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The Impact of Managerial Ownership on Dividend Policy: Evidence from Euro Stoxx 50 Firms in the Covid-19 Context

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Abstract

This dissertation analyzes how managerial ownership and the quality of corporate governance affect dividend distribution among listed firms in the Euro Stoxx 50 index, with a particular focus on the Covid-19 period.

Dividends are a significant yet controversial aspect of corporate finance, often seen as signals of firm performance. Agency theory suggests that both managerial ownership and dividends serve as instruments to mitigate conflicts of interest between managers and shareholders. While prior research has yielded mixed results, and some studies have explored this relationship during past crises, no research has been carried out on the topic during the most recent global crisis, Covid-19. This study attempts to fill this gap through a panel data analysis from 2013 to 2023 on Euro Stoxx 50 firms, contributing to the limited literature on this subject in the European Union (EU) context.

The findings reveal a positive and statistically significant relationship between managerial ownership and dividend payouts, particularly in firms with low ownership levels, suggesting that dividends and ownership function as complementary governance mechanisms in these contexts. This relationship has intensified during the pandemic period, with no robust evidence that Covid-19 independently influenced dividend policy. However, the results suggest that other governance variables, such as board diversity and institutional ownership, showed shifts in relevance during the crisis. These insights contribute to understanding how ownership structures and governance practices affect dividend decisions during periods of economic uncertainty.

Keywords: Managerial ownership; dividends; corporate governance; agency theory; Covid-19

JEL Codes: G01; G32; G35

Resumo

Esta dissertação analisa de que forma a propriedade dos gestores e a qualidade da governação corporativa influenciam a distribuição de dividendos entre as empresas cotadas no índice Euro Stoxx 50, com particular enfoque no período da Covid-19.

Os dividendos constituem um elemento significativo, embora controverso, das finanças empresariais, sendo frequentemente interpretados como sinais do desempenho da empresa. A teoria da agência sugere que tanto a propriedade dos gestores como os dividendos funcionam como instrumentos para mitigar os conflitos de interesse entre gestores e acionistas. Apesar de a investigação anterior ter produzido resultados contraditórios e de algumas crises passadas já terem sido analisadas neste contexto, não existem estudos sobre este tópico durante a mais recente crise global, a Covid-19. Este estudo procura colmatar esta lacuna através de uma análise de dados em painel de 2013 a 2023 sobre as empresas do Euro Stoxx 50, contribuindo para a limitada literatura sobre esta temática no contexto da União Europeia (UE).

Os resultados revelam uma relação positiva e estatisticamente significativa entre a propriedade dos gestores e o pagamento de dividendos, particularmente em empresas com baixos níveis de propriedade, sugerindo que os dividendos e a propriedade funcionam como mecanismos de governação complementares nestes contextos. Esta relação intensificou-se durante o período pandémico, não existindo evidência robusta de que a Covid-19, por si só, tenha influenciado a política de dividendos. No entanto, os resultados sugerem que outras variáveis de governação, como a diversidade nos conselhos de administração e a propriedade institucional, registaram mudanças na relevância durante a crise. Estas conclusões contribuem para uma melhor compreensão de como as estruturas de propriedade e as práticas de governação afetam as decisões relativas aos dividendos em períodos de incerteza económica.

Palavras-chave: Propriedade dos gestores; dividendos; governação corporativa; teoria da agência; Covid-19

Códigos JEL: G01; G32; G35

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1. Introduction

Agency theory emphasizes the potential conflicts of interest between managers and shareholders that arise from the separation of ownership and control (Jensen & Meckling, 1976). Corporate governance mechanisms are essential for managing these agency costs. Dividend policy serves as a valuable instrument in preventing the misappropriation of free cash flow by management (Jensen, 1986). Meanwhile, managerial ownership aligns managerial incentives with shareholder interests, thereby promoting enhanced company performance (Cole & Mehran, 1989). The quality of corporate governance, particularly the characteristics of the board of directors, also plays a crucial role in shaping corporate decisions, influencing dividend distribution and, consequently, agency dynamics (Jensen, 1986).

The Covid-19 pandemic engendered unprecedented challenges for companies, prompting a period of transformation and adaptation reflected in corporate governance dynamics and practices, including dividend distribution (Krieger et al., 2021; Tinungki et al., 2022).

While the relationship between dividend policy and managerial ownership under normal economic conditions has been the subject of numerous studies, its nature remains unclear, with findings ranging from positive and negative to nonmonotonic relationships (Jensen et al., 1992; Espen Eckbo & Verma, 1994; Farinha, 2003b; Florackis et al., 2015). Furthermore, some studies have also examined how broader ownership and governance characteristics relate to dividend policy during times of crisis (Sawicki, 2009; Mili et al., 2017). Nevertheless, to date, no research has examined the relationship between dividend policy and managerial ownership in the context of the Covid-19 pandemic.

To fill this gap, the present dissertation analyzes how managerial ownership and the quality of corporate governance influence dividend distribution decisions among firms listed in the Euro Stoxx 50 index, with a special focus on the Covid-19 period.

The significant role and controversial nature of dividends in the world of finance represent the primary motivation behind this investigation. Black (1976) posited that the "dividend picture appears to be a puzzle with pieces that don't fit together the more closely we examine

it" (p.5). Dividend distribution and policy decisions are significant for companies, with implications extending beyond the firms themselves to the financial markets and the broader economy, as the decisions can be interpreted as important signals of a company's corporate health and investment potential (Miller & Rock, 1985).

The empirical strategy is based on panel data regression models, drawing on the methodological frameworks developed by Farinha (2003b) and Florackis et al. (2015). The dataset comprises non-financial firms listed on the Euro Stoxx 50 index from 2013 to 2023, thereby including the pre-, during- and post-Covid-19 periods.

The results reveal a robust, positive, and linear relationship between managerial ownership and dividend payouts, suggesting that dividends and ownership function as complementary governance mechanisms. This relationship is particularly evident in firms with lower levels of managerial ownership. As expected, the Covid-19 pandemic reinforced this relationship; however, it did not have a direct impact on dividend policy.

This study contributes not only to a more nuanced understanding of how corporate governance and ownership structures influence dividend decisions in the context of the Covid-19 crisis but also enriches the literature from a geographic standpoint by offering insights specific to the EU context. The European setting presents unique institutional characteristics that affect the governance-dividend dynamic, helping to assess whether such institutional diversity leads to distinct corporate behaviors (La Porta et al. 1999). Moreover, analyzing the Covid-19 period provides valuable lessons for stakeholders – including investors, corporate boards, and regulators – on how governance mechanisms respond to adverse and unexpected economic events.

The subsequent sections of this dissertation are structured as follows: Section 2 reviews the relevant literature, including the theoretical underpinnings of agency theory and corporate governance, the effects of Covid-19 pandemic, and prior research on managerial ownership and dividend policy. Section 3 delineates the data and methodology, encompassing the hypotheses, the dataset, the variable definitions, the empirical strategy, and the regression models. In Section 4 the empirical results are presented, including robustness and quantile analyses. Section 5 discusses the main findings, and Section 6 concludes.

2. Literature Review

2.1. Agency Theory and Corporate Governance

Jensen and Meckling (1976) introduced the agency theory, which presupposes a relationship in which the principal delegates work to the agent, who is obliged to act on behalf of the best benefits for the principal. In large companies, this relationship exists in which shareholders (principals) delegate work to managers (agents). However, this separation of ownership and control causes what are known as agency costs, which include opportunism and self-interest on the part of managers. In other words, managers stop acting in the best interests of shareholders and use their power to act for their benefit. Consequently, shareholders are forced to bear the costs of monitoring manager's behavior (Jensen & Meckling, 1976).

Corporate governance plays a crucial role in reducing agency costs. It comprises the processes, customs, policies, and laws that guide the way companies are managed and controlled. Zingales (1998) defines corporate governance as “allocation of ownership, capital structure, managerial incentive schemes, takeovers, board of directors, pressure from institutional investors, product market competition, labor market competition, organizational structure, etc., can all be thought of as institutions that affect the process through which quasi-rents are distributed (p. 4)”. A more comprehensive definition is that proposed by John and Senbet (1998) and includes the role of stakeholders. According to John and Senbet (1998), corporate governance is described as “mechanisms by which stakeholders of a corporation exercise control over corporate insiders and management such that their interests are protected. The stakeholders of a corporation include equity-holders, creditors and other claimants who supply capital, as well as other stakeholders such as employees, consumers, suppliers, and the government (p. 372)”. A plethora of definitions for corporate governance can be found in the existing literature. While these definitions may vary, they all explicitly or implicitly share certain common elements. Fundamentally, they emphasize the conflicts of interest between insiders (e.g. managers) and outsiders (e.g. shareholders), arising primarily from the separation between ownership and control (Farinha, 2003a). Dividend policy and managerial ownership represent key mechanisms within corporate governance, serving to align the interests of managers and shareholders, mitigate agency problems in firms, and ultimately enhance firm value.

2.1.1. Dividend Policy

Dividend policy refers to the financial decision taken by the board of directors regarding the proportion of the company's profits that will be given to shareholders (Black, 1976). The primary goal of any corporation is to increase shareholder wealth. In this regard, managers try to find a balance between the distribution of profits generated by shareholders and the incorporation of earnings into the business through reinvestment (Farinha & Soro, 2012).

According to the free cash flow theory, Jensen (1986) argues that excess free cash flow can be a source of agency problems between managers and shareholders. When a firm has substantial free cash available, managers may be inclined to use these resources for personal benefit rather than prioritizing shareholder value. Jensen (1986) contends that reducing free cash flow is an effective way to limit such discretionary misuse. By returning excess cash to shareholders in the form of dividends, firms can reduce managerial power, eliminate inefficient expenditures, and enhance shareholder value. Furthermore, Easterbrook (1984) suggests that dividends help address agency problems by limiting available internal funds and forcing managers to seek more frequent external financing. This, in turn, increases external monitoring – not only through debt issuance, but also through equity issuance, as the need for capital exposes management to greater scrutiny from investment banks, analysts, and institutional investors (Michaely & Roberts, 2012). Consequently, dividend payments serve as a disciplining mechanism, helping to prevent excessive spending or investment in unprofitable projects.

However, there are some limitations in dividend policy as a corporate governance mechanism. Rozeff (1982) developed a model of optimal dividend payout, balancing agency costs and the transaction costs associated with issuing external finance. The study suggests that higher dividends reduce agency costs but increase transaction costs. Rozeff (1982) identified significant relationships between dividend payouts and variables such as insider ownership, firm risk (beta), expected revenue growth, and shareholder dispersion. These results highlight the role of investment policy in determining dividend decisions and suggest that companies aim to reduce the total agency costs and external financing when determining payout ratios.

2.1.2. Managerial Ownership

Managerial ownership promotes better alignment between the interests of managers and shareholders by giving managers a personal stake in the company's success. According to Jensen and Meckling (1976), if managers hold 100% of the company's residual rights, agency costs are rendered zero. This suggests that as the percentage of shares held by the manager increases, the problems associated with the separation of control and ownership decrease, as they bear a large fraction of the costs of evasion, consumption of privileges, and other actions that destroy the value of the company. Cole and Mehran's (1989) research aligns with this perspective, indicating that an increase in the percentage held by managers corresponds to enhanced performance. This finding supports the hypothesis of an alignment of interests between shareholders and managers, resulting from increased managerial participation.

However, although managerial ownership can reduce agency problems, several studies report a nonmonotonic relationship. That is, while low to moderate levels of ownership may align interests, higher levels may instead lead to managerial entrenchment, reducing the board's ability to exercise effective oversight. According to Stulz (1988), a high level of ownership by managers, coupled with the substantial voting power that accompanies it, leads to a greater probability of managers becoming entrenched in their positions within the firm. In other words, moderately high levels of stock ownership can exacerbate conflicts between shareholders and managers rather than ameliorate them. Consistent with this, McConnell and Servaes (1990), analyzing companies listed on the NYSE or AMEX in 1976 and 1986, found a significant curvilinear relationship between Tobin's Q and the fraction of ordinary shares held by insiders (directors and managers). Thus, at low levels of insider ownership, the relationship between Tobin's Q and insider ownership was strongly positive, while at high levels, the relationship became negative.

Additionally, Shleifer and Vishny (1989) posit that managers can fortify their position by making manager-specific investments that enhance their value to shareholders. Consequently, managers can reduce the likelihood of replacement and extract higher salaries and larger perquisites from shareholders, as well as gain more discretion in determining corporate strategy – reinforcing the entrenchment effect rather than mitigating agency costs.

2.1.3. Corporate Governance Quality

In the context of examining the impact of managerial ownership on dividend policy, the quality of corporate governance – particularly board characteristics – plays a critical role, since it influences all of the company's corporate decisions (Florackis et al., 2015). According to the free cash flow hypothesis (Jensen, 1986), ineffective governance in firms often results in the accumulation and mismanagement of free cash flow, thereby failing to optimize shareholder value. Conversely, robust corporate governance structures encourage managers to distribute excess cash to shareholders through dividends or share buybacks. Jiraporn, Kim and Kim (2011) findings support this view, showing that stronger governance is associated with a higher propensity for dividend distribution.

Empirical studies have identified several governance features significantly influencing dividend policies, including institutional ownership, board size, independence, gender diversity, and Chief Executive Officer (CEO) duality.

Institutional ownership is regarded as an effective mechanism to mitigate agency issues. According to Demsetz (1983), “specialized ownership” has both the incentives and the capacity to oversee managerial behavior. Supporting this view, Sukkaew (2015) and Khan (2021) report that institutional investors increase dividend payouts by enhancing oversight. However, Obradovich and Gill (2012) posit that “where institutional ownership... is high, these stakeholders try to control the agency problem by controlling the dividend payout decision” (p. 61), thereby suggesting a substitution effect. This view is further emphasized by Haye (2015) who finds this for hedge funds.

Board size remains a central theme in governance literature, though findings are mixed. From an agency theory perspective, Jensen (1993) argues that “when boards get beyond seven or eight people they are less likely to function effectively” (p.865). Under such conditions, firms tend to pay high dividends as an alternative mechanism to mitigate agency problems, consistent with the substitution hypothesis (La Porta et al., 2000). Supporting this, several studies – including Obradovich and Gill (2012), Mansourinia et al. (2013), Khan (2021), Bokpin (2011), Jiraporn and Ning (2006), Chen et al. (2017), Bradford et al. (2013), Tahir et al. (2020) and Pucheta-Martínez and Bel-Oms (2015) – report a positive relationship.

Conversely, the resource dependency theory proposes that larger boards offer firms better expertise and access to critical resources, thereby improving internal governance (Ning et al. 2010). Studies like Alias et al. (2014), Batool and Javid (2014), and Ghosh and Sirmans (2006), support this view by finding a negative relationship.

