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DETERMINANTS OF UKRAINIAN AGRO-INDUSTRIAL COMPANIES' STOCK PRICE MOVEMENTS

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Abstract. *Economic activity in the sphere of agriculture generated from 7.5% to 12.4% of Ukrainian GDP during 2010–2020. The financial health and stability of system-forming agro-industrial companies strongly influence socio-economic outcomes at the current stage of Ukrainian development. The market capitalization of agro-industrial enterprises, as well as the evolution of their stock prices, reflects the efficiency of economic activity and management decisions. The constant evaluation of Ukrainian agro-industrial companies' stock price movements, along with the determinants that cause their change, allows a clear understanding to be obtained for strategic management of the current market position of the company as well as when forming a vision for the next steps of development. Consequently, the aim of this article is to review the evolution of the largest Ukrainian agro-industrial companies' stock prices, to empirically evaluate the interconnection of selected determinants with stock price changes, and to formulate conclusions based on the analysis conducted. To achieve the research aims, statistical methods such as correlation and multiple regression analysis were used, as well as comparative economic analysis.*

Based on the study results, it is possible to conclude that during 2010–2020 the stock prices of selected agro-industrial companies had uneven paths of evolution, but there was an overall downward shift in 2014 during the economic crisis in Ukraine. With selected multiple regression independent variables, it is possible to explain more than 70% of stock price variation and to closely capture the general trend of 2010–2020 stock price movements. The study results can be used by the management of agro-industrial companies to make data-based strategic decisions.

Keywords: *capital, market capitalization, stock prices, share capital, financial resources.*

JEL Code: G12, Q13, Q14

Introduction

The agriculture sector is one of the most important parts of the modern Ukrainian economy. Economic activity in sphere of agriculture generated from 7.5% to 12.4% of GDP during 2010–2020, and at the current stage this sector is one of the most important for the national economy. Considering the continuous development of the Ukrainian economy based on market principles and taking into account the globalization of trade, it is important to have sustainably growing domestic agro-industrial companies with competitive products in internal as well as external markets. The largest agro-industrial companies in Ukraine have public status. Their public company statuses and IPOs have already allowed them to raise long-term resources and increase their equity, and have had a positive reputational effect due to the transparency in their actions and the availability of financial information. Market capitalization and stock prices are indicators that reflect the financial health of the enterprise, and their sustainable growth can allow them to raise additional equity or debt financing at lower cost, as well as having more benefits for shareholders.

The concept of companies' valuation and its connection with stock prices has been described in the scientific works of Collins (1957), King (1966), Rappaport (1987), Chen, Roll, and Ross (1986), and others. The writings of these authors contain the fundamental basis of these scientific subjects, the estimation of determinants affecting stock prices and the developed methodology of the impact of its valuation, and theoretical and practical aspects of the dependencies of stock price on financial performance. Collins (1957) considered net profit, dividend, and book value as factors affecting the stock prices of American banks, while Chen, Roll, and Ross (1986) evaluated the effect of industrial production, inflation, risk premium, market index, consumption, and oil prices on stock returns. Further development of research on stock price impactors and empirical evidence for specific countries was provided in the works of Gill, Biger, and Mathur (2012), who considered, among others, earnings per share, book value, and dividend coverage as stock price determinants for American firms. Narayan and Narayan (2010) tested the relationship of oil prices and the exchange rate with the stock price movements of Vietnamese companies, while Sharma (2011) examined earning per share, book value per share, price earnings ratio, dividend per share, dividend payout, dividend yield, size in terms of sale, and net worth as predictor variables for stock price movements. Yee and Thaker (2018) estimated earnings per share and dividend per share as being significantly related to Malaysian manufacturing companies' stock prices.

Different aspects of Ukrainian agro-industrial companies' financial stability, performance and competitiveness were considered in the scientific works of Davydenko (2015), Ilchuk et al. (2019), Dibrova et al. (2020), and others. The writings of these authors contain the basis for research into the Ukrainian agro-industrial sector.

