Australian Corporate Responses to Climate Change: The Carbon Disclosure Project

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by

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Abstract

Climate change issues have increasingly attracted government, business and professional attention in recent years. More specifically, there is mounting evidence that indicates that human induced carbon emissions are a major cause of climate change. The objective of the Carbon Disclosure Project (CDP) is to ensure that investors are better informed about the risks and opportunities facing these companies due to climate change (CDP 2007). The CDP has requested carbon, water, and climate change information from companies in some sixty countries worldwide to date. This study examines the determinants of firms who responded to the CDP questionnaire in 2010 and finds that firm size and membership of a polluting industry are significant factors.

Keywords: Sustainability, CDP project, legitimacy theory, CSR
Australian Corporate Responses to Climate Change: The Carbon Disclosure Project

1. Introduction

Climate change issues have increasingly attracted government, business and professional attention as mounting evidence indicates human induced carbon emissions as the major cause, that will lead to global environmental and economic devastation in the foreseeable future (Stern 2006). The adoption of the Kyoto Protocol in 1997 led to substantial stakeholder and government activities in some countries to combat climate change. However the then Australian Howard led government refused to ratify this agreement (United 1998). It was not until 2007 that the Australian Labor Party signed the Kyoto Protocol on 3 December, and ratified it on 11 March 2008, to fulfil an electoral promise.

While there is increasing demand from various stakeholder groups for companies to publicly report information on their climate change-related business practices, Australia has also been slow to act in terms of greater regulation to mandate corporate responsibility and sustainability reporting (Kent and Monem 2008). Hence the adoption of sustainability reporting in Australia is currently voluntary and is likely to remain so in the foreseeable future. Of particular concern in the Australian context is its high energy consumption and reliance on fossil fuels which cause significant greenhouse gas (GHG) emissions, notably the highest per capita emissions in the world (Australian Greenhouse Office 2006). According to the Australian Greenhouse Office (2006) the main sectors that are responsible for Australia’s GHG emissions are electricity, gas and water (35%), agriculture, forestry and fisheries (24%), manufacturing (13%), services and construction (11%), residential (9%) and mining (8%).
Financial statement disclosure of carbon emissions is also not mandatory for corporate organisations in most countries. However, corporate disclosure on climate change and determinants of climate change disclosure has become the focus of much research in recent years (Kolk et al. 2008, Haque and Deegan 2010, Freedman and Jaggi 2005, Stanny and Ely 2008, Reid and Toffel 2009).

The Carbon Disclosure Project (CDP), headquartered in London, is an independent not-for-profit organisation concerned with the disclosure of corporate climate change information. The CDP is an international collaboration of institutional investors that has called upon the largest quoted companies worldwide to report on various aspects of their carbon profile and carbon management. The objective of the CDP is to ensure that investors are better informed about the risks and opportunities facing these companies due to climate change (CDP 2007). The CDP has requested carbon, water, and climate change information from companies in some sixty countries worldwide to date and over 6,000 companies. The global offices and international partner organisations of the CDP are widely located in more than 25 countries, with offices for example in New York, Berlin, Sydney, Tokyo, Milan, and Beijing.

In 2006, Australia and New Zealand were categorised as new geographical locations by the CDP for requesting carbon information. For the period 2006 to 2007 Australian firms targeted by the CDP were limited to the ASX100, which was subsequently expanded in 2008 to include the ASX 200. Over a five year period the number of Australian firms responding to the CDP has increased substantially from 55 firms in 2006, 59 in 2007, 96 in 2008, 104 in 2009 and declining slightly to 94 in 2010. Explanation provided by companies chose not to respond in that year centred on resource constraints driven by financial crisis and the requirements of other regulations such as the National Greenhouse and Energy Reporting Act 2007 (CDP 2010). Responding to the CDP
questionnaire by companies is completely voluntary. Hence, the current study aims to identify
the major driving factors that motivate companies such as the ASX 200 in Australia to provide
carbon information to the general public. Scientific evidence indicates that Australia has already
begun to experience significant climate change as a result of the harmful effects of global
warming (Preston et al. 2006). Their research further predicted that climate change would have
detrimental environmental and economic impacts on Australia with reduced rainfall, increasing
droughts and intensifying bushfires, as well as more intense cyclones and flooding. Therefore a
wide range of industries in Australia are likely to be affected by the potential economic and
social impacts of climate change.

This paper investigates the relationship between CDP respondents and firm characteristics such
as size, leverage, and membership of a polluting industry. It conducts logit regression and finds
that both size and membership of a polluting industry are determinants of a firm's decision to
respond to the CDP questionnaire. Factors such as block holder membership and auditor are not
significantly associated with the choice to respond. This paper contains the following sections.
Section 2 discusses the CDP project and the trend in responses over the last five years. Section 3
presents the theoretical framework and literature review related to this study. Section 4 outlines
the hypotheses, section 5 the sample and research methodology. Section 6 discusses the results
and section 7 concludes the study and discusses future research opportunities.

