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The condition of companies in relation to their growth on example of NYSE and NASDAQ

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Abstract

This article covers the topic of the relationship between the growth of companies and their financial condition when different business profiles are surveyed, such as high-tech, growth potential companies included in the NASDAQ Composite Index and traditional, matured companies included in the Dow Jones Industrial Average (DJIA), commonly known as blue-chip stocks. The hypothesis that the relationship between the Altman *Z*-score and the growth of enterprises as measured by assets, equity, sales, and earnings per share is positive was tested with Granger and VAR models. The main difference was found to be related to the size of the companies size and dynamics of growth. It was also shown that between NASDAQ enterprises there was no relationship between their growth and Altman *Z*-score, whereas when the DJIA blue chips were taken into account, a positive relationship was identified. It can be concluded that high-tech enterprises grow in a less predictable way not related to their economic condition, but mature enterprises focused on the growth and their condition. The value added of the article is finding that high-tech companies with growth potential and blue chips are managed in a different way due to their strategies of development.

Keywords Company growth, Economic condition, Altman *Z*-score model

JEL Classification G30, G32, G33, M2

Introduction

The growth of companies is a process expected from all stakeholders. Owners and society benefit from expanding-economic units; investors expect higher rates of return, employees expect increased employment opportunities; and recently, companies are expected to have a positive impact on the environment (ESG trends). Growth may be represented by the growth of sales, assets, equity, and earnings per share, and EPS growth is directly related to the value maximization. On the other hand, Altman *Z*-score is a financial metric that measures the likelihood of a company to bankrupt. It is a composite score that takes into account several financial ratios, such as profitability, liquidity, and leverage. More and more often, investors and managers analyze this indicator to assess the financial health of a company. The condition of an enterprise can affect the dynamics of growth, but growth may determine the financial situation of a company, especially when the capital is not invested effectively and the implemented investment projects are not profitable. Growing equity and assets do not have to result in growing earnings per share and related value.

Financial performance and growth of companies were first analyzed by Rappaport [43] where financial metrics and strategies for value creation and growth were analyzed. Many research papers focus on this issue in light of

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innovations [46, 58]. Christensen [13] explored the challenges that firms face during disruptive innovation and how they can adapt to growth. Strategic management and growth were presented by Volberda et al. [56] where various strategic management frameworks relevant to company growth were analyzed, and earlier Teece et al. [52] where the concept of dynamic capabilities, crucial for firms to adapt, innovate, and achieve sustainable growth was introduced. Balance of growth is possible with the assessment of the threat of bankruptcy. Altman [3] in his seminal work introduced the *Z*-score, a widely used financial ratio model for bankruptcy prediction. Beaver [8] in his research explored the use of various financial ratios to identify financially distressed firms at risk of bankruptcy. Lee and Ching-Cheng [31] presented a study that investigated the combination of financial ratios with machine learning techniques to improve bankruptcy prediction.

The analysis of the topics of assessing the financial condition of enterprises, their growth in the context of innovation, and limitations caused by aggressive strategies leading to bankruptcy influenced the concept of combining these issues. The contribution of the presented research is to show that there is a balance between growth and good financial condition, which can be achieved in traditional enterprises representing the industrial sector, and which is impossible to achieve in innovative companies.

Companies can be divided with respect to the capital intensity and tangible of their operations related to tangible assets and new technologies related to intangible assets that can grow at a very dynamic pace without intense production based on tangible assets. Investing in new technologies often requires a long-term perspective, and it may take years to develop and deliver to the market innovative products. Moreover, in this group of companies sales may not be related to the large tangible assets and production. New technologies characterize companies listed on NASDAQ that differentiate this group from those included in the DJIA on NYSE. The business profile and the development phase are another factors that can determine the relationship between the financial condition and the growth of companies.

The objective of this study is to determine the relationship between the Altman *Z*-score that reflects the financial condition of a company and the growth of a company measured by the growth of sales, assets, equity and EPS. This problem, which has not yet been studied in the literature, represents a research gap in analyzed based on NASDAQ and NYSE-listed companies. To test the hypothesis, the Granger test and VAR models were applied.

The article is composed of the following sections: review of the literature, presentation of data and methods, results, discussion, and conclusions.