There is no consensus on the scope of determinants that fully reflect stock price movements, and such a consensus could not exist as informational and political factors as well as emotional aspects of traders, their personal goals, and strategy are hard to measure with figures. However, according to previous studies it is possible to explain general trends and correlations between stock price movements and certain determinants which are relevant for a specific market, industry, or company.

This research is based on three Ukrainian agro-industrial producers with different produc-

tion specializations and market capitalization, as stated in Table 1.

Table 1. *Information about the companies in this study*

Company	Stock exchange	Stock-exchange ticker	Market capitalization as of beginning of 2022, USD	Production specialization
Astarta	Warsaw Stock Exchange	AST	~ 250 million	Agriculture and sugar
Kernel	Warsaw Stock Exchange	KER	~ 1,100 million	Agriculture and sunflower oil
MHP	London Stock Exchange	MHPC	~ 700 million	Agriculture and poultry

For this study it was decided to select four factors: book value per share; trailing 12-month earnings per share; exchange rate; and the commodity price that is relevant for company operations. The main research objective is to answer the question of if it is possible to explain the stock price movement of Ukrainian agricultural producers using a multi-regression model with selected factors, and to which degree the factors correlate with stock price changes.

This paper is organized in the form of case study with the following objectives:

- to analyze the movements dynamics of selected Ukrainian agro-industrial companies' stock prices during 2010–2020;
- to select financial performance and macroeconomic variables in order to create an econometric model aimed at explaining the stock price movements of selected Ukrainian agro-industrial companies;
- to present, examine, and evaluate the results of the created models;
- to provide conclusions and proposals based on the obtained results.

Information sources for the case study were: quarterly and annual financial statements of selected Ukrainian agro-industrial companies; State Service of Statistics data; Federal Reserve Economic Data; data on historical share prices from Stock exchange websites; and scientific articles from international publications.

The achievement of the research objectives was based on the creation of models to evaluate the impact of selected determinants on stock price movements by applying correlation analysis, the multiple regression technique, and a comparative economic analysis.

Consequently, the aims of this research are: to review the evolution of the stock prices of the largest Ukrainian agro-industrial companies; to empirically evaluate the interconnection of selected determinants with stock price changes; and to formulate conclusions based on conducted analysis.

Literature review

Many researchers have attempted to empirically explain and predict price movements in stock markets using various research methods with different sets of determinants and factors.

Chen, Roll, and Ross (1986) used a time series of industrial production, inflation, con-

sumption, risk premium, and oil prices as factors to explain stock returns. As a result, it was found that industrial production, changes in risk premium, and inflation are significant in explaining stock returns.

Ma and Kao (1990) analyzed the impact of exchange rate change on stock price movements. It was concluded that stock prices generally benefit from domestic currency appreciation.

Abdullah and Hayworth (1993) used VAR model to analyze price fluctuations on stock market. They discovered that such factors as budget deficits, long-term interest rates and money growth are causal factors of stock price movements.

Bilson, Brailsford, and Hooper (2000) investigated the impact of macroeconomic variables to explain equity returns in 20 emerging stock markets. Such variables as value-weighted world market index, money supply, goods price, real activity, and exchange rate were used within a multifactor model. Some evidence was found that the mentioned variables were significant with emerging market stock returns; however, the degree of significance of each factor varied from country to country. In terms of degree of significance, exchange rate was considered the most common factor for selected emerging markets.

Chan and Hameed (2006) estimated if earnings forecast from analysts affect stock prices in emerging markets. According to their research, firms' earnings forecasts in markets with wide analyst coverage significantly affect stock price movements.

Chen and Zhang (2007) provided empirical evidence that stock price movements are related to movements in profitability, capital investment, growth opportunities, discount rate and earnings yield.

Ghosh et al. (2010) analyzed, with multiple regression, the interconnection between share price changes on the Bombay Stock Exchange in India and a set of factors: exchange rate, oil price, gold price, call money rate, cash reserve ratio, and foreign direct investment. According to their research, exchange rate and call money rate are the factors that have the most significant impact on stock price changes, while other factors have insufficient influence.

