

THE CONSEQUENCES OF ENVIRONMENTAL DISCLOSURE QUALITY: EVIDENCE FROM FRANCE

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Abstract

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We examine the consequences of environmental disclosure (ED) quality. We test to see if ED quality affects the cost of equity capital (COEC), market valuation, and institutional investors. We focus on the French context as France is one of the pioneer countries in the mandatory adoption of ED. Our sample includes companies listed in the *Société des Bourses Françaises* (SBF) 120 index for the period 2009–2014. To measure ED quality, we use the qualitative attributes of information quality. The manual content analysis is then used to calculate the score of ED quality. We then link our ED measurement with measures of COEC, market valuation, and institutional ownership. Our analysis offers several interesting findings. First, it shows that ED quality negatively impacts COEC. It also shows that ED quality is negatively associated with higher market valuations. Finally, it provides evidence that ED quality positively affects institutional ownership. Our results indicate that enhancing ED quality leads to desirable economic consequences for disclosing companies and investors.

Keywords: Environmental Disclosure Quality, Value Relevance, Cost of Equity Capital, Ownership Holding of Institutional Investors, France

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1. INTRODUCTION

Regulators and market participants become increasingly interested in knowing the potential benefits of non-financial disclosure (Ng & Rezaee, 2015). Despite the growing literature on the consequences of corporate reporting, there is limited evidence on whether investors consider environmental disclosure (ED) quality in their decisions (Reverte, 2016). Yet, it is debatable whether investors rely on ED for their decision-making. Indeed, this information may lack credibility since it is often not verifiable (Sieber et al., 2014).

Moreover, prior research on the financial impacts of the environment provides mixed and inconclusive results (Plumlee et al., 2015). Our study draws on existing ED literature. Following Baalouch et al. (2019), we measure use ED quality using the qualitative attributes of information quality as suggested by professional bodies such as the International Accounting Standards Board (IASB), Financial Accounting Standards Board (FASB) conceptual framework, and Global Reporting Initiative (GRI) guideline. We then examine the consequences of ED quality following three strands of research. The first strand examines whether ED quality affects

the cost of equity capital (COEC). The second strand examines the impact of ED quality on equity valuation. The third strand tests the impact of ED quality and equity holding decisions by institutional investors.

Further, our motivation arises from several gaps: first, France is a suitable setting to investigate this issue since it is one of the leading countries that has published mandatory requirements for non-financial reporting at the international level. It implements a well-implemented regulatory framework for environmental disclosure. The Nouvelle Régulation Economique (NRE) Act 2001 and the Grenelle Act II highlighted the need for third-party verification and consequently, called for better transparency. It allows us to go beyond studying voluntary disclosure and focus on mandatory disclosure. Second, this study is in line with the recent calls for a comprehensive disclosure quality measure (Chauvey et al., 2015). Third, no study, to date, investigates ED quality, in the French context, through the qualitative attributes of quality information. Finally, according to the results obtained by Alatawi and Daud (2022), it seems that few researchers focus on the French context to study integrated reporting from 1992 to 2021.

The findings align with our main hypothesis both for the analyses of the whole period (2009–2014) and for the post-adoption of Grenelle Act II after 2012, companies can benefit from committing to a higher level of ED quality. Particularly, ED quality lowers COEC; however, reduces market value. Finally, quality affects positively and significantly the ownership holdings by institutional investors. Our study offers three contributions. Our first contribution is about the measures of the dependent variable ED quality. Indeed, prior studies mainly use a crude measure of environmental disclosure as the initiation of standalone reports, e.g., an environmental report (Dhaliwal et al., 2014), and always capture the volume of disclosed information rather than its credibility. We rely on the qualitative characteristics provided by IASB and GRI since there is no conventional framework for non-financial disclosure. Second, our research fills the gap in environmental disclosure literature using a multi-theoretical framework; we consider differential dimensions of the capital market by considering the impact on financial decision-making. Finally, we consider the considerable growth of socially responsible investors (SRI) and differentiate them from conventional ones in additional analysis.

The rest of the paper is structured as follows. Section 2 reviews related literature and develops research hypotheses. In Section 3, we discuss the sample and the research method. In Section 4, we present our findings and the discussion. Section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Regulatory framework

France is a pioneer country regarding ED, which has a widely implemented regulatory framework in the field. The French ED regulatory framework is based on:

The Waste Management Law: This law appeared at the beginning of 1975 when the French regulation began to reflect on environmental reporting mainly for the field of waste management. This law concerns communities operating in waste treatment and exploitation of waste. The Environmental Code suggests that “each individual has the right to be informed about the harmful effects on human health and the environment of the collection, transport, treatment, storage and deposit waste as well as about the measure taken to prevent or compensate for these effects” (The Environmental Code, 2010, Article L125-1). The second law related to waste management is Law No. 92-646 of July 13, 1992 which specifies that “the communication, in order to measure the effects of its activity on public health and the environment and to initiate the measure taken to eliminate or minimize the harmful effects of the waste” (Art. 3-1 A).

The Social Balance Sheet: The formal recognition of the need for environmental reporting took place in France in 1977 through Law No. 77-769 of July 12, 1977 with the emergence of the social balance sheet. This document contains some indicators, which allow a diagnosis of human resources and social aspects. Article L438-1 stipulates that a social balance sheet would be submitted to the committee of the company when the labour force comprises at least 300 employees.

