CORPORATE GOVERNANCE, OWNERSHIP, COMPANY STRUCTURE AND ENVIRONMENTAL DISCLOSURE: EVIDENCE FROM SAUDI ARABIA

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Abstract

This study examines the Environmental Disclosure (ED) practices in Saudi Arabia and the potential relationship with Corporate Governance (CG) , ownership and company structure, following the application of the Saudi 2006 CG code in 2007. The study deepens the understanding of ED and its main determinants in one of the largest economies in the Middle East. A self-constructed ED checklist, based on ISO 26000, is used. We employ regression and content analyses to examine a sample of 267 annual reports covering the period 2007-2011. The analysis finds that the average ED has improved following the application of the Saudi 2006 CG code to 30%, more than double the 14.61% found by Al-Janadi et al. (2013) during 2006-2007. The analysis also finds that audit committee effectiveness, role duality, state and institutional ownerships, firm profitability, and industry sensitivity positively affect ED. However, board independence, family ownership, and firm size are found not to be significant determinants, while a negative significant correlation was found with firm leverage. The results imply that CG regulators and stakeholders should acknowledge the importance of active audit committees comprising relevant experts and independent directors, in addition to the role of state and institutional ownership in enhancing ED. The study covers a five-year period, contrary to the majority of ED studies which focus on only one year. The study helps to fill the gap in ED literature in developing countries. Finally, the study provides a recent evaluation for the Saudi CG code recently applied in 2007.

Key Words: Corporate Governance, Ownership Structure, Environmental Disclosure, Saudi Arabia

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1. Introduction

Concern for the environment has increased significantly across the globe in recent decades. This concern has been driven in part by a number of environmental disasters caused by humans, such as the Bhopal gas tragedy. The release of toxic gas, on the 3rd of December 1984 in India, left about 16,000 dead in a few days. Another international tragedy was occurred on 26th of April 1986, when an explosion occurred at the Chernobyl Nuclear Power Plant in Ukraine resulting in severe human and environmental consequences. Thus, the black side of the industrial development is the potential for terrible environmental consequences.

Consequently, environmental organizations were established and environmental laws and standards were issued. For example, the *Greenpeace Organization* was established in 1971, the main objective of which is to highlight issues and force governments to adopt solutions for the global environmental problems. Furthermore, ISO14001 was issued by the International Organization for Standardization (ISO), with the aim of promoting more effective and efficient environmental management in firms and better communication of environmentally relevant information to stakeholders. Moreover, several governments have acknowledged importance of environmental disclosure (ED); the UK government has announced that ED is deemed to be crucial in corporate reporting and firms must report essential environmental issues in their annual reports (Sun et al., 2010).

Accordingly, firms have come under increasing pressure to account for and disclose transparently how their activities affect the environment. This can be achieved through environmental accounting and disclosure. Moreover, Giannarakis et al. (2014) find that polluting firms tend to increase their Corporate Social Responsibility (CSR) disclosure including ED to legitimize their activities, eliminate stakeholder pressure and avoid any regulatory cost. However, most national and international accounting standards and laws do not compel firms to provide ED (AbuRaya, 2012), implying that ED remains voluntary on an international scale.

ED may be one of the most relevant, sensitive, and important voluntary disclosure categories for two reasons. First, it is related to the health of humans, society and environment; health is the most valuable asset for humans. Second, the disclosure of material environmental information can be relevant for

stakeholders' decisions and financial markets. According to the publication, *Environmental Disclosure in Financial Reporting,* by the Commission for Environmental Cooperation, the share price of US Liquids Inc., a Houston waste-management firm, fell 58% in one week when employees reported to government agencies that the firm had illegally dumped hazardous wastes and falsified records. This example indicates that the ED may be one of most important voluntary disclosures categories.

ED extends the accountability of firms to include their environmental responsibilities (Gray, et al., 1987; Rizk, 2006; AbuRaya, 2012). However as the code is voluntary it raises questions such as: how accurately do firms disseminate information that informs the public of the dangerous implications of their activities on the environment? And, Will firms accuse themselves of malpractice? In this context, Rizk (2006) argues that ED may have economic consequences for the firms making the disclosure; it may increase or curtail sale revenues, or it may invite prosecution. As a result, this can create a transparency problem, which can impact negatively on the financial markets and the investment community as the lack of transparency has been a key factor in financial scandals around the world (Abdel-Fattah, 2008).

