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The Impact of Board Gender Diversity on Dividend Payouts in EU Countries: A Quantitative Study

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by

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Abstract

This bachelor thesis was conducted through a quantitative study on the relationship between board gender diversity in publicly listed companies active in the EU and said firms' dividend payouts. It also investigated how this relationship seemed to have been influenced by country-specific factors that were not accounted for through the chosen explanatory variables. It hypothesizes that there would be a positive relationship between board gender diversity and dividend payouts. By carrying out a panel data regression analysis on a final sample of 369 firms from 15 EU countries over a nine-year period, a fixed effect *least squares dummy variable* model confirmed the hypothesized relationship. The results are consistent with *agency theory,* the literature on *dividend payouts,* and *gender socialization theory*, which, taken together, posit that women on average possess characteristics that make them consider the agency problem between shareholders and managers more thoroughly, thus paying higher dividends as a way to minimize *agency costs* to the shareholders. The main contribution of this paper lies in demonstrating that board gender diversity positively affects shareholders through the increased likelihood of dealing with agency problems via the mechanism of dividend payouts. It complements past research particularly by focusing its measure of diversity on distributional equality between genders on the board and extending the geographical scope over a variety of countries. Finally, it directs future research toward examining more closely the impact of national characteristics on the examined relationship.

Key Words: Board Gender Diversity, Board Gender Composition, Dividend Payouts, Dividend Payout Policy, European Union, Agency Theory, Gender Socialization Theory

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1. Introduction

We will start this thesis by setting the scene for the topic under consideration and presenting the context in which our research question is relevant. We will also present the delimitations of the study, and outline its disposition.

1.1. Background & Problematization

A rise in popular movements that advocate the rights of women around the world has been seen throughout the past decades. In some developing nations women are still fighting for the most rudimentary rights while movements in the developed world highlight more subtle issues. The Mahsa Amini protests in Iran, for example, were sparked by protests against the Islamic Iranian government (Amnesty International, 2023). They erupted following the death of Mahsa Amini under police custody, the former being accused of improper hijab usage (Amnesty International, 2023). These events make it clear that women in certain societies still have to fear for their lives due to entrenched patriarchal norms. Simultaneously, as pointed out by He and Whited (2023, p.2), women in the US are still highly underrepresented in top management positions, with only *"6.6% of CEO positions at S&P 500 companies"* held by females in 2023. Similarly, women only held about 30% of board seats in Fortune 500 firms (Deloitte, 2022). While 30% still constitutes an underrepresentation, it is a notable increase from about 14.8% in 2007 (Catalyst, 2007), indicating a shift toward more gender equality.

This development can potentially be attributed to social and regulatory pressure over the last couple of decades. In 2015, the United Nations' members developed the 2030 Agenda for Sustainable Development, out of which the 17 Sustainable Development Goals (SDGs) were formed (United Nations, n.d.b). Goal number five of the SDGs is to *"Achieve gender equality and empower all women and girls"* (United Nations, n.d.a, n.p.). We argue that social pressures such as the Mahsa Amini protests in Iran are grounded in norms of justice based on equal gender rights. Protestors seem to demand equality on the proposition that gender equality is just for its own sake.

Interestingly, the British philosopher John Stuart Mill (1869) proposed that gender equality should be striven for as it would contribute to the advancement of the human race as a whole. Modern-day regulatory developments are likely to be based on both; the idea that gender equality will lead to human advancement and in particular increased economic output, and the idea that gender equality should be striven for for its own sake. However, the former point highlights that there might be some inherent advantages to striving for gender equality. Indeed, recent academic research has shown that a higher degree of gender equality—in particular in corporate boards—has a positive impact on firm performance (e.g. Carter et al. 2003; Erhardt et al. 2003; Liu et al. 2014).

Already in the 18th-century, Adam Smith (1776), in his work *The Wealth of Nations,* argued that humanity could end up in an economically suboptimal situation, as managers of companies are generally responsible for capital that does not belong to them, and therefore monitor it with less vigilance than they would had it been their own. Two centuries later, Jensen and Meckling (1976) proposed that the—by this time so-called *agency costs*—could be reduced as insider ownership increases, which in turn makes managers responsible for their own capital. *Agency costs* are the formal theorization of the problem already voiced by Adam Smith (1776). They represent costs arising from the *principal-agent problem* as described in the literature on *agency theory*: The fact that the principals (the shareholders) and the agents (the managers) may have different interests and attitudes toward risk, resulting in the latter making decisions that are not aligned with the best interests of the former (Eisenhardt, 1989).

In accordance with John Stuart Mill's (1869) proposal that gender equality will lead to human advancement, Ain et al. (2021) find that board gender diversity helps improve corporate governance, because of the traits commonly associated with women such as being more social, caring and risk-averse. Importantly, said improvement of corporate governance entails a greater focus on aligning the interests of shareholders and managers, to mitigate the agency problem (Ye et al. 2019). Because of the *agency costs*-reducing property of dividends (Jensen, 1986), we hypothesize a more gender-diverse board to pay out higher dividends.

In essence, if it is true that gender equality can lead to a reduction of *agency costs*, then the current state of under-representation of women on corporate boards is suboptimal from a shareholder-perspective. The issue of rectifying the current situation, *ceteris paribus*, would then become pressing from, *inter alia*, an economic standpoint. Several studies find evidence to support the hypothesis that board gender diversity improves corporate governance, promoting higher dividend payouts (e.g. Ain et al. 2021; Byoun et., 2016; Chen et al. 2017; Khan & Baker, 2023; Ye et al. 2019).

After careful revision of the current body of literature, it becomes clear that not only has past literature possibly overlooked the importance of gender equality, but also narrowed its focus on one national market. It is under such consideration that this study examines how board gender diversity, as proxied by a measurement approach emphasizing gender equality, affects the firm's dividend payout. Additionally, the study incorporates an international aspect into the matter by discussing the differences between 15 EU countries revealed through the regression analysis. To improve the efficiency of the econometric estimates, it was decided to gather data over nine years. This longitudinal aspect assisted in achieving a more comprehensive data analysis (Caruana et al. 2015).

1.2. Research Purpose, Aim & Contribution

The study's purpose is to give valuable insights into whether gender diversity impacts financial decision-making processes and outcomes, specifically dividend payouts, through more equitable and efficient corporate governance. Potentially, this study can shed light on an area where an intersection between financial management, gender equality, and corporate governance is found. This research aims to examine a possible correlation between gender diversity on corporate boards and dividend payouts, incorporating a cross-national element by investigating a sample of multiple EU countries, which has been lacking in previous literature. Moreover, a novel approach to measuring board gender diversity is used with the aim of better reflecting the hypothesized relationship. What follows as the contribution of this research paper is therefore, first, its effective approach in measuring board gender diversity as it relates to gender equality. Second, the cross-national element, which allows for the exploration of differences and similarities between the countries under investigation, through the lens of sociopolitical and cultural analysis, the latter in particular supported by Geert Hofstede's 6-D model of national culture (Hofstede, 2011). The findings of the study can be used to inform policymakers, corporate leaders, and scholars regarding the benefits and challenges of enhancing gender diversity in corporate governance and financial strategy.

1.2.1. Research Question

In pursuit of the aims outlined for this study, we pose the following research question:

Is there a relationship between a firm's board gender diversity and its dividend payouts?

1.3. Delimitations of the Study

It should be noted that we have defined boundaries to focus our research scope. We do acknowledge, however, that these delimitations may also introduce certain limitations to our study which are discussed in *section 5.3*. First, our study was geographically delimited to the 27 EU countries, providing a unique context influenced by different regulatory environments, cultural norms, and corporate governance structures. This selection allows for the exploration of gender diversity´s impact on dividend policies across a variety of settings, although it may limit the generalizability of our findings to countries other than those under investigation or those with significantly different socioeconomic and regulatory environments. Second, this study exclusively examines large publicly listed firms, chosen given their economic significance and the availability of reliable and accessible data. This focus excludes, for instance, small and medium-sized enterprises (SMEs), non-public companies and startups, which may experience different dynamics in terms of gender diversity and financial policies.

The chosen proxy for board gender diversity is a measure of how far the proportion of women on corporate boards is from being 50%. This quantitative measure, while useful for statistical analysis, simplifies the complex dimension of gender diversity including factors such as leadership roles, tenure, and sector-specific representation and may not fully capture the subtle distinctions of gender inclusivity and its effects on corporate governance and financial decisions. However, we believe that it more accurately captures the intended concept as compared to some of the proxies used in previous literature. Furthermore, *dividend payout ratio* is used as a proxy for dividend payouts, providing a quantifiable measure of how profits are distributed to shareholders but possibly overlooking important aspects of dividend strategic decisions and policies including timing, frequency, and responses to market and economic fluctuations.

Additionally, this study assumes existing past data to accurately reflect the real situation of gender diversity and dividend policies in the selected largest publicly listed firms, a reliance that may, for example, be affected by data availability, data quality, transparency issues, and reporting standards. Lastly, this study is limited to a time scope that considers data from the period from 2015 to 2023, acknowledging that both gender diversity and dividend payout policies are subject to change over time. This, in turn, implies that our findings may not fully account for long-term trends or the immediate impact of recent regulatory changes.

1.4. Disposition

The paper starts by examining past research that has developed the underlying theory for the hypotheses through composing a comprehensive literature review. This entails a review of *agency theory*, the literature on *dividend payouts*, and that on *gender socialization theory*. Subsequently, the methodology is presented, starting with the method of data gathering and cleaning, and finally an explanation of the model specification, including the choice of variables. Furthermore, the results are showcased and examined for their statistical rigor. Moreover, the findings are discussed before ending with concluding remarks.

2. Literature Review

The literature review will present relevant prior research and theory that underpins the argument that board gender diversity impacts dividend payouts. It is divided into two encompassing sections, the first one presenting a theoretical background and the latter an empirical review of the current body of research on the subject. The section ends with a summary highlighting the key findings from previous research and presenting the hypothesis developed based on the literature.

2.1. Theoretical Literature Review

The theoretical section of this literature review will outline the three theoretically important streams of literature that build support for the hypothesis and subsequent statistical analysis. These are (1) agency theory, (2) dividend payout literature, (3) gender socialization theory.

2.1.1. Agency Theory

Agency costs have played an important role in the economics literature since they were first formally suggested to be theorized by Stephen Ross and Barry Mitnick around 1975, as suggested by Mitnick (2006). *Agency theory* sets forth the dilemma of risk-sharing which is when the parties partaking in cooperation have different goals and attitudes toward risk (Eisenhardt, 1989). The theory is particularly concerned with the situation in which one contracting party, the principal, delegates work to the other, the agent, and with the question of how to ensure that the latter acts in the interests of the former (Eisenhardt, 1989).

In the case of the joint-stock limited liability company, the principals would be the stockholders, and the agents the managers (Fama & Jensen, 1983). Costs to the principals (shareholders) may accrue where agents (managers) act in their self-interest and make decisions that are positive for themselves in the short-term, but negative for the firm as a whole, and thus for the shareholders (Fama & Jensen, 1983). Jensen and Meckling (1976) posit that *agency costs* can arise in three ways and that the total cost that the company may incur is, therefore, the sum of three subcategories of *agency costs*: (1) monitoring costs, (2) bonding costs, and (3) residual loss. According to the authors, the first category includes all expenses associated with monitoring and controlling the agent's behavior while the second category concerns the cost of monetary incentives to nudge managers to use certain resources to ensure that they do not make suboptimal decisions for shareholders. Finally, they argue that the third class of costs comprises the expenses associated with a divergence between the utility-maximizing outcome for shareholders and the actual outcome that results from the manager's actions.

The divergence in utility-maximizing decisions between managers and shareholders can be traced back to what Hennart and Verbeke (2022) term *bounded reliability* and *bounded rationality*, drawing upon the transaction cost stream of international business literature. According to them, the former concept refers to people's tendency to take shortcuts in their logical reasoning that may lead to suboptimal outcomes, and the latter refers to people's desire to put their self-interest first, which in a contractual relationship, such as that of the shareholders and the managers, can lead to a default on prior agreements. Furthermore, information asymmetry and self-interest are two pillars upon which this type of problem rests (Hennart & Verbeke, 2022). While established theoretical frameworks such as Fama's (1970) *efficient market hypothesis* assume perfect information leading to efficient markets, the reality that we live in is characterized by information asymmetry, as has been evidenced by empirical studies (e.g. McGuinness et al. 2017; Al-Makalwi et al. 2010).

If there were a mechanism for shareholders to effectively monitor the behavior of the managers without having to spend copious amounts of time and money on the matter, the problem would be negligible. Unfortunately, there is no such cost-free way for the shareholders of a firm to micro-manage and monitor the behavior of its managers, resulting in information asymmetry (Jensen & Meckling, 1976). Fama and Jensen (1983) assert that a corporation's board of directors is an effective mechanism to monitor potential opportunistic managerial behavior. However, the governance structure of the board, the relationship of its members to the firm, and the characteristics of the members themselves may affect its effectiveness in reducing the shareholder-manager agency problem (Ain et al. 2021).

2.1.2. Dividend Payout

Chen et al. (2017) highlight that dividend policy can mitigate agency problems by addressing issues related to imperfect information. Specifically, Rozeff (1982) finds that dividend payouts are higher when insider ownership is lower, i.e., when managers hold fewer shares of the company whose day-to-day operations they manage, and thus there is a greater proportion of equity investors who do not have direct access to internal company information. The author argues that this is the case because outside shareholders demand larger dividends, for they do not possess the same level of information about the company as insiders. It follows that the greater the proportion of outside shareholders, the greater the incentive to convey information about the company in the form of dividends. Rozeff (1982) concludes that these results serve as evidence for "*... the view that dividend payments are part of the firm's optimum monitoring/bonding package and serve to reduce agency costs"*. (Rozeff, 1982, p. 250).

Furthermore, Easterbrook (1984) explicitly asks whether dividends can be used as a device to align interests and thus reduce *agency costs*. He answers the question by suggesting, similarly to Rozeff (1982), that the payment of dividends can lead to a reduction in monitoring costs. To illustrate Easterbrook's (1984) line of argument, he argues that firms with a certain debt-to-equity ratio will generate a benefit to creditors in the form of increased securities as a result of successful business activities. He further argues that paying dividends by taking on new debt could rebalance the power relationship between equity and debt providers while keeping the company in the capital market where it raises debt. As a result, the firm is constantly supervised by financiers (Easterbrook, 1984). Similar to Rozeff's (1982) findings, Easterbrook's (1984) results suggest that dividends play a role in an optimal monitoring package and the associated reduction in *agency costs*.

To better understand the claims of these two scholars, it should be noted that imperfect information is an important pillar of the agency problem, as mentioned in *section 2.1.1.*. Harris and Raviv (1979) point out that imperfect information and information asymmetry between agent and principal lead to *moral hazard* if the agent can benefit from exploiting said information asymmetry. *Moral hazard* refers to the incentive of the agent to act against the principal's interest because of the information asymmetry (Ramakrishnan &

Thakor, 1982). It has been found that supervision can lead to a reduction in the costs associated with this *moral hazard* (Harris & Raviv, 1979). Since monitoring reduces the costs associated with information asymmetry—which is an essential component of the emergence of the agency problem and *agency costs* in general—monitoring can also be said to reduce *agency costs*. In other words, through the mechanism of reducing information asymmetry, monitoring reduces *agency costs*.

Jensen (1986) develops this idea further and links it firmly to *agency theory*, naming it the *free cash flow problem.* He postulates that free cash flows are the flows of capital exceeding what is required to finance all projects undertaken with a positive net present value post discounting at the cost of capital. In simple terms, it is the retained earnings that remain after a company has paid its liabilities, including taxes, amortization, and interest. He further argues that the agency problem between shareholders and managers becomes significant when the firm enjoys substantial free cash flows relative to its equity. Dividends can alleviate the problem by reducing the free cash flow available to managers, forcing them to acquire capital in external debt markets, thereby reducing the agency problem between shareholders and managers (DeAngelo et al. 2006). Furthermore, by increasing the financial leverage of the company, managers are incentivized to manage the firm's finances in accordance with the best interests of its shareholders (Jensen, 1986; Pass, 2004). This occurs because by issuing debt, managers bind their promise of repayment of future cash flows to debtholders and bestow upon them the right to sue the company should it fail to meet its debt obligations (Jensen, 1986).

Most of the aforementioned literature has emphasized the positive effect of dividend payouts, especially with regard to their role in mitigating the agency problem. However, as Black (1976, p. 5) argues: *“The harder we look at the dividends picture, the more it seems like a puzzle, with pieces that just don’t fit together".* On one hand, higher dividends are often considered laudable as they potentially mitigate agency problems (DeAngelo et al. 2006) and curb distractions in the interest of managers and shareholders (Jensen, 1986; Easterbrook, 1984). On the other hand, there seems to be some indication in the literature that higher dividends are not necessarily to the advantage of the company or its shareholders (e.g. DeAngelo et al. 2006; Grullon et al. 2002; Rozeff, 1982).

For example, excessive payouts may limit a company's ability to reinvest in growth opportunities, potentially signaling limited future growth in the sacrifice of immediate payouts (Rozeff, 1982). Moreover, such a policy may limit financial flexibility, making it more difficult for firms to adapt to market changes and investment opportunities (Rozeff, 1982; Grullon et al. 2002). While Jensen (1986) emphasizes the benefits of increasing financial leverage, he also acknowledges that there is an increased financial risk when dividends are favored over debt reduction. From a tax perspective, the different treatment of dividends and capital gains can influence investor preferences and investment decisions (Allen et al. 2000; Black, 1976; Foley et al. 2007; Miller & Scholes, 1978; Pettit, 1977). This is because investors tend to invest in companies whose dividend policy is in line with their tax objectives (Ashraf et al. 2016; Desai & Jin, 2011). Finally, consistently high dividends may create shareholder expectations, which could put pressure on companies to maintain or increase dividends regardless of financial health or market conditions (DeAngelo et al. 2006).

While the ambiguity that surrounds the potential impact of dividends on the firm and its environment should be acknowledged, this study primarily focuses on the role that board gender diversity plays in determining dividend payouts. The substantial body of research underlying *agency theory* and dividend policy is a monument to the importance of dividend policy, and by extension dividend payouts, even if a qualitative judgment of their overall impact cannot be made. Much of the current literature suggests that gender diversity on corporate boards mitigates the agency problem through increased dividend payouts (e.g. Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Khan & Baker, 2023; Ye et al. 2019). This will be discussed further in the next sections as it ties to *gender socialization theory.*

2.1.3. Gender Socialization Theory

Gender socialization theory posits a framework for understanding how individuals:

> *…develop, refine and learn to 'do' gender through internalizing gender norms and roles as they interact with key agents of socialization, such as their family, social networks and other social institutions.* (John et al. 2017, p.6).

This learning process begins from an early age and continues throughout an individual's life, influencing the way one perceives themselves and others, as well as their interactions and positions within society (Hoominfar, 2021). This theory states that gender roles are not biologically determined but mediated and reinforced by society in various ways, such as family upbringing, education, media, and cultural norms (Hoominfar, 2021). This process is rooted in social constructs and fosters gender-specific behaviors, expectations, and, as the current body of literature suggests, impacts economic roles and decisions in the corporate sector (Ain et al. 2021; Hoominfar, 2021; García-Meca et al. 2022). It is argued that such gender-based expectations transcend their impact on individual behavior and can influence financial decision-making processes in the corporate setting, potentially leading to differences in corporate behaviors, including the propensity to pay dividends (e.g. Ain et al. 2021; Byoun et al. 2016; Gul et al. 2011; Ye et al. 2019).

The literature highlights several key traits that are generally associated with women's leadership style and have an impact on the dynamics of the corporate board in which they participate. Among other things, it is claimed that women have accentuated empathy, caringness, receptiveness, diligence, ethical sensitivity, risk aversion, and a more inclusive leadership style (Bettinelli et al. 2019; Carlson, 1972; Eagly & Crowley, 1986; Gilligan, 1977; Kim et al. 2013; Sun et al. 2021). Adams and Ferreira (2009) find that female directors tend to have higher meeting attendance rates compared to their male counterparts. This diligence also extends to their approach to governance, with Bernardi and Arnold (1997) finding that women tend to favor harmony and compliance with rules and laws. The literature also emphasizes the generally more inclusive and participative leadership style of women, with García-Meca et al. (2022) describing female leadership as more interactive. Adams and Kirchmaier (2016) also note that female directors often bring better communication skills to the board, which increases overall efficiency. In addition, women's tendency to be more nurturing and expressive potentially facilitates information sharing between managers and directors (e.g. Ain et al. 2021; Byoun et al. 2016; Betz et al. 1989; Chen et al. 2017; Khazanchi, 1995).

Among the traits that women develop through their socialization, risk aversion is particularly emphasized in the literature (Ain et al. 2021; Betz et al. 1989; Chen et al. 2017; Cumming et al. 2015; Faccio et al. 2016; García-Meca et al. 2022; Huang & Kisgen, 2013; Khazanchi, 1995; Palvia et al. 2020; Price, 2012; Saeed & Sameer, 2017; Ye et al. 2019). A study by Arun et al. (2015) finds that companies with higher representation of women on their boards are more likely to adopt conservative accounting practices. In similar lines, Powell & Ansic (1997) emphasize that women are generally less aggressive in decision-making processes and are particularly risk-averse in financial contexts. Similarly, Huang and Kisgen (2013) find that male executives are more likely to take bold financial actions, such as more frequent acquisitions and a higher degree of debt issuance compared to female executives. Their findings suggest that men tend to be more overconfident than women when making important business decisions, which can be attributed to the issue described in the literature that male executives are on average relatively less risk-averse than female executives (e.g. Betz et al. 1989; Croson and Gneezy; 2009; Chen et al. 2017; Cumming et al. 2015; Faccio et al. 2016; Gul et al. 2011; Khazanchi, 1995; Palvia et al. 2020). This divergence in risk-taking behavior is also examined by Faccio et al. (2016), who find that companies led by female CEOs tend to have less volatile earnings and lower leverage, indicating a preference for stability over risk.

One possible explanation for this phenomenon may be linked to *gender socialization theory* (Ain et al. 2021; Akerlof & Kranton, 2000; García-Meca et al. 2022; Hoominfar, 2021). As Faccio et al. (2016) suggest, the traits associated with women as per said theory also seem to influence females' decision-making in the professional environment. Additionally, women's greater risk aversion, highlighted by Price (2012) and further explored by Cumming et al. (2015)—who associated female executives with fewer incidents of corporate fraud and insider trading—suggests that female leadership may foster a more cautious and conservative financial strategy.

Interestingly, Croson and Gneezy (2009) also found that risk aversion is higher in women and went further to explain why these differences in risk-taking exist. First, they argue that women's risk aversion is not only related to their more cautious nature but also reflects their ability to adapt their social preferences more dynamically in different scenarios, in contrast to men who tend to show more uniform social responses. Second, they observe a greater reluctance to compete in women than in men. They attribute these gender differences in risk-taking to a number of factors, including how the two genders respond emotionally to uncertainty. In particular, women tend to have stronger emotional reactions to risk (Croson & Gneezy, 2009), with research by Fujita et al. (1991) showing that women feel the impact of negative outcomes more intensely, which increases their risk aversion. Third, they point to the difference in levels of self-confidence between genders. Finally, Croson and Gneezy (2009) find that men and women interpret risks differently, with men generally being more stimulated by challenges, while women tend to perceive them as threats.

As this discussion of prior literature on *gender socialization theory* showed, there are several personality traits commonly associated with women that have been shown to impact the corporate environment in multiple different ways. Synthesizing what we know about female corporate behavior with existing knowledge on dividend payouts and *agency theory*, this paper argues that the traits usually associated with women improve corporate governance, defined based on the OECD's (2005) proposal as a framework that ensures effective decision-making and strategic planning in order to contribute to a company's success, which in turn promotes higher dividend payouts, thereby reducing *agency costs* as via the mechanisms discussed in *section 2.1.2.*. The upcoming section will underline this line of argument with empirical evidence of board gender diversity's impact on dividend payouts.

2.2. Empirical Literature Review

The empirical section of this literature review will present an array of academic research output that has studied empirically the relationship between board gender diversity and dividend payouts. It presents how board gender diversity has been found to influence corporate governance, and ends with evidence from studies conducted on the relationship between board gender diversity and dividend payout in various national markets.

2.2.1. Gender Diversity on Corporate Boards

The importance of gender diversity in corporate leadership has been brought to the foreground by a growing body of research. Some studies find that boardroom gender diversity has a positive impact on organizational performance (Carter et al. 2003; Erhardt et al. 2003; Liu et al. 2014), corporate governance (Adams & Ferreira, 2009), risk-taking (Faccio et al. 2016), improve corporate decision-making (Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016; Erhardt et al. 2003; Gul et al. 2011; Miller & Triana, 2009; Ye et al. 2019) and reduce agency problems (Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Khan & Baker, 2023; García-Meca et al. 2022; Gyapong et al. 2019; Saeed & Sameer, 2017). Some of the literature also assumes that gender diversity on company boards promotes innovation, empathy for stakeholders, ethical behavior and creativity (Ain et al. 2021; Byoun et al. 2016; Cumming et al. 2015; Krishnan & Parsons, 2008; Liu et al. 2020; Miller & Triana, 2009; Ye et al. 2019). For example, Shaukat et al. (2016) emphasize the tendency of companies with female board members to prioritize corporate social responsibility, while Levi et al. (2014) show a trend toward less aggressive acquisition strategies for companies with higher participation of women on the board. Miller and Triana (2009) also find that companies with gender-balanced boards invest more in research and development than those with a more unequal board gender balance.