2. The CDP Project

2.1 Background
There are five programs and two initiatives currently being run by the CDP. The five programs
include Investor CDP, CDP Supply Chain, CDP Public Procurement, CDP Water Disclosure
and CDP Cities. Carbon Action and CDP Mittelstand Initiatives are two new programs introduced in 2011. The timeline of CDP development is illustrated in Table 1.

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By the end of 2010, the CDP acted on behalf of 534 institutional investors (known as signatories) including banks, pension funds, asset managers and insurance companies with assets of US$64 trillion, for example HSBC, Morgan Stanley, National Australia Bank, Bank of America, Goldman Sachs and Nedbank. This represents huge growth compared to just 35 signatory investors in May 2002 representing assets of only US$4.5 trillion. Questionnaires have been sent out to the Global 500 firms by market capitalisation, on 1 February every year since 2003 to request climate change data under the Investor CDP program. The deadline for companies to respond to the questionnaire is 31 May of every year. Firms’ responses to the CDP are classified into four categories, namely Answered Questionnaire (AQ), Provided Information (IN), Declined to Participate (DP) and No Response (NR). These classifications are published in the year-end reports and are available for download on the CDP website. Commencing in 2009, responding firms were also asked to decide the accessibility of their disclosure to the CDP in terms of “Public” and “Not Public”, which are disclosed on the CDP reports during September to December each year. The answered questionnaires of those responding firms that choose to be “Public” can be freely downloaded from the CDP website. “Not Public” climate change data is kept by the CDP and is not released to the public.

2.2. The Investor CDP questionnaire 2010

The Investor CDP questionnaire 2010 includes five sections: Governance; Risks and Opportunities; Strategy; GHG accounting; Energy, Fuel use, and Trading, and Climate Change
Communications. There are twenty-two lead questions (level 1) in the 2010 Investor CDP questionnaire. For example, a lead question would be “Do current and/or anticipated regulatory requirements related to climate change present significant risks for your company?” Depending on the answers to the lead questions, the conditional questions (level 2 and level 3) would be raised. Under the Governance section, firms are asked to provide information on responsibility for climate change within the organisation and the associated individual performance incentives given for managing climate change. For Risks and Opportunities, companies are requested to identify their regulatory, physical, and other risks and opportunities related to climate change. Under the Strategy section of the questionnaire information on the company’s strategy and targets for emission reduction in terms of Scope 1 and Scope 2 emissions are requested. Firms are also asked to provide detailed information on Scope 1, Scope 2 and Scope 3 emissions data, as well as their boundary and methodology to derive those data, and emission trading schemes in which companies participate. The last section of the 2010 Investor CDP questionnaire requires firms to provide information and evidence on Climate Change Communications that the firms provide in other places, such as the Annual Report and Sustainability Reports.

2.3 Trend in disclosure over five year-period

Australia and New Zealand were firstly identified by Investor CDP as a new geographical location in 2006. From the period of 2006 to 2007, firms that were targeted by CDP were limited to ASX100, and that has been expanded to include ASX 200 from 2008 onwards. Within a short period of time, the number of Australian firms responding to CDP increased substantially, from 55 firms in 2006, 59 in 2007, 96 in 2008, 104 in 2009 and 94 in 2010 as indicated in table 2. Particularly in 2009, over 50% of ASX200 was using CDP as a mechanism for carbon disclosure.
The trend in CDP response regarding ASX 100 from 2006 to 2010 is indicated in Figure 1. For analysis purpose, the response for IN, DP and NR are grouped together as “No Answer”. The response rates for ASX 100 have grown considerably. It went from 55% response in 2006 to 59% in 2007, and 73% in the following two years. In 2010, there was a slight decrease downwards to 72% of response rate, but this already represents substantial growth from just 55% in 2006.

In terms of the public accessibility of carbon disclosure, 82.2% (60 firms) of responding ASX100 in 2009 were willing to release carbon disclosures to the general public, and the percentage increase to 87.5% (63 firms) in 2010 that is illustrated in Table 3 and Figure 2.

The Australian corporate response to CDP drops in 2010 as compared to 2008 and 2009, but the companies’ willingness to publicly release their carbon disclosure increases. This behaviour can be explained by organisational legitimacy theory. Firms’ decisions to answer CDP questionnaires, but not release the disclosure to the public, may be perceived by society as illegitimate or not operating within the bounds of the “social contract” (Donaldson 1982, Deegan
and Blomquist 2006). In order to reduce the legitimacy gap or illegitimacy, firms might change from not public to public releasing carbon disclosure to obtain legitimacy (Lindblom 1994). Firms will only react to the demands of ‘powerful stakeholders’ who control critical resources required by the organisation. The demands of stakeholders without such power will tend to be ignored as proposed by stakeholder theory (Ullmann 1985). Analysing Australian corporate responses to CDP over the five years period since 2006, indicates that the demand for carbon disclosures is certainly not ignored by Australian firms. The CDP itself, which represents the significant interests of institutional investors that control huge amounts of assets, could be considered to be a powerful stakeholder itself in the corporate world.

