Deviation from Predictions in Corporate Environmental Performance: Antecedents and Financial Consequences

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ABSTRACT

This dissertation examines two main research questions: Why do firms deviate from their predicted level of toxic emissions, and how do these differences relate to financial performance? The objective is threefold: (1) to understand deviation in corporate environmental performance by looking at both industry and firm level variables, (2) to see how this deviation relates to both profitability and fluctuations in financial performance, and (3) to see if, and how, corporate environmental legitimacy affects the relationship between corporate environmental deviation and corporate financial performance.

To achieve this objective the construct "corporate environmental performance deviation" is developed. It is defined as the extent to which a firm's environmental performance deviates from its predicted performance, and is used to capture within-firm strategic choices in environmental management. Predicted environmental performance is calculated based on certain firm characteristics such as size and industry. Actual environmental performance is calculated using a weighted score of air emissions obtained from the Toxic Release Inventory (TRI) database. The difference between these two values represents a corporation's environmental performance deviation.

Corporate environmental performance deviation focuses on strategic choices related to environmental management, while recognizing that environmental management is the result of both institutional pressures and within-firm strategic decisions. Aligned with this focus, variables

related to this strategic choice are used to explain deviation in environmental management, including an environmental integration capability, firm strategy, and industry munificence and dynamism. Associated with the internal and external organizational analysis, institutional theory and the resource-based view (RBV) are used to explore the tension between deviation to increase competitiveness versus isomorphism to attain legitimacy.

The sample is composed of 311 U.S. firms who have reported their toxic air releases to the TRI from 1998-2007. The sample is broken down into two subsets, those that exceed (positive deviation) or fail to meet (negative deviation) predicted environmental performance.

Results of a longitudinal analysis show that positive environmental deviation is related to a greater capacity to strategically integrate environmental issues into a firm's existing business approach, less munificence and dynamism in the task environment, and reduced financial fluctuations. Negative environmental deviation is decreased through a demonstrated capacity to strategically integrate environmental issues into a firm's existing strategic approach, and related to greater munificence and dynamism in the task environment, reduced profitability and increased financial fluctuations.

Lastly, although there are no significant main effects for corporate environmental legitimacy, the paradoxical combination of negative deviation and environmental legitimacy can reduce the severity of the negative financial results to negative deviation, both in terms of profitability and financial fluctuations.

Keywords: Corporate environmental performance deviation, corporate financial performance, corporate environmental legitimacy, institutional theory, resource-based view, prospect theory, Toxic Release Inventory (TRI), endogeneity.

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"The next 40 years thus presents an unprecedented challenge: either alter the nature of economic activity or risk irreversible damage to the planet's basic ecological systems. This portends nothing less than a "paradigm shift" for the field of strategic management because it appears that few, if any, of our past economic and organizational practices can be continued for long into the future; they are simply not environmentally sustainable." (Hart, 1995: 991).

CHAPTER 1: INTRODUCTION

A fundamental and long-standing question in management research is why organizations differ (Rumelt, Schendel & Teece, 1994). Recently, environmental issues have gained importance (Berchicci & King, 2007) as global environmental problems (such as climate change, resource scarcity, ozone depletion, pollution, and habitat destruction) continue to expand with alarming speed, exceeding even the worst case scenarios predicted only a few years ago (Pacala & Socolow, 2004). Correspondingly, environmental performance has emerged as an important concept in strategic management, and why organizations differ in environmental performance has become an important area of investigation (Lockett, Moon & Visser, 2006; Starik, 2006).

To investigate differences in environmental performance the construct corporate environmental performance deviation is developed and used (hereafter environmental deviation). Environmental deviation is defined as the extent to which a firm's environmental performance deviates from its predicted environmental performance. The specific component of environmental performance examined in this thesis is toxic air emissions. Thus, environmental deviation draws a distinction between the observed level of toxic air emissions and the level that is predicted on the basis of a number of empirically identified predictors (Brammer & Millington, 2008).

The fundamental value in using environmental deviation is that firm strategic choice is investigated. The particular strategic choice examined is the decision to perform above or below environmental predictions for toxic air emissions. This within-firm analysis tells us whether managers have decided to simply meet predictions by committing the same level of environmental performance as firms with similar characteristics (e.g., size, industry, financial performance, slack, leverage), whether they have decided to perform below predictions, or if they have decided to exceed predictions. This strategic choice is missing in past studies examining why firms differ in their environmental management approach.

To investigate and explain differences in firm environmental management approaches, researchers have examined the financial implications of environmental performance (Margolis & Walsh, 2003; Orlitzky, Schmidt & Rynes, 2003), managerial cognitions including interpretations of environmental issues as threats or opportunities (Ghobadian et al., 1995; Lee & Rhee, 2007; Sharma, 2000), motivations and contextual factors (Bansal & Roth, 2000), stakeholder pressures (Buysse & Verbeke, 2003; Henriques & Sadorsky, 1999; Gonzalez-Bonito & Gonzalez-Bonito, 2006), organizational champions pushing for a more proactive environmental approach (Andersson & Bateman, 2000), and regulations (Marcus & Geffen, 1998; Majumdar & Marcus, 2001), all of which have been shown to partially explain differences in environmental performance.

Yet, by and large, researchers have been unsuccessful at examining the strategic and underlying component of environmental management that exists within-firms. The examination of corporate environmental performance has tended to use absolute levels of environmental performance to compare firms, where firms are required to meet certain criteria and are rated correspondingly, typically through the classification of a particular environmental strategy. For

example, if a firm has an environmental management system (like ISO 14001) in place, environmentally friendly products or services, a life-cycle analysis, and a specific environmental department, they might be classified as having a proactive environmental strategy. Comparisons are then made between firms with either a proactive or reactive environmental approach as researchers try to understand variation in environmental performance. In contrast, environmental deviation moves the analysis from a between firm comparison to a within-firm comparison. That is, the environmental performance of each particular firm is examined based on the difference between their own predicted and actual environmental performance. This permits a much more nuanced and detailed analysis of environmental strategic choices as the idiosyncratic characteristics of each individual firm are considered. The examination of environmental deviation is also interesting at a conceptual level.

According to institutional theory, firms become isomorphic with their institutional environment to gain legitimacy (Meyer & Rowan, 1977; Tolbert & Zucker, 1996). Accordingly, firms that deviate in their environmental approach may lose or fail to gain legitimacy, which often relates to a decrease in financial performance. In contrast, from a resource-based perspective, firms that deviate in their environmental approach may benefit financially by differentiating themselves from competitors and gaining a competitive advantage. This tension between the two theories as they are applied to sustainability phenomena has largely been overlooked. In examining environmental deviation, I explore the tension between the need for firms to be different as they strive to improve their competitive position, and the need for them to be the same as they seek legitimacy (Deephouse, 1999).

In this thesis, I also examine the financial consequences of corporate environmental deviation. Specifically, I examine how environmental deviation relates to profitability and

financial fluctuations over a 10-year time period. A number of past studies investigate the relationship between environmental performance and financial performance (most notably Margolis & Walsh, 2003; Margolis & Elfenbein, 2008; Orlitzky, Schmidt & Rynes, 2003), with particular attention to how environmental performance can increase financial performance (e.g., Hart, 1995; Shrivastava, 1995). However, prior studies tend to focus on one particular point in time, and no study to date has examined the effect of environmental performance on fluctuations in financial performance. A typical premise in past research is that the level of environmental performance will be positively correlated with the level of financial performance in a particular period. Such an approach fails to acknowledge the potential influence of environmental performance on sustained financial performance, one of the fundamental principles of business sustainability.

This thesis will proceed as follows: first, I begin by reviewing the literature on organizations and the natural environment, followed by a discussion on institutional theory and the resource-based-view, and how each theory has been applied to the study of environmental issues. Second, I present the study model and develop the hypotheses. Third, the methodology is discussed including the study sample, the operationalization of the variables, and the analyses used. Fourth, I present the results, followed by the discussion including an explanation of the results and the implications, theoretical and methodological contributions, and study limitations. Finally, I conclude by delineating the contributions of this thesis.

CHAPTER 2: LITERATURE REVIEW

This chapter begins by discussing the current state of research on organizations and the natural environment, and is followed by a discussion on how this thesis extends the current literature.

2.1. Organizations and the Natural Environment (abbreviated as ONE)

Corporate environmental performance has been defined in a number of ways, but Klassen and Whybark (1999: 605) state that "a common definition of environmental performance has been based on the quantity of pollutants released from a plant, either as measured by a third party (Bragdon & Marlin, 1972) or as reported to the federal government (Freedman & Jaggi, 1988)."

Research examining corporate environmental performance, and ONE research more generally, has increased significantly over the years, particularly empirical research (Starik, 2006). A major reason for this increase is the increasingly dramatic human, and business organizations in particular, impact on the environment (Makower, 2009). For example, while there are natural causes of global warming, such as volcanic eruptions, it is now understood that the current warming is anthropogenic, that is, created by humans (Gore, 2006). The primary means through which we have warmed our planet is through the burning of fossil fuels and the resulting production of carbon dioxide. Business has had a major impact on this process as our production of carbon dioxide increased dramatically as a result of the industrial revolution.

For its part, academic attention to ONE research remains relatively small. For example, Bansal and Gao (2006) found that it accounted for only 1.5 percent of the total research in 11 top management journals. However, significant progress has been made (Berchicci & King, 2007). In particular, business researchers have created peer-reviewed journals and divisions at the Academy of Management specifically for environmental issues, and the 2009 conference theme was "Green Management Matters". In addition, of the papers that do focus on corporate social responsibility, most have examined environmental issues in particular (Lockett, Moon & Visser, 2006).

Management research investigating the natural environment can be classified into two main areas (Bansal & Gao, 2006). The first seeks to contribute to organization theory and financial performance by viewing the natural environment as an important factor in organizational outcomes. This includes research examining the relationship between financial and environmental performance (e.g., Margolis & Walsh, 2003; Orlitzky, Schmidt & Rynes, 2003; Russo & Fouts, 1997). The second examines environmental performance and assumes that the natural environment is an important outcome in itself. In their review of the ONE research from 1995-2005, Bansal and Gao (2006) note, to their surprise, that over half of the articles they identified can be classified in this second category.

Examining the same 11 top management journals and using the same key words as Bansal and Gao (2006) from 2006 to the present, this trend has continued. Furthermore, recent ONE research has overwhelmingly focused on stakeholder expectations and pressures and the subsequent effect on environmental performance (Delmas & Toffel, 2008; Eesley & Lenox, 2006; Howard-Grenville, 2007; Kassinis & Vafeas, 2006; Murillo-Luna, Garces-Ayerbe & Rivera-Torres, 2008; Roome & Wijen, 2006; Rueda-Manzanares, Aragon-Correa & Sharma, 2008; Schaefer, 2007). Researchers also appear to be analyzing the relationship between environmental performance and financial performance in greater detail identifying moderators (Rueda-Manzanares, Aragon-Correa & Sharma, 2008), and improvements in environmental risk management through the reduction of the cost of equity capital and higher tax benefits (Sharfman & Fernando, 2008). Furthermore, the idea evident in early studies that environmental performance will always increase financial performance is slowly being replaced with the more moderate, contingent belief that environmental performance may only benefit some firms under certain circumstances (Berchicci & King, 2007).

Berchicci and King (2007) provide the most recent review of the ONE literature to date and highlight two particular insights gleaned from their examination. First, ONE researchers have consistently broken from "orthodox disciplinary perspectives". This results primarily from the rejection of standard economic models which assume equilibrium, where the purpose of business is to maximize short-term shareholder value. According to mainstream economic theory, firms gain little by providing public goods, and it is the government's role to deal with problems caused by externalities. Researchers studying organizations and the natural environment argue and demonstrate that the system is far from equilibrium, and that businesses should either invest in environmental management to improve their bottom-lines, or because they are particularly well suited to do so.