However, the impact of including female members on the board extends from merely improving the dynamics and operational efficiency of the board to bringing a variety of perspectives critical to effective governance and decision-making, for instance in choosing the optimal dividend policy (Ain et al. 2021; Cumming et al. 2015; García-Meca et al. 2022;

Gul et al. 2011; Saeed & Sameer, 2017; Ye et al. 2019). Synthesizing theoretical frameworks such as *agency theory,* dividend payout literature and *gender socialization theory* helps understanding the mechanisms through which female leadership can influence corporate governance and financial outcomes (Ain et al. 2021; García-Meca et al. 2022; Ye et al. 2019). The literature demonstrates a relationship between more equal female board participation and higher dividend payout, emphasizing the quality of corporate governance as a mediating factor (e.g. Ain et al. 2021; Chen et al. 2017; Ye et al. 2019).

2.2.1.1. Gender Diversity's Role at the Individual Level

Ain et al. (2021) and Ye et al. (2019) assume that gender diversity has an impact on the effectiveness of the board of directors at both the individual and collective levels. At the individual level, consistent with what *gender socialization theory* proposes, female board members are expected to have unique traits such as a higher level of risk aversion, ethical sensitivity, and a law-abiding attitude than their male counterparts (Ain et al. 2021; Betz et al. 1989; Chen et al. 2017; Cumming et al. 2015; Faccio et al. 2016; García-Meca et al. 2022; Huang & Kisgen, 2013; Khazanchi, 1995; Palvia et al. 2020; Price, 2012; Saeed & Sameer, 2017; Ye et al. 2019). This is proposed to contribute to a culture of good corporate governance and shareholder advocacy (Ain et al. 2021; Byoun et al. 2016; Bernardi & Arnold, 1997; Price, 2012; Ye et al. 2019).

Cumming et al. (2015) and Gul et al. (2011) hypothesize that the influence of female board participation extends to the promotion of ethical standards and prudent risk management. Together with them, Bernardi and Arnold (1997) also suggest that boards with female members are more likely to comply with laws and regulations and are more sensitive to ethical issues. Huang and Kisgen (2013) and Price (2012) further argue that the risk aversion of female board members leads to boards pursuing more conservative financial and investment strategies, which has an impact on the overall risk profile of the company. Chen et al. (2017), Faccio et al. (2016) and Gyapong et al. (2019), for instance, contribute to this discussion by bringing arguments from social psychological research that point to gender differences in optimism about economic outcomes, showing that women are more conservative overall when making financial decisions.

Women's focus on monitoring and governance activities and more likely engagement in a "watchdog role" (Byoun et al. 2016) illustrates a governance approach that also promotes shareholder interests (e.g. Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016; Gul et al. 2011; Ye et al. 2019). The alignment of interests with shareholders at the individual level through improved corporate governance resulting from the aforementioned unique female traits, presumably makes women more likely to consider the agency problem and thus promote higher dividend payouts as a monitoring mechanism (e.g. Ain et al. 2021; Byoun, Chang & Kim, 2016; Chen et al. 2017; Saeed & Sameer, 2017; Ye et al. 2019).

2.2.1.2. Gender Diversity's Role at the Collective Level

On a collective level, gender-diverse boards are believed to foster an effective problem-solving environment due to the broader range of perspectives that such a board brings, as well as the enhanced communication skills of female board members (Adams & Kirchmaier, 2016; Agarwal et al. 2016; Ain et al. 2021; Ye et al. 2019). These diverse perspectives challenge the prevailing groupthink and enrich discussions, especially on complex issues, leading to more critical and independent decision-making processes (Ain et al. 2021; Carter et al. 2003; Chen et al. 2014; Gul et al. 2011; Saeed & Sameer, 2017).

Female directors are less inclined to conform and are more likely to express different perspectives than their male counterparts (Adams & Ferreira, 2009; Carter et al. 2003). As Miller & Triana (2009) and Gul et al. (2011) argue, this diversity of opinion promotes a comprehensive review of issues, improves the quality of discussions, and broadens the information available to the board, which is critical for informed decision-making. Female board members who exhibit strong leadership traits and styles that emphasize trust, collaboration and superior communication skills, contribute significantly to effective problem-solving by fostering a culture of open dialog and collaborative decision-making (Adams & Kirchmaier, 2016; Agarwal et al. 2016; Croson & Gneezy, 2009; Niederle & Vesterlund, 2007). In this regard, female board members not only directly contribute to better monitoring through their unique traits such as their more nurturing, ethical and risk-averse nature, but also indirectly by increasing the overall efficiency of the board through their influence on their male colleagues (Ain et al. 2021; Byoun et al. 2016; Gyapong et al. 2019; Ye et al. 2019). This improvement in corporate governance, resulting from better board dynamics, improved decision-making and the promotion of shareholder interests through a gender-diverse board, is expected to increase the likelihood of dividend payouts (Ain et al. 2021).

2.2.2. Evidence from Global Studies on Gender Diversity & Dividend Payout

The majority of studies conducted in various locations to examine the relationship between corporate board gender diversity and dividend payouts found a positive correlation. For instance, Chen et al. (2017) in their study of S&P 1500 companies, Ye et al. (2019) in their international sample of 22 countries, and Ain et al. (2021) in their large sample of Chinese companies all identified a positive relationship between the proportion of female board members and dividend payouts. They suggest that gender diversity on the board enables better corporate governance, understood as alignment with shareholder interests. According to them, this occurs through improved board dynamics and efficiency. This improvement in governance is suggested by them to increase the tendency to pay out higher dividends. Similar results were found in other studies conducted in the USA (Benjamin & Biswas, 2019; Byoun et al. 2016), Australia (Gyapong et al. 2019), Nigeria (Idris et al. 2019), and India (Khan & Baker, 2023; Mulchandani et al. 2021), all of which also report a significant positive relationship between corporate board gender diversity and higher dividend payouts.

Conversely, a study by Saeed and Sameer (2017) found different results for China and India. In their study of the three emerging markets of China, India, and Russia, they concluded that gender diversity on boards is negatively associated with dividend payments. Similarly, Tahir et al. (2020) found a negative relationship between gender board diversity and dividend payouts in their study of Malaysian firms. Interestingly, García-Meca et al. (2022, p.3) argue that from an *agency theory* perspective, this negative relationship could be because female board members act as a *"substitute mechanism"* to dividends due to their monitoring role. They suggest that the presence of women on a company's board could directly protect shareholders' interests through more effective monitoring and management, reducing the need for higher dividends as a control mechanism.

Benjamin and Biswas (2019) and Gyapong et al. (2019) added a layer of complexity. Gyapong et al. (2019) found in their study on the Australian Stock Exchange that the positive effect of board gender diversity on dividend policy is only pronounced for non-executive female board members. Similarly, Benjamin and Biswas (2019) discovered a positive relationship only for companies with CEO duality, where a chairperson also holds the position of CEO in the same company. Lastly, García-Meca et al. (2022) identified an inverse U-shaped relationship between female board representation and dividend payments in Spanish companies. They found that dividends increase with increasing female representation up to a certain point, after which the traditionally risk-averse characteristics of women lead to a decrease in dividend payments.

Despite the differing findings on the impact of gender diversity on dividend payouts, there is widespread agreement among scholars that gender-diverse corporate boards lead to a broader range of perspectives in decision-making processes (Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016; Erhardt et al. 2003; Gul et al. 2011; Miller & Triana, 2009; Ye et al. 2019). The diverse experiences that different genders bring to the table are expected to result in more informed and balanced decision-making in organizations with gender-diverse boards (Ain et al. 2021; Gyapong et al. 2019; Saeed & Sameer, 2017). As Ain et al. (2021), Byoun et al. 2016 and Ye et al. (2019) point out, these decisions often align more closely with shareholders' interests and effectively address corporate governance challenges, increasing efficiency and ultimately reducing agency problems via higher dividend payouts (e.g. Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Gul et al. 2011; Ye et al. 2019).

2.3. Summary of Literature Review

This literature review examined the complexities of corporate governance, focusing on the impact of board gender diversity on dividend payouts within the framework of *agency theory,* the literature on *dividend payouts,* and *gender socialization theory*. It began with an insight into *agency theory*, which examines the relationship between principals (shareholders) and agents (managers). As mentioned, this theory emphasizes how goal misalignment and information asymmetries lead to *agency costs*, which are economic inefficiencies that appear because managers do not always act in the best interests of shareholders (Eisenhardt, 1989; Jensen & Meckling, 1976; McGuinness et al. 2017). It then outlined the important role of the board of directors in reducing these *agency costs* and addressing the shareholder-manager agency problem (Ain et al. 2021; Fama & Jensen, 1983).

Before introducing *gender socialization theory*, the relationship between dividend policy and corporate governance problems was examined. Drawing on papers by *inter alia* Jensen (1986), Easterbrook (1984) and Rozeff (1982), it was outlined what the current literature says about how dividends can mitigate *agency costs*. Despite the theoretical benefits of dividend payouts in reducing *agency costs*, it was also emphasized that the literature simultaneously recognizes some potential disadvantages of high dividend payouts, such as limiting financial flexibility and growth opportunities.

Gender socialization theory was then introduced and discussed highlighting several traits generally associated with women in leadership roles. The literature mainly emphasizes females' tendency to be more nurturing, diligent, ethically sensitive, and risk-averse. After presenting *gender socialization theory,* it was used to discuss how these characteristics commonly attributed to female board members can lead to better corporate governance. The literature assumes that female characteristics increase the efficiency of corporate boards, by improving transparency, dynamics, and supporting decision-making (e.g. Ain et al. 2021; Chen et al. 2017).

Finally, the literature review examined how these theoretical frameworks relate to dividend policies. It was shown that the impact of gender diversity on corporate boards on dividend payouts presents a picture in which different studies reach different conclusions. While some studies report a negative or insignificant relationship, the majority of the literature suggests a positive relationship. Interestingly, García-Meca et al. (2022) find an inverse U-shaped relationship, indicating that the positive relationship only holds partially. The positive relationship between dividend payouts and board gender diversity is believed to stem from improved management practices with a focus on promoting shareholders' interests, due to the traits generally attributed to women according to *gender socialization theory* (Ain et al. 2021).

2.4. Hypothesis Development

Informed by the above literature review, the following null- and alternative hypotheses were conceived:

Null Hypothesis (H0): There is no positive relationship between board gender diversity and dividend payouts.

Alternative Hypothesis (H1): There is a positive relationship between board gender diversity and dividend payouts.

To reiterate, the alternative hypothesis rests upon the argument that is fashioned by *gender socialization theory* in combination with *agency theory*. Namely that women on average possess qualities associated with attending to shareholder interests, which entail the mitigation of *agency costs* through dividends. Furthermore, it should be stressed that this positive relationship between gender diversity and dividend payouts corresponds to a negative correlation between the dependent and independent variable in this study, because of how the independent variable was defined (see *section 3.3.1.2.)*

3. Research Methodology

The following section will provide a detailed description of the methodology employed in this study. It starts by outlining the overall design of the study and continues with a detailed description of the data collection, cleaning, and model choice procedure. In the process of data collection and cleaning, the initially intended sample of 27 EU countries had to be reduced to 15 EU countries to ensure a statistically rigorous analysis. The data gathered from external sources was partly used directly to inform the regression analysis, and partly to compute new variables more adequate for this study. The choice of variables included in the regression model was influenced by theoretical underpinning and previous research. Finally, the regression model was chosen based on recognized model selection criteria.

3.1. Research Design

This study undertook a quantitative research design, whereby elements of qualitative cultural analysis were applied to the underlying quantitative regression model. The data underlying the variables was gathered from the Bloomberg financial database and was entirely secondary. The study examined 369 companies from 15 EU countries over a nine-year period, with each firm-year observation representing one data point. It used a deductive approach as defined by Bryman and Bell (2011) by deriving a hypothesis from previously conducted academic research and then testing it empirically.

3.2. Research Method

The research question (*see section 1.2.1.*) was investigated using panel data containing a longitudinal and a cross-sectional component. First, the blue-chip indices of 21 EU countries as of April 2024 were sourced. The raw data used to construct the variables to measure a possible change in board gender diversity vis-a-vis their dividend payouts was collected over a nine-year period. Chronologically, the chosen nine-year period ranged from 2015-2023. This period was chosen partly for its recency and partly to avoid the 2008 financial crisis.

However, it is recognized that this period includes the COVID-19 pandemic, which may have had unintentional impacts on the data. This limitation is explained in more detail in *section 5.3.6.*. This research method required a panel data regression model as the data points had both temporal and spatial dimensions (Gujarati & Porter, 2009). The study used the *R* programming language and its associated *interactive development environment* (IDE), *R Studio*, to compile the data points and run the panel data regression model.

3.2.1. Data Collection & Sampling

This academic output was exclusively based on secondary data obtained from the Bloomberg financial terminal. The Bloomberg terminal has a database containing financial data from numerous publicly listed companies, providing a convenient way to access this data through a single software system, rather than meticulously scrutinizing hundreds of companies' annual reports (Bloomberg, n.d.a).

The intended theoretical population consisted of all companies in the current 27 countries that are members of the European Union as of the second quarter of 2024. The choice of the current 27 EU countries was twofold: First, the European Union has so far received limited attention from previous research. Second, it provides a fruitful ground for further cross-country analysis of the potential differences or similarities that the regression analysis may reveal. As is evident in the literature review, previous research on the relationship between the degree of board gender diversity and dividend payouts has often looked at merely one market at a time (e.g. Ain et al. 2021; Gyapong et al. 2019).

For each country, the sample of companies consisted of the members of the respective blue-chip indices which were listed as members according to Bloomberg (2024). According to Chen (2022, n.p.)*, "A blue-chip index is an index that tracks the shares of well-known and financially stable publicly traded companies known as blue chips"*. The selection of indices used was based on a recommendation from the European Institute for Gender Equality (EIGE, 2023) and is presented in *Table 1* in the *Appendix*. Indices that did not correspond to those recommended by EIGE were the following: Bulgaria (BGBX40), Estonia (TALSE), Greece (ASE), Italy (SX45IP), and Poland (WIG30). These indices were used because the initially recommended ones were not accessible via the Bloomberg terminal and they were deemed to most closely correspond to the recommended indices in terms of representability. No representative indices were accessible for the countries of Cyprus and Lithuania. Additionally, the accessible and recommended indices for Luxembourg, Malta, Latvia, and

Slovakia were deemed to contain too few firms to be useful for this study. As a result, six out of the initially intended 27 EU countries had to be excluded from the analysis at this point.

For the remaining 21 indices data on 11 variables over a period of nine years was sourced for each individual firm observation. These 11 variables were sourced to be used either directly for the regression analysis or to inform the calculation of a variable eventually included in the regression model. The sourced variables were total cash common dividend (TCCD), debt-to-asset ratio (DA), total assets (TA), net income (NI), % of women on board (WoB), cash and cash equivalents (Cash), return on assets (ROA), total market value (TMV), % of non-executive directors on board (NEDB), five-year average revenue growth (REVG), and retained earnings (RE). Note that out of these variables only debt-to-asset ratio, return on assets, % of non-executive directors on board, and five-year average revenue growth will appear individually as proxies in the final regression equation. The remaining variables were solely used for computations.

3.2.2. Data Cleaning

Consequently, the sample data was put into a workable format by merging the individual Excel spreadsheets with the individual index data and renaming the columns so that the data could be processed using the *R* programming language. Thereafter, the number of firm-year observations that lacked data, so-called N/A data, were counted for all the variables in each firm. If a particular company was missing more than 50% of firm-year observations for at least one variable, then it was assumed that this company was missing too many data points to provide valuable information for the study. An exception was made for the dependent variable (*dividend payout ratio*), the independent variable (*board gender composition*) and the control variable *board independence*, proxied by the % of non-executive directors on board, as these are considered stable measurements. Their stability results from the fact that board composition rarely changes over the course of several years. A company was only excluded based on one of these three variables if more than ⅔ of values for the variable were missing.

If many firm-year observations were missing within a country, the subsequent statistical analysis of that country's data became less accurate. Therefore, it was decided to exclude any country with more than 10% missing data points from the analysis. The proportion was calculated by adding the total N/A points for the companies in a particular country and dividing by the total number of data points for that country. The countries excluded on this basis were: Bulgaria, Romania, Estonia, Slovenia, Hungary, and the Czech Republic. In addition, companies with considerable ownership stemming from non-EU countries were excluded, even if they were included in the blue-chip index of an EU country. In countries where some companies failed to meet the inclusion criteria but the overall missing data did not surpass 10%, only those specific companies breaching thresholds were excluded, while the others were kept.

For a single company with a number of missing data points below the aforementioned thresholds, the missing data points were instead imputed using the Classification and Regression Tree (CART) method included in the Multivariate Imputation by Chained Equations (MICE) statistical package for the *R* environment (van Buuren et al. 2022). Imputation entails the computing of plausible values to substitute into missing values and thereby create a complete data set (Kleinke et al. 2020). The CART method was selected as a suitable imputation method due to its strength in dealing with outlier data points, its ability to handle multicollinearity, and its ability to work well with skewed distributions (van Buuren, 2018). These were deemed important properties based on an investigation of the data and its descriptives.

Finally, it was decided to exclude any outlier, defined as observations lying outside of three standard deviations from the mean, so as to accord with assumption (7) of the Classical Linear Regression Model (CLRM), which requires that the values of the regressors in a sample should be diverse enough and not contain any outliers (Gujarati & Porter, 2009). *Section 4.3.* will elaborate further on the CLRM and its assumptions.

These manipulations and cleanings led to a final sample of 15 EU countries with a total of 369 companies over a nine-year period. This resulted in long-format panel data with 3223 firm-year observations for each of the variables. The distribution of firm-year observations across countries is shown in *Table 2.0* in the *Appendix*. While it was initially intended to study all 27 EU countries, it became clear at this point that the population would need to be redefined as several countries had to be systematically excluded due to data availability reasons. The newly defined population was thus all companies from the 15 EU countries included in this study.

Gathering data on large publicly listed companies made the sample non-random in the traditional sense. However, it should be stressed that these companies are highly representative of the economic and corporate governance landscape within each country (Stoxx, 2024). Blue-chip indices are specifically designed to include the most significant and influential companies, which are key drivers of economic activity (Chen, 2022) and leaders when it comes to corporate governance practices, including gender diversity on boards, as governance-related regulation usually only applies to listed companies (e.g. Financial Reporting Council, 2024; Swedish Corporate Governance Board, 2020). The focus on such companies allowed for the examination of the relationship between board gender diversity and dividend payouts in a context where board structures and dividend payouts are well-documented and easily accessible. Although this approach may overlook smaller and/or privately held companies, which will be discussed in *section 5.3.,* the insights gained from studying major economic players nevertheless provide valuable information about the working mechanisms between board gender diversity and dividend payouts for all types of companies.

3.2.3. Understanding the Data

Before initiating the model selection procedure, a descriptive statistics analysis was conducted in order to obtain a more accurate overview of the characteristics of the data. First, boxplots were created for each variable to detect possible anomalies in the distribution of the variable values. Thereafter, a summary statistics table with the standard measures including the mean, median and standard deviation, was constructed. This was followed by assembling a scatter plot between the dependent and independent variable (*dividend payout ratio* and *board gender composition*) to obtain a first impression of a possible relationship between them. *Section 4.1.* will elaborate on the results of a descriptive statistics analysis, including all variables relevant to the final model. Note that the scatter plot between the dependent and independent variable is reported in *Figure 3.0* in *section 4.2.*, rather than *section 4.1.*, as it is of greater relevance to the presentation of the regression results.

3.2.4. Choice of Regression Model

For this study, the Ordinary Least Squares method of regression analysis was chosen, as it is deemed to be one of the most attractive methods for estimating linear relationships (Gujarati & Porter, 2009). This method attempts to estimate a regression function by minimizing the sum of the squared residuals, where residuals are defined as the difference between the observed values of the dependent variable in the sample and the values of the dependent variable predicted by the estimated regression model (Gujarati & Porter, 2009).

In order to find out what combination of variables would represent an optimal regression model, a rigorous investigation of previous research and theory was conducted.

The reason why each individual variable was included can be found in *section 3.3.1.*. Additionally, the residual analysis revealed the necessity of including quadratic terms for two control variables, namely *profitability* (ROA) and *investment opportunities* (PB). *Figure 10.0* in the *Appendix* shows the results as provided using the residualsPlots() function of the Companion to Applied Regression (CAR) package in *R*. The function applies a lack-of-fit test to each regressor, thereby testing the probability of the quadratic term of each variable to be zero (Fox & Weisberg, 2018). For the purpose of this study, the quadratic term was included when the probability of it being non-zero was below the 0.1% significance level. Note that this led to a total of eleven proxies for nine variables. When referring to the nine variables included in this study, the linear and quadratic terms were counted as one variable. From the analysis, a model with one dependent, one independent, and eight control variables was selected, namely: *Dividend payout* (logDPR), and *board gender composition* (DistanceWoB), *firm size, profitability* (ROA), *board independence* (NEDB), *leverage (DA), investment opportunities (PB), firm value (TobinsQ), maturity* (Earnings), *and firm growth* (REVG).

Once the model variables were specified, a pooled OLS model, a fixed effect model, and a random effect model were estimated. Thereafter, Park's (2011) model selection procedure was followed. According to him, a pooled OLS model should be chosen when the null hypotheses (H_0) of both an F-test of the fixed effect (FE) model and a Lagrange Multiplier (LM) test of the random effect (RE) model cannot be rejected. Park (2011) states that an FE model should be chosen if only H_0 of the F-test is rejected, while a RE model should be chosen if only H_0 of the LM test is rejected. He elaborates that if both null hypotheses are rejected, the result of the Hausman test indicates the appropriate model. Rejection of the null hypothesis of the Hausman test indicates that the FE model should be chosen (Gujarati & Porter, 2009). *Table 3* in the *Appendix* summarizes Park's (2011) model selection procedure.

To clarify, a pooled OLS model is a regression model where all observations are pooled without any consideration for the cross-sectional or time series dimensions of the data (Gujarati & Porter, 2009). A fixed effect model, in particular a *least squares dummy variable mode (LSDV)* model, is one where the observations are equally pooled. However, it allows certain cross-sectional units to have their own intercept term (Gujarati & Porter, 2009). Finally, a random effect model pools the observations, however, the intercept values of different cross-sectional units are assumed to be random (Gujarati & Porter, 2009).

Before elaborating on the F-test it is important to note that the fixed effect model as specified in this study is a *least squares dummy variable* (*LSDV*) model. This model is different from a fixed effect *within* model in that it includes dummy variables for the groups that one wants to differentiate between and account for (Gujarati & Porter, 2009). The coefficient estimates, however, are equivalent (Gujarati & Porter, 2009). Fixed effect *within* models are usually a popular choice in regression analysis as they have statistically attractive properties (Gujarati & Porter, 2009). However, for the study at hand, the *within* approach would not have been adequate, and hence the *LSDV* model was estimated as the fixed effect model.

The particular groups that this study was interested in differentiating were the different countries. The country variable was accounted for through dummy variables, as we hypothesized that country-specific factors, such as sociocultural and institutional differences, may affect the regression through unobserved mechanisms. A particularly interesting example of an unobserved country-specific characteristic is culture. Recently, corporate finance theory has begun to take into account more behavioral assumptions, including the potential relationship between risk aversion and dividend payouts (Liao et al. 2022). In practice, if it were the case that such a relationship existed, the intercept term of the regression would be different for a more risk-averse country as compared to another less risk-averse country.

Including fixed effects through dummy variables for each country, we can estimate a regression function reflecting the correlation of *board gender composition* and *dividend payout* without any interference by unobserved country characteristics as elaborated upon. In essence, any differences that exist between companies based on their affiliation to a particular country are eradicated in order to estimate a regression function that fits all 15 countries. An analysis of the coefficients and the associated p-values of the countries' dummy variables will, however, allow us to draw conclusions about those differences. If the model were to be estimated as a fixed effect *within* model, said analysis would be impossible as no individual coefficients and p-values for each country's dummy variable would be obtained.

Moving forward, an F-test on the fixed effect *LSDV* model was conducted. The F-test was performed according to the methodology presented by Obi (2021). In particular, this procedure tested whether or not the fixed effects, in other words, the country dummies, are all zero (Obi, 2021). If this were to be the case, there would be no statistical support for actual differences between the countries that would affect the regression. A graph as shown in *Figure 1.0* in the *Appendix* helped to visualize whether or not any such differences existed. As can be seen from the varying intercept terms, one could expect country-specific factors to influence the regression. At a p-value of 1.693e-36, the F-test showed that there are indeed such differences, and thus the fixed effect *LSDV* model should be preferred over the pooled OLS. At a significance level of < 0.1% the null hypothesis that all fixed effects equal zero was rejected.

A Lagrange Multiplier (LM) test developed by Breusch and Pagan was subsequently used on the random effect model. A random effect model differs from a fixed effect model in that it assumes that the unobserved factors accounted for with dummy variables in the *LSDV* model should be considered random rather than fixed, as part of a particular group's intercept term (Gujarati & Porter, 2009). Consequently, unobserved factors are added to the error term in a random effect model (Gujarati & Porter, 2009). This explanation should clarify how country-specific differences, such as institutions, culture and other sociocultural factors, affect the regression differently when considered fixed versus random. The former case assumes differences to be fixed to a particular country, while the latter considers differences to be random. Eventually, the LM test was run. The null hypothesis proposed that there were no significant random effects (Park, 2011). With a p-value of 7.587e-9, the null hypothesis was rejected and it was concluded that there were significant random effects.

