

# An Econometric Approach on Performance and Financial Equilibrium during the COVID-19 Pandemic

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## Abstract

*On the account of the current pandemic crisis and recurrent lockdown periods, most of the companies around the world have registered massive decreases in sales, while others were forced to go bankrupt. In the same line, the New York Stock Exchange was seriously impacted by the lockdown measures enacted in countries all over the world. Nevertheless, despite this unprecedented context, large companies have managed to overcome challenges, continued their activities and even made important investments, thus increasing the trust of stock market players in their financial performance. The current study investigates the link between performance and liquidity on a sample of 34 companies listed on the New York Stock Exchange. Results show that liquidity significantly influenced company performance, which ultimately impacted on investors' willingness to stay active on this capital market.*

**Key words:** liquidity; return on assets; return on equity; return on investments

**J.E.L. classification:** G00, G32

## 1. Introduction

Any entrepreneur, irrespective of the spread of economic activities, aims to develop the business in the long run and ultimately be performant. Under the financial lens, performance translates into generating profit. As Ludwig von Mises – a well-known representative of the Austrian School of Economics – used to say, “he who serves the public best, makes the highest profits”. Nevertheless, entrepreneurial drive, financial performance and long-term goals can sometimes be deterred by unexpected phenomena such as the current COVID-19 pandemic crisis. While some companies can manage to stay in business and continue serving the public by going online and/or by restricting on-site operations, others can hardly retain their employees because of drastic mitigation of sales or even have to file for bankruptcy.

Within this framework of massive economic changes on the global market and rising level of uncertainty, it seems propitious to investigate the degree to which company liquidity influences financial performance. Therefore, in this study we have analyzed the relationship between company performance and liquidity during the period ranging from the first quarter of 2007 until the third quarter of 2020 in order to capture the effects of both the global financial crisis and the COVID-19 pandemic crisis.

The sample pool comprised the first 34 companies listed on the New York Stock Exchange, ranked according to their transaction volumes. Companies operate in various economic sectors such as artificial intelligence, e-commerce, financial services, food and beverages, investment banking, manufacturing of electronics and computer software, movie production, retail, etc.

The article is structured as follows. Section 2 presents studies focused on company financial equilibrium and performance. Section 3 describes the research methodology, while section 4 details the empirical findings. The last section formulates conclusions and avenues for future research.

## 2. Literature review

The literature reports that company financial performance is influenced by numerous variables including liquidity, which measures the short-term financial equilibrium in business (Amihud, 2002; Asle, Valahzagharad and Ahranjani, 2013; Chen, 2018; Daryanto, Samidi and Siregar, 2018; Dong, Feng and Sadka, 2019; Dzomonda and Fatoki, 2020; Franzoni, Nowak and Phalippou, 2012; Jose, Lancaster and Stevens, 1996; Marozva, 2015; Yang, Guaruglia and Guo, 2017). On the one hand, liquidity indicators show the capacity of a company to meet short-term liabilities (Bătrâncea, Bătrâncea and Moscviciov, 2009a; Bătrâncea, Bătrâncea and Borlea, 2007). On the other hand, financial performance indicators show the capacity of a company to generate profit with respect to its total assets, equity, total expenses, etc. (Coleman and Wu, 2020; Moscviciov *et al*, 2010; Soenen, 1993).

The following paragraphs will briefly present relevant studies that have investigated the connection between liquidity and financial performance and have emphasized the importance of cash and assets easily convertible into cash for any company aiming for long-term performance.

Wang (2002) analyzed the relationship between liquidity management and operating performance for 1555 companies from Japan and 379 companies from Taiwan during the time span January 1985 – December 1996. Empirical results showed that aggressive liquidity management significantly increased operating performance in both markets, irrespective of the company financial system.

Czyzewski and Hicks (1992) reported that companies that were successful on the market and possessed considerable cash assets were also the ones attaining higher levels of return on assets.

Farooq and Bouaich (2012) analyzed the link between liquidity and company performance across countries from the MENA region (i.e., Bahrain, Egypt, Jordan, Kuwait, Morocco, Saudi Arabia, United Arab Emirates) and concluded that the former had a positive influence on the latter. In addition, other interesting results reported by authors were that the concept of liquidity had a higher value in civil law countries and that the connection liquidity-performance was more intense for companies operating in civil law countries as compared to common law countries.

