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How is the impact of ESG Performance on Dividend Policy influenced by Financial Architecture, Legal Origins and Investor Protections?

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Abstract

First, this paper tested the relationship between ESG performance and the dividend payout ratio. Second, it examined whether this effect varies across countries with different financial architectures, legal origins, and investor protections. Based on 15,010 firm-year observations from data on 1,530 firms across 26 different countries spanning 2010 to 2021, an industry and time fixed effects panel model and a Poisson model were conducted. A positive relationship between ESG performance and dividend payout was found, indicating that higher ESG performance could reduce the cost of capital and increase the ability to pay dividends. COVID-19 years affected dividend payout negatively. Furthermore, financial architecture and a common law legal origin were found to positively affect this relationship, suggesting that in stronger markets it may be easier to find financing, and that a robust legal framework safeguards the funds of investors, making it more attractive to invest. In contrast, investor protection was found to negatively affect the relationship between ESG performance and dividend payout, implying that when there are already robust investor protections, ESG and dividends both reduce agency costs and may have a substitute effect.

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1 Introduction

"The harder we look at the dividends picture, the more it seems like a puzzle, with pieces that just do not fit together" (Black, 1976, p. 5). According to Miller & Modigliani (1961) dividend irrelevance theory, under perfect market conditions, dividend policy has no effect on stock prices or cost of capital. Prior research, however, has identified several factors influencing dividend policies: Market imperfections such as taxes, imperfect information, and agency problems significantly impact dividend policy decisions (Lease et al., 1999); larger and more profitable firms tend to distribute higher dividends (Denis & Osobov, 2008); and dividends are more appreciated by shareholders in countries with weak investor protections (Pinkowitz et al., 2006).

According to agency theory, dividend payouts can reduce information asymmetry and agency costs between shareholders and managers by limiting unnecessary spending. The signalling theory suggests that dividend payouts can send signals to the market about future prospects, thereby reducing information asymmetry (Baker & Weigand, 2015). Another way to reduce agency costs and signalling costs is through investments in environmental, social, and governance (ESG) activities (Cui et al., 2018). ESG has gained relevance over the past decade, as the focus has shifted towards more sustainable and responsible practices, representing a balance between financial performance, transparency, social considerations, and environmental impact (PwC, 2024). For instance, investments in sustainable funds were $5 billion in 2018, and this figure had increased to $70 billion by 2021 (McKinsey & Company, 2022).

Prior studies have provided several findings related to signalling and agency theory. Managers and shareholders in conservative countries place significant importance on their public image and, through the signalling effect, expect higher dividends. In line with agency theory, managers and shareholders in conservative countries both seek to maintain a healthy relationship, and shareholders have the incentive to monitor managers' spending. Consequently, they request higher dividends (Shao et al., 2010). Within firms, there is an agency problem wherein the interests of managers are not aligned with those of the owners. Managers, being more publicly monitored, are more concerned with their reputation. ESG is a tool that could enhance managers' reputations; however, the risk arises that managers

might spend excessively on ESG to improve their personal image, rather than maximizing profits (Cheung et al., 2018; Schmitz & Schrader, 2015).

ESG can be used as a costly tool to signal confidence in firms' operations to the market. Consumers may perceive high ESG-performing firms as delivering better products due to better stakeholder relations (Schmitz & Schrader, 2015). Both ESG and dividend payouts help reduce information asymmetry. However, an efficient mix of mechanisms leads to the lowest signalling and agency costs (Ambarish et al., 1987). In contrast, Peng & Isa (2020) found no evidence of an association between ESG and agency problems. It would be interesting to investigate the relation between ESG performance and dividend payout. As previous literature has found different relationships between ESG performance and dividend payout (e.g., Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Niccolo et al., 2020; Saeed & Zamir, 2021; Zahid et al., 2023). Furthermore, multiple studies address the impact of institutional differences on the relationship between ESG and dividend payout (e.g., Chouaibi et al., 2021; Dua & Sharma, 2024; Zahid et al., 2023).

Firstly, this study aims to investigate the relationship between dividend payouts and ESG performance. Secondly, how this relation is influenced by institutional differences e.g., financial architecture, legal origins, and investor protection. Leading to the following research question: “How is the relation between ESG performance and dividend payout affected by financial architecture, legal origin, and investor protection”.

This study uses 15,010 firm-year observations over 26 different countries and 1,530 firms between 2010 and 2021. A dummy variable for the COVID-19 virus is included to account for the pandemic its impact. This is tested in an industry and time fixed effects panel mode, and a Poisson model. In addition, several robustness tests were conducted.

This study has several findings. First, the relationship between ESG performance and dividend payout was found to be positive. According to agency theory, firms with strong ESG performance experience fewer agency problems and incur lower costs related to monitoring managers, thereby increasing their capacity to pay dividends. In accordance with signalling theory, firms may signal to the market that investments in ESG do not negatively impact free cash flows by distributing high dividends, indicating financial stability. Additionally, firms with higher ESG performance are perceived as less risky, which can lead to a lower cost of capital and a better ability to pay dividends. However, it is challenging to determine if higher ESG performance directly causes higher dividend payouts, as firms with more resources can more

easily invest in ESG and distribute higher dividends. Second, financial architecture positively affects the relationship between ESG performance and dividend payout. Although the results were not strong, they suggest that in countries with a robust financial architecture, it may be easier for firms to secure financing for ESG investments. Furthermore, ESG performance may increase valuations due to investor demand, because ESG preferences, leading to larger funds available for dividends. Third, a common law legal origin positively affects the relationship between ESG performance and dividend payout. Although the results were not strong, this finding indicates that disclosure requirements may lead to strong transparency and accountability, enabling firms with high ESG performance to generate more funds for dividend payments. Fourth, investor protection negatively affects the relationship between ESG performance and dividend payout. Although the results were not strong, this suggests that ESG and dividend payout may be substitutes in countries with strong investor protection. Furthermore, it could be influenced by investors who prefer reinvesting a firm's profits in ESG initiatives rather than distributing dividends.

This study has several theoretical and practical implications. First, it contributes to the understanding of the relationship between ESG and dividend payout with respect to agency and signalling theory. Additionally, it enhances the understanding of how institutional differences affect ESG and dividend payout, in the context of agency and signalling theory. Practically, this study implies that investors who prefer ESG investments may expect higher dividend payouts, allowing them to invest both responsibly and profitably. Furthermore, it suggests to managers that investing in ESG and paying higher dividends can positively affect stakeholders, potentially improving reputations, reducing the cost of capital, and lowering signalling and agency costs. Moreover, it indicates to policymakers that focusing on ESG legislation could reduce the need for other corporate governance mechanisms, potentially leading to a reduced regulatory burden.

The rest of the paper is organized as follows. In Section 2 hypotheses are derived based on relevant literature. Section 3 contains the research methodology. Section 4 includes the results and Section 5 contains the discussion and conclusion.

2 Literature & Hypotheses

2.1 ESG

This section will discuss the relationship between ESG performance and dividend payout, focusing on agency theory and signalling theory. According to agency theory, firms try to reduce agency costs by paying dividends. If a firm is forced to raise external capital to pay dividends, managers should reduce agency costs by disclosing new information to secure financing. The optimal level of dividend payment is the point where agency costs or transaction costs are lowest (Moh'd & Perry, 1995). In the context of ESG engagement, Barnea & Rubin (2010) and Godfrey (2005) argue that managers have an interest in over-investing in ESG activities to enhance their own reputation as environmentally and socially responsible, often at the expense of shareholders. However, by investing in ESG activities, firms increase the transparency of their operations. This reduces information asymmetry and thus agency costs between managers and stakeholders. Lakhal et al. (2023) argue that an excessive focus on ESG leads to a suboptimal solution where both dividend levels and stakeholder interests are out of balance. In balancing stakeholder interests, shareholders may use dividend payments to expropriate wealth from debtors. Since shareholders have better access to cash flows, debt holders have an incentive to limit dividend payments (Allen & Michaely, 1995; Frankfurter & Wood, 2002). Further literature finds that, in line with agency theory, ESG has a positive impact on dividend policy, suggesting that both reduce information asymmetry and bring stakeholders together (Bilyay-Erdogan et al., 2023; Zahid et al., 2023). Moreover, ESG can lead to more efficient investments. ESG limits the amount of free cash flows that can be misused for overinvestment and increases information transparency, thus reducing the likelihood of underinvestment (Bilyay-Erdogan et al., 2023; Samet & Jarboui, 2017).

