DETERMINANTS OF PERFORMANCE DURING COVID-19 PANDEMIC: AN EMPIRICAL RESEARCH ON PHARMACEUTICAL COMPANIES LISTED ON THE BUCHAREST STOCK EXCHANGE

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Abstract:

Recent studies report that the majority of industries have experienced drastic decreases in sales within the context of the coronavirus pandemic. Nevertheless, considering the high demand for medicine and medical equipment triggered by efforts of fighting the virus, companies in the pharmaceutical industry have managed to maintain a rather steady financial equilibrium, despite the fact that they have registered a mitigation in performance indicators. This empirical research has shown that all five pharmaceutical companies listed on the Bucharest Stock Exchange and included in the sample have reported slight decreases related to both performance indicators (i.e., return on assets, return on equity, profit margin) and financial equilibrium (i.e., current liquidity ratio, quick ratio, cash ratio) when comparing 2020 results with those reported in the period 2010–2019. The econometric analyses have revealed that the financial equilibrium indicators and the performance indicators are statistically linked, meaning that an improvement in the value of equilibrium indicators yields an increase in the performance of companies operating in the Romanian pharmaceutical industry.

1. Introduction

Economic development is – beyond any doubt – based on the manner in which manufacturing companies within a country operate and create jobs, export goods and services, generate value added, all which ultimately are positively reflected in an increase in Gross Domestic Product (GDP), decrease in unemployment and inflation, increase in prosperity level of the respective country.

The current sanitary crisis has had negative effects on most economic activities at global level since governments have enacted various total or partial lockdown periods in order to stop the virus spread. Across the European Union, the European Commission has agreed to exempt its members from the Maastricht Treaty requirement concerning the 3% deficit and has granted them the possibility of exceeding this threshold. Moreover, the European Commission has created for its members a subsidy fund amounting to around 37 billion euros in the effort to support countries to eliminate the negative effects of the COVID-19 pandemic.

Considering all restrictions imposed by governments, the pharmaceutical industry is one important sector of the economy that has been less affected during this unprecedented period due to the increasing demand for medicine and medical equipment necessary to treat patients infected with the virus.

Therefore, in the present article we considered that it would be timely to analyze the degree to which economic performance of companies operating in the Romanian pharmaceutical industry have been impacted by the current pandemic.

The empirical research was conducted on a sample including all companies listed on the Bucharest Stock Exchange, namely: Antibiotice SA, Biofarm SA, Farmaceutica Remedia SA, Ropharma SA and SCD Zentiva. The period of analysis ranged from 2010–2020. To ensure data comparability and investigate the influence of the COVID-19 pandemic on this economic sector, I considered the semestrial reports for each year.

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The structure of the article is the following. Section 2 draws on relevant literature review tackling company short-term equilibrium and performance. Section 3 reports the research methodology and results. Section 4 presents concluding remarks.

2. Literature Review

The question of how liquidity drives the economic performance of the company has been intensively investigated in recent literature using data from worldwide economic agents (Akgün and Memiş Karataş, 2020; Bagchi and Chakrabarti, 2014; Bannister, Mihalek and Smith, 1997; Batrancea, 2011; Batrancea, Batrancea and Moscviciov, 2009a, 2009b; Borhan, Naina and Azmi, 2014; EL-Ansary and Al-Gazzar, 2020; Pattiruhu and Paais, 2020; Samo and Murad, 2019; Tran, Nguyen and To, 2020).

Liquidity is crucial for any business because it supports manufacturing and distribution processes, it covers staff expenditures and other current liabilities generated from interactions with suppliers (Batrancea and Batrancea, 2005). For that matter, liquidity represents "a concern of the short-term investor and a minor matter for the long-term investor", according to the opinion of Peter Bernstein, a well-known American economist who refined the efficient market hypothesis (EMF).

