

# Code of Ethics versus Annual Report: Analysis of Environmental Disclosures

PIERLUIGI SANTOSUOSSO  
 Faculty of Economics  
 Sapienza University of Rome  
 9 Via del Castro Laurenziano, 00161 Rome  
 ITALY  
 pierluigi.santosuosso@uniroma1.it

*Abstract:* - This paper compares environmental disclosure in Codes of Ethics and in Annual Reports. On the basis of a sample of 197 Italian listed firms, research findings reveal that firm size, capital intensity and industry classification are positively associated with the level of environmental disclosure in both documents. We also examine environmental disclosure by exploring the consistency between the information presented in the two documents. Disclosure consistency is defined as the logarithm of the level of environmental disclosure in the Annual Reports divided by the level presented in the Code of Ethics. It is found that disclosure consistency is positively associated with firm size and capital intensity. Industry classification and ownership dispersion also affect disclosure consistency when firm subsamples are considered.

*Key-Words:* - environmental disclosure; code of ethics; annual report; Italian listed companies

## 1 Introduction

Research that has empirically explored and variously classified the content of Codes of Ethics shows that environmental protection is one of the most important ethical standards that should guide the conduct of managers and employees (e.g., Carasco & Singh, 2003; Kaptein, 2004; Lugli et al., 2009; Singh, 2006; Singh et al., 2011; Fredericks & Ngan, 2010; Kleynjans & Hudon, 2016). In our sample of 197 Italian listed firms, almost 80% of Codes of Ethics presents at least one word related to environmental protection. In particular, environmental issues are discussed in a specific section of the Code of Ethics or, more frequently, are considered along with workplace health and safety standards. A Code of Ethics is not a mandatory document, but almost all Italian listed companies have adopted one. Its adoption meets the need to comply with the Legislative Decree 231/2001. Under the aforesaid Decree, the company is not responsible for crimes (corruption, fraud, unlawful dividend payments) committed by officials with representative or managerial functions if suitable organizational and management models have been adopted to prevent them. The Code of Ethics, as part of these models, introduces and makes binding the principles and rules of behaviour to prevent the offenses listed in the Decree. Although internal stakeholders (e.g., employees and managers) are already informed about the existence of such a Code, given their obligation to comply

with the ethical standards contained therein, the Code of Ethics is voluntarily published in the investor relations section of the companies' website and easily downloadable.

This paper compares the level of environmental disclosure in Codes of Ethics (ENVETH) with the level in Annual Reports (ENVREP) in order to examine the disclosure consistency between the two documents. The information contained in the Code of Ethics is essentially focused on principles and represents an ethical guide to decision making, whereas environmental information disclosed in the Annual Report covers a variety of topics including types of investment, environmental legal obligations, risk assessment, assets valuation, environmental performances and the description of company activities. Firms disclose environmental information in the Management Commentary section and, to a lesser extent, in the Explanatory Notes of the Annual Report. In this context, a high proportion of environmental disclosure in the Annual Report suggests *ceteris paribus* that a firm is actively committed to environmental issues in line with the principles established in the Code of Ethics, whereas a low proportion would signal that a firm is not as involved in environmental matters as stated in the Code of Ethics. A balanced presence of information concerning environmental issues in the two documents would give *ceteris paribus* an indication of disclosure consistency.

To address this question, the present study used the level of environmental disclosure ENVETH, ENVREP and a “disclosure consistency index” (DCINDEX). DCINDEX is measured as ENVREP divided by ENVETH. The logarithm form of the aforementioned variables was used in the present analysis. We also examined which determinants affect ENVETH, ENVREP and DCINDEX. More specifically, proxy variables of political visibility, contracting and monitoring costs and firm profitability were examined. The firm sample is made up of 197 Italian listed firms and three subsamples are examined to enlarge upon these issues. As described in section 3, we analysed information about environmental protection that companies have published voluntarily in the Annual Report, just as the information presented in the Code of Ethics is voluntary.

The remainder of this study is organized as follows. The second section develops the research question and the main related literature. The third section describes the sample selection and the survey methodology whilst the fourth section presents the research findings and the last section provides concluding remarks.

