

Sustainability performance, corporate governance, and financial performance: Evidence from Poland and Central European listed companies

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Abstract

PURPOSE: Businesses are regarded as the main agents that can help achieve sustainable development. Therefore, more and more firms of various characteristics integrate sustainability issues into their business strategies. There is ongoing debate on the relationship between sustainability engagement and firm performance, with ambiguous results. Our study falls into this stream of research by adding the perspective of the Central European economy. The main objective of our paper is to examine the relationship between firm sustainability performance and its financial performance in the context of various corporate governance characteristics (in particular board attributes and ownership structure). **METHODOLOGY:** Our research sample covers firms listed on the Warsaw Stock Exchange representing various indexes (related to their size) and sectors in 2015–2021. We measure sustainability performance with our original aggregated index created by integrating key firm ESG engagement characteristics. Financial performance is analyzed from two different perspectives – accounting perspective illustrated by profitability of assets (ROA) and market perspective - illustrated by market value (MV/BV ratio). To achieve the research aims, several statistical methods were employed in the study, including selected descriptive statistics and panel regression models. **FINDINGS:** Our results confirm a significant positive relationship between sustainability and financial performance, as measured by ROA and MV/BV ratios. Additionally, we observe a significant positive relationship between gender diversity on the management board (the presence of women on the management board) and accounting performance. Our results provide an argument for firm engagement in sustainability initiatives, as it may improve its profitability and market value. **IMPLICATIONS for theory and practice:** Our study not only contributes to the corporate finance and sustainability literature by providing evidence on the relationship between sustainability performance and financial performance in the context of the Central European economy, but also provides insights for corporate governance research in terms of boards attributes and different types of ownership structures. The policy suggestions derived from our findings can benefit both managers and regulators, focusing on the sustainable development paradigm and ultimately enhancing overall stakeholder well-being. **ORIGINALITY AND VALUE:** The originality of our research stems from investigating the relationship between sustainability performance and firm performance from both an accounting and a market perspective and using the original sustainability index developed for the purpose of the study. Additionally, we address potential gaps in existing research by incorporating several corporate governance characteristics to clarify their importance for a firm performance. **Keywords:** sustainability performance, firm performance, ownership structure, board attributes, corporate governance, listed companies, ESG performance, financial performance

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INTRODUCTION

In recent years, the concept of sustainability has been promoted extensively by authorities in the European Union (EU) or the United Nations (UN). Enterprises are encouraged to integrate social, environmental, corporate governance, ethical, and human rights concerns into their business strategy and operations. This shift towards sustainability fundamentally changes the way the companies are managed, with sustainability goals being added to the economic goals and integrated into business strategy. However, many companies consider sustainability activities as costly ones. Apart from the legal obligation to implement sustainability in everyday operations, there should be incentives for companies to include sustainability recommendations in the business. These may include the positive impact of sustainability performance on enhancing resources management efficiency, strengthening competitive position, improved financial results, and positive reactions from the financial market. Consequently, companies are interested in sustainable activities, provided they prove beneficial.

According to the recent literature review by Rahi et al. (2023), the debate on the link between sustainability performance and financial performance remains unresolved. Moreover, they argue that contemporary research in this field lacks a comprehensive framework. Additionally, they observe that the nexus between sustainability and firm performance depends on the country-level sustainability. Motivated by these conclusions, we try to address these issues in our research by focusing on the relationship between sustainability performance and firm financial performance in the Polish context.

Extant research provides inconsistent evidence on sustainability adoption on the firm performance (Lindgreen et al., 2009; Lassala et al., 2017; Lassala et al., 2021; Rahi et al., 2023). Despite the increased implementation of sustainable issues around the world, there is still a disagreement on the link between sustainability and financial performance, which is represented by the proponents of the neutral, positive or negative approach. The main controversies arise from the fact that sustainability initiatives may increase costs and impact financial performance in the short term, while the potential benefits of these actions may only be seen in the long term. Other concerns include the diversity of regulations and reporting frameworks for sustainability across countries, varying opinions and expectations among shareholders and other stakeholders, which may be country-specific, as well as the existence of greenwashing practices. The lack of a consensus on this relationship motivates the authors to further explore this issue in the context of one of the European Central economies.

In this study, firm performance is analyzed through two distinct lenses: the accounting approach and the shareholders theory approach (Friedman, 2007). The first approach is focused on the accounting profit and a firm's profitability as measured by return on assets (ROA), while the second approach examines market performance as measured by market to book value (MV/BV). These two different approaches enable us to examine the relationship between firm financial performance and sustainability performance in two separate dimensions. The rationale behind this approach stems from the statements of Gentry and Shen (2010), who argued that measures of accounting profitability and market performance represent distinct dimensions of firm performance and should not be used interchangeably. ROA, a classic efficiency metric, computed as net profit over total assets, aligns with the neoclassical theory of corporate finance (Van Der Laan et al., 2007) and stresses the importance of generating accounting profit. This measure of financial performance is commonly used in empirical studies due to its simplicity and comparability. However, its application requires accepting the limitation of the accounting profit used as a measure of a firm's financial performance, such as short-term focus, ignoring cash flow and risk, or being affected by accounting and tax policies. To overcome these limits, the second approach is used based on MV/BV ratio as the financial performance measure, illustrating shareholder value maximization objective. Therefore, the market to book value represents the sentiment of investors and the way they perceive the value of the company and its future growth. However, when using market performance measures, one has to accept that a firm's stock price may not reflect its fundamental value due to financial market imperfections and limited market efficiency. Despite these considerations, financial performance ratios are widely used in both theoretical studies and empirical research. Researchers typically regard accounting ratios as measures of past or short-term financial performance, while market ratios are seen as proxies for future or long-term performance (Gentry & Shen, 2010). This duality allows for comprehensive analysis of firm financial performance from different perspectives.

The second element - corporate sustainability performance encompasses the ability of a company to positively influence environmental, social, and economic development through its governance practices and market presence (Krechovská & Procházková, 2014; Marco-Lajara et al., 2023). Within this framework, the business case for sustainability emerges as the strategic attempt by companies to balance social, economic, and environmental objectives. By integrating

sustainable development goals into the corporate strategy, companies aim not only to achieve long-term success but also contribute meaningfully to sustainable development (Marco-Lajara et al., 2023). There is no single, universal approach to measuring sustainability performance. As presented in the literature, corporate sustainability performance can be measured using various indicators and models (Dočekalová & Kocmanová, 2016; Jiang et al., 2018; Nikolaou et al., 2019; or Matuszewska-Pierzynka et al., 2023). This lack of standard metrics makes it difficult to examine the importance of sustainability performance and compare results for different companies.

This study differs from previous research in three key aspects. Firstly, various studies have used different measurement scales for specific aspects of sustainability (Dočekalová & Kocmanová, 2016; Jiang et al., 2018; Nikolaou et al., 2019). This diversity may lead to discrepancies and affect the perceived link between sustainability and financial performance. To effectively integrate various aspects of sustainability, this study introduces our own measure - the aggregated index of sustainability performance. Additionally, the originality of our research stems from investigating the relationship between sustainability performance and firm performance in two distinct dimensions - from both market and accounting perspectives. Most of the existing research refers solely to either market or accounting performance measures, missing the benefits of applying multiple perspectives. Finally, we address potential gaps in existing research by incorporating several corporate governance characteristics to clarify the relationship between sustainability and firm performance. We believe that corporate governance characteristics, including management board attributes (in particular, board size and board diversity) and different types of ownership structures (in this, family, state, managerial, or institutional investor ownership), may either facilitate or hinder the implementation of sustainability concepts in the business strategy and thereby help explain the relationship between sustainability performance and firm performance.

Based on the literature, three research hypotheses are formulated to evaluate the relationship between sustainability performance and firm performance (H1), the size of the management board and firm performance (H2), the gender diversity of the management board and firm performance (H3), ownership concentration and firm performance (H4), and the type of ownership structure and firm performance (H5). The nature of the data allows us to use panel data analysis. We focus on companies listed on the Warsaw Stock Exchange across three indices: WIG20, mWIG40, and sWIG80. The study examines data over the period 2015-2021. The final sample covers 93 companies with 651 firm-year observations. The data were retrieved from Notoria Service, the EMIS database, the economic service of the Polish Press Agency, as well as information sourced directly from companies' websites and corporate reports.