Benaković and Posedel (2010) investigated the relationship between macroeconomic factors and stock return in the Croatian market. They used a multiple regression model with 5 macroeconomic determinants: inflation, interest rate, market index, industrial production, and oil prices. As a result of their analysis, it was concluded that the market index of the Zagreb stock exchange was the common, statistically significant factor for all 14 selected Croatian companies. Inflation and interest rate were also statistically significant for 6 and 7 companies, respectively, while other factors were considered statistically non-significant.

Sharma (2011) empirically evaluated the relationship between stock prices and company performance indicators such as: earning per share, book value per share, price earnings ratio, dividend per share, dividend payout, dividend yield, size in terms of sale, and net worth for 1993/94–2008/09. As a result of their research, it was found that earning per share, book value per share, and dividend per share have a significant influence on stock price movements.

Gill, Biger, and Mathur (2012) also used multiple regression to analyze the interconnection between the share prices of American firms and selected explanatory variables: book value per share, earnings per share, dividend coverage ratio, dividend per share, dividend payout ratio, price-earnings ratio, firm size, CEO duality, internationality, and firm industry. They established that earnings per share, price-earnings ratio, book value per share, dividend per share, interna-

tionality of the firm, and CEO duality have an impact on the equity share prices of American firms.

Rajhans (2013) used multiple regression to identify factors affecting the stock prices of Indian firms. It was concluded that profit, fixed assets, net sales, and WACC have a significant impact on firms' market capitalization.

Avdalovic and Milenković (2017) performed research with data from 2010–2014 using a multiple regression model with stock price as a dependent variable, and selected independent variables such as: total assets of the company, return on equity, return on assets, earnings per share, book value, leverage, price-earnings ratio, and price to book ratio. They concluded that in the observed model, assets, return on assets, earnings per share, book value, price-to-book ratio, and leverage were considered to be statistically significant predictors of stock price movements.

Yee and Thaker (2018) investigated the stock price movements of 30 companies from the manufacturing industry in Malaysia. They used separate multiple regression models with firm-specific variables and macroeconomic variables as predictors. In the firm-specific model, the following were included: earnings per share, dividend per share, and return on equity as independent variables; in the macroeconomic model – interest rate, exchange rate, money supply, and GDP. As a result, it was concluded that all firm-specific determinants have a significant impact on stock prices, while macroeconomic indicators were considered insignificant in their research.

Considering the research results of the reviewed literature, it can be concluded that there is no consensus in the set of determinants that can universally explain the stock price movements of any company; however, many empirical findings were obtained relating to firm-specific and macroeconomic factors that influence stock prices.

For this paper it was decided to use a combination of firm-specific (book value per share, earnings per share, and firm-specific commodity price) and macroeconomic (exchange rate) factors to evaluate their influence on the stock price movements of selected Ukrainian agricultural companies.

Methodology

In the case study, a multiple-regression model was used to evaluate the impact of a selected series of indicators that affect share price: book value per share, trailing 12-month earnings per share, exchange rate, and main company operations' commodity price. Multiple regression can establish the level of significance and the relative predictive importance of independent variables (R^2). Due to the small data sample, the statistical significance of the variables is considered at $p < 0.2$.

Considering the fact that the publication of financial reports has a delayed impact on share price (Callen et al., 2013), it was decided to derive weighted average stock price from the series over the quarter after the reporting period. All other series of variables for the multiple-regression model represent companies' quarterly reporting periods. The time series is 1 quarter.

The following equation represents the model that was used in the case study research:

The definitions of selected variables and the data sources from which they were collected are stated in the Table 2.

Table 2. *Definitions of variables*

Variable	Abbreviated variable	Definition	Data sources
Basic Series			
Stock price	SP	Daily stock price during the quarter after reporting period, translated to USD	Warsaw Stock Exchange – *gpw.pl*
Volume	VOL	Daily stock trade volumes during the quarter after the reporting period	Yahoo! Finance – *finance.yahoo.com*
Book value	BV	Equity available to common shareholders	Financial reports from official websites: *astartaholding.com* *kernel.ua* *mhp.com.ua*
Net profit	NP	Net profit over the reporting period (quarter)	
Average shares outstanding	ASO	The average number of current shares in the company's stock outstanding over the reporting period	
Exchange rate	ER	Time series of USD/UAH exchange rate	Yahoo! Finance – *finance.yahoo.com*
Main company operations' commodity price	MCOCP	Time series of main company operations' commodity price	Federal Reserve Economic Data: *fred.stlouisfed.org/series*
Derived Series			
Daily average stock price	DASP	A figure that represents the daily average price of a stock	
Weighted average stock price	WASP	A figure that represents the average price of a stock, adjusted for its trade volume	
Book value per share	BVPS	A figure that represents the value of a company's equity on a per-share basis	
Trailing 12-month earnings per share	EPS (TTM)	A figure that represents the total earnings of a company over the last 4 quarters on a per-share basis	