Charmier *et al* (2018) investigated the influence of liquidity on the performance of 21 commercial banks in Ghana over the period 2007–2016 and showed that liquidity had a positive influence on company performance.

Hou *et al* (2019) found a significant relationship between funding liquidity and private equity performance on data from Chinese companies.

## 3. Research methodology

The current research study was conducted on financial data retrieved from 34 companies listed on the New York Stock Exchange for the period first quarter 2007 – third quarter 2020. The specific time frame was chosen in order to determine the link between liquidity and performance during the 2007 global financial crisis and the current pandemic crisis, two major events of the last decades.

For company performance, the following indicators were chosen:

- Return on Assets Ratio (ROA), computed as the ratio of net income to total assets;
- Return on Equity Ratio (ROE), computed as the ratio of net income to equity;
- Return on Investments Ratio (ROI), computed as the ratio of net income to total expenses.

The proxies for company liquidity were the following indicators:

- Current Ratio (CR), computed by dividing current assets and current liabilities;
- Quick Ratio (QR), computed by dividing quick assets and current liabilities;
- Debt to Equity Ratio (DE), computed by dividing total debts and equity.

Due to the longitudinal nature of the study, panel data analysis was selected as a method of testing the aforementioned link.

#### 4. Findings

As a first step, the evolution of performance indicators was analyzed for the selected sample (Table 1).

Table no. 1. Evolution of performance indicators

	ROA	ROE	ROI	CR	QR	DE
Mean	0.0898	0.1686	0.1952	1.7025	0.9738	1.8603
Median	0.0797	0.1740	0.1679	1.3000	0.7900	1.2400
Maximum	0.3813	14.1759	2.5194	11.9100	9.7000	42.6000
Minimum	-0.9804	-64.9133	-0.4232	0.0000	0.0000	-154.0200
Std. dev.	0.0707	1.6570	0.1845	1.3424	1.1992	5.0560
Skewness	-1.3413	-32.9937	4.5747	3.1943	2.3104	-16.2566
Kurtosis	31.3431	1304.087	44.0232	17.4321	11.1071	508.3084
Jarque-Bera	61971.54***	1.30***	124252.0***	19066.50***	6664.938***	19624802***
Sum	164.6940	309.3647	329.5062	3127.490	1788.900	3417.430
Sum Sq. Dev.	9.1569	5035.452	57.4245	3308.465	2640.187	46934.54
Observations	1835	1835	1688	1837	1837	1837

Source: Author's computations.

Note: \*\*\* indicates significance at the 1% level.

Table 1 displays the mean, median and standard deviation values for all the indicators chosen to represent company performance and liquidity. Concerning the standard deviation, debt to equity had the largest volatility, followed by return on equity and return on assets. Based on the skewness values, it can be noticed that three indicators were skewed to the right, while the others were skewed to the left. The kurtosis values for all indicators were above 3, thus indicating leptokurtic distributions. Moreover, the Jarque-Bera test reported that the series was non-normally distributed at the 1% level.

As a second step, correlations between the variables of interest were investigated in order to identify potential multicollinearity problems. Table 2 presents the correlation matrix.

Table no. 2. Correlation matrix between indicators related to company liquidity and performance

Indicators	ROA	ROE	ROI	CR	QR	DE
ROA	1					
ROE	0.0114	1				
ROI	0.6632	-0.0043	1			
CR	0.4138	0.0193	0.1208	1		
QR	0.3581	0.0206	0.0491	0.8099	1	
DE	-0.2103	0.2447	-0.1148	-0.1406	-0.1400	1

Source: Author's computations.

According to the literature (Chen and Rothschild, 2010), correlation values exceeding 0.9 pose severe multicollinearity problems. From Table 2 it can be noticed that the variables of interest did not reach this level. Hence, multicollinearity did not represent a problem for the financial data considered in this study.

As a third step, the link between liquidity and performance was modeled via a panel data analysis using the EViews software version 9.0. Within this context, the following research hypotheses were investigated:

H1: There is a linear relationship between current ratio, quick ratio, debt to equity ratio and return on assets.

H2: There is a linear relationship between current ratio, quick ratio, debt to equity ratio and return on equity.

H3: There is a linear relationship between current ratio, quick ratio, debt to equity ratio and return on investments.

