ARTICLE

DOES CEO OWNERSHIP IN HIGH-TECH COMPANIES AFFECT CORPORATE FINANCIAL DECISIONS?

Bukalska, E., Czerniak, J., Florek, I.

Elżbieta Bukalska / Maria Curie Skłodowska University in Lublin, Faculty of Economics, Department of Corporate Finance and Accounting, Pl. M. C. Skłodowskiej 5, 20-031 Lublin, Poland. Email: elzbieta.bukalska@mail.umcs.pl (corresponding author)

Jakub Czerniak / Maria Curie Skłodowska University in Lublin, Faculty of Economics, Department of Microeconomics and Applied Economics, Pl. M. C. Skłodowskiej 5, 20-031 Lublin, Poland. Email: jakub.czerniak@mail.umcs.pl

Irmina Florek / Maria Curie Skłodowska University in Lublin, Doctoral School of Social Sciences, ul. Weteranów 18, 20-038 Lublin, Poland. Email: irmina.florek@mail.umcs.pl

Abstract

The role of high-tech companies increases in turbulent times. Additionally, the status of the company (high-tech or non-high-tech) affects financial decisions. Moreover, CEOs with ownership in the company that they work for make specific financial decisions. The paper aims to identify the impact of CEO ownership on financial decisions in high-tech companies. The sample consists of 750 manufacturing firm-year observations from the period 2018-2021. All the companies included in the research are listed on the Warsaw Stock Exchange. Linear mixed-model analysis with individual and interactive effects were implemented. Findings show that high-tech companies managed by CEOs with a stake in a company differ from the rest: they are smaller, have higher cash ratios and have lower debt ratios. However, in high-tech companies, CEOs with a stake in the company affect investment expenditure, debt ratio and cash holdings positively. The originality of this research lies in including the interactive impact of CEO ownership and high-tech companies on financial decisions. The findings might be important for investors who want to invest in high-tech companies with a CEO as an owner.

Implications for Central European audience: The findings might be important for other Central Eastern European countries and listed companies. The findings are important for investors who consider investing in companies managed by a CEO having a stake in the company as CEO ownership might lead to empire-building behaviour or rent extraction. The findings are important for policymakers as the cautious financing policy of high-tech companies (mostly based on equity) might affect the efficiency of public aid. Evidence shows that is important for the theoretical discussion on financial decisions and CEO ownership in a specific type of companies (high-tech companies).

Keywords: CEO ownership; high-tech companies; pecking order theory
JEL Classification: G32, G35, L25

Introduction

The practice of corporate finance consists of several decisions in dynamic dimensions: investment, working capital, dividend and financing (debt and equity) and in static dimensions: target debt level and cash holdings. Two main theories attempt to explain corporate financial decisions: the agency theory of free cash flow and the pecking order theory. However, existing research shows inconsistent results and does not indicate which one of these theories is sufficient to explain financial decisions of companies, especially those operating in high-tech branches.

The role of the high-tech sector is significant for every economy. This sector produces approximately from 30% to almost 50% of Poland's domestic product (Grodzicki, 2014). High-tech companies are subject to high uncertainty of capital investment results, and thus, investors are exposed to high risk. In describing high-tech companies, Liang (2011) and Cowling et al. (2021) selected the following characteristics: strong uncertainty about whether new products will be accepted on the market, high value of human capital and innovative potential. It is believed that these specificities of high-tech companies create specific conditions that the CEO should consider when making financial decisions.

Moreover several recent events have created high social-economic-political turbulences: the COVID-19 crisis, Russian aggression in Ukraine and climate change. This makes a good environment for Schumpeterian creative destruction and the base to move from the fifth to the sixth Kondratiev wave of changes (Wilenius, 2014; Archibugi & Mariella, 2021). This might increase the significance of high-tech companies (being a vehicle for innovation) for the economy. Additionally, Poland is in a specific geo-political position (close to Baltic countries, Belarus and Ukraine and on the railroad from China via Belarus to Europe), which again might increase the significance of high-tech companies in Poland (Rodionova, 2021; Karpińska, 2021; Kliuchnikava, 2022). Sound financial decisions are of great importance for high-tech companies' existence and development, especially in turbulent times. However, existing findings yield no consistent evidence of corporate finance decisions in high-tech companies (e.g., on debt level – Neville & Lucey, 2022; Khalifa et al., 2022; or on investment – Yang et al., 2022; Gavious et al., 2016).

Due to the fact that, on an everyday basis, companies are run by CEOs, the paper focuses on their role, especially on their ownership in the company that they manage. The role of the CEO depends mostly on corporate governance systems. CEOs in the United States (one-tier system) make all the decisions (or have exclusive power to initiate them), while in Europe (two-tier system), CEOs have more constraints on their actions and shareholders have the final say on a larger number of issues. Thus, it seems that the influence of the CEO is likely to be more distinct when the role of the CEO and ownership are combined.

CEO ownership is a subject of much research. On the one hand, CEO ownership aligns the ownership interest with CEOs and diminishes agency problems and costs. CEO ownership might be perceived by other investors as a positive signal for business success as the shares are held by a person with superior information on the company. However, the CEOs' ownership creates a specific situation (where CEOs' labour and capital are involved in the same company) that affects their corporate financial decisions. However, the existing

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

research findings on impact of CEO ownership on corporate financial decisions are inconclusive, let alone the high-tech company specificity.

All the above considerations provide a good starting point for investigating the impact of CEO ownership on financial decisions in high-tech companies. The main assumption of this research is that in high-tech companies, CEOs having a stake in the company's capital have a significant impact on financial decisions.

The study covers the period 2018–2021. The research period includes years of prosperity (2018–2019) and years of crisis (2020–2021). The data of 197 manufacturing companies listed on the Warsaw Stock Exchange were collected. A sample of 750 firm-year observations was developed. Linear mixed-model analysis with individual and interactive effects to verify the hypotheses is employed.

The originality of this research lies in combining the high-tech status of the company with CEO ownership and financial decisions. This contributes to existing research in several ways. Firstly, the paper tries to add to the discussion on corporate financial decisions against existing theories (agency costs of free cash flow and pecking order theory). Moreover, within the agency theory, several tools for mitigating agency problems have been developed (e.g., dividends, debt, CEO ownership). Our study provides evidence of the implementation of these tools by high-tech companies managed by CEOs with a stake in the company. As for the pecking order theory, the paper provides evidence on which external capital is raised to a greater extent – debt or equity. This explains whether the classical or modified version of the pecking order theory explains better financial decisions.

Secondly, the paper adds to the debate on the role of CEOs and the impact of their ownership on financial management. This is especially important due to the previous findings on CEOs' empire-building, combining the interests of owners and CEOs, rent extraction and private benefits of control. The paper sheds light on whether a CEO having a stake in the company behaves more like a principal or more like an agent.

Thirdly, the paper adds to the discussion on high-tech companies, whose functioning is quite important for the economy due to their higher innovation potential in an uncertain environment. The findings provide a specific picture of high-tech companies and their financial decisions, especially when the high-tech company is managed by the CEO having a stake in the capital.

The rest of the paper is organized as follows: the next section contains a literature review and development of hypotheses. Section 2 presents the methodology (variables, sample, methods and models) employed in the research. Section 3 presents the findings and discussion with previous research. Finally, conclusions with an indication of some limitations and directions for future research are presented.

1 Literature Review

The practice of corporate finance consists of several decisions in dynamic dimensions: investment, working capital, dividend and financing (debt and equity) and decisions in static dimensions: debt level and cash holdings. Another attitude describes corporate finance as a set of cash outflows (investment expenditures and dividend payments) and cash inflows

(financing) in connection with the target debt ratio and remaining cash pool (Petty et al., 2015; Vernimmen et al., 2022).

Two main theories attempt to explain corporate financial decisions: the agency theory of free cash flow and the pecking order theory. Although they are used quite often to explain capital structure decisions, their assumptions refer to the wider scope of financial decisions.

Agency theory assumes that due to the separation of ownership and management, CEO opportunism can cause hoarding of money and investing it in many projects even with negative net present value (overinvestment). This behaviour is detrimental to stockholders because the rate of return is below what it should be. However, large cash holding and overinvestment allow CEOs to build an empire. To prevent these problems, dividend payments and debt issuance have been proposed as the mechanisms that can mitigate the free cash flow and overinvestment problem. Dividend payouts and obtaining new debt decrease the cash pool remaining in the company, thus diminishing the overinvestment problem. Existing information asymmetry between owners and managers included in the agency theory also leads to signalling behaviour (Bhattacharya, 1979; Miller and Rock, 1985). The role of dividend payout and debt issuance is to release private information to the market (see Flannery, 1986; Ross, 1977). Dividend payout and debt issuance are perceived as positive signals.

