Accounting, Auditing & Accountability Journal

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Received December 1999
Revised October 2000
Accepted November 2000

Keywords *Environment, Disclosure, Costs*

Abstract *The purpose of this study is to examine three electric utilities, two publicly owned and one privately owned. The basis of this examination is legitimacy theory employing a small sample case-type approach. In particular we are interested in social and environmental disclosures found in annual reports and how these disclosures differentiate between publicly owned and privately owned enterprises. In our examination we use some traditional efficiency measures but we also employ effectiveness measures relying on the proprietary costs and information costs views in our analysis. Our major findings are that ownership status and size, which are likely to affect legitimacy, influence the amount of social and environmental disclosure. Finally, while environmental disclosures seem to be related to information costs and benefits, this relationship does not seem to hold for social disclosures.*

Introduction

Accounting-based efficiency measures have provided the means of comparison between public (i.e. government owned) and private firms for several decades. One particular industry that has been examined repeatedly is the electric utility industry.

In attempting to address whether privately owned electric companies outperform their publicly owned counterparts, researchers have found mixed results. Vining and Boardman (1992) classified empirical studies comparing private versus public companies by the studies' findings. Under the electric utility industry, Vining and Boardman listed 13 published papers. Five of these studies (Shepherd, 1966; Moore, 1970; Peltzman, 1971; De Alessi, 1974, 1977) found private companies outperformed public firms, three (Meyer, 1975; Neuberg, 1977; Pescatrice and Trapani, 1980) found public outperformed private companies and five (Mann, 1970; Yunker, 1975; DiLorenzo and Robinson, 1982; Fare *et al.*, 1985; Atkinson and Halvorsen, 1986) found no difference between public and private companies.

The mixed results of the 13 cited studies are interesting for two reasons. First, these firms operate in highly regulated environments. Consequently, if

The authors wish to express their appreciation to the Certified General Accountants Association of British Columbia and the Social Sciences and Humanities Research Council of Canada for financial support. The authors wish to acknowledge the helpful comments of Michel Magnan and M.R. Mathews as well as the research assistance provided by Andrew Wiebe. The comments of two anonymous referees and the editor were also appreciated.

Accounting, Auditing & Accountability Journal, Vol. 14 No. 5, 2001, pp. 587-616.

there were any differences, it might be expected that private companies would outperform their public equivalents. Second, the apparent bias of some researchers is evident in their discussions of privately owned and publicly owned firms[1]. With respect to most of the comparisons made, the researchers have used relatively large sample sizes focusing on cost, profit and technical efficiency measures.

It has been argued that efficiency measures fail to capture all of the goals and objectives of enterprises (Gordon and Cormier, 1996; Gordon and Boland, 1998). Examples of efficiency measure failures are the exclusion of externalities and ignoring longer-term social goals such as minority employment. While a privately owned, profit-oriented company may be able to ignore externalities and other social goals, the accountability of publicly owned enterprises in North America makes them vulnerable to criticism if management ignores such goals. Given this social setting, measurement of the effectiveness of meeting social goals by both privately owned and publicly owned enterprises seems appropriate.

The purpose of this study is to examine three electric utilities, two publicly owned and one privately owned. The basis of this examination will be legitimacy theory employing a small sample case-type approach rather than the large sample sizes often used. In particular we are interested in the types of annual report disclosures made and how these differentiate between publicly owned and privately owned enterprises. While some traditional efficiency measures are examined, we also examine effectiveness measures. Included in these effectiveness measures are environmental and social disclosures found in annual reports. By examining the companies in this format, we begin the development of a framework involving effectiveness measures for the evaluation of private versus public firms.

One type of research that employs small samples is case study research. In such research, the authors examine the facts surrounding one or more situations and use qualitative analysis as opposed to the more predominant quantitative analysis. As Bonoma (1985, p. 203) states "[a] growing number of researchers in economics, ... medicine, ... organizational behavior, ... sociology, ... and psychiatry have advocated and helped foster rebirth of qualitative research in the social sciences".

Bonoma (1985, p. 202) also notes that "dissatisfaction with the application of quantitative research methods and strategies has emerged, particularly as they are applied to phenomena not easily operationalized or easily observable outside the natural settings in which they occur ... "[2]. In particular we think that effectiveness measures of firm performance are not easily operationalized (i.e. quantified) and should be studied with an awareness of the context. However, case study or small sample size research need not be limited to qualitative research. As Yin (1994) indicates, various quantitative analyses may also be used to help describe and explain the findings of such research[3]. Thus in this paper, the three companies are studied using both qualitative information and quantitative analysis.

The paper is presented in five sections. The second section presents a discussion of three bodies of literature, organizational legitimacy theory, environmental accounting research, and proprietary and information costs. The organizational legitimacy theory indicates why legitimation for a government owned enterprise might be different from a privately owned company. The environmental accounting research provides evidence that an enterprise's size is an important variable and that such disclosures are related to effectiveness measures. The proprietary and information costs literature outlines how the risk faced by a firm in capital markets affects its reporting strategies. The third section describes the three companies examined in this paper as well as their regulatory environments. In the fourth section, two additional pieces of quantitative evidence are used to make comparisons between the three companies. Finally, a conclusion and limitations are presented.

Three bodies of literature

The three bodies of literature described below are relevant to the visibility or accountability issue. Legitimacy theory literature indicates that more attention will be paid to those companies that are more "visible" or rely more on political or social support. One of the findings in some of the environmental accounting research is that the size of the company matters. If, as hypothesized, larger companies have greater visibility and are more politically sensitive than smaller firms (Watts and Zimmerman, 1978), then larger companies would be expected to make more disclosures. These disclosures in turn may affect capital markets that represent one potential place where all firms issuing debt or equity are visible. This would follow whether the companies are privately or publicly owned.

Legitimacy theory

Legitimacy theory rests on the concept that organizations have contracts with society and fulfilling these contracts legitimates the organizations and their actions. As outlined by Rousseau (1975) in 1762 a social contract is an association that people (or organizations) enter into freely to enhance society's overall welfare. These contracts then are used as the basis for the inclusion of social preferences into corporate actions (Shocker and Sethi, 1974; Mathews, 1997). Where an organization is successful in meeting such contracts, this leads to congruence between the organization and society.

Dowling and Pfeffer (1975, pp. 126-7) indicated that organizations may take certain actions to become legitimate or to maintain their legitimacy:

> First, the organization can adapt its output, goals and methods of operation to conform to prevailing definitions of legitimacy. Second, the organization can attempt, through communication, to alter the definition of social legitimacy so that it conforms to the organization's present practices, output, and values. Finally, the organization can attempt, again through communication, to become identified with symbols, values, or institutions which have a strong base of social legitimacy.

Gray *et al.* (1995, p. 54) outlined Lindblom's 1992 description of legitimacy theory[4]. According to Gray *et al.* Lindblom refined how organizations may react to legitimacy concerns by employing four strategies. These strategies can be related to Dowling and Pfeffer's three actions. For example, Lindblom stated that the organization may take measures to educate society as to changes in the organization's actions (relates to Dowling and Pfeffer's first action). The second strategy is to alter how society perceives an organization's actions without making any changes to those actions (Dowling and Pfeffer's second action). A third strategy is one of manipulation where the organization attempts to divert society's attention away from the issues of concern to alternative issues (Dowling and Pfeffer's third action). Lindblom's final strategy is where an organization seeks to alter society's expectations of it (relates to Dowling and Pfeffer's second action)[5].

Accounting and financial reporting represent ways an organization communicates with society and its stakeholders, thereby legitimating its actions. Brown and Deegan (1998) pointed out that legitimacy theory has been the basis for several studies of social responsibility and environmental disclosures that have used annual reports and financial statement data.