Our research is conducted in the specific context of Polish companies, following the suggestions of Xiao et al. (2018) and Rahmi et al. (2023), who stated that corporate sustainability performance depends on country-level sustainability. They also emphasized that stakeholder expectations related to sustainability are influenced by the unique characteristics of each country. Poland is the largest economy in Central Eastern Europe with a well-developed financial market. By focusing on Polish companies, we aim to set a benchmark for further research and actions on implementing sustainability in Central Eastern European countries. Despite Poland's economic significance, there is a paucity of research on Polish companies and the relationship between sustainability performance and firm performance. One stream of existing research on Polish companies refers to the review of sustainability (alternatively CSR/SDG) practices implemented by Polish companies (Dyduch & Krasodomska, 2017; Garstecki et al., 2019; Witek-Crabb, 2019), their impact on financial results (Witek-Crabb, 2018; Daszyńska-Żygadło, 2019) or societal factors behind sustainable entrepreneurship orientation (Doś & Pattarin, 2024). There are some studies for the specific sectors: the energy sector (Zieliński & Jonek-Kowalska, 2021; Stuss et al., 2021), industry (Daszyńska-Żygadło, et al., 2020), banking (Pyka & Nocoń, 2024; Daszyńska-Żygadło et al., 2020; Matuszak & Różańska, 2017; Matuszak et al., 2019) or ESG funds (Dmuchowski et al., 2023). Finally, much research has been devoted to sustainability (CSR/ESG) reporting - its content, quality and assurance (Krasodomska et al., 2022; Klimczak et al., 2023; Krasodomska et al., 2023; Hąbek, 2014).

To our knowledge, our study is the first to investigate the relationship between sustainability performance and firm performance (both illustrated by market and accounting ratios) using our own developed measure of sustainability performance integrating various aspects of sustainability actions across a broad sample of Polish companies.

Our findings not only contribute to the corporate finance and sustainability literature, but also provide insights for corporate governance research, as we add the perspective of various board attributes and ownership structures to our study. The policy suggestions derived from our findings can benefit managers and regulators, ultimately enhancing overall stakeholder well-being.

The remainder of this paper is organized as follows. The next section briefly discusses the theoretical background of the study, reviews existing literature, and develops hypotheses. Subsequently, we present the data, variables, and research

methodology. Following this, we discuss the empirical results and their interpretation. Finally, we present the theoretical and practical implications of the study. The paper concludes with recommendations regarding future research agendas.

LITERATURE REVIEW

The major objective of our study is to assess the relationship between sustainability performance and financial performance. The current literature regarding this relationship provides mixed evidence from different perspectives: 1) neutral approach – proposing a neutral stance, suggesting that there is no relationship between sustainability performance and financial performance (Aras et al., 2018; Witek-Crabb, 2018); positive approach – indicating that sustainability performance can improve financial performance, aligning with the social impact hypothesis and reputation-building explanation (Waddock & Graves, 1997; Margolis et al., 2009; Fernando et al., 2017; Daszyńska-Żygadło, 2019; Matuszewska-Pierzynka, 2021); and negative approach – suggesting that sustainability performance may worsen financial performance, in line with the substitution hypothesis (García-Castro et al., 2009; Vogel, 2006).

Moreover, the direction of impact is also debatable. It is unclear whether improvements in financial performance result from sustainable actions, as proposed by the social impact hypothesis, or whether financial results drive firm's engagement in sustainable practice, as suggested by the hypothesis of availability of funds for sustainable actions, which is linked to the slack resources theory. This ongoing debate underlines the complexity of this relationship and justifies further research in this field.

Numerous studies have examined the relationship between corporate financial performance and sustainability performance (often referred to as Corporate Social Responsibility, CSR or more recently - Environmental, Social and Governance, ESG performance). However, as evidenced by Rahi et al. (2023) in the recent literature review, the debate on the link between sustainability performance and financial performance is not solved. According to Makni et al. (2009), financial performance levels can be changed in response to changes in sustainability performance. This is in line with Freeman's (1984) stakeholder theory, stating that integrating corporate social responsibility in the firm strategy allows companies to meet stakeholders' needs and improve their reputation, consequently leading to better financial results. In empirical studies, Matuszewska-Pierzynka (2021) confirmed that the improvement in economic, environmental, and social sustainability performance leads to an increase in operating performance in terms of total revenues. Gonçalves et al. (2023) found a strong positive association between sustainability and economic performance in European firms, particularly driven by the environmental pillar. This positive relationship between sustainability performance and firm performance is explained by the synergic effect hypothesis (Ma & Latif, 2023). On the other hand, an inverse relationship between CSR levels and financial performance has also been proposed (García-Castro et al., 2009), as some researchers argue that a firm's sole social responsibility is profit maximization. CSR initiatives, in this view, represent unnecessary expenses that can lower firm financial performance relative to its competitors (Friedman, 2007). It is also suggested that the relationship between sustainability and financial performance varies across different sectors (Şerban et al., 2023) and for companies of different sizes (Abughniem et al., 2019; Kılıç et al., 2022).

Several studies found a positive relationship between sustainability (or ESG performance) and profitability measured by the return on assets (ROA) ratio (Velte, 2017; Bodhanwala & Bodhanwala, 2018; Bassetti et al., 2020; Pham et al., 2021; Kılıç et al., 2022). However, in a study by Velte (2017), this association was not found for a market performance, as measured by Tobin's Q. Moreover, through analysis of the three distinct components of ESG, it was confirmed that governance (G) performance exhibits the strongest influence on financial performance when compared to environmental (E) and social (S) performance. Han et al. (2016) observed that ESG disclosure scores, used as a proxy for ESG performance in Korean corporations, provided diversified results concerning corporate financial performance, as measured by Return on Equity (ROE), Market-to-Book Ratio (MV/BV) and Stock Return. Several studies demonstrated a positive direct relationship between sustainability performance and market performance, as measured by MV/BV ratio (Lourenço et al., 2013; Maso et al., 2023), whereas Aras et al., (2018) and (Kılıç et al., 2022) found insignificant results when examining the link between sustainability performance and market value. The positive association between the sustainability performance and market value is linked to firm reputation as sustainable companies are recognized for their commitment, attracting more investors in the capital market and consequently, achieving a higher price to book value ratio (Buallay, 2019; Maso et al., 2023).

Therefore, the debate remains open due to inconclusive or mixed findings (Lindgreen et al., 2009; Lassala et al., 2017; Lassala et al., 2021; Rahmi et al., 2023). Several factors contribute to this discrepancy, including variations in applied models (Al-Tuwaijri et al., 2004), number of sustainability standards adopted by firms (Darnall et al., 2023), differences

in definitions and variables used to measure financial performance and sustainability, sample characteristics (Waddock & Graves, 1997) including country-specific factors, and the absence of control variables as size and economic sector (Abughniem et al., 2019; Lassala et al., 2021).

Based on this discussion presented in the extant literature, we have chosen to adopt a positive approach and have consequently formulated our primary hypothesis regarding the relationship between sustainability performance and financial performance in terms of accounting (ROA) and market performance (MV/BV).

H1a: There is a positive relationship between sustainability performance and ROA.

H1b: There is a positive relationship between sustainability performance and MV/BV.

Additionally, in our study, we aim to address the selected corporate governance mechanisms (in particular, management board characteristics and ownership structures) as the factors moderating the relationship between sustainability performance and financial performance. This part of research is designed to detect if corporate governance factors are important determinants of financial performance for companies of diverse sustainability performance. In particular, we focus on the characteristics of management boards, as this internal corporate governance mechanism has a strong impact on firms' efficiency. Extant studies suggest that strong corporate governance leads to higher sustainability performance contributing to financial performance and firm value (Lu, 2020; Pham et al., 2021; Nguyen, 2022; Wang et al., 2023).

