Assessing the Financial Performance of the Companies that Shape the S&P 500 Index

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Abstract: Our research focuses on the financial performance of the companies that shape the S&P 500, the US stock market index. We have chosen this index because it reflects the performance of the largest US companies. It is seen, by many, as an indicator of the performance of the US economy. We examine corporate data for the period 2015-2019, which are publicly available. The performance of the companies included in the study was assessed using statistical methods, which also include a sector-specific assessment for this period. The sectors we have selected represent a relevant volume in terms of the number of enterprises in the sample. Our hypothesis is that the performance of each sector has contributed to the average performance of the enterprises that constitute the index, in terms of the five-year enterprise performance in a different proportion. An important area of our research was to examine and demonstrate how the values of the key indicators, that we identified for the study, varied individually and whether they showed significant differences between sectors. Everyone is aware of the most recent events and, unfortunately, their consequences. At both the macro- and micro-levels, the corona virus has had a significant impact, which has also affected the performance of many companies. In our analysis, we will also look at how the financial performance for the period 2016-2019, influenced the value of the operating results for the companies under review in 2020.

Keywords: Analysis; Financial performance; S&P 500; EBIT

1 Introduction

The performance of enterprises, is relevant information, for all the countries, and their role in economic operations is undisputed. During their operation, they hire workers, produce goods and provide services to households. They generate fiscal revenue for the government through their tax liability. Domestic and other European

Union companies, especially those in the SME sector, often rely on both domestic and EU resources. In the event of the covid pandemic, countries can formulate specific problem-solving/financial-resolving package plans to keep businesses running. [1] [2]

In addition to small and medium enterprises, there are a number of large corporations that play a major role in terms of GDP, employment or even foreign trade. It is not new that SMEs represent more than 99% of the total number of companies, not only in Hungary but also in the countries of the European Union. According to data from the Central Statistical Office, only 7.1% of all SMEs are active in the industry, compared to 23.7% of non-SMEs. 'Within the SME sector, the combined weight of agriculture, industry and construction is increasing proportionally as the size category of enterprises increases'. [3] Human resources are one of the most important factors in the economic development of a state. This finding applies without exception to all states worldwide. It is very important, that the current legislation allows their citizens to work without difficulty, to work efficiently and to take other forms of income in each state. [4]

Recently, packages of different economic stimulus and business support measures have stimulated our interest in the overseas financial performance of companies, especially those listed on the stock exchange. The stock market provides a certain degree of transparency for the performance of listed companies, which is why we have chosen the Standard & Poor's 500 Index to test the performance of the largest corporations in the United States. Company analysis stresses financial data from 2015 to 2019, focusing on analysis of profitability and liquidity, as well as the evolution of net working capital and price-to-earnings (P/E) ratio. [5] [6]

2 Literature Review

The literature review section first briefly introduces the importance and role of the S & P 500 Index, then describes the indicators involved in assessing a company's financial performance, and after that it presents and evaluates the results of the analysis.

Based on our studies, the stock market can be defined as a centralized market for alternative commodities. It is worth reflecting on the implications of alternative commodities, which are primarily concerned with commodities traded on commodity exchanges. In recent decades, financial innovation has brought about major changes in this area, with the emergence of certificates and other leveraged futures in addition to traditional financial products. [7-12]

In the stock markets, some investors win while others lose, and this is the beauty of operations in the stock market: participants cannot decide or calculate in advance who will be transferred from a particular group to another and when, but one thing is for sure: of course, not all participants can win at the same time. [13]

The aggregate performance of listed stocks can be expressed in a variety of indices, one of which is the S&P 500, described in the introduction, which is an indicator of the performance of the US stock market, including the 505 largest companies with capital concentration in the US. The S&P 500 is also often used as a market portfolio and as a benchmark for beta US stocks. [14] The depth of the financial system depends among other things on lending and the stock market capitalization to GDP. Through stock market funding the economy can growth, especially in countries where the this form of funding is not common. [15] According to publicly available data, our selected index accounts for 80% of the value of the US stock market. However, the market as a whole is determined by the indicators of the ten largest US companies, which account for 28.5% of the market value of the index, i.e., the world economy. They are the best-known giant corporations of the world: Amazon, Apple, Microsoft, Facebook, Alphaet, Tesla, Nvidia, Berkshire Hathaway Inc., JPMorgen. [16]

The performance of US companies included in the analysis can be expressed in the S&P 500 Stock Index but let us take a look at how the values of a particular financial indicator perform. Since the performance of the company is an important issue for investors before investing into them and not only past performance but also future performance is important, the question of who wants to know the financial performance of the company may be raised with the issue of how likely it is to develop in the future. Expectations for the future are basically expressed in terms of hopes for the growth of the company. [17] This means that the more a company grows, the higher the value of its stock and the more it invests. It is important how this growth can be quantified, which indicators can affect the value of earnings before interest and taxes (EBIT), and whether these effects work in the same way in all sectors. [18]

