

[This is the last version of the paper before it was published. NB! In the published paper some numbers in Table 5 (Regression analysis) are displaced. The table is correctly displayed in this version.]

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## Environmental reporting regulations and reporting practices

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### Abstract

This study explores how four different types of environmental reporting regulations affect reporting practices. Accounting Act requirements, accounting standard requirements, accounting standard recommendations, and no regulation/voluntary disclosure are associated with different levels of reporting obligations. Disclosures made by enterprises subject to regulations are compared with those of enterprises that are not. There are separate regression models for each type of regulation. The sample consists of 235 enterprises from the private and public sectors. Content analysis is used to measure environmental disclosure.

Enterprises subject to regulations report significantly more types of the information content required by law than other enterprises, which is in line with the higher regulatory legitimacy risk. There is no such difference in disclosure between the two groups of enterprises for the information required and recommended by the accounting standard. This may suggest that pragmatic, cognitive, and moral legitimacy issues outweigh the regulatory legitimacy risk for these types of information, or that legitimacy risks are generally low. Enforcement of regulations will increase the regulatory risk. For information that is voluntary for all enterprises to disclose, enterprises that are not subject to any regulations report significantly more types of information than those that are. This result is not in line with predictions made from any of the four types of legitimacy. Some alternative explanations are discussed.

Since regulatory regimes may include several types of means, the main contribution is the comparison of four types of regulations within the same regime, as opposed to analysing only one

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type of regulation at a time such as in the extant literature. The study also explores different types of legitimacy, and addresses the lack of research on environmental reporting in the public sector.

**Keywords:** Regulation versus voluntarism; environmental reporting; pragmatic, cognitive, moral and regulatory legitimacy; Accounting Act, accounting standard and voluntary disclosure; public and private sector.

## Introduction

*'It is important to note that in the interaction between law, other regulations and practice, law and other regulations have become more influential, compared with practice, in recent years' (Kvifte and Johnsen 2008, 28).*

Research on the relation between environmental reporting regulations and reporting practice usually consider one type of regulation (Criado-Jiménez et al. 2007; Frost 2007; Larrinaga et al. 2002; Llana, Moneva, and Hernandez 2007). In reality, regulatory regimes often include legal regulations, administrative regulations, and guidelines, and they are based on the interplay between, for instance, laws and accounting standards. The objective of this study is to explore how different types of regulation influence reporting practices.

The objectives of environmental disclosure can be defined in relation to supply, demand, and externalities (Gjesdal 1981). Per definition, voluntary disclosure is sufficient to cover supply objectives. However, this is less obvious for demand (including externalities). Regulations may be a means to secure the demanded information. However, environmental reporting regulations are expected to raise costs and diminish competitiveness (Adams 2002; Deegan and Shelly 2014; Jaffe et al. 1995; Porter and van der Linde 1995). Regulations should not be imposed if they are unlikely to secure the desired reporting practice (and the information is important). Therefore, regulation versus voluntarism is one of the big debates within the environmental and corporate social responsibility (CSR) reporting literature (Adams, Coutts, and Harte 1995; Donaldson and Preston 1995; Fallan and Fallan 2009; Frost 2007; Larrinaga et al. 2002; Maltby 1997; Mobus 2005; Porter and van der Linde 1995; Wilmshurst and Frost 2000).

The voluntarism perspective claims that enterprises will respond to and meet stakeholders' demand for disclosure without regulations (Donaldson and Preston 1995; Maltby 1997; Wilmshurst and Frost 2000). However, stakeholders do not always need the same information (Deegan and Rankin 1997; Fallan 2013a; Maltby 1997; McInnes, Beattie, and Pierpoint 2007; Neu et al. 1998), and their power to influence enterprises varies (Carroll 1991; Clarke and Gibson-Sweet 1999; Clarkson 1995). Voluntarism also increases the likelihood of opportunistic reporting behaviour (Fallan and Fallan 2009). Voluntary reporting is generally found to be incomplete, not always related to actual environmental performance, and dominated by general, narrative, and positive information (Beck, Campbell, and Shrivies 2010; Brammer and Pavelin 2008; De Villiers and Van Staden 2006; Deegan and Rankin 1996; Fallan 2015; Islam and Deegan 2010; Niskanen and Nieminen 2001; Patten and Crampton 2004; Williams and Pei 1999). Such disclosure also varies more between companies and years.

Many countries use, or consider using, some kind of reporting regulations (Nyquist 2003). Does regulation bring enterprises' environmental disclosure more in line with the characteristics of

useful information (IASB 2010; Snavely 1967), or at least ensure a minimum of information? Studies reveal that a large proportion of companies do not fully comply with the reporting regulations (Adams, Coutts, and Harte 1995; Criado-Jiménez et al. 2007; Day and Woodward 2004), and regulations do not make companies report bad news (Larrinaga et al. 2002). Furthermore, mandatory disclosure cannot stop strategic use of voluntary CSR reporting (Criado-Jiménez et al. 2007; Larrinaga et al. 2002; Mobus 2005). According to many studies, environmental disclosure is often only a legitimization device, and more legislation will not necessarily increase accountability (Patten 2005).

Still, a lack of full compliance does not mean that the regulations are without effect. Longitudinal studies have shown that the introduction of, or changes in, regulations affect reporting (Criado-Jiménez et al. 2007; Fallan and Fallan 2009; Frost 2007; Llana, Moneva, and Hernandez 2007). However, while studies usually consider only one type of regulation, e.g., an accounting standard or a legal requirement (Criado-Jiménez et al. 2007; Frost 2007; Larrinaga et al. 2002; Llana, Moneva, and Hernandez 2007; Mobus 2005; Vormedal and Ruud 2009), regulation regimes often consist of a heterogeneous set of regulations from various sources (Melting and Tungen 2012; Nyquist 2003).

The objective of this study is to explore the relation between four types of regulation and corporate environmental disclosure. The types of regulation are the following: requirements codified in law, accounting standard requirements, accounting standard recommendations, and no regulation (voluntary disclosure). Does it matter whether reporting is required by law, required by accounting standards, recommended by accounting standards, or is voluntary?

