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THE VALUE RELEVANCE OF ACCOUNTING INFORMATION: FOCUSING ON BULGARIA[3]

Value relevance can be defined as the ability of accounting variables to explain or predict financial outcomes. This study intends to examine the value relevance of accounting information, specifically the impact of accounting information on the stock prices of non-financial public companies listed on the Bulgarian Stock Exchange. The examined period is 01.01.2016 – 31.12.2021. We apply the panel unit root test, descriptive statistics, the panel regression models, the correlation matrix, and the Granger causality test. The results collected demonstrate that the earnings per share, the dividend per share, and the book value of equity per share calculated for the analyzed companies have an impact on the stock price of these enterprises. A moderate positive correlation between stock price and other accounting variables is revealed.
Keywords: value relevance; accounting information; Bulgarian capital market; panel data; panel regression;
JEL: C23; G15; M40; M41

1. Introduction

The capital market can be defined as an institution that contributes to social and economic development and growth, both in developed and developing countries. Investors invest their capital and expect a guarantee that they will receive a quick return on their investment. The main sources of information for investors are financial statements and accompanying notes/disclosures. Undoubtedly, the relationship between accounting information and the capital market is one of the most analyzed and discussed topics in the field of accounting and financial literature. To analyze the stock price response to the accounting information of publicly traded companies, it is necessary to establish the value relevance of accounting information. The value relevance of accounting information can be described as the extent to which the elements of the financial statements interact with stock prices. Accounting

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information is considered relevant only when it influences the economic decisions of financial statement users.

Scientific research published by Amir et al. (1993) is considered to be the first study to use the term "value relevance" and define it as the relationship between accounting figures and the market value of stocks. Accounting information is value-relevant when potential investors use it to evaluate companies and change stock prices (Barth et al., 2018; Nayeri et al., 2012). Value relevance is defined as the capacity of the information disclosed in financial statements to distinguish or summarize information that impacts stock prices. This is supported by empirical evidence showing a statistically significant correlation between market values and accounting values (Hellström, 2005).

The main objective of the study is to analyze the value relevance of accounting information, specifically the impact of accounting information on the stock prices of non-financial public companies listed on the Bulgarian Stock Exchange.

2. Literature Review

2.1. Value relevance of accounting information

Nguyen et al. (2021) discuss the importance of accounting for the functioning of the capital market and confirm the fundamental role of accounting information in avoiding information asymmetry and moral hazard. The study of value relevance aims to determine whether accounting information contained in financial statements provides useful and valuable information for users of this accounting information, especially investors (Negakis, 2005; Mishary, Alanezi, 2011; Mulenga, Bhatia, 2018).

Pervan and Bartulović (2014) analyze the value relevance of accounting information on the following Southeast European capital markets: Ljubljana Stock Exchange, Zagreb Stock Exchange, Sarajevo Stock Exchange, Banja Luka Stock Exchange, and Belgrade Stock Exchange for the period 2005-2010 and demonstrate that there is a statistically significant and positive relationship between accounting value per share and stock prices for all examined capital markets. Závodný and Procházka (2022) analyzed the value relevance of accounting information in the Visegrad Group countries (Czech Republic, Hungary, Poland, and Slovakia) for the period 2005-2017. They demonstrated that profit has an impact on the stock prices of the Prague Stock Exchange and the Budapest Stock Exchange. On the other hand, the authors find evidence that accounting information is not value-relevant on the Slovak Stock Exchange. Hossain (2021) concludes that accounting information is significant and important in making effective decisions by investors in the stock market in Dhaka, Bangladesh. Oktari and Sunarsih (2020) demonstrated that profit has a positive effect on the stock prices of manufacturing companies listed on the Indonesian Stock Exchange from 2016 to 2019.

Khanji (2020) applies multiple regression analysis to study the impact of dividend per share, earnings per share, book value per share, market-to-book ratio, and price-to-earnings ratio on the stock prices of manufacturing companies listed on the Amman Stock Exchange for the period 2009-2018. The results obtained by the researchers show that all variables, except for

the price-to-earnings ratio, are statistically significant and can greatly explain the dynamics of stock prices for Jordanian manufacturing companies. Omokhudu and Ibadin (2015) find that the relationship between profit, cash flows, and dividends, on the one hand, and stock prices, on the other hand, is statistically significant for companies listed on the Nigerian Stock Exchange for the period 1994-2013. Ogbodo and Osisioma (2020) evaluate the relationship between the significance of accounting information and stock prices, focusing on manufacturing companies listed on the Nigerian Stock Exchange (NSE). An ex-post facto research design was used. Regression analysis using the ordinary least squares (OLS) method and the Granger causality test were used to test the hypothesis. The results of this study revealed a significant positive relationship between dividend per share and stock price. The researcher recommends, among other things, that standard-setters, regulatory authorities of the stock market, and registered manufacturing companies in Nigeria continuously develop ways to improve the quality of accounting information published in financial statements to maintain and increase their value relevance for investors and other stakeholders.

Jaba et al. (2016) conducted a statistical assessment of the value relevance of accounting information for companies listed on the Bucharest Stock Exchange in Romania. The study was conducted on a sample of 67 companies from 2006 to 2012. To assess the importance of the value, the authors analyze the impact of key indicators related to the financial condition and performance. These indicators are calculated using information from the annual financial statements and the growth coefficient of the daily share price. Panel data analysis was used to assess the monthly significance of financial information for valuation. The results of the study show that accounting information is valuable for investors. Simeonov and Lamay (2020) developed a comprehensive methodology for analyzing investments in publicly traded companies. The authors apply a set of models in an empirical analysis for the four companies with the highest market capitalization from the SOFIX index. The study demonstrates the formation of complex investment profiles for "Sopharma", "Himimport", "Eurohold" and "MS Hydraulic". The investment profiles of the analyzed companies exhibit significant variations in terms of the firm's liquidity, profitability, franchise value, capital income, market risk, and market liquidity of their shares.