Board independence enhances the board's capacity to monitor management and reduce agency costs (Jensen & Meckling, 1976). Similarly, Fama and Jensen (1983) argue that independent directors help separate decision management from decision control, thereby reducing the risk of managerial opportunism. The empirical evidence is mixed. Some studies report a negative association, consistent with the substitution hypothesis (La Porta et al., 2000), including Shehu (2015), Al-Najjar and Hussainey (2009), Benjamin and Zain (2015). Conversely, other studies suggest a complementary relationship, in which independent directors support higher dividend payouts to protect shareholders' interests, including Yarram and Dollery (2015), Jiraporn and Ning (2006), Chen et al. (2017), Alias et al. (2014), Shafana and Hassan (2019), Sharma (2011), Sukkaew (2015), and Haye (2015).

CEO duality, where the CEO also fulfils the role of the board chair, may compromise the board's capacity to effectively monitor and oversee its activities (Jensen, 1993; Baliga et al., 1996). Most of empirical evidence suggests that CEO duality is associated with higher dividends, potentially to compensate for weakened governance. Studies include Obradovich and Gill (2012), Yarram and Dollery (2015), Chen et al. (2017), Bradford et al. (2013), Batool and Javid (2014), and Ghosh and Sirmans (2006).

Gender diversity has gained attention in the field of corporate governance. The presence of women on boards has been associated with improved board effectiveness, enhanced monitoring, and greater independence (Adams & Ferreira, 2009; Carter et al., 2010). Chen et al. (2017) provide strong empirical evidence that a higher fraction of female directors leads to greater dividends, particularly in weaker governance contexts. Similarly, Pucheta-Martínez and Bel-Oms (2015) find that "gender diversity on board of directors can alleviate the agency problem of free cash flow by monitoring and resolving the manager-shareholder conflict in an effective way". Byoun et al. (2016) further reinforce this view by showing that gender-diverse boards are not only more likely to pay dividends but also tend to distribute larger amounts, especially in firms with greater agency problems.

2.2. Covid-19's Impact on Corporate Governance

The Covid-19 pandemic, which emerged in 2019, has had a huge impact on society and the economy worldwide. Lockdowns, travel restrictions, and social distancing as a way of preventing the spread of the virus have had economic consequences. Companies, in particular, have faced many challenges and experienced a period of great change and adaptation. This was also reflected in corporate governance practices, as companies were forced to review and change policies to ensure their survival.

Although most sectors have shown losses during the pandemic period, there are some sectors have benefited from the Covid-19 pandemic. According to Sun et al. (2021), there are seven sectors have stood out during the pandemic: Pharmaceutical Industry, Internet and Related Services, Processing of Food from Agricultural Products, Software and Information Technology Services, Manufacturing of Computers, Communication and Other Electronic Equipment, Farming, and Education.

Several authors have shown that corporate governance policies have indeed changed as a result of the Covid-19 pandemic. Khatib and Nour (2021) studied the effect of Covid-19 on the association between corporate governance attributes and firm performance. Using a sample of 188 non-financial companies from the Malaysian market for the years 2019-2020, they concluded that Covid-19 affected several dimensions of firm characteristics. In particular, board size was relevant and positively associated with performance in normal periods but became irrelevant during the crisis, while board diversity had a positive impact on a firm performance during the pandemic period. Similarly, Boshnak et al. (2023) studied the impact of corporate governance mechanisms on the performance of listed companies in Saudi Arabia before and during the Covid-19 pandemic. The results showed that during the pandemic the company's market performance, measured from the Tobin-Q ratio, decreased with a larger board size and more board meetings while it increased with board experience, board education, and board gender. Additionally, Jebran and Chen (2021) point out that mechanisms such as risk management committees, board diversity, independent directors, foreign institutional investors, concentration of ownership, dual role of the CEO, block ownership, and family ownership seem to be effective in helping companies get through the Covid-19 crisis.

With particular regard to the impact of Covid-19 on dividends, Krieger et al. (2021) analyzed the dividends of around 1,400 dividend-paying companies United States (U.S.) between the first quarter of 2015 and the second quarter of 2020. The results showed that 213 companies cut dividends, and 93 companies omitted dividends in the second quarter of 2020. The authors also concluded that all sectors showed signs of dividend cuts, with the most affected being the industrial sector. This represents the opposite of what happened in the 2008 financial crisis, characterized by a reduction in dividends in financial companies and no change in non-financial companies. In contrast, Tinungki et al. (2022) investigated the effect of the Covid-19 pandemic on the dividend policy of companies listed on the Indonesia Stock Exchange (IDX) between 2014 and 2020. The results showed that during the pandemic, companies tended to maintain or increase dividend distribution as a positive signal to investors, which raised the condition of slow trading in the capital market.

As previously noted, prior studies have shown how firms adapted their corporate governance mechanisms in response to the uncertainty brought by the Covid-19 pandemic, including adjustments to dividend policies. However, there remains a gap in the literature regarding the specific relationship between managerial ownership and dividend policy during crisis period. Understanding how managerial ownership influences dividend decisions in times of heightened uncertainty is particularly important, as firms face the dual challenge of preserving liquidity while meeting shareholder expectations. In this context, Jebran and Chen (2021) caution against generalizing findings from previous financial crises to the Covid-19 crisis, emphasizing the need for firm-level analysis – an approach adopted in this dissertation. Furthermore, Khatib and Nour (2021) and Boshnak et al. (2023) call for future research to incorporate a wider range of governance attributes, particularly different ownership structures such as managerial and institutional ownership. Boshnak et al. (2023) additionally stress the importance of extending the temporal scope of analysis. By examining the pre-, during-, and post-Covid-19 periods, this study responds to these recommendations and offers a more comprehensive perspective on how the relationship between managerial ownership and dividend policy evolves under prolonged external shocks.

2.3. The Influence of Managerial Ownership on Dividend Policy

The empirical literature on the relationship between managerial ownership and dividend policy presents diverging conclusions, reflecting the complexity and context-dependent nature of this interaction. **Table 1** synthesizes key studies in the field, outlining their findings across three dominant perspectives: negative, positive, and nonmonotonic relationships.

Empirical Evidence of a Negative Relationship

Several studies provide evidence that managerial ownership and dividends act as substitute governance mechanisms. This view, rooted in agency theory, argues that as managers' equity stakes increase, the need for dividends as a monitoring mechanism decreases. Classic studies by Crutchley and Hansen (1989), Jensen et al. (1992), and Chen and Steiner (1999) support this perspective, showing that higher insider ownership is typically associated with lower dividend payouts in firms based in the U.S. Additional support for this negative relationship includes Tayachi et al. (2021), who examined firms across eight countries, including developed and developing countries. Espen Eckbo and Verma (1994) also observed that dividend payouts decline as the voting power of owner-managers increases in Canadian firms and Short et al. (2002) confirmed this pattern in London Stock Exchange firms.

Other studies take a broader perspective. Rizqia et al. (2013), analyzing Indonesian manufacturing firms, concluded that while managerial ownership exerts a negative effect on dividend policy, it positively impacted firm value, indicating that retained earnings may be reinvested in ways that benefit the firm in the long run. Pieloch-Babiarz (2020), using Polish electromechanical companies, found that an increase in dividend premium leads to higher payout in order to cater investor sentiment, however, when managerial ownership is high the catering effect weakens, as managers prioritize control over responding to investor preferences.

Empirical Evidence of a Positive Relationship

Conversely, some researchers argue that managerial ownership and dividends can function as complementary mechanisms. Zwiebel (1996) developed a theoretical model where entrenched managers may voluntarily distribute dividends to signal efficiency and deter takeovers. Empirical evidence across diverse contexts supports this theoretical perspective. Jo and Pan (2009), studying U.S. industrial firms, found that firms with entrenched managers were more inclined to pay higher dividends, suggesting that dividends serve as a strategic tool to appease shareholders and reduce external scrutiny. Similarly, Vo and Nguyen (2014), analyzing Vietnamese listed firms, documented a positive association between managerial ownership and dividend payouts, along with reduced leverage. Al-Qahtani and Ajina (2017), investigating Saudi-listed firms, also identified managerial ownership as positively influencing dividend distributions, interpreting dividends as a mechanism to limit managerial opportunism. These finds are further corroborated by Obaidat (2018), who confirmed similar results in Jordanian financial institutions.

Empirical Evidence of a Nonmonotonic Relationship

A third group of studies identifies nonlinear relationships. Schooley and Barney (1994) reported a U-shaped pattern for U.S. industrial companies where the increasing CEO ownership initially reduces agency costs and dividends, but beyond a threshold, further increases in ownership lead to higher dividends. Farinha (2003b), analyzing United Kingdom (U.K.) firms, found a strong U-shaped relationship, with a shift at approximately 30% ownership, indicating an entrenchment effect. Florackis et al. (2015), in their study of U.S. firms, proposed a more nuanced model. At low levels of ownership (below 10 percent), the relationship is negative, aligning with agency cost reduction. At high levels (above 60 percent), the relationship becomes positive, reflecting entrenchment motives. However, between these ranges, the relationship is largely flat, which contradicts the U-shaped identified by Schooley and Barney (1994) and Farinha (2003b). Additionally, Florackis et al. (2015) noted that this relationship varies depending on the degree of debt or financial constraints experienced by companies.

Adding further complexity, Farinha and López-de-Foronda (2009) examined the relationship between dividend policy and insider ownership across different legal environments, distinguishing between Anglo-Saxon (common law) and civil law countries. They found distinct nonlinear patterns depending on legal traditions. In Anglo-Saxon countries (U.S., U.K., Ireland), characterized by strong minority shareholder protection, the relationship between insider ownership and dividends follows a negative–positive–negative pattern. Conversely, in civil law countries (EU countries), with weaker protection for minority shareholders, the relationship exhibits a positive–negative–positive pattern.

Most of the existing research on managerial ownership and dividend policy predominantly focuses on non-European markets, particularly the U.S. and Canada. Although extensively studied in these contexts, this relationship remains underexplored within the unique institutional environment of EU countries. In this context, Short et al. (2002) explicitly recommend extending the study of ownership structures and dividend payout to non-Anglo-Saxon markets to test the generalizability of existing findings. The diverse corporate governance frameworks across EU Member States provide a valuable setting for analysis, as the interactions between managerial ownership, dividends, and agency issues may vary significantly depending on governance systems and legal traditions (La Porta et al., 1999). Institutional differences – particularly in terms of investor protection and legal origin – play a critical role in shaping corporate decisions (La Porta et al., 2000). Therefore, investigating this relationship within the EU context enhances our understanding of whether such institutional differences lead to distinct corporate behaviors compared to those observed in more extensively studied regions, such as the U.S.

Table 1: Literature on Relationship Between Managerial Ownership and Dividends

Reference	Objective / Contribution	Methodology	Explanatory Variables	Region / Period	Sign of Relationship
Crutchley & Hansen (1989)	Examines how managerial ownership, leverage and dividend policy are jointly determined by five-firm specific variables used as proxies for agency costs.	OLS Regressions (three separate equations)	EARNVOL (earnings volatility), ADV+R&D (advertising and R&D expenses), STDRET (stock return volatility as flotation cost proxy), FIRMSIZE, DIVERSE (stock diversification measure)	United States, 1981-1985	Negative (indirect)
Jensen et al. (1992)	Investigates how insider ownership, debt, and dividend policies are simultaneously determined using a structural equations system to capture interdependencies.	3SLS (simultaneous equations model)	Insider ownership, debt, business risk, profitability, R&D, fixed assets, growth, investment, size, number of divisions	United States, 1982 and 1987	Negative (direct)
Chen & Steiner (1999)	Analyzes the interrelations between managerial ownership, risk-taking, debt policy, and dividend policy using a simultaneous equations model, with a specific focus on how managerial ownership relates to these corporate decisions.	Nonlinear Two-Stage Least Squares (NL2SLS) in a simultaneous equations model	LRISK (firm risk), LRISK ² , LDEBT (leverage), LDIV (dividends), LVAL (equity value), R&D, FIVE (5% blockholders), INST (institutional ownership), LSIZE (firm size), OL (operating leverage), DINDEX (diversification), FIXED (fixed assets), ROA, INV (investment), GRTH (growth)	United States, 1994 (785 NYSE firms)	Negative (direct)

Tayachi et al. (2021)	Examines the impact of different ownership structures on capital structure and dividend policy.	Generalized Method of Moments (System GMM, two-step dynamic panel)	MO (managerial ownership), IO (institutional ownership), OC (ownership concentration), ROA, SZ (firm size), GRW (growth), IC (interest coverage)	Developed and developing countries (e.g., Australia, Japan, India); 2010–2019	Negative (direct)
Eckbo & Verma (1994)	Tests the consensus-dividend hypothesis by analyzing how the relative voting power of owner-managers and institutional shareholders affects dividend policy.	Three-stage least squares (3SLS) and Linear Structural Relations model (LISREL)	φ_m (voting power of owner-managers), φ_c (voting power of institutional shareholders), TA^{-1} (inverse of total assets), DEBT/TA, STDR (stock return volatility)	Canada, 1976–1988	Negative (direct)
Short et al. (2002)	Examines the relationship between ownership structure (institutional and managerial) and dividend policy within the framework of traditional dividend models.	Generalized Least Squares (GLS) with Fixed Effects Panel Data Models	Inst (institutional ownership dummy), MDum (managerial ownership dummy), E (earnings), D_{t-1} (lagged dividends), D_{t-2} (second lag), E_{t-1} (lagged earnings)	United Kingdom, 1988–1992	Negative (direct)
Rizqia et al. (2013)	Examines the effect of managerial ownership, leverage, profitability, firm size, and investment opportunity on dividend policy and firm value.	Path analysis using Structural Equation Modeling (SEM)	MOWN (managerial ownership), DAR (debt to assets ratio), ROA, SIZE (firm size), CAPX/A (investment opportunity)	Indonesia, 2006–2011	Negative (direct)

Pieloch-Babiarz (2020)	Analyzes how managerial ownership affects firms' willingness to adjust dividend payouts in response to investor sentiment (catering effect).	Random-effects panel regression	MANAG (managerial ownership > 5%), SHARE (managerial ownership > 20%), Cater (dividend premium), PROF (profitability), LIQ (liquidity), DEBT, AGE (firm age)	Poland (electromechanical firms), 2009–2018	Negative (moderating effect)
Zwiebel (1996)	Develops a dynamic theoretical model to analyze how entrenched managers might use debt and dividends strategically to maintain control in the presence of takeover threats.	Theoretical dynamic model (game-theoretic framework)	Not applicable (theoretical model)	Not applicable (theoretical)	Positive (theoretical)
Jo & Pan (2009)	Investigates whether managerial entrenchment influences firms' propensity to pay dividends and tests whether payout policy is used as a governance mechanism.	Logit regressions (Fama-MacBeth and GEE estimations)	G index (managerial entrenchment), NYPCTL (firm size), EBIAT/A (profitability), V/A (growth opportunities), RE/TA (maturity), LAGMLEV (leverage), Firm age, IHPCT (institutional ownership)	United States, 1990–2003	Positive (direct)
Vo & Nguyen (2014)	Examines the simultaneous relationship between managerial ownership, leverage, and dividend policy to assess their role as internal governance mechanisms.	Three-stage least squares (3SLS) simultaneous equations	MGO (managerial ownership), LEV (leverage), DIVR (dividend payout), FCF (free cash flow), SIZE, GRO (sales growth), LIQ (liquidity), ROA, TANG (asset tangibility)	Vietnam, 2007–2012	Positive (direct)