According to the signalling theory on dividend policy, a firm's decision to pay or reduce dividends sends signals to investors about the firm's financial health, future prospects and management's confidence in the firm. This theory is based on the idea that dividend actions contain important information for the market and can influence investor perceptions (Bhattacharya, 1979). In the ESG context, high dividend payments can indicate ethical and sustainable activities, taking into account the preferences of both stakeholders, including shareholders. By distributing profits more fairly to those who contributed to their creation,

the firm's reputation may improve. On the other hand, firms can signal to the market that ESG costs do not significantly reduce short-term free cash flows, and by paying high dividends, the firms signal financial stability (Benlemlih, 2019). Firms with high information asymmetry and high growth opportunities should not pay dividends because external capital is more expensive than internal capital. It is cheaper to signal through enhanced disclosure or share buybacks (Allen & Michaely, 1995). Moreover, signalling additional firm information can reduce information costs, lower the cost of capital and improve firm value (Rakotomavo, 2012; Saeed & Zamir, 2021). Zahid et al. (2023) found that ESG affects dividends through two channels: risk and earnings. ESG reporting reduces information asymmetry with debtors, potentially leading to a lower cost of capital. With reduced financial constraints, it is easier to pay dividends without taking excessive risks in growth opportunities and financial stability. Through the earnings channel, ESG activities can improve the firm's reputation, which can lead to increased sales or market share, and better relationships with stakeholders can increase profits. In addition, investments in ESG can send positive signals about the long-term stability of firms (Baker & Weigand, 2015; Niccolo et al., 2020; Verga Matos et al., 2020). Based on the agency and signalling theory a positive relation between ESG and dividend payouts is expected.

Multiple studies find a positive effect of ESG on dividend payouts (Ben Salah & Ben Amar, 2022; Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Oh & Park, 2021; Rakotomavo, 2012; Salvi et al., 2024; Verga Matos et al., 2020; Zahid et al., 2023). In contrast, higher ESG performance may decrease dividend growth due to reduced free cash flows (Benlemlih, 2019; Zahid et al., 2023). This effect is similar for family firms, where the effect of ESG performance on dividend payments is negative (Sheikh et al., 2021). Moreover, ESG investments lead to higher costs, reducing the free cash flows available for dividends (Baker & Weigand, 2015; Niccolo et al., 2020). In addition, Saeed & Zamir (2021) address that increased laws and regulations regarding ESG reporting practices could increase transparency to stakeholders, making it easier for shareholders to monitor managers and thus request fewer dividends. The author also notes that in weaker institutions, both mechanisms have a substitute effect.

There are findings that suggest ESG has a positive effect on dividend payouts, while other studies find this effect to be negative or to have a substitute effect. Based on the literature, the following hypothesis is derived:

H1: *ESG performance has a positive effect on dividend payouts*

2.2 Market Vs. Bank-Based Systems

Several studies address the significance of institutional differences on ESG performance and dividend payouts. Institutional differences include financial architecture, legal origin, and investor protections (La Porta et al., 2000, 2008; Levine, 2002). The following section provides definitions of these institutional differences. First, the financial market is a mechanism for the exchange of goods and services. It plays a critical role in resource allocation, risk management, and capital provision. More developed markets are associated with market-based systems, while less developed ones are associated with bank-based systems (Bodie & Merton, 1998; Levine, 1997). Financial architecture measures the size, efficiency, and activity of stock markets relative to banks (Levine, 2002). Second, legal origin refers to the historical framework of a country's legal system, defined in common law and civil law. Common law relies on judicial decisions and case law, tending to be more flexible. In contrast, civil law relies on code law and statutes, with less impact on judicial decisions and tending to be more conservative. Common law is associated with market-based systems, and civil law with bank-based systems (La Porta et al., 2008). Third, investor protection is a corporate governance mechanism that safeguards shareholder rights. Stronger investor protection is associated with market-based systems, while weaker investor protection is associated with bank-based systems (La Porta et al., 2000). These three concepts are closely related (La Porta et al., 2008).

This section discusses the institutional differences in relation to agency theory and signalling theory. According to agency theory, shareholders aim to limit excessive spending by managers. This is particularly important in less developed countries with weaker financial markets, legal frameworks, and regulations. Paying higher dividends or engaging in ESG activities increases transparency and reduces agency costs (Aivazian et al., 2003). Consistent with agency theory, firms in common law countries invest in ESG to maximize shareholder value. Firms in civil law countries are more inclined to be pro-social, investing in ESG to maximize stakeholder value even if it results in reduced firm performance. Additionally, firms in countries with strong investor protection may not pursue ESG activities due to potential negative effects on firm performance. However, investors may prefer ESG, resulting in potential benefits for firm performance (DasGupta & Roy, 2023). Corporate governance and ESG are strongly related, both reducing information asymmetry (Castillo-Merino & Rodríguez-Pérez, 2021). While corporate governance systems mainly focus on the relationship between

management and shareholders, ESG extends to all stakeholders (Miniaoui et al., 2019). In economic downturns, investors demand fewer dividends when strong corporate governance mechanisms are in place (Jabbouri, 2016). Moreover, investor protection serves to safeguard shareholders from expropriation by managers and controlling shareholders by law. Strong investor protection is associated with a robust corporate governance system (La Porta et al., 2000). Corporate governance should prevent firms from overinvesting in ESG or limit ESG activities. From a broader perspective, corporate governance should protect shareholders who lack power over managers (Gangi et al., 2019). Strong investor protections reduce dividend payouts, even when ESG performance is high. Investors already feel secure with investor protections, minimizing agency problems, and therefore, may not require higher dividends to reduce information asymmetry further (Dua & Sharma, 2024).

According to signalling theory, firms possess more information than investors. By paying dividends or engaging in ESG, they can signal positive expectations to the market and reduce information asymmetries. In bank-based financial systems, this signalling effect is weaker. Banks lend money to these firms and request interest on their loans. To manage their risks, they require firm information, reducing information asymmetry. Therefore, firms have less incentive to signal with dividends or ESG activities (Moradi et al., 2016). In market-based financial systems, information asymmetry between investors and managers is higher. Therefore, investors may request higher dividends or ESG engagement to reduce these asymmetries (Aivazian et al., 2003). During stable periods, firms that pay out higher dividends have less volatile stock prices, suggesting that paying dividends sends signals of reduced risk. Additionally, stocks are higher valued and may outperform the market. However, in periods of high growth, dividends may not have the same signalling effect (Farooq et al., 2012). In countries with strong investor protections and corporate governance mechanisms, signalling with dividends may not be relevant (Jabbouri, 2016).

Several studies have identified a positive relationship between stock market development and ESG (Ng et al., 2020; Saeed & Zamir, 2021). While market capitalization is positively associated, the effect based on size, efficiency, and activity is slightly negative for market-based systems on dividend payouts (Shao et al., 2010). Additionally, a negative relationship has been found (Twu, 2012). Multiple studies have found a positive effect of investor protection on dividend payouts (Alzahrani & Lasfer, 2012; Bilyay-Erdogan et al., 2023). However, a negative effect has been observed on ESG (DasGupta & Roy, 2023). Other studies

have reported a negative effect of common law origin on dividends (Castillo-Merino & Rodríguez-Pérez, 2021; Liang & Renneboog, 2017), while this effect was positive on ESG (DasGupta & Roy, 2023). In contrast, it has been found that there is no effect of legal origins on dividend payouts (Saeed & Zamir, 2021). Different studies found that the moderating effect of investor protection and common law weakens the relationship between ESG and dividend payout (Chouaibi et al., 2021; Dua & Sharma, 2024). Additionally, the effect of audit quality weakens this relation (Zahid et al., 2023).