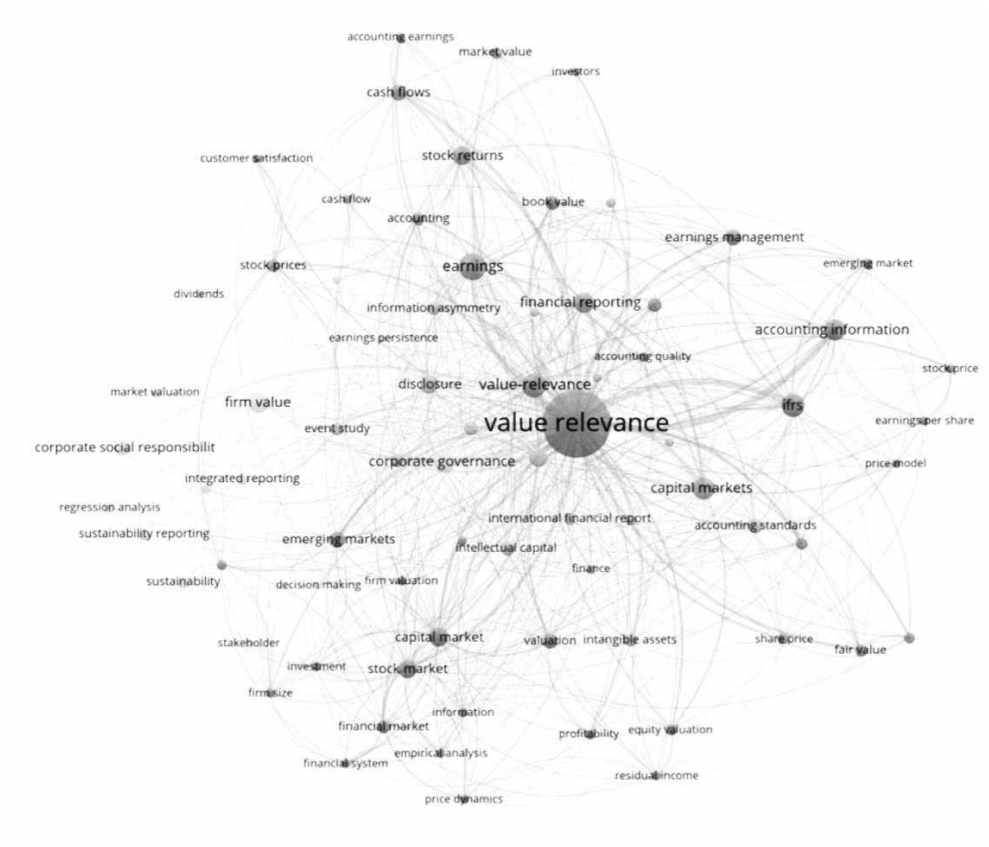
3. Bibliometric Analysis

Bibliometric methods are widely used to represent the relationship between quantitative methods and the research domain. This study proposes research questions, what are the mapping and trend of digital economy research using visual bibliometric analysis? Bibliometrics can measure research productivity at individual, institutional, and international levels. To search and classify similar documents in the global academic database Scopus, this study lists important keywords related to digital economy publications. The researchers used the Scopus database as the main source of information, as it is considered a reliable source of scholarly publications by academics. We apply VOSviewer to create a map that visualizes the relationship between the keywords: „value relevance“ and „capital markets“. 1235 publication results were retrieved from the Scopus database in January 2024, which were further limited to business, management and accounting, economics, econometrics, and finance. The refinement reduced this to a total of 684 results. A total of 1664 keywords were

identified in the 684 studies that were taken into account. Of the 1664 keywords, 98 were the keywords that appeared at least 5 times in the studies. Terms were found to have low relevance scores and their co-occurrences with other phrases followed a more or less random pattern. VOSviewer allows to exclusion of keywords with low relevance scores. After the evaluation, the total number of keywords is 89, which has a strong degree of relevance to the topic under study.

The visualization map of the keyword network is presented in Figure 1. In the resulting visualization, each term is represented by a circle. We observe 5 clusters with keywords with the following main terms: value relevance, accounting information, earnings, capital markets, and corporate governance. The distance between the two circles indicates the proximity of the two keywords. The connecting lines in the figure depict the relationships between the elements. Also, the thicker the line, the stronger the relationship between the items. We observe strong relationships between the keywords, which are defined in this study, namely: value relevance and capital markets. The estimated total between them is estimated to 75.55 points.

Figure1. The visualization of the co-occurrence of the explored keywords



4. Methodology and Data

4.1. Data

This study provides an empirical analysis of the impact of accounting information on stock prices in the Bulgarian capital market. The panel data were used on an annual basis. The analyzed period is 01.01.2016 – 31.12.2021. Several research papers have presented the main advantages of using panel data (Arellano, 2013; Baltagi, 2013; Biorn, 2017). The use of panels allows one to observe a certain variable at one specific moment and simultaneously observe another variable at another moment and analyze different relationships, interactions, and patterns (Kapitanov, 2021).

Table 1 lists the financial and accounting variables used in the empirical analysis.

Table 1. Variables used in the empirical analysis

Variable	Type of variable	Abbreviation	Formula
Stock price	Dependent	SP	Stock price at the end of the year (December 31st)
Earnings per share	Independent	EPS	$\frac{Profit\ after\ taxes}{Weighted\ average\ number\ of\ shares}$
Sales per share	Independent	SPS	$\frac{Sales\ revenue}{Number\ of\ shares\ outstanding}$
Book value per share	Independent	BVS	$\frac{Shareholders'\ equity}{Number\ of\ shares\ outstanding}$
Net operating cash flow per share	Independent	CFS	$\frac{Net\ cash\ flows\ from\ operating\ activities}{Number\ of\ shares\ outstanding}$
Dividend per share	Independent	DPS	$\frac{Total\ amount\ of\ dividends\ paid}{Number\ of\ shares\ outstanding}$

Source: Authors' systematization based on previous research.