## 2 Research question and background

Environmental disclosure and its determinants have been extensively explored in the last decades by examining the Annual Report and other corporate documents (for a review, Gray et al., 1995; Ali et al., 2017). The content of the Code of Ethics, including environmental matters, have also been examined in relation to various topics such as corporate performances (Adams, 2004), the Sarbanes-Oxley act (Canary & Jennings, 2008; Holder-Webb & Cohen, 2012), the legitimacy of ethical codes (Long & Driscoll, 2008), the evaluation of its ethical content (Schwartz, 2002) or the influence of a Code of Ethics on behaviour (Schwartz, 2001, 2002; Marnburg, 2000). Unlike previous research, our purpose is to verify whether the information about environmental issues provided in the Code of Ethics is confirmed in the Annual Report. We assumed that consistency indirectly signals to shareholders the reliability of information and, *ceteris paribus*, the credibility of firms. The basic idea is simple and may be summarised as follows. The Code of Ethics indicates the ethical standards that a firm is committed to comply with, whereas the Annual Report confirms the commitment and attention towards sustainability and environment safeguarding. The information in the Annual Report

does not imply good environmental performance, but testifies that environmental issues presented in the Code of Ethics are taken into consideration and disclosed to stakeholders.

In this perspective, we examined the environmental disclosure in the two documents and their consistency by adding a new measure: namely, the disclosure consistency index (DCINDEX). As will be specified in section 3, the DCINDEX is measured by the logarithm of ENVREP divided by ENVETH. In more detail, the DCINDEX is characterized by two elements. First, the index does not consider the topics covered in the two documents, but focuses on the level of environmental disclosure as measured by the number of words related to environmental issues. The comparison of topics related to environmental protection in the two documents presents some limits given the different purposes and nature of the Code of Ethics and the Annual Report. Second, the index examines the number of words in the two documents without considering a word count relative to the size of each document. The high volume of financial information in the Annual Report would make the percentage of information on environmental issues insignificant.

Based on the existing literature on environmental reporting, we also explored the determinants of the level of disclosure ENVETH, ENVREP and DCINDEX by testing three sets of proxy variables for firm-characteristics without assuming specific hypotheses about possible relationships.

First, we examined some proxies of political visibility such as firm size, capital intensity and industry classification. It has been argued that firms with greater political visibility (Belkaoui & Karpik, 1989) are encouraged to disclose more information in order to address the economic and social concerns of stakeholders about environmental issues. Firm size is one of the most studied variables in the research literature for measuring political visibility because of the greater impact that larger firms have on consumers, investors, suppliers, creditors, employees and local communities. More specifically, a positive association between the level of environmental disclosure and firm size is plentifully supported in the literature with theoretical justification and empirical evidence (e.g., Gray et al., 1995; Deegan & Gordon, 1996; Hackston & Milne, 1996; Gao et al., 2005; Freedman & Jaggy, 2005; Hossain & Reaz, 2007; Stanny & Ely, 2008; García-Sánchez, 2008; da Silva Monteiro & Aibar-Guzmán, 2010; Cormier et al., 2011). Capital intensity has also been analysed in numerous studies as an explanatory variable of the

extent of environmental disclosure. More specifically, two perspectives are commonly used to explain the level of environmental disclosure. The first one posits that firms with higher capital intensity are expected to have invested in clean technologies. These firms tend to increase environmental disclosure in order to differentiate themselves from other companies. The second approach assumes that capital intensity is associated with polluting activities. These firms are inclined to disclose information to dispel shareholders' concerns (for a review, Silva-Gao, 2012). Although these perspectives assume firms have different environmental performances, capital intensity and environmental disclosure are presumed to be positively associated. Capital intensity, usually measured by total capital expenditure divided by revenue, has been found to be significantly related to environmental disclosure (Clarkson et al., 2008; Aerts & Cormier, 2009; Connors & Gao, 2011; Silva-Gao, 2012), even though an unexpected negative association (Moroney et al., 2012) or no association were also found (Stanny & Ely, 2008; Peters & Romi, 2014; Odia, 2015). Furthermore, several studies have explored the role of industry classification on environmental disclosure. Although the exact contribution of the industry type has not yet been clarified, as noted in reviews on this topic (Gray et al., 1995; Ali et al., 2017), a positive association between environmentally sensitive industries and the level of environmental disclosure has been found (Hackston & Milne, 1996; Deegan & Gordon, 1996; Gao et al., 2005; Cho & Patten, 2007; Brammer & Pavelin, 2006; Haddock-Fraser & Fraser, 2008; García-Sánchez, 2008; Liu & Anbumozhi, 2009; Peters & Romi, 2014).

