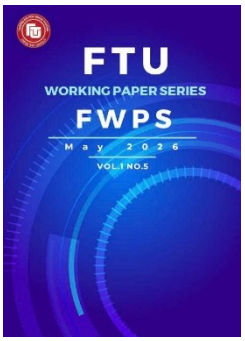

Working Paper 2026.1.5.17

- Vol. 1, No. 5

THỰC HÀNH CHUỖI CUNG ỨNG BỀN VỮNG VÀ CHI TRẢ CỔ TỨC CỦA DOANH NGHIỆP: BẰNG CHỨNG TOÀN CẦU TỪ DỮ LIỆU BẢNG ĐA QUỐC GIA

Phạm Ngọc Anh[1], Phạm Hà My, Trịnh Phương Hà, Nguyễn Hưng Thịnh,

Lương Vân Anh

Sinh viên K62 CLC Kinh tế đối ngoại – Viện Kinh tế và Kinh doanh quốc tế

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Nguyễn Vân Hà

Khoa Tài chính – Ngân hàng

Trường Đại học Ngoại thương, Hà Nội, Việt Nam

Tóm tắt

Nghiên cứu này xem xét mối quan hệ giữa thực hành chuỗi cung ứng bền vững và chính sách cổ tức của doanh nghiệp dựa trên một bộ dữ liệu quy mô lớn ở cấp độ doanh nghiệp trên phạm vi nhiều quốc gia. Dựa trên dữ liệu bảng bao gồm các doanh nghiệp thuộc nhiều quốc gia và nhiều năm, nghiên cứu phân biệt hai khía cạnh của chính sách cổ tức: tỷ lệ chi trả cổ tức và quyết định chi trả cổ tức. Thực hành chuỗi cung ứng bền vững được đo lường thông qua một chỉ số phản ánh các chính sách môi trường của doanh nghiệp liên quan đến tích hợp chuỗi cung ứng, lựa chọn và giám sát nhà cung cấp, bao bì bền vững và việc chấm dứt hợp tác với các nhà cung cấp không tuân thủ.

[1] Corresponding author, Email: k62.2312150011@gtu.edu.vn

Để xem xét tính động của chính sách cổ tức và các vấn đề nội sinh tiềm ẩn, nghiên cứu sử dụng khuôn khổ thực nghiệm hai giai đoạn. Phương pháp hồi quy dữ liệu bảng động được sử dụng để phân tích tỷ lệ chi trả cổ tức, trong khi mô hình probit nhị biến được ước lượng nhằm xem xét quyết định chi trả cổ tức của doanh nghiệp. Kết quả cho thấy thực hành chuỗi cung ứng bền vững có mối liên hệ có hệ thống với hành vi chi trả cổ tức của doanh nghiệp, cho thấy mức độ tham gia vào các hoạt động bền vững ảnh hưởng đến cả mức độ chi trả và khả năng chi trả cổ tức. Những phát hiện này chỉ ra rằng cam kết của doanh nghiệp đối với các thực hành chuỗi cung ứng bền vững có thể đóng vai trò như một tín hiệu quan trọng về sự ổn định tài chính và chất lượng quản trị, từ đó mang lại những hàm ý đối với nhà đầu tư và các quyết định phân phối lợi nhuận của doanh nghiệp.

Từ khóa: thực hành chuỗi cung ứng bền vững, chính sách cổ tức, tỷ lệ chi trả cổ tức, quyết định chi trả cổ tức.

SUSTAINABLE SUPPLY CHAIN PRACTICES AND CORPORATE DIVIDEND PAYOUTS: GLOBAL EVIDENCE FROM A MULTI-COUNTRY PANEL

Abstract

This study examines the relationship between sustainable supply chain practices and corporate dividend policy using a large cross-country firm-level dataset. Based on panel data covering firms across multiple countries and years, the analysis distinguishes between two dimensions of dividend policy: the dividend payout ratio and the decision to pay dividends. Sustainable supply chain practices are measured using an index capturing firms' environmental policies related to supply chain integration, supplier selection and monitoring, sustainable packaging, and the termination of non-compliant suppliers.

To account for the dynamic nature of dividend policy and potential endogeneity concerns, the study employs a two-stage empirical framework. A dynamic panel regression is used to analyze dividend payout ratios, while a bivariate probit model is estimated to examine firms' dividend payment decisions. The results provide evidence that sustainable supply chain practices are systematically associated with firms' dividend behavior, suggesting that sustainability engagement influences both the level and likelihood of dividend payments.

These findings indicate that firms' commitment to sustainable supply chain practices may serve as an informative signal of financial stability and governance quality, with implications for investors and corporate payout decisions.

Keywords: sustainable supply chain practices, dividend policy, dividend payout, dividend payment.

1. Introduction

Sustainable supply chain practices (SSCP) have become an increasingly important element of corporate sustainability strategy. Growing regulatory and stakeholder pressure has led to expanding research on both the drivers and outcomes of SSCP. Prior studies suggest that SSCP can improve operational efficiency and risk management, potentially enhancing financial performance (Govindan et al., 2020). At the same time, they can be resource-intensive, requiring investments in supplier development and organizational coordination across multiple supply-chain tiers (Busse et al., 2016; Bloemer et al., 2025). These trade-offs make it important to understand how SSCP relates to key corporate financial decisions.