Environmental disclosure is demanded because it (a) may be of value to stakeholders' decision-making and control, and/or (b) may facilitate incentive mechanisms (Fallan 2013a; Gjesdal 1981). In Norway, environmental reporting regulations are motivated by this dual purpose (Nyquist 2003; Utenriksdepartementet 2009): the reported information is important in and of itself, and enterprises' board of directors are forced to pay attention to environmental performance. The focus of this study is the influence of regulation on reporting itself.<sup>2</sup>

Since regulatory regimes may include several types of means, the main intended contribution of this study is the analysis of the relation between several types of regulations, associated with differing reporting obligations, and environmental reporting practice, as opposed to analysing only one regulation type per study like in the extant literature. However, in order to build hypotheses concerning this relation, including both mandatory and voluntary disclosure, the concept of legitimacy is broken down into pragmatic, cognitive, moral and regulatory legitimacy (Aldrich and Ruef 2006; Suchman 1995). While legitimacy theory is the most used theoretical framework in this field (Campbell, Craven, and Shrives 2003), legitimacy is usually discussed as one homogenous concept. The reminder that different types of legitimacy may support contrasting hypotheses is an additional contribution. Since research on environmental reporting usually focuses on large, listed companies from the private sector (Fifka 2012), the present study also contributes by including public-sector enterprises.

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<sup>2</sup> Further, this study does not analyse compliance with regulations or the level of disclosure, only the difference in reporting between enterprises subject to regulations or not (and different other corporate characteristics).

## The regulatory regime

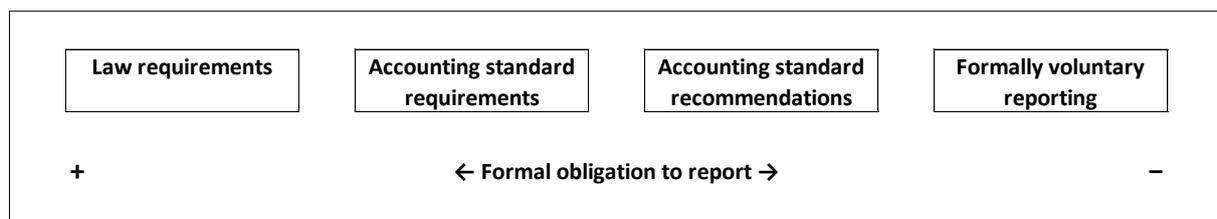
The Norwegian regulatory regime is an interesting case for several reasons. Environmental reporting regulations were introduced as early as in 1989. The regulations explored in this study have been operative since 1999, so the accompanying reporting practice has had time to mature. Additionally, the regulations apply to most enterprises and enterprise types, irrespective of industry and size.

In Norway, the regulation of corporate environmental reporting is closely tied to accounting regulations. The Norwegian Accounting Act specifies enterprise types with statutory obligations to keep accounts according to the law, and these enterprise types are subject to environmental regulation.<sup>3</sup> An alternative set of rules for enterprise types not identified by the Accounting Act does not require environmental disclosure, and their reporting is formally voluntary.

'The Norwegian Accounting Act is best characterized as framework legislation without detailed regulation' (Kvifte and Johnsen 2008, 23). Its legal provisions are supplemented by more detailed requirements and recommendations in accounting standards. This two-level hierarchical system is made statutory through the concept of good accounting practice, which is defined as a basic accounting principle in the Accounting Act. Good accounting practice is specified in accounting standards from the Norwegian Accounting Standards Board (NRS) (Den norske revisorforening 2007; Kvifte and Johnsen 2008). 'Good accounting practice requires that the development of guidelines falls within the statutory framework, in addition to having practical application' (Kvifte and Johnsen 2008, 23).

NRS standards separate reporting requirements and recommendations. Companies are supposed to report according to both. Nevertheless, the regulatory regime creates a continuum, or at least several ordinal levels, of reporting obligation for the enterprises subject to regulations. In Figure 1, the obligation to report shrinks from left to right.<sup>4</sup>

**Figure 1:** *The regulation – voluntariness continuum*



The main environmental reporting requirements concern the content of the board of directors' report. According to the Accounting Act, section 3-3/3-3a<sup>5</sup>, the board of directors must provide information pertaining to the environmental impact of running the business, including inputs and products (in a life-cycle perspective). Decisions regarding how much, what type, and in what

<sup>3</sup> The environmental reporting regulations apply even to companies that have to prepare financial (group) statements according to International Financial Reporting Standards (IFRS) because of the European Economic Area agreement.

<sup>4</sup> Voluntary reporting standards (e.g., Global Reporting Initiative) might be included in Figure 1. Such standards are not considered in this study.

<sup>5</sup> As of fiscal year 2013 (which was reported for the first time in 2014), an additional section is operative (3-3c). However, this study's data do not cover the 2013 annual reports, so these requirements are not discussed here.

form environmental information is disclosed are left up to the company (Fallan and Fallan 2009; Nyquist 2003). NRS 16 'Board of directors' report' requires a more specific description, including quantification, of different types of impacts caused by inputs, production, and products and measures implemented to reduce negative environmental impacts (Melting and Tungen 2012; Nyquist 2003). Still, most types of the environmental information content that an enterprise may report are not regulated. The disclosure of such information is voluntary. More information about the content of the different regulations and voluntary disclosure is provided in Table 2.

Norwegian authorities have never enforced the environmental reporting regulations themselves, and auditors are not required to verify the environmental content in the board of directors' report<sup>6</sup> (Fallan 2015; Fallan and Fallan 2009; Melting and Tungen 2012; Nyquist 2003; Vormedal and Ruud 2009). The same studies also reveal that many Norwegian companies do not fully comply with the environmental disclosure regulations.

## **Theory and hypothesis development**

In the Norwegian context, there are enterprise types that are subjected to all four types of reporting obligation in Figure 1. There are also enterprise types for whom all environmental disclosures are voluntary. Do differences in reporting obligation, because of enterprise and/or regulation type, affect corporate environmental disclosure?

