

# LEGITIMACY OR GOOD GOVERNANCE: WHAT DRIVES CARBON PERFORMANCE IN AUSTRALIA

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## Abstract

Previous studies present diverse views on carbon performance. The legitimacy perspective posits that external forces from a wide range of stakeholders drives environmental performance change, while the governance perspective posits that strong internal governance structure leads to performance improvement. This study empirically examines the validity of these different perspectives. Using data released by top polluting companies included in the Australian National Greenhouse and Energy Reports (NGER), the study finds that better governance structures are significantly associated with higher carbon performance, but there is no significant relationship between external carbon disclosure and carbon performance. The results suggest that future policy needs to focus more on ensuring strong corporate governance system and encouraging the integration of environmental aspects into governance agenda.

**Keywords:** Carbon Performance, Corporate Governance, Carbon Disclosure, Legitimacy, Environmental Sensitivity

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## 1 Introduction

Climate change has triggered a growing demand for carbon performance improvement and disclosure. It has never been more critical for companies of all sizes and across all sectors to monitor and control carbon emissions and energy consumption of their operations (Cowan and Deegan, 2011). The Kyoto Protocol, an international treaty binding developed nations to a 'cap and trade' approach to greenhouse gas reduction, became effective in 2005. Since then, many developed countries as well as developing economies have ratified the Protocol, which further triggers businesses all over the world becoming key players in finding low-carbon solutions. In Australia, the Kyoto Protocol was ratified soon after the former Prime Minister Kevin Rudd was elected in 2007. The enactment of Australian National Greenhouse and Energy Reporting (NGER) Act 2007 has made carbon performance disclosure mandatory for all high polluting entities. The recently passed Carbon Tax Bill has made the top 500 Australian emitters to be charged a flat rate of A\$23 per tonne of emissions from 1 July 2012. This was said to facilitate Australian companies to get prepared for Emission Trading Scheme (ETS) in 2015.

Although the case for improving carbon performance is clear, experience indicates that researchers and business managers generally stand for diverse views in understanding corporate carbon performance. In the area of social and environmental

accounting, the legitimising nature of corporate "green" behaviour is largely accepted, particularly when disclosure is seen as an effective method for companies to maintain or enhance their social legitimacy (O'Donovan, 2002; Deegan, 2002). The legitimacy perspective suggests that the existence and behaviour of an organisation are significantly influenced by the larger and powerful social system where the organisation operates. Improved corporate social and environmental performance may lead to a state of legitimacy conferred by society and thereby companies can survive and grow (Lindblom, 1994; Deegan, 2002). Clearly, the existence and increasing external forces from a wide range of stakeholders in society are perceived as the main driver for environmental performance improvement. Burritt and Schaltegger (2010) called this view an "outside-in" approach to sustainability accounting.

Although not largely examined in the context of carbon emissions, another stream of literature which analyses the role of internal governance and management on corporate social and environmental performance has received growing attention. This body of literature argues that boards are ultimately responsible for corporate environmental strategy (Kassinis and Vafeas, 2002). Corporate boards cannot work effectively if they do not make adequate social and environmental efforts and provide necessary knowledge, guidance and resources to assist firms in addressing sustainability challenges (Berrone and

Gomez-Mejia, 2009a; Huang, 2010). Therefore, there is a strong connection between governance structures and corporate social and environmental behaviour and performance (Jamali, et al. 2008). A number of previous studies have found that companies with better governance structures are more likely to be better corporate citizens, concern more about business attitude towards corporate social responsibility, focus more on long-term environmental benefits, and in all, be more socially and environmentally responsible (see e.g., Ibrahim and Angelidis, 1995; Johnson and Greening, 1999; McKendall et al., 1999; Russo and Harrison, 2005; Jamali, et al. 2008). In this regard, strong and responsible corporate governance may be the main driver for environmental as well as carbon performance change.