Transparency is one of the main Corporate Governance (CG) principles and objectives. Thus, many authors argue that an effective CG system is associated with increased transparency (e.g., Gul and Leung, 2004; Abdel-Fattah, 2008; AbuRaya, 2012; Albassam, 2014; Peters and Romi, 2014; Giannarakis et al., 2014). This implies that an effective CG system may encourage or force managers to disseminate more information about the impact of their company's activities on the environment.

However, different elements can affect the degree of CG compliance. For instance, ownership structure is one of the main CG mechanisms that could influence managerial decisions including those related to ED. Empirically, Barako et al. (2006) find that audit committee existence, foreign and institutional ownership are positively correlated with the voluntary disclosure including the ED. Moreover, Rao et al. (2012), Htay et al. (2012) and Janadi et al. (2013) find that board independence is positively correlated with ED. Furthermore, AbuRaya (2012) finds that higher ED quantity is associated with separation of the dual role of Chief Executive Officer (CEO) and chairman, as well as a higher frequency of board meetings. This implies that CG and ownership and company structure could enhance the transparency on environmental activities.

This study investigates the extent of ED in Saudi Arabia and the potential influence of CG and ownership type and company structure on ED. The findings indicate that the average ED was 30% during the years 2007-2011. Furthermore, the results find a positive significant correlation between audit committee effectiveness, role duality, state and institutional ownerships, firm profitability, and industry type and the extent of ED in Saudi Arabia. A negative significant correlation was found for firm leverage, while no statistically significant correlations were found for board independence, family ownership, and firm size on the extent of ED.

This study contributes to the literature in the following ways. First, according the Saudi Arabian General Investment Authority website (SAGIA, 2014), Saudi Arabia holds 25% of the world's oil reserves, and contributes 25% of the Arab world's gross domestic product (GDP). Moreover, the upstream and downstream hydrocarbon sectors are the main components of GDP in Saudi Arabia. However, very few ED studies that are relevant to the type of economy in Saudi Arabia have been published. Second, this study incorporates five years; the majority of ED studies focus on only one year's worth of data (Saleh et al., 2010; Giannarakis et al., 2014). Third, this study provides a recent evaluation of the CG reforms in Saudi Arabia, through studying the years following the application of the Saudi 2006 CG code. Finally, the study incorporates variables, such as audit committee effectiveness, state ownership and family ownership that are rarely examined in relation to ED.

This study is organized on the following lines. The second section reviews the literature and illustrates the gaps in the literature, while the third section formulates the hypotheses. The fourth section highlights the methodology, while the fifth section presents and discusses the results. The final section summarizes the conclusions, implications, limitations, and future research.

2. Literature Review

This section contains a selective literature review on the determinants of ED determinants, and also on the wider aspect of CG. Haniffa and Cooke (2002) investigate a sample of 167 Malaysian firms for the year 1995. The findings indicate a negative significant relationship between independent non-executive directors, chairperson and the proportion of the family members on the boards and ED. Moreover, Gul and Leung (2004) investigate a sample of 385 Hong Kong firms for the year 1996. The results find that CEO duality and proportion of expert independent directors on the board are negatively correlated with voluntary disclosure including ED. Furthermore, firm size, profitability, the presence of audit committee, and firm growth were found to be positively correlated. In addition, Barako et al. (2006) examine a sample of 54 Kenyan firms over the period 1992-2001. The results indicate that audit committee existence, institutional ownership, foreign ownership, firm size, and leverage are positively correlated with the voluntary disclosure including ED; the board

composition is negatively correlated, while the board leadership structure is not correlated.

Moreover, Sun et al. (2010) examine a sample of 245 UK firms for the year ended in March 2007. They find no significant statistical relationship between various measures of earnings management and the ED. They find also that audit committee diligence, but not board size, affects the relationship between the ED and earnings management. AbuRaya (2012) examine a sample of 229 UK firms with 916 firm-year observations, during the years 2004-2007. The study finds that the average ED is 38.44%, and that higher ED quantity is related with a lower percentage of independent non-executive directors on the board, Chairperson/CEO separation, higher frequency of board meetings, greater cross-directorships of board members, presence of board-level environmental responsibility committee, and lower ownership concentration. Rao et al. (2012) examine a sample of 100 Australian firms for the year 2008. The results demonstrate a significant positive correlation between the proportion of independent and female directors on the board and ED. Said et al. (2013) investigate Malaysian public listed firms during the year 2009. The analysis finds positive significant correlations between independent chairpersons, the chairperson's age, the existence of a CEO with a law background and the industry type with ED.