As proposed by Park (2011), if it is the case that both fixed and random effects show significance, the Hausman test should be used to determine the appropriate model. It tests the null hypothesis that the unobserved factors are uncorrelated with the regressors (Park, 2011). Park (2011) further states that if correlation is found then the random effect estimates become biased and inconsistent, while the fixed effect estimates remain unbiased and consistent. The Hausman test yielded a p-value of 2.2e-16, so the null hypothesis was rejected, and consequently, it was concluded that the fixed effect model was preferable.

To summarize, following Park's (2011) model selection procedure, the fixed effect *LSDV* model proved to be the most suitable for this study. To reiterate, we specified dummy variables, as this helps to define a theoretically more appropriate regression that excludes otherwise existing differences between countries that might influence the regression results. Although these differences were controlled for during the statistical analysis, they are discussed in *section 5.2.*.

3.3. Model Specification

For this study, an Ordinary Least Squares (OLS) model was estimated; in particular a fixed effect *least squares dummy variable (LSDV)* model with dummy variables accounting for individual country effects. As discussed in *section 3.2.4.*, the decision to employ a fixed effect model was taken following Park's (2011) model selection procedure. The dummy variable specification was chosen due to the nature of this study. Since the study is investigating cross-sectional data across several different countries, it was desired to account for unobserved country-specific confounders. The variables used in this study were: the *dividend payout ratio* (logDPR) as the dependent variable, a measure of *board gender composition* (DistanceWoB) as the independent variable, and a number of control variables including: *firm size, profitability* (ROA)*, board independence* (NEDB)*, leverage (DA), investment opportunities (PB), firm value (TobinsQ), maturity* (Earnings)*, and firm growth* (REVG).

What follows is the thereby estimated model:

$$Y_{it} = \alpha + \beta X_{it} + \sum_{k=1}^{10} \gamma_k Z_{kit} + \sum_{j=1}^{14} \delta_j D_j + \varepsilon_{it}$$

Where:

Y_{it} = is the dependent variable (logDPR) for individual i at time t.

α = is the intercept term representing the baseline value of logDPR when all regressors are zero (associated with the reference country (AT)).

β = is a coefficient representing the effects of the independent variable on the dependent variable.

X_{it} = is the independent variable (DistanceWoB) for individual i at time t.

γ_k = are the coefficients of the control variables, capturing the effect of each control variable on Y_{it}

Z_{kit} = represents the k:th control variable on firm i at time t.

δ_j = are the coefficients of the dummy variables representing the effect of each country relative to the reference country.

D_j = are dummy variables representing different countries, with j indexing each country.

ε_{it} = is the error term, representing unobserved factors affecting the dependent variable for individual i at time t.

In more specific terms the model can be expressed as follows:

$(logDPR)_{it} = \alpha + \beta(DistanceWoB)_{it} + \gamma_1(FirmSize)_{it} + \gamma_2(ROA)_{it} + \gamma_3(ROA^2)_{it} + \gamma_4(NEDB)_{it} + \gamma_5(DA)_{it} + \gamma_6(PB)_{it} + \gamma_7(PB^2)_{it} + \gamma_8(TobinsQ)_{it} + \gamma_9(Earnings)_{it} + \gamma_{10}(REVG)_{it} + \delta_1(BE) + \delta_2(DE) + \delta_3(DK) + \delta_4(ES) + \delta_5(FI) + \delta_6(FR) + \delta_7(GR) + \delta_8(HR) + \delta_9(IE) + \delta_{10}(IT) + \delta_{11}(NL) + \delta_{12}(PL) + \delta_{13}(PT) + \delta_{14}(SE) + \varepsilon_{it}$

3.3.1. Variables of the Model

The aforementioned variables utilized in the final model were defined as follows:

3.3.1.1. Dependent Variable: Dividend Payout (logDPR)

For each sampled firm in each country and each of the nine years under study, the DPR was calculated using the following formula:

$$Y = Dividend\ Payout = ln\left(\frac{Total\ Common\ Cash\ Dividend\ Paid}{Net\ Income}\right)$$

Note that this study uses the natural logarithm of the dividend payout ratio as a proxy for the variable. This decision was taken after a descriptive statistics analysis revealed a heavy skewing of the dividend payout ratio toward the right. Log transformations are considered best practice in statistics as they help to reduce skewness (West, 2021). The dividend payout ratio (DPR) was used as a proxy for the dividend payout of a given firm and was calculated by dividing the total cash common dividend, as sourced from Bloomberg, by its net income, in line with Ain et al. (2021) and Saeed and Sameer (2017). The measure total cash common dividend refers to all common cash dividends paid to common shareholders from the profit of the firm (Bloomberg, n.d.b). Scores of peer-reviewed studies (e.g. Afza & Mirza, 2011; Khan & Baker, 2023; Saeeda & Sameed, 2017) that have examined a company's dividend payout have used this proxy as an operationalization measure, underscoring its credibility.

3.3.1.2. Independent Variable: Board Gender Composition (DistanceWoB)

The independent variable of this study is board gender composition, proxied by the percentage point value away from a perfectly equal distribution between women and men on the board. It is measured as the absolute value of the distance of the proportion of women on the board from being exactly 0.5.

$$X = Board\ Gender\ Composition = \left| \frac{Number\ of\ Women\ on\ the\ Corporate\ Board}{Total\ Number\ of\ People\ on\ the\ Corporate\ Board} - 0.5 \right|$$

The data gathered from Bloomberg that underpins the calculations is based on the legal gender of an individual at the time of undertaking employment (Bloomberg, n.d.c). This measure of board gender composition, and by extension board gender diversity, has to our knowledge not previously been used in any of the reviewed literature. Nevertheless, it was not only deemed an adequate measure of board gender composition but also a better way to proxy board gender diversity, as it acknowledges the goal of equalizing the proportion of male and female board members.

3.3.1.3. Control Variables

In addition to the dependent and independent variable, eight control variables were included in the panel regression model so as to account for extraneous factors that may influence the dividend payout of the firm.

3.3.1.3.1. Leverage (DA)

Leverage, defined as total debt over total assets, was used to gauge the proportion of the company's funding that is coming from borrowed capital. It was used as a control variable in this study as several papers have argued for the correlation that exists between high leverage and dividend payouts (Asif et al. 2011; Higgins, 1972; McCabe 1979; Rozeff, 1982). Asif et al. (2011) explain that past literature has usually emphasized how firms with high leverage pay lower dividends in order to avoid having to rely on costly external financing. It is only plausible that a company that already has a high cost of capital due to high levels of leverage will be more inclined to use internal funds for investments and thus have less capital left for dividend payouts. We defined leverage as follows:

$$Leverage = \frac{Total\ Debt}{Total\ Assets}$$

3.3.1.3.2. Profitability (ROA)

The return on assets measure, as operationalized by net income over total assets, was used to control for the firm's profitability in affecting dividend payout decisions. It allows one to gauge the efficiency of the firm's management in utilizing the firm's assets to generate revenue (Bloomberg, n.d.d). Gill et al. (2010, p.9) argue that *"profitability has long been* *regarded as the primary indicator of a firm's capacity to pay dividends".* They present several papers arguing that past, current, and future profits all determine dividend payouts (Baker & Powell, 2000; Baker et al. 1985; Lintner, 1956; Pruitt & Gitman, 1991). Similarly, Amidu and Abor (2006) and Rizqia et al. (2013) defend the generally accepted notion that higher profitability should come with higher dividend payouts.

$$Return\ on\ Assets\ =\ \frac{Net\ Income}{Total\ Assets}$$

Additionally, for reasons discussed in *section 3.2.4.*, a squared term of ROA was included in the final regression model:

$$Return\ on\ Assets^2\ =\ (\frac{Net\ Income}{Total\ Assets})^2$$

3.3.1.3.3. Firm Size

The firm size, as proxied by the natural logarithm of its total assets, was included as it is believed that dividend payouts increase as the size of the firm increases (Hariem, 2021). Firm size is argued to facilitate access to capital markets which frees up money that can be distributed to shareholders rather than reinvested (Lloyd et al. 1985). The measure is logarithmized in accordance with Jogiyanto (2000), in Saraswati & Bernawati's (2020) recommendation on using the natural logarithm of a firm's total assets as a proxy for firm size, as it is a stable proxy.

$$Firm\ Size\ =\ ln(Total\ Assets)$$

3.3.1.3.4. Board Independence (NEDB)

The degree of board independence, defined as the number of independent directors over total directors, indicates how vested the board is in the operations of the company. It is of interest to the study because a board that is highly intertwined with the day-to-day operations of the firm may have a significantly different dividend payout than one with high independence. As Fama and Jensen (1983) note, a board of directors whose members have no financial stake in the company they are supposed to monitor and govern have no incentive to act in a way that would yield them egotistical benefits at the expense of the long-term financial viability of the company. In this way, the governance capability of the board may be enhanced which amongst other things is supposed to show through increased dividend payouts (Chang, 2023).

$$Board\ Independence = \frac{Number\ of\ Independent\ Directors}{Number\ of\ Total\ Directors}$$

3.3.1.3.5. Firm Value (TobinsQ)

Additionally to profitability, firm value was decided to be included as a control variable. It has been discussed in relation to dividend payouts in several prior papers (e.g. Budagaga, 2017; Eades, 1982; Nurokhmah et al. 2022,). As explained by Nurokhmah et al. (2022), the *bird in hand theory* (Lintner, 1956; Walter, 1963) and the dividend relevance theory (Gordon, 1959) both argue for a causal relationship between dividends and firm value, where the former affects the latter, while dividend signaling theory asserts that dividends convey information about the health of the firm and ultimately the firm value. While it becomes evident that so far the theory has focused on the impact of dividend payouts on firm value, it should be noted that regression analysis cannot infer anything about causation (Gujarati & Porter, 2009). Therefore, the direction of this proposed relationship is less important. Instead this study acknowledges the theoretically founded potential correlation between these two variables and follows previous research (Ain et al. 2021; Chen et al. 2017; Ye et al. 2019) in its approach to include it as a control variable. Firm value is proxied by Tobin's Q as has previously been done by several studies (Benson & Davidson III, 2009; Chung & Pruitt, 1994; Rose, 2005). It is calculated by dividing the total market value of the firm by its total assets.

$$Firm\ Value = Tobin's\ Q = \frac{Total\ Market\ Value}{Total\ Assets}$$

3.3.1.3.6. Investment Opportunities (PB)

The price-to-book ratio represents the ratio of equity market value to the accounting book value of said equity, as measured per the balance sheet (Branch et al. 2005). It provides a gauge into the under- and over-valuation of a company's assets, by showing the value (price) that market participants affix to a firm relative to said firm's book value of its equity (Fernando, 2024). According to Esqueda (2015), the price-to-book ratio can be considered a measure of investment opportunities. Similarly, Gambacorta et al. (2023) argue that the price-to-book ratio is a proxy for investment opportunities. They further explain that lower price-to-book ratios are expected to correlate with higher dividend payouts as they put pressure on management to compensate the shareholders for low growth expectations through dividend payments.

$$Price\ to\ Book\ Ratio\ =\ \frac{Current\ Stock\ Price}{Book\ Value\ per\ Share}$$

Additionally, for reasons discussed in *section 3.2.4.*, a squared term of price-to-book ratio was included in the final regression model:

$$Price\ to\ Book\ Ratio^2\ =\ (\frac{Current\ Stock\ Price}{Book\ Value\ per\ Share})^2$$

3.3.1.3.7. Maturity (Earnings)

According to DeAngelo et al. (2006), earnings, defined as retained earnings over total assets, provides a measure of a firm's mix of earned and contributed capital, which in turn is argued to be a relevant proxy for the life-cycle stage, in other words maturity, of a company. In their widely cited paper, the authors provide evidence in support of the *life-cycle hypothesis*, which states that more mature companies tend to pay out higher dividends (DeAngelo et al. 2006). Due to the relevance of the DeAngelo et al. (2006) paper within the realm of dividend policy research and because of the significant findings, it was decided only to be adequate to include earnings as a control variable in this study and thereby create a more holistic combination of control variables.

$$Earnings\ =\ \frac{Retained\ Earnings}{Total\ Assets}$$

3.3.1.3.8. Firm Growth (REVG)

According to Dempsey et al. (2019), firm growth is generally considered to inversely correlate with dividend payouts. Notably, low growth is generally associated with large, profitable, and mature companies. As has been argued in previous sections, all these characteristics are expected to correlate with higher dividend payouts. It is therefore not surprising that low firm growth rates also correlate with higher dividend payouts. Firm growth, as proxied by five-year annual revenue growth, was included to produce a more holistic picture of what is generally considered to influence dividend payouts conjointly with other variables and in accordance with previous literature on the determinants of dividend payouts (e.g. Osobov & Denis, 2007; Subramaniam et al. 2014). To be specific, the firm growth was calculated as via the equation shown below (Bloomberg, n.d.e):

$$Firm\ Growth\ =\ \left(\left(\frac{Most\ Recent\ Revenue}{Revenue\ five\ years\ earlier}\right)^{1/5} - 1\right) \cdot 100$$

4. Results

The results section will start with a descriptive analysis of the data, followed by the fitted regression model. It ends with a presentation of the tests that were employed to ensure the statistical robustness of the model.

4.1. Descriptive Analysis

As mentioned in *section 3.2.3.,* part of the methodology was concerned with reviewing the descriptive statistics of the gathered data. *Figure 2.0* shows a matrix of the boxplots of all the variables included in the model, including the independent and dependent variable apart from all the control variables, however, excluding the dummy variables. The individual boxplots—*Figure 2.1-2.12*—can be found in the *Appendix*.

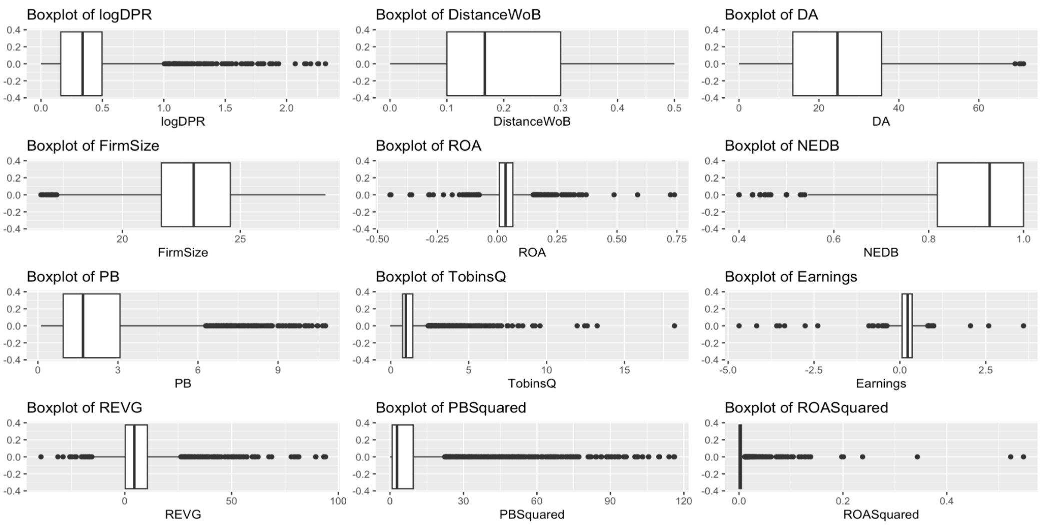

Figure 2.0 Matrix of Boxplots for all included variables.

The dependent variable, the *dividend payout ratio* (logDPR), showed a right skew in its boxplot, indicating that there were many observations in the upper-most quartile, with relatively high values compared to the rest of the distribution. The boxplot of *gender board* *composition* (DistanceWoB), which showed the distributions of the values of the independent variable, appeared nearly perfectly normally distributed, with merely a slight indication of a right skew. Its median was equal to approximately 0.17, suggesting that the median firm was circa 17 percentage points away from having an equal number of females and males on their boards. Similarly, the boxplot of *leverage* (DA) seemed almost perfectly normally distributed. The plot for *firm size* was similar to that of the independent variable, however, with more extreme values.

The boxplots of *profitability* (ROA), *firm value* (TobinsQ), *maturity* (Earnings), and *firm growth* (REVG) all showed a fairly similar pattern, with many observations centered around a small range of values, while simultaneously showing a large number of extreme values in both tails. *Firm value* was an exception as it was only skewed toward the right tail, but not toward the left one. In this sense, it was more similar to the boxplots of *board independence* (NEDB) and *investment opportunities* (PB), which, while having the majority of values spread out over a wider range of values than the four other variables previously discussed, both had long tails in either of the two directions. Lastly, the boxplots of ROA^2 and PB^2 were highly skewed due to the quadratic effect added onto the initial variables. The careful reader should note that these boxplots represent the values of observations after being cleaned for outliers, that is to say, values that fall outside of three standard deviations from the mean.

While boxplots constitute a valuable means to visualize the descriptive statistics of the variables, it was also deemed necessary to compile a table with descriptive information for all variables. *Table 4* reports said descriptive statistics, in particular the mean, standard deviation, minimum and maximum value, the first and third quartile, as well as the median and the number of firm-year observations for each variable.

Table 4. Descriptive statistics of all variables

Summary Statistics

	Mean	SD	Min	Q1.25%	Median	Q3.75%	Max	N
logDPR	0.3632880	0.3074907	0.0000000	0.1609180	0.3386640	0.4967681	2.3157492	3223
DistanceWoB	0.2100228	0.1346847	0.0000000	0.1000000	0.1666670	0.3000000	0.5000000	3223
FirmSize	23.0239111	2.2537003	16.5444478	21.6503356	23.0200715	24.5769349	28.6107552	3223
ROA	0.0418342	0.0589847	-0.4481964	0.0088583	0.0343815	0.0648707	0.7400126	3223
NEDB	0.8848022	0.1469193	0.4000000	0.8181820	0.9285710	1.0000000	1.0000000	3223
DA	25.1926967	14.9488092	0.0000000	13.4613814	24.6093884	35.6494999	71.1791458	3223
PB	2.3220462	1.9606978	0.1159420	0.9480520	1.6902050	3.0783920	10.7779207	3223
TobinsQ	1.2976667	1.1273956	-0.0494398	0.7614457	0.9689568	1.4143343	18.2071580	3223
Earnings	0.2221884	0.2795175	-4.6828310	0.0641479	0.2249519	0.3568604	3.5988498	3223
REVG	6.3785658	11.1009320	-39.2425003	0.2168760	4.4902229	10.5940952	93.9558792	3223
PBSquared	9.2350415	16.4495596	0.0134425	0.8988026	2.8567929	9.4764975	116.1635751	3223
ROASquared	0.0052282	0.0191365	0.0000000	0.0001850	0.0014266	0.0045255	0.5476187	3223

Finally, *Table 2* shows the number of firm-year observations per country. Portugal (PT) had the lowest number of firm-year observations with 111 values, whilst Greece (GR) had the most with 454. On average each country had roughly 200 firm-year observations. Please note that the country codes used to abbreviate the country names follow the ISO 3166-1 alpha-2 codes convention (ISO, 2020).

Table 2. Number of firm-year observations per country.

AT	BE	DE	DK	ES	FI	FR	GR	HR	IE	IT	NL	PL	PT	SE
189	155	283	157	265	201	303	454	135	115	300	141	210	111	203

4.2. Regression Results

As discussed in *section 3.3.* this study used a fixed effect *least squares dummy variable (LSDV)* model to test the hypothesis that the greater the distance of *board gender composition* is from 50%, the lower the *dividend payout ratio* would be. To visualize a possible relationship *Figure 3.0* shows a simple linear regression model with the logarithmized *dividend payout ratio* (logDPR) as the dependent variable and our measure of *board gender composition* (DistanceWoB) as the independent variable.

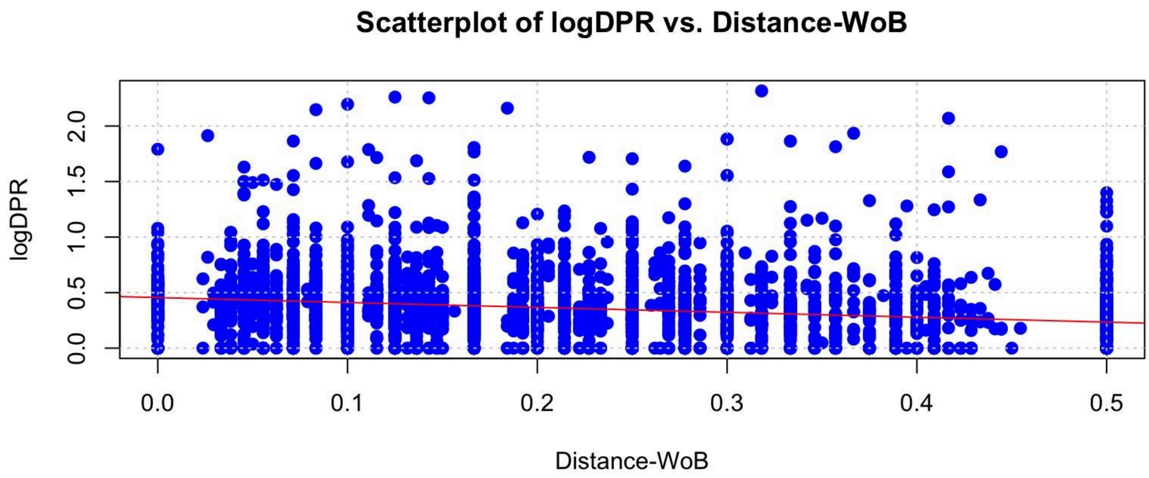

Figure 3.0 Scatter plot of the dependent variable (logDPR) against the independent variable (Distance-WoB)

While the graph cannot be used to make inferences, it does indicate that there might, as hypothesized, be a negative relationship between the two variables. *Figure 4.0* reports the results of the fixed effect *LSDV* model. The figure shows that 3223 firm-year observations were used to estimate the results. The residual statistics show the distribution of the residuals. It should be noted that the maximum value of the residuals was about three times as high as the absolute value of the minimum, which could indicate a violation of the normality assumption of the residuals. *Section 4.3.* will elaborate on this. Furthermore, *Figure 4.0* reports the coefficients. The codes to the right of the coefficient estimates indicate at what level of significance the estimates were significant. It can be seen that the independent variable *board gender composition* (DistanceWoB) was significant at a 5% significance level. In other words, there was sufficient statistical support for the assertion that board gender diversity is linearly correlated with the dividend payout ratio.

Looking at the associated coefficient of DistanceWoB, the negative sign confirmed the initial suspicion that the more gender unequal a firm board is, the lower the dividend payout ratio. Because the dependent variable is a logarithmized measure of the dividend payout ratio, while the independent variable is not, it is required to exponentiate the coefficient to arrive at the factor at which the dependent variable changes with respect to the independent variable (Ford, 2018). The effect that was estimated was that for each one percentage point increase in the distance from perfect gender-equal board composition, the dividend payout ratio decreased on average by a factor of 0.8897 ($e^{-0.1169} = 0.8897$), in other words roughly 11%, given all other variables stay constant. Note the difference between percentage point and percent, as a result of defining the measure of dividend payouts as the logarithmized dividend payout ratio.

The control variables *firm size, board independence (NEDB), investment opportunities (PB), firm growth (REVG)*, and *profitability (ROA^2)* were all significant at a 0.1% significance level. In the case of *firm size* (which to remind the reader, is the natural logarithm of total assets) it can be concluded that, *ceteris paribus,* a 1% increase in total assets leads to an average increase of 0.0119% in the dividend payout ratio. Here, it should be noted that both the variable *firm size* and the *dividend payout ratio* are logarithmized, implying that one does not need to exponentiate the coefficient for interpretation (Ford, 2018). In the case of *board independence* (NEDB), the conclusion is that a one percentage point increase in the percentage of *non-executive directors on board*, leads to an average increase of 22.7% ($e^{0.2046} = 1.2270$) of *dividend payout ratio*, given all other variables stay constant. In the case of *investment opportunities* (PB), a one-unit increase is associated with an average increase of 8.83% ($e^{0.0846} = 1.0883$) in the dividend payout ratio, given all other variables stay constant. *Investment opportunities*, proxied by PB^2, a one-unit increase is associated with an average decrease of 0.8% ($e^{-0.007992} = 0.9920$) in the *dividend payout ratio*, given all other variables stay constant.

For *firm growth* (REVG), a one percentage point increase in growth leads to an average decrease of roughly 0.3% ($e^{0.003097} = 0.9969$) in the *dividend payout ratio*, given all other variables stay constant. Furthermore, in the case of ROA^2, a one-unit increase in the squared ratio of net income over total assets practically leads to a 100% decrease in the *dividend payout ratio* ($e^{-12290} = 0$), given all other variables stay constant. To clarify, if return on assets is 0.1 (10%) then ROA^2 is 0.01. A one-unit increase in ROA^2 is equal to a move from 0.01 to 1.01. The ROA equivalent to that is 1.005 ($\sqrt{1.01}$), in other words, 100.5%. Moving from a ROA of 10% to 100.5% marks a significant change and effectively means a total reduction in the dividend payout ratio. The results of the remaining control variables, *profitability*, *leverage*, *firm value* and *maturity*, will not be interpreted as their coefficients were insignificant and thus there was not sufficient reason to believe that they were linearly correlated with the *dividend payout ratio*.