3. Theoretical Framework and Literature Review

3.1 Legitimacy and Stakeholder theory

The empirical studies of corporate environmental reporting have commonly employed legitimacy theory and stakeholder theory in an attempt to explain corporate disclosure practices. There have been a large number of research studies in corporate social and environmental disclosure area, which provide evidence supportive of legitimacy theory and stakeholder theory (O’Donovan 2002, Deegan and Blomquist 2006, Nasi and Nasi 1997, Brown and Degan 1998, Wallace 1995). Both of these theories are built on foundations provided by political economic theory that explicitly recognizes the power conflicts and various struggles occur between various groups within society (Deegan 2002). The current research employs both legitimacy and stakeholder theory to explain Australian firms’ GHGs emission disclosure practices to the CDP.

Legitimacy is defined by Suchman (1995, p.574) as “a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definition”. Legitimacy is a dynamic constraint on
organizational behavior (Dowling and Pfeffer 1975). Legitimacy theory posits that organizations continually seek to ensure that they operate within accepted norms of society (Brown and Degan 1998, Guthrie et al. 2004). Management is assumed to maintain an awareness of changes in social values which define legitimacy and respond accordingly within the legitimacy perspective (Deegan and Blomquist 2006). Society permits an organization to continue in existence so long as it meets its societal obligations continuously, because what was considered legitimate at one point in time might not be or appear to be legitimate in a subsequent period (Lindblom 1994, Deegan and Blomquist 2006). The idea of ‘legitimacy’ suggests that organizations are constraint to act in compliance with the terms of their “social contract”, representing a corporation’s indirect obligations to the society from a moral perspective and the multitude of explicit and implicit expectations society has about how the organization should conduct its operations (Donaldson 1982, Deegan and Blomquist 2006). Organizations are viewed as part of a social system, and they “are not considered to have any inherent right to resources, or in fact, to exist” (Deegan, 2002, p.292). If society perceives that the organization is operating outside the bounds of the ‘social contract’, and then society will revoke the organization’s ‘contract’ to continue its operation and the survival of the organization will be threatened (Deegan 2002).

Freeman (1984) also argues that a major role of corporate management is to assess the importance of meeting the demands of stakeholders so that to enable the firm to achieve its strategic objective. Stakeholder is defined by Gray, et al. (1996, p.45) as “any human agency that can be influenced by, or can itself influence, the activities of the organization in question”. Ullmann (1985) presents a three-dimensional model to explain the correlations among social disclosure and social and economic performance. The first dimension of the conceptual model is stakeholder power. It is argued that an organization will only react to the demands of “powerful stakeholders” who control critical resources required by the organization, the demands of
stakeholder without such power will tend to be ignored by the focal organization. This is consistent with the stakeholder concept suggested by Pfeffer and Salancik (1978):

> Our position is that organizations survive to the extent that they are effective. Their effectiveness drives from the management of demands, particularly the demands of interest group upon which the organizations depend for resources and support… (1978, p.243-44)

Therefore, different strategies are posited to be adopted by firms to fulfil the demands of stakeholders with different level of power intensity. Those strategies may range from avoiding the stakeholders’ demand to partial or total fulfilment of them (Ullmann 1985).

Stakeholder theory and legitimacy theory are emphasized by several studies as largely overlapping theories that provide consistent but slightly different insights for managerial behaviour motivations (Deegan 2002, Deegan and Blomquist 2006, O’Donovan 2002, Gray et al. 1995). It would be incorrect to treat legitimacy theory and stakeholder theory as two distinct theories, and it is further stated by Gray et al. (1995, p. 67):

> The difference theoretical perspectives need not be seen as competitors for explanation but as sources of interpretation of different factors at different levels of resolution. In this sense, legitimacy theory and stakeholder theory enrich, rather than compete for, our understandings of corporate social disclosure practices.

Therefore, the hypotheses tested in this research are derived from an application of both legitimacy and stakeholder theory.

### 3.2 Literature Review

Over the past 30 years research in Australia and overseas has investigated a broad range of corporate social responsibility (CSR) issues, with one stream attempting to assess the relationship between environmental disclosure, firm characteristics and external influences
(Trotman and Bradley 1981, Cowen et al. 1987, Patten 1991, Guthrie and Parker 1989, Deegan et al. 2002, Patten 2002, Brammer and Pavelin 2008, García-Ayuso and Larrinaga 2003, Gao et al. 2005, Brammer and Pavelin 2006). Researchers have shown that larger, more profitable firms and those in more social and environmental sensitive industries are expected to make greater use of social and environmental disclosure. Since the mid-1970s, many researchers have also attempted to examine the relationship between environmental performance and environmental disclosure (Fry and Hock 1976, Ingram and Frazier 1980, Wiseman 1982, Freedman and Wasley 1990, Patten 2002, Clarkson et al. 2008). Studies in this area have produced mixed results. Earlier studies tended to find no relationship, while more recent studies have found either significant negative (Patten 2002) or positive relationships (Clarkson et al. 2008).