The proposed econometric models followed this general form:

$$B_{it} = a_0 + a_1A_{1it} + a_2A_{2it} + a_3A_{3it} + a_4A_{4it} + \delta_i + \theta_t + \varepsilon_{it}$$

where,

- $a_0$  denotes the intercept;
- $a_i$  denotes the coefficient of the independent variable;
- $A$  denotes the independent variable;
- $i$  denotes the activity of the company, taking values from 1 to 34;
- $t$  denotes the time frame;
- $\delta_i$  denotes the fixed effects that comprise country-specific factors;
- $\theta_t$  denotes the fixed effects that comprise common shocks (i.e., 2007 global financial crisis, COVID-19 pandemic crisis);
- $\varepsilon_{it}$  denotes the error term.

Considering that common shocks impacted the dependent variables, models were estimated with and without fixed effects. Table 3 includes the estimated models regarding the relationship between liquidity and performance.

Table no. 3. Estimated econometric models

	Model 1		Model 2		Model 3	
	$ROA = a_0 + a_1CR + a_2QR + a_3DE$		$ROE = a_0 + a_1CR + a_2QR + a_3DE$		$ROI = a_0 + a_1CR + a_2QR + a_3DE$	
Constant	0.0584*** (22.7242)	0.0675*** (21.6401)	-0.0773 (-1.1995)	-0.0111 (-0.1056)	0.1639*** (19.1823)	0.1597*** (14.0579)
CR	0.0158*** (10.6489)	0.0134*** (7.5494)	0.0272 (0.7322)	-0.0080 (-0.1333)	0.0365*** (5.548738)	0.0375*** (4.0695)
QR	0.0078*** (4.7049)	-0.0003 (-0.1778)	0.0522 (1.2619)	0.0214 (0.3318)	-0.022*** (-3.4899)	- 0.0239*** (-2.6018)
DE	-0.0016*** (-5.4202)	-0.0002 (-0.6248)	0.0799*** (10.4981)	0.0925*** (11.1106)	-0.0036*** (-4.1699)	-0.0013* (-1.7710)
Cross-section effects	No	Yes	No	Yes	No	Yes
Time-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Prob.>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R <sup>2</sup>	0.1991	0.5680	0.0840	0.1100	0.0540	0.4053
Adjusted R-squared	0.1734	0.5457	0.0546	0.0641	0.0210	0.3722
F statistic	7.7502	25.4793	2.8581	2.3950	1.6335	12.2376
Observations	1835	1835	1835	1835	1688	1688

Source: Author's computations.

Note: Robust  $t$ -statistics are shown in parentheses; \*, \*\*, \*\*\* denote statistical significance at the 10%, 5% and 1% levels. The variance inflation test was used to investigate the hypothesis of multicollinearity for all models. Since the values of the variance inflation test was below 4, it can be concluded that there is a low risk of multicollinearity. The Harvey test rejected the null hypotheses of homoskedasticity.

In the first model without cross-section fixed effects, results indicated that 19.91% of the variance in return on assets had been triggered by liquidity indicators ( $F = 7.75, p < .001$ ). If current ratio increased by one unit, return on assets would also increase by 0.0158 units. If quick ratio increased by one unit, performance would follow the same trend with 0.0078 units. Moreover, had debt on equity increased by a single unit, performance would decrease by 0.0016 units. In the presence of cross-section fixed effects, only the influence of current ratio remained significant at the 1% level.

The second econometric model (the version without cross-section fixed effects) showed that 8.39% of the variance in the return on equity indicator was caused by the independent variables. The influences of current ratio and quick ratio did not reach significance. According to results, debt to equity had a significant influence on performance, meaning that if this indicator increased by one unit, return on equity would increase by 0.0799 units. Regarding the cross-section fixed-effect model, again only debt to equity reached significance: when this indicator increased by one unit, performance would increase by 0.0925 units, slightly more than in the case of the first version of the econometric model.

