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How does the financial market influence firms' Green innovation? The role of equity analysts

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Abstract

This paper investigates how equity analysts influence firms' green innovation across different financial markets. Using a unique data set consisting of more than 6000 listed firms across 56 different countries, we find that corporate green innovation is positively associated with the number of equity analysts following the firm. We attribute this result to the informational role of analysts, which encourages managers to invest more in eco-innovation. However, when we divide the full sample into two subsamples based on whether covered firms are incorporated in market-oriented or bank-oriented countries, we find that the association between firm's green innovation and analyst coverage becomes negative in the case of market-oriented financial systems. We argue that potential explanations for this result rely on the differences occurring among market-oriented and bank-oriented systems in terms of listed companies' ownership structure and the prevalence of arm's length transaction banking rather than long-term lender–borrower relationships.

KEYWORDS
bank-oriented, environmental innovation, equity analyst, green innovation, market-oriented, stock market

1 | INTRODUCTION

What is the role of the financial system in the transition towards a green and sustainable economy, and how can this contribution change based on the degree of development of the financial market? These questions are now being given greater attention because of the increased frequency and impact of environmental catastrophes due to climate change and the growing awareness of environmental issues induced by the COVID-19 pandemic. While existing studies shed light on how banks and institutional investors may be a driving force behind firms' environmental performance (e.g., X. Chen et al., 2018; Dyck et al., 2019; Gangi et al., 2019), our paper adds to the ongoing debate by investigating how the stock market influences firms' green innovation,[1] which lies in "*developing new products, processes or organisational practices that reduce pollution and favour rational use of natural resources*" (García-Sánchez et al., 2020a, p. 1). This is an important topic for two main reasons.

First, a new green perspective considers investments in eco-innovation leading to "win-win" situations in which the reduced environmental impact is accompanied by higher benefits in terms of risk mitigation, superior competitiveness (Demirel & Kesidou, 2011), better reputation, and increased market share and profit margins (Berrone et al., 2013; García-Sánchez et al., 2020b). These benefits occur because firms gain a sustainable competitive advantage from green innovation (Nirino et al., 2020) since it depends on intangible resources unique to the organization and not easily observable or replicable by externals, such as intellectual capital, which is noted as one of the key drivers of corporate green transition (Ali et al., 2021).

Second, the association between the public equity market and investing in eco-innovation activities is unclear. Theoretically, under financial frictions, the stock market should foster environmental innovation by improving firms' access to capital because such activity is particularly likely to be sensitive to debt financing constraints (e.g., Cecere et al., 2020). However, the stock market may also generate negative externalities, such as managerial myopia, which undermines incentives to invest in green innovation. The rationale for such behavior relies on eco-innovation investments' characteristics that affect the stock market reaction, which, in turn, drives management investment choices. Indeed, pursuing environmental innovation implies an intrinsically risky long-term commitment for the firm, with returns diluted over time. These features, jointly considered with involved companies' reluctance to reveal all of the information concerning their investments in innovation (Bhattacharya & Ritter, 1980) and individual investors' lack of resources and technical skills (Luo et al., 2015), make the environmental innovation process not easily assessable by the market (Holmstrom, 1989). As a result, companies that invest more in eco-innovation are more likely to be undervalued by the public equity market and, in the case of widespread ownership, to be exposed to hostile takeovers (Stein, 1988). Aware of this and concerned with preserving their jobs, managers may be stimulated to invest less in environmental innovation and place more effort into routine tasks that are less risky and guarantee short-term returns (e.g., He & Tian, 2013).

Following earlier literature, we focus on equity analysts[2] to investigate the possible impact of the stock market on corporate environmental innovation. Specifically, since financial analysts working for brokerage houses collect and process public and private information about firms they follow (Matsumoto et al., 2011; Mola et al., 2013; Scherbina, 2008) to produce equity reports, forecast firms' outcomes, define target prices and make stock recommendations (e.g., Healy & Palepu, 2001), they are able to influence investors' decisions and stock prices (e.g., Y. H. Chang & Chan, 2008; Womack, 1996). Therefore, the way they address eco-innovation activities and embed their assessments in the information they disclose to the market may have

an impact on firms' incentives to either boost or relieve the engagement in such activities. Stated differently, to the extent that analysts help investors to recognize the actual value of eco-innovation, firm management would not abstain from engaging in this type of innovation. Otherwise, if financial analysts are more likely to encourage investors to focus on quarterly profits instead of revealing the long-term value of eco-innovation activities, then managers will be more concerned with meeting short-term expectations rather than investing in environmental innovation (He & Tian, 2013; Irani & Oesch, 2016).

Contrasting arguments emerging from the evidence discussed above suggest how the possible effect of equity analysts' coverage on corporate environmental innovation remains an open question. We attempt to fill this gap by using a unique data set of more than 6000 unique firms (approximately 37,000 yearly observations between 2002 and 2018) across 56 different countries.

We find several interesting results. First, when we estimate our multivariate analyses based on the full sample, we provide evidence of a positive association between the corporate environmental innovation and the number of equity analysts covering a firm. We attribute this result to the informational role of financial analysts, whose effect, which prevails over the pressure effect, encourages managers to invest more in eco-innovation activities. However, when we divide the full sample into two subsamples based on whether covered firms are incorporated in a market-oriented or a bank-oriented country, we find that the association becomes negative in the case of market-oriented financial systems. We argue several potential explanations for this result that rely on differences that exist among market-oriented and bank-oriented systems in terms of listed companies' ownership structure, market for corporate control, and the prevalence of arm's length transaction banking rather than long-term lender–borrower relationships.[3] Our results are resilient to several robustness tests performed to alleviate the concerns that the association between corporate green innovation and the number of analysts following may be driven by industry-specific factors and omitted variables or by the criterion used to distinguish between market-oriented and bank-oriented countries.[4]

Providing evidence on the association between corporate environmental innovation and equity analysts, our paper contributes to the literature in two ways.

First, we add further evidence to the discussion of environmental innovation drivers. In this regard, in addition to regulatory factors, the literature distinguishes between the demand-side (stakeholders asking for more attention on sustainability issues) and supply-side (companies' internal) drivers (Doran & Ryan, 2016; Kesidou & Demirel, 2012). Among demand-side drivers, we introduce financial analysts, providing evidence of their role in shaping management decisions concerning eco-innovative strategies.

Second, our paper contributes to the literature on the possible impact of equity analysts on managers' behavior. Indeed, while previous studies find evidence that analyst coverage has a significant impact on various corporate decisions, such as financing choices (X. Chang et al., 2006), investment selection (To et al., 2018), innovation strategies (Guo et al., 2019; He & Tian, 2013) and accounting and tax policies (e.g., Allen et al., 2016; Yu, 2008), to the best of our knowledge, there are no studies analyzing the relation between corporate green innovation and equity analysts. We fill this gap because we believe that investigating whether analyst coverage fosters or impedes corporate green innovation is an effective way to contribute to the ongoing debate on whether the informative effect of equity analysts prevails over the pressure effect they exert on corporate managers. Indeed, unlike other corporate investments (including other types of innovation strategies), green innovation activities are characterized by asymmetric information problems that are exacerbated by investors' difficulty in assessing how much of the

value created through green innovation investments would be captured by society (De Marchi, 2012) and how much will benefit the firm. Moreover, the reputational return that firms seek to obtain through green innovation (Stojčić, 2021) is difficult to assess as well. Additionally, the long-term nature and the high failure probability of green innovation investments might be incompatible with the attention that financial analysts typically place on company short-term profits.

The remainder of this paper is organized as follows. Section 2 provides the literature review and research hypotheses. Section 3 discusses the data, variables, and empirical strategy. Sections 4 and 5 present the empirical results and discussion. Concluding remarks are discussed in the final section.

2 | THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1 | Literature on Green innovation

Awareness about environmental protection was dramatically revived by a growing number of events either directly linked to the issue (pollution, resource depletion, and natural catastrophes) or not, as is the case of the COVID-19 pandemic (Severo et al., 2021). The general perception of a world headed towards a tipping point suggests how the inadequacy of current business practices requires their rethinking based on sustainable development (Binder & Belz, 2014). In this scenario, innovation practices targeted for environmental preservation become pivotal to promote the required change.

Since the Schumpeterian "creative destruction" view (Schumpeter, 1942), innovation has been commonly referred to as one of the main drivers of economic growth by both theoretical studies and empirical evidence (Mansfield, 1972). Thus, to shed light on this intricate issue, we start by defining what green innovation means and how it deviates from the general meaning of innovation. Innovation benefits institutions pursuing it and generates positive externalities for stakeholders. Environmental innovation holds these features as well, but it is achieved whenever a beneficial effect for the natural environment is produced, regardless of whether this was the main objective of the institution producing it (Kammerer, 2009; OECD, 2009). Such beneficial effect lies in the reduction or prevention of environmental damage (Horbach, 2008) in terms of lower depletion of natural resources and release of toxic substances (Reid & Miedzinski, 2008). García-Sánchez et al. (2020a) define it as the development of new products, processes, or organizational practices that reduce pollution and favor rational use of natural resources.

However, why do firms engage in green innovation? As people's consciousness of environmental issues intensifies, their attention and interest in green products and processes increase as well (Chiou et al., 2011; Elkington, 1994). Thus, firms are more likely to reshape their business activities in response to such proenvironmental transition (Esty & Winston, 2009; Przychodzen & Przychodzen, 2013). As a result, by creating value for stakeholders, eco-innovation becomes a powerful tool to maintain or obtain a competitive advantage in dynamic markets (Doran & Ryan, 2016).