A number of relevant studies have been published in 2014. Peters and Romi (2014), investigates a sample of 1,238 firm-year observations of US firms, during 2002 to 2006. The findings indicate a positive significant relationship between presence of environmental committees, a sustainability officer and the ED and that expertise of both of them are positively correlated with greater ED transparency, but committee size is negatively correlated. Cormier et al. (2014) investigates 172 Canadian firms subject to mandated ED for the year 2008. The study finds that mandated ED does not relate to analysts' information set in the presence of good CG but it does for firms with weak CG; therefore, the study concludes that mandatory disclosure may act as an environmental governance mechanism. Giannarakis et al. (2014) examine a sample of 100 of large-sized US firms listed on the Standard & Poor's 500 Index, during 2009 to 2012. The results reveal that the more polluting firms tend to disclose greater levels of CSR information including the ED, and that CEO duality and the presence of women on the board do not affect the extent of CSR disclosure.

Finally, very few studies were found on Saudi Arabia. One early study, Al-Khuwiter (2005), distributed a questionnaire to 100 financial managers, 102 auditors, and 91 accounting academics. The findings indicate a significant weakness in the adoption of environmental accounting and disclosure practices in Saudi Arabia and that the two main drivers of the environmental accounting and disclosure are the image of the firm and adherence to local environmental laws. Another study on Saudi Arabia is Al-Janadi et al. (2013), which examines 87 annual reports of Saudi firms listed in 2006 and 2007. The study finds that the lowest disclosure category is ED with an average of 14.61%. However, the study finds that non-executive directors, board size, CEO duality, audit quality and government ownership are positively associated with disclosure levels.

To conclude, most ED studies are conducted on developed countries, such as the USA, the UK, Australia, and Canada. In addition, the majority of studies focus on only one year's worth of data, confirming the findings of Saleh et al. (2010) and Giannarakis et al. (2014). Moreover, only a few studies address the relationship between CG and ED, especially in developing countries, compared to other categories of voluntary disclosure. Finally, to the best of our knowledge, only two studies have been conducted in relation to Saudi Arabia, but both have a number of deficiencies. Al-Khuwiter (2005) does not address CG or any of its variables and furthermore is dated. Al-Janadi et al. (2013) examine only old two years, 2006 and 2007, and use a small sample size of only 87 annual reports.

3. Hypotheses Development

Audit Committee Effectiveness

The audit committee is one of the main CG mechanisms and a key pillar of CG systems. The aim of the committee is to improve control and monitoring of managers' decisions, as well as the integrity of financial reporting (Fama, 1980; Fama and Jensen, 1983; Abdel-Fattah, 2008). CG codes around the world require certain characteristics for the composition and structure of audit committees, such as independence, expertise, and diligence. Thus, Section 14 of the 2006 Saudi CG code stipulates that each firm should construct an audit committee comprising at least three non-executive directors, with at least one director specialized in financial and accounting affairs.

The characteristics demanded by CG codes are supported by research. According to Bryan et al., (2004) and Soliman and Ragab (2014), the activity of audit committees, measured by the frequency of their meetings, improves disclosure quality and quantity. Furthermore, independence is a crucial characteristic for auditors, boards, and audit committees. Agency theory suggests that independence reduces agency costs and information asymmetry. Finally, Madawaki and Amran (2013) and Soliman and Ragab (2014) find that audit committee expertise enhances the reporting quality. Accordingly, we believe that effective audit committees comprising the necessary expertise, holding frequent meetings, and containing independent external directors are more likely to

encourage or force the managers comply with stakeholders' needs for ED. Therefore, the study's first hypothesis is:

H1: There is a positive correlation between audit committee effectiveness and environmental disclosure.

Board Independence

Board independence is measured by the proportion of non-executive directors on the board. A high proportion of non-executives is a signal of strong CG that will motivate transparency and disclosure levels (Gul and Leung, 2004; AbuRaya, 2012). Agency theory supports the role of non-executive directors on the board. Moreover, Forker (1992), Abdel-Fattah (2008), and Htay et al. (2012) argue that appointing non-executive directors to the board will result in higher disclosure levels of the material matters of firms. Accordingly, non-executive directors are more likely to encourage managers to comply with stakeholders' needs for the ED. Therefore, the study's second hypothesis is:

H2: There is a positive correlation between board independence and environmental disclosure.