Al-Qahtani & Ajina (2017)	Examines how different forms of ownership (managerial, family, institutional, and ownership concentration) influence dividend policy.	Panel data regression with fixed effects	MANG (managerial ownership), FAM (family ownership), IINS (institutional ownership), CONC (ownership concentration), SIZE, LEVRE (leverage), ROA	Saudi Arabia, 2012–2015	Positive (direct)
Obaidat (2018)	Examines the impact of various ownership structures—including managerial ownership—on the dividend policy of financial firms.	OLS regression (cross-sectional analysis)	MOWN (managerial ownership), INSTOWN (institutional ownership), FOROWN (foreign ownership), CONC (ownership concentration)	Jordan (financial firms), 2014–2016	Positive (direct)
Schooley & Barney (1994)	Develops and tests a formal model to examine how CEO stock ownership influences dividend yield.	OLS regression with quadratic term	CEOOWN (CEO ownership), CEOOWNSQ (CEO ownership squared), EXPSALE (expected sales growth), PASTSALE (past sales growth), BETA (systematic risk), LNUMSHRS (log number of shareholders)	United States (235 industrial firms), 1980	Nonlinear (U-shaped)
Farinha (2003b)	Examines the relationship between insider ownership and dividend policy.	OLS regression with quadratic term (cross-sectional analysis)	INSBEN (beneficial insider ownership), INSBEN ² (square of insider ownership), GROW1 (past growth), GROW2 (growth opportunities), DEBT, VARIAB (stock return volatility), CASH, DISPERS (shareholder dispersion), INSTIT (institutional ownership), NONEXPCT (non-executive directors), IACT (irrecoverable taxes), SIZE, LANALYST (analyst following), ROA, DUMNEG (negative earnings dummy), CADBURY (compliance with Cadbury Code)	United Kingdom, 1987–1991 and 1992–1996	Nonlinear (U-shaped)

Florackis et al. (2015)	Examines the relationship between managerial ownership and dividend policy, accounting for debt financing and financial constraints.	Semi-parametric regression (spline-based) and OLS with quadratic term	MAN (managerial ownership), MAN ² (managerial ownership squared), LEVERAGE, KZ-INDEX (index of financial constraints), FIRM_SIZE, INVESTMENT, CASH_HOLDING, TOBIN'S Q, BOARDSIZE, STAGGERED_BOARD (dummy for classified board structure), ACTIVE_DIRECTORS (ratio of active CEOs on board), INDEPENDENT_DIRECTORS, BUSY_DIRECTORS (ratio of directors with >4 directorships), OUTSIDE_DIRECTORS, OLD_DIRECTORS (ratio of directors over 70), WOMEN_DIRECTORS, EXPERIENCED_DIRECTORS (ratio of directors with ≥15 years' service)	United States (NYSE, AMEX, NASDAQ), 2001–2007	Nonlinear (complex/multi-turning points)
Farinha & López-de Foronda (2009)	Examines the relationship between dividend policy and insider ownership using a nonlinear specification.	Tobit regression, OLS and dynamic panel GMM; Logit used for robustness checks	INSI (insider ownership), INSI ² (squared insider ownership), INSI ³ (cubed insider ownership), INST (institutional ownership), DR (debt ratio), MB (market-to-book ratio), LOGACT (firm size – log total assets), ROE (return on equity), ROA (return on assets)	Common Law (U.S., U.K., Ireland); Civil Law (France, Spain, Belgium, Netherlands, etc.), 1996–2000	Nonlinear – Common Law: Negative-Positive-Negative – Civil Law: Positive-Negative-Positive

2.3.1. Changes in Times of Crisis

A growing body of research has explored how ownership and governance characteristics influence dividend policy during periods of economic distress. While not directly centered on managerial ownership, the following studies highlight how various governance and ownership factors influence dividend policy during times of crisis.

Sawicki (2009) investigates the relationship between corporate governance and dividend policy in five East Asian countries over the period of 1994-2003, focusing on changes following the Asian Financial Crisis of 1997. There is some evidence that, before the crisis, dividends acted as a substitute for other corporate governance mechanisms and post-crisis reforms strengthened governance, leading to higher dividends. Additionally, the study finds that dividends are higher in common law countries and that firm-level governance enhances investor protection across legal regimes.

Mili et al. (2017) analyzed governance and ownership structure and their impacts on dividend policy in 362 firms from East Asian and Gulf Cooperation Council (GCC) countries (2003-2011) with a focus on financial crisis periods. The results showed strong evidence of the role of corporate ownership structure and board characteristics in explaining dividend policy, especially during periods of crisis. In particular, the authors showed that companies with a higher proportion of institutional shareholders seek higher dividend payout ratios, while CEO duality introduces varying effects on dividend determinants, such as ownership concentration and board independence.

These studies offer significant insights into the impact of financial crises on the influence of ownership and governance mechanisms in shaping dividend policy. In light of the particular challenges posed by the Covid-19 outbreak, it is especially relevant to explore how this dynamic played out during the pandemic period.

3. Data and Methodology

This dissertation investigates how the Covid-19 pandemic affected corporate governance characteristics and their influence on dividend distribution decisions, focusing on companies listed in the Euro Stoxx 50 index. The analysis centers on whether the pandemic led to significant changes in corporate governance structures and explores how these attributes – especially managerial ownership – shaped dividend policies across the pre-, during-, and post-Covid-19 periods. The central research question guiding this study is:

How do corporate governance characteristics - particularly managerial ownership - influence dividend payments among Euro Stoxx 50 listed companies, and did this relationship change due to the Covid-19 pandemic?

3.1. Testable Hypotheses

The relationship between managerial ownership and dividend policy has been widely studied, yet the literature presents mixed results. Agency theory argues that equity stakes align managerial and shareholder, potentially reducing the need for dividends as a monitoring tool (Crutchley & Hansen, 1989; Jensen et al., 1992; Chen & Steiner, 1999; Tayachi et al., 2021). Conversely, other studies propose a positive relationship, where entrenched managers use dividends to signal credibility and appease shareholders (Zwiebel, 1996; Jo & Pan, 2009; Vo & Nguyen, 2014; Al-Qahtani & Ajina, 2017; Obaidat, 2018). A third body of literature identifies a nonmonotonic relationship, whereby the effect of managerial ownership on dividends varies with ownership levels – potentially taking the form of U-shaped or inverted U-shaped patterns (Schooley & Barney, 1994; Farinha, 2003b; Florackis et al., 2015; Farinha & López-de-Foronda, 2009).

Among these perspectives, the findings of Farinha and López-de-Foronda (2009) appear particularly relevant due to their focus on civil law countries with institutional contexts similar to those of the Euro Stoxx 50 firms analyzed here. They suggest that at low levels of managerial ownership, insiders increase dividends to signal alignment with minority investors. At moderate levels, entrenched insiders reduce dividends, potentially expropriating minority investors. At extremely high levels, dividends rise again to satisfy the liquidity needs of controlling shareholders. Accordingly, the first hypothesis is stated as follows:

Hypothesis 1: The relationship between managerial ownership and dividend payments is nonmonotonic.

The Covid-19 pandemic introduced new challenges and dynamics in corporate decision-making. The heightened uncertainty, economic disruption, and liquidity pressures led firms to reassess their governance frameworks and payout strategies. Several studies show that dividend policies were adjusted during the pandemic, with some firms cutting or omitting dividends (Krieger et al., 2021), while others increased payouts as a signaling device to reassure investors (Tinungki et al., 2022).

Although the effects of Covid-19 were unprecedented, research on prior crises suggests that ownership structures and corporate governance mechanisms tend to play a heightened role in shaping payout decisions during periods of economic stress (Sawicki, 2009; Mili et al., 2017), as firms increasingly rely on internal mechanisms to preserve stability and maintain investor confidence. While the Covid-19 context differs in nature, it similarly created pressure for firms to balance cash preservation with the need to reassure shareholders. In light of this context, the second hypothesis is proposed:

Hypothesis 2: The Covid-19 pandemic has a positive impact on the relationship between managerial ownership and dividend payments, intensifying its pattern.

3.2. Data

3.2.1. Sample

The dataset comprises companies listed in the Euro Stoxx 50 index, excluding financial and insurance firms due to their distinct regulatory framework. Consequently, the final sample includes 38 firms over the period from 2013 to 2023, covering the pre-, during-, and post-Covid-19 phases, enabling comprehensive comparative analyses. The resulting dataset contains 418 firm-year observations. Furthermore, to capture the differential impacts across various sectors, the sample was segmented by industry, acknowledging that the Covid-19 pandemic affected sectors unevenly (Sun et al., 2021).

Data were collected from multiple sources. Financial metrics and corporate governance characteristics were obtained from Refinitiv Workspace. Meanwhile managerial and institutional ownership data were manually collected from company disclosures between 2013 and 2023. These disclosures include Universal Registration Documents, Annual Reports (e.g., Form 20-F), and other publicly available filings. Due to the voluntary nature of disclosure practices, complete ownership data were unavailable for all firms and years. In such instances, missing values were documented, and only firms with available and verifiable information were incorporated into the empirical analysis involving these variables.

3.2.2. Empirical Variables

This subsection outlines the variables utilized in the empirical models, elaborating on their definitions, rationales for inclusion, and anticipated relationship with the dependent variable.

The dependent variable is dividends (*DIV*), operationalized using a proxy based on the ratio of total dividends paid to total assets, a widely accepted measure in the literature (Michael & Roberts, 2012; Florackis et al., 2015). This proxy was chosen over alternatives such as the dividend payout ratio due to its broader availability and comparability across firms, as net income is often affected by differences in accounting practices and discretionary reporting choices. To ensure robustness, alternative dividend measures – including the dividend payout ratio – were tested in robustness checks presented later in the analysis.

The primary explanatory variable is managerial ownership (*MAN_OWN*), measured as the percentage of shares held by a firm's management and directors (Morck et al., 1988). While the literature offers mixed evidence on its influence over dividend policy, three main views emerge: a negative relationship grounded in agency theory (Crutchley & Hansen, 1989; Jensen et al., 1992; Chen & Steiner, 1999), a positive link associated with managerial entrenchment (Zwiebel, 1996; Jo & Pan, 2009; Vo & Nguyen, 2014; Al-Qahtani & Ajina, 2017; Obaidat, 2018), and a nonmonotonic pattern dependent on ownership levels (Schooley & Barney, 1994; Farinha, 2003b; Florackis et al., 2015, Farinha & López-de-Foronda, 2009). Based on this, the study hypothesizes a nonmonotonic effect. To capture potential nonlinearity, a squared term (MAN_OWN^2) is also included in the analysis.

Literature states that corporate governance quality and characteristics have a significant impact on important corporate decisions, including dividend policy. In this way, several control variables are included to account for governance-related effects, as described below:

- Institutional Ownership (*INST_OWN*): is defined as the percentage of shares held by institutional investors. Institutional investors are typically seen as effective monitors who help reduce agency costs and may support higher dividends to limit managerial discretion (Demsetz, 1983; Sukkaew, 2015; Khan, 2021), although some studies suggest a substitution effect – where strong monitoring reduces the need for dividends (Obradovich & Gill, 2012; Haye, 2015). Due to the mixed findings in the literature, the expected sign for this variable may be either positive or negative.
- Board Size (*BOARD_SIZE*): is defined as the number of directors on the corporate board. From an agency theory perspective, larger boards may be less effective in monitoring management, which can lead firms to use dividends as an alternative governance mechanism (Jensen, 1993; La Porta et al., 2000). In this view, a positive relationship is expected (Bokpin, 2011; Chen et al., 2017; Bradford et al., 2013). However, resource dependency theory suggests that larger boards enhance decision-making quality and provide access to broader resources, thereby reducing the need for dividends as a control tool (Ning et al. 2010; Ghosh & Sirmans, 2006) Given these competing perspectives, a significant relationship is expected but the sign is ambiguous.
- Board Independence (*BOARD_INDEP*): is measured as the proportion of independent directors on the board. Independent directors are expected to provide objective oversight, helping mitigate agency problems by separating decision control from decision management (Fama & Jensen, 1983; Jensen & Meckling, 1976). However, empirical evidence on the effect of board independence on dividend policy is mixed. Some studies support a substitution effect, where stronger internal governance reduces reliance on dividends (Shehu, 2015; Al-Najjar & Hussainey, 2009; Benjamin & Zain, 2015), while others point to a complementary role, with independent boards promoting higher dividends to protect shareholder interests (Yarram & Dollery, 2015; Jiraporn & Ning, 2006; Chen et al., 2017; Sharma, 2011). Thus, the expected sign is ambiguous.

- Board Tenure (*BOARD_TENURE*): is defined as the average number of years that directors have served on the board. While this variable is not a central focus in the context of dividend policy, some studies suggest that longer-tenured boards may enhance monitoring effectiveness by providing directors with greater firm-specific knowledge and experience, potentially improving oversight of managerial discretion (Sharma, 2011; Ghosh & Sirmans, 2006). Given the limited attention this variable has received in the literature and its relatively minor role in this analysis, no directional expectation is proposed; it is included purely as a control.
- Female Board Representation (*FEMALE_BOARD*): is defined as the percentage of female directors on the corporate board. Gender-diverse boards are associated with enhanced oversight, improved board independence, and greater sensitivity to shareholders' interests (Adams & Ferreira, 2009; Carter et al., 2010). From an agency theory perspective, the presence of women on boards strengthens internal governance and helps mitigate agency conflicts. Empirical studies find that greater board gender diversity is positively related to dividend payouts, particularly in firms facing higher agency problems (Chen et al., 2017; Pucheta-Martínez & Bel-Oms, 2015; Byoun et al., 2016). Therefore, a positive sign is expected for this variable.
- Board Type (*BOARD_TYPE*): a categorical variable indicating the governance structure of the board. It takes the value 1 for a mixed board structure (defined by Refinitiv Workspace as boards that do not strictly follow either unitary or two-tier models), 2 when board type is not disclosed, 3 for a two-tier board (separate supervisory and management boards), and 4 for a unitary board (single board combining executive and non-executive members). As this variable is not central to the theoretical framework of this study and lacks consistent empirical treatment in the dividend literature, it is included solely as a control.
- CEO Duality (*CHAIR_CEO*): a dummy variable equal to 1 if the CEO also serves as board chair and 0 otherwise. CEO duality is often viewed as a governance weakness, as it concentrates power and may reduce the board's ability to effectively monitor management (Jensen, 1993; Baliga et al., 1996). To offset weaker controls, firms may increase dividends to reassure shareholders, as supported by several studies (Yarram & Dollery, 2015; Chen et al., 2017; Bradford et al., 2013; Ghosh & Sirmans, 2006). Therefore, a positive sign is expected for this variable.