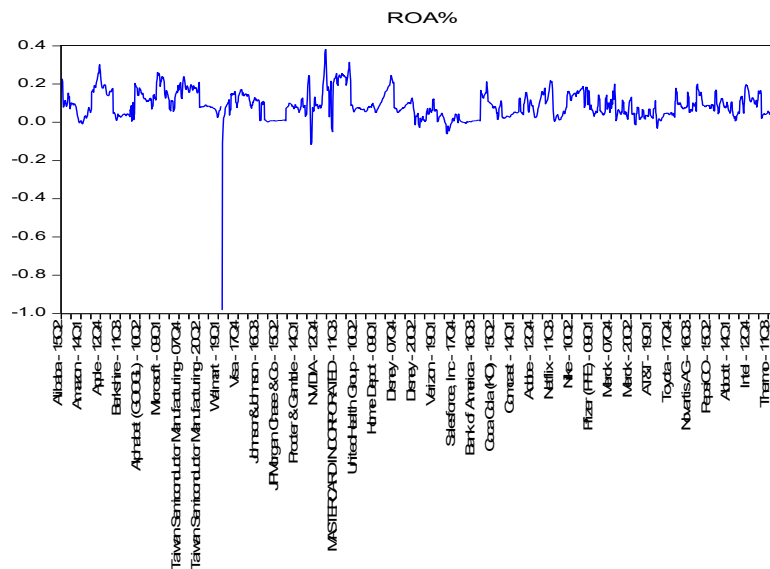
According to the third model without cross-section fixed effects, results indicated that 5.40% of the variance in return on investments was generated by liquidity indicators ( $F = 1.6335, p < .001$ ). All liquidity indicators had a significant impact. Namely, when current ratio changed by one unit, the performance indicator changed by 0.0365 units. An increase of one unit in the quick ratio indicator would be followed by a decrease of 0.022 units in performance. Moreover, an increase of one unit in debt to equity would trigger a decrease of 0.0036 units in performance. When considering the model with cross-section fixed effects, one could observe that its goodness-of-fit was better than in the case of the version without these effects. Namely, the variance explained by the three liquidity indicators was 40.53% ( $F = 12.2376, p < .001$ ). The influence of current ratio was significant in that a one-unit increase in this indicator would be followed by a 0.0375 increase in performance. In the same vine, if quick ratio increased by one unit, return on investments decreased by 0.0239 units. Last but not least, a one-unit increase in debt to equity would be followed by a 0.0013 decrease.

## 5. Conclusions

The research study examined the evolution of performance on a sample comprising the first 34 companies listed on the New York Stock Exchange according to their transaction volumes. The indicators chosen to capture company performance have targeted the internal-based performance, shareholder equity performance and investment efficiency.

Internal-based performance has been determined via return on assets (ROA), computed as a ratio of net income to total assets of the company. The importance of this indicator stems from the fact that it captures the efficiency with which profit is generated by means of company internal resources. Empirical results showed that current ratio and quick ratio had a positive influence on ROA, while debt to equity ratio had a negative impact.

Figure no. 1. Evolution of ROA for the 34 listed companies

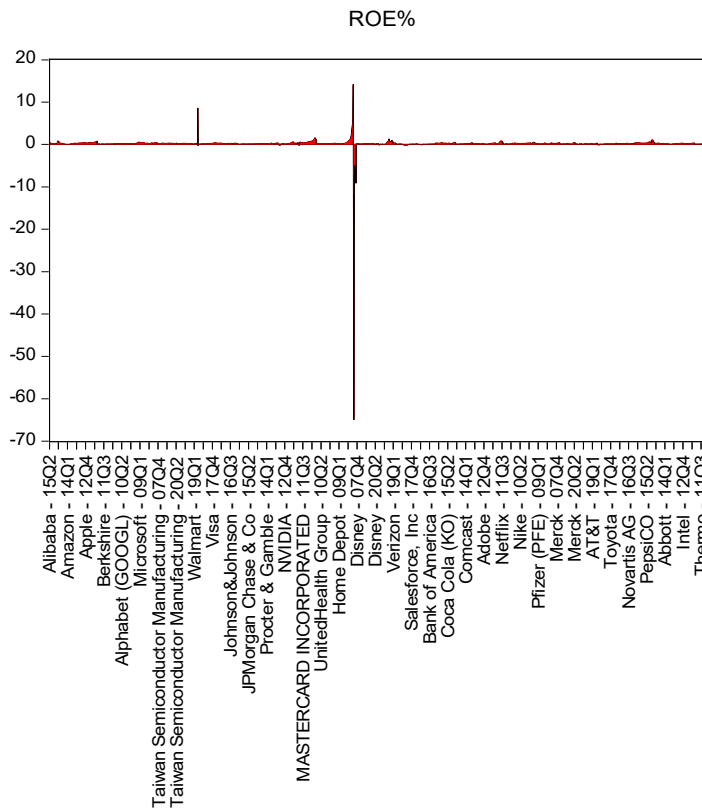


Source: Author's computations.