Some of the examinations employing accounting and financial statements have been longitudinal studies of one company. In his study, Hogner (1982) looked at US Steel Corporation's annual reports for an 80-year period. Guthrie and Parker's (1989) paper examined 100 years of Australia's Broken Hill Proprietary Company Limited. In the Hogner paper, a link was made between social disclosures and expectations by the community for social performance. Guthrie and Parker found that while environmental social reporting could be explained using legitimacy theory, other social disclosures could not be explained.

Patten's 1992 paper used legitimacy theory to study changes in environmental disclosures by North American oil companies after the *Exxon Valdez* oil spill. As Patten expected, the oil spill represented a threat to the legitimacy of oil companies. This threat necessitated an increase in the oil companies' environmental disclosures in their annual reports.

Australian company data have formed the basis for four recent studies (Deegan and Gordon, 1996; Deegan and Rankin, 1996; Brown and Deegan, 1998; Wilmshurst and Frost, 2000) that have relied on legitimacy theory for their explanations. Deegan and Gordon's (1996) results provided evidence of three relationships. First, companies' environmental reporting was positively related to the increase in environmental interest groups. Second, the sample companies' reporting emphasized the positive actions taken. Third, an industry's environmental sensitivity was positively correlated with the amount of disclosure made by the corporations in that industry. Deegan and Rankin (1996) examined how prosecutions for environmental offences were related to changes in environmental reporting in annual reports. They found there was a significant increase in environmental disclosures surrounding the prosecutions. Additionally, they found that prosecuted corporations provided

more positive reporting than did a matched sample of companies that had not been prosecuted. Brown and Deegan (1998) explored the relationship between the coverage given by the print media to certain industries and the effect this coverage had on the level of environmental disclosure. They found increased print media attention resulted in higher levels of environmental disclosure. Using a mail survey of 62 CFOs coupled with content analysis of the CFOs' companies' environmental reports, Wilmshurst and Frost (2000) found significant correlations between those factors managers rated as important and their companies' environmental disclosures. These authors concluded there was limited support for legitimacy theory as an explanation of the relationship between managers' decision processes and the environmental disclosures made by their companies.

Savage *et al.* (1999) explored the disclosures made by two Canadian pulp and paper companies. Using a legitimacy theory framework, the pulp and paper companies' environmental disclosures were explained from a social contract perspective. This was accomplished by classifying disclosures into symbolic versus substantive legitimations.

Falconbridge, a Canadian company, was used by Buhr (1998) to test whether legitimacy theory or political economy theory better explained the company's sulphur dioxide emissions disclosures for a 28-year period. Overall, her findings were that legitimacy theory offered the better explanation. Buhr found that the disclosures were motivated by Falconbridge's use of technology rather than by the use of its annual report as a device to further a corporate viewpoint on social, political and economic points.

The studies cited to this point have focused on privately owned corporations. Thus, the effect of government (i.e. public) versus private ownership in a legitimacy setting deserves further examination. Dowling and Pfeffer (1975, p. 133) indicated "(w)hile legitimacy is a constraint on all organizations, it is likely that it affects some organizations more than others. This is because (1) some organizations are considerably more visible, and (2) some organizations depend relatively more heavily on social and political support". Government owned enterprises would certainly seem to fit the second point since they exist due to social and political support. As well, government owned enterprises may be more visible, and hence more vulnerable, in the political sense because government accountability is often an election issue.

Research on environmental accounting reporting

Environmental accounting research has examined various aspects of the disclosure process. Some studies have focussed on when firms disclose. For example, Rezaee *et al.* (1995) and Gamble *et al.* (1995) addressed disclosures required by regulators and accounting standard setters. The findings of these studies are critical of present mandated disclosures because these either do not specifically address the issue of environmental reporting (Rezaee *et al.*, 1995) or

they result in insufficient information to meet the users' needs (Gamble *et al.*, 1995).

While regulators and standard setters serve as motivators for the disclosure of information, other motivations also have been examined. The motivations studied for environmental reporting range from legitimacy theory (e.g. Parker, 1986; Deegan and Gordon, 1996; Brown and Deegan, 1998), to stakeholder theory (e.g. Roberts, 1992), to political economy theory (Tinker *et al.*, 1991), to the role of public or external pressure (Patten, 1991; Neu *et al.*, 1998; Walden and Schwartz, 1997), and to information costs and benefits (Cormier and Magnan, 1999). The overall conclusion from these articles is that interest groups, stakeholders and society have some influence over the types and timing of firms' disclosures.

Other researchers have studied different aspects of environmental disclosure. For example, studies have addressed the relationship of environmental reporting to:

- environmental performance (Wiseman, 1982; Ingram and Frazier, 1980; Fekrat *et al.*, 1996; Ilinitch *et al.*, 1998);
- the market (Belkaoui, 1976; Freedman and Stagliano, 1991; Blacconiere and Patten, 1994; Little *et al.*, 1995; Cormier and Magnan, 1997); and
- users (Buzby and Falk, 1978; Rockness, 1985; Tilt, 1994).

An overall conclusion from these studies is that environmental reporting has some effect but the effects vary due to factors such as industry and types of disclosures made.

Researchers also have examined the firms making environmental disclosures. Freedman and Jaggi (1986) examined the characteristics of environmental disclosing firms compared to nondisclosing firms. Two other studies (Barth *et al.*, 1995; Li *et al.*, 1997) focussed on what determines the disclosure of environmental liabilities by firms. From these studies, one important characteristic emerges. Firm size seems to influence the amount of environmental disclosures made.

Important to the present study is the idea that environmental reporting often takes a qualitative form (e.g. see Wiseman, 1982). Qualitative disclosures are more easily related to a company's effectiveness (i.e. getting the job done) than to its efficiency (i.e. a comparison of inputs used to outputs). For this reason, environmental reporting is used as a basis of comparison for the companies studied.

Proprietary and information costs

In this paper we contend that firms' environmental disclosures are related to "proprietary costs" (Verecchia, 1983; Scott, 1994). Proprietary costs arise due to the existence of proprietary information. Proprietary information is private information, which is value-relevant to the price of a firm's shares, or debt traded in capital markets. This information is known by managers but is

unknown by investors until the information is made public. This lack of disclosure occurs even though more disclosure has been found to benefit firms through lower costs in, or easier access to, capital markets (e.g. Botosan, 1997). The potential of decreased future cash flows provides one explanation for nondisclosure of proprietary information (Dye, 1985). As noted by Cormier and Magnan (1999), proprietary information may be used by third parties (e.g. employees, customers, suppliers and competitors) to enhance their positions *vis-à-vis* the disclosing firm in contract negotiations or competitive situations. From a management perspective, nondisclosure of proprietary information can result in lower third party costs.

As one type of proprietary information, environmental disclosures may represent significant costs to the firm when made publicly available. Where costs are excluded from financial statements, these may affect share prices or debt contracts as well as the firm's reputation when subsequently disclosed. Examples of proprietary information that may have potentially significant costs related to them include environmental liabilities or commitments.

Social disclosures represent an additional type of proprietary information. These disclosures indicate what various stakeholders think a firm ought to be doing. Examples of this type of proprietary information include the number of minorities hired, employee training costs, as well as money spent on regional development. Failure to disclose this information may be due to an unsatisfactory record. If an unsatisfactory record is later disclosed, this may prove costly to the firm in the capital markets due to decreased reputation. Thus, social and environmental disclosures will be avoided where managers have the perception that the associated proprietary costs are high.

In situations where managers have access to information that investors do not, information asymmetry exists (Grossman, 1981; Milgrom, 1981). Nondisclosure may influence investors to assume the worst about a firm, causing the investors to bid down the stock price or require an interest rate premium on debt. Alternatively, investors may seek and collect more information. A rational investor would be expected to seek more information where enough time and money exists and where the benefits from information gathering are expected to exceed the costs of the information gathering process.