Following existing literature, five firm-level financial controls, typically identified as key determinants of dividend policies, were also included:

- Firm Size (*FIRM_SIZE*): is measured as the natural logarithm of market capitalization. While the theoretical links to dividend policy are not conclusive (Smith & Watts, 1992), empirical evidence suggests that larger firms are more likely to pay dividends (Fama & French, 2001; Denis & Osobov, 2008). Thus, no specific sign is expected, and the variable is included as a control for firm-level characteristics.
- Return on Assets (*ROA*): is calculated as net income over total assets, serving as a profitability proxy. More profitable firms are typically better able to pay dividends, and prior studies suggest a positive relationship (Miller & Rock, 1985; Jensen et al., 1992; Fama & French, 2001). Therefore, a positive sign is expected.
- Capital Expenditures (*CAPEX*): is defined as total capital expenditures over total assets, capturing firms' investment intensity (Florackis et al., 2015). According to the pecking order theory (Myers & Majluf, 1984), firms prefer to finance investments using internal funds. Therefore, higher capital expenditures may reduce retained earnings available for dividend distribution. Thus, a negative sign is expected.
- Cash Holdings (*CASH*): is defined as the ratio of total cash and cash equivalents to total assets and captures the firm's liquidity. Free cash flow theory (Jensen, 1986) suggests that high cash increases agency problems, prompting firms to pay more dividends. In line with this, Denis and Osobov (2008) argue that firms with greater cash reserves are better positioned to smooth dividend payments over time. Therefore, a positive sign is expected for this variable.
- Debt (*DEBT*): is calculated as total debt (book value of debt) to total assets, reflecting the firm's leverage. Under agency theory, debt acts as a disciplining mechanism by limiting the free cash flow available to managers, thereby reducing agency costs. In this context, debt is often seen as a substitute for dividends, since both are tools that help constrain managerial discretion (Jensen & Meckling, 1976; Jensen, 1986; Stulz, 1988). Based on this reasoning, a negative sign is expected for this variable.

A comprehensive summary of all variable definitions and expected signs can be found in **Appendix 1**.

3.2.3. Exploratory Data Analysis

Table 2 presents the summary statistics of all variables included in the empirical analysis, providing a breakdown between and within components, which reflects both cross-sectional and temporal variation across firms in the panel. This decomposition is particularly useful in the context of panel data, as it offers a clearer view of the structure of the data across Euro Stoxx 50 companies from 2013 to 2023.

Table 2: Descriptive Statistics

Variable		Mean	Std. dev.	Min	Max
DIV	overall	0.025	0.020	0	0.162
	between		0.017	0.003	0.091
	within		0.010	-0.024 ¹	0.117
MAN_OW	overall	0.036	0.110	0.000	0.594
	between		0.113	0.000	0.594
	within		0.009	-0.028	0.095
INST_OW	overall	0.642	0.202	0.033	0.92
	between		0.204	0.126	0.889
	within		0.034	0.459	0.850
BOARD_SIZE	overall	14.405	3.926	6	22
	between		3.806	6.545	20.364
	within		1.052	10.496	19.769
BOARD_INDEP	overall	0.679	0.230	0.16	1
	between		0.210	0.224	1
	within		0.095	0.178	0.898
FEMALE_BOARD	overall	0.361	0.109	0	0.667
	between		0.076	0.204	0.549
	within		0.079	0.018	0.642
CHAIR_CEO	overall	0.432	0.496	0	1
	between		0.466	0	1
	within		0.184	-0.386	1.341
BOARD_TENURE	overall	6.832	2.073	2.111	14.250
	between		1.788	4.038	13.207
	within		1.049	2.651	9.934

¹ Within values reflect deviations from firm-specific means rather than raw values. Negative figures may occur as a result of mean-centering during the within transformation, particularly in binary or low-variability variables.

BOARD_TYPE	overall	3.421	0.696	1	4
	between		0.543	2.091	4
	within		0.443	0.967	5.330
FIRM_SIZE	overall	10.896	0.725	8.176	12.882
	between		0.640	9.663	12.544
	within		0.397	9.409	12.345
ROA	overall	0.057	0.048	-0.133	0.360
	between		0.039	0.015	0.177
	within		0.029	-0.091	0.259
CAPEX	overall	0.041	0.025	0.001	0.138
	between		0.023	0.003	0.101
	within		0.011	-0.003	0.094
CASH	overall	0.093	0.079	0.011	0.528
	between		0.073	0.022	0.410
	within		0.034	-0.050	0.301
DEBT	overall	0.260	0.121	0.000	0.583
	between		0.108	0.070	0.481
	within		0.056	-0.019	0.483

Notes: This table presents descriptive statistics for the dependent variable (*DIV*), the main explanatory variable (*MAN_OWN*) and all control variables used in the analysis. The statistics are decomposed into overall, between and within components to reflect the structure of the panel dataset. Overall refers to the total variation across all observations. Between captures variation across firms, based on company-level means. Within reflects variation within firms over time, based on deviations from firm-specific means. Variable definitions are provided in Section 3.2.2. The sample consists of 38 non-financial firms listed in the Euro Stoxx 50 index, covering the 2013-2023 period.

The dependent variable, dividends (*DIV*), has a mean of 2.5% and a standard deviation of 2%. The values range from 0% to 16.2%, indicating that while some firms did not pay dividends in a given year, others allocated a relatively high proportion of their assets to dividends. The between-firm variation (1.7%) exceeds the within-firm variation (1%), indicating that the most variation occurs across firms rather than over time within the same firm, which supports the notion of a relatively stable dividend policy at the firm level.

Managerial ownership (*MAN_OWN*) averages 3.6%, ranging from 0% to 59.4%, with a relatively high standard deviation of 11%. Most of this variation is cross-sectional (11.3%) rather than time-based (0.9%), reflecting significant heterogeneity across firms. In contrast, institutional ownership (*INST_OWN*) is substantially higher, averaging 64.2%, and ranging from 3.3% to 92%. The high between-firm variation (20.4%) relative to the within-firm change suggests a stable and dominant presence of institutional investors in these firms.

The average number of members in a board (*BOARD_SIZE*) is 14.4 members, with the smallest board consisting of 6 members, and the largest one comprising 22, with variation primarily occurring between firms. Board independence (*BOARD_INDEP*) averages 67.9%, with values spanning from 16% to 100% (full independence). Variation is predominantly cross-sectional, and firms generally maintain a majority of independent directors. Female board representation (*FEMALE_BOARD*) averages 36.1%. Interestingly, within-firm variation (7.9%) slightly exceeds between-firm variation (7.6%), indicating that gender diversity has evolved more within firms over time rather than differing widely across firms, suggesting shifts in board composition throughout the years..

CEO duality (*CHAIR_CEO*) appears in approximately 43% of observations, with low within-firm variation, suggesting persistence in the governance structure. Average board tenure (*BOARD_TENURE*) is 6.8 years, showing both within- and between-firm variation. Board type (*BOARD_TYPE*), a categorical measure of governance structure, has a mean of 3.421, though its interpretation is limited due to its coded nature.

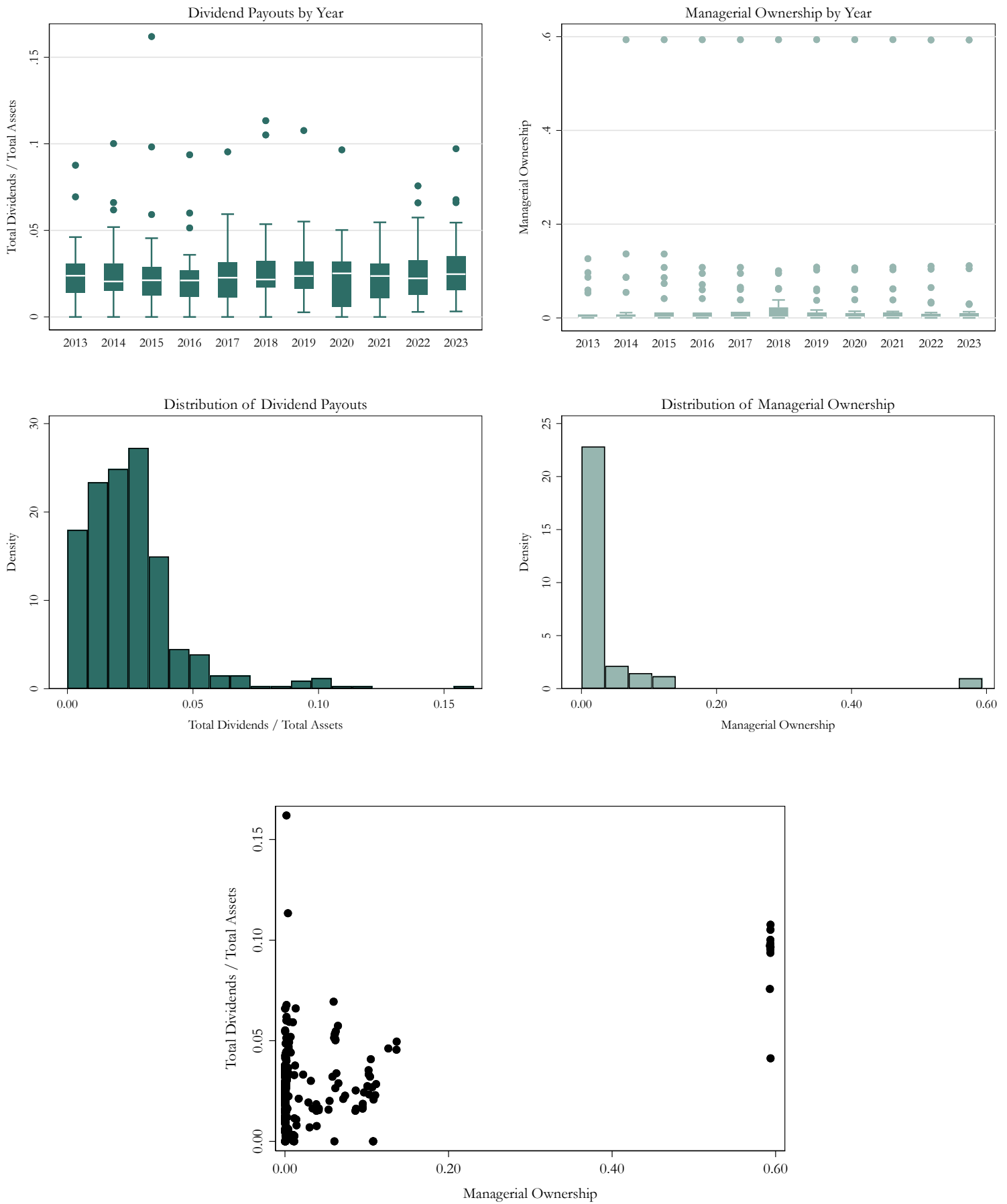
Firm size (*FIRM_SIZE*), measured as the natural logarithm of market capitalization, averages 10.90 and varies primarily across firms since the variation is moderately higher between firms (0.64) than within (0.40). Profitability (*ROA*) exhibited a mean of 5.7%, ranging from -13.3% to 36%, while investment intensity (*CAPEX*) averaged 4.1%, with higher cross-sectional variation, reflecting structural differences in capital expenditure strategies.

Cash holdings (*CASH*) and debt (*DEBT*) average 9.3% and 26 of total assets, respectively. Cash ratios range widely from 1.1% to 52.9%, reflecting significant differences in liquidity positions, potentially due to sectoral differences or varying risk appetites. Debt shows less variation over time, indicating structural variation in capital structure policies across firms.

Among all the variables, board size exhibits the highest standard deviation, indicating the greatest structural variability across firms. Conversely, dividends show the lowest variability, reinforcing the idea of relatively stable dividend policies among Euro Stoxx 50 firms.

To complement the descriptive statistics, **Figure 1** summarizes the exploratory data analysis through a combination of box plots, histograms, and a scatter plot of the key variables.

Figure 1: Exploratory Visualization of Dividend Policy and Managerial Ownership



The box plots at the top illustrate the annual distribution of dividends and managerial ownership, respectively, from 2013 to 2023. Dividends, measured as a percentage of total assets, show a relatively stable median and limited interquartile range across most years, highlighting stability despite varying macroeconomic contexts. However, in 2020, the interquartile range expands downward due to a lower first quartile, suggesting increased heterogeneity in dividend payouts during that year. This indicates that while some firms maintained typical distributions, others significantly reduced or suspended dividends. Although occasional extreme values are visible, most companies cluster within a narrow payout range. Managerial ownership, however, exhibits a highly concentrated distribution close to zero, indicating generally modest and persistent managerial equity stakes over time. Occasional outliers represent firms with significantly higher managerial ownership, but these instances are infrequent and do not reflect broader trends.

The histograms (middle panels) further detail these distributions. Dividend payouts show a right-skewed distribution, with most observations below 5% of total assets, suggesting conservative payout practices among Euro Stoxx 50 firms. Managerial ownership is heavily concentrated at very low levels, though very few firms demonstrate notably high managerial ownership stakes exceeding 50%.

Finally, the scatter plot at the bottom explores the relationship between managerial ownership and dividend payments. The data points are predominantly clustered at lower ownership levels with moderate dividend variability, and no clear linear relationship is immediately apparent. However, firms with relatively higher managerial ownership levels tend to correspond to moderately higher dividend payments, suggesting a potential positive association to be further examined in subsequent analyses.

3.4. Empirical Strategy

This section presents the methodological approach adopted to estimate the relationship between managerial ownership and dividends, with particular attention to the challenges inherent to panel data. Several diagnostic tests were conducted to ensure the reliability of the regression results and to address potential econometric concerns.

The analysis begins with the Ramsey Regression Equation Specification Error Test (RESET) applied to the baseline regression, which includes only the dependent variable and the pivotal explanatory variable, managerial ownership. This test assesses whether the model suffers from omitted variable bias. The null hypothesis of correct model specification is not rejected, as the p-value obtained (0.1904) exceeds the 5% significance level², suggesting that the model is correctly specified and that the inclusion of additional explanatory variables is not strictly necessary. Nevertheless, to account for observable heterogeneity across firms, control variables (outlined in Section 3.2) are included in subsequent models, in line with the relevant literature.