Alongside multiple regression, correlation analysis was performed. With correlation analysis, it is possible to examine the strength of the linear relationship between variables and establish their interrelation. The theoretical correlation impacts of the determinants on stock price movements are summarized in Table 3, based on previous research.

Table 3. *Summary of expected signs of each determinant*

Determinant	Author	Country or market	Expected impact on stock price*
Book value per share	Sharma (2011)	India	+
	Gill, Biger & Mathur (2012)	USA	+
	Srinivasan (2012)	India	+
	Tandon & Malhotra (2013)	India	+
	Avdalovic & Milenković (2017)	Serbia	+
Earnings per share	Patell (1976)	USA	+
	Sharma (2011)	India	+
	Gill, Biger & Mathur (2012)	USA	+
	Srinivasan (2012)	India	+
	Tandon & Malhotra (2013)	India	+
	Enow & Brijlal (2016)	South Africa	+
Earnings per share (continued)	Avdalovic & Milenković (2017)	Serbia	+
	Yee & Thaker (2018)	Malaysia	+
Exchange rate	Bilson, Brailsford & Hooper (2000)	Emerging markets	-
	Ghosh et al. (2010)	India	-
	Yee & Thaker (2018)	Malaysia	+
Main company operations' commodity price	---	---	+

**"+" means increase of stock price with determinant value increase, "-" means decrease of stock price with determinant value increase.*

According to previous research, selected determinants such as book value per share and earnings per share should have a positive effect on share prices, and exchange rate in general should have negative effect, however in one research paper a slight positive effect was observed. In theory, main company operations' commodity price should have a positive effect on share prices, which is connected to expectations on the increase of future earnings.

Results

Astarta company held an IPO and started listing shares on the Warsaw Stock Exchange in 2006; as of the beginning of 2022, the company's market capitalization was around 250 million USD. The data in Figure 1 gives a summary of the stock price movements of Astarta by quarter during 2010–2020.

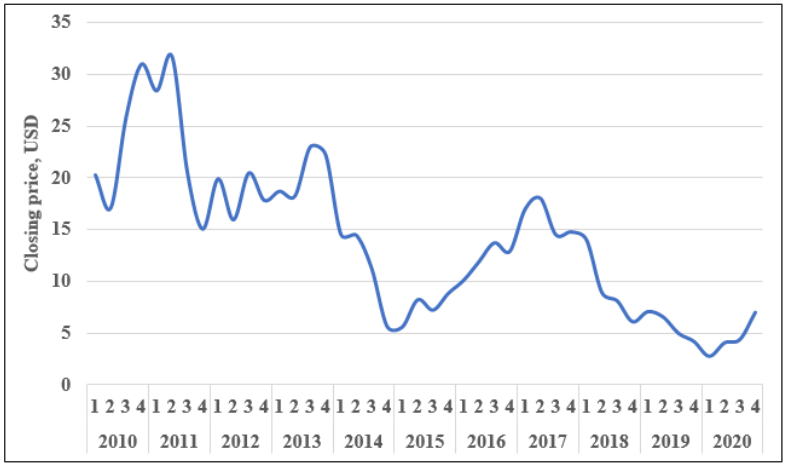

Figure 1. The dynamics of Astarta's stock price movements during 2010–2020.
Source: author's calculations based on data from Yahoo Finance website.