Individual collection of information may be inefficient from a societal perspective (Diamond, 1985) because scarce resources (i.e. time and money) are being used to collect the same information many times. In this situation a firm's voluntary disclosure of the information is a more efficient way to meet investors' needs (Atiase, 1985; Lang and Lundholm, 1993). Firms have an incentive to reduce information asymmetry where they rely on the capital markets (Gibbins *et al.*, 1990; Frankel *et al.*, 1995) to reduce perceived riskiness and hence the cost of capital (Botosan, 1997). Where firms rely on capital markets for either debt or equity financing, the reliance on capital markets will

be associated with environmental and social disclosures (Scott, 1994; Cormier and Magnan, 1999).

Legitimacy theory, environmental reporting, and the proprietary and information costs literatures lead to the conclusion that a firm's ownership structure, its size relative to other firms in the same industry and the risk faced in capital markets will affect its reporting strategies. Publicly owned firms are expected to face greater pressures than privately owned firms to disclose additional information due to visibility and accountability issues resulting from the large number of stakeholders. This large number of stakeholders means that the benefits of disclosure are likely to outweigh the associated costs for the publicly owned firms. Publicly owned firms are therefore expected to provide more social and environmental disclosures than privately owned firms. Where there is a difference in size between firms in the same industry, expectations are that the larger firms will provide more social and environmental disclosures. With respect to capital markets it is expected that firms which are concerned with investors' risk perceptions will provide more social and environmental disclosures than other firms. We examine these expectations in the following sections.

Regulation, the examined companies and descriptive information

The three companies chosen for examination are Hydro-Québec, BC Hydro and TransAlta. Hydro-Québec and BC Hydro are government owned enterprises operating in the Canadian provinces of Québec and British Columbia respectively. TransAlta is a privately owned company operating in Canada in the province of Alberta. These companies are examined for the period 1985 through 1996.

Regulatory and company backgrounds

In 1996 the Canadian electric utility industry was highly regulated under the control of provincial governments[6]. Regulation involved a range of issues from the environment to the rates charged domestic customers. The primary disclosure sources used in this study are the companies' 1985 through 1996 annual reports including the financial statements. The types of disclosures made in the financial statements were those required by Canadian generally accepted accounting principles at the statement dates. As indicated in the audit reports of the companies these accounting principles applied to both privately and publicly owned electric utilities.

With respect to environmental regulation, the Canadian scene is a mix of federal and provincial legislation where the federal statutes generally represent enabling and facilitating legislation aimed to produce federal-provincial co-operation (OECD, 1995, p. 30). This type of structure results from the fact that provinces control natural resources. However, in more recent times, the federal government has set minimum standards for such things as energy efficiency but relied on provincial regulations for implementation (OECD, 1995, p. 30).

In Québec, under Hydro-Québec's Act, assented to December 23, 1996, the *Régie de l'énergie* has exclusive jurisdiction to determine or modify the rates and conditions under which electricity is transmitted or supplied by Hydro-Québec. Before that date, Hydro-Québec reported directly to the Québec government. In BC Hydro's home province regulations were, and continue to be, set by the British Columbia Public Utilities Commission (British Columbia Public Utilities Commission, 1989; Financial Post DataGroup, 1996, p. 160). In Alberta where TransAlta operates, the regulatory body was the Alberta Public Utilities Board (now the Alberta Energy and Utilities Board) (Financial Post DataGroup, 2000, p. 3).

Hydro-Québec was incorporated in 1944 and is responsible for generating, transmitting and distributing most of the electrical power consumed in the province of Québec. Hydro-Québec is one of the largest electric utilities in both Canada and North America. Power is generated primarily by hydro-electric plants (varied between 96 percent in 1985 and 93 percent in 1996) with the remainder of power being generated by thermal electric plants (Financial Post Information Services, 1986, p. 322; Financial Post DataGroup, 1996, p. 411). As of 1995, 30 percent of the thermally generated power (or approximately 2 per cent of the total power generated) came from nuclear stations with the remainder being generated by oil, gas-turbine and diesel units (Hydro-Québec, 1995, p. 65).

Incorporated in 1962, BC Hydro is the primary source of electrical power generation, transmission and distribution in the province of British Columbia and is the third largest electric utility in Canada. BC Hydro serviced between 90 and 94 percent of the provincial population during the 1985-1996 period (BC Hydro, 1985/1986 and 1996, inside cover). Power generation came from approximately 90 percent hydro-electric plants and 10 percent thermal plants for the period studied (Financial Post Information Services, 1986, p. 81; Financial Post DataGroup, 1996, p. 160).

TransAlta Utilities Corporation was originally incorporated in 1947. During the period under study, TransAlta was engaged in the generation, transmission and distribution of electric energy (Financial Post DataGroup, 1996, p. 767). In 1985 TransAlta provided 81 percent of the electricity used in Alberta and about two-thirds of the electricity consumed by Alberta utility customers in 1996 (TransAlta Corporation, 1985, p. 2; 1996, inside cover). Electrical power is generated by a combination of coal-fired thermal plants and hydro-electric plants. As of 1996, thermal production represented 95 percent of the output (TransAlta Corporation, 1996, inside cover).

TransAlta was chosen as the privately owned firm to study for a variety of reasons. First, most Canadian electric utilities during the study period (1985-1996) were government owned. Second, TransAlta was the largest privately owned Canadian electric utility in terms of both revenues and total assets during the period (Financial Post Information Services, 1986; Financial Post DataGroup, 1996)[7]. Third, it is a firm deemed to be an "excellent" company in the popular press. Additionally, TransAlta has made

direct comparisons on a cost dimension between itself, Hydro-Québec and BC Hydro in its annual reports (e.g. TransAlta Corporation, 1995, p. 25; 1996, p. 15).

The background of the three companies highlights a major difficulty faced by many researchers who choose to use real data. The data are sometimes messy, meaning that researchers are faced with trying to control for confounding effects. In this study, we are faced with three variables that may confound our examination and conclusions. The first variable is ownership (private vs. public). The second variable is the three companies' sizes and the third variable relates to the companies' production processes[8]. In the later sections of the paper, we have tried to control for these confounding effects. For example with respect to size, we have weighted certain variables by total assets. Our control for production processes takes the form of using firm specific variables. Finally, we use a dummy variable for type of ownership when appropriate. However, despite having used these control techniques, some conclusions we might like to draw may be limited.

Descriptive information

Tables I-IV provide descriptive information used to make comparisons between Hydro-Québec, BC Hydro and TransAlta.

Table I provides the means for 18 variables. Data were collected for these variables because they represent common financial, efficiency and effectiveness measures used in previous studies.

Variables	Hydro-Québec	BC Hydro	TransAlta
Full-time employees	19,802	5,461	2,447
Assets ($'000s)	39,824	9,887	4,056
Net fixed assets ($'000s)	35,746	8,812	3,654
Long-term debt ($'000s)	27,407	7,336	1,409
Common shareholders' equity ($'000s)	9,362	1,716	1,362
New investment in fixed Assets ($'000s)	2,706	356.8	293.7
Earnings ($'000s)	550,252	133,444	159,718
Net fixed assets/full-time employees	1,795,447	1,629,852	1,513,084
Leverage (D/E)	2.91	4.48	1.03
Return on equity (ROE)	5.9	7.1	11.7
Earnings/full-time employees ($)	27,506	25,965	66,246
New investment in fixed assets/common shareholders' equity	0.07	0.04	0.07
Interest coverage	1.114	1.158	2.395
Capitalization rate	24.375	18.61	46.58
ABIGOOD news	1.833	0.667	0.333
ABIBAD news	0.667	0.083	0.333
Environmental disclosures (ENVIRDISAR)[a]	13.59	12.75	11.17
Social disclosures (SOCIALDISAR)[b]	7.25	2.50	1.17

Table I.
Descriptive statistics (means of variables for 1985-1996)

Notes:
[a] Based on a revised Wiseman Index (1982) we call the Environmental Disclosure Index.
[b] Average instances of disclosure