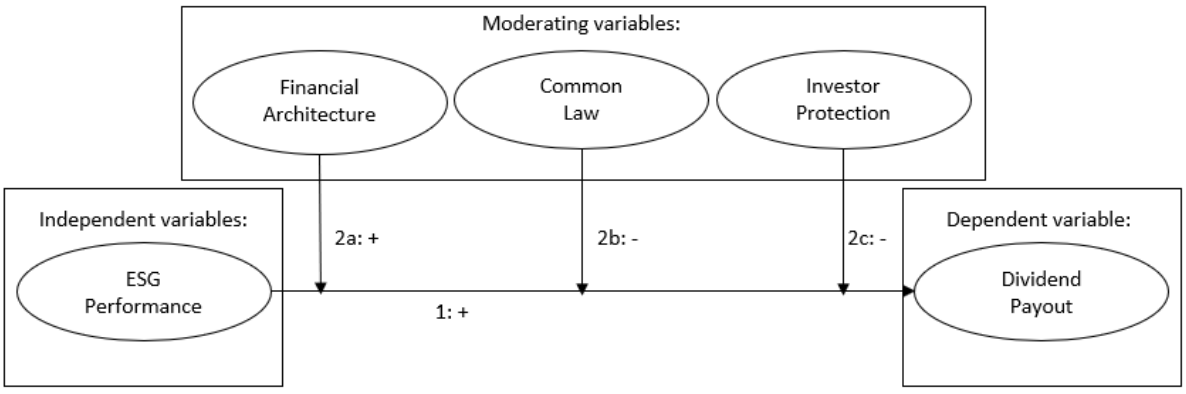
Despite conflicting findings in the literature, the following hypotheses are derived based on discussed theories and empirical evidence. Figure 1 provides an illustration of the relationships examined in this study.

***H2a**: Countries with strong financial architecture strengthen the effect between ESG performance and dividend payouts.*

***H2b**: Countries with common law legal origin weaken the effect of ESG performance on dividend payouts.*

***H2c**: Countries with strong investor protection weaken the effect of ESG performance on dividend payouts.*

FIGURE 1: CONCEPTUAL MODEL



Notes. The conceptual model shows all relationships studied. Within the blocks, the different variables are indicated.

3 Data & Methods

3.1 Data

ESG scores and financial data are sourced from the LSEG workspace. Financial architecture and investor protection data is obtained from the World Bank database and legal origins from a study by Liang & Renneboog (2017). This study uses 15,010 firm-year observations across 26 countries and 1,530 firms between 2010 and 2021. The selected time window starts after the financial crisis, covers the emerging years of ESG and ends with the COVID-19 pandemic years, making it an appropriate period to assess the impact of ESG on the dividend payout ratio.

Several adjustments were made to the dataset. First, financial firms and utility firms with SIC codes 4900-4999 and 6000-6999 were excluded due to their unique roles in the economies and the different laws and regulations they are subject to (Bilyay-Erdogan et al., 2023; Shao et al., 2010; Zahid et al., 2023). Second, countries with no observations were omitted, and missing observations for the financial architecture measures were replaced with the country mean. Other missing values were excluded. Third, firms with a negative net income were removed, as negative net income results in negative values for the dividend payout ratio (Saeed & Zamir, 2021; Shao et al., 2010).

Table 1 presents the descriptive statistics of the panel dataset. The mean of dividend payout ratio is 3.24, exponentiated a div payout ratio of 24,53% ($e^{3.24}$-1), and for dividend payout ratio year-over-year 4.45, a growth of -14% (($e^{4.45}$/100)-1). Notably, there are zeros in the data of the dependent variables. Dividend payout ratio year-over-year has less observations, because over zeros the year-over-year change cannot be calculated. Additionally, the ESG score has no zero values. Dividend payout ratio and Dividend payout ratio year-over-year have some high observations, but these are not influential. The United States (26.2%) and Japan (17.5%) are the most represented countries in the data. For more details, see Table 5 in Appendix B.

TABLE 1: DESCRIPTIVE STATISTICS

Variables	N	Mean	Min	Max	Stdev
Dividend payout ratio	15010	3.24	0.00	9.72	1.41
Dividend payout ratio year-over-year	13395	4.45	0.00	13.23	0.95
E score	15010	47.74	0.00	98.97	28.00
G score	15010	54.39	0.10	99.45	21.81
S score	15010	51.27	0.16	98.47	25.14
ESG score	15010	51.49	0.77	95.77	20.88
Architecture-Efficiency	15010	4.31	0.53	7.10	0.96
Architecture-Size	15010	0.26	-1.61	1.93	0.76
Architecture-Activity	15010	0.13	-2.31	1.65	0.93
Architecture-Aggregate	15010	0.51	-1.40	2.36	0.70
Investor protection	15010	71.35	50.00	88.00	8.24
Firm Size	15010	15.81	10.80	20.44	1.51
Leverage	15010	0.53	0.01	11.93	0.23
Return on assets (ROA)	15010	0.07	0.00	2.63	0.08
Cash Ratio	15010	14.67	0.00	100.00	12.97
Life Cycle	15010	4.24	0.05	12.27	0.76

Notes. This table present the summary statistics of the used variables. Definitions of the variables can be found in table 4 of appendix A. Binary variables are not included in this table.

3.2 Variables

3.2.1 Dependent Variable

Dividend payout is defined in two ways. The first measure is the natural logarithm of the dividend payout ratio, which shows the proportion of total dividends paid to shareholders relative to the net income (Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Salvi et al., 2024; Zahid et al., 2023). The second measure is the natural logarithm of the year-over-year change in the dividend payout ratio, formulated as the natural logarithm of dividends paid in a year divided by dividends paid in the previous year (Saeed & Zamir, 2021; Zahid et al., 2023).

The logarithm of the dividend payout ratio and the year-over-year change in the dividend payout ratio are used because they normalize the distribution. This can help when the distribution of the dividend payout ratio and year-over-year changes are skewed. It also makes interpreting the results easier, as the coefficients can be read as percentage changes. Furthermore, it stabilizes the variance of the error terms due to heteroskedasticity concerns (see data inspection in Appendix C). In this study, the dividend payout ratio is transformed with log(1+Y) to better handle zeros in the data. Additionally, a Poisson model is conducted alongside the fixed effects panel model, as it can better address potential bias when log-transforming zeros (Chen & Roth, 2024).

3.2.2 Independent Variables

ESG Performance

The ESG score measures the performance of a firm's environmental, social, and governance status. It consists of 10 categories representing the three pillars: environmental, social, and governance. The ESG score is a relative sum of the category weights, normalized to a percentage between 0 and 100 (LSEG, 2024). A higher score indicates better overall ESG performance (Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Zahid et al., 2023). There are no zero values for the aggregate scores, zeros in the pillar scores are included in the analysis as they have significance.

Financial Architecture

The financial architecture of a country can impact financial decisions based on the size, activity, and efficiency of the stock market compared to banks (Kwok & Tadesse, 2006; Levine, 2002; Moradi et al., 2016; Shao et al., 2010).

Architecture-Size measures the size of stock markets relative to banks in a given country. The size of the domestic equity market is measured by the market capitalization of local stocks relative to the country's GDP. The size of the banking sector is measured by the bank credit ratio, which reflects the banking sector's claims on the private real sector as a percentage of GDP, excluding non-bank intermediaries and credit to the public sector.

Architecture-Activity assesses the level of stock market activity compared to the banking sector in a specific country. It measures stock market activity relative to economic activity by considering the total traded value as a percentage of GDP. It also examines the importance of banks in private sector economic activity using the bank credit ratio.