Information on the share prices of the analyzed Bulgarian public companies was collected from the website of Infostok AD – https://www.infostock.bg/infostock/control/home.

The following accounting variables were used in this study: earnings per share, sales revenue per share, book value per share, net operating cash flow per share, and dividend per share. These metrics were selected based on previous research and the ability to obtain data to calculate them (Stoykova, 2022). The accounting information was collected and processed from the individual annual financial statements of the analyzed companies. In addition, the Bulgarian capital market requires its listed issuers to disclose detailed quarterly and annual financial statements. Thus, all accounting data are collected from the Bulgarian Stock Exchange (BSE).

Earnings or loss per share is calculated by dividing the net profit or loss for the period attributable to ordinary shareholders by the weighted average number of ordinary shares held during the period. Higher profits are also expected to result in higher share prices and the implied sign of the coefficient on this accounting measure should be positive.

Sales per share (SPS) is calculated by dividing the sales revenue by the number of shares outstanding at the end of the period. An increase in the amount of a company's sales revenue

should lead to an increase in its stock price. This indicator is expected to have a coefficient with a positive sign in the regression equation.

High values of book value per share usually indicate that the company has good financial performance and reserves for previous accounting periods and this implies that share prices will also be high (Srinivasan, 2012; Sharma, 2011). Higher values of this indicator are assumed to be linked to higher share prices. Therefore, the expected sign in front of this coefficient in the regression equation is positive.

The net operating cash flow per share (CFS) is a significant accounting indicator. The accounting information contained in the cash flow statement is very important to investors as they are interested in the ability of the reporting entity to generate sufficient liquid funds to satisfy payments to shareholders (mainly in the form of dividends). The indicator 'net operating cash flow per share' is assumed to have a positive impact on the share price and the sign in front of the coefficient of this accounting variable is expected to be positive.

For this study, the financial accounting variable dividend per share (DPS) shows the dividend that each share brings to its holder. Dividend usually positively influences stock price and it is assumed that the sign in front of its coefficient in the regression model will be positive (+).

Table 2 presents the explanatory (factor) variables used in the regression equation and the expected sign in front of their coefficients in the regression equation.

Table 2. Independent variables and the expected sign for each of them

Independent variables	Expected sign
Earnings per share (EPS)	Positive +
Sales per share (SPS)	Positive +
Book value per share (BVS)	Positive +
Net cash flow per share (CFS)	Positive +
Dividend per share (DPS)	Positive +

Source: Authors' systematization based on previous research.

Twenty individual joint-stock companies from different industries in Bulgaria are included in the sample. Following Hellström's (2006) approach, financial companies are excluded from the sample because the structure and accounting of these companies differ significantly from non-financial companies (Hellström, 2006). All the companies included in the sample are public companies that list their shares on the Bulgarian Stock Exchange (BSE). The stock market indices SOFIX, BGBX40, BGTR30, and BGREIT are based on the market capitalization of the common stock issues of the selected public Bulgarian companies. The public companies on which these stock indices are calculated must meet certain minimum criteria for liquidity, market capitalization, number of shareholders, and so on. This research focuses on companies from different sectors of the Bulgarian economy, namely the manufacturing industry, professional activities and research, transport, storage and post, real estate operations, hotels and restaurants, extractive industry, and construction. In addition, these twenty companies have been selected because all the necessary accounting information is available for the entire analysis period 2016-2021 and these are all non-financial public companies that are listed on the Bulgarian Stock Exchange (BSE) at the time of collection and processing of the necessary information (as of 15.09.2022). The companies analyzed are

public companies, and the BSE requires all listed issuing companies to prepare and publish their quarterly and annual financial statements. The accounting data used in this study is from the companies' annual financial statements. The public companies under study prepare and present their financial statements following the International Financial Reporting Standards (IFRS) (Accounting Act, 2021).

Table 3 presents information for all public companies included in the sample. The specific sector, subsector of all the companies under study, and their stock codes are also presented.

Table 3. Analyzed enterprises included in the sample

№	Company name	Sector	Subsector	Code
1	TCHAIKAPHARMA HIGH QUALITY MEDICINES AD-SOFIA	Manufacturing	Manufacture of pharmaceutical preparations	THQM
2	SOPHARMA AD-SOFIA	Manufacturing	Manufacture of pharmaceutical preparations	SFA
3	NEOCHIM AD-DIMITROVGRAD	Manufacturing	Manufacture of fertilisers and nitrogen compounds	NEOH
4	SIRMA GROUP HOLDING AD-SOFIA	Professional, scientific and technical activities	Activities of head offices	SGH
5	SPEEDY AD-SOFIA	Transportation and storage	Other postal and courier activities	SPDY
6	MONBAT AD-SOFIA	Manufacturing	Manufacture of batteries and accumulators	MONB
7	VELGRAF ASSET MANAGEMENT AD-SOFIA	Real estate activities	Renting and operating of own or leased real estate	VAM
8	SOPHARMA TRADING AD-SOFIA	Wholesale and retail trade; repair of motor vehicles and motorcycles	Wholesale of pharmaceutical goods	SFT
9	AGRIA GROUP HOLDING AD-VARNA	Professional, scientific and technical activities	Business and other management consultancy activities	AGH
10	ALBENA AD-ALBENA	Accommodation and food service activities	Restaurants and mobile food service activities	ALB
11	KORADO BULGARIA AD-STRAZHITSA	Manufacturing	Manufacture of central heating radiators and boilers	KBG
12	OIL AND GAS EXPLORATION AND PRODUCTION AD-SOFIA	Mining and quarrying	Extraction of crude petroleum	NGAZ
13	ALCOMET AD-SHUMEN	Manufacturing	Aluminium production	ALCM
14	TRACE GROUP HOLD AD-SOFIA	Construction	Construction of roads and motorways	T57
15	EMKA AD-SEVLIEVO	Manufacturing	Manufacture of other electronic and electric wires and cables	EMKA
16	ZARNENI HRANI BULGARIA AD-SOFIA	Wholesale and retail trade; repair of motor vehicles and motorcycles	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	ZHBG
17	GALATA INVESTMENT COMPANY AD-VARNA	Real estate activities	Buying and selling of own real estate	GTH
18	BALKAN AND SEA PROPERTIES REIT-VARNA	Real estate activities	Buying and selling of own real estate	BSP
19	HIMSNAB BULGARIA AD-SOFIA	Real estate activities	Renting and operating of own or leased real estate	CHSB
20	PETROL AD	Wholesale and retail trade; repair of motor vehicles and motorcycles	Retail sale of automotive fuel in specialised stores	PET