In more recent years climate change-related issues have captured the attention of researchers. Based on theories of global governance, institutionalisation and commensuration, Kolk, Levy and Pinkse (2008) investigated the FT500 firms’ responses to climate change by closely analysing their CDP questionnaires from 2003 to 2007 based on geographical location. They argued that institutional investors have a key role to play in institutionalising carbon disclosure as a routine practice, by putting pressure on companies to disclose such information. Their results showed that the response rate increased from 2003 to 2005 but has remained constant since. Kolk et al (2008) however concluded that even though these reporting mechanisms have developed quickly, there are many problems in regards to the meaningfulness of this information, particularly for comparability and comprehensibility. Several reasons were provided to explain this finding. Firstly, that questions contained in CDP are very broad in nature; secondly, that most firms use a narrative style to answer the questionnaire; and thirdly, that the quantitative information provided by firms depends on the methodology chosen for estimation.
Stanny and Ely (2008) identified what drives US S&P 500 firms to disclose information about the effects of climate change to CDP. Results revealed that larger firms and firms belonging to FT500 for CDP4 (previous CDP inquiries) are more likely to disclose climate change information to the CDP. The degree of foreign sales is found to be positively associated with the firms’ propensity to answer the CDP questionnaire, which suggested that global firms have greater incentives to disclose. However, no significant association was found between institutional ownership and disclosure. Nonetheless, profitability, leverage, Tobin’s Q, industry and asset age appears not to relate to firms’ decisions regarding climate change disclosure.

Reid and Toffel (2009), another US based study, also investigated factors that relate to the S&P 500 firms’ decision to answer (or not answer) the CDP questionnaire in 2006 and 2007. The results of their study showed strong support that firms were more likely to answer the CDP questionnaire if they have been targeted by a shareholder resolution. Also, firms were more likely to agree to engage in practices consistent with the aims of a social movement, if the firm or others in their industry have already been targeted by a shareholder resolution on a related issue.

A recent study by Luo et al. (2010) examined corporate incentives to disclose carbon information to the CDP in the global context. They found that size, being in a country that has an ETS, belonging to a carbon incentive industry\(^1\), and being in a common law country were significantly positively related with firms propensity to disclose carbon information. Hence, influences from social, economic, and regulatory/institutional factors are significant. However, no significant relationship was found between market factors and firms’ decision to disclose carbon information.

\(^1\) Eight sector dummy variables, namely Consumer Staples, Energy, Healthcare, Industries, Information Technology, Materials, Telecommunications and Utilities, are included in the model of study. Only Utilities is found significant at 0.01 level, while Healthcare and Information Technology are significant at 0.1 level, which lead the authors to conclude that firms in carbon-incentive industries are more likely to disclose related carbon information.
carbon information. Therefore, it was concluded that the decisive determinants of carbon disclosure to the CDP comes from the attitude of the general public and government, rather than those market factors such as shareholders and debtholders (Luo et al. 2010). Thus, this study appears to support the scenario that investors do not take into account the companies’ emissions information for investment decision making purposes, which is in contrast to other studies that suggest the opposite (Lash and Wellington 2007, Schultz and Williamson 2005, Cotter and Najah 2011). Furthermore, firms that answered the CDP questionnaires but refused to release them to the public were considered to be non-disclosing firms in the study, which is different to previous studies that treated them as disclosing firms (Stanny and Ely 2008, Peters and Romi 2009).

An Australian based study by Cotter and Najah (2011) investigated stakeholder influence on global corporations’ climate change disclosures incorporated in their annual and sustainability reports. The Carbon Disclosure Leaders Index (CDLI) 2009 methodology was used to calculate disclosure scores for the sample corporations’ climate change disclosures. Three measures of corporate responsiveness to institutional investor expectations on climate change disclosures were applied to capture the stakeholder influence, namely a company’s decision to complete and make publicly available information included in the CDP questionnaire, the CDP disclosure score and an indication of CDP activities’ influence on corporate communications. By adopting a stakeholder engagement perspective, the results of the study showed significant positive relations between institutional investor influence and corporate climate change disclosure that confirm the important role of institutional investor influence in relation to the global companies climate change disclosure practices. However, Luo et al. (2010) found that emissions disclosures were not driven by major stakeholders that are used to proxy for market factors.
Rankin, Windsor and Wahyuni (2011) examined whether the existence of internal organisation systems and external factors leads to voluntary carbon emission disclosure, based on a sample of 187 firms listed on the Australian Stock Exchange in 2007. They provided evidence that firms disclosing GHG emissions information are more likely to have also implemented an environmental management system (EMS), have stronger government systems, make publicly available disclosure to the CDP, are larger, and operate in either the energy & mining, or industrial sector. Companies that have an ISO14001-certified EMS, use the Global Reporting Initiative (GRI) to guide substantiality disclosure and disclose to the CDP with publicly access are more likely to present credible GHG emissions disclosures.

In summary, previous studies have shown that to date there is very little research that has focused upon CDP reporting in the Australian context. Therefore this study contributes to the literature by investigating all ASX 200 firms’ responses to the CDP questionnaire. A binary logistic regression will be used to determine if there is an association between a firm's decision to disclose and firm characteristics such as size, leverage, ownership and polluting industry.