Architecture-Efficiency evaluates the efficiency of the stock market compared to the banking sector in a specific country. Equity market efficiency is measured by the ratio of the total value of shares traded to GDP. Banking efficiency is measured by the bank overhead ratio, defined as the ratio of bank overhead costs to bank assets.

The average of size, activity, and efficiency is computed by removing the means of the three components from each respective observation, the values are centered around zero. The average of these components after removing the mean is the architecture-aggregate. A higher value indicates a more market-based financial system. There are no zeros in the data.

Legal Origin

Legal origin refers to the historical legal traditions that shape a country's legal system. To include the impact of a country's legal origin, a dummy variable is used. A value of 1 indicates common law, and 0 indicates other origins, mostly civil law. Common law countries are associated with market-based systems (Kwok & Tadesse, 2006; Liang & Renneboog, 2017; Shao et al., 2010). Table 5 in Appendix B provides more details about the legal origins per country.

Investor Protection

Investor protection refers to the regulations and regulatory bodies established by the government to protect the rights and interests of investors in the financial market. This is measured using the investor protection index from 2019, with scores ranging from 0 to 100. Higher scores indicate stronger investor protection (Kwok & Tadesse, 2006; Shao et al., 2010). Although legal origin and investor protection are correlated (Liang & Renneboog, 2017), correlation and VIF tests indicate no multicollinearity. Therefore, investor protection and common law can be used together in the regression model. The correlation matrix is provided in Table 7 of Appendix E, and more details on the VIF scores are in Appendix C. More details on the investor protection scores per country are provided in Table 5 of Appendix B.

COVID-19

COVID-19 heavily impacted firms' liquidity, which is an important measure for the severity and persistence of a economic downturn (Halling et al., 2020). To test the effect on the dividend payout ratio, a dummy variable for the COVID-19 pandemic is included for the years 2020 and 2021.

3.3.3 Control Variables

Previous studies on the determinants of dividend payouts have included several control variables. This study will incorporate the following control variables to isolate the effects of ESG performance, financial architecture, legal origin, and investor protection on dividend payouts (Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Salvi et al., 2024; Shao et al., 2010; Zahid et al., 2023).

Firm size is calculated as the natural logarithm of the book value of total assets. For large firms, it is easier and cheaper to use external finances, and they often have large free cash flows. Firm size positively affects dividend payouts. Leverage is the ratio of total liabilities to total assets. A high leverage ratio negatively affects dividend payouts. Firms with a lot of debt are monitored by debtholders. Debt typically entails periodic interest payments, which decrease retained earnings. Thus, firms are likely to pay fewer dividends. Return on Assets (ROA), the profitability ratio, is measured as net income to total assets. Following the life cycle theory, firms with high returns on assets are more mature, have higher free cash flows, and are more likely to pay higher dividends. Return on assets is positively associated with dividend payout. The cash ratio represents the degree of cash and cash equivalents to total assets. When there are agency problems, managers tend to increase cash and short-term investments, which reduces dividend payouts. Conversely, paying dividends is a tool to mitigate agency costs, and thus should reduce the cash ratio. Growth, measured as the logarithm of sales growth, indicates that firms with high growth opportunities will finance their investments with retained earnings, resulting in lower dividend payouts. In contrast, firms with low growth opportunities are more likely to pay higher dividends due to higher retained earnings. This is represented by a dummy variable, where 1 indicates positive growth and 0 indicates negative growth. Therefore, growth negatively impacts dividend payouts. The life cycle proxy is the natural logarithm of the ratio of retained earnings to the book value of common equity, serving as an indicator of the firm's life cycle. The life cycle theory suggests that firms in their mature state have higher cash flows than investment opportunities and are more likely to pay more dividends. Young firms need all their cash flows and retained earnings to finance investments and are likely to pay fewer dividends. There are no missing values in the data; zeros are included, as they have significance.

3.3 Methodology

3.3.1 Regression Analysis

Fixed Effects Panel Regression

To test both hypotheses, a time and industry fixed effects panel regression model was conducted, that can analyse data from multiple firms over multiple time periods. The inclusion of fixed effects controls for heterogeneity across entities, addressing unobserved factors that may influence both the dependent and independent variables but are not directly measured

in the regression. This enables a focus on within-variation. The model will incorporate industry fixed effects based on the SIC industry codes of the firms. 10 industry dummies will be used to capture differences in industry regulations, competitive dynamics, or technological disparities. Time fixed effects will be included to account for time-varying factors that could influence dividend payout, using 11 dummies to capture market trends or economic conditions. The models will be initially tested without controls to assess the significance of the control variables. Due heteroskedasticity concerns in the error terms, regression coefficients are less reliable. To improve reliability, Petersen's (2009) White's robust standard errors are included. Clustered at the firm level, because observations of the same firm may be correlated due to unobserved firm factors. The following model will be used to test the hypotheses:

$$Y_{it} = \beta_0 + \beta_1 E_{it} + \beta_2 F_{it} + \beta_3 C_{it} + \beta_4 P_{it} + \beta_5 V_{it} + \beta_6 (E_{it} * F_{it}) + \beta_7 (E_{it} * C_{it}) + \beta_8 (E_{it} * P_{it}) + \beta_9 X_{it} + \gamma_{it} + \delta_{it} + \varepsilon_{it}$$

Where Y_{it} represents the dividend payout measures, β_0 is the constant, $\beta_1 E_{it}$ represents the ESG measures, $\beta_2 F_{it}$ denotes the architecture-aggregate, $\beta_3 C_{it}$ is the common law dummy, $\beta_4 P_{it}$ indicates investor protection, and $\beta_5 V_{it}$ represents the COVID-19 dummy. The term $\beta_6 (E_{it} * F_{it})$ denotes the interaction between the ESG score and architecture aggregate, $\beta_7 (E_{it} * C_{it})$ is the interaction between the ESG score and common law dummy, and $\beta_8 (E_{it} * P_{it})$ represents the interaction between the ESG score and investor protection. Additionally, $\beta_9 X_{it}$ denotes the control variables, γ_j represents the time fixed effect δ_t represents the industry fixed effect, and ε_{it} is the error term.

Poisson Regression

If there are many zeros in the dependent variable, transforming it with log(1+Y) may lead to inconsistent or biased regressions. A Poisson regression can address this issue, as it naturally handles zeros (Chen & Roth, 2024). The Poisson model assumes that the dependent variable follows a Poisson distribution, where the variance is equal to the mean, a property known as equidispersion. It uses the natural logarithm of the expected value of the dependent variable as a linear function of the predictor variables. Poisson regression coefficients show the percentage change in dependent variable, assuming that the other predictors are constant (Coxe et al., 2009). The Poisson regression is modelled as follows:

$$ln(\hat{\mu}) = \beta_0 + \beta_1 E_{it} + \beta_2 F_{it} + \beta_3 C_{it} + \beta_4 P_{it} + \beta_5 V_{it} + \beta_6 (E_{it} * F_{it}) + \beta_7 (E_{it} * C_{it}) + \beta_8 (E_{it} * P_{it}) + \beta_9 X_{it}$$

Where $\ln(\hat{\mu})$ is the predicted count for dividend payout measures, β_0 is the constant, $\beta_1 E_{it}$ represents the ESG measures, $\beta_2 F_{it}$ denotes the architecture-aggregate measure, $\beta_3 C_{it}$ is the common law dummy, $\beta_4 P_{it}$ indicates investor protection, and $\beta_5 V_{it}$ is the COVID-19 dummy. The term $\beta_6(E_{it} * F_{it})$ represents the interaction between the ESG score and architecture aggregate, $\beta_7(E_{it} * C_{it})$ denotes the interaction between the ESG score and common law dummy, and $\beta_8(E_{it} * P_{it})$ is the interaction between the ESG score and investor protection. Lastly, $\beta_9 X_{it}$ represents the control variables.