The asymmetric information and signalling hypothesis were the basis for the pecking order theory (Myers & Majluf, 1984). Additionally, this theory includes the CEO's reluctance to share private information. That is why there is a specific order for capital management: at the very beginning, companies set the list of investment projects; then the companies use internal funds, then they issue external debt (sending a positive signal about financial standing and good prospects of the company) and finally they issue equity. This theory explains why profitable companies have low debt ratios (due to reliance on internal funds). However, this also implies that companies pay low dividends to gather cash from profits and retain earnings.

The CEO plays a central role in the agency theory and the pecking order theory. The information asymmetry between owners and the CEOs (included in both the agency theory and the pecking order theory) and the CEO's reluctance to share private information (included in the pecking order theory) reflect a key role of CEOs in financial decision making.

The core of the agency theory is the separation of ownership and management and mechanisms that can mitigate the CEOs and make them act in the owners' interest. Another dominant element of the agent-principal relationship in the agency theory is company ownership and tools for mitigating CEOs' opportunistic behaviour. Thus, CEOs who acquire a proportion of company shareholding will be both agents and principal officers, giving them a good reason to influence almost every activity in the organization. That is why CEO ownership is implemented as one of the tools for diminishing agency costs (e.g., Shleifer & Vishny, 1986). CEO ownership is supposed to make managers think as owners. However, existing research shows an inconsistent picture of the CEO as owner.

Coles et al. (2012), Le and Tannous (2016) and Tayachi et al. (2023) found a positive correlation between debt ratio and CEO ownership. However, Farhangdoust et al. (2020) and Taha et al. (2024) found that CEO ownership does not affect debt policy. On the other hand, Munandar (2017) and Qawasmeh and Azzam (2020) found that CEO ownership has a strong negative effect on the debt ratio.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

Akhtar et al. (2021) found that CEOs' ownership and investment decisions are positively correlated. Le and Tannous (2016) found that CEO ownership positively correlates with capex but with no statistical significance. However, Hamidi (2015) found that CEO ownership shows a negative effect on capital expenditure. Adu-Ameyaw et al. (2022) found that managerial ownership is insignificant for investment in fixed intangible assets. Guthrie and Hobbs (2021) found that a CEO with a stake in the company can better time investment decisions.

Rozeff (1982) and Jensen et al. (1992), the first studies on the relationship between CEO ownership and dividend payout, found a negative relation. They proved that higher CEO ownership leads to a decrease in dividend payouts and an increase in internal funds. These internal funds are used to finance investment expenditures. Vo and Nguyen (2014) and Taha et al. (2024) found that CEOs with significant ownership increase their propensity to pay dividends. Florackis et al. (2015) found that dividends increase with the increase of CEO ownership, but this increase is stronger for low-debt firms.

Research conducted by Dittmar et al. (2003) and Thanatawee (2019) shows that CEO ownership has a negative effect on cash holdings. However, Le and Tannous (2016), Talbi and Menchaoui (2023) and Sun et al. (2023) found that CEO ownership and cash holdings are positively correlated with statistical significance. Akhtar et al. (2021) and Akhtar (2022) found both a positive impact of a low level of managerial ownership on cash holdings and a negative impact of a higher level of managerial ownership on cash holdings.

The confirmed (positive or negative but statistically significant) impact of CEO ownership on financial decisions was developed into a managerial entrenchment hypothesis. Entrenched managers are more prone to behave for their own benefit (Thanatawee, 2019) connected with rent extraction and private benefits of control (Fabisik et al., 2021).

The problem with the theories and previous research and their inconsistent findings is that they deal with only one small aspect of financial decisions (e.g., financing or dividends, debt ratio or cash holdings) and do not include specificity of company running. To overcome the shortcomings, we made the assumption of including the whole range of financial decisions (investment, dividend, equity and debt financing, cash and debt ratio) in a specific type of company, namely high-tech.

The specificity of high-tech companies that is important for financial decisions can be described in several points (Cowling et al., 2021): (1) high-tech companies are smaller and younger with lack of economies of scale, and thus face greater constraints when seeking to access capital from external markets; (2) high innovation activities and operating in high-tech sectors, and thus high default probability, especially in times of economic downturn; (3) longer lead time to commercialization restricts the ability of the firm to generate free cash flow to service the principal and interest on a bank loan; (4) higher risks inherent in high-tech given the high uncertainty of innovation and R&D, and thus higher information asymmetry; (5) investors find it difficult to evaluate the profitability of projects due to the high novelty of their products and lack of market history; thus, investors will add an extra risk premium to the expected rate of return; (6) high-tech relies heavily on growth opportunities; their intangible and highly firm-specific assets have little collateral value.

Existing research indicates that investment expenditures (capex) are lower in high-tech companies due to a higher reliance on intellectual capital in these companies (Ortega-Argilés et al., 2015; Gavious et al., 2016). A negative relation between the high-tech specificity of the companies and capex was also found by Khallaf et al. (2024). At the same time, some studies have shown that high-tech companies have higher investment expenditures (Yang et al., 2022). Combining CEO ownership and the high-tech specificity of the companies with a lack of research including both factors, it is assumed that due to the lack of empire-building interest of the CEO and a higher reliance on intangible assets in high-tech companies. Thus, the following hypothesis is formulated:

H1: In high-tech companies, CEO ownership has a significant and negative impact on investment expenditures.

Existing research shows that high-tech companies have lower dividend payouts (Lee & Lee, 2019; Hasan et al., 2022; Barros et al., 2023). While research into the impact of CEO ownership on dividends shows mixed results. When combining the high-tech status of the company with CEO ownership, it might be believed that because CEOs with ownership in high-tech companies face a low information asymmetry between owners and managers, there is no need to use dividends as a signal. Since CEOs with ownership in high-tech companies face a high information asymmetry between managers and creditors, there are a lot of difficulties in gaining external capital. Taking the information asymmetry into account, it is assumed that companies will refrain from dividend payouts and cash outflows. Thus, the following hypothesis is formulated:

H2: In high-tech companies, CEO ownership has a significant and negative impact on dividend payments.

Booth and Zhou (2013) found that non-high-tech companies keep their cash ratio (cash to total assets) quite stable, while high-tech companies increased their cash ratio three times over the period 1980–2007. Shipe (2015) found higher cash holdings but also higher cash volatility for companies with higher R&D expenditure. Similarly, Begenau and Palazzo (2021) found a positive impact of R&D expenditure on cash holdings. Research into the impact of CEO ownership on cash holdings provides results showing both positive and negative impacts. However, it is believed that CEOs with ownership in high-tech companies are more interested in the sound financial standing of riskier (high-tech) companies and this will lead to higher cash holdings. Additionally, lower investment expenditures and lower dividend payments will also lead to an increase in internal funds retained in the companies and cash holdings. Thus, the following hypothesis is formulated:

H3: In high-tech companies, CEO ownership has a significant and positive impact on the cash ratio.

Research into high-tech financial decisions is mostly focused on access to financing and capital structure. Usually, it is found that high-tech companies rely strongly on equity financing having low leverage (e.g., Hogan et al., 2017; Shrestha et al., 2024). Serrasqueiro et al. (2016) concluded that high-tech SMEs follow the modified pecking order theory when financing capital expenditures. They use the retained earnings at the beginning, then external equity and debt as the last source of financing. However, some research shows that when getting older, high-tech companies might turn from using external equity to using internal funds and debt to a greater extent (Neville & Lucey; 2022; Kwak, 2021). Additionally, Sardo

and Serrasqueiro's (2021) results suggest that high-tech firms' intellectual capital investments have a negative impact on debt but a positive effect on internal finance and equity issues. Again, research into the impact of CEO ownership on financing shows a more diverse picture. However, the research generally refers to the impact of CEO ownership on the debt ratio. It is assumed that in high-tech companies managed by CEOs with ownership in the company, there is a low information asymmetry between owners and managers and a high information asymmetry between managers and creditors (high-tech specificity). This makes getting a bank loan or issuing bonds more difficult and issuing new shares easier. The business operating activity of high-tech companies is affected by high idiosyncratic risk. Thus, the extra risk should not be added by the financial leverage. This leads to a lower debt ratio. What is more, higher cash holdings allow high-tech companies to keep lower debt ratios. Thus, the following hypotheses are formulated:

H4: In high-tech companies, CEO ownership has a significant and positive impact on external equity collection.