The concept of financial *performance* captures the company's ability to generate profit, which is a long-term objective for every lucrative business (Batrancea et al., 2007, 2010; Batrancea, Batrancea and Moscviciov, 2009; Csegedi, Batrancea and Moscviciov, 2012). Talking about financial performance, Peter Drucker stated that "profitability is the sovereign criterion of the enterprise", while Zig Ziglar, an American author and motivational speaker, used to say that "profitability comes from loyalty, productivity, and having a character base from which to work".

In the following paragraphs, the most recent empirical studies tackling the link between liquidity and performance will be briefly presented. Empirical results are rather mixed, with some studies reporting a positive or negative relationship, while others identified no significant relationship.

Using data from 120 Malaysian companies listed on the stock exchange and the period 2012–2014, Alarussi and Alhaderi (2018) found that company size, working capital and efficiency measured with asset turnover ratio had a direct connection with profitability, while debt to ratio and leverage established a negative relationship. In this study, liquidity measured via current ratio did not play any significant role.

Eljelly (2004) studied the relationship between liquidity (i.e., current ratio; cash conversion cycle) and profitability for companies listed on the stock market in Saudi Arabia. Results indicated that Saudi companies registered a negative influence of liquidity, especially for those characterized by high levels of current ratio and extended cash conversion cycles. In addition, company size was another variable driving performance at the industry level.

Lim and Rokhim (2020) analyzed several variables impacting on company performance for 10 pharmaceutical entities listed on the Indonesian stock market during the period 2014–2018. The variables of interest were: a) company size, proxied by overall sales; b) company efficiency measured with assets turnover; c) liquidity, measured via current ratio; d) market power, using the Lerner index; e) company growth (i.e., sales increase). According to their results, liquidity positively influenced performance measured with the indicators return on equity, return on assets and earnings per share. In addition, return on assets was positively influenced by company size and market power.

Nguyen and Nguyen (2020) investigated company performance using data from 1,343 Vietnamese companies listed on the national stock market for the time span 2014–2017. The independent variables of interest were company size, liquidity and solvency, financial leverage and financial adequacy. The outcome variable was company performance measured

via return on assets (ROA), return on equity (ROE) and return on sales (ROS). According to their results, liquidity had a direct relationship with ROA and ROE and an indirect relationship with ROS. Moreover, long-term equilibrium indicators positively influenced ROA and ROS, while ROE was negatively impacted by it.

Using data from a large sample of US companies, Guragai, Hutchinson and Farris (2019) analyzed via linear regression models the degree to which the cash conversion cycle length influenced profitability (measured by return on equity) and liquidity. Empirical results showed that cash conversion cycle length was negatively connected with company profitability, while positively connected with liquidity.

3. Method and Results

Compared to previous research studies reported in the literature, one could notice that the factors influencing the performance of companies in the pharmaceutical industry are current liquidity ratio, quick ratio and cash ratio. For that matter, economic results support the fact that pharmaceutical companies register excess of liquidity, reason for which their earnings after tax (EAT) represent cash profitability and not accounting profitability.

In the present research study, the following indicators have been used:
- Return on Assets (ROA), determined as a ratio between EAT and total assets (TA);
- Return on Equity (ROE), determined as a ratio between EAT and equity;
- Profit Margin (PM), determined as the ratio between operational income (OI) and turnover (T);
- Current Liquidity Ratio (CLR), determined as a ratio between current assets (CA) and current liabilities (CL);
- Quick Ratio (CR), determined as a ratio between quick assets (receivables, cash and current accounts) and current liabilities (CL);
- Cash Ratio (CASHR), determined as a ratio between cash and current accounts and current liabilities (CL).

The first aspect analyzed was how the current pandemic had influenced the liquidity and performance ratios for each of the five companies and at the overall level of the pharmaceutical companies listed on the Bucharest Stock Exchange (table 1).