Our second set of determinants is related to the so-called contracting and monitoring costs arising from information asymmetry between managers, shareholders and lenders. More specifically, an increased level of disclosure could reduce the information asymmetry component of the firm's cost of capital (Leuz & Verrecchia, 2000). With regard to the relationship between managers and shareholders, ownership dispersion has been frequently used as a proxy variable of the level of information asymmetry existing between managers and shareholders. In such a context, a high level of ownership dispersion could lead firms to increase the level of environmental disclosure in an attempt to reduce the firm's cost of capital. In accordance with this hypothesis, several empirical studies have provided evidence of a positive association between ownership dispersion and the level of environmental

disclosure (Brammer & Pavelin, 2006; Cullen & Christopher, 2002; Cormier et al., 2005), but inconclusive results were also found (Liu & Anbumozhi, 2009; Cormier et al., 2011; Chan et al., 2014). Similarly, higher disclosure standards help reduce the information asymmetry between managers and lenders who are typically interested in a safer investment. The proxy variable of contracting and monitoring costs for lenders usually includes firm leverage (Belkaoui & Karpik, 1989). According to this theoretical framework, contracting and monitoring costs could be reduced *ceteris paribus* when firms that are more financially levered present a high level of environmental disclosure. Evidence of a positive association between leverage and the level of social and environmental disclosure has been provided in several studies (Roberts, 1992; Malone et al., 1993; Richardson & Welker, 2001; Clarkson et al., 2008). However, the relationship between leverage and environmental disclosure practices has also been explained in a different way. More specifically, a negative association was suggested because leverage is a factor that limits a firm's ability to raise funds for developing environmental programs and for disclosing such information. According to this hypothesis, a number of studies have documented that leverage and the level of environmental disclosure are negatively correlated (Belkaoui & Karpik, 1989; Brammer & Pavelin, 2006; Cormier et al., 2009; Cormier et al., 2011; Connors & Gao, 2011; Moroney et al., 2012). Contrary to expectations, it is notable that no significant association between the level of environmental disclosure and leverage was found (Cormier et al., 2005; Stanny & Ely, 2008; Saleh Al Arussi et al., 2009; Aerts & Cormier, 2009; Liu & Anbumozhi, 2009; Peters & Romi, 2014).

The last set of determinants concerns the potential relationship between environmental disclosure and firm profitability. According to the principal-agent framework, environmental disclosure can reduce the stakeholders' perception that profitability and environmental responsibility are a zero-sum game (Neu et al., 1998). In other words, environmental information disclosed by profitable firms would signal to stakeholders that higher profitability does not undermine environmental programs. The positive relationship between firm profitability and environmental disclosure has also been explained on the basis of alternative interpretations. For example, it was argued that managers' skills are required to manage profitable firms, as well as social commitments (e.g., Belkaoui & Karpik, 1989). Moreover, a positive association was suggested in light of the

resources that profitable firms have for developing environmental programs and providing environmental disclosure (e.g., Brammer & Pavelin, 2006). Although there is some evidence of a positive association between the level of environmental disclosure transparency and firm profitability once firms have chosen to disclose environmental information (Peters & Romi, 2014), a large number of empirical studies have been unable to demonstrate a clear association (Hackston & Milne, 1996; Al-Tuwaijri et al., 2004; Cormier et al., 2005; Clarkson et al., 2008; Stanny & Ely, 2008; Brammer & Pavelin, 2006; Saleh Al Arussi et al., 2009; Aerts & Cormier, 2009; Liu & Anbumozhi, 2009; Reverte, 2009; Connors & Gao, 2011; Cormier et al., 2011; Meng et al., 2013; Chan et al., 2014).

### 3 Firm sample and methodologies

Our sample is made up of firms listed on the Italian stock exchange. Their Codes of Ethics, which are available on the companies' websites, were manually downloaded (from January to December, 2015). We also downloaded the Annual Reports for the 2015 financial year that include the consolidated and the separate financial statements of parent companies. Sustainability reports were not analyzed because they are only partially available as a voluntary document before 2016. As from 1 January 2017, Sustainability reports (now called Non-Financial Statement) have been introduced in Italy as a mandatory document (Legislative Decree 254/2016) for large companies with more than 500 employees according to the EU Directive 2014/95. We excluded banks, insurance companies and firms whose Code of Ethics was not available. On the basis of these selection criteria, the sample includes 197 firms. The companies operate in various industries and account for about 57% of Italian listed companies. Financial data related to the independent variables used in regression analyses were obtained from Amadeus (Bureau Van Dijk) for the period 2013-2015 and their average values were computed for three years.

As much research on this topic shows (for a review, Kuo et al., 2012), measurement methods for environmental disclosure have evolved over time, starting from a simple yes/no analysis of the presence of social and environmental disclosure in Annual Reports (Ernst & Ernst, 1978) to complex scores based on both the quantity and quality of environmental disclosure (e.g., Cormier & Magnan, 2003; Aerts et al., 2006; Cormier & Magnan, 2015; Plumlee et al., 2015).