During 2010–2020, the stock prices of Astarta experienced several major shifts and an overall unequal evolution. The highest price during the period was observed in 2011 Q2: 31.72 USD, which was 55.5% higher than in 2010 Q1. This was mostly due to favorable commodity prices and a stable UAH exchange rate, alongside good profitability. The Ukrainian hryvnia devalued from 8.24 USD/UAH in 2013 Q4 to 15.82 USD/UAH in 2014 Q4, and continued to decline in 2015, ending 2015 Q4 at 24.03 USD/UAH, which was the main influence of the downward trend in stock price changes in 2014–2015.

Table 4. *Correlation analysis for Astarta*

	WASP
BVPS	–0.07
TTM EPS	0.78
ER	–0.72
MCOCP: Sugar	0.82

Source: author's calculations using MS Excel based on aggregated data.

Correlation analysis for Astarta shows a strong positive relation between stock prices and such determinants as earnings per share and prices of sugar, but there is also a strong negative impact of exchange rate on stock prices. Book value per share demonstrated a minor negative relation with stock prices during 2010–2020.

Table 5. *Outcomes of the specified multiple regression model for Astarta*

	Intercept	**BVPS, USD**	**TTM EPS, USD**	**ER, USD/ UAH**	**MCOCP: US Cents per pound – Sugar**
Coefficients	17.915	–0.136	1.663	–0.363	0.135
Standard error	5.320	0.125	0.293	0.081	0.212
***t*-stat**	3.368	–1.087	5.686	–4.496	0.638
***p*-value**	0.002	0.284	0.000	0.000	0.527
***R*-square**	0.84				
Dependent variable	Weighted Average Stock Price of the quarter after reporting period				

Source: author's calculations using MS Excel based on aggregated data.

The model for Astarta has an R^2 value of 0.84, which indicates that 84% of stock price movements can be explained with the defined independent variables; however, only 2 determinants – TTM earnings per share and exchange rate – were statistically significant, with $p < 0.2$. The intercept of regression indicates that with defined independent variables equal to 0, stock price will have a value of 17.91 USD. The coefficients of independent variables indicate change in the weighted average stock price of the quarter after the reporting period if the variables increase by 1 conditional unit. According to the model, an increase of TTM EPS by 1 USD or of world prices of sugar by 1 US cent per pound causes an increase in stock price of 1.66 USD or 0.13 USD, respectively. An increase of book value per share by 1 USD or of exchange rate by 1 USD/UAH causes a decrease in stock price of 0.14 USD or 0.36 USD, respectively.

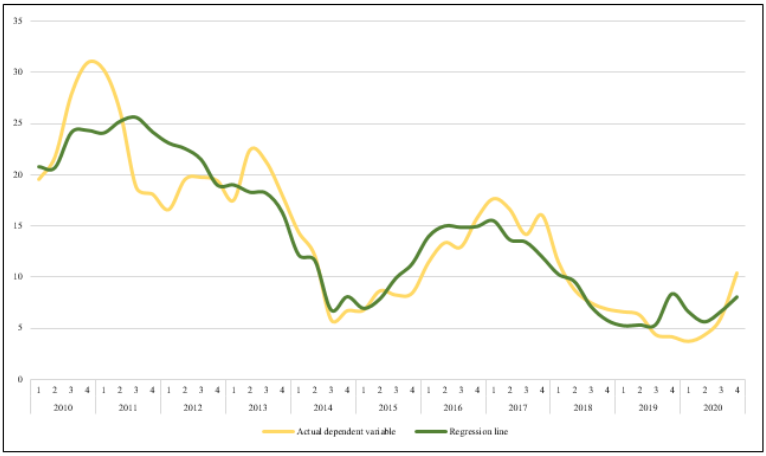

Figure 2. Visual representation of model outcome and actual stock prices of Astarta.
Source: author's calculations using MS Excel based on aggregated data.

The Kernel company held an IPO and started listing shares on the Warsaw Stock Exchange in 2007; as of the beginning of 2022, the company's market capitalization was around 1,177 million USD. The data presented in Figure 3 gives a summary of the stock price movements of Kernel by quarter during 2010–2020.