The NRE Act 2001: Nouvelles Régulations Economiques (NRE) or Law No. 2001-420 of May 15, 2001 relating to new economic regulations requires French companies listed in the stock market to disclose social and environmental information in their reports. This Act is considered a pioneer law in France that the French Parliament established to motivate firms to adopt corporate social responsibility (CSR) strategies within the private sector. The NRE Act is based on Article 116 of the law of May 15, 2001 which makes it compulsory for all listed companies to take into consideration the environmental and social impacts of their economic activities in annual reports. Article 116 of the NRE Act states in its last paragraph about Article L225-102 that the report includes “information whose list fixed by the decree of the Council of the State on how the company consider the social and environmental consequences of their activities. This paragraph does not apply to companies whose securities are not traded on a regulated market”.

In 2002, Decree No. 2002-221 of the NRE Act, which completes Article 116, specified that companies reported information according to a list of 19 topics on social and environmental issues.

The Grenelle Act I and II: Since the last decade, there has been an increasing awareness of the French government about the sustainability issue conducted to the establishment of the “Grenelle I” Act on August 3, 2009. This Act is the result of the “Law Project” concerning the proposal discussed in May 2007. The purpose of this law is “sustainability”, it contains several articles on different topics mainly social reporting (Article 46 of the Grenelle Act title V) entitled “Governance, Information and Training”.

The “Grenelle II” Act covering environmental commitment was voted on by parliament on June 29, 2010 and enacted on July 12, 2010 (Law No. 2010-788).

The “Grenelle II” named “Environmental Commitment Law” tends to apply the objectives of “Grenelle I” through the introduction of different measures and tools to achieve these goals. Article 225 of the “Grenelle II” Act constitutes a new reporting regulation in France. It constrains firms to disclose in their annual reports, both, information about the environmental and social consequences of their activities, and their commitment to sustainable development. The “Grenelle II” Act is mandatory for French listed firms and for unlisted firms who present at least 100 million Euros as total assets and liabilities, and their permanent employees’ average of 500 during the fiscal year. The “Grenelle II” and its decree of application of April 26, 2012 require that a third party should verify the published non-financial information in the report.

2.2. Theoretical background

Prior literature on environmental disclosure lacks a complete theoretical framework, that relies on its financial impacts, and even if it exists, it is still ambiguous (De Klerk et al., 2015). In our paper, we use a multi-theoretical approach, which includes market equilibrium theory, investors’ preferences, and efficient market hypotheses. Merton (1987) developed the market equilibrium theory, which is based on the fact that COEC and market value are associated with their investors’ size. Heinkel et al. (2001) stated that the increasing number of firm investors will reinforce the diversification of stockholding risk and hence COEC will be lower. Environmental investment strategies could alter risk-sharing opportunities so that firms operating in polluting industries tend to have their share prices lowered. On this level, reducing COEC could be a result of investors’ attraction to ethical perceptions in their portfolio choice, and therefore, firms tend to publish better ED quality (Feng et al., 2015).

In addition, we focus on investors’ ethical preferences or investors’ choice behavior. On this level, understanding investor behavior is a difficult task as claimed by (Beal et al., 2005, p. 25). According to traditional finance theory, in their decision-making, investors seek to maximize their utility and are concerned only with the firm’s financial return (expected return) and risk profile. However, given the emergence of non-financial issues, firms become more concerned with other risks such as environmental ones. Therefore, investors go beyond traditional wealth maximization objectives and incorporate ethical considerations in their decision-making process. Regarding this perspective, there are two ways for individual investors who desire to invest in a socially responsible manner. First, they can purchase securities from companies operating in a socially responsible manner. Second, they can purchase units in socially responsible mutual funds managed by institutional investors (Haigh & Hazelton, 2004). As a result, companies seek to provide a better level of ED quality to allow better decision-making. Therefore, investors’ utility function becomes defined as “the sum of the product of the investment period and the net affective experience associated with the ownership of the ethical investment” (Beal et al., 2005, p. 25).

Finally, based on the efficient market hypothesis (EMH) and according to Basu (1977), “in an efficient capital market, security price fully reflects available information” (p. 6637). For environmental disclosure, Alotaibi and Hussainey (2016) used the EMH to examine whether CSR disclosure has value relevance and influence on firm value. They find that CSR information is expected to increase benefits to investors since the value of a company could be affected by the potential adjustments in firms’ security prices.

2.3. Hypotheses development

2.3.1. The first hypothesis: Cost of equity capital (COEC)

The question of whether the stock market incorporates ED when pricing the risk is still open and the literature provides mixed and non-conclusive results (Plumlee et al., 2015). On this level, Ng and Rezaee (2015) noted that ED quality allows investors to have a better assessment of their risk investment and its return which will enhance risk sharing and lower COEC. From another perspective, investors’ ethical preferences can influence COEC. Hence, an investor who seeks to invest in companies with a negative screen (e.g., operating in the Tobacco industry) will request high expected returns to counteract their risks which leads to an increase in COEC (Chava et al., 2010).

Therefore, a high ED quality is likely to enhance investors’ confidence in their predicted future cash flows and mitigate their required risk premium (Ng & Rezaee, 2015). Furthermore, Sieber et al. (2014) noted that when firms disclose useful information on their environmental strategy, investors will reduce their estimation risk when assessing the firm valuation and therefore will accept a lower return on their investments. In addition, Qiu et al. (2016) viewed that increasing ED quality will increase investors’ concerns about its credibility, because of the lack of quality; the firm’s share prices could be mispriced or under-valued. Bonetti et al. (2023) show that carbon emissions disclosure is associated with lower COEC. We, therefore, hypothesize that:

H1: There is a negative impact of ED quality on COEC.