Review of the literature

Value management should lead to its maximization and, therefore, such a management can be defined as the concept of managing the enterprise from the point of view of the owners [35]. The growth of a company is related to the increase in equity, which enables financing the growing assets as a result of the implementation of investment projects [51]. Financial decisions are related to the cheapest possible capital necessary to finance the activity, which is adapted in the organizational form of the economic unit, its development phase, and thus the risk [20, 47]. The growth of business entities is a crucial process on a capital market because otherwise investors would not receive the expected rate of return [39].

The development of the company is closely related to the growth, a measurable category, while it can be also considered as a qualitative category, applicable to describe the changing status of a company [16, 18]. However, the cost management is also an important factor in assessing the effectiveness of operations, as they significantly affect the level of operating result, which in turn translates into EPS [7]. The application of modern cost management methods solves many problems related to, for example, continuous technological development, which contributes to the increase in indirect costs in the company [1]. Furthermore, the results of Lungkang et al. [33] showed that the return on assets and the debt-to-asset ratio had a significant effect on firm value, while earnings per share, growth and size did not have a significant effect. In the study of Danbolt et al. [15], the EPS growth was not correlated with growth potential measures.

Business growth can be measured by sales, assets, or equity growth, but such a growth may not add value to owners because profits may not increase when the organization implements investment projects with a negative NPV [5, 25, 63]. Danbolt et al. [15] presented a theoretical approach to the relationship of CAPEX investment profitability with future earnings per share, which reflected the growth of a company. On the other hand, there is evidence of a negative size-profitability and positive growth-profitability relationship, suggesting that initially profitability increases with the growth of the firm, but as size increases, it breeds inefficiency. Variables of the business cycle and the development of the stock market suggest a positive relationship with the profitability of firms [61]. Moreover, Tegegn et al. [53] in their article examined the impact of company-specific factors (age, size, leverage ratio, premium

growth rate liquidity ratio, and materiality of assets) on profitability represented by ROA in the insurance sector. It was found that leverage and asset materiality were not significantly related to profitability.

The prognosis of the development of the financial situation of the company, that is, the forecast of its future solvency or insolvency, is based on the evaluation and interpretation of the results at present. Financial analysis of the company plays a vital role [37, 48]. In addition, to simplify financial and accounting indicators, the analysis of the financial situation also includes various methods of assessing bankruptcy risk. There are simple and complex methods, which give opportunities to control the health of the organizational unit [30]. With the help of numerous indicators, an economic entity is able to control the most important areas of operation. In terms of shaping the financial situation of the company, an economic entity conducts an analysis with numerous ratios. Accurate selection of the structure and the entire set of indicators allows one to present the pattern of financial and economic activity and the state of the financial condition [42, 49].

The relationship between the growth of companies measured by EPS growth and financial condition measured by Altman *Z*-score may reflect the critical moment of value creation depending on the financial situation of a company [3, 4]. It should be noted that many researchers refer in their papers to the bankruptcy prediction models to help assess the condition of a company [11, 24, 59]. Financial ratios play an important role in revealing corporate financial soundness, a role which helps to maintain the competitive position of an enterprise, with the achievement of stable development contributing to the elimination of potential financial risks [29]. The economic condition of a company can influence its growth, making it more or less intense [17, 28, 29]. In the literature, we can find more and more studies related to the application of the Altman *Z*-score model to analyze the financial and economic situation of a company, also in developing markets [6, 48]. Boa and Úradníček [10] showed the widespread use of the Altman bankruptcy formula and verified its application. The results indicated that Altman's bankruptcy formula was portable to assess economic conditions and useful for predicting their financial distress. Meeampol et al. [36] reported that the use of the *Z*-score model can predict the sign of a possible bankruptcy that may occur. Furthermore, Mulyati and Ilyasa [40] presented a study in which they compared the scores of four financial distress prediction models using statistical techniques and the precision of the prediction model considering the financial condition. Moreover, as Ullah et al. [55] presented in their research, the most popular models for predicting financial distress for any company are the Altman *Z*-score model.

Tung and Phung [54] in their study applied the Altman *Z*-score model to assess the bankruptcy risk of a set of multidisciplinary enterprises of various types, mainly small and medium. The research findings showed that both the non-financial factors such as business area, type and size of the business, the educational level of managers and executors and other characteristics, and the financial factors such as earnings before tax, net profit/equity ratio, earnings before interest and tax/total assets ratio equity/total debt ratio, affect the bankruptcy risk of enterprises.

The analysis of the literature allowed to select the factors determining the risk of bankruptcy, growth of companies and their financial condition.