H5: In high-tech companies, CEO ownership has a significant and negative impact on external debt collection.

H6: In high-tech companies, CEO ownership has a significant and negative impact on the debt ratio.

2 Methodology

The research plan covers several steps. First, the variables reflecting all the research areas are defined: CEO ownership, high-tech status and corporate financial decisions. Then, the decision on the sample is made. Later, the decisions on methods and models are made.

The data are presented with descriptive statistics at the beginning. The correlation coefficients between variables are calculated to find the relationship between the variables and the correlation matrix is presented. The differences between subsamples of high-tech and non-high-tech companies and between the subsamples of companies with CEO ownership and without CEO ownership and also high-tech with CEO ownership and the rest of the companies (non-high-tech and high-tech without CEO ownership) are identified. However, testing the differences does not provide evidence of the impact of specific factors. To find the impact, regression analysis is implemented. The regression analysis results are presented to verify the hypotheses and to find the impact of CEO ownership in high-tech companies on financial decisions.

Several variables describe dependent, independent and control variables.

The independent variables include company status (high-tech or non-high-tech) and CEO ownership (*CEOown*).

The OECD product approach was adopted to distinguish high-tech companies. A company is defined as high-tech if the company's products in a specific year are connected with aerospace, computers/office machines, electronics/telecommunications, pharmacy, scientific instruments, electrical machinery, chemistry, non-electrical machinery and armaments. Information on what products are manufactured was collected from official companies'

websites. If the products could be assigned to any of the abovementioned nine product groups, the company was considered to be high-tech. If not, then the company was treated as non-high-tech. Standard International Trade Classification (SITC), Revision 4 (2006) was used to verify the classification. The procedure was as follows. First, the product was found on the SITC list and its SITC code was checked. Then it was checked whether the product code falls among codes assigned to any high-tech product group.

CEO ownership is reflected by the percentage stake in the company's capital (Akhtar et al., 2021; Coles et al., 2012; Fabisik et al., 2021) and by a dummy: 1 if the CEO has a stake in the company's capital and 0 otherwise (Chowdhury et al., 2023; Anik et al., 2021).

As for dependent variables, several proxies are used: both dynamic (investment expenditures, dividend payouts, external debt raising – both debt and equity) and static (cash holdings and financial leverage). These very variables are used due to the problems with previous research findings. The problem with previous studies and their inconsistent findings is that they deal with only one small aspect of financial decisions (e.g., financing or dividends, debt ratio or cash holdings). To overcome the shortcomings, the assumption was made of including the whole range of financial decisions (investment, dividend, equity and debt financing, cash and debt ratio). This way of calculating financial variables is quite common in research (e.g., Lee & Lee, 2019).

Size and firm performance were adopted as control variables. Size calculated as a natural logarithm of total assets is widely used in the research. Operating cash flow is also quite often used as a measure of firm performance (Bowen et al., 2008; Wu et al., 2021; Ball & Nikolaev, 2022). This financial category has several advantages over operating profit or net profit as it reflects real cash flows on operating activity and is independent of accounting rules (GAAP or IFRS). Additionally, using operating cash flow, it is possible to compare it with other dynamic financial categories used in the research, such as dividend payout, investment expenditures, equity and debt raising.

Table 1 presents the definition and formulas of the variables included in the research.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

Table 1 | Definition of variables and their formulas

Variables with their codes	Formula	Remarks
	Independent variables	
CEO ownership (*CEOown*)	Percentage stake of CEO in the capital (in %)	-
CEO ownership dummy (*CEOownD*)	Dummy variable: 1 if the CEO has a stake in the company's capital, 0 otherwise	-
High-tech dummy (*High-techD*)	Dummy variable: 1 if the company belongs to the high-tech industry, 0 otherwise	-
	Dependent variables	
Investment expenditure (*CAP ratio*)	Capex to total assets (in %)	Although capex is cash outflow, it is presented as a positive value; this means that the higher the capex expense the higher the positive capex ratio
Dividend payout (*Div ratio*)	Dividend payout to total assets (in %)	Although the dividend is cash outflow, it is presented as a positive value; this means that the higher the dividend payout the higher the positive dividend ratio
Equity issuance (*EI ratio*)	(equity issuance minus own shares acquisition) in relation to total assets (in %)	Positive net equity issuance means that the equity issuance (inflow) is higher than the acquisition of own shares (outflow); positive ratio means that the company collects more capital from equity issuance than spends on own shares acquisition
Debt issuance (*DI ratio*)	(bank loan and bond issuance) minus (bank loan repayment and bond acquisition) to total assets (in %)	Positive net debt issuance means that the bank loans and bonds issuance (inflow) is higher than bank loans and bonds repayment (outflow); positive ratio means that the company collects more money from a bank loan or bond issuance than spends on debt repayment
Debt ratio	Total liabilities to total assets (in %)	-
Cash ratio	Cash and cash equivalents to total assets (in %)	-

Control variables		
Firm performance (*OCF ratio*)	Operating cash flow to total assets (in %)	-
Size	Natural logarithm of total assets	-

Source: Authors' own elaboration

The research covers the period 2018–2021. The research period includes years of prosperity (2018–2019) and years of crisis (2020–2021). Financial companies, service companies and companies lacking data were excluded. It was possible to collect data of 197 manufacturing companies following the above requirements with some companies entering and leaving the stock market during the analysed period. A sample of 750 firm-year observations was developed. The sample consists of complete four-year data for 166 companies (out of 197), three-year data for 24 companies and two-year data for the remaining 7 companies.

The sample covers the period 2018–2021 and data for 197 manufacturing companies. This dataset makes it difficult to use ordinary least square (OLS) regression analysis (ordinary least square with linear regression line) as the sample has time-varying variables. These variables show dependence (e.g., the debt ratio is not random for a specific company over time but shows a specific change path). If a dataset were a balanced panel sample, it would be possible to implement a panel regression analysis with fixed and random effects. However, a non-balanced panel sample was established due to some missing observations. To overcome some difficulties with implementing OLS (longitudinal data) and panel regression analysis (missing observations), linear mixed models were used as a good method for analysing dependent, multilevel, hierarchical, longitudinal or correlated data. Linear mixed models are an extension of simple linear models (OLS) to allow both fixed and random effects and are particularly used when there is dependence in the data arising from a hierarchical or time-varying structure.

Eventually, the linear mixed model was implemented with fixed and random effects. Each model includes a time effect (variables 0-1 for each year to exclude the influence of external economic conditions on the results – year effect) to model time heterogeneity. Additionally, both individual and interactive variables describing CEO ownership in high-tech companies (*HighTechD* x *CEOownD*) were included in each model. SPSS software was employed.

A model with interaction effects was developed. To discover the corporate financial strategy in high-tech companies with the CEO as an owner, an interactive variable of high-tech status (dummy variable) with CEO ownership (dummy variable) was included. The general regression model with interaction effects is as follows:

$$DV = \beta_0 + \beta_1 HighTechD + \beta_2\, CEOownD + \beta_3 HighTechD\ x\ CEOownD + \beta_4\, Size + \beta_5\, OCF\ Ratio + \beta_6\, CAP\ Ratio + \beta_7\, Div\ Ratio + \beta_8\, EI\ Ratio + \beta_9\, DI\ Ratio + \beta_{10}\, Debt\ Ratio + \beta_{11}\, Cash\ Ratio + \varepsilon_i \quad (1)$$

where *DV* is the dependent variables vector, reflecting proxies for corporate financial decisions: investment expenditure, dividend payment, equity issuance, debt issuance, debt ratio and cash ratio.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

3 Findings

Table 2 presents descriptive statistics of the total sample. The mean and the median are presented. The minimum and maximum values of the variables are included as well. Additionally, standard deviation (SD) and coefficient of variation (CoV) are presented. Moreover, the results of the normality test (Shapiro-Wilk test) are included.