Note: The table presents the names, sectors, and subsectors of all public companies included in the sample as well as their stock code (as of 15.09.2022).
Source: Authors' systematization.

3.2. Methodology

Before proceeding to the empirical analysis of the impact of accounting information on stock prices, it is necessary to apply a General Panel Unit Root Test. This panel unit root test summarizes the results of all the five-unit root tests (when applicable). This test is applied to check the stationarity of the panel of data analyzed, that is, whether the panel is stationary or non-stationary.

The basic mathematical formula of this equation is as follows:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X'_{it}\delta + \epsilon_{it} \quad (1)$$

The null and alternative hypotheses can be represented as follows:

$$H_0: \alpha = 0 \quad (2)$$

$$H_1: \alpha < 0 \quad (3)$$

The null hypothesis states that there is a unit root, i.e., the data is non-stationary, while the alternative hypothesis states that there is no unit root and the data is stationary. If the test results indicate that we should accept the null hypothesis for the presence of a unit root (i.e., reject the alternative hypothesis), it is necessary to transform the series. This transformation is done by calculating the first and/or second difference. As a result, the data is integrated in the first or second order.

Correlation analysis and Granger causality test were applied to verify the presence of interaction between the variables under study. Regression analysis (OLS regression (Ordinary Least Squares Regression), Least Squares Method) is widely used and applicable in establishing the presence and direction of a relationship between two or more variables. The regression model is a suitable method for investigating the impact of accounting information on stock prices in the Bulgarian capital market. For empirical analysis, the following three regression models are applied: pooled least squares (OLS); panel least squares with fixed effect (Panel Least Squares with Fixed Effect), and panel regression with random effect (Random effect model).

The averaged least squares method is a simple panel regression that combines only spatial (cross-sectional) and temporal (time series) data. This model lacks individual spatial and time-specific effects, implying that the dynamics of the data are the same across periods. This panel regression can be represented by the following formula:

$$y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (4)$$

In panel fixed effect regression, the constant is specific to each group, but it does not change over time. In a fixed effect panel regression, each economic unit of analysis is "unique" and thus cannot be considered as the result of a random selection from a particular general population (Nenova, 2020). To calculate a fixed effect panel regression, the following equation is applied:

$$y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (5)$$

In random effects panel regression, objects are randomly sampled from a large population. The main advantage of applying random effect panel regression is the elimination of heteroscedasticity. The model can be represented by the following mathematical relationship:

$$y_{it} = \alpha + \beta X_{it} + u_i + \varepsilon_{it} \quad (6)$$

The following explanatory legend applies to equations (4), (5) and (6):

For i = 1, 2, ..., N и t = 1, 2, ..., T.

where:

y is a dependent variable;

x – independent variables;

t – reflects the time range;

T – the number of periods;

i – reflects the spatial range;

N – the number of individual or spatial data;

a – intercept of the model;

β – unknown parameter subject to calculation;

u – specific individual effects;

ε – error.

When using panel regression, the model error εit is a composite of the model error with temporal data and the model error with spatial data (Nenova, 2020).

To determine which of the two models, fixed effect or random effect, is more appropriate, the Hausman Test will be applied.

For the empirical analysis, the software product EViews 12 was used.

5. Empirical Analysis

5.1. Results from the Panel Unit Root test

Before applying the descriptive statistics, correlation analysis, Granger causality test, and regression models, the panel unit root test was applied. The results obtained from the general panel unit root test indicate that all the panel time series analyzed are non-stationary at zero order (level), i.e., we have to accept the null hypothesis of the presence of non-stationarity in the variables under study at level (0) (p-value > 0.05). Therefore, must be transformed into the first difference. The first difference of all analyzed variables is stationary, so we can proceed to the empirical analysis.

5.2. Results from descriptive statistics

The results from the descriptive statistics of the panel data are presented graphically in Appendix 1.

From the graphically presented results, it can be concluded that the highest mean values for each of the variables under study were recorded in 2021. Additionally, the highest mean value was observed for the accounting indicator of sales revenue from shares (14.3 for 2021), while the lowest was observed for net operating cash flows per share (-0.07 for 2018). On the other hand, the lowest recorded mean value for stock prices was in 2020 (9.5). It can be assumed that this is due to the COVID-19 pandemic that started in March 2020, which had a negative impact on the capital markets.