Both legitimacy and governance perspectives have been supported by previous studies and evidence. However, in most cases, they are separately examined. Questions remain as to whether corporate carbon performance is more of a response to external pressures for the purpose of gaining legitimacy, that is, companies only seek legitimacy and perform where necessary to create a well-received carbon report and company image, therefore disclosure drives performance change; or whether companies are “active” not “responsive” actors, therefore, strong carbon performance is driven by strong internal governance structures. Answers to these questions will inform future policy directions as to whether government policy should be directed more to stakeholder power and accountability, as the legitimacy view posits that these will transfer to performance improvement; or whether government policy should be directed more to ensuring strong corporate governance system and encouraging the integration of environmental aspects into governance agenda, as the governance view suggests that these will transfer to better environmental performance. Using carbon emission data released in the Australian NGER for top polluting companies during 2009 and 2010, this paper investigates the extent to which carbon performance of Australian companies are associated with external forces for achieving legitimacy and with internal elements propelled by strong governance structures.

The remainder of the paper is structured as follows. In Section 2, extant literature is reviewed, focusing on corporate environmental performance and its relationship with legitimacy, disclosure, as well as corporate governance. Respective hypotheses are therefore developed based upon literature review. Section 4 discusses the research method used to select sample, collect data and measure relevant variables. This is followed by result analysis in Section 5. Section 6 contains the conclusion of this study.

## 2 Extant literature and hypotheses development

### 2.1 Disclosure to performance

The legitimacy perspective has prevailed in social and environmental accounting studies in the past two decades (Owen, 1990; Lindblom, 1994; O’Donovan, 2002; Deegan, 2002; Deegan et al., 2002; Mobus, 2005; Cowan and Deegan, 2011). Suchman (1995, p. 574) defines legitimacy 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 definitions”. Therefore, an entity’s value system must be congruent with the value system of the larger social system where the entity exists (Lindblom, 1994; Scott, 1995). If an organisation is viewed as legitimate by its social audiences, it will be perceived as more “meaningful”, more “predictable”, and more “trustworthy” (Suchman, 1995, p. 575) and society will “confers” the “state” of legitimacy to the organisation (Deegan, 2002, p.292). Since the turn of the twenty-first century, there has been a rapidly growing demand for corporate social and environmental responsibility from society. The business community has acknowledged this demand and actively respond to such demand by improving their social and environmental performance and disclosures. For example, the recent KPMG international survey reveals that nearly 95% of the world top 250 companies disclose social and environmental responsibility information (KPMG, 2011). This is because business managers understand that by reaching a social legitimate condition, their organisation will be rewarded with various benefits such as increased prestige, social support, internal and external commitment, access to resources, acceptance in professions and invulnerability to questioning (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Scott, 1995). These rewards are prerequisites for an organisation to fulfill its own goals and interests.

The legitimacy effect has been confirmed by many prior empirical studies, particularly the studies of environmental disclosures. For example, Deegan and Gordon (1996) found that environmental disclosures are generally positive in tone, in particular, for environmental sensitive industries, in order to alleviate external community and political pressures. Bewley and Li (2000) found that firms with a higher pollution propensity and greater media coverage of their environmental performance tend to disclose more environmental information as a response. Patten (2002a) noted a significant increase in environmental disclosures by US firms in 10K reports following the introduction of the Toxic Release Inventory (TRI).

The legitimacy effect on environmental performance has been examined in two ways. The negative reading of the legitimacy effect explains that disclosures are merely used as legitimising tools to