Table 2 | Sample descriptive statistics

	Mean	Median	Min	Max	SD	CoV	Shapiro-Wilk normality test
CAP ratio	5.03	3.10	0.00	61.82	6.79	1.35	0.642***
Div ratio	2.34	0.00	0.00	107.69	7.89	3.37	0.288***
EI ratio	3.53	0.00	0.00	120.78	15.31	4.34	0.307***
DI ratio	-2.81	-0.56	-79.62	86.22	158.31	56.34	0.122***
Debt ratio	48.91	46.29	1.43	473.08	35.50	0.73	0.698***
Cash ratio	11.84	6.40	0.00	92.17	15.51	1.31	0.683***
CEOown	12.53	0.13	0.00	99.61	20.83	1.66	0.665***
OCF ratio	6.04	7.72	-692.0	139.14	31.13	5.18	0.380***
Total assets	6,447.5	215.2	0.05	1,182,922.0	60,776.1	9.43	0.074***

Note: ** and *** indicate significance at the 5% and 1% levels, respectively.
Source: Authors' own elaboration

The average CEO ownership is 13% with a median of 0.13%, which means that in half of the observations, CEO ownership is almost absent or insignificant. The average value of operating cash flows is positive and stands for 6% of total assets. The average corporate investment expenditure is 5% of total assets, while dividend payments are 2% of total assets. The median value of dividend payouts is 0.0, which means that in at least half of the observations, there are no dividend payouts. The main source of external funds is share issuance (3.5% of total assets) while debt is mostly repaid (almost 3% of total assets). All these decisions result in the debt ratio (on average, 50% of total assets) and the cash ratio (on average, 12% of total assets).

The data in Table 2 draw a picture of the financial decisions of the average company in the sample. The company is effective on operating cash flows and the external equity is raised. The cash from internal and external sources is spent on dividend payments, investment expenditures and debt repayment.

The sample data are not normally distributed as the Shapiro-Wilk test results show (the *p*-value is lower than the chosen alpha level (0.05), which allows us to reject H0, assuming that data are normally distributed. Thus, the Spearman correlation analysis and non-parametrical

U Mann-Whitney test were employed. Table 3 presents the correlation matrix and multicollinearity test results (variance inflation factor – VIF).

Table 3 | Correlation matrix

	CAP ratio	Div ratio	EI ratio	DI ratio	Debt ratio	Cash ratio	OCF ratio	Size	CEOown	VIF
Div ratio	0.182***	1								1.106
EI ratio	-0.022	-0.087**	1							1.289
DI ratio	0.085**	0.071**	0.046	1						1.278
Debt ratio	-0.030	-0.190***	-0.040	-0.019	1					1.137
Cash ratio	-0.057	0.108***	0.125***	-0.015	-0.308***	1				1.419
OCF ratio	0.338***	0.357***	-0.126***	-0.304***	-0.212***	0.211***	1			1.498
Size	0.200***	0.276***	-0.095***	-0.016	0.194***	-0.061	0.186***	1		1.237
CEOown	-0.026	0.019	0.089**	-0.075**	-0.187***	0.140***	0.091**	-0.192***	1	1.026
High techD	0.013	0.031	0.215***	0.049	-0.316***	0.291***	0.013	-0.370***	0.219***	1.322

Note: ** and *** indicate significance at the 5% and 1% levels, respectively.
Source: Authors' own elaboration

Several relationships were found in the sample. The high-tech status of the companies is positively related to share issuance (EI ratio), cash holdings (cash ratio) and CEO ownership, but negatively to the debt ratio (debt ratio) and company size. This means that high-tech companies are smaller and have higher cash holdings and lower debt ratios. They are more prone to issue new shares. In high-tech companies, there is more CEO ownership.

CEO ownership is positively related to operating cash flows (OCF ratio), equity issuance (EI ratio), cash ratio (cash ratio) and high-tech status but negatively to debt raising (DI ratio), the debt ratio (debt ratio) and company size. Companies with CEO ownership are smaller and mostly have high-tech status. These companies have higher firm performance and cash ratios but lower debt ratios. Additionally, they are more prone to issue new shares and repay debt.

However, the correlation coefficients do not exceed 0.4 and all the variables might be employed in the regression analysis. Additionally, the VIFs do not exceed 5.0, which means moderate correlation and lack of multicollinearity and, again, all the variables might be employed in the regression analysis.

The U Mann-Whitney non-parametric test was employed to compare the subsamples. Table 4 presents the results of the U Mann-Whitney non-parametric test for subsamples. Mean and median values are presented for each variable.

Table 4 | U Mann-Whitney test results

	High-tech	Non-high-tech	U Mann-Whitney test with p-value	CEOown	Non-CEOown	U Mann-Whitney test with p-value	High-tech with CEOown	High-tech without CEOown and non-high-tech	U Mann-Whitney test with p-value
CAP ratio	6.05 2.98	4.54 3.12	-0.37	5.54 3.11	4.52 3.10	-1.43	6.6 2.9	4.6 3.1	-0.686
Div ratio	4.09 0.00	1.50 0.00	-0.86	2.65 0.00	2.03 0.00	-0.73	4.5 0.0	1.7 0.0	-1.578
EI ratio	7.85 0.00	1.44 0.00	-6.04 ***	4.30 0.00	2.74 0.00	-3.00 ***	8.9 0.0	2.0 0.0	-6.820 ***
DI ratio	-6.05 -0.26	-1.25 -0.76	-1.37	-1.45 -0.76	-4.18 -0.34	-1.56	-0.9 -0.3	-3.3 -0.7	-0.194
Debt ratio	38.69 33.20	53.83 49.85	-8.87 ***	44.28 42.29	53.61 49.68	-5.71 ***	33.7 26.2	53.1 48.9	-9.733 ***
Cash ratio	20.47 11.35	7.69 5.23	-8.16 ***	14.52 6.86	9.13 6.00	-3.50 ***	25.1 16.2	8.2 5.2	-10.106 ***
OCF ratio	4.64 8.34	6.72 7.36	-0.37	8.02 8.31	4.03 6.92	-2.38 ***	9.0 9.0	5.2 7.3	-1.964 **
Total assets	548.3 92.6	9,286.3 347.3	-10.39 ***	608.6 177.9	12,376.1 332.5	-6.22 ***	655.8 96.4	8,040.7 294.9	-7.913 ***
CEOown	14.94 9.96	11.38 0.00	-6.14 ***	X	X	X	X	X	X
High-techD	X	X	X	0.43 0.00	0.22 0.00	-6.24 ***	X	X	X
N	256	494	X	397	353	X	170	580	X

Note: Mean and median are presented for each variable. ** and *** indicate significance at the 5% and 1% levels, respectively.
Source: Authors' own elaboration

The companies with high-tech status differ significantly from the non-high-tech, especially in that the high-tech companies are smaller, have higher cash holdings, lower debt ratios and gain more capital via share issuance. Additionally, in high-tech companies, the CEO ownership is higher.

The companies with a CEO as an owner differ from those without a CEO's stake in the capital, especially in that companies with a CEO as an owner are smaller, have higher firm performance (operating cash flow ratio), have higher cash holdings and lower debt ratio and gain more capital via share issuance. Additionally, there are more companies with high-tech status among the companies with CEO ownership.

All the companies, grouped in several sub-samples, have similar financial decision patterns: companies are effective in operating cash flows, the external equity is raised and the cash from internal and external sources is spent on dividend payments, investment expenditures

and debt repayment. However, in high-tech companies with CEO ownership, internal and external (from new equity) cash is higher, this cash is spent on higher investment expenditure and higher dividend payments and the remaining cash is transformed into (three times) higher cash holdings; due to the lower debt level, the debt repayment is lower as well.

The results show that high-tech companies with CEOs having a stake in the company differ from the rest of the companies: they are smaller and have higher firm performance (higher OCF ratios), higher external equity issuance, lower debt ratios and higher cash ratios. However, no statistically significant differences in investment expenditures, dividend payments and new debt were found.

These differences indicate that the research into the impact of high-tech status and CEO ownership is justified. However, these differences do not present the impact of high-tech status or CEO ownership on financial decisions. Regression analysis was implemented to find the impact. Since the sample is longitudinal but not a balanced panel data sample, the linear mixed-model analysis, with both fixed and random effects, was implemented. The LMM allows coping with non-independent data structures. To model the impact of CEO ownership in high-tech companies (and verify the research hypotheses), a regression analysis with an interactive variable of high-tech status (dummy variable) with CEO ownership (dummy variable) was implemented.