3.3.2 Robustness tests

The main models already incorporate two different specifications. To further test robustness, several additional tests are conducted. These tests primarily use dummy variables to assess robustness within different subgroups. First, a dummy variable based on the ESG score is created: a score greater than 50 is classified as high, and a score less than 50 is classified as low. This allows to examine whether the effects differ between firms with high and low ESG scores. Second, a test where the architecture-aggregate is divided into a market-based system (greater than the mean of 0.51) and a bank-based system (lower than the mean of 0.51) is conducted (Shao et al., 2010). This tests if the effects remain consistent across these groups. Finally, a robustness check is conducted to determine if having an environmental score at all influences the dividend payout ratio.

4 Results

4.1 Main Results

4.1.1 Correlations

The Pearson correlations in Table 7 of Appendix E show that the dividend payout ratio has a positive correlation with the ESG score. Additionally, the architecture-aggregate shows a negative correlation to the dividend payout ratio. Investor protection and Common have positive correlations with the dividend payout ratio. The correlation between Investor protection and common law is 0.646. Both can be included, as the dataset is large and the VIF scores and correlations are below the thresholds. More details on the data inspection can be found in Appendix C.

4.1.2 Fixed Effects & Poisson Regressions

Table 2 presents the results of both the fixed effects and Poisson models concerning the dividend payout ratio and the year-over-year dividend payout ratio. The fixed effects model accounts for unobserved variations within industries and factors that vary over time. Zeros are managed through a log-like transformation of log(1+Y), which can lead to interpretation and scaling challenges. Therefore, an alternative approach is adopted: the Poisson model, which handles the bias caused by log-transforming zeros in the data more effectively (Chen & Roth, 2024). To test the effect of the included control variables, each model is tested twice, once with and once without control variables.

In accordance with Hypothesis 1, the findings indicate that the ESG score has a significantly positive effect on the dividend payout ratio. For example, in column 2, if the ESG score increases by 1 unit, the dividend payout ratio increases by 4.3% ($e^{0.042}$-1). In column 4, the effect is less strong, 1%. Additionally, the findings suggest that increased ESG performance correlates with a higher dividend payout ratio year-over-year. For example, column 8 shows that if the ESG score increases by 1 unit, the dividend payout ratio year-over-year increases by 0.03%. Firms that invest in ESG may use dividend payouts as a tool to mitigate agency costs (Benlemlih, 2019). In addition, investing in ESG could lead to increased cash flow, providing more funds to pay dividends (Salvi et al., 2024). Conversely, ESG investment increases costs and reduces free cash flows (Niccolo et al., 2020; Sheikh et al., 2021), which stabilizes dividend payout ratio over the years (Zahid et al., 2023).

In line with Hypothesis 2a, the effect of architecture-aggregate on the relationship between the ESG score and dividend payout ratio is significantly positive. For example, column 2 shows that if the effect of the ESG score and architecture-aggregate increases by 1 unit, the dividend payout ratio increases by 0.4%. This effect is less strong in column 4, at 0.1%. This slightly suggests that if a stock market is larger, more active, and more efficient, the effect of ESG performance on the dividend payout tends to be stronger. Weaker effects are observed for the year-over-year dividend payout ratio. For instance, column 8 shows that if the effect of ESG score and architecture-aggregate increases by 1 unit, the year-over-year dividend payout ratio increases by 0.04%. In line with the findings, stock markets are important in providing capital for ESG investments (Ng et al., 2020; Saeed & Zamir, 2021). Contrary, the signalling effect of dividends is reduced as the stock market becomes more developed and efficient, and the information is already well interpreted in stock prices (Twu, 2012).

Contrary to Hypothesis 2b, the effect of common law on the relationship between the ESG score and dividend payout ratio, as well as for the year-over-year dividend payout ratio, is significantly positive. For example, column 3 shows that the effect of the ESG score on the dividend payout ratio is 1.2% stronger for firms in common law countries compared to other legal origins. Additionally, in column 8, the effect of ESG performance on the year-over-year dividend payout ratio is 0.1% stronger in common law countries, though this effect is less pronounced. In line with the findings, firms in common law countries invest in ESG to strengthen financial performance, increasing their ability to distribute dividends (DasGupta & Roy, 2023). Furthermore, civil law legal frameworks better align stakeholders' interests through ex ante rule-making. Where, common law legal frameworks emphasize ex post rule-making, which less effectively aligns stakeholders' interests. Therefore, ESG and dividend policies become more important as signalling mechanisms (Liang & Renneboog, 2017). In contrast, ESG and dividends could be substitutes as both reduce information asymmetry (Saeed & Zamir, 2021).

In line with Hypothesis 2c, the more investor protection a country has, the weaker the effect of the ESG score on the dividend payout ratio for firms in that country. Although statistically significant, this effect is not particularly strong: in column 2, the effect is -0.1%. Similarly, the effect on the year-over-year dividend payout ratio is significantly negative, indicating that higher investor protections weaken the effect of the ESG score on the dividend payout ratio. In line with the findings, investor protections already reduce agency costs, and therefore shareholders demand fewer dividends (Chouaibi et al., 2021; Dua & Sharma, 2024).

Additionally, COVID-19 had a slightly significantly negative effect on dividend payout ratios and year-over-year changes. This finding is consistent with figures 2 and 3 in Appendix D, which suggest a decrease in dividends in the years 2020 and 2021, reflecting the economic impact of the pandemic on the distribution of profits to shareholders. Logically, this effect is not significant in the fixed effects panel model, as the time fixed effects already account for the economic downturns that may be caused by COVID-19.

Finally, the F-Statistic implies that the model is significant. The R^2 and adjusted R^2 indicate that the fixed effects panel models do not explain the data well. The log likelihood and the Akaike Information Criterion suggest that the Poisson model does not fit the data well.

TABLE 2: FIXED EFFECTS AND POISSON REGRESSION MODELS

	Dependent variable:							
	Dividend payout ratio				Dividend payout ratio Year-over-year			
	panel linear		*Poisson*		*panel linear*		*Poisson*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG score	0.037***	0.042***	0.014***	0.015***	0.012*	0.011	0.003***	0.003***
	(0.005)	(0.008)	(0.002)	(0.002)	(0.007)	(0.007)	(0.001)	(0.001)
Architecture-Aggregate	-0.496***	-0.463***	-0.163***	-0.155***	-0.029	-0.043	-0.014	-0.016*
	(0.112)	(0.101)	(0.017)	(0.017)	(0.053)	(0.049)	(0.009)	(0.009)
Common law	-0.746***	-0.748***	-0.288***	-0.286***	-0.372***	-0.298***	-0.101***	-0.084***
	(0.151)	(0.189)	(0.032)	(0.033)	(0.097)	(0.091)	(0.018)	(0.018)
Investor protection	0.038***	0.040***	0.015***	0.016***	0.011*	0.010	0.003***	0.003***
	(0.008)	(0.010)	(0.002)	(0.002)	(0.006)	(0.006)	(0.001)	(0.001)
COVID-19	0.134	0.054	-0.023**	-0.026**	-0.143	-0.134	-0.051***	-0.049***
	(0.143)	(0.086)	(0.011)	(0.010)	(0.092)	(0.088)	(0.006)	(0.006)
ESG score* Architecture-Aggregate	0.004**	0.004**	0.001***	0.001***	0.001	0.001	0.0005***	0.0004***
	(0.002)	(0.002)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.0002)	(0.0002)
ESG score*Common law	0.012***	0.012***	0.004***	0.005***	0.005***	0.004***	0.001***	0.001***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0003)	(0.0003)
ESG score*Investor protection	-0.001***	-0.001***	-0.002***	-0.002***	-0.002*	-0.002	-0.004***	-0.004***
	(0.0001)	(0.0001)	(0.00003)	(0.00003)	(0.0001)	(0.0001)	(0.00002)	(0.00002)
Constant			0.203*	0.391***			1.363***	1.169
			(0.111)	(0.119)			(0.064)	(0.068)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,010	15,010	15,010	15,010	13,395	13,395	13,395	13,395
Adjusted R^2	0.053	0.077			0.006	0.026		
Log Likelihood			-28,000	-27,848			-24,841	-24,797
Akaike Inf. Crit.			56,018	55,726			49,701.	49,625
F Statistic	107.720***	91.422***			13.275***	28.512***		