4. Hypotheses development

This section develops a number of hypotheses relating a firm's decision to respond to the CDP questionnaire to various firm characteristics and stakeholder power variables. Based on legitimacy and stakeholder theory, firms are likely to respond to the CDP in an attempt to maintain the ‘social contract’ (Donaldson 1982, Deegan 2002, Deegan and Blomquist 2006) and balance the conflicting demands of stakeholders (Ansoff 1965, Freeman 1984, Deegan and Blomquist 2006). The hypotheses are discussed in detail below.
Blockholders, proxy for stockholder power, are parties who held 5% or more of the companies’ stock (Roberts 1992), and they are considered to be one particular group of powerful stakeholder according to the stakeholder theory. According to Keim (1978), the demand of information from the corporation by shareholders becomes broader when the distribution of ownership of a corporation becomes less concentrated. Disperse corporate ownership, especially by shareholders concerned with carbon emissions, heightens pressure for management to disclose climate change information (Ullmann 1985). Therefore, an inverse relation is predicted between the percentage of block holders’ ownership and the response.

**H1: Firms with lower percentage of block holders are more likely to respond to the CDP.**

Larger firms are under greater scrutiny and attract more public attention than smaller firms, so they are more likely to provide disclosures (Stanny and Ely 2008). According to Luo et al (2010), larger firms face greater social pressure to provide carbon disclosure because public have higher expectation for environmental performance of larger firms. Non-disclosing firms will give the impression to the public that they ignore the risks of climate change, and society and stakeholders may penalize them by deriving their rights of continued operation or existence (Luo et al. 2010, Deegan and Rankin 1997). In addition, previous environmental studies demonstrated evidence of positive size-disclosure relation (Patten 1991, Clarkson et al. 2008, Luo et al. 2010). Larger firms attract greater scrutiny from stakeholders, which indicate higher legitimacy exposures, so it can be argued that large firms are more likely to respond the CDP questionnaire to alleviate the potential legitimacy risks. In this study, we use the natural logarithm of market capitalisation as a proxy for firm size. Hence, we propose that:
H2: larger firms are more likely to respond to the CDP.

Firms in polluting industries, i.e. energy and utilities, face greater public concerns than others. Industries whose business operations negatively influence the environment are facing greater legitimacy risk. Thus, the legitimacy gap is likely to be differing across industries. Previous studies show that corporations in carbon sensitive industries that face a heightened threat of regulatory scrutiny are more likely than firms in non-carbon sensitive industries to disclose related carbon information to the CDP (Reid and Toffel 2009, Luo et al. 2010). Interestingly, Stanny and Ely (2008) fail to support a high carbon industry (utilities, energy, materials and industries) with the propensity to disclose carbon information to the CDP. In fact, firms in carbon sensitive industries are found to be less likely to disclose (Stanny and Ely 2008). As such, this study revisits this relation by hypothesising that:

H3: firms in polluting industries, such as energy and mining industries are more likely to respond to the CDP.

It is argued that an organization will only react to the demands of “powerful stakeholders” who control critical resources required by the organization according to stakeholder theory (Ullmann 1985). Thus, the higher a company's leverage, the higher the demand or pressure of carbon emissions information from debt holders. There is an expectation that companies with a large amount of debt on their balance sheet will disclose more information to secure their debt and to enhance their chance of getting more funds from financial institutions (Ahmed and Nicholls 1994). Roberts (1992) establish a significant positive relationship between leverage and corporate social responsibility disclosure. However, others do not find a significant association between leverage and a firm’s propensity to disclose carbon information (Stanny and Ely 2008, Prado-Lorenzo et al. 2009, Luo et al. 2010). Therefore, the current research proposes that:
H4: firms with higher leverage are more likely to respond to the CDP.

Assurance provider-PwC, ASX200 in 2009 and profitability are included as control variables in the current study. Although it is entirely management’s decision whether to answer the CDP questionnaire, an external audit firm can significantly influence the amount of information disclosed by its clients. The investor CDP samples of companies’ response were scored using the CDP Scoring Methodology developed jointly by the CDP and PwC. Further, PwC is acted as the CDP’s global advisor and report writer and it is the largest audit firm in the world, so it is likely to be less dependent on their clients, which enable to them to influence the amount of information disclosed in their normal course of duty (Barako et al. 2006). Therefore, assurance provider-PwC, which is measured by a dummy variable (i.e. firms that were assured by the PwC is coded 1, and 0 otherwise) is included as one of the control variables in the empirical model.

Stanny and Ely (2008) argue that firms are under greater scrutiny if they received the CDP questionnaire for the previous period, and they expect that those firms are more likely to answer the CDP questionnaire in the subsequent period. The result of their study finds that firms in the FT500 for the CDP4 are more likely to respond to the CDP5. Therefore, the membership of ASX200 in 2009 is also included as a control variable in the current study.

Previous research has shown mixed results between profitability and disclosure. Some studies find no relationship between profitability and firms’ decision to disclose carbon information (Stanny and Ely 2008, Luo et al. 2010). However, Roberts (1992) establishes a significant positive relation between profitability and disclosure while an inverse association is detected by Prado-Lorenzo et al (2009). It is argued that profitable firms use sources other than the annual
financial statements to a greater extent than less profitable companies in respect of social and environmental disclosure (Tagesson et al. 2009). The primary goal of a corporation is to secure economic returns to shareholders, and a firm’s decision to provide discretionary social and environmental disclosure has a direct effect on the company’s earnings. In a corporation with low profitability, corporate managers will probably focus on economic demands than the production of social and environmental disclosures (Ullmann 1985, Roberts 1992, Tagesson et al. 2009). Thus, it is reasonable to expect that a firm’s financial performance may influence its decision to answer the CDP information request. Furthermore, profitable firms are likely to have more resource to cope with the cost of voluntary disclosure, and the management of a profitable firm will disclose more to the market to enhance the value of the firm (Barako et al. 2006).