First of all, in our study, we looked at the profitability of the firms and sectors under study, focusing on ROA and ROE. Return on assets (ROA) expresses how much profit a unit of capital can generate. ROE can also be used to analyze the effects of ownership on the company's performance [19]. By the studies the governmental ownership significantly has negative effect on the ROE and for example in Jordan the ownership structure decides the company's performance [20]. The higher the value of this indicator, the better the performance of the company. In the analysts' view profitability indicators do not affect exchange rate movements in the short term, but they actually do in the longer term. [21]

The graph below shows the weights of profitability and capitalization. In the US, companies with higher profitability had almost twice the market capitalization in terms of amount invested than companies with lower profitability from 1990 to 2018, in billions of dollars of data.

The ROE ratio examines the return per unit of capital, i.e., it is the ratio of profit after tax to equity. The relationship between the ROE ratio and the excess return on the stock market has been studied in several research. [22] [23]

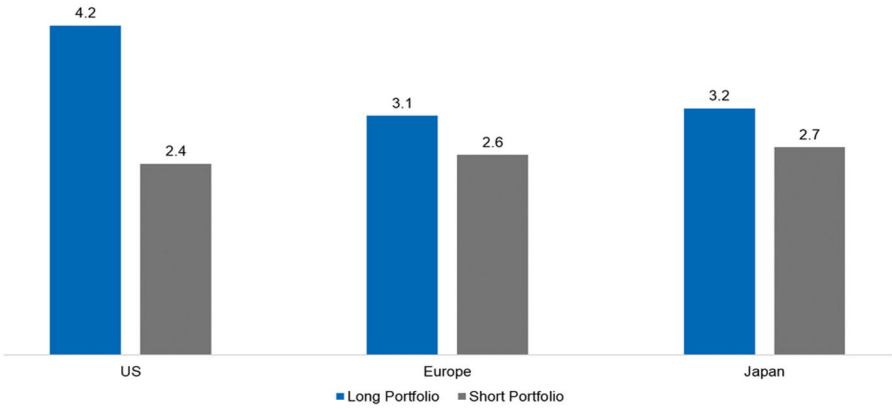

Figure1
Profitability Factor

Source: FactorResearch, https://insights.factorresearch.com/research-the-odd-factors-profitability-investment/) [24]

The analysis found that there are significant differences between industries in terms of short-term and long-term investments, as shown in the following graph.

In addition to profitability, the indicators used and applied are liquidity indicators. We use a general form, that is, the value of current assets and current liabilities are compared. The indicator expresses the coverage that assets available for less than one year can provide for our liabilities within the year.

The higher the value of the indicator, the more favourable it is, although its value can be significantly influenced by stocks and receivables, even in a negative direction, especially since there may also be stocks that can no longer be sold with sufficient profit. Receivables may also include items that are not easy to recover. The liquidity ratio, which only compares the actual liquid funds, i.e., cash and cash equivalents and the value of the securities with a maturity within the year, with the value of the liabilities within the year offers a way to avoid these problems.

In addition to profitability and liquidity, we also looked at the ratio of price-earnings ratio (P/E), which is the ratio of the share price to the estimated future earnings per share (EPS). The share price value is the result of market supply and demand, it reflects the current market trend. In other words, how the market perceives the value of a stock, EPS is the profit per share after tax.

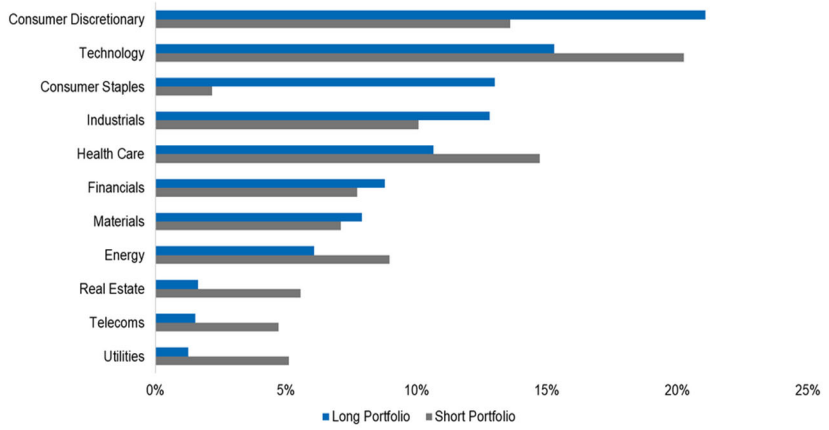

Figure 2
Profitability Factor in the US: Breakdown by Sectors (1990-2018)

Source: FactorResearch, https://insights.factorresearch.com/research-the-odd-factors-profitability-investment/ [25]

