Journal of Accounting Literature

357

How biodiversity risk shapes corporate dividend decisions

G.M. Wali Ullah and Ilke Onur
College of Business, Creative arts, Law and Social Sciences, Flinders University, Adelaide, Australia
Christiana Osei Bonsu
Australian Institute of Business, Adelaide, Australia, and
Mohammad Abdullah
School of Business and Economics, Universiti Putra Malaysia, Serdang, Malaysia

Received 27 March 2025
Revised 12 November 2025
15 March 2026
Accepted 24 March 2026

Abstract

Purpose – Recent research has emphasised the impact of textual analysis-based environmental measures on corporate financial decision-making. In this regard, an emerging stream of research focuses on the impact of firm-level exposure to biodiversity risk. This study adds to the literature by examining the impact of biodiversity risk on dividend payout policy.

Design/methodology/approach – We use a large dataset of 30,652 firm-year observations from 3,220 unique US-listed firms for the period 2001–2020. Our baseline model uses ordinary least squares (OLS) regressions. We consider several endogeneity tests, including staggered adoption of state-level climate change action plans, 2-stage least squares (2SLS) with an instrumental variable, and entropy balancing to ensure robustness.

Findings – Our results show that increased exposure to biodiversity risk is associated with lower dividend payouts. Cash flow and earnings volatility act as channels driving this relationship. We also find that firm life cycle, financial constraints, CEO age, and withdrawal from the Paris Agreement moderate this relationship.

Originality/value – This study adds to the growing literature on the impact of biodiversity risk exposure on financial decision-making. By highlighting the importance of biodiversity risk to corporate stakeholders, this study enriches the broader discourse on climate finance and corporate finance strategies.

Keywords Biodiversity risk, Dividend payouts, Climate change, Paris agreement

Paper type Research article

1. Introduction

Biodiversity, short for "biological diversity", refers to the variability of life on Earth, including plants, animals, microorganisms and their ecosystems. Biodiversity is essential for mitigating the effects of climate change and provides significant economic benefits in many industries, including agriculture, forestry, fisheries and tourism. According to the World Economic Forum's Global Risk Report (2020), biodiversity loss is the second most impactful and third most likely risk for the next decade. The report highlights the significant implications of biodiversity loss for humanity, ranging from the disruption of supply chains to the collapse of food and health systems. Furthermore, it is estimated that $7.2 trillion of enterprise value is exposed to unmanaged biodiversity risk (Carvalho *et al.*, 2023), and that biodiversity and ecosystem degradation result in annual economic damages ranging from $4 trillion to $20 trillion (Kapnick, 2022).

Biodiversity risk is associated with potential losses incurred by market participants due to natural deterioration. The risk can be categorised into two main types: transition risk from regulatory actions and physical risk from actual biodiversity loss or losses related to nature

JEL Classification — G30, G35, Q54

© G.M. Wali Ullah, Ilke Onur, Christiana Osei Bonsu and Mohammad Abdullah. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at Link to the terms of the CC BY 4.0 licence.

Journal of Accounting Literature
Vol. 48 No. 5, 2026
pp. 357-388
Emerald Publishing Limited
e-ISSN: 2452-1469
p-ISSN: 0737-4607
DOI 10.1108/JAL-03-2025-0162

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

(Giglio *et al.*, 2026). The risk that is associated with biodiversity loss has attracted the attention of investors, especially following the Kumming Declaration at the United Nations Biodiversity Conference (COP15) in October 2021. For example, Soylemezgil and Uzmanoglu (2024) identified the emergence of a biodiversity risk premium in US corporate bond markets, with physical biodiversity risks increasingly reflected in bond pricing. Similarly, equity investors began pricing biodiversity risk into equity prices (Garel *et al.*, 2024; Giglio *et al.*, 2026; Huang *et al.*, 2024) as well as in the commodity market (Guidolin and Pedio, 2025). A recent survey identified that nature-related risks are financially material to investors, although a significant challenge exists in perceiving how these risks can be considered as a single metric and how to analyse its impact on corporate financial policies (Gjerde *et al.*, 2025). Due to concerns related to reputational damage and increased debt risk, biodiversity risk has been shown to reduce institutional ownership (Wang, 2025). However, firms that are proactive in managing biodiversity risk generate more value for shareholders (Sun *et al.*, 2025). Given the economic implications, researchers have examined the impact of biodiversity risk on firm-level outcomes such as stock returns (Giglio *et al.*, 2026; Kalhoro and Kyaw, 2024; Zhou *et al.*, 2025a, b), stock price crash risk (Liang *et al.*, 2024) firm operations (Ahmad and Karpuz, 2024; Giglio *et al.*, 2026; Li *et al.*, 2024a; Salmi *et al.*, 2023; Zu Ermgassen *et al.*, 2022), corporate innovation (Tian and Chen, 2025) and debt maturity (Duong *et al.*, 2025; Yang and Li, 2025). Other studies have examined how biodiversity is financed (Flammer *et al.*, 2025) and its impact on capital expenditure (Trinh, 2023). At present, biodiversity reporting is at a comparable stage to that of climate change reporting five to ten years ago (Agnew, 2022), with gender diverse boards (Haque and Jones, 2020) and boards with NGO directors (Toukabri and Alwadai, 2024) disclosing more on biodiversity.

Given the potential direct and indirect effects of biodiversity risk on a company's financial performance, it is likely to affect dividend payouts. Therefore, this study investigates how, and through which channels, biodiversity risk impacts firms' dividend payouts. This research addresses a significant gap in the literature and contributes to the limited climate finance research in this area, as noted by Karolyi and Tobin-de la Puente (2023). Our research is closely related to Hossain *et al.* (2024) and Zhou *et al.* (2025a, b). Hossain *et al.* (2024) provide evidence from the U.S. that biodiversity risk is negatively associated with dividends, focusing on documenting the direct relationship and testing heterogeneity across firm characteristics. Zhou *et al.* (2025a, b) extend this line of inquiry to China, showing that biodiversity risk reduces dividends mainly through financing difficulties and resource reallocation, with stronger effects for firms with weaker political connections, stronger external supervision, and poorer internal governance. Our research advances this literature by identifying distinct mechanisms, cash flow volatility and earnings volatility, two channels well-documented to influence firms' payout decisions (Bliss *et al.*, 2015; Chay and Suh, 2009). We show that biodiversity risk increases volatility in firm fundamentals, which in turn drives dividend conservatism as firms' smooth payouts and retain cash as a precautionary response. In doing so, our study moves the discussion from whether biodiversity risk matters (Hossain *et al.*, 2024) and through which financing channels (Zhou *et al.*, 2025a, b), to how operational and earnings stability serve as critical pathways linking biodiversity risk to payout policy. This perspective enriches theoretical understanding of the biodiversity dividend nexus.

Dividend payout is a pivotal corporate decision, impacting stock valuation and determining how companies allocate cash to shareholders (Brav *et al.*, 2005; Faulkner and García-Feijóo, 2022). Consequently, dividends are a critical component of corporate strategic planning (Allen and Michaely, 2003). Given the significance of corporate dividend payout policy to both shareholders and managers, the extant literature has been dedicated to identifying the key determinants of dividend decisions (Caliskan and Doukas, 2015; DeAngelo *et al.*, 2006; Denis and Osobov, 2008; Fama and French, 2001; John *et al.*, 2015; Koo *et al.*, 2017; Michaely and Roberts, 2012). However, the impact of biodiversity risk is limited in this literature.

Biodiversity risk can impact dividend payments in two contrasting ways. According to signalling theory, dividend policy changes can provide insight into future cash flow changes

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

(Bhattacharya, 1979; Miller and Rock, 1985). This suggests that companies may adjust their dividend policies in response to perceived cash flow risk stemming from biodiversity risk. Research has indicated a negative correlation between corporate risk management strategies and dividend payouts, suggesting that firms facing higher biodiversity-related risks may reduce dividends to preserve capital (Dionne and Ouederni, 2011). Indeed, Ahmad and Karpuz (2024) demonstrate that firms facing high biodiversity risk hold more cash for precautionary motives. Biodiversity risk exposure can negatively impact a company's future earnings by increasing the costs of corporate compliance, which in turn reduces profits and future cash flows (Jung *et al*., 2018; Zhu and Hou, 2022). Firm biodiversity risk is associated with lower sales and profitability, and a higher likelihood of bankruptcy (Adamolekun, 2024; Bach *et al*., 2025). Given the significant influence of earnings on dividend policy (Cheung *et al*., 2018; Gul, 1999; Michaely and Roberts, 2012), exposure to biodiversity risk is likely to have a negative impact on dividends. Moreover, the management of biodiversity risk requires substantial financial resources (Flammer *et al*., 2023; Panwar *et al*., 2023). While investing these financial resources to manage biodiversity risk can pay off in future stock prices, (Przychodzen and Przychodzen, 2013), it can negatively impact other aspects of firm operations, such as dividend payments, as resources are reallocated to manage biodiversity risk (Karolyi and Tobin-de la Puente, 2023; Nedopil, 2023).

On the other hand, research has shown that companies with high biodiversity risk are more likely to experience stock price crashes (Liang *et al*., 2024) and investors require a risk premium for firms exposed to higher biodiversity risk (Coqueret *et al*., 2025). In addition, investors may request a higher risk premium when they are uncertain about future regulation or litigation to protect biodiversity (Garel *et al*., 2024). We argue that companies with greater biodiversity risk pay out more dividends to investors in order to offset the risk they have created, based on the catering theory of dividends (Baker and Wurgler, 2004; Wang *et al*., 2022). Additionally, these large dividend payments assist companies in improving shareholder opinions regarding their capacity to control biodiversity risk exposure.

The two contrasting theoretical discussions suggest that overall impact of biodiversity risk on dividend payment is ambiguous. We empirically investigate this puzzle using a sample of publicly listed US firms for the 2001–2020 period, with 30,652 firm-year observations. We use three related measures of biodiversity risk, constructed by Giglio *et al.* (2026), that are based on mentions of biodiversity risk exposure in the 10-Ks of the companies in our dataset. To examine the impact of biodiversity risk on the magnitude of dividend payments, we consider the natural logarithm of one plus dividends paid, along with the dividend payout ratio, as our key outcome variables following prior studies (Hossain *et al*., 2023a, b; Tao *et al*., 2022). Our investigation comprises fixed effect regressions as well as further analyses to correct for possible endogeneity. To this end, we utilise a staggered difference-in-differences model considering the state-level enactment of Climate Change Adaption Plans (CCAP) and 2-stage least squares (2SLS) regressions using the Google biodiversity index as an instrumental variable, along with entropy balancing techniques. Overall, our results consistently show a negative significant relationship between biodiversity risk and dividend payout. This finding is both statistically significant and economically meaningful; a one standard deviation increase in biodiversity risk is associated with around 3 to 8% reduction in dividend payouts, depending on the measure used.

Furthermore, we scrutinise the channels through which biodiversity risk impacts dividend payout. Biodiversity risk may disrupt supply chains, raise compliance costs, or affect access to natural inputs, thereby heightening cash flow uncertainty. Firms facing volatile cash flows tend to conserve liquidity and reduce dividend payouts (Bliss *et al*., 2015; Chay and Suh, 2009). In addition, biodiversity-related shocks may reduce earnings stability and persistence, leading managers to adopt more conservative dividend policies to preserve financial flexibility. Our results show that cash flow and earnings volatility act as channels through which a firm's biodiversity risk exposure leads to a decrease in dividend payouts. Further analysis indicates that financial constraints, firm life cycle, CEO age and Paris agreement

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

withdrawal decision moderate the negative relationship between biodiversity risk and dividend payout.

Although there is overlap in the concepts of biodiversity risk and climate risk, the two issues show some differences. While biodiversity risk stems from the threats to the variety of life on Earth and its consequences, climate risk relates to the potential negative outcomes from changes in the climate system. The adverse effects of changes in the climate system can accelerate biodiversity decline, while biodiversity loss can contribute to climate change by destroying carbon sinks (Giglio *et al.*, 2026). Nevertheless, important distinctions exist between the two. Climate risk is predominantly expressed through phenomena such as extreme weather events, sea level rise, and the growing incidence of climate-related disasters, all of which generate substantial financial and operational challenges. By contrast, biodiversity loss stems largely from habitat degradation and pollution, which undermine ecosystem services and, in turn, disrupt economic activity (Carvalho *et al*., 2023; Ginglinger and Moreau, 2023; Li *et al*., 2024a). However, given the growing focus on climate change and its economic impacts, it is crucial to distinguish between these risks and identify their distinctive impacts on financial decision-making. Moreover, as identified by He *et al*. (2025), ESG rating agencies obtain only limited information about firms' exposure to climate risk. However, effective biodiversity risk management can significantly reduce inconsistencies in ESG rating evaluations. This suggests that the impact of biodiversity risk on firm financial policies, as an emerging and material concern to firm operations, requires increased research focus. Therefore, while past studies elaborated on how different measures of climate change risk negatively impacts dividend payouts (Huang *et al*., 2018; Zhang and Ma, 2024; Zhu and Hou, 2022), our focus on the influence of biodiversity risk adds significantly to the literature.