The basis of legitimacy theory is that organisations need to operate in accordance with the norms and values of their respective societies in order to exist. When expectations are met and value systems are congruent, the organisation has legitimacy (Brown and Deegan 1998; Lindblom 2010). However, norms and rules change over time, and so do corporate performance and society's dependence on an enterprise's services. Different stakeholders may have different norms and values as well as different perceptions of whether an organisation meets or violates a given set of norms. An organisation may even comply with society's expectations in one area but not in another. Stakeholders continuously assess an organisation's output, methods, and goals from a legitimacy perspective. Actual or potential breaches of stakeholder expectations pose a threat to organisational legitimacy (i.e., a legitimacy gap), and cause a legitimacy risk (Brown and Deegan 1998; Lindblom 2010).

According to the theory, legitimacy risk means that organisations continually seek to ensure compliance with the explicit and/or implicit social contract (Brown and Deegan 1998). Therefore, the corporate need for legitimacy is closely connected to strategies that facilitate it (Aldrich and Ruef 2006; Lindblom 2010; O'Donovan 2002). Environmental reporting is a tool that may be used to secure legitimacy in relation to legitimacy gaps concerning environmental performance (including environmental reporting itself) or other issues. Lindblom (2010) clarifies how environmental disclosure is used in legitimation strategies. This legitimation process shows why legitimacy theory is used to explain environmental reporting. Of course, in an analysis of how regulations affect disclosure, risks related to the reporting process itself are especially relevant.

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<sup>6</sup> However, auditors should control whether environmental information content in line with the requirements of the Accounting Act and NRS 16 is provided in the board of directors' report. This task is also included their checklists.

Legitimacy theory is perceived to be the pre-eminent explanatory theory in environmental reporting research (Campbell, Craven, and Shrivs 2003). However, critics claim that the theory 'can only provide a partial explanation' (Adams 2002, 224–225), and that 'a more sophisticated approach to legitimacy is required to understand the role of environmental reporting' (Lodhia, Jacobs, and Park 2012, 631). While most studies in this field distinguish corporate characteristics and/or external contextual factors, these studies also usually treat legitimacy as one concept (Brown and Deegan 1998; Campbell, Craven, and Shrivs 2003; Deegan, Rankin, and Voght 2000; Patten 1992, 2005; Patten and Crampton 2004; Wilmshurst and Frost 2000). However, different types of legitimacy may result in different predictions for disclosure in many situations: 'although different types of legitimacy often reinforce one another, they occasionally can come into conflict' (Suchman 1995, 585). For example, studies that analyse both mandatory and voluntary disclosure should allow for analysis of different types of legitimacy. Some types of legitimacy may support the regulation approach, while others indicate that voluntarism is sufficient to secure supply of the demanded information.

In this study, the legitimacy concept is broken down into pragmatic, cognitive, and sociopolitical legitimacy, based on the frameworks of Aldrich and Ruef (2006) and Suchman (1995). Pragmatic legitimacy depends on how an organisation's behaviour and services affect stakeholders' self-interest, and is based on the stakeholders' cost-benefit calculations. Cognitive legitimacy concerns the degree to which a phenomenon is accepted in society, where the highest form is that it is so common that it is taken for granted. Sociopolitical legitimacy is gained if stakeholders assess something as appropriate and right. It could be evaluated to be in accordance with their cultural norms and values, including their perceptions of right and wrong (moral legitimacy), and/or in compliance with government rules and regulations (regulatory legitimacy).

An analysis of the relations between regulatory regimes and environmental reporting, calls for a consideration of regulatory legitimacy (Fallan 2014a, 2015, 2016). The high proportion of Norwegian companies that do not fully comply with the reporting regulations means that it is important to explore the accompanying risk. General acceptance of and conformity with laws and regulations is imperative for a well-functioning society. The existence of reporting regulations means that there is a potential risk associated with environmental reporting itself. Because of the possibility of non-compliance, enterprises that are subjected to environmental reporting regulations are exposed to a formal and normative regulatory legitimacy risk that other enterprises do not experience. Based on regulatory legitimacy risk alone, legitimacy theory predicts that enterprises with formal reporting obligations disclose more information pertaining to the Norwegian Accounting Act requirements, NRS 16 requirements, and NRS 16 recommendations than other enterprises. The apparent lack of enforcement and lack of negative consequences of non-compliance in Norway (Fallan 2015; Melting and Tungen 2012; Vormedal and Ruud 2009) may reduce the regulatory legitimacy risk and affect reporting (Fallan and Fallan 2009; Larrinaga et al. 2002; Patten 2005). However, both formal and normative aspects mean that there is still a risk. Regulatory legitimacy arguments support hypotheses 1–3, which are listed below.

However, the regulatory legitimacy risk in the Norwegian setting is likely to decrease in line with the reporting obligation in Figure 1 (Fallan 2016). Even though enterprises are supposed to report according to the Accounting Act requirements, NRS 16 requirements, and NRS 16 recommendations, there is a formal distinction between the three. This fact is also likely to be

present in corporate management's normative evaluations. Therefore, it is more likely that there is a difference in disclosure between companies facing regulations and those that do not for disclosure concerning the law requirements (hypothesis 1) than for disclosure concerning the NRS 16 requirements (hypothesis 2). In the same way, it is also more likely that hypothesis 2 is supported than hypothesis 3 (disclosure concerning the NRS 16 recommendations). This argument is strengthened by indications that the NRS 16 standard is not well known among producers of corporate environmental reporting (Fallan 2014a, 2015).

What about information content that is voluntary for all enterprises to disclose, cf. the box to the right of Figure 1? There is no formal regulatory legitimacy risk related to this kind of information, even for enterprises subject to environmental reporting regulations. The implication is that regulatory legitimacy predicts no difference between enterprises subject to regulations and those who are not in the disclosure of environmental information that is voluntary for all enterprises to report (hypothesis 4).