In the case of shareholders, it represents the maximum dividend per share that ordinary shareholders will receive if the company pays all profits as dividends. Comparing the two values of stock price and EPS gives the answer to the question of how many times the profitability of the stock, in this case expressed by the EPS, should be paid for the security you need to pay the profitability of a stock (in this case, expressed in EPS). [26]

Last but not least, we also studied P/BV = market price per share/book value per share, where book value per share = (total assets-total liabilities) is divided by a number of outstanding shares. [27]

A common indicator for evaluating a company's financing strategy is net working capital, which is the difference between current assets and current liabilities. Current assets are assets that serve the operation of an enterprise for up to one year, that is, assets used or sold within one year, which can be permanent or temporary, depending on the frequency of purchase demand.

2 Material and Methods

Financial and price data for the S&P 500 index components are compiled based on data published on the most popular websites, including www.suredividend.com, www.morningstar.com, www.finance.yahoo.com and www.finviz. com. Based on the data available on July 11, 2020, the S&P 500 index component list was downloaded from suredividend.com and includes the names and stock codes of all

505 components. Based on this data, the financial data of each company during the period 2015-2019 was downloaded from Morningstar.com, which also includes the main financial indicators.

These data include financial details from the balance sheet, income statement and cash flow statement published in the company's annual financial report, which can be found on the Morningstar website. We used the data from the finviz.com website to collect the industries and sectors to which the constituent stocks of the S&P 500 index belonged and used the F search function to add relevant data to the 505 companies in the original database. Accordingly, the industry and sectoral information of each company was added to the database because we also performed statistical analysis on these industries. Among the 505 companies, the minimum number of companies analysed in 2015-2019 was 493, and the maximum in 2019 was 499. The reason for the change in the number of items is that data was not available for the indicators relevant to us for the company in question, so we were unable to calculate the indicator.

Compared to our previous experience with corporate sector research, the current decline in the number of companies is negligible, and we believe this is due to the fact that listing requires companies to provide continuous and up-to-date information to investors and other stock market participants. The sample includes data from companies operating in 11 sectors, the sectors relevant to us were Finance, Healthcare, Industry and R & D & I. More than 60 companies per year were analysed in each industry over the years.

The total sample includes data of 2483 companies for 5 years. In our analysis, we not only checked the complete sample based on the indicators we selected, but also conducted a separate analysis of the above-mentioned industries. For data analysis, we used the function of the SPSS statistical software package, in which we checked the correlation value between the various indicators. One of the characteristics of Pearson correlation is that it is independent of variance, the correlation coefficient can take a value between -1 and 1, and it is symmetric. [28] [29]

4 Findings

Table 1 is summarizing the financial performance of companies in the S&P 500 was also compiled.

Table 1
The financial performance of companies that shape S&P 500 index

Name of indicator	2015	2016	2017	2018	2019
ROA	6.91	6.67	6.84	7.15	6.96
ROE	17.41	17.07	17.96	18.64	18.54
Liquidity ratio	1.58	1.52	1.48	1.43	1.41

Quick liquidity ratio	1.03	1.02	1.00	0.95	0.93
P/E	17.63	18.17	19.40	15.49	18.42
P/BV	3.63	3.74	4.05	3.48	3.72
EBIT	1312	1355	1487	1622	1608
NWC	1027	991	933	927	904

Source: authors' own calculation using SPSS

Return on assets shows balanced performance over the review period. The same applies to the return on equity. Equity is smaller than total liabilities / assets, so the trend is the same, and return on equity is always above the return on assets. In terms of overall liquidity, the picture could be one of more efficient management, but it does not seem to be the case as the quick ratio is also decreasing.

The liquidity ratio reaches the 1.3-1.4 expected value in the literature. Despite the numerous factor number, the quick liquidity ratio is also balanced. Compared with previous years, the price-earnings ratio in 2019 showed a trend reversal. As for the earnings before interest and taxes (EBIT), all except one year showed a steady growth, which is a positive and good indicator of the company's performance.

Net working capital shows that companies are not only financing their current assets but also part of their fixed assets from temporary sources. In the following part, we look at the values of the indicators by industry, examining whether we find any meaningful differences between activities. First, we use candlestick charts to show the changes of the asset-ratio performance of four sectors. The figure provides an excellent illustration of the variation in performance of each sector, as well as the variation in dispersion relative to themselves.

The financial sector has the lowest ROA ratio. The banking/financial sector operated in a low interest rate environment. The after-effects of the financial crisis that started and spread in 2008 have not yet fully disappeared, especially in the first part of the period under review. This phenomenon was not only prevalent on the US market but was also evident on the European markets. [30-32] Once the after-effects of the crisis had been overcome, profitability indicators improved, both in terms of equity and return on assets.