To detect multicollinearity among the explanatory variables, Variance Inflation Factors³ (VIFs) were examined. Multicollinearity occurs when independent variables exhibit a high correlation, which has the potential to introduce bias into coefficient estimates and inflate standard errors. Although there is no universally accepted threshold, a VIF below 5 is commonly considered acceptable as indicative of the absence of multicollinearity. As shown in **Appendix 2**, all individual VIFs, as well as the mean VIF, fell below this threshold, thereby confirming that multicollinearity is not a concern.

Subsequently, the Breusch-Pagan Lagrange Multiplier test⁴ was initially employed to select between the Pooled Ordinary Least Squares (POLS) and the Random Effects (RE)⁵ models. The null hypothesis supports the use of POLS (no significant individual-specific effects),

² Unless otherwise stated, all hypothesis tests in this section are evaluated at the 5% significance level.

³ The Variance Inflation Factor (VIF) is a measure of the extent to which the variance of an estimated coefficient is increased due to such correlation.

⁴ This test evaluates whether the correlation between the residuals obtained from the Ordinary Least Squares (OLS) estimation deviates significantly from zero.

⁵ The Random Effects (RE) model assumes that individual-specific effects are random, uncorrelated with explanatory variables, and have constant variance across observations.

while the alternative hypothesis favors RE. The test returned a p-value of 0.0000, which leads to the rejection of the null hypothesis at the 5% significance level. Hence, the RE model is preferred over POLS.

Following this, the analysis sought to determine whether Fixed Effects (FE)⁶ model would be more suitable than RE. To this end, the Hausman test was conducted. Under the null hypothesis, the RE model is consistent and efficient; the alternative posits that only the FE model yields consistent estimates. The test produced a p-value of 0.0070, leading to rejection of the null hypothesis and indicating that the FE model is the more appropriate specification for this study.

Homoscedasticity, or constant variance of the error term across observations, is a fundamental classical hypothesis in regression analysis. A violation of this condition – known as heteroscedasticity – can result in inefficient estimates. To assess this issue, the Breusch-Pagan test was applied. The obtained results showed a p-value of 0.0000 leads to rejection of the null hypothesis of homoscedasticity, indicating the presence of heteroscedasticity in the model. To correct for this, Huber-White robust standard errors were employed.

Autocorrelation corresponds to the correlation of residuals over time within the same observational unit (or firm), and its presence violates the classical assumption of independently distributed errors. In panel data, it is crucial to test for autocorrelation in both the within (i.e., over time) and between (i.e., cross-sectional patterns) dimensions of variation.

To evaluate the within-firm autocorrelation, the Wooldridge test was employed. The resulting p-value of 0.0017 led to the rejection of the null hypothesis, indicating the presence of first-order autocorrelation⁷ in the temporal component of the data. As a corrective measure, cluster-robust standard errors at the firm level were applied in subsequent regressions. For the between-firm variation, the Arellano-Bond test on first-differenced residuals showed no evidence of serial correlation (p-values of 0.1556 for AR(1) and 0.2076

⁶ The Fixed Effects (FE) model assumes that individual-specific characteristics, whether observed or unobserved, exhibit a correlation with explanatory variables. Consequently, FE incorporates individual-specific intercepts to explicitly control for these unobserved differences.

⁷ First-order autocorrelation refers to the correlation between a variable and its own lagged value at one period prior.

for AR(2)), suggesting that autocorrelation is primarily a time-related issue within firms rather than across them.

Finally, it is essential to assess potential endogeneity in the relationship under study particularly regarding the key regressor of interest, managerial ownership (*MAN_OWN*). Endogeneity, defined as a correlation between an explanatory variable and the error term, constitutes a violation of the classical assumption of exogeneity ($E(u|x) = 0$). It may arise from omitted variables, simultaneity, or reverse causality, resulting in biased and inconsistent estimators (Ribeiro, 2023).

This analysis focuses specifically on the potential endogeneity of *MAN_OWN*. First, omitted variable bias was addressed through the Ramsey RESET (discussed earlier), which found no evidence of misspecification. Therefore, endogeneity due to omitted variable bias is not a concern in this context.

The more plausible concern is simultaneity – where managerial ownership may be jointly determined with dividends or other explanatory variables. To address this, a Two-Stage Least Squares (2SLS) estimation was implemented, using the lag of *MAN_OWN* (*LMAN_OWN*) as an instrument to isolate exogenous variation. The formal test of endogeneity yielded a p-value of 0.1766, implying that the null hypothesis of exogeneity cannot be rejected. Therefore, there is no statistical evidence to suggest that *MAN_OWN* is endogenous.

As for reverse causality – the idea that dividends might influence managerial ownership – is regarded as theoretically implausible within this context.

Overall, the results support treating *MAN_OWN* as exogenous in the framework. Nevertheless, due to earlier evidence of heteroscedasticity and within-panel autocorrelation, the Ordinary Least Squares (OLS) method was applied with Newey-West corrected standard errors, both with and without fixed effects, as a robustness check. The consistency of these findings with the 2SLS estimates reinforces the validity of the main approach, as detailed in Section 4.

3.5. Regression Models

Following the evaluation of the classical assumptions by means of preliminary tests and the application of the necessary corrections where the assumptions were not initially satisfied, the development of the regression models is carried out in order to empirically test the hypotheses outlined previously.

The suggested hypotheses will be tested empirically using a panel regression model, exploring the relationship between dividends and a set of explanatory variables, including managerial ownership, the characteristics of the board of directors, and various control variables. This methodology approach aligns with the frameworks adopted by Farinha (2003b) and Florackis et al. (2015). Panel data analysis allows us to examine both cross-sectional (company-level) and temporal dimensions, providing a comprehensive perspective on the phenomena under study. The research covers the period from 2013 to 2023, utilizing a sample of companies listed in the Euro Stoxx 50.

To test hypothesis 1, the following empirical model is specified:

$$DIV_{i,t} = \beta_1 + \beta_2(MAN_{OWN_{i,t}}) + \beta_3(MAN_{OWN_{i,t}}^2) + \gamma X_{i,t} + \varphi_i + \theta_t + \varepsilon_{i,t} \quad (3.1)$$

with $i = 1, \dots, n$ and $t = 1, \dots, T$. Where $DIV_{i,t}$ is the dependent variable representing dividends, measured by the ratio of total dividends by total assets (Florackis et. al, 2015), for firm i at time t . The key independent variable, managerial ownership, $MAN_OWN_{i,t}$ is defined as the percentage of shares held by managers and directors of firm i at time t . To capture potential nonlinearity, $MAN_OWN_{i,t}^2$, the squared managerial ownership is included (Farinha, 2003b). β_1 , β_2 , and β_3 represent parameters to be estimated. β_1 is the intercept, β_2 indicates the linear effect and β_3 captures the nonlinear effect (quadratic) effect of managerial ownership. $\gamma X_{i,t}$ denotes the vector of control variables, including corporate governance characteristics (institutional ownership, board size, board independence, female board representation, CEO duality, board type, and board tenure), as well as firm-level financial controls (firm size, return on assets, capital expenditures, cash holdings and debt). φ_i represents the unobserved firm fixed effect for firm i , capturing all time-invariant

differences across firms. θ_t corresponds to the unobserved time fixed effect for period t , capturing common shocks in each year. Lastly, $\varepsilon_{i,t}$ is the idiosyncratic error term.

For hypothesis 2, which concerns the assessment of the impact of the Covid-19 pandemic, a dummy variable (*COVID*) was constructed, with a value of 1 assigned to observations from 2020 onwards and a value of 0 otherwise. The empirical model incorporates both additive and multiplicative Covid-19 effects:

$$\begin{aligned} DIV_{i,t} = & \beta_1 + \beta_2(MAN_{OWN_{i,t}}) + \beta_3(MAN_{OWN_{i,t}}^2) + \gamma X_t + \varphi_i + \theta_t \\ & + \delta(COVID_{i,t}) + \delta_2 COVID.(MAN_{OWN_{i,t}}) \\ & + \delta_3 COVID.(MAN_{OWN_{i,t}}^2) + \delta_4 COVID.\gamma X_t + \varepsilon_{i,t} \end{aligned} \quad (3.2)$$

$\delta(COVID_{i,t})$ captures the additive effect of the Covid-19 period on dividend payments. $\delta_2 COVID.(MAN_{OWN_{i,t}})$ corresponds to the interaction between Covid-19 and managerial ownership, measuring how the relationship between managerial ownership and dividends changed during the Covid-19 period. $\delta_3 COVID.(MAN_{OWN_{i,t}}^2)$ is the interaction between Covid-19 and the squared managerial ownership and evaluates changes in the nonlinear effect of managerial ownership during the pandemic. $\delta_4 COVID.\gamma X_t$ assesses how the effects of other control variables shift under Covid-19 conditions.

4. Results

4.1. Main Regression Results

The analysis begins with the baseline regression that examines the relationship between managerial ownership and dividends without control variables. This preliminary specification establishes the fundamental association before the introduction of additional explanatory factors. **Table 3** presents results from three estimation approaches: 2SLS, and OLS with Newey-West standard errors, estimated both with and without fixed effects.

Table 3: Regression Results for the Baseline Specification

Variable	2SLS	Newey-West without FE	Newey-West with FE
MAN_OWN	0.108*** (0.00694)	0.108*** (0.0114)	
d_MAN_OWN			-0.0823* (0.0475)
Constant	0.0236*** (0.00272)	0.0233*** (0.00141)	0.000109 (0.000731)
R-squared	0.290		

Notes: This table reports the coefficient estimates and robust standard errors (in parentheses) for the baseline regression specification, which includes only the dependent variable (*DIV*) and the main explanatory variable (*MAN_OWN*). The estimations were conducted over the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index during the 2013-2023 period. Column (1) presents the results from 2SLS with White robust standard errors to correct for heteroscedasticity and firm and year fixed effects. Column (2) displays results using the OLS method with Newey-West standard errors, correcting for both heteroscedasticity and autocorrelation. Column (3) shows OLS with Newey-West standard errors and fixed effects, applied to the within-transformed version of *MAN_OWN* (*d_MAN_OWN*). Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

In the 2SLS estimation, *MAN_OWN* is instrumented using its lagged value to account for potential endogeneity. The findings suggest that there are no significant endogeneity concerns related to *MAN_OWN*. Furthermore, fixed effects at two dimensions (firm and year) are incorporated, along with White robust standard errors to correct for heteroscedasticity. The estimated coefficient on *MAN_OWN* is positive (0.108) and significant at the 1% level. This result implies that, on average, an increase in managerial ownership corresponds to higher dividend payments, providing strong initial evidence of a positive association between these variables.

The OLS estimation with Newey-West standard errors corrects for heteroscedasticity and also addresses autocorrelation, which the 2SLS method does not explicitly handle. Excluding fixed effects, the results remain consistent – the coefficient on *MAN_OWN* is again positive (0.108) and statistically significant at the 1% level, reinforcing the robustness of the previously identified relationship. The second OLS estimation with Newey-West standard errors incorporates fixed effects by transforming the variables into their within-firm demeaned versions (*d_DIV* and *d_MAN_OWN*). Here, the coefficient changes sign and becomes negative; however, the estimate is not statistically significant at conventional levels. Therefore, no meaningful conclusion can be drawn from this latter estimation concerning to the direction or magnitude of the relationship between managerial ownership and dividends.

After establishing a baseline association between managerial ownership and dividend payments, the analysis is expanded by incorporating a comprehensive set of control variables. The results are presented in **Table 4**, using the same three estimation methods applied previously, with the 2SLS estimation corresponding to the benchmark specification.

Table 4: Regression Results for the Benchmark Specification

Variable	2SLS	Newey-West without FE	Newey-West with FE
MAN_OWN	0.0609*** (0.00689)	0.0602*** (0.0107)	
INST_OWN	-0.0225*** (0.00498)	-0.0170** (0.00705)	
BOARD_SIZE	-0.00110*** (0.000333)	-0.00112*** (0.000427)	
BOARD_INDEP	0.00852 (0.00696)	0.00668 (0.00641)	
FEMALE_BOARD	-0.00271 (0.0185)	-0.00239 (0.0120)	
CHAIR_CEO	0.00379 (0.00348)	0.00293 (0.00253)	
BOARD_TENURE	-0.000581 (0.000388)	-0.000373 (0.000396)	
BOARD_TYPE	-0.000719 (0.00251)	-0.000467 (0.00194)	
FIRM_SIZE	0.00404*** (0.00141)	0.00461*** (0.00162)	
ROA	0.201*** (0.0322)	0.205*** (0.0320)	

CAPEX	-0.0215 (0.0540)	-0.0102 (0.0440)	
CASH	-0.0126 (0.0252)	-0.00956 (0.0186)	
DEBT	-0.0254*** (0.00762)	-0.0240*** (0.00902)	
d_MAN_OWN			-0.0497 (0.0323)
d_INST_OWN			-0.0431** (0.0177)
d_BOARD_SIZE			-0.000481 (0.000398)
d_BOARD_INDEP			0.00487 (0.00743)
d_FEMALE_BOARD			-0.0134 (0.0106)
d_CHAIR_CEO			0.00351 (0.00359)
d_BOARD_TENURE			-0.00108* (0.000591)
d_BOARD_TYPE			0.00103 (0.00102)
d_FIRM_SIZE			0.00585*** (0.00215)
d_ROA			0.111** (0.0426)
d_CAPEX			0.227*** (0.0660)
d_CASH			-0.0192 (0.0250)
d_DEBT			-0.00963 (0.0140)
Constant	0.00845 (0.0221)	-0.00323 (0.0183)	-5.42e-05 (0.000539)
R-squared		0.760	

Notes: This table reports the coefficient estimates and robust standard error (in parentheses) for the extended regression specification, which includes the dependent variable (*DIV*), the main explanatory variable (*MAN_OWN*), and a set of corporate governance and firm-level control variables. The estimations are conducted on the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index over the 2013–2023 period. Column (1) presents results from 2SLS with the White robust standard errors to correct for heteroscedasticity and firm and year fixed effects. Column (2) displays results using the OLS method with Newey-West standard errors, correcting for both heteroscedasticity and autocorrelation. Column (3) shows OLS with Newey-West standard errors and fixed effects, applied to the within-transformed version of *MAN_OWN* (e.g., *d_MAN_OWN*). As a robustness check, the Lewbel estimator was also employed. The underidentification test returned a p-value of 0.062, indicating that the generated instruments are not valid and supporting the exogeneity of *MAN_OWN* (**Appendix 3**). Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

The 2SLS regression results reveal that the coefficient for *MAN_OWN* remains positive (0.0609) and statistically significant at the 1% level, thereby reinforcing the initially identified positive relationship even after controlling for other influential factors. Concerning to the control variables, *INST_OWN* exhibits a negative (-0.0225) and statistically significant coefficient at the 1% level, indicating that firms with higher institutional ownership tend to distribute fewer dividends. Similarly, a negative and significant coefficient for *BOARD_SIZE* (-0.00110) may indicate that enhanced internal monitoring by larger boards reduces the need for dividend-based discipline. In contrast, *FIRM_SIZE* and *ROA* exhibit positive and strongly significant associations with dividends, with coefficients of 0.00404 and 0.201, respectively. The findings suggest that larger and more profitable firms appear to possess the capacity and propensity to distribute higher dividends. Lastly, *DEBT* is negatively associated with dividends, exhibiting a significant coefficient of -0.0254, which implies that firms with higher leverage tend to reduce dividend distributions.