Table 1. The evolution of performance indicators for pharmaceutical companies

Company	ROA prior to pandemic 2010-2019	ROA during pandemic 2020	ROE prior to pandemic 2010-2019	ROE during pandemic 2020	PM prior to pandemic 2010-2019	PM during pandemic 2020
Antibiotice	3.13%	2.43%	4.33%	3.64%	15.02%	16.20%
Biofarm	8.19%	8.40%	9.96%	10.97%	31.12%	33.66%
Remedia	0.37%	0.00%	0.61%	0.00%	0.61%	0.00%
Ropharma	0.85%	0.36%	1.42%	0.69%	1.48%	1.66%
Zentiva	7.51%	3.85%	9.94%	8.45%	20.91%	16.63%
Industry average	**4.01%**	**3.01%**	**5.25%**	**4.75%**	**13.83%**	**13.63%**

Source: Own computations based on financial reports of companies.

Based on the data included in Table 1, one can notice that in the case of four companies their performance indicators have registered a decrease compared to the industry average in the period 2010–2019. Although these companies have operated during the pandemic on the national/regional and international markets by selling their products, they have not registered

performant activities. Most probably, they either manufactured products that remained unsold or did not collect receivables on time during the cash conversion cycle.

By analyzing the industry average, the following ideas were concluded:

- The values of all indicators during the pandemic were below their values in the last 10 years;
- Regarding ROA, companies Antibiotice SA, Farmaceutica Remedia SA and Ropharma SA registered values below the industry average, while Biofarm SA and Zentiva had values above the industry average;
- For ROE, Biofarm and Zentiva exceeded the average;
- Regarding PM, Antibiotice SA, Biofarm SA and Zentiva had values above the average.

Secondly, I have analyzed the evolution of the liquidity indicators for the chosen companies (table 2).

Table 2. The evolution of liquidity indicators for pharmaceutical companies

Company	CLR prior to pandemic 2010-2019	CLR during pandemic 2020	QR prior to pandemic 2010-2019	QR during pandemic 2020	CASHR prior to pandemic 2010-2019	CASHR during pandemic 2020
Antibiotice	231.67%	203.58%	171.30%	142.86%	2.79%	2.03%
Biofarm	356.32%	382.46%	307.54%	317.52%	124.88%	172.44%
Remedia	110.55%	126.10%	66.47%	90.03%	22.86%	42.84%
Ropharma	117.28%	102.52%	81.22%	70.27%	12.23%	3.60%
Zentiva	311.47%	147.38%	252.81%	125.60%	115.64%	70.13%
Industry average	225.46%	192.41%	175.87%	149.26%	55.68%	58.21%

Source: Own computations based on financial reports.

Table 2 shows that the liquidity indicators belong to the standard safety gap: CLR [150%-250%]; QR [100%-150%], CASHR [50%-100%]. Judging by their evolution, the companies that have registered values above the industry average were Antibiotice SA, Biofarm SA and Zentiva.

Another aspect of interest was the modeling of company performance that aimed to establish the factors impacting on performance. Using the software EViews version 9, the data were analyzed by means of a panel data analysis (table 3). The following hypotheses were formulated:

H1: There is a linear dependence between liquidity and ROA.
H2: There is a linear dependence between liquidity and ROE.
H3: There is a linear dependence between liquidity and PM.

The econometric model had the following general form:

$$Z_{it} = a_0 + a_1 Y_{1it} + a_2 Y_{2it} + a_3 Y_{3it} + a_4 Y_{4it} + \delta_i + \theta_t + \varepsilon_{it}$$

where:
- a_0 is the intercept;
- a_i is the coefficient of the variable;
- Y is the independent variable;
- i refers to the company;
- t refers to the time period analyzed (2010–2020);
- δ_i represents the fixed effects;
- θ_t represents the fixed effects, controlling for the COVID-19 crisis;
- ε_{it} is the error term.