Based on regulatory legitimacy, the following hypotheses have been developed:

*Hypothesis 1: Enterprises subject to environmental reporting regulations disclose more types of environmental information content required by the Accounting Act than other enterprises, ceteris paribus.*

*Hypothesis 2: Enterprises subject to environmental reporting regulations disclose more types of environmental information required by NRS 16 than other enterprises, ceteris paribus.*

*Hypothesis 3: Enterprises subject to environmental reporting regulations disclose more types of environmental information content recommended by NRS 16 than other enterprises, ceteris paribus.*

*Hypothesis 4: There is no difference in the number of types of environmental information content that is voluntary for all enterprises to disclose, disclosed by enterprises subject to environmental reporting regulations, and the number of types disclosed by other enterprises, ceteris paribus.*

The predictions of how regulations affect environmental disclosure based on a moral, cognitive, and pragmatic legitimacy perspective differ from those based on regulatory legitimacy. The moral legitimacy risk concerning environmental reporting itself is based on stakeholders' normative acceptance of it as right or wrong (Aldrich and Ruef 2006; Suchman 1995). Enterprises should report information on important environmental issues because it is the right thing to do. Absence of such disclosures may create a moral legitimacy gap. "Appearing to be doing the right thing" is found to be an important consideration in enterprises in some environmentally related situations, e.g., the Exxon Valdez oil spill (O'Donovan 2002). This also illustrates an evaluation of normative behaviour (Suchman 1995). The environmental reporting regulations are likely to reflect what the government perceives to be the most important environmental information, both for a broad range of decision makers and for the government's stewardship role on behalf of the natural environment/the society (Fallan 2013a, 2014a; Nyquist 2003). The legislator's purpose in the law indicates a normative stand (Nyquist 2003; Utenriksdepartementet 2009). Moral legitimacy suggests that enterprises, irrespective of a formal reporting obligation, will choose to disclose such important information

voluntarily (Aldrich and Ruef 2006; Fallan 2014a, 2016). This reasoning supports the null hypotheses of hypotheses 1-3: there is no difference in disclosure between enterprises subject to regulation and those that are not. However, while the predictions based on moral legitimacy are the opposite of those based on regulatory legitimacy for hypotheses 1–3, hypothesis 4 is equal in both cases.

Cognitive legitimacy is based on the cognition of something as taken-for-granted (Suchman 1995). Suchman (1995, 585) states that such legitimacy is ‘elusive to obtain’ and ‘difficult to manipulate’. Information subject to regulation is likely of particular importance. This suggests that if the disclosure of any environmental information is associated with a cognitive legitimacy risk, it is the required and recommended information. However, empirical findings indicate that there are few ‘committed users’ and little explicit use of corporate environmental disclosure in Norway, yet (Fallan 2013a). Then it is hard to argue that environmental reporting currently is generally inevitable based on some taken-for-granted cultural account, or that a situation where an enterprise does not disclose environmental information is ‘unthinkable’ (Aldrich and Ruef 2005; Suchman 1995). In some situations, such as the Exxon Valdez oil spill in Alaska, reporting is imperative regardless of regulations, because of cognitive, pragmatic, and moral legitimacy gaps. However, such issues are outside the study’s scope. In Norway, environmental scandals are quite rare, and there are also other sources of environmental information than corporate disclosure. This reduces the general cognitive legitimacy risk concerning (regulation of) environmental disclosure. Therefore, cognitive legitimacy arguments currently support hypothesis 4 and the null hypotheses of hypotheses 1–3, all of which predict no difference between enterprises subject to regulations and those who are not.

The demand for information varies between and within stakeholder groups, and across enterprises, industries, countries, situations, and time. Additionally, the power of various stakeholders differs according to these parameters (De Villiers and Van Staden 2010; Deegan and Rankin 1997; Fallan 2013a). This heterogeneity poses a risk in itself. But it may be difficult, in theory, to identify general differences in pragmatic legitimacy risks among the two groups of enterprises (subject to regulations or not) and the four types of reporting regulations that are specified in the hypotheses. The enterprise’s reporting risk depends on the degree to which environmental disclosure is important to its stakeholders. If it is, and, hence, a potential risk exists, the direct pragmatic legitimacy risk related to reporting depends on whether stakeholders get the information they need, and whether the content of the disclosed information benefits them. As described above, regulations may identify information that is important to many stakeholders. However, pragmatic legitimacy implies that enterprises will disclose information that is important to (powerful) stakeholders irrespective of regulations. Stakeholders’ informational needs do not depend on whether information is mandatory or voluntary to report or whether the enterprises are subject to regulation or not.<sup>7</sup> Hence, in this case, the predictions based on pragmatic legitimacy correspond to those of moral and cognitive legitimacy.

In sum, moral, cognitive, and pragmatic legitimacy suggest no difference in reporting practices between enterprises subject to regulations and those who are not, in the current

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<sup>7</sup> It might be of interest to stakeholders whether enterprises with whom they have exchanges/interdependencies comply with (reporting) regulations or not, but that pragmatic legitimacy risk is likely to evaporate more quickly than the accompanying normative regulatory legitimacy risk when non-compliance does not appear to have consequences for the enterprise.

Norwegian setting.<sup>8</sup> This is in accordance with the voluntarism perspective of disclosure. The review of the regulation versus voluntarism literature shows that there are no clear answers as to what approach is best. Neither does the theoretical reasoning above. Hypotheses 1–4 are based on regulatory legitimacy arguments, while the other types of legitimacy support the null hypotheses of hypotheses 1–3 and hypothesis 4.

## **Methodology**

A quantitative, cross-sectional analysis of disclosure data concerning 2009 is used to explore how different types of reporting regulation affect reporting practice. This section informs considerations of reliability, construct validity and external validity/generalisation of results (Cook and Campbell 1979).