Acknowledging the importance of such an issue, a wide body of literature has focused on the rationale of corporate eco-innovation strategies, which are typically justified based on the resource-based view (RBV) and stakeholder theory. When firms are not financially constrained

(Frondel et al., 2007), they are more likely to engage in eco-innovation to achieve an advantage over competitors (Doran & Ryan, 2016). While financial and material resources remain relevant (Roome, 1992), according to RBV, for such competitive advantage to be sustainable, it must derive from elements that are unique to the organization and neither transferrable nor replicable by externals (Serrano-García et al., 2021). These properties are mostly embodied in intangible resources that constitute a firm's intellectual capital (in terms of individuals' skills and expertize, organizational culture, and relationships with externals), which is listed among key supply-side drivers (Ali et al., 2021) since corporate green innovation often requires reshaping business processes (Przychodzen & Przychodzen, 2013). For this purpose, green intermediaries' contribution along the firm's supply chain becomes crucial in sustainable transition, especially in smaller firms that typically lack such critical drivers (Fernández et al., 2021).

However, a firm's choice to convey resources and capabilities through sustainable projects instead of alternative uses lies in the pressure exerted by external stakeholders too (Thomas et al., 2021). Henriques and Sadorsky (1999) identify the following four types of "environmental stakeholders": regulatory stakeholders (e.g., government, trade associations, and competitors),[5] organizational stakeholders (e.g., employees, customers, and suppliers), community stakeholders, and the media.

While supply-side drivers alone are not able to explain why managers engage in eco-innovation, shareholders' pressure argument and the importance of government intervention (e.g., Kanda et al., 2015) uniquely contribute to explaining companies' minimum level of engagement to show themselves "green" (Horbach, 2008; Kesidou & Demirel, 2012).

Understanding why, all things equal, some firms engage more than others in eco-innovation requires an evaluation of the expected benefits in terms of financial performance and firm value.

Innovation practices can be risky and costly for short-term returns (Simpson et al., 2006), but firms are eventually able to sacrifice them to reach higher long-term business goals (Hizarci-Payne et al., 2021). Existing evidence seems to overcome the wisdom of considering green investments as a mere depletion of resources, stating, instead, a "win-win" logic embedded in the eco-innovation/firm performance link (Auer & Schuhmacher, 2016; Doran & Ryan, 2016). For example, while Ali et al. (2021) emphasize the importance of intellectual capital in the abovementioned relationship, Hizarci-Payne et al. (2021) observe this positive impact of eco-innovation on firm performance to be stronger in emerging markets than in developed markets. Similar results are suggested by Lee and Min (2015) and Craig and Dibrell (2006), who note how the win-win logic is stronger for family firms than for nonfamily firms. Przychodzen and Przychodzen (2013) observe how sustainable innovation positively impacts stock prices in terms of both higher returns and lower volatility.

2.2 | Financial analysts and Green innovation link and research hypotheses

Since previous literature seems to agree on the positive impact of eco-innovation on financial performance, the subsequent question that arises refers to the pathways that allow this win–win situation to occur. Specifically, under which circumstances is the positive effect of environmental innovation on financial outcomes more likely to be realized? Answering this question would provide crucial insights into firms' motivations to undertake eco-innovation,

relevant for both practitioners and policymakers. Based on the existing literature, we use the following setting to address the matter. Given that managerial decisions are mainly oriented to financial returns (e.g., Healy, 1985), before embarking on a long-term risky investment such as eco-innovation (Simpson et al., 2006), managers will wonder whether forfeiting short-term results is worthwhile. The answer will be positive as long as shareholders (in particular, investors) will be able to recognize the positive net present value embedded in green innovation projects; otherwise, the shareholders will see these projects as a mere depletion of resources. However, such recognition requires specific assessment capabilities and expertize and investors, particularly retail investors, are often constrained in this regard (Luo et al., 2015). Therefore, focusing on the stock market environment will help to clarify the role of information in shaping firms' decisions to engage in eco-innovation.[6] For this purpose, equity analysts provide an ideal setting given the uniqueness of the informative function they perform (Huang et al., 2014; Malmendier & Shanthikumar, 2007; Mola et al., 2013).

Financial analysts are important information intermediaries, playing a pivotal role in reducing information asymmetries between insiders and outsiders (Asquith et al., 2005; Hong et al., 2000; Lui et al., 2007) and, thus, mitigating agency problems (Jensen & Meckling, 1976; Malkiel & Fama, 1970). Given their proximity to management, they can obtain private information that cannot be obtained by investors, but they also add value to market participants by simply rearranging publicly available information, making it effortlessly readable (Huang et al., 2018; Mola et al., 2013).[7] In turn, this leads to greater efficiency in terms of creating rational price expectations among investors (Kim et al., 2019), higher liquidity (Madureira & Underwood, 2008), and trading volumes (Jegadeesh et al., 2004). In addition to the typical informative function, the literature highlights the importance of their monitoring function, which consists of challenging decisions by managers. This incentivizes them to adopt responsible rather than opportunistic behaviors (T. Chen et al., 2015) and also provides investors with a tool to objectively evaluate the long-term consequences of managerial decisions (Hong & Kacperczyk, 2010). Ayres et al. (2019) argue about an ex-ante monitoring function, resulting in an improved information environment, and an ex-post monitoring function, since analysts, through their reports, increase the likelihood of negative consequences for firms when managers fail to act properly. Thus, analyst coverage is likely to discourage managers from adopting a short-term orientation (He & Tian, 2013) and hiding relevant information from stakeholders (Degeorge et al., 2013; Yu, 2008).

These features make investors rely highly on equity analysts' reports and forecasts for their allocative choices (Joos et al., 2016; Lui et al., 2007). Such importance further increases for retail investors, who are less able to retrieve relevant information by themselves (Kecskes & Womack, 2008; Kelly & Ljungqvist, 2012), and when firms' disclosure is poor and biased (Hong & Kacperczyk, 2010). The analysts' informative function becomes crucial for eco-innovation, which hinges on intangible resources requiring their skills to be properly assessed (García-Meca, 2005). Hence, since analysts enhance stock market information efficiency, investors become able to recognize the net present value of risky long-term investments such as environmental innovation-related investments, stimulating managers to pursue them. Based on these considerations, we advance the following hypothesis:

H1a: *Corporate green innovation is positively associated with the number of equity analysts following the firm.*

This hypothesis states the "information effect," embodying analysts' upside for market efficiency and investors' and CEOs' decisions. However, previous studies argued about a "pressure effect" (To et al., 2018) occurring whenever managers worry about negative consequences deriving from missing analysts' expectations (Degeorge et al., 2013; Yu, 2008). For example, Guo et al. (2019) observe how managers react to increased external monitoring by focusing innovation strategies on external acquisitions rather than internal R&D expenses to preserve short-term results.[8] When financial analysts exert too much short-term pressure, managers will focus on immediate returns rather than long-term growth, and projects that are more likely to be sacrificed are those with long-term value consequences that cannot be easily assessed by the market (Holmstrom, 1989). The potential pressure effect requires introducing a hypothesis that opposes H1a.

H1b: *Corporate green innovation is negatively associated with the number of equity analysts following the firm.*

While previous studies argue about a "dichotomic effect," considering financial analysts' literature overall suggests they are not alternative. For example, a confirmation of H1a would mean that the information effect prevails over the pressure effect and not that the pressure effect is absent. Performing their duties, analysts eventually exert both, but, depending on firm-specific and/or market-related factors, one effect will prevail.

These considerations suggest that financial systems' features matter. As observed, among others, by He and Tian (2013) and Degeorge et al. (2013), information disclosed by analysts acquires different relevance according to the degree of financial system development. Typically, companies operating in market-oriented systems rely more on equity or debt issuances to finance themselves, and negative implications for missing market expectations severely affect their funding capabilities (X. Chang et al., 2006). Therefore, managers, being more concerned about not failing analysts' forecasts, will reduce long-term-oriented investments that require relinquishing immediate returns. Moreover, dispersed ownership (which typically characterizes public companies in market-oriented systems) further exacerbates agency problems. Indeed, because these companies are exposed to hostile takeovers, managers' fear of being unseated will further persuade them to abandon long-term value creation projects (Stein, 1988). Again, among these long-term value creation projects, green innovation-related projects represent the main candidates to be deleted because of their properties (Simpson et al., 2006). Based on these arguments, we develop the following hypothesis:

H2a: *Corporate green innovation is negatively associated with the number of equity analysts following the firm in market-oriented systems.*

The traditional paradigm divides financial systems based on firms' funding preferences. As opposed to the abovementioned market-oriented systems, companies in bank-oriented systems rely highly on bank loans for financing (Boot & Thakor, 2000). Here, agency problems deriving from both ownership-control separation and takeover pressure are less pronounced. A long-term-oriented relationship between lenders and borrowers leads the borrowers to greater informative opacity for two reasons. First, because they are less dependent on security issuance, concerns for management to meet market expectations are relieved, and they will be encouraged, instead, to hide relevant information from stakeholders (Yu, 2008). Second, since relationship lending relies on the accumulation of information about funded companies over

time (Berger & Udell, 2002), banks will lead them to less detailed disclosure in an attempt to preserve their informative advantage. In such a scenario, analysts' informative function becomes pivotal (Jensen & Meckling, 1976; Malkiel & Fama, 1970). With greater opacity boosting information asymmetries, investors rely highly on analysts' capabilities (Huang et al., 2018; Joos et al., 2016) to assess eco-innovation activities. Most importantly, the pressure effect is less likely to be felt by managers. Accordingly, we draw our last research hypothesis.