Second, ONE scholars have "been willing to rethink what is endogenous and what is exogenous" (Berchicci & King, 2007: 538). In particular, researchers have shown how exogenous forces, originating from suppliers and consumers for example, can become sources of both innovation and competitive advantage (e.g., Hart, 1995; Porter & Van der Linde, 1995; Rugman & Verbeke, 1998), and how institutional formation and change can be endogenous.

2.2 Extending Previous Research

Although previous research has made substantial contributions toward our understanding of environmental management, we still know very little about environmental management as an issue of strategic choice. In particular, the conventional examination of corporate environmental performance, using absolute levels of environmental performance for between firm comparisons, says little about the strategic environmental choices made within-firms. In this thesis, the strategic component of environmental management is modeled through the construct environmental deviation. In particular, a model of the determinants of toxic air emissions is

estimated and used as the basis of a classification that groups firms according to the difference between their actual and their predicted emissions. More specifically, a three-stage empirical approach is used that draws a distinction between the observed level of toxic air emissions and the level that is predicted on the basis of a number of predictors (Brammer & Millington, 2008).

To do so, I first calculate the degree to which a firm's emissions deviate from what is predicted based on its characteristics, including size, industry, financial performance, leverage, slack, and year of emissions. The direction of deviation is then used to classify firms into those that exceed predictions (positive deviation), and those that fail to meet predictions (negative deviation). Second, I identify antecedents to positive and negative deviation. Third, I investigate the financial performance characteristics of firms grouped according to their environmental management strategy. This three-stage model allows a detailed examination of corporate environmental management strategy. In addition, in contrast to much of the existing literature, a longitudinal research design is used that examines environmental deviation, possible antecedents, and the financial consequences over a 10-year period.

I use four variables to explain environmental deviation. First, a firm's deviation in its business strategy relates to strategic choices made within the company, and I explore the effect of business strategy deviation on environmental deviation. By examining a firm's existing business strategy I align my investigation with the focus on within-firm strategic choice and respond to recent recommendations in the literature. As stated by Christmann (2000: 675): "...future research needs to analyze environmental strategies in the broader context of firms' existing resources and capabilities and their existing business strategies."

Second, some firms have the willingness and ability to strategically integrate environmental issues within their current business approach; I label this assimilation an

"environmental integration capacity". This is an area of increasing importance as firms are now challenged to integrate environmental demands with business needs (Rueda-Manzanares, Aragon-Correa & Sharma, 2008). While a company may know how to demonstrate increased environmental responsibility, and they may know how to improve their financial performance, the integration of the two remains a difficult and little understood challenge. Corporations that are willing and able to achieve such integration have made a strategic choice to consider environmental issues in their day-to-day operations and decisions, and we should, therefore, see their environmental deviation increase in a positive direction. Indeed, certain capabilities are associated with a proactive environmental approach including stakeholder integration (Rueda-Manzanares, Aragon-Correa & Sharma, 2008), strategic proactivity, and continuous innovation (Sharma, Aragon-Correa & Rueda-Manzanares, 2007). In addition, capabilities are notoriously difficult to measure in strategic management, yet from an RBV-perspective it has been argued that they provide the most benefit to firms, and that researchers should therefore develop methods to better understand them (Armstrong & Shimizu, 2007; Newbert, 2007).

Third, with the potential to influence within-firm strategic choice, industry munificence and dynamism are used to explain environmental deviation. Factors external to a firm, such as munificence and dynamism, have important implications for managerial decisions. For example, researchers in the organizational behaviour literature have found that such factors make rational and financially effective decisions difficult (Cyert & March, 1963; Simon, 1955), and ONE researchers have found that the task environment influences environmental management (Rueda-Manzanares, Aragon-Correa & Sharma, 2008). While researchers have examined the moderating effects of munificence and dynamism on environmental performance (Russo & Fouts, 1997), environmental strategy (Rueda-Manzanares, Aragon-Correa & Sharma, 2008), and how a

munificent environment can help develop alternative energy industries (Russo, 2003), none have examined the direct affect of munificence and dynamism on environmental management.

Given their potential to influence within-firm strategic choice, business strategy, environmental integration capacity, munificence and dynamism are used to explain corporate environmental deviation.

Not only does this thesis examine the antecedents to environmental deviation, but the financial consequences are also explored. The financial implications to environmental deviation are likely of interest to all stakeholders, and the relationship between environmental and financial performance has long interested researchers (e.g., Bragdon & Marlin, 1972; Fogler & Nutt, 1975; Russo & Fouts, 1997). Yet despite the number of researchers that have examined the relationship between environmental management and financial performance, the relationship remains perplexing particularly as a product of conflicting study results and methodological errors and weaknesses (Margolis & Walsh, 2001; Orlitzky, Schmidt & Rynes, 2003). For example, in their meta-analytic study, Orlitzky, Schmidt and Rynes (2003) note that in comparison to social performance, the methodologies used in the examination of environmental performance are less strong and robust, and subject to greater measurement and sampling error.

Furthermore, a recent study by Garcia-Castro, Arino and Canela (2010) adds further confusion and methodological problems to the mix. In their examination of the relationship between corporate social and financial performance they re-create a number of past studies but use a statistical procedure that addresses endogeneity. Although the original studies found a positive relationship between social and financial performance, by addressing endogeneity the relationship became either negative or neutral. This of course questions past studies which have examined the relationship between environmental and financial performance while failing to

address endogeneity. Although researchers have been aware of endogeneity for awhile (e.g., Shaver, 1998), it has not been adequately addressed in ONE research.

While I improve upon previous studies that have examined environmental management and financial performance (by for example addressing endogeneity and examining environmental deviation in particular), I also examine financial fluctuations. That is, rather than simply focusing on the level of financial performance alone, the effect on long term fluctuations are investigated. Such an approach acknowledges the potential influence of the environmental management strategy on sustained financial performance, one of the fundamental principles of business sustainability. In particular, I suspect that environmental management has a long term effect on financial performance and will be reflected in reducing financial fluctuations.

Lastly, the relationship between environmental deviation and financial performance is further investigated by examining the possible moderating effect of corporate environmental legitimacy. In particular, research examining the relationship between corporate environmental and financial performance remains ambiguous and questionable (Margolis & Walsh, 2003; Orlitzky et al., 2003). This has resulted in more detailed analyses of the relationship including the examination of possible moderators (e.g., Rueda-Manzanares, Aragon-Correa & Sharma, 2008). A moderating effect for environmental legitimacy might explain some of the differing results in studies that have examined the relationship between environmental management and financial performance.

2.3 Summary

Chapter 2 discussed the limited representativeness of ONE research in the overall management literature and its recent growth. The literature was grouped into two main categories: those that examine the natural environment as an organizational outcome, and those

that examine the natural environment as an important outcome in itself. This thesis takes the latter approach. The construct "corporate environmental performance deviation" was proposed as a way to examine within-firm strategic choice, an area that has received little attention in the ONE literature to date. This little understood or studied area of investigation lead to the inclusion of a number of variables related to within-firm strategic choice.

CHAPTER 3: THEORETICAL APPROACH

In this chapter, both theories used in this study (institutional theory and RBV) are discussed in general, and how they have been applied in ONE research specifically. I discuss why each theory is particularly applicable to the research questions in this thesis, and how each theory is extended in light of recent criticisms.

3.1. Institutional Theory

Institutional theory rejects the rational actor models of classical economics, and focuses on the cultural and cognitive explanations of firm behaviour. It looks beyond financial and task performance alone to explain firm survival, and examines the need to conform to gain legitimacy. Institutional theory gained prominence in the late 1980s and early 1990s as an alternative to the economic rational choice theory, which frequently fell short of explaining organizational behaviour (Powell & DiMaggio, 1991). Researchers' rational actor models were simply not consistent with organizational realities.

In the early 1980s when most researchers were asking why organizations differ, DiMaggio and Powell (1983) wondered why organizations were so similar. They noted that when organizational fields first emerge there is considerable diversity in their approaches and form, however, as the field matures there's an inexorable push towards homogenization. They coined the term "isomorphism" to explain this homogenization. Isomorphism is defined as "a

constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions" (DiMaggio & Powell, 1983: 149). Institutional isomorphism promotes the success and survival of organizations, even if this isomorphism detracts firms from efficiency (Meyer & Rowan, 1977). As such, institutional theory helps explain how institutions, once established, may persist even though they are sub-optimal (Meyer & Rowan, 1977). It argues that organizational change occurs as a result of processes which make organizations more similar without necessarily making them more efficient (Powell & DiMaggio, 1983). Furthermore, it is argued that when change does occur, it will be episodic and dramatic as opposed to incremental and smooth (Powell & DiMaggio, 1991).

According to DiMaggio and Powell (1983), isomorphism originates from three main institutional pressures: coercive, normative and mimetic. Coercive pressures come from outside a population of firms and include pressures such as government regulations, public opinion, and lawsuits (Dacin, 1997; Siegel, Agrawal & Rigsby, 1997). Normative pressures come from universities and professional networks, and include pressures such as industry standards, best practices, and conventional wisdom (Milstein, Hart & York, 2002). Lastly, mimetic pressures come from within a population of firms and include pressures such as standard responses to uncertainty, and the imitation of large, profitable, more senior firms by smaller newcomers (Milstein et al., 2002).

Institutional theory explains how choices and preferences are shaped by institutional forces, and that firm survival depends not only on actual task performance, but also the extent to which a firm becomes isomorphic with its environment to gain legitimacy (Meyer & Rowan, 1977; Tolbert & Zucker, 1996). Suchman (1995: 574) defined 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".

Institutional theorists believe that individual corporate choices cannot be understood without taking the embedded context into consideration. They examine cognitive and cultural explanations, including bounded rationality and cognitive limits to explain organizational behaviour (Powell & DiMaggio, 1991). Institutional theory is most often applied at the firm and field level of analysis, and according to Powell and DiMaggio (1991) it takes a "supraindividual unit of analysis" that cannot be reduced to the sum of the individual parts (Powell & DiMaggio, 1991).

3.1.1. The Application of Institutional Theory to the Study of Organizations and the Natural Environment

In this section, I review the three main ways that institutional theory has been applied to ONE research, why institutional theory is particularly suited to address the two main research questions of this thesis, and lastly, I explain how the theory is expanded in this thesis.

According to Bansal and Gao (2006), institutional theory has been one of the most dominant theories applied to studies examining the context of the natural environment. The theory has been applied to the study of ONE in a number of ways. First, the influence of the institutional context on environmental management has been a common area of investigation (e.g., Christmann, 2004; Russo & Fouts, 1997). For example, the institutional context has been shown to have a significant influence on environmental performance and the adoption of environmental strategies (Child & Tsai, 2005; Christmann, 2004; Russo & Fouts, 1997; Sharfman, Shaft, & Tihanyi, 2004). This area of investigation is likely to increase in importance with greater perceived public concern and regulatory pressure related to the natural environment

(Banerjee, 2001; Banerjee, Iyer, & Kashyap, 2003). Similarly, researchers have examined how different institutional pressures relate to environmental management (Jennings & Zandbergen, 1995; Milstein et al., 2002). For example, Jennings and Zandbergen (1995), who were among the first academics to apply institutional theory to the natural environment (Milstein et al., 2002), discussed how increased coercive pressures were more likely to lead to the adoption of a practice. They continued to argue, however, that in the absence of coercive pressures, both normative and mimetic pressures would become more important. Furthermore, they hypothesized that mimetic pressures would be more likely than normative pressures to influence organizations to adopt concepts and practices related to ecological sustainability. As another example, in one of the few studies to examine differences across industries, Milstein et al., (2002) found that not all isomorphic pressures lead to homogeneity among firms. To their surprise, they found greater variation in environmental strategy in industries with strong coercive pressures as opposed to industries with weaker coercive pressures.

Second, researchers have applied the "supraindividual unit of analysis" characteristic of institutional theory (Powell & DiMaggio, 1991) by examining organizational fields (Hoffman, 1999; 2001). For example, Hoffman (1999) used institutional theory to study how changes in environmentalism affected the chemical industry, and looked at the co-evolution of organizational fields (surrounding environmentalism) and institutions.