Dividend payout policy remains a long-standing issue in corporate finance. The dividend payout ratio - dividends as a share of earnings - is a common measure of firms' payout decisions (Corporate Finance Institute, n.d.). Since Miller and Modigliani's dividend irrelevance argument under perfect capital markets, several theories have explained why dividends may matter in practice. The agency/free cash flow view suggests dividends reduce agency problems by limiting managers' ability to overinvest excess cash (Jensen, 1986). Signaling theory argues that dividend changes convey information about managers' expectations of future earnings (Bhattacharya, 1979). The life-cycle view proposes that mature, profitable firms with fewer growth opportunities pay higher dividends, while younger firms retain earnings to finance investment (DeAngelo et al., 2006). Empirical evidence across markets is broadly consistent with these ideas: profitability, larger size, stable cash flows, and fewer investment opportunities are linked to higher dividend payouts, whereas higher leverage and strong growth prospects tend to constrain dividends (Denis & Osobov, 2008). Even so, the "dividend puzzle" remains, showing that dividend policy is shaped by a complex mix of

firm and contextual factors (Black, 1976).

Although they all aim to promote sustainability, SSCP is distinct from broader frameworks such as ESG (Environmental, Social, and Governance) and CSR (Corporate Social Responsibility) in both scope and implementation. In particular, SSCP concentrates on supply chain activities, emphasizing how firms integrate sustainability into supplier management, logistics, and production processes within their day-to-day operations. Owing to this operational focus, SSCP has emerged as a rapidly expanding research area over the past decade, acting as a link between high-level sustainability strategies and firm-level operational outcomes.

Empirical evidence supports the importance of SSCP. A meta-analysis by Govindan et al. (2020) indicates that sustainable supply chain practices contribute positively to both operational and financial performance. In addition, Zhao et al. (2025) find that firms adopting proactive supply chain sustainability strategies tend to outperform their peers in terms of market competitiveness, investment appeal, and operational efficiency. Consequently, sustainable supply chains should be viewed not only as a response to ethical and regulatory pressures but also as a strategic tool for managing risks and enhancing financial outcomes, including cost of capital, profitability, and shareholder value (Chava, 2014, El Ghoul et al., 2018).

Against this background, an emerging question is how SSCP connect to corporate dividend payout behaviour. The literature points to two competing perspectives. The first is a substitution view: sustainability initiatives can be costly and may reduce the cash available for shareholder distributions. Using agency theory, scholars argue that managers with abundant free cash flow may allocate resources to sustainability projects that serve reputational or private objectives, potentially at the expense of dividends (Jensen, 1986; Barnea & Rubin, 2010). Consistent with this argument, a study found that higher CSR or environmental spending is associated with lower dividend payouts, suggesting that firms redirect cash toward stakeholder-oriented investments rather than shareholder returns (Fonseka & Richardson, 2024). This study further reported that mandatory ESG disclosure

requirements were followed by significant cuts in dividend payout ratios, implying that sustainability mandates can crowd out dividends in practice.

The complementary view suggests that sustainability and dividends can coexist. Drawing on signaling and stakeholder theories, firms with strong sustainability commitments may maintain dividends to signal financial strength and retain investor confidence (Lys et al., 2015). In this view, high-CSR firms can use dividends as a governance mechanism to reassure shareholders that sustainability investments are not being pursued at their expense (Cheung et al., 2018). Empirical work also supports this possibility, showing that firms with better CSR performance often have higher dividend payout levels or a greater propensity to pay dividends (Seth & Mahenthiran, 2022). Overall, the evidence remains mixed.

Most prior research relies on broad CSR/ESG measures rather than supply-chain-specific sustainability, and many studies are country-specific. This study addresses these gaps using a global panel of 52 economies from 2003-2024 (about 54,700 firm-year observations). SSCP are measured using five policy-based indicators related to procurement, supplier management, packaging, and supplier termination, emphasizing operational supply-chain practices. Prior evidence highlights that supply-chain sustainability can reduce risk and support performance (Govindan et al., 2020; Wang et al., 2023). Dividend payout ratio is measured as cash dividends divided by net income and is discussed as a response to transparency, risk exposure, and stakeholder expectations (Hasan & Al-Najjar, 2024). The empirical design uses firm and year fixed effects, consistent with recent international corporate finance and ESG-dividend research methods (Chen et al., 2024; Bilyay-Erdogan et al., 2023).

The paper is structured into five sections. Following this introduction, Section 2 develops the research hypotheses, Section 3 outlines the research design, Section 4 reports and discusses the empirical results, and Section 5 concludes.

2. Hypothesis development

Dividend payment (the binary decision of whether a firm pays dividends) is primarily

explained by firms' financial fundamentals and their position in the corporate life cycle. Under perfect capital markets, dividend policy is irrelevant (Miller & Modigliani, 1961), while later theories emphasize agency conflicts and life-cycle considerations (Jensen & Meckling, 1976; DeAngelo et al., 2006). Empirically, firms with higher profitability, larger size, and greater accumulated retained earnings are significantly more likely to pay dividends. Fama and French (2001) document that small and unprofitable firms rarely pay dividends, whereas Denis and Osobov (2008) show that the retained-earnings-to-equity ratio is a key predictor of the pay versus no-pay decision across countries. Consistent with life-cycle theory, mature firms with substantial earned equity tend to distribute dividends, while growth firms retain earnings to finance investment (DeAngelo et al., 2006).

Sustainable supply chain practices (SSCP) are typically financed through operating cash flows or retained earnings and form part of broader CSR or ESG strategies. Importantly, existing evidence indicates that CSR activities do not materially constrain firms' ability to pay dividends. Benlemlih (2019) finds that firms with stronger CSR engagement maintain more stable dividend policies, suggesting that CSR does not crowd out dividend payments. Similarly, Flammer (2015) shows that CSR investments are typically framed as long-term strategic initiatives aimed at improving firms' operational performance and growth rather than short-term cash distribution policies. Reflecting this, standard empirical models of the binary dividend decision focus on profitability, leverage, and investment opportunities, and typically do not include CSR or ESG variables (Fama & French, 2001; Denis & Osobov, 2008). This omission reflects the view that dividend initiation is a structural outcome of firms' life-cycle stage rather than discretionary sustainability spending. Accordingly, while SSCP may influence internal resource allocation, existing theory and evidence suggest that they do not directly affect the firm's decision of whether to pay dividends. Therefore, we suggest the following hypothesis:

H1a: Sustainable supply chain practices do not affect the decision to pay dividends.