Moving to the OLS estimation with Newey-West standard errors without fixed effects, the *MAN_OWN* coefficient remains positive (0.0602) and statistically significant at the 1% level, closely aligning with the 2SLS result. This consistency further supports the robustness of the previously identified positive relationship. Regarding the control variables, *INST_OWN* retains a negative association with dividends (-0.0170), although its statistical significance decreases to the 5% level. Likewise, *BOARD_SIZE* maintains a negative (-0.00112) and statistically significant coefficient at the 1% level. *FIRM_SIZE* (0.00461) and *ROA* (0.205) again appear positively and significantly related to dividends, confirming earlier observations. *DEBT* (-0.0240) is also negative and significant at the 1% level, reaffirming the inverse relationship between leverage and dividends distribution. These results broadly align with those obtained using the 2SLS, demonstrating stability in the key relationships analyzed.

Finally, column 3 presents the OLS estimation with Newey-West standard errors incorporating fixed effects. Under this specification, the coefficient for *d_MAN_OWN* is not statistically significant, suggesting no clear evidence of a relationship with dividend payments once firm-specific effects and autocorrelation are accounted for. Among control variables, *d_INST_OWN* remains negatively related to dividends (-0.0431), significant at the 5% level. *d_FIRM_SIZE* and *d_ROA* maintain their positive and significant relationships with dividend payments, though the significance of return on assets is reduced compared to

earlier estimates. An interesting change occurs with d_CAPEX , which now shows a positive and statistically significant association with dividends (0.227). This result implies that firms with higher investment activities also tend to distribute more dividends, possibly indicating stronger financial positions allowing simultaneous investment and dividend distribution.

The next step of the analysis introduces a nonlinear specification of the relationship between managerial ownership and dividend payments by including a squared term of managerial ownership, as defined in regression model (3.1). **Table 5** presents the results from the 2SLS and the OLS estimation with Newey-West standard errors and fixed effects.

Table 5: Regression Results for the Benchmark Specification with Nonlinear Term

Variable	2SLS	Newey-West with FE
MAN_OWN	0.0399 (0.0367)	
MAN_OWN ²	0.0377 (0.0632)	
INST_OWN	-0.0231*** (0.00519)	
BOARD_SIZE	-0.00102** (0.000412)	
BOARD_INDEP	0.00922 (0.00756)	
FEMALE_BOARD	-0.00259 (0.0185)	
CHAIR_CEO	0.00376 (0.00349)	
BOARD_TENURE	-0.000578 (0.000387)	
BOARD_TYPE	-0.000768 (0.00251)	
FIRM_SIZE	0.00388*** (0.00119)	
ROA	0.202*** (0.0319)	
CAPEX	-0.0301 (0.0551)	
CASH	-0.0147 (0.0255)	
DEBT	-0.0261*** (0.00796)	

d_MAN_OWN		-0.0561 (0.0347)
d_MAN_OWN ²		0.496 (0.629)
d_INST_OWN		-0.0429** (0.0177)
d_BOARD_SIZE		-0.000481 (0.000398)
d_BOARD_INDEP		0.00499 (0.00742)
d_FEMALE_BOARD		-0.0131 (0.0107)
d_CHAIR_CEO		0.00356 (0.00360)
d_BOARD_TENURE		-0.00108* (0.000592)
d_BOARD_TYPE		0.00103 (0.00102)
d_FIRM_SIZE		0.00586*** (0.00216)
d_ROA		0.111** (0.0427)
d_CAPEX		0.226*** (0.0660)
d_CASH		-0.0184 (0.0252)
d_DEBT		-0.0103 (0.0143)
Constant	0.0101 (0.0200)	-0.000104 (0.000562)
	0.0399	
R-squared	0.762	

Notes: This table reports the coefficient estimates and robust standard error (in parentheses) for the full specification, which includes a nonlinear term for managerial ownership (MAN_OWN^2), corresponding to regression model (3.1). The estimations cover the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index from 2013 to 2023. Two estimation methods are employed. Column (1) presents results from 2SLS with White robust standard errors to correct for heteroscedasticity and firm and year fixed effects. Column (2) shows OLS with Newey-West standard errors and fixed effects, applied to the within-transformed version of MAN_OWN (e.g., d_MAN_OWN). Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

In the 2SLS results, the coefficient for MAN_OWN remains positive but is not statistically significant, indicating that we cannot infer a robust direct effect. The coefficient for the squared term (MAN_OWN^2) is also statistically insignificant, suggesting no empirical support for a nonlinear (e.g., U-shaped or inverted U-shaped) relationship in this specification. The lack of statistical significance in both ownership terms suggests that the

previously observed relationship does not hold when introducing the nonlinear terms. The control variables largely mirror previous patterns. *INST_OWN* (-0.0231) and *BOARD_SIZE* (-0.00102) maintain statistically significant negative associations with dividend payouts. Conversely, *FIRM_SIZE* (0.00388) and *ROA* (0.202) continue to exhibit strong positive relationships with dividends. *DEBT* also remains negatively and significantly associated with dividend payments (-0.0261), reinforcing earlier results.

Turning to the OLS estimation with Newey-West standard errors and fixed effects, the coefficient for *MAN_OWN* turns negative but remains statistically insignificant, while the squared term is positive yet also not significant. These results provide no support for a clear nonlinear pattern between managerial ownership and dividend payouts. Among the control variables, the overall direction and statistical significance of effects remain consistent, except for *d_BOARD_SIZE*, which loses its significance entirely. Notably, *d_CAPEX* emerges as positively and significantly related to dividends (0.226), suggesting that firms engaging in higher investment activity may also have the financial flexibility to distribute higher dividends.

In sum, the introduction of the quadratic term for managerial ownership does not provide evidence of a nonlinear relationship. The absence of statistical significance for both linear and squared terms across both estimation techniques suggests that the effect of managerial ownership on dividend policy is likely not nonlinear within the sample.

To conclude the analysis, this section examines the potential impact of Covid-19 pandemic on the relationship between managerial ownership and dividend payments, incorporating both additive and interaction terms as described in regression model (3.2)⁸. **Table 6** presents the corresponding results based on the 2SLS estimation.

⁸ Although regression model (3.2) originally included a squared term for managerial ownership to account for nonlinearity, it was excluded from **Table 6** due to lack of statistical support in preliminary regressions.

Table 6: Regression Results for the Covid-19 Interaction Model

Variable	2SLS
MAN_OWN	0.0515*** (0.0111)
MAN_OWN x COVID	0.0337** (0.0141)
COVID	-0.0185 (0.0548)
INST_OWN	-0.0274*** (0.00850)
BOARD_SIZE	-0.000927** (0.000465)
BOARD_INDEP	0.00689 (0.0106)
FEMALE_BOARD	-0.0286*** (0.0107)
CHAIR_CEO	0.00518** (0.00217)
BOARD_TENURE	-0.000297 (0.000357)
BOARD_TYPE	0.000383 (0.00182)
FIRM_SIZE	0.00471** (0.00212)
ROA	0.184*** (0.0319)
CAPEX	-0.0718 (0.0623)
CASH	0.0254 (0.0364)
DEBT	-0.0287** (0.0120)
INST_OWN x COVID	0.0122 (0.0153)
BOARD_SIZE x COVID	0.000392 (0.000623)
BOARD_INDEP x COVID	0.00676 (0.0102)
FEMALE_BOARD x COVID	0.106*** (0.0300)
CHAIR_CEO x COVID	-0.00234 (0.00490)
BOARD_TENURE x COVID	-0.000546 (0.000935)
BOARD_TYPE x COVID	-0.00952*

	(0.00550)
FIRM_SIZE x COVID	-0.000358
	(0.00410)
ROA x COVID	0.00383
	(0.0590)
CAPEX x COVID	0.0987
	(0.102)
CASH x COVID	-0.0827*
	(0.0471)
DEBT x COVID	0.00472
	(0.0243)
Constant	0.00704
	(0.0256)
R-squared	0.818

Notes: This table reports the coefficient estimates and robust standard error (in parentheses) for the regression specification that includes both additive and multiplicative effects of the Covid-19 pandemic, corresponding to regression model (3.2). The variable *COVID* captures the additive effect of the pandemic, while terms such as $MAN_OWN \times COVID$ represent interaction effects, showing how the relationship between each explanatory variable and dividends changes during the pandemic. The estimations use the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index from 2013 to 2023. The regression uses 2SLS with White robust standard errors to correct for heteroscedasticity and firm and year fixed effects. Endogeneity test confirms that *MAN_OWN* can be treated as exogenous. Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

The coefficient for *MAN_OWN* is positive (0.0515) and statistically significant at the 1% level, suggesting that before the pandemic, higher managerial ownership was associated with increased dividend payouts. The interaction term $MAN_OWN \times COVID$ is also positive (0.0337) and significant at the 5% level, indicating that this positive association intensified during the Covid-19 period. Although the standalone *COVID* dummy variable is not statistically significant, suggesting that the overall impact of the pandemic on dividends is not distinguishable without considering interaction effects.

Turning to control variables, *INST_OWN* outside the pandemic is negatively and significantly associated with dividends (-0.0274), consistent with earlier findings. However, the interaction term $INST_OWN \times COVID$ is statistically insignificant, suggesting that there is insufficient evidence to conclude that the relationship changed during the Covid-19 period. *BOARD_SIZE* exhibits a small but negative coefficient (-0.000927), significant at the 5% level before the pandemic, but this relationship does not hold during the Covid-19 period, as the coefficient turns positive and is no longer statistically significant.

A notable shift occurs in the case of the female board representation: outside the pandemic, the *FEMALE_BOARD* coefficient is negative (-0.0286) and statistically significant at the 1% level, whereas the interaction term *FEMALE_BOARD* $\times$ *COVID* is positive (0.106) and strongly significant at the 1% level. This reversal suggests that firms with greater female representation on boards were more likely to increase dividend distributions during the pandemic.

CEO duality (*CHAIR_CEO*) is positively associated with dividends before Covid-19 (0.00518), significant at the 5% level), but this effect is no longer significant in the pandemic context.

FIRM_SIZE is positively related to dividend payouts before the pandemic, with a coefficient of 0.00471 that is statistically significant at the 5% level, while its interaction with the *COVID* dummy is statistically insignificant, suggesting that the effect did not significantly change during the crisis. Similarly, *ROA* is positively and strongly related to dividends outside the pandemic (0.184, significant at the 1% level), yet the interaction with Covid-19 (*ROA* $\times$ *COVID*) is insignificant, indicating that the probability-dividend link did not materially change during the crisis.

In sum, the results from **Table 6** indicate a robust positive association between managerial ownership and dividend payouts before the Covid-19 pandemic. Moreover, the interaction term (*MAN_OW* $\times$ *COVID*) suggests that this relationship became more pronounced during the Covid-19 period. The pandemic itself, as captured by the Covid-19 dummy, does not appear to have a significant standalone impact on dividend policy.

4.2. Robustness Checks

4.2.1. Temporal Subsample Analysis

To test robustness of the relationship between managerial ownership and dividend payouts across different time periods, the sample was segmented into three distinct sub-periods: pre-Covid-19, during Covid-19, and post-Covid-19. **Table 7** reports the results from the benchmark specification (2SLS), with each column corresponding to one of these periods.

Table 7: Robustness Check – Regression Results by Time Period

Variable	Pre-Covid-19	During Covid-19	Post-Covid-19
MAN_OWN	0.0485*** (0.0113)	0.0898*** (0.0173)	0.0807*** (0.0208)
INST_OWN	-0.0278*** (0.00835)	-0.0154 (0.0102)	-0.0322 (0.0205)
BOARD_SIZE	-0.000938** (0.000462)	-0.000507 (0.000738)	0.000948 (0.00124)
BOARD_INDEP	0.00674 (0.0106)	0.0123 (0.0118)	0.0311** (0.0131)
FEMALE_BOARD	-0.0295*** (0.0104)	0.0654 (0.0411)	0.129*** (0.0446)
CHAIR_CEO	0.00535** (0.00215)	0.00539 (0.00522)	0.000896 (0.00700)
BOARD_TENURE	-0.000284 (0.000354)	-0.00124 (0.00111)	-0.00248* (0.00127)
BOARD_TYPE	0.000393 (0.00181)	-0.00752 (0.00564)	-0.0133** (0.00664)
FIRM_SIZE	0.00464** (0.00214)	0.00340 (0.00481)	0.00883** (0.00388)
ROA	0.188*** (0.0315)	0.180*** (0.0451)	0.220** (0.0909)
CAPEX	-0.0676 (0.0615)	-0.00486 (0.123)	-0.000414 (0.139)
CASH	0.0270 (0.0368)	-0.0808* (0.0455)	0.0297 (0.0498)
DEBT	-0.0288** (0.0121)	-0.0274 (0.0241)	0.00364 (0.0320)
Constant	0.00803 (0.0257)	0.00401 (0.0544)	-0.0917 (0.0594)
R-squared	0.855	0.767	0.801

Notes: This table presents results from the benchmark regression specification, estimated using 2SLS, segmented by period: pre-Covid-19, during Covid-19, and post-Covid-19. The Covid-19 period was defined as 2020-2021, reflecting the years in which firms were most directly affected by pandemic-related restrictions, uncertainty, and policy interventions. The pre-Covid-19 period includes all years prior to 2020, while the post-Covid-19 period captures the recovery phase, beginning in 2022. This segmentation aligns with OECD (2021), which identifies the first 15 months after March 2020 as the core phase of the pandemic's economic impact. The estimations use the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index from 2013 to 2023. Endogeneity tests conducted for each subperiod found no statistically significant evidence of endogeneity in *MAN_OWN*. Accordingly, *MAN_OWN* is treated as exogenous in all three estimations. Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

Across all three time segments, the coefficient on *MAN_OWN* remains positive and statistically significant, with estimates of 0.0485 in the pre-pandemic period, 0.0898 during the pandemic, and 0.0807 in the post-pandemic. These findings reinforce the earlier evidence of a consistent and robust association between dividends and managerial ownership, suggesting that the nature of this relationship persisted regardless of the broader economic disruptions introduced by the Covid-19 crisis.