The 2010 Deepwater Horizon oil spill by British Petroleum (BP), one of the oil and gas "supermajors", stands out as an example of the intersection between corporate operations, biodiversity loss, and financial policy. The spill followed the explosion of the Deepwater Horizon drilling rig, which was operated by BP, in the Gulf of Mexico. Over 87 days, approximately 4.9 million barrels (around 780 million litres) of oil were released into the marine environment, contaminating coastal wetlands, open ocean habitats, and estuarine ecosystems (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, 2011). The spill affected over 2,100 kilometres of shoreline, causing widespread mortality and habitat disruption among marine species, including tens of thousands of seabirds, thousands of sea turtles, and hundreds of marine mammals (Peterson *et al*., 2012; U.S. Fish and Wildlife Service, 2016). The economic consequences for BP were equally significant. The company incurred over US$65 billion in total spill-related costs, including cleanup operations, environmental restoration, legal settlements, and penalties (Vaughan, 2018). In 2010 alone, BP reported a record annual loss of approximately $20.8 billion, largely due to provisions for spill-related liabilities (BP, 2011). To preserve liquidity and stabilize its balance sheet, BP suspended its dividend for three quarters in 2010, the first suspension since World War II. BP reinstated the dividend later that year, though it was roughly half of its previous level (BP, 2011). These figures illustrate how the environmental devastation caused by the spill translated directly into substantial financial losses and a significant shift in BP's dividend policy.

In this regard, our study makes several contributions to the emerging finance literature on biodiversity risk. Firstly, this is one of the leading studies to demonstrate that firms exposed to high biodiversity risk pay lower dividends [1]. Previous studies have considered the impact of biodiversity risk on stock returns (Giglio *et al.*, 2026; Kalhoro and Kyaw, 2024), stock price crash risk (Liang *et al*., 2024) and firm operations (Ahmad and Karpuz, 2024; Giglio *et al.*, 2026; Li *et al*., 2024b; Salmi *et al*., 2023; Zu Ermgassen *et al*., 2022). Taking note of the call for research by Karolyi and Tobin-de la Puente (2023), our study adds to this limited literature by measuring the negative impact of biodiversity risk on how companies distribute cash to shareholders in the form of cash dividends.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Secondly, the study identifies potential channels through which biodiversity risk impacts dividend payout. Specifically, we demonstrate that biodiversity risk negatively impacts dividend payout through cash flow and earnings volatility channels (Gul, 1999; Jung *et al.*, 2018; Michaely and Roberts, 2012; Zhu and Hou, 2022). In doing so, our study moves the discussion from whether biodiversity risk matters (Hossain *et al.*, 2024), and through which financing channels (Zhou *et al.*, 2025a, b), to how operational and earnings stability serve as critical pathways linking biodiversity risk to payout policy. This perspective enriches theoretical understanding of the biodiversity dividend nexus.

Thirdly, we contribute to the literature on CEO attributes by showing that the negative impact of biodiversity risk on dividend is stronger for firms managed by younger CEOs. This finding aligns with the argument that younger CEOs are more proactive in allocating resources to mitigate biodiversity risks, thereby potentially reducing immediate financial returns to shareholders in favour of long-term sustainability (Desir *et al.*, 2024). Finally, we make a contribution to the literature that employs signaling theory (Bhattacharya, 1979; Miller and Rock, 1985) to examine the determinants of dividends by considering ecological factors.

The paper is structured as follows. Section 2 provides details of the dataset and the research methodology. Section 3 presents basic regression results followed by analyses to control for potential endogeneity and model misspecification. In section 4, the focus is on the potential channels through which biodiversity risk impacts dividend payout. Section 5 comprises further analysis to capture the effect of firm differences and exogenous shocks. Lastly, section 6 concludes.

2. Data and research model

2.1 Data

Our firm-level biodiversity risk variable comes from the biodiversity risk exposure data constructed by Giglio *et al.* (2026). Making use of the 10-Ks of US listed firms, they created text-based measures of biodiversity risk. More specifically, they have three different measures: (1) Biodiversity count (BioCount) is equal to one if biodiversity risk is mentioned in the 10-K of a firm in a given year at least twice, and zero otherwise; (2) Biodiversity negative (BioNegative) is the difference between the number of negative-sentiment and positive-sentiment biodiversity related sentences in the 10-Ks; (3) Biodiversity regulation (BioRegulation) is equal to one if biodiversity risk is mentioned in the 10-K of a firm in a given year at least twice, out of which one of the mentions is related to regulation (i.e. containing words such as law(s), regulation, Act, ESA, etc.), and zero otherwise. Appendix Table A2 reports the year-wise distribution of the biodiversity risk measures in our dataset. The mention of biodiversity regulations in 10-K reports was significantly lower in the early stages of the dataset (before 2012) but gradually increased to around 3% of firm-year observations between 2015 and 2020. Similarly, the number of mentions of biodiversity started to increase and surpassed 3% of the firm-year observations from 2012 onwards. These figures correspond with those reported by Giglio *et al.* (2026), which suggests that firms have recently become more aware of and exposed to biodiversity risk due to regulatory changes and increased stakeholder awareness [2]. Moreover, Appendix Table A3 reports the correlation between the three biodiversity risk measures, demonstrating a significantly positive correlation between Bioregulation and BioCount and moderately strong correlation between BioNegative and the other two measures.

The outcome variable in our research is the dividend payments by the US listed companies. Firms usually make the strategic choice of distributing some (or all) of their profits as dividends. The rest is reinvested back in the business. We make use of Log of Dividend (Ln (1+Dividend)) and Dividend Payout Ratio to represent the magnitude of dividend payments [3]. Despite dividends being sticky in nature and many firm-year observations of our sample consisting of zero dividends, firms tend to follow a target dividend payout strategy and slowly adjusts them over time to smooth target achievements (Ha *et al.*, 2017; Lin and Yu, 2025). Our

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

empirical analysis captures the nexus between biodiversity risk exposure and the choice of dividend payments at the firm level [4]. Moreover, to add further robustness, we examine the significance of biodiversity risk on historical dividend payout trends by considering the average dividend payout ratio over the past three years prior to the biodiversity measures as the dependent variable.

All the control variables we use in our analysis are sourced from the Compustat database. They comprise PPE to asset ratio (PPE), capital expenditure ratio (CAPEX Ratio), financial leverage (Leverage), return on assets (ROA), firm size (Ln (Total Assets)), market to book equity (MBE), cash flow ratio (CFR), and net working capital (NWC). Definitions of all variables in our dataset are presented in Table A1 in the Appendix. We winsorise the variables at the 1% and 99% levels to ensure that outliers do not influence our findings.

Our dataset focuses on the 2001–2020 period since these are the years the firm-level biodiversity risk variables are available for. Furthermore, limiting the sample period to 2020 enables us to avoid the turbulent initial period of the Covid-19 global pandemic, when firms across all industries cut or omitted dividend payments in general (Cejnek *et al*., 2021; Krieger *et al*., 2021). Firms in the utility and financial industries are excluded from our final sample due to their regulated nature, leading to a final dataset of 30,652 firm-year observations from 3,220 unique firms.

Table 1 presents the summary statistics. Not all firms pay out dividends every year. The mean value for Ln (1+Dividend) is 1.92, while the same figure for Dividend Payout Ratio is 0.15. Both measures have relatively high standard deviations which indicates that dividend payouts are highly dispersed among the firms. This dispersion may reflect varying profitability, dividend policies, or stages of corporate life cycles within the sample. As for the biodiversity measures, BioCount has a mean of 0.03 and a standard deviation of 0.16. The same figures for the BioRegulation variable are 0.02 and 0.13, respectively. This indicates that on average very few of the listed firms in the US mention biodiversity risk, related to regulation or not, in their 10-Ks, consistent with Giglio *et al.* (2026). The higher standard deviation, however, points to some firms that might mention biodiversity risk multiple times, further supporting the idea of high variability in how firms disclose biodiversity risks. We observe a similar pattern for the BioNegative variable, with a mean of 0.02 and a standard deviation of 0.25. However, at the higher quantile, the difference between negative and positive biodiversity mentions is 2, hinting at the presence of a notable separation between the two sentiments.

Table 1. Summary statistics

Variable		Mean	SD	Quantiles 25th percentile	Median	75th percentile
Ln (1 + Dividend)	30,652	1.92	2.13	0.00	1.31	3.62
Dividend Payout Ratio	30,625	0.15	0.40	0.00	0.00	0.25
BioRegulation	30,652	0.02	0.13	0.00	0.00	0.01
BioNegative	30,652	0.02	0.25	0.00	0.00	2.00
BioCount	30,652	0.03	0.16	0.00	0.00	0.00
PPE to Assets	30,652	0.21	0.25	0.03	0.10	0.30
CAPEX Ratio	30,652	0.13	0.16	0.06	0.10	0.16
Leverage	30,652	0.21	0.22	0.04	0.16	0.32
ROA	30,652	0.09	0.10	0.03	0.08	0.14
Firm Size (Ln (Total Assets))	30,652	7.28	1.50	6.18	7.43	8.67
Market to Book Equity	30,652	4.89	17.64	1.39	2.19	3.70
Cash Flow Ratio	30,652	0.05	0.19	0.01	0.06	0.12
Net Working Capital	30,652	0.03	0.15	−0.06	0.01	0.12

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

3. Research model

We use the following model to examine the link between firms' biodiversity risk and dividend payouts:

$$\text{Dividend Payout}_{i,t} = \beta_0 + \beta_1 \text{Biodiversity Risk}_{i,t} + \sum \gamma_k Controls_{i,t} + \mu_j + \delta_t + \epsilon_{it} \quad (1)$$

where i denotes the firm, j represents the industry, and t denotes the year. The outcome variable, Dividend Payout$_{i,t}$, is either Ln(1+Dividend) or Dividend Payout Ratio. Biodiversity Risk$_{i,t}$ represents one of the following three measures: BioCount, BioNegative and BioRegulation. $Controls_{i,t}$ represents the firm-level control variables. μ_j denotes the industry fixed effects to account for industry-level time-invariant unobservable factors. δ_t denotes the year fixed effects and ϵ_{jt} is the error term. For all regressions, robust standard errors are clustered at the firm level.

4. Results

4.1 Baseline regression results

Table 2 presents the results of the baseline regressions, where Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. The results consistently show a significant negative relationship between

Table 2. Baseline result

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio
BioRegulation	−0.4646***	−0.0684***
	(0.0753)	(0.0215)
PPE to Assets	1.6474***	0.1218***
	(0.0702)	(0.0165)
CAPEX Ratio	−0.6483***	−0.1255***
	(0.1731)	(0.0246)
Leverage	−0.6458***	0.0085
	(0.0645)	(0.0145)
ROA	1.9457***	0.2632***
	(0.1520)	(0.0296)
Firm Size	0.6884***	0.0191***
	(0.0091)	(0.0020)
Market to Book Equity	−0.0004***	−0.0002*
	(0.0001)	(0.0000)
Cash Flow to Assets	−0.2751***	0.0754***
	(0.0812)	(0.0179)
Net Working Capital	−0.6103***	−0.0014
	(0.0758)	(0.0185)
Constant	−3.5190***	−0.0266*
	(0.0674)	(0.0147)
Observations	30,652	30,625
Adjusted *R*-squared	0.4341	0.1018
Year FE	YES	YES
Industry FE	YES	YES

Note(s): The baseline regression model between biodiversity risk and dividend payout is shown in this table. Ln (1 + Dividend) and Dividend Payout Ratio are the dependent variables in specifications 1 and 2, respectively. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides a thorough explanation of every variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

biodiversity risk and dividend payouts, suggesting that firms facing higher biodiversity risk tend to pay lower dividends. This finding is both statistically significant and economically meaningful. For instance, a one standard deviation increase in BioRegulation, is associated with a 6.03% reduction in dividend payouts and 0.89% reduction in payout ratio [5]. Further, in Table 3, we consider the alternate proxies of biodiversity risk – BioNegative and BioCount. The findings for other biodiversity measures, as well as the Dividend per Share outcome variable, present similar results, both in sign and magnitude. We find a negative and statistically significant effect of these biodiversity variables with the dividend proxies across specifications 1–4, further supporting our hypothesised relationship.

We address potential concerns about firms with zero biodiversity risk exposure and non-dividend paying strategy influencing the findings of our study. To this end a restricted sample of firms that had at least one instance of being exposed to biodiversity risk and paid a dividend during our sample period. Results, reported in specifications 1–4 in Appendix Table A4, show that our findings remain consistent for the restricted samples [6]. We also consider the possibility that firms adjust dividends in anticipation of future biodiversity-related cash flow shocks before the publication of the 10-K by examining a lagged version of the baseline regression model. The results, reported in specifications 5 and 6 of Appendix Table A4, demonstrate that our findings remain consistent in the lagged model. Further, results reported in Appendix Table A5 demonstrate that biodiversity risk influences past dividend payout trend, as the relationship remain consistent when we consider average payout ratio over the past three years (prior to the biodiversity measures) as a dependent variable [6]. Overall, our baseline regression findings strongly support the hypothesis that firms facing higher biodiversity risk tend to pay lower dividends.