Table 5 presents the results of the fixed effects of LMM analysis.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

Table 5 | Fixed effects LMM analysis results

Variables	CAP ratio	Div ratio	EI ratio	DI ratio	Debt ratio	Cash ratio	OCF ratio
High-techD	0.627	1.513	1.144	-8.707 **	-8.79 **	-0.021	-1.272
CEOownD	0.303	-0.555	-1.058	-1.348	-4.152	-2.571 **	3.904 **
High-techD xCEOownD	2.076 **	0.156	-0.271	11.904 **	-3.013	14.344 ***	-2.616
Size	0.113	-0.084	-0.553 **	0.609	-0.599	-0.910 ***	2.681 ***
OCF ratio	0.037 ***	0.043 ***	-0.149 ***	0.600 ***	-0.186 ***	0.098 ***	X
CAP ratio	X	0.050	0.383 ***	-0.44 **	0.028	-0.306 ***	0.547 ***
Div ratio	0.038	X	0.185 **	-0.224	-0.355 **	0.227 ***	0.484 ***
EI ratio	0.090 ***	-0.057 ***	X	0.427 ***	-0.188 **	0.291 ***	-0.520 ***
DI ratio	-0.015 **	-0.010	0.063 ***	X	-0.049	-0.038 **	0.309 ***
Debt ratio	0.001	-0.018 **	-0.031 **	-0.054	X	-0.039 **	-0.106 ***
Cash ratio	-0.084 ***	0.081 ***	0.337 ***	-0.301 **	-0.273 ***	X	0.397 ***
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Akaike criterion AIC	5222,841	5437,009	6245,246	7868,705	7784,597	6245,246	7344,812
-2LL	5192,841	5407,009	6215,246	7838,705	7754,597	6215,246	7314.812

Note: ** and *** indicate significance at the 5% and 1% levels, respectively.
Source: Authors' own elaboration

Table 6 presents random effects of LMM analysis results.

Table 6 | Random effect LMM analysis results

Variables	CAP ratio	Div ratio	EI ratio	DI ratio	Debt ratio	Cash ratio	OCF ratio
High-techD	4.843	2.980	8.248	-4.569	0.762	7.381	-5.063
CEOownD	0.964	-0.892	0.417	-0.725	2.919	0.797	-0.103
High-techD xCEOownD	-1.271	-0.034	-4.023	8.140	-10.682	7.243	1.933
Size	-0.956	0.749	-1.299	0.434	6.597**	1.650	-0.202
OCF ratio	0.215	0.154	-0.132	-0.387	0.469	0.302	X
CAP ratio	X	-0.122	0.341	0.334	-0.931	-0.412	0.344
Div ratio	-0.178	X	-0.092	0.367	-0.913	-0.144	0.426
EI ratio	0.075	-0.044	X	0.006	-0.752	0.160	-0.193
DI ratio	0.246	0.112	0.063	X	0.333	0.070	-0.423
Debt ratio	0.018	-0.022	-0.145	0.044	X	-0.208	0.087
Cash ratio	-0.219	-0.082	0.308	0.563	-0.574	x	0.594
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Akaike criterion AIC	6855,420	6574,154	7835,852	8311,823	8728,196	7734,352	7759,184
-2LL	6793,420	6512,154	7765,852	8251,823	8666,196	7672,352	7699,184

Note: ** and *** indicate significance at the 5% and 1% levels, respectively.
Source: Authors' own elaboration

In the case of high-tech companies, a positive impact of CEO ownership presence on investment expenditures, dividend payouts, external debt raising and cash ratio is observed, along with a negative impact on external equity raising and debt ratio. However, this impact is statistically significant only in the case of investment expenditures, external debt raising and cash ratio. The findings show that in high-tech companies, the CEO with a stake in the company affects higher investment expenditures, higher cash holdings and higher external debt raising.

Thus, the findings confirm only H3 (assuming to find a positive impact of CEO ownership in high-tech companies on cash holdings) but contradict H1 (assuming to find a negative impact of CEO ownership in high-tech companies on investment expenditures) and H5 (assuming to find a negative impact on external debt collection). Due to the lack of statistical significance, it is impossible to support or contradict the assumptions on the impact of CEO ownership in high-tech companies on dividend payments (H2), external equity collection (H4) and debt ratio (H6).

Out of the control variables, it turns out that operating cash flow is the most important factor affecting all financial decisions, However, the OCF ratio has a positive impact on investment expenditure, dividend payouts, new debt raising and cash ratio, and a negative impact on share issuance and debt ratio. The strongest impact of the OCF ratio is on external debt issuance (positive). This means that with higher firm performance (being the source of internal funds), companies are more prone to get external capital via debt issuance.

4 Discussion

The findings show that high-tech companies, when compared to non-high-tech companies (after testing the differences with the U Mann-Whitney test), are smaller but have higher CEO ownership. What is more, in high-tech companies, when compared to non-high-tech companies, more external equity is raised. This is in line with previous research providing evidence for a modified version of the pecking order theory (Hogan et al., 2017; Serrasqueiro et al., 2016). High-tech companies also have lower debt ratios and higher cash ratios. The findings on the higher cash holdings in high-tech companies are in line with Booth and Zhou (2013) and Shipe (2015). The companies' small size might also explain the findings on a lower debt ratio. According to Stereńczak and Kubiak (2023) and Czerwonka and Jaworski (2022), smaller companies have lower debt ratios. However, high-tech companies differ from non-high-tech companies in terms of investment expenditures and dividend payouts. Thus, the findings do not confirm previous findings of lower investment expenditures (capex) in high-tech companies reported by Ortega-Argilés et al. (2015) or Gavious et al. (2016). The findings do not confirm lower dividend payouts in high-tech companies reported by Lee and Lee (2019) or Hasan et al. (2022). The higher external equity raised and the lower debt ratio might be explained by the higher idiosyncratic risk connected with operating activity. The higher operating risk should be accompanied by lower financial leverage (which complies with the general corporate finance theory).

Companies with CEO ownership (compared to those without CEO ownership after testing the differences with the U Mann-Whitney test) are smaller, have higher firm performance and almost half belong to high-tech industries. The findings on the specificity of the financial decisions in the companies managed by the CEO having a stake in the company show that these companies have higher external equity issuance, lower debt ratio and higher cash ratio. It seems that in these companies, cash coming from higher operating cash flows and external equity issuance is turned into debt repayment and higher cash holdings. The findings on debt ratio in companies managed by CEOs having a stake in the company confirm those by Huang and Song (2006) and Munandar (2017) but contradict those by Coles et al. (2012) and Le and Tannous (2016). The findings on higher cash holdings in companies managed by CEOs having a stake in the company confirm previous results by Le and Tannous (2016) but contradict those by Dittmar et al. (2003), Akhtar et al. (2021) and Thanatawee (2019).

Additionally, our findings show that high-tech companies managed by CEOs with a stake in the company (compared to the rest of the companies after testing the differences with the U Mann-Whitney test) are smaller and have higher firm performance. The findings show that these companies also have higher external equity issuance, lower debt ratios and higher cash ratios. These findings align with the assumption of the importance of good financial standing and sound financial decisions for high-tech companies, as these are companies with

higher idiosyncratic risk connected with operating activity, which should be accompanied by lower financial leverage). In addition to the lower debt, high-tech companies managed by CEOs with a stake in the capital have higher cash ratios, which is in line with previous findings by Booth and Zhou (2013) and Shipe (2015). Higher cash holdings might again be explained by higher operating risk and a precautionary motive of cash holdings. The lower debt ratio, higher cash ratio, higher firm performance, similar dividend payouts and investment expenditures do not provide evidence of CEOs' rent extraction (Fabisik et al., 2021). Moreover, higher external equity issuance might confirm the implementation of a modified version of the pecking order theory (Hogan et al., 2017; Serrasqueiro et al., 2016; Shipe, 2015). Additionally, higher external equity issuance is not in the interest of the CEO with a stake in the company, as new share issuance diminishes their stake in the company. This might confirm that CEOs with a stake in high-tech companies act in the interest of the company and its sound financial standing. It might also mean that CEO ownership is an efficient tool for diminishing agency problems and discouraging CEOs from empire-building, as no other tools (such as debt or dividends) are implemented. This is in line with the assumption of the importance of good financial standing and sound financial decisions for high-tech companies.