Research methods and statistical data

To verify the research hypothesis, financial data of companies included in two stock exchange indices were analyzed.

- NASDAQ Composite (82 companies);
- Dow Jones Industrial Average (26 companies).

The following companies: APPLE, CISCO, INTEL, MICROSOFT I WALGREENS were excluded from a NASDAQ sample and were analyzed as a part of DJIA listed companies, not to double themselves, because they are listed on both exchanges and are both high-tech and blue-chips, but as mature entities, they suit to DJIA group to a higher extent.

The data were acquired from the Bloomberg database as annual financial statements (balance sheets, PLA) for the years 1976–2019. The data ends with 2019 because in 2020 the COVID-19 pandemic broke out, which could change the pattern of the growth and distress pattern in the group of companies surveyed. Based on the data included in the balance sheets and income statements of the surveyed companies, the growth rates of sales (gS), total assets (gTA), equity (gE), and earnings per share (gEPS) were calculated. The Altman *Z*-score (AZ) ratios were retrieved for all observations directly from the Bloomberg database.

First, the basic descriptive statistics and correlations between the selected variables were analyzed and in the next step the stationarity of the data was verified to eliminate the possibility of spurious regressions. A stochastic process is stationary when the joint and conditional probability distributions of the process are time-invariant [27]:

$$E(Xt) = cons = \mu \tag{1}$$

$$Var(Xt) = cons = \sigma 2 \tag{2}$$

$$Cov(X_t X_t + j) = \sigma j \tag{3}$$

Granger causality was verified for pairs of variables analyzed. A two-lag VAR model was estimated for pairs of variables, and the joint significance test of the lags of a given variable was applied in the equation explaining the variable in the pair. This process can be represented by Eqs. (4) and (5):

$$y_t = \alpha_0 + \Sigma_{j=1}^{k} \alpha_{1j} y_{t-j} + \Sigma_{j=1}^{k} \beta_{1j} x_{t-j} + \varepsilon_{1t} \tag{4}$$

$$x_t = \alpha_0 + \Sigma_{j=1}^{k} \alpha_j x_{t-j} + \Sigma_{j=1}^{k} \beta_j y_{t-j} + \varepsilon_t \tag{5}$$

In this case, the null hypothesis is as follows:

$$H_0 : \beta_1 = \beta_2 = \cdots =: \beta_k = 0 \tag{6}$$

Equation (6) indicates that there is no stationarity.

In the next step, the impact of one variable on selected variables was examined with the VAR (Vector Autoregression Model) model, presented in basic formulas (4–6). VAR models indicate the impact factor in the case of a statistically significant relationship between variables.

The earnings per share (EPS), equity (E), total asset (TA) and sales (S) were calculated as a first difference because unit root tests indicated their non-stationary at original levels. The growth rates (represented by Δ in the equation) of assets, equity and sales were calculated according to the following formula:

$$\Delta X_{+n} = \frac{X_n - X_0}{X_0} \tag{7}$$

where $n=1$ accordingly and X_n denotes the total assets, equity, or sales at the end of n years after year in which the total earnings are equal to X_0.

The growth of earnings per share was determined in the following way:

$$\Delta EPS_{+n} = \frac{EPS_n - EPS_0}{TA_0}, \tag{8}$$

where EPS_n refers to earnings per share in n years ahead of year 0. The growth of earnings is calculated in relation to the assets size (TA) due to the fact that earnings can be negative and the change of a ratio from the negative and positive value is not symmetric and can affect the growth rate [15].

The growth was analyzed for $n=1$, 3, 5 and 7 years. At the same time, the assessment of the financial condition reflects the current situation at the moment of assessment, which limits the Z-score analysis to the current years (t_0).

Verification of the hypothesis regarding the impact of the condition of a company as measured by Altman Z-score on the growth of the enterprise (and opposite) was carried out in the next section.

Results

Descriptive statistics for the surveyed variables are presented in Table 1.