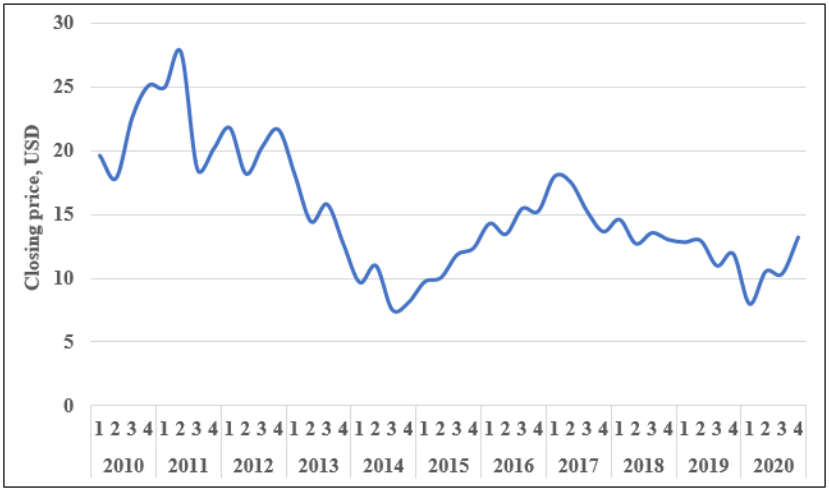

Figure 3. The dynamics of Kernel's stock price movements during 2010–2020.
Source: author's calculations based on data from Investing.com website.

Table 6. *Correlation analysis for Kernel*

	WASP
BVPS	–0.39
TTM EPS	0.57
ER	–0.53
MCOCP: *Sunflower Oil*	0.68

Source: author's calculations using MS Excel based on aggregated data.

Correlation analysis for Kernel shows a positive relation between stock prices and such determinants as earnings per share and prices on sunflower oil; there is also a negative impact of exchange rate on stock prices. Book value per share demonstrated a moderate negative relation with stock prices during 2010–2020.

Table 7. *Outcomes of the specified multiple regression model for Kernel*

	Intercept	**BVPS, USD**	**TTM EPS, USD**	**ER, USD/ UAH**	**MCOCP: USD per ton – Sunflower Oil**
Coefficients	15.507	–0.528	2.274	–0.151	0.005
Standard Error	4.612	0.166	0.500	0.104	0.004
***t* stat**	3.362	–3.182	4.547	–1.458	1.452
P-value	0.002	0.003	0.000	0.153	0.154
R Square	0.74				
Dependent Variable	Weighted Average Stock Price of the quarter after reporting period				

Source: author's calculations using MS Excel based on aggregated data.

The model for Kernel has an R^2 value of 0.74, which indicates that 74% of stock price movements can be explained by the defined independent variables. All determinants – book value per share, TTM earnings per share, exchange rate, and sunflower oil prices – were statistically significant, with $p < 0.2$. The intercept of regression indicates that with the defined independent variables equal to 0, stock price will have value of 15.51 USD. The coefficients of the independent variables indicate a change in the weighted average stock price of the next quarter after the reporting period if the variables increase by 1 conditional unit. According to the model, an increase of TTM earnings per share or of world prices of sunflower oil by 1 USD per kg cause an increase

in stock price of 2.27 USD or 5 USD, respectively. An increase of book value per share by 1 USD or of exchange rate by 1 USD/UAH causes a decrease in stock price of 0.53 USD or 0.15 USD, respectively.

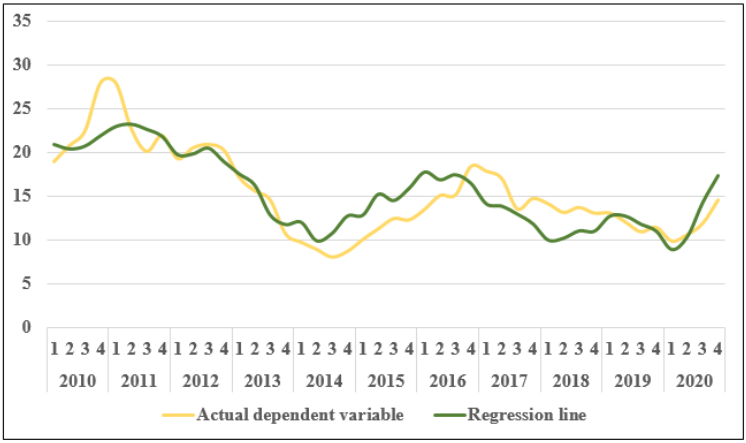

Figure 4. Visual representation of model outcome and actual stock prices of Kernel

Source: author's calculations using MS Excel based on aggregated data.