However, when investigating the impact of CEO ownership in high-tech companies on financial decisions (regression analysis), the findings show a positive and statistically significant impact only on investment expenditures (positive), external debt raising (positive) and cash holdings (positive). This might mean that CEOs with a stake in high-tech companies understand the necessity of having good financial standing: high firm performance, low leverage and high cash holdings. However, at the same time, they are aware of the necessity of the company's higher and faster growth: high investment expenditure and raising extra debt capital to complete internal funds. Moreover, they try to attract and maintain other shareholders by paying dividends.

The positive impact on investment expenditures aligns with the previous findings of Akhtar et al. (2021) or Yang et al. (2022). This might be explained by higher investment in more advanced technologies (Akhtar et al., 2021). This positive impact of a CEO with a stake in the company might also be explained by the companies' small size and young age – usually, companies in earlier stages of their life cycle invest more (Yang et al., 2022). Additionally, the results align with the findings of Adu-Ameyaw et al. (2022), who found that companies with higher growth potential invest more.

Additionally, the positive impact of CEO ownership on cash holdings supports the findings of Akhtar et al. (2021), Akhtar (2022), Talbi and Menchaoui (2023) and Sun et al. (2023). However, Akhtar et al. (2021), Akhtar (2022) and Talbi and Menchaoui (2023) believed that high cash holdings in companies managed by CEOs with a stake in the company are a result of poor governance. Sun et al. (2023) believed that the positive relationship between CEO ownership and cash holdings is more pronounced for firms with higher firm-specific risk and suggested that CEO ownership encourages firms to hold more cash as precautionary savings. The findings are also in line with those by Begenau and Palazzo (2021), who found that it is typical for capital-intensive (R&D-intensive) companies to have higher cash holdings as small firms with higher growth potential engage in larger precautionary savings and, in doing so, they deliver a larger cash-to-assets ratio.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

On the other hand, this notion (positive impact on investment expenditure and higher cash holdings) reflects the typical behaviour of the CEO according to the agency costs of free cash flow, which might imply the CEO's empire-building. Moreover, Sun et al. (2023) showed that firms with high CEO ownership and excess cash holdings have more capital expenditures and R&D expenses but do not have higher dividend payments. Overall, their findings support the notion that firm ownership aligns the interests of CEOs and shareholders rather than encouraging managers to extract private benefits through hoarding cash. Additionally, Begenau and Palazzo (2021) found that small firms with higher growth potential engage in larger precautionary savings and have higher cash holdings. It might be believed that the findings on the positive impact of CEOs with a stake in high-tech companies on positive investment expenditures and cash holdings should be explained more by the specificity of high-tech companies (smaller company, higher operating risk and higher information asymmetry between the company and its creditors) than by empire-building behaviour. However, these findings contradict those assuming rent extraction and private benefits of control (e.g., Akhtar, 2022; Talbi & Menchaoui, 2023).

Our study shows a positive impact of CEO ownership in high-tech companies on external debt raising and, simultaneously, a lack of impact on the (low) debt ratio. Our findings on the lack of impact of CEO ownership on debt ratios are in line with those by Farhangdoust et al. (2020), who argued that there is no trade-off relationship between managerial ownership and debt concerning the reduction of agency costs. This might mean that CEO ownership is sufficient to diminish agency problems and there is no need to increase debt to mitigate managers. Farhangdoust et al. (2020) also thought that a low debt ratio in companies managed by CEOs with a stake is interpreted as managerial risk aversion action (part of managerial entrenchment). However, the positive impact of CEO ownership in high-tech on external debt (but not equity) raising is against the managerial entrenchment hypothesis, favouring alignment with the ownership interest hypothesis.

The positive impact of CEO ownership in high-tech companies on external debt raising contradicts the results of Serrasqueiro et al. (2016) on the modified pecking order theory of SME high-tech companies. The positive impact on external debt raising is connected with high-tech companies' specific point in their life. They are relatively young and small but profitable and after collecting external equity in the initial public offering (IPO) process; that is why the companies have low debt ratios. CEOs with a stake in the company might believe that it is time to raise external debt. Additionally, due to obligatory reporting, public high-tech companies can diminish the information asymmetry and become more creditworthy to banks. This is in line with previous research showing that high-tech companies change financing from equity to debt over time (Neville & Lucey, 2022; Kwak, 2021).

Conclusion

The paper aimed to determine the impact of CEO ownership in high-tech companies on financial decisions (investment expenditure, dividend payouts, external equity raising, external debt raising, cash holdings and debt ratio). It was assumed that in high-tech companies, CEO ownership has a statistically significant impact on financial decisions: negative on investment expenditure, negative on dividend payouts, positive on external

equity collecting, negative on external debt collecting, negative on debt ratio and positive on cash holdings.

The findings show that high-tech companies managed by CEOs with a stake in the company (compared to the rest of the companies in the sample) have higher firm performance, higher external equity issuance, lower debt ratio and higher cash ratio. However, the results prove that CEO ownership positively affects investment expenditure, external debt raising and cash holdings in high-tech companies. Thus, it was possible to address only several hypotheses: confirm H3 (assuming to find a positive impact of CEO ownership in high-tech companies on cash holdings) but reject H1 (assuming to find a negative impact of CEO ownership in high-tech companies on investment expenditures) as well as reject H5 (assuming to find a negative impact on external debt collection). Due to the lack of statistical significance, it is impossible to confirm or reject the assumptions on the impact of CEO ownership in high-tech companies on dividend payments (H2), external equity collection (H4) and debt ratio (H6).

The findings align with the agency theory of free cash flow and the pecking order theory. As for the agency theory, a CEO with a stake in the capital positively affects investment expenditure and cash holdings in high-tech companies. This implies the specific behaviour of a CEO with a stake in a company described by the agency theory, especially empire-building. Empire-building behaviour assumes hoarding cash and overinvestment. However, it is possible that the reason behind the behaviour of the CEO with a stake in a company lies in the specificity of high-tech companies. Additionally, no other tools for diminishing agency problems, such as leverage and dividend payouts, have been implemented. This means that CEO ownership is sufficient to align the interests of managers with shareholders' interests. Thus, there is no support for the managerial entrenchment or expropriation hypotheses.

As for the pecking order theory, a confirmation of the classical capital-raising order was found: a positive impact of a CEO with a stake in the company on debt issuance. However, it might be explained by the specific time in the high-tech companies' lives: having collected external equity in the IPO process, having low debt ratios and decreasing information asymmetry in listed companies.

The findings have both theoretical and practical implications. The paper provides evidence important for the theoretical discussion on financial decisions and CEO ownership in high-tech companies, especially when considering the agency theory. The agency theory assumes several tools for diminishing agency problems: CEO ownership, debt and dividend payment. The research provides evidence of high-tech companies' implementing only one of these tools: CEO ownership. This might mean that CEO ownership is sufficient to diminish agency problems and there is no need to increase debt or pay higher dividends to mitigate managers. Additionally, the research provides evidence for the theoretical discussion on financial decisions and CEO ownership in high-tech companies, especially when considering agency theory assumptions on CEOs' empire-building and rent extraction (private benefits of control). The research does not provide any evidence on rent extraction. However, some aspects of CEO behaviour might give the impression of empire-building (high cash holdings and high investment expenditures), but the company specificity (high-tech) with good prospects justifies the high cash holdings and high investment expenditures. Thus, the paper provides evidence that a CEO having a stake in the company behaves more like a principal than an agent.

Volume **14** | Issue **4** | 2025
https://doi.org/10.18267/j.cebr.395

The paper also provides evidence important for the theoretical discussion on financial decisions and CEO ownership in high-tech companies, especially when considering the pecking order theory. Our research proves that CEOs with a stake in a high-tech company positively affect the raising of external debt capital. This explains that the classical, non-modified version of the pecking order theory explains better financial decisions. However, the classical version of the pecking order of capital raising is present after collecting external equity in the IPO process, which led to low debt ratios.

In addition, the paper provides evidence for the theoretical discussion on financial decisions and the financial situation of high-tech companies. High-tech companies are important for the economy due to their higher innovation potential. However, they function in an uncertain environment and their activity has uncertain outcomes. The findings provide a specific picture of high-tech companies and their financial decisions: they invest more, have high cash holdings and have low debt ratios.

As for practical implications, the findings are important for investors who consider investing in companies managed by a CEO having a stake in the company (both high-tech and non-high-tech), as some might be afraid that CEO ownership might lead to empire-building behaviour or rent extraction and private benefits of control. The paper provides evidence of reasonable CEO behaviour aimed at the company's sound financial prospects and development in the owners' interests.