H2b: *Corporate green innovation is positively associated with the number of equity analysts following the firm in bank-oriented systems.*

3 | SAMPLE SELECTION, VARIABLES, AND SUMMARY STATISTICS

3.1 | Sample construction and data collection

To test our research hypotheses, we set our sample identification strategy as follows. We start by collecting information about equity analysts' coverage from the Institutional Brokers Estimate System (I/B/E/S) database. I/B/E/S provides information about equity analysts' recommendations, forecasts, and estimates for firms listed in worldwide stock exchanges. Because we are interested in the role of analysts among different financial systems (namely, the H2a and H2b hypotheses), we consider both US and International I/B/E/S databases. For this purpose, some difficulties arise, based on both the databases' structures and the specificity of our analysis. In particular, I/B/E/S no longer releases the "Broker Translation File," allowing immediate recognition of exact brokerage and firms' names and relevant codes (i.e., CUSIP or SEDOL, for non-US companies). The I/B/E/S code is specific and not official; the same is true for the company name. Moreover, in analyzing several stock markets, we cannot uniquely rely on the ticker symbol, since the same ticker is frequently associated with more than one firm and, considering the large time frame adopted (2002–2018), it is more likely to change over time. We addressed this issue by identifying patterns and similarities between I/B/E/S CUSIP and SEDOL codes and the official codes retrieved on Refinitiv Eikon, leading to the first match between I/B/E/S data and companies' official names and codes. Hence, we manually check the accuracy of each correspondence, allowing us to correctly identify names and ISIN codes for 8071 unique firms included in the I/B/E/S historical series between 2002 and 2018. We then merge these data with Refinitiv Datastream to obtain financials. We exclude financial firms (Worldscope "Industry Group" codes between 4300 and 4395) and firms with no data for financials and Environmental Innovation Score (EIS) value from Thomson ASSET4 in the sample period. Our final sample consists of 6426 unique firms incorporated in 56 different countries. Tables 1 and 2 show the sample's geographical and sectoral distribution, respectively, while a description of the variables included in our model is provided in Table 3 and in the next section.

3.2 | Variable descriptions

3.2.1 | Dependent variable

We employ as a dependent variable the Environmental Innovation Score (EIS) provided by the Thomson ASSET4 database because it is largely employed by previous studies (e.g.,

TABLE 1 Sample geographical distribution

Country	ISO	No. of firms	Country	ISO	No. of firms
Australia	AU	172	Marshall Islands	MH	2
Austria	AT	17	Mauritius	MU	2
Belgium	BE	34	Mexico	MX	3
Bermuda	BM	88	Morocco	MA	1
Brazil	BR	16	Myanmar	MY	40
Canada	CA	249	Netherland Antilles	AN	4
Cayman Islands	KY	107	Netherlands	NL	110
Chile	CL	2	New Zealand	NZ	18
China	CN	122	Norway	NO	27
Czech Republic	CZ	4	Panama	PA	7
Denmark	DK	28	Papua New Guinea	PG	1
Finland	FI	80	Philippines	PH	1
France	FR	248	Poland	PL	3
Germany	DE	250	Portugal	PT	15
Gibraltar	GI	1	Russia	RU	10
Greece	GR	26	Singapore	SG	45
Hong Kong	HK	102	South Africa	ZA	2
Hungary	HU	2	Spain	ES	92
India	IN	133	Sweden	SE	67
Indonesia	ID	31	Switzerland	CH	128
Ireland	IE	36	Taiwan	TW	49
Israel	IL	15	Thailand	TH	25
Italy	IT	69	Timor-Leste	IM	1
Japan	JP	476	Turkey	TR	18
Jersey	JE	16	UAE	AE	1
Korea (Republic of)	KR	124	United Kingdom	GB	695
Liberia	LR	3	United States	US	2584
Luxembourg	LU	20	Virgin Islands	VG	4

Note: 6426 unique firms; sample period: 2002–2018.

Rajesh, 2020) to measure firms' involvement in eco-innovation activities. Unlike other CSR measures that are only based on information voluntarily disclosed by companies, EIS also considers objective data such as R&D expenditures leading to product innovation and green revenues. Such specification is required since, when addressing CSR issues, it is important "*to distinguish between the rhetoric of socially responsible corporate behavior and substantive action*" (Campbell, 2007, p. 5).

TABLE 2 Industry distribution

Industry	Industry code	Unique firms	Unique firms (%)	No. of firm-years	No. of firm-years (%)	Mean	Median
Aerospace	13	60	0.93	353	0.95	35.82	29.17
Apparel	16	67	1.04	342	0.92	20.78	0.00
Automotive	19	140	2.18	848	2.29	53.15	59.60
Beverages	22	85	1.32	485	1.31	26.67	17.74
Chemicals	25	272	4.23	1617	4.37	40.60	40.71
Construction	28	371	5.77	2366	6.39	27.52	9.62
Diversified	31	183	2.85	1192	3.22	32.30	27.34
Drugs. cosmetics & health care	34	411	6.40	2234	6.03	9.68	0.00
Electrical	37	123	1.91	665	1.80	37.37	34.86
Electronics	40	857	13.34	4663	12.59	26.64	7.14
Food	46	209	3.25	1228	3.32	28.17	18.85
Machinery & equipment	49	262	4.08	1514	4.09	36.95	33.52
Metal producers	52	243	3.78	1466	3.96	5.84	0.00
Metal product manufacturers	55	83	1.29	482	1.30	28.68	24.25
Oil. gas. coal & related services	58	491	7.64	2802	7.57	11.61	0.00
Paper	61	66	1.03	396	1.07	38.62	40.38
Printing & publishing	64	55	0.86	364	0.98	5.80	0.00
Recreation	67	270	4.20	1522	4.11	10.19	0.00
Retailers	70	365	5.68	2189	5.91	23.84	0.00
Textiles	73	25	0.39	142	0.38	31.53	16.67
Tobacco	76	34	0.53	233	0.63	14.62	0.00
Transportation	79	275	4.28	1539	4.16	10.66	0.00
Utilities	82	574	8.93	3477	9.39	25.87	8.09
Miscellaneous/not available	85	905	14.08	4911	13.26	13.51	0.00
Total		6426	100	37,030	100	22.40	0.00

Notes: In this table, we report the distribution of firms by the industrial sector they belong to. First two columns report industry name and Thomson (2-digit) code, respectively. In the third and fourth columns, we report the number of unique firms in absolute and percentage terms, respectively, and we do the same for the number of firm years (fifth and sixth columns). Considering missing data, for each firm we have, on average, 5.76 yearly observations, for a total number of firm-year observations equal to 37,030. The last two columns report the mean and median values of the Environmental Innovation Score for each industry. Sample period: 2002–2018.

TABLE 3 Variables description

Variables	Definition
Firm-specific	
EnvInnovation	The environmental innovation category score reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products. The score ranges from 0 to 100, with higher values associated with more eco-innovativeness. Values are in $t+1$ (1 year ahead)[a]
Ln(Analysts)	Natural logarithm of (one plus) the number of analysts following a firm in a year[b]
Leverage	Ratio of the book value of total debt on the book value of total assets[c]
Ln(Asset)	Natural logarithm of book value of assets[c]
LnMarketToBook	Natural logarithm of ratio of market capitalization on book value of equity[c]
DivPayer	Indicator variable equal to one if the firm has paid dividends in a year, zero otherwise[c]
Profitability	Ratio of net income on book value of total assets[c]
Ln(Board Size)	Natural logarithm of the total number of board members at the end of the fiscal year[a]
Board gender diversity	Percentage of female members of the board[a]
Independent members	Percentage of independent board members as reported by the company[a]
Exec Comp ESG	Indicator variable equal to one if the executives' compensation is linked to company's ESG performance, zero otherwise[a]
CEO Comp to TSR	Indicator variable equal to one if the CEO's compensation is linked to total shareholders' return, zero otherwise[a]
Institutionals (%)	Percentage of shares held by investment companies and pension funds[c]
Country variables	
CO2Emissions	Carbon dioxide emissions from the burning of fossil fuels and the manufacture of cement (metric tons per capita)[d]
GDPGrowth	Annual percentage growth rate of GDP at market prices[d]
PM2.5AirPollution	PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)[d]
R&D expenditure	Gross domestic expenditures on research and development, in percentage of GDP[d]
StockMktValueTraded	Total value of all traded shares in a stock market exchange as a percentage of GDP[e]

[a]*Source*: THOMSON ASSET4.

[b]*Source*: I/B/E/S.

[c]*Source:* REFINITIV EIKON (Datastream).

[d]*Source*: WORLD BANK (Environmental, Social & Governance database).

[e]*Source*: WORLD BANK (Global Financial Development database).

The EIS represents one of the three dimensions of firms' environmental performance (the other two refer to emissions and resource use). It is defined as a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products. It ranges from 0 to 100, with values close to 100 indicating excellent performance and a high degree of transparency. Considering the purpose of our analysis and the long-term orientation of investment in eco-innovation (Hizarci-Payne et al., 2021; Simpson et al., 2006), we use as our dependent variable the value of EIS in $t + 1$ (1 year ahead).

3.2.2 | Analyst coverage

To evaluate the role of the stock market in shaping firms' eco-innovation, we collect data about equity analysts to build our main independent variable. Specifically, for each firm, we compute the number of analysts following per year. Based on previous literature (Hong et al., 2000; To et al., 2018; Yu, 2008), we define an analyst following a firm if he or she issued at least one earning forecast in the considered year. For this purpose, we employ data on earnings per share estimates that represent the most commonly used measure, the most frequently updated by analysts in their reports and the best covered by the I/B/E/S database. We define our main regressor as the natural logarithm of one plus the number of analysts following in a year.

3.2.3 | Control variables

Based on the eco-innovation drivers' literature and RBV argument, we employ a variety of firm-level controls. To account for resource availability, we use the book value of assets, dividend payments, and profitability; the market-to-book ratio accounts for firms' investment opportunities, performance, and systematic risk (Fama & French, 1992); and the leverage ratio measures for financial constraints. Furthermore, previous literature suggests that corporate governance mechanisms influence both the role of equity analysts (Irani & Oesch, 2016; Yu, 2008) and firms' engagement in green innovation (Amore & Bennedsen, 2016; Guo et al., 2019). Accordingly, we employ a set of controls addressing governance and ownership structure. We control for board size, board gender diversity, and the number of independent board members. Furthermore, we employ a dummy variable indicating whether executives' compensation is linked to Environmental Social and Governance (ESG) performance (*Exec Comp ESG*) and a dummy variable indicating whether the CEO's compensation is linked to total shareholders' return (*CEO Comp to TSR*). Finally, we control for the percentage of shares held by investment companies and/or pension funds (*Institutionals (%)*). Yearly firm-level data are retrieved from Refinitiv Datastream.