respond to external pressures. Therefore, increased disclosures will not drive actual performance improvement. For example, Hughes et al. (2001) revealed that companies with more disclosures have poorer environmental performance rankings. Patten (2002b) and Cho and Patten (2007) found a significant negative relationship between voluntary environmental disclosures and environmental performance, suggesting poorer environmental performers provide more extensive off-setting or positive environmental disclosures. In contrast, the positive reading of the legitimacy perspective claims that firms will improve environmental performance to meet the requirement of external stakeholders. Therefore, increased disclosures will lead to improved performance. For example, Al-Tuwaijri et al. (2004) found a positive relationship between environmental performance and disclosures of pollution related environmental information, suggesting that performance and disclosures are aligned to achieve social legitimacy. Liu et al. (2010) found that companies with lower ratings in the mandatory government-orientated environmental disclosure program in China are more likely to improve their environmental performance in subsequent years. Loftus (2011) argued that corporate social responsibility (CSR) reporting is a driver of CSR performance through stakeholder empowerment and pressures. CSR reporting becomes a driver of CSR performance so that information asymmetry between management and various external stakeholders including society in general can be reduced.

As per carbon performance, Cowan and Deegan (2011) suggested that social legitimacy is more likely to have a positive effect because of increasing governmental and community expectations. With the establishment of National Pollutant Inventory (NPI) and the NGER Act 2007 in Australia, the legitimacy gap between the community and governmental expectations of carbon emission levels and corporate carbon performance becomes more visible and sensitive. Companies are more likely to close the legitimacy gap by improving carbon performance and thus making their norms and value regarding carbon emissions “more closely aligned with the norms and value, and expectations of environmental performance of the community” (Cowan and Deegan, 2011, p.415). Therefore, from the legitimacy perspective, the following hypothesis can be generated:

H1: *Ceteris paribus*, a company’s carbon performance is positively associated with its carbon disclosure level.

## 2.2 Governance to Performance

The significance of corporate governance has been discussed intensively since the early 2000s because of the collapse of large corporations around the world (e.g., Enron and WorldCom in U.S. and HIH Insurance Limited and One.Tel Limited in Australia).

The subsequent adoption of the Sarbanes-Oxley Act of 2001 in the US and the CLERP 9 reform<sup>2</sup> as well as best corporate governance practices in Australia signalled an important role of governance in safeguarding the integrity of corporate disclosure. The recent global financial crisis reinforced the vital role of corporate governance, especially corporate board, but the discussion seems to progressively shift from financial governance towards social and environmental governance (e.g., climate change, human rights and philanthropy) for achieving corporate sustainability in the long term (de Villiers et al., 2011; Walls et al., 2012).

There is a growing interest and debate as to how improved governance structure can effectively influence corporate social and environmental performance. From the governance perspective, companies are “active” not “responsive” to social and environmental challenges. As suggested by Post et al. (2011), a strong and diverse governance group will ensure the quality of business decisions because it encourages active discourse between different knowledge domains, perspectives, values and ideas in the decision-making process. Better quality business decisions will lead to enhanced organisational effectiveness, improved relationships with stakeholders and better corporate social and environmental performance (Huang, 2010). De Villiers et al. (2011) echoed that a strong and independent board is more likely to assist firms in pursuing high environmental performance because it is more likely to provide necessary guidance and resources when urging management to address environmental issues with sufficient effort (Russo and Harrison, 2005; Berrone and Gomez-Mejia, 2009b).

Empirical evidence largely supports the positive relationship between corporate governance and corporate social and environmental performance. For example, Ibrahim and Angelidis (1995) found that independent boards exhibit greater concern about business management’s attitude toward corporate social responsibility. This is because independent boards are more likely to realise the potential of long-term investments in social and environmental issues and resist any management pressure to overlook such investments (McKendall et al., 1999). Johnson and Greening (1999) supported this view through providing evidence that board independence, reflected as outside director representation, was positively linked with corporate social performance. Focusing on corporate philanthropy, Wang and Coffey (1992) found that board composition, measured as the ratio of insiders to outsiders, the percentage of insider stock ownership, and the proportion of female and minority

<sup>2</sup> The Australian Securities and Investments Commission proposed the reform of Corporate Law Economic Reform Program paper no. 9 (CLERP 9: Audit Reform and Corporate Disclosure) in September 2002, which became CLERP 9 Bill in 2003.

board members, were positively and significantly associated with corporate charitable contributions. Similarly, Brown et al. (2006) found that companies with larger boards of directors are more likely to undertake corporate philanthropy activities such as more cash giving and establishment of corporate philanthropy foundations. Huang (2010) examined the effect of corporate governance on corporate social responsibility and performance in the context of Asia. He found that a strong corporate governance involving independent outside directors has a significantly positive impact on corporate performance, especially social performance.