2.3.2. The second hypothesis: Value relevance

The literature shows that stock market participants’ interest in the disclosure of non-financial information is growing (Eccles et al., 2014), and whether this type of information has a value relevance is open to debate (Gao et al., 2016). The literature on the value relevance of ED offers mixed and inconsistent results (Alotaibi & Hussainey, 2016). By providing an effective and high-quality environmental disclosure, firms would enjoy investors’ confidence and appreciation will facilitate their access to the capital market and therefore influence investment decisions (Iatridis, 2013). According to Healy et al. (1999), when a firm provides high-quality disclosure that will influence the perceptions of investors and, thus, influence firm valuation, and when quality is low, the firm will suffer from mispricing problems and a lower level of return. At this level, de Villiers and Marques (2016)

showed a positive association between CSR disclosure quality and share prices. In the same vein, Matsumura et al. (2014) noted that if the capital market views the disclosed information on carbon emissions as insufficiently reliable because this carbon emissions information is self-disclosed and lacks credibility, they might not consider it when making decisions about firm valuation. Qiu et al. (2016) noted that investors receive a favorable image when a firm publishes accurate and transparent information, which leads to a better estimation of the company's value by affecting the share price. Meng and Zhang (2022) find that ED becomes an important piece of information for investors' decision-making process. In the same vein, Zhang and Yang (2023) concluded that ED information is value-relevant for the capital market and is important for the improvement and development of the stock market. Consequently, we hypothesize that:

H2: ED quality is value-relevant.

2.3.3. The third hypothesis: Institutional ownership

Social, environmental, and ethical issues become important in the investment decision process. Institutional ownership becomes significantly associated with firms' environmental engagement, suggesting that institutional investors are more attracted by disclosed information by green firms (Benlemlih et al., 2023). As a result, we have noticed the rapid growth of SRI investment in the last decade which has become a significant segment of international capital markets. SRI institutional investors are only interested in environmental, social, and governance (ESG) concerns (Eurosif, 2008, p. 6). On this level, investors are willing to include ethical criteria in their investment decisions and suggest that is possible "to do well while doing good" (Cortez et al., 2011, p. 269).

Few studies tested the impact of a firm's ED policy on equity holding decisions ownership in terms of a distinction between SRI and conventional institutional investors whose decision-making is based only on financial wealth maximization. Historically, the SRI investors have been a radical minority and their demand for better environmental reporting quality has not been met (Friedman & Miles, 2001).

Regarding this perspective, based on investor choice behavior we consider that investors behave irrationally and incorporate ethical preferences in their decision-making. From their side, Adam and Shauki (2014) argued that regarding SRI, moral norms, intention, and perceived behavior have an impact on investors' decision-making behavior. Williams (2007) believed that investors who are interested in environmental issues may extend this behavior into their portfolio strategies. Thus, a firm's environmental disclosure could be a crucial source of information for institutional investors. On this level, Clarkson et al. (2015) found the issuance of CSR reports and their assurance has a positive impact on the investment decisions by SRI institutional investors. These findings are consistent with our conjecture that better ED quality could influence institutional investors who usually consider both the risks and returns associated with investment. We, therefore, hypothesize that:

H3: The ownership holding by institutional investors is positively affected by ED quality.

3. RESEARCH METHODOLOGY

In this paper, we use a quantitative research method to test our research hypotheses. Our research falls under the domain of positivist research. We use a deductive approach as we test several research hypotheses developed using relevant theories. Other alternative research methods could be used. For example, we could answer the same research question raised in this paper using the qualitative method such as interviews and surveys. Researchers could follow the domain of interpretivism research and use an inductive research approach to generate new theories from the data.

3.1. Data

Our study examines French companies listed in the *Société des Bourses Française* (SBF) 120 index. We chose a six-year period (2009–2014) for the analysis as this allows us to analyse ED quality over time and highlight the impact of different regulations (e.g., the NRE Act of 2001 and the Grenelle Act of 2012). Following El Ghoul et al. (2011), financial and non-financial firms are included in our analysis¹. We collect data from annual reports and standalone reports, DataStream, Worldscope, Bloomberg, and ASSET4.

We have to note that the number of available annual reports varies from year to year. We exclude various observations given data unavailability. However, as we are working on the consequences of environmental disclosure, the number of observations varies from the different regressions to keep the maximum number for all the estimations (de Villiers & Marques, 2016). Table 1 provides the sample composition by economic sector for each model using the DataStream Industry Classification Benchmark (ICB) classification.

Table 1. Sample composition across industries

Industry/Model	Model 1	Model 2	Model 3
Consumer goods	102	102	96
Consumer services	120	120	114
Financials	78	78	78
Health care	54	60	54
Industrials	132	132	126
Oil and gas	24	24	24
Technology	66	66	66
Telecommunication	6	6	6
Utilities	30	30	30
Basic materials	36	36	36
Total	630	654	627

Note: Model 1, Model 2, and Model 3 are defined in subsection 2.2.

We check whether outliers or extreme values exist in the current study using the numerical and graphical methods in the statistical software STATA. These outliers may lead to a biased estimation of our results. We use the strategy of winsorising (e.g., variables at the 1st and 99th percentiles) to deal with this problem which consists of modifying the extreme observations with values that are closest to them without deleting those.