'The majority of banks expect ROE to exceed 10% in the long run, and financial institutions that do not adapt or are slow to adapt will be unable to maintain profitability levels,' said Chief Economist Bálint Dancsik at the MNB (National Bank of Hungary). Declining profitability and digitization are major challenges for the European and Hungarian banking systems. [33]

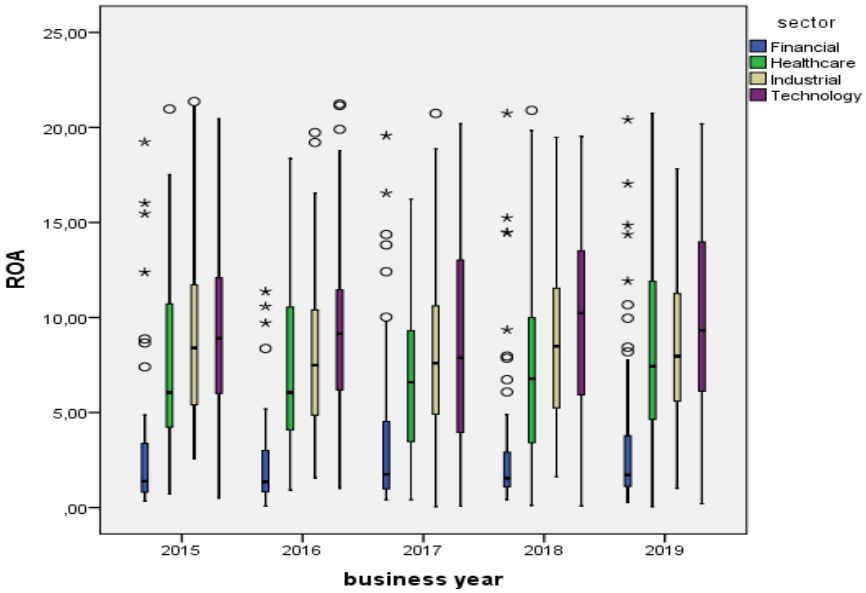

Figure 3
The value of the ROA in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

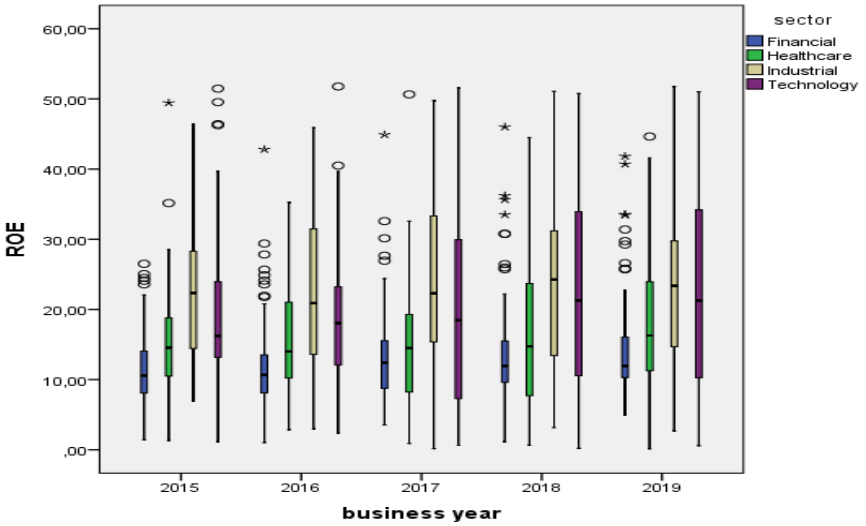

Figure 4
The value of the ROE in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

As we can see from the figure 4, US banks have also achieved an average ROE of 10% by the end of the review period. Profitability improvements have begun to increase significantly not only in Europe, but also in the US financial markets under consideration. The Covid pandemic since 2019 have had a negative impact on the performance of the global economy, but analysts expect record performance to overcome this. 'US banks were able to finish the year with unprecedented profits, thanks to the overall recovery of the global economy and the surge in financial markets', told Tim Adams, the leader of the Institute of International Finance industry association to CNBC. Backtracks from the initial optimistic pronouncements made in early 2020 April, where the IIF President and CEO Timothy Adams supported the calls by the World Bank and IMF on private creditors to suspend debt payments. [34]

Of the ROE / ROE indicators of each sector we can highlight the banking sector, which has outperformed over the last few decades, However, R&D&I shows far better performance. 2017 represents a fairly hectic situation for the sector, as evidenced by the large variability in indicators. In terms of industrial performance, ROA indicator peaked in 2015, but was consistently above the financial and healthcare sectors, except in 2016. [35] [36]