On the basis of the analysis of descriptive statistics of the research samples presented in Table 1, it can be concluded that they differ significantly from each other. Blue-chip companies included in the DJIA are characterized by an average higher earnings per share (EPS), a higher risk of bankruptcy (the Altman Z-score average was lower), significantly higher capital invested (Equity), higher assets (Total Asset) and a higher

Table 1 Descriptive statistics for two analyzed groups of companies

Sample	Statistics	EPS	AZ	E	TA	S
DJIA Included Companies	Mean	3.48	5.54	40,971.46	92,488.62	60,560.03
	Median	2.62	4.98	28,818.50	72,124.00	34,441.00
	Maximum	18.05	35.23	198,528.00	375,319.00	500,343.00
	Minimum	−2.20	1.53	−3268.00	5161.00	5.45
	SD	2.89	2.81	36,358.64	74,129.39	83,341.80
NASDAQ Included Companies	Mean	2.62	51.63	9786.49	20,740.75	11,540.77
	Median	1.34	6.28	2564.42	5100.31	2824.69
	Maximum	88.40	3763.72	177,628.00	375,319.00	265,595.00
	Minimum	−20.97	−30.64	−3590.00	38.96	0.00
	SD	6.45	322.40	20,719.97	46,639.77	27,813.71
U Mann–Whitney	Asymptotic significance	0.00	0.00	0.00	0.00	0.00

Sources: Own study in EViews

average level of sales. As a consequence, it should be stated that the analyzed groups of enterprises are different from each other according to *U* Mann–Whitney test. Blue chips included in DJIA are bigger and riskier, although the level of Altman *Z*-score indicates they are in a good condition, and a high level of this indicator for companies included in the NASDAQ index is burdened with a high level of standard deviation.

In the next step the correlation between the pairs of the variables was analyzed and the results are presented in Table 2.

The correlation between Altman *Z*-score and surveyed variables was significantly negative in most cases. In the group of companies included in the NASDAQ Composite Index, the Altman *Z*-score was not correlated with EPS.

On the basis of stationarity tests, it was possible to determine variables that can be used for further analyses. Non-stationary variables are usually stationary in their first difference. The results of the tests are presented in Table 3.

According to the results presented in Table 3, it can be concluded that in both groups of companies, the non-stationary variables are: EPS, Equity, Total Asset, and Sales. These variables should be included in the study in the form of a first difference.

The Granger causality test allows one to assess the influence of the examined variables on each other. The results are presented in Table 4.

The results presented in Table 4 indicate that in the case of DJIA—listed companies causality was found in the sense of Granger for majority of the analyzed variables, while in the case of NASDAQ listed companies

Table 2 Pearson's correlation

Specification	EPS	AZ	E	TA	S
DJIA					
EPS	1.00	−0.26***	0.26***	0.43***	0.38***
AZ	−0.26***	1.00	−0.19***	−0.36***	−0.22***
E	0.26***	−0.19***	1.00	0.89***	0.63***
TA	0.43***	−0.36***	0.89***	1.00	0.71***
S	0.38***	−0.22***	0.63***	0.71***	1.00
NASDAQ					
EPS	1.00	0.01	0.28***	0.23***	0.23***
AZ	0.01	1.00	−0.05**	−0.05**	−0.04*
E	0.28***	−0.05**	1.00	0.93***	0.81***
TA	0.23***	−0.05**	0.93***	1.00	0.88***
S	0.23***	−0.04*	0.81***	0.88***	1.00

The significance levels of the parameters are given in the table: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Sources: Own study in EViews

Table 3 *P*-value for unit root tests

Specification	Levin, Lin and Chu	Im, Pesaran and Shin	ADF—Fisher	PP—Fisher
Daw Jones included companies				
EPS	1.00	1.00	1.00	0.92
AZ	0.00	0.01	0.01	0.00
E	0.54	1.00	1.00	1.00
TA	1.00	1.00	1.00	1.00
S	0.98	1.00	1.00	1.00
Nasdaq included companies				
EPS	1.00	1.00	0.00	0.00
AZ	0.00	0.00	0.00	0.00
E	1.00	1.00	1.00	1.00
TA	1.00	1.00	1.00	1.00
S	1.00	1.00	1.00	1.00

Sources: Own study in EViews

such a relationship cannot be confirmed in most of the cases. Due to the influence of Altman's *Z*-score on growth, AR(2) models were analyzed for the variables gEPS and gS, where two lag periods and an explanatory variable were selected for the Altman *Z*-score variable.

The results for AR (2) models are presented in Table 5, and it can be concluded that the influence of Altman *Z*-score on the gEPS and gS in the group of DJIA company group.