The highest value of the median for stock prices was recorded in 2018 (7.1). The highest registered value of the median for stock prices was 7.1 in 2018, while the lowest (4.1) was in 2020. From the graph of the maximum values of the variables by year, it can be seen that the highest maximum values for stock prices (112.0), sales revenue from shares (132.0), earnings per share (18.5), and net operating cash flows per share (22.9) were recorded in 2021. On the other hand, the highest maximum value for dividend per share (5.3) was registered in 2020, and for the accounting value per share – in 2019 (with a maximum value of 113.7). From the analysis of the minimum values of the variables, it can be concluded that the lowest minimum values were recorded in 2018 for earnings per share (-7.4) and net operating cash flows per share (-11.0). While for stock prices, the lowest minimum values were in 2020 and 2021.

The graphs of the standard deviation values for the individual variables by year show that the lowest value of the standard deviation for stock prices was recorded in 2019 (13.3), while the highest was in 2021 (24.7). It should be noted that lower values of the standard deviation indicate that stock prices have less dispersion around the mean, and these values are closer to the mean values. Higher values of the standard deviation indicate greater volatility in stock prices. The highest values of the standard deviation were recorded in 2021 for all analyzed variables. Specifically, the standard deviations were as follows: stock prices (24.7), sales revenue from shares (30.1), earnings per share (4.2), dividend per share (1.38), net operating cash flows per share (5.3), and accounting value per share (26.8).

The values of the skewness coefficient, presented in Appendix 1, are positive for most of the variables, except for the negative values of the earnings per share indicators for 2018 (-3.1) and 2019 (-0.7), and net operating cash flows per share for 2018 (-1.7) and 2019 (-0.5). When the skewness coefficient is positive, it means that the data has a right-skewed distribution. All values of the kurtosis coefficient for the individual variables are positive, indicating that the curve of the empirical distribution is above the normal curve.

Figure 2 shows the correlation matrix as a "lower triangular" heat map with correlation coefficients as labels superimposed on the graph. A moderate positive correlation between stock price and other accounting variables is revealed. The strongest correlation is between book value per share and earnings per share with a coefficient equal to 0.873234. This implies that firms with strong earnings per share will enjoy upward pressure on share prices. We report the weakest correlation between book value per share and dividend per share.

Figure 2. Correlation matrix

	SP	EPS	SPS	BVS	CFS	DPS
SP	1					
EPS	0,495972	1				
SPS	0,504318	0,548337	1			
BVS	0,477011	0,288345	0,319179	1		
CFS	0,528413	0,873234	0,573961	0,364185	1	
DPS	0,592623	0,632886	0,464174	0,070123	0,575918	1

Source: Authors' calculations.

5.3. Panel Regression results

Table 4. Results of the Hausman test for the regression analysis

Correlated Random Effects – Hausman Test				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		59.421610	5	**0.0000**
** WARNING: the estimated cross-section random effects variance is zero.				
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
D(SPS)	0.063851	0.127344	0.000962	0.0406
D(EPS)	1.534096	3.262149	0.071939	0.0000
D(DPS)	-5.894803	-3.016223	0.384052	0.0000
D(CFS)	-0.449760	-1.145640	0.015020	0.0000
D(BVS)	0.792688	-1.189139	0.084280	0.0000
Cross-section random effects test equation:				
Dependent Variable: D(SP)				
Method: Panel Least Squares				
Date: 10/28/22 Time: 23:24				
Sample (adjusted): 2017 2021				
Periods included: 5				
Cross-sections included: 20				
Total panel (balanced) observations: 100				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.229109	0.484945	0.472444	0.6380
D(SPS)	0.063851	0.114919	0.555621	0.5801
D(EPS)	1.534096	0.531456	2.886592	0.0051
D(DPS)	-5.894803	1.318656	-4.470312	0.0000
D(CFS)	-0.449760	0.282231	-1.593586	0.1152
D(BVS)	0.792688	0.456567	1.736194	0.0866
	Effects Specification			
Cross-section fixed (dummy variables)				
Root MSE	4.100174	R-squared		0.639006
Mean dependent var	0.114830	Adjusted R-squared		0.523488
S.D. dependent var	6.858590	S.E. of regression		4.734473
Akaike info criterion	6.159936	Sum squared resid		1681.142
Schwarz criterion	6.811228	Log likelihood		-282.9968
Hannan-Quinn criterion.	6.423526	F-statistic		5.531661
Durbin-Watson stat	1.346912	Prob(F-statistic)		0.000000

Source: Authors' calculations

To determine the most appropriate and powerful panel regression model, fixed effect or random effect, it is necessary to apply the Hausman test. The results of this test are listed in Table 4. In applying the Hausman test to determine the most appropriate panel regression model for our analysis, there are two hypotheses: null (H_0) and alternative (H_1). Under the null hypothesis, the random effect model is the most appropriate model, whereas, under the alternative hypothesis, the fixed effect model should be chosen. The results in Table 4 show sufficient evidence to reject the null hypothesis (p-value = 0.00) and accept the alternative hypothesis. Therefore, the best-fitting model is the fixed effect panel regression and we need to apply this model.

The point to be made here is that to apply the Hausman test in EViews 12, it is necessary to run the random effect panel regression first.

The results obtained from the Hausman test provide us with a reason to apply the following four regression models to the panel data: simple panel regression, fixed-effect panel regression by establishment, fixed-effect panel regression by period (year), and fixed-effect panel regression by establishment and year in parallel. Based on the obtained values of the coefficient of determination (R-squared) for each regression model, the panel regression model with fixed effect by enterprises and by years simultaneously was selected as the most appropriate and generated the best results, taking into account the highest value of the coefficient recorded in this model. In addition, 70% of the variation in stock prices is due to variations in the accounting variables SPS, EPS, DPS, CFS, and BVS.