¹ We have analyzed the annual and standalone reports of some financial companies such as BNP Paribas and Credit Agricole, and we find their disclosure formats and contents similar to which mandated by the French regulation.

3.2. Models and variables measurement: Regression model specification

We test whether ED quality (*EDQUAL*) affects COEC. Following prior research (Ng & Rezaee, 2015; Feng et al., 2015; Dhaliwal et al., 2014), we control for risk (*BETA*), net income (*DLOSS*), size (*SIZE*), leverage

(*LEV*), and book-to-market ratio (*BTM*). We run a fixed effects panel data regression after controlling for industry and year-fixed effects. Equation (1) presents the *COEC* model with other control variables suggested by previous empirical literature.

$$COEC_{i,t} = \beta_0 + \beta_1 EDQUAL_{i,t} + \beta_2 BETA_{i,t} + \beta_3 DLOSS_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 BTM_{i,t} + IndustryEffects_{i,t} + YearEffects_{i,t} + \varepsilon_{i,t} \tag{1}$$

where, β_0 is the intercept; β_1, \dots, β_7 the regression coefficients; ε is the error term.

A panel data is used and we measure the variables as $X_{i,t}$: $i = 1, 2, \dots, n$; $t = 1, 2, \dots, 6$ and we

control for Industry effects and year effects, respectively.

The variables' definitions of Model 1 are provided in Table 2.

Table 2. Variables' definition (Model 1)

Variable	Description	Measure	Data source
<i>COEC</i>	Cost of equity capital	Industry-adjusted earnings-to-price (EP) ratio (IndEPt) in year t is calculated as the difference between the firm's EP ratio and the median industry EP ratio in year t according to the ICB classification.	DataStream and Worldscope
<i>EDQUAL</i>	Quality of environmental disclosure	It is based on the qualitative characteristics of accounting information as described in subsection 2.2.	Annual reports, standalone reports
<i>BETA</i>	Capital market beta	It is calculated by the market model and rolling the regression using the monthly data for firms and the SBF 120 index as a proxy for the market return. The firm's returns are then regressed on the market return to obtain the beta estimation.	DataStream
<i>DLOSS</i>	Net income	It is a dummy variable equal to 1 when the net income for year t is negative and 0 otherwise.	DataStream

Then, in Eq. (2), we measure the value relevance of ED quality using Ohlson's (1995) model based on the study of Barth et al. (2008). We run a regression of market value (*MV*) on book value (*BV*), and net income (*NI*). Following Elzahar et al. (2015), we scale all these variables by the number of shares outstanding (NOSH). We add a vector of "other information" which represents the environmental disclosure of the firm which is not deflated. To find

out whether there is any influence of other variables on this relationship we include a set of control variables: property, plants and equipment (*PPE*), capital expenditures (*CAPEX*), leverage (*LEV*), and firm size (*SIZE*) following several prior research (De Villiers & Marques, 2016; Elzahar et al., 2015). Hence, the valuation model is formulated as below. The variables' definition of Model 2 is provided in Table 3.

$$MV_{i,t} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 NI_{i,t} + \beta_3 EDQUAL_{i,t} + \beta_4 PPE_{i,t} + \beta_5 CAPEX_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SIZE_{i,t} + IndustryEffects_{i,t} + YearEffects_{i,t} + \varepsilon_{i,t} \tag{2}$$

Table 3. Variables' definition (Model 2)

Variable	Description	Measure	Data source
<i>MV</i>	The market value of equity	The market value of equity is scaled by NOSH.	DataStream (WC08001)
<i>BV</i>	The book value of equity	The book value of equity is scaled by NOSH.	DataStream (WC03501)
<i>NI</i>	The net income	The net income is scaled by NOSH.	DataStream (WC01751)
<i>EDQUAL</i>	Quality of environmental disclosure	It is based on the qualitative characteristics of accounting information as described in subsection 2.2.	Annual reports, standalone reports
<i>PPE</i>	Property, plants and equipment	The ratio of property, plants, and equipment expenditures to total sales (PPE/SALES)	DataStream
<i>CAPEX</i>	Capital expenditures	The ratio of capital expenditure to total assets (CAPEX/ASSETS).	DataStream
<i>LEV</i>	Firm leverage	It is measured by total debt to total assets.	DataStream WC03255/WC02999
<i>SIZE</i>	Firm size	The natural logarithm of the market value of the firm.	DataStream

Finally, to test whether ownership held by institutional investors is affected by the ED quality, we use, at first, the pooled sample to run our regression for the sample period.