Notes. Columns 1 and 2 present the fixed effects models for the dividend payout ratio. Columns 3 and 4 present the Poisson models for the dividend payout ratio. Columns 5 and 6 present the fixed effects models for the year-over-year dividend payout ratio. Columns 7 and 8 present the Poisson models for the year-over-year dividend payout ratio. Definitions of the variables can be found in table 4 of appendix A. White's robust standard errors clustered at the firm level are in parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

4.2 Robustness tests

4.2.1 High ESG score Vs. Low ESG Score

Table 3 of Appendix E presents the robustness test, where ESG is treated as a binary variable. Observations with an ESG score of less than 50 are transformed to 0, while observations with a score greater than 50 are transformed to 1. These regressions aim to test how having a low

or high ESG score differently affects the dividend payout ratio and the year-over-year change in the dividend payout ratio. The results confirm that ESG performance positively affects the dividend payout ratio and the year-over-year change in the dividend payout ratio. Furthermore, in line with previous results, the effect of architecture aggregate, common law, and investor protection significantly affects the relation between high versus low ESG performers and dividend payouts. The effect of COVID-19 remains negative.

4.2.2 Market-based Vs. Bank-based financial systems

Table 8 of Appendix E shows the results of a robustness test where the architecture aggregate measure was transformed into a dummy variable. Values lower than the mean (0.51) are coded as zero, and values higher than the mean (0.51) are coded as one. Using the dummy variable makes the interpretation easier, as there are two distinct groups. The findings confirm the positive effect on the dividend payout ratio and the year-over-year change in the dividend payout ratio. Moreover, in line with previous results, the effect of architecture aggregate, common law, and investor protection significantly affects the relation between ESG performance and dividend payouts. The effect of COVID-19 remains negative. Although, the effect of the market-based dummy is less strong.

4.2.3 No Environmental score Vs. Environmental score

Table 9 of Appendix E presents an additional robustness test, where the Environmental (E) score is treated as a dummy variable. E scores of 0 remain 0, and E scores greater than 0 are converted to 1. This test examines if having any E score at all indicates a different dividend payout. Since the other ESG measures contained no zeros, the E score was used. The findings are in line with the previous main results and robustness tests. Remarkable, is the dividend payout ratio and the year-over-year change in the dividend payout ratio for firms that have an E score are significantly higher than for firms that have a high ESG score (see Table 3 of Appendix E). Suggesting that focusing on environmental factors has a strong influence on dividend payouts.

5 Discussion & Conclusion

First, this paper tested the relationship between ESG performance and the dividend payout ratio. Second, it examined whether this effect varies across countries with different financial architectures, legal origins, and investor protections. Based on 15,010 firm-year observations from data on 1,530 firms across 26 different countries spanning 2010 to 2021, an industry and time fixed effects panel model and a Poisson model were conducted.

In line with Hypothesis 1, a positive relationship between ESG performance and dividend payout was found. With COVID-19 negatively influencing these results. According to agency theory, firms with strong ESG performance experience fewer agency problems and incur lower costs related to monitoring managers, thereby increasing their capacity to pay dividends. In accordance with signalling theory, firms may signal to the market that investments in ESG do not negatively impact free cash flows by distributing high dividends, indicating financial stability. Additionally, firms with higher ESG performance are perceived as less risky, which can lead to a lower cost of capital and a better ability to pay dividends. However, it is challenging to determine if higher ESG performance directly causes higher dividend payouts, as firms with more resources can more easily invest in ESG and distribute higher dividends. The effect on the year-over-year change in the dividend payout ratio shows similar relationships but is less strong, suggesting that ESG performance has little positive effect on dividend payout growth.

In line with Hypothesis 2a, financial architecture positively affects the relationship between ESG performance and dividend payout. Although the results were not strong, they suggest that in countries with a robust financial architecture—where stock markets are larger, more efficient, and more active—it may be easier for firms to secure financing for ESG investments. Furthermore, in these transparent markets, ESG performance may increase valuations due to investor preferences, leading to larger funds available for dividends.

In contrast with Hypothesis 2b, a common law legal origin positively affects the relationship between ESG performance and dividend payout. Although the results were not as strong or as hypothesized, this finding indicates that common law countries have a robust legal framework that encourages ESG performance and where investors feel safeguarded. Disclosure requirements in these countries lead to strong transparency and accountability, enabling firms with high ESG performance to generate more funds for dividend payments.

In line with Hypothesis 2c, investor protection negatively affects the relationship between ESG performance and dividend payout. Although the results were not strong, this suggests that high investor protection reduces agency costs. When investors prioritize high ESG performance, agency costs decrease, reducing the need to pay higher dividends. Similarly, high ESG performance could signal good corporate sustainability, potentially leading investors to prefer reinvesting profits rather than receiving them as dividends.

This study has several theoretical and practical implications. First, it contributes to the literature on the relationship between ESG and dividend payout, with respect to agency and signalling theory (Benlemlih, 2019; Bilyay-Erdogan et al., 2023; Lakhal et al., 2023; Niccolo et al., 2020; Rakotomavo, 2012; Samet & Jarboui, 2017; Verga Matos et al., 2020; Zahid et al., 2023). Additionally, it contributes to the literature on how institutional differences affect ESG and dividend payout, again with respect to agency and signalling theory (Aivazian et al., 2003; DasGupta & Roy, 2023; Dua & Sharma, 2024; Jabbouri, 2016; Moradi et al., 2016).

This study has several practical implications. First, it implies that investors preferring ESG investments can expect higher dividend payouts, allowing them to invest both responsibly and profitably. Furthermore, it indicates to managers that investing in ESG and paying higher dividends has positive effects on stakeholders, potentially improving reputations, reducing the cost of capital, signalling costs, and agency costs. Moreover, it suggests to policymakers that focusing on ESG legislation reduces the need for other corporate governance mechanisms, potentially leading to a reduced regulatory burden.

This paper is subject to several limitations. First, there is the issue of potential causality. The findings suggest that higher ESG performance indicates higher dividend payout ratios; however, firms with more resources can invest more in ESG or distribute more dividends. This makes it difficult to determine if ESG causes higher dividends or if financially stronger firms are simply better positioned to do so. Second, multinational corporations operate in many different countries. This study assigns them based on headquarter locations, raising questions about the reliability of the country effects. For example, a firm headquartered in the US might earn half its revenues in Europe. Third, there could be an omitted variable bias, as institutional differences are more nuanced than the three measures included in this study.

The limitations mentioned above could lead to interesting opportunities for future research. First, to better capture the effects of institutional differences, firms can be assigned to countries based on achieved turnover. Second, due to potential omitted variable bias, tax

regulations and other corporate governance mechanisms could be included in the model. Third, the effect of share buybacks can be included as another mechanism to spend internal capital and signal to the market.