Selected variables	Public (N = 24) SD	Mean	Private (N = 12) SD	Mean	T-statistic	P-value	Chi-square probability
Earnings/full-time employees ($)	26,735	14,363	66,246	20,157	−4.93	0.000	0.000
Net fixed assets/full-time employees ($)	1,712,650	279,547	1,513,084	288,070	−6.06	0.061	0.010
LEVERAGE	3.70	1.15	1.028	0.201	11.06	0.000	0.000
CAPTIAL MARKETS	0.083	0.282	0.083	0.289	0.000	1.000	1.000
ROE	6.49	3.42	11.7	2.72	−4.93	0.000	0.000
New investment in fixed assets/common shareholders' equity	0.052	0.230	0.072	0.016	−2.90	0.007	0.016
ABIGOOD News	1.25	1.11	0.333	0.651	3.11	0.004	0.010
ABIBAD News	0.375	0.924	0.333	0.651	0.16	0.880	0.882
ENVIRDISAR	13.17	8.11	11.17	4.69	0.79	0.435	0.426
SOCIALDISAR	4.88	3.08	1.17	1.03	5.32	0.000	0.000

Table II.
Comparison of 12-year average variables for public versus private firms

	Hydro-Québec	BC Hydro	TransAlta
Environmental disclosure index by year			
1985	5	0	3
1986	7	0	7
1987	5	3	5
1988	11	7	12
1989	16	14	19
1990	24	4	15
1991	15	17	12
1992	11	21	14
1993	21	29	9
1994	19	25	13
1995	14	12	10
1996	15	21	15
Social disclosures by year			
1985	4	1	0
1986	4	1	0
1987	5	1	1
1988	5	2	1
1989	6	3	0
1990	7	4	0
1991	10	3	2
1992	10	3	2
1993	7	2	2
1994	9	4	2
1995	11	2	3
1996	9	4	1

Table III.
Environmental disclosure details for the period 1985 through 1996 by firm

Table IV.
Number of instances where socially descriptive variables disclosed for the period 1985 through 1996 by firm

Variables	Hydro-Québec	BC Hydro	TransAlta
Number of women employed	12	n/d	n/d
Number of days training per employee	4	n/d	n/d
Training costs as percentage of sales	5	1	n/d
Gifts and sponsorships provided	6	n/d	5
Contributions to United Way	8	n/d	1
Purchases of goods and services	12	2	n/d
Oil decontamination	3	8	2
Percentage of PCB contaminated material recovered that was recycled	2	n/d	n/d
Residential costs/kilowatt	12	12	6
Amounts spent on regional development	2	2	n/d
Research and development expenses	9	n/d	n/d
Annual hours of interrupted service	12	5	n/d
Total instances of disclosures	87	30	14
Media exposure:			
Good news	1.83	0.67	0.33
Bad news	0.67	0.08	0.33

Examination of the financial measures indicates that both Hydro-Québec and BC Hydro are much larger than TransAlta. For example using total assets as a proxy for size, Hydro-Québec is almost ten times, and BC Hydro is slightly more than twice, the size of TransAlta. This size pattern is also reflected in both the average number of full-time employees[9] and new investment in fixed assets for the 12-year period.

Deviations from the ten-to-one and two-to-one size patterns are seen in the average amount of long-term debt held, common shareholders' equity and earnings. Hydro-Québec holds 19 times, and BC Hydro holds five times, the amount of long-term debt compared to TransAlta. This means, of course, that common shareholders' equity for Hydro-Québec and BC Hydro represents a smaller proportion of their total assets compared to TransAlta. With respect to average earnings for the 12 years, Hydro-Québec earned three times more than TransAlta while BC Hydro earned only 83 percent of TransAlta earnings.

Eight efficiency ratios are reproduced in Table I. These are: net fixed assets to full-time employees; leverage (debt to equity); return on equity; earnings to full-time employees; new investment in fixed assets/common shareholders' equity; interest coverage; and capitalization rate. With the exception of net fixed assets to full-time employees, TransAlta's 12-year averages are better than those of either Hydro-Québec or BC Hydro. Of particular note are the net fixed assets to full-time employees, leverage ratio, interest coverage, return on equity (ROE) and earnings to full-time employees. TransAlta has a higher ROE while employing fewer fixed assets to full-time employees and maintaining less debt. Based on these efficiency measures alone, TransAlta outperforms its government-owned counterparts.

The ABIGOOD news/ABIBAD news variables represent the number of news stories about a particular firm in a given year using the ABI Inform database (Table I). On average Hydro-Québec received more media attention (good news and bad news) than either BC Hydro or TransAlta. BC Hydro on average was mentioned in more good news items than was TransAlta (0.667 vs 0.333). However, BC Hydro was mentioned less often in bad news items than TransAlta (0.083 vs 0.333) for the 1985-1996 period.

The number of environmental disclosures (ENVIRDISAR) made in the annual reports was also collected. Indexes have been calculated in the literature to measure the level of environmental disclosure found in a firm's annual and environmental reports and as a proxy for the firm's voluntary environmental reporting strategy (e.g. Fekrat *et al.*, 1996; Cormier and Magnan, 1999). For this study environmental disclosures are measured using the "Environmental Disclosure Index", an updated version of the Wiseman Index (1982) as adapted by Cormier and Magnan (1999) (see Appendix 1). This index is based on a score of one to three, where a three is given for an item described in monetary or quantitative terms, a two is given for a specifically described item and a one is given for an item discussed in general terms. For the three sample firms annual reports issued between 1985 and 1996 were read. The environmental disclosure items were noted and scored using the described index. The individual scores were reviewed independently by two people to ensure consistency over time and across firms. Referring to Table I, both Hydro-Québec and BC Hydro on average (13.59 and 12.75 respectively) made slightly more environmental disclosures in their annual reports than did TransAlta (11.17).

SOCIALDISAR is the final variable found in Table I. This variable captures the average number of social disclosures made by each company over the 12-year period in the annual reports. SOCIALDISAR includes information items such as employee training, charitable contributions and service interruptions. The average disclosures of SOCIALDISAR are higher for Hydro-Québec (7.25) and BC Hydro (2.50) compared to TransAlta (1.17) as one would predict using either legitimacy theory or the size factor.

Taken together the four items of good news, bad news, environmental disclosures and social disclosures in Table I suggest one conclusion regarding the qualitative measures. In this study the publicly owned firms disclosed more qualitative information and had more disclosed about them than did the privately owned TransAlta.

Table II presents the results of t-tests comparing the financial ratios as well as the ABIGOOD and ABIBAD News disclosures, ENVIRDISAR, SOCIALDISAR and a new variable, CAPITAL MARKETS, for the three firms. CAPITAL MARKETS is a variable introduced to capture a significant change in a firm's debt to equity ratio from one year to the next. For this study a significant change is defined as being at least 25 percent.

The basis of comparison in Table II is public versus private observations. For these tests there were a total of 24 public (Hydro-Québec and BC Hydro

each for 12 years) and 12 private observations (TransAlta for 12 years). Other items reported in Table I such as total assets and liabilities were not tested for significant differences because of the major differences in the sizes of the three companies. With the exception of the ABIBAD News, the net fixed assets divided by full-time employees, CAPITAL MARKETS and ENVIRDISAR, all the other variables are significantly different at 0.01 or less. Net fixed assets divided by full-time employees is significant at a 0.061 level while the ABIBAD News, CAPITAL MARKETS and ENVIRDISAR variables are insignificant. These results support the less formal inspection of Table I including the finding that the privately owned company, TransAlta, was more efficient in terms of the given financial ratios.

While the average number of social (SOCIALDISAR) disclosures differs significantly between publicly and privately owned firms, the lack of a significant difference for ENVIRDISAR in Table II is of interest because the finding seems to be counter-intuitive. From legitimacy literature we would expect that government owned firms would produce more disclosures because of their visibility. From the more general accounting research we would expect that larger firms (i.e. Hydro-Québec and BC Hydro) would produce more environmental information. However, the firms examined here operate in a regulated industry. Such regulation serves to ensure that certain types of information, and especially environmental disclosures, are made. What the results given in Table II cannot explain are the possible relationships between environmental disclosures and other efficiency and effectiveness variables.