Dividend policy depends critically on firms' ability to generate stable and predictable cash flows. Sustainable supply chain practices (SSCP) enhance such stability by reducing

operational, regulatory, and stakeholder-related risks embedded in supply-chain activities. Prior research shows that sustainability-oriented firms experience lower downside risk and reduced cash flow volatility, which strengthens their capacity to sustain higher dividend payouts (Albuquerque et al., 2019).

In addition, SSCP are typically implemented through formal governance and monitoring mechanisms, such as supplier standards, audits, and reporting systems, which constrain managerial discretion. From the free cash flow perspective (Jensen, 1986), these governance-enhancing features mitigate agency problems and increase the amount of cash available for shareholder distribution. Consistent with this view, sustainability engagement is associated with improved governance quality and more shareholder-friendly financial policies (Benlemlih & Bitar, 2018).

Moreover, responsible supply chain practices contribute to superior operational and financial performance, expanding the earnings base from which dividends are paid (Awaysheh & Klassen, 2010; Eccles et al., 2014; Flammer, 2015). From a signaling perspective, dividends signal current financial strength, while SSCP signal long-term orientation and resilience, jointly reducing information asymmetry and reinforcing investor confidence (Spence, 1973; Lys et al. 2015).

Taken together, by stabilizing cash flows, improving governance, and enhancing performance, SSCP strengthened firms' capacity and willingness to distribute earnings to shareholders. Accordingly, we propose the following hypothesis:

H2a: Sustainable supply chain practices positively affect firms' dividend payout ratios.

From the free cash flow perspective (Jensen, 1986), managers with excess cash have incentives to overinvest in projects that yield private benefits. Sustainability initiatives, including SSCP, can provide reputational or relational benefits to managers and are therefore prone to overinvestment when internal cash is abundant. Seth et al. (2022) show that CSR-related activities often attract overinvestment by managers and directly compete with dividends, noting that dividend payouts and CSR investments "are partial substitutes". Similarly, Barnea and Rubin (2010) argue that firms reduce agency problems by

distributing higher dividends to limit cash available for manager-driven CSR projects. Ni and Zhang (2019) also find that CSR obligations significantly reduce dividend payouts, consistent with firms diverting free cash to stakeholder-oriented spending. These empirical findings suggest that SSCP, which requires costly supplier audits, green technologies and compliance processes, draws heavily on internal funds, thereby reducing the pool available for dividend distribution.

Under traditional signaling models (Spence, 1973), dividends are considered as indicators of firm quality; however, sustainability investments like SSCP can also act as credible signals of long-term orientation. Lys et al. (2015) argue that CSR expenditures serve as forward-looking signals that managers undertake more intensively when they anticipate stronger future performance. Lu and Taylor (2016) also document that firms with superior sustainability performance tend to achieve stronger subsequent financial outcomes, reinforcing the view that sustainability engagement signals favorable future prospects. Applied to SSCP, investments in responsible and resilient supply-chain operations serve as long-term signals that the firm prioritizes sustainability-driven value creation. Funding these initiatives often requires retaining earnings, particularly in emerging-market settings where external financing is limited. Arhinful et al. (2025) provide evidence that environmental expenditures significantly reduce dividend yield, suggesting that firms use retained cash to support sustainability investments intended to generate future benefits. Therefore, we suggest the following hypothesis:

H2b: Sustainable supply chain practices negatively affect dividend payout ratios.

3. Research design

3.1. Sample and data

Firm-level information used in this study is sourced from the Refinitiv (LSEG) financial database. This dataset is widely recognized in international empirical research for its extensive global coverage, timely market updates, and high data accuracy (Nguyen et al., 2020).

Macroeconomic variables are collected from reputable public sources: GDP per capita from the World Development Indicators (World Bank) and annual inflation (CPI) from the OECD Statistics database. After all cleaning procedures, the final dataset comprises 54,700 firm-year observations from 52 countries covering the period 2003-2024.

Table 1 presents the number of observations by country. The distribution is highly uneven. The United States (24.74%) and China (11.08%) account for more than one-third of the sample, followed by the United Kingdom, Japan, India, Germany, and Canada (each above 2%). The remaining observations come from many countries with small shares, reflecting greater data availability in more developed economies.

Table 1: Sample distribution by country

Country	Frequency	Percent (%)	Cumulative (%)	Country	Frequency	Percent (%)	Cumulative (%)	Country	Frequency	Percent (%)	Cumulative (%)
AE	277	0.51	0.51	GB	3,586	6.56	38.23	NO	285	0.52	63.96
AT	312	0.57	1.08	GR	132	0.24	38.47	NZ	347	0.63	64.6
AU	1,672	3.06	4.13	HK	1,168	2.14	40.6	OM	75	0.14	64.73
BE	396	0.72	4.86	HU	59	0.11	40.71	PE	191	0.35	65.08
BH	77	0.14	5	ID	435	0.8	41.51	PH	330	0.6	65.69
BR	849	1.55	6.55	IE	432	0.79	42.3	PL	331	0.61	66.29
CA	1,690	3.09	9.64	IL	201	0.37	42.66	PT	136	0.25	66.54
CH	1,309	2.39	12.03	IN	2,094	3.83	46.49	QA	240	0.44	66.98
CL	393	0.72	12.75	IT	678	1.24	47.73	RU	177	0.32	67.3
CN	6,062	11.08	23.83	JP	4,660	8.52	56.25	SA	309	0.56	67.87
CO	169	0.31	24.14	KR	1,273	2.33	58.58	SE	1,292	2.36	70.23
DE	1,407	2.57	26.71	KW	106	0.19	58.77	SG	646	1.18	71.41
DK	461	0.84	27.56	LU	151	0.28	59.05	TH	801	1.46	72.88
EG	154	0.28	27.84	MA	134	0.24	59.29	TR	317	0.58	73.46
ES	589	1.08	28.92	MX	522	0.95	60.25	US	13,533	24.74	98.2
FI	499	0.91	29.83	MY	1,282	2.34	62.59	ZA	987	1.8	100
FR	1,008	1.84	31.67	NL	466	0.85	63.44	Total	54,700	100	