Discussion

The results show that companies included in the DJIA index are characterized by a higher average level of sales, assets, invested capital, and earnings per share. On the other hand, the average Altman *Z*-score value for these companies is lower (but within a savings range) compared to companies included in the NASDAQ index. The differences between the companies surveyed, taking into account the stock exchange on which they are listed, are statistically significant. The correlation between the Altman *Z*-score and the growth factors on both stock exchanges is negative and statistically significant (except for AZ and EPS on NASDAQ). This result shows that the larger the company and the higher the earnings per share (only in DJIA), the lower the Altman *Z*-score. However, the correlation between all growth factors, i.e., sales, equity, assets, and earnings per share, in both groups of enterprises turned out to be positive, showing that these values are related in a positive and statistically significant way. In the causality study, it was found that in the case of companies included in DJIA, the Altman Z-score affects the growth of EPS in periods of 1, 3, 5, and 7 years, and the same increase affects the Altman *Z*-score while in the

Table 4 Granger test results

Specification	F-Statistic DJIA	Prob	F-Statistic NASDAQ	Prob
EPS				
AZ ⇏ gEPS	**4.24**	**0.02**	0.10	0.90
AZ ⇏ gEPS 3	**6.39**	**0.00**	0.03	0.97
AZ ⇏ gEPS 5	**8.88**	**0.00**	0.01	0.99
AZ ⇏ gEPS 7	**42.13**	**0.00**	0.01	0.99
gEPS ⇏ AZ	**3.25**	**0.04**	0.08	0.93
gEPS 3 ⇏ AZ	**3.62**	**0.03**	0.06	0.94
gEPS 5 ⇏ AZ	**3.04**	**0.05**	0.03	0.97
gEPS 7 ⇏ AZ	**4.13**	**0.02**	0.02	0.98
E				
AZ ⇏ gE	0.17	0.84	0.06	0.94
AZ ⇏ gE 3	**4.57**	**0.01**	0.09	0.91
AZ ⇏ gE 5	**17.04**	**0.00**	0.12	0.89
AZ ⇏ gE 7	**29.25**	**0.00**	0.02	0.98
gE ⇏ AZ	2.11	0.12	0.71	0.49
gE 3 ⇏ AZ	1.20	0.30	0.08	0.92
gE 5 ⇏ AZ	**5.75**	**0.00**	0.06	0.95
gE 7 ⇏ AZ	**5.11**	**0.01**	0.06	0.94
TA				
AZ ⇏ gTA	0.03	0.97	0.2	0.82
AZ ⇏ gTA 3	1.13	0.32	**2.51**	**0.08**
AZ ⇏ gTA 5	**6.32**	**0.00**	0.10	0.90
AZ ⇏ gTA 7	2.22	0.11	0.05	0.95
gTA ⇏ AZ	1.61	0.2	0.74	0.48
gTA 3 ⇏ AZ	**3.67**	**0.03**	0.04	0.96
gTA 5⇏ AZ	**7.41**	**0.00**	0.04	0.96
gTA 7 ⇏ AZ	**8.09**	**0.00**	0.16	0.85
S				
AZ⇏ gS	**2.66**	**0.07**	0.12	0.88
AZ⇏ gS 3	**5.19**	**0.01**	0.32	0.73
AZ⇏ gS 5	1.78	0.17	0.03	0.97
AZ⇏ gS 7	**2.56**	**0.08**	0.09	0.92
gS ⇏ AZ	**19.59**	**0.00**	0.24	0.79
gS 3 ⇏ AZ	0.42	0.66	0.04	0.96
gS 5 ⇏ AZ	**2.51**	**0.08**	0.92	0.40
gS 7 ⇏ AZ	1.01	0.36	0.17	0.84

Means there is no Granger cause

Sources EViews

Values in bold mean that the given variables have a statistically significant influence on each other

Table 5 AR models for selected variables: gEPS and gS

Specification	gEPS DJIA	gS DJIA	gEPS NASDAQ	gS NASDAQ
gEPS (−1)	0.83***		1.05***	
gEPS (−2)	−1.14*		−0.16***	
gS (−1)		0.04		0.02
gS (−2)		0.10**		0.01*
Const	411.92***	0.01	4.91	0.23***
AZ	−42.75**	0.01***	0.00	0.00
R-squared	0.88	0.1	0.74	
Adj. R-squared	0.88	0.05	0.73	
F-statistic	133.98	2.08	53.62	