This negative relationship offers support for the signalling theory proposition discussed in Section 1. Exposure to biodiversity risks and related concerns can negatively impact a firm's future earnings, limiting its ability to distribute profits to shareholders. This aligns with the findings of Cheung *et al*. (2018), Gul (1999), and Michaely and Roberts (2012), who emphasise the role of earnings in dividend decisions. Additionally, our results reflect a broader understanding of corporate sustainability, where firms dealing with environmental risks, such as carbon and biodiversity, prioritise retaining earnings for risk management or sustainability

Table 3. Baseline results with alternative proxies of biodiversity risk

Dependent variable	(2) Ln (1 + dividend)	(2) Ln (1 + dividend)	(3) Dividend payout ratio	(4) Dividend payout ratio
BioNegative	−0.1885***		−0.0276***	
	(0.0391)		(0.0100)	
BioCount		−0.5189***		−0.0670***
		(0.0617)		(0.0166)
Constant	−3.5179***	−3.5185***	−0.0265*	−0.0266*
	(0.0674)	(0.0673)	(0.0147)	(0.0147)
Observations	30,652	30,652	30,625	30,625
Adjusted *R*-squared	0.4339	0.4347	0.1016	0.1020
Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Note(s): This table demonstrates the robustness of the baseline regression model, utilizing alternative proxies of biodiversity risk. Ln (1 + Dividend) and Dividend Payout Ratio are the dependent variables in specifications 1–2 and 3–4, respectively. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides a thorough explanation of every variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

efforts over dividend payouts. This is in accord with findings from Jung *et al*. (2018), Zhu and Hou (2022), and others who highlight the financial strain that environmental concerns impose on dividend policies.

In the case of control variables, PPE to Assets shows a consistent positive association with dividend payouts, suggesting that firms with more tangible assets may have a higher capacity to pay dividends due to more stable cash flows and reduced liquidity risks. Similarly, ROA is positively associated with dividends, indicating that more profitable firms are in a better position to distribute earnings. Firm Size also shows a positive association with dividend payouts, consistent with the idea that larger firms, with greater resources and financial stability, are more likely to distribute dividends. In contrast, the CAPEX Ratio is negatively associated with dividend payouts, suggesting that firms investing heavily in growth may retain earnings to fund capital projects rather than pay dividends. The Market to Book Equity ratio and Net Working Capital similarly show a negative relationship with dividends, as firms with higher market valuations tend to prioritise reinvestment over dividend distribution. Lastly, coefficients for Leverage and Cash Flow to Assets variables are negative and significant, as expected, but only when the outcome variable is Ln(1+Dividend). For Dividend Payout Ratio as the dependent variable, both these controls show a positive but statistically insignificant relationship.

Our baseline analysis includes only year and industry fixed effects. This is due to the lack of variation over time for our biodiversity risk measures. Limited within-variance can weaken statistical inference in fixed-effect models, lowering the likelihood of identifying significant effects for our variables of interest. However, to present a more robust set of findings, next we repeat our analysis after including the firm level fixed effects. A possible advantage is limiting the impact of unobserved heterogeneity between firms that could possibly influence both dividend payouts and biodiversity risk measures. Table 4 presents the results of the robustness exercise [7]. The results remain relatively consistent with the baseline model. The impact of BioRegulation on dividend payouts continues to be negative and significant. However, the magnitude of the coefficient is notably smaller when compared to results in Table 2. Overall, we believe this exercise offers further robustness to our general hypothesis that higher exposure to biodiversity risk leads to lower dividend payouts.

4.2 Endogeneity and model misspecification

Endogeneity and model misspecification are potential concerns when analysing the effect of biodiversity risk on dividend payouts. In our context, endogeneity may arise due to omitted variable bias or measurement error, leading to biased and inconsistent estimates. Similarly, another concern, model misspecification, could be due to imbalanced covariates or incorrect functional form, which might distort the estimates. To address these concerns, in this section we implement entropy balancing, ensuring that treated and control firms are well-matched on relevant covariates, and conduct a staggered difference-in-differences (DiD) analysis to account for variation in treatment timing. We also employ a two-stage least squares (2SLS) approach with an instrumental variable (IV) to isolate the exogenous variation in biodiversity risk. These techniques help enhance the robustness and reliability of the estimated relationship between biodiversity risk and dividend payouts.

4.3 Difference-in-difference analysis

The Climate Change Adaptation Plans (CCAP) represents a critical response to the challenges posed by climate change, including biodiversity loss. CCAPs are designed to help the states mitigate and adapt to the adverse impacts of climate change by setting out sector-specific recommendations for action, such as in agriculture, biodiversity, coasts, water, and public health (Cao *et al*., 2024; Ray and Grannis, 2015). These plans are implemented gradually, with different states adopting them at different times, driven by local political factors, climate vulnerabilities, and governance capacity. Early adopters like Florida and Maryland finalised

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 4. Baseline results with firm fixed effects

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio
BioRegulation	−0.0210*	−0.0403**
	(0.0074)	(0.0201)
PPE to Assets	0.1978*	−0.0727**
	(0.1127)	(0.0326)
CAPEX Ratio	0.1231***	−0.0241
	(0.0424)	(0.0217)
Leverage	−0.0033	0.0522***
	(0.0569)	(0.0177)
ROA	0.5139***	0.1119**
	(0.1257)	(0.0449)
Firm Size	0.0286*	−0.0217***
	(0.0159)	(0.0054)
Market to Book Equity	0.0000	−0.0002
	(0.0001)	(0.0002)
Cash Flow to Assets	0.0479	0.1480***
	(0.0624)	(0.0281)
Net Working Capital	−0.3922***	0.0070
	(0.0817)	(0.0319)
Constant	1.3310***	0.3219***
	(0.1160)	(0.0397)
Observations	30,126	30,098
Adjusted *R*-squared	0.8466	0.3448
Year FE	YES	YES
Firm FE	YES	YES

Note(s): The regression model between biodiversity risk and dividend payout using firm fixed effects is shown in this table. Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. Year and firm fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

their CCAPs in 2008, and 19 states had passed their own adaptation plans by 2021 (Ray and Grannis, 2015).

The purpose of these plans is to address climate risks, including biodiversity loss, by identifying the challenges posed by climate change and planning appropriate responses. In states with CCAPs, firms face increased regulatory pressure and potential costs related to climate change adaptation, including stricter environmental regulations aimed at protecting biodiversity. Therefore, firms operating in these states are likely to perceive biodiversity risk as a more pressing issue and are expected to adjust their financial strategies, particularly their dividend policies, in response to the anticipated regulatory burden and long-term sustainability concerns. Equation (3) represents a staggered Difference-in-Differences (DiD) style analysis, which is formulated to scrutinise the exogeneous implementation of the staggered CCAP:

$$\begin{aligned}\text{Dividend Payout}_{i,t} &= \beta_0 + \beta_1 \text{Biodiversity Risk}_{i,t} + \beta_2 CCAP_{i,t} \\ &\quad + \beta_3 \text{Biodiversity Risk}_{i,t} \times CCAP_{i,t} + \sum \gamma_k Controls_{i,t} + \varepsilon_{i,t} \qquad (2)\end{aligned}$$

Where, $\text{Dividend Payout}_{i,t}$ denotes dividend payout policy for firm *i*, at year *t*. $\text{Biodiversity Risk}_{i,t}$ denotes firm level biodiversity risk measures. $CCAP_{i,t}$ is a dummy variable indicating if Climate Change Adoption Plans have been implemented at time *t* for the

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

state that firm i has the headquarter in. $Controls_{i,t}$ denotes firm level control variables and $\varepsilon_{i,t}$ is the error term.

The results, presented in Table 5, reveal significant changes in how firms exposed to biodiversity risk adjust their dividend payouts. Following the enactment of the CCAP in a given state, firms headquartered in those states increase their focus on biodiversity risk, likely due to heightened regulatory concerns and greater environmental awareness. These firms that are exposed to higher levels of biodiversity risk further reduce their dividend payouts. This behaviour aligns with the expectation that firms in these states are increasingly prioritising long-term investments in sustainability and compliance with environmental regulations over short-term shareholder returns. Specifically, the negative relationship between biodiversity risk and dividend payouts becomes more pronounced in firms headquartered in CCAP states. This suggests that the regulatory environment established by the CCAPs not only intensified firms' awareness of biodiversity risks but also provided a strong incentive for them to retain earnings to meet the financial demands of climate adaptation efforts. Thus, the results from Table 5 support the hypothesis that the adoption of state-level CCAPs strengthens the negative

Table 5. The staggered passing of climate change adoption plans (CCAP)

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend per share
CCAP × BioRegulation	−0.4398**	−0.0361**
	(0.2161)	(0.0175)
CCAP	0.1204***	0.0202**
	(0.0354)	(0.0084)
BioRegulation	−0.4184***	−0.0712***
	(0.0733)	(0.0173)
PPE to Assets	1.6487***	0.1223***
	(0.0593)	(0.0140)
CAPEX Ratio	−0.6444***	−0.1249***
	(0.0613)	(0.0145)
Leverage	−0.6477***	0.0082
	(0.0474)	(0.0112)
ROA	1.9349***	0.2615***
	(0.1382)	(0.0327)
Firm Size	0.6878***	0.0191***
	(0.0081)	(0.0019)
Market to Book Equity	−0.0004***	−0.0002*
	(0.0006)	(0.0001)
Cash Flow to Assets	−0.2669***	0.0768***
	(0.0934)	(0.0221)
Net Working Capital	−0.6182***	−0.0029
	(0.0774)	(0.0183)
Constant	−3.5255***	−0.0279**
	(0.0585)	(0.0139)
Observations	30,652	30,625
Adjusted R-squared	0.4325	0.1020
Year FE	YES	YES
Industry FE	YES	YES

Note(s): This table shows result for exogeneous shock of the staggered state-level passing of Climate Change Adoption Plans (CCAP). Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. Year and industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

impact of biodiversity risk on dividend payouts, highlighting how regulatory measures can shape corporate decision-making related to environmental risks and shareholder distributions.

4.4 Instrumental variable analysis

In this section we utilise Two-Stage Least Squares (2SLS) approach to mitigate potential endogeneity between biodiversity risk and firm performance by employing an instrumental variable (IV). Following Bach *et al*. (2025), we use the Google Biodiversity Attention Index as the instrumental variable for biodiversity regulation. The Google Biodiversity Attention Index measures public interest in biodiversity-related topics by counting the frequency of searches for biodiversity terms like "species loss" or "ecosystem services" on Google (Giglio *et al.*, 2026). This measure captures the degree to which the broader stakeholders, through Google, search and care about ecosystem issues leading to biodiversity loss, without having any direct impact on firm-level financial policies (Bach *et al.*, 2025). This index presents search interest relative to the highest point in the US. As such, the index is not firm-specific, but rather, it is more broadly aligned with negative, biodiversity-related news and events, such as COP15. This indicator serves as an ideal instrument because it reflects societal concern for biodiversity issues, which is likely to influence firm-level biodiversity risk exposure, thus meeting the relevance criterion. Importantly, the Google Biodiversity Attention Index is exogenous to firm-level dividend payouts and does not have a direct impact on firms' outcomes, fulfilling the exclusion criterion necessary for a valid instrument. We make use of the following first and second stage estimations in the 2SLS regression:

First Stage:

$$\text{Biodiversity Risk}_{i,t} = \beta_0 + \beta_1 \textit{Google Biodiversity Attention Index}_t + \sum \gamma_k \textit{Controls}_{i,t} + \varepsilon_{i,t} \tag{3}$$

Second Stage:

$$\text{Dividend Payout}_{i,t} = \beta_0 + \beta_1 \widehat{\text{Biodiversity}}\,\text{Risk}_{i,t} + \sum \gamma_k \textit{Controls}_{i,t} + \varepsilon_{i,t} \tag{4}$$

Where, Dividend Payout$_{i,t}$ denotes dividend payout policy for firm *i*, at year *t*. Biodiversity Risk$_{i,t}$ denotes firm level biodiversity risk measure. *Google Biodiversity Attention Index*$_t$ is the instrumental variable. $\widehat{\text{Biodiversity}}\,\text{Risk}_{i,t}$ is the fitted biodiversity risk measure from the first stage regression. *Controls*$_{i,t}$ denotes firm level control variables and $\varepsilon_{i,t}$ is the error term.

First stage results, presented in Table 6, show that the Google Biodiversity Index is positively and significantly related to biodiversity regulation, suggesting that increased public attention to biodiversity concerns is associated with heightened regulatory attention. In the second stage, when biodiversity regulation is instrumented using the Google Biodiversity Index, the results in specifications 2 and 3 show that the instrumented biodiversity regulation variable is statistically significant and negatively associated with dividend payouts. This analysis, which controls for potential endogeneity, further corroborates the initial results, reinforcing the argument that firms exposed to higher biodiversity risk reduce their dividend payouts.