In accordance with a content analysis approach followed by several studies on social and environmental disclosures (e.g., Deegan & Gordon, 1996; Brown & Deegan, 1998; Neu et al., 1998; Wilmshurst & Frost, 2000; Frost, 2007), ENVETH and ENVREP were measured by computing the number of words related to environmental issues in the Codes of Ethics and Annual Reports. The present research has initially required a qualitative analysis of the content of the two documents in order to identify the most frequent words related to environmental issues. More specifically, it used a preliminary quantitative text analysis where the most frequent phrases and words were identified and a list of words concerning environmental issues was then selected based on a subjective judgment. Secondly, the frequency of the selected key words was determined in order to compute ENVETH and ENVREP for each firm. In the selection process, some words were intentionally excluded. First, we did not include words with a multiple meaning. For example, the word "environment", as a single word, was deliberately excluded since it was frequently used in different contexts to express different meanings (e.g., work environment, the currency of the primary economic environment, competitive environment and control environment) and/or to mention the Italian Environment Ministry or subsidiary companies whose names include this word. Second, some words were omitted to avoid redundancy. For example, for the sentence "gas emissions in the atmosphere", we selected only the word "emission" without using the words "gas" and "atmosphere". Based on these selection criteria, the following key-words were used in this study: animal and plant species, biodiversity, climate change, Co2, ecosystem, emissions, energy efficiency, energy saving, environmental impact, environmental protection, environmental safeguard, fauna, flora, global warming, greenhouse effect, habitat, Iso 14001, natural resources, pollution, rational use, rational use of energy, renewables, respect for the environment, sustainable development and waste. Some words related to environmental issues may have been missed due to the qualitative analysis that was required in the word selection. However, any omissions are mitigated by the fact that a comparison of the two documents, and not their absolute value, is the focus of the present study. The same key-words were used for the measurement of environmental disclosure in both the Codes of Ethics and the Annual Reports.

After completing the preliminary analysis, we then explored how ENVETH and ENVREP are affected by firm size, capital intensity, industry

classification, ownership dispersion, firm leverage and profitability. In the regression analysis based on the ordinary least squares (OLS regression), the dependent variable ENVETH is expressed as the total number of words related to environmental issues included in  $\sum_{e=1}^n W_e$ , where  $W_e$  is the word  $e$  found in the Code for firm  $i$ . In a second OLS regression, the dependent variable ENVREP is given by  $\sum_{r=1}^n W_r$ , where  $W_r$  is the word  $r$  found in the Annual Report for firm  $i$ . However, residuals of the regressions were not normally distributed as shown by looking at the Q-Q-Plots and by the results of the Jarque-Bera test for ENVETH (J-B = 414.791, p-value 8,49802e-091) and ENVREP (J-B = 4537.82, p-value 0). A transformation procedure was therefore performed by using the natural logarithm for ENVETH (J-B = 1.60261, p-value 0.448742) and ENVREP (J-B = 4.1015, p-value 0.128639). More specifically, since zero is present in the sample (38 companies for ENVETH and 61 companies for ENVREP), the transformation procedure required converting ENVETH and ENVREP into its logarithm form  $y'_i = \ln(y_i + 1)$ , where  $y_i$  denotes ENVETH and ENVREP for firm  $i$ .

The OLS regression has the following general form:

$$DISCL_i = \beta_0 + \beta_1 SIZE_i + \beta_2 CAPINT_i + \beta_3 IND_i + \beta_4 FLOAT_i + \beta_5 LEV_i + \beta_6 ROS_i \quad (1)$$

where:

- DISCL = environmental disclosure as measured by the natural logarithm of (ENVETH + 1) or (ENVREP + 1);
- SIZE = firm size as measured by the natural logarithm of total assets;
- CAPINT = capital intensity as measured by tangible fixed assets divided by total assets;
- IND = industry classification that equals 1 for an environmentally sensitive industry and 0 otherwise;
- FLOAT = ownership dispersion as measured by the total % of ordinary shares held by investors with less than 2% of the total voting rights;
- LEV = firm leverage as measured by the total debt divided by total assets;
- ROS = return on sales measured by EBIT divided by total revenues.