Role Duality

In certain firms, the board chairperson also serves as the CEO; this is termed role duality. However, separation of the roles is thought to enhance the board independency and improve reporting quality (Forker, 1992; Jensen, 1993; Abdel-Fattah, 2008; AbuRaya, 2012). Several studies, such as Forker (1992), Haniffa and Cooke (2002), Gul and Leung (2004), and AbuRaya (2012), find that chairperson/CEO separation is positively correlated with voluntary disclosure levels including the ED. Moreover, the agency theory believes that an independent chairperson provides the board with strong powers to monitor and demand sufficient disclosure (Al-Janadi et al., 2013). Accordingly, we argue that an independent chairman is less likely to conceal material information on environmentally sensitive activities, since he/she is not directly engaged in executing these activities. Furthermore, it may induce him/her to disclose more environmental information. Therefore, the study's third hypothesis is:

H3: There is a negative correlation between role duality and environmental disclosure.

Family Ownership

A large number of firms in the developing world, including Arab countries, are family-owned and controlled (Abdel-Fattah, 2008; Baydoun et al., 2013). Typically, company ownership in Saudi Arabia is family-concentrated (Al-Lehaidan, 2006; Ghazwy, 2010; Al-Janadi et al., 2013; Albassam, 2014). Moreover, Ho and Wong (2001) and Haniffa

and Cooke (2002) find that family-controlled firms are less likely to disclose more information. However, Block and Wagner (2010) and Ghazwy (2010) argue that family firms usually recognize the importance of social responsibility and therefore, in addition to achieving financial objectives, work to maintain a satisfactory social and environmental performance. We argue that family firms tend to play a positive social role, to improve the image, prestige, and reputation of their families. Therefore, the study's fourth hypothesis is:

H4: There is a positive correlation between family ownership and environmental disclosure.

State Ownership

State ownership could play a key role in encouraging firms to respect the environment and be transparent about their sensitive environmental activities. In general, governments are expected to work for the good of the public, and protect their populations from threats to their lives. As they defend the state boundaries from external enemies, they must also protect the health of the populace from environmental and industrial threats. In this context, governments issue environment-protection regulations for firms to apply. Thus, governments should provide an effective example in applying these regulations, in firms in which they hold a large shares ratio. Therefore, high state ownership could be an effective CG mechanism (Claessen et al., 1999; Zeitun and Tian, 2007). Moreover, Al-Janadi et al. (2013) find a positive correlation between state ownership and voluntary disclosure including ED in a sample of Saudi firms. Accordingly, the study's fifth hypothesis is:

H5: There is a positive correlation between state ownership and environmental disclosure.

Institutional Ownership

Agency theory suggests that institutional investors could be an effective monitoring mechanism for ED (Jensen and Meckling, 1976; Abdel-Fattah, 2008; AbuRaya, 2012). This suggestion is consistent with the efficient-monitoring hypothesis, which suggests that institutional investors are sophisticated and have greater expertise, resources and power than other investors, which enable them to effectively monitor managers' decisions (Guan et al., 2007; Abdel-Fattah, 2008; AbuRaya, 2012). However, the passive hands-off hypothesis suggests that institutions are passive and short-term investors that prioritize their financial interests (Porter, 1992; Claessens and Fan, 2002). In relation to ED, Barako et al. (2006), Saleh et al. (2010) and Htay et al. (2012) find a positive relationship with institutional ownership. In line with these findings, this study believes in the positive role of institutional investors as suggested by agency theory and the efficient-monitoring hypothesis.

Therefore, we examine both aspects, through the following hypothesis:

H6: There is a positive correlation between institutional ownership and environmental disclosure.

4. Methodology

Sample and Data

The study population covers all listed firms on the Saudi Stock Exchange between 2007 and 2011. Table 1 shows the distribution of firm-year observations by year. The initial sample included 694 firm-year observations, which is reduced by 172 observations of financial and insurance firms. Next, the initial sample is reduced by 255 observations because of missing data on the study variables, which results in a final sample of 267 observations. The observations with missing data reduced gradually over time which may be due to the application of the Saudi CG code in 2007. The companies' annual reports are the main data sources, and were obtained from www.tadawual.com.sa.

Table 1. The study sample firm-year observations

	2007	2008	2009	2010	2011	Total
Initial Sample	111	129	146	152	156	694
Less: Financial and Insurance firm-year observations	(28)	(32)	(36)	(38)	(38)	(172)
Less: Firm-year observations with missing data	(64)	(58)	(52)	(44)	(37)	(255)
Final Sample	19	39	58	70	81	267

The Study Model

We use the following multiple regression model for the panel data fixed effects analysis, in order to test the study's hypotheses.