4.5 Entropy balancing

In this section we employ entropy balancing (EB) to generate a matched sample in order to reduce the possibility of sample selection bias and account for any model misspecification. Entropy Balancing is used to address potential biases in observational studies by balancing the distribution of covariates between treatment and control groups. This technique ensures that the treatment group (firms exposed to biodiversity risk) and the control group (firms not exposed to biodiversity risk) are comparable across key characteristics (the control variables

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 6. Two-stage least squares analysis

Dependent variable	(1) Regulation	(2) Ln (1 + dividend)	(3) Dividend payout ratio
Google Biodiversity Index	0.0004***		
	(0.0001)		
BioRegulation		−1.7737***	−0.3145***
		(0.2436)	(0.0553)
PPE to Assets	0.0701***	1.7453***	0.1778***
	(0.0061)	(0.0644)	(0.0139)
CAPEX Ratio	−0.0049	−0.8089***	−0.1478***
	(0.0038)	(0.1991)	(0.0285)
Leverage	−0.0017	−0.7315***	0.0270*
	(0.0038)	(0.0690)	(0.0155)
ROA	0.0195	2.8628***	0.3461***
	(0.0123)	(0.1660)	(0.0319)
Firm Size	−0.0008	0.7760***	0.0268***
	(0.0006)	(0.0098)	(0.0021)
Market to Book Equity	0.0007*	−0.0005***	−0.0001
	(0.0003)	(0.0002)	(0.0001)
Cash Flow to Assets	−0.0088	−0.9052***	0.0356**
	(0.0069)	(0.0785)	(0.0174)
Net Working Capital	−0.0037	−0.1960***	−0.0090
	(0.0049)	(0.0725)	(0.0175)
Constant	0.2003***	−4.1418***	−0.0946***
	(0.0671)	(0.0738)	(0.0152)
Underidentification test			
Anderson Canon. LM Statistic	96.81		
p-value	0.000		
Weak identification test			
Cragg-Donald Wald F Statistic	106.88		
Observations	26,499	26,499	26,475
R-squared	0.1568	0.3581	0.0418
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

Note(s): This table shows result for 2-stage Least Squares using Instrumental Variable. Specification 1 shows result for first stage regression using Google Biodiversity Index as instrumental variable. Ln (1 + Dividend) is the dependent variable in specification 2, and Dividend Payout Ratio is the dependent variable in specification 3. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

of the study). By minimising the differences in the distribution of covariates, Entropy Balancing helps to mitigate confounding variables that could distort the estimated treatment effects, making the results more reliable and robust. The method is considered doubly robust, meaning that it accounts for both the balance of covariates and the statistical significance of the treatment effect, leading to more accurate causal inferences (Hainmueller, 2012; Hossain *et al.*, 2023a, b). This is also preferred to propensity score matching technique, as it leads to significant loss of observations (McMullin and Schonberger, 2020).

Panel A of Table 7 demonstrates the convergence of the Entropy Balancing procedure based on the mean, variance and skewness with a target moment of one in matching the treatment and control groups [8]. It shows that, after applying the Entropy Balancing weights, the distribution of covariates between firms exposed to biodiversity risk and those not exposed is nearly identical, indicating successful matching. This balancing ensures that the treatment and control groups are comparable, eliminating the potential for confounding variables to bias

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 7. Entropy balancing

Panel A: Proof of convergence

	Treatment Mean	Variance	Skewness	Control Mean	Variance	Skewness
Before balancing						
PPE to Assets	0.6597	0.0475	−0.9317	0.2663	0.0606	1.0851
CAPEX Ratio	0.1101	0.0087	2.1421	0.1313	0.0259	20.4201
Leverage	0.3119	0.0328	0.7827	0.2267	0.0536	2.5971
ROA	0.1016	0.0068	1.4561	0.1017	0.0117	0.1312
Firm Size	7.8310	1.5001	−0.7597	6.9010	2.3141	−0.1941
Market to Book Equity	4.6810	8748.0000	14.6701	7.3681	24446.0000	23.4202
Cash Flow to Assets	0.0890	0.0084	−0.4297	0.0531	0.0304	−5.5451
Net Working Capital	0.0045	0.0099	1.0662	0.0312	0.0231	−0.1363
After balancing						
PPE to Assets	0.6597	0.0475	−0.9317	0.6597	0.0475	−0.9317
CAPEX Ratio	0.1101	0.0087	2.1421	0.1101	0.0087	2.1421
Leverage	0.3119	0.0328	0.7827	0.3119	0.0328	0.7827
ROA	0.1016	0.0068	1.4561	0.1016	0.0068	1.4561
Firm Size	7.8310	1.5001	−0.7597	7.8310	1.5001	−0.7597
Market to Book Equity	4.6810	8748.0000	14.6701	4.6810	8748.0000	14.6701
Cash Flow to Assets	0.0890	0.0084	−0.4297	0.0890	0.0084	−0.4297
Net Working Capital	0.0045	0.0099	1.0662	0.0045	0.0099	1.0662

Panel B: Regression with entropy balanced matched sample

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio
BioRegulation	−0.5469***	−0.0640***
	(0.0872)	(0.0240)
PPE to Assets	0.2497	0.0693
	(0.1907)	(0.0545)
CAPEX Ratio	−0.6885	−0.0813
	(0.6554)	(0.0546)
Leverage	−1.9216***	−0.0818*
	(0.1953)	(0.0452)
ROA	1.5656***	0.0518
	(0.5674)	(0.1365)
Firm Size	0.9169***	−0.0007
	(0.0297)	(0.0085)
Market to Book Equity	0.0007	−0.0002
	(0.0001)	(0.0001)
Cash Flow to Assets	0.1983	0.3283***
	(0.3736)	(0.1244)
Net Working Capital	−3.5083***	−0.3604***
	(0.3462)	(0.0847)
Constant	−3.9898***	0.1916***
	(0.2589)	(0.0655)
Observations	30,652	30,625
Adjusted *R*-squared	0.5368	0.1531
Year FE	YES	YES
Industry FE	YES	YES

Note(s): This table shows result for Entropy Balancing. Panel A present results for proof of entropy balancing convergence and Panel B present results for regression using entropy balanced matched sample. In Panel B, Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. Year and industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

the results. In Panel B of Table 7, the regression results using the Entropy Balanced matched weighted sample further confirm the findings from the baseline models [9]. The coefficient on biodiversity risk remains negative and statistically significant, reinforcing the conclusion that firms exposed to higher biodiversity risk tend to reduce their dividend payouts.

4.6 Channel analysis

Understanding the channels through which biodiversity risk impacts dividend payouts is crucial for identifying the underlying mechanisms driving this relationship. Biodiversity risk may influence dividend policy by increasing cash flow volatility and earnings volatility, both of which affect firms' ability to maintain stable payouts. By analysing these channels, in this section we aim to provide deeper insights into how biodiversity risk translates into financial decision-making and affects corporate payout policies.

4.7 Role of cash flow volatility

In this section we examine the role of cash flow volatility on the association between biodiversity risk and firm dividend policy. We assume that firms exposed to greater biodiversity risks are likely to experience more volatile cash flows, which can significantly impact their dividend policies. The variability in cash flows arises from increased costs associated with regulatory compliance, potential fines, and the necessity for investment in biodiversity risk management initiatives (Ahmad and Karpuz, 2024; Flammer *et al*., 2023). These financial uncertainties compel firms to adopt more conservative dividend policies to ensure they retain sufficient capital to absorb shocks and manage risks effectively (Dionne and Ouederni, 2011). Consequently, the volatility in cash flows due to biodiversity risks necessitates a reduction in dividend payouts, as firms prioritise financial stability over immediate shareholder returns (Bach *et al*., 2025; Gul, 1999). This strategic shift aligns with the signalling theory, where firms adjust dividends in response to anticipated changes in future cash flows to signal their financial health to investors (Bhattacharya, 1979; Miller and Rock, 1985). To examine the role of cash flow volatility, we create a dummy variable of high cash flow volatility, where the value is 1 if the three-year standard deviation of the cash flow ratio is higher than the median, and 0 otherwise.

Table 8 presents result for the role of cash flow volatility. Supporting our conjecture, the results in specification 1 indicate that high biodiversity risk significantly increases cash flow volatility, underscoring the financial instability associated with environmental risks. Firms exposed to greater biodiversity risks experience more volatile cash flows, which directly affect their financial planning and operational stability. This heightened volatility introduces uncertainty in the firm's ability to generate consistent earnings, a critical factor in determining dividend policies. In specifications 2 and 3, the interaction term Regulation × High Cash Flow Volatility exhibits a statistically significant negative impact on dividend payouts. This finding suggests that regulatory pressures, when coupled with elevated cash flow volatility, amplify the adverse impact on dividend distribution. In essence, regulatory compliance costs, combined with unstable cash flows driven by biodiversity risks, constrain the firm's ability to distribute dividends, as more resources are diverted toward managing financial and environmental uncertainties.

4.8 Role of earnings volatility

Next, we examine the role of earnings volatility. We expect high biodiversity risk to lead to more earnings volatility, which, in turn, significantly affects dividend policies. This expectation is based on the premise that biodiversity risk can escalate compliance costs and disrupt business operations, thereby reducing profitability and future cash flows (Zhu and Hou, 2022). As firms face heightened earnings uncertainty due to biodiversity-related challenges, they might adopt more conservative dividend policies to preserve cash and buffer

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 8. Channel analysis – cash flow volatility

Dependent variable	(1) High cash flow volatility	(3) Ln (1 + dividend)	(3) Dividend payout ratio
BioRegulation	0.1267***	−0.2431*	−0.0637*
	(0.0194)	(0.1277)	(0.0357)
High Cash Flow Volatility		−0.3701***	−0.0736***
		(0.0234)	(0.0019)
BioRegulation × High Cash Flow Volatility		−0.2838*	−0.0608***
		(0.1511)	(0.0059)
PPE to Assets	−0.2592***	1.5376***	0.1106***
	(0.0170)	(0.0648)	(0.0178)
CAPEX Ratio	0.0112	−0.8848***	−0.1542***
	(0.0197)	(0.0749)	(0.0298)
Leverage	0.1218***	−0.6397***	0.0273*
	(0.0136)	(0.0518)	(0.0160)
ROA	0.0686	2.6160***	0.3288***
	(0.0420)	(0.1594)	(0.0350)
Firm Size	−0.0952***	0.6943***	0.0107***
	(0.0024)	(0.0095)	(0.0024)
Market to Book Equity	0.0000	−0.0004***	−0.0002
	(0.0000)	(0.0001)	(0.0001)
Cash Flow to Assets	−0.1132***	−0.3024***	0.0903***
	(0.0287)	(0.1091)	(0.0223)
Net Working Capital	−0.0828***	−0.6902***	−0.0249
	(0.0227)	(0.0861)	(0.0212)
Constant	1.3582***	−3.3227***	0.0646***
	(0.0178)	(0.0747)	(0.0192)
Observations	26,736	26,703	26,681
R-squared	0.1750	0.4397	0.1068
Controls	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Note(s): This table presents the results of the effect of high cash flow volatility. High cash flow volatility is represented by a dummy variable, where the value is 1 if the three-year standard deviation of the cash flow ratio is higher than the median, and 0 otherwise. Ln (1 + Dividend) is the dependent variable in specification 2, and Dividend Per Share is the dependent variable in specification 3. Year and industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

against potential financial instability (Dionne and Ouederni, 2011). Ahmad and Karpuz (2024) demonstrate that companies exposed to high biodiversity risk tend to hold more cash for precautionary reasons, indicating a strategic shift towards liquidity management over dividend distribution. Consequently, we anticipate that firms with significant biodiversity risk will exhibit lower and more volatile dividend payouts, reflecting their need to mitigate the financial impact of biodiversity-related uncertainties on their earnings. We proxy high earnings volatility by a dummy variable, where the value is 1 if the three-year standard deviation of the ROA is higher than the median, and 0 otherwise.

Table 9 shows result for the role of earnings volatility. In accord with our expectation, the results in specification 1 reveal that high biodiversity risk significantly increases earnings volatility, indicating that firms exposed to environmental risks experience greater fluctuations in their profitability. This heightened volatility reflects the unpredictability of earnings streams, which can be attributed to factors such as increased operational costs, disruptions in

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 9. Channel analysis – earnings volatility

Dependent variable	(1) High earnings volatility	(2) Ln (1 + dividend)	(3) Dividend payout ratio
BioRegulation	0.1074***	−0.0802	−0.0472*
	(0.0190)	(0.1140)	(0.0251)
High Earnings Volatility		−0.4796***	−0.0583***
		(0.0239)	(0.0054)
BioRegulation × High Earnings Volatility		−0.5783***	−0.0836**
		(0.1423)	(0.0333)
PPE to Assets	−0.2367***	1.5196***	0.1539***
	(0.0167)	(0.0646)	(0.0110)
CAPEX Ratio	−0.0496**	−0.9170***	−0.2050***
	(0.0194)	(0.0748)	(0.0179)
Leverage	0.0847***	−0.6414***	0.0457***
	(0.0134)	(0.0516)	(0.0120)
ROA	0.8305***	2.9821***	0.4068***
	(0.0413)	(0.1606)	(0.0376)
Firm Size	−0.1164***	0.6723***	0.0149***
	(0.0024)	(0.0096)	(0.0022)
Market to Book Equity	0.0000	−0.0004***	−0.0002
	(0.0000)	(0.0001)	(0.0000)
Cash Flow to Assets	−0.1066***	−0.3031***	0.0680***
	(0.0282)	(0.1089)	(0.0257)
Net Working Capital	0.2153***	−0.5599***	0.0026
	(0.0222)	(0.0861)	(0.0177)
Constant	1.4028***	−3.1431***	0.0166
	(0.0175)	(0.0754)	(0.0170)
Observations	26,685	26,653	26,639
R-squared	0.2310	0.4435	0.0567
Controls	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Note(s): This table presents the results of the effect of high earnings volatility. High earnings volatility is represented by a dummy variable, where the value is 1 if the three-year standard deviation of the ROA is higher than the median, and 0 otherwise. Ln (1 + Dividend) is the dependent variable in specification 2, and Dividend Payout Ratio is the dependent variable in specification 3. Year and industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

supply chains, and compliance with environmental regulations. Such volatility poses a challenge for firms in maintaining stable financial performance, making it difficult to forecast and allocate resources effectively. Specifications 2 and 3 further emphasise the role of earnings volatility in shaping dividend policies. The interaction term Regulation × High Earnings Volatility demonstrates a statistically significant and negative impact on dividend payouts. This suggests that regulatory pressures exacerbate the negative influence of earnings volatility on dividend decisions. In other words, firms facing both stringent regulations and unpredictable earnings are more likely to reduce dividend distributions to preserve financial flexibility and meet regulatory compliance costs. These findings indicate high biodiversity risk, by increasing earnings volatility, erodes a firm's ability to maintain consistent dividend payments. As a result, firms may opt to retain earnings as a buffer against future uncertainties rather than distributing them to shareholders.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

4.9 Additional analysis

In addition to examining the direct effects of biodiversity risk on dividend payouts, we also explore potential moderating factors that may influence this relationship. Specifically, in this section we analyse how financial constraints, firm life cycle stages, CEO age, and the US decision to withdraw from the Paris Agreement shape the impact of biodiversity risk on dividend policy. This analysis provides a more nuanced understanding of the factors that condition the biodiversity risk–dividend payout relationship.