Turning to the dummy variables, it is most important to point out that the intercept itself is the 15^{th} dummy variable. In this case, Austria was used as the intercept term as it is the first country that appears when all 15 are sorted alphabetically. The study showed that there was not sufficient statistical evidence suggesting that the intercept term was different from zero at a 5% significance level. In more practical terms, the *dividend payout ratio* of a company did not seem to be influenced either positively or negatively by whether the company was from Austria or not. Ten out of the remaining 14 dummy variables were, however, significant at a 5% level, suggesting that, everything else equal, the *dividend payout ratio* of firms in these countries was different from those in the reference country Austria. In other words, there was statistical evidence that companies in some countries seem to pay out more or less dividends, as measured through the *dividend payout ratio*, because of factors pertaining to the country in which the company was registered. A more detailed analysis of the potential determinants of this phenomenon will follow in *section 5.2.*.

According to the R-squared figure, the model could explain roughly 15.87% of the variance of the *dividend payout ratio* (Gujarati & Porter, 2009). For multiple regression models, the adjusted R-squared is of greater significance as it accounts for the number of variables included in the model (Gujarati & Porter, 2009). At 15.21%, the adjusted R-squared still showed significant explanatory power. The p-value of the F-statistic (2.2e-16) indicated that the model was overall significant (p-value < 0.05). It is important to note that model significance merely indicates the presence of at least one variable that has a significant relationship with the dependent variable, as the null hypothesis of the F-Test posits that no variable is statistically significantly correlated with the dependent variable (Berenson et al. 2019).

```
lm(formula = logDPR ~ DistanceWoB + FirmSize + ROA + NEDB + DA +
    PB + TobinsQ + Earnings + REVG + PBSquared + ROASquared +
    factor(Country), data = filtered_imputed_data)

Residuals:
     Min       1Q   Median       3Q      Max
-0.57736 -0.16748 -0.04666  0.10152  1.89780

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -1.777e-01  9.700e-02  -1.832 0.067019 .
DistanceWoB       -1.169e-01  4.767e-02  -2.452 0.014278 *
FirmSize           1.186e-02  3.502e-03   3.386 0.000719 ***
ROA                1.331e+01  1.193e+01   1.116 0.264667
NEDB               2.046e-01  4.858e-02   4.211 2.61e-05 ***
DA                -3.716e-04  3.529e-04  -1.053 0.292443
PB                 8.460e-02  8.987e-03   9.414  < 2e-16 ***
TobinsQ           -7.367e-03  6.444e-03  -1.143 0.252980
Earnings           2.884e-02  2.037e-02   1.416 0.156776
REVG              -3.097e-03  4.831e-04  -6.410 1.66e-10 ***
PBSquared         -7.992e-03  1.001e-03  -7.988 1.89e-15 ***
ROASquared        -1.229e+04  3.196e+03  -3.847 0.000122 ***
factor(Country)BE  1.018e-01  3.187e-02   3.193 0.001420 **
factor(Country)DE -6.248e-02  2.775e-02  -2.252 0.024399 *
factor(Country)DK -9.259e-02  3.144e-02  -2.945 0.003255 **
factor(Country)ES  7.146e-02  2.872e-02   2.488 0.012904 *
factor(Country)FI  1.525e-01  2.923e-02   5.219 1.91e-07 ***
factor(Country)FR  6.037e-02  2.834e-02   2.130 0.033222 *
factor(Country)GR  1.598e-02  2.849e-02   0.561 0.574954
factor(Country)HR -8.913e-04  3.373e-02  -0.026 0.978921
factor(Country)IE -1.267e-01  3.504e-02  -3.617 0.000303 ***
factor(Country)IT  3.360e-02  2.819e-02   1.192 0.233339
factor(Country)NL  2.750e-02  3.228e-02   0.852 0.394450
factor(Country)PL -9.858e-02  2.894e-02  -3.406 0.000667 ***
factor(Country)PT  1.527e-01  3.661e-02   4.171 3.11e-05 ***
factor(Country)SE  8.375e-02  2.995e-02   2.796 0.005200 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.2831 on 3197 degrees of freedom
Multiple R-squared:  0.1587,    Adjusted R-squared:  0.1521
F-statistic: 24.13 on 25 and 3197 DF,  p-value: < 2.2e-16
```

Figure 4.0. Summary of the Fixed Effect Least Squares Dummy Variable Model

4.3. Robustness Tests

After running the model, the underlying assumptions were tested to check its validity and reliability. Fundamentally, the study is testing a multiple linear relationship. Econometric theory enables the testing of such a relationship based on sample data and allows for inferences about the population parameters if certain assumptions hold. If these do not hold, one needs to be careful with trusting their results. Brooks (2019) states that, in general, one may encounter any combination of the following problems if the underlying assumptions are incorrect: (A) the coefficient estimates are wrong, (B) the standard errors are wrong, and/or (C) the distributions that we assume our test statistics to follow are inappropriate. According to Gujarati and Porter (2009, p.62), the assumptions of the classical linear regression model (CLRM) are as follows: (1) "*The regression model is linear in the parameters*", (2) the X values are supposed to be independent of the error term, (3) the expected value of the error term given a particular X is zero, (4) the variance of the error term given any X is the same, (5) the error terms of two subsequent observations X are not correlated, (6) the sample must be great enough, and finally (7) the X values in a sample should be diverse enough and not contain any outliers.

If all these assumptions hold, the Gauss-Markov theorem delineates that the estimators obtained by Ordinary Least Squares (OLS) regression are so-called BLUE (Gujarati and Porter, 2009). Gujarati and Porter (2009) explain that this means that the estimators are the **B**est, **L**inear, **U**nbiased and **E**fficient estimators. The *best* follows from all the other properties holding. Gujarati and Porter (2009) state that the estimators need to be *linear*. They further state that estimators are *unbiased* if their average expected value is equal to the true population parameter. Finally, they assert that estimators are *efficient* if they have minimum variance compared to all other possible linear and unbiased estimators.

Before we start the discussion on how we tested all the aforementioned assumptions and whether our estimators can be considered BLUE, we would like to emphasize that there are two other assumptions that we tested, which although not decisive for the BLUE property of an estimator, are still important. Namely, (1) the assumption of non-multicollinearity and (2) the assumption of the normally distributed error term. Non-multicollinearity does not count as one of the underlying assumptions of the CLRM, according to Gujarati and Porter (2009), however, only if the assumption holds, that is to say, we do not find any multicollinearity between our variables, can we identify the effect of a particular variable on the dependent variable. This is particularly important for the interpretation of our results.

Table 5 reports the results of our analysis of multicollinearity through a Pearson correlation matrix. We found that only the two proxies for *investment opportunities* (PB and PB^2) had a correlation of more than 0.8, which, according to (Gujarati & Porter, 2009), is often considered the level at which we can speak of problematic multicollinearity. For better readability, we decided to exclude the dummy variables from the correlation matrix.

Additionally, VIF values are reported in *Table 6* in the *Appendix*. The table reports generalized VIF (GVIF) values and scaled GVIFs since the model included several categorical predictors (i.e. the dummy variables). According to DeRuiter (2019), the rule of thumb requires us to square the scaled GVIF values to be able to decide whether a problematic level of multicollinearity exists. If the squared value of the scaled GVIF exceeds ten, there is strong evidence of multicollinearity (DeRuiter, 2019). As already suggested by the Pearson correlation matrix, the VIF values show that only PB and PB^2 were highly correlated. However, while the presence of multicollinearity for at least two variables was confirmed, this multicollinearity was to be expected as PB^2 is simply the quadratic expression of PB. The implications of leaving both terms in the model are that we will not be able to confidently quantify the effect of each of the expressions on the *dividend payout ratio*. The joint effect, however, remains unchanged, and as the *price-to-book ratio* is not of main interest to this study, the multicollinearity was accepted.

Table 5 Pearson Correlation Matrix

Pearson Correlation Matrix

	logDPR	DistanceWoB	FirmSize	ROA	NEDB	DA	PB	TobinsQ	Earnings	REVG	PBSquared	ROASquared
logDPR	1.0000000	-0.1946379	0.1665610	0.0147945	0.1380058	0.0115881	0.0992682	0.0257816	0.0460136	-0.1333582	0.0386016	-0.0686579
DistanceWoB	-0.1946379	1.0000000	-0.4518912	-0.0481797	-0.2849398	-0.0070053	-0.1191819	-0.0726631	-0.0357179	0.0235406	-0.0826109	0.0040048
FirmSize	0.1665610	-0.4518912	1.0000000	-0.2367735	0.3740710	0.0662158	-0.1583425	-0.1706590	-0.1462001	-0.2418062	-0.1377508	-0.1564965
ROA	0.0147945	-0.0481797	-0.2367735	1.0000000	-0.0274521	-0.1509341	0.3944928	0.4932134	0.3836743	0.1997185	0.3493183	0.5305680
NEDB	0.1380058	-0.2849398	0.3740710	-0.0274521	1.0000000	-0.1261759	0.0959833	0.0484357	0.0520977	-0.0703733	0.0709638	-0.0078527
DA	0.0115881	-0.0070053	0.0662158	-0.1509341	-0.1261759	1.0000000	-0.0234414	-0.0859753	-0.1327517	-0.0179205	-0.0468760	-0.1056814
PB	0.0992682	-0.1191819	-0.1583425	0.3944928	0.0959833	-0.0234414	1.0000000	0.6523391	0.2215616	0.2011488	0.9441535	0.1856161
TobinsQ	0.0257816	-0.0726631	-0.1706590	0.4932134	0.0484357	-0.0859753	0.6523391	1.0000000	0.2757560	0.1809067	0.6381834	0.3450535
Earnings	0.0460136	-0.0357179	-0.1462001	0.3836743	0.0520977	-0.1327517	0.2215616	0.2757560	1.0000000	0.1403006	0.1713065	0.0779638
REVG	-0.1333582	0.0235406	-0.2418062	0.1997185	-0.0703733	-0.0179205	0.2011488	0.1809067	0.1403006	1.0000000	0.1836826	0.0614126
PBSquared	0.0386016	-0.0826109	-0.1377508	0.3493183	0.0709638	-0.0468760	0.9441535	0.6381834	0.1713065	0.1836826	1.0000000	0.1869714
ROASquared	-0.0686579	0.0040048	-0.1564965	0.5305680	-0.0078527	-0.1056814	0.1856161	0.3450535	0.0779638	0.0614126	0.1869714	1.0000000

Finally, while also not underlying the CLRM, the normally distributed error term assumption is, according to Gujarati and Porter (2009), essential to the classical normal linear regression model (CNLRM). This assumption states that the error terms of the model should follow a normal distribution (Gujarati & Porter, 2009). As long as this assumption holds the statistical analysis is simplified, especially for small samples, as it allows the estimation of confidence intervals and to test statistical hypotheses using the t-test and the chi-square test (Gujarati & Porter, 2009). The preceding assumption was tested by analyzing the Q-Q plot of residuals, which is reported in *Figure 5.0*. As can be seen from the graph, there was a slight deviation from normality, which is reflected in the reverse S-shaped distribution of the residuals. The interpretation of this pattern is that the data is overdispersed and shows more outliers in the tails of the distribution than the normal distribution would predict (Ford, 2015). However, as mentioned and supported by Sheather (2009), this is chiefly a problem for small samples. Additionally, he argues that the normality assumption is crucial if the model is used for prediction. As neither is the case in this particular study and a violation of the normality of residual assumption does not impact the BLUEness of the estimators according to the Gauss-Markov theorem, the pattern spotted in the Q-Q plot was deemed to be unproblematic. Additionally, a histogram of the residuals was constructed, as shown in *Figure 6.0*.

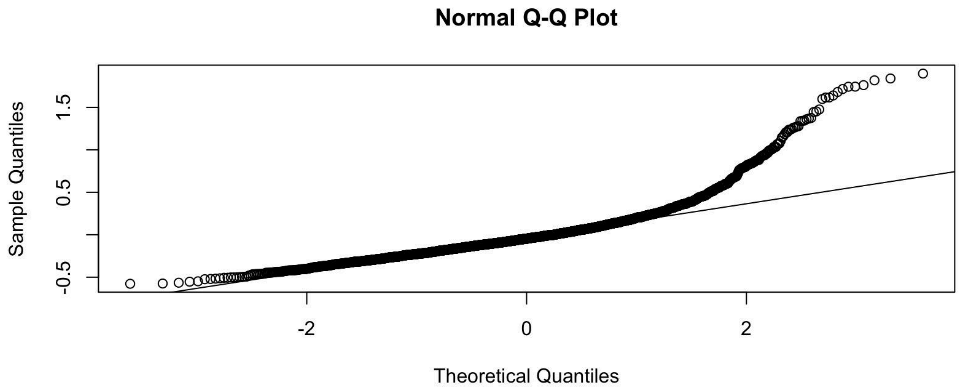

Figure 5.0 Normal Q-Q Plot

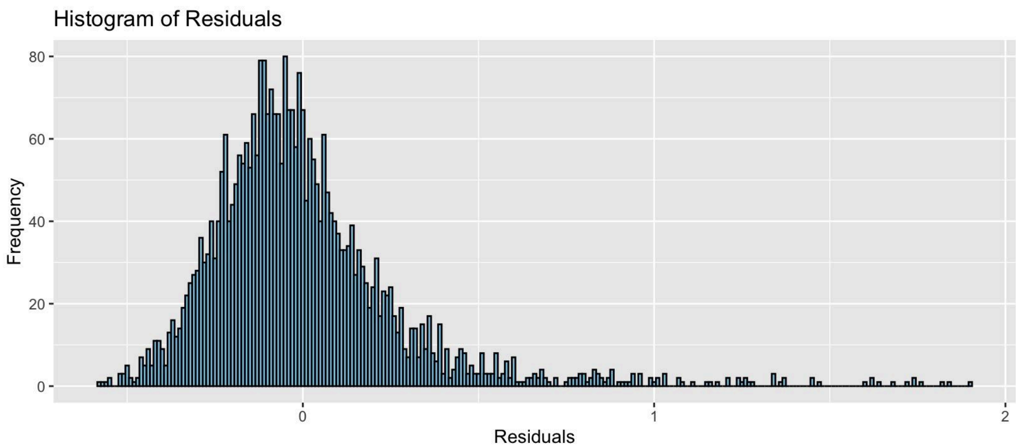

Figure 6.0 Histogram of Residuals

Moving forward, the seven assumptions of the CLRM were tested. Assumption 1 had already been tested in *section 4.2.* where the scatterplot between the dependent variable (*dividend payout ratio*) and the independent variable (*board gender composition*) was investigated. The scatter plot is shown in *Figure 3.0* and shows no non-linear relationship. Assumption (1) was therefore assumed to hold. Similarly, the descriptive analysis had already shown that assumption (7)—that there is enough diversity in our data and no outliers—holds. Note that outliers, as defined previously, were values that lay outside of three standard deviations of the mean. The descriptives of each variable included in the model are listed in *Table 4*, and show the range of values for each variable. Assumption (7), as discussed in *section 3.2.2.,* was the reason why outliers were initially excluded from the analysis.

Before elaborating on assumptions (2) to (5), we would like to emphasize that with a sample size of 369 firm observations and 3223 firm-year observations, the sample is great enough to make inferences about all nine regressors and their relationship to the dependent variable. Assumption (6) was thus assumed to hold. Assumption (2) holds if the covariance between the regressors and the residuals is zero. This assumption can be tested by examining the plots of each regressor with the residuals and seeing if there are any noticeable patterns that would violate the assumption (Gujarati & Porter, 2009). *Figure 7.0* presents a matrix of all required scatterplots. For better visualization, the *Appendix* lists all individual residual plots separately in *Figure 7.1-7.11*. None of the individual residual plots seemed to exhibit any obvious pattern. The scatter plots of ROA*,* ROA^2*,* Tobin's Q*,* and Earnings showed some degree of clustering, which, however, seemed to be the case due to extreme values. As these extreme values were relatively close to zero in all respective graphs, that was deemed to be unproblematic.

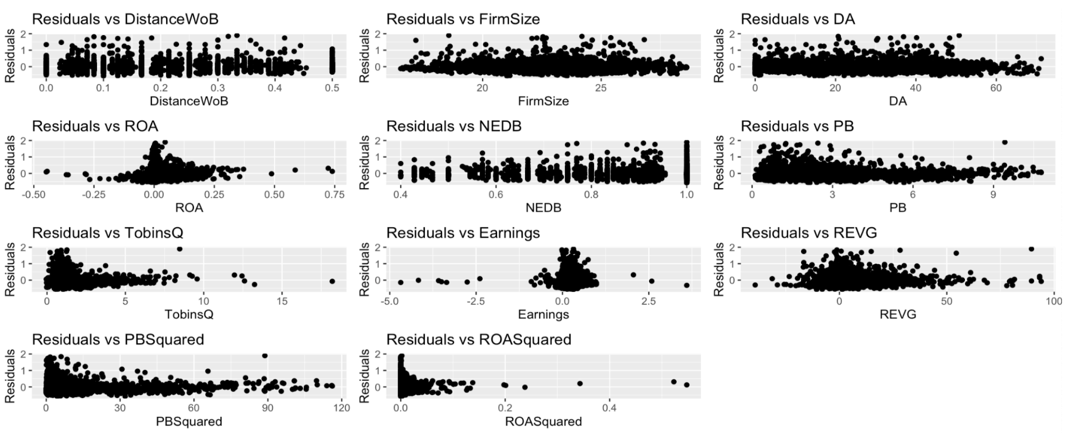

Figure 7.0 Matrix of scatterplots for all included variables.

Assumption (3), which states that the error terms should have an expected mean value of zero, can be investigated by looking at a scatterplot of residuals against fitted values (Gujarati & Porter, 2009). A desirable pattern would be a random scattering of the residuals around the X-axis. *Figure 8.0* shows such a plot for our model. What is noticeable is a slight deviation of the randomness below the X-axis. This pattern points toward an irregularity in the initial data. After revisiting the individual scatter plots of residuals against each of the regressors, it became evident that the variable *board independence* (NEDB) had an unproportional amount of values at x=1.0 indicating that 100% of the directors on the board did not have any executive function. While this property did not contribute to the aesthetic value of the scatterplot between residuals and fitted values, it was deemed not to interfere with assumption (3), the expected mean value of the error terms should be zero.

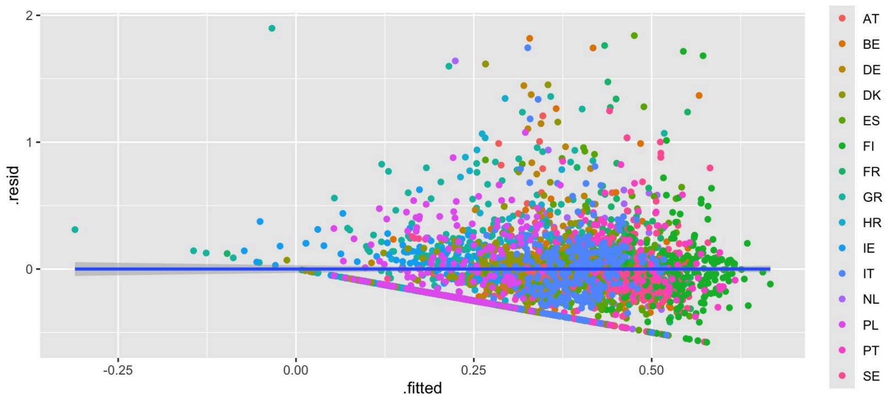

Figure 8.0 Residuals vs. fitted values color-coded by country.

Assumption (4), the assumption of homoscedastic error terms, can be tested in several ways (Gujarati & Porter, 2009). Informally, one can search for suspicious patterns in the residual plots (Gujarati & Porter, 2009). Formally, one can use White's general heteroscedasticity test, which works by regressing the squared residuals on the *"regressors, their squared values, and the cross product(s) of the regressors"* (Gujarati & Porter, 2009, p.386). The procedure tests the null hypothesis that there is no heteroscedasticity (Gujarati & Porter, 2009). The result of a White's test on our model produced a p-value of 2.43e-5, and since this p-value is significantly smaller than the 5% significance level, we concluded that the null hypothesis of the White's test—that there is no heteroscedasticity—could be rejected. The issue with heteroscedasticity being present lies in its tendency to yield imprecise estimates of the standard errors, and consequently to p-values lower than they ought to be for the estimated variable coefficients (Gujarati & Porter, 2009). Thus, inferences about coefficients with the presence of heteroscedasticity can be misleading. Interestingly, the presence of heteroscedasticity does not affect the consistency, bias, or linearity of the estimators (Gujarati & Porter, 2009). Before explaining the methods used to rectify the violation of this assumption, we will present the result of testing assumption (5).

Assumption (5), the absence of autocorrelation between the error terms, was tested using the Breusch-Godfrey test. According to Gujarati and Porter (2009), the Breusch-Godfrey test is a suitable method to formally test for autocorrelation. The test is performed by regressing the residuals on the regressors and their lagged values, and tests the null hypothesis that there is no autocorrelation of any order (Gujarati & Porter, 2009). The result of this test showed a p-value of 2.2e-16, which is below the 5% significance level. Again this leads to the conclusion that the null hypothesis can be rejected, in this case, that there is no autocorrelation. As the study utilized panel data—with data on variables over a nine-year period—the presence of autocorrelation was not surprising. As with heteroscedasticity, the estimators were still unbiased, linear, and consistent despite the detection of autocorrelation (Gujarati & Porter, 2009). The issue, once again, was the loss of efficiency; in other words, the estimators no longer showed minimum variance (Gujarati & Porter, 2009). With autocorrelation, as opposed to heteroscedasticity, we might declare the coefficients insignificant, even though they actually may be significant (Gujarati & Porter, 2009).

It is important to note that in both cases, the problems that accompany the presence of either heteroscedasticity or autocorrelation are assumed to appear with all other assumptions of the CLRM holding true (Gujarati & Porter, 2009). If, as was the case in this study, both the homoscedasticity assumption and the no-autocorrelation assumption are violated simultaneously, the effect that this has on the coefficient estimates is ambiguous. Regardless, there are remedial measures to account for both problems simultaneously (Gujarati & Porter, 2009). Generalized least squares (GLS) is generally one of the first remedial measures mentioned regarding both autocorrelation and heteroscedasticity problems (Gujarati & Porter, 2009). However, as Gujarati and Porter (2009) note, using the GLS is oftentimes difficult to apply in practice as it requires us to know, first, that the cause of heteroscedasticity is known, and second, that the so-called coefficient of first-order autocorrelation is known, both of which are rarely the case.