Table 5 presents the results of running the fixed-effects panel regression by firm and year. First, differences in variables were included in the model. Considering the results obtained and the fact that stock prices reflect accounting information with some lag in the Bulgarian capital market, the regression model applied to the panel data can be represented by the following equation (in the equation, the statistically significant coefficients for each variable are marked in bold):

$$D(SP) = 0.234853244659 + 0.0350576514995*D(SPS) + \mathbf{1.16794936232}*D(EPS) - \mathbf{6.32087943237}*D(DPS) - 0.278332716067*D(CFS) + \mathbf{0.99181942033}*D(BVS) + [CX=F, PER=F] \quad (7)$$

Analyzing the results obtained for the coefficient of sales per share (SPS), it can be concluded that this accounting variable is statistically insignificant at the 5% significance level. These results give us reason to argue that the amount of sales revenue does not affect stock prices. These results corroborate those obtained by other researchers (Sharma, 2011; Ogiriki et al., 2022).

However, the coefficient of earnings per share (EPS) is statistically significant at the 5% level of significance. This coefficient has a positive sign in the regression equation, which is expected. This implies that high EPS values are directly related to stock prices; that is, the higher the earnings per share, the higher the stock price. The empirical results provide us with sufficient evidence to argue that EPS can explain the stock price dynamics of analyzed public companies. Other researchers have also demonstrated a positive and statistically significant relationship between earnings per share and stock prices (Kwon, 2009; Khanna,

2014; Shehzad & Ismail, 2014). Here, it is necessary to clarify that if the earnings per share increases by one point, this will lead to an increase in the share price by 1.167949 points.

Table 5. Fixed effect panel regression results by firm and by year simultaneously

Dependent Variable: D(SP)
Method: Panel Least Squares
Date: 11/09/22 Time: 22:45
Sample (adjusted): 2017 2021
Periods included: 5
Cross-sections included: 20
Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.234853	0.456961	0.513946	0.6089
D(SPS)	0.035058	0.119363	0.293707	0.7698
D(EPS)	**1.167949**	0.515570	2.265353	**0.0265**
D(DPS)	**-6.320879**	1.290136	-4.899389	**0.0000**
D(CFS)	-0.278333	0.274515	-1.013909	0.3141
D(BVS)	**0.991819**	0.435811	2.275803	**0.0259**

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

Root MSE	3.755297	R-squared	0.697181
Mean dependent var	0.114830	Adjusted R-squared	0.577759
S.D. dependent var	6.858590	S.E. of regression	4.456717
Akaike info criterion	6.064212	Sum squared resid	1410.225
Schwarz criterion	6.819711	Log likelihood	-274.2106
Hannan-Quinn criter.	6.369976	F-statistic	5.837972
Durbin-Watson stat	1.359802	Prob(F-statistic)	0.000000

Source: Authors' calculations

The coefficient of dividend per share (DPS) is statistically significant and negative in the applied model at the 5% significance level. Therefore, the financial accounting variable DPS has an impact on stock prices, and this accounting information is value-relevant. Dividend per share has a negative impact on stock prices, suggesting that high values of DPS are inversely related to stock prices (i.e., an increase in the dividend amount will lead to a decrease in the stock price). The sign of this coefficient does not match its expected sign, which is positive. These results are consistent with the results of several research papers (Srinivasan, 2012; Malhotra & Tandon, 2013; Neupane, 2020). A highly negative value of the DPS coefficient is registered in the regression equation, which means that if the value of dividend per share increases by 1 point, the stock price will decrease by 6.320879 points.

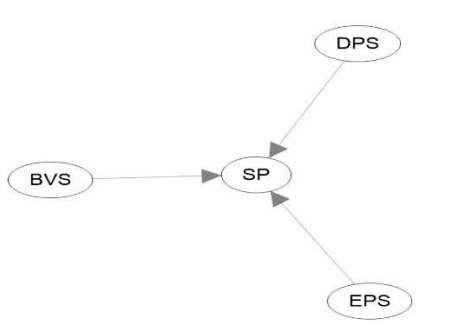
In the regression model, the coefficient of net cash flow per share (CFS) is statistically insignificant at a significance level of 0.05.

A statistically significant value of the coefficient of book value per share (BVS) is recorded in the panel fixed effect regression by a firm and by year simultaneously. These results indicate that book value per share is an important accounting variable for stock price determination in combination with the other accounting variables included in the model.

Therefore, book value per share has an impact on stock price dynamics. These results confirm those obtained by other researchers (Malhotra & Tandon, 2013; Almumani, 2014; Warrad, 2017). In the regression equation, the sign in front of the coefficient is positive, and if BVS increases by one point, SP will increase by 0.991819 points. This sign matches the expected one. Here, we can summarize that the book value of a stock has an impact on stock prices.

The relationships between the statistically significant explanatory variables and the dependent variable SP, based on the applied methodology, are shown in Figure 3.

Figure 3. Dependency graph



Source: Authors' calculations.

Finally, individual fixed effects tests are applied to the panel fixed effects regression by firm and year simultaneously. The results of these tests are summarized in Table 6. When analyzing the obtained positive and negative values of the individual effects, we proceed from the statements that the higher and more positive the value, the greater the impact exerted on the dependent variable (stock price); accordingly, at lower recorded negative values, the impact exerted is weaker (Kopnova, Rosental, 2010; Nenova, 2020).

The results for the fixed individual effect by companies report only five positive values of the individual effects: Tchaikapharma High-Quality Medicines AD-Sofia (1.409282), Speedy AD-Sofia (19.38583), Agria Group Holding AD-Varna (0.450675), Korado-Bulgaria AD-Strazhitsa (0.077743), and Balkan and Sea Properties Reit-Varna (0.006691). These results indicate that the accounting variables calculated for these firms have the strongest impact on stock prices. In addition, accounting information from the financial statements of Speedy AD-Sofia has the largest impact on stock price dynamics.