In addition, based on the ST argument, to account for macroeconomic and environmental drivers, we collect country-level data from WorldBank databases. Specifically, from the ESG database, we obtain measures of CO_2 emissions and air pollution to account for natural environment quality and GDP growth rate and domestic expenditures on R&D to proxy for a country's economic development. Finally, from the Global Financial Development database, we obtain information on stock market dimensions in terms of total value traded. Descriptive statistics are reported in Table 4. Correlation matrix (not reported for brevity) confirm that no collinearity issue occurs among regressors, since all values are close to zero.

TABLE 4 Summary statistics

Variables	25p	Median	Mean	75p	Std. dev.	No. obs.
EnvInnovation	0.0000	0.0000	23.5460	50.0000	30.9053	37,030
Ln(Analysts)	2.4849	2.8904	2.8145	3.1781	0.5403	37,030
Leverage	−0.0410	0.1403	0.1086	0.2816	0.2606	37,030
Ln(Asset)	21.4512	22.3659	22.4434	23.4408	1.4626	37,030
Ln(MarketToBook)	−0.2630	0.1249	0.1861	0.6077	0.6810	37,030
DivPayer	1.0000	1.0000	0.7735	1.0000	0.4186	37,030
Profitability	0.0235	0.0532	0.0554	0.0935	0.0888	37,030
Board Size	2.0794	2.3026	2.3086	2.4849	0.3259	33,885
Board gender diversity	0.0000	11.1100	12.2069	20.0000	11.3400	33,145
Independent members	0.4444	0.6667	0.6195	0.8333	0.2575	31,860
Exec Comp ESG	0.0000	0.0000	0.2443	0.0000	0.4297	33,977
CEO Comp to TSR	0.0000	0.0000	0.4085	1.0000	0.4916	33,869
Institutionals (%)	0.0000	0.0500	0.0678	0.1100	0.0866	36,777

Notes: This table reports summary statistics for the dependent variable (*EnvInnovation*) and the firm-level independent variables. Unique firms: 6426; sample period: 2002–2018.

4 | MULTIVARIATE ANALYSES

In this section, we test our predictions about the association between corporate eco-innovation and the number of equity analysts covering a firm by using ordinary least squares (OLS) regressions. Since it takes time for companies to reshape their eco-innovation commitment, we use 1 year ahead *EnvInnovation*. Moreover, to mitigate the impact of outliers, we winsorize (at the 1st and 99th percentiles) regressors based on accounting data, namely, leverage, book assets, market-to-book, and profitability ratio.

Table 5 presents the results of full sample OLS estimations. In the baseline specification (Column 1), we uniquely control for financials. We progressively add year and firm fixed effects (Column 2), governance and ownership controls (Column 3), and country-specific controls (Column 4) to increase the explanatory power of our models. Indeed, we can note that the adjusted R^2 increases from 11.8% for the baseline specification to 18.8% for the full specification. In this regard, fixed effects aim to capture unobserved heterogeneity in the firm-specific, that is, time-invariant, levels of environmental innovation. Considering specifications including only firm-level controls (Columns 1, 2, and 3), we observe that the coefficient of our variable of interest (*Ln(Analysts)*) is always positive and statistically significant at the 1% confidence level. This result holds even when we exclude firms having an EIS equal to 0.[9] Overall, this is consistent with our H1a that financial analysts' informative role prevails over their pressure role, encouraging managers to invest more in eco-innovation activities. In addition, consistent with the RBV argument, *EnvInnovation* is negatively associated with the leverage ratio (*Leverage*), while the association becomes positive for firm size (*Ln(Asset)*). Both controls are always statistically significant at the 1% level, suggesting that larger and less financially constrained companies tend to be more eco-innovative. Again, green innovation is negatively

TABLE 5 Full sample analysis

	(1)	(2)	(3)	(4)
Ln(Analysts)	1.405***	1.192***	1.531***	−0.306
	(0.317)	(0.316)	(0.356)	(0.520)
Leverage	−4.979***	−5.592***	−7.610***	−8.092***
	(0.574)	(0.569)	(0.654)	(0.939)
Ln(Asset)	6.249***	6.565***	5.723***	5.080***
	(0.137)	(0.140)	(0.170)	(0.237)
Ln(MarketToBook)	−2.828***	−2.545***	−3.273***	−2.947***
	(0.265)	(0.267)	(0.306)	(0.449)
DivPayer	4.857***	4.977***	5.076***	3.309***
	(0.353)	(0.364)	(0.409)	(0.582)
Profitability	2.780*	2.122	1.754	6.102**
	(1.554)	(1.556)	(1.816)	(2.675)
Ln(Board Size)			4.095***	9.060***
			(0.635)	(0.891)
Board Gender Diversity			0.217***	0.120***
			(0.0159)	(0.0231)
Independent Members			−0.00216	0.104***
			(0.00836)	(0.0134)
Exec Comp ESG			2.375***	3.361***
			(0.415)	(0.557)
CEO Comp to TSR			−0.00698	1.449***
			(0.368)	(0.530)
Institutionals (%)			−8.108***	−7.180***
			(1.869)	(2.707)
CO2Emissions				−1.411***
				(0.0851)
GDPGrowth				−0.599***
				(0.151)
PM2.5AirPollution				−0.0152
				(0.0231)
R&D expenditure				8.153***
(% GDP)				(0.435)
StockMktValueTraded				−0.0304***
(% GDP)				(0.00607)

(Continues)

TABLE 5 (Continued)

	(1)	(2)	(3)	(4)
Intercept	−123.5***	−147.2***	−141.0***	−137.3***
	(2.644)	(2.973)	(3.668)	(5.545)
Year fixed	No	Yes	Yes	Yes
Firm fixed	No	Yes	Yes	Yes
N	37,030	37,030	31,057	15,558
R^2	.118	.144	.147	.190
adj. R^2	.118	.144	.146	.188

Notes: This table shows the results of OLS estimation on the full sample. To the baseline specification of Column 1, which includes only financials among regressors, we progressively add fixed effects (Column 2), governance and ownership variables (Column 3), and country-specific variables (Column 4). The dependent variable is the Environmental Innovation Score (in $t+1$) from the Refinitiv Eikon ASSET4 database.

Standard errors are reported in parentheses.

*, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively. Unique firms: 6426; sample period: 2002–2018.

associated to *Ln(MarketToBook)* and positively associated with *DivPayer*, while *Profitability* is positive but statistically significant only in the baseline specification (at the 10% level). Column 3 documents how governance and ownership features contribute to explaining corporate green innovation. Specifically, more *EnvInnovation* is positively associated with *Ln(Board Size)*, *Board Gender Diversity,* and *Exec Comp ESG*, while it is negatively influenced by institutional investors' shareholdings (*Institutional (%)*). All coefficients are significant at the 1% level. In contrast, *Independent Members* and *CEO Comp to TSR* are not statistically significant. However, considering the full specification (which includes country-level controls), our variable of interest (*Ln(Analysts)*) becomes not statistically significant. While this may seem surprising, this finding suggests that some macroeconomic features may affect the association between environmental innovation and analyst coverage.

In particular, previous literature (e.g., Degeorge et al., 2013) suggests that the effectiveness of equity analysts' informative function changes according to financial market-related features. Thus, we use the size of the domestic stock market as a proxy for the degree of financial system development to perform a split sample analysis. Specifically, we divide our full sample into two subsamples: market-oriented countries, where the total value traded on the domestic stock market (*StockMktValueTraded (% GDP)*) is above the sample median, and the remainder are bank-oriented countries. The results of the OLS estimations for the two subsamples are reported in Table 6. We can note that the adjusted R^2 progressively increases from the baseline to the full specification (+5.8 for the market-oriented subsample and +8.4 for the bank-oriented subsample). Interestingly, while previous results are confirmed for the bank-oriented subsample (Panel B), the coefficient of *Ln(Analysts)* becomes negative in the market-oriented subsample (Panel A). It is statistically significant at the 1% confidence level in all the specifications. The other controls hold the same explanatory power as in the full sample analysis, with few exceptions. For example, focusing on full sample specifications (Columns 4 and 8), *Ln (MarketToBook)* becomes nonsignificant for the market-oriented subsample, while the coefficient of *Institutionals (%)* becomes nonsignificant for the bank-oriented subsample, as expected.

TABLE 6 Splitting sample analysis

	Panel A: Market-oriented countries				Panel B: Bank-oriented countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Analysts)	−1.563***	−1.846***	−1.985***	−3.743***	4.576***	3.671***	3.761***	2.963***
	(0.436)	(0.440)	(0.490)	(0.751)	(0.470)	(0.473)	(0.546)	(0.759)
Leverage	−8.056***	−8.910***	−11.16***	−12.68***	−0.902	−1.065	−3.433***	−2.574*
	(0.736)	(0.736)	(0.830)	(1.237)	(0.916)	(0.922)	(1.072)	(1.450)
Ln(Asset)	6.066***	6.414***	5.514***	5.264***	6.245***	6.528***	5.775***	4.862***
	(0.201)	(0.202)	(0.239)	(0.369)	(0.196)	(0.197)	(0.244)	(0.316)
Ln(MarketToBook)	−1.794***	−1.218***	−1.475***	0.373	−3.284***	−3.209***	−4.379***	−4.517***
	(0.367)	(0.367)	(0.412)	(0.653)	(0.404)	(0.396)	(0.459)	(0.640)
DivPayer	5.968***	5.433***	5.213***	3.564***	2.060***	2.627***	3.265***	2.594***
	(0.450)	(0.456)	(0.510)	(0.775)	(0.635)	(0.637)	(0.711)	(0.917)
Profitability	5.009***	5.157***	4.049*	3.945	0.685	−3.402	−4.901	6.893
	(1.867)	(1.881)	(2.224)	(3.517)	(2.734)	(2.730)	(3.083)	(4.237)
Ln(Board Size)			1.142	4.867***			5.159***	9.452***
			(0.977)	(1.613)			(0.842)	(1.111)
Board gender diversity			0.199***	0.183***			0.233***	0.108***
			(0.0220)	(0.0363)			(0.0231)	(0.0312)
Independent members			0.0679***	0.197***			0.0113	0.0792***
			(0.0131)	(0.0267)			(0.0117)	(0.0161)

(Continues)