The variables' definition of Model 3 is provided in Table 4.

$$IO_{i,t} = \beta_0 + \beta_1 EDQUAL_{i,t} + \beta_2 DY_{i,t} + \beta_3 BV/MV_{i,t} + \beta_4 BETA_{i,t} + \beta_5 ROE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SIZE_{i,t} + IndustryEffects_{i,t} + YearEffects_{i,t} + \varepsilon_{i,t} \tag{3}$$

Table 4. Variables' definition (Model 3)

<i>Variable</i>	<i>Description</i>	<i>Measure</i>	<i>Data source</i>
<i>IO</i>	Institutional ownership	The percentage of shares held by institutional investors.	Bloomberg database and ASSET4
<i>EDQUAL</i>	Quality of environmental disclosure	It is based on the qualitative characteristics of accounting information as described in subsection 2.2.	Annual reports, standalone reports
<i>DY</i>	Dividend yield	DataStream dividend yield issued to control for the potential growth.	DataStream
<i>BV/MV</i>	Book-to-market value	Book value divided by market value.	DataStream
<i>Beta</i>	The market beta	Control for idiosyncratic risk is calculated using the market model using the monthly returns for firms and the benchmark index as a proxy for market return.	DataStream
<i>ROE</i>	Return on equity	It is equal to return divided by total equity.	DataStream
<i>LEV</i>	Firm leverage	It is measured by total debt to total assets.	DataStream WC03255/WC02999
<i>SIZE</i>	Firm size	The natural logarithm of the market value of the firm.	DataStream

3.3. Variables definitions

3.3.1. Environmental disclosure (ED) quality

Prior disclosure literature relied on constructed indexes to assess corporate disclosure. Several researchers highlighted, particularly, the difficulty of measuring directly the disclosure quality and having a universal measure (Beattie et al., 2004). Researchers define overall disclosure quality as the ease of reading and interpreting the information (Hopkins, 1996) and its usefulness for decision-making (Braam & van Beest, 2013). Recently, few researchers tried to build a comprehensive measure of disclosure quality referring to a valid conceptual framework. For instance, Chakroun and Hussainey (2014) measured the financial disclosure quality through an index built from the fundamental and enhancing qualitative characteristics of the IASB (2010). The quality of ED is still unexplored to the best of our knowledge. Accordingly, the lack of a universal conceptual framework for non-financial information led us to refer to a conceptual framework of financial one to elaborate an index to measure the ED quality following Baalouch et al. (2019). Indeed, we could rely on qualitative attributes of financial reporting to measure ED quality (Solomon, 2000). This is in accordance with the European Federation of Accountants (FEE), which

states that, as applied successfully to financial information, the qualitative attributes could be applied to ED. Accordingly, to measure ED quality we rely upon the conceptual frameworks of the IASB, the FASB, and the review of the GRI guidelines.

In this paper, the unweighted approach is used to measure ED quality measure based on qualitative characteristics of information quality. Indeed, it is not suitable to prioritize one characteristic over the others relying on the conceptual framework of IASB. In addition, this is considered relevant for the different user groups and limits the researchers' subjectivity compared to the weighted method (Cooke, 1989).

In this vein, our ED quality index is composed of five qualitative attributes: relevance, clarity, neutrality, verifiability, and comparability following the studies of Baalouch et al. (2019) and Chauvey et al. (2015) conducted in the French context. Our index is presented in the Appendix, Table A.1. An index is determined for each attribute. We consider that all qualitative attributes are complements rather than substitutes and we calculate and aggregate the score of ED quality rather than considering each attributes separately following prior studies (Chakroun & Hussainey, 2014; Baalouch et al., 2019). Accordingly, we compute our index as follows:

$$EDQUAL_{i,t} = \frac{[RELV_i + NEUTR_i + CLAR_i + COMP_i + VERF_i]}{5} \quad (4)$$

3.3.2. Cost of equity capital (COEC)

Measuring COEC is difficult since it is not directly observable (Reverte, 2016). Nevertheless, various methods have been used by academics and still debating the best method. Referring to prior research on environmental disclosure, we found that the COEC is mainly measured through two approaches. The first one relies on the market data such as the price earning (P/E) ratio or realized returns. The second one relies on the implied COEC estimated through the analysts' forecasts by either the dividend discount model or the residual income model (Ahmed et al., 2019).

For our study, we do not use the implied COEC given the criticisms addressed to this method, which is based on analysts' forecasts and those considered subjective and yield biased estimates (Easton, 2004). Following prior research (Ng & Rezaee, 2015; Francis et al., 2005), we use the P/E ratio to estimate COEC. To measure the industry-adjusted EP ratio (IndEP_t) we followed some steps. Firstly, for each of the ICB groups we calculated the median EP ratio for all

companies showing positive earnings in year *t*. Excluding the firm in question, when calculating the industry median EP we require at least six positive earnings firms in the industry in year *t*. Finally, the IndEP_t in year *t* is measured as the difference between the EP ratio and the median industry EP ratio in year *t*.

3.3.3. Market value of the firm

To test our second hypothesis (*H2*), we use Ohlson's (1995) firm valuation model. Ohlson's (1995) model includes the notion of "other information" which is not included in the current earnings or book value but affects the market value of the firm (Gregory et al., 2014). This model allows us to treat environmental information as "other information" available to market participants (Elzahar et al., 2015). Our specific valuation model is based on Barth et al.'s (2008) study. The market value is calculated as the market value of equity (MV) scaled by the number of shares outstanding (NOSH).

3.3.4. The ownership holding of institutional investors

Institutional investors are blockholders in large companies. The ownership data holdings were provided by the Bloomberg database. We use the percentage of shares held by these institutional investors. Regarding SRI investors (additional analysis), they incorporate ESG factors into management and investment processes. However, given the difficulties in identifying socially responsible investors as they include various criteria in selecting firms, we followed (Clarkson et al., 2015) and split our sample into companies included in Dow Jones Sustainability Indices (DJSI) and otherwise. Then, for companies indexed in DJSI for the sample period we consider an investor as SRI if their ownership is greater than the industry median using the ICB classification.