The study's research design relies on comparing public- and private-sector enterprises. Is it reasonable to include enterprises of both sectors in the same analysis? Most research on environmental reporting concerns large and/or listed private-sector companies with a business objective (Fifka 2012; Guthrie, Ball, and Farneti 2010; Tagesson et al. 2009). Variables such as size and environmental risk/industry are important drivers of environmental disclosure in those companies (Fifka 2013). The same variables are important also in the public sector (Fallan 2016; Houmstuen 2014; Ramstad 2014; Singh and Ahuja 1983; Tagesson et al. 2009). This is not surprising, considering the trend of new public management and the fact that underlying environmental issues are not influenced by organizational structure or sector affiliation. Still, this study controls for sector affiliation and business versus non-profit/political objectives in order to ensure an adequate research design on this issue (Belal et al. 2001; Burritt and Welch 1997; Gibson and Guthrie 1995; Lodhia, Jacobs, and Park 2012; Secchi 2006).

### **Population and sample**

The manual content analysis used to collect data on the information content of environmental disclosure is demanding on resources and leads to small sample sizes. Therefore, careful stratification is necessary to obtain sufficient approximate external validity. In this study it is imperative to include two populations of Norwegian enterprises: enterprise types with a statutory obligation to keep accounts in accordance with the Norwegian Accounting Act (i.e., enterprises that are subject to environmental reporting regulations—population B) and enterprise types that are obliged to keep accounts in accordance with a different set of rules (i.e., enterprises that are not subject to environmental reporting regulations—population A). The stratification process should also take into account the most important explanatory variables for environmental disclosure: environmental risk/industry and enterprise size (Fifka 2013).

Population A includes many enterprises from the public sector. Local governments/municipalities and state-owned universities/university colleges are chosen for this study because they are classified as having relatively high and low environmental risk, respectively. The enterprises of these two subpopulations are divided according to size into groups labelled large, medium, and

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<sup>8</sup> These predictions are based solely on risks directly related to reporting and reporting regulation. Moral, cognitive, and pragmatic legitimacy may also affect environmental reporting because reporting is used as a legitimation tool concerning risks related to other issues (Lindblom, 2010). A consideration of such risks is outside this study's scope.

small. The subsamples include enterprises from each size group. The university subsample contains 14 of 38 entities, while the 428 municipalities are represented by 14 entities.

Population B is more heterogeneous. Since population A consists of public-sector enterprises, it is necessary to include such entities to control for sector affiliation. The subsample considers 69 of 75 enterprises that are wholly or partly owned by state ministries and are subjected to environmental reporting regulations. Further, population B consists of private-sector enterprises in order to extend external validity and to relate the results to the majority of research (Fifka 2012). This subsample includes 138 enterprises, most of which are drawn from the 231 companies listed on the Oslo Stock Exchange (OSE) by year-end 2009.

The distribution of different characteristics pertaining to the total population of 235 enterprises is listed in Table 1. These characteristics are identical with the dichotomous variables in the regression models.

**Table 1: Number of enterprises in the sample, divided by enterprise characteristics**

Enterprise characteristics		Statutory obligation to keep accounts according to the accounting act			Objective			Environmental impact			Listed		
		Yes	No	Sum	(Sector) political	Business	Sum	High	Low	Sum	Yes	No	Sum
Objective	(Sector) political	46	28	74									
	Business	161	0	161									
	Sum	207	28	235									
Environmental impact	High	105	14	119	30	89	119						
	Low	102	14	116	44	72	116						
	Sum	207	28	235	74	161	235						
Listed	Yes	144	0	144	0	144	144	79	65	144			
	No	63	28	91	74	17	91	40	51	91			
	Sum	207	28	235	74	161	235	119	116	235			
Sector	Public	69	28	97	73	24	97	46	51	97	8	89	97
	Private	138	0	138	1	137	138	73	65	138	136	2	138
	Sum	207	28	235	74	161	235	119	116	235	144	91	235

### The regression models

The regression models used to analyse the association between environmental disclosure and regulation are based on an ordinary least square (OLS) estimation.

$$DISCLOSURE_{i,j} = \alpha_0 + \beta_1 REGULATED + \beta_2 SECTOR + \beta_3 OBJECTIVE + \beta_4 SIZE + \beta_5 INDUSTRY + \beta_6 LISTED + \varepsilon_j$$

The notation  $i$  is regression models 1 through 4, one for each of the four types of regulation pictured from left to right in Figure 1. The notation  $j$  is enterprises 1 through 235. Information on each variable is given below.

### Operationalization of the dependent variable

The dependent variable of each regression model measures the environmental content related to the relevant regulation type. Content analysis is the most-used data collection method in CSR reporting research (Fifka 2013; Pesci and Costa 2014). It converts the meaning of text into quantitative variables by assigning it to predefined content categories. The list of categories is supposed to be complete, and the categories are mutually exclusive (Krippendorff 2004; Neuendorf 2002). The construction of the list of categories, including the ability of the reporting score to provide a 'true and fair view' of an enterprise's reporting and the difference between enterprises' reporting,

is crucial for the study's construct validity (Cook and Campbell 1979). In order to answer the research question, the categorisation has to allow for the characteristics of each type of regulation. The Norwegian Accounting Act requires disclosure of certain types of information *content*, and the same is the case with the NRS 16 recommendations. The NRS 16 requirements concern both information *content* (more detailed) and a specification of *form* (quantitative and narrative) of the disclosure. There are, of course, no such requirements for the voluntary disclosure categories. The content categories used in the study reflect these characteristics. Construct validity is ensured by using categories developed in other studies (e.g., Fallan 2014b, 2015, 2016; Fallan and Fallan 2009; Ljungdahl 1999; UNCTC 1991). The complete list of categories is presented in Table 2. The table contains one column for each type of regulation/dependent variable/regression model, and specifies the content categories that correspond to each of the four types of regulation portrayed in Figure 1. Companies are assigned one point for each content category reported.