TABLE 6 (Continued)

	Panel A: Market-oriented countries				Panel B: Bank-oriented countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exec Comp ESG			2.699***	2.761***			2.371***	3.607***
			(0.551)	(0.778)			(0.625)	(0.799)
CEO Comp to TSR			1.454***	2.931***			−1.397**	−0.410
			(0.484)	(0.743)			(0.581)	(0.781)
Institutionals (%)			−16.70***	−19.30***			2.428	6.252
			(2.451)	(3.742)			(2.909)	(4.001)
CO2Emissions				−1.676***				−1.029***
				(0.498)				(0.109)
GDPGrowth				0.512				−0.461***
				(0.714)				(0.160)
PM2.5AirPollution				0.153				−0.0567**
				(0.135)				(0.0264)
R&D expenditure				22.73***				6.732***
(% GDP)				(2.025)				(0.496)
StockMktValueTraded				0.0618***				−0.0280**
(% GDP)				(0.0180)				(0.0125)
Intercept	−112.7***	−135.5***	−124.4***	−170.2***	−129.6***	−149.0***	−138.3***	−144.0***
	(3.981)	(4.287)	(4.989)	(20.97)	(3.665)	(6.241)	(12.10)	(7.088)

TABLE 6 (Continued)

	Panel A: Market-oriented countries				Panel B: Bank-oriented countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year fixed	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Firm fixed	No	Yes	Yes	Yes	No	Yes	Yes	Yes
N	19,283	19,283	16,699	7,147	17,747	17,747	14,358	8411
R^2	.099	.135	.138	.160	.144	.173	.188	.231
adj. R^2	.098	.134	.136	.156	.144	.171	.186	.228

Note: Using the same specifications as in Table 5, this table shows results of OLS estimations for firms located in market-oriented countries (Panel A) and bank-oriented countries (Panel B). We define a firm as operating in a market-oriented country if the associated yearly total value traded on the domestic stock market (*StockMktValueTraded (% GDP)*) is above sample median; otherwise, we define it as operating in a bank-oriented country. The dependent variable is the Environmental Innovation Score in $t + 1$.

Standard errors are reported in parentheses.

*, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively. Unique firms: 6426; sample period: 2002–2018.

Overall, the results of the split sample analysis confirm Hypotheses H2a and H2b. A further discussion and interpretation of the results are provided in Section 5.

4.1 | Robustness check

This section presents the results of several robustness checks that we conduct to validate our main findings.

First, we are concerned that the association between corporate green innovation and analyst coverage may be driven by industry-specific factors. To ensure that this is not the case, we first introduce industry-fixed effects in our regressions; then, we perform OLS regressions by excluding firms operating in the electronics and utility sectors, which together account for approximately 25% of our full sample. As highlighted in Panels A and B of Table 7, the results are qualitatively similar to those presented in Tables 5 and 6.

Second, we aim to alleviate the risk that our results are affected by endogeneity concerns. Indeed, even if we control for many firm characteristics, it is possible that unobservable variables omitted from our empirical models influence both analyst coverage and corporate green innovation, rendering our results spurious. For example, high talent managers are likely to lead companies that attract more equity analysts, but they may also actively engage in long-term investment projects that result in higher green innovation performance. To mitigate this risk, as in most empirical studies using panel data and involving an endogeneity concern, we use a panel-fixed effects model that allows controlling for unobservable firm-specific effects such as managerial ability and risk aversion that may be reasonably assumed to be time-invariant. The results, which are reported in Panel A of Table 8, are qualitatively similar to those illustrated in Tables 5 and 6.

Finally, to further confirm that the association between corporate green innovation and the number of analysts following changes across countries according to the structure of their financial systems, we also use data about private credit by deposit money bank expressed in percentage of GDP (*Private Credit/GDP*) as an alternative criterion to distinguish between market-oriented and bank-oriented countries.[10] Again, our main results, which we display in Panel B of Table 8, remain unchanged.

5 | DISCUSSION

In the previous section, we provided two main results. First, we find a positive and significant association between the level of environmental innovation in publicly listed firms and the number of equity analysts following them. Second, when we divide the full sample into two subsamples based on the structure of the financial system of the country in which the sample firm is incorporated, we provide strong evidence that this association holds for bank-oriented countries, while it becomes negative in the case of firms operating in market-oriented countries. In this section, we provide plausible explanations for both results.

Following various studies (e.g., Guo et al., 2019; He & Tian, 2013; To et al., 2018), we build our interpretative framework on the idea that financial analysts introduce informative mechanisms that influence firm managers' incentives to invest in eco-innovation in different ways.

By collecting and processing public and private information about firms they follow (Matsumoto et al., 2011; Mola et al., 2013; Scherbina, 2008), financial analysts are able to

TABLE 7 Robustness check

	Panel A: Adding industry fixed				Panel B: Excluding most numerous industries			
	Full sample		Market-oriented	Bank-oriented	Full sample		Market-oriented	Bank-oriented
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Analysts)	1.200***	−0.117	−2.877***	2.747***	1.067**	−0.885	−3.870***	2.786***
	(0.352)	(0.517)	(0.735)	(0.763)	(0.444)	(0.652)	(0.987)	(0.917)
Leverage	−3.097***	−3.452***	−7.642***	1.357	−2.083**	−2.713**	−7.367***	1.420
	(0.653)	(0.935)	(1.205)	(1.476)	(0.880)	(1.257)	(1.768)	(1.812)
Ln(Asset)	5.567***	4.975***	5.274***	4.746***	5.213***	4.486***	5.356***	3.839***
	(0.167)	(0.232)	(0.357)	(0.312)	(0.209)	(0.284)	(0.466)	(0.359)
Ln(MarketToBook)	−2.989***	−2.843***	−0.0627	−4.184***	−5.020***	−4.523***	−1.455	−5.968***
	(0.298)	(0.437)	(0.622)	(0.633)	(0.376)	(0.554)	(0.889)	(0.740)
DivPayer	4.475***	2.857***	2.942***	2.196**	7.614***	5.457***	5.913***	3.688***
	(0.398)	(0.565)	(0.762)	(0.887)	(0.525)	(0.719)	(1.046)	(1.057)
Profitability	4.948***	8.831***	6.691**	9.754**	6.227***	11.62***	10.17**	10.36**
	(1.795)	(2.620)	(3.400)	(4.214)	(2.242)	(3.095)	(4.159)	(4.679)
Ln(Board Size)	4.262***	9.109***	6.153***	9.689***	3.514***	8.445***	8.910***	5.472***
	(0.618)	(0.861)	(1.546)	(1.086)	(0.794)	(1.069)	(2.004)	(1.349)
Board gender diversity	0.240***	0.142***	0.211***	0.130***	0.343***	0.239***	0.326***	0.156***
	(0.0157)	(0.0228)	(0.0359)	(0.0308)	(0.0192)	(0.0280)	(0.0446)	(0.0376)
Independent members	0.000148	0.0990***	0.161***	0.0812***	−0.00146	0.112***	0.286***	0.0484**
	(0.00817)	(0.0131)	(0.0257)	(0.0159)	(0.0105)	(0.0164)	(0.0344)	(0.0194)

(Continues)

TABLE 7 (Continued)

	Panel A: Adding industry fixed				Panel B: Excluding most numerous industries			
	Full sample		Market-oriented	Bank-oriented	Full sample		Market-oriented	Bank-oriented
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exec Comp ESG	2.373***	3.004***	2.084***	3.472***	1.766***	3.168***	2.407**	3.824***
	(0.406)	(0.545)	(0.757)	(0.789)	(0.516)	(0.694)	(1.005)	(0.962)
CEO Comp to TSR	0.255	1.129**	2.150***	−0.477	−1.326***	0.166	−0.0217	−0.955
	(0.361)	(0.522)	(0.726)	(0.781)	(0.466)	(0.666)	(0.975)	(0.931)
Institutionals (%)	−7.366***	−5.393**	−14.99***	6.510	−14.82***	−13.38***	−22.46***	1.312
	(1.865)	(2.676)	(3.675)	(3.983)	(2.292)	(3.271)	(4.728)	(4.738)
CO2Emissions		−1.387***	−1.850***	−0.994***		−1.456***	−1.747***	−1.408***
		(0.0841)	(0.481)	(0.108)		(0.103)	(0.663)	(0.134)
GDPGrowth		−0.574***	0.548	−0.472***		−0.822***	−0.216	−0.614***
		(0.148)	(0.695)	(0.158)		(0.186)	(0.931)	(0.195)
PM2.5AirPollution		−0.0570**	0.0869	−0.0799***		−0.0129	0.117	−0.0994***
		(0.0230)	(0.131)	(0.0263)		(0.0280)	(0.174)	(0.0314)
R&D expenditure		7.107***	21.38***	5.986***		9.275***	19.50***	8.711***
(% GDP)		(0.433)	(1.987)	(0.493)		(0.544)	(2.491)	(0.621)
StockMktValueTraded		−0.0263***	0.0664***	−0.0165		−0.0403***	0.0247	−0.0733***
(% GDP)		(0.00602)	(0.0174)	(0.0123)		(0.00739)	(0.0233)	(0.0153)
Intercept	−124.9***	−119.7***	−156.9***	−130.2***	−132.2***	−124.9***	−144.6***	−107.1***
	(3.738)	(5.496)	(19.52)	(7.130)	(4.513)	(6.869)	(21.76)	(8.359)
Year fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 7 (Continued)

	Panel A: Adding industry fixed				Panel B: Excluding most numerous industries			
	Full sample		Market-oriented	Bank-oriented	Full sample		Market-oriented	Bank-oriented
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed	Yes	Yes	Yes	Yes	No	No	No	No
N	31,057	15,558	7147	8411	20,057	10,068	4067	6001
R^2	.178	.220	.206	.249	.156	.217	.211	.243
adj. R^2	.178	.218	.202	.246	.155	.214	.205	.239

Notes: In this table, we check whether industry distribution affect our analysis. Specifically, in Panel A we add industry-fixed effects in our OLS specification on the full sample (Columns 1 and 2) and splitting in the market and bank-oriented countries (Columns 3 and 4, respectively). In Panel B we run our OLS specification excluding firms operating in electronics and utility sectors, which, standalone, account for the 25% of our full sample, approximately. The dependent variable is the Environmental Innovation Score in $t+1$.