To avoid these problems, we followed Gujarati and Porter's (2009) advice to use the Newey-West method of correcting the OLS standard errors. It is noted that this method to account for misestimated standard errors can simultaneously solve the problem of autocorrelation and heteroscedasticity (Gujarati & Porter, 2009). The method was employed using the generic coeftest() function in R with the specification vcov. = NeweyWest, making additional use of the sandwich package (Hothorn et al. 2022). The results of applying this method to the initially estimated coefficients are presented in *Figure 9.0*. Most notably, the coefficient for the independent variable (*board gender composition*) changed to be significant at the 10% level, rather than the 5% level, after applying robust standard errors. The control variables that were already highly significant before applying robust standard errors to the coefficients mostly remained highly significant at the 0.1% level. The correlation between the *board independence* (NEDB) and the dependent variable was statistically significant at the 1% level, while the coefficient of *firm size* was statistically significant at the 5% level. Regarding the dummy variables, it is most notable that the coefficient pertaining to France was no longer statistically significant after applying robust standard errors. The remaining dummy variable coefficients remained statistically significant, however, many of them were significant only at a 10% or 5% level after the application of robust standard errors. The coefficients themselves are not influenced by the procedure, which is why the quantifications of the effects of the independent and control variables on the dependent variables, as presented in *Section 4.2.,* did not change.

```
> # Apply Newey-West standard errors
> coeftest(fixed_effects_lsdv, vcov. = NeweyWest)

t test of coefficients:

                     Estimate  Std. Error t value  Pr(>|t|)    
(Intercept)       -0.17771494  0.15061688 -1.1799 0.2381223    
DistanceWoB       -0.11686690  0.06495187 -1.7993 0.0720680 .  
FirmSize           0.01185573  0.00593500  1.9976 0.0458450 *  
ROA                0.13311493  0.12117923  1.0985 0.2720706    
NEDB               0.20457397  0.06935909  2.9495 0.0032061 ** 
DA                -0.00037156  0.00055282 -0.6721 0.5015561    
PB                 0.08459882  0.01498338  5.6462 1.784e-08 ***
TobinsQ           -0.00736744  0.00858746 -0.8579 0.3909959    
Earnings           0.02884494  0.02427565  1.1882 0.2348331    
REVG              -0.00309669  0.00080889 -3.8283 0.0001315 ***
PBSquared         -0.00799228  0.00152136 -5.2534 1.591e-07 ***
ROASquared        -1.22946634  0.23234069 -5.2917 1.294e-07 ***
factor(Country)BE  0.10175772  0.04581433  2.2211 0.0264147 *  
factor(Country)DE -0.06248056  0.03351832 -1.8641 0.0624032 .  
factor(Country)DK -0.09259416  0.04974605 -1.8613 0.0627883 .  
factor(Country)ES  0.07146120  0.03746509  1.9074 0.0565574 .  
factor(Country)FI  0.15254471  0.03826968  3.9860 6.868e-05 ***
factor(Country)FR  0.06036631  0.03905850  1.5455 0.1223157    
factor(Country)GR  0.01597854  0.03975067  0.4020 0.6877337    
factor(Country)HR -0.00089128  0.04025221 -0.0221 0.9823357    
factor(Country)IE -0.12673281  0.03993509 -3.1735 0.0015206 ** 
factor(Country)IT  0.03360190  0.04107356  0.8181 0.4133664    
factor(Country)NL  0.02749646  0.04598217  0.5980 0.5498950    
factor(Country)PL -0.09858002  0.03829151 -2.5745 0.0100842 *  
factor(Country)PT  0.15269387  0.07072142  2.1591 0.0309174 *  
factor(Country)SE  0.08375113  0.04374804  1.9144 0.0556586 .  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Figure 9.0 Robust Standard Error Corrected Coefficient Estimates

5. Discussion

The discussion section will start by reiterating the purpose of the study and go on to discuss the findings in relation to prior research, as well as underline the importance and implications of said findings. Moreover, it will discuss potential reasons for seeing differences in dividend payouts between the examined countries, absent the variables that were evaluated in the regression model. Lastly, it will provide reflective insights on the limitations of the study's methodology, as well as provide recommendations for future research within the topic area.

5.1. Findings

The findings subsection will remind the reader of the purpose of the study and reiterate the main results. It further relates said results to prior research and theory and finishes by emphasizing the importance of them.

5.1.1. Reminder of the Purpose

The purpose of this study was to investigate a possible link between board gender diversity and the dividend payouts of a company. Previous research has found that board gender diversity can improve the working mechanisms of corporate boards, reduce inefficiencies and promote shareholders' interests (e.g. Adams & Ferreira, 2009; Ain et al. 2021; Chen et al. 2017; Ye et al. 2019). It is often claimed that dividends indicate how well the interests of shareholders are taken into account by companies (e.g. Easterbrook, 1984; Ye et al. 2019). As a result, the hypothesis has been developed that equal gender representation on corporate boards leads to higher dividend payouts. *Agency theory* explains how goal misalignment and information asymmetries lead to *agency costs* for shareholders as managers do not always act in the shareholders' best interest (Eisenhardt, 1989). *Agency costs* can be reduced through the payment of dividends, as the latter acts as a monitoring device (Easterbrook, 1984). Thus, a more gender-equal board of directors, which is more likely to take into account the interests of shareholders due to the traits commonly attributed to women, is argued to be more likely to pay out higher dividends in order to lower *agency costs* for the shareholders.

5.1.2. Summary of Results

Using an Ordinary Least Squares fixed effect *least squares dummy variable* regression, the null hypothesis that there is no relationship between *board gender composition* and the *dividend payout ratio* was tested on a sample of large publicly listed firms from 15 different EU countries. After accounting for autocorrelation and heterogeneity by using robust standard errors in *section 4.3.*, the final results showed that said null hypothesis was rejected at a significance level of 10%. Specifically, the results showed that the *dividend payout ratio* decreased by an average of 11% when the gender distribution on corporate boards deviated by one percentage point from perfect equality, *ceteris paribus*. For five out of eight control variables, our results showed a significant correlation at least at the 5% significance level. The remaining three control variables showed no significant correlation. A more detailed interpretation of the results of the control variables was presented in *section 4.2.* and is therefore not reproduced here.

The results of the regression analysis also led us to reject the null hypothesis presented in section *2.4.* "*There is no positive relationship between board gender diversity and dividend payouts"* as the negative correlation found in this study, between the measure *board gender composition* and the *dividend payout ratio,* suggests that a higher degree of board gender diversity is positively correlated with dividend payouts. Thus, the research question as presented in *section 1.2.1. "Is there a relationship between a firm's board gender diversity and its dividend payouts?"* may be answered affirmatively. The following section explains how the results of this study relate to previous research.

5.1.3. Relation of Findings to Previous Research and Theory

This subsection will first relate the findings connected to the independent variable and its correlation with the dependent variable to previous empirical research. It will furthermore elaborate on how these findings relate to the theory as discussed in section 2.. Lastly, it will mention the results concerning the control variables used in this study and how these relate to previous research.

5.1.3.1. Main Findings in Relation to Previous Empirical Research

As summarized in *section 2.2.2.*, there are numerous studies in a variety of countries that suggest that a more diverse board leads to higher dividend payouts (e.g. Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Ye et al. 2019). However, it is important to note how the measure of board gender diversity in this study differs from those used previously. In many previous studies (e.g. Ain et al. 2021; Chen et al. 2017; Khan & Baker, 2023), board gender diversity was measured by the proportion of women on boards. Some studies additionally used other measures such as dummy variables to determine whether at least one woman was on the board in order to measure board gender diversity in a more comprehensive way (e.g. Gyapong et al. 2019; Mulchandani et al. 2021; Ye et al. 2019). In this study, however, the absolute value of the proportion of women on the board minus 0.5 was used to measure how far the board is from being completely gender balanced. In practice, this means that for the purposes of this study, both a board with 25% women and a board with 75% women deviate 25 percentage points from perfectly even board gender distribution.

While board gender diversity as defined in previous studies often correlated positively with dividend payouts (e.g. Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Ye et al. 2019), this study found a negative correlation. Nevertheless, due to the differences in the definition of the independent variable, the implications of the results are similar. Previous studies indicated that a higher level of gender diversity, as measured by the proportion of women on the board, leads to higher dividend payouts (e.g. Ain et al. 2021; Byoun et al. 2016; Chen et al. 2017; Ye et al. 2019). However, a limitation of this measurement approach is that the implication of these results suggests that a board consisting only of women would pay out the highest dividends. While previous studies might have accepted this idea, the present study rejects this hypothesis as the focus is on the role of diversity in advancing shareholder interests rather than only female board members advancing shareholder interests. From the negative correlation between the measure of board gender diversity used in this study and dividend payouts, it can be concluded that dividend payouts increase as the proportion of women on company boards approaches 50%. As soon as the threshold of 50% is exceeded, dividend payouts fall due to lower levels of diversity.

As previously mentioned, while these results are consistent with the findings of several previous studies confirming that dividend payouts increase as the proportion of female board members increases, this study differs in that it establishes a threshold above which higher female board participation no longer leads to higher dividend payouts. The study by García-Meca et al. (2022) came to similar conclusions to ours in that it showed an inverse U-shaped relationship between the proportion of women on boards and dividend payouts. This suggests that at a certain point, an increase in the proportion of women on boards leads to a decrease in dividend payouts. However, it is important to note that the definition of *board gender composition* as used in this study includes a somewhat arbitrary threshold of 50%. This limitation is discussed in more detail in section *5.3.3.*, where it will further be clarified that the findings of this study should be interpreted with caution regarding the asserted negative correlation of boards with a female proportion above 50%, as firms with this board composition make up only a small portion of our sample.

5.1.3.2. Main Findings in Relation to the Theory

The findings of our study support the theoretical findings of previous research that gender diversity on corporate boards positively influences dividend payouts through improved corporate governance, as explained in *section 2.1.*. This assertion is justified and supported by three major theoretical frameworks: *agency theory*, the literature on *dividend payouts*, and *gender socialization theory*. The first states that reducing information asymmetry between the principal and the agent mitigates *agency costs* and aligns the actions of the agent with the interests of the principal (Eisenhardt, 1989). The second asserts that dividends can act as a monitoring device and thereby reduce information asymmetry (e.g. Easterbrook, 1984). The third states that certain traits commonly associated with female directors, for instance, their higher risk aversion and more ethical behavior, contribute to better governance practices by being, *inter alia*, more likely to consider the agency problem in their decision-making (e.g. Ain et al. 2021).

As Ain et al. (2021) and Ye et al. (2019) argue, higher dividend payouts can be considered a sign of the agency problem being more thoroughly considered by the board. Combining these three theoretical frameworks, our results suggest that gender balanced corporate boards are likely to increase dividend payouts and thereby reduce *agency costs*. Specifically, our findings are consistent with and extend existing theories, suggesting that gender-diverse boards can reduce agency problems and associated costs such as monitoring, bonding and residual losses from misalignment of interests between shareholders and managers (e.g. Ain et al. 2021; Byoun et al. 2016; Ye et al. 2019).

5.1.3.3. Additional Findings in Relation to Previous Research

In addition to our main findings, we also provide evidence for and against other dividend payout-related theories. Leverage is often quoted as an essential control variable in studies on the impact factors on dividend payouts. The higher the levels of debt a company owes, the higher their cost of capital, which in turn incentivizes them to use their available cash for investments rather than to pay out dividends (Asif et al. 2011). While various studies have already found evidence of this potential relationship (e.g. Rozeff, 1982), our study did not find statistically significant support for this hypothesized relationship. Profitability, as elaborated upon in *section 3.3.1.3.2.,* has been widely proclaimed to correlate positively with dividend payouts (e.g. Lintner, 1956). However, in our model, the linear term was statistically insignificant, whilst a quadratic term with a negative regression coefficient held significance at the 5% level, meaning that its vertex will be a maximum point (Månsson & Nordbeck, 2011). Thus, according to our findings, there should be a level of profitability, as proxied by ROA, where companies maximize their dividend payout ratio. However, more research should be conducted on this potential relationship before any significant conclusions can be inferred.

Firm size as proxied by the natural logarithm of total assets was found to be statistically significant at the 5% level and positively correlated with dividend payouts. This result aligns well with established research on its influence on dividend payouts, as a larger firm generally has better access to capital markets, enabling a higher share of profit distributed as payouts rather than reinvestment (e.g. Lloyd et al. 1985). *Board independence* (NEDB), as discussed in *section 3.3.1.3.4.*, has been found to positively correlate with dividend payouts. The theoretical argument for this can be found in *agency theory*, with a higher proportion of independent board of directors leading to the mitigation of agency-related issues such as *bounded reliability* (Chang, 2023; Hennart & Verbeke, 2022). Our study found strong support for this relationship, with *board independence* being significant at the 1% level and with a positive regression coefficient (0.2046).

Furthermore, Tobin's Q as a generally accepted measure of *firm value* has been argued to covary positively with dividend payout, underpinned by theories such as the previously mentioned *bird in hand theory* (Lintner, 1956; Walter, 1963) and the *dividend relevance theory* (Gordon, 1959). However, our study did not find statistical evidence for it being a significant determinant of dividend payouts. Moving forward, the price-to-book (PB) ratio as a measure of a firm's equity market value has been used to proxy the *investment opportunities* of the firm (e.g. Esqueda, 2015). As elaborated in *section 3.3.1.3.6.* the lower the PB ratio, the higher the expected dividend payout. However, our results seem to partially contradict this, as PB was found to be statistically significant with a positive coefficient. Moreover, for reasons discussed in *section 3.2.4.*, a squared term of it was included in the model. Both the linear and quadratic terms were significant at the 0.1% level, but the linear term had a positive coefficient (≈ 0.0846) whilst the quadratic term had a negative (≈ -0.00799). This implies that for smaller values of PB, the linear term dominates, and would thus have a positive impact on dividend payouts. However, as the PB ratio becomes inflated, it would shift toward a negative impact on dividend payouts. Why this might be the case is an area for future research to examine.

Tangential to firm size is *maturity*, as proxied by the earnings ratio. It has historically been utilized as a proxy for the life-cycle stage of the company, as supported by the *life-cycle theory of dividends* (DeAngelo et al. 2006). Per this theory, a higher earnings ratio would imply a more mature company and thus a higher propensity for dividend payouts. Our findings do not indicate support for this line of theoretical argumentation, with *maturity* as proxied by earnings being statistically insignificant. Lastly, as mentioned in *section 3.3.1.3.8.*, a negatively proportional relationship between the *firm growth* (REVG) and the dividend payout is argued for in the literature. Our results were in accordance with this argumentation as our variable that proxied *firm growth* was significant at the 0.1% level and with a negative coefficient.

5.1.4. Importance of Findings

The importance of our results lies in educating the reader, academia, the public, and policymakers about the importance of striving for gender equality in corporate settings. The findings of this study suggest that increased board gender-equal composition has a positive impact on shareholder interests as expressed through higher dividend payouts. The study adds to an already existing body of literature by making it more comprehensive and providing evidence on 15 different European countries.

5.2. Differences between Countries

By incorporating dummy variables for each one of the 15 countries that were under investigation in our study, it is possible to distinguish potential differences in dividend payout policy that stem from the unobservable country-specific factors not accounted for in the other variables of our model. The interpretation of the dummy coefficients as presented in *Figure 9.0* is that—absent the variables accounted for—there are differences in dividend payouts stemming from the fixed country effects. It should be noted that the intercept as shown in *Figure 9.0*, which these dummy coefficients are relative to, is the dummy coefficient of a country itself. This country was set to Austria by *R Studio* because it was the first of the 15 countries when ordered alphabetically. This implies that the remaining 14 dummy coefficients all stand relative to Austria. The p-value associated with Austria's dummy variable (i.e. the intercept) was statistically insignificant with a p-value of 0.2381, implying that the intercept can be assumed to be equal to zero.

From this, we can discern three broad categories of countries: (A) Countries with a negative and significant dummy coefficient; on average they possess lower dividend payouts relative to group B, other factors being constant. (B) Countries with insignificant dummy coefficients; such a coefficient entails that they have no distinguishable country effect differences from Austria. (C) Countries with a positive and significant dummy coefficient; on average have larger dividend payouts than group B, *ceteris paribus*. In the first group, we find Germany, Denmark, Ireland, and Poland; the second contains Austria, France, Greece, Croatia, The Netherlands, and Italy; and the third consists of Belgium, Spain, Finland, Portugal, and Sweden.

We would argue that a potential reason for seeing such differences could be divergences between the countries' respective cultural contexts, which can be proxied by Hofstede's 6-D model of national culture (Hofstede, 2011). He establishes six dimensions along which a national culture can be measured on a scale from 0 to 100: (1) Power distance; relating to the extent to which the populace is content with an unequal distribution of power in the society, with a high score indicating higher compliance. (2) Uncertainty avoidance; pertaining to the degree to which the populace feels distress in the face of an unknown future. (3) Individualism versus collectivism; a high score indicates high individualism and vice versa. (4) Masculinity versus femininity; pertaining to society's preference for achievement and success versus modesty and cooperation. A high score indicates high masculinity, meaning that the country's culture has a preference for personal achievement and success, and vice versa. (5) Long- versus short-term orientation; it concerns the populace's affinity for progressive change versus conservative safeguarding and honoring of their traditions and norms. A high score indicates a long-term orientation, with a preference for said societal conservatism. (6) Indulgence; addresses society's laxness with regard to basic human inclinations to enjoyment. A high score indicates high indulgence and vice versa.

In the case of dividends and their function as a tool to mitigate the agency problem between shareholders and managers, we would argue that a country whose culture scores high in masculinity and low in uncertainty avoidance would have a general tendency to pay out lower dividends, as members of these cultures on average would be more risk-taking and accept an uncertain future to a higher degree than members of cultures whose scores on these two dimensions are lower. From a shareholder-perspective, this would entail a lower preference in dividend payouts, as they would prefer reinvestment in the company that could potentially generate greater future cash flows in the long term, rather than cash in hand through dividends.

Using data on the countries' scores on these six dimensions from Hofstede Insights (2024), and compiling the sum of the categories in each group by tallying the scores of the individual countries that constitute the group in question, we can look at general patterns that may underpin or oppose said reasoning. By analyzing the average scores of the three groups (A, B, C) with respect to masculinity and uncertainty avoidance, we can observe that there is a distinction in masculinity among them, with a falling average score, meaning falling average levels of masculinity for the groups, coinciding with a trend of rising dividend payouts (Group A = 53.5; Group B = 50.5; Group C = 31.6). In other words, while the groups of countries tend to become less masculine, they tend to pay out higher dividends, which accords with the hypothesized relationship. The uncertainty avoidance average score for the three groups partly speaks for our conjecture, as Group A, the group paying lower dividends than the reference country, has the lowest score with respect to the uncertainty avoidance dimension (54) as projected by the hypothesis presented above, however Group B (77.34) has a slightly higher score-sum than Group C (71.4).