More specifically, the industry classification IND is a categorical variable which takes a value of one if a company operates in an environmentally

sensitive industry and 0 otherwise. Like other studies (e.g., Hackston & Milne, 1996), we posited that environmentally sensitive industries include primary and secondary industry companies. According to the classification of economic activity provided by the Italian National Institute of Statistics (Vicarie et al., 2009) these industries include: agriculture, forestry and fishing, mining, manufacturing, energy, oil and gas, water treatment and waste management and construction. Transport and storage firms were also included among the environmentally sensitive industries for their contribution to total gas emissions (EEA, 2018). All other firms engaged in tertiary industries are considered to be not environmentally sensitive industries. In particular, we included in this group firms in the following industries: wholesale and retail trade, the catering and hotel industry, information and communication services, real estate, financial services, professional, scientific and technical services, rental, travel and business support services, education, arts, entertainment and recreation. Based on this assumption, our sample is composed of 80 firms in an environmentally sensitive industry and 117 firms belonging to a non-environmentally sensitive industry. Moreover, the present study defined CAPINT as tangible fixed assets divided by total assets in order to isolate the asset components that potentially have real environmental effects, with the exclusion of intangible and financial assets. Lastly, we computed ownership dispersion FLOAT as the total percentage of ordinary shares held individually by small investors with less than two percent of the total voting rights of the company. This measure is slightly more restrictive than the percentage (3%) that denotes "significant shareholders" in Italian law (Act n°58, 1998). Lastly, as a measure of firm profitability, Return on Sales (ROS) was computed as earnings before interest and taxes (EBIT) divided by total revenue. Although other proxy variables of firm profitability were analyzed (EBIT and Net income divided by total assets), the use of ROS allowed us to avoid multicollinearity problems and to increase the significance of the explanatory variables and also the overall regression analysis.

The second issue we examined focuses on the consistency between the level of ENVETH and ENVREP as measured by DCINDEX. As mentioned above, we initially estimated DCINDEX for firm  $i$  as  $ENVREP_i/ENVETH_i$ . As already noted for ENVETH and ENVREP, the Q-Q-Plot and the results of the Jarque-Bera test documented that residuals of the regression analysis were not normally distributed when DCINDEX was analysed

as the dependent variable (J-B = 2131.49, p-value 0). A transformation procedure was performed by using the natural logarithm of DCINDEX. More specifically, since ENVETH or ENVREP have positive or null values, DCINDEX was transformed into  $\ln[(ENVREP_i + 1)/(ENVETH_i + 1)]$ . Normality tests provided the results of the logarithm transformation (J-B = 1.08614, p-value 0.580962). A value of the logarithm of DCINDEX = 0 shows that environmental disclosure is equally distributed in the two documents. Otherwise, a value of DCINDEX  $\neq$  0 signals a disconnection or inconsistency between environmental disclosure in the Code of Ethics and environmental disclosure in the Annual Report. More specifically, for a DCINDEX > 0, environmental disclosure in the Annual Report is greater than in the Codes of Ethics. Vice versa, for a DCINDEX < 0, environmental disclosure is greater in the Code of Ethics. The DCINDEX was explored as dependent variable using the OLS regression model in order to estimate factors affecting disclosure consistency.

The OLS regression has the following general form:

$$DCINDEX_i = \beta_0 + \beta_1 SIZE_i + \beta_2 CAPINT_i + \beta_3 IND_i + \beta_4 FLOAT_i + \beta_5 LEV_i + \beta_6 ROS_i \quad (2)$$

where:

DCINDEX = disclosure consistency index defined as the natural logarithm of  $[(ENVREP_i + 1)/(ENVETH_i + 1)]$

All remaining terms are as defined previously.

To enlarge upon this issue, the correlation between DCINDEX and the proxies variables mentioned above was carried out on the basis of the logistic regression model (3). The regressions involved the binary dependent variable Y where  $\beta_p$  is the *pth* parameter of the logistic model obtained by the method of maximum likelihood. We

performed three logistic regressions involving firms that present a DCINDEX > 0, DCINDEX < 0 and DCINDEX = 0. Firms with an equal distribution of environmental disclosure in the two documents (DCINDEX = 0) include those that did not disclose information about environmental issues either in the Code of Ethics or in the Annual Report.

The first regression model was performed for a subsample (subsample 1) composed of firms having a DCINDEX > 0 (Y=1) and firms that present a DCINDEX < 0 (Y=0). The second regression involved a subsample (subsample 2) made up of firms with DCINDEX > 0 (Y=1) and firms with a balanced presence of information on environmental issues that present a DCINDEX = 0 (Y=0). Lastly, the third regression was performed for a subsample (subsample 3) composed of firms with a DCINDEX < 0, (Y=1) and firms with a DCINDEX = 0 (Y=0).