4.10 Financial constraints

First, we examine the moderating effect of financial constraints. Existing literature indicates that under heightened financial constraints, firms are likely to reduce spending on environmental initiatives, leading to poorer environmental performance (Fan and Zhao, 2024; Trinh *et al*., 2024; Xu and Kim, 2021). This prioritisation can lead to reduced spending on biodiversity conservation and climate risk mitigation, deteriorating their overall environmental performance (Fan and Zhao, 2024; Xu and Kim, 2021). Financial constraints are associated with higher financing costs, which increase the marginal costs of environmental remediation efforts and limit the firm's capacity to invest in sustainable practices (Feng *et al*., 2024; Trinh *et al*., 2024). As a result, firms under financial strain may find it challenging to allocate resources towards mitigating biodiversity risks effectively. In the context of dividend payouts, this could mean that financially constrained firms facing greater biodiversity risks are likely to pay less dividends. The necessity to conserve cash for essential operations and immediate financial obligations takes precedence over dividend distributions. This behaviour aligns with the prospect theory, where decision-makers prioritise losses over potential gains, leading to conservative financial strategies under uncertainty (Kahneman and Tversky, 2013).

To capture the presence of financial constraints, we introduce two variables: High Financial Constraint and High WW Index, as proposed in earlier studies (Hoberg and Maksimovic, 2015; Whited and Wu, 2006). We define them as dummy variables taking the values of 1 if the financial constraint and the WW index values are greater than their median and 0 otherwise. We interact them with BioRegulation in our regression analysis. Table 10 presents the results of the effect of financial constraints on dividend payouts for firms with higher biodiversity risk. The findings indicate that firms facing higher financial constraints and greater biodiversity risk pay less in dividends. This behaviour aligns with the argument that financially constrained firms prioritise liquidity and the retention of earnings over dividend payouts to manage the increased costs and risks associated with environmental compliance and remediation (Fan and Zhao, 2024; Trinh *et al*., 2024; Xu and Kim, 2021). The negative relationship between financial constraints and dividend payouts indicates the challenges these firms face in balancing financial stability with environmental responsibility (Feng *et al*., 2024).

4.11 Firm life cycle

Next, we explore the role of firm's life cycle on the relationship between biodiversity risk and dividend payments. Firm life cycle plays a significant role in shaping a company's environmental strategies and dividend policies. During the growth stage, firms are often characterised by high innovation and proactive environmental strategies. These companies tend to invest heavily in addressing biodiversity risks and complying with environmental regulations to capitalise on growth opportunities and respond to public scrutiny, especially in high-emission sectors (Primc and Čater, 2016; Tascón *et al*., 2021). As firms transition into the maturity stage, they benefit from stability and a strong reputation built through consistent environmental performance, which helps them maintain competitive advantages and sustain stakeholder relationships (Al-Hadi *et al*., 2019). In the context of biodiversity risk, mature firms are likely to face greater expectations for environmental stewardship. This is because they have the resources and established processes to manage such risks effectively.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 10. The effect of financial constraints

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio	(3) Ln (1 + dividend)	(4) Dividend payout ratio
High Financial Constraint × BioRegulation	−0.6279***	−0.1065**		
	(0.1649)	(0.0494)		
High Financial Constraint	−0.0586***	−0.0199***		
	(0.0222)	(0.0053)		
High WW Index × BioRegulation			−0.3155**	−0.7505***
			(0.1420)	(0.1845)
High WW Index			0.2497***	−0.0249
			(0.0200)	(0.0289)
BioRegulation	−0.0744	0.0244	−0.1891***	−0.5581***
	(0.1472)	(0.0449)	(0.0923)	(0.1278)
PPE to Assets	1.6426***	0.1244***	1.6284***	0.1189
	(0.0703)	(0.0164)	(0.0701)	(0.0839)
CAPEX Ratio	−0.6393***	−0.1219***	−0.6689***	−0.1070
	(0.1723)	(0.0240)	(0.1731)	(0.0867)
Leverage	−0.6446***	0.0113	−0.6459***	0.0610
	(0.0645)	(0.0144)	(0.0640)	(0.0672)
ROA	1.9361***	0.2578***	1.9186***	0.4025**
	(0.1520)	(0.0291)	(0.1529)	(0.1955)
Firm Size	0.6889***	0.0186***	0.6720***	0.0101
	(0.0091)	(0.0020)	(0.0090)	(0.0117)
Market to Book Equity	−0.0004***	−0.0002*	−0.0004***	−0.0008
	(0.0001)	(0.0000)	(0.0001)	(0.0008)
Cash Flow to Assets	−0.2799***	0.0758***	−0.1763**	0.0225
	(0.0808)	(0.0178)	(0.0853)	(0.1326)
Net Working Capital	−0.6212***	−0.0039	−0.5901***	0.0046
	(0.0759)	(0.0187)	(0.0755)	(0.1095)
Constant	−3.4800***	−0.0092	−3.5482***	−0.0299**
	(0.0680)	(0.0149)	(0.0674)	(0.0038)
Observations	30,652	30,625	30,652	30,625
Adjusted *R*-squared	0.4344	0.1027	0.4372	0.1018
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Note(s): This table shows result for effect of financial constraints. Ln (1 + Dividend) is the dependent variable in specifications 1 and 3, and Dividend Payout Ratio is the dependent variable in specifications 2 and 4. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Consequently, older and more mature firms facing higher biodiversity risks may exhibit a tendency to pay more dividends. This behaviour can be attributed to their need to signal financial stability and maintain investor confidence.

Following DeAngelo *et al.* (2006), we use the ratio of retained earnings to total assets (*RE/TA*) and the ratio of retained earnings to total equity (*RE/TE*) as proxies for firm cycle and interact them with BioRegulation in our regression analysis. Table 11 presents the results using both variables. The findings show that older and more mature firms with higher biodiversity risk pay higher dividends. The result supports the argument that mature firms, despite facing significant environmental challenges, use dividend payouts as a strategy to reassure investors and demonstrate robust financial health. This aligns with the understanding that while younger firms focus on growth and innovation in managing biodiversity risks, mature firms leverage their established capabilities and financial resources to balance environmental responsibilities with shareholder returns (Al-Hadi *et al.*, 2019; Primc and Čater, 2016; Tascón *et al.*, 2021).

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 11. The effect of firm life cycle

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio	(3) Ln (1 + dividend)	(4) Dividend payout ratio
RE/TA × BioRegulation	1.1997***	0.0578**		
	(0.2412)	(0.0212)		
RE/TA	0.1202***	0.0226***		
	(0.0172)	(0.0032)		
RE/TE × BioRegulation			0.0797***	0.0052*
			(0.0210)	(0.0028)
RE/TE			0.0180***	0.0019***
			(0.0021)	(0.0004)
Regulation	−0.5567***	−0.0743***	−0.5009***	−0.0653***
	(0.0783)	(0.0218)	(0.0793)	(0.0233)
PPE to Assets	1.6082***	0.1159***	1.5826***	0.1104***
	(0.0706)	(0.0166)	(0.0792)	(0.0181)
CAPEX Ratio	−0.6738***	−0.1304***	−0.6444***	−0.1216***
	(0.1785)	(0.0256)	(0.1892)	(0.0263)
Leverage	−0.5539***	0.0244*	−0.5826***	0.0260
	(0.0656)	(0.0147)	(0.0700)	(0.0163)
ROA	1.8670***	0.2508***	2.6222***	0.2983***
	(0.1556)	(0.0304)	(0.1748)	(0.0358)
Firm Size	0.6582***	0.0138***	0.7243***	0.0184***
	(0.0099)	(0.0022)	(0.0105)	(0.0024)
Market to Book Equity	−0.0004***	−0.0002*	−0.0001	0.0007
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Cash Flow to Assets	−0.6100***	−0.0110	−0.4586***	0.0842***
	(0.0971)	(0.0201)	(0.0941)	(0.0226)
Net Working Capital	−0.7702***	−0.0307	−0.7136***	−0.0193
	(0.0798)	(0.0191)	(0.0859)	(0.0216)
Constant	−3.2805***	−0.0157	−3.7994***	−0.0230
	(0.0763)	(0.0167)	(0.0776)	(0.0172)
Observations	30,602	30,575	25,280	25,258
Adjusted *R*-squared	0.4361	0.1018	0.4210	0.0905
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Note(s): This table shows result of the effect of firm life cycle. Ln (1 + Dividend) is the dependent variable in specifications 1 and 3, and Dividend Payout Ratio is the dependent variable in specifications 2 and 4. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

4.12 CEO age

We further examine how the relationship varies based on the CEO age. Earlier studies show that older CEOs tend to engage in less corporate risk-taking (Ferris *et al*., 2017). Given that CEOs are responsible for major decisions and directing firm strategy, their cognitive abilities and knowledge base are crucial for navigating complex and evolving competitive, political, and economic environments (Rajagopalan and Datta, 1996). However, cognitive abilities decline with age, which can diminish a CEO's effectiveness in managing environmental risks, including biodiversity risks (Desir *et al*., 2024; Wilson *et al*., 2010). In line with this, Wali Ullah *et al*. (2024) found that managerial ability negatively impacts climate change exposure, indicating that more skilled managers can reduce firm-level climate risks. Younger CEOs, who generally possess sharper cognitive skills, greater risk-taking propensity and managerial ability, are likely to be more proactive in addressing biodiversity risks (Desir *et al*., 2024). Consequently, younger CEOs might be more effective in mitigating these risks compared to

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

their older counterparts. To examine the effect of CEO age, we split our sample into two groups: *Older CEOs* and *Younger CEOs*, based on the median CEO age.

Table 12 presents the results for the effect of CEO age on the relationship between biodiversity risk and dividend payouts. The findings reveal that the negative effect of biodiversity risk on dividend payouts is stronger for younger CEOs. This suggests that younger CEOs, who are more attuned to environmental concerns and more willing to take strategic risks, might reduce dividend payouts more significantly when faced with higher biodiversity risks. This behaviour aligns with the argument that younger CEOs are more proactive in allocating resources to mitigate biodiversity risks, thereby potentially reducing immediate financial returns to shareholders in favour of long-term sustainability (Desir *et al.*, 2024).

4.13 Paris agreement withdrawal

Under the Paris Agreement, countries, including the US at the time, were expected to meet specific environmental targets to reduce greenhouse gas emissions, a move that also encompassed the protection of ecosystems and biodiversity (Smith *et al.*, 2022; Wali Ullah *et al.*, 2024). For firms, this international framework created a heightened sense of

Table 12. The effect of CEO age

	(1)	(2)	(3)	(4)
	Ln (1 + dividend)		Dividend payout ratio	
Dependent variable	Older CEOs	Younger CEOs	Older CEOs	Younger CEOs
BioRegulation	−0.4304***	−0.7463***	−0.0482	−0.0791**
	(0.1130)	(0.1742)	(0.0463)	(0.0336)
PPE to Assets	1.4698***	1.3168***	0.0989***	0.0511*
	(0.1329)	(0.1360)	(0.0291)	(0.0302)
CAPEX Ratio	−4.5629***	−2.3179***	−0.3668***	−0.6539***
	(0.3400)	(0.1863)	(0.0344)	(0.0553)
Leverage	−0.8623***	−0.4630***	0.0399	0.0860***
	(0.1266)	(0.1295)	(0.0299)	(0.0298)
ROA	0.4518	2.3762***	0.1128*	0.2802***
	(0.5061)	(0.3699)	(0.0659)	(0.0954)
Firm Size	0.8666***	0.7671***	0.0104**	0.0076
	(0.0205)	(0.0186)	(0.0042)	(0.0054)
Market to Book Equity	−0.0004***	−0.0006***	−0.0007	−0.0001
	(0.0001)	(0.0002)	(0.0002)	(0.0002)
Cash Flow to Assets	3.3157***	1.5731***	0.3779***	0.7481***
	(0.6463)	(0.3827)	(0.0593)	(0.1027)
Net Working Capital	−0.6924***	−0.7009***	−0.0182	0.0092
	(0.1712)	(0.1568)	(0.0346)	(0.0441)
Constant	−4.2665***	−4.1096***	0.0532*	0.1552***
	(0.1543)	(0.1302)	(0.0316)	(0.0433)
Observations	9,614	10,101	9,614	10,301
Adjusted *R*-squared	0.4618	0.4241	0.0928	0.1234
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Chow-test *p*-value	0.0012		0.0038	

Note(s): This table shows result for the effect of CEO age. The sub samples of older and younger CEOs are developed based on the median CEO Age. Ln (1 + Dividend) is the dependent variable in specifications 1 and 2, and Dividend Payout Ratio is the dependent variable in specifications 3 and 4. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

responsibility toward mitigating environmental impacts, including biodiversity risks. Companies faced increasing regulatory pressures and expectations from stakeholders to reduce their carbon footprints and address biodiversity loss, often resulting in increased costs, compliance efforts, and more conservative dividend policies to manage these risks. Trump's decision to withdraw from the Paris Agreement marked a dramatic shift in US climate policy, signalling a move away from these global commitments and regulatory pressures (Faccini *et al.*, 2021). This decision was also relatively unexpected. Such an exogenous shock enables us to measure the combined effect of an environmental agreement and biodiversity risk on dividend payouts.