Table 3. Estimated econometric models

	Model 1	Model 2	Model 3
	ROA $= a_0 + a_1CLR + a_2QR$ $+ a_3CASHR$	ROE $= a_0 + a_1CLR$ $+ a_2QR + a_3CASHR$	PM $= a_0 + a_1CLR + a_2QR$ $+ a_3CASHR$
Constant	–1.8634*** (–13.1596)	–1.8074*** (–14.1140)	–1.7176*** (–12.7557)
CLR	1.4502*** (3.1547)	1.2334*** (2.9668)	1.4896*** (3.4075)
QR	0.4214 (1.5826)	0.4915** (2.0411)	1.2555*** (4.9588)
CASHR	0.0295 (0.3723)	0.0484 (0.6752)	–0.1183 (–1.5687)
Fixed effects	Yes	Yes	Yes
Prob.>F	0.0000	0.0000	0.0000
R^2	0.6901	0.6688	0.8221
Adjusted R^2	0.5894	0.5611	0.7642
F-statistic	6.8523	6.2126	14.2145
Observations	54	54	54

Note: Robust *t*-statistics are indicated in parentheses; *, **, *** denote statistical significance at 10%, 5% and 1% levels. Multicollinearity was investigated via the variance inflation test, which was below 4 for all models. Homoskedasticity was tested via the Breusch-Pagan-Godfrey test, which rejected the null hypothesis in all cases.

According to the **Model 1**, 58.94% of the variation in ROA was generated by the current liquidity ratio. That is, a one-unit increase in CLR triggered a 1.4502 increase in ROA, which was statistically significant at the 1% level.

Model 2 indicated that current liquidity ratio and quick ratio significantly influenced the evolution of ROE. Namely, when considering CLR, a one-unit increase in current liquidity led to a 1.2334 increase in performance. Similarly, when the quick ratio increased by one unit, ROE increased by 0.4915 units. Overall, results showed that the independent variables chosen explained 56.11% of the changes in ROE (F-statistic = 6.2126; $p<0.001$).

In **Model 3**, results showed that the independent variables had a significant effect on profit margin (F-statistic = 14.2145, $p<0.001$). More exactly, these variables explained almost 80% of the variance in performance. When current liquidity ratio increased by one unit, profit margin increased by 1.4896 units. Moreover, a one-unit change in liquidity was followed by an increase of 1.2555 units in performance.

Overall, as expected, the estimated econometric models confirmed the three hypotheses, namely that liquidity ratios generated significant changes in performance indicators.

4. Conclusions

The present study investigated the effects of short-term equilibrium on performance for five companies operating in the pharmaceutical industry and listed on the Bucharest Stock Exchange. Since the aim of the article was to highlight the link between liquidity and performance during the current pandemic crisis, the time frame considered was 2010–2020.

By means of a panel data analysis with fixed effects, which was run with the help of the EViews version 9 statistical software, it was shown that current liquidity ratio and quick ratio

had a significantly positive effect on company performance, measured with the indicators return on assets (ROA), return on equity (ROE) and profit margin (PM).

Moreover, although the pandemic has decreased the performance of the five pharmaceutical companies as compared to the decade 2010–2019, they have still registered positive results due to their increased sales triggered by the high demand for medicine and medical equipment. Hence, the empirical results confirmed the three hypotheses, especially considering the particular nature of the pandemic crisis. While the majority of worldwide businesses had to restrict and or/close economic activities during recurrent lockdown periods, companies in the pharmaceutical industry had the possibility to continue the manufacturing process in order to support health systems. Interestingly enough, two of the companies analyzed (i.e., Biofarm SA, Farmaceutica Remedia SA) have generated even a higher current liquidity ratio and quick ratio when compared with the decade prior to the pandemic.

In terms of limitations, one could point out the sample size including five economic entities. Nevertheless, this was conditioned by the very fact the only five companies from this industry are currently listed on the Bucharest Stock Exchange. Future research focused on the pharmaceutical sector could take into consideration companies listed on other stock markets at regional and international level. Based on the same rationale previously mentioned, such companies would register similar performance results as the ones operating in Romania. Another limitation might be the fact that other factors can also impact on company performance. Hence, future studies could investigate the degree to which long-term equilibrium – represented by solvency ratios – might impact on profitability ratios.

All in all, the empirical investigation emphasized the strong connection that liquidity and performance establish, irrespective of the harsh economic conditions on the market. As Ruth Porat, the chief executive officer of the multinationals Alphabet and Google, stated "liquidity is oxygen for the financial system".

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