Table III provides disclosure details for each year from 1985 to 1996 by company. An examination of these details enhances understanding of the environmental and social disclosures made by the three companies and how these disclosures changed over time.

The early years under examination indicate that relatively few environmental disclosures were made. For 1985 Hydro-Québec scored a five, TransAlta scored a three and BC Hydro scored a zero. Using 1995 as another comparison year, Hydro-Québec's Environmental Disclosure Index was 14, BC Hydro's 12 and TransAlta's was ten. However, the highest index for each company was achieved in different years. The highest Environmental Disclosure Index was in 1990 for Hydro-Québec (24), 1993 for BC Hydro (29) and 1989 for TransAlta (19). The high 1990 Environmental Disclosure Index for Hydro-Québec may have been tied to a reporting structure change (Hydro-Québec, 1990, p. 5). Commencing in 1990, the National Assembly of Québec's standing committee where Hydro-Québec had to appear was enlarged. This enlarged committee was to receive a "Hydro-Québec Development Plan every three years, following consultations with interested parties" (Hydro-Québec, 1990, p. 9). A review of the 1993 annual report for BC Hydro did not yield any specific event or events that explained its highest Environmental Disclosure Index. However, TransAlta's highest index came in the same year the company's management made a submission to the Canadian House of

Commons Standing Committee on the Environment. From the annual report it is unclear whether the increase in the index and this submission are related or just coincidental.

Two types of environmental disclosures made by electric utilities are of special interest to a variety of stakeholders. These disclosures concern air emissions and effects on water resources. Using the 1987 (first year all three companies have an Environmental Disclosure Index) and 1995 reports (a year in which the Environmental Disclosure Index is similar for all three companies), these two types of disclosures are outlined.

In 1987 Hydro-Québec provided few details regarding air emissions or water resources. The primary air quality issue contained in this annual report dealt with the implementation of non-smoking legislation (Hydro-Québec, 1987, p. 13). In the technology section of the annual report, two items are discussed that could have related to air or water pollution. These technical points were completion of laboratory and field tests for various types of insulators (Hydro-Québec, 1987, p. 16) and the assessment of a pilot project for generation of energy using wind. In the section on environment, Hydro-Québec's annual report outlined a continuing study of how its construction projects affected the environment (Hydro-Québec, 1987, p. 20) and a program undertaken jointly with the Cree aboriginal community to solve a mercury problem in the James Bay regions' lakes and reservoirs (Hydro-Québec, 1987, p. 21).

Under the environmental protection section in 1995, Hydro-Québec (1995, p. 16) detailed its participation in wildlife protection efforts that included waterfowl and fish. Also, mention was made of the James Bay Mercury Agreement that noted this project's continuation and a finding that mercury levels were expected to return to "natural values" within 25 to 30 years (Hydro-Québec, 1995, p. 17). A second project involving the Cree community indicated Hydro-Québec had provided more than $4 million devoted to "remedial work" for certain water resources to foster "hunting and fishing activities". Additionally, Hydro-Québec indicated a general policy of internal environmental assessments that would presumably involve potential air and water pollution (Hydro-Québec, 1995, p. 16).

BC Hydro's 1987 annual report contains no discussion of the effect that power generation had on water resources, fish or wildlife habitat. The only mention of BC Hydro's air emissions is contained in a statement that its Burrard Thermal generating station had its emission permit issued as confirmed by the Environmental Appeal Board (BC Hydro, 1987, p. 4).

By 1995 BC Hydro's air emission and water resources disclosures increased substantially. In 1995 BC Hydro's annual report was split into two components, one containing the financial statements and a corporate review explaining its activities. From the corporate review, BC Hydro noted that it had initiated a plan to reduce nitrogen oxide (NOx) emissions by 75 percent over the following five years. This decreased pollution was to be accomplished by use of new technology at the Burrard Thermal generating station (BC Hydro, 1995 p. 20).

Fish and wildlife populations in two river systems were to be enhanced through a $4.1 million dollar fund. Additionally, for three other rivers water releases from hydro-electric plants were to be assessed due to concerns about fish habitat. Finally, a study was being launched to examine concerns about dams and residents living below the dams due to potential earthquake hazards (BC Hydro, 1995, p. 21).

TransAlta indicated in 1987 (p. 4) it had access to low-cost, low-sulphur coal through its mining activities. As well, TransAlta's (1987, p. 10) annual report included a statement that it was developing a low NOx SOx (oxides of nitrogen and sulphur) burner capable of controlling for emissions from both the sub-bituminous coal used by TransAlta as well as the bituminous coal used in eastern Canada and the US. With respect to water resources, TransAlta outlined how it was replacing two lakes that had been drained in 1984 to allow for coal extraction. The replacement lake cost $2 million and was thought to "provide habitat for wildlife" as well as "recreational opportunities for people living in the area"(TransAlta Corporation, 1987, p. 10).

As with Hydro-Québec and BC Hydro, TransAlta also provided more information in 1995 compared to 1987 on its air emissions and effects on water resources. Air emissions were addressed in a discussion of greenhouse gases. TransAlta outlined a voluntary plan it had submitted to the Canadian Government in September 1995 that addressed a range of operations and improvements (TransAlta Corporation, 1993, p. 21). Additionally, in the sustainable development section, TransAlta outlined how through efficiency measures it had reduced air emissions in a thermal plant and reduced water use in a hydro-electric facility by adopting a new turbine (TransAlta Corporation, 1995, p. 10). Attention to water resources included discussion of two specific examples, concerns with water levels at a thermal plant and regulation of water flow at a hydro-electric plant (TransAlta Corporation, 1995, p. 21).

From Table III Hydro-Québec's social disclosures indicate an increasing trend from four disclosures in 1985 to nine disclosures in 1996. Hydro-Québec provided the highest number of disclosures in a given year with ten in each of 1991 and 1992. BC Hydro provided at least, one social disclosure each year from 1985 to 1996. TransAlta provided the fewest total social disclosures with four years (1985, 1986, 1989 and 1990) having zero disclosures and only 1995 with a high of three disclosures.

Table IV provides a listing of the 12 socially descriptive variables that form the basis of SOCIALDISAR. Four of these variables are efficiency related: training costs as a percentage of sales, purchases of goods and services, residential costs/kilowatt, and research and development costs. The remaining eight variables are indicative of effectiveness measures. Data for each of these variables were collected from the three companies' annual reports. Of interest are the "total instances of disclosure" for these 12 items. Hydro-Québec discloses these variables in 87 instances as compared to a maximum of 144 (12 items by 12 years) instances. BC Hydro discloses in 30 instances while

TransAlta has the fewest disclosures at 14. This evidence is consistent with other studies that have found that larger firms provide more disclosures than do smaller firms.

Only one of the four efficiency variables (residential costs/kilowatt) has information provided by all three firms. For the remaining three efficiency variables, Hydro-Québec and BC Hydro provide some information for two of them with Hydro-Québec alone supplying information for the third (research and development expenses).

All three companies supplied the effectiveness measure of oil decontamination. Two other effectiveness measures have data provided by Hydro-Québec and BC Hydro while two measures (gifts and sponsorships; contributions to United Way) are provided by Hydro-Québec and TransAlta. Hydro-Québec alone reports on number of women employed, number of days of training per employee and percentage of PCB contaminated material recovered that was recycled. Finally, referring to Tables II and IV, evidence is found of a positive relationship between media exposure and social disclosures. Hydro-Québec provided the largest total number of social disclosures (87) and received the most media citations for both good and bad news. TransAlta had the fewest social disclosures and the fewest good news citations by the media. Publication of more good news than bad news stories (e.g. Hydro-Québec and BC Hydro) may indicate firms' reporting strategies influence the media. We examine this in more detail in the following section.