Significance levels for the parameters are given in the table: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Sources: Own study in EViews

case of companies included in the index NASDAQ, no such relationships found. This means that the good condition of enterprises affects the increase in EPS and, consequently, the increase in value, which in turn influences the good condition of enterprises. This demonstrates good management and coordination of economic growth and health. This is possible because of the type of business, industry-based on production that requires tangible assets. In the case of companies included in the NASDAQ index, such causality cannot be stated. In the case of the remaining increases in the DJIA group, AZ also influenced growth in most cases. It can be concluded that an increase in sales has a faster impact on the condition of companies, which also immediately affects the increase in sales. In the case of equity and assets, these relationships emerge later. In the group of companies included in NASDAQ, only one significant relationship was found, which was the impact of AZ on gTA after 3 years. In earlier studies [11], a negative relationship was found between Altman's *Z*-score and EPS growth for companies included in WIG (Poland) and DAX (Germany).

The value of a company is mostly influenced by factors such as operating profit growth, cash tax rate, revenue growth rate, working capital, weighted average cost of capital, capital expenditures, and a period of competitive advantage. If managers manage these factors correctly, it leads to a situation where the present value of cash flows is maximized the same as the EPS [45, 57]. The results indicate that the companies listed on NASDQ are characterized by nonlinear growth patterns, which has also been confirmed in the literature by Sabourin et al. [44], Goh [22], and Enjolras et al. [19]. Many companies listed on the NASDAQ are known for exhibiting nontraditional growth patterns because these companies often operate in industries related to innovations, where their growth trajectory can differ significantly from more traditional and mature companies, which is also in line with research presented by Morales et al. [38]. Valuations of these companies may be influenced by market sentiment, investor expectations, and future growth prospects [26].

It was also found that the larger the company and the higher the EPS level, the lower the Altman *Z*-score value. Therefore, the previous research of Tung and Phung [54]

confirms that the increase in EPS and the size of the company influence bankruptcy. Moreover, it was found that the more a company focuses on maximizing profits, the worse its condition.

Conclusions

The aim of the article was to evaluate the relationship between the financial condition of companies and their growth measured by earnings per share, sales, equity, and total assets, with the comparison between companies included in DJIA and NASDAQ stock indices. It should be emphasized that the companies included in the DJIA differ from the companies listed on the NASDAQ in their size regarding assets, equity, sales, and earnings per share. Companies included in the DJIA are called blue chips and are larger in terms of sales, assets, invested capital, and generated earnings per share, with their average Altman *Z*-score level being lower, although in a safe range and characterized by smaller fluctuations compared to companies included in the NASDAQ Composite Index. The difference between the surveyed groups was statistically significant and allowed for further, deeper analysis.

The results show that a condition of a company is related to growth, and vice versa, the growth affects financial condition. The confirmation of the hypothesis was found only in a group of DJIA companies; in NASDAQ group none of the relationships was significant. With regard to NASDAQ-listed companies, innovations appear at an unexpected moment. Growth in high-tech enterprises is independent of strategy and depends on random events. For this reason, companies in this group are working on many projects in the hope that some of them will be commercialized in future. As a result, no significant results are found for the financial condition and growth factors.

The research results confirmed that the size of the companies influences the bankruptcy and that in the mature enterprises, as it was found on the Polish and German markets, the relationship between the Altman *Z*-score and EPS is negative, so excessive profit maximization can affect the risk of bankruptcy.

These findings add value to the theory of company growth on the capital market and provide investors with valuable insights into the financial condition of a company. In the group of mature DJIA companies, the relationship between growth and economic situation is strong, while among innovative companies listed on NASDAQ there is no relationship at all. Such research has not been conducted before. The results show how different innovative companies are and what other management rules they follow. This issue should certainly be discussed, and further research should be carried out to find answers to the above question.

The study and its conclusions are related to the period before the global COVID-19 crisis, which can be argued as a limitation of this study. Future research should extend this topic taking into account development level, assets structure, and innovations of surveyed companies. Due to their growth-oriented nature, stocks of NASDAQ listed companies can exhibit higher levels of price volatility compared to more mature companies, such as blue chips included in DJIA.

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Availability of data and materials
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Declarations

Ethics approval and consent to participate
Authors mentioned in the manuscript have agreed for authorship read and approved the manuscript, and given consent for submission and subsequent publication of the manuscript.

Consent for publication
Applicable.

Competing interests
I wish to disclose here that there are no potential conflicts of interest at any level of this study.

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