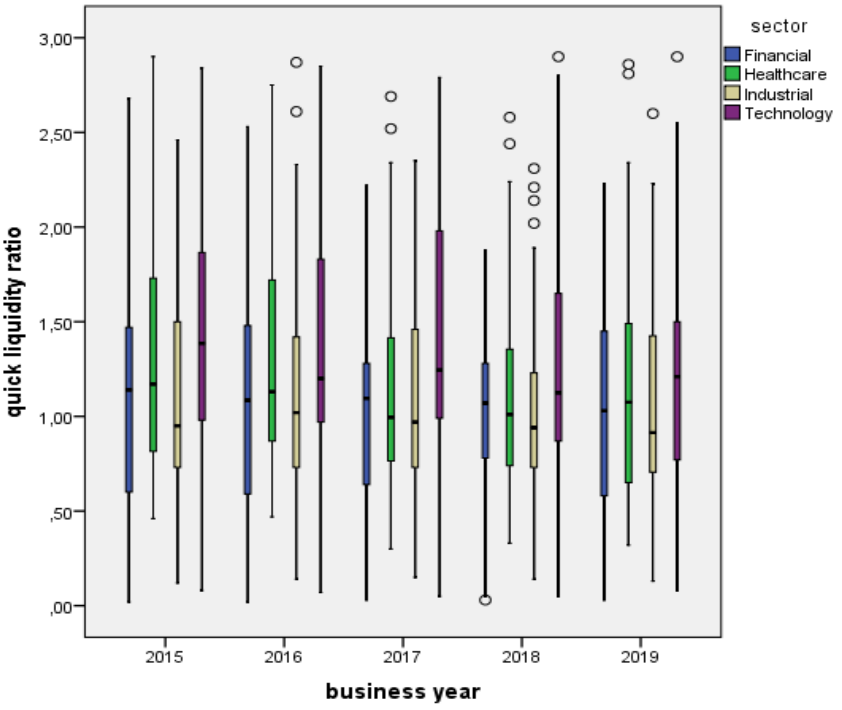

Figure 5

The value of the quick liquidity ratio in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

For ROE and ROA, there are significant differences between sectors, but both indicators show similar trends across sectors, with significant differences in variance both between sectors and by year. The financial sector shows the most consistent (balanced) performance in both ROE and ROA. The technology sector was showing the biggest fluctuations.

For quick ratio = (accounts receivable + securities + cash) / short-term liabilities, the companies under review behave similarly, but there are also good and bad years. The progress of Industry 4.0 for technology-developing companies is also evident here, with the liquidity of companies in this sector surpassing that of the financial sector. However, liquidity improved until 2017, then declined on average in 2018 and surpassed 1 in 2019.

Liquidity in the banking and health sectors was about the same in 2019 and similar in 2015. This clearly reflects the aftermath of the financial crisis in the banking sector, as evidenced by the 2016 data. In terms of liquidity, the lowest average during the review period was recorded by the industrial companies. This can be explained by the fact that they are engaged in production activities with high fixed asset requirements.

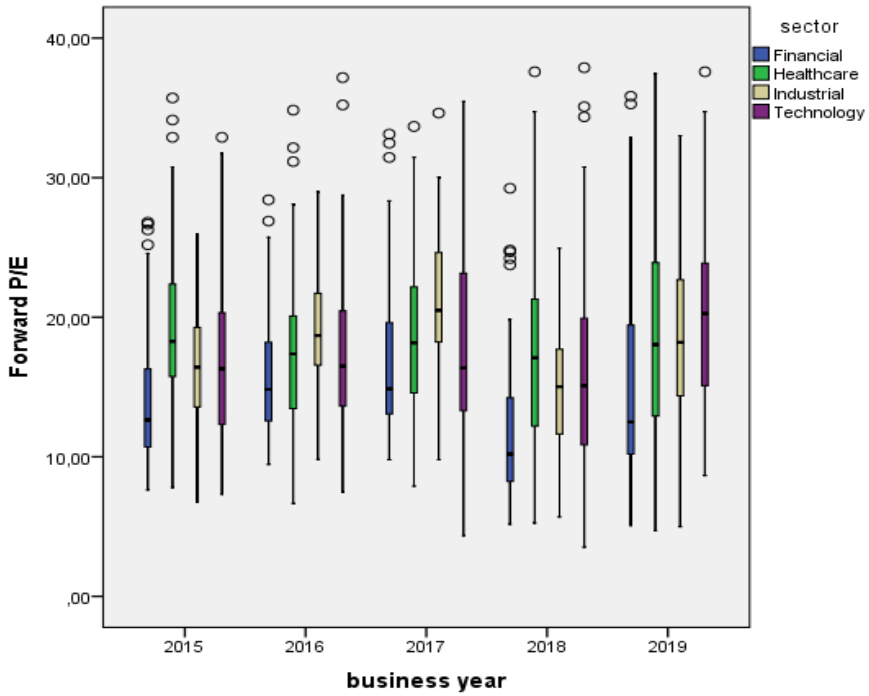

Figure 6

The value of the forward P/E in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

In the following part, we look at the P/E ratio. Again, the indicator shows significant variations across sectors here, and the usual order of performance of the indicators changes. In 2016 and 2017, the industrial sector was the best performer. The technology sector, which represents research and development, did not show an outstanding performance compared to the other sectors and even lost its leading position in 2015, 2016 and 2017. The financial sector is also among the tail enders in this case.