Standard errors are reported in parentheses.

*, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively. Unique firms: 6426; sample period: 2002–2018.

TABLE 8 Robustness check

	Panel A: Panel-fixed effects regressions				Panel B: Alternative splitting sample	
	Full sample		Market-oriented	Bank-oriented	Market-oriented countries	Bank-oriented countries
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Analysts)	2.061***	1.594**	−1.612*	4.543***	−3.304***	1.482**
	(0.457)	(0.620)	(0.992)	(0.915)	(0.753)	(0.739)
Leverage	1.381	−1.746	−4.651**	0.844	−13.59***	0.173
	(1.086)	(1.472)	(1.936)	(2.229)	(1.224)	(1.466)
Ln(Asset)	0.209***	0.116***	0.133	0. 251***	5.072***	5.614***
	(0.128)	(0.176)	(0.236)	(0.271)	(0.365)	(0.322)
Ln(MarketToBook)	−0.537***	−0.155	−0.352	−0.00219	−0.0846	−5.469***
	(0.121)	(0.159)	(0.269)	(0.197)	(0.646)	(0.641)
DivPayer	0.843*	0.177	3.906***	−2.287***	3.285***	2.986***
	(0.508)	(0.653)	(1.074)	(0.841)	(0.784)	(0.888)
Profitability	−1.059	5.850**	6.321*	5.525	7.586**	4.720
	(1.641)	(2.383)	(3.297)	(3.371)	(3.501)	(4.268)
Ln(Board Size)	1.536**	1.387	−2.804*	4.933***	7.053***	8.973***
	(0.778)	(1.088)	(1.636)	(1.483)	(1.536)	(1.129)
Board gender diversity	0.220***	0.112***	−0.00797	0.141***	0.157***	0.125***
	(0.0183)	(0.0262)	(0.0416)	(0.0338)	(0.0353)	(0.0313)
Independent members	0.0762***	0.0173	-0.0168	0.0181	0.168***	0.0529***
	(0.0101)	(0.0159)	(0.0296)	(0.0191)	(0.0254)	(0.0164)
Exec Comp ESG	4.328***	2.529***	1.185	2.785***	4.132***	1.804**
	(0.398)	(0.572)	(0.806)	(0.803)	(0.771)	(0.806)
CEO Comp to TSR	3.618***	1.704***	1.979***	0.583	2.739***	−1.304*
	(0.405)	(0.582)	(0.766)	(0.872)	(0.743)	(0.777)
Institutionals (%)	−2.532	−3.802	−3.354	−5.285	−17.08***	6.793*
	(1.906)	(2.609)	(3.352)	(4.057)	(3.805)	(3.863)
CO2Emissions		−3.338***	−3.858***	−3.313***	−3.237***	−0.795***
		(0.231)	(0.319)	(0.341)	(0.355)	(0.112)
GDPGrowth		0.303***	1.881***	0.320***	−0.00247	−0.361*
		(0.0994)	(0.397)	(0.105)	(0.315)	(0.188)
PM2.5AirPollution		−0.0733	0.168	−0.286**	−0.0142	−0.318***
		(0.0939)	(0.155)	(0.131)	(0.0485)	(0.0384)

TABLE 8 (Continued)

	Panel A: Panel-fixed effects regressions				Panel B: Alternative splitting sample	
	Full sample		Market-oriented	Bank-oriented	Market-oriented countries	Bank-oriented countries
	(1)	(2)	(3)	(4)	(5)	(6)
R&D expenditure		16.98***	44.61***	17.98***	16.28***	7.487***
(% GDP)		(1.692)	(5.121)	(2.340)	(3.452)	(0.481)
StockMktValueTraded		0.0548***	0.0458***	0.0621***	−0.00359	0.0233**
(% GDP)		(0.00585)	(0.0113)	(0.0128)	(0.0179)	(0.0106)
Intercept	1.965	6.703	−40.84***	−9.844	−105.4***	−161.4***
	(2.230)	(6.118)	(14.97)	(7.708)	(15.60)	(7.030)
Year fixed					Yes	Yes
Firm fixed					Yes	Yes
N	31,069	15,563	7148	8415	7416	8142
R^2	.039	.073	.111	.079	.147	.255

Notes: In Panel A we report results of panel-fixed effects regressions on the full sample (Columns 1 and 2) and splitting in the market and bank-oriented countries (Columns 3 and 4, respectively). In Panel B, we run our full OLS specification using a different splitting criterion for market and bank-oriented countries. Specifically, we employ a measure of private credit by deposit money bank (in percentage of GDP): Values above sample median are associated to bank-oriented countries; otherwise, market-oriented countries. The dependent variable is the Environmental Innovation Score in $t + 1$.

Standard errors are reported in parentheses.

*, **, and *** indicates statistical significance at the 10%, 5%, and 1% levels, respectively. Unique firms: 6426; sample period: 2002–2018.

mitigate asymmetric information problems between insiders and outsiders, which typically hinder investments in environmental innovation. This type of innovation is the result of a long process that is risky and has long-term value consequences that cannot be easily assessed by the market (Holmstrom, 1989) due to the absence of both investors' technical expertize and full information about corporate innovation activities (Bhattacharya & Ritter, 1980). Consequently, companies that invest more in eco-innovation are more likely to be undervalued by the stock market and, in the case of widespread ownership, to be exposed to hostile takeovers (Stein, 1988). Therefore, managers of these firms, who are worried about preserving their positions, may decide to focus their efforts on activities that are less risky and short-term returns oriented (e.g., He & Tian, 2013). From this perspective, if financial analysts help investors recognize the actual value of eco-innovation activities, then analyst coverage may help to remove an important deterrent to environmental innovation.

Parallel to the informative effect, a pressure effect is also attributed to equity analysts, which may discourage managers from making long-term investments, such as eco-innovation projects. The rationale behind the pressure effect hypothesis is that financial analysts may favor corporate short-termism by raising managers' concerns of missing quarterly earnings forecasts. Since missing analysts' earnings forecasts is usually punished by the stock market, managers

will forego eco-innovative investment projects and will focus on activities that increase profitability in the short term.

Of course, the net effect of equity analyst coverage on firms' environmental innovation will be positive or negative, depending on which of the two contrasting forces prevails. In this sense, our results suggest that, on average, benefits resulting from the informative role dominate the negative externalities from the pressure effect.

However, our findings also indicate that the intensity of both informative and pressure effects changes across listed firms according to the type of financial system structure in which they operate. Building on prior work, our key identification assumption is that listed firms in market-oriented countries are more sensitive to the financial analyst pressure effect and benefit less from their information production than listed firms in bank-oriented countries. This assumption is motivated by several arguments that are drawn from both the corporate governance literature and studies on bank-firm relationships.

According to previous studies analyzing governance issues across the globe (e.g., Singh & Zammit, 2006), the first argument is that, on average, listed firms in market-oriented countries suffer from more agency problems and are subject to more short-term pressures than their counterparts incorporated in bank-oriented countries. Indeed, dispersed share ownership and the separation of ownership from the control that typically characterizes market-oriented listed firms force managers to prioritize short-term profits to avoid undervaluation by the market and to prevent the risk of hostile takeovers (Stein, 1988). In this sense, the fact that equity analysts periodically issue quarterly earnings forecasts that are carefully monitored by market participants may exacerbate managerial myopia and compel CEOs to avoid engaging in strategic long-term activities, such as environmental innovation. Otherwise, the pressure effects from financial analysts should influence the management of firms with high concentrated share ownership much less, as bank-oriented firms typically have. Indeed, managers of these firms are more incentivized by controlling shareholders to achieve the long-term value maximization goals. For this reason, they are, *ceteris paribus*, less concerned about missing quarterly earnings forecasts issued by equity analysts and may invest more in eco-innovation activities.

However, the ownership structure not only influences managers' sensitivity to analysts' pressure but also the way financial analysts, by mitigating information asymmetry between insiders and outsiders, may foster firm investments in eco-innovation. The second argument we have drawn from the governance literature to interpret our results relies on the existence of a positive association between information asymmetry and the level of ownership concentration. Indeed, previous studies suggest that the presence of controlling shareholders (as in the case of family firms) is likely to increase a firm's opacity by limiting its voluntary disclosure. Thus, to the extent that listed firms in bank-oriented countries suffer more information asymmetry than their counterparts in market-oriented systems, the role of analyst coverage in helping investors recognize the actual value of eco-innovation activities will be more pronounced in bank-oriented systems than in market-oriented systems.

Our assumption that listed firms in market-oriented countries are more sensitive to financial analysts' pressure and benefit less from their information production than listed firms in bank-oriented countries can also be explained by considering the evidence provided by the literature on the bank–firm relationship. Indeed, previous research suggests that, in market-oriented systems, transaction-based forms of financing, that is, financing that is associated with the collection of information based on objective criteria such as financial ratios (e.g., Berger & Udell, 2002; Duqi et al., 2018), that are characterized by discontinuity and short-term perspective prevail. Therefore, corporate managers are encouraged to enhance transparency and,

equally, are concerned about engagement in investments that, penalizing short-term earnings and current market evaluation, can hinder external fundraising capacity. Of course, to the extent that listed firms in market-oriented countries are highly transparent and subject to strong short-term pushes, the pressure effect of financial analysts will overcome the information effect, as suggested by our findings. Conversely, in bank-oriented systems, long-term relationships between firms and banks are more likely to occur (so-called relationship banking). This type of bank-firm relationship induces banks to acquire proprietary information over time through contact with the firm and its owners/managers on a variety of dimensions and use this information in their credit decisions. As such, relationship banking induces corporate managers to be less sensitive to short-term pressures and to adopt a long-term view in their investment choices because they are less dependent on securities issuance for financing. Furthermore, previous studies also suggest that when banks have relationships with borrower firms, they acquire an informative advantage towards other potential lenders and try to preserve it by discouraging borrowers' voluntary disclosure (e.g., Ali & Hwang, 2000; Lo, 2014). Viewed in this light, it is not surprising that in bank-oriented systems, the association between corporate environmental innovation and financial analyst coverage is positive.