The MHP company held an IPO and started listing global depositary receipts on the London Stock Exchange in 2008; as of the beginning of 2022, the company's market capitalization was around 700 million USD. The data in Figure 5 gives a summary of the stock price movements of MHP by quarter during 2010–2020.

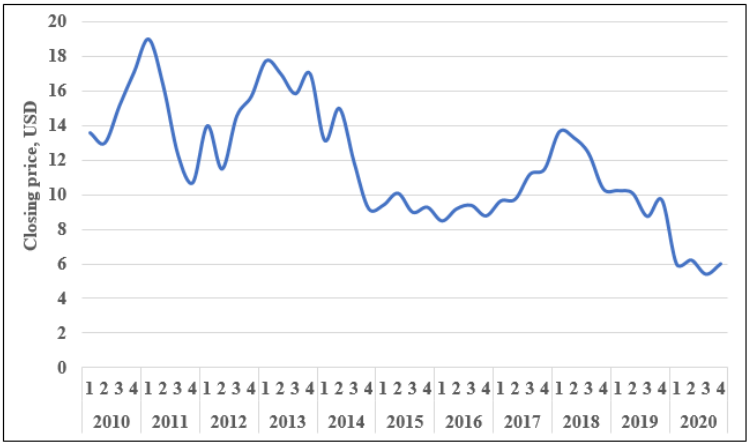

Figure 5. Dynamics of MHP's stock price movements during 2010–2020.

Source: author's calculations based on data from London Stock Exchange website.

Table 8. *Correlation analysis for MHP*

	WASP
BVPS	–0.22
TTM EPS	0.48
ER	–0.76
MCOCP: Poultry	–0.32

Source: author's calculations using MS Excel based on aggregated data.

Correlation analysis for MHP has shown a positive relation between stock prices and earnings per share; also, there is strong negative impact of exchange rate on stock prices. Book value per share and prices of poultry demonstrated moderate negative relations with stock prices during 2010–2020.

Table 9. *Outcomes of the specified multiple regression model for MHP*

	Intercept	**BVPS, USD**	**TTM EPS, USD**	**ER, USD/ UAH**	**MCOCP: US Cents per Pound – Poultry**
Coefficients	12.847	–0.284	0.770	–0.316	0.061
Standard Error	2.175	0.118	0.179	0.046	0.023
***t* stat**	5.908	–2.412	4.301	–6.866	2.674
P-value	0.000	0.021	0.000	0.000	0.011
R Square	0.75				
Dependent Variable	Weighted Average Stock Price of the quarter after reporting period				

Source: author's calculations using MS Excel based on aggregated data.

The model for MHP has an R^2 value of 0.75, which indicates that 75% of stock price movements can be explained with the defined independent variables. All independent variables were statistically significant, with $p < 0.2$. The intercept of regression indicates that with the defined independent variables equal to 0, stock price will have a value of 12.85 USD. The coefficients of independent variables indicate the change in the weighted average stock price of the next quarter after the reporting period if the variables increase by 1 conditional unit. According to the model, an increase of TTM earnings per share or of world prices of poultry by 1 US Cent per pound causes an increase in stock price of 0.77 USD or 0.06 USD, respectively. An increase of book value per share by 1 USD or of exchange rate by 1 USD/UAH causes a decrease in stock price of 0.28 USD or 0.32 USD, respectively.