$EnDIndex_{it} = \beta0 + \beta1\ ACscore_{it} + \beta2\ Brdindp_{it} + \beta3\ RolDual_{it} + \beta4\ Famown_{it} + \beta5\ Stateown_{it} + \beta6\ Instown_{it} + \beta7\ ROA_{it} + \beta8\ Levrg_{it+} \beta9\ IndSen_{it} + \beta10\ Size_{it} + \varepsilon$

Dependent Variable

The ED index is the model dependent variable. To measure its extent, we adopt three steps, as followed previously in the literature (e.g., Botosan, 1997; Rizk, 2006; AbuRaya, 2012). First, we constructed an ED checklist covering five categories-environmental expenditure, pollution abatement, environmental preservation, recycling programs, and environmental award-based on the available information and the social responsibility standard, ISO 26000. Second, we examined the annual reports of the sample firms using manual content analysis in order to determine the checklist-items that are actually disclosed for each firm-year observation; we assigned one if the item is disclosed and zero otherwise. Third, we calculated the total number of items actually disclosed for each firm-year observation and divided this number by the total number of the checklist items, which results in a disclosure index value for each firm-year observation. We use the following equation:

$$EnDIndexit = \frac{\Sigma\ Actual\ Items\ Disclosed}{Total\ Checklist\ Items}$$

Independent and Control Variables

The independent variables can be classified into three groups. The first group consists of three CG variables; audit committee effectiveness, board independence, and role duality. We use an aggregate score to represent the overall audit committee effectiveness, instead of examining each characteristic individually. The aggregate score is used by Brown and Caylor (2006) and Jiang et al. (2008), among others. The second group includes three ownership variables; family ownership, state ownership, and institutional ownership. The third group includes four corporate characteristics, as control variables; profitability, leverage, industry, and firm size.

In relation to the control variables we make four assumptions. First, we believe that profitable firms can afford the costs of additional disclosure, as well as the costs of applying environment-protection procedures, which may influence positively ED. Second, highly leveraged firms may disclose less environmental information, since they may prefer to retain extra voluntary disclosure costs to pay debts. Third, the ED may vary between sensitive and non-sensitive industries; therefore, we included a dummy variable that differentiates between both industries types, with the expectation of a positive correlation. Fourth, larger firms can have a larger number of stakeholders; therefore, they may be under more pressure to disclose environmental information than small firms. Accordingly, we examine these beliefs by including the four control variables, return on assets (as a proxy for profitability), firm leverage, industry sensitivity and firm size. Table 2 presents the study variables and their measurements.

Table 2. The Study Variables' Definitions and Measurement

Symbol	Definition	Measurement
Dependent Variable:		
EnDIndexit	Environmental Disclosure Index	The ratio of sum of ED items disclosed by a firm i for the year t to the total number of ED items in the checklist.
Independent Variables:		
ACscore$_{it}$	Audit Committee Score	It is a dummy variable that takes the value one if the AC of the firm i and the year t, consists of fully independent members, with at least three members, one of whom is a financial expert, and holds at least three meetings a year, and zero otherwise.
Brdindpit	Board Independence	This variable equals the proportion of outside directors to total number of directors on the board for the firm i during the year t.
RolDualit	Role Duality	This variable is a dummy variable that equals one if the board chairman is also the CEO of the firm i and the year t, and zero otherwise.
Famown$_{it}$	Family Ownership	This variable equals the ratio of number of shares held by family members to the total number of outstanding shares of the firm i and the year t.
Stateownit	State Ownership	This variable equals the ratio of number of shares held by the Saudi government or any of its agencies to the total number of outstanding shares of the firm i and the year t.
Instownit	Institutional Ownership	Institutional ownership is measured as the ratio of number of shares held by institutional investors to the total number of outstanding shares of the firm i and the year t.
Control Variables:		
ROAit	Return on Assets	It is a proxy for firm performance, that is the ratio of total net income to the total assets of the firm i and the year t.
Levrgit	Firm Leverage	This variable equals the total debts divided by the total assets of the firm i and the year t.
IndSenit	Industry Sensitivity	It is a dummy variable that equals one if the firm i during the year t belongs to one of the following sensitive industries: chemicals, petrochemicals and engineering, and cement industries, and zero otherwise.
Sizeit	Firm Size	This variable is measured as the natural logarithm of total assets of the firm i and the year t.