The withdrawal, along with the broader environmental deregulation that followed, led to a less stringent regulatory environment. US-based firms that had been concerned about biodiversity risks, motivated by global agreements and regulatory expectations (Soylemezgil and Uzmanoglu, 2024), now found themselves in a more relaxed environment where biodiversity concerns were no longer seen as a priority (Giglio *et al.* (2026); Hoepner *et al.*, 2023). As a result, firms began to reassess the relevance of biodiversity risks in their strategic planning and financial decisions. We expect this shift to influence firm behaviour, leading to changes in dividend payouts. Companies no longer need to allocate as much capital toward mitigating biodiversity-related risks as before, and instead increase shareholder returns. To capture the moderating effect of the Paris agreement withdrawal, in equation (5) we interact BioRegulation with the Paris agreement withdrawal dummy variable.

$$\begin{aligned}\text{Dividend Payout}_{i,t} = \beta_0 + \beta_1 \text{Biodiversity Risk}_{i,t} + \beta_2 \textit{Paris Agreement Withdrawal} \\ + \beta_3 \text{Biodiversity Risk}_{i,t} \times \textit{Paris Agreement Withdrawal} \\ + \sum \gamma_k \textit{Controls}_{i,t} + \varepsilon_{i,t}\end{aligned} \tag{5}$$

$\text{Dividend Payout}_{i,t}$ denotes dividend payout policy for firm *i*, at year *t*. $\text{Biodiversity Risk}_{i,t}$ denotes firm level biodiversity risk measures. Paris Agreement Withdrawal is a dummy variable that is equal to 1 for year 2017 and onwards, and 0 otherwise. $\textit{Controls}_{i,t}$ are firm level control variables, which are identical to those in equation (1). $\varepsilon_{i,t}$ denotes the error term.

To capture the direct effect of Trump's decision, we restrict the sample to two years before and after the withdrawal, excluding year 2017. Table 13 shows that the regression results provide valuable insights into how firms adjusted to this exogenous shock. We observe a shift in dividend payout behaviour. Specifically, the negative impact of biodiversity risk on dividend payouts disappears. In the years following the withdrawal, firms that were previously exposed to higher biodiversity risk begin to increase their dividend payouts. This change suggests that the environmental deregulation associated with the Paris Agreement withdrawal diminished the perceived urgency of biodiversity risk for these firms. As a result, firms that were once focused on mitigating biodiversity risks, potentially at the cost of dividends, began to prioritise returning profits to shareholders through higher dividends. The deregulation appears to have reduced the incentive for firms to retain earnings for sustainability efforts, leading to an increase in dividend payouts as firms recalibrated their strategies in response to the altered regulatory landscape.

This is further evidenced by our additional analysis, in which we identify how dividend payouts changed immediately following the signing of the Paris Agreement in 2015 [10]. Following the same research model as equation (5), we operationalise this by replacing the Paris Agreement Withdrawal dummy with the Paris Agreement Signing dummy, which takes the value of 1 from 2015 onwards and 0 otherwise, and by restricting the sample to two years before and after 2015 (excluding 2015). Considering the interaction between the Paris Agreement Signing dummy with BioRegulation as the primary variable of interest, the results, reported in Appendix Table A6, show a statistically significant negative relationship between the interaction term and the dividend payout proxies. This indicates that, during the period

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table 13. The effect of Paris agreement withdrawal

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend per share
Paris Agreement Withdrawal × Regulation	0.4153**	0.0930**
	(0.1629)	(0.0461)
Paris Agreement Withdrawal	0.1359***	0.0330***
	(0.0224)	(0.0087)
Regulation	−0.0478	−0.1035***
	(0.1992)	(0.0366)
PPE to Assets	−0.1297	0.0907***
	(0.1694)	(0.0259)
CAPEX Ratio	0.0374	−0.1371***
	(0.0618)	(0.0278)
Leverage	−0.1508	0.0279
	(0.1002)	(0.0198)
ROA	0.7225**	0.4360***
	(0.3535)	(0.0706)
Firm Size	0.0715	0.0170***
	(0.0499)	(0.0041)
Market to Book Equity	0.0001**	0.0002
	(0.0000)	(0.0001)
Cash Flow to Assets	−0.1822	0.0870*
	(0.1405)	(0.0444)
Net Working Capital	−0.2307	−0.0331
	(0.1696)	(0.0369)
Constant	1.4276***	0.0048
	(0.3560)	(0.0308)
Observations	6,085	6,061
Adjusted *R*-squared	0.4264	0.0886
Year FE	NO	NO
Industry FE	YES	YES

Note(s): This table shows result for exogeneous shock of Donald Trump's 2017 Paris Agreement Withdrawal. The Paris Agreement Withdrawal is a dummy variable for years 2017 onwards. Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. Industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

when environmental regulations strengthened following the signing of the Paris Agreement, exposure to biodiversity risk led firms to reduce dividend payouts. Only after the deregulated period following withdrawal from the Paris Agreement firms have reduced incentives to retain earnings for sustainability initiatives.

5. Conclusion

This study examines the impact of biodiversity risk on corporate dividend payouts, addressing a critical but underexplored aspect of sustainability and financial decision-making. As environmental risks, including biodiversity loss, become increasingly relevant for firms and investors, understanding their implications for corporate policies is essential. To ensure robust and reliable results, this study employs a comprehensive empirical approach. Our findings reveal that increased biodiversity risk has a negative and significant effect on dividend payouts, suggesting that firms facing greater exposure to biodiversity-related risks are more likely to adopt conservative dividend policies. This result is consistent with the idea that biodiversity risk increases financial uncertainty, leading firms to hold earnings for

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

precautionary motives and reduce their willingness to distribute cash to shareholders. The effect is particularly pronounced in firms with higher cash flow and earnings volatility, indicating that financial instability amplifies the impact of biodiversity risk on dividend decisions. Additionally, the moderating analysis highlights that the response to biodiversity risk varies based on firms' financial constraints, life cycle stages, CEO age, and the US withdrawal from the Paris Agreement.

The findings of this study contribute to the growing literature on environmental risk and corporate finance by providing new insights into how firms adjust their financial policies in response to biodiversity threats. These findings carry several practical implications. Corporate managers can proactively adjust dividend policies to retain earnings for risk mitigation, invest in biodiversity-friendly practices such as sustainable sourcing or habitat restoration, and enhance disclosure of biodiversity risk in sustainability reports to signal responsible management to stakeholders. For environmentally conscious investors, the results provide guidance for portfolio allocation, enabling the identification of firms that effectively manage biodiversity risk, anticipating potential impacts on dividend income. Policymakers can leverage these insights to design regulatory frameworks that encourage biodiversity risk management, such as linking environmental compliance to financial incentives. Future research could extend this work by exploring how regulatory changes, institutional ownership, international agreements, or geographical differences influence the relationship between biodiversity risk and financial policies.

Appendix

Table A1. Variable specification

Variables	Description	Data source
Ln (1 + Dividend)	Natural logarithm of 1 plus the amount of dividend declared on common shares	Compustat
Dividend Per Share	Ratio of dividends declared on common shares to the total number of shares outstanding	Compustat
Biodiversity_ Regulation	The 10 K-Biodiversity-Regulation Score measures firm exposure to biodiversity risks related to regulations. It assigns a score of "1" if a firm's 10-K statement contains at least two sentences mentioning biodiversity risks and at least one of these sentences references regulatory terms such as laws, regulations, or restrictions; otherwise, it assigns a score of "0"	Giglio *et al.* (2026)
Biodiversity_ Negative	The 10 K-Biodiversity-Negative Score assesses the sentiment of biodiversity mentions in firms' 10-K statements. Using the BERT model for sentiment analysis, this score specifically counts biodiversity-related sentences with negative sentiment, indicating perceived risks rather than opportunities	Giglio *et al.* (2026)
Biodiversity_ Count	10 K-Biodiversity-Count Score quantifies biodiversity risk exposure based on textual analysis of firms' 10-K statements. A score of "1" is assigned if a statement includes at least two sentences related to biodiversity; otherwise, a score of "0" is given	Giglio *et al.* (2026)
PPE to Assets	Ratio of Property, Plants and Equipment to total assets	Compustat
CAPEX Ratio	Ratio of capital expenditure to total assets	Compustat
Leverage	Sum of current and long-term liabilities divided by total assets	Compustat
ROA	Ratio of net income to total assets	Compustat
Firm Size (Ln (Total Assets))	Natural logarithm of total assets	Compustat
Market to Book Equity	Ratio of market to book value of total equity	Compustat

(*continued*)

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table A1. Continued

Variables	Description	Data source
Cash Flow Ratio	Ratio of operating income before depreciation minus interest expenses, taxes, and common dividends, all divided by the book value of assets	Compustat
Net Working Capital	Difference between current operating assets and current operating liabilities divided by total assets	Compustat
High Financial Constraint	Dummy variable taking the value of 1 if the firm has higher than median values of the "delaycon" measure – facing risk of delaying their investments due to issues with liquidity	Hoberg and Maksimovic (2015)
High WW Index	Dummy variable taking the value of 1 if the firm has higher than median values of the Whited-Wu index $WW_{i,t} = -0.091 \times \frac{CF_{i,t}}{BA_{i,t-1}} - 0.062 \times DIVPOS_{i,t} + 0.021 \times \frac{LD_{i,t}}{ASSETS_{i,t-1}} - 0.044 \times SIZE_{i,t} - 0.035 \times SG_{i,t} + 0.102 \times ISG_{i,t}$ where BA is the book value of total assets, DIVPOS is a dummy variable, equal to 1 if the dividend is positive. LD denotes long-term debt, Size is the logarithm of total assets, SG is sales growth and ISG means industrial sales growth	Author Constructed
RE/TE	Ratio of earned equity to total common equity	Compustat
RE/TA	Ratio of earned equity to total assets	Compustat
CEO Age	Age of the CEO of the firm	Execucomp

Table A2. Year-wise percentage distribution of biodiversity risk measures (BioRegulation and BioCount)

Year	Regulation	Count
2001	0.55%	1.17%
2002	0.36%	0.73%
2003	1.10%	2.00%
2004	0.70%	1.52%
2005	0.77%	1.98%
2006	0.98%	1.96%
2007	1.32%	2.21%
2008	1.36%	2.33%
2009	1.26%	2.17%
2010	1.66%	2.65%
2011	1.85%	2.97%
2012	2.40%	3.73%
2013	2.33%	3.08%
2014	2.86%	3.88%
2015	2.73%	3.98%
2016	3.16%	4.58%
2017	4.24%	5.28%
2018	4.57%	5.51%
2019	3.61%	4.74%
2020	3.60%	4.75%

Table A3. Correlation matrix between the biodiversity risk measures

	Regulation	Count	Negative
Regulation	1.0000		
Count	0.8179	1.0000	
Negative	0.4809	0.3975	1.0000

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table A4. Baseline regression results for the restricted sample of firms exposed to biodiversity risk, paying dividends and estimations using lagged independent variables

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend payout ratio	(3) Ln (1 + dividend)	(4) Dividend payout ratio	(5) Ln (1 + dividend)	(6) Dividend payout ratio
BioRegulation	−0.4511***	−0.0709***	−0.8247***	−0.0803***	−0.3848***	−0.0815***
	(0.0909)	(0.0250)	(0.0923)	(0.0303)	(0.0812)	(0.0228)
Constant	−3.9464***	−0.1597*	−3.8396***	0.5038***	−3.8037***	−0.0205*
	(0.3651)	(0.0819)	(0.1236)	(0.0408)	(0.0760)	(0.0113)
Observations	1,793	1,778	15,905	15,890	27,522	27,492
Adjusted *R*-squared	0.5953	0.0717	0.4801	0.0740	0.4348	0.1027
Controls	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Note(s): In this table, the baseline regression model is estimated for the restricted sample of firms that are exposed to biodiversity risk and paid a dividend during the time period of 2001–2020 and estimations considering the lagged independent variables. Ln (1 + Dividend) and Dividend Payout Ratio are the dependent variables in specifications 1, 3 and 5, and 2, 4 and 6, respectively. Specifications 5 and 6 considers the lagged independent variables of the baseline model. Year and industry fixed effects are taken into account in all specifications. Appendix Table A1 provides a thorough explanation of every variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Table A5. Re-estimated baseline regressions using average dividend payout ratio over the last 3 years as the dependent variable