4. MAIN RESULTS

4.1. Descriptive and correlation analyses

Table 5 provides the descriptive analysis. It shows that ED quality presents a mean of 0.17, suggesting that the compliance of French companies with existing regulations in terms of credibility is still weak. The cost of equity capital calculated using IndEPT presents a mean of 1.799 suggesting that French companies enjoy a high level of equity financing which could be due to the high level of risk. The mean market value (MV) of the firm is 41.97. The mean value of institutional ownership (IO) holding is 39.67% with a maximum of 93.73%.

Table 5. Descriptive statistics for the COEC

Variable	Mean	SD	Min	Max
EDQUAL	0.170	0.129	0	0.50
COEC	1.799	11.16	-25.56	20.98
MV	41.97	31.41	4.462	120.2
BV	25.88	18.85	3.125	72.07
NI	2.185	2.218	-1.847	7.074
IO	39.57	21.33	0.420	93.73

Table 6 presents the correlation analysis. It shows that ED quality is associated with a lower COEC. The associations between the market value of the firm and quality are positive and significant. For the correlation coefficients of institutional investors, the table shows a positive and statistically significant association between IO and EDQUAL.

Table 6. Correlation coefficients among the explanatory variables

Variable	EDQUAL	COEC	MV	IO
COEC	-0.0410*	1		
MV	0.172***		1	
IO	0.958***			1

Note: *, ***, significant at 10% and 1%, respectively (two-tail test).

4.2. Main findings

Table 7 shows regression with robust standard error clustered by firms. This helps us to consider any issue of residual autocorrelation. In addition, to mitigate the time effects (heteroscedasticity), the year-fixed effect and industry-fixed effects were added to our models.

Table 7. Results of the main regression analyses

Variable	Cost of equity capital	The market value of the firm	Institutional ownership
	EDQUAL	EDQUAL	EDQUAL
EDQUAL	-9.930* (5.044)	-21.21* (10.77)	15.24** (7.192)
BV		0.597*** (0.108)	
EPS		6.890*** (0.814)	
LEV	5.288 (4.396)	-0.0667 (0.0915)	1.569 (9.735)
SIZE	2.366** (1.054)	6.232** (2.542)	1.331 (4.800)
DLOSS	-13.46*** (3.110)		
BETA	8.430* (4.485)		3.535 (2.622)
BV/MV	1.194** (0.540)		1.816 (1.284)
PPE/SALES		0.300 (0.745)	
CAPEX/ASSET		1.225** (0.546)	
DY			0.784* (0.434)
ROE			10.45 (7.391)
Constant	-20.70*** (7.525)	-32.69* (17.62)	8.999 (32.39)
Year effects	YES	YES	YES
Industry effects	YES	YES	YES
Std. error clustering	Firm	Firm	Firm
Model F	15.84***	30.22***	23.52***
Prob > F	0.000	0.000	0.000
Obs.(N)	630	654	627
Adj. R-squared	0.302	0.655	0.7344

Note: *, **, *** significant at 10%, 5%, and 1%, respectively (two-tail test).

4.2.1. ED quality and COEC

As predicted earlier, the results show that the coefficients of ED quality are negative and significantly lower than zero (-9.930 with p-value = 0.052 significant at 10% level). The results indicate that ED quality plays a more significant role in reducing the expected return. This indicates that investors are interested in ED quality rather than the volume of information when they identify firm risk. Dejean and Martinez (2009) indicate that the lack of credibility of environmental disclosure contributes to the low confidence of investors in disclosed information and therefore to a higher COEC. This explains the efforts undertaken by the regulatory framework of non-financial disclosure in France to enhance the quality of disclosed information such as the Grenelle Act II. Additionally, this reflects the efforts undertaken by European countries to set strong standards about environmental issues, backed up by forceful regulatory actions like in France (Feng et al., 2015).

In line with the literature, our empirical findings revealed that the ED quality contributes to lower equity financing and is somewhat value-relevant. In other words, this specific information reduces information asymmetries and is useful to investors (Elzahar et al., 2015). Additionally, Iatridis (2008) finds that higher quality of disclosure may help firms have higher needs for capital, suggesting that firms disclosing higher quality of information achieve a lower COEC. From the market equilibrium theory perspective, Heinkel et al. (2001) show that social investment strategies could alter risk-sharing opportunities so that firms operating in polluting industries tend to have their share prices lowered. On this level, intensifying the role of non-financial information will improve the reputation of the firm and attract a large number of investors. Thus, a higher ED quality may attract the attention of more investors, which contributes to lower COEC.

4.2.2. The value relevance of ED quality

We test the value relevance of ED quality using Ohlson's (1995) model specification. Although there is no elaborate theoretical framework that may help to explain this relationship (Hassel et al., 2005), we consider that only financial statements cannot explain market value because nowadays market participants become more implicated and carefully screen potential investments considering financial and environmental criteria. Contrary to what was predicted earlier, the findings of the main regression indicate a negative and significant association at a 10% level between the quality and market value of the firm ($\beta_2 = -21.21$, p-value = 10.77). On this level, it can be observed that ED has emerged as one of the investment decision-making criteria. However, the stock market participants become more interested in the credibility of disclosed information because the volume is already mandatory by the existing regulations. As evidenced by the efficient market hypothesis, any disclosed information for what it engaged a cost should be integrated into the share price of the firm. Our obtained results corroborate with those obtained by (Cardamone et al., 2012) who find a negative