The relationship between board characteristics and firm performance is indeed complex and multidimensional, often explored through the lenses of agency theory (Jensen & Meckling, 1976). Within this research stream, various board characteristics are explored, including the composition of the board, board independence, the presence of board committees, and board size. Due to their explanatory power and data availability, our study is concentrated on two specific characteristics: board size and board gender diversity. The structure and activity of the board represent key internal mechanisms of corporate governance, providing tools and methods for managing and controlling firm performance effectively from the perspective of its owners and other stakeholders. Such internal mechanisms play an essential role in the continental corporate governance system typical for Polish companies. The first board characteristic that may have an impact on firm performance is board size, however the extant literature provides mixed evidence. On one hand, many studies confirmed a negative relationship between board size and firm performance (Guest, 2009; O'Connell & Cramer, 2010; Augusto et al., 2019). A study by Guest (2009) for UK listed firms spanning from 1981 to 2002 found that board size has a strong negative impact on firm profitability and market performance. It also suggested that such a relationship is due to poor communication and lower effectiveness of large boards. O'Connell and Cramer (2010) received similar results in Ireland context - they observed that board size exhibits a strong negative association with firm performance. Similarly, in the context of emerging economies, Alabdullah et al. (2021) proved that there is a negative relationship between size of the board and profitability. On the other hand, Larmou and Vafeas (2010) found that an increase in the board size leads to an increase in the share market price, therefore, it is positively related to shareholder value. The same positive relationship between board size and firm performance (both in terms of accounting and market performance) was found by Pucheta-Martínez and Gallego-Álvarez (2019) covering over 10,000 firm-years observations from 34 countries across six geographic zones. The positive association between board size and firm performance with regard to its market value was confirmed for West African companies in study by Tuo et al. (2021). However, Rodríguez-Fernández et al. (2014), who studied Spanish companies, suggested that there is no clear relationship between board size and firm performance. Finally, Neves et al. (2022) suggested that non-financial French firms should have the optimal number of board members for achieving good performance.

As indicated above, research on the relationship between board size and firm performance indeed provides mixed results. These inconsistencies arise from the diverse types and functions of boards under examination, such as management boards or supervisory boards in a two-tier corporate governance system, or the board of directors in a one-tier corporate governance system. Additionally, variations in the measures of firm performance used across studies contribute to these unequivocal findings. Based on these diverse observations, we formulate hypotheses regarding the relationship between the size of management board and firm performance without specifying the nature of this relationship:

H2a: There is a significant relationship between the size of the management board and ROA.

H2b: There is a significant relationship between the size of the management board and MV/BV.

The second board characteristic examined in this study is board gender diversity, which is associated with the potential for more comprehensive and balanced decision-making, as well as enhanced transparency, accountability, and ethical behavior. In our study, we aim to examine if Polish companies are adapting to the social changes related to the increased participation of women in the workforce and if they are using the opportunity to enhance their performance through more inclusive leadership practices. Numerous studies have explored the impact of board gender diversity on firm performance. Similarly, in this context, empirical results are varied and inconclusive, further motivating our research.

Pucheta-Martínez and Gallego-Álvarez (2019) found that having a female director is positively linked to firm performance. Green and Homroy (2018) studied large European firms and provided robust evidence of the positive effect of female board representation on firm performance. They also found that female representation on board committees is positively related to firm performance. In the context of developing countries, the positive significant effect of female board representation on firm performance was also observed in West African companies (Tuo et al., 2021). Similarly, Li and Chen (2018) found that the board gender diversity has a positive impact on firm performance, but this relationship is observed for the companies of relatively smaller size in case of the analyzed Chinese listed companies. They also provided evidence that firm size may undermine the positive impact of board gender diversity on firm performance. Brahma et al. (2021) stated that gender diversity positively and significantly impacts financial performance (ROA and Tobin's Q), especially when three or more women serve on the board of firms compared to firms with lower levels of representation in the UK context. It is suggested that gender diversity leads to better decision-making processes, different attitudes toward risk and diversified skills, which may positively influence firm performance (Hassan et al., 2016; Moreno-Gómez et al., 2018; Pidani et al., 2020).

In contrast to these findings, Gruszczyński (2020) observed no significant correlation between female representation on corporate boards and firm performance in the context of large European companies. Similarly, Marinova et al. (2016) did not confirm the definitive link between board diversity and firm performance as measured by Tobin's Q across Dutch and Danish companies. Finally, Darmadi (2013) found a negative relationship between female representation and ROA in the Indonesian context.

Variations in results for the relationship between board gender diversity and firm performance have similar reasons as in the case of a link between board size and firm performance. Therefore, this issue remains open for discussion. As proponents of the positive approach, we formulate the following hypothesis in our study to contribute to this ongoing discussion:

H3a: There is a positive relationship between gender diversity of the management board and ROA.

H3b: There is a positive relationship between gender diversity of the management board and MV/BV.

As previously indicated, the second group of corporate governance factors pertains to ownership structure. Building upon existing research (e.g., Zandi et al., 2020; Bhakar et al., 2024), our study underscores the importance of ownership structure for the decision-making process, defining strategic objectives, formulating sustainability strategy, consequently shaping financial results and impacting market valuation. We recognize the role of firm owners in effective management decisions and in reducing conflict of interest between managers and shareholders, facilitated by the supervisory board's monitoring activity. Consequently, we assume in our study that ownership structure may influence firm performance, in terms of both accounting profitability and market value.

Research on the relationship between ownership structure and firm performance dates back to the seminal work of Berle and Means (1932), who found that in widely held corporations in the U.S. (with ownership dispersed among small shareholders and control), control tends to be concentrated in the hands of insiders, leading to underperformance. Ownership concentration serves as an internal mechanism within corporate governance, influencing the control delegated to management and owners (Neves et al., 2023). Based on these findings, Jensen and Meckling (1976) developed the owner-manager agency problem, stating that separation of ownership and control leads to potential agency conflicts. Later, Shleifer, and Vishny (1986) suggested that large external equity holders can mitigate agency conflicts through effective monitoring and management discipline. Following these statements, we focus first on the relationship between ownership concentration and financial performance. However, the literature demonstrates that the impact of ownership concentration on firm performance ranges from positive to negative outcomes.

Mak and Kusnadi (2005) indicated that there is a positive relationship between block-holders' (large) ownership and firm performance (as measured by the Tobin Q ratio) in the context of Malaysia and Singapore. Similarly, Young et al.

(2008) reported that firm performance (Tobin Q) is positively related to block holders' ownership in Taiwan. Bhakar et al. (2024) confirmed the same positive relationship in a literature review study covering works from 1977 to 2022.

In contrast, contradictory evidence was presented in the works of Demsetz and Villalonga (2001), suggesting that higher ownership concentration leads to lower firm performance (Tobin Q) in the US context. Villalonga and Amit (2006) found out that block-holders' ownership is negatively associated with firm performance (Tobin Q) in a sample of 508 firms listed on the Fortune 500 spanning from 1994 to 2000. Similarly, Pekovic and Vogt (2021) found a negative relationship between ownership concentration and firm performance. Moreover, Paniagua et al. (2018) documented the negative relationship between ownership dispersion and firm performance (measured by Return on Equity, ROE) in their study, covering a diverse sample of 1207 companies from 59 countries. Laporšek et al. (2021) confirmed that Slovenian state-owned companies exhibit lower profitability compared to privately-owned counterparts. However, their study did not confirm a statistically significant relationship between ownership concentration and firm performance.

Despite the mixed empirical evidence, the agency theory posits that shareholders with large stakes in a corporation can effectively monitor management. Therefore, we may expect higher ownership concentration to be associated with better firm performance. The above argument suggests the following hypothesis:

H4a: There is a positive relationship between the ownership concentration and ROA.

H4b There is a positive relationship between the ownership concentration and MV/BV.

Given the inconsistent findings regarding the relationship between ownership concentration and firm performance, we decide to focus further research on the impact of different types of controlling owners: managers, family, institutional investors, and state ownership. These various types of owners have different investment objectives, influencing their relations with the companies they invest in. They may also differ in their opinions about the importance of a firm's engagement in sustainability initiatives, which may impact a firm's financial and sustainability performance.