The logistic regression has the following general form:

$$\begin{aligned} \text{logit}(pDCINDEX) = & \beta_0 + \beta_1 SIZE_i + \\ & + \beta_2 CAPINT_i + \beta_3 IND_i + \beta_4 FLOAT_i + \\ & + \beta_5 LEV_i + \beta_6 ROS_i \quad (3) \end{aligned}$$

where:

$pDCINDEX$  = probability between 0 and 1 that DCINDEX will occur. DCINDEX is defined as the natural logarithm of  $[(ENVREP_i + 1)/(ENVETH_i + 1)]$ .

All remaining terms are as defined previously.

Table 1 presents the correlation matrix related to the independent variables involved in the regression analyses. The overall results suggest the absence of a multicollinearity problem for the variables used in models (1) and (2), as confirmed by the variance inflation factor (VIF) shown in the note of table 1.

Table 1. Correlation matrix for independent variables

	SIZE	CAPINT	IND	FLOAT	LEV	ROS
SIZE	1					
CAPINT	0.1497	1				
IND	0.1075	0.1373	1			
FLOAT	0.2772	0.0401	0.125	1		
LEV	0.1275	0.3094	-0.0326	-0.0937	1	
ROS	0.1549	-0.0393	0.1162	0.0308	0.0286	1

Note: VIF ranges from 1,044 for the ROS coefficient to 1.157 for the LEV coefficient.

## 4 Empirical Results

Table 2 shows the frequency of the selected words in the two documents and their percentage use. Although the most common word in both documents was “waste”, it is easy to notice a different use of the selected key words in the two documents. For example, the words “emissions”, “energy efficiency”, “waste” and “renewables” are more frequently used in the Annual Report as can be

seen by comparing it with the percentage indicated in the Code of Ethics. Vice versa, “sustainable development”, “respect for the environment” and “environmental safeguard” are examples of phrases used less frequently in the Annual Report than in the Ethical codes. The note in table 2 shows the difference between the percentage use of each word in the Annual Report and the Code of Ethics.

Table 2. Selected words. Frequencies and percentages

Code of Ethics						Annual Report					
$W_e$	N°	%	$W_e$	N°	%	$W_r$	N°	%	$W_r$	N°	%
Waste	141	16,73	Biodiversity	11	1,30	Waste	859	24,00	Ecosystem	48	1,34
Sustainable development	113	13,40	Habitat	9	1,07	Emissions	477	13,33	Natural resources	43	1,20
Respect for the environment	85	10,08	Renewable energies	9	1,07	Energy efficiency	449	12,55	Biodiversity	32	0,89
Environmental protection	82	9,73	Rational use of energy	8	0,95	Renewables	300	8,38	Respect for the environment	32	0,89
Environmental safeguard	82	9,73	Ecosystem	7	0,83	Environmental protection	296	8,27	Environmental safeguard	29	0,81
Environmental impact	71	8,42	Animal and plant species	6	0,71	Renewable energies	188	5,25	Climate change	15	0,42
Natural resources	51	6,05	Energy saving	6	0,71	Pollution	174	4,86	Habitat	5	0,14
Pollution	41	4,86	Climate change	3	0,36	Energy saving	134	3,74	Rational use	4	0,11
Energy efficiency	39	4,63	Fauna	2	0,24	Environmental impact	128	3,58	Fauna	4	0,11
Emissions	29	3,44	Flora	2	0,24	Co2	123	3,44	Flora	4	0,11
Renewables	16	1,90	Greenhouse effect	1	0,12	Iso 14001	122	3,41	Global warming	3	0,08
Rational use	15	1,78	Global warming	0	0	Sustainable development	56	1,56	Rational use of energy	1	0,03
Iso 14001	14	1,66	Co2	0	0	Greenhouse effect	53	1,48	Animal and plant species	0	0

Note: The difference between the percentage use of each word in the Annual report and in the Code of ethics was computed. Emissions (+9,888%), Energy efficiency (+7,919%), Waste (+7,275%), Renewables (+6,484%), Renewable energies (+4,185%), Co2 (+3,437%), Energy saving (+3,032%), Iso 14001 (+1,748%), Greenhouse effect (+1,362%), Ecosystem (+0,511%), Global warming (+0,084%), Climate change (+0,063%), Pollution (-0,002%), Fauna (-0,125%), Flora (-0,125%), Biodiversity (-0,411%), Animal and plant species (-0,712%), Rational use of energy (-0,921%), Habitat (-0,928%), Environmental protection (-1,457%), Rational use (-1,668%), Environmental impact (-4,846%), Natural resources (-4,848%), Environmental safeguard (-8,917%), Respect for the environment (-9,189%), Sustainable development (-11,840%).