Furthermore, we would assert that another reason for observing these differences may lie in institutional differences, both historical and contemporary in nature, between the nations. Different law systems, historically dominant political factions, and ties with the different prevailing political blocks of 20th-century Europe may all play their respective parts in the differences we observe. For instance, if we examine the countries in Group C (larger dividends), Belgium and Portugal have incorporated gender quotas (33%) on the corporate boards of their publicly listed companies (EIGE, n.d). As per the same EIGE report, in Group B we find Austria, France and Italy, and in Group A, with the lowest dividend payout, we only find Germany.

In 2022, the EU passed a federation-wide directive for gender quotas on large publicly listed companies active in the union (Directive 2022/2381). It requires publicly listed companies active in the member-states to achieve a 40% figure of the minority gender in non-executive director positions, and 33% in all director positions (Directive 2022/2381). However, said directive will not come into effect until 2026 (Rankin 2022). Thus, we would argue that yet another reason for seeing higher dividend payouts, especially for companies belonging to Group C, would be that they are registered in countries that currently have gender quotas for corporate boards. Moreover, by putting legal pressure on companies to achieve a more balanced board gender distribution, we would argue that we should, as per our findings, see a general change toward higher dividend payouts among the affected EU companies over the forthcoming years. How this will unfold is an area of fertile ground for further research, where the relationship between the board gender diversity and the dividend payouts of the company could be more intricately studied. For instance, one could employ a classic experimental design study on these companies (Bryman & Bell, 2011), by investigating the dividend payouts before and after the EU-wide quota was implemented, and controlling for extraneous factors that could affect said dividend payouts.

Although these insights are not the main objective of our study, and the academic rigor behind them is weaker than that of our main findings, they nevertheless pave the way for future research. For instance, the effects of board gender diversity on dividend payouts could be investigated in different national markets in isolation, and thereafter the results compared and analyzed utilizing Hofstede's and/or other sociopolitical and cultural models. Researchers could also employ the experimental treatment design on the companies that will be most notably affected by the upcoming EU gender quota directive to explicitly observe how the new board gender distribution will affect the dividend payouts of said firms.

5.3. Limitations

We recognize that our study has certain limitations that may affect the generalizability of our findings, yet these caveats also offer valuable insights for future research. The limitations section will thus present the various shortcomings of our study, such as sampling and imputation constraints, limitations in the definition of the independent variable and in the selection of variables, and finally the impact of examining data implicitly affected by the COVID-19 pandemic.

5.3.1. Sampling Constraints

First, a significant limitation of our study is the inability to generalize our findings to the EU countries not included in our analysis. Originally, our research aimed to cover all 27 EU countries, however, due to data availability issues discussed in *section 3.2.2.*, our analysis was confined to only 15 countries. While the reduction in the number of countries was a necessary decision driven by the lack of sufficient data rather than a methodological flaw, it inherently restricts the applicability of our findings. Specifically, the countries included in the analysis were not chosen through a random sampling process, but rather based on the availability and adequacy of data, making it difficult to extrapolate the findings to other countries.

Similarly, data accessibility and availability constraints on medium-sized, small, and privately held companies from each country hindered us from taking a random sample of the whole population of companies in each country. The focus on large publicly listed companies helps to address this issue as these types of companies are highly representative of the economy of the country as a whole and usually possess a role-model function. Nevertheless, the conclusions reached through analyzing only the largest and most influential companies in each country should be used carefully to make inferences on companies with different characteristics, especially as the results are significant only at a 10% level. The inability to confidently generalize beyond the observed countries and companies underscores a primary limitation binding most researchers due to data accessibility and availability, rather than the methodology used when handling the data.

5.3.2. Imputation Constraints

We furthermore acknowledge limitations associated with using the CART method within the MICE package for imputing missing data points below the necessary thresholds. As van Buuren (2018) outlines, CART's assumptions about data splitting may not always hold true, which can lead to inaccuracies if the data relationships are complex. Another concern is the risk of uncongeniality, defined by Meng (1994) as the occurrence of a misalignment between the imputation model and the true data characteristics or the analysis model, leading to potential inaccuracies in the conclusions drawn from the imputed data. We lastly acknowledge that our reliance on the default settings of the *R programming language, R Studi*o, without making necessary adjustments, could degrade the quality of our imputation. However, we opted for this approach because deleting every observation for which we do not have complete information would make working with real-world data near impossible.

5.3.3. Definition of the Independent Variable Constraints

We acknowledge a third limitation in the way we've defined our independent variable, *board gender composition*, by setting a threshold at 50%. While this threshold implies an equal distribution of male and female board members, it is important to note that our analysis does not verify whether this specific 50/50 ratio is the most effective for maximizing dividend payouts, i.e., if it is the point at which the relationship between the number of female board members and dividend payouts becomes inversely proportional. In reality, more optimal gender ratios, such as 60/40 or 40/60, may exist that could potentially yield better financial outcomes through enhanced board diversity. However, our current study was not designed to pinpoint this ideal ratio. Instead, we suggest that future research should investigate the existence and impact of such optimal ratios.

5.3.4. Choice of Variables Constraints

While an all-encompassing model was strived for, we also recognize that the internal validity of the model could have been increased by incorporating further control variables than the eight ones included in the chosen fixed effect *LSDV* model. For instance, other empirical research on similar topics included variables such as the number of years the incumbent CEO had been employed, the nationality of board members, and ownership concentration (Ain et al. 2021; Gyapong et al. 2019; Khan & Baker, 2023). However, this would have required further data access that was not at our disposal through the Bloomberg terminal at the time of data collection. Nevertheless, the study's inclusion of fixed effect dummy variables for each country under consideration partly mitigated this issue, and showed that there likely are, as previously discussed, cultural and institutional factors that affect dividend payouts that were not explicitly accounted for in the final regression model.

When creating a regression model, there is often a trade-off between variable-inclusion versus loss of clarity. As Hawkins (2004) points out, having too many variables in a regression model may cause overfitting, implying that the large number of variables decreases the validity of the model. According to him, this can be for a number of reasons, but particularly because each added variable may contribute with random variation. As the number of variables increases, the compounded effect of said randomness thus becomes significant (Hawkins, 2004). In line with this reasoning, we decided to opt for the principle of parsimony, meaning that we would only include the variables that had theoretical support for inclusion, as elaborated upon in *section 3.3.1.*.

5.3.5. Lack of Representation Constraints

Additionally, we emphasize that some of the conclusions drawn from our results warrant careful consideration as only a limited number of firms, namely 105 companies, included in our study have more than 50% female board members. Consequently, the evidence supporting the hypothesis that a proportion of female board members above 50% correlates with reduced dividend payouts is not robust. To address this limitation, researchers could strive to test the hypothesis using a sample composed of a relatively normally distributed number of companies, where the proportion of female board members is approximately equally distributed around the 50% threshold. This approach could provide a more reliable test of the hypothesis.

5.3.6. COVID-19 Pandemic Constraints

Our study focuses on a nine-year period from 2015 to 2023, selected for its recency and to exclude the influence of the 2008 financial crisis. However, this timeframe encompasses the

COVID-19 pandemic, which potentially undermines the reliability of our findings due to its impact on global economies and corporate behavior. Specifically, the pandemic-induced economic uncertainty led to non-standard corporate governance practices (Grove et al. 2021), which could affect our analysis of trends in board gender diversity. Additionally, the impact of the pandemic was not uniform across the 15 EU countries examined, further complicating our analysis. The variability resulting from differing national responses to the pandemic could affect the reliability of our results since such factors are not considered in our current analysis. To accurately isolate the effects of board gender diversity on dividend payouts from those induced by the pandemic's economic shocks, a more robust methodological approach, such as the piecewise linear regression (Gujarati & Porter, 2009), would have been necessary. Addressing this challenge is an opportunity for future research.

5.4. Implications of the Study & Suggestions for Future Research

This last section will provide a summary of the implications of the study and recommendations for future research.

5.4.1. Implications of the Study for Policy, Practice & Theory

Our study reveals significant implications for policy, practice, and theory concerning the impact of gender diversity on corporate boards across the 15 EU countries studied. We found a positive relationship between boards with equal gender representation (50% female and 50% male directors) and higher dividend payouts. This suggests that gender diversity in corporate boards can contribute positively to its dynamic effectiveness as well as to financial decision-making (e.g. Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016; Ye et al. 2019). In line with the implications from the study by Ain et al. (2021), who observed a similar relationship in Chinese firms, our results support the case for the introduction of gender quotas in the studied EU countries that currently do not have such policies, as well as for the revision of existing policies where necessary. Thus, this study underscores the aforementioned EU directive that is to be implemented in 2026.

From a practical perspective, our results emphasize the importance of promoting women's career development as a strategy to mitigate agency problems. Policymakers might consider implementing training and support measures to enhance female professional skills, promoting a competitive environment for female professionals. Such initiatives can facilitate their entry into corporate boards and lead to broader improvements in corporate governance and thus reduce *agency costs*. Diverse boards are often more comprehensive and inclusive in managing corporate resources and strategies, which is beneficial not only for ethical and compliance purposes but also for performance enhancement, as suggested by the literature (e.g. Adams & Ferreira, 2009; Ain et al. 2021; Byoun et al. 2016). Lastly, from a theoretical standpoint, our study contributes to the body of literature on *dividend payouts* by showing that board gender diversity influences dividend payouts through enhanced governance effectiveness. This deeper understanding of the role of female directors can help academics, policymakers, and regulators in making informed decisions regarding the inclusion of female directors into corporate governance frameworks, thus optimizing corporate governance and dividend strategies.

5.4.2. Recommendations for Future Research

The caveats of our study open up scope for future research. As mentioned in *section 5.3.* our study uses a 50% threshold to define gender balance on corporate boards. Future research should consider exploring whether different ratios, such as 60/40 or 40/60, could more effectively enhance dividend payouts. Additionally, given the limited representation of firms with high female board member proportions in our data, we recommend that future studies include a more diverse and balanced distribution of firms, covering various proportions of female board members to provide a more comprehensive analysis.

Moreover, the limitation of our study to analyze only 15 EU countries makes it necessary to extend future research to other geographical regions. This could enrich the understanding of how the gender composition of boards influences corporate behavior through the impact on dividend payouts in different cultural and regulatory environments. For instance, comparing a broader data set that includes more EU countries with data from Asian countries, where cultural attitudes toward gender roles and corporate governance practices can be very different, or with data from North American companies that may not be subject to the same regulatory standards for board composition, could provide a more well-rounded view of the issue. This broader approach would allow researchers to assess whether the positive effects of board gender diversity observed in the 15 EU countries analyzed in this study are a global phenomenon or whether these effects depend on specific local factors.

Additionally, our focus on large listed companies within the blue-chip indices of the analyzed EU countries requires future research to broaden the study's scope to include small and medium-sized enterprises (SMEs), unlisted companies, and start-ups. Including these types of companies in the study would provide a more comprehensive view of how the gender composition of corporate boards affects dividend payouts in different corporate environments. Our exclusive focus on listed companies may overlook sector-specific dynamics in private or smaller companies, which could differ in terms of financial management and the impact of gender diversity due to lower regulatory environments and different stakeholder expectations. This bias could also influence the observed relationship between *board gender composition* and *dividend payouts* as, for instance, larger firms generally have more resources to implement government practices that may not be feasible for smaller firms. For this reason, we suggest that future research gather a more heterogeneous and random sample to increase the generalizability of the results and make them more relevant to a wide range of companies both within the EU and globally.

Lastly, as previously mentioned in *section 5.2.,* we recommend future research to investigate the impact of institutional and regulatory differences on corporate governance and dividend policies across various EU countries. We suggest expanding on the analysis of how historical and contemporary factors such as different legal systems, political histories, and affiliations with 20th-century political blocks influence corporate financial behaviors. Specifically, the introduction of gender quotas in EU countries and assessment of the causal impact of gender diversity on dividend policies by comparing dividend payouts before and after the implementation of the impending EU-wide gender quota directive set to take effect in 2026. Employing sociopolitical and cultural frameworks such as Hofstede's 6-D model could further enrich this analysis, offering deeper insights into how cultural and social norms influence corporate governance and financial decisions across different national markets.

6. Conclusion

By investigating data on 15 different EU countries, this study tested the hypothesis that board gender diversity correlates positively with dividend payouts. The fact that women in some countries still have to fight for some of their most basic rights, such as that of self-determination, while they are discriminated against in corporate settings in other countries, as shown through severe underrepresentation, exploring the effects of striving for equality becomes increasingly urgent.

In the corporate world, dividend payout choices have long fascinated scholars and practitioners alike. Through the lens of *agency theory* and *gender socialization theory*, we have shown how the issue of gender equality relates to that of dividend payout policy through the mechanism of corporate governance. According to *agency theory*, misalignment and information asymmetry lead managers to act counter to the best interests of the shareholders (Eisenhardt, 1989). *Gender socialization theory* suggests several reasons why a mix of female and male managers helps to reduce the *agency costs* that arise for shareholders from the principal-agent problem. At the individual level, female directors are found to foster a culture of good corporate governance and shareholder advocacy due to their higher level of risk aversion, ethical sensitivity, and diligent governance compared to their male counterparts (e.g. Ain et al. 2021; Byoun et al. 2016; Ye et al. 2019). At the collective level, women's participation on corporate boards is posed to introduce diverse perspectives, thus enriching groupthink and discussions while simultaneously improving decision-making (e.g. Adams & Ferreira, 2009; Ain et al. 2021; Ye et al. 2019). In this light, female directors are expected to not only enhance corporate governance through their unique traits but also by influencing their male counterparts. This impact is shown through increased dividend payouts, which demonstrates the extent to which shareholders' interests are safeguarded and promoted. Ultimately, higher dividend payouts are expected to reduce *agency costs*.

The empirical analysis revealed that board gender diversity does in fact influence dividend payouts. Similar to previous research the findings suggest that as the proportion of females on the board increases, dividend payouts also increase. However, by defining board gender diversity as a measure of how close the male/female distribution on the board is to 50/50, the study showed that the positive correlation between an increase in the proportion of female board members only increases dividends as long as the proportion does not exceed 50%. Thereafter, a further increase in the proportion of females on the board results in a reduction in dividend payouts.

The study contributes to the existing literature on the role of board gender diversity in dividend decisions by emphasizing the importance of diversity in terms of equality, where a 50/50 ratio of female to male board members is the desirable outcome. It also contributes by examining the impact of female directors on dividend payouts in EU national markets, complementing previous studies in regions such as China, India, Australia, and the US. Lastly, the study's cross-national approach paves the way for future research, particularly regarding the influence of national contexts on dividend payout decisions.

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8. Appendix

Table 1: Indices of 21 countries initially chosen for analysis

Country	*Blue-Chip Index*
Austria	ATX
Belgium	BEL 20
Bulgaria	BGBX 40
Croatia	CROBEX
Czech Republic	PX
Denmark	OMXC 25
Estonia	TALSE
Finland	OMXH 25
France	CAC 40
Germany	DAX 40
Greece	ASE
Hungary	BUX
Ireland	ISEQ20P
Italy	SX45IP
Netherlands	AEX
Poland	WIG 30
Portugal	PSI 20
Romania	BET
Slovenia	SBITOP
Spain	IBEX 35
Sweden	OMXS

Table 2: Number of firm-year observations per country

AT	BE	DE	DK	ES	FI	FR	GR	HR	IE	IT	NL	PL	PT	SE
189	155	283	157	265	201	303	454	135	115	300	141	210	111	203

Table 3: Model selection procedure according to Park (2011)

Fixed Effect Model	*Random Effect Model*	*Model Choice*
F-test: do not reject H0	LM-test: do not reject H0	Pooled OLS
F-test: reject H0	LM-test: do not reject H0	Fixed Effect Model
F-test: do not reject H0	LM-test: reject H0	Random Effect Model
F-test: reject H0	LM-test: reject H0	Use *Hausman Test* to decide between FE and RE Model

Table 4: Descriptive statistics of all variables

Summary Statistics

	Mean	SD	Min	Q1.25%	Median	Q3.75%	Max	N
logDPR	0.3632880	0.3074907	0.0000000	0.1609180	0.3386640	0.4967681	2.3157492	3223
DistanceWoB	0.2100228	0.1346847	0.0000000	0.1000000	0.1666670	0.3000000	0.5000000	3223
FirmSize	23.0239111	2.2537003	16.5444478	21.6503356	23.0200715	24.5769349	28.6107552	3223
ROA	0.0418342	0.0589847	-0.4481964	0.0088583	0.0343815	0.0648707	0.7400126	3223
NEDB	0.8848022	0.1469193	0.4000000	0.8181820	0.9285710	1.0000000	1.0000000	3223
DA	25.1926967	14.9488092	0.0000000	13.4613814	24.6093884	35.6494999	71.1791458	3223
PB	2.3220462	1.9606978	0.1159420	0.9480520	1.6902050	3.0783920	10.7779207	3223
TobinsQ	1.2976667	1.1273956	-0.0494398	0.7614457	0.9689568	1.4143343	18.2071580	3223
Earnings	0.2221884	0.2795175	-4.6828310	0.0641479	0.2249519	0.3568604	3.5988498	3223
REVG	6.3785658	11.1009320	-39.2425003	0.2168760	4.4902229	10.5940952	93.9558792	3223
PBSquared	9.2350415	16.4495596	0.0134425	0.8988026	2.8567929	9.4764975	116.1635751	3223
ROASquared	0.0052282	0.0191365	0.0000000	0.0001850	0.0014266	0.0045255	0.5476187	3223

Table 5: Pearson correlation matrix

Pearson Correlation Matrix

	logDPR	DistanceWoB	FirmSize	ROA	NEDB	DA	PB	TobinsQ	Earnings	REVG	PBSquared	ROASquared
logDPR	1.0000000	-0.1946379	0.1665610	0.0147945	0.1380058	0.0115881	0.0992682	0.0257816	0.0460136	-0.1333582	0.0386016	-0.0686579
DistanceWoB	-0.1946379	1.0000000	-0.4518912	-0.0481797	-0.2849398	-0.0070053	-0.1191819	-0.0726631	-0.0357179	0.0235406	-0.0826109	0.0040048
FirmSize	0.1665610	-0.4518912	1.0000000	-0.2367735	0.3740710	0.0662158	-0.1583425	-0.1706590	-0.1462001	-0.2418062	-0.1377508	-0.1564965
ROA	0.0147945	-0.0481797	-0.2367735	1.0000000	-0.0274521	-0.1509341	0.3944928	0.4932134	0.3836743	0.1997185	0.3493183	0.5305680
NEDB	0.1380058	-0.2849398	0.3740710	-0.0274521	1.0000000	-0.1261759	0.0959833	0.0484357	0.0520977	-0.0703733	0.0709638	-0.0078527
DA	0.0115881	-0.0070053	0.0662158	-0.1509341	-0.1261759	1.0000000	-0.0234414	-0.0859753	-0.1327517	-0.0179205	-0.0468760	-0.1056814
PB	0.0992682	-0.1191819	-0.1583425	0.3944928	0.0959833	-0.0234414	1.0000000	0.6523391	0.2215616	0.2011488	0.9441535	0.1856161
TobinsQ	0.0257816	-0.0726631	-0.1706590	0.4932134	0.0484357	-0.0859753	0.6523391	1.0000000	0.2757560	0.1809067	0.6381834	0.3450535
Earnings	0.0460136	-0.0357179	-0.1462001	0.3836743	0.0520977	-0.1327517	0.2215616	0.2757560	1.0000000	0.1403006	0.1713065	0.0779638
REVG	-0.1333582	0.0235406	-0.2418062	0.1997185	-0.0703733	-0.0179205	0.2011488	0.1809067	0.1403006	1.0000000	0.1836826	0.0614126
PBSquared	0.0386016	-0.0826109	-0.1377508	0.3493183	0.0709638	-0.0468760	0.9441535	0.6381834	0.1713065	0.1836826	1.0000000	0.1869714
ROASquared	-0.0686579	0.0040048	-0.1564965	0.5305680	-0.0078527	-0.1056814	0.1856161	0.3450535	0.0779638	0.0614126	0.1869714	1.0000000

Table 6: VIF values