Additional quantitative evidence

As argued earlier, we maintain that publicly owned firms face different expectations from society than do privately owned firms. Social (SOCIALDISAR) and environmental disclosures (ENVIRDISAR) in annual reports are thought to relate to the social goals and objectives facing firms. What we examine next is the relationship of social and environmental disclosures to the variables provided in Table II. We use a framework based on information and proprietary costs to begin this examination.

To examine how proprietary and other information disclosures relate to the financial ratios presented in Table II, we provide two additional pieces of quantitative evidence. First, correlation coefficients between the types of disclosures (social or environmental) and the other variables are provided. Second, a sensitivity test using the variable mean differences based on the level of disclosure (i.e. high disclosing firms compared to low disclosing firms) is outlined.

As mentioned, we used the Environmental Disclosure Index to score elements of environmental disclosures. This index highlights information that is proprietary in nature because it reflects the firm's actual plans and initiatives. Financially sound firms are predicted to disclose proprietary information (e.g. environmental information). For these firms the benefits of making disclosures outweigh the costs related to disclosing proprietary information to employees, competitors, suppliers or other third parties.

However, firms in poor financial condition are predicted to avoid disclosing proprietary information. In this situation, the costs associated with proprietary disclosures are expected to outweigh the benefits of making the disclosures in the minds of the firm's managers.

Social disclosures represent the number of proprietary or informational items disclosed by a firm each year in the annual report. As with environmental disclosures, firms that are financially sound are expected to disclose these items. Additionally, a firm is expected to make these disclosures if it is highly visible and is deemed to be accountable to society.

The first stage of this analysis is to examine how the two types of DISCLOSURE (either social disclosure (SOCIALDISAR) or environmental disclosure (ENVIRDISAR)) are correlated to the chosen independent variables. These variables are: ROE (return on equity); ABIGOOD News and ABIBAD News are as described earlier; LEVERAGE (the debt to equity ratio); NEWINEQ (new investment in fixed assets divided by common shareholders' equity); EARN/FTEMPL (earnings divided by the number of full-time employees); FA/FTEMPL (net fixed assets divided by full-time employees); PUBLIC OWNERSHIP (a dummy variable that is a 1 for Hydro-Québec or BC Hydro and 0 for TransAlta); and reliance on CAPITAL MARKETS (measured using a dummy variable that takes on a value of 1 (0 otherwise) for a firm in any year where the debt-to-equity ratio has increased by at least 25 percent which is deemed to be a major debt issue).

It is expected that as ROE, NEWINEQ, EARN/FTEMPL FA/FTEMPL, and CAPITAL MARKETS increase, environmental and social disclosures increase. When PUBLIC OWNERSHIP is a 1, then environmental and social disclosures are expected to increase. As discussed in Cormier and Magnan (1999) these variables proxy for proprietary costs and as such are expected to be positively related to both environmental and social disclosures. That is, more environmental information will be disclosed where managers think the costs of nondisclosure are higher than the costs of disclosure. In a political cost sense, firms that have higher earnings, ROE or earnings per full-time employee may be targets of environmental or other political groups.

LEVERAGE is expected to be negatively related to environmental and social disclosures found in the annual reports. In this case disclosing environmental and social information may indicate areas of increased proprietary costs for the firm. Such costs could make credit negotiations more difficult and costly because they indicate areas of firm risk.

The signs for ABIGOOD News and ABIBAD News are ambiguous. On the one hand, where these disclosures have already been made public through the media, there may be little reason to disclose them again in the annual reports. On the other hand, once environmental and social disclosures are publicly available including them in the annual report is unlikely to harm the company further. Additionally, the tone of the firm's media exposure (i.e. the "good news/bad news" nature of press reports about a specific firm) is likely to affect a firm's reporting strategy. Thus, media exposure in specialized

publications[10] is introduced as a control dimension in this analysis (i.e. ABIGOOD News and ABIBAD News variables). Due to the exploratory nature of the analysis, no directional predictions are made with respect to the relationship between reporting of environmental performance and the firm's environmental disclosures.

Social disclosures

From Table V, five independent variables are found to have significant correlation coefficients with social disclosures (SOCIALDISAR). These variables are ROE, ABIGOOD News, ABIBAD News, FA/FTEMPL, and PUBLIC OWNERSHIP. However, ROE has a negative sign instead of the predicted positive sign.

As a sensitivity test, the sample was split into two sub-groups based on the median of social disclosure (Table VI). For each variable, averages are presented for the high disclosing group as well as for the low disclosing group. Results support the findings from the correlation coefficients in Table V for ROE, FA/FTEMPL, ABIGOOD News and PUBLIC OWNERSHIP. However,

Variable	Predicted sign	Social disclosure	Environmental disclosure
ROE	+	−0.312*	0.331*
EARN/FTEMPL	+	−0.274	0.218
ABIGOOD News	−/+	0.749*	0.376*
ABIBAD News	−/+	0.390*	0.181
LEVERAGE	−	0.149	−0.164
NEWINEQ	+	0.207	0.253
FA/FTEMPL	+	0.673*	0.444*
PUBLIC OWNERSHIP	+	0.569*	0.134
CAPITAL MARKETS	+	−0.128	0.408*

Note: * Significance is given for two-tailed test

Table V.
Correlation coefficients

Variable	Predicted direction	> Median high disclosers	< Median low disclosers	*P*-value	Chi-square probability
ROE	>	6.480	9.450	0.027	0.021
EARN/FTEMPL(000)	>	28.4	48.1	0.017	0.030
ABIGOOD News	?	1.600	0.480	0.003	0.002
ABIBAD News	?	0.530	0.240	0.301	0.657
LEVERAGE	<	3.100	2.600	0.353	0.340
NEWINEQ	>	0.063	0.056	0.388	0.465
FA/FTEMPL	>	1.780	1.552	0.023	0.021
PUBLIC OWNERSHIP	>	1.000	0.430	0.000	0.003
CAPITAL MARKETS	>	0.067	0.095	0.768	0.899

Table VI.
The relationship between social disclosure and its determinants: variable means differences according to social disclosure

ABIBAD News is no longer significant while EARN/FTEMPL becomes significant[11].

Environmental disclosures

Using Table V and correlation coefficients, environmental disclosure (ENVIRDISAR) is correlated with ROE, ABIGOOD News, FA/FTEMPL and CAPITAL MARKETS. All four of these variables have the expected signs.

As a sensitivity test, the sample was again split into two sub-groups based on the median of environmental disclosure (Table VII). For each variable, averages are presented for the high disclosing group as well as the low disclosing group. In terms of predicted direction of signs, results support those presented in Table V. For the sensitivity results, the *p*-values for ABIGOOD News and FA/FTEMPL are statistically significant[12].

Summary

Referring to variables that have both significant correlation coefficients and passed the sensitivity test, social disclosures relate to ROE, ABIGOOD News, FA/FTEMPL and PUBLIC OWNERSHIP. For environmental disclosures, ROE and FA/FTEMPL are found to have both significant correlation coefficients and pass the sensitivity analysis.

One interpretation of these findings is that firms have different targets when making social as opposed to environmental disclosures. More social disclosures are provided when ROE decreases, the firm is publicly owned, and the amount of fixed assets compared to full time employees (FA/FTEMPL) increases. The visibility of the firm as captured by the amount of, or increase in, fixed assets is important. The ROE and PUBLIC OWNERSHIP variables represent accountability to a large number of stakeholders, those interested in the efficiency of the firm and those concerned with how government owned enterprises meet society's general objectives. We interpret this evidence to mean that social disclosures are related to a need for legitimacy.