Table 3 presents the descriptive statistics of the variables used in the regression analyses. A higher value was found in the level of ENVREP compared to ENVETH. Although the levels in both ENVREP and ENVETH present a fairly similar median (median = 3 for ENVETH and a median = 4 for ENVREP), the descriptive statistics reported a high standard deviation (st. deviation = 40.657) and an average value of ENVREP (mean = 18.168). Differences between firms in the DCINDEX were found. More specifically, the research findings revealed that there are 97 firms with a logarithm value of DCINDEX > 0, 68 firms with a value of DCINDEX < 0 and 32 firm with a value of DCINDEX = 0, including firms that did not disclose

information about environmental issues either in the Code of Ethics or in the Annual Report (21 firms). More than 80% of firms that did not disclose any information are not in an environmentally sensitive industry.

The results of the OLS regression according to model (1) and (2) are reported in Table 4. Although the coefficient of determination (Adjusted  $R^2 = 0.09137$ ) revealed a large portion of unexplained deviation, the research findings showed that ENVETH has a significant positive association with SIZE and, to a lesser extent, with CAPINT and IND. These results confirm the empirical findings reported in section 2. More specifically, firms with greater political visibility, as measured by SIZE,

CAPINT and IND, are more likely to adopt a Code of Ethics that presents ethical standards with a higher level of environmental disclosure. It was also found that proxies of political visibility affect the level of environmental disclosure in Annual Reports. More specifically, SIZE, CAPINT and IND are positively correlated with the level of ENVREP. The coefficient of determination was higher (Adjusted  $R^2 = 0.28$ ), but the other hypotheses set out in the research literature about the role of firm profitability and contracting and monitoring costs on environmental disclosure mentioned in section 2

were not supported on the basis of model (1). Based on model (2), research findings revealed that DCINDEX is positively associated with SIZE and, to a lesser extent, with CAPINT. This result confirms the positive correlation between proxies of political visibility and the disclosure consistency index. In other words, firms that disclose more environmental information in the Annual Report than in the Code of Ethics are larger and with a higher portion of tangible fixed assets than firms that disclose a lower level of such information.

Table 3. Descriptive statistics of selected variables for firm  $i$

	Mean	Median	St. Deviation	10 <sup>th</sup> percentile	90 <sup>th</sup> percentile
ENVETH <sup>(1)</sup>	4,279	3,000	4,857	0,000	10,000
ENVREP <sup>(1)</sup>	18,168	4,000	40,657	0,000	44,000
DCINDEX <sup>(2)</sup>	3,46	1,00	4,90	0,22	8,86
SIZE	12.80	12.62	2.00	10.65	15.50
CAPINT	0.211	0.155	0.194	0.014	0.515
FLOAT	0.275	0.288	0.178	0.012	0.471
LEV	0.296	0.289	0.179	0.069	0.538
ROS	-1.168	0.049	9.456	-0.216	0.202

Note: (1) ENVETH and ENVREP are shown here before the logarithmic transformation. (2) DCINDEX is shown as  $[(ENVREP_i + 1)/(ENVETH_i + 1)]$  before the logarithmic transformation.

Table 4. OLS regression results of ENVETH, ENVREP and DCINDEX on firm characteristics

	Sample (197 firms)		Sample (197 firms)		Sample (197 firms)	
	ENVETH		ENVREP		DCINDEX	
	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>	<i>Estimate</i>	<i>p-value</i>
const	-0,120235	0,76270	-3,0305	<0,00001***	-2,91026	<0,00001***
SIZE	0,0943257	0,00347***	0,311097	<0,00001***	0,216771	0,00003***
CAPINT	0,678318	0,03857**	1,97381	0,00023***	1,29549	0,01324**
IND	0,266906	0,03092**	0,348281	0,07971*	0,0813747	0,67725
FLOAT	0,0006013	0,86503	0,00682829	0,23167	0,00622699	0,26931
LEV	-0,129133	0,71705	0,0464023	0,93555	0,175536	0,75679
ROS	0,00202136	0,75207	-0,0074543	0,46973	-0,00947566	0,35239
Adjusted R <sup>2</sup>	0,091375		0,280598		0,143855	
F stat	4,117502		13,09137		6,208820	

Notes: \*\*\* Significant at the 0.01 level. \*\* Significant at the 0.05 level, \* Significant at the 0.10 level (two-tailed).