**Table 2: Content categories**

No.	Content category	Content subcategory	Regression models			
			1	2	3	4
			Accounting Act requirements	NRS 16 requirements	NRS 16 recommendations	Voluntary reporting
1	Environmental impact - process		X			
1a		Description of impact		X		
1b		Impact quantity		X		
1c		Measures to reduce (increase) negative (positive) impacts		X		
2	Environmental impact - product		X			
2a		Description of impact		X		
2b		Impact quantity		X		
2c		Measures to reduce (increase) negative (positive) impacts		X		
3	No environmental impact		X	X		
4	Environmental policy				X	
5	Environmental objectives				X	
6	Environmental authorities				X	
7	Environmental events				X	
8	Environmental organisation				X	
9	Environmental auditing				X	
10	Auditing of environmental reporting				X	
11	Environmental investments				X	
12	Environmental costs/revenues				X	
13	Environmental liabilities				X	
14	Definition of environmental concepts				X	
15	Accounting principles				X	
16	Economic non-monetary information (demand side)				X	
17	Economic non-monetary information (supply side)				X	

### Selection of data source and data collection concerning the dependent variable

Enterprises might use many communication media to disclose environmental information. This study includes voluntary reporting, and should consider all corporate reporting in all media (total disclosure). Empirical studies reveal that the information content of environmental disclosures in annual reports covers approximately all the content of total disclosure (Fallan 2013b; Tilt 2008). While this study examines the content of environmental disclosure, it provides valid results to select the annual report as the only data source.

Data were collected by thoroughly reading the annual reports. Additionally, electronic searches in the PDF documents were conducted to ensure that all relevant text was identified. A

value of one was assigned to a content category if that type of environmental information existed in the annual report, and a zero was assigned if otherwise. Several people have coded the data in addition to, and in cooperation with, the author (Brekke and Vang 2012; Hofsmo and Johansen 2012; Ramstad 2014). Measures such as the dichotomous scoring system, training sessions, a code book with example registrations, and a discussion of difficult cases underway secured relatively high inter-coder reliability. The two main coders achieved a coding similarity of 97.4%, far above the tolerance levels indicated in the literature (Milne and Adler 1999).

### **Independent variables**

This subsection includes an explanation of the choice of variables and a description of the operationalisation. If nothing else is stated, the data were obtained from the annual report.

**REGULATED:** It is a dichotomous variable that separates enterprises with a statutory obligation to report environmental information in line with the Accounting Act and NRS 16 (value of 1), and enterprises that are not subjected to environmental reporting regulations (value of 0). This is the key variable that provides the answers to the hypotheses.

**SECTOR:** It is a dichotomous variable that separates enterprises with public-sector affiliation (value of 1) from private-sector enterprises (value of 0). The identification and classification of state-owned enterprises is found in the Ministry of Trade's ownership report (NHD 2010). Universities/university colleges and municipalities are identified on the state government's website, and OSE-listed companies are identified on OSE's web site. The reason for including SECTOR and OBJECTIVE as control variables is given at the start of the methodology section.

**OBJECTIVE:** This is a dichotomous variable where enterprises are assigned a value of 1 if they have a (sector) political/non-profit objective and a value of 0 if they have a business objective. The classification concerning state-owned companies is found in the Ministry of Trade's ownership report (NHD 2010). Municipalities and universities have a value of 1, and OSE-listed companies have a value of 0.

**SIZE:** Enterprise size is a continuous variable. It is measured by the natural logarithm for the number of employees, in line with, for instance, Ljungdahl (1999). Relatively uniform findings in extant studies require that SIZE and INDUSTRY are included as control variables (Fifka 2013).

**INDUSTRY:** Environmental risk/industry is a dichotomous variable where enterprises are assigned a value of 1 if they have relatively high environmental risk and a value of 0 if they have relatively low risk. This is a common choice in the literature (Brown and Deegan 1998; Fallan and Fallan 2009; Monteiro and Aibar-Guzmán 2010; Reverte 2009).

**LISTED:** This is a dichotomous variable where enterprises are assigned a value of 1 if they are listed on OSE and a value of 0 if they are not listed. The data were found on the OSE website. This control variable is included because most previous studies only consider listed companies (Fifka 2012); the visibility of listing increases legitimacy risk, which makes it relevant from a legitimacy perspective; OSE has made their own reporting assessments, and the variable is included in studies that integrate private- and public-sector enterprises (Belal et al. 2001; Fallan 2016; Ramstad 2014).

## Results

Descriptive statistics are presented in Table 3. The mean scores of the dependent variables/disclosure models 1–4 are below the maximum theoretical scores from Table 2 (presented in brackets): 1.4 (3), 2.1 (7), 1.4 (4), and 1.5 (10), respectively. These scores provide an indication of the level of disclosure for information belonging to each type of regulation.

The mean scores of the independent dichotomous variables reveal that 88% of the enterprises are required to follow the Accounting Act, 41% have a public-sector affiliation, 32% have a sector political/non-profit objective, 61% are listed on the OSE, and 51% are from industries with a relatively high environmental risk.

**Table 3: Descriptive statistics**

	Mean	Std. deviation	Minimum	Maximum
<b>Dependent variables (n = 235)</b>				
Accounting Act requirements (model 1)	1,409	0,694	0	3
NRS 16 requirements (model 2)	2,089	1,537	0	6
NRS 16 recommendations (model 3)	1,43	1,342	0	4
Voluntary reporting (model 4)	1,545	1,824	0	8
<b>Independent variables (n = 235)</b>				
REGULATED	0,881	0,325	0	1
OBJECTIVE	0,315	0,465	0	1
LISTED	0,613	0,488	0	1
SIZE	5,73	2,25	0	10,91
INDUSTRY	0,506	0,506	0	1
SECTOR	0,413	0,493	0	1

Table 4 reveals high bivariate correlation between the independent variables SECTOR, OBJECTIVE, and LISTED, partly because of small samples. An analysis of VIF-scores (risk of multicollinearity) indicates that either SECTOR or LISTED has to be dropped from the study. It is decided to keep SECTOR because few studies have analysed the consequences of differences in sector affiliation, as explained above.