Moving to corporate environmental performance, Kassinis and Vafeas (2002) revealed that the likelihood of becoming a lawsuit defendant increases with board size, the fraction of directors in industrial firms, and the fraction of inside ownership, but decreases with the number of directorships held by outside directors. More recently, Post et al. (2011) evaluated the relationship between boards of directors' composition and environmental corporate social responsibility. They found that a higher proportion of outside board directors are associated with more favourable environmental corporate social responsibility and higher KLD (Kinder Lydenberg Domini) natural environment ratings. It was also found that if boards are consist of three or more female directors, firms are likely to receive higher KLD strengths scores and if boards have directors who on average are closer to 56 years old and with more Western European background, they are more likely to implement environmental governance structures or processes. De Villiers et al. (2011) found that firms with stronger board structures, such as higher board independence, larger representation of active CEOs on the board, and more legal experts on the board, achieve significantly higher firm environmental performance.

Although previous studies have not particularly focused on corporate carbon performance, as one of the most important environmental performance indicators, carbon performance is likely to be positively driven and overseen by corporate governance strength or quality. Kassinis and Vafeas (2002) suggested that managers, researchers, and policymakers need to pay more attention to corporate governance in forming any corporate environmental policies, clearly including carbon policies. This leads to the proposal of the following hypothesis:

H2: *Ceteris paribus*, a company's carbon performance is positively associated with its corporate governance strength.

### 3 Research Method

#### 3.1 Data collection

The data of this study were collected from several databases. Carbon emission and energy consumption

data were sourced from the Australian National Greenhouse Gas and Energy Reports (NGER). Under the NGER Act 2007 (Section 23), Australian companies which pass the reporting thresholds<sup>3</sup> are obliged to provide their greenhouse gas emission data annually. This information contains Scope 1 and Scope 2 greenhouse gas emissions and total energy consumption<sup>4</sup>. During 2009 and 2010, there were 80 listed companies which registered and reported their greenhouse and energy information in the Australian NGER database. These listed companies reported their carbon emission information either in one or both years, which created 147 observations in total for this study. Carbon disclosure information was collected from Carbon Disclosure Project (CDP). CDP is the largest international registry of corporate disclosure with regard to greenhouse gas emissions. CDP represents hundreds of large institutional investors and stakeholders globally to request corporate disclosure of carbon information (CDP 2012). Country-specific CDP data, including Australian companies' CDP information, have been released since 2008 to meet the increasing demand for carbon disclosures in individual countries. Corporate governance information was collected from the WHK Horwath corporate governance reports. WHK Horwath produces independent assessment and ranking of corporate governance structures and strength for Australia's largest public companies listed on the Australian Stock Exchange (ASX). Their ranking was based upon the Principles of Good Corporate Governance and Best Practice Recommendations released by the ASX Corporate Governance Council. Finally, the economic data of this study were sourced from the Aspect Database and Company 360 which include accounting information of Australian companies listed on the ASX.

#### 3.2 Model and variables

Based on the discussion in previous literature and the hypotheses developed, the following regression model is estimated:

<sup>3</sup> In the 2008-2009 reporting year, corporations that had total greenhouse gas emissions (CO<sub>2</sub> equivalent or CO<sub>2</sub>-e)<sup>3</sup> above 125 kilotonnes (KT) or total amount of energy produced or consumed above 500 terajoules (TJ) are required to report. The thresholds change to 87.5 KT and 350 TJ for 2009-2010 and 50 KT and 200 TJ for later years.