Dependent variable: average dividend payout ratio	(1)	(2)
BioRegulation	−0.0659***	
	(0.0157)	
BioCount		−0.0704***
		(0.0118)
PPE to Assets	0.1386***	0.1405***
	(0.0122)	(0.0122)
CAPEX Ratio	−0.1199***	−0.1201***
	(0.0277)	(0.0227)
Leverage	0.0094	0.0098
	(0.0106)	(0.0106)
ROA	0.2566***	0.2563***
	(0.0225)	(0.0224)
Firm Size	0.0197***	0.0198***
	(0.0015)	(0.0015)
Market to Book Equity	−0.0002**	−0.0002*
	(0.0000)	(0.0000)
Cash Flow to Assets	0.0385***	0.0379***
	(0.0133)	(0.0132)
Net Working Capital	0.0144	0.0146
	(0.0134)	(0.0133)
Constant	−0.0374***	−0.0374***
	(0.0114)	(0.0114)
Observations	26,798	26,798
Adjusted *R*-squared	0.1633	0.1613
Year FE	YES	YES
Industry FE	YES	YES

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Table A6. The effect of the 2015 Paris agreement signing

Dependent variable	(1) Ln (1 + dividend)	(2) Dividend per share
Paris Agreement Signing × Regulation	−0.3719**	−0.1535**
	(0.1850)	(0.0641)
Paris Agreement Signing	0.1313***	−0.0001
	(0.0321)	(0.0092)
Regulation	−0.4306***	−0.0214
	(0.1294)	(0.0554)
Constant	−4.2780***	−0.0328
	(0.1015)	(0.0333)
Observations	6,034	6,015
Adjusted *R*-squared	0.4208	0.1031
Controls	YES	YES
Year FE	NO	NO
Industry FE	YES	YES

Note(s): This table shows result for the effect of the 2015 Paris Agreement Signing. The Paris Agreement Signing is a dummy variable for years 2015 onwards. Ln (1 + Dividend) is the dependent variable in specification 1, and Dividend Payout Ratio is the dependent variable in specification 2. Industry fixed effects are taken into account in both specifications. Appendix Table A1 provides an explanation of each variable. Robust standard errors, clustered at the firm level, are in parentheses. Significance at the 1%, 5%, and 10% levels is denoted by the symbols ***, **, and *, respectively

Notes

1. To the best of our knowledge, this study and the working paper by Hossain *et al*. (2024) are the only studies to date that examine the link between biodiversity risk and corporate dividend policy among US listed firms.

2. We acknowledge that our results could be influenced by the fact that a large portion of the sample reported zero for biodiversity risk. As Giglio *et al.* (2026) have outlined, firms are exposed to biodiversity risk in a significantly different way than to climate risk. The biodiversity risk variable differs from other climate risk measures due to the lack of a standardised disclosure framework. To address this concern, we re-estimate and report our baseline results after restricting our sample to firms that identified biodiversity risk exposure in their 10-K statements at least once during the sample period. The re-estimated baseline results reported in Appendix Table A4 demonstrate that our results remain consistent for this restricted sample. These results highlight the importance of biodiversity risk in shaping corporate financing policies. We thank the anonymous reviewer for this suggestion.

3. We also considered Dividend per Share as an alternative proxy for dividend payments and obtained consistent results. These results are available upon request. We thank the anonymous reviewer who suggested we consider the Dividend Payout Ratio as a key proxy in the paper.

4. Similar to biodiversity risk variables, our sample consists largely of firm-year observations with zero dividend payments. Although dividends are sticky and adjust slowly over time, many firms resumed paying dividends during our time period. To address the concern that these observations might distort our results, we re-estimated our baseline regressions separately over a restricted sample of firms that paid dividends at least once during our time period. Appendix Table A4, specifications 3 and 4, report these results and demonstrate that our baseline findings remain consistent for such firms, thus addressing the concern that large zero dividend values distort our findings.

5. This figure is calculated by multiplying the related coefficient with the standard deviation of the BioRegulation variable; (−0.4646 * 0.13) and (−0.0684 * 0.13).

6. We thank the anonymous reviewer for suggesting these tests.

7. From this section onwards, the results for the BioRegulation variable are presented, given its potentially significant financial impact on firms (Li *et al.*, 2024b). For brevity, the findings for BioCount and BioNegative variables are omitted. They are qualitatively similar to the ones reported and are available upon request.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

8. We find proof of convergence using first, second and third target moments. For brevity, we report the proofs for target moments of one, with the rest available upon request.
9. We re-estimate the baseline OLS regression model using the weights derived from entropy balancing technique.
10. We thank the anonymous referee for suggesting this additional analysis.

References

Adamolekun, G. (2024), "Firm biodiversity risk, climate vulnerabilities, and bankruptcy risk", *Journal of International Financial Markets, Institutions and Money*, Vol. 97, 102075, doi: 10.1016/j.intfin.2024.102075.

Agnew, H. (2022), "Biodiversity quickly rises up the ESG investing agenda", *Financial Times*, available at: https://www.ft.com/content/abbcec95-0154-40cd-83b9-d988bd3271b9 (accessed 1 February 2025).

Ahmad, M.F. and Karpuz, A. (2024), "Beyond climate change risk: biodiversity and corporate cash holdings", *Economics Letters*, Vol. 236, 111608, doi: 10.1016/j.econlet.2024.111608.

Al-Hadi, A., Chatterjee, B., Yaftian, A., Taylor, G. and Monzur Hasan, M. (2019), "Corporate social responsibility performance, financial distress and firm life cycle: evidence from Australia", *Accounting and Finance*, Vol. 59 No. 2, pp. 961-989, doi: 10.1111/acfi.12277.

Allen, F. and Michaely, R. (2003), "Payout policy", in *Handbook of the Economics of Finance*, Vol. 1, pp. 337-429.

Bach, T.N., Hoang, K. and Le, T. (2025), "Biodiversity risk and firm performance: evidence from US firms", *Business Strategy and the Environment*, Vol. 34 No. 1, pp. 1113-1132, doi: 10.1002/bse.4039.

Baker, M. and Wurgler, J. (2004), "A catering theory of dividends", *The Journal of Finance*, Vol. 59 No. 3, pp. 1125-1165, doi: 10.1111/j.1540-6261.2004.00658.x.

Bhattacharya, S. (1979), "Imperfect information, dividend policy, and 'the bird in the hand' fallacy", *The Bell Journal of Economics*, Vol. 10 No. 1, pp. 259-270, doi: 10.2307/3003330.

Bliss, B.A., Cheng, Y. and Denis, D.J. (2015), "Corporate payout, cash retention, and the supply of credit: evidence from the 2008-2009 credit crisis", *Journal of Financial Economics*, Vol. 115 No. 3, pp. 521-540, doi: 10.1016/j.jfineco.2014.10.013.

BP (2011), *BP Annual Report and Form 20-F 2010*, BP p.l.c., London.

Brav, A., Graham, J.R., Harvey, C.R. and Michaely, R. (2005), "Payout policy in the 21st century", *Journal of Financial Economics*, Vol. 77 No. 3, pp. 483-527, doi: 10.1016/j.jfineco.2004.07.004.

Caliskan, D. and Doukas, J.A. (2015), "CEO risk preferences and dividend policy decisions", *Journal of Corporate Finance*, Vol. 35, pp. 18-42, doi: 10.1016/j.jcorpfin.2015.08.007.

Cao, Z., Chen, S.X., Dong, T. and Lee, E. (2024), "Climate change uncertainty and supply chain financing", *The British Accounting Review*, Vol. 57 No. 5, 101423, doi: 10.1016/j.bar.2024.101423.

Carvalho, S.H.C.d., Cojoianu, T. and Ascui, F. (2023), "From impacts to dependencies: a first global assessment of corporate biodiversity risk exposure and responses", *Business Strategy and the Environment*, Vol. 32 No. 5, pp. 2600-2614, doi: 10.1002/bse.3142.

Cejnek, G., Randl, O. and Zechner, J. (2021), "The COVID-19 pandemic and corporate dividend policy", *Journal of Financial and Quantitative Analysis*, Vol. 56 No. 7, pp. 2389-2410, doi: 10.1017/s0022109021000533.

Chay, J.-B. and Suh, J. (2009), "Payout policy and cash-flow uncertainty", *Journal of Financial Economics*, Vol. 93 No. 1, pp. 88-107, doi: 10.1016/j.jfineco.2008.12.001.

Cheung, A., Hu, M. and Schwiebert, J. (2018), "Corporate social responsibility and dividend policy", *Accounting and Finance*, Vol. 58 No. 3, pp. 787-816, doi: 10.1111/acfi.12238.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Coqueret, G., Giroux, T. and Zerbib, O.D. (2025), "The biodiversity premium", *Ecological Economics*, Vol. 228, 108435, doi: 10.1016/j.ecolecon.2024.108435.

DeAngelo, H., DeAngelo, L. and Stulz, R.M. (2006), "Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory", *Journal of Financial Economics*, Vol. 81 No. 2, pp. 227-254, doi: 10.1016/j.jfineco.2005.07.005.

Denis, D.J. and Osobov, I. (2008), "Why do firms pay dividends? International evidence on the determinants of dividend policy", *Journal of Financial Economics*, Vol. 89 No. 1, pp. 62-82, doi: 10.1016/j.jfineco.2007.06.006.

Desir, R., Rakestraw, J., Seavey, S., Wainberg, J. and Young, G. (2024), "Managerial ability, CEO age and the moderating effect of firm characteristics", *Journal of Business Finance and Accounting*, Vol. 51 Nos 1-2, pp. 148-179, doi: 10.1111/jbfa.12689.

Dionne, G. and Ouederni, K. (2011), "Corporate risk management and dividend signaling theory", *Finance Research Letters*, Vol. 8 No. 4, pp. 188-195, doi: 10.1016/j.frl.2011.05.002.

Duong, K.T., Nguyen, T.T. and Tram, H.T.X. (2025), "Biodiversity risk and corporate debt maturity", *International Review of Financial Analysis*, Vol. 107, 104556, doi: 10.1016/j.irfa.2025.104556.

Faccini, R., Matin, R. and Skiadopoulos, G.S. (2021), "Dissecting climate risks: are they reflected in stock prices?", available at: SSRN 3795964.

Fama, E.F. and French, K.R. (2001), "Disappearing dividends: changing firm characteristics or lower propensity to pay?", *Journal of Financial Economics*, Vol. 60 No. 1, pp. 3-43, doi: 10.1016/s0304-405x(01)00038-1.

Fan, H. and Zhao, K. (2024), "Uncovering the intensity of climate risk and opportunity: awareness and effectiveness", *The British Accounting Review*, Vol. 57 No. 2, 101469, doi: 10.1016/j.bar.2024.101469.

Faulkner, M. and García-Feijóo, L. (2022), "Hot-stove effects: the impact of CEO past corporate experiences on dividend policy", *Journal of Financial and Quantitative Analysis*, Vol. 57 No. 5, pp. 1695-1726, doi: 10.1017/s002210902100034x.

Feng, F., Han, L., Jin, J. and Li, Y. (2024), "Climate change exposure and bankruptcy risk", *British Journal of Management*, Vol. 35 No. 4, doi: 10.1111/1467-8551.12792.

Ferris, S.P., Javakhadze, D. and Rajkovic, T. (2017), "CEO social capital, risk-taking and corporate policies", *Journal of Corporate Finance*, Vol. 47, pp. 46-71, doi: 10.1016/j.jcorpfin.2017.09.003.

Flammer, C., Giroux, T. and Heal, G. (2023), "Biodiversity finance".

Flammer, C., Giroux, T. and Heal, G.M. (2025), "Biodiversity finance", *Journal of Financial Economics*, Vol. 164, 103987, doi: 10.1016/j.jfineco.2024.103987.

Garel, A., Romec, A., Sautner, Z. and Wagner, A.f. (2024), "Do investors care about biodiversity?", *Review of Finance*, Vol. 28 No. 4, rfae010.

Giglio, S., Kuchler, T., Stroebel, J. and Zeng, X. (2026), "Biodiversity risk", *Review of Finance*, Vol. 30 No. 1, pp. 131-161.

Ginglinger, E. and Moreau, Q. (2023), "Climate risk and capital structure", *Management Science*, Vol. 69 No. 12, pp. 7492-7516, doi: 10.1287/mnsc.2023.4952.

Gjerde, S., Sautner, Z., Wagner, A.F. and Wegerich, A. (2025), "Corporate nature risk perceptions", available at: SSRN.

Guidolin, M. and Pedio, M. (2025), "The pricing of biodiversity risk in commodity markets", available at: SSRN 5208232.

Gul, F.A. (1999), "Growth opportunities, capital structure and dividend policies in Japan", *Journal of Corporate Finance*, Vol. 5 No. 2, pp. 141-168, doi: 10.1016/s0929-1199(99)00003-6.

Ha, C.Y., Im, H.J. and Kang, Y. (2017), "Sticky dividends: a new explanation", *Finance Research Letters*, Vol. 23, pp. 69-79, doi: 10.1016/j.frl.2017.05.010.

Hainmueller, J. (2012), "Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies", *Political Analysis*, Vol. 20 No. 1, pp. 25-46, doi: 10.1093/pan/mpr025.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Haque, F. and Jones, M.J. (2020), "European firms' corporate biodiversity disclosures and board gender diversity from 2002 to 2016", *The British Accounting Review*, Vol. 52 No. 2, 100893, doi: 10.1016/j.bar.2020.100893.

He, F., Duan, L., Lucey, B. and Hao, J. (2025), "Biodiversity risk or climate risk? Which factor affects corporate ESG rating divergence", *International Review of Financial Analysis*, Vol. 104, 104302, (PA), doi: 10.1016/j.irfa.2025.104302.