The results for the fixed individual effect by year show that accounting variables calculated for 2017 (-1.997396) and 2018 (-1.635895) have the weakest impact on share prices, whereas accounting information from 2020 (2.721583) has the strongest impact. This can be explained by the beginning of the year 2020. The coronavirus pandemic has created uncertainty and risk for some of the sectors in which some of the companies surveyed operate.

The results obtained from the tests conducted show that the accounting variables of only 25% of the companies (i.e., 5 out of 20 companies analyzed) have a significant impact on the share price, while in the case of years, the percentage is 67% (4 out of 6 years); that is, accounting

data for four years have a significant impact on the share price. For this reason, a Granger causality test with a period of 4 years is applied (Table 7).

Table 6. Results from tests for individual fixed effects

Company	Years	Fixed effect by company and by year	
		By company	By year
TCHAIKAPHARMA HIGH QUALITY MEDICINES AD-SOFIA	2016	1.409282	0.384788
SOPHARMA AD-SOFIA	2017	-0.225863	-1.997396
NEOCHIM AD-DIMITROVGRAD	2018	-6.207179	-1.635895
SIRMA GROUP HOLDING AD-SOFIA	2019	-0.391482	0.526920
SPEEDY AD-SOFIA	2020	19.38583	2.721583
MONBAT AD-SOFIA	2021	-1.011367	0.384788
VELGRAF ASSET MANAGEMENT AD-SOFIA		-0.214065	
SOPHARMA TRADING AD-SOFIA		-0.935391	
AGRIA GROUP HOLDING AD-VARNA		0.450675	
ALBENA AD-ALBENA		-7.009707	
KORADO BULGARIA AD-STRAZHITSA		0.077743	
OIL AND GAS EXPLORATION AND PRODUCTION AD-SOFIA		-1.439949	
ALCOMET AD-SHUMEN		-1.786015	
TRACE GROUP HOLD AD-SOFIA		-0.602262	
EMKA AD-SEVLIEVO		-0.137655	
ZARNENI HRANI BULGARIA AD-SOFIA		-0.280697	
GALATA INVESTMENT COMPANY AD-VARNA		-0.119140	
BALKAN AND SEA PROPERTIES REIT-VARNA		0.006691	
HIMSNAB BULGARIA AD-SOFIA		-0.754767	
PETROL AD		-0.214684	

Source: Authors' calculations.

From the results reported in Table 7, we find that for four years, we observed a Granger causal relationship between the variables under study and companies' stock prices. The observed interdependence was bidirectional.

Table 7. Granger Causality Test Results for a time period of 4 lags

Sample: 2016 2021			
Lags: 4			
Null Hypothesis:	Obs	F-Statistic	Prob.
DPS does not Granger Cause SP	40	81.6943	5.E-16
SP does not Granger Cause DPS		29.8638	3.E-10
EPS does not Granger Cause SP	40	17.6107	1.E-07
SP does not Granger Cause EPS		30.9363	2.E-10
BVS does not Granger Cause SP	40	12.7798	3.E-06
SP does not Granger Cause BVS		31.8764	1.E-10
CFS does not Granger Cause SP	40	15.8262	4.E-07
SP does not Granger Cause CFS		3.43555	0.0195
SPS does not Granger Cause SP	40	30.0789	3.E-10
SP does not Granger Cause SPS		42.4825	4.E-12

Source: Authors' calculations.

6. Conclusion

The value relevance can be defined as the ability of the accounting information contained in the financial statements to measure and summarize the value of the enterprise. The relevance of accounting information describes how investors react to the disclosure of accounting information. This reaction demonstrates the significance of accounting information in the investment decision-making process, highlighting its usefulness for investors (Scott, 2015).

The results of the empirical analysis indicate that the earnings per share, dividend per share, and book value per share of non-financial public companies traded on the Bulgarian Stock Exchange have influenced the prices of their shares between 2016 and 2021. This study confirms that these accounting indicators would be useful for investors and analysts to analyze and evaluate the shares of companies from various sectors, enabling them to make informed economic decisions. The results of the study show that accounting information has value for investors, but it varies significantly over time and among different companies. These results provide evidence to support the argument that the accounting and financial indicators “earnings per share (EPS)”, “dividend per share (DPS)”, and “book value per share (BVS)” are characterized with value relevance and have an impact on share prices in the Bulgarian capital market. On the other hand, the accounting indicators "revenues from share sales" and "net cash flows per share" do not have a statistically significant impact on share prices. These accounting variables are not considered value-relevant. This may be due to several main factors: the development of accounting legislation and regulations, audit and control mechanisms, changes in the business climate, the business cycle, economic development, and industry structure. These factors have a significant influence on the extent and changes in the value relevance of accounting information. A moderate positive correlation between stock price and other accounting variables is revealed and by the applied Granger causality test we prove that this relationship is bidirectional. We prove that firms with strong earnings per share will enjoy upward pressure on share prices.