<sup>4</sup> According to the explanatory information released in 2008-09 and 2009-10 NGER data, scope 1 emissions are the release of greenhouse gases into the atmosphere as a direct result of an activity or series of activities that constitute the facility. Scope 2 emissions are the release of greenhouse gases emitted at a second facility because of the electricity, heating, cooling or steam that is consumed at the facility.

$$\begin{aligned} \text{CPerf} = & \beta_0 + \beta_1 \text{CGov} + \beta_2 \text{CDResp} + \beta_3 \text{CDQual} + \beta_4 \text{SIZE} + \beta_5 \text{LEV} + \beta_6 \text{GRW} + \\ & + \beta_7 \text{ROA} + \beta_8 \text{LIQ} + \beta_9 \text{FSlack} + \beta_{10} \text{ESen} + \varepsilon \end{aligned} \quad (1)$$

### 3.2.1 Dependent variable

The dependent variable carbon performance (CPerf) is measured in two ways. The first measurement uses corporate total carbon emissions, including both Scope 1 and Scope 2 emissions. The second measurement uses Scope 1 emissions because at present only Scope 1 emissions are regulated by either emission trading systems (ETS) in Europe or carbon tax in Australia. Both measurements are scaled by sales revenue to reflect carbon emission intensity, which is consistent with previous measures in Patten (2002b) and Clarkson et al. (2011). As carbon emission intensity reflects the pollution level, carbon performance should be read as the inverse of carbon intensity.

### 3.2.2 Independent variables

Corporate governance (CGov) is measured using the ranking of corporate governance practices in WHK Horwath reports. The factors considered for ranking include (1) the existence, independence and structure of a company's board of directors, audit committee, remuneration committee and nomination committee; (2) the level of perceived independence of the company from external auditors; (3) disclosures relating to the existence of a code of conduct, risk management and share trading policy; and (4) the clarity of the corporate governance disclosure. Benchmarked against best practices in each factor considered, companies are ranked from 1 (poor) to 5 (excellent) stars. As there may be a lag between good governance structure and improved carbon performance, we use governance rankings in preceding years to capture the lead-lag effect.

Carbon disclosure is measured as carbon disclosure response (CDResp) and carbon disclosure quality. CDResp reflects whether the company produces carbon reports in response to the request of large institutional stakeholders supporting CDP. If the company produces reports, then it is coded "1"; otherwise it is recorded "0". Then, based on the quality of corporate response to CDP, CDQual reflects whether the company produces high quality carbon reports included in Climate Disclosure Leadership Index. If the company is included in the leadership list, it is coded "1"; otherwise "0" is recorded.

### 3.2.3 Control Variables

#### 3.2.3.1 Size (SIZE)

Pattern (2002b) found that as firms increase in size, they become more visible or rely on political or social support. Therefore, larger companies are likely to disclose more information for legitimacy purposes. In terms of carbon performance, larger firms may face

higher public pressure for controlling their emission levels. So size is expected to have a positive effect on carbon performance. Size is measured as the natural logarithm of total assets.

#### 3.2.3.2 Leverage (LEV)

When companies' leverage levels increase, they may be less likely to invest in non-financial activities such as environmental management. Previous evidence shows that corporate leverage levels are associated with environmental disclosure and performance (de Villiers et al., 2011; King and Lenox, 2002). Consistent with Clarkson et al. (2011), leverage is measured as total debt divided by total assets.

#### 3.2.3.3 Growth (GRW)

Sales growth is used to represent management competence because companies with greater management capability are more likely to pursue long-term investment strategies (Clarkson, et al., 2011). This is likely to create financial value (King and Lenox, 2002) and improve environmental performance (de Villiers et al., 2011). Growth is measured as change in sales divided by sales revenue.