The positive relationship between environmental disclosures and ROE indicates that to decrease public pressure as ROE increases, more environmental disclosures will be made. As found with social disclosures, as a

Table VII.
The relationship between environmental disclosure and its determinants: variable means differences according to environmental disclosure

Variable	Predicted direction	> Median high disclosers	< Median low disclosers	*P*-value	Chi-square probability
ROE	>	8.970	7.452	0.261	0.372
EARN/FTEMPL(000)	>	44.2	35.7	0.230	0.203
ABIGOOD News	?	1.330	0.560	0.027	0.051
ABIBAD News	?	0.560	0.171	0.165	0.265
LEVERAGE	<	2.690	2.931	0.655	0.791
NEWINEQ	>	0.063	0.055	0.301	0.355
FA/FTEMPL	>	1.814	1.501	0.001	0.002
PUBLIC OWNERSHIP	>	0.720	0.610	0.494	0.584
CAPITAL MARKETS	>	0.110	0.055	0.560	0.791

firm increases in size (FA/FTEMPL) or where it is publicly owned, the firm becomes more visible and therefore, more accountable with respect to environmental issues. From this evidence, legitimacy seems to serve as an explanation for these types of disclosure.

The univariate results from Tables V, VI and VII hint at another interesting finding. Environmental disclosures seem to be more closely related to information costs and benefits than do social disclosures. The predicted signs of CAPITAL MARKETS and LEVERAGE indicate ENVIRDISAR is associated with these variables as predicted. SOCIALDISAR's correlations with CAPITAL MARKETS and LEVERAGE are opposite to predictions. Employing regression analysis, further sensitivity tests are used to examine the relationship between the types of disclosures (SOCIALDISAR or ENVIRDISAR) and the independent variables (see Appendix 2). From the regression analysis environmental disclosures seem to be more closely related to information costs and benefits than do social disclosures confirming the univariate results.

Conclusions and limitations

This paper provides evidence of two things. First, the publicly owned firms disclosed more social and environmental information than did the privately owned company. Second, these disclosures are related to the size of the companies with the largest, Hydro-Québec, providing the most information and the smallest, TransAlta, providing the least. In this study, size is linked to ownership status. Because the government owned enterprises are politically supported and are large, they must make more disclosures due to reasons of accountability and visibility as outlined in legitimacy theory. Finally, while environmental disclosures appear to be related to information costs and benefits, this relationship does not seem to hold for social disclosures.

One important limitation is that regulation of electrical utilities in Canada is a provincial jurisdiction. The three firms in this study come from three different provinces and therefore are potentially faced with different rules and regulations. Having noted this limitation, it is a limitation inherent in many studies that have examined electric utilities from not only different states (e.g. Fare *et al.*, 1985) or provinces but also different countries.

A second limitation is that we examined two publicly owned firms and only one privately owned firm. Because of the study time period, 1985 to 1996, there were few privately owned electric utility companies in Canada. We chose the largest private Canadian company to use in our comparisons and this company was still smaller than the publicly owned firms. A future study might be able to address this limitation by using different companies from a different geographical setting.

A third limitation is the possible confounding effects of the variables we have used in our study. In particular, confounding effects may result from the companies' size, their production processes and ownership. As noted earlier in

the paper we have made efforts to control these effects in three ways. First, we scale certain variables by the companies' total assets to control for size. Second, we include a variable for ownership (PUBLIC OWNERSHIP) and third, we employ firm effect variables (TRANSALTA and BC HYDRO) when appropriate. However, confounding effects may still be present and affect the conclusions drawn.

We suggest that future studies comparing publicly and privately owned firms should examine effectiveness variables such as environmental and social disclosures in addition to efficiency measures. Further, we think that legitimacy theory, proprietary costs and information costs add to the discussion and explanation of why firms with different ownership structures have diverse reporting strategies.

Notes

1. Researcher bias is implied in such studies as Yunker (1975). In this study of US electric utilities where no significant differences were found between public and private companies, Yunker stated that "... the public-private efficiency issue is only one small part of the larger issue of *socialism versus capitalism* (Yunker, 1975, pp. 66-7, emphasis added).
2. Some types of dissatisfaction have been identified by Van Maanen (1982, p. 13) and include "the relatively trivial amount of explained variance, the abstract and remote character of key variables, the lack of comparability across studies, the failure to achieve much predictive value ... and the causal complexity of multivariate analysis, which, even when understood, makes change-oriented actions difficult to contemplate".
3. Yin (1994, p. 117) outlined and explained the use of several different quantitative tools for analyses including time series. The time series example cited by Yin used a small sample size of four which is close to the sample size employed in this study.
4. This paragraph presents Gray *et al.*'s (1995) version of Lindblom's unpublished paper.
5. Gray *et al.* (1995, p. 54) argued that the second and fourth strategies are different. The second strategy is in response to society's misperceptions while the fourth strategy results from society's "unrealistic" or "incorrect" expectations of an organization's responsibilities. This distinction remains somewhat unclear as "misperception" could result from either "unrealistic" or "incorrect" expectations.
6. In 1995 and 1996 Canadian firms began to anticipate decreasing regulation and increasing competition in the North American electric utility industry. Evidence of this anticipation is found in the Hydro-Québec 1995 Annual Report (Hydro-Québec, 1995, pp. 4-5) and in TransAlta's 1996 Annual Report (TransAlta Corporation, 1996, p. 9).
7. Of special note, for the 1985-1996 period TransAlta was also larger than the other government owned electric utilities with the exception of Ontario-Hydro which ranked second in size behind Hydro-Québec.
8. While the production processes for the three companies differ, it should be noted that our emphasis in this paper is on environmental effects which are broader than simply air pollution. TransAlta's electricity production is primarily based on coal while BC Hydro's and Hydro-Québec's production is based primarily on hydro with some of Hydro-Québec's power generation based on nuclear power. Both BC Hydro and TransAlta generate electricity using thermal and hydro production.

   Coal-fired plants produce emissions that have been linked to acid rain and air pollution. However, hydro-based production has negative environmental effects associated with it that have resulted in calls to dismantle some dams (Fuhs, 2000; Reisner, 2000). These environmental concerns are quite wide-ranging including the effects on fish habitats and

stocks (e.g. Pacific salmon), the effects on indigenious peoples and the damage to the eco-systems in the area of the dams (Raphals, 1992; Ulrich, 1999; Volkman, 1992). Such high profile dam projects as the High Aswan Dam (White, 1988) and the yet to be completed Three Gorges project in China (Jhaveri, 1988) have also spurred environmental concerns. Given these concerns, we think it makes sense to broadly examine environmental disclosures for the three companies used in this study.

9. TransAlta did not disclose the number of full-time employees each year. The four missing data points were estimated using disclosures from preceding and following years' annual reports where this information was disclosed.
10. Examples of specialized publications include *Electrical World, Energy Economist, Canadian Business Review, Public Utility Fortnightly, Investment Dealers' Digest* and *International Commercial Litigation*.
11. A further sensitivity test was undertaken using multivariate analyses in the form of a pooled, cross-sectional regression. The details of the regression are supplied in Appendix 2. Controlling for firm specific effects and dropping EARN/FTEMPL which is highly correlated with ROE renders FA/FTEMPL, and the two firm effect variables as significant with ABIGOOD News somewhat significant in a two-tailed test. What this is interpreted to mean is that social disclosures are related to the size of the organization and to media exposure.
12. As with social disclosure, a pooled, cross-sectional regression was run to test the sensitivity of environmental disclosure to the independent variables. From Appendix 2 six variables are found to be significant (ABIGOOD News, ABIBAD News, LEVERAGE, NEWINEQ, CAPITAL MARKETS, and one firm specific variable.

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Appendix 1. Environmental disclosure index ratings

(Based on the Wiseman Index (1982) as adapted by Cormier and Magnan (1999))

(1) Economic factors:
- Past and current expenditures for pollution control equipment and facilities.
- Past and current operating costs of pollution control equipment and facilities.
- Future estimates of expenditures for pollution control equipment and facilities.
- Future estimates of operating costs for pollution control equipment and facilities.
- Financing for pollution control equipment or facilities.
- Environmental debt.
- Risk provision.
- Provision for charge.