5. Results and Discussion

Descriptive Statistics

Table 3 displays the descriptive statistics of all the model variables. First, the mean value of *EnDindex* is 0.30, indicating that the average ED of the sample firms is 30% during the years 2007-2011, which is more than double the 14.61%, found by Al-Janadi et al., (2013) for a sample of Saudi firms during 2006-2007. This improvement in ED extent may be due to the application of the Saudi CG code in 2007. Second, the mean value of *ACscore* is 0.26, implying that 26% of the sample audit committees can be deemed effective, since they consist of fully independent directors, with at least three directors, one of whom is a financial expert, and hold at least three meetings a year. Third, the *Brdindp* mean value is 0.52, indicating that on average more than half of the boards' directors of the sample firms are independent. However, the mean value of *RolDual* is 0.85, which implies that on average 85% of the sample boards' chairpersons play a dual role as board chairmen and CEOs. This mean is very high if compared with 0.04% found by AbuRaya (2012) for a sample of UK firms.

Table 3. Descriptive statistics (N= 267)

Variable	Mean	Median	Max	Min	SD.
$EnDIndex_{it}$	0.30	0.00	4.00	0.00	0.79
$ACscore_{it}$	0.26	0.33	1.00	1.00	0.81
$Brdindp_{it}$	0.52	0.50	1.00	0.00	0.22
$RolDual_{it}$	0.85	1.00	1.00	0.00	0.36
$Famown_{it}$	0.15	0.00	0.95	0.00	0.24
$Stateown_{it}$	0.08	0.00	0.83	0.00	0.17
$Instown_{it}$	0.13	0.00	0.66	0.00	0.19
ROA_{it}	0.10	0.07	7.18	-0.59	0.40
$Levrg_{it}$	0.10	0.04	0.62	0.00	0.15
$IndSen_{it}$	0.25	0.00	1.00	0.00	0.43
$Size_{it}$	9.24	9.22	11.05	7.18	0.69

Fourth, the descriptive statistics of ownership variables shows that 15%, on average, of the sample firms' outstanding shares are owned by families, followed by 13% by institutional investors, and 8% by government agencies. Furthermore, the maximum values are 95% for family ownership, 83% for state ownership, and 66% for institutional ownership. These results support the arguments of Al-Lehaidan (2006), Al-Janadi et al. (2013), and Albassam (2014) that firm ownership in Saudi Arabia is family-concentrated. The mean value of *Levrg* is 0.10, which implies that the sample firms, on average, do not suffer a severe debt problem. Furthermore, the mean value of *IndSen* variable is 0.25, indicating that 25%, on average, of the sample firms belong to one of the sensitive industries.

Correlation Matrix

Table 4 shows that the highest correlation between independent variables is 0.41 which is between state ownership and firm size, followed by -0.34 between board independence and institutional ownership. These correlations do not represent a harmful multicollinearity problem, since they are all less than 50%. Guajarati (1995) and Bryman and Cramer (2001) argue that correlation between independent variables of more than 80% can be considered to be a serious multicollinearity problem. Moreover, a positive correlation of 0.30 between *EndIndex* and *IndSen* implies that firms in the sensitive industries' category may report greater levels of ED than do other firms, and a positive correlation of 0.24 between *EndIndex* and *ROA* indicates that profitable firms may report greater levels of ED than do less profitable firms. However, *Brdindp and Famown* variables seem to be less correlated to *EnDIndex*, while *size* was not correlated at all.

Table 4. Correlation Matrix

Variabl	EnDInd	ACsco	Brdin	RolDu	Famo	Stateo	Insto	RO	Levr	IndSe	Siz
EnDInd	1.00										
ACscor	-0.12	1.00									
Brdindp	-0.01	0.15	1.00								
RolDual	0.15	0.14	0.02	1.00							
Famow	0.05	0.07	-0.18	0.17	1.00						
Stateow	0.10	0.02	-0.04	0.07	-0.20	1.00					
Instown	0.19	-0.01	-0.34	0.05	0.23	-0.26	1.00				
ROA	0.24	0.00	-0.12	0.21	-0.10	0.32	0.14	1.00			
Levrg	-0.09	-0.16	-0.11	0.00	-0.07	-0.05	0.26	0.18	1.00		
IndSen	0.30	-0.05	0.24	-0.04	-0.29	0.26	-0.09	0.26	0.07	1.00	
Size	0.00	-0.01	-0.14	0.09	0.18	0.41	0.15	0.02	0.29	0.18	1.0

Regression Results

Table 5 displays the regression analysis results. Regarding the CG variables, the coefficient of the variable *ACscore* was found to be positive and statistically significant at 1% ($\beta1= 0.265$, t-statistic= 2.650), which implies that firms with effective audit committees report ED more than do other firms. This result is consistent with arguments of Bryan et al. (2004), Madawaki and Amran (2013), and Soliman and Ragab (2014) that audit committee effectiveness improves disclosure quantity and quality. The result confirms our hypothesis that effective audit committees are more likely to induce or force managers to comply with the increased needs of ED. Therefore, we accept the study's first hypothesis.