Source: Authors' calculations

Table 2 reports the yearly distribution of observations, showing a strong upward trend over time. The sample expands from fewer than 200 observations in 2003 to over 6,000 observations per year in recent years, with the largest shares in 2023 (11.60%) and 2024 (11.33%). This pattern reflects the growing availability of ESG disclosures and expanded Refinitiv coverage.

Table 2. Sample distribution by year

Year	Frequency	Percent (%)	Cumulative (%)	Year	Frequency	Percent (%)	Cumulative (%)
2003	197	0.36	0.36	2014	1,885	3.45	21.63
2004	260	0.48	0.84	2015	2,157	3.94	25.57
2005	455	0.83	1.67	2016	2,485	4.54	30.11
2006	531	0.97	2.64	2017	2,914	5.33	35.44
2007	435	0.8	3.43	2018	3,345	6.12	41.55
2008	670	1.22	4.66	2019	3,923	7.17	48.73
2009	903	1.65	6.31	2020	4,566	8.35	57.07
2010	1,262	2.31	8.62	2021	5,146	9.41	66.48
2011	1,588	2.9	11.52	2022	5,790	10.59	77.07
2012	1,813	3.31	14.83	2023	6,345	11.6	88.67
2013	1,830	3.35	18.18	2024	6,200	11.33	100
				Total	54,700	100	

Source: Authors' calculations

3.2. Regression model

3.2.1. Model specification

Following prior cross-country payout studies, this study adopts a two-stage empirical framework to examine the impact of sustainable supply chain practices (SSCP) on firms' dividend policies, distinguishing between (i) the decision to pay dividends and (ii) the level of dividend payouts (Heckman, 1979).

In the first stage, conditional on dividend payments, the effect of SSCP on the dividend payout ratio is analyzed using panel-data regressions. The model controls for firm-level financial characteristics and macroeconomic conditions, with firm fixed effects included to address unobserved firm-specific heterogeneity and year fixed effects to capture

common macroeconomic shocks (Wooldridge, 2010). All firm-level variables are lagged by one year to mitigate reverse causality. However, standard OLS and fixed-effects estimators may yield biased estimates in dynamic settings due to unobserved heterogeneity and the inclusion of lagged dependent variables (Hsiao, 2022; Nickell, 1981). To address these biases and further mitigate potential reverse, this study employs the two-step System GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998).

$$dividend = \beta_0 + \beta_1 ssci_{i,t-1} + \beta_2 roa_{i,t-1} + \beta_3 size_{i,t-1} + \beta_4 tdta_{i,t-1} + \beta_5 cash_{i,t-1} + \beta_6 retain_{i,t-1} + \beta_7 binde_{i,t-1} + \beta_8 dividend_{i,t-1} + \beta_9 infla_{i,t-1} + \beta_{10} gdppercap_{i,t-1} + \varepsilon_{i,t}$$

where *dividend* is the dividend payout ratio, and *ssci* measures sustainable supply chain practices. The control variables include profitability *(roa)*, size *(size)*, leverage *(tdta)*, cash holdings *(cash)*, retained earnings *(retain)*, and board independence *(binde)*. The model also incorporates the lagged dependent variable *dividend* to capture payout smoothing. At macro level, inflation *(infla)* and GDP per capita *(gdppercap)* capture country-year economic conditions. All variables are lagged by one year *(t-1)* as specified in the empirical model.

In the second stage, as a robustness check, we employ a bivariate probit model to jointly analyze firms' dividend payment decisions and their adoption of high-level sustainable supply chain practices (*ssci*). The two binary dependent variables are (i) the dividend payment indicator (*dividum*), which equals one if a firm pays any dividend in a given year, and (ii) a high-SSCP adoption indicator (*d_ssci*), which takes the value of one if a firm's SSCP index is at or above the sample median. The bivariate probit model allows correlated errors across equations, capturing unobserved factors that jointly affect sustainability adoption and dividend payment decisions, and enables an assessment of whether stronger sustainability practices are associated with a higher likelihood of paying dividends.

$$dividum = \beta_0 + \beta_1 ssci_{i,t-1} + \beta_2 roa_{i,t-1} + \beta_3 size_{i,t-1} + \beta_4 tdta_{i,t-1} + \beta_5 cash_{i,t-1} + \beta_6 retain_{i,t-1} + \beta_7 binde_{i,t-1} + \beta_8 dividum_{i,t-1} + \beta_9 infla_{i,t-1} + \beta_{10} gdppercap_{i,t-1} + \varepsilon_{i,t}$$

$$d\_ssci = \gamma_0 + \gamma_{1roa_{i,t-1}} + \gamma_{2size_{i,t-1}} + \gamma_3 tdta_{i,t-1} + \gamma_4 cash_{i,t-1} + \gamma_5 retain_{i,t-1} + \gamma_6 binde_{i,t-1} + \gamma_7 dividum_{i,t-1} + \gamma_8 infla_{i,t-1} + \gamma_9 gdppercap_{i,t-1} + u_{i,t}$$

The key explanatory variables include the continuous SSCP (*ssci*) measure which captures the intensity of firms' sustainable supply chain practices. Additionally, this model includes other control variables similar to the first model, except for the lagged continuous dividend variable (*dividend*), which is replaced by the lagged dummy dividend variable (*dividum*). All explanatory variables are also lagged by one year to ensure that firm characteristics and sustainability practices precede the observed payout and adoption decisions.