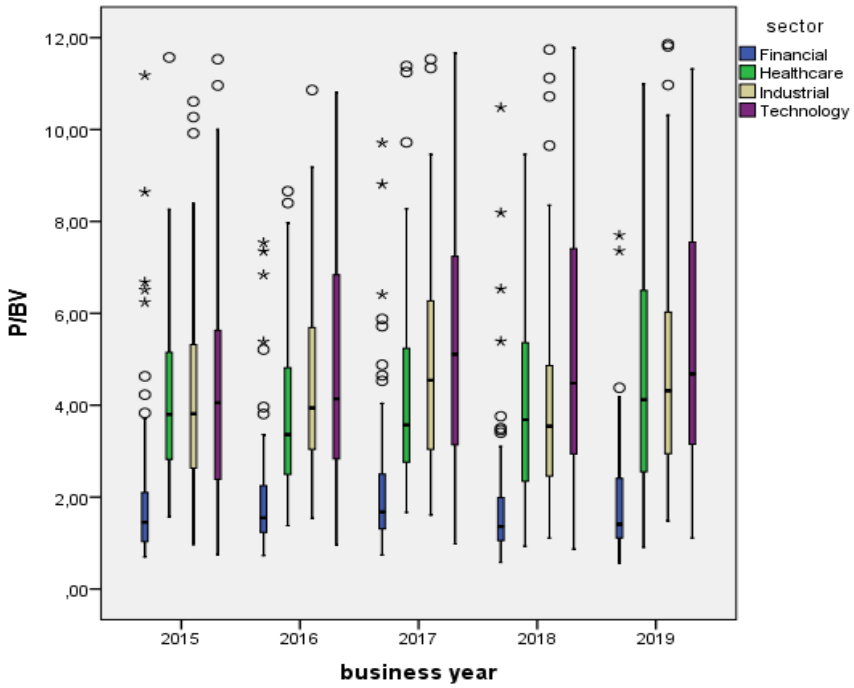

Figure 7
The value of the P/BV in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

We also looked at the P/BV (market price per share/book value per share) ratio by industry. It can be seen that Industry 4.0 leads the average and has a higher dispersion value. The financial sector showed the lowest value. Market prices may deviate significantly from book value, which may result in stocks being undervalued or overvalued. In this case, the market is boding well for the future of the R&D&I industry. The healthcare industry is becoming more and more popular in the investment market.

The changes in net working capital are often linked to the evaluation of the company's financing strategy. In terms of NWC (net working capital) values from 2017 to 2019, the financing strategy of the healthcare industry is the most conservative. With the smallest variance, the financial sector has a similar strategy.

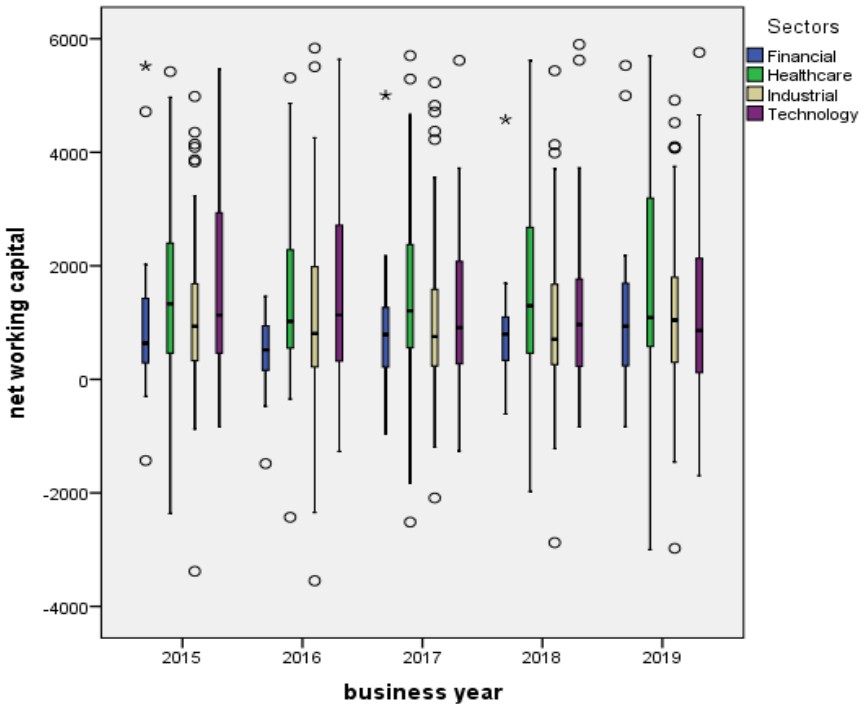

Figure 8

The value of the net working capital in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

The next indicator to be examined is EBIT, which is also examined later in terms of its relationship with other indicators. EBIT is the highest in the financial sector. In other words, the average values of the candles in blue are comparatively higher than the values in the other sectors.