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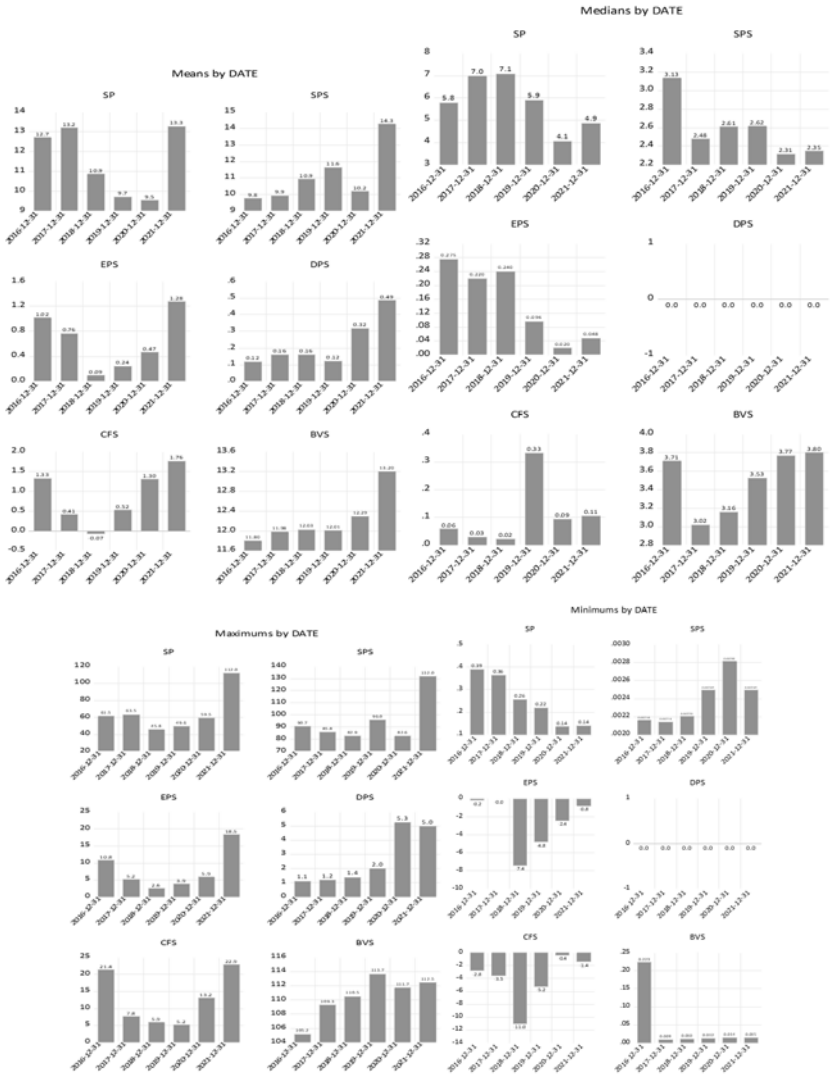
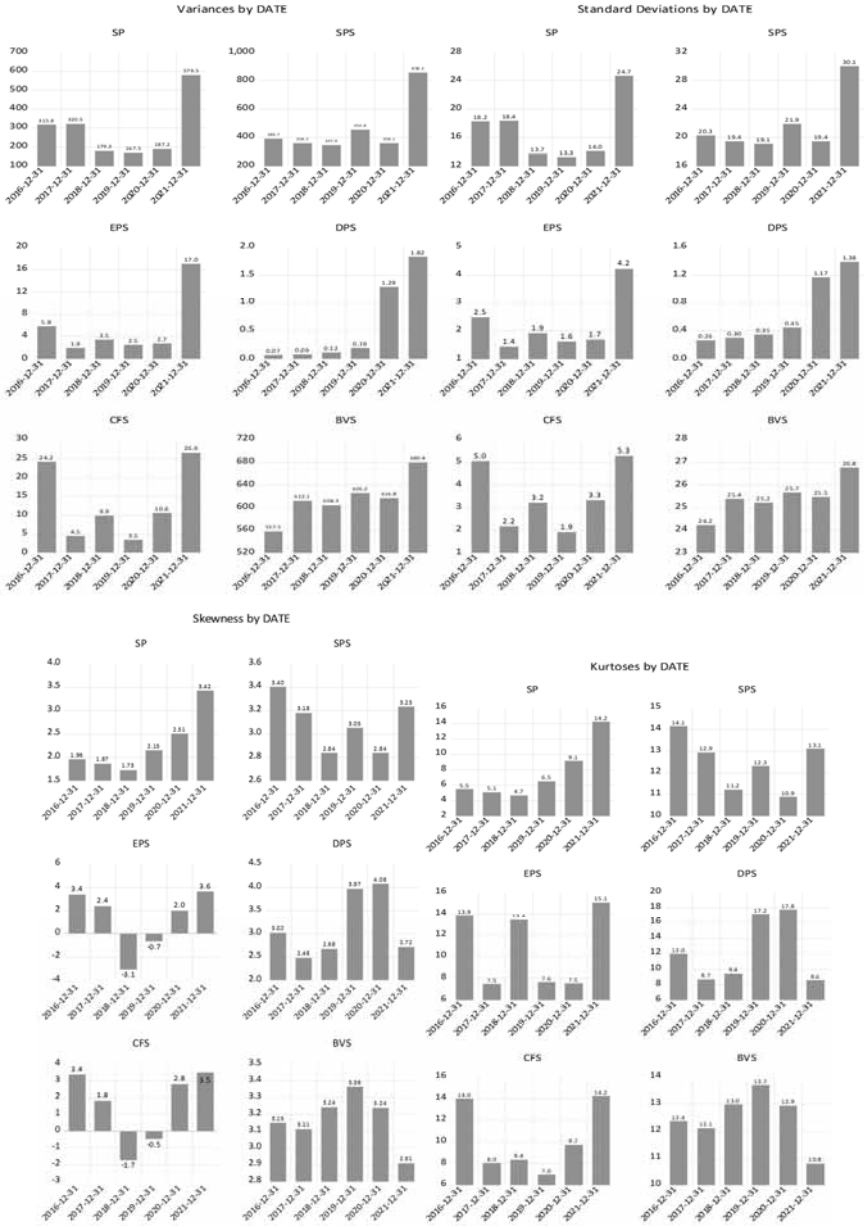
Appendix 1. Graphic presentation of the results of the descriptive statistics




Variances by DATE
Standard Deviations by DATE
SP
SPS
EPS
DPS
CFS
BVS
Skewness by DATE
Kurtoses by DATE