5. Research Design and Data Description

5.1 Sample

This study performs a logit regression analysis to determine if there were any firm characteristics which are associated with a firm's decision to respond to the CDP questionnaire. The sample was Standard and Poor’s ASX 200 firms in Australia. Data used for analysis was obtained from the Fin Analysis and DatAnalysis. Eight firms were removed from the sample due to the non-disclosure of sufficient data for all testing requirements. This resulted in a final sample of 192 companies for the 2010 reporting year.

5.2 Empirical model

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2 Eight firms were removed due to non-disclosure of block holders interest or no asset for the reporting year.
A logit regression model was used to examine the determinants of public disclosure of carbon information. The dependent variable was "1" if a firm provides carbon information by answering CDP questionnaire, and "0" otherwise, the binary choice-logit model to the test the hypotheses is as follows:

\[
\Pr (\text{Response2010}=1) = \beta_0 + \beta_1 \text{BH} + \beta_2 \text{POL} + \beta_3 \text{SIZE} + \beta_4 \text{LEV} + \beta_5 \text{PwC} + \beta_6 \text{ASX200} + \beta_7 \text{PROFIT} + \epsilon
\]

**Dependent variable**

Response is "1" if the firm answer the CDP 2010 questionnaire and "0" otherwise;

**Independent variables**

BH is the percentage of block holders’ ownership at the end of the fiscal year 2009;

POL is “1” if the firms are from polluting industries and “0” otherwise;

SIZE is the natural logarithm of total assets at the end of the fiscal year 2009;

LEV it total debt divided by total assets at the end of the fiscal year 2009;

**Control Variables**

PwC is “1” if the firm was audited by Price Waterhouse Coopers in 2009 and “0” otherwise;

ASX200 is “1” if part of ASX200 for CDP2009 and “0” otherwise;

PROFIT is return on asset (ROA) at the end of the fiscal year 2009.

**6. Results**

**6.1 Empirical results**

Table 4 provides descriptive statistics for dependent and independent variables used in the analysis. The mean of response is 0.48, which represents the participation rate in the investor CDP program. About 48% of the sample firms responded to the CDP 2010 program, thus the non-participation rate in ASX200 is significantly high, which was about 52% in 2010.
Table 5 provides Spearman correlation coefficients for all the variables of the study. Firstly, size is positively associated with Response (coefficient 0.54697, significant at 0.000 level), suggesting that larger firms are more likely to answer the CDP questionnaire due to public scrutiny. Secondly, membership of the ASX200 in 2009 is also significantly associated with response rate, indicating that firms belonging to this group are more likely to disclose carbon information by answering the CDP questionnaire in 2010. Thirdly, BH is found to be positively associated with Response (Coefficient 0.15315, significant at 0.05 level). In addition, the result show LEVERAGE is also positively associated with Response, suggesting that firms with higher leverage tend to answer the CDP questionnaire. POL, PwC and PROFIT are found to be not significantly correlated to Response.

Table 6 provides the results of logit model for determinants of answering the CDP questionnaire. The model is well specified since the null hypothesis that the variables as a group are not significantly associated with the probability of answering the CDP questionnaire at the 0.000 level is rejected (the Chi-square test statistics are 82.72, 65.26 and 41.33 for Likelihood Ratio, score and Wald tests respectively). The Cox and Snell R-square and Nagelkerke R-square are 35.00% and 46.70% and correctly predict firms’ actual responses in 84.6% (refer to Concordant). Based on the chi-square test statistic of 6.7832 (p-value of 0.5602) for Hosmer-Lemeshow test of goodness-of-fit, the null hypothesis that there is no difference between the observed and
predicted values of the response variable cannot be rejected, so it can be concluded that the model fits the data well.

6.3 Robustness tests

Instead of using total assets, another measurement-natural logarithm of market capitalisation at the end of fiscal year of 2009 is used to proxy for firm size in the logit regression model. The results support our earlier findings about the significant influence of size and membership of ASX200 in 2009 on a firm’s decision to answer the CDP questionnaire, but polluting industries is only significant at 0.1 level. Another approach we use return on equity (ROE) at the fiscal year of 2009 to proxy for a firm’s profitability instead of using ROA, although not reported in details in this paper, the findings are consistent with our earlier findings, where size, membership of a polluting industry and ASX200 in the previous reporting year are found to be positively significant.