The operating results for banks include income from financial services, that is, interest and expenses, which represent the one-time or continuous income of the industry. In other words, given the low ROE and ROA, we concluded that the banking industry performance in terms of revenue and expenditure is not bad, but in terms of losses, this may be related to past activities and crises, leading to worsening performance. The industry has not totally recovered from the significant credit losses at the beginning of the period. As far as EBIT is concerned, R&D&I has the lowest performance, with a relatively low standard deviation.

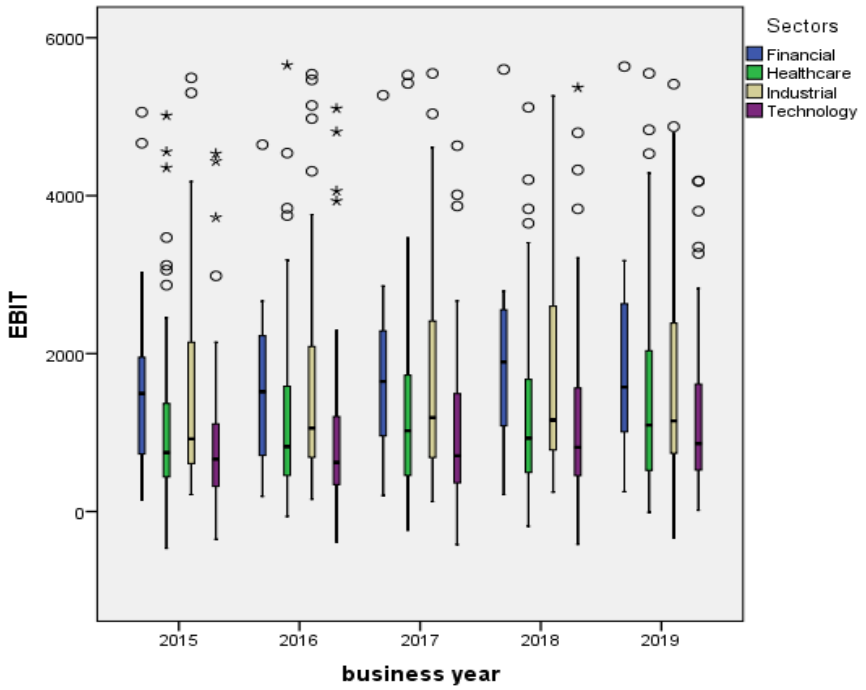

Figure 9
The value of the EBIT in the financial, healthcare, industrial and technilogy sector

Source: authors' own editing using SPSS

In our research, we examined how each financial indicator affects the value of other indicators, using Pearson's correlation test. EBIT showed a positive relationship with ROE for the companies under study, while the relationship was negative for liquidity, and a similar relationship was found for the P/E ratio. These values imply that when operating profit increases, the return on equity also improves, which can be explained by the fact that a higher EBIT value leaves a higher taxable profit after deduction of corporate tax and dividends paid to preferred shareholders, i.e., the taxable profit per unit of capital increases. However, it is also easy to see that high liquidity is not good for the profitability of the company. A high stock of inventories and receivables may even indicate a high level of liquidity, but it may also mean that part of the inventories cannot be sold or the receivables from customers cannot be managed properly, i.e., these items will not generate real sales and therefore the company will not be able to generate an increasing EBIT. It should also be mentioned, that the company's operating profit can be negatively affected by high cash holdings and a high number of securities within a year, as these do not generate any increase in sales for the company, which also has a negative impact on EBIT. For the P/E ratio, we see that if EBIT increases, the P/E ratio decreases. [37] [38]

Further examination of the relationships between the indicators showed that the ROA indicator was positively correlated with all other indicators except EBIT whose direction was positive. Increasing the value of earnings per asset also has a positive impact on solvency, return on equity, P/E ratio and P/BV ratio.

Table 2

Correlation matrix of the indicators and EBIT

Name	EBIT	ROA	ROE	Liquidity ratio	Quick liquidity ratio	P/E	P/BV
Pearson Correlation EBIT	1	0.32	**0.152****	**-0.161****	**-0.153****	**-0.201****	-0.033
Sig. (2-tailed)		0.181	0.000	0.000	0.000	0.000	0.184
N	1967	1720	1583	1808	1827	1703	1662

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: authors' own calculation using SPSS

Below we have further explored our previous hypothesis according to which there might be a relationship between the value of each indicator and continued our analysis in each sector where we obtained interesting values. This analysis also shows that calculating averages on a large sample of items can still hide important information from us.