4.2.2. Sectoral Subsample Analysis

To assess the robustness of the relationship between managerial ownership and dividend payments across different industries, the sample was segmented into four distinct sectoral groups: (i) Consumer (comprising consumer discretionary and consumer staples), (ii) Tech/Comm (information technology and communication services), (iii) Energy/Utilities and (iv) Industrial/Materials. **Table 8** presents the results from the benchmark specification (2SLS), with each column corresponding to a distinct sector.

Table 8: Robustness Check – Regression Results by Sector

Variable	Consumer	Energy/Utilities	Industrial/ Materials
MAN_OWN	0.0525*** (0.0141)	-7.340*** (0.843)	0.162*** (0.0300)
INST_OWN	-0.0520*** (0.0124)	-0.0617*** (0.00688)	0.0442*** (0.00849)
BOARD_SIZE	-0.000140 (0.000809)	-0.000213 (0.000284)	-0.00128*** (0.000256)
BOARD_INDEP	0.0439*** (0.0162)	-0.0815*** (0.0285)	0.0194*** (0.00728)
FEMALE_BOARD	-0.0142 (0.0218)	0.00844 (0.0221)	0.000357 (0.00596)

CHAIR_CEO	-0.00313 (0.00417)	0.00922	0.00428** (0.00176)
BOARD_TENURE	-0.000910*** (0.000266)	-0.00172*** (0.000401)	-0.000745 (0.000683)
BOARD_TYPE	0.0162*** (0.00328)	0.000188	-0.00559** (0.00242)
FIRM_SIZE	0.00243 (0.00322)	0.0153*** (0.00191)	0.00848*** (0.00127)
ROA	0.271*** (0.0580)	-0.163*** (0.0562)	0.0129 (0.0247)
CAPEX	0.176** (0.0753)	0.172*** (0.0505)	0.320*** (0.0726)
CASH	-0.0623* (0.0338)	-0.116 (0.0943)	-0.0461** (0.0203)
DEBT	0.00830 (0.00841)	0.0247 (0.0396)	-0.0269*** (0.00977)
Constant	-0.0549** (0.0256)	-0.0470** (0.0187)	-0.0786*** (0.00936)
R-squared	0.912	0.923	0.866

Notes: This table presents results from the benchmark regression specification, estimated using 2SLS, segmented by sector: Consumer, Energy/Utilities, and Industrial/Materials. The estimations use the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index from 2013 to 2023. The Tech/Comm sector is excluded from the results due to multicollinearity issues. Based on endogeneity testing, *MAN_OWN* is treated as exogenous in all sector-specific estimations. Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

In the Consumer sector, the coefficient on *MAN_OWN* is positive (0.0525) and statistically significant at the 1% level, reinforcing the previously established positive relationship with dividends. For the Energy/Utilities sector, however, the coefficient is negative (-7.340) and also highly significant, suggesting that in this specific sector, higher managerial ownership is associated with lower dividend payouts. Finally, in the Industrial/Materials sector, the *MAN_OWN* coefficient is again positive (0.162) and significant at the 1% level, providing further support for the main findings within this segment of the market.

These results suggest that while the positive relationship between managerial ownership and dividends is broadly consistent across sectors, notable exceptions such as the Energy/Utilities sector indicate that industry-specific dynamics may condition the nature of this relationship.

4.2.3. Alternative Measures of Dividends

To assess the robustness of the main findings, two alternative specifications are tested: (i) the dividend payout ratio, defined as total dividends divided by net income, and (ii) a broader distribution measure, calculated as the sum of total dividends and share repurchases divided by net income. These measures are commonly used in the literature to capture different aspects of a firm's payout policies. **Table 9** presents benchmark 2SLS results for both definitions. Columns (1) and (2) report the results without including the squared term for managerial ownership, while Columns (3) and (4) present the specifications that include the nonlinear term (MAN_OWN^2).

Table 9: Robustness Check – Regression Results with Alternative Dependent Variables

Variable	Alternative 1	Alternative 2	Alternative 1 (nonlinear)	Alternative 2 (nonlinear)
MAN_OWN	-0.646 (0.615)	0.745 (1.014)	-3.497 (4.074)	2.154 (3.519)
MAN_OWN ²			5.127 (6.936)	-2.535 (5.924)
INST_OWN	-3.243* (1.730)	-3.781** (1.762)	-3.321* (1.789)	-3.742** (1.833)
BOARD_SIZE	-0.0143 (0.0604)	0.0748 (0.0623)	-0.00328 (0.0703)	0.0693 (0.0703)
BOARD_INDEP	1.860 (1.452)	3.019** (1.382)	1.955 (1.535)	2.973** (1.464)
FEMALE_BOARD	-0.0649 (1.207)	1.200 (1.187)	-0.0489 (1.224)	1.192 (1.196)
CHAIR_CEO	0.0865 (0.405)	-0.154 (0.446)	0.0827 (0.394)	-0.152 (0.446)
BOARD_TENURE	0.0424 (0.0394)	0.00356 (0.0567)	0.0428 (0.0408)	0.00335 (0.0567)
BOARD_TYPE	0.00895 (0.124)	-0.0286 (0.106)	0.00238 (0.119)	-0.0253 (0.105)
FIRM_SIZE	-0.209 (0.419)	-0.360 (0.423)	-0.232 (0.441)	-0.349 (0.442)
ROA	-9.090** (3.915)	-10.10** (3.959)	-8.924** (3.955)	-10.18** (3.971)
CAPEX	-12.42* (7.120)	-13.79 (8.539)	-13.59* (7.909)	-13.22 (8.896)
CASH	3.154** (1.606)	1.590 (2.369)	2.862* (1.681)	1.734 (2.465)
DEBT	-0.0417	-0.113	-0.132	-0.0682

	(0.882)	(0.963)	(0.874)	(1.012)
Constant	4.500	5.060	4.719	4.952
	(4.082)	(4.270)	(4.281)	(4.432)
R-squared	0.049	0.058	0.050	0.058

Notes: This table presents results from the benchmark regression specification, estimated using 2SLS, employing alternative measures of the dependent variable. The estimations use the full sample of 38 non-financial firms listed in the Euro Stoxx 50 index from 2013 to 2023. Columns (1) and (2) use the dividend payouts ratio, defined as total dividends divided by net income. Columns (3) and (4) use an extended measure that includes total dividends plus shares buyback, also divided by net income. Each specification is estimated both with and without the squared term of managerial ownership to assess potential nonlinear effects. Variable definitions are provided in Section 3.2.2. Statistical significance is denoted by * at 10%, ** at 5%, and *** at 1%.

Across all specifications, the coefficients for *MAN_OWN* and *MAN_OWN*² are statistically insignificant, regardless of the payout metric used. Specifically, *MAN_OWN* is negative in Column (1) and positive in Column (2), but neither estimate reaches conventional levels of significance. Similarly, the squared term in Columns (3) and (4) does not exhibit statistical relevance. These findings suggest that neither a linear nor a nonmonotonic relationship between managerial ownership and dividends holds when alternative definitions of dividend policy are employed.

Although endogeneity tests were passed, the lack of consistent significance highlights that the earlier results are sensitive to the specific choice of dividend metric. This reinforces the importance of robustness checks when analyzing payout behavior.

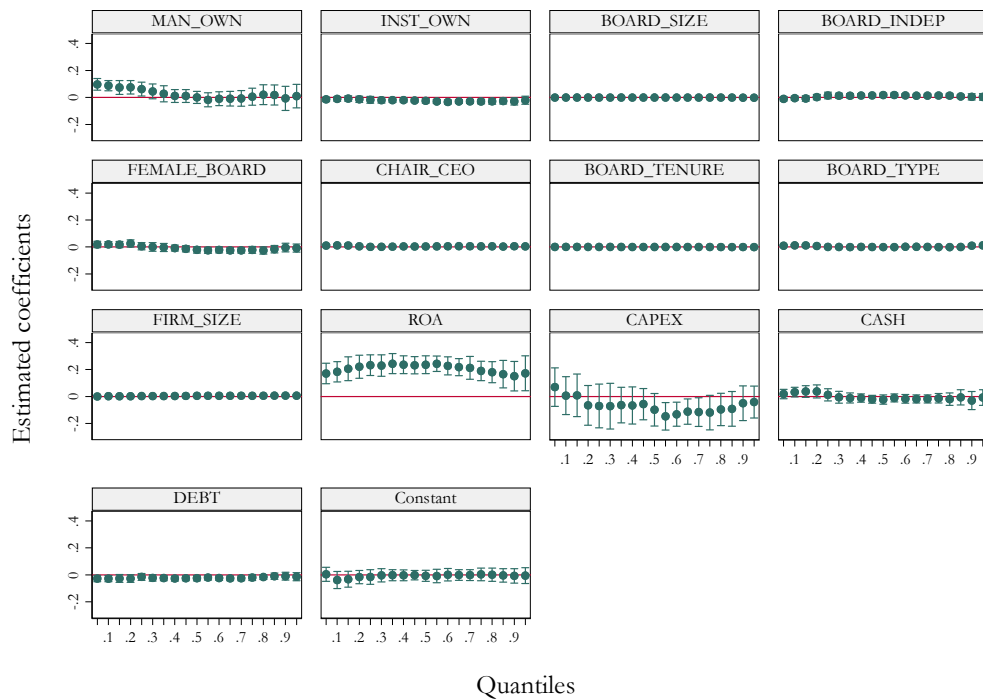
4.2.4. Data Standardization and Winsorization

As an additional robustness check, the analysis was replicated using standardized variables (z-scores) and a winsorized dataset, in which extreme values were trimmed at the 5th and 95th percentiles. The standardization procedure was first applied to the baseline regression including only managerial ownership and dividends, followed by the inclusion of control variables. In both specifications, the coefficient for managerial ownership remained positive and statistically significant, reinforcing the main findings. Similarly, the winsorization approach was implemented following the same sequence – first without controls and then including them. The results again confirmed the positive and significant association between managerial ownership and dividend payments, suggesting that the main conclusions are not sensitive to the presence of outliers or differences in variable scale.

4.3. Quantile Analysis

To complement the main regression results and further assess the robustness of the relationship between managerial ownership and dividends, a quantile regression analysis was conducted. This method allows for examining whether the impact of each independent variable on dividend payouts varies across different points of its distribution. **Figure 2** presents the estimated coefficients for all explanatory variables across their respective quantiles

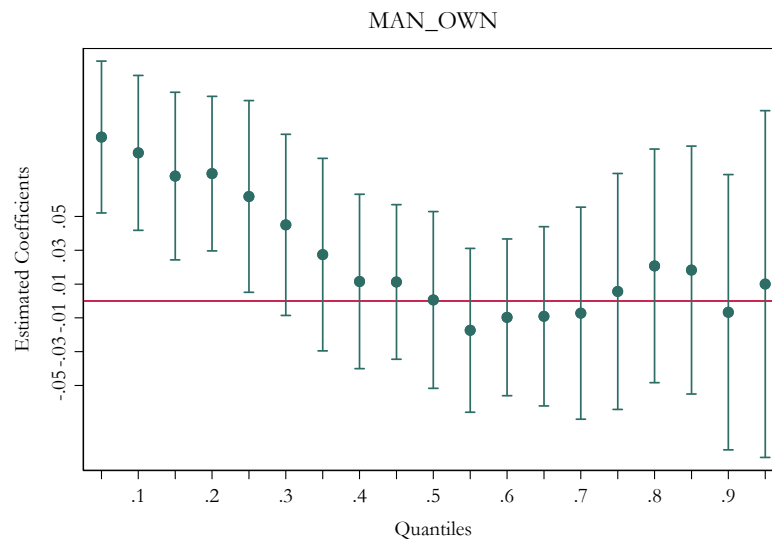
Figure 2: Quantile Analysis of All Variables



Most governance and firm-level variables display relatively stable and statistically insignificant marginal effects across the distribution, suggesting limited variation in their influence on dividends. However, three variables – *ROA*, *CAPEX*, and *MAN_OW* – exhibit notable heterogeneity. In the case of *ROA*, the marginal effect on dividends increases for firms with lower to medium profitability, peaking around the 0.6 quantile. This indicates that among moderately profitable firms, profitability exerts a stronger positive influence on dividend payouts. Beyond this point, the effect slightly declines, though it remains statistically significant, suggesting diminishing marginal returns in firms that may have already established stable payout policies. *CAPEX*, by contrast, shows a more negative marginal effect at lower quantiles, implying that among firms with lower investment intensity,

increases in capital expenditures are more likely to crowd out dividend distributions. As *CAPEX* rises, this effect attenuates and flattens, albeit without strong statistical significance – suggesting a weaker trade-off between investment and dividends in more investment-intensive firms. Regarding *MAN_OWN*, **Figure 3** isolates its marginal effect on dividends.

Figure 3: Quantile Analysis of Managerial Ownership



The coefficient is positive at lower quantiles, approaches zero around the median, and becomes marginally negative at the upper end of the distribution. Although the estimates lose precision at the tails – as shown by wider confidence intervals – the overall pattern indicates that managerial ownership has a stronger positive effect on dividend policy in firms where managerial ownership is lower. In contrast, its influence diminishes or becomes negligible in firms where managers hold substantial equity stakes.

5. Discussion

This section discusses the main empirical findings in light of the hypotheses developed and the literature previously reviewed. It aims to provide a critical interpretation of the regression results and assess their implications for the study of the relationship between managerial ownership and dividend policy.

5.1. The Relationship Between Managerial Ownership and Dividends

The results consistently reveal a positive and statistically significant relationship between managerial ownership and dividend payouts, both in the baseline model (**Table 3**) and in the model including all corporate governance and firm-level controls (**Table 4**). These findings suggest that higher levels of managerial ownership are associated with greater dividend distributions, as supported by Zwiebel (1996), Jo and Pan (2009), Vo and Nguyen (2014), Al-Qahtani and Ajina (2017), and Obaidat (2018). While much of the prior literature associates this positive relationship with the behavior of entrenched managers, the firms in this sample are generally characterized by low levels of managerial ownership. Therefore, the results are more likely explained by an alignment effect, whereby even modest equity stakes may strengthen managers' incentives to act in the interest of shareholders, rather than by classic entrenchment dynamics.

On the other hand, the results contradict a broad strand of literature that identifies a negative relationship, viewing dividends and managerial ownership as substitute mechanisms to address agency problems. According to this perspective, at higher managerial ownership levels, dividends become less necessary (Crutchley & Hansen, 1989; Jensen et al., 1992; Chen & Steiner, 1999; Tayachi et al., 2021). A notable exception emerges from the sectoral segmentation analysis (**Table 8**). While the Consumer and Industrial/Materials sectors support the previously identified positive relationship, the Energy/Utilities sector demonstrates a negative and statistically significant relationship. This deviation may reflect sector-specific governance dynamics and cash flow requirements, highlighting the importance of industry context in governance research.