**Table 4: Bivariate correlations (Pearson's r)**

	1	2	3	4	5	6	7	8	9
(1) DISCLOSURE model 1									
(2) DISCLOSURE model 2	0.76***								
(3) DISCLOSURE model 3	0.32***	0.55***							
(4) DISCLOSURE model 4	0.31***	0.58***	0.64***						
(5) REGULATED	0.18**	-0.00	-0.05	-0.21**					
(6) SECTOR	-0.01	0,06	0,04	0.26***	-0.44***				
(7) OBJECTIVE	-0.10	-0.05	-0.09	0,05	-0.54***	0.79***			
(8) SIZE	0.26***	0.44***	0.45***	0.47***	-0.14*	0,01	-0.11*		
(9) INDUSTRY	0.19**	0.25***	0.44***	0.40***	0,01	-0.05	-0.14*	0.27***	
(10) LISTED	0,05	0,02	0,03	-0.13*	0.46***	-0.91***	-0.85***	0.14*	0,11

\* = p < 0.05

\*\* = p < 0.01

\*\*\* = p < 0.001

Table 5 shows that all four regression models are significant, and the explained part of the variation in the dependent variable varies between 12% and 39%. All VIF-scores are well below the critical value of 5.

In model 1 (information required by the Accounting Act), REGULATED and SIZE are significant variables that are positively related to this type of DISCLOSURE. Large enterprises and enterprises in industries with high environmental risk disclose significantly more types of information pertaining to models 2, 3, and 4 than smaller and low-risk enterprises. In model 4, all variables are significant. Public-sector enterprises disclose more types of voluntary information than those from the private sector, and enterprises with a (sector) political/non-profit objective report more than those with a business objective. REGULATED is a significant variable as it was in model 1, but with the opposite sign.

**Table 5: Regression analyses**

Company attributes:	Model 1: Accounting Act requirements		Model 2: NRS 16 requirements		Model 3: NRS16 recommendations		Model 4: Voluntary reporting		VIF-value
	$\beta$	t	$\beta$	t	$\beta$	t	$\beta$	t	
REGULATED	0,266	3.53***	0,081	1,14	-0,012	-0,18	-0,126	-2.01*	1,50
OBJECTIVE	0,015	0,13	-0,066	-0,63	-0,149	-1,51	-0,293	-3.15**	3,32
SECTOR	0,100	0,99	0,154	1,60	0,167	1,86	0,450	5.32***	2,74
SIZE	0,260	3.93***	0,404	6.42***	0,341	5.83***	0,331	6.01***	1,17
INDUSTRY	0,124	1,93	0,135	2.21*	0,340	5.98***	0,298	5.56***	1,10
Constant		1,31		-0,36		-0,54		-0,5	
F-value	7.21***		13.17***		22.25***		30.92***		
Adj. R <sup>2</sup>	11,7 %		20,6 %		31,2 %		39,0 %		
n	235		235		235		235		

\* =  $p < 0.05$

\*\* =  $p < 0.01$

\*\*\* =  $p < 0.001$

## Discussion

Enterprise size and industry/environmental risk are significant variables with a positive sign in all four models.<sup>9</sup> Large enterprises with high environmental risk disclose more types of environmental content than other entities. These findings are in line with quite uniform results in the literature (Fifka 2013), and validate the present study.<sup>10</sup>

Regression model 1 reveals that enterprises subject to environmental reporting regulation report significantly more types of information content required by the Accounting Act than those entities that are not required to report. Hypothesis 1 is supported. This result corresponds to regulatory legitimacy reasoning. On the other hand, hypotheses 2 and 3 are rejected. There is no significant difference in reporting of information required or recommended by NRS 16 between the same two groups of enterprises. Given the reasoning in the theory section, pragmatic, cognitive, and moral legitimacy arguments seem to be stronger than the regulatory legitimacy risk in these cases. Regression model 4 shows that enterprises that are not subject to environmental reporting regulations disclose significantly more types of content that is voluntary for all enterprises to report, compared to enterprises that are subject to regulations. Hypothesis 4 is rejected, even though

<sup>9</sup> Except in model 1, where environmental risk ( $p = 0.055$ ) just misses the 5% boundary.

<sup>10</sup> Of course, ideally, all enterprises subject to regulation should comply with the regulations in regression model 1–3, so that no variables (except possibly REGULATION) are significant. In reality, that is not the case.

predictions based on all four types of legitimacy supported this hypothesis. Reasons for and implications of these findings are discussed further below.

The support for hypothesis 1 suggests that there is a relation between law regulation and environmental reporting. It seems reasonable that regulatory legitimacy risk affects behaviour, both the formal risk and the normative evaluation that disclosure in line with legal requirements is the right thing to do. Even though the research design does not allow causal inferences, the results together with the theory indicate that regulation affects disclosure practices. Still, if this is true, it does not automatically mean that governments should impose law regulations.<sup>11</sup> This regression analysis looks only at the *difference* in reporting between two groups of enterprises while controlling for other corporate characteristics. The basis of such government decisions should also, among other things, reflect whether the resulting *level* of disclosure and *type* of disclosed information (e.g., qualitative characteristics) are satisfactory. These aspects should be explored further in future studies.

Taken together, the results concerning hypotheses 1–3 indicate that legal requirements affect disclosure more than accounting standard requirements and accounting standard recommendations. Such a claim is in line with the differing degree of reporting obligation between the types of regulation, as illustrated in Figure 1. Lower reporting obligation reduces the regulatory legitimacy risk. The likelihood that pragmatic, cognitive, and/or moral legitimacy issues then outweigh regulatory legitimacy risks increases. There is no surprise if the regulatory legitimacy risk is quite low, both for dependent variable 1, 2, and 3. There have been no enforcement of or negative formal consequences from non-compliance with these regulations in Norway, there are several studies showing that many companies do not fully comply with the regulations<sup>12</sup> (Melting and Tungen 2012; Vormedal and Ruud 2009), and there are indications of low familiarity with NRS 16 among producers of environmental reporting (Fallan 2015). However, all this may also suggest a generally low (pragmatic, cognitive, moral, and regulatory) legitimacy risk concerning such disclosure. Regulators should notice that enforcement/review will shift the Accounting Act and NRS 16 regulations to the left on the reporting obligation continuum in Figure 1, and, in theory, increase the regulatory risk. That will strengthen the relation between these regulations and reporting practices. Enforcement will probably also increase the visibility and knowledge of the accounting standard.