association between publishing sustainability reports and the value relevance of the banking sector. The negative impact could be interpreted from a cost-concerned perspective where a high level of environmental information quality requires third-party verification as mandated by French law or a "comply or explain" principle, which is considered as costly for the firm. Therefore, this will affect the perceptions of investors and thus, the market value of the firm. In the same vein, Hassel et al. (2005) consider that investors as being carried out at the expense of increased profits perceive environmental responsibility activities. Moreover, we will have a negative reaction from rational investors due to an expected reduction in profitability with no corresponding reduction in risk. Another possible explanation from the efficient market hypothesis is that environmental information is expected to increase benefits to investors as this information may bring positive or negative adjustments to a firm's security price thus affecting the market value. In this case, investors may perceive only negative environmental information that informs about the potential realized risk and threats because they are risk-averse. Thus, the impact of the disclosed information on the market value of the firm will be negative.

4.2.3. The equity holdings decision by institutional investors

We test whether the effect of ED quality on the equity holding of institutional investors is simultaneous. The coefficients reveal that quality ($\beta_2 = 15.241$, p-value < 0.035) is positively and significantly associated with the ownership holding of institutional investors at the 5% level. Therefore, the reported results support our predictions in *H3*. These results indicate that institutional investors when deciding to hold equity and taking into consideration the non-financial disclosure become more concerned with the credibility of disclosed information. This is consistent with the preferences of institutional investors to include ethical considerations in their decision-making. In other words, investors go beyond the traditional wealth maximization objectives and become concerned with the environmental activities of the firm. Thus, they prefer to hold stock in these companies as long as expected returns are met. Our results corroborate with the findings of Derwall et al. (2011) who found the co-existence of ethically driven and profit-seeking institutional investors who include both ethical and financial criteria in their utility function. In addition, as assigned by Heinkel et al. (2001), CSR may be associated with increased risk, and then investors will choose to spread their portfolio ownership holding and include environmental information with a high level of to reduce the investment risk. Overall, we conclude that institutional investors take into consideration what is disclosed by firms about their environmental performance and are more interested in the credibility and transparency of disclosed information. We conclude that institutional investors appreciate the efforts taken by French regulation to enhance the credibility of non-financial information and the requirement of third-party verification.

4.3. Additional analyses

4.3.1. ED quality and SRI investors' ownership holding

In this part, we overlooked the effect of ED quality on the ownership holding of institutional investors, specifically, by socially responsible investors who include ethical consideration in their investment selection and management process (Leite & Cortez, 2014). On this level, SRI uses different screening methods to include firms from their investment universe by evaluating their social and environmental risks. The dependent variable is the percentage of ownership by these investors. Given the difficulties in identifying socially responsible investors, we classify institutional investors as SRI based on their portfolio holdings (Clarkson et al., 2015). We consider an institutional investor to be SRI if the percentage of share of DJSI firms (i.e., firms included in the DJSI during the sample period) held by the institutional investors is greater than the industry median following (Clarkson et al., 2015). We refer to DJSI because it ranked as the most efficient company in the area of social and environmental responsibility. It seems as a benchmark for institutional investors who increasingly rely on this index to create their portfolios. Thus, providing a high level of ED quality allows firms to credibility signal environmentally responsible behavior, benefit from a good reputation, and therefore attract the attention of SRI investors.

Contrary to the results obtained using the full sample; the findings presented in Table 8 indicate that ED quality has a positive but not significant impact on SRI ownership. In other words, SRI investors may be more interested in whether companies comply with the existing regulations and disclose environmental indicators mandated by the law. Moreover, the inclusion in DJSI is moderated by whether firms disclose their environmental performance and activities and not the credibility of disclosed information. Furthermore, the concept of quality is a new issue and companies do not give it considerable attention mainly before the instauration of the Grenelle Act II. On the other hand, there is no sanction for no compliance with the law in France because the "comply or explain" (a "comply or explain" approach is proposed by the Grenelle Act II. Independent auditors give their opinion on

the omissions and provide explanations) principle gives companies the freedom to comply with the law. Our results corroborate with those obtained by Clarkson et al. (2015) who find a positive and significant effect of the assurance of CSR information on the decision-making of SRI investors indicating the role that plays the assurance of information in the inclusion in DJSI.

Table 8. ED quality and the ownership holding of SRI investors

Variable	QUAL model
$EDQUAL_t$	11.63 (7.842)
DY_t	2.080*** (0.542)
$SIZE_t$	3.763* (2.207)
$BVMV_t$	-0.965 (0.796)
$BETA_t$	9.246*** (2.077)
ROE_t	34.05*** (11.77)
LEV_t	9.060 (6.688)
Constant	7.692 (15.94)
Observations	188
Year effects	YES
Prob > F	0.000
Adj. R-squared	0.248

Note: *, *** significant at 10% and 1%, respectively (two-tail test).

4.3.2. Effect of the introduction of Grenelle Act II

It is crucial to check whether the change in existing regulation reinforces the effect of environmental disclosure on financial decision-making. Thus, we have re-run our regression for the period after the adoption of Grenelle Act II in 2012. The obtained results (Table 9) are similar to our main findings suggesting that the new regulation came into effect to reinforce the credibility of disclosed information. Moreover, Grenelle Act II comes to reinforce the effect of the quality of environmental information. Accordingly, we consider that investors include ethical considerations in their utility functions. Moreover, the environmental disclosure provides the source of information that may signal the performance of the firms and therefore affect their decision of equity holding.