```
> # Print the VIF values
> print(vif_values)
                     GVIF Df GVIF^(1/(2*Df))
DistanceWoB      1.656859  1        1.287190
FirmSize         2.503410  1        1.582217
ROA              1.990841  1        1.410972
NEDB             2.047348  1        1.430856
DA               1.118420  1        1.057554
PB              12.478564  1        3.532501
TobinsQ          2.121136  1        1.456412
Earnings         1.302471  1        1.141258
REVG             1.155776  1        1.075070
PBSquared       10.886270  1        3.299435
ROASquared       1.503078  1        1.226001
factor(Country)  5.697991 14        1.064119
```

Figure 1: Graph of fixed effect LSDV with country-specific intercepts

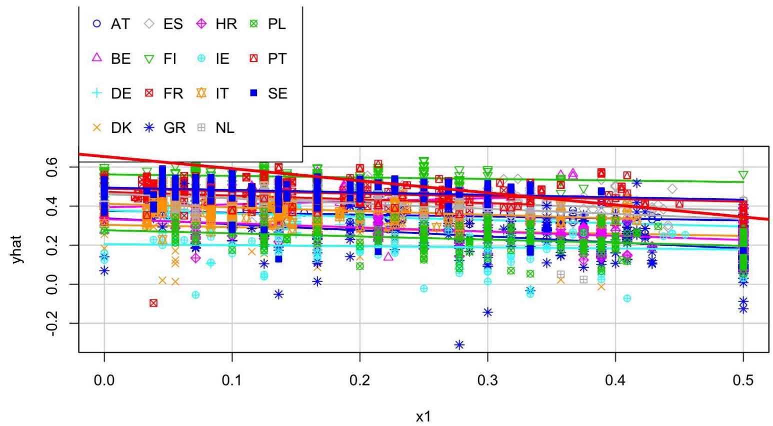

Figure 2.0: Matrix of boxplots for all included variables

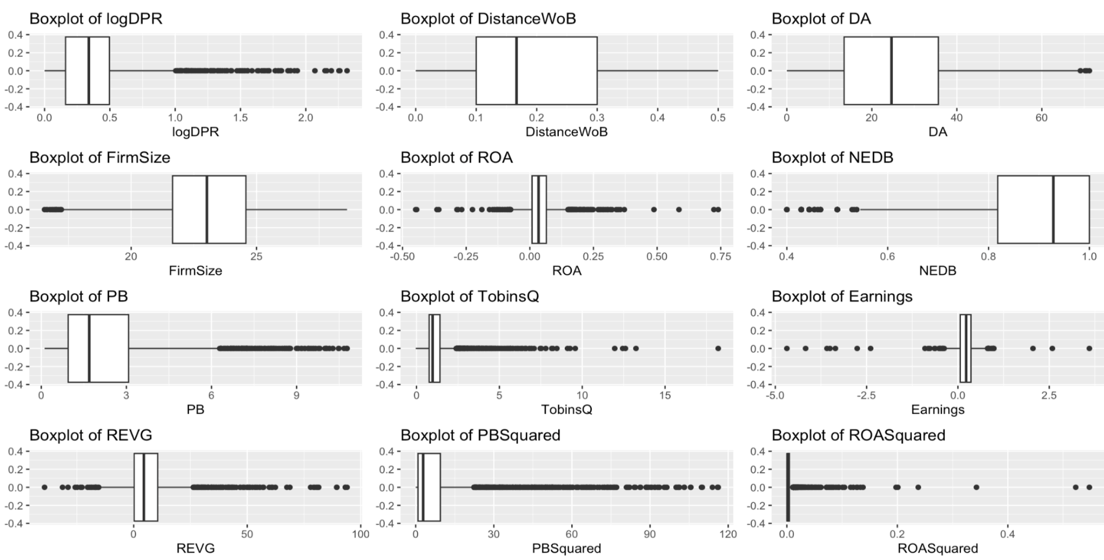

Figure 2.1 Boxplot for dependent variable dividend payout ratio (logDPR)

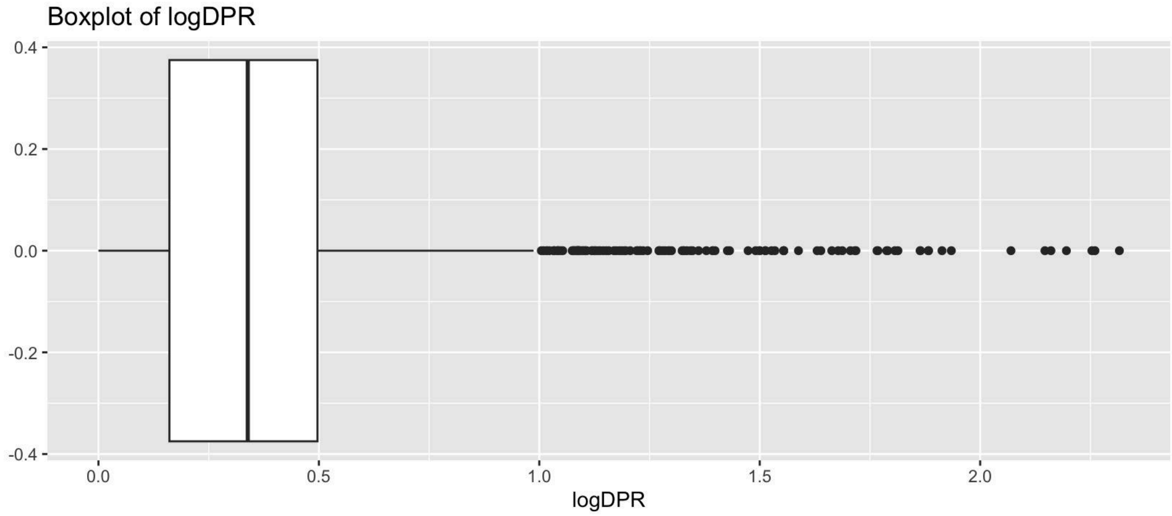

Figure 2.2 Boxplot for independent variable board gender composition (DistanceWoB)

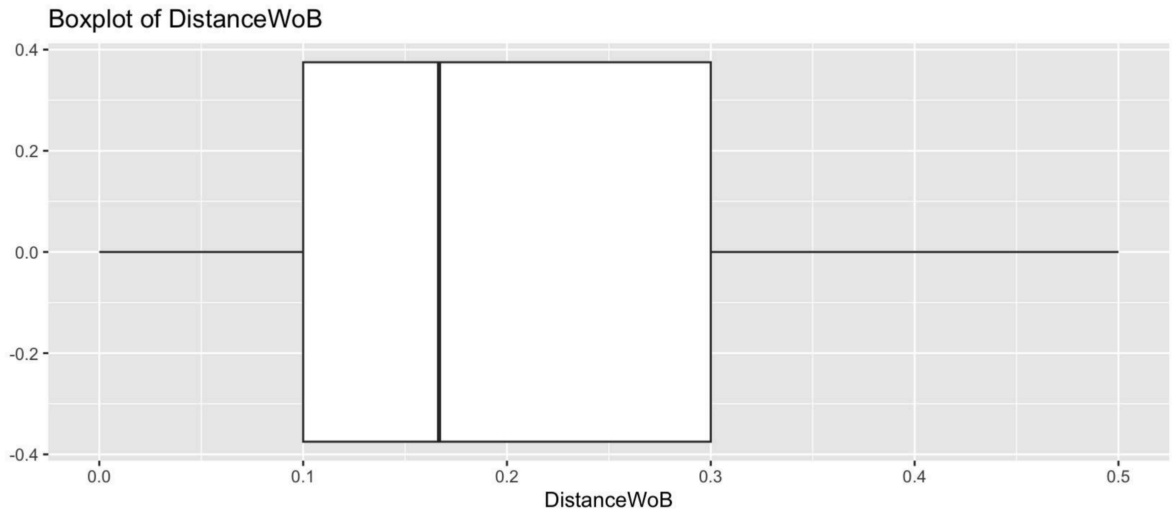

Figure 2.3 Boxplots for control variable leverage (DA)

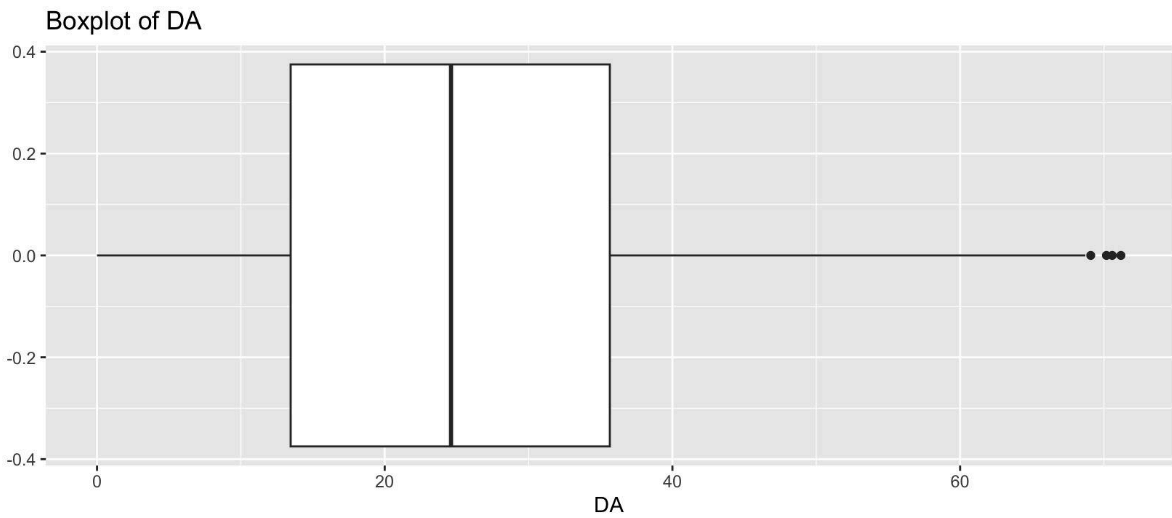

Figure 2.4 Boxplot for control variable firm size

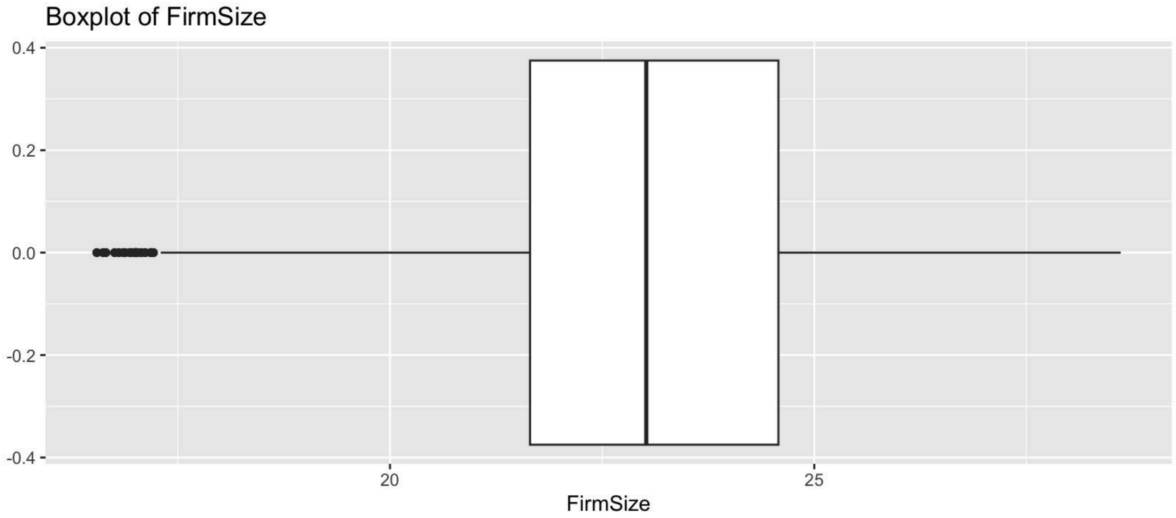

Figure 2.5 Boxplot for control variable return on assets (ROA)

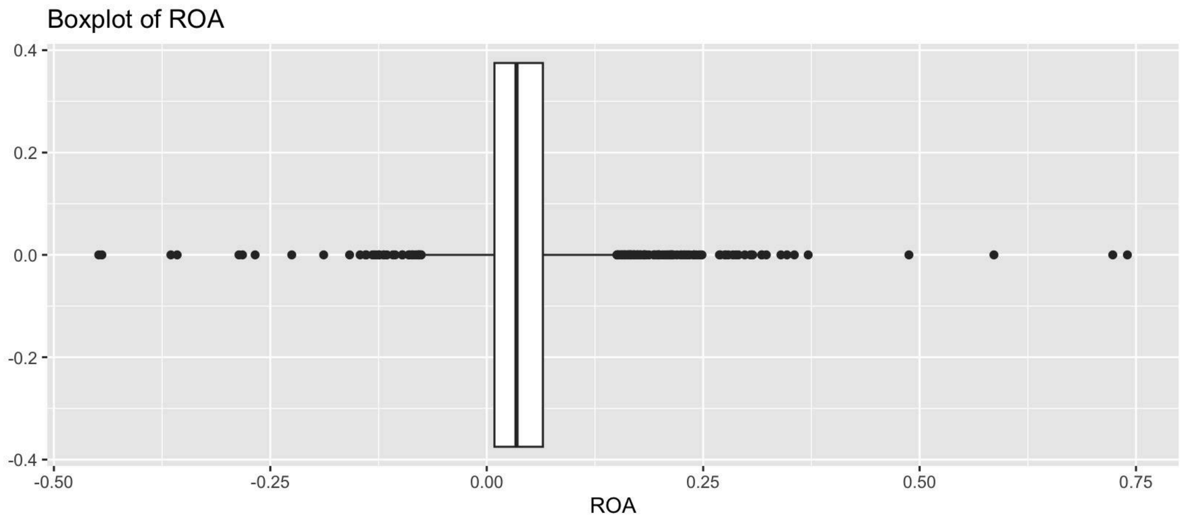

Figure 2.6 Boxplot for control variable board independence (NEDB)

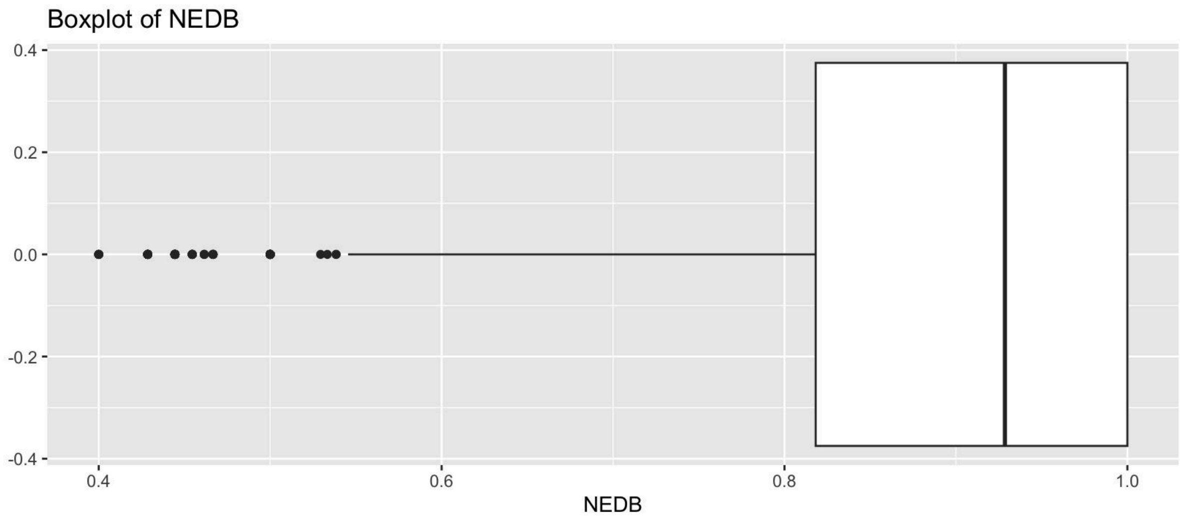

Figure 2.7 Boxplot for control variable price-to-book ratio (PB)

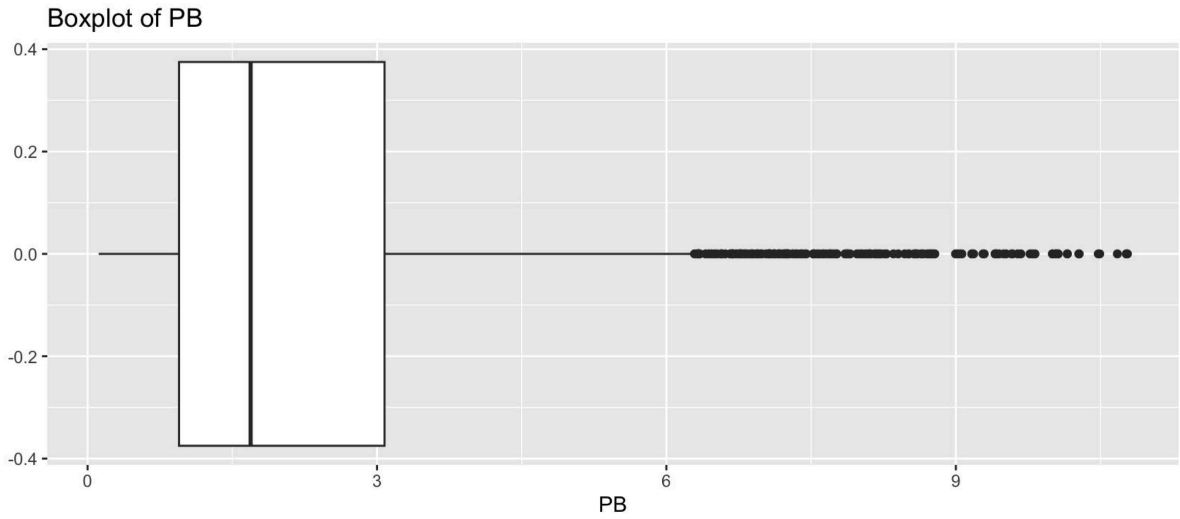

Figure 2.8 Boxplot for control variable profitability (TobinsQ)

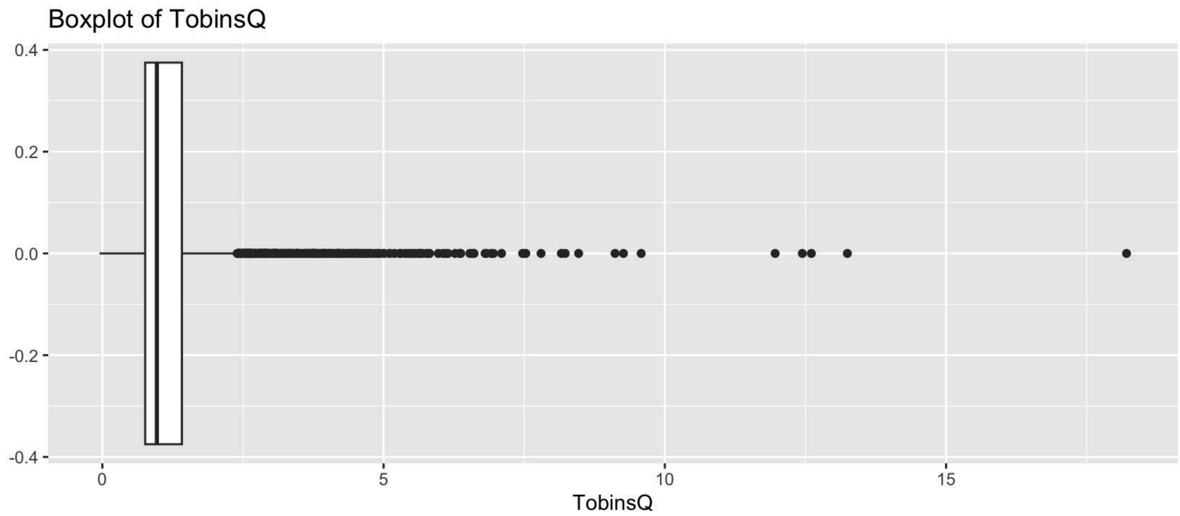

Figure 2.9 Boxplot for control variable maturity (Earnings)

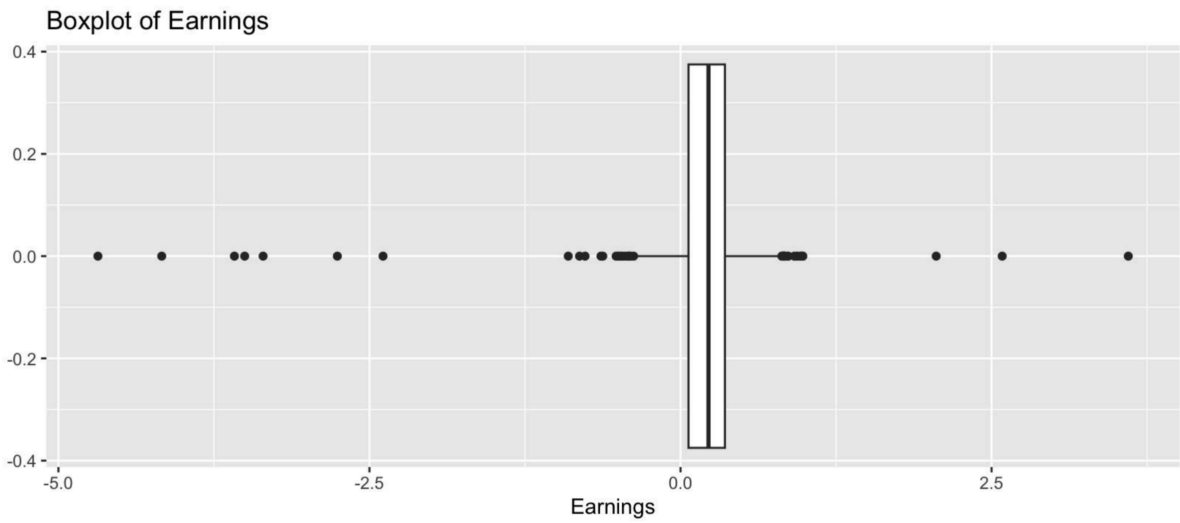

Figure 2.10 Boxplot for control variable firm growth (REVG)

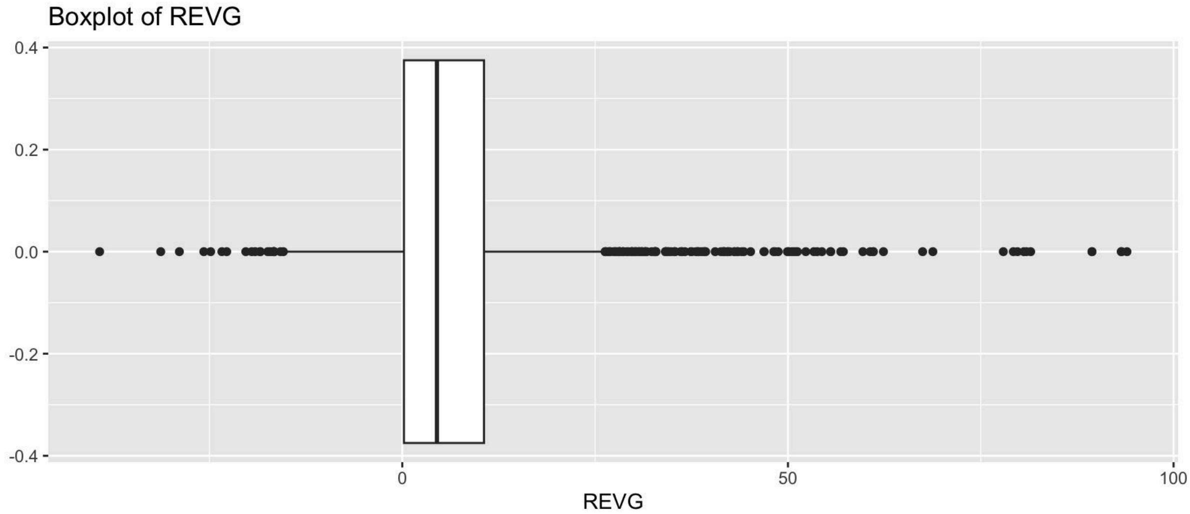

Figure 2.11 Boxplot for control variable price-to-book ratio squared (PB^2)

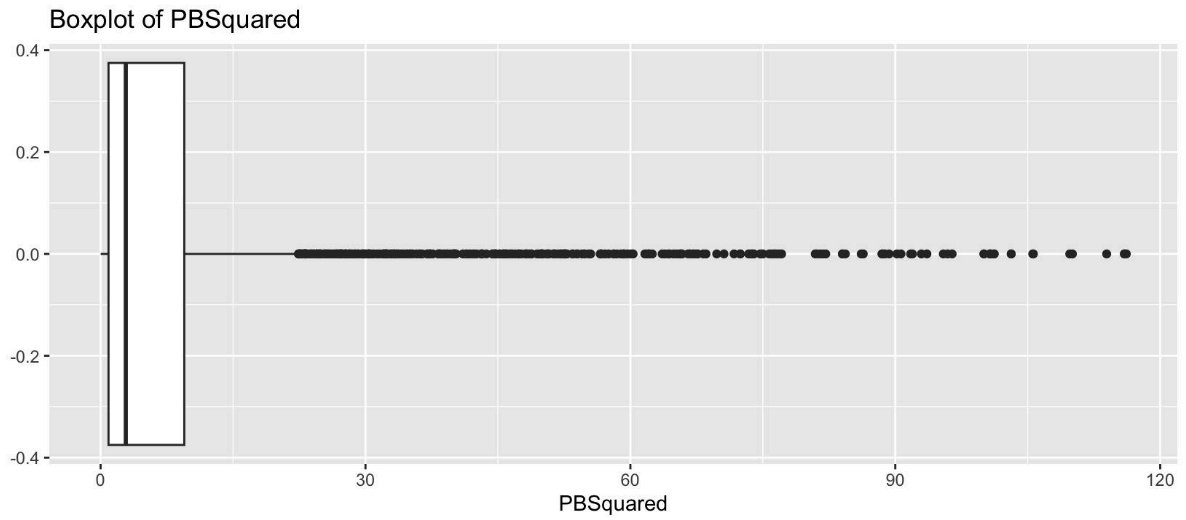

Figure 2.12 Boxplot for control variable return on assets squared (ROASquared)

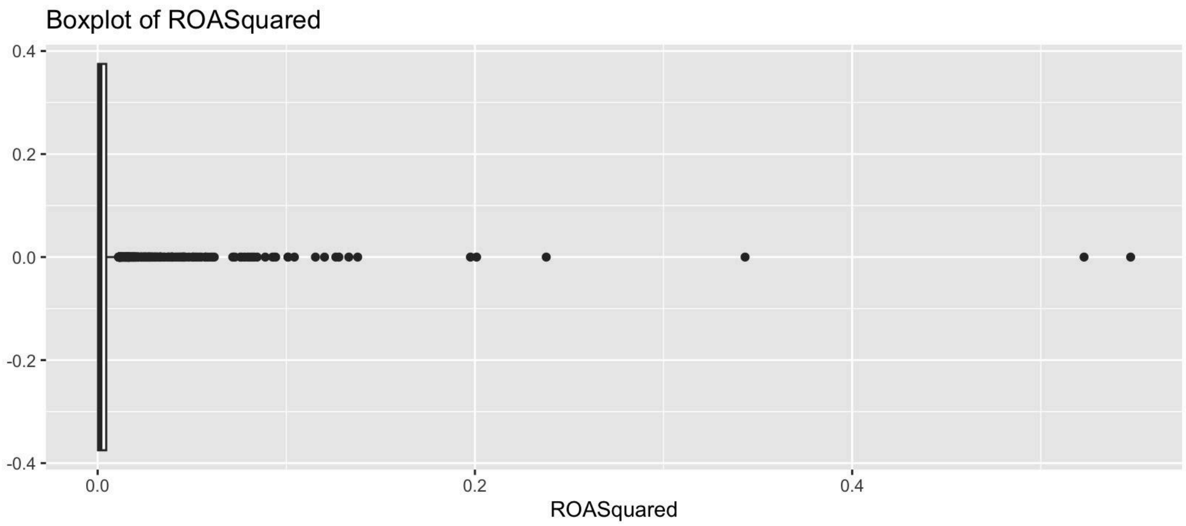

Figure 3.0: Scatter plot of the dependent variable (logDPR) against the independent variable (Distance-WoB)

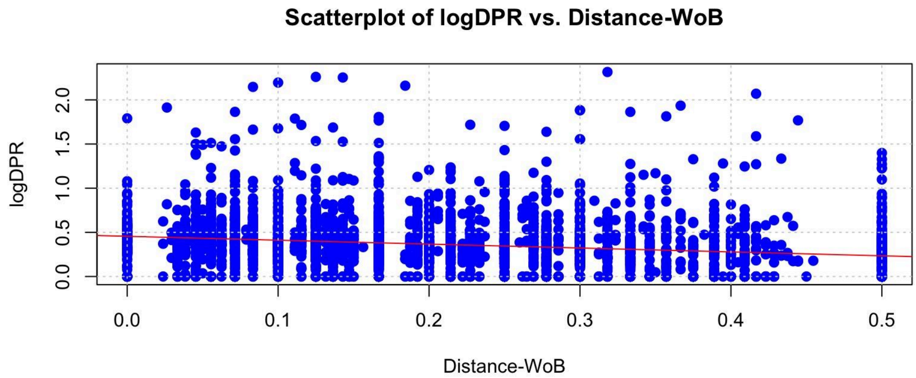

Figure 4.0: Summary of the fixed effects least squares dummy variable model