In terms of practical implications, the findings are also important for policymakers as the relatively high firm performance of high-tech companies and cautious financing policy (mostly based on equity) affect the high efficiency of public aid. Policymakers might feel that supporting high-tech companies will benefit their growth and development. The growth of high-tech companies positively affects the whole economy and society by solving economic problems in novel ways and providing new opportunities for employing highly skilled workers, thus developing the whole economy.

However, the research is not free from limitations. The research covers only one specific country. Although Poland is the biggest Central and Eastern European country with a post-communist transition, the Polish economy, financial market and institutional background might differ from other countries in the CEE region. Especially, there might be some cultural differences in the attitude towards financial decisions, e.g., Poland has the highest score in uncertainty avoidance (93), while Slovakia has 51, Czechia has 74 and Hungary has 82 (https://www.theculturefactor.com/country-comparison-tool?countries), which might affect the CEOs' financial (cash or debt) decisions.

Moreover, the linear mixed model was implemented with a specific set of independent and control variables. It is possible that changes in the method and control variables might produce different results. Moreover, we investigated publicly listed companies with specific information disclosure obligations after collecting external equity in the IPO process. Smaller, younger and private companies might follow different order of raising capital (in line with the modified pecking order). Private companies have a higher information asymmetry, which affects their financial decisions.

The limitations of the research provide good grounds for future research. Expanding the sample by including data (and variables) on private companies and from other countries is possible in future research. Including data on R&D might provide information on the companies' innovativeness. This might broaden the discussion on the financial conditions of innovative activities of high-tech and non-high-tech companies. Future research might use data from private companies to compare them with public companies. This comparison might shed light on the differences between private and public companies in financial decisions of CEOs with a stake in the capital – especially whether a classical or modified version of the pecking order theory is implemented and whether CEOs with a stake in the capital align their interests with those of shareholders or maybe they have private benefits of control.

Acknowledgement

Funding: No special funding.

Conflict of interest: The authors hereby declare that this article was not submitted or published elsewhere. The authors do not have any conflict of interest.

References

Adu-Ameyaw, E., Hickson, L., & Danso, A. (2022). Managerial compensation and fixed intangible assets investment: the role of managerial ownership and firm characteristics. *Journal of Applied Accounting Research*, *23*(5), 1071-1094. https://doi.org/10.1108/JAAR-04-2021-0099.

Akhtar, T. (2022). Corporate governance, excess-cash and firm value: Evidence from ASEAN-5. *Economics and Business Review*, *8*(4), 39-67. https://doi.org/10.18559/ebr.2022.4.3

Akhtar, T., Tareq, M. A., & Rashid, K. (2021). Chief Executive Officers' monitoring, board effectiveness, managerial ownership, and cash holdings: evidence from ASEAN. *Review of Managerial Science*, *15*, 2193-2238. https://doi.org/10.1007/s11846-020-00421-0.

Anik, S., Chariri, A., & Isgiyarta, J. (2021). The effect of intellectual capital and good corporate governance on financial performance and corporate value: A case study in Indonesia. *The Journal of Asian Finance, Economics and Business*, *8*(4), 391-402. https://doi.org/10.13106/jafeb.2021.vol8.no4.0391.

Archibugi, D., & Mariella, V. (2021). Is a European recovery possible without high-tech public corporations? *Intereconomics*, *56*(3), 160-166. https://doi.org/10.1007/s10272-021-0973-x.

Ball, R., & Nikolaev, V. V. (2022). On earnings and cash flows as predictors of future cash flows. *Journal of Accounting and Economics*, *73*(1): 101430. https://doi.org/10.1016/j.jacceco.2021.101430.

Barros, V., Matos, P. V., Sarmento, J. M., & Vieira, P. R. (2023). High-tech firms: Dividend policy in a context of sustainability and technological change. *Technological Forecasting and Social Change*, *190*, 122434. https://doi.org/10.1016/j.techfore.2023.122434.

Begenau, J., & Palazzo, B. (2021). Firm selection and corporate cash holdings. *Journal of Financial Economics*, *139*(3), 697-718. https://doi.org/10.1016/j.jfineco.2020.09.001.

Bhattacharya, S. (1979). An exploration of nondissipative dividend-signaling structures. *Journal of Financial and Quantitative Analysis*, *14*(4), 667-668. https://doi.org/10.2307/2330441.

Booth, L. D. & Zhou, J. (2013). Increase in cash holdings: Pervasive or sector-specific? *Frontiers in Finance and Economics*, *10*(2), 31-62.

Bowen, R. M., Rajgopal, S., & Venkatachalam, M. (2008). Accounting discretion, corporate governance, and firm performance. *Contemporary Accounting Research*, *25*(2), 351-405.

Chowdhury, M. R. U., Xie, F., & Hasan, M. M. (2023). Powerful CEOs and investment efficiency. *Global Finance Journal*, *58*, 100886. https://doi.org/10.1016/j.gfj.2023.100886.

Coles, J. L., Lemmon, M. L., & Meschke, F. F. (2012). Structural models and endogeneity in corporate finance: The link between managerial ownership and corporate performance. *Journal of Financial Economics, 103*(1), 149-168, https://doi.org/10.1016/j.jfineco.2011.04.002.

Cowling, M., Liu, W. & Zhang, N. (2021). In the post-crisis world, did debt and equity markets respond differently to high-tech industries and innovative firms? *International Small Business Journal*, *39*(3), 247-288. https://doi.org/10.1177/0266242620947281.

Czerwonka, L., & Jaworski, J. (2022). Capital structure and its determinants in companies originating from two opposite sides of the European Union: Poland and Portugal. *Economics and Business Review*, *8*(1), 24-49. https://doi.org/10.18559/ebr.2022.1.3.

Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis*, *38*(1), 111-133. https://doi.org/10.2307/4126766.

Fabisik, K., Fahlenbrach, R., Stulz, R. M., & Taillard, J. P. (2021). Why are firms with more managerial ownership worth less? *Journal of Financial Economics*, *140*(3), 699-725. https://doi.org/10.1016/j.jfineco.2021.02.008.

Farhangdoust, S., Salehi, M., & Molavi, H. (2020). Management stock ownership and corporate debt: evidence from an emerging market. *Management Research Review*, *43*(10), 1221-1239. https://doi.org/10.1108/MRR-12-2018-0475.

Flannery, M. J. (1986). Asymmetric information and risky debt maturity choice. *The Journal of Finance*, *41*(1), 19-37. https://doi.org/10.2307/2328342.

Florackis, C., Kanas, A., & Kostakis, A. (2015). Dividend policy, managerial ownership and debt financing: a non-parametric perspective. *European Journal of Operational Research, 241(3)*, 783-795. https://doi.org/10.1016/j.ejor.2014.08.031.

Gavious, I., Lahav, Y., & Russ, M. (2016). Changes in the value implications of compensation costs throughout the economic cycle: an examination of high-tech versus low-tech industries. *Asia-Pacific Journal of Accounting & Economics*, *23*(2), 200-223. https://doi.org/10.1080/16081625.2015.1057189.

Grodzicki, M. J. (2014). Global value chain and competitiveness of V4 economies. In D. Kiendl-Wendner & K. Wach (Eds.), *International competitiveness in Visegrad countries: Macro and micro perspectives* (pp. 13–31). Fachhochschule Joanneum.

Guthrie, G., & Hobbs, C. (2021). How managerial ownership and the market for corporate control can improve investment timing. *Journal of Banking & Finance, 128*, 106154. https://doi.org/10.1016/j.jbankfin.2021.106154.

Hamidi, M. (2015). Determinants of capital expenditure decisions in Malaysian companies. In Proceedings of the Australasian Conference on Business and Social Sciences 2015 (pp. 1238-1249). https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=492a7787a47818931d4f9775fd112f61e9291a67

Hasan, F., Shafique, S., Das, B. C., & Shome, R. (2022). R&D intensity and firms dividend policy: evidence from BRICS countries. *Journal of Applied Accounting Research*, *23*(4), 846-862. https://doi.org/10.1108/JAAR-02-2022-0027.

Hogan, T., Hutson, E., & Drnevich, P. (2017). Drivers of External Equity Funding in Small High-Tech Ventures. *Journal of Small Business Management, 55*(2), 236-253. https://doi.org/10.1111/jsbm.12270.