Managerial ownership, as suggested by Jensen and Meckling (1976) on the grounds of the agency theory, can potentially reduce managerial incentives to consume perquisites, expropriate shareholders' wealth, or engage in other sub-optimal activities and consequently align the interests of managers and shareholders, lowering agency costs and leading to improved firm performance. In line with this notion, Coles et al. (2012) found a positive association between managerial ownership and firm performance (Tobin Q) in their analysis of data from the Execucomp database from 1993 to 2000. Similarly, Singh and Davidson (2003) observed a positive impact of managerial ownership on asset management efficiency (measured by total assets turnover) among large US companies. The same positive relationship was observed by Zandi et al. (2020) in a study covering 200 Malaysian listed companies. In contrast, scholars such as Demsetz (1983) and Fama and Jensen (1983a & b) pointed out that increasing insider ownership stakes might foster adverse entrenchment effects, potentially leading to intensified managerial opportunism at the expense of external investors.

Family firms are a special class of large shareholders with unique incentive structures. For example, concerns regarding family and business reputation and firm survival would tend to mitigate the agency costs of external debt and external equity (Demsetz & Lehn, 1985; Anderson et al., 2003), although controlling family shareholders may still expropriate minority shareholders (Claessens et al., 2002; Villalonga & Amit, 2006). Several studies (e.g., Anderson & Reeb, 2003; Villalonga & Amit, 2006; King & Santor, 2008) reported that family firms, particularly those with large personal ownership, tend to outperform non-family firms (in terms of both profitability and Tobin Q). In addition, the empirical findings presented by Maury (2006) suggest that large controlling family ownership in Western Europe is associated with beneficial effects on minority shareholders in terms of profitability.

Institutional investors, managing diversified portfolios on behalf of their clients, are characterized by their expertise and active involvement in firm management. Compared to individual investors, institutional investors are more skillful and sophisticated – thus they are called better-informed investors (Li et al., 2017). The presence of institutional investors among company shareholders has been studied in terms of their impact on many aspects of corporate finance (Ferreira & Matos, 2008). Particularly, the positive impact of institutional investors has been confirmed on firm performance – both in terms of accounting and market performance. Institutional investors may motivate management effectively, as they have the necessary resources and ability to monitor, discipline, and influence managers (Cornett et al., 2007; Callen & Fang, 2013). Thus, several studies have proven a positive relationship between institutional ownership and firm performance, both in terms of profitability (Cornett et al., 2007; Elyasiani & Jia, 2010) and in terms of market value (measured by Tobin Q) (Buchanan et al., 2018; Arora & Sharma, 2016).

State ownership introduces a distinct set of firm objectives, including social and political goals (e.g., Hellman & Schankerman, 2000), which may diverge from profit-driven motives. These functions and objectives may encourage government agencies to intervene in business activities. The State might want the company to implement investment projects even if they are not profitable enough, particularly in the case of multi-generation projects. The State's intended role is to ensure public security in critical sectors (energy, transportation, telecommunication services, and broadcasting). This might lead to a lower financial firm performance of SOEs (State-Owned Enterprises) (Kabaciński et al., 2020; Chong & Zhang, 2022).

There are several studies on the firm performance of SOEs (e.g., Eforis & Uang, 2015; Szarzec & Nowara, 2017; Matuszak & Szarzec, 2019). Despite the common perception that State ownership is connected with lower firm performance, the results of existing studies show mixed results. Eforis and Uang (2015) found that state ownership is positively related to firm performance, demonstrating that governmental support in developing countries is beneficial to firm growth. Szarzec and Nowara (2017) observed that economic performance of state-owned companies is, on average, comparable to their private counterparts. However, Matuszak and Szarzec (2019) reported lower performance among state-owned enterprises. Additionally, studies such as Berger et al. (2005) have linked associate state ownership and state governance with inefficiencies and poor performance in Argentina context.

Given these diverse findings, it is evident that the type of ownership structure significantly influences firm performance. Further research is needed to understand the relationship between the type of ownership and firm results in this accounting and market performance. Based on this rationale, we propose the following hypothesis:

H5a: There is a significant relationship between the type of ownership structure and ROA.

H5b: There is a significant relationship between the type of ownership structure and MV/BV.

METHODOLOGY

Research method and sample

The research aims to explore the relationship between corporate sustainability performance and corporate financial performance. Additionally, in our study, we aim to address the selected corporate governance mechanisms (board characteristics and ownership structures) as the factors determining the financial performance for companies of diverse sustainability performance. To achieve this, the study employs several statistical methods, including selected descriptive statistics and panel regression models. The research design is presented in Figure 1.

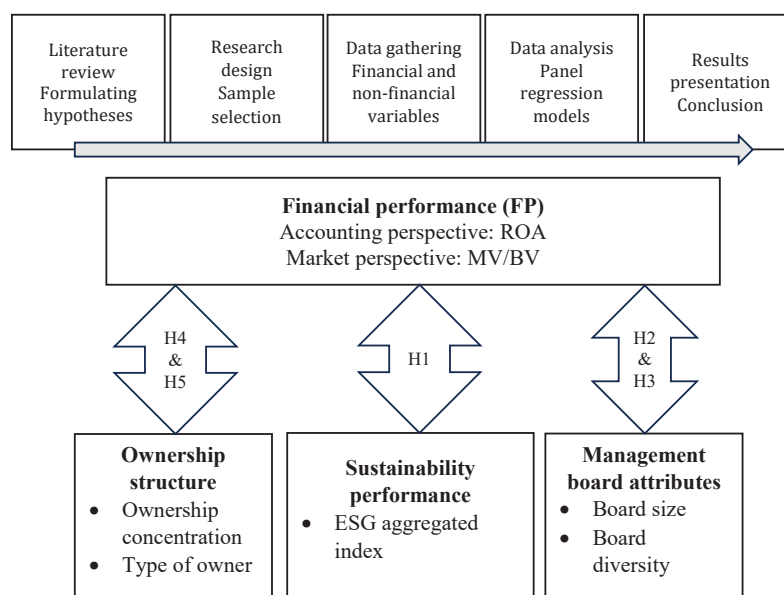


Figure 1. Research design

Focusing on companies listed on the Warsaw Stock Exchange across three indices: WIG20 (20 large companies), mWIG40 (40 medium companies), and sWIG80 (80 small companies), the study examines data spanning from 2015 to 2021. Initially, 140 companies were included in these indices (as of December 31, 2022). However, exclusions were necessary for firms in the financial sector (such as banks and insurers), foreign companies operating outside Poland, or firms with missing information (in this, companies that were not included in these indices for the entire 2015-2021 period). Consequently, the final sample covers 93 companies with 651 firm-year observations (16 companies coming from WIG20, 23 - from mWIG40, and 54 - from sWIG80). The research sample comprises: 44 companies from the manufacturing sector, 22 from the service sector, 11 from the construction sector, 13 from the trade sector, and 3 from the mining sector. Data collection process involved using Notoria Service for primary financial and corporate governance data. In addition, the annual reports of the companies for the years 2015-2021 were analysed using the EMIS database, the economic service of the Polish Press Agency, as well as information sourced directly from companies' websites and corporate reports. The nature of data allows the use of panel regression models to test the research hypotheses. The general form of the panel regression model can be expressed as follows (Gruszczynski et al., 2012, p. 271):

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (1)$$

where:

- Y_{it} represents the endogenous variable, in our study there are two endogenous variables that represent operating performance measured by ROA (return on assets) and market performance measured by MV/BV (market value to book value);
- α_i – intercept term;
- β – row vector of slope coefficient of regressors;
- X_{it} - exogenous variables described in Table 1;
- ε_{it} - error term.

The period 2015-2021 was chosen for analysis for several reasons. Primarily, in 2015 the United Nations adopted the Sustainable Development Goals (SDGs), a global initiative aiming at ending poverty, protecting the planet, and ensuring peace and prosperity by 2030. Moreover, numerous law regulations were introduced at both the European Union and national levels to promote sustainability and corporate responsibility. Key regulations include the adoption of the Non-financial reporting Directive (NFRD) in October 2014, and the proposal for a Corporate Sustainability Reporting Directive (CSRD) in April 2021. At the national level, the most important regulations included the adoption of the Energy of Poland until 2040 (2021), The 2030 National Environmental Policy (2019), and The Strategy for Responsible Development for the period up to 2020 (with a perspective up to 2030). Therefore, a strong regulatory framework requires adequate responses from businesses.