Moreover, the findings are not consistent with the nonlinear relationship hypothesized by some studies, including Schooley and Barney (1994), Farinha (2003b), Florackis et al. (2015), and Farinha and López-de-Foronda (2009), who find U-shaped or cubic patterns. In **Table 5**, the inclusion of the squared term for managerial ownership did not yield statistically significant results, indicating that, within this sample, there is no robust statistical support for a nonmonotonic relationship between managerial ownership and dividends.

Nevertheless, contextual insights from Farinha and López-de-Foronda (2009) remain relevant in explaining the positive and linear relationship identified in this study. Their research indicates that the relationship between insider ownership and dividend policy varies across different legal environments. Specifically, in civil law countries – where minority shareholder protection tends to be weaker – the relationship is expected to be positive at low levels of managerial ownership. Given that the Euro Stoxx 50 comprises predominantly large, established firms operating under civil law jurisdictions, typically characterized by dispersed capital ownership structures and relatively low managerial ownership, the positive linear relationship found in this study aligns well with these institutional settings. Incremental increases in managerial ownership in this context may therefore signal confidence in the market (Miller & Rock, 1985) and strengthen alignment with shareholders who value stable dividends. Consequently, dividends and managerial ownership appear to function as complementary, rather than substitute, governance mechanisms. This interpretation is consistent with La Porta et al. (2000), who argue that in certain institutional contexts, dividends may act as a complement to internal governance in mitigating agency problems.

Accordingly, hypothesis 1 is rejected. While the findings consistently show a statistically significant positive relationship, they do not support a nonmonotonic pattern. This may be explained by institutional factors unique to this sample, such as the civil law legal environment and predominantly low levels of managerial ownership. This result, however, remains consistent with the initial segment of the pattern proposed by Farinha and López-de-Foronda (2009), who argue that at low ownership levels, dividends tend to increase as a way to signal alignment with minority shareholders in civil law settings.

The quantile regression analysis provides additional insights, revealing nuances not captured by the baseline regressions. While the aforementioned models indicate a generally positive

linear effect, the quantile results demonstrate that this effect is not uniform across different levels of managerial ownership. Specifically, the marginal effect of managerial ownership on dividend payouts is more pronounced in firms with lower levels of managerial ownership, whereas in firms with higher levels of managerial ownership, this marginal effect diminishes and becomes statistically insignificant. This further reinforces the conclusions drawn from Farinha and López-de-Foronda (2009).

These quantile analysis results can be interpreted through the lens of agency theory (Jensen & Meckling, 1976), which posits that agency costs arise primarily from the separation between ownership and control. In firms with low managerial ownership, managers typically have weaker incentives to prioritize shareholders' interests, thereby increasing the likelihood of opportunistic behavior. In such settings, incremental increases in managerial ownership not only serve to align interests but also appear to encourage greater dividend distributions. This interpretation is consistent with Jensen's (1986) free cash flow theory, which argues that the distribution of excess cash to shareholders can serve to mitigate the potential for managerial spending that may be inefficient or self-serving in nature. This mechanism is further supported by Easterbrook (1984), who emphasizes the disciplinary role of dividends in limiting managerial discretion and exposing firms to greater scrutiny from external capital markets. Moreover, dividend payments can function as a form of signaling, conveying positive information to investors regarding the quality of the firm and its future prospects (Miller & Rock, 1985).

Conversely, in firms already characterized by high managerial ownership, the alignment of interests is presumed to be stronger, as managers hold a significant personal stake in the outcomes of their decisions. In this context, further increases in ownership provide diminishing governance benefits, and the complementary role of dividends in mitigating agency problems becomes less relevant. This viewpoint aligns with the findings of Jensen and Meckling (1976), who posited that agency costs tend to dissipate as managerial ownership approaches a state of full control. This finding aligns with the conclusions of Cole and Mehran (1989), who argued that higher levels of managerial ownership are associated with better firm performance, reinforcing internal alignment. Consequently, in high-ownership firms, dividends may no longer act as an essential governance mechanism, as ownership itself sufficiently constrains managerial discretion.

5.2. Governance and Financial Control Variables

Among the control variables, institutional ownership consistently shows a negative and significant relationship with dividend payouts, in line with the substitution hypothesis. This finding suggests that institutional investors may act as effective monitors, reducing the reliance on dividends as a tool for mitigating agency costs (Obradovich & Gill, 2012; Haye, 2015).

Board size also demonstrates a negative association with dividends, supporting the resource dependency view that larger boards bring more expertise and thus reduce the need for external governance mechanisms like dividend payments (Ning et al., 2010; Alias et al., 2014).

As expected, firm size and return on assets exhibit positive and significant coefficients, indicating that larger and more profitable firms are more likely to distribute dividends, consistent with prior research (Fama & French, 2001; Denis & Osobov, 2008; Miller & Rock, 1985).

The debt ratio shows a generally negative relation with dividends, particularly in the 2SLS estimations, which supports agency theory arguments that debt serves as a substitute for dividends (Jensen & Meckling, 1976; Stulz, 1988).

Interestingly, capital expenditures reveal a positive and significant effect in some specifications, especially under OLS estimations with Newey-West standard errors and fixed effects. These results deviated from pecking order theory expectations (Myers & Majluf, 1984), suggesting that financially stronger firms may simultaneously support investment and dividend distribution.

5.3. The Role of the Covid-19 Pandemic

Regarding hypothesis 2, which posits that the Covid-19 pandemic intensified the relationship between managerial ownership and dividends, the results provide empirical support for this claim. As shown in **Table 6**, the coefficient for managerial ownership was positive and significant before the pandemic, and the interaction term ($MAN_OWN \times COVID$) is also positive and statistically significant. This indicates that the positive association between managerial ownership and dividends became more pronounced during the Covid-19 period. These results also resonate with the patterns documented in earlier crises by Sawicki (2009) and Mili et al. (2017), who found that corporate governance variables tend to exert stronger influence during periods of financial stress.

The Covid-19 dummy variable itself is insignificant, suggesting that the pandemic did not independently affect dividend policy. These findings are consistent with Tinungki et al. (2022), who found that many firms maintained or even increased dividend payouts during the pandemic, and contradict Krieger et al. (2021), who reported widespread dividend cuts in the US.

Additional shifts were observed in some governance-related control variables. For example, female board representation, which showed a negative association with dividends prior to a pandemic, turned significantly positive during Covid-19. This suggests that firms with more gender-diverse boards may have adopted more shareholder-oriented payout strategies under crisis conditions. In contrast, other variables such as institutional ownership, CEO duality, and board size lost statistical significance in the Covid-19 period, indicating that their influence on dividend decisions weakened. These results corroborate earlier findings by Khatib and Nour (2021) and Boshnak et al. (2023), who report governance adjustments during Covid-19 crisis.

Therefore, hypothesis 2 is supported. The relationship between managerial ownership and dividend payouts not only persisted during Covid-19 but became stronger, suggesting that, in times of crisis, firms may have relied more heavily on internal governance mechanisms like managerial ownership to guide payout decisions.

6. Conclusion

This dissertation set out to examine how managerial ownership and the quality of corporate governance influence dividend distribution among firms listed on the Euro Stoxx 50 index, with a particular focus on the Covid-19 period. Motivated by the central role of dividends in corporate finance – often described as a persistent puzzle (Black, 1976) – the study draws on agency theory, which posits dividends and ownership as governance mechanisms to mitigate conflicts between managers and shareholders. Using panel data from 38 non-financial Euro Stoxx 50 firms between 2013 and 2023 and regression models based on the frameworks of Florackis et al. (2015) and Farinha (2003b), the spans pre-, during-, and post-pandemic periods.

The findings reject hypothesis 1, which anticipated a nonmonotonic relationship. Instead, a consistently positive and statistically significant association between managerial ownership and dividend payout is observed, suggesting that these mechanisms act as complements. This aligns with the theoretical arguments from Zwiebel (1996) and empirical evidence from Jo and Pan (2009), Vo and Nguyen (2014), Al-Qahtani and Ajina (2017), and Obaidat (2018). Conversely, the results challenge the view that ownership and dividends serve as substitutes, as proposed by Crutchley and Hansen (1989), Jensen et al. (1992), and others. A notable exception was found in the Energy/Utilities sector, which showed a negative relationship, possibly reflecting industry-specific dynamics. No support was found for a nonlinear relationship, contradicting earlier studies such as Schooley and Barney (1994), Farinha (2003b), Florackis et al. (2015), and Farinha and López-de-Foronda (2009). Additionally, quantile analysis revealed that this positive effect is most pronounced in firms with lower managerial ownership, diminishing as ownership increases. This is consistent with free cash flow theory, which suggests that dividends play a greater disciplinary role when managerial alignment is weaker (Jensen, 1986; Easterbrook, 1984).

Hypothesis 2 is supported. The interaction term between managerial ownership and the Covid-19 period is positive and statistically significant, indicating that the relationship between ownership and dividends intensified during the pandemic. The additive Covid-19 dummy, however, was not significant, suggesting that the pandemic itself did not exert a direct effect on dividend policy. Nonetheless, other governance variables – such as board

diversity and institutional ownership – exhibited shifts in significance, highlighting the adaptability of governance mechanisms under external shocks (Khatib & Nour, 2021; Boshnak et al., 2023).

Overall, the results suggest that managerial ownership plays a positive effect on dividend policy – particularly in firms with low ownership concentration – and that this dynamic becomes more pronounced during periods of heightened uncertainty. For corporate boards and investors, this emphasizes the value of ownership-based governance strategies. For policymakers, the stability of dividend behavior throughout the pandemic signals the robustness of internal governance in large, established firms.

Limitations

The primary limitation of this dissertation concerns the sample size. As implied by its name, the Euro Stoxx 50 index includes only 50 firms, and after excluding financial institutions due to their distinct regulatory environments, the final sample comprises only 38 companies. Moreover, the index predominantly represents large, mature, and well-established European firms, thereby restricting the generalizability of the findings to smaller or less prominent firms across the continent. A further limitation lies in data availability. Because the study relies on corporate governance variables – such as managerial and institutional ownership – much of the required data had to be manually collected from company annual reports and investor documents for each year between 2013 and 2023. In several cases, these disclosures were incomplete or entirely unavailable, which may have constrained the comprehensiveness of the dataset.

Suggestions for Future Research

Future research could expand the sample by examining a broader index, such as the STOXX Europe 600, thereby capturing a more diverse corporate landscape. Comparative studies across regions – such as between the EU, the US, and Asia – would also offer valuable insights into the role of institutional context. Additionally, future work could incorporate debt as a third governance mechanism, building on the approach of Jensen et al. (1992) and Florackis et al. (2015), to better capture the interaction among key levers of agency cost mitigation.

Appendix

Appendix 1: Variables' Summary

This appendix provides a detailed summary of the empirical variables described in Section 3.2, including their definitions and expected signs.

Table A. 1: Variables' Summary

Variable	Definition	Expected Sign
<i>Dependent Variable</i>		
Dividends (DIV)	Ratio of total dividends paid to total assets	
<i>Corporate Governance Variables</i>		
Managerial Ownership (MAN_OWEN)	Percentage of shares held by firm's management and directors	Nonmonotonic
Institutional Ownership (INST_OWEN)	Percentage of shares held by institutional investors	Ambiguous
Board Size (BOARD_SIZE)	Number of directors on the corporate board	Ambiguous
Board Independence (BOARD_INDEP)	Ratio of independent directors to the total number of directors on the board	Ambiguous
Board Tenure (BOARD_TENURE)	Average number of years that directors have served on the board	No expected sign
Female Board Representation (FEMALE_BOARD)	Percentage of female directors on the corporate board	Positive
Board Type (BOARD_TYPE)	Categorical variable indicating the governance structure of the board. It takes the value 1 for a unitary board, 2 for two-tier board, 3 for a mixed board structure, 4 when board type is not disclosed	No expected sign
CEO Duality (CHAIR_CEO)	Dummy variable that equals 1 if the CEO also serves as the chairman of the board of directors and 0 otherwise	Positive
<i>Control Variables</i>		
Firm Size (FIRM_SIZE)	Natural logarithm of market capitalization	No expected sign
Return-on-Assets (ROA)	Ratio of net income to total assets	Positive
Capital Expenditures (CAPEX)	Ratio of total capital expenditures to total assets	Negative

Cash Holdings (CASH)	Ratio of total cash and cash equivalents to total assets	Positive
Debt (DEBT)	Ratio of total debt (book value of debt) to total assets	Negative

Appendix 2: Multicollinearity Test - VIF

This appendix presents the Variance Inflation Factors (VIFs) computed for all explanatory variables included in the regression models. The table reports both the VIF values and their corresponding tolerance values ($1/\text{VIF}$), allowing for the assessment of multicollinearity. As indicated in the main text, all VIF values fall below the conventional threshold of 5, suggesting that multicollinearity does not pose a concern in this analysis.

Table A. 2: Variance Inflation Factor (VIF)

Variable	VIF	1/VIF
INST_OWN	3.460	0.289
BOARD_INDEP	3.120	0.321
BOARD_SIZE	2.540	0.394
MAN_OWN	2.480	0.402
FIRM_SIZE	2.350	0.426
CASH	2.180	0.458
BOARD_TENURE	2.020	0.495
ROA	1.870	0.534
DEBT	1.760	0.568
BOARD_TYPE	1.750	0.570
CHAIR_CEO	1.730	0.576
FEMALE_BOARD	1.490	0.672
CAPEX	1.340	0.748
Mean VIF	2.16	

Appendix 3: Lewbel Estimator

As a robustness check for potential endogeneity issues in *MAN_OWN*, the Lewbel estimator was applied. Unlike conventional instrumental variable (IV) methods, which rely on externally defined instruments, the Lewbel method internally generates instruments based on model heteroscedasticity. The pseudo-instruments must satisfy three core conditions: (i) they must be correlated with the endogenous regressor (relevance), (ii) uncorrelated with the structural error term (exogeneity), and (iii) not directly determine the dependent variable (exclusion restriction).

Two key identification tests were examined using the Lewbel method: the underidentification test and the weak identification test. The underidentification test assess whether the internally generated instruments are valid for clearly identifying the potentially endogenous variable. In this analysis, the underidentification test returned a p-value of 0.06, exceeding the conventional 5% significance threshold. Thus, the Lewbel-generated instruments fail to robustly identify *MAN_OWN* as endogenous, indicating the pseudo-instruments are not valid for this analysis. Given that the instruments were found not valid according to the underidentification test, evaluation of the weak identification test, which determines instrument strength, becomes unnecessary.

Therefore, the Lewbel robustness check confirms the appropriateness and reliability of the previously adopted estimation strategies. Specifically, the failure of Lewbel-generated instruments to detect significant endogeneity reinforces the validity of the main regression results obtained through 2SLS and OLS estimation with Newey-West standard errors, thus providing further confidence in the robustness of the primary conclusion regarding the relationship between managerial ownership and dividend distribution.

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