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7 Appendices

7.1 Appendix A

TABLE 3: VARIABLE DESCRIPTIONS

Variables	Definition	Formula
Dependent variables:		
Dividend payout ratio	The natural logarithm of the proportion of total dividends paid to net income.	$ln(\frac{Total\ dividends\ paid_t}{Net\ income_t})$
Dividend payout ratio year-over-year	The natural logarithm of the year-over-year change in dividend payout ratio	$ln\left(\frac{Dividend\ payout\ ratio_t}{Dividend\ payout\ ratio_{t-1}}\right)$
Independent variables:		
ESG score	Sum Environmental, Social, Governance performance score.	
High ESG score	Dummy variable, 1 for ESG score greater than 0, and 0 for ESG scores of 0.	
E score binary	Dummy variable, 1 for E score greater than 0, and 0 for E scores of 0.	
E score	Environmental score	
S score	Social score	
G score	Governance score	
Architecture-Size	Size of stock markets relative to that of banks in a given country	$ln\left(\frac{Market\ cap,\ \ domestic\ stock/GDP}{Claims\ banking\ sector\ against\ private\ sector/GDP}\right)$
Architecture-Activity	Activity of the stock market compared to the banking sector in a specific country	$ln\left(\frac{Total\ value\ traded/GDP}{Claims\ banking\ sector\ against\ private\ sector/GDP}\right)$
Architecture-Efficiency	Efficiency of the stock market compared to the banking sector in a specific country	$\ln\left(\frac{Total\ value\ traded/GDP}{Banking\ overhead\ costs/Banking\ assets}\right)$
Architecture-Aggregate	Mean removed average of architecture size, activity and efficiency	$\frac{(Size-\widehat{Size})+(Activity-\widehat{Activity})+(Efficiency-\widehat{Efficiency})}{3}$
Market-based	Dummy variable, 1 for market-based and 0 for bank-based	
Common law	Dummy variable, 1 for common law and 0 for other legal origins	
Investor protection	Investor protection score of 2019	

TABLE 4 (CONTINUED): VARIABLE DESCRIPTIONS

Variables	Definition	Formula
Control variables:		
Firm size	The natural logarithm of the book value of total assets.	$ln(book\ value\ of\ total\ assets)$
Leverage	The ratio of total liabilities to total assets	$\frac{Total\ liabilities}{Total\ assets}$
Return on assets (ROA)	The ratio for profitability, measured as net income to total assets	$\frac{Net\ income}{Total\ assets}$
Cash ratio	The ratio of cash and cash equivalents to total assets	$\frac{Cash + cash\ equivalents}{Total\ assets}$
Growth	A dummy 1 for positive growth and 0 for negative growth based on the natural logarithm of sales growth	$\ln\left(\frac{Current\ sales}{Previous\ sales}\right)$, if >0 = 1, otherwise 0
Life cycle	The ratio of retained earnings to book value of common equity	$\ln\left(\frac{Retained\ earnings}{Book\ value\ of\ common\ equity}\right)$

7.2 Appendix B

TABLE 4: NUMBER OF FIRMS, LEGAL ORIGINS AND INVESTOR PROTECTION SCORES PER COUNTRY

Country	Number of firms	(%)	Legal Origin	Investor Protection
Australia	98	6.4%	English Common Origin	64
Belgium	13	0.8%	French Civil Origin	68
Brazil	27	1.8%	French Civil Origin	62
Chile	10	0.7%	French Civil Origin	66
China	60	3.9%	Socialist	72
Denmark	19	1.2%	Scandinavian Civil Origin	72
France	63	4.1%	French Civil Origin	68
Germany	52	3.4%	German Civil Origin	62
Hong Kong SAR, China	94	6.1%	English Common Origin	84
India	35	2.3%	English Common Origin	80
Indonesia	17	1.1%	French Civil Origin	70
Italy	13	0.8%	French Civil Origin	66
Japan	268	17.5%	German Civil Origin	64
Korea, Rep.	40	2.6%	German Civil Origin	88
Malaysia	25	1.6%	English Common Origin	62
Mexico	15	1.0%	French Civil Origin	58
Netherlands	14	0.9%	French Civil Origin	76
Norway	14	0.9%	Scandinavian Civil Origin	86
Singapore	24	1.6%	English Common Origin	80
South Africa	29	1.9%	English Common Origin	74
Spain	11	0.7%	French Civil Origin	72
Switzerland	30	2.0%	German Civil Origin	50
Thailand	12	0.8%	English Common Origin	86
Turkiye	15	1.0%	English Common Origin	76
United Kingdom	131	8.6%	English Common Origin	84
United States	401	26.2%	English Common Origin	71
Total	**1530**	**100.0%**		

Notes. The first and second columns show the ratio of firms per country. The third column indicates the legal origins, and the fourth column shows the Investor Protection Index scores in 2019, on a scale of 0 to 100.

7.3 Appendix C

Below the results of the data Inspection:

Autocorrelation:

First, to test for potential autocorrelation, a Durbin Watson test for panel data is conducted. As the p-value is 0.07761 and the DW-statistic 1.9756 the null hypothesis cannot be rejected with a 5% significance level. Therefore, there is no sign of autocorrelation in the model.

Heteroscedasticity:

Second, to test for heteroscedasticity, the Breusch-Pagan test is conducted. As the p-value is less than 0.01 the model is heteroskedastic. A solution for this is adding robust standard errors to the model.

Outliers and influential cases:

Third, because the dataset is large there is no need to remove outliers or influential cases as these does not change the model much.

Multicollinearity:

Fourth, to test for multicollinearity correlations and VIF are tested to see if investor protection and common law are multicollinear based on a correlation of 0.625 and a VIF of respectively 1.61 and 1.56 as these are not between 5 and 10 there is no tested multicollinearity.

Random vs Fixed effects:

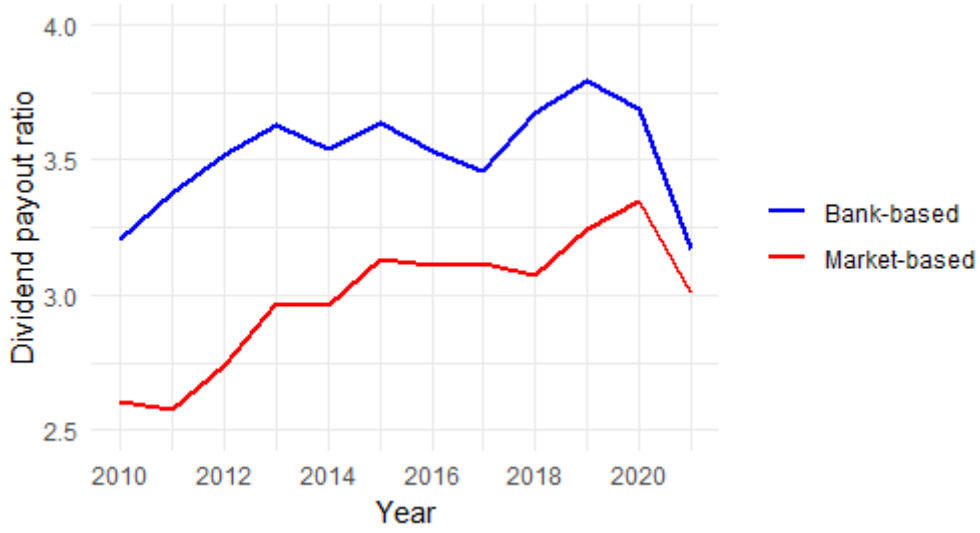
Fifth, the Hausman test is conducted to show whether the fixed or random effects model is more applicable. The p-value is smaller than 0.01 suggesting one model is inconsistent.

Fixed effects:

Finally, to test if there are significant unobserved time or entity effects the Lagrange multiplier test for two-way fixed effects is conducted. The p-value smaller than 0.01 indicates that there are unobserved effects in the model.

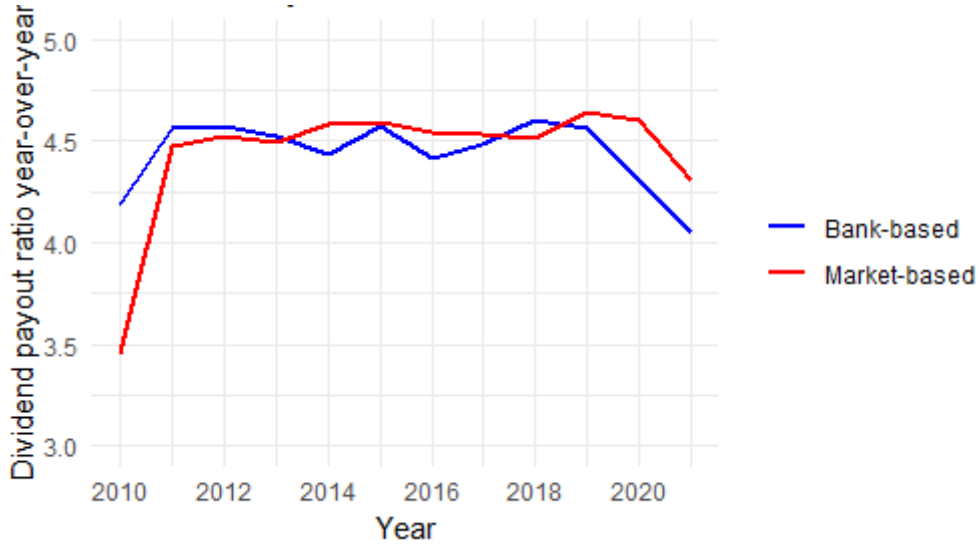
7.4 Appendix D

FIGURE 2: DIVIDEND PAYOUT RATIO OVER TIME



Notes. Definitions of the variables can be found in table 4 of appendix A.