Throughout this period, there has been an increasing global focus on sustainability issues, encompassing environmental protection, social responsibility, and corporate governance. Various corporate stakeholders are becoming more aware of the imperatives of sustainability and the obligations corresponding to society. This leads to bottom-up pressures on managers to prioritize sustainability performance to drive long-term corporate value. Poland was selected as the country setting for examining the nexus between sustainable and financial performance due to its leading economy position in Central and Eastern Europe, and successful transition from a command to a free-market economy. This experience may become useful today, when Poland is facing other challenges in sustainable development, energy transition, climate change, social inequalities, and the circular economy. Thus, studying the sustainability practices and reporting mechanisms of Polish firms may provide interesting insights into the evolving landscape of ESG transformation across Central European companies.

Moreover, the Warsaw Stock Exchange offers trading in stock of companies from various sectors, industries, ownership structures, and corporate governance practices. This diversity facilitates comprehensive observations and comparisons of ESG practices, sustainable performance metrics, and financial performance.

Variables included in the empirical analysis

To ascertain the relationship between sustainability performance and firm performance, several variables were applied in line with extant research in this field. Understanding the limitations of each indicator, the corporate financial performance

was measured alternatively: Return on Assets (*ROA*) as an accounting measure and market-to-book value (*MV/BV*) as a market performance ratio. As explained in the introduction, this approach aligns with the suggestion of Gentry and Shen (2010), who stated that accounting profitability and market performance represent distinct dimensions of firm performance. This perspective allows for a more comprehensive analysis of the relationship between sustainability performance and financial performance. *ROA*, calculated as net profit over total assets, can be considered as the traditional efficiency measure (Van Der Laan et al., 2007), while the *MV/BV* ratio illustrates the shareholder value maximization objective. *ROA* values were calculated based on financial accounting data retrieved from Notoria Service, while *MV/BV* values were calculated using stock market prices from the Warsaw Stock Exchange at the end of each fiscal year. Our approach is consistent with several studies examining the relationship between firm performance and sustainability performance in various contexts (Lourenço et al., 2013; Velte, 2017; Bodhanwala & Bodhanwala, 2018; Bassetti et al., 2020; Pham et al., 2021, Maso et al., 2023).

A range of indicators and metrics are used to assess the corporate sustainability performance, focusing on particular aspects of sustainability actions, as evidenced in studies by Dočekalová and Kocmanová (2016), Jiang et al. (2018), Nikolaou et al. (2019), Daszyńska-Żygadło (2019) and Matuszewska-Pierzynka et al. (2023). This variety may lead to discrepancies and affect the perceived link between sustainability and financial performance. To effectively integrate various aspects of sustainability, this study introduces our own measure - the ESG aggregated index of sustainability performance (*ESGaggr*). The original index is constructed as a composite of five elements, illustrating the multi-dimensional nature of firm sustainability performance. When constructing the ESG aggregated index, we use five variables, assuming that each is equally important for the sustainability performance. We computed the overall mean across these five factors, following the methodology used by Van Der Laan et al. (2007). These elements include two factors related to external assessment of ESG firm performance, ensuring its objectivity (*WIG_ESG* and ESG risk rating), and three factors related to a firm's internal decisions: the applied sustainability reporting practices (GRI standard and ESG report) and sustainability management practices, along with a strategic approach to ESG issues represented by appointing a board member for the sustainability issues (ESG board member). Therefore, the ESG aggregated index is derived from five key components, each assigned a binary value:

- *WIG_ESG* - takes 1, if firm is listed within the ESG index on the Warsaw Stock Exchange (in each year), 0 – otherwise;
- ESG risk rating - takes 1, if firm has got the ESG risk rating assigned by the Sustainalytics (at least once during the analyzed period), 0 – otherwise;
- GRI standard - takes 1, if firm uses the GRI standard for the sustainability reporting (in each year), 0 – otherwise;
- ESG report - takes 1, if firm has got a separate sustainability/ESG/CSR/non-financial report (in each year), 0 – otherwise;
- ESG board member - takes 1, if firm appoints a board member responsible for the sustainability/ESG/CSR actions or strategy (in each year), 0 - otherwise.

Therefore, the ESG aggregated index spans from 0 to 1, illustrating the breadth of coverage across these five elements of sustainability performance. A score of 0 suggests a lack of observations related to sustainability performance, while a score of 1 indicates comprehensive coverage across all components. We decided to build our own ESG aggregated index for several reasons. Firstly, to cover various aspects of sustainability performance, comprising both the internal dimension: strategic approach and reporting practices, and the external assessment: ESG risk ratings and inclusion in the ESG index. Secondly, we use the composite index to encompass a broad spectrum of companies in our study, as many Polish companies are either not included in the ESG index or are not evaluated through ESG risk ratings.

Understanding the importance of corporate governance mechanisms as the factors moderating the relationship between sustainability performance and financial performance, we use variables illustrating the board attributes in our study. In particular, we focus on the management board characteristics, as this internal corporate governance mechanism has a strong impact on firm efficiency and firm performance (Lu, 2020; Pham et al., 2021; Nguyen, 2022; Wang et al., 2023).

Following extant literature, we decide to focus on two management board characteristics, which are presented with two variables retrieved from the Notoria database:

- the size of the board – measured by the natural logarithm of the number of board members (*LnBoard*) (Augusto et al., 2019; Alabdullah et al., 2021; Neves et al., 2022);

- the presence of women on the board – measured as the number of women on board to the total number of board members (*Board_W*) (Hassan et al., 2016; Moreno-Gómez et al., 2018; Pidani et al., 2020).

The second group of corporate governance mechanisms related to ownership characteristics are illustrated through various variables, each shedding light on different aspects of ownership structure. These variables describe the importance of specific types of owners (financial, state, managerial, family owners), and provide information on ownership concentration. The family firm indicator (*FAM_own*) is a binary variable, denoting whether a firm is family-owned (1) or not (0) retrieved from the Warsaw Stock Exchange. Additionally, for other types of ownership structures, we use the percentage of total shares held by specific owners, including the state (*STATE_OWN*), financial investor (*FIN_OWN*) or the CEO (*MAN_OWN*). Ownership concentration is captured through two proxies, following the approach used by Horobeț et al. (2019) in a study on ownership concentration in the European Union. The first ratio illustrates the percentage of total shares held by the primary dominant shareholder (*OWN_1*), while the second one represents the percentage of total shares held collectively by the top three major shareholders (*OWN_3*). These measures provide insight into the level of control exerted by majority shareholders.

We also include in our research several control variables presenting the specificity of the company: firm size, market maturity, leverage, and tangibility. The size of a firm has been found to have a significant influence on the relationship between sustainability performance and financial performance, with varying effects observed in different sectors and countries (Abughniem et al., 2019; Kılıç et al., 2022). In our model, we employ the natural logarithm of total assets as a proxy for firm size (*SIZE*) following earlier studies (Yadav et al. 2021). While many studies examine the relationship between firm size and profitability, the results remain inconclusive. Some studies confirm the positive relationship between firm size and profitability (Doğan, 2013 and Işık et al., 2017 for Turkish firms; and Rahman & Yilun, 2021 for Chinese companies, Yoon & Jang, 2005 for restaurants, Kędzior & Kędzior 2023, for Polish SMEs in the service industry, and Ziolo et al. 2023, for 11 EU countries). However, Becker-Blease et al. (2010) discovered both positive and negative relationship between size and profitability for U.S. firms from different industries, suggesting that the relation may be contingent upon industry specific. Additionally, they found a negative correlation between profitability and the number of employees for firms of similar size, as measured by total assets and sales. Moreover, they observed that for some industries, profitability exhibits diminishing rates as firms grow larger and eventually decline. Similar observations suggesting that larger firms may be less efficient in terms of profitability were described by Yadav et al. (2021) in their study of 12 emerging Asia-Pacific countries. The same results illustrating the negative relationship between profitability and ROA for Polish companies listed on the Warsaw Stock Exchange were presented by Majerowska and Gostkowska-Drzewiecka (2018).