Table 9. Post-adoption of Grenelle Act II regression (Part 1)

Variable	Cost of equity capital	The market value of the firm	Institutional ownership
	EDQUAL	EDQUAL	EDQUAL
$EDQUAL$	-7.899* (5.100)	-24.86* (12.81)	21.718* (12.865)
BV		0.608*** (0.135)	
EPS		8.464*** (1.003)	
LEV	1.026 (4.645)	-0.00423 (0.110)	-1.240 (0.938)
$SIZE$	0.153 (1.052)	5.669** (2.836)	-0.602 (0.925)
$DLOSS$	-15.47*** (2.879)		
$BETA$	8.466* (4.304)		0.380 (0.930)

Table 9. Post-adoption of Grenelle Act II regression (Part 2)

Variable	Cost of equity capital	The market value of the firm	Institutional ownership
	EDQUAL	EDQUAL	EDQUAL
BV/MV	1.655** (0.678)		1.505 (0.467)
PPE/SALES		0.0404 (0.758)	
CAPEX/ASSET		0.977 (0.694)	
DY			-0.0596 (0.924)
ROE			21.009* (0.027)
Constant	-5.394 (7.725)	-34.22* (19.14)	35.075 (13.04)
Year effects	YES	YES	YES
Industry effects	YES	YES	YES
Obs.(N)	315	327	314
Adj. R-squared	0.387	0.690	0.825

Note: *, **, *** significant at 10%, 5%, and 1%, respectively (two-tail test).

5. CONCLUSION

We examined the association between ED quality and COEC, the market valuation of the firm using Ohlson's model (1995), and the ownership holding of institutional investors. We constructed a new measure of ED quality for a sample of French-listed companies. Then we performed a content analysis of annual and standalone reports. Based on a multi-theory framework, the empirical findings support our research hypotheses. The findings showed that COEC is a crucial channel whereby the market sets the price for environmental disclosure. Particularly, the results indicate that quality plays a more significant role in reducing the expected return. Our findings indicate that investors when pricing the risk of the firm interested mainly in the credibility of disclosed information rather than the volume. To test our second hypothesis (H2), we use Ohlson's (1995) which states that the firm valuation is related to accounting and non-accounting information. Contrary to what was predicted earlier, the findings indicate a negative and significant association at a 10% level between the quality and market value of the firm. Then, we test the third hypothesis (H3) on whether the ownership holding by institutional investors is affected by ED quality. The coefficient reveals that quality is positively and significantly associated with the ownership holding of institutional investors simultaneously with an important effect at 5%. These results indicate that institutional investors' decision-making to hold a firm's equity could be affected by non-financial disclosure that is why they become concerned with the credibility of disclosed information.

Our findings offer practical implications. The study has an interest in capital market

participants, as their investment decision-making would be influenced. Indeed, managers may benefit from environmental information, including higher share prices that could enhance incentive pay and job security. Regulatory bodies may want to consider implementing environmental disclosure regulations. Finally, this research is considered a response to the recent calls for deeper research about the usefulness of ED reporting for investors. Finally, our study shed light on the benefits related to the disclosed environmental information and ethical behavior to improve financial performance.

Our paper has several limitations. First, our ED quality measure might not capture all quality dimensions. It would be interesting to undertake a qualitative study to understand the perceptions of different stakeholders on the definition of ED quality to provide a valid measure for ED quality. Second, our results are concerned with listed firms and do not consider other unlisted firms that might be concerned with the existing regulations. Further research is needed to examine the consequences of environmental disclosure for unlisted companies and small and medium enterprises. Finally, our study focused on the French context and our conclusion might not be applicable to other contexts. Further research is needed to examine the consequences of ED quality in different contexts. Further research could also examine the impacts of country characteristics (e.g., inflation, regulatory framework, cultural issues, legal systems, and political factors) on the relationship between ED quality and COEC, market valuation, and institutional ownership. It would also be interesting to examine the impact of ED quality on the cost of debt.

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APPENDIX

Table A.1. ED quality measurement

Qualitative characteristics	Measurement	Sources	Indices
Relevance	Time specification ↓ 1: Forward-looking information 1: Backward information (present or past) 0: No time specification	Michelon et al. (2015), Beretta and Bozzolan (2008)	$RELV_i = \frac{\sum_{i=1}^n Relevance_i}{Max\ relevance}$
Neutrality	1: Positive information 1: Negative information 0: Neutral information	GRI (2006), Chauvey et al. (2015), Guthrie and Parker (1990)	$NEUTR_i = \frac{\sum_{i=1}^n Neutrality_i}{Max\ neutrality}$
Clarity	1: Monetary 1: Quantitative 0: Declarative (general)	Cormier and Magnan (2007), Michelon et al. (2015), Botosan and Plumlee (2005)	$CLAR_i = \frac{\sum_{i=1}^n Clarity_i}{Max\ clarity}$
Comparability	1: Comparison with the previous period 1: Comparison with other organizations 0: No comparison	Jonas and Blanchet (2000)	$COMP_i = \frac{\sum_{i=1}^n Comparability_i}{Max\ comparability}$
Verifiability	1: Presence of audit of environment disclosure 0: No audit	The Grenelle Act II in France (2012), Simnett et al. (2009)	$VERF_i = \frac{\sum_{i=1}^n Verifiability_i}{Max\ verifiability}$