```
lm(formula = logDPR ~ DistanceWoB + FirmSize + ROA + NEDB + DA +
    PB + TobinsQ + Earnings + REVG + PBSquared + ROASquared +
    factor(Country), data = filtered_imputed_data)

Residuals:
     Min       1Q   Median       3Q      Max
-0.57736 -0.16748 -0.04666  0.10152  1.89780

Coefficients:
                    Estimate Std. Error t value Pr(>|t|)
(Intercept)       -1.777e-01  9.700e-02  -1.832 0.067019 .
DistanceWoB       -1.169e-01  4.767e-02  -2.452 0.014278 *
FirmSize           1.186e-02  3.502e-03   3.386 0.000719 ***
ROA                1.331e+01  1.193e+01   1.116 0.264667
NEDB               2.046e-01  4.858e-02   4.211 2.61e-05 ***
DA                -3.716e-04  3.529e-04  -1.053 0.292443
PB                 8.460e-02  8.987e-03   9.414  < 2e-16 ***
TobinsQ           -7.367e-03  6.444e-03  -1.143 0.252980
Earnings           2.884e-02  2.037e-02   1.416 0.156776
REVG              -3.097e-03  4.831e-04  -6.410 1.66e-10 ***
PBSquared         -7.992e-03  1.001e-03  -7.988 1.89e-15 ***
ROASquared        -1.229e+04  3.196e+03  -3.847 0.000122 ***
factor(Country)BE  1.018e-01  3.187e-02   3.193 0.001420 **
factor(Country)DE -6.248e-02  2.775e-02  -2.252 0.024399 *
factor(Country)DK -9.259e-02  3.144e-02  -2.945 0.003255 **
factor(Country)ES  7.146e-02  2.872e-02   2.488 0.012904 *
factor(Country)FI  1.525e-01  2.923e-02   5.219 1.91e-07 ***
factor(Country)FR  6.037e-02  2.834e-02   2.130 0.033222 *
factor(Country)GR  1.598e-02  2.849e-02   0.561 0.574954
factor(Country)HR -8.913e-04  3.373e-02  -0.026 0.978921
factor(Country)IE -1.267e-01  3.504e-02  -3.617 0.000303 ***
factor(Country)IT  3.360e-02  2.819e-02   1.192 0.233339
factor(Country)NL  2.750e-02  3.228e-02   0.852 0.394450
factor(Country)PL -9.858e-02  2.894e-02  -3.406 0.000667 ***
factor(Country)PT  1.527e-01  3.661e-02   4.171 3.11e-05 ***
factor(Country)SE  8.375e-02  2.995e-02   2.796 0.005200 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.2831 on 3197 degrees of freedom
Multiple R-squared:  0.1587,    Adjusted R-squared:  0.1521
F-statistic: 24.13 on 25 and 3197 DF,  p-value: < 2.2e-16
```

Figure 5.0: Normal Q-Q plot

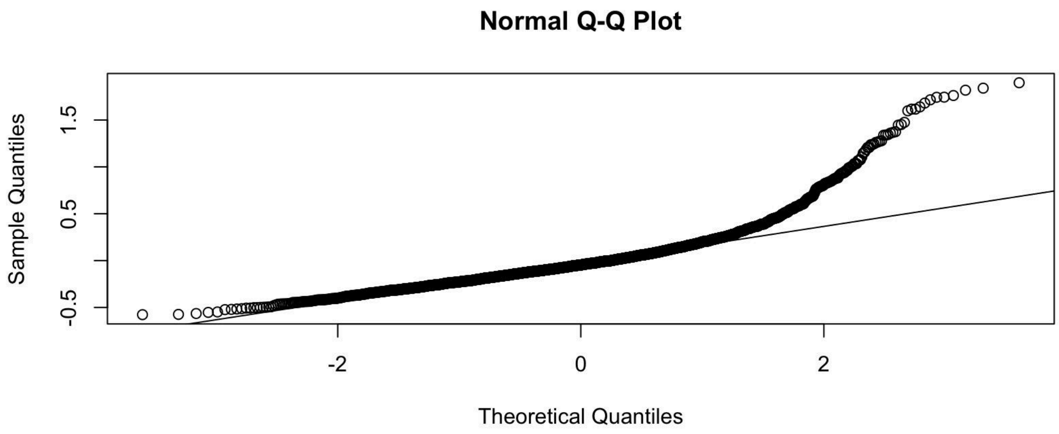

Figure 6.0: Histogram of residuals

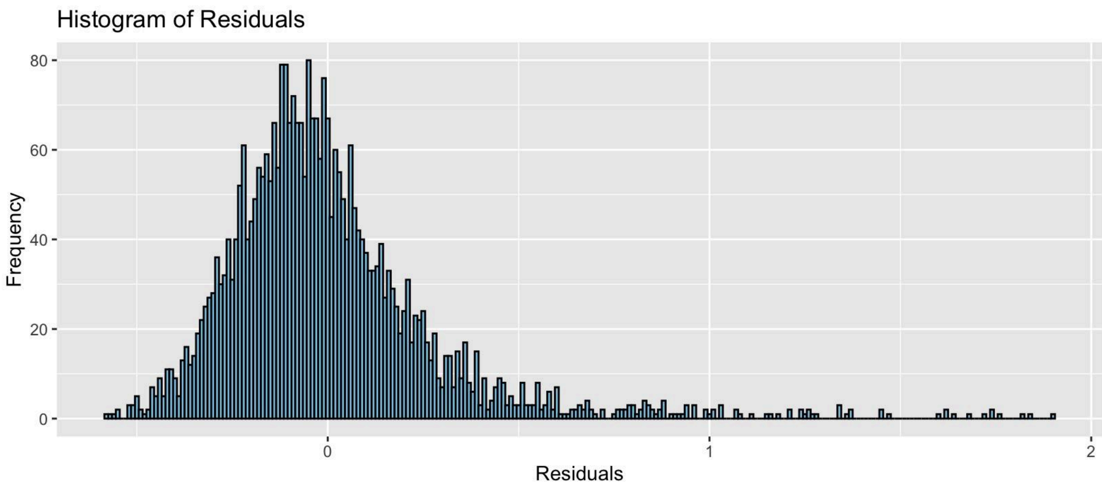

Figure 7.0 Matrix of scatterplots for all included variables

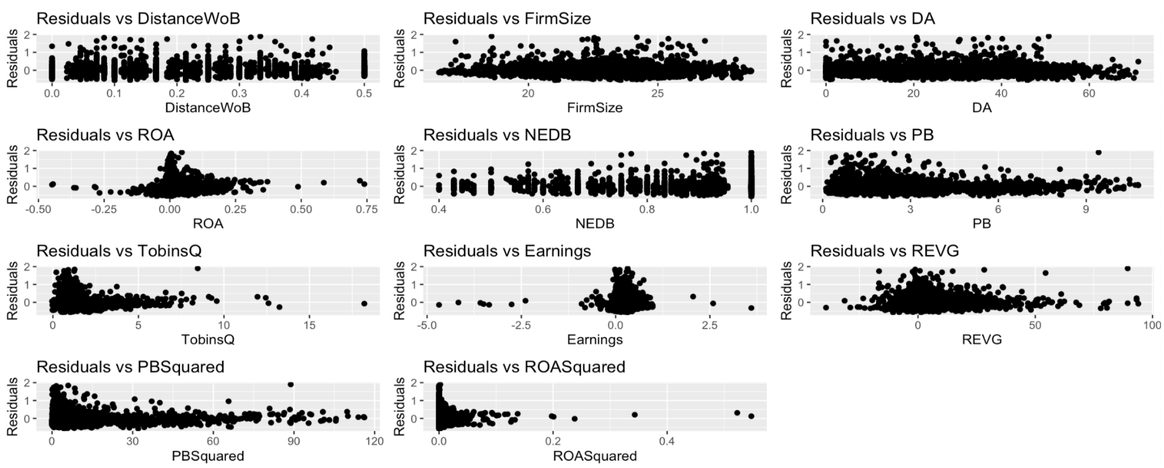

Figure 7.1 Scatterplot for independent variable board gender composition (DistanceWoB)

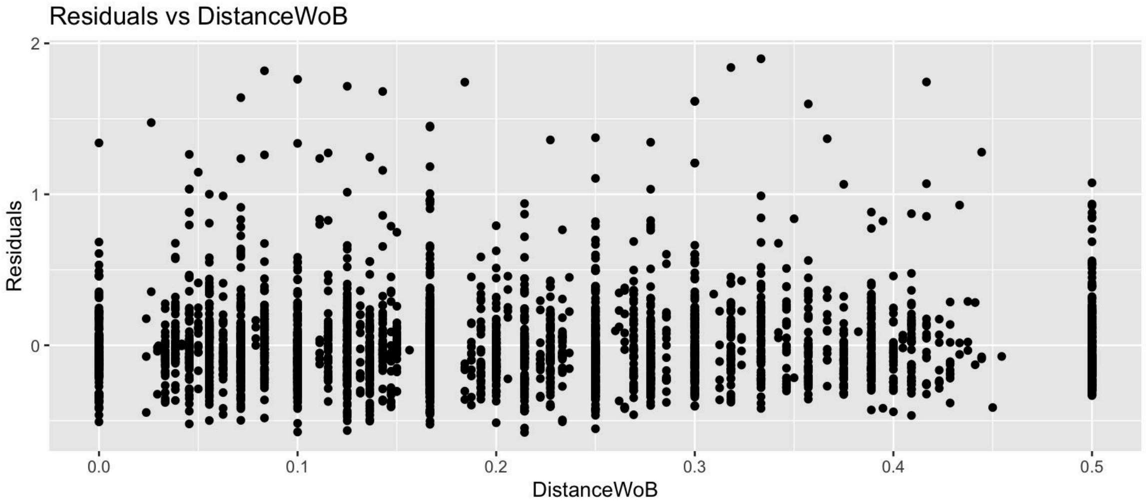

Figure 7.2 Scatterplot for control variable firm size

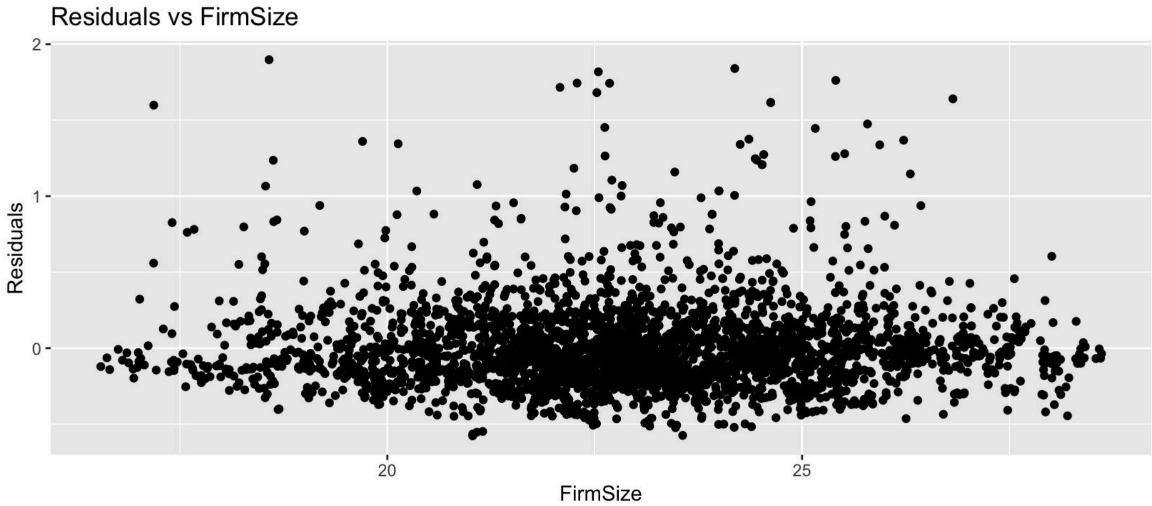

Figure 7.3 Residual plot for control variable debt-to-asset ratio (DA)

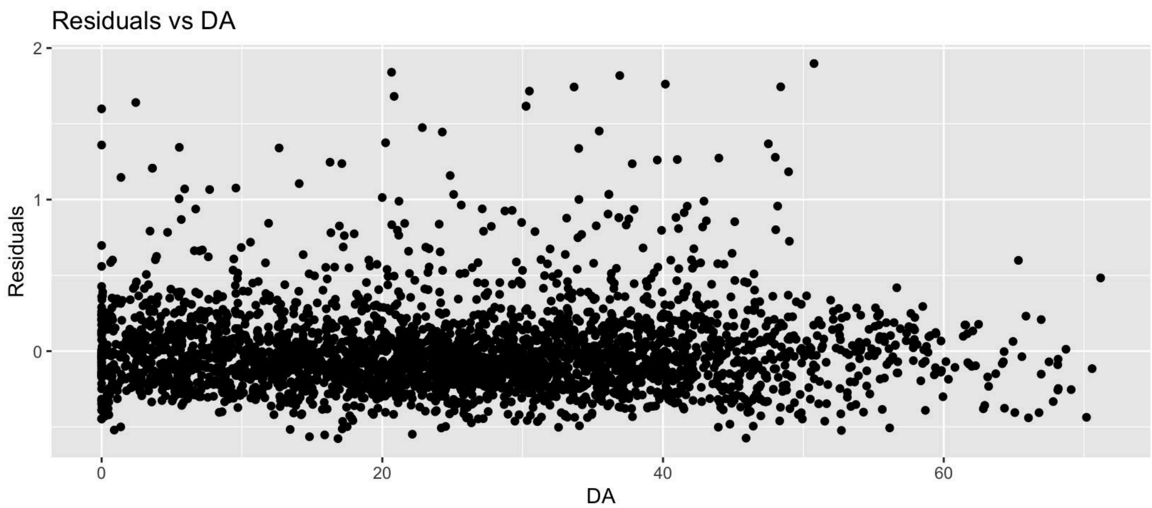

Figure 7.4 Scatterplot for control variable return on assets (ROA)

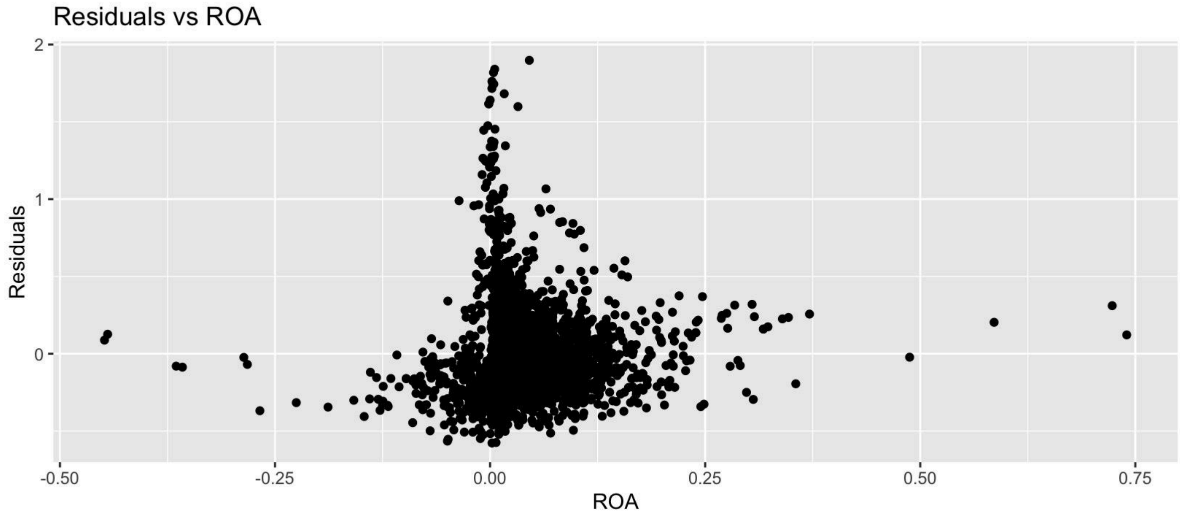

Figure 7.5 Scatterplot for control variable board independence (NEDB)

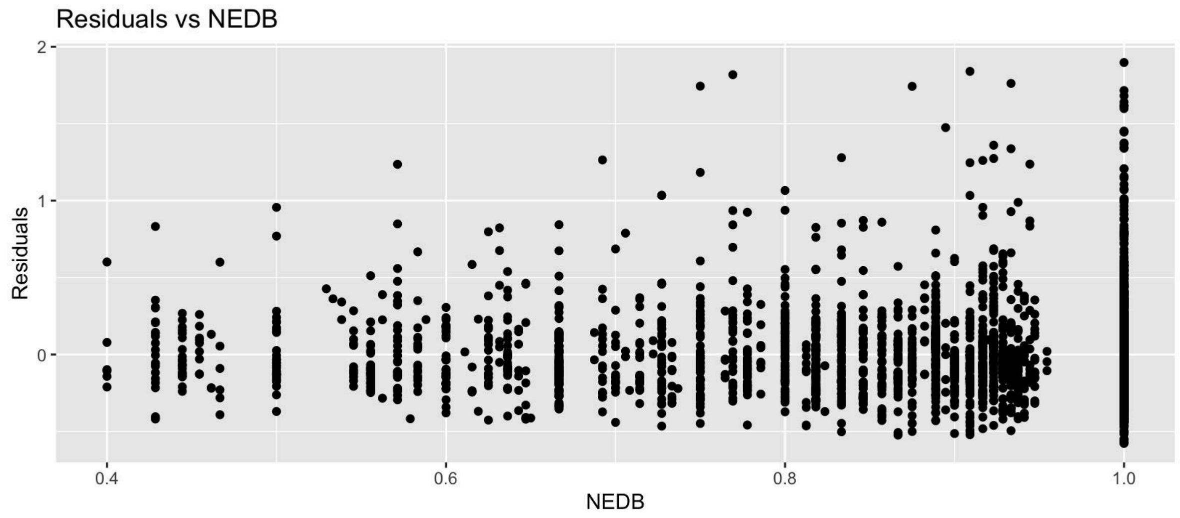

Figure 7.6 Scatterplot for control variable Price-to-Book Ratio (PB)

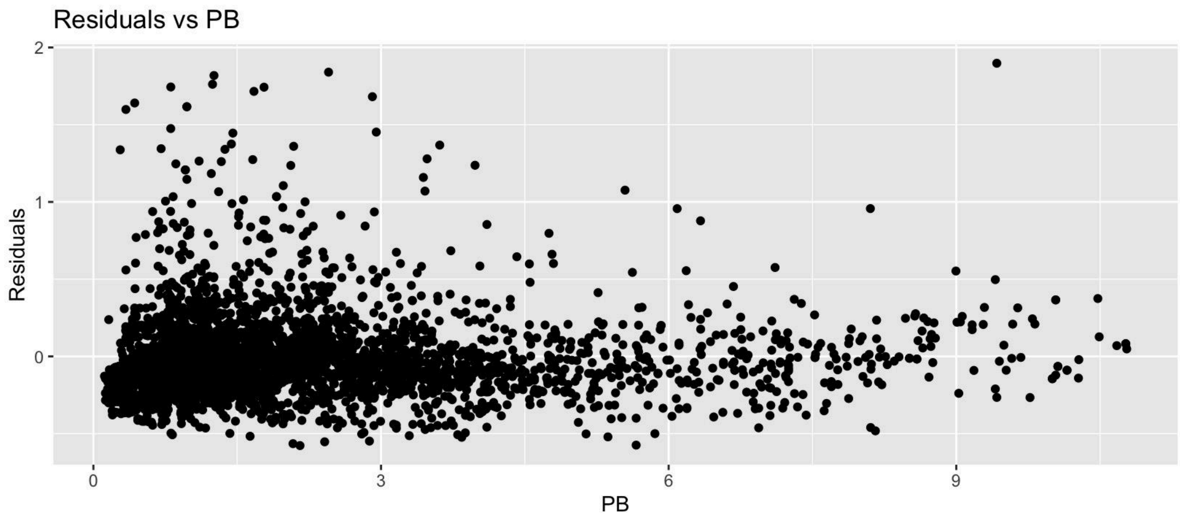

Figure 7.7 Scatterplot for control variable Profitability (Tobin's Q)

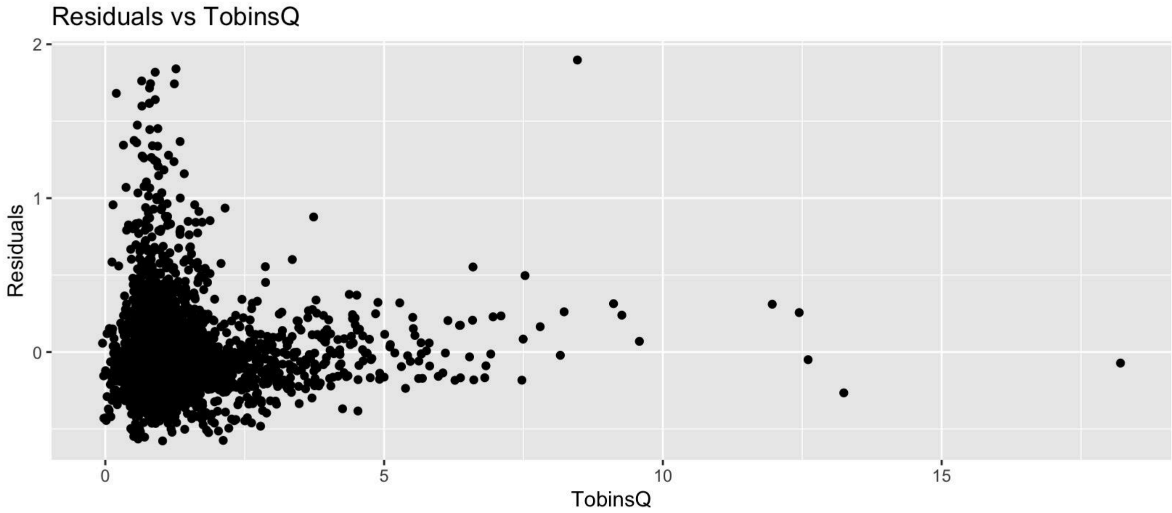

Figure 7.8 Scatterplot for control variable earnings

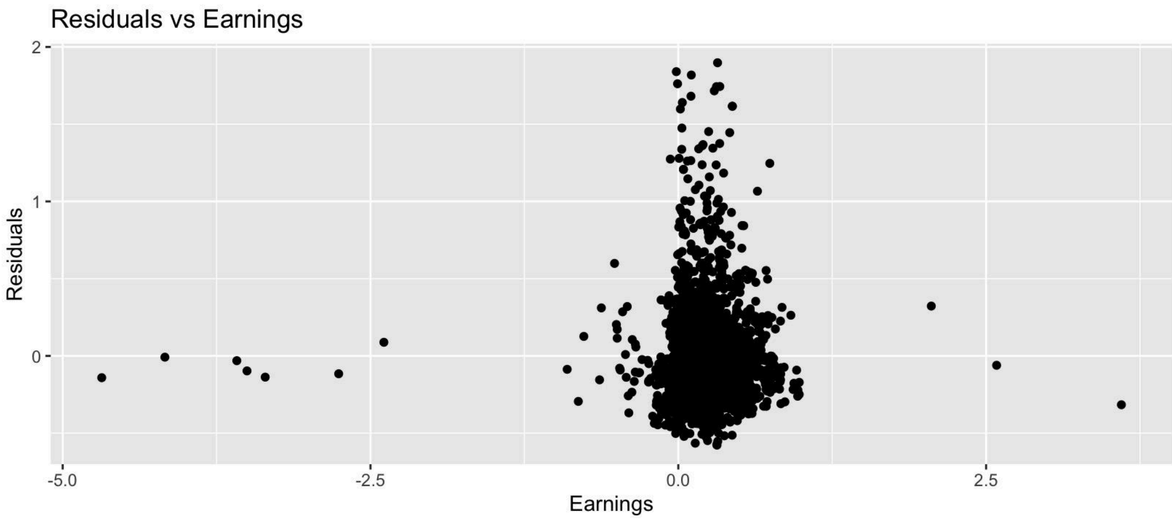

Figure 7.9 Scatterplot for control variable firm growth (REVG)

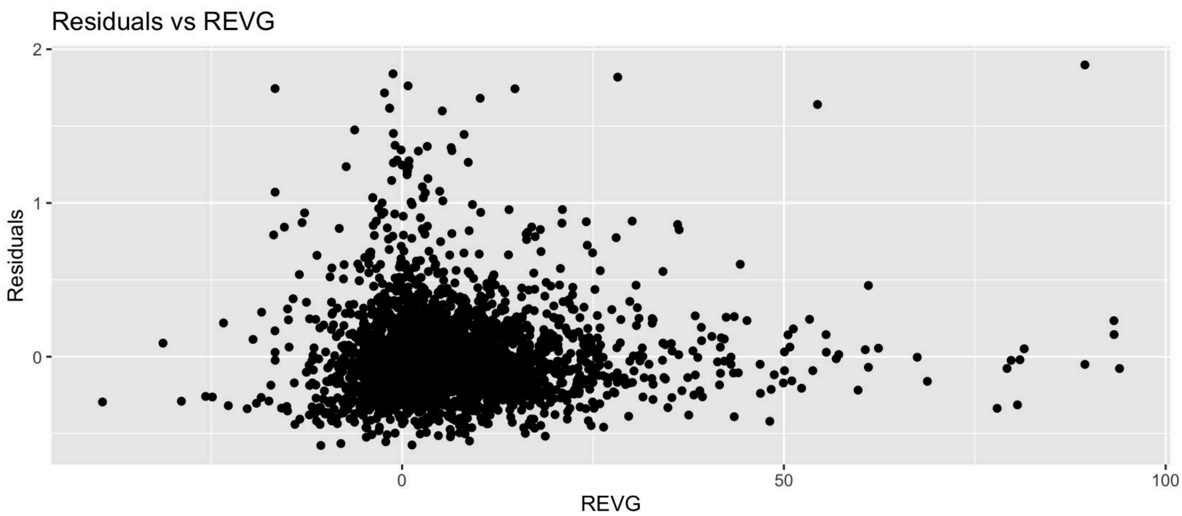

Figure 7.10 Scatterplot for control variable price-to-book ratio squared (PB^2)

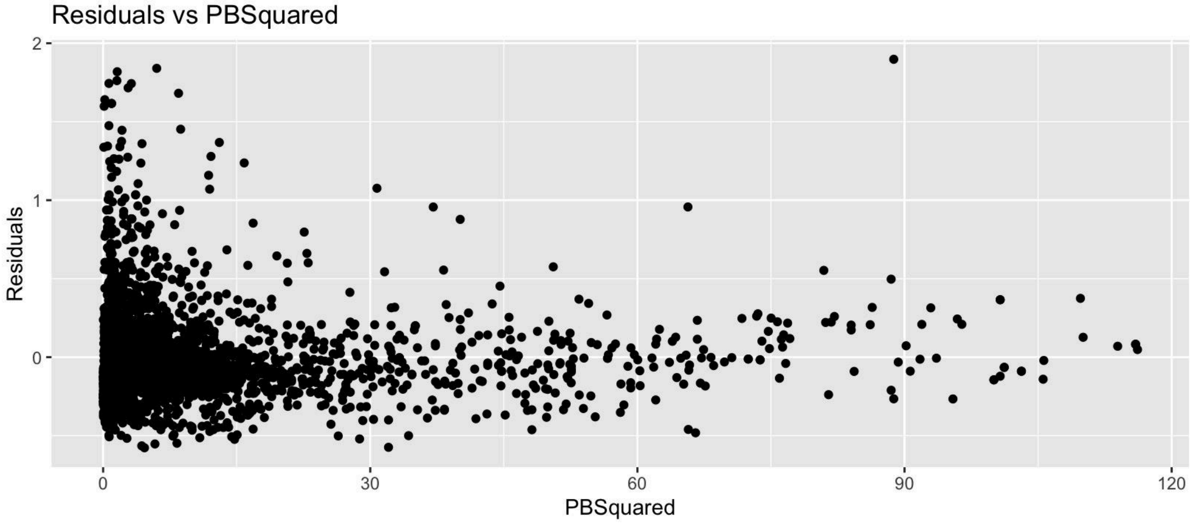

Figure 7.11 Scatterplot for control variable return on assets squared (ROASquared)

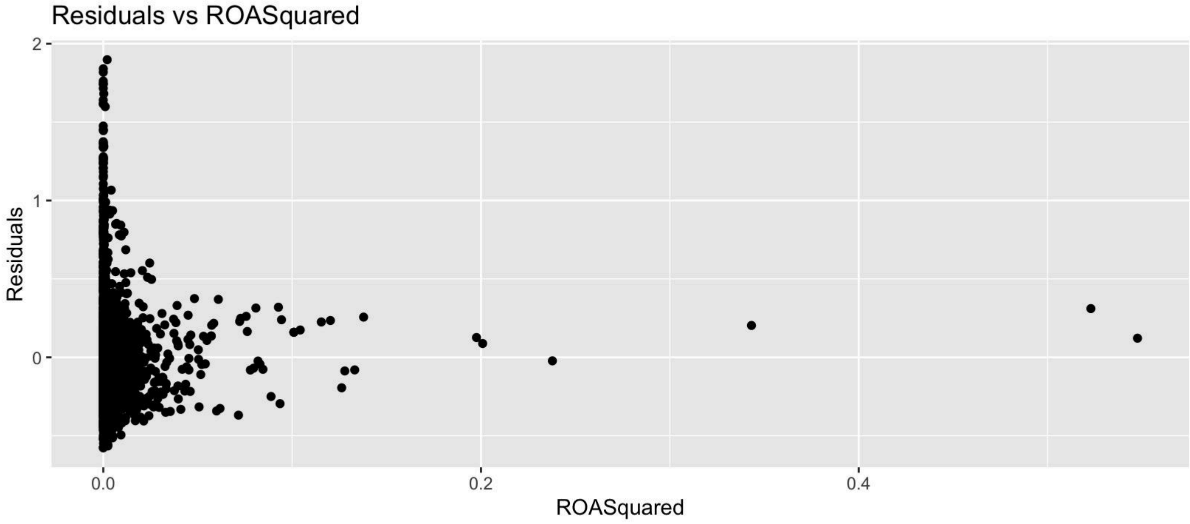

Figure 8.0 Residuals vs. fitted values color-coded by country

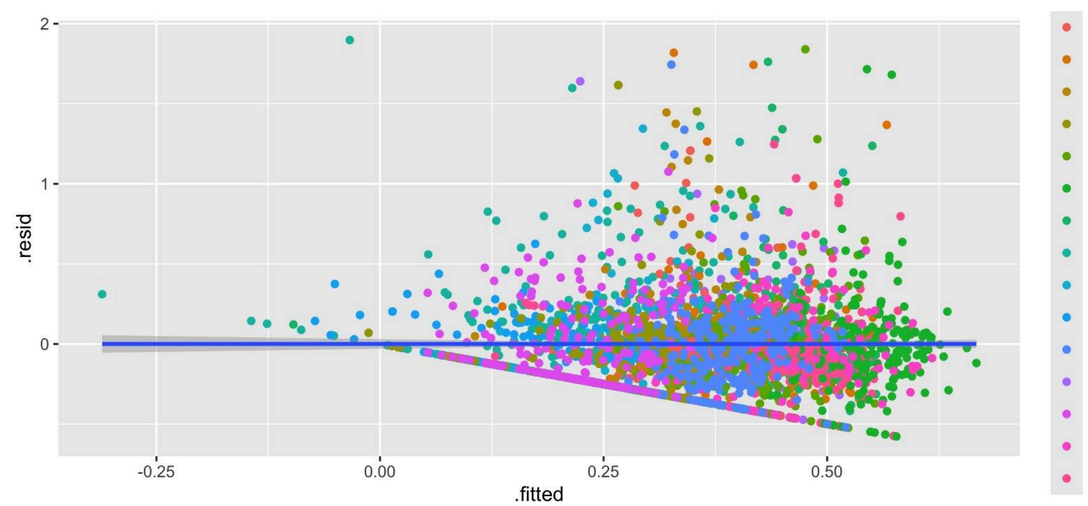

Figure 9.0 Robust standard error corrected coefficient estimates

```
> # Apply Newey-West standard errors
> coeftest(fixed_effects_lsdv, vcov. = NeweyWest)

t test of coefficients:

                    Estimate  Std. Error t value  Pr(>|t|)    
(Intercept)       -0.17771494  0.15061688 -1.1799 0.2381223    
DistanceWoB       -0.11686690  0.06495187 -1.7993 0.0720680 .  
FirmSize           0.01185573  0.00593500  1.9976 0.0458450 *  
ROA                0.13311493  0.12117923  1.0985 0.2720706    
NEDB               0.20457397  0.06935909  2.9495 0.0032061 ** 
DA                -0.00037156  0.00055282 -0.6721 0.5015561    
PB                 0.08459882  0.01498338  5.6462 1.784e-08 ***
TobinsQ           -0.00736744  0.00858746 -0.8579 0.3909959    
Earnings           0.02884494  0.02427565  1.1882 0.2348331    
REVG              -0.00309669  0.00080889 -3.8283 0.0001315 ***
PBSquared         -0.00799228  0.00152136 -5.2534 1.591e-07 ***
ROASquared        -1.22946634  0.23234069 -5.2917 1.294e-07 ***
factor(Country)BE  0.10175772  0.04581433  2.2211 0.0264147 *  
factor(Country)DE -0.06248056  0.03351832 -1.8641 0.0624032 .  
factor(Country)DK -0.09259416  0.04974605 -1.8613 0.0627883 .  
factor(Country)ES  0.07146120  0.03746509  1.9074 0.0565574 .  
factor(Country)FI  0.15254471  0.03826968  3.9860 6.868e-05 ***
factor(Country)FR  0.06036631  0.03905850  1.5455 0.1223157    
factor(Country)GR  0.01597854  0.03975067  0.4020 0.6877337    
factor(Country)HR -0.00089128  0.04025221 -0.0221 0.9823357    
factor(Country)IE -0.12673281  0.03993509 -3.1735 0.0015206 ** 
factor(Country)IT  0.03360190  0.04107356  0.8181 0.4133664    
factor(Country)NL  0.02749646  0.04598217  0.5980 0.5498950    
factor(Country)PL -0.09858002  0.03829151 -2.5745 0.0100842 *  
factor(Country)PT  0.15269387  0.07072142  2.1591 0.0309174 *  
factor(Country)SE  0.08375113  0.04374804  1.9144 0.0556586 .  
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Figure 10: Lack-of-fit test for independent and control variables

```
> residualPlots(pooled_ols)
            Test stat Pr(>|Test stat|)    
DistanceWoB   -1.9196          0.05500 .  
FirmSize      -2.2827          0.02251 *  
ROA           -4.8922        1.046e-06 ***
NEDB          -2.2707          0.02323 *  
DA             0.5060          0.61288    
PB            -9.2938        < 2.2e-16 ***
TobinsQ       -0.0211          0.98317    
REVG           1.9066          0.05667 .  
Tukey test    -1.4907          0.13605    
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Authorship Statement

We hereby declare that we are the sole authors of this bachelor thesis, who have jointly written the paper, and that we have not used any sources other than those listed in the bibliography and identified as references. We further declare that we have not submitted this thesis at any other institution in order to obtain a degree.

Adam Svenningsson	Raphael Kollegger-Steger	Valentina Favero Porto

Lund, Sweden | 21 May 2024

AI Usage Statement

Chat GPT 3.5 was utilized to assist with the coding in the *R* programming language. It was not used in relation to any section in this thesis. The AI was not used by any means as a co-author of this thesis. Furthermore, *Grammarly* was used sporadically to improve language and grammar throughout the thesis.

Example prompts:

1. *Use the Breusch-Godfrey test to test for autocorrelation in the fixed_effects_lsdv model in the R programming language.*
2. *Write code to merge all data frames from a list of data frames starting with the same three letters in the R programming language.*
3. *Plot the residuals of my fixed_effects_lsdv model against the fitted values using the ggplot2 package in the R programming language.*

Adam Svenningsson	Raphael Kollegger-Steger	Valentina Favero Porto

Lund, Sweden | 21 May 2024