Therefore, the question regarding the relationship between firm size and firm performance remains an ongoing topic of debate. Firm market maturity is a typical control variable that illustrates its specifics and may have an impact on firm strategy, management decisions, and financial performance. In our model we use the number of years from the debut on the Warsaw Stock Exchange as a proxy for firm market maturity (*MAT*), illustrating how the company is dealing with new requirements when being listed. This approach is used in many studies as a proxy for firm age (Brahma et al., 2020; He et al., 2019; Peng & Tao, 2022). The link between firm performance and firm maturity (age) has been extensively studied with mixed results (Rossi, 2016). The negative relationship between firm maturity and firm performance is confirmed in empirical studies, e.g. Loderer and Waelchli (2010), Doğan (2013) for Turkish firms, and Rahman and Yilun (2021) for public firms in the Chinese context. However, evidence is also provided for a U-shaped relationship between firm maturity and performance, with an initially negative effect before positive returns are realized (Đặng et al., 2021).

The relationship between leverage (*LEV*) and financial performance, particularly profitability, is the subject of numerous studies in the context of financing decisions and capital structure theories (Koralun-Bereźnicka, 2019; Wiczorek-Kosmala, 2021). However, the results are mixed - some studies confirm the trade-off theory of capital structure, illustrating the positive relationship between leverage and profitability, while others provide evidence for the pecking order theory with a negative relationship between the level of debt and profitability. Studies also focus on the opposite direction, analyzing the interaction between profitability and firm leverage. Doğan (2013) and Yadav et al. (2021) found a negative relationship between profitability and firm leverage ratio. The same observation described Kędzior and Kędzior (2023) for Polish SMEs from the service industry, also Kaźmierska-Józwiak et al. (2015) for non-financial companies listed on the Warsaw Stock Exchange. Yoon and Jang, (2005) observed a positive relationship between the level of debt and firm profitability in the restaurant industry. Finally, Dalci (2018) and Nikhil et al. (2024) proved that the impact of leverage on profitability is inverted U-shaped. The positive impact of leverage on profitability arises from the tax shield, while the negative one – from

the bankruptcy costs and agency problems. These observations are consistent with the trade-off theory of capital structure. Bukalska and Radman-Pesa (2018) found differences in the direction of relationship due to the type of profitability ratio, as they observed a positive relationship between debt and ROE and a negative relationship between debt and ROA. As to the relationship between leverage and market value, it is expected that firms with lower leverage may have higher MV/BV ratios, as investors perceive them as less risky. Thus, this inconsistency may motivate further studies in this field. In our study, we use debt-to-asset ratio as a proxy for firm leverage, informing about the level of financial risk.

The relationship between asset tangibility (*TANG*) and financial performance is significant, as evidenced by Jha and Kumar (2024), however, the results are mixed. On the one hand, Kędzior and Kędzior (2023) examined SMEs operating in the service sector in Poland and found that asset tangibility negatively impacts firm profitability. The same negative relationship between profitability and asset tangibility was confirmed for Asian companies by Yadav et al. (2021). On the other hand, Majerowska and Gostkowska-Drzewiecka (2018) found that for the companies listed on the WSE in 1998-2016, an increase in the tangibility ratio leads to an increase in ROA. The opposite direction may be expected for the relationship between asset tangibility informing about business risk and MV/BV ratio, as less risky firms are characterized by better market performance. In our study, we measure asset tangibility by fixed assets to total assets ratio and use it as a proxy for business risk linked to the operations sector. The methods for computing the variables are outlined in Table 1.

Table 1. The formulas of the variables applied in the study

Dependent variables	Financial performance	Symbol
ROA	Return on assets = net profit to total assets	ROA
MV/BV	Market value to book value	MVBV
Independent variables	sustainability performance, board characteristics, ownership characteristics	
Sustainability measure ESG aggregate index	ESG aggregated index derived from five key components: WIG_ESG, ESG risk rating, GRI standard, ESG report, ESG board member	ESGaggr
Management board size	Ln from the number of members on the management board	LnBoard
Women on the management board	Percentage of women on the management board	Board_W
State ownership	Percentage of shares held by the state	State_own
Financial investors ownership	Percentage of shares held by financial investors	Fin_own
Managerial ownership	Percentage of shares held by CEO	Man_own
Family firm	Dummy variable: <ul style="list-style-type: none"> • 1 if the person who founded or acquired the company, together with his or her relatives and descendants, holds at least 25 percent of the voting rights at the company's general meeting of shareholders company (WSE classification), • and 0 otherwise. 	Fam_own
Ownership concentrations 3	The percentage of shares held by the three biggest owners	Own_3
Ownership concentrations 1	The percentage of shares held by the first owner	Own_1
Control variables		
Size	Ln from total assets	Size
Leverage	Total debt to total assets	Lev
Tangibility	Fixed assets to total assets	Tang
Market maturity	Ln from the number of years the company is present on the WSE	Mat

RESULTS AND DISCUSSION

Table 2 provides descriptive statistics for the 651 firm-year observations. The mean return on assets (ROA) stands at 5.96%, slightly surpassing the median value of 5.19%. The average market-to-book value (MV/BV) ratio is 2.34, exceeding the median of 1.34. Referring to ESGaggr score values, the results indicate considerable variability in their ESG performance. The mean score is 0.2927, however, the median is substantially lower (at 0.20). A relatively high standard deviation of 0.2797 informs about significant dispersion around the mean, indicating a wide range of ESG performance among the companies analyzed. Overall, these results suggest that while some companies may have relatively high ESG scores, there

are also a significant number with lower scores, reflecting diverse environmental, social, and governance practices across the dataset.

On average, analyzed companies have a management board composed of several members, which closely aligns with the median of 4.00. However, the representation of women on these boards is relatively low, with an average of fewer than 1 woman serving (median equals zero). This observation signals room for improvement in gender diversity within board structures.

Table 2. Descriptive statistics of the analyzed variables

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
ROA	651	5.967	5.19	13.97	-71.21	99.30
MVBV	651	2.34	1.34	8.819	-167.96	70.87
ESGaggr	651	0.2927	0.20	0.2797	0	1
lnBoard	651	1.29	1.38	0.44	0	2.48
Board_W	651	0.4516	0.0	0.6874	0	3.00
Board	651	4.02	4.0	1.77	1	12
State_own	651	4.94	0.0	15.28	0	72.17
Fin_own	651	18.99	13.61	20.40	0	87.54
Man_own	651	15.57	0.8	23.22	0	99.97
Own_3	651	56.37	37.0	16.90	0.4153	99.97
Own_1	651	38.89	57.0	19.34	0.29	99.97
Lev	651	0.506	0.50	0.191	0.049	1.98
Tang	651	0.5295	0.5352	0.2176	0.0103	0.9384
Mat	651	9.79	10	4.81	0	22.00
Assets (mln PLN)	651	5267.25	1262.95	12625.46	21.28	106754

The findings show a wide range in the values of total assets and a large disparity between the mean and median values, with a mean value of 5,267.25 million PLN, a median of 1,262 million PLN. The maximum value of total assets equals 106,754 million PLN (it is the value of PKN Orlen's total assets in 2021). In contrast, the minimum value of total assets is only 21,28 million PLN. The average time the companies are listed on the WSE is close to 10 years.

The results indicate the variability in ownership structures among the companies, with varying levels of *FIN_OWN*, *MAN_OWN*, and *STATE_OWN*. The variable *FAM_OWN* is a binary variable (equal to 1 if a company is classified as a family firm by the Warsaw Stock Exchange, and 0 otherwise). Therefore, we are providing a frequency distribution of this variable. As presented in Table 3, 215 firm observations are classified as family companies in our database, accounting for 33.03 percent of the total sample.