3.2.2. Dividend payout ratio (dividend)

The dependent variable in this study is the dividend payout ratio (*dividend*), defined as total cash dividends divided by net income. Consistent with prior literature (Fama & French, 2001; Denis & Osobov, 2008; Alzahrani & Lasfer, 2012), this measure captures firms' propensity to distribute earnings to shareholders.

A higher dividend payout ratio indicates that firms distribute a larger share of their profits to shareholders, whereas a lower ratio reflects greater earnings retention for internal financing. This makes *dividend* a transparent and economically meaningful indicator of firms' distribution policies in cross-country settings.

Given its direct relevance to payout decisions and the substantial firm-year variation in this dataset, *dividend* is an appropriate outcome variable for assessing whether sustainable supply chain practices influence corporate distribution behavior.

3.2.3. Dividend payment decision (dividum)

We construct a binary dividend payment indicator (*dividum*), equal to one if a firm pays a positive cash dividend in a given year and zero otherwise, capturing the extensive margin of dividend policy. This decision is conceptually distinct from the dividend payout ratio, as firms

must first decide whether to pay dividends before determining payout levels; prior studies show these two dimensions are driven by different mechanisms Fama & French, 2001; Denis & Osobov, 2008).

In the second stage, *dividum* is modeled using a bivariate probit to examine the link between SSCP and firms' propensity to pay dividends while addressing potential endogeneity, simultaneity, and selection concerns.

3.2.4. Sustainable supply chain practices (ssci)

Similar to the study by Karaman et al. (2024), the variable *ssci* measures the extent to which a firm adopts sustainable supply chain practices. It is constructed as an index based on five criteria: an environmental supply-chain policy, an environmental supplier selection policy, an environmental supplier monitoring policy, a sustainable packaging policy, and a policy to terminate partnerships with non-compliant suppliers.

Each indicator equals one if the firm has the relevant policy, and zero otherwise. Firms score one if they integrate environmental considerations into supply-chain management, apply environmental standards in supplier selection, monitor suppliers' environmental performance, promote sustainable packaging, or show willingness to terminate relationships with non-compliant suppliers.

The SSCP index is the average of these five indicators, ranging from zero to one, with higher values indicating greater adoption of sustainable supply chain practices.

We also construct a binary variable d_ssci to identify high adopters. A firm is classified as high SSCP if its score is at or above the sample median (50th percentile). This dummy is used in the second-stage analysis to capture the extensive margin of sustainability adoption in dividend decisions.

3.2.5. Control variables

Following recent studies on dividend policy (Chen et al., 2024; Saeed & Zamir, 2021; Benlemlih, 2019), this study includes a comprehensive set of firm-level and macroeconomic control variables that are consistently applied across both stages of the empirical framework.

At the firm level, profitability (roa) is measured as earnings before taxes divided by total assets and captures firms' capacity to generate internal funds. More profitable firms are expected to distribute higher dividends once they choose to pay, and are also more likely to initiate or maintain dividend payments due to stronger and more stable cash-flow generation, consistent with life-cycle theory (Benlemlih, 2019; Firth et al., 2016). Firm size (*size*) is calculated as the natural logarithm of total assets. Larger firms tend to be more mature, face lower business risk, and enjoy greater access to external financing, which enhances their ability to sustain dividend payments.

Leverage (*tdta*), defined as total liabilities divided by total assets, captures firms' financial constraints and monitoring by creditors. Highly leveraged firms often face restrictions on dividend payments, leading to a negative association with dividend payouts. Cash holdings (*cash*), measured as cash and cash equivalents divided by total assets, reflect firms' liquidity positions. From an agency perspective, higher cash reserves may increase managerial discretion and reduce incentives to distribute dividends. Retained earnings (*retain*), defined as retained earnings scaled by total assets, proxy for firms' financial maturity and accumulated internal capital and are expected to be positively related to dividend policy. Board independence (*binde*), measured as the proportion of independent directors on the board, reflects the strength of corporate governance and monitoring, which can encourage managers to distribute excess cash to shareholders.

To account for payout persistence, lagged dependent variables are included in each stage. Dividend policies exhibit smoothing behavior, leading firms to avoid frequent payout changes. Accordingly, the lagged dividend payout ratio and the lagged dividend payment indicator are included in the respective regressions. At the macroeconomic level, inflation (*infla*) and GDP per capita (*gdppercap*) capture macroeconomic uncertainty and economic development.

All firm-level control variables are lagged by one year (t−1) to mitigate reverse causality concerns and ensure that firm characteristics precede dividend decisions.

4. Empirical Results

4.1. Descriptive statistics

Table 3 summarizes the main variables used in the analysis. The dividend payout ratio (dividend) has a mean of 0.450 and a median of 0.381, indicating substantial heterogeneity in payout behavior across firms. The dividend payment dummy (*dividum*) has a mean of 0.883, suggesting that dividend-paying firms dominate the sample. The key explanatory variable, sustainable supply chain practices (*ssci*), has an average value of 0.342, with a median of 0.500, indicating that many firms cluster around moderate levels of sustainability adoption.