The coefficient of the variable *Brdindp* was found to be positive, but statistically insignificant *(β2=0.145, t-statistic=0.470)*, which indicates that board independence may not be a determinant of the ED, in Saudi Arabia. This result is inconsistent with Rao et al. (2012), Htay et al. (2012), and Janadi et al. (2013), who find a positive correlation, and with Haniffa and Cooke (2002), Barako et al. (2006), and AbuRaya (2012), who find a negative correlation. Therefore, we reject the study second hypothesis.

The coefficient of the variable *RolDual* was found to be positive and statistically significant at

10% (β3= 0.358, t-statistic= 1.790), indicating that firms with boards' chairpersons who serve jointly as CEOs, report more ED than other firms. The result contradicts agency theory and findings of previous studies, such as Forker (1992) and Haniffa and Cooke (2002), and AbuRaya (2012) However, Al-Janadi et al. (2013) find a similar result from a sample of Saudi firms. This result can be explained by Stewart (1991) and Heracleous (2001) who argue that role duality could enhance decision making and enable boards to provide adequate monitoring.

Table 5. The Regression Analysis Results

Symbol	Definition		Coef.	t- statistic	P> t
Cons.	Model Constant	β0	0.702	0.730	0.465
ACscore$_{it}$	Aggregated AC score	β1	0.265	2.650	0.009***
Brdindp$_{it}$	Board Independence	β2	0.145	0.470	0.639
RolDual$_{it}$	Role Duality	β3	0.358	1.790	0.075*
Famown$_{it}$	Family Ownership	β4	0.364	1.260	0.210
Stateown$_{it}$	State Ownership	β5	0.318	1.690	0.094*
Instown$_{it}$	Institutional Ownership	β6	1.093	3.100	0.002***
ROA$_{it}$	Firm profitability	β7	1.327	1.970	0.050**
Levrg$_{it}$	Firm leverage	β8	-0.456	-2.290	0.023**
IndSen$_{it}$	Industry sensitivity	β9	0.616	3.990	0.000***
Size$_{it}$	Firm size	β10	-0.079	-0.780	0.438
Additional Statistics					
N= 267	F-value = 5.720	Prob>F = 0.000		Overall R-sq = 0.2430	

*Significant at 1%, **Significant at 5%, ***Significant at 10%

Regarding the ownership variables, the coefficient of the variable *Famown* was found to be positive, but statistically insignificant *(β4=0.364, t-statistic=1.260)*, implying that family ownership may not be a determinant of ED in Saudi Arabia. This result is consistent with that of Ghazwy (2010) who finds no significant correlation in Saudi Arabia. In contrast, the analysis demonstrates that the coefficient of the variable *Stateown* was found to be positive and statistically significant at 10% *(β5=0.318, t-statistic= 1.690)*, indicating that firms with higher state ownership disclose more environmental information than do other firms. Our explanation for the positive correlation is that governments work for the interests of the public and regularly issue environment-protection regulations, and therefore, they are expected to provide a positive example for compliance with these regulations. Our result confirms the previous arguments of Claessen et al. (1999) and Zeitun and Tian (2007) that high state ownership could be an effective CG mechanism by which to improve transparency. Furthermore, our result confirms the positive correlation found by Al-Janadi et al. (2013) in Saudi Arabia. Accordingly, we accept the study's fifth hypothesis.

The results also show that the coefficient of *Instown* variable was found to be positive and statistically significant at 1% *(β6= 1.093, t-*

statistic=3.100), which confirms the correlation (0.19) found by the correlation matrix. This result indicates that firms with high institutional ownership are more likely to disclose more environmental information. This result confirms the agency theory suggestion of a positive influence of institutional ownership on transparency, as well as the arguments of the efficient-monitoring hypothesis. Moreover, the result confirms the findings of Barako et al. (2006), Saleh et al. (2010) and Htay et al. (2012), who establish a positive correlation. Accordingly, we accept the study's sixth hypothesis.