Third, researchers have applied institutional theory in the examination of corporate environmental legitimacy (Bansal & Hunter, 2003; Bansal & Clelland, 2004). For example, Bansal and Clelland (2004) argued and found that environmentally legitimate firms incurred less unsystematic stock market risk. In particular, in contrast to systematic risk which reflects stock price variability for macroeconomic events like exchange rates, unsystematic risk reflects stock

price variability for events that affect a specific firm, like for example, an oil spill. Investor reactions to such events influence stock prices and, therefore, the firm's unsystematic risk. Bansal and Clelland (2004) found that firms earn environmental legitimacy when their environmental performance conforms to stakeholders' expectations, and that this legitimacy reduces the unsystematic stock market risk.

Institutional theory is applied to this thesis in two main ways. First, I use it to help hypothesize about the direction of the relationship between environmental deviation and financial performance. Specifically, institutional theory suggests that deviation harms legitimacy making it difficult for firms to acquire resources, and ultimately harming the corporation financially, *ceteris paribus*. Second, the moderating effect of corporate environmental legitimacy on the relationship between environmental deviation and financial performance is examined. Thus, institutional theory helps to explain both why firms deviate in their predicted level of toxic emissions, and how environmental deviation and legitimacy relate to financial performance.

Oliver (1991) criticizes institutional theory for assuming organizational passivity, and failing to address the strategic behaviour and the ability of firms to influence institutionalization. She argues that the strategic choices of organizations can influence and determine the survival of a firm. By examining environmental deviation within individual firms, the strategic choice of environmental management is investigated. Instead of examining absolute levels of toxic emissions (characteristic of environmental performance measures), the deviation from predictions is analyzed which provides objective information on the strategic behaviour within the firm. Thus organizations are not assumed to be passive recipients of the institutional context, but their strategic behaviour, both in terms of their environmental and business strategies, is examined.

3.2. Resource-Based-View (RBV)

Although the beginnings of RBV are credited to Penrose (1959), the theory did not gain prominence until the 1980s and early 1990s, particularly with the work of Wernerfelt (1984) and Barney (1986; 1991). At the time when organizational theorists were primarily concerned with the external environment, RBV emerged to help scholars to once again look within organizations.

The resource-based view states that firm resources that are valuable, rare, non-imitable and non-substitutable hold the potential of sustained competitive advantage (Barney, 1991). A resource is considered valuable if it contributes to firm efficiency or effectiveness, rare if it is not widely held, non-imitable if it cannot be easily replaced by competitors, and non-substitutable if other resources cannot fulfill the same function (Barney, 1991). Since having written his classic 1991 paper, Barney has combined non-imitability and non-substitutability into one dimension, and 'organization' has been added (Barney, 1995; Barney & Hesterly, 2006). Organization asks whether or not a company's policies and procedures are organized to support the exploitation of the resource. Together, these characteristics of resources are referred to as VRIO (valuable, rare, non-imitable, and organization).

As the name suggests, central to the theory are resources. Wernerfelt (1984: 172) first referred to a resource as "anything which [can] be thought of as a strength or weakness of a given firm," but then offered a more formal definition as "those (tangible and intangible) assets which are tied semipermanently to the firm." Barney (1991) limited this definition to "strengths that firms can use to conceive of and implement their strategies." Finally, Teece, Pisano, and Shuen (1997) defined resources as "firm-specific assets that are difficult if not impossible to imitate." Capabilities, which have gained increasing importance within RBV (Armstrong &

Shimizu, 2007; Newbert, 2007), can be defined as "capacities to deploy resources, usually in combination, to affect a desired end (Amit & Schoemaker, 1993)" (Christmann, 2000: 666).

The theory is based on two underlying assumptions: resource heterogeneity and resource immobility. The first assumption states that firms in an industry or strategic group are not identical in terms of the resources they posses. Within the workplace, managers make varying estimations of a resource's possible future value before investing in the resource (*ex-ante*). This results in differences across firms in the use of resources. The second assumption states that resources are not perfectly mobile across firms as they may be path dependent, causally ambiguous, or socially complex. Within the workplace, once managers have invested in particular resources (*expost*), resource immobility which arises from path dependence, causal ambiguity, or social complexity hinders other organizations from possession and development of resources at a comparable level. This can then lead to a sustained competitive advantage (Barney, 1991; Berchicci & King, 2007).

3.2.1. The Application of RBV to the Study of ONE

In this section, I review the main ways that RBV has been applied to ONE research, why RBV is particularly suited to address the two main research questions of this thesis, and, lastly, how I expand the theory.

The resource-based-view is commonly used to examine the natural environment (e.g., Aragon-Correa, 1998; Aragon-Correa & Sharma, 2003; Christmann, 2000). Indeed, a variant of the theory has been developed looking specifically at the environment, called the natural-resource-based-view (Hart, 1995; Judge & Douglas, 1998). It argues that a sustained competitive advantage can be obtained by increased environmental responsibility, and specifically examines

resources related to pollution reduction or environmentally friendly products (Berchicci & King, 2007).

The resource-based view has been particularly useful in the examination of the relationship between environmental management and financial performance (Christmann, 2000; Judge & Douglas, 1998; King & Lennox, 2000; Klassen & McLaughlin, 1996; Russo & Fouts, 1997). The main argument is that environmental management, a firm capability, can lead to a sustained competitive advantage. For example, Clelland, Douglas, and Henderson (2006) found that environmental practices and performance can lead to a sustained competitive advantage by creating internal value, particularly when environmental assets are combined with existing organizational skills. Specifically, they examined the manufacturing industry and found that the more productive the resource was in lowering pollution levels, the greater the expected within-firm value creation. Judge and Douglas (1998) found that the level of integration of environmental management into the strategic planning process was positively related to both financial and environmental performance.

The examination of how environmental management is related to financial performance has also lead to the examination of environmental capabilities. In particular, researchers have examined capabilities such as accumulated experience, the ability to influence environmental laws and regulations, flexibility to adapt to legislative changes, and the creation of barriers to entry (Bansal & Bogner, 2002; Dean & Brown, 1995; Faucheux, Nicolai & O'Connor, 1998; Hart, 1995; Hillman & Hitt, 1999; Russo & Fouts, 1997). This relates particularly well to the "organization" dimension of VRIO (valuable, rare, non-imitable, and organization) resources. Importantly, researchers have noted that the combination of resources with existing organizational skills creates causal ambiguity among competitors as to how a firm is capitalizing

on its use of the resource. It is this combination that ultimately results in a sustained competitive advantage through the causal ambiguity created by the social complexity and embeddedness within the firm (Hart, 1995; Newbert, 2007; Rueda-Manzanares, Aragon-Correa & Sharma, 2008; Teece, 1987).

Researchers have also used RBV to match particular resources and capabilities with environmental strategies (Hart, 1995; Russo and Fouts, 1997; Sharma and Vredenburg, 1998; Rugman and Verbeke, 1998; Buysse and Verbeke, 2003; Aragon-Correa and Sharma, 2003). For example, Hart (1995) discussed product stewardship as an environmental strategy and associated it with product differentiation and the need and ability to conduct a proper life-cycle-analysis. Christmann (2000) applied RBV to the examination of environmental strategies and highlighted the importance of resource and capability heterogeneity. In particular, he found that environmental management best practices do not always lead to a cost advantage, but do so only when firms possess complementary assets, such as process innovation and implementation.

The resource-based view is applied to this thesis in two main ways. First, I examine how a firm's capability to strategically integrate environmental issues into their existing business approach affect environmental deviation. Thus the effect of capabilities on environmental deviation is examined. Second, I use it to hypothesize about the direction of the relationship between environmental deviation and financial performance. Specifically, RBV suggests that deviation can be a source of competitive advantage leading to additional economic rents, *ceteris paribus* (Barney, 1991). Thus, RBV helps to explain both why firms deviate from their predicted level of toxic emissions and how this deviation relates to financial performance.

The resource-based view has traditionally referred to value as the ability of a resource or capability to contribute to the bottom-line. However, Dyck & Bell (forthcoming) recently noted

that this limits the theory as value could also be defined in terms of alternative forms of performance, such as environmental performance. While this may eventually contribute to the bottom-line, the idea is that value defined in terms of profits alone greatly limits RBV, especially in terms of what can be termed "truly valuable resources" (Dyck & Bell, forthcoming). Accordingly, I apply RBV to the examination of environmental deviation.

3.3. Summary

This chapter provided a synopsis of institutional theory and RBV, including the central arguments and criticisms to each theory, and how they have been applied in ONE research in particular. I explained how each theory is used in this thesis, as well as my contributions in expanding the theories. Interestingly, each theory suggests a differing result for the effect of environmental deviation on financial performance. The next section discusses each study variable in particular, and addresses the ostensibly opposing theoretical predictions for the relationship between environmental deviation and financial performance.

CHAPTER 4: HYPOTHESIS DEVELOPMENT

Having previously discussed the relevant literature and remaining conceptual gaps, this chapter develops the research hypotheses. The first four hypotheses address the research question: Why do firms deviate from their predicted level of toxic emissions? Specifically, I use four main variables, including environmental integration capacity, strategic deviation, munificence, and dynamism, to explain corporate environmental deviation (See Figure 1). The fifth and sixth hypotheses address the research question: How does environmental deviation relate to financial performance? Specifically, I make hypotheses about the relationships between environmental deviation and financial performance in terms of profitability and fluctuations, and about the moderating effect of environmental legitimacy (see Figure 2).

Insert Figures 1 and 2 about here

Before developing the hypotheses, I develop the construct corporate environmental deviation in relation to other relevant constructs such as environmental performance. I systematically define this construct not only because it is a pivotal construct to my theory, but also, more importantly, because it carries significant theoretical meaning that warrants further investigation.

4.1. Construct Development: Corporate Environmental Performance Deviation

Environmental deviation is defined as the extent to which a firm's actual environmental performance deviates from its predicted environmental performance. In particular, I examine the extent to which a firm's toxic air emissions deviate from predicted emissions. Predicted emissions are calculated based on empirically identified predictors including size, industry, financial performance, leverage, slack and year of reported emissions. Positive environmental deviation means that a firm has lower toxic emissions than predicted; it exceeds predictions thus the deviation is considered positive. In contrast, negative environmental deviation means that a firm has greater toxic emissions than predicted; it performs below predictions thus the deviation is considered negative.

The fundamental difference between environmental deviation and environmental performance is that deviation examines why firms *choose* to differ. Researchers have tended to use environmental performance to make comparisons *between* firms. In contrast, I compare actual environmental performance to predicted environmental performance *within* individual firms. This distinction between environmental deviation and common measures of corporate environmental performance has important implications. For example, it is possible for a firm to

have high environmental performance overall (by having a low level of toxic emissions for example), but low environmental deviation where their environmental performance does not differ much from predictions given its organizational characteristics such as its size, financial performance and industry. Or, a firm might have poor environmental performance overall (by having a high level of toxic emissions for example), but positive environmental deviation where its level of emissions are lower than the predictions.

The purpose of examining environmental deviation is to explore the largely unexamined strategic choice component of environmental management. Specifically, I use the deviation from "normal" levels of toxic air emissions to identify two groups of companies: those which deviate positively and those which deviate negatively. These two positions reflect different managerial decisions in terms of exceeding or falling below emission predictions. This implies that firms may take very different strategic environmental approaches, even in the face of similar institutional pressures, (Oliver, 1991).

4.2. Environmental Integration Capacity

A firm's ability to integrate environmental issues into their existing strategic approach could be a key factor in explaining environmental deviation. While some firms may purposely decide not to integrate environmental issues into their core business approach, others might simply lack the capability to align environmental and business needs. This integration capacity is particularly relevant for today's corporations who are challenged to integrate environmental demands with business needs (Rueda-Manzanares, Aragon-Correa & Sharma, 2008). To date, little is known from a researcher or managerial perspective about this integration and its relationship to environmental management.

