et al. (2020), Zheng et al. (2021), Golubeva (2021). Such findings confirm that the COVID-19 pandemic denotes an unprecedented global disaster (Fang et al., 2021) that caused, among others, a drastic fall in stock market indices (Aslam et al., 2021), stock market volatility (Uddin et al., 2021) as well as ongoing damage to the global economy (Fernandez-Perez et al., 2021).

## **Conclusions**

Taking into account diverse measures of performance, specifically, accounting as well as market-based ones, this research expansively discusses the key drivers that determine them.

For this purpose, a sample of Slovenian listed firms has been used while the performance is presented with ROA, ROE as well as Tobin's Q. Moreover, a selection of firm-oriented factors has been employed comprising size, liquidity, leverage, tangibility, sales growth, age of the firm, and most importantly COVID-19 dummy to reflect the effects of the pandemic on firm performance.

After conducting a dynamic panel analysis, encompassing 2017 – 2021 time span, several findings arise offering a new angle to comprehend the impact of the pandemic on firm performance. Liquidity, leverage, and sales growth are proven to have a statistically significant impact on corporate performance. Moreover, the negative effects of the COVID-19 pandemic are documented once again.

This research is not exempt from limitations with are reflected in the fact that the analysis covers a small, frontier economy and the research sample is rather small. Thus, it might be useful for future research to expand the sample size by considering specific markets or industries as well as other countries in order to obtain a cross-country dimension.

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