As can be seen in Figure 1, both the global financial crisis and the COVID-19 crisis had no significant impact on ROA since its evolution was constant during the first quarter of 2007 until the third quarter of 2020. The only outlier was registered by Visa in the first quarter of 2019, which had a massive decrease of 80% in ROA as compared to 2007.

Shareholder equity performance has been measured with return on equity (ROE), determined as a ratio of net income to equity. This indicator shows the amount of profit generated by shareholders' investments. According to the empirical results, only debt to equity had a significant influence on the evolution of ROE.

Figure no. 2. Evolution of ROE for the 34 listed companies

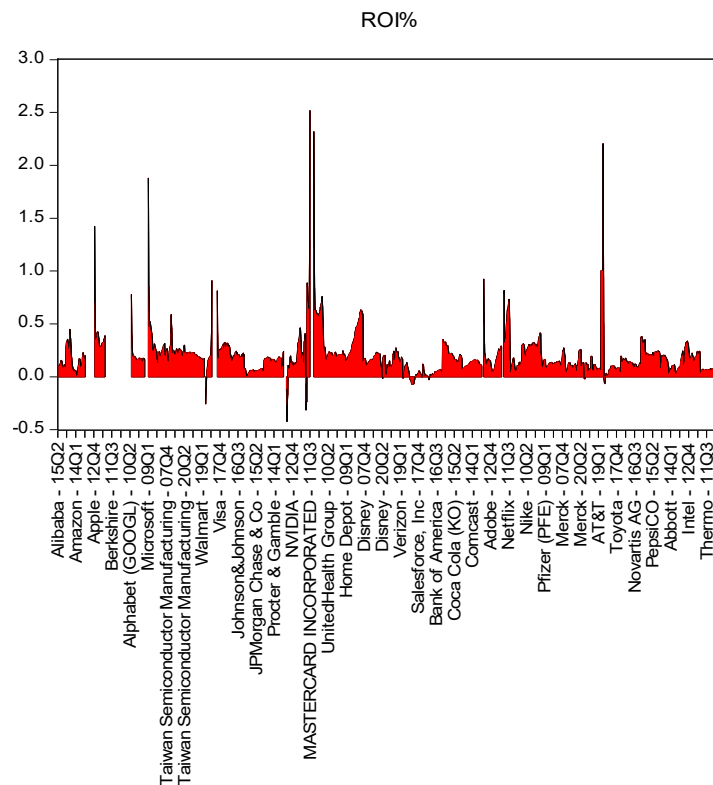


Source: Author's computations.

Figure 2 shows that the evolution of ROE was constant for all companies, except for Home Depot in the first quarter of 2009 and Disney in the fourth quarter of 2007.

Return on investment (ROI) is another indicator capturing company performance and it has been determined as a ratio of net income to total expenses. According to our results, current ratio had a positive impact on investment efficiency, while quick ratio and debt to equity ratio had a negative impact.

Figure no. 3. Evolution of ROI for the 34 listed companies



Source: Author's computations.

Across the selected time frame, the evolution of ROI was positive, namely companies managed to surpass both crises by increasing their investments.

Overall, the empirical study showed that liquidity indicators significantly influenced the financial performance of companies listed on the New York Stock Exchange for the period first quarter 2007 – third quarter 2020.

Future studies could consider expanding the sample pool by including more companies listed on the New York Stock Exchange or other major stock markets around the world. Along the same lines, comparisons between different stock markets could be conducted. In addition, one could take into account other factors that drive company performance.

One a final note, it can be stated that studying what variables influence financial performance is fundamental for the long-term success of any business. Given the increasing degree of uncertainty on global markets, business people must learn how to efficiently navigate crises (Bătrâncea, Bătrâncea and Moscviciov, 2009b; Bătrâncea *et al*, 2013), stock market crashes, recession periods, decreasing sales and still keep business operations going (Bătrâncea and Bătrâncea, 2006; Bătrâncea *et al*, 2007; Bătrâncea *et al*, 2007). As Warren Buffet, the savviest investor on Wall Street, says “if a business does well, the stock eventually follows”.

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