Table 3. Descriptive statistics

Variable	N	Mean	SD	Min	p25	p50	p75	Max
dividend	54,700	0.450	0.330	0.000	0.199	0.381	0.693	1.000
dividum	54,700	0.883	0.322	0.000	1.000	1.000	1.000	1.000
ssci	54,700	0.342	0.349	0.000	0.000	0.500	0.500	1.000
roa	54,700	0.068	0.094	-4.177	0.018	0.050	0.098	2.926
size	54,700	22.519	1.892	14.864	21.294	22.412	23.669	29.531
tdta	54,700	0.232	0.172	0.000	0.087	0.214	0.344	2.197
cash	54,700	0.094	0.099	0.000	0.027	0.065	0.128	0.989
retain	54,700	0.276	0.525	0.000	0.086	0.219	0.396	75.055
binde	54,700	0.522	0.291	0.000	0.333	0.539	0.778	1.000
infla	54,700	2.926	3.999	-4.448	1.234	2.268	3.670	58.507
gdppercap	54,700	10.331	0.951	6.900	9.496	10.698	10.968	11.832

Source: Authors' calculations

Tables 4 and 5 report pairwise correlations among key variables. Dividend payout and the dividend payment dummy are weakly positively correlated with SSCP, suggesting that firms with stronger sustainability engagement are slightly more likely to distribute dividends. Overall, low correlations among variables indicate that multicollinearity is unlikely to be a concern.

Table 4. Pearson correlations for dividend payout variables

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
dividend (1)	1.000									
ssci (2)	**0.0871**	1.000								
roa (3)	**-0.2117**	**0.0359**	1.000							
size (4)	**-0.0121**	**0.1320**	**-0.2382**	1.000						
tdta (5)	**0.0744**	**0.0481**	**-0.1575**	**0.1112**	1.000					
cash (6)	**-0.0540**	**0.0168**	**0.2255**	**-0.2096**	**-0.2290**	1.000				
retain (7)	**-0.0237**	**0.0656**	**0.1597**	**-0.1416**	**-0.0813**	**0.0936**	1.000			
binde (8)	**0.0449**	**-0.0433**	**-0.0369**	**0.0711**	-0.003	**-0.1608**	**-0.0184**	1.000		
infla (9)	**-0.0479**	**0.0267**	**0.0323**	**-0.0976**	**-0.0103**	**-0.0468**	-0.0011	**0.0248**	1.000	
gdppercap (10)	**0.0579**	**0.0223**	**-0.0529**	**0.0688**	**-0.0139**	**-0.0357**	**0.0344**	**0.3071**	**-0.1602**	1.000

Note: Correlation coefficients in boldface are significant at least at the 5 % level.

Source: Authors' calculation

Table 5. Pearson correlations for dividend payment decision variables

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
dividum (1)	1.0000									
ssci (2)	**0.0711**	1.0000								
roa (3)	**-0.0248**	**0.0359**	1.0000							
size (4)	**0.1342**	**0.1320**	**-0.2382**	1.0000						
tdta (5)	-0.0022	**0.0481**	**-0.1575**	**0.1112**	1.0000					
cash (6)	**-0.0620**	**0.0168**	**0.2255**	**-0.2096**	**-0.2290**	1.0000				
retain (7)	**0.0146**	**0.0656**	**0.1597**	**-0.1416**	**-0.0813**	**0.0936**	1.0000			
binde (8)	**-0.0141**	**-0.0433**	**-0.0369**	**0.0711**	-0.0030	**-0.1608**	**-0.0184**	1.0000		
infla (9)	**-0.0646**	**0.0267**	**0.0323**	**-0.0976**	**-0.0103**	**-0.0468**	-0.0011	**0.0248**	1.0000	
gdppercap (10)	**-0.0665**	**0.0223**	**-0.0529**	**0.0688**	**-0.0139**	**-0.0357**	**0.0344**	**0.3071**	**-0.1602**	1.0000

Note: Correlation coefficients in boldface are significant at least at the 5 % level.

Source: Authors' calculation

4.2. Multivariate results

4.2.1. Dividend payout ratio

Table 6. Panel OLS, Fixed Effects, and System GMM

dividend	Pooled OLS	Fixed Effects	System GMM
L.ssci	0.035***	0.012*	0.063*
	(0.004)	(0.007)	(0.037)
L.roa	0.183***	-0.062**	0.931**
	(0.038)	(0.030)	(0.417)
L.size	-0.002*	0.068***	0.014
	(0.001)	(0.006)	(0.011)
L.tdta	0.027***	-0.081***	-0.203
	(0.009)	(0.024)	(0.164)
L.cash	-0.070***	-0.090***	-0.038
	(0.017)	(0.032)	(0.279)
L.retain	-0.004**	0.006	-0.127
	(0.002)	(0.009)	(0.096)
L.binde	0.017***	0.029*	0.013
	(0.006)	(0.015)	(0.016)
L.dividend	0.552***	0.153***	0.638***
	(0.007)	(0.008)	(0.143)
L.infla	0.002***	0.001	0.003***
	(0.001)	(0.001)	(0.001)
L.gdppercap	0.008***	0.083***	0.009**
	(0.002)	(0.014)	(0.004)
Constant	0.132***	-2.002***	-0.265
	(0.028)	(0.138)	(0.282)
N	45,851	45,851	38,245
R2	0.300	0.046	
Overall R-sq		0.033	
Within R-sq		0.046	
Arellano-Bond test for AR(2) in first differences: Pr > z =			0.710
Hansen test of overid. restrictions: Prob > chi2 =			0.076
*Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*			

Source: Authors' calculation

Table 6 presents the regression results on the impact of sustainable supply chain practices

(ssci) and control variables on dividend payouts (dividend) across three models. Model (1) includes basic firm-level control variables. Model (2) adds macroeconomic controls: inflation (infla) and per capita GDP (gdppercap). Model (3) further controls for firm and year fixed effects (Firm FE & Year FE). Standard errors are reported in parentheses, and ***, ** , * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Model (1) tests the effect of SSCP on dividend, with basic firm-level controls. The results show that SSCP has a positive and significant coefficient of 0.038 ($p<0.01$), indicating that firms with better sustainable supply chain practices pay higher dividends, supporting hypothesis H2. Pretax return on assets (roa) also has a strong positive effect of 0.268 ($p<0.01$), consistent with the expectation that more profitable firms pay higher dividends. Firm size (size), cash holdings (cash), and retained earnings ratio (retain) all have negative and significant coefficients, reflecting the tendency of larger firms or those holding more cash or retained earnings to pay lower dividends. The proportion of independent board members (binde) and lagged dividend payout (L.dividend) show strong positive effects, indicating stable governance and dividend policy. Leverage (tdta) has a positive coefficient of 0.026 ($p<0.01$), suggesting that firms with higher leverage tend to pay higher dividends in this model.