6 | CONCLUSION

Using a data set of more than 6000 unique firms across 56 different countries, we provide evidence of the positive association between corporate green innovation and the number of equity analysts following. We attribute this result to analysts' informative role, whose effect, prevailing over the pressure effect, encourages managers to invest more in eco-innovation activities. However, when we divide the full sample into two subsamples based on whether covered firms are incorporated in a market-oriented or a bank-oriented country, we find that the association becomes negative in the case of market-oriented financial systems. We argue that potential explanations for this result rely on the differences occurring among market-oriented and bank-oriented systems in terms of listed companies' ownership structure and the prevalence of arm's length transaction banking rather than long-term lender–borrower relationships.

Our study has implications for academics, policymakers, and firm stakeholders. From an academic perspective, our findings suggest that future research may assess the overall impact of the financial market on a country's green innovativeness. Indeed, even if equity analysts are a key component of the financial market, by investigating their possible impact on corporate incentives to engage in green innovation, we provide only a partial view of the issue. Further studies, for example, may analyze how the transition to the public equity market may influence a firm's degree of environmental innovation. In addition, previous scholars noted how, when dealing with responsible investment issues, analyses often suffer from misspecification concerns, that is, one or more relevant variables are omitted in the models (e.g., Nirino et al., 2020). Accordingly, future research may offer a more integrated view of eco-innovation drivers, considering the effect of (and, eventually, the interaction between) equity analysts and intellectual capital, since the latter's characteristics represent the ideal setting to test analysts' informative function. From such a perspective, the role of equity analysts may be crucial both in the discussion about determinants of corporate green innovation and the impact of responsible investment on firm performance.

Furthermore, future research investigating the role of equity analysts as a determinant of corporate green innovation may address two main limitations of this paper. First, while we employ the (log of) raw number of analysts covering a stock, other studies could consider the quality of the information environment surrounding firms in terms of, for instance, analysts' skills and expertize. Second, it is worth mentioning that equity analysts' literature has often raised endogeneity concerns in the analysts-firm relationship (T. Chen et al., 2015; Hong & Kacperczyk, 2010; Kelly & Ljungqvist, 2012). Specifically, since analysts' remuneration depends on trading volumes they generate through their reports and their reputation is based on the informative advantage given by their proximity to management (McNichols & O'Brien, 1997), they often prefer to cover firms having certain characteristics in terms of size and financial performance or drop coverage of firms with deteriorated outlooks (rather than issuing negative recommendations). In this regard, given both the increasing attention of society on environmental issues and recent evidence suggesting how eco-innovative firms attract more analysts (e.g., Zaman et al., 2021), future research could move from these considerations to obtain interesting insight into the causality directions in the relationship between analysts and green innovation.

Finally, for policymakers and firm stakeholders, our findings suggest that the financial market can represent a channel to facilitate green innovation, provided that companies do not have characteristics (e.g., in terms of ownership structure and bank-firm relation) that make managers particularly sensitive to the pressure effect exerted by the stock market.

ENDNOTES

[1] Consistent with previous studies (e.g., Costa-Campi et al., 2017), the terms green innovation, environmental innovation, and eco-innovation are used here synonymously.

[2] For the remainder of the paper, unless otherwise specified, we will use the expression "equity analyst" to refer to "sell-side equity analysts." This specification is required since equity analysts can be either sell-side, typically working for a brokerage house and issuing independent recommendations, forecasts and estimates, or buy-side, usually employed by investment companies to search for suitable securities in which to invest. With the same meaning, we will also use the expression "financial analyst."

[3] We argue the reasons for the plausibility of this explanation in more detail in Section 5.

[4] However, we are aware that our findings cannot establish a causal link between the number of equity analysts and corporate green innovation. This limitation can arise because, as deeply discussed in the final section, financial analysts may be attracted by firms having certain characteristics that are correlated to corporate green innovation.

[5] The authors list competitors in the group of regulatory shareholders since they stress the importance of industry self-regulation in promoting green-oriented practices.

[6] Previous scholars (e.g., Kanda et al., 2018) have noted how the information gathering and dissemination role by intermediaries is critical for corporate green innovation.

[7] For this purpose, while Mola et al. (2013) describe financial analysts' functions through two (complementary) hypotheses, i.e., "private information" and "investor recognition", resuming these arguments, Huang et al. (2018) discuss an information discovery role and an information interpretation role.

[8] Because the purchase amount is capitalized, while R&D expenses represent a negative item in the income statement.

[9] Specifically, to verify the robustness of our results, we run OLS specifications excluding firm-year observations in which Environmental Innovation Score (EIS) is zero. However, since this specification does not catch the effect of a score switching from zero to a positive value, we rerun our analyses by excluding only firms

having a value of EIS "always" equal to 0. Results are qualitatively similar to those presented in this section (they are not displayed for brevity).

[10] Specifically, when the value of the variable *Private Credit/GDP* is above the sample median, we consider the company as belonging to a bank-oriented system. Otherwise, we consider the firm to be in a market-oriented country.

REFERENCES

Ali, A., & Hwang, L. S. (2000). Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research*, *38*(1), 1–21.

Ali, W., Jun, W., Hussain, H., Khan, N. A., Younas, M. W., & Jamil, I. (2021). Does green intellectual capital matter for green innovation adoption? Evidence from the manufacturing SMEs of Pakistan. *Journal of Intellectual Capital*, *22*, 868–888.

Allen, A., Francis, B. B., Wu, Q., & Zhao, Y. (2016). Analyst coverage and corporate tax aggressiveness. *Journal of Banking & Finance*, *73*, 84–98.

Amore, M. D., & Bennedsen, M. (2016). Corporate governance and green innovation. *Journal of Environmental Economics and Management*, *75*, 54–72.

Asquith, P., Mikhail, M. B., & Au, A. S. (2005). Information content of equity analyst reports. *Journal of Financial Economics*, *75*(2), 245–282.

Auer, B. R., & Schuhmacher, F. (2016). Do socially (ir) responsible investments pay? New evidence from international ESG data. *The Quarterly Review of Economics and Finance*, *59*, 51–62.

Ayres, D. R., Campbell, J. L., Chyz, J. A., & Shipman, J. E. (2019). Do financial analysts compel firms to make accounting decisions? Evidence from goodwill impairments. *Review of Accounting Studies*, *24*(4), 1214–1251.

Berger, A. N., & Udell, G. F. (2002). Small business credit availability and relationship lending: The importance of bank organisational structure. *The Economic Journal*, *112*(477), F32–F53.

Berrone, P., Fosfuri, A., Gelabert, L., & Gomez-Mejia, L. R. (2013). Necessity as the mother of 'green' inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*, *34*(8), 891–909.

Bhattacharya, S., & Ritter, J. R. (1980). Innovation and communication: Signaling with partial disclosure. *Journal of Financial and Quantitative Analysis*, *15*(4), 853–854.

Binder, J. K., & Belz, F. M. (2014). Mission possible: Recognizing entrepreneurial opportunities in social and ecological problems. *Academy of management proceedings*, United States, *2014*(1), 16256.

Boot, A. W., & Thakor, A. V. (2000). Can relationship banking survive competition? *The Journal of Finance*, *55*(2), 679–713.

Campbell, J. L. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of Management Review*, *32*(3), 946–967.

Cecere, G., Corrocher, N., & Mancusi, M. L. (2020). Financial constraints and public funding of eco-innovation: Empirical evidence from European SMEs. *Small Business Economics*, *54*(1), 285–302.

Chang, X., Dasgupta, S., & Hilary, G. (2006). Analyst coverage and financing decisions. *The Journal of Finance*, *61*(6), 3009–3048.

Chang, Y. H., & Chan, C. C. (2008). Financial analysts' stock recommendation revisions and stock price changes. *Applied Financial Economics*, *18*(4), 309–325.

Chen, T., Harford, J., & Lin, C. (2015). Do analysts matter for governance? Evidence from natural experiments. *Journal of Financial Economics*, *115*(2), 383–410.

Chen, X., Yi, N., Zhang, L., & Li, D. (2018). Does institutional pressure foster corporate green innovation? Evidence from China's top 100 companies. *Journal of Cleaner Production*, *188*, 304–311.

Chiou, T. Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 822–836.

Costa-Campi, M. T., García-Quevedo, J., & Martínez-Ros, E. (2017). What are the determinants of investment in environmental R&D? *Energy Policy*, *104*, 455–465.

Craig, J., & Dibrell, C. (2006). The natural environment, innovation, and firm performance: A comparative study. *Family Business Review*, *19*(4), 275–288.

De Marchi, V. (2012). Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms. *Research Policy*, *41*(3), 614–623.

Degeorge, F., Ding, Y., Jeanjean, T., & Stolowy, H. (2013). Analyst coverage, earnings management and financial development: An international study. *Journal of Accounting and Public Policy*, *32*(1), 1–25.

Demirel, P., & Kesidou, E. (2011). Stimulating different types of eco-innovation in the UK: Government policies and firm motivations. *Ecological Economics*, *70*(8), 1546–1557.

Doran, J., & Ryan, G. (2016). The importance of the diverse drivers and types of environmental innovation for firm performance. *Business Strategy and the Environment*, *25*(2), 102–119.

Duqi, A., Tomaselli, A., & Torluccio, G. (2018). Is relationship lending still a mixed blessing? A review of advantages and disadvantages for lenders and borrowers. *Journal of Economic Surveys*, *32*(5), 1446–1482.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics*, *131*(3), 693–714.

Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, *36*(2), 90–100.

Esty, D. C., & Winston, A. (2009). *Green to gold: How smart companies use environmental strategy to innovate, create value, and build competitive advantage*. John Wiley & Sons.

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, *47*(2), 427–465.