The seemingly higher level of compliance for law requirements (mean actual disclosure of 1.4 content categories out of a theoretical maximum of 3) than for accounting standard requirements (2.1 out of 7), outlined in the section of descriptive statistics, may not be caused by different levels of regulatory legitimacy risk alone. A likely explanation concerns qualitative characteristics of information. Corporate management is not indifferent to the kind of information that is reported (Brammer and Pavelin 2008; Guidry and Patten 2010; Hasseldine, Salama, and Toms 2005). The legal requirements leave it up to the enterprise how to report the required information content. Disclosure of general and narrative information is easy, cheap, and non-binding. Such information attributes support the adoption of content required by the law. NRS 16 requires specific and quantitative information that is more difficult, costly, and binding to disclose. These information attributes hamper adoption. Differences in information attributes may explain differences in

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<sup>11</sup> The most basic issue here is whether the information is important for stakeholders.

<sup>12</sup> Even the descriptive statistics in this study show that the actual level of reporting for the dependent variables are much lower than the maximum theoretical score.

reporting practice (Fallan 2014a, 2015). This perspective is in line with Adams' (2002) call for research on internal contextual factors. The importance of a focus on such explanations is also illustrated by the key role of the qualitative characteristics of information in conceptual frameworks for financial reporting (IASB 2010; Snavely 1967). However, a further analysis of such issues is left for future studies on the level of disclosure and type of qualitative information characteristics.

While hypotheses 1–3 and the accompanying null hypotheses are contradictory, they are all based on legitimacy theory arguments. Different types of legitimacy can be used to explain the results, whether the hypotheses are supported or rejected. However, the rejection of hypothesis 4 is not explained by the legitimacy framework used in this study. Why do enterprises not subject to regulation disclose more types of information that is voluntary for all enterprises to report than entities subject to regulation? Do they face different demands for disclosure (from different stakeholder groups) than enterprises subject to regulations? It is not easy to identify this different demand or these different groups, given that the analysis of voluntary disclosure controls for sector affiliation, objective, size, and industry. And while analysis of qualitative information characteristics may explain the level of disclosure of voluntary reporting, it cannot explain the difference in reporting between enterprises subject to regulation and those that are not. It may be that enterprises subject to regulation give priority to the supply of required information, content after having supplied something, while enterprises not subject to regulation have a different approach—e.g., more random, more situational, or more stakeholder-influenced. A related possibility is that of Einhorn (2005, 613), which finds that mandatory disclosures play a crucial role in determining voluntary disclosure strategies: for example, 'the likelihood of voluntary disclosure being provided by firms is ... negatively related to the level of discretion in mandatory reporting'. The type of regulation that the regulated enterprises in this study may seem most likely to adhere to—legal requirements—provides a great deal of discretion. The ideas of Einhorn (2005) indicate that this discretion may explain why these companies provide less voluntary disclosures. A further analysis of this issue, including a theoretical explanation, is out of the scope of this study. However, it seems likely that the interplay between the four types of regulations affects disclosure practices. Knowledge of such interplay should be important for regulators.

This study shows that there is a need for more research on the causes of disclosure, including the relation between regulation and disclosure. In addition to the suggestions above, it is probably necessary to use more comprehensive explanatory frameworks, such as that suggested in Adams (2002) or the framework based on innovation adoption theory (Rogers 2003) discussed by Fallan (2014a, 2015), in order to capture more of this picture. While discussing the study's theoretical framework and hypotheses, it is important to notice that they have been limited to perspectives of regulation and environmental reporting itself. According to legitimacy theory, environmental reporting is a strategy that is used to mitigate legitimacy risks concerning both environmental performance (including environmental disclosure) and other issues (Lindblom 2010). Such uses, beyond the direct risks concerning the regulation of environmental disclosure, are not considered in this study.

The Norwegian system has framework legislation without detailed regulation. Identification and definition of relevant information with qualitative characteristics in line with the decision usefulness and stewardship objectives is left for accounting standards. Hence, compliance with these standards is important. The mean scores of Table 3 suggest that few of the types of information

required and recommended in NRS 16 are disclosed, on average. The results of Table 5 indicate that accounting standard regulations do not make the targeted enterprises report this information to a greater extent than entities that are not subject to regulation. This may be an important weakness in the use of accounting standards for the regulation of environmental reporting, at least in the way it is handled in Norway. Even though this study indicates that compliance with legal requirements is higher, this may be caused by differences of information characteristics. If the level of reporting is considered insufficient, enforcement of regulations is likely to improve reporting and increase compliance with the accounting standard by increasing the regulatory risk.

## Conclusion

Enterprises subject to environmental reporting regulations disclose more types of information required by the Norwegian Accounting Act than other enterprises, in line with the hypothesized existence of a regulatory legitimacy risk. This indicates that requirements in the Accounting Act affect environmental reporting practice. There is no corresponding difference in disclosure between the two groups of enterprises for requirements and recommendations of the accounting standard NRS 16. This is in accordance with pragmatic, cognitive and moral legitimacy. It seems like the reporting obligation and regulatory legitimacy risk is higher for law regulations than for the standard regulations. It is likely that enforcement is necessary to increase compliance, especially to make enterprises report the specific and quantitative information required by NRS 16.

As opposed to the situation for information content required by law, enterprises that are not subject to regulation disclose more information content that is voluntary for all enterprises than those enterprises subject to regulations. This finding is in defiance of the legitimacy framework used in the study. Therefore, some other potential explanations are suggested.

Public sector enterprises report more voluntary information than private sector enterprises, in line with the stewardship role of the public sector, and enterprises with sector political/non-profit objectives reporting more voluntary information than those with business objectives. Large enterprises and enterprises from industries with high environmental risk report more of all types of environmental information than smaller and low environmental risk enterprises. These findings are in accordance with previous research, and validate the current analysis.

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