Table 3. The frequency distribution of the values of a variable *FAM_OWN*

Data	Frequency	Percent
0	436	66.97
1	215	33.03
Total	651	100.00

Table 4 presents the coefficients of the pairwise correlation between the independent variables and the coefficients of variance inflation factors (VIF). According to the literature, values greater than 5.0 indicate significant concerns regarding collinearity (Hair et al., 2013). Since all VIF values are lower than this threshold, there is no collinearity concern.

Table 4. Correlation matrix between independent variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	VIF
1. ESGaggr	1.000													2.08
2. lnBoard	0.462 ***	1.000												3.71
3. Board_W	0.185 ***	0.346 ***	1.000											1.33
4. Fam_own	-0.139 ***	-0.178 ***	0.085 **	1.000										1.36
5. State_own	0.315 ***	0.1518 ***	-0.101 ***	-0.227 ***	1.000									1.65
6. Fin_own	-0.036	0.052	0.003	-0.218 ***	-0.203 ***	1.000								1.32
7. Man_own	-0.191 ***	-0.049	0.079 **	0.337 ***	-0.2174 ***	-0.277 ***	1.000							1.36
8. Own_1	0.032	-0.008	-0.009	0.225 ***	0.215 ***	-0.119 ***	0.149	1.000						3.8
9. Own_3	-0.130 ***	-0.045	0.0338	0.217 ***	0.051	-0.001	0.222 ***	0.822 ***	1.000					3.71
10. Size	0.644 ***	0.543 ***	0.031	-0.224 ***	0.431 ***	-0.0001	-0.239 ***	0.228 ***	0.091 **	1.000				2.79
11. Lev	0.107 ***	0.115 ***	-0.0270	0.023	-0.090 **	-0.030	0.137 ***	0.072 *	0.121 ***	0.168 ***	1.000			1.16
12. Tang	0.243 ***	0.044	0.089 **	-0.153 ***	0.265 ***	-0.057	-0.206 ***	0.137 ***	0.081 **	0.226 ***	-0.070 *	1.000		1.20
13. Mat	0.110 ***	0.073 *	-0.122 ***	-0.137 ***	-0.124 ***	0.229 ***	-0.084 **	-0.026	-0.060	0.190 ***	-0.088 **	0.005	1.000	1.23
													Mean VIF	1.91

Note: ***, **, * significant at 1%, 5%, 10% respectively.

Two methods were employed in this study to estimate the panel regression model: the fixed effects approach and the random effects approach. Based on the results of the Hausman test, the random effects model was selected as more suitable than the fixed effects model. We conducted estimations across various models using different explanatory variables and two dependent variables to measure firm performance, from the accounting (*ROA*) and market perspective (*MV/BV*). Tables 5 and 6 present the estimation results of the seven specifications of the general panel regression models, which verify the hypotheses formulated in the study. Each table presents estimation results for six models, incorporating different variables that describe specific types of ownership structure (financial, state, managerial, family) and ownership concentration. Model 1 incorporates family ownership (*FAM_OWN*), Model 2 includes State ownership (*STATE_OWN*), Model 3 focuses on financial investors ownership (*FIN_OWN*), Model 4 examines managerial ownership (*MAN_OWN*), Model 5 uses metric illustrating the holdings of the major shareholder as concentration measure (*OWN_1*), while Model 6 considers the holdings of top three shareholder (*OWN_3*). Finally, Model 7 encompasses all variables related to ownership structure characteristics.

Table 5. Results of the panel regression analysis (ROA)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
ESGaggr	3.760* (2.155)	4.230* (2.174)	3.794* (2.161)	3.839* (2.148)	3.875* (2.152)	3.864* (2.153)	4.343** (2.173)
lnBoard	-2.272 (1.414)	-2.368* (1.409)	-2.316 (1.410)	-2.174 (1.408)	-2.574* (1.422)	-2.130 (1.430)	-1.733 (1.433)
Board_W	2.068*** (0.732)	2.031*** (0.730)	2.093*** (0.730)	2.125*** (0.728)	2.116*** (0.729)	2.031*** (0.734)	1.744** (0.735)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Mat	0.246* (0.132)	0.212 (0.133)	0.244* (0.134)	0.234* (0.132)	0.242* (0.132)	0.242* (0.132)	0.249* (0.136)
Leverage	-37.293*** (2.607)	-37.713*** (2.621)	-37.210*** (2.600)	-36.511*** (2.616)	-37.175*** (2.595)	-37.333*** (2.600)	-37.331*** (2.635)
Size	0.709 (0.609)	0.856 (0.617)	0.667 (0.601)	0.460 (0.610)	0.761 (0.605)	0.646 (0.601)	0.810 (0.634)
Tang	-24.897*** (3.053)	-24.452*** (3.065)	-24.931*** (3.048)	-25.395*** (3.051)	-24.641*** (3.054)	-25.002*** (3.046)	-24.689*** (3.083)
Fam_own	0.773 (1.959)						1.561 (2.124)
State_own		-0.070 (0.053)					-0.072 (0.060)
Fin_own			-0.003 (0.034)				-0.045 (0.037)
Man_own				-0.060* (0.031)			-0.076** (0.034)
Own_1					-0.048 (0.035)		-0.126** (0.054)
Own_3						0.029 (0.037)	0.153*** (0.055)
Constant	26.291*** (8.018)	25.131*** (7.900)	27.216*** (7.779)	30.781*** (7.979)	27.836*** (7.781)	25.729*** (7.973)	22.470*** (8.504)
Observations	651	651	651	651	651	651	651

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Results of the panel regression analysis (MVBV)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
ESGaggr	3.391* (1.804)	3.637** (1.809)	3.294* (1.803)	3.507* (1.803)	3.298* (1.816)	3.411* (1.846)	3.639* (1.869)
lnBoard	0.318 (1.164)	0.149 (1.155)	0.292 (1.154)	0.157 (1.155)	0.114 (1.169)	0.217 (1.168)	0.165 (1.186)
Board_W	0.407 (0.625)	0.353 (0.627)	0.477 (0.619)	0.420 (0.621)	0.481 (0.622)	0.463 (0.625)	0.276 (0.637)
AgeMat	-0.147* (0.086)	-0.179** (0.089)	-0.128 (0.088)	-0.151* (0.086)	-0.155* (0.086)	-0.152* (0.086)	-0.150 (0.092)
Leverage	-13.145*** (2.088)	-13.545*** (2.122)	-13.059*** (2.078)	-13.383*** (2.110)	-13.013*** (2.088)	-13.068*** (2.102)	-13.920*** (2.168)
Size	-0.428 (0.369)	-0.304 (0.388)	-0.465 (0.366)	-0.398 (0.371)	-0.395 (0.381)	-0.454 (0.376)	-0.193 (0.408)
Tang	-6.320*** (1.981)	-6.126*** (1.988)	-6.585*** (1.960)	-6.253*** (1.981)	-6.399*** (1.976)	-6.493*** (1.977)	-5.898*** (2.038)
Fam_own	0.700 (0.947)						0.347 (1.051)
State_own		-0.038					-0.037

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
		(0.032)					(0.035)
Fin_own			-0.025 (0.021)				-0.031 (0.023)
Man_own				0.017 (0.019)			0.008 (0.021)
Own_1					-0.013 (0.022)		-0.045 (0.040)
Own_3						0.000 (0.025)	0.039 (0.044)
Constant	17.983 *** (4.585)	17.255 *** (4.638)	19.156 *** (4.445)	17.817 *** (4.570)	18.569 *** (4.474)	18.763 *** (4.489)	15.392 *** (4.979)
Observations	651	651	651	651	651	651	651

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The results provide evidence for a significant positive relationship between a firm's sustainability performance, as measured by *ESGaggr*, and both, its accounting performance, illustrated by *ROA* and its market performance, measured by *MV/BV*. This suggests that firms with higher sustainability scores, as reflected in their ESG aggregate index (constructed by the authors), tend to be more profitable, as indicated by *ROA*, and tend to be better perceived by the investors (valuable) measured by *MV/BV*. This result supports hypothesis H1a and H1b and is also in line with the results of earlier studies: Velte (2017), Bodhanwala and Bodhanwala, (2018), Daszyńska-Żygadło (2019), Bassetti et al., (2020), Pham et al., (2021), Lourenço et al., (2013), Maso et al., (2023), and Buallay, (2019).