Environmental integration capacity is defined as a firm's capability to synthesize environmental issues with its existing business strategy. It is the extent to which managers are able and willing to include environmental issues into all their business decisions. It reflects both the relevance of environmental issues to the firm's business, and the managerial capability to embed environmental issues into business operations daily. The relevance here points to the fact that environmental issues have greater implications on some business models than on others. For example, environmental issues are highly relevant to firms operating in visibly polluting industries. Relevance is also partly based on managerial interpretations, such as the perceptions of environmental issues as threats or opportunities (Ghobadian et al., 1995; Sharma, 2000). The capability indicates the readiness in firm resources and experiences to manage environmental issues strategically. The capability relates to prior experience, accumulated commitment, and organizational structure associated with environmental management.

I propose that environmental integration capacity will increase environmental deviation in a positive direction for two reasons. First, environmental integration capacity demonstrates that environmental concerns are both relevant to the particular organization, and that managers have the capability to embed them into their daily business operations. Due to this combined relevance and capability evident through an environmental integration capacity, environmental deviation will increase in a positive direction. It is the combination between the two aspects of environmental integration capacity that is key. For example, environmental issues might be relevant for a firm, but without the managerial willingness and ability to integrate such issues into their existing business approach, environmental deviation will not increase in a positive direction. Similarly, managers might be willing and able to integrate environmental issues, but if these issues are not relevant to their existing business approach, integration is not possible. For

example, if the existing business approach is characterized by short-term profit-maximization, integrating environmental issues are likely to raise costs in the short-term. A lack of relevance to the existing business approach might also exist as a result of managerial perceptions. That is, the manager(s) do not perceive that environmental issues are relevant, even though they may be, making integration impossible.

Second, the greater the environmental integration capacity, the better firms are at combining ostensibly competing stakeholder demands. Stakeholder demands often compete (Frooman, 1999). While not always possible, one method to overcome this is to find and exploit common ground in the demands (Freeman & McVea, 2001). That is, rather than setting stakeholder specific strategies, or decoupling environmental management from core strategic management (Weaver et al., 1999), managers can find ways to satisfy multiple stakeholders simultaneously (Freeman & McVea, 2001). Environmental integration capacity is a firm's ability to satisfy multiple stakeholders simultaneously with regard to environmental and financial responsibilities. The better firms are at this integration, the easier for the firms to accommodate competing demands between environmental stakeholders and shareholders, and in turn, the more likely that a firm will further increase their environmental deviation in a positive direction. In other words, an environmental integration capacity allows a firm to benefit their business and environmental goals simultaneously, as the capacity for the two to be integrated in day-to-day decisions exists. Such simultaneous benefits will please both environmentally-focused and financially-focused stakeholders, leading a firm to further increase their positive environmental deviation. This is particularly the case as stakeholder demands for greater environmental responsibility continue to increase over time (Hart, 2005; Savitz & Weber, 2006).

Accordingly, I predict that environmental integration capacity will further increase positive environmental deviation, and decrease negative environmental deviation.

Hypothesis 1a: Environmental integration capacity will increase positive environmental deviation

Hypothesis 1b: Environmental integration capacity will decrease negative environmental deviation

4.3. Strategic Deviation

Strategic deviation "refers to changes in the pattern of a firm's resource commitments over time" (Carpenter, 2000: 1182). Following Mintzberg (1978), this construct represents strategy as an observed pattern which manifests itself across a number of organizational actions. The manifested strategy is reflected in firm strategic resource deployment across major functional areas such as productions and operations, marketing, and finance (Geletkanycz & Hambrick, 1997). The examination of business strategy deviation permits the continued focus on within-firm strategic decisions, and attempts to link such decisions made in both the core business strategy and the environmental strategy.

Conceptually, strategic deviation is based on the notion of isomorphism (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Isomorphism among corporations occurs as many firms within an industry adopt a similar strategy, thereby creating an industry central tendency (Greenwood & Hinings, 1993). According to institutional theory, firms follow industry central tendencies to gain legitimacy, which enables them to attain necessary resources, reduce uncertainty, and ultimately enhance their survivability (DiMaggio & Powell, 1983; Meyer & Rowan, 1977).

Managers of firms that deviate in their business strategy have made the strategic choice to deviate, and since all strategic choices should be consistent with one another, these same

managers would also tend to deviate in their environmental strategy. For example, if an industry is characterized by a low-cost provider business strategy, we would expect most, if not all, organizations within this industry to exhibit this strategy (to varying degrees). Yet if managers make the strategic choice to deviate from this business strategy, I suspect that the same reason leading to this deviation will be apparent in their environmental strategy. Indeed, research has found that a firm's business strategy affects its environmental strategy (Aragon-Correa, 1998), and I extend this research by examining how and if, deviation in the business strategy is related to deviation in the environmental strategy. By deviating in both the business and environmental strategy the overall strategic goals of the corporation are more likely to be consistent with one another, as opposed to deviating in one area and not the other (Aragon-Correa, 1998).

In addition, managerial strategic choices are affected by perceived institutional pressures and the perceived benefits to differentiation. Research has shown that despite the pull toward institutional isomorphism, many firms deviate from the industry central tendency (Geletkanycz and Hambrick, 1997; Porac et al., 1989). If managers are willing and able to resist the pull of isomorphism in their firm's business strategy, they are also likely to be willing and able to resist the pull of isomorphism in their firm's environmental strategy. Firms that resist institutional isomorphism do so because, from an RBV perspective, differentiation can be a source of competitive advantage (Barney, 1986; 1991). If managers perceive benefits to differentiation in their business strategy, these same perceived benefits are likely to be apparent in their environmental strategy; at least much more than would be the case if managers did not perceive any benefits to differentiation. In the end, the combined pull toward isomorphism and the push toward differentiation are consistent across the organization and managerial strategic choices.

Therefore, I predict that strategic deviation will increase environmental deviation, whether this deviation is positive or negative.

Hypothesis 2: Strategic deviation will have a positive effect on environmental deviation.

4.4. Munificence

Organizational task environments are considered a key issue of management research (Andrews, 2009; Dess & Beard, 1984). For example, Majumdar and Marcus (2001) found that well-designed, flexible regulations improved environmental productivity, whereas less well-designed regulations had a negative impact. Furthermore, factors external to a firm such as munificence, dynamism and rivalry have important implications for managerial decisions. For example, the organizational behaviour literature has found that such factors make rational and financially effective decisions difficult (Cyert & March, 1963; Simon, 1955).

Munificence is defined as "the extent to which the environment can support sustained growth" (Dess & Beard, 1984: 55). It refers to the capacity for *financial* growth in the external environment. A munificent industry has a large capacity for growth and an abundance of resources, whereas a less munificent industry has a low capacity for growth and limited resources.

I propose that munificence will suppress positive environmental deviation, but encourage negative environmental deviation, as the availability of resources and growth lead to greater emissions and reduced efficiency. That is, munificence will be related to larger firm emissions than what is expected based on organizational characteristics.

Although firms in a munificent environment may in fact have more opportunities to allocate resources to the development of both an environmentally proactive strategy and environmental capabilities (Rueda Manzanares et al., 2008), the availability of resources and

room for growth provide less incentive for them to do so. That is, the munificence encourages wastefulness and greater emissions because there are so many resources available. Consider, for example, that consumption in Western countries is much greater than in Eastern countries primarily because Western countries have so many resources at their disposal. The increased number and access to resources encourages wastefulness because once one resource is used up, another can easily and cheaply be found to replace it. If this is not an option, one must be less wasteful with the single resource available. Furthermore, because of the opportunities for growth in a munificent environment, firms are more likely to grow, and as firms grow they use more resources and tend to create more pollution and emissions (Chen, Lai & Wen, 2006; Lopez-Gamero, Claver-Cortes & Molina-Azorin, 2008; Moore, 2001), increasing the likelihood that these firms will fail to meet environmental expectations.

In contrast, in a non-munificent environment, firms must make the most of the limited resources available, perhaps even reusing "waste", leading to greater efficiencies and lower environmental pollution (King & Lenox, 2001). With limited opportunities for growth, firms seek to improve profitability through increases in efficiencies, as well as reductions in wastes and emissions (Aldrich, 1979). These firms are more likely to "grow" through cost reductions, whereas for firms in a munificent environment growth is most likely to come from increases in revenue (Sheppard, 1995). In a non-munificent environment, any strategy that aids in reducing costs would therefore be considered of central importance. For example, King and Lenox (2001) analyzed the environmental performance of over 17,000 manufacturing firms and found "strong evidence that lean production, as measured by ISO 9000 adoption and low chemical inventories, is complementary to waste reduction and pollution reduction". Indeed, the commonly heard phrase "lean and mean" characteristic of a non-munificent environment has been linked to the

natural environment with the phrase "lean and green" (King & Lenox, 2001; Kleindorfer, Singhal & Wassenhove, 2005). Positive environmental deviation thus becomes particularly attractive in a non-munificent environment as it can reduce costs by lowering compliance costs, reducing waste, and improving efficiency and productivity (Ambec & Lanoie, 2008; Hart, 1995; Hart & Ahuja, 1996).

In addition, environmental responsibility to date is largely associated with reductions in firm costs (Ambec & Lanoie, 2008; Hart, 1995; Hart & Ahuja, 1996). For example, on their private label line of toys, Wal-Mart (legendary for its ability to cut costs) realized that by making the packaging a little bit smaller, they could "save $2.4 million a year in shipping costs, 3,800 trees, and one million barrels of oil" (Fortune, 2006). By installing auxiliary power units on its fleet of trucks that reduce idle time, Wal-Mart can save $26 million a year in fuel costs. Inspired by these findings, Wal-Mart has set a goal to increase the fuel efficiency of their fleet of trucks by 50% in ten years. If successful, by 2015, this will result in savings of $310 million per year. Finally, Wal-Mart has "installed machines called sandwich balers in its stores to recycle and sell plastic that it used to throw away. Companywide, the balers have added $28 million to the bottom line" (Fortune, August: 2006). Other examples include Dupont, which reduced its global energy use by 7% resulting in savings of more than $3 billion, and UPS, which by using hybrid electric delivery trucks estimates that they will reduce their fuel consumption by 44,000 gallons in one year. Such rapid cost savings with minimal firm investment are particularly attractive to firms operating in a non-munificent environment. While the cost savings from increased environmental responsibility will also be attractive to firms operating in munificent environments, they must balance an abundance of resources and opportunities for growth with efficiency improvements.

For these reasons, I made the following predictions:

Hypothesis 3a: Industry munificence will decrease positive environmental deviation.

Hypothesis 3b: Industry munificence will increase negative environmental deviation.

4.5. Dynamism

Dynamism is defined as "change that is hard to predict and that heightens uncertainty for key organizational members" (Dess & Beard, 1984: 56). In a dynamic and turbulent environment, managers must deal with instability and unanticipated changes and consequences, whereas in a stable environment changes and consequences are more predictable.

I propose that dynamism will suppress positive environmental deviation but encourage negative environmental deviation, as the uncertainty and unpredictability of the task environment reduces the likelihood of firm commitment and investment in environmental responsibility. That is, dynamism will be related to larger firm emissions than we would expect based on organizational characteristics.

Environmental management is associated with significant changes within a corporation as numerous firm functions are impacted (Russo & Fouts, 1997). Given this large impact, strategic choices related to environmental management are of high importance. Yet greater uncertainty makes it difficult for managers to assume important commitments, to decide if and where to make large investments, and whether or not to introduce major changes (Aragon-Correa & Sharma, 2003; Rueda-Manzanares, Aragon-Correa & Sharma, 2008). It is also difficult to identify key strategic factors (Amit & Schoemaker, 1993) or to develop and use resources and capabilities (Black & Boal, 1994). Outcomes are also less clear in dynamic and uncertain environments, making it less likely that managers will be willing to use limited organizational resources for environmental management.

Furthermore, in a dynamic environment, managers are more likely to struggle to understand how, or which environmental option to select to manage their environmental approach strategically. For example, many energy companies continue to question whether they should be investing in solar, wind, bio-fuel, nuclear, clean-burning coal, or carbon capture and storage.

In addition, it is more difficult for managers to understand changing stakeholder expectations pertaining to the natural environment. For example, shareholders have typically been viewed as being against corporate social and environmental performance (Freidman, 1970), but the growing popularity of social index funds suggests this is not always the case. This may be particularly confusing for firms that have traditionally taken a combative stance toward environmental integration.