(2) Laws and regulation:
- Litigation (present and potential).
- Fines.
- Orders to conform.
- Corrective actions.
- Incidents.
- Future legislation or regulation requirements.

(3) Pollution abatement:
- Air emission information.
- Water discharge information.
- Solid waste disposal information.
- Control, installations, facilities or processes described.
- Compliance status of facilities.
- Noise and odours.

(4) Sustainable development reporting:
- Conservation of natural resources.
- Recycling.
- Life cycle information.

(5) Land remediation and contamination:
- Sites.
- Efforts of remediation (present and future).
- Cost/potential liability (Provisions for site remediation).

(6) Spills:
- Number.
- Nature.
- Efforts to reduce.
- Liabilities (actual and potential).

(7) Environmental management:
- Environmental policies or company concern for the environment.
- Environmental management system.
- Environmental auditing.

(8) Goals and targets:
- Awards.
- Department or office for pollution control.
- ISO 14000.
- Participation in elaboration of environmental standards.
- Joint projects with other firms on environmental management.

(9) Rating scale:
- 3: item described in monetary or quantitative terms.
- 2: item described specifically.
- 1: item discussed in general.

Appendix 2

In Tables AI-AIII we provide the results from correlations between the independent variables as well as from pooled, cross-sectional regressions. The regression equations are of the form:

$$\begin{aligned} \text{DISCLOSURE} = {} & a + b1\,(\text{ROE}) + b2\,(\text{ABIGOOD News}) + b3\,(\text{ABIBAD News}) \\ & + b4\,(\text{LEVERAGE}) + b5\,(\text{NEWINEQ}) + b6\,(\text{FA/FTEMPL}) \\ & + b7\,(\text{CAPITAL MARKETS}) + b8\,(\text{BC HYDRO}) + b9\,(\text{TRANSALTA}). \end{aligned}$$

For the multivariate analyses in this Appendix, we use the information from the above correlations to adjust the regression. In particular we drop EARN/FTEMPL from the analysis due to high multicolinearity with ROE (variance of inflation at 20) as evidenced by its positive and significant correlation with ROE. (The variance of inflation factor (VIF) for Xj is 1/1-RSQj, where RSQj is the R-square from the regression of Xj on the remaining k-1 predictors. If Xj is highly correlated with the remaining predictors, its VIF is very large.) PUBLIC OWNERSHIP is replaced by two firm specific dummy variables for BC Hydro and TransAlta to control for

firm effect. The first of the two dummy variables takes on a value of one for BC Hydro and zero otherwise and the second takes on a value of one for TransAlta and a zero otherwise.

From the social disclosure regression, the independent variables explain 83.4 percent of the variance in the dependent variable (SOCIALDISAR). The signs of the independent variables are as expected except for LEVERAGE. ABIBAD News was included in the regression despite its lack of significance in comparing publicly owned versus privately owned firms as shown in Table II. This inclusion was meant to ensure that all media exposure (good and bad) was represented.

In this multivariate setting, FA/FTEMPL and the firm specific effects are significant while ABIGOOD News has some statistical significance ($p < 0.189$ two-tailed). These results confirm the univariate analyses presented in Table VI. The only difference in the multivariate and univariate analyses is a surprising lack of significance for the ROE variable. ROE is significant when the publicly owned and privately owned comparison is made in Tables II and VI. Despite this significance, ROE is not found to be significant in explaining the dependent variable SOCIALDISAR. The variable EARN/FTEMPL is dropped from the regression due to high multicolinearity with ROE.

	1	2	3	4	5	6	7	8	9
1. ROE	1	0.905*	−0.154	0.020	−0.685*	0.389*	−0.091	−0.616*	0.256
2. EARN/FTEMPL		1	−0.161	0.154	−0.769*	0.490*	0.062	−0.759*	0.113
3. ABIGOOD News			1	0.601*	0.074	0.116	0.650*	0.411*	0.009
4. ABIBAD News				1	−0.078	0.172	0.456*	0.024	−0.074
5. LEVERAGE					1	-0.632*	0.102	0.806*	0.077
6. NEWINEQ						1	0.048	−0.408*	−0.052
7. FA/FTEMPL							1	0.324*	0.052
8. PUBLIC OWNERSHIP								1	0.120
9. CAPITAL MARKETS									1

Table AI.
Correlation matrix: independent variables

Independent variable	Predicted sign	Standardized coefficient	*T*-statistic	*P*-value[a]
Intercept	−/+	−0.748	−0.290	0.774
ROE	+	0.032	0.295	0.365
ABIGOOD News	−/+	0.486	1.332	0.189
ABIBAD News	−/+	−0.122	−0.341	0.736
LEVERAGE	−	0.004	0.008	0.993
NEWINEQ	+	0.102	0.662	0.257
FA/FTEMPL	+	0.004	3.570	0.000
CAPITAL MARKETS	+	0.349	0.419	0.338
BC HYDRO	−/+	−3.444	−2.800	0.010
TRANSALTA	−/+	−4.641	−4.460	0.000
Adjusted *R*-square 83.4 percent				
F statistic 20.5 (0.000)				
Durbin-Watson 1.84				
N 36				

Notes: [a] One tailed test values are listed except for variables where the predicted signs are ambiguous or not as predicted. Firm-specific intercepts not reported
Dependent variable is social disclosures as contained in the annual report

Table AII.
Pooled cross-sectional regression of the relationship between social disclosure and its determinants

Table AIII.
Pooled cross-sectional regression of the relationship between environmental disclosure and its determinants

Independent variable	Predicted sign	Standardized coefficient	*T*-statistic	*P*-value[a]
Intercept	−/+	5.365	0.354	0.728
ROE	+	−0.439	−1.032	0.317
ABIGOOD News	−/+	3.693	1.941	0.069
ABIBAD News	−/+	−3.465	−2.169	0.045
LEVERAGE	−	−3.029	−1.907	0.037
NEWINEQ	+	0.266	2.966	0.004
FA/FTEMPL	+	−0.001	−0.743	0.468
CAPITAL MARKETS	+	9.316	1.742	0.049
BC HYDRO	−/+	14.059	2.829	0.012
TRANSALTA	−/+	−2.959	−0.830	0.418
Adjusted *R*-square 73.6 percent				
F statistic 6.4 (0.000)				
Durbin−Watson 2.31				
N 36				

Notes: [a] One tailed test values are listed except for variables where the predicted signs are ambiguous or not as predicted
Dependent variable is environmental disclosures as contained in the annual report

From the second equation in this appendix, the independent variables explain 73.6 percent of the variance in the dependent variable (ENVIRDISAR). ABIBAD News was included in the regression despite its lack of significance in comparing publicly owned versus privately owned firms as shown in Table II. As with the social disclosure regression, this inclusion was meant to ensure that all media exposure (good and bad) was represented. All signs of the independent variables are as expected with the exception of ROE and FA/FTEMPL. ABIGOOD News and ABIBAD News as well as LEVERAGE, NEWINEQ, CAPITAL MARKETS and the BC HYDRO firm effect variable are significant at a 0.07 level. Again, the variable EARN/FTEMPL is dropped from the regression due to high multicolinearity with ROE.

The amount of fixed assets (a size variable) compared to equity (NEWINEQ) and the BC Hydro variable positively relate to increased environmental disclosures. Also the positive sign for CAPITAL MARKETS indicates where a firm wishes to issue additional debt (CAPITAL MARKETS), more environmental reporting will result. However, as LEVERAGE increases environmental disclosures decrease and smaller firms (e.g. TransAlta) make less environmental disclosures than larger firms.

Unlike social disclosures, environmental disclosures seem to be influenced by the level of indebtedness (LEVERAGE) and the need for new financing (CAPITAL MARKETS). This is interpreted to mean that environmental disclosures reduce the level of information asymmetry between managers and investors. This same reduction in information asymmetry does not seem to occur with social disclosures. That is, social disclosures appear to be unrelated to CAPITAL MARKETS, LEVERAGE or ROE.

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