In almost all models, the parameters for both endogenous explanatory variables were insignificant at 0.05. This means that our findings do not provide evidence that there is a relationship between the size of the management board and firm performance, contrary to our expectations and to previous research suggesting either negative (Guest, 2009; O'Connell & Cramer, 2010; Augusto et al., 2019) or positive (Larmou & Vafeas, 2010; Pucheta-Martínez & Gallego-Álvarez, 2019) relationship between board size and firm performance. The findings suggest that having more members of the management board does not result in a better or worse firm performance, measured by both *ROA* and *MV/BV*. Therefore, the study findings do not support hypotheses H2a or H2b.

The analysis provides compelling evidence that the presence of women on the management board is associated with better accounting performance, measured by *ROA* (H3a). This means that having greater representation of women on the management board may lead to higher *ROA*, which is in line with the findings of Brahma et al. (2021). However, our results do not give evidence of a significant relationship between the presence of women on the management board and market performance, measured by *MV/BV*. Therefore, hypothesis H3b did not find support in the results. These findings align with those of Li and Chen (2018).

Contrary to our expectations, our findings regarding the relationship between ownership concentration and firm performance are inconsistent. The results suggest a negative statistically significant relationship between the level of shares owned by the first largest shareholder (*OWN_1*), and a positive statistically significant relationship between the level of shares owned by the three largest shareholders (*OWN_3*) and firm performance measured by *ROA* (Model 7). Prior studies also show inconsistent results. Some authors claim that large blockholders can be effective for monitoring managers, thus resulting in positive firm performance (Iwasaki & Mizobata, 2020; Mak & Kusnadi, 2005). Some state that the presence of blockholders might increase information asymmetry, affecting firm performance (Demsetz & Villalonga, 2001; Villalonga & Amit, 2006). Interestingly, Laporšek et al. (2021) did not confirm a statistically significant relationship between ownership concentration and firm performance. Therefore, we argue that the discussion on the importance of ownership concentration should remain open, and further research may use other measures of ownership concentration.

The findings show a negative and statistically significant relationship between the level of managerial ownership (*Man_own*) and firm performance measured by *ROA*. These results contradict prior research indicating a positive relationship between managerial ownership and firm performance (Kyeré & Ausloos, 2020; Zandi et al., 2020) but add arguments to the discussion on the negative effects of managerial ownership as suggested by Demsetz (1983) and Fama and Jensen

(1983a & b). On the other hand, our results do not confirm a relationship between the level of managerial ownership and market firm performance measured by MV/BV. This means that managerial shareholding does not influence MV/BV value. This result is consistent with Kyere and Ausloos (2020).

Finally, we did not find any evidence for the relationship between financial ownership, state ownership, family ownership and firm performance, measured by both ROA and MV/BV ratios. Therefore, hypotheses H5a and H5b can not be supported. Contrary to our expectations, ownership structure is not related to firm performance.

Furthermore, the results confirm the positive relationship between firm maturity (Mat) and firm performance, as measured by both ROA and MV/BV. Therefore, we may expect that more matured firms (the maturity measured by the number of years of presence on the Warsaw Stock Exchange) will demonstrate higher performance measures. Interestingly, our findings contradict previous studies, which suggested either a negative relationship between firm age and firm performance (Loderer & Waelchli, 2010; Doğan, 2013), Rahman & Yilun, 2021), or proposed a U-shaped relationship (Dang et al., 2022). These discrepancies in the results may arise from the way we measure firm age or from the specific situation of the Polish economy.

Our findings also confirm a negative relationship between leverage and firm performance, as measured by both ROA and MV/BV, suggesting that companies with higher debt levels in their capital structure tend to achieve lower profitability and lower market valuation. This observation aligns with earlier research by Bukalska and Radman-Pesa (2018), who found a negative relationship between debt levels and ROA. Such negative relationships may arise from bankruptcy costs and agency costs of debt, which are particularly important in highly leveraged firms.

Finally, the results provide evidence for a negative relationship between tangibility and firm performance, using ROA and MV/BV measures. This observation implies that companies with higher levels of fixed assets tend to exhibit lower firm performance. This negative correlation between tangibility and firm performance may be attributed to the impact of asset structure on cash levels, investments and capital structure, as well as reduced flexibility and increased operating costs leading to higher operating risk. These results are consistent with observations presented by Kędzior and Kędzior (2023) and Yadav et al. (2021).

CONCLUSION

The main objective of our study was to investigate the nexus between corporate sustainability performance and firm performance. Following panel regression analysis of data from Polish listed companies for a period spanning from 2015 to 2021, our results only enable us to support hypotheses regarding a positive relationship between sustainability performance and firm performance, as well as a positive relationship between the gender diversity of the management board and firm performance (but in this case, only for accounting measure).

In line with our expectations, our study indicates a significant positive relationship between sustainability performance and financial performance, represented by ROA and MV/BV. Therefore, companies with better sustainability performance are expected to exhibit higher profitability of assets, which is in line with the synergic effect hypothesis and stakeholder theory. Furthermore, these companies are also better perceived by investors in the financial markets, leading to higher market valuation. This positive market response may be attributed to both enhanced corporate reputation and the growing popularity of impact investing (SRI) strategies. These findings provide compelling reasons for companies to undertake sustainability initiatives and integrate sustainability issues into their operations and strategy, as doing so not only aligns with ethical imperatives but also contributes to firm performance. Similarly, we observed a positive significant relationship between gender diversity on the management board and accounting performance. Consequently, firms with higher feminization ratios are expected to achieve higher profitability of assets. This positive association between women presence on board and ROA may be explained by stronger corporate governance mechanisms and improved risk management practices. Moreover, gender diversity on the management board offers opportunities of using various perspectives, skills and knowledge in the decision-making process, which may lead to innovations, more creative solutions, and improved financial results.

However, no significant relationship was found between feminization of the management board and market performance. This suggests that investors may not view the diversity of the management board as a key factor impacting their perception of the company and its future growth prospects. These results may underline that different factors contribute to accounting performance and market performance, confirming the necessity of using both approaches to

examine firm financial performance. In this way, our study contributes to the discussion on the importance of sustainability performance for firm results, as well as the role of women in strategic management.

The second board attribute - board size, measured by the number of board members, contrary to our expectations, proved to be an insignificant factor for firm performance. With regard to the ownership concentration, our findings are mixed. The positive relationship between firm performance and ownership concentration was observed only when considering the metric illustrating the holdings of the top three shareholders. Regarding different types of ownership structures, we only found a significant negative relationship between managerial ownership and firm performance in terms of accounting profitability. The remaining types of ownership structures, such as family ownership, state ownership and institutional investor ownership, did not present any significant relationship with firm performance. Therefore, we may expect that other corporate governance mechanisms may be more important than ownership structure in the context of firm performance.

Among our control variables, only leverage and tangibility were found to be significant predictors of firm performance, both showing a negative relationship. Conversely, firm market maturity proved to be positively associated with firm performance. The remaining control variables did not show any significant association with firm performance.

Our study not only contributes to the corporate finance and sustainability literature, but also provides insights for corporate governance research, in particular, with regard to the importance of the board gender diversity. The policy suggestions derived from our findings can benefit both managers and regulators, focusing on the sustainable development paradigm, ultimately enhancing overall stakeholder well-being.

The main limitations of this study stem from the sample size and single-country setting. Therefore, further research could encompass a larger sample of firms across different countries, such as Visegrad Group (V4) countries or other Central European countries. Focusing on these regions could provide valuable comparative insights into how sustainability practices and firm performance interplay within varying regulatory and cultural contexts. Another limitation may be linked to the way we measure sustainability performance and define firm performance, given various approaches to these metrics. Therefore, future research could explore a more comprehensive understanding of the relationship between sustainability practices and firm performance. Further research may apply different measures of financial performance and consider time and sector effects in the broader analysis.

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Conflicts of interest

The authors declare no conflict of interest.

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