#### 3.2.3.4 Financial performance (ROA)

Although the debate on the link between corporate environmental performance and financial performance is still inconclusive (Porter and Kramer, 2006), previous empirical studies often report positive relationship between financial performance and environmental performance (Wahba, 2008), social performance (Waddock and Graves, 1997), corporate social responsibility (Schnietz and Epstein, 2005), or corporate sustainability (Lo and Sheu, 2007). The positive link is favoured by the business community and practitioners as it suggests both interests of shareholders and other stakeholders could be satisfied if sustainability is managed. Therefore, we predict a positive relationship between financial performance, measured as ROA, and carbon performance.

#### 3.2.3.5 Liquidity (LIQ)

Companies with higher liquidity may have more flexibility to allocate resources to environmental management, thus achieving higher environmental performance. So consistent with Clarkson et al. (2011), we include liquidity as a control variable. It is measured as cash and cash equivalents divided by total assets.

### 3.2.3.6 Financial Slack (FSlack)

De Villiers et al. (2011) suggested that firms with larger financial slack are more likely to divert resources towards environmental management such as being able to accommodate large environmental compliance costs. Therefore, financial slack is controlled and measured as net cash flow from operations divided by total assets.

### 3.2.3.7 Environmental Sensitivity (ESen)

Deegan and Gordon (1996) and Frost and Wilmshurst (2000) found that environmentally sensitive industries, determined to be mining and resources, chemical and petroleum (gas/oil), report more environmental information and are more aware of environmental-related costs. Cho and Patten (2007) revealed that firms operating in environmentally sensitive industries such as oil exploration, paper manufacturing, chemical and allied products, petroleum refining and metals, disclose more non-litigation-related environmental

information. Therefore, we expect that heavy polluters in the public eye may have to bear more political costs and take more responsibility to improve their environmental performance. According to Global Industry Classification Standard (GICS) adopted by the ASX, Australian industries are classified into ten sectors, namely energy, materials, industrials, consumer discretionary, consumer staples, health care, financials, information technology, telecommunication services and utilities. Energy, materials and utilities are regarded as highly emission sensitive industries, which are coded "1", and the remainders are recorded "0".

## 4 Results

### 4.1 Descriptive statistics

The descriptive statistics and correlations between tested variables are presented in Tables 1 and 2 respectively.

**Table 1.** Descriptive statistics for registered firms during 2009 and 2010

Variable	Mean	Std.Dev.	Min	Max
CPerf				
Total emissions	.621	.991	.004	5.987
Scope 1 emissions	.511	.907	.000	5.639
CGov	4.129	.822	2	5
CDResp	.613	.489	0	1
CDQual	.250	.434	0	1
SIZE	15.448	1.778	12.200	20.346
LEV	.501	.218	0	.971
GRW	.039	.257	-.636	1.349
ROA	.074	.107	-.262	.741
LIQ	.075	.078	0	.394
FSlack	.085	.069	-.222	.396

**Table 2.** Correlation between tested variables

Variable	Total emissions	Scope 1 emissions	CGov	CDResp	CDQual	SIZE	LEV	GRW	ROA	LIQ	FSlack
Scope 1 emissions	.994										
CGov	-.237	-.245									
CDResp	-.093	-.085	.274								
CDQual	-.126	-.118	.357	.387							
SIZE	-.322	-.306	.400	.489	.403						
LEV	-.081	-.085	-.045	-.075	-.071	-.195					
GRW	.008	.010	-.198	-.186	-.031	-.109	.037				
ROA	-.290	-.265	.262	.282	.277	.534	-.146	.141			
LIQ	.017	.047	-.210	-.085	.027	-.107	-.244	.132	-.039		
FSlack	-.008	-.010	-.118	-.040	.013	-.225	-.466	.142	-.157	.361	
ESen	.473	.460	-.070	-.026	-.088	-.274	-.063	.040	-.481	.137	.062

Table 1 statistics show that on average companies release 0.621kg of total carbon emissions and 0.511kg of Scope 1 emissions per dollar of sales revenue. The maximum releases are close to 6 kg in

both emissions for every dollar of revenue generated. The average corporate governance rank is 4.129, with the lowest rank recorded as 2 and the highest as 5. The results also show that 61.3% of companies have

disclosed carbon information in response to stakeholders' requests, but only 25% of them have disclosed high quality carbon information. The average leverage level is around 50% with the highest debt to assets ratio reaching 97.1%. The average sales growth rate is 3.9% and return on assets is 7.4%, although a small number of companies have generated negative growth or ROA during the study period.