The first sector was finance, and the indicators of more than 70 large companies included in the smallest item sample were evaluated against other indicators. The Pearson correlation did not show a significant relationship between any indicator and EBIT. As for the other indicators, there was a verifiable relationship, such as a positive relationship between ROA/ROE and a positive relationship between ROA/liquidity ratio. [39-41] The situation is different in the health sector, where liquidity has a negative impact on operating profit, i.e., if EBIT increases, the liquidity of health care companies decreases, if EBIT decreases, the liquidity of companies improves, and a similar relationship can be described for EBIT and P/E ratio. The survey sample included the data of more than 200 companies.

The number of companies engaged in industrial activities in the sample was close to 300. In this case, both liquidity indicators, namely, the P/E ratio and P/BV have a negative (opposite) effect on the value of EBIT. A decrease in operating profit has a positive impact on liquidity, P/E ratio, and P/BV ratio. In the case of the technology sector, EBIT correlates with fewer indicators than in industrial enterprises. EBIT showed a positive relationship with ROA and ROE, and EBIT showed the opposite relationship with the P/E ratio. An interesting lesson is that

there was no verifiable relationship with liquidity. Therefore, it can be concluded that, as a whole, the nature of the activity has a strong influence not only on the change in the value of each indicator, but also on the impact on each other. For example, in the financial sector, the operating profit was not affected by the indicators studied. [42-45]

Table 3
Correlation matrix of the indicators and EBIT in each sectors

Name	EBIT	ROA	ROE	Liquidity ratio	Quick liquidity ratio	P/E	P/BV
Financial							
Pearson Correlation EBIT	1	-0.040	-0.113	-0.199	-0.172	0.025	-0.167
Sig. (2-tailed)		0.725	0.329	0.083	0.136	0.812	0.165
N	96	81	76	77	76	91	71
Healthcare							
Pearson Correlation EBIT	1	-0.015	0.161*	**-0.194****	-0.155*	**-0.311****	-0.074
Sig. (2-tailed)		0.820	0.021	0.005	0.027	0.000	0.296
N	242	219	205	207	203	210	200
Industrial							
Pearson Correlation EBIT	1	-0.106	0.136*	**-0.283****	**-0.195****	**-0.310****	-0.135*
Sig. (2-tailed)		0.068	0.026	0.000	0.001	0.000	0.026
N	314	294	270	305	310	300	275
Technology							
Pearson Correlation EBIT	1	**0.223****	**0.241****	0.137*	0.060	**-0.219****	0.020
Sig. (2-tailed)		0.001	0.000	0.034	0.354	0.001	0.767
N	283	238	219	240	239	248	224

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: authors' own calculation using SPSS

Summary and Conclusions

Our research examined the financial performance of 505 large companies, in the S&P 500 stock performance index, over the five years between 2015 and 2019, using SPSS software. We first studied the whole corporate group, and then, we

assessed and compared some of the relevant sectors and industries. The indicators studied included ROA, ROE, liquidity ratios, net working capital, P/E, P/BP and EBIT. We found significant differences in performance across sectors. In the next part of the analysis, the factors affecting EBIT were assessed using Pearson's correlation. Similarly to analysing the full sample, we first looked at the factors that affect EBIT for a sample of 505 companies and then examined the impact of the indicators on EBIT by sector.

Our hypothesis was that, in relation to the average performance of the companies that make up the S&P 500 index, the performance of each sector contributed different proportions to the five-year corporate performance. Furthermore, we examined how the values of the key indicators used in the study varied and whether they showed significant differences across industries. It is confirmed that various sectors affect the value of the S&P 500 index in different ways. The financial sector has the lowest value of the ROA indicator, the reason for this is that the banking/financial sector operated in a low interest rate environment. It is clear from the values of the indicators that the impact of a crisis has a prolonged effect on the performance of a sector, which is particularly true for the financial sector. In the first phase of the crisis, no change in the values of the indicators is discernible, while for other sectors the "symptoms" are immediate, e.g., in the form of a shortfall in turnover, it is difficult to see the stock data, for the financial sector, because of losses. For ROA and ROE indicators, the technology sectors showed the largest dispersion. The liquidity of the banking and healthcare sectors was almost identical in 2019, with similar values in 2015. In terms of liquidity, the lowest average values over the period were recorded by companies in the manufacturing sector. An extended future objective of our research is to quantify/compare the impact of COVID-19 and the Russian-Ukrainian conflict, on the performance of the sectors. The research is hindered by the need to separate the two impacts for the year 2022 and the need to collect data on a company-by-company basis, to analyse the companies that make up the S&P 500 index.

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