Fernández, S., Torrecillas, C., & Labra, R. E. (2021). Drivers of eco-innovation in developing countries: The case of Chilean firms. *Technological Forecasting and Social Change*, *170*, 120902.

Frondel, M., Horbach, J., & Rennings, K. (2007). End-of-pipe or cleaner production? An empirical comparison of environmental innovation decisions across OECD countries. *Business Strategy and the Environment*, *16*(8), 571–584.

Gangi, F., Meles, A., D'Angelo, E., & Daniele, L. M. (2019). Sustainable development and corporate governance in the financial system: Are environmentally friendly banks less risky? *Corporate Social Responsibility and Environmental Management*, *26*(3), 529–547.

García-Meca, E. (2005). Bridging the gap between disclosure and use of intellectual capital information. *Journal of Intellectual Capital*, *6*, 427–440.

García-Sánchez, I. M., Aibar-Guzmán, C., & Aibar-Guzmán, B. (2020a). The effect of institutional ownership and ownership dispersion on eco-innovation. *Technological Forecasting and Social Change*, *158*, 120173.

García-Sánchez, I. M., Gallego-Álvarez, I., & Zafra-Gómez, J. L. (2020b). Do the ecoinnovation and ecodesign strategies generate value added in munificent environments? *Business Strategy and the Environment*, *29*(3), 1021–1033.

Guo, B., Pérez-Castrillo, D., & Toldrà-Simats, A. (2019). Firms' innovation strategy under the shadow of analyst coverage. *Journal of Financial Economics*, *131*(2), 456–483.

He, J. J., & Tian, X. (2013). The dark side of analyst coverage: The case of innovation. *Journal of Financial Economics*, *109*(3), 856–878.

Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, *7*(1-3), 85–107.

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*(1-3), 405–440.

Henriques, I., & Sadorsky, P. (1999). The relationship between environmental commitment and managerial perceptions of stakeholder importance. *Academy of Management Journal*, *42*(1), 87–99.

Hizarci-Payne, A. K., İpek, İ., & Kurt Gümüş, G. (2021). How environmental innovation influences firm performance: A meta-analytic review. *Business Strategy and the Environment*, *30*(2), 1174–1190.

Holmstrom, B. (1989). Agency costs and innovation. *Journal of Economic Behavior & Organization*, *12*(3), 305–327.

Hong, H., & Kacperczyk, M. (2010). Competition and bias. *The Quarterly Journal of Economics*, *125*(4), 1683–1725.

Hong, H., Lim, T., & Stein, J. C. (2000). Bad news travels slowly: Size, analyst coverage, and the profitability of momentum strategies. *The Journal of Finance*, *55*(1), 265–295.

Horbach, J. (2008). Determinants of environmental innovation—new evidence from German panel data sources. *Research Policy*, *37*(1), 163–173.

Huang, A. H., Lehavy, R., Zang, A. Y., & Zheng, R. (2018). Analyst information discovery and interpretation roles: A topic modeling approach. *Management Science*, *64*(6), 2833–2855.

Huang, A. H., Zang, A. Y., & Zheng, R. (2014). Evidence on the information content of text in analyst reports. *The Accounting Review*, *89*(6), 2151–2180.

Irani, R. M., & Oesch, D. (2016). Analyst coverage and real earnings management: Quasi-experimental evidence. *Journal of Financial and Quantitative Analysis*, *51*, 589–627.

Jegadeesh, N., Kim, J., Krische, S. D., & Lee, C. M. (2004). Analyzing the analysts: When do recommendations add value? *The Journal of Finance*, *59*(3), 1083–1124.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Joos, P., Piotroski, J. D., & Srinivasan, S. (2016). Can analysts assess fundamental risk and valuation uncertainty? An empirical analysis of scenario-based value estimates. *Journal of Financial Economics*, *121*(3), 645–663.

Kammerer, D. (2009). The effects of customer benefit and regulation on environmental product innovation: Empirical evidence from appliance manufacturers in Germany. *Ecological Economics*, *68*(8-9), 2285–2295.

Kanda, W., Hjelm, O., Clausen, J., & Bienkowska, D. (2018). Roles of intermediaries in supporting eco-innovation. *Journal of Cleaner Production*, *205*, 1006–1016.

Kanda, W., Mejiá-Dugand, S., & Hjelm, O. (2015). Governmental export promotion initiatives: awareness, participation, and perceived effectiveness among Swedish environmental technology firms. *Journal of Cleaner Production*, *98*, 222–228.

Kecskes, A., & Womack, K. L. (2008). Adds and drops of coverage by equity research analysts. Available at SSRN 960501.

Kelly, B., & Ljungqvist, A. (2012). Testing asymmetric-information asset pricing models. *The Review of Financial Studies*, *25*(5), 1366–1413.

Kesidou, E., & Demirel, P. (2012). On the drivers of eco-innovations: Empirical evidence from the UK. *Research Policy*, *41*(5), 862–870.

Kim, J. B., Lu, L. Y., & Yu, Y. (2019). Analyst coverage and expected crash risk: Evidence from exogenous changes in analyst coverage. *The Accounting Review*, *94*(4), 345–364.

Lee, K. H., & Min, B. (2015). Green R&D for eco-innovation and its impact on carbon emissions and firm performance. *Journal of Cleaner Production*, *108*, 534–542.

Lo, A. K. (2014). Do declines in bank health affect borrowers' voluntary disclosures? Evidence from international propagation of banking shocks. *Journal of Accounting Research*, *52*(2), 541–581.

Lui, D., Markov, S., & Tamayo, A. (2007). What makes a stock risky? Evidence from sell-side analysts' risk ratings. *Journal of Accounting Research*, *45*(3), 629–665.

Luo, X., Wang, H., Raithel, S., & Zheng, Q. (2015). Corporate social performance, analyst stock recommendations, and firm future returns. *Strategic Management Journal*, *36*(1), 123–136.

Madureira, L., & Underwood, S. (2008). Information, sell-side research, and market making. *Journal of Financial Economics*, *90*(2), 105–126.

Malkiel, B. G., & Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, *25*(2), 383–417.

Malmendier, U., & Shanthikumar, D. (2007). Are small investors naive about incentives? *Journal of Financial Economics*, *85*(2), 457–489.

Mansfield, E. (1972). *Research and innovation in the modern corporation*. Springer.

Matsumoto, D., Pronk, M., & Roelofsen, E. (2011). What makes conference calls useful? The information content of managers' presentations and analysts' discussion sessions. *The Accounting Review*, *86*(4), 1383–1414.

McNichols, M., & O'Brien, P. C. (1997). Self-selection and analyst coverage. *Journal of Accounting Research*, *35*, 167–199.

Mola, S., Rau, P. R., & Khorana, A. (2013). Is there life after the complete loss of analyst coverage? *The Accounting Review*, *88*(2), 667–705.

Nirino, N., Ferraris, A., Miglietta, N., & Invernizzi, A. C. (2020). Intellectual capital: The missing link in the corporate social responsibility–financial performance relationship. *Journal of Intellectual Capital*. Advance online publication. https://doi.org/10.1108/JIC-02-2020-0038

OECD. (2009). *Sustainable manufacturing and eco-innovation. Framework*. Practices and Measurement. Synthesis Report.

Przychodzen, J., & Przychodzen, W. (2013). Corporate sustainability and shareholder wealth. *Journal of Environmental Planning and Management*, *56*(4), 474–493.

Rajesh, R. (2020). Exploring the sustainability performances of firms using environmental, social, and governance scores. *Journal of Cleaner Production*, *247*, 119600.

Reid, A., & Miedzinski, M. (2008). Eco-innovation. Final report for sectoral innovation watch. Europe Innova. Technopolis group (Vol. 60, pp. 80–91).

Roome, N. (1992). Developing environmental management strategies. *Business Strategy and the Environment*, *1*(1), 11–24.

Scherbina, A. (2008). Suppressed negative information and future underperformance. *Review of Finance*, *12*(3), 533–565.

Schumpeter, J. (1942). Creative destruction. *Capitalism, Socialism and Democracy*, *825*, 82–85.

Serrano-García, J., Bikfalvi, A., Llach, J., & Arbeláez-Toro, J. J. (2021). Orchestrating capabilities, organizational dimensions and determinants in the pursuit of green product innovation. *Journal of Cleaner Production*, *313*, 127873.

Severo, E. A., De Guimarães, J. C. F., & Dellarmelin, M. L. (2021). Impact of the COVID-19 pandemic on environmental awareness, sustainable consumption and social responsibility: Evidence from generations in Brazil and Portugal. *Journal of Cleaner Production*, *286*, 124947.

Simpson, P. M., Siguaw, J. A., & Enz, C. A. (2006). Innovation orientation outcomes: The good and the bad. *Journal of Business Research*, *59*(10–11), 1133–1141.

Singh, A., & Zammit, A. (2006). Corporate Governance, Crony Capitalism and Economic Crises: Should the US business model replace the Asian way of "doing business"? *Corporate Governance: An International Review*, *14*(4), 220–233.

Stein, J. C. (1988). Takeover threats and managerial myopia. *Journal of Political Economy*, *96*(1), 61–80.

Stojčić, N. (2021). Social and private outcomes of green innovation incentives in European advancing economies. *Technovation*, *104*, 102270.

Thomas, A., Scandurra, G., & Carfora, A. (2021). Adoption of green innovations by SMEs: An investigation about the influence of stakeholders. *European Journal of Innovation Management*. Advance online publication. https://doi.org/10.1108/EJIM-07-2020-0292

To, T. Y., Navone, M., & Wu, E. (2018). Analyst coverage and the quality of corporate investment decisions. *Journal of Corporate Finance*, *51*, 164–181.

Womack, K. L. (1996). Do brokerage analysts' recommendations have investment value? *The Journal of Finance*, *51*(1), 137–167.

Yu, F. F. (2008). Analyst coverage and earnings management. *Journal of Financial Economics*, *88*(2), 245–271.

Zaman, R., Atawnah, N., Haseeb, M., Nadeem, M., & Irfan, S. (2021). Does corporate eco-innovation affect stock price crash risk? *The British Accounting Review*, *53*, 101031.

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