Hoberg, G. and Maksimovic, V. (2015), "Redefining financial constraints: a text-based analysis", *The Review of Financial Studies*, Vol. 28 No. 5, pp. 1312-1352, doi: 10.1093/rfs/hhu089.

Hoepner, A.G., Klausmann, J., Leippold, M. and Rillaerts, J. (2023), "Beyond climate: the impact of biodiversity, water, and pollution on the CDS term structure".

Hossain, A., Masum, A.-A., Saadi, S., Benkraiem, R. and Das, N. (2023a), "Firm-level climate change risk and CEO equity incentives", *British Journal of Management*, Vol. 34 No. 3, pp. 1387-1419, doi: 10.1111/1467-8551.12652.

Hossain, M.N., Rabarison, M.K., Ater, B. and Sobngwi, C.K. (2023b), "CEO marital status and dividend policy", *Journal of Corporate Finance*, Vol. 78, 102342, doi: 10.1016/j.jcorpfin.2022.102342.

Hossain, M.N., Kamal, M.R. and Rabarison, M.K. (2024), "Biodiversity risk and dividend policy", available at: SSRN 4910994.

Huang, H.H., Kerstein, J. and Wang, C. (2018), "The impact of climate risk on firm performance and financing choices: an international comparison", *Journal of International Business Studies*, Vol. 49 No. 5, pp. 633-656, doi: 10.1057/s41267-017-0125-5.

Huang, Y., Créti, A., Jiang, B. and Sanin, M.E. (2024), "Biodiversity risk, firm performance, and market mispricing", *Proceedings of the EUROFIDAI-ESSEC Paris December Finance Meeting*.

John, K., Knyazeva, A. and Knyazeva, D. (2015), "Governance and payout precommitment", *Journal of Corporate Finance*, Vol. 33, pp. 101-117, doi: 10.1016/j.jcorpfin.2015.05.004.

Jung, J., Herbohn, K. and Clarkson, P. (2018), "Carbon risk, carbon risk awareness and the cost of debt financing", *Journal of Business Ethics*, Vol. 150 No. 4, pp. 1151-1171, doi: 10.1007/s10551-016-3207-6.

Kahneman, D. and Tversky, A. (2013), "Prospect theory: an analysis of decision under risk", in *Handbook of the Fundamentals of Financial Decision Making*, pp. 99-127, doi: 10.1142/9789814417358_0006.

Kalhoro, M.R. and Kyaw, K. (2024), "Manage biodiversity risk exposure?", *Finance Research Letters*, Vol. 61, 104989, doi: 10.1016/j.frl.2024.104989.

Kapnick, S. (2022), "The economic importance of biodiversity: threats and opportunities", in *JP Morgan Asset Management*, available at: https://am.jpmorgan.com/us/en/assetmanagement

Karolyi, G.A. and Tobin-de la Puente, J. (2023), "Biodiversity finance: a call for research into financing nature", *Financial Management*, Vol. 52 No. 2, pp. 231-251, doi: 10.1111/fima.12417.

Koo, D.S., Ramalingegowda, S. and Yu, Y. (2017), "The effect of financial reporting quality on corporate dividend policy", *Review of Accounting Studies*, Vol. 22 No. 2, pp. 753-790, doi: 10.1007/s11142-017-9393-3.

Krieger, K., Mauck, N. and Pruitt, S.W. (2021), "The impact of the COVID-19 pandemic on dividends", *Finance Research Letters*, Vol. 42, 101910, doi: 10.1016/j.frl.2020.101910.

Li, Q., Shan, H., Tang, Y. and Yao, V. (2024a), "Corporate climate risk: measurements and responses", *The Review of Financial Studies*, Vol. 37 No. 6, pp. 1778-1830, doi: 10.1093/rfs/hhad094.

Li, Y., Liu, X., Canil, J. and Cheong, C.S. (2024b), "Biodiversity risk and firm efficiency", *Finance Research Letters*, Vol. 71, 106414, doi: 10.1016/j.frl.2024.106414.

Liang, C., Yang, J., Shen, L. and Dong, D. (2024), "The role of biodiversity risk in stock price crashes", *Finance Research Letters*, Vol. 67, 105856, doi: 10.1016/j.frl.2024.105856.

Lin, J.-C. and Yu, M.-T. (2025), "Managerial overconfidence and dividend stickiness", *Journal of Accounting, Auditing and Finance*, Vol. 40 No. 1, pp. 165-192, doi: 10.1177/0148558x221150102.

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

McMullin, J.L. and Schonberger, B. (2020), "Entropy-balanced accruals", *Review of Accounting Studies*, Vol. 25 No. 1, pp. 84-119, doi: 10.1007/s11142-019-09525-9.

Michaely, R. and Roberts, M.R. (2012), "Corporate dividend policies: lessons from private firms", *The Review of Financial Studies*, Vol. 25 No. 3, pp. 711-746, doi: 10.1093/rfs/hhr108.

Miller, M.H. and Rock, K. (1985), "Dividend policy under asymmetric information", *The Journal of Finance*, Vol. 40 No. 4, pp. 1031-1051, doi: 10.1111/j.1540-6261.1985.tb02362.x.

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (2011), *Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling*, Washington, DC.

Nedopil, C. (2023), "Integrating biodiversity into financial decision-making: challenges and four principles", *Business Strategy and the Environment*, Vol. 32 No. 4, pp. 1619-1633, doi: 10.1002/bse.3208.

Panwar, R., Ober, H. and Pinkse, J. (2023), "The uncomfortable relationship between business and biodiversity: advancing research on business strategies for biodiversity protection", *Business Strategy and the Environment*, Vol. 32 No. 5, pp. 2554-2566, doi: 10.1002/bse.3139.

Peterson, C.H., Anderson, S.S., Cherr, G.N., Ambrose, R.F., Anghera, S., Bay, S., Blum, M., Condon, R., Dean, T.A., Graham, M., Guzy, M., Hampton, S., Joye, S., Lambrinos, J., Mate, B., Meffert, D., Powers, S.P., Somasundaran, P., Spies, R.B., Taylor, C.M., Tjeerdema, R. and Adams, E.E. (2012), "A tale of two spills: novel science and policy implications of an emerging new oil spill model", *BioScience*, Vol. 62 No. 5, pp. 461-469, doi: 10.1525/bio.2012.62.5.7.

Primc, K. and Čater, T. (2016), "Environmental strategies in different stages of organisational evolution: theoretical foundations", *Australasian Journal of Environmental Management*, Vol. 23 No. 1, pp. 100-117, doi: 10.1080/14486563.2015.1050703.

Przychodzen, J. and Przychodzen, W. (2013), "Corporate sustainability and shareholder wealth", *Journal of Environmental Planning and Management*, Vol. 56 No. 4, pp. 474-493, doi: 10.1080/09640568.2012.685927.

Rajagopalan, N. and Datta, D.K. (1996), "CEO characteristics: does industry matter?", *Academy of Management Journal*, Vol. 39 No. 1, pp. 197-215, doi: 10.5465/256636.

Ray, A.D. and Grannis, J. (2015), "From planning to action: implementation of state climate change adaptation plans", *Michigan Journal of Sustainability*, Vol. 3, 20181221, doi: 10.3998/mjs.12333712.0003.001.

Salmi, A., Quarshie, A.M., Scott-Kennel, J. and Kähkönen, A.-K. (2023), "Biodiversity management: a supply chain practice view", *Journal of Purchasing and Supply Management*, Vol. 29 No. 4, 100865, doi: 10.1016/j.pursup.2023.100865.

Smith, P., Arneth, A., Barnes, D.K., Ichii, K., Marquet, P.A., Popp, A., Pörtner, H.O., Rogers, A.D., Scholes, R.J., Strassburg, B., Wu, J. and Ngo, H. (2022), "How do we best synergize climate mitigation actions to co-benefit biodiversity?", *Global Change Biology*, Vol. 28 No. 8, pp. 2555-2577, doi: 10.1111/gcb.16056.

Soylemezgil, S. and Uzmanoglu, C. (2024), "Biodiversity risk in the corporate bond market", available at: SSRN 4721219.

Sun, W., Mei, J., Chen, K. and Li, Z. (2025), "Biodiversity risk and value creation in emerging markets", *Finance Research Letters*, Vol. 85, 108069, doi: 10.1016/j.frl.2025.108069.

Tao, Q., Wei, K.J., Xiang, X. and Yi, B. (2022), "Board directors' foreign experience and firm dividend payouts", *Journal of Corporate Finance*, Vol. 75, 102237, doi: 10.1016/j.jcorpfin.2022.102237.

Tascón, M.T., Castro, P. and Ferreras, A. (2021), "How does a firm's life cycle influence the relationship between carbon performance and financial debt?", *Business Strategy and the Environment*, Vol. 30 No. 4, pp. 1879-1897, doi: 10.1002/bse.2722.

The World Economic Forum (2020), "*Global risk report 2020*", The World Economic Forum, available at: https://www.weforum.org/publications/the-global-risks-report-2020/ (accessed 8 March 2026).

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026

Tian, Y. and Chen, H. (2025), "Eco-innovation under pressure: how biodiversity risks shape corporate sustainability strategies", *Finance Research Letters*, Vol. 73, 106615, doi: 10.1016/j.frl.2024.106615.

Toukabri, M. and Alwadai, A.M. (2024), "Corporate commitments to biodiversity disclosure and sustainable board. Do NGO directors on board matter? Recent evidence from S&P 500 companies", *Journal of Corporate Accounting and Finance*, Vol. 35 No. 3, pp. 109-145.

Trinh, H.H. (2023), "Biodiversity risks and corporate investment", available at: SSRN 4587333.

Trinh, V.Q., Trinh, H.H., Li, T. and Vo, X.V. (2024), "Climate change exposure, financial development, and the cost of debt: evidence from EU countries", *Journal of Financial Stability*, Vol. 74, 101315, doi: 10.1016/j.jfs.2024.101315.

U.S. Fish and Wildlife Service (2016), *Deepwater Horizon: Natural Resource Damage Assessment*, U.S. Department of the Interior.

Vaughan, A. (2018), "BP's deepwater horizon bill tops $65bn", *The Guardian*, available at: https://www.theguardian.com/business/2018/jan/16/bps-deepwater-horizon-bill-tops-65bn (accessed 9 March 2026).

Wali Ullah, G.M., Khan, I. and Abdullah, M. (2024), "Managerial ability and climate change exposure", *International Journal of Managerial Finance*, Vol. 20 No. 3, pp. 651-676, doi: 10.1108/IJMF-12-2022-0551.

Wang, Y. (2025), "The silent cost of biodiversity loss: unveiling its impact on institutional ownership", *International Review of Financial Analysis*, Vol. 103, 104075, doi: 10.1016/j.irfa.2025.104075.

Wang, Y., Li, M. and Kamar, A. (2022), "Environmental concerns and impression offsetting: new evidence on dividend payout", *Financial Markets, Institutions and Instruments*, Vol. 31 Nos 2-3, pp. 87-118, doi: 10.1111/fmii.12165.

Whited, T.M. and Wu, G. (2006), "Financial constraints risk", *The Review of Financial Studies*, Vol. 19 No. 2, pp. 531-559, doi: 10.1093/rfs/hhj012.

Wilson, R.S., Leurgans, S.E., Boyle, P.A., Schneider, J.A. and Bennett, D.A. (2010), "Neurodegenerative basis of age-related cognitive decline", *Neurology*, Vol. 75 No. 12, pp. 1070-1078, doi: 10.1212/WNL.0b013e3181f39adc.

Xu, Q. and Kim, T. (2021), "Financial constraints and corporate environmental policies", *The Review of Financial Studies*, Vol. 35 No. 2, pp. 576-635, doi: 10.1093/rfs/hhab056.

Yang, G. and Li, Y. (2025), "Research on biodiversity risk and corporate short-term debt for long-term use under disclosure regulation", *Finance Research Letters*, Vol. 77, 107049, doi: 10.1016/j.frl.2025.107049.

Zhang, Z. and Ma, Z.Z. (2024), "Does temperature influence dividend policy?", available at: SSRN 4974174.

Zhou, C., Chen, Y., Ji, Q. and Zhang, D. (2025a), "Does public attention to biodiversity matter to stock markets?", *International Review of Financial Analysis*, Vol. 98, 103925, doi: 10.1016/j.irfa.2025.103925.

Zhou, Y., Lucey, B.M. and He, F. (2025b), "Dividend payouts and biodiversity risk–Chinese evidence", *Research in International Business and Finance*, Vol. 76, 102792, doi: 10.1016/j.ribaf.2025.102792.

Zhu, B. and Hou, R. (2022), "Carbon risk and dividend policy: evidence from China", *International Review of Financial Analysis*, Vol. 84, 102360, doi: 10.1016/j.irfa.2022.102360.

Zu Ermgassen, S.O., Howard, M., Bennun, L., Addison, P.F., Bull, J.W., Loveridge, R., Pollard, E. and Starkey, M. (2022), "Are corporate biodiversity commitments consistent with delivering 'nature-positive' outcomes? A review of 'nature-positive' definitions, company progress and challenges", *Journal of Cleaner Production*, Vol. 379, 134798, doi: 10.1016/j.jclepro.2022.134798.

Corresponding author
G.M. Wali Ullah can be contacted at: gm.waliullah@flinders.edu.au

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: **permissions@emeraldinsight.com**

Downloaded from http://ftp.nowpublishers.com/jal/article-pdf/48/5/357/11527332/jal-03-2025-0162en.pdf by guest on 23 June 2026