In Model (2), macroeconomic controls, including inflation (infla) and per capita GDP (GDPperCAP), are added. The coefficient of L.ssci slightly decreases to 0.034 but remains highly significant at the 1% level, continuing to confirm its positive effect on dividend. roa retains a strong positive effect of 0.271 ($p<0.01$). L.size and L.retain remain negative but slightly less significant, while L.tdta continues to have a positive effect of 0.030 ($p<0.01$). Inflation (0.001, $p<0.05$) and per capita GDP (0.007, $p<0.01$) are both positive but R-squared sees no significant increase. This suggests that favorable macroeconomic conditions help firms pay higher dividends but the effect is subtle. binde (0.019, $p<0.01$) and lagged dividend (0.555, $p<0.01$) continue to show strong positive effects.

Model (3) controls for firm and year fixed effects. In this model, the coefficient of L.ssci decreases to 0.013 ($p<0.1$), still supporting hypothesis H2 but with lower statistical

significance. After controlling for fixed effects, L.roa has a negative coefficient of -0.083 ($p < 0.1$), indicating that higher pretax profitability is associated with lower dividend payouts. L.size becomes positive at 0.075 ($p<0.01$), implying that larger firms pay higher dividends once fixed effects are accounted for. L.tdta has a negative coefficient of -0.080 ($p<0.01$), reflecting that highly leveraged firms reduce dividend payouts. L.cash and L.retain lose statistical significance, and L.binde also becomes insignificant. Lagged dividend payout (L.dividend) still maintains a strong positive effect of 0.160 ($p<0.01$), showing continuity and stability in dividend policy. Macroeconomic variables are no longer strongly significant after controlling for fixed effects. The R-squared rises from 0.299 in Model (1) to 0.504 in Model (3), indicating improved explanatory power when fixed effects are considered.

Across all three models, SSCP consistently has a positive effect on dividend, supporting hypothesis H2 that SSCP positively affects dividend payouts. Control variables such as profitability, firm size, leverage, and dividend history also play important roles, but the magnitude and direction of their effects vary when macroeconomic variables are added and fixed effects are controlled.

4.2.2. Probability of paying dividend

Table 7: Panel Logit and Bivariate Probit Marginal Effects

dividum	Bivariate Probit (ME)
d_ssci	0.0911**
	(0.0462)
L.ssci	
L.roa	0.0965***
	(0.0264)
L.size	0.0058***
	(0.0015)
L.tdta	-0.0266***
	(0.0084)
L.cash	-0.0661***
	(0.0142)
L.retain	0.0319***
	(0.0099)
L.binde	0.0094
	(0.0066)
L.dividum	0.2612***
	(0.0219)
L.infla	-0.0009***
	(0.0003)
L.gdppercap	-0.0064***
	(0.0017)
Constant	
N	
lnsig2u	
Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.	

Source: Authors' calculation

Table 7 reports marginal effects from the bivariate probit model. The results indicate that high SSCP adoption is positively and significantly associated with the likelihood of paying dividends. Specifically, the high SSCP dummy (*d_ssci*) exhibits a marginal effect of 0.091 ($p < 0.05$), implying that firms with SSCP scores at or above the sample median are more likely to distribute dividends.

Firm-level characteristics display signs consistent with dividend policy theory. Profitability is positively and highly significantly related to dividend payment (0.097, $p < 0.01$), while firm size also shows a positive and significant effect (0.006, $p < 0.01$), indicating that larger and more profitable firms are more likely to pay dividends. In contrast, leverage (-0.027, $p < 0.01$) and cash holdings (-0.066, $p < 0.01$) are negatively associated with the likelihood of dividend payment, reflecting financial constraints and agency considerations. Retained earnings enter with a positive and significant coefficient (0.032, $p < 0.01$), supporting the life-cycle explanation of dividend policy, whereas board independence does not exhibit a statistically significant effect.

Consistent with dividend persistence, the lagged dividend payment indicator is positive and highly significant (0.261, $p < 0.01$), suggesting strong inertia in firms' payout decisions. Macroeconomic conditions also matter: inflation (-0.001, $p < 0.01$) and GDP per capita (-0.006, $p < 0.01$) are both negatively associated with the probability of paying dividends.

5. Conclusion

This study provides new global evidence on the relationship between sustainable supply chain practices (SSCP) and corporate dividend policy. Using a large cross-country panel of 54,700 firm-year observations from 52 economies over the period 2003-2024, we adopt a two-stage empirical framework that distinguishes between firms' dividend payout levels and their decision to pay dividends. The results consistently indicate that stronger adoption of SSCP is associated with higher dividend payout ratios and a greater likelihood of paying dividends, even after accounting for firm-specific heterogeneity, macroeconomic conditions, and payout persistence.

By focusing on supply-chain-level sustainability rather than broad ESG or CSR scores, this study highlights the importance of operational sustainability in shaping firms' financial distribution policies. The findings suggest that sustainability-oriented supply chain practices do not crowd out shareholder payouts but instead coexist with dividend payments, potentially reflecting improved governance, reduced risk, and more stable cash flows. Overall,

this research contributes to the growing literature on sustainability and corporate finance by demonstrating that responsible supply chain practices can play a meaningful role in firms' payout decisions across diverse institutional environments.