As expected, the correlation results presented in Table 2 show that total emissions and Scope 1 emissions are highly correlated. This seems to suggest that corporate emission levels are predominantly determined by its Scope 1 emissions. The correlations between independent variables do not seem to present

any significant concern of multicollinearity. Most correlations are below 0.3 and the highest correlation is between size and ROA, which is 0.534.

Table 3 presents the regression results on carbon performance. The first set of columns present the results for total emissions, and the second set the results for Scope 1 emissions. In each instance, the first model, Model 1, includes full independent and control variables. The subsequent models test one of the independent variables hypothesized, with Model 2 focusing on corporate governance strength (CGov) and Model 3 on carbon disclosure response (CDResp) and quality (CDQual).

**Table 3.** Regression results on carbon performance

Variable	Total emission models			Scope 1 emission models		
	1	2	3	1	2	3
Intercept	.002*** (3.15)	.000*** (3.76)	.001*** (3.45)	.003*** (3.00)	.001*** (3.54)	.008*** (2.68)
CGov	.035** (-2.13)	.061* (-1.89)		.026** (-2.26)	.048** (-2.00)	
CDResp	.173 (1.37)		.340 (.96)	.154 (1.44)		.327 (.98)
CDQual	.337 (-.96)		.339 (-.96)	.338 (-.96)		.253 (-1.15)
SIZE	.045** (-2.03)	.023** (-2.31)	.002*** (-3.24)	.056* (-1.94)	.032** (-2.18)	.012** (-2.56)
LEV	.895 (.13)	.849 (.19)	.382 (.88)	.757 (.31)	.709 (.37)	.475 (.72)
GRW	.920 (-1.10)	.778 (-.28)	.826 (.22)	.934 (-.08)	.786 (-.27)	.993 (-.01)
ROA	.043** (-2.05)	.041** (-2.07)	.039** (-2.08)	.049** (-1.99)	.048** (-2.00)	.071* (-1.82)
LIQ	.364 (-.91)	.321 (-1.00)	.266 (-1.12)	.609 (-.51)	.552 (-.60)	.349 (-.94)
FSlack	.108 (-1.62)	.107 (-1.62)	.051* (-1.97)	.094* (-1.69)	.095* (-1.68)	.127 (-1.54)
ESen	.000*** (4.28)	.000*** (4.47)	.000*** (4.95)	.000*** (4.15)	.000*** (4.35)	.000*** (4.68)
F Stat	5.51***	6.54***	7.12***	5.15***	6.06***	5.78***
Adj-R <sup>2</sup>	.278	.275	.291	.262	.257	.243

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$

The empirical results in Table 3 show that carbon performance is significantly and positively associated with corporate governance strength (CGov) but not with carbon disclosure levels (CDResp and CDQual). In total emission models, CGov is consistently related to total carbon emission performance with ( $p = .035$  in Model 1) or without ( $p = .061$  in Model 2) carbon disclosure variables included. Neither CDResp ( $p = .173$ ) nor CDQual ( $p = .337$ ) shows any significance in the full model ( $p = .173$  and  $p = .337$  respectively in Model 1) and the model without CGov ( $p = .340$  and  $p = .339$  respectively in Model 3). The results for the control variables indicate that firm size and ROA are

positively associated with total carbon performance in all three models and the significant relationship between financial slack (FSlack) and total carbon performance only appears in Model 3 without corporate governance strength included. As expected, environmental sensitivity (ESen) is significantly and negatively (positively) related to total carbon performance (total carbon emission intensity in all models), suggesting firms in heavy polluting industries has a significantly lower level of total carbon performance.