Huang, G., & Song, F. M. (2006). The determinants of capital structure: evidence from China. *China Economic Review, 17*(1), 14-36. https://doi.org/10.1016/j.chieco.2005.02.007.

Jensen, G. R., Solberg, D. P. & Zorn, T. S. (1992), Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies, *Journal of Financial and Quantitative Analysis, 27*(2), 247-263. https://doi.org/10.2307/2331370.

Karpińska, K. (2021). Situation Of The R&D Sector In Poland In The Face Of The Current Crisis. *Studies In Logic, Grammar And Rhetoric*, *66*(4), 409-424., https://doi.org/10.2478/slgr-2021-0023.

Khalifa, M., Trabelsi, S., & Matoussi, H. (2022). Leverage, R&D expenditures, and accounting conservatism: Evidence from technology firms. *The Quarterly Review of Economics and Finance*, *84*, 285-304. https://doi.org/10.1016/j.qref.2022.02.002.

Khallaf, A., Samet, A., & Efendi, J. (2024). Do Firms' Characteristics Influence Their IT Strategies? A Study on the Driving Force behind Firms' Decisions to Appoint IT Expertise. *Journal of Risk and Financial Management*, *17*(10), 465. https://doi.org/10.3390/jrfm17100465.

Kliuchnikava, Y. (2022). The impact of the pandemic on attitude towards innovation among SMEs in the Czech Republic and Poland. *International Journal of Entrepreneurial Knowledge*, *10*(1), 34-45. https://doi.org/10.37335/ijek.v10i1.131.

Kwak, G. (2021). Financing decision of high-tech SMEs in Korea: A revisitation to pecking order theory. *Applied Economics Letters*, *28*(16), 1400-1406. https://doi.org/10.1080/13504851.2020.1820437.

Le, T. P. V., & Tannous, K. (2016). Ownership structure and capital structure: A study of Vietnamese listed firms. *Australian Economic Papers, 55*(4), 319-344. https://doi.org/10.1111/1467-8454.12089.

Lee, N., & Lee, J. (2019). R & D intensity and dividend policy: Evidence from South Korea's biotech firms. *Sustainability*, *11*(18), 4837. https:/doi.org/10.3390/su11184837.

Liang, B. (2011). Evaluation of high-tech enterprises. *Canadian Social Science,* 7(6), 245-248.

Miller, M. H., & Rock, K. (1985). Dividend policy under asymmetric information. *The Journal of Finance,* 40(4), 1031-1051. https://doi.org/10.2307/2328393.

Munandar, A. (2017). The impact of managerial ownership, size, and growth rate on capital structure. *Jurnal Riset Terapan Akuntansi*, *1*(2), 84-88.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187-221. https://doi.org/10.1016/0304-405x(84)90023-0.

Neville, C., & Lucey, B. M. (2022). Financing Irish high-tech SMEs: The analysis of capital structure. *International Review of Financial Analysis*, *83*, 102219. https://doi.org/10.1016/j.irfa.2022.102219.

Ortega-Argilés, R., Piva, M., & Vivarelli, M. (2015). The productivity impact of R&D investment: are high-tech sectors still ahead? *Economics of Innovation and New Technology*, *24*(3), 204-222. https://doi.org/10.1080/10438599.2014.918440.

Petty, J. W., Titman, S., Keown, A. J., Martin, P., Martin, J. D., & Burrow, M. (2015). *Financial management: Principles and Applications* (6th ed.). Pearson.

Qawasmeh, S., & Azzam, M. (2020). CEO characteristics and earnings management. *Accounting*, *6*(7), 1403-1410. https://doi.org/10.5267/j.ac.2020.8.009.

Rodionova, I. (2021). Knowledge- and technology-intensive industries: Case study of the EU and the position of Poland. *Proceedings of the XV International Scientific Conference: Analysis of International Relations 2021 – Methods and Models of Regional Development*, 117-131. https://air.ue.katowice.pl/pdf/2021/10_Rodionova.pdf

Ross, S. A. (1977). The Determination Of Financial Structure: The Incentive-Signalling Approach. *The Bell Journal Of Economics*, *8*(1), 23-40. https://doi.org/10.2307/3003485.

Rozeff, M. S. (1982). Growth, Beta and Agency Costs as Determinants of Dividend Payout Ratios. *Journal of Financial Research,* 5(3), 249-259.

Sardo, F., & Serrasqueiro, Z. (2021). Intellectual capital and high-tech firms' financing choices in the European context: a panel data analysis. *Quantitative Finance and Economics*, *5*(1), 1-18. https://doi.org/10.3934/QFE.2021001.

Serrasqueiro, Z., Maçãs Nunes, P., & da Rocha Armada, M. (2016). Capital structure decisions: old issues, new insights from high-tech small and medium-sized enterprises. *The European Journal of Finance, 22*(1), 59-79. https://doi.org/10.1080/1351847X.2014.946068.

Shipe, S. (2015). Volatility of cash holding and firm value. *Job Market Paper, Florida State University*. https://www.usf.edu/business/documents/departments/finance/conference/2015-volatility-of-cash-holdings.pdf

Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy*, *94*(3), 461-488.

Shrestha, K., Philip, S. S. S., & Khaw, K. L. H. (2024). Impact of geopolitical risk on target debt ratio. *Finance Research Letters, 60*, 104964. https://doi.org/10.1016/j.frl.2023.104964.

Stereńczak, S., & Kubiak, J. (2023). The choice of external financing source: The role of company size and stock liquidity. *Economics and Business Review*, *9*(3), 44-65. https://doi.org/10.18559/ebr.2023.3.800.

Sun, W., Yin, C., & Zeng, Y. (2023). Precautionary motive or private benefit motive for holding cash: Evidence from CEO ownership. *International Review of Financial Analysis, 90*, 102820. https://doi.org/10.1016/j.irfa.2023.102820.

Taha, M. M., Hegazy, I. R., & Arafa, E. M. (2024). The Impact of CEOs' Power on Dividends Policy: Evidence from Egypt. *The Academic Journal of Contemporary Commercial Research*, *4*(2), 51-75. https://doi.org/10.21608/ajccr.2024.226081.1075.

Talbi, D., & Manchaoui, I. (2023). Impact of board attributes and managerial ownership on cash holdings: empirical evidence using GMM and quantile regressions. Corporate Governance, *23*(4), 723-741. https://doi.org/10.1108/CG-04-2021-0145.

Tayachi, T., Hunjra, A. I., Jones, K., Mehmood, R., & Al-Faryan, M. A. S. (2023). How does ownership structure affect the financing and dividend decisions of firm? *Journal of Financial Reporting and Accounting*, *21*(3), 729-746. https://doi.org/10.1108/jfra-09-2021-0291.

Thanatawee, Y. (2019). Alignment or entrenchment? Evidence from cash holdings in Thailand. *Afro-Asian Journal of Finance and Accounting, 9*(3), 291-308. https://doi.org/10.1504/aajfa.2019.100978.

Vernimmen, P., Quiry, P., & Le Fur, Y. (2022). *Corporate finance: theory and practice* (6th ed.). John Wiley & Sons.

Vo, D. H., & Nguyen, V. (2014). Managerial Ownership, Leverage and Dividend Policies: Empirical Evidence from Vietnam's Listed Firms. *International Journal of Economics and Finance, 6*(5), 274-284. https://doi.org/10.5539/ijef.v6n5p274.

Wilenius, M. (2014). Leadership in the sixth wave—excursions into the new paradigm of the Kondratieff cycle 2010–2050. *European Journal of Futures Research, 2*(36). https://doi.org/10.1007/s40309-014-0036-7.

Wu, H. C., Chen, J. H., & Wang, P. W. (2021). Cash holdings prediction using decision tree algorithms and comparison with logistic regression model. *Cybernetics and Systems*, *52*(8), 689-704. https://doi.org/10.1080/01969722.2021.1976988.

Yang, C., Hua, Y., & Hua, Z. (2022). R&D investment along the firm life-cycle: new evidence from high-tech industries. *International Journal of Technology Management*, *88*(2-4), 353-388. https://doi.org/10.1504/ijtm.2022.121488.

The research article passed the double-blind review process. | Received: 10 September 2024**; Revised:** 30 November 2024**; Accepted:** 10 December 2024**; Available online:** 14 April 2025**; Published in the regular issue:** 8 October 2025.