Moreover, government regulation pertaining to the natural environment may also be difficult to predict in dynamic environments. For example, prior to the BP oil spill disaster, many geographic areas planned to conduct off-shore drilling. Now, many areas such as California have decided not to pursue off-shore drilling and are proposing a ban on all future off-shore drilling (http://abclocal.go.com).

Lastly, even if managers in a dynamic environment are concerned about the natural environment, they are less inclined to act because of the increased degree of uncertainty. In contrast, in a non-dynamic environment, firms are better able to predict the outcomes to significant environmental investments. In a more certain environment, managers that are concerned about the natural environment are more likely to take action, as the consequences are more clear.

Therefore, I propose the following hypotheses.

Hypothesis 4a: Dynamism will decrease positive environmental deviation.

Hypothesis 4b: Dynamism will increase negative environmental deviation.

4.6. Environmental Deviation and Financial Performance

Deephouse (1999: 147) noted that "firms face pressures to be different and to be the same. By differentiating, firms reduce competition. By conforming, firms demonstrate their legitimacy. Both reduced competition and legitimacy improve performance." I examine the influence of environmental deviation on financial performance by looking at this tension between uniqueness and conformity

With a few exceptions (Deephouse, 1999; Porac et al., 1989), this tension between competitive and institutional forces has typically been overlooked in research. Most researchers have tended to focus on either the value of being different, or the value of being similar (Deephouse, 1999). They have demonstrated that firms face pressures to be different (Barney, 1991; Baum & Mezias, 1992; Porter, 1991), or that firms face pressures to be the same (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Suchman, 1995). On one hand, from a resource-based perspective, differentiation is viewed positively as it is often perceived as a source of competitive advantage that can lead to economic rents (Barney, 1991). On the other hand, from an institutional perspective, differentiation is viewed negatively as it harms legitimacy making it difficult for firms to acquire resources (Deephouse, 1999).

The benefits of being different result from a reduction in competition for resources. At one point in time, all markets have a finite set of resources (Deephouse, 1999). Firms within these markets strategically compete for the limited resources. Limits to performance may occur because of increased strategic similarities (Baum & Mezias, 1992; Baum & Singh, 1994; Hannan, Ranger-Moore & Banaszak-Holl, 1990), and an increase in the number of firms

competing for the same resources (Baum & Singh, 1994). Thus, the differentiation, and specifically environmental deviation, can benefit financial performance. For example, unlike many other oil and gas companies, Royal Dutch Shell decided to take pre-emptive action on carbon emissions, instead of waiting for governmental constraints:

> But rather than sit on the sidelines and wait for carbon constraints to alter the company's business environment, Shell took an early position on the issue and engaged in actions that began to manage its carbon footprint. These actions have earned the company credibility and a powerful voice within policy, advocacy and market circles. And this voice grants the company a measure of control over its future business environment (Hoffman, 2006: 111).

Such control could be an important source of competitive advantage as Shell helps shape the institutional norms and regulations surrounding carbon constraints. By exceeding expectations, Shell believes it will benefit financially.

Yet the positive financial benefits to deviation may not necessarily be limited to increases in environmental responsibility. A firm may also benefit financially by having lower environmental performance than expected. Such negative environmental deviation can be associated with reduced environmental costs (assuming the firm is operating within the law and would not be subject to fines or penalties), which may be particularly attractive when competitors have higher costs associated with greater standards of environmental responsibility. This leads to an as yet unexamined question in ONE research: if the majority of companies in an industry exhibit positive environmental deviation, are those that practice negative environmental deviation, then, at an advantage? Following a resource-based argument, those companies with a reactive approach may in fact hold a (short-term) competitive advantage. That is, theoretically, a competitive advantage may be obtainable regardless of the direction of the deviation.

From an institutional perspective, however, deviation is viewed negatively as it harms legitimacy, making it difficult for firms to acquire resources (Deephouse, 1999). As such, firms

that fail to meet expectations would fail to gain legitimacy, and would subsequently suffer negative financial performance.

Yet the link between environmental deviation and negative financial performance from an institutional perspective is not as clear as it first appears. Consider, for example, that stakeholder expectations for environmental responsibility have changed, and what can be considered the industry norm is continually rising. Therefore, it can be argued that legitimacy is earned by demonstrating a level of environmental responsibility higher than what we would predict based on organizational characteristics. Indeed, Bansal and Clelland (2004) found that directionality was important as high environmental performers earned higher legitimacy than lower environmental performers. While this may appear self-evident, it is in contrast to earlier arguments made from a resource-based perspective where it was argued that environmental deviation, regardless of direction could benefit a firm financially. Bansal and Clelland (2004) went on to argue that firms with higher environmental performance earned higher legitimacy as this level of performance conformed to stakeholders' expectations.

Ultimately, however, firms must find a strategic balance between the pressures of competition and legitimacy. That is, "firms must balance the benefits of reduced competition against the costs of reduced legitimacy," this has been referred to as 'strategic balance theory' (Deephouse, 1999: 148). The need for legitimacy limits the degree to which firms can differentiate. The theory suggests that a certain degree of differentiation is financially beneficial to firms, but too much will result in a decrease in financial performance because they will lose legitimacy. Porac, et al. (1989) referred to this point of diminishing returns as the 'competitive cusp'. Therefore, from a theoretical standpoint, institutional theory and RBV contrast in their predictions for the relationship between environmental deviation and financial performance, but

strategic balance theory would suggest that firms should differentiate as much as legitimately possible (Deephouse, 1999).

Previous research proposed a list of factors associated with environmental performance, such as reduced costs, gaining competitive parity, and regulatory advantages, that may contribute to improvements in financial performance. It is believed that, for example, environmental performance can reduce costs by lowering compliance costs, reducing waste, and improving efficiency and productivity (Ambec & Lanoie, 2008; Hart, 1995; Hart & Ahuja, 1996). Empirical research has demonstrated that environmental performance can lead to a competitive advantage through product differentiation (Ambec & Lanoie, 2008; Porter & van der Linde, 1995), international competitive advantages (Hart, 1995; Miles & Covin, 2000), greater appeal to consumers (Miles & Covin, 2000), improvements in legitimacy (Bansal & Clelland, 2004), strengthening firm reputation (Hart, 1995; Miles & Covin, 2000), selling of pollution control technology (Ambec & Lanoie, 2008), the creation of entry barriers (Dean & Brown, 1995; Hart, 1995; Russo & Fouts, 1997), and the development of new market opportunities and better access to markets (Ambec & Lanoie, 2008). Environmental performance has also been shown to offer regulatory advantages by leading to greater flexibility to adapt to legislative changes (Bansal & Bogner, 2002), through the ability to influence environmental laws and regulations (Faucheux et al., 1998; Hart, 1995; Hillman & Hitt, 1999; Miles & Covin, 2000), and by reducing or avoiding legal liabilities (Hart, 1995; Rooney, 1993).

Similarly, research has found negative implications to poor environmental performance. For example, Hamilton (1995) found that firms reporting pollution figures to the Toxic Release Inventory (TRI) suffered statistically significant negative returns in stock value within a day. Dramatic events, such as an oil spill, can have a large effect on firm profitability as investors

react to the potential liabilities, fines, penalties, and clean-up costs (Bansal & Clelland, 2004). Konar and Cohen (2001) found that legal chemical releases reported to the TRI had a significant negative effect on the intangible asset values of firms. On the other hand, they found that for the average firm in their sample, a 10 percent reduction in emissions resulted in a $34 million increase in market value. Lastly, Bansal and Clelland (2004) found that firms perceived as environmentally illegitimate experienced higher unsystematic risk. Taken together, these studies suggest that the level of environmental performance is positively related to the level of financial performance.

When it comes to environmental deviation, however, it is not clear how deviation relates to financial performance. Prior literature seems to suggest that the direction of deviation matters. Specifically, empirical research has found positive financial outcomes to increased levels of environmental responsibility (Orlitzky et al., 2003; Russo & Fouts, 1997), and negative financial outcomes to decreased levels of environmental responsibility (Hamilton, 1995; Klassen & McLaughlin, 1996; Konar & Cohen, 1997; 2001). Therefore, from a resource-based perspective, prior research seems to suggest that differentiation based on positive environmental deviation will benefit a firm financially, but differentiation based on negative environmental deviation will harm a firm financially. Furthermore, from an institutional perspective, prior research seems to suggest that increased legitimacy accompanies positive environmental deviation, and decreased legitimacy comes with negative environmental deviation (Bansal & Clelland, 2004).

Thus, the two ostensibly opposing theories are reconciled into the following two hypotheses:

Hypothesis 5a: Positive environmental deviation will have a positive effect on financial performance, *ceteris paribus*.

Hypothesis 5b: Negative environmental deviation will have a negative effect on financial performance, *ceteris paribus*.

4.7. The Moderating Effect of Corporate Environmental Legitimacy

Corporate environmental legitimacy is defined as "the generalized perception or assumption that a firm's corporate environmental performance is desirable, proper, or appropriate" (Bansal & Clelland, 2004: 94, adapted from Suchman, 1995: 574). With escalating global environmental problems and the perception that business is a major contributor to these problems, corporations are under mounting pressure to address environmental concerns. Some companies have responded to these pressures symbolically with little to no substance (Westphal & Zajac, 1994; 1998; 2001), while others have enthusiastically and wholeheartedly taken substantive actions to address their environmental responsibility (Weaver et al., 1999).

Firms engaging in either symbolic or substantive actions are attempting to gain legitimacy among stakeholders. Attaining legitimacy is important for organizations as it can lead to greater access to resources, stronger exchange relationships with business partners, and better job applicants (Aldrich & Fiol, 1994; DiMaggio & Powell, 1983; Oliver, 1991; Pfeffer & Salancik, 1978; Turban & Greening, 1997). Often times, firms need only appear to conform to attain legitimacy, since stakeholders may not be able to tell the truth behind the scenes. In fact, from a rational-actor perspective, we might expect managers and their organizations to act symbolically as appearing to conform is easier and permits greater internal flexibility than actual conformity (Suchman, 1995). Accordingly, symbolic actions have been found in the implementation of corporate governance structures (Westphal & Zajac, 1994; Zajac & Westphal, 1995), ethics codes (Weaver et al., 1999), and ISO 14001 certification (Russo & Harrison, 2005). Yet despite the apparent benefits to symbolic actions over substantive actions, a firm could face

significant repercussions from a variety of stakeholders if their symbolic actions are found to lack substance.

The attainment of environmental legitimacy suggests that stakeholders believe the firm is taking substantive environmental actions, which in fact, may or may not be the case. For firms with positive environmental deviation, I propose that if stakeholders perceive this deviation as legitimate, the conferred legitimacy will strengthen the financial benefits to positive environmental deviation because of better access to resources. For example, some firms may have access to the latest environmentally friendly technologies that help to reduce both emissions and costs. Legitimate firms also tend to be subject to less scrutiny than their non-legitimate counterparts (Bansal & Clelland, 2004). In the event of a crisis, environmentally legitimate firms may be given the benefit of the doubt as the illegitimate activity is decoupled from the corporation itself. That is, the illegitimate activity is viewed as an exception and not representative of the company in general. When given the benefit of the doubt from stakeholders, the negative financial consequences from failing to meet expectations are less severe, if apparent at all.

Similarly, environmentally legitimate firms may be able to use their reputation to their advantage in crisis situations (Dawar & Pillutla 2000). For example, Klein and Dawar (2004) found evidence of a spillover or "halo effect" from corporate social responsibility actions to other unrelated judgements, where prior socially responsible actions protected the firm in a crisis situation.

Firms with negative environmental deviation, nonetheless, can be conferred environmental legitimacy as well, so long as the firms' primarily symbolic actions toward environmental management are perceived as genuine. Such stakeholder misperception leads to

better access to resources and reduced stakeholder scrutiny, as was the case with positive deviators, potentially reversing the previously predicted negative relationship between negative environmental deviation and financial performance.