7. Discussion and Conclusion
In this study, we investigate explanations for companies answering the CDP questionnaire based on a sample of ASX200 companies in the CDP report 2010. Our Binary logistic regression results provided support for our hypotheses. Larger firms and firms that are from polluting industries were positively associated with voluntary CDP carbon disclosure, even in the absence of mandatory accounting and reporting requirements. In addition, we do not find that firms with higher leverage and higher percentage of block holder ownership interest are more likely to respond to the CDP questionnaire. The findings are consistent with Luo, et al. (2011) confirming that the attitude of the general public is the decisive determinant of corporate climate change disclosure behaviour rather than direct stakeholders such as shareholders and debt holders. Finally, no significant positive relationship was found between firms audited by PWC and firms’ decisions to disclose carbon information.

There are at least three limitations of this study. Firstly, the analysis was based on cross-sectional data in 2010. Thus, it may have limited external validity. Secondly, the sample of the study was ASX200 firms, and it is indeterminate whether the explanations provided will hold in other countries due to social and cultural differences. Last but not least, this study focuses on the carbon information disclosed the CDP and does not incorporate other forms of GHG emission disclosure, such as company websites, sustainability reports or annual reports. Thus, future research investigating CDP disclosure could focus on panel data analysis, and could also investigate the same issues by looking at companies in other countries, such as developing economies in India, Brazil, China and Russia.
# Table 1: CDP Program and Initiatives Adopted from CDP Project
(Source: https://www.cdproject.net/)

<table>
<thead>
<tr>
<th>Program/Initiatives</th>
<th>Objectives</th>
<th>Launched Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor CDP</td>
<td>Climate change data requested from large companies worldwide to be used for decision making to allocate scarce resources, such as institutional investors’ decision for investment.</td>
<td>2003</td>
</tr>
<tr>
<td>CDP Supply Chain</td>
<td>Climate change data requested across the supply chain based on the compiling supplier lists prepared by supply chain members to encourage suppliers to measure and disclosure such data and to enhance members’ purchasing decisions.</td>
<td>2008</td>
</tr>
<tr>
<td>CDP Public Procurement</td>
<td>Climate change data requested across the supply chain of national and local governments to build a resilient and low carbon government supply chain.</td>
<td>2008</td>
</tr>
<tr>
<td>CDP Water Disclosure</td>
<td>Critical water-related data requested from a subset of the world’s largest 500 companies in the FTSE Global Equity Index Series to inform the global market place on investment risk and commercial opportunity.</td>
<td>2010</td>
</tr>
<tr>
<td>CDP Cities</td>
<td>It provides a standardized reporting emission data, analysis of climate risks and opportunities and adaptation plans for major cities around the world.</td>
<td>2010</td>
</tr>
<tr>
<td>Carbon Action</td>
<td>Carbon action request letter is sent to Global 500 firms to accelerate company action on carbon reduction activities by requesting firms to implement cost-effective greenhouse gas emissions reduction.</td>
<td>2011</td>
</tr>
<tr>
<td>CDP Mittelstand</td>
<td>This new pilot program aim to attract all companies (such as unlisted companies and SMEs) in Germany with foreign sales of over €50 million</td>
<td>2011</td>
</tr>
</tbody>
</table>
Table 2: Trend of response to CDP in Australia from 2006 to 2010

<table>
<thead>
<tr>
<th>Response</th>
<th>2006 (ASX100)</th>
<th>2007 (ASX100)</th>
<th>2008 (ASX200)</th>
<th>2009 (ASX200)</th>
<th>2010 (ASX200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ</td>
<td>55</td>
<td>59</td>
<td>96</td>
<td>104</td>
<td>94</td>
</tr>
<tr>
<td>IN</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>DP</td>
<td>28</td>
<td>13</td>
<td>28</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>NR</td>
<td>12</td>
<td>22</td>
<td>70</td>
<td>75</td>
<td>73</td>
</tr>
</tbody>
</table>

Total No. of Listed Companies 100 100 201* 200 200

*On 20 December 2007, Publishing and Broadcasting Limited demerged to form Crown Limited and Consolidated Media Holding Limited. Hence the number of companies in the ASX 200 is 201.