The results in Scope 1 emission models are consistent with those in total emission models,

showing a significant positive relationship between corporate government strength ( $p = .026$  and  $p = .048$  respectively in Models 1 and 2) and Scope 1 carbon performance. Carbon disclosure variables remain insignificant. In addition to significant findings for firm size, ROA and ESen, FSlack also shows some moderate significance in the full model ( $p = .094$  in Model 1) and the model without carbon disclosure variables ( $p = .095$  in Model 2). Based on the empirical results presented, Hypothesis 2 is supported in this study but Hypothesis 1 is rejected under all circumstances.

## 5 Sensitivity analysis

As this study uses carbon emission intensity to proxy carbon performance, a potential threat of this

measurement is that carbon performance is industry sensitive by nature. The results in Table 3 clearly show a strong relationship between environmental sensitivity and carbon performance. In order to directly confront this threat, an alternative measurement of carbon performance was employed. Total carbon emissions were first scaled by sales revenue to control the size effect, and then scaled by individual industry average carbon emissions to control the industry effect. Table 4 presents the results after these further adjustments.

**Table 4.** Regression results on industry adjusted total carbon performance measures

Variable	1	2	3
Intercept	.000*** (4.12)	.000*** (4.89)	.000*** (4.67)
CGov	.010*** (-2.62)	.010*** (-2.63)	
CDResp	.556 (.59)		.964 (.04)
CDQual	.790 (-.27)		.974 (.03)
SIZE	.099* (-1.67)	.072* (-1.81)	.002*** (-3.16)
LEV	.202 (-1.28)	.213 (-1.25)	.354 (-.93)
GRW	.099* (-1.66)	.081* (-1.76)	.262 (-1.13)
ROA	.095* (-1.68)	.093* (-1.69)	.046** (-2.02)
LIQ	.603 (-.52)	.583 (-.55)	.527 (-.63)
FSlack	.110 (-1.61)	.108 (-1.62)	.025** (-2.27)
F Stat	2.43***	3.04***	2.42***
Adj-R <sup>2</sup>	.188	.185	.150

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$

Consistent with previous findings, CGov is strongly associated with carbon performance ( $p = .010$  in Models 1 and 2) using the alternative measurement. Carbon disclosure variables are still insignificant in all instances. In addition to firm size and ROA, sales growth (GRW) and FSlack have also presented some significant results. Taken together, the sensitivity analysis confirms that the previous conclusions are robust to the additional consideration.

## 6 Conclusion

This paper discusses two diverse views on corporate environmental performance in the extant literature.

The legitimacy perspective posits that external forces from a wide range of stakeholders in society drives environmental performance change, while the governance perspective posits that strong internal governance structure leads to environmental performance improvement. Using data from top polluting companies registered under the Australian NGER Act during 2009 and 2010, this study empirically examines the extent to which carbon performance of Australian companies are associated with external forces for achieving legitimacy and with internal elements driven by good governance structure.



The findings consistently show that carbon performance is positively associated with corporate governance strength indicating a higher level of corporate governance significantly helps improve corporate carbon performance. However, the insignificant results of carbon disclosure levels suggest that corporate carbon performance improvement is not directly connected with external legitimacy pressures. These results indicate that the larger and powerful social system may influence how companies report but not how they improve environmental performance. Good governance with responsible corporate board is more likely to drive the actual change of behaviour and performance. It is suggested that in order to improve actual environmental performance, future government policy should move from developing more comprehensive reporting guidelines. Instead, policy should focus more on assisting corporations in building strong corporate governance system, integrating more environmental aspects into governance agenda, and transferring from “responsive” to “active” environmental performers.

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