Consider Wal-Mart as an example. In a 2006 cover article in *Fortune* magazine, Wal-Mart was called "The Green Machine". Yet recently, the company reached a $27.6 million settlement for improperly dumping hazardous waste including fertilizers, aerosol cans, pesticides, paints and other chemicals at 236 stores in California (CBC news, May 3, 2010). Wal-Mart, at least within California, may be an example of greenwashing, where the firm portrays itself as being green when in fact it is not. Or put differently, its actions are more symbolic than substantive. Furthermore, its symbolic actions were effective, at least with Fortune magazine, lending the firm environmental legitimacy.

Hypothesis 6a: Corporate environmental legitimacy will moderate the relationship between positive environmental deviation and financial performance; this relationship will be stronger under conditions of greater environmental legitimacy.

Hypothesis 6b: Corporate environmental legitimacy will moderate the relationship between negative environmental deviation and financial performance; this relationship will become positive under conditions of greater environmental legitimacy.

4.8. Summary

This chapter presented the arguments leading to six hypotheses. Hypothesis 1 predicts a positive effect of environmental integration capacity on positive environmental deviation, and a negative effect on negative environmental deviation. Hypothesis 2 predicts a positive effect of strategic deviation on environmental deviation. Hypotheses 3 and 4 predict reduced positive environmental deviation with munificence and dynamism and increased negative environmental deviation with munificence and dynamism, or more simply, larger emissions than expected with greater munificence and dynamism. Hypothesis 5 predicts increased financial performance with

positive environmental deviation, and decreased financial performance with negative environmental deviation. Lastly, when accompanied with environmental legitimacy, Hypothesis 6 predicts a stronger relationship between positive environmental deviation and financial performance, and positive financial results to negative environmental deviation. In the next section, I examine the methodology used to address the hypotheses.

CHAPTER 5: METHOD

5.1. Sample

The sample was drawn from the Toxic Release Inventory (TRI), publicly available on the U.S. Environmental Protection Agency (EPA) website. This database offers facility level data on the toxic chemical releases and waste management activities of 22,880 facilities/plants operating in the United States. Companies in the United States are required to report their chemical releases and waste management activities if: (1) they are primarily engaged in manufacturing, mining, electric utilities, hazardous waste treatment, or chemical distribution; (2) they have at least 10 employees; (3) they manufacture, import, process, or otherwise use any of the listed toxic chemicals in excess of their threshold quantities (Toffel & Marshall, 2004).

As a testament to the credibility of the data, in 1987 and 1996, 93-95 percent of the facilities that were required to report to the TRI did so (King & Shaver, 2001). Furthermore, the data quality of each facility is checked by the EPA. If a potential error is found, the facility is notified and their report is subject to a certified revision or withdrawal. Lastly, the database has been used by a number of management scholars studying the environment and publishing in top academic journals (e.g., Clelland, Douglas & Henderson, 2006; King & Shaver, 2001; King & Lennox, 2002; Klassen & Whybark, 1999; Russo & Harrison, 2005).

A number of researchers that have used the TRI have simply summed the total emissions of all chemicals per firm (Clelland, Douglas & Henderson, 2006; Dooley and Fryxell 1999; Feldman, Soyka & Ameer, 1997; Klassen & Whybark, 1999; Konar and Cohen 2001). According to Toffel and Marshall (2004: 144-145) this is problematic because:

> The potential harm caused by a particular amount of a chemical released to the environment depends on a number of factors, including the properties of the chemical and the medium to which it is released. Simply summing annual emissions of all TRI substances released by a facility in a given year is a poor proxy for its aggregate potential harm to human health or the environment because the toxicity of TRI chemicals varies over more than 6 orders of magnitude (Horvath et al. 1995). In summary, "mass is a crude proxy for environmental effect" (Lifset 2001, 1).

As an alternative, they recommend the use of toxicity weighting databases whose goal is to assess the environmental and health impacts of emissions, thereby weighting the toxicity of each chemical in terms of relative harm. Indeed, a number of researchers have applied a weighting technique to TRI data (Berchicci, Dowell & King, 2009; King & Lenox, 2002; Russo & Harrison, 2005). Unfortunately, there are a number of weighting techniques and academics have been varied in their applications of the different approaches. Recently, however, Toffel and Marshall (2004) conducted a comprehensive review of 13 weighting databases. They recommend the Risk Screening Environmental Indicators (RSEI) as one of the most comprehensive databases (covering a large amount of the chemicals reported in the TRI), and the best for analyzing the human impact of toxic releases.

In calculating a weighting, "RSEI considers the following information: the amount of chemical released, the toxicity of the chemical, its fate and transport through the environment, the route and extent of human exposure, and the number of people affected" (RSEI User's Manual, page 7). For this thesis, the latest version currently available, RSEI 2.2.0, was used. Updates in the new version relevant to this thesis include a new methodology to calculate air

emissions, the EPA's Provisional Peer-Reviewed Toxicity Values (PPRTV) was used for the first time, and corresponding changes to some of the toxicity values were made. In using RSEI, I focus on the 411 chemicals it reports, which have a weighted score for air emissions.

I focus on total air emissions as my measure of environmental performance. As such, transferred or off-site air emissions are not an issue, which is in contrast to land or water emissions reported to the TRI. Further, the three main industries I examine (electric utilities, chemicals and paper) predominantly release their toxic chemicals through air. As a percentage of the total emissions to air, water and land, in the electric utilities, chemicals, and paper industries, air emissions account for 83 percent, 77 percent, and 87 percent, respectively. Therefore, in these three industries, the toxic chemical releases are largely released via air emissions. Lastly, the three industries selected account for nearly three-fourths of all air emissions reported to the TRI in 2007.

The time frame examined in this study was from 1998-2007[1]. Although changes to the TRI data have been made over time, for example, chemicals have been added and toxicity values in weighting schemes have changed, such changes do not affect my results because I am not making year over year comparisons of this data.

Before aggregating the data it was necessary to weight the toxic chemical releases of each facility. Each respective chemical release was multiplied by its corresponding air emission toxicity value. This toxicity value was the sum of both normal (stack air emissions) and abnormal (e.g., leaks) air emissions. Although the weighting database RSEI does not include a weight for every chemical listed in the TRI, it does, however, offer a much more comprehensive coverage than other popular databases such as the Human Toxicity Potential (19 percent

[1] The years 1996 and 1997 were initially included but had to be dropped because of a high number of missing values for environmental deviation.

coverage compared to RSEI's 69 percent coverage). While this reduced the total number of chemicals included in the study from 448,825 to 356,919, it still represented 80 percent coverage of the original list, and certainly includes chemicals of greater importance. The weighted value of each chemical release was then summed per facility.

Aggregating the data from the facility level to the firm level was attempted via two methods. First, facilities were linked using the Dun and Bradstreet (D&B) numbers provided in the TRI data (King & Shaver, 2001). However, over time it became apparent that these numbers were frequently incorrect. For example, a facility with the exact same name would have multiple D&B numbers, or the same D&B number would be used for different parent companies. Furthermore, a number of facilities in the sample did not have a D&B number. As such, the parent company name listed in the TRI data was used instead. This way, any discrepancies could be easily resolved by ensuring that the parent company name listed was correct. For example, there were frequent discrepancies in how the parent company name was written, such as 3M CO, 3M Company, and 3M CO. (notice the period at the end), or General Electric and GE, or BF Goodrich and Goodrich. Using the name meant that these could all easily be added together as they represented the same parent company, something that was much harder to do with the D&B numbers.

After meticulously going through every parent company name in the data and making sure any discrepancies were resolved, a colleague with a computer science background wrote a program in Microsoft excel to have the weighted value per facility, summed to the firm-level per year (from 1998-2007). This final weighted value per parent company, per year, represented the actual environmental performance value. The sample size at this point (which includes privately-owned, publically-traded, and government-run companies) was 13,946 organizations.

The next step was to match the TRI data to Compustat. This painstaking process involved searching every company name in both Compustat North America and CRSP. I searched in both databases as I found that some companies that were not listed in one database could be in the other. At this point, a large number of companies were dropped as they were not listed in either Compustat or CRSP. To ensure that these were either privately-owned or government-run companies, 20 firms were randomly selected for a web-based search. Of these 20, 18 were private, one had merged with a larger public company, and one was public but a search in both Compustat and CRSP did not bring up the company name. Following this random sample test I can conclude that about 95 percent of firms eliminated from the sample because they did not have financial information available on Compustat or CRSP were either government run or private.

In addition, it was necessary to delete companies where the TRI reported data for the North American, Canadian, or American divisions, but the Compustat data was for the global company. Drawing conclusions between the environmental performance of a geographic division and the financial performance of the entire company would not be suitable. After deleting such companies, or as described in the previous paragraph firms where no financial data was available, the sample was 4,249 firms.

It was also necessary to delete mergers and acquisitions, and firms that had gone bankrupt during the study period. Compustat includes a variable that indicates whether a firm is active or inactive within the database. All inactive firms were deleted from the sample, with the exception of 9 companies that had financial data for the entire study period, 1998-2007, representing 2.2 percent of the data. Deleting all inactive accounts decreased the sample size by 120 firms.

Also, some companies simply stopped reporting to the TRI during the study time period. For example, although Alpharma Inc. reported to the TRI for 1996-1998, there were no values beyond this period. Another example is Apogee Enterprises Inc, who reported in one year only, 2003. Forty-seven such companies were deleted. It is likely that they stopped reporting because they no longer met any of the three requirements previously listed, which mandated them to report to the TRI.

Lastly, there were an unfortunately large number of firms with many missing financial values which were necessary to calculate the study variables; these were also deleted. The major reason for the large number of missing values is because I examine a 10-year time period, and few firms had the necessary financial information consistently reported during this period. This greatly reduced the sample size but still provided a more than satisfactory final sample of 311 firms.

The sample was well dispersed geographically; the 284 US firms were represented in 47 different states, and the 28 international firms (those with an international company headquarters) were in 10 different countries (Japan, Great Britain, Netherlands, Germany, Switzerland, Sweden, France, Finland, Ireland, South Africa). In the US, Ohio, Texas, and California contained the largest number of parent companies representing 6.7, 6.6, and 6.2 percent of the sample respectively. For the international firms, Europe had 24 companies, Japan had three, and Africa had one. Prior studies with a similarly widely dispersed sample did not consider it necessary to control for state (Kassinis and Vafeas, 2006). However, to ensure that state was not affecting the results, the variable was dummy coded, and found to have no effect on the regression examining variation in environmental deviation, or on the relationship between

environmental deviation and financial performance. Furthermore, it was not correlated with any variables in the study.

5.2. Operationalization of Variables

5.2.1. Dependent Variables

Corporate Environmental Performance Deviation. The operationalization of environmental deviation was adopted from Sanders and Hambrick (2007) who used a similar measurement for their construct, financial performance deviance. The measurement involved a four-step process. First, the toxic chemical air releases were obtained from the TRI database, and the chemicals were weighted using the RSEI database, thus giving a value of environmental performance. Second, the weighted TRI facility level data was aggregated to the firm level. This was done by matching the parent companies of facilities, then summing the releases per firm. Third, it was necessary to identify predictors of environmental performance to obtain a value for "predicted environmental performance". These are shown in Table 1 and their operationalization is described on pages 67-68.