Table 5 presents the results of regression analyses according to model (3). Although the coefficients of determination revealed a large portion of unexplained deviation, significant relationships were also found when logistic regressions were used according to model (3). For the firm subsample 1 (165 firms) having a DCINDEX > 0, (Y=1) and a DCINDEX < 0 (Y=0),

the hypothesis of political visibility was confirmed. More specifically, the positive coefficient for SIZE and CAPINT suggests that the probability of having a “DCINDEX > 0” response (Y = 1) increases as the values of these variables increase. The other predictive variables do not have sufficient explanatory power to clarify the type of responses. For the firm subsample 2 (129 firms) with a



DCINDEX > 0, (Y=1) and a DCINDEX = 0 (Y=0), the probability of having a “DCINDEX > 0” response (Y = 1) increases as the values of SIZE, CAPINT, IND and FLOAT increase. These results support the hypothesis of political visibility and the positive coefficient of FLOAT, as a proxy variable of ownership dispersion, also confirms the role of the contracting and monitoring costs in explaining

environmental disclosures. For the firm subsample 3 (100 firms) with a DCINDEX < 0, (Y=1) and a DCINDEX = 0 (Y=0), no significant relationships were found. *Ceteris paribus*, this result revealed that the information contained in the Code of Ethics was less significant than that provided in the Annual Report.

Table 5. Logistic regression results of DCINDEX on firm characteristics

	Sub-Sample 1 (165 firms)		Sub-sample 2 (129 firms)		Sub-sample 3 (100 firms)	
	DCINDEX≠0		DCINDEX≥0		DCINDEX≤0	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
const	-4,62718	0,00064***	-6,12818	0,00182***	-0,880981	0,63372
SIZE	0,323496	0,00171***	0,437419	0,00321***	0,0927677	0,55938
CAPINT	1,92048	0,04733**	6,3615	0,00321***	2,13856	0,23152
IND	0,202396	0,56942	1,07941	0,05127*	0,55754	0,29642
FLOAT	0,0129171	0,23650	0,029184	0,05784*	0,0140928	0,35291
LEV	-0,104035	0,92307	-1,9349	0,20927	-1,14756	0,43992
ROS	-0,0221896	0,28295	-0,0417662	0,48994	-0,0399121	0,57052
Adjusted R <sup>2</sup>	0,037201		0,164548		-0,065410	

Notes: \*\*\* Significant at the 0.01 level. \*\* Significant at the 0.05 level, \* Significant at the 0.10 level (two-tailed).

## 5 Concluding remarks

This paper has presented an empirical investigation into the level of environmental disclosure in Codes of Ethics (ENVETH) and in Annual Reports (ENVREP) using a sample of 197 Italian listed firms. The question of consistency between the environmental information disclosed in the two documents (DCINDEX) was addressed. We also explored the determinants of the levels of ENVETH, ENVREP and DCINDEX by examining several proxy variables of political visibility, contracting and monitoring costs and firm profitability.

The research findings confirmed the positive role that political visibility has in influencing the extent of environmental disclosure. More specifically, firm size, industry classification and capital intensity have a positive role in explaining the level of ENVETH and ENVREP. The analysis of DCINDEX provided similar results. Firm size and capital intensity, as proxies of political visibility, affect the level of DCINDEX positively for the entire firm sample. Additional evidence was provided when firm sub-samples were examined on the basis of the logistic regression model. Indeed, firm size and capital intensity have a significant explanatory power when a subsample of firms with a DCINDEX > 0 and DCINDEX < 0 was examined (subsample 1). The statistical significance of factors

affecting DCINDEX also emerged for a subsample of firms with a DCINDEX > 0 and DCINDEX = 0 (subsample 2). In fact, in addition to the positive coefficients of SIZE, CAPINT and IND, the proxy variable of ownership dispersion as measured by FLOAT confirms the role of the contracting and monitoring costs in explaining environmental disclosure. No significant relationships were found for a subsample of firms with a DCINDEX < 0 and DCINDEX = 0 (subsample 3).

Overall, the research findings enhance our understanding of the content of Codes of Ethics by exploring their determinants and the consistency with the information presented in the Annual Reports. Disclosure consistency testifies that environmental issues stated in the Code of Ethics are taken into consideration and disclosed to stakeholders in the Annual Reports. Moreover, the analysis of DCINDEX highlights relationships that do not emerge from a separate examination of the environmental disclosure level in the two documents, especially when firm subsamples were examined. However, this study has a number of limitations. First, the research findings should be interpreted with some caution since several proxy variables used in the analysis depend on the choice of the words related to environmental issues, the classification criterion of environmentally sensitive

industries and the percentage of ordinary shares that denote shareholders as small investors. Another limitation is the restriction of environmental disclosure study to only Codes of Ethics and Annual Reports. Future research could include all environmental information available (e.g., in the corporate websites or in the Sustainability reports before and after the Legislative Decree 254/2016). Lastly, future research could integrate the quality of environmental disclosure to better evaluate the consistency between environmental information presented in the Code of Ethics and in the Annual Report.

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