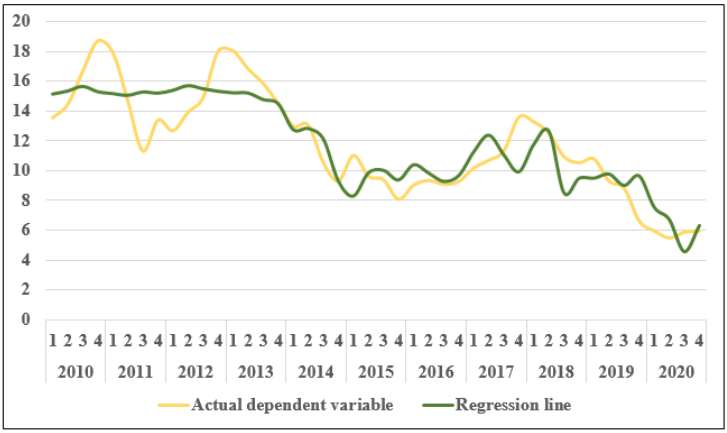

Figure 6. Visual representation of model outcome and actual stock prices of MHP.
Source: author's calculations using MS Excel based on aggregated data.

Table 10 summarizes the outcomes of regression models and correlation analyses. Statistical significance was considered at the level of $p < 0.2$, and the correlation direction indicates the direction of stock price change with the increase of the specific determinant. According to the summary, the profitability of each company reflected through a trailing 12-month earnings per share indicator significantly impacts stock price movements with a positive correlation. Exchange rate also significantly impacts the stock prices of all selected companies, and this correlation is negative. Book value per share impacts stock price movements significantly in 2 of 3 cases, and this correlation is negative. The main company-specific commodity price also impacts stock price movements significantly in 2 of 3 cases, however this correlation direction is inconsistent.

Table 10. *Summary of correlation and regression analysis outcomes*

	Statistical significance				Correlation direction			
	BVPS	TTM EPS	ER	MCOCP	BVPS	TTM EPS	ER	MCOCP
Astarta	N	Y	Y	N	-	+	-	+
Kernel	Y	Y	Y	Y	-	+	-	+
MHP	Y	Y	Y	Y	-	+	-	-

Source: author's aggregation from previous tables.

Conclusion and discussion of the perspectives for future research

The conducted research investigated the impact of selected determinants – book value per share, trailing 12-month earnings per share, company-specific commodity price, and exchange rate – on the stock price movements of the three largest agriculture producers in Ukraine. R^2 values of created and examined multiple regression models indicated that, based on the selected determinants, it is possible to explain between 74% and 84% of the chosen companies' stock price variations during 2010–2020.

The directions of the correlation coefficients of selected determinants, except commodity prices, were consistent. The direction of the correlation between stock prices and book value per share was negative, which is the opposite to the expected result and could be the basis for further investigation considering the political and economic context in Ukraine during 2010–2020.

Determinants that were statistically significant for all companies from the sample were: trailing 12-month earnings per share, which reflects companies' performance and ability to generate profit; and exchange rate, which represents the macroeconomic situation in Ukraine.

Main commodity price, which is the company-specific determinant of stock price movements, demonstrated an uneven level of statistical significance among the sample of companies. Taking into consideration a significance level of $p = 0.2$, the significance levels were met for poultry price for MHP and sunflower oil price for Kernel; however, sugar price was not statistically significant for the stock price movement of Astarta, since $p = 0.527$, which is higher than 0.2.

This research provides some evidence that earnings per share and exchange rate have a significant impact on the stock price movements of selected Ukrainian agro-industrial companies, while book value per share and commodity price impacted stock prices significantly for 2 of the 3 selected firms.

Based on models created within this research it is possible to estimate the trend of the stock price movements of Ukrainian agriculture companies in the short term; however, from 16% to 26% of stock price variation remains unexplained, which is grounds for further research.

Understanding the impact of specific determinants on stock price movement based on historical data can help to allocate resources in the management decision-making process in order to achieve financial performance and capitalization in the short term.

In the context of the impact of exchange rate and earnings per share on share prices, this paper supports the findings of: Bilson, Brailsford, & Hooper (2000); Ghosh et al. (2010); Sharma (2011); Gill, Biger, and Mathur (2012); Enow and Brijlal (2016); Avdalovic and Milenković (2017); and Yee and Thaker (2018).

This study is limited to the sample of Ukrainian agro-industrial companies. The findings of this paper could be relevant only to firms similar to those that were included in this research. Additionally, the determinant of commodity price is based on the main production commodity that is relevant for the operations of each separate firm.

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