Insert Table 1 about here

All variables that were found to have a significant effect on environmental performance were included in the calculation of predicted environmental performance. The formula is provided below, where *i* represents the firm and *t* the year:

Equation 1: $Y_{it} = \beta 1\text{Industry}_i + \beta 2\text{Size}_{it} + \beta 3\text{PriorFinancialPerformance}_{it} + \beta 4\text{Leverage}_{it} + \beta 5\text{Slack}_{it} + \text{Year}_t + \varepsilon_{it}$

Conceptually, there are no surprises in this equation. We would expect industry to affect environmental performance as regulations, stakeholder expectations, and institutional norms differ across industries. Size is also not surprising given that larger firms tend to pollute more (Russo & Fouts, 1997). In addition, previous research has used size as a proxy for firm visibility as highly visible companies are often under increased scrutiny from stakeholders (Adams & Hardwick, 1998; Brammer & Millington, 2008). Correspondingly, studies have found that larger firms are more likely than smaller firms to integrate environmental practices into their organizations (Chen, Lai & Wen, 2006; Lopez-Gamero, Claver-Cortes & Molina-Azorin, 2008; Moore, 2001). Prior financial performance and leverage (sometimes referred to as risk) have been used in past research as measurements for the availability of financial resources (Brammer & Millington, 2008), and we could add slack to this categorization. Highly profitable firms are better able to make significant investments in environmental performance, and prior studies have found level of risk to be related to all major types of performance (Bromiley, 1991; Miller & Leiblein, 1996; Orlitzky et al., 2001). Similarly, Douglas and Judge (1995) found a positive relationship between the amount of resources available for natural environment issues and the level of integration of environmental issues into the strategic planning process. In addition, Lee and Rhee (2007) found that a firm's slack resources were significantly related to environmental strategic change. Lastly, a supplementary analysis of the data shows that almost all firms increased their environmental performance from 1998-2007, leading to the inclusion of year in the above formula.

Fourth, a regression was run on the environmental performance value calculated in step two above with all predictors identified in the third step. The residual from the regression represents the difference between actual and predicted environmental performance, and this was

the final value for environmental deviation. As stated by Sanders and Hambrick (2007: 1068): "The measure thus indicates the degree to which performance was higher or lower than estimated by all the available predictors."

As indicated earlier, selecting the sample was based on the three digit NAICS code taken from the TRI database. However, for the calculation of environmental deviation, to further differentiate the sample, the four digit NAICS code was used to dummy code industry. It was believed that the three digit code allowed too much variation between firms, whereas the four digit code was a good balance between refinement and generalization.

The exact break down of the three industries was as follows: The electric utilities industry (full name electric power generation, transmission and distribution and the omitted dummy variable in the regression analyses) remained the same from the 3-digit NAICS code, and the paper industry was further broken down into 'pulp, paper and paperboard mills' and 'converted paper product manufacturing'. The chemical industry was broken down into seven more detailed industries: basic chemical manufacturing; resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing; pesticide, fertilizer, and other agricultural chemical manufacturing; pharmaceutical and medicine manufacturing; paint, coating, and adhesive manufacturing; soap, cleaning compound, and toilet preparation manufacturing; other chemical product and preparation manufacturing.

Corporate Financial Performance. Financial performance was operationalized in two ways; all values were obtained from Compustat. First, profitability was measured using an accounting based calculation of Tobin's Q. In particular, it was calculated by dividing the sum of shareholder's equity, long-term debt, and current liabilities by total assets (Berrone & Gomez-Mejia, 2009). It represents the market value of a firm's assets to the replacement cost of the

firm's assets. If the firm value is greater than the cost to rebuild it, then excess profits are being earned. Given that autocorrelation is a common problem in longitudinal research, that is, a firm's performance in one year is very likely to be correlated with previous and upcoming performance, the moving average was used (Honore & Kyriazidou, 2000). In particular, the three year moving average was calculated where, for example, Tobin's Q in 2005 was the average between 2004-2006, that is, N-1, N, and N+1. A lagged or moving average of financial performance accounts for changes in strategy that managers may decide to implement based on adequate or inadequate firm profitability (Garcia-Castro, Arino & Canela, 2010), and is a means of dealing with autocorrelation (Honore & Kyriazidou, 2000).

Second, a novel approach to the examination of financial performance was included by examining fluctuations in financial performance. Firms seek stable and steady financial growth, not large fluctuations from year to year. By examining financial fluctuations, the ability of environmental management to stabilize profits is investigated.

Fluctuations in financial performance are measured by taking the absolute difference in Tobin's Q between the prior year (t + n – 1) and the focal year (t + n), for a total of three years (Chatterjee & Hambrick, 2007), with the exception of 1998-2001 which was four years. For example, the difference between the Tobin's Q value in 2004 is subtracted from the value in 2005. Calculating the difference in the same way from years 2006 and 2007, the total difference in the absolute values is summed. This summed value represents fluctuations in financial performance from 2005-2007. Lastly, the absolute value of this number was taken as the direction of the difference, whether positive or negative, was not important, only the magnitude of the changes in performance were important.

5.2.2. Independent Variables

Environmental Integration Capacity (EIC). To code this construct, the annual reports of all sampled companies, when available, were obtained from corporate websites. The operationalization of EIC involved a number of steps. First, a set of keywords were chosen. These included: environmental (environmentally), toxic (toxicity), pollution, sustainable development, sustainability, ecology (ecological), emissions, green, hazardous, energy efficiency (energy efficient) and global-warming. Some of these words were obtained from Bansal (2005), and Berrone and Gomez-Mejia (2009). Other words were added as I discovered that companies occasionally or frequently used these words in their annual reports.

Second, to ensure the accuracy of these keywords and that no other words should be added, I randomly selected the annual reports of 10 companies, ensuring a variety of years. This addressed a possible variety of terms used by any of the 10 different companies and helped to include any changes in lexicon that may have occurred over the 10 year time period. In this random sample of 10 companies the longest annual report was Siemens, 2007: 336 pages; the shortest was General Cable, 2000: 16 pages. Using the software program *Atlas* I searched the keywords indicated above with slight modifications based on the software. For example, instead of searching both environmental and environmentally, I would search environmental* which would flag both words. During this step, whenever a keyword was identified in an annual report, I read the entire section looking to see if the keyword was identifying relevant information, and pulling out any other keywords I might use. At the end of this stage a number of keywords were dropped for a variety of reasons. "Ecolog*", which includes ecology and ecological, had zero hits in all 10 annual reports. "Sustain*", which includes sustainability and sustainable, almost always related to sustained financial performance. As such, I tried searching sustainability and

sustainable development instead. Few firms used the phrase "sustainable development", but "sustainability" was used in a number of reports. Accordingly, both "sustain*" and "sustainable development" were dropped, but "sustainability" was included in the final set of keywords. "Emissions" was dropped as in almost all cases when a report mentioned emissions the full terminology—greenhouse-gas emissions—was used earlier in the paragraph. Therefore, the keyword "green*" captured when emissions were mentioned, but was also more inclusive. Similarly, "global-warming" and "energy efficien*" were dropped because nearly all mentions of them were accompanied with the words "greenhouse-gas emissions". Lastly, "hazardous" and "toxic" were dropped because whenever the words came up in a report they were closely followed by the word "environmental"; so they added nothing beyond what a search for "environmental*" would. After analyzing all 10 companies, I finalized the set of keywords which were: environmental*, green*, pollution, and sustainability. Examples of EIC found using these keywords are provided in Table 2.

Insert Table 2 about here

Third, using the keywords identified in step three, all annual reports were analyzed. This entailed searching the keywords, at which point *Atlas* would extract the corresponding sections of the text. The entire section was read and coded accordingly. Environmental integration capacity was coded on a four-point scale, where 0 = no keywords mentioned, 1 = discussion is about environmental remediation, costs, liabilities or compliance, 2 = a basic or low level of EIC, and 3 = high EIC. High and low EIC were differentiated based on the degree of integration. Some firms integrated environmental issues into their strategic approach at a basic level. For

example in their 2004 annual report American Electric discusses their plans to build an Integrated Gasification Combined Cycle (IGCC) power plant to serve customers by 2010. The main benefit to an IGCC plant is the reduction in greenhouse-gas emissions. While the planned construction of such a plant does demonstrate American Electric's commitment to the environment as organizational resources have gone into the development of the plan, it only demonstrates low EIC at this point because they continue to produce the large majority of their power from traditional, high emission coal plants. Clearly, the natural environment is not yet fully integrated into all strategic decisions at American Electric. Other firms integrated environmental issues in almost all strategic decisions. That is, when a strategic decision was made environmental management was always part of their thinking. For example, in its 2004 annual report (page 39) Anheuser-Busch, classified as a chemical company, states:

> The company is strongly committed to environmental protection. Its Environmental Management System provides specific guidance for how the environment must be factored into business decisions and mandates special consideration of environmental issues in conjunction with other business issues when any of the company's facilities or business units plan capital projects or changes in processes. Anheuser-Busch also encourages its suppliers to adopt similar environmental management practices and policies.

This paragraph demonstrates a high level of EIC as the environment is considered in all capital projects or process changes. Further, in the annual report the company goes on to explain specific environmental initiatives that have been implemented. Table 3 gives exemplary statements of high and low EIC.

Insert Table 3 about here

Given that there was such a large amount of data to code for this variable, a single value was calculated for every two years. Specifically, where available, all 1998 annual reports were coded and this represented the value from 1998-1999, all 2000 annual reports were coded representing the value from 2000-2001, and so forth. The only exceptions were when the annual reports in 1998, 2000, 2002, 2004 or 2006 were missing, and the closest report was used. For example, Brady did not have an annual report for the year 2000, therefore, the 2001 annual report was coded to represent the value for these two years. A single code for two years was deemed appropriate as changes to a firm's EIC would likely take at least two years to implement. For example, a company that has high environmental integration is very unlikely to decrease their integration within two years. Similarly, a company with no environmental integration is unlikely to increase it dramatically within two years. This was confirmed by a visual inspection of the data where there was very little change in EIC within firms across the study time period. In addition, a cross-tabulation analysis of firms with negative environmental deviation showed that the majority of firms had an EIC value of one from 1998-2007, and over time there was a gradual increase in the number of firms with an EIC score of three (8 firms in 1998 compared to 19 in 2007), whereas all other EIC scores were relatively consistent over time. For firms with positive environmental deviation, the majority of firms had an EIC value of two from 1998-2007, and there was a gradual decrease in the number of firms with an EIC score of zero from 1998-2007 (21 firms in 1998 compared to 9 in 2007), whereas all other EIC scores were relatively consistent over time.

Importantly, only concrete environmental actions were coded. So, if a company stated that they were committed to the environment, yet did not indicate how they were demonstrating their commitment, they received a zero for EIC. For example, in the first pages of annual

reports, the chairman or chief executive officer would frequently state that they were committed to the environment as they sought sustainable profits. This would not be coded directly, but if in the annual report specific references to the company's environmental commitment were identified, these would be coded.

Munificence. This was measured as the coefficient of the regression of industry-level sales on calendar time (Berman et al., 1999). This measure represents industry financial growth, and was measured every three years, with the exception of 1998-2001, a four year measure required because of the 10 year study period.

Dynamism. This was measured as the standard error of the same regression used for munificence, divided by the mean of industry sales (Berman et al., 1999). This measure represents the change and unpredictability in the industry. The time periods for dynamism were the same as those used in the measurement of munificence.

Strategic deviation. Following Mintzberg (1978), this construct represents strategy as an observed pattern which manifests itself across a number of organizational actions. The manifested strategy is reflected in firm strategic resource deployment across major functional areas such as productions and operations, marketing, and finance (Geletkanycz & Hambrick, 1997). In particular, four measures were used to create a composite measure of strategic deviation: (1) plant and equipment newness (net P&E/gross P&E), (2) overhead efficiency (sales, general and administrative expenses/sales), (3) capital intensity (fixed assets/number of employees), and (4) financial leverage (debt/equity) (Geletkanycz & Hambrick, 1997). To eliminate noise, the average value of each measure between years t and t +1 was used as the value at year t (Carpenter, 2000; Palepu, 1985). Each measure was then standardized by year over all firms and taking the absolute value of the standardized score, the average of the four

measures was calculated to create a single measure (Finkelstein & Hambrick, 1990; Geletkanycz & Hambrick, 1997).

While strategic deviation is an independent variable in the investigation of the first research question, it is a control variable in the analysis of the second research question. It is included as a control variable in the investigation of the relationship between environmental deviation and financial performance to isolate deviation in environmental performance. That is, if a significant effect was found, I wanted to be sure this effect was due to deviation in the environmental approach, and not due to deviation in the business approach.