Figure 1: Australian ASX100 CDP response from 2006 to 2010

Table 3: Accessibility of ASX 100 CDP response in 2009 and 2010

<table>
<thead>
<tr>
<th>Access</th>
<th>2009 (ASX100)</th>
<th>2010 (ASX100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of Cos.</td>
<td>Percentage</td>
</tr>
<tr>
<td>Public</td>
<td>60</td>
<td>82.2%</td>
</tr>
<tr>
<td>Not public</td>
<td>13</td>
<td>17.8%</td>
</tr>
<tr>
<td>Total responding firms</td>
<td>73</td>
<td>100%</td>
</tr>
</tbody>
</table>
Figure 2: Public accessibility of ASX100 CDP response in 2009 and 2010 (percentage)
Table 4 Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE</td>
<td>200</td>
<td>0.48000</td>
<td>0.50085</td>
<td>0</td>
<td>0</td>
<td>1.00000</td>
<td>Response</td>
</tr>
<tr>
<td>BH09</td>
<td>193</td>
<td>0.48844</td>
<td>0.15980</td>
<td>0.47280</td>
<td>0.05670</td>
<td>0.83700</td>
<td>Block holder</td>
</tr>
<tr>
<td>POL</td>
<td>200</td>
<td>0.35000</td>
<td>0.47817</td>
<td>0</td>
<td>0</td>
<td>1.00000</td>
<td>Industry</td>
</tr>
<tr>
<td>LEVERAGE</td>
<td>198</td>
<td>0.48367</td>
<td>0.24541</td>
<td>0.47728</td>
<td>0.00862</td>
<td>1.57295</td>
<td>TL/TA</td>
</tr>
<tr>
<td>SIZE</td>
<td>197</td>
<td>21.55407</td>
<td>1.76019</td>
<td>21.51670</td>
<td>18.38055</td>
<td>27.20656</td>
<td>Ln (asset)</td>
</tr>
<tr>
<td>PWC</td>
<td>200</td>
<td>0.31500</td>
<td>0.46568</td>
<td>0</td>
<td>0</td>
<td>1.00000</td>
<td>PwC</td>
</tr>
<tr>
<td>PROFIT</td>
<td>200</td>
<td>0.06391</td>
<td>0.08947</td>
<td>0.06215</td>
<td>-0.30420</td>
<td>0.59030</td>
<td>ROA</td>
</tr>
<tr>
<td>ASX200</td>
<td>200</td>
<td>0.86500</td>
<td>0.34258</td>
<td>1.00000</td>
<td>0</td>
<td>1.00000</td>
<td>ASX200</td>
</tr>
</tbody>
</table>
Table 5: Spearman Correlation Coefficients Matrix of the variables

<table>
<thead>
<tr>
<th></th>
<th>Response</th>
<th>BH</th>
<th>POL</th>
<th>SIZE</th>
<th>LEVERAGE</th>
<th>PwC</th>
<th>ASX200</th>
<th>PROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>0.15315**</td>
<td>0.09232</td>
<td>0.25066***</td>
<td>0.21092**</td>
<td>0.08101</td>
<td>0.32098***</td>
<td>0.0306</td>
<td></td>
</tr>
<tr>
<td>BH</td>
<td>0.15315**</td>
<td>-0.00915</td>
<td>0.8995</td>
<td>0.25066***</td>
<td>0.0029</td>
<td>0.11592</td>
<td>0.13021*</td>
<td>0.10157</td>
</tr>
<tr>
<td>POL</td>
<td>0.09232</td>
<td>-0.00915</td>
<td>-0.16347**</td>
<td>0.33463***</td>
<td>0.09140</td>
<td>-0.01687</td>
<td>-0.06600</td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.54697***</td>
<td>-0.16347**</td>
<td>0.43796***</td>
<td>0.00048</td>
<td>0.28182***</td>
<td>0.13976**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEVERAGE</td>
<td>0.21092**</td>
<td>-0.07232</td>
<td>0.33463***</td>
<td>0.43796***</td>
<td>0.01464</td>
<td>0.21564**</td>
<td>-0.02387</td>
<td></td>
</tr>
<tr>
<td>PwC</td>
<td>0.08101</td>
<td>-0.0914</td>
<td>0.00048</td>
<td>0.01464</td>
<td>0.8378</td>
<td>0.01559</td>
<td>0.04204</td>
<td></td>
</tr>
<tr>
<td>ASX200</td>
<td>0.32098***</td>
<td>0.13021*</td>
<td>0.01687</td>
<td>0.28182***</td>
<td>0.21564**</td>
<td>0.01559</td>
<td>-0.06613</td>
<td></td>
</tr>
<tr>
<td>PROFIT</td>
<td>0.0306</td>
<td>-0.06600</td>
<td>-0.13976**</td>
<td>-0.02387</td>
<td>0.04204</td>
<td>0.8265</td>
<td>0.3595</td>
<td></td>
</tr>
</tbody>
</table>

Note: *, **, *** Correlation is significant at 0.1, 0.05, and 0.001 levels, respectively (two tailed).

Response is one if the firm answer the CDP 2010 questionnaire and zero otherwise; PwC is one if the firm was audited by Pricewaterhousecoopers in 2009 and zero otherwise; BH is the percentage of block holders ownership in at the end of the fiscal year 2009; POL is one if the firms are from polluting industries and zero otherwise; SIZE is the natural logarithm of market capitalization at the end of the fiscal year 2009; LEVERAGE is total debt divided by total assets at the end of the fiscal year 2009; ASX200 is one if part of ASX200 for CDP2009 and zero otherwise; PROFIT is return on equity (ROE) at the end of the fiscal year 2009.
Table 6: Logit regression

<table>
<thead>
<tr>
<th>Testing Global Null Hypothesis: BETA=0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
</tr>
<tr>
<td>Score</td>
</tr>
<tr>
<td>Wald</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysis of Maximum Likelihood Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>BH</td>
</tr>
<tr>
<td>POL</td>
</tr>
<tr>
<td>SIZE</td>
</tr>
<tr>
<td>LEVERAGE</td>
</tr>
<tr>
<td>PwC</td>
</tr>
<tr>
<td>ASX200</td>
</tr>
<tr>
<td>PROFIT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hosmer and Lemeshow Goodness-of-Fit Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>6.7832</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Association of Predicted Probabilities and Observed Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per cent Concordant</td>
</tr>
<tr>
<td>Per cent Discordant</td>
</tr>
</tbody>
</table>
References


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