In relation to the control variables, the analysis found that the coefficient of the *ROA* was positive and statistically significant at 5% *(β7= 1.327, t-statistic= 0.050)*, which confirms the correlation (0.24) as reported in the correlation matrix. This implies that highly profitable firms report higher levels of environmental information than do less profitable firms, which confirms our argument that profitable firms can afford the extra costs of ED. Our result is consistent with that of Gul and Leung (2004). The coefficient of the *Levrg* variable was found to be negative and statistically significant at 5% *(β8= -0.456, t-statistic=-2.290)*, indicating that highly leveraged firms are less likely to disclose higher levels of environmental information, which is consistent with the negative correlation (-0.09) found

by the correlation matrix. This result confirms our argument that highly leveraged firms may prefer to save the extra voluntary disclosure costs in order to pay debts, which reduces the level of ED. This result is consistent with that found by Cormier and Magnan (2003), but inconsistent with that of Barako et al. (2006). The analysis found also that the coefficient of the variable *IndSen* was positive and statistically significant at 1% *(β9= 0.616, t-statistic= 3.990),* which confirms the positive correlation (0.30) reported by the correlation matrix. This result indicates that firms that belonging to the sensitive industries' category report higher levels of environmental information than do other firms. This result confirms our expectations and the arguments of Said et al. (2013). Finally, the coefficient of the *Size* variable was found to be negative, but statistically insignificant *(β10= -0.079, t-statistic= -0.780),* which confirms the correlation matrix result that firm size is not correlated (0.00) with ED. Therefore, firm size cannot be deemed a determinant of ED.

To conclude, audit committee effectiveness, role duality, state ownership, institutional ownership, firm profitability, and industry sensitivity were found to be positively and statistically correlated with the ED index. Furthermore, firm leverage was found to be negatively and statistically correlated with the ED index. However, board independence, family ownership, and firm size were found not to be statistically correlated with the ED index.

6. Conclusion

This study evaluates ED practices and its determinants in Saudi Arabia following the application of the Saudi 2006 CG code. Saudi Arabia is one of the largest economies in the Middle East holding 25% of the world oil reserves and contributing 25% of the Arab world's GDP; however, despite the importance of the economy there has been a lack research in the area of ED in the Kingdom. We use manual content analysis and a self-constructed ED checklist to examine annual reports of a sample of 267 firm-year observations from 2007 to 2011. The results find that the average ED extent is 30%, more than double the 14.61% found by Al-Janadi et al. (2013) for a sample of Saudi firms in the period 2006-2007. Furthermore, the analysis concludes that firms with effective audit committees, role duality, high state and institutional ownership, and high profitability rates, as well as those that belong to the sensitive industries' category report greater levels of environmental information than do other firms. Moreover, firms with high leverage levels were found to report less environmental information. However, no statistical significant correlations were found for board independence, family ownership, and firm size. Our results confirm agency theory suggestions that CG mechanisms, such as audit committees and state and institutional ownerships could enhance transparency, and thus, disclosure levels. However, our results on role duality contradict agency theory suggestions that chairperson/CEO separation increases transparency levels.

The study results provide important implications. For GC regulators, the results emphasize the importance of effective audit committees, and state and institutional ownership in enhancing the transparency on the material environmental matters. In this context, governance codes should emphasize specific minimum characteristics of CG mechanisms, such as independence, expertise, and activity of audit committees. Furthermore, stakeholders should exert greater pressure on managers to disclose greater disclosure on environmental matters, since disclosure levels are still moderate. In addition, they should recognize that financially healthy firms, those with high profit levels and lower leverage, are more likely to present greater levels of ED, while other firms may prefer to save extra disclosure costs, in order to enhance performance or pay debts. This may help to determine the ED expectations before investing in a specific firm.

The study has a number of limitations, which invites future research. First, the sample size is relatively small, and the study period is restricted to 2007-2011. Further research should expand the sample size and period to better generalize and validate the results. The study examines only the period following the application of the Saudi 2006 CG code; however, a broader conclusion can be reached when comparing the years prior to the introduction of the code in 2007. Further research could include a comparison study between ED practices before and after the application of the code, to better evaluate the effectiveness of the code. Future research in the ED context can also include more variables, such as number and extent of environmental fines, and the presence of environmental prosecutions against the firms. A research question to be investigated is: could environmental prosecutions and fines be the main drivers of firms to give greater attention to environmental matters, and thus, the ED?

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