5.2.3. Moderating Variable

Corporate Environmental Legitimacy. The operationalization of corporate environmental legitimacy followed the procedure of Bansal and Clelland (2004). Accordingly, the *Wall Street Journal* was used as the media source, and a single source was used to avoid duplicate news as the measure is calculated based on the number of articles. In a review of the literature on the operationalization of legitimacy, media reports were the most commonly used method of measurement (e.g., Barron, 1998; Brown and Deegan, 1998; Deephouse, 1996; Deephouse and Carter, 2005; Lamertz and Baum, 1998). As noted by Bansal and Clelland, the *Wall Street Journal* in particular is relevant "because of its national coverage and its importance to investment communities" (2004: 97).

In addition to the keywords used by Bansal and Clelland (2004): "environmental", "toxic", sustainable development" (changed to "sustainability" as it brought up more hits), and "pollution", the following keywords were searched: "environmentally", "alternative energy", " "ecology", "hazardous", "greenhouse-gas emissions", and "global warming". The words "ecology", "alternative energy", "pollution", and "hazardous" were taken from Berrone and

Gomez-Mejia (2009). Greenhouse-gas emissions and global warming were added because these were particularly relevant to the air emissions focus of this dissertation. Furthermore, including these terms resulted in a significantly larger number of retrieved articles. Other terms that were included but latter dropped because they either did not bring up any additional articles, or brought up too many unrelated articles were: "environment", "waste", "disposal", "green", "ecological", "toxicity", and "contamination".

The sample time frame for this dissertation was 10 years. Given that it is certainly possible for a company's environmental legitimacy to change over a 10 year period, at first, an attempt was made to calculate two measures of environmental legitimacy per firm, one from 1998-2002, and the other from 2003-2007. A five year time frame for the variable is similar to Bansal and Clelland (2004) who used a four year time frame for their measurement of corporate environmental legitimacy. It is necessary to use multiple years because few firms have enough relevant articles per year. Unfortunately, there were too few articles in the first time frame resulting in a high number of missing values. As such, it was necessary to exclude the years 1998-2002. In the end, the measure that was used was a single value per firm from 2003-2007. This meant that the analysis of the second research question was restricted to the years 2003-2007. While this was unfortunate, it was necessary to examine the moderating effect of corporate environmental legitimacy. Furthermore, the main effects for the relationship between environmental deviation (both positive and negative) and financial performance (both Tobin's Q and fluctuations) were the same as when the full 10 year study period was analyzed.

Some companies had a very large number of articles. For example, GE had 265, Exxon Mobil had 287, and Dupont had 160. Given that there were a number of such companies, I followed Deephouse (1996), and set a minimum number of articles per firm, and for companies

that exceeded this number I took a stratified sample of the articles. In his case, for firms with eight or less articles, Deephouse (1996) included all articles. For firms with more than eight articles, he included a stratified sample of eight articles plus 25 percent of the total number of articles. In my case, for any firm that exceeded 20 articles, I included the 20 most relevant articles (as identified in Proquest) plus a stratified sample of 25 percent of the total number of articles. The total number of relevant articles examined was 675. Following Bansal and Clelland (2004) each article was coded for having either a negative, positive, or neutral impact on the firm's environmental legitimacy.

To calculate the final value the Janis-Fadner coefficient of imbalance was used (Bansal and Clelland, 2004; Deephouse, 1996). The coefficient ranges from +1 to -1, where a value close to +1 indicates a high frequency of favourable articles and a value close to -1 indicates a high frequency of unfavourable articles.

During the operationalization of this variable some interesting results were observed. First, even companies who specialize in environmentally unfriendly products or services can obtain positive environmental legitimacy (although the values were never very high). For example, the electric company Southern Co had a positive value because they were doing a number of things to curb their emissions.

Second, companies that have recently changed their approach to the natural environment, from a reactive to a more proactive approach, must deal with past environmental problems if they wish to obtain the full benefit of their new approach. Even pollution which occurred 30-60 years ago can be problematic. For example, General Electric has invested significantly in wind power and committed massive amounts of firm resources to "ecomagination" which they advertise as their attempt at solving some of the world's biggest environmental problems while

driving profitability. Yet the pollution of the Hudson River (which occurred from 1947-1977) and asbestos lawsuits remain ongoing, bringing the company's environmental legitimacy value close to zero. Without the articles surrounding the pollution of the Hudson River and asbestos lawsuits, GE would have been amongst the highest scored companies for environmental legitimacy.

Third, some companies were strong in a number of environmental issues but poor in others, resulting in an environmental legitimacy value close to zero. The positive environmental actions of such companies could either be viewed as damage control for their negative environmental actions, or a poor commitment of firm resources as the company is still not viewed positively in regards to the natural environmental. For example, Dupont was praised in a number of articles for having a strong record in combating greenhouse-gas emissions, but condemned for their continued use of perfluorooctanic acid (PFOA) in the manufacturing of Teflon cookware.

To test for the moderating effect of environmental legitimacy on the relationship between environmental deviation and financial performance, both legitimacy and deviation were standardized then mean-centered, and the interaction term was formed by multiplying together the two centered values (Aiken & West, 1991; Cohen, Cohen, West & Aiken, 2003).

5.2.4. Control Variables and Variables for Predicted Environmental Performance

Seven control variables were included in the analyses. First, *size* was included because larger firms tend to pollute more, and studies have found that larger firms are more likely than smaller firms to integrate environmental practices into their organizations (Chen, Lai & Wen, 2006; Lopez-Gamero, Claver-Cortes & Molina-Azorin, 2008; Moore, 2001; Russo & Fouts, 1997). Firm size was measured as the natural log of total assets. In addition, previous research has used

size as a proxy for firm visibility as highly visible companies are often under increased scrutiny from stakeholders (Adams & Hardwick, 1998; Brammer & Millington, 2008). Increased firm visibility could lead to higher costs associated with increased taxation, fines and litigation for example. It might also lead to increased environmental responsibility as these firms seek to appease the increased demands from stakeholders and to avoid or pre-empt environmental legislation (Brammer & Millington, 2008).

Second, *prior financial performance* could affect both environmental deviation and future financial performance, and was therefore included as a control variable. Highly profitable firms are better able to make significant investments in environmental performance (Brammer & Millington, 2008). It was measured as both the previous year's return on assets, and the previous year's total shareholder return, ROA_{t-1} and $TSR_{t-1.}$ Both measures were included as one represents an accounting based measure of performance and the other market based. However, as both measures yielded the same results only the value of one is reported (Sanders & Hambrick, 2007). Furthermore, prior Tobin's Q was calculated, but because it was highly correlated with Tobin's Q moving average it was not used as the measure of prior profitability ($r = .92$, $p < .01$).

Third, *slack* was included as Douglas and Judge (1995) found a positive relationship between the amount of resources available for natural environment issues and the level of integration of environmental issues into the strategic planning process. In addition, Lee and Rhee (2007) found that a firm's slack resources were significantly related to environmental strategic change. Slack was measured as the ratio of current assets to current liabilities (Bansal, 2005; Schuler, 1996).

Fourth, *financial leverage* (sometimes referred to as risk), measured as total liabilities divided by shareholder's equity, was controlled as prior studies have found level of risk to be

related to all major types of performance (Bromiley, 1991; Miller & Leiblein, 1996; Orlitzky et al., 2001).

Fifth, whether a firm's head office was *domestic* or foreign, that is, inside or outside the U.S., was included as a control variable as there are differences in national regulations, and these could account for differences in environmental deviation. Specifically, a Domestic firm was given a value of 0 when the firm's head office was in the U.S., and a value of 1 if the head office was outside the U.S.

Sixth, *year* was dummy coded as almost all firms in the sample increased their environmental performance (as measured in step 2 of the calculation of environmental deviation) from 1998 to 2007.

Seventh, *industry* was dummy coded using the four-digit NAICS code, resulting in the following ten industries: (1) electric utilities (the omitted dummy variable in the regression analyses); (2) pulp, paper and paperboard mills; (3) converted paper product manufacturing; (4) basic chemical manufacturing; (5) resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing; (6) pesticide, fertilizer, and other agricultural chemical manufacturing; (7) pharmaceutical and medicine manufacturing; (8) paint, coating, and adhesive manufacturing; (9) soap, cleaning compound, and toilet preparation manufacturing; and (10) other chemical product and preparation manufacturing.

5.3. Data Analysis

Data cleaning. Outliers in the dependent variables (Tobin's Q, Tobin's Q fluctuations, and environmental deviation) were double checked to ensure that they were accurately reported. All were correct, and left in the analysis as these outliers are of interest to the examination of environmental deviation and financial performance. Furthermore, while the financial measures

were slightly beyond normality (environmental deviation was normal), they were within acceptable limits (Tabachnick and Fidell, 2007).

The control variables, size, prior financial performance, and slack, and the independent variable strategic deviation were all log transformed. Outliers were not deleted as once the variables were transformed the values were no longer disconnected from their distributions and seemed reasonable (Tabachnick and Fidell, 2007). Munificence was arcsine transformed to bring it to normality. All other variables were normal.

The analyses were conducted in Stata (described in the next section). In Stata, an entire observation is eliminated if a single value is missing. For example, if a firm is missing a value for slack in 1999 but has data on all other constructs, 1999 will be excluded from the analysis. Therefore, missing values for control variables were filled in, using either the mean of the values per firm (possibility of 10 values from 1998-2007), or if a single value or no data was available for the firm, the industry average per year was input. In the calculation of Tobin's Q moving average, if one of the three years was missing, the average of the two years of available data was used to reduce the number of missing values. To ensure that the addition of the missing values would not affect the results, I checked the correlations between the old variables with missing date and the new variables without the missing data. All correlations were significant at the .001 level.

The assumption of linearity was checked via a scatterplot of all variables; the assumption was met in all cases (Leech, Barrett and Morgan, 2007).

As is the case with most longitudinal data, the assumption of constant variance was violated. As such, it was necessary to use a data analysis technique that addressed this issue; this is described in the next section.

Data Analysis. To address the two main research questions, two regression analyses were conducted, one for each dependent variable. The first analysis examined the effect of the independent variables on environmental deviation. The second analysis examined the relationship between environmental deviation and financial performance, and the moderating effect of environmental legitimacy. All control variables were included in both regression analyses, and strategic deviation was added as a control variable in the second analysis.

To test the hypotheses related to the first research question, the xtgls command in Stata was used, which fits a cross-sectional time-series linear model using generalized least squares. This analysis was used as it permits estimation in the presence of AR(1) autocorrelation within panels and heteroskedasticity across panels. Longitudinal data almost always has autocorrelation as each year's performance is likely to be correlated with the previous or subsequent year. To test for autocorrelation in my data, I used Durbin-Watson, the value of which indicated the existence of auto-correlation.

In general linear model regression analysis, one key assumption is that the error term has a constant variance. In longitudinal data, there are multiple observations per firm, and the error term may vary with each observation. The command "hettest" in Stata was used to test for heteroskedasticity. The Cook-Weisbergh test was significant, meaning that the null hypothesis of constant variance must be rejected. As such, the xtgls command indicating both auto-correlation and heteroskedasticity was used for the first research question.

To test the hypotheses related to the second research question, the Hausman-Taylor estimator for error component models was used (the *xthtaylor* command in Stata). The main benefit to this test is that it accounts for endogeneity. Although endogeneity is a well known problem and is frequently dealt with in economics by using econometric techniques, such

techniques have rarely been used in strategic management (Garcia-Castro, Arino & Canela, 2010; Hamilton & Nickerson, 2003). Endogeneity occurs because managers do not make strategic choices randomly—an assumption in many cross-sectional regression models—but make decisions based on their projected effect on performance (Hamilton & Nickerson, 2003). Managers make such decisions based on difficult to quantify factors that are typically well known to managers but essentially unobtainable to researchers. These "unobserved variables" are rarely addressed in statistical analyses (i.e., no study will have an exhaustive list of control variables) resulting in biased coefficient estimates. As stated by Garcia-Castro, Arino and Canela (2010: 110): "The biases result from omitted variables correlated with both the strategic decision and firm's performance (Hamilton and Nickerson, 2003; Wooldridge, 2002)."

The Hausman