REFERENCES

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, 65(10), 4451–4469.

Alzahrani, M., & Lasfer, M. (2012). Investor protection, taxation, and dividends. *Journal of Corporate Finance*, 18(4), 745–762.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.

Arhinful, R., Obeng, H. A., Mensah, L., & Mensah, C. C. (2025). Signaling sustainability: The impact of sustainable finance on dividend policy among firms listed on the London Stock Exchange. *Business Strategy and the Environment*.

Awaysheh, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. *International Journal of Operations & Production Management*, 30(12), 1246–1268.

Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics*, 97(1), 71–86.

Benlemlih, M. (2019). Corporate social responsibility and dividend policy. *Research in International Business and Finance*, 47, 114–138.

Benlemlih, M., & Bitar, M. (2018). Corporate social responsibility and investment efficiency. *Journal of Business Ethics*, 148(3), 647–671.

Bhattacharya, S. (1979). Imperfect information, dividend policy, and "the bird in the hand" fallacy. *The Bell Journal of Economics*, 259–270.

Bilyay-Erdogan, S., Danisman, G. O., & Demir, E. (2023). ESG performance and dividend payout: A channel analysis. *Finance Research Letters*, 55, 103827.

Black, F. (1976). The dividend puzzle. *The Journal of Portfolio Management*, 2(2), 5–8.

Bloemer, A., & Minner, S. (2025). Auditing and training to incentivize sustainability in multi-tier supply chains: Substitutes or complements? *European Journal of Operational Research*.

Busse, C., Schleper, M. C., Niu, M., & Wagner, S. M. (2016). Supplier development for sustainability: Contextual barriers in global supply chains. *International Journal of Physical Distribution & Logistics Management*, 46(5), 442–468.

Chen, X., Li, W., Torsin, W., & Tsang, A. (2024). Dividend policy under mandatory ESG reporting. *Journal of International Financial Markets, Institutions and Money*, 93, 101986.

Cheung, A., Hu, M., & Schwiebert, J. (2018). Corporate social responsibility and dividend policy. *Accounting & Finance*, 58(3), 787–816.

DeAngelo, H., DeAngelo, L., & Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: A test of the life-cycle theory. *Journal of Financial Economics*, 81(2), 227–254.

Denis, D. J., & Osobov, I. (2008). Why do firms pay dividends? International evidence on the determinants of dividend policy. *Journal of Financial Economics*, 89(1), 62–82.

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857.

Fama, E. F., & French, K. R. (2001). Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics*, 60(1), 3–43.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549–2568.

Fonseka, M., & Richardson, G. (2023). The effect of mandatory corporate social responsibility disclosure and performance on firms' dividend decisions: Evidence from China. *Economic Modelling*, 120, 106152.

Govindan, K., Rajeev, A., Padhi, S. S., & Pati, R. K. (2020). Supply chain sustainability and performance of firms: A meta-analysis of the literature. *Transportation Research Part E: Logistics and Transportation Review*, 137, 101923.

Hasan, F., & Al-Najjar, B. (2024). Green investment and dividend payouts: An intercontinental perspective. *Journal of Environmental Management*, 370, 122626.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica*, 153–161.

Hsiao, C. (2022). *Analysis of panel data* (No. 64). Cambridge University Press.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, 76(2), 323–329.

Jensen, M. C., & Meckling, W. H. (2019). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Corporate Governance* (pp. 77–132). Gower.

Karaman, A. S., Ellili, N. O. D., & Uyar, A. (2024). Do sustainable supply chain practices mitigate carbon emissions? The role of supplier environmental, social and governance training. *Business Strategy and the Environment*, 33(8), 8126–8148.

Lakhal, F., Kuzey, C., Uyar, A., & Karaman, A. S. (2023). The relationship between dividend payout and corporate social responsibility: The moderating effect of shareholder friendliness and board monitoring. *Journal of Cleaner Production*, 394, 136297.

Lu, W., & Taylor, M. E. (2016). Which factors moderate the relationship between sustainability performance and financial performance? A meta-analysis study. *Journal of International Accounting Research*, 15(1), 1–15.

Lys, T., Naughton, J. P., & Wang, C. (2015). Signaling through corporate accountability reporting. *Journal of Accounting and Economics*, 60(1), 56–72.

Matos, P. (2020). ESG and responsible institutional investing around the world: A critical review.

Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *The Journal of Business*, 34(4), 411–433.

Nguyen, V. H., Choi, B., & Agbola, F. W. (2020). Corporate social responsibility and debt maturity: Australian evidence. *Pacific-Basin Finance Journal*, 62, 101374.

Ni, X., & Zhang, H. (2019). Mandatory corporate social responsibility disclosure and dividend payouts: Evidence from a quasi-natural experiment. *Accounting & Finance*, 58(5), 1581–1612.

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica*, 1417–1426.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, 9(1), 86–136.

Saeed, A., & Zamir, F. (2021). How does CSR disclosure affect dividend payments in emerging markets? *Emerging Markets Review*, 46, 100747.

Seth, R., & Mahenthiran, S. (2022). Impact of dividend payouts and corporate social responsibility on firm value: Evidence from India. *Journal of Business Research*, 146, 571–581.

Spence, M. (1978). Job market signaling. In *Uncertainty in Economics* (pp. 281–306). Academic Press.

Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32(1–3), 97–180.

Wang, J., Zhu, L., Feng, L., & Feng, J. (2023). A meta-analysis of sustainable supply chain management and firm performance: Some new findings on sustainable supply chain management. *Sustainable Production and Consumption*, 38, 312–330.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT Press.