FIGURE 3: DIVIDEND PAYOUT RATIO YEAR-OVER-YEAR OVER TIME



Notes. Definitions of the variables can be found in table 4 of appendix A.

7.5 Appendix E

TABLE 5: PEARSON CORRELATION MATRIX OF KEY VARIABLES

	Dividend payout	Dividend payout year-over-year	ESG score	Architecture -Aggregate	Investor protection	Common law
Dividend payout ratio	1					
Dividend payout year-over-year	0.693	1				
ESG score	0.116	0.054	1			
Architecture-Aggregate	-0.115	-0.015	-0.086	1		
Investor protection	0.021	-0.024	-0.061	0.22	1	
Common law	0.008	-0.047	-0.024	0.479	0.646	1

Notes. Definitions of the variables can be found in table 4 of appendix A.

Table 6: Robustness tests – High ESG score Vs. low ESG score

	Dependent variable:			
	Dividend payout ratio		Dividend payout ratio year-over-year	
	panel linear	*Poisson*	*panel linear*	*Poisson*
	(1)	(2)	(3)	(4)
High ESG score	1.487***	0.565***	0.338	0.083*
	(0.345)	(0.077)	(0.238)	(0.043)
Architecture-Aggregate	-0.390***	-0.127***	-0.025	-0.008
	(0.067)	(0.010)	(0.026)	(0.005)
Common law	-0.268*	-0.112***	-0.148***	-0.040***
	(0.150)	(0.019)	(0.056)	(0.010)
Investor protection	0.021***	0.009***	0.004	0.001*
	(0.007)	(0.001)	(0.003)	(0.001)
COVID-19	0.119	-0.015	-0.121	-0.046***
	(0.098)	(0.010)	(0.092)	(0.006)
High ESG score*Architecture-Aggregate	0.145**	0.049***	0.053*	0.018***
	(0.066)	(0.012)	(0.029)	(0.007)
High ESG score *Common law	0.369***	0.139***	0.115**	0.036***
	(0.102)	(0.022)	(0.045)	(0.012)
High ESG score *Investor protection	-0.020***	-0.008***	-0.006	-0.001**
	(0.005)	(0.001)	(0.004)	(0.001)
Constant		0.729***		1.237***
		(0.080)		(0.045)
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	No
Observations	15,010	15,010	13,395	13,395
Adjusted R^2	0.069		0.026	
Log Likelihood		-27,888.220		-24,800.170
Akaike Inf. Crit.		55,806.450		49,630.330
F Statistic	81.519***		27.620***	

Notes. Columns 1 and 2 present the fixed effects panel model and the Poisson model for dividend payout ratio. Columns 3 and 4 present the fixed effects panel model and the Poisson model for dividend payout ratio year-over-year. Definitions of the variables can be found in table 4 of appendix A. White's robust standard errors clustered at firm level are in the parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

TABLE 7: ROBUSTNESS TEST – MARKET-BASED VS. BANK-BASED FINANCIAL SYSTEMS

	Dependent variable:			
	Dividend payout ratio		Dividend payout ratio year-over-year	
	panel linear	*Poisson*	*panel linear*	*Poisson*
	(1)	(2)	(3)	(4)
ESG score	0.039***	0.014***	0.010	0.003***
	(0.008)	(0.002)	(0.007)	(0.001)
Market-based	-0.544***	-0.190***	-0.091	-0.016
	(0.110)	(0.022)	(0.076)	(0.012)
Common law	-0.892***	-0.324***	-0.290***	-0.089***
	(0.177)	(0.032)	(0.097)	(0.018)
Investor protection	0.035***	0.014***	0.010	0.003***
	(0.010)	(0.002)	(0.006)	(0.001)
COVID-19	0.075	-0.026**	-0.092	-0.050***
	(0.085)	(0.010)	(0.083)	(0.006)
ESG score*Market based	0.003	0.001***	0.002	0.0004**
	(0.002)	(0.0004)	(0.001)	(0.0002)
ESG score*Common law	0.014***	0.005***	0.004***	0.001***
	(0.002)	(0.001)	(0.001)	(0.0003)
ESG score*Investor protection	-0.001***	-0.0002***	-0.0002	-0.00004***
	(0.0001)	(0.00003)	(0.0001)	(0.00002)
Constant		0.578***		1.167***
		(0.124)		(0.072)
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	No
Observations	15,010	15,010	13,395	13,395
Adjusted R^2	0.080		0.026	
Log Likelihood		-27,311.520		-24,299.980
Akaike Inf. Crit.		54,653.040		48,629.960
F Statistic	93.449***		27.888***	

Notes. Columns 1 and 2 present the fixed effects panel model and the Poisson model for dividend payout ratio. Columns 3 and 4 present the fixed effects panel model and the Poisson model for dividend payout ratio year-over-year. Definitions of the variables can be found in table 4 of appendix A. White's robust standard errors clustered at firm level are in the parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.

TABLE 8: ROBUSTNESS TEST – NO ENVIRONMENTAL SCORE VS. ENVIRONMENTAL SCORE

	Dependent variable:			
	Dividend payout ratio		Dividend payout ratio Year-over-year	
	panel linear	*Poisson*	*panel linear*	*Poisson*
	(1)	(2)	(3)	(4)
E score binary	2.720**	1.010***	1.132**	0.236**
	(1.126)	(0.192)	(0.565)	(0.116)
Architecture-Aggregate	-0.706***	-0.236***	-0.121	-0.031**
	(0.194)	(0.031)	(0.075)	(0.014)
Common law	-0.376	-0.179***	-0.216	-0.062**
	(0.236)	(0.053)	(0.136)	(0.025)
Investor protection	0.046***	0.017***	0.018**	0.004**
	(0.016)	(0.003)	(0.007)	(0.002)
COVID-19	0.188**	-0.002	-0.005	-0.037***
	(0.078)	(0.011)	(0.058)	(0.006)
E score binary* Architecture-Aggregate	0.400**	0.141***	0.123**	0.033**
	(0.165)	(0.032)	(0.061)	(0.015)
E score binary*Common	0.341	0.156***	0.150	0.045*
	(0.223)	(0.054)	(0.131)	(0.026)
E score binary *Investor protection	-0.039**	-0.014***	-0.018**	-0.004**
	(0.016)	(0.003)	(0.008)	(0.002)
Constant		-0.059		1.014***
		(0.195)		(0.118)
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	No
Observations	15,010	15,010	13,395	13,395
Adjusted R^2	0.067		0.027	
Log Likelihood		-25,145.400		-22,306.250
Akaike Inf. Crit.		50,320.800		44,642.500
F Statistic	71.786***		26.111***	

Notes. Columns 1 and 2 present the fixed effects panel model and the Poisson model for dividend payout ratio. Columns 3 and 4 present the fixed effects panel model and the Poisson model for dividend payout ratio year-over-year. Definitions of the variables can be found in table 4 of appendix A. White's robust standard errors clustered at firm level are in the parentheses. *Significant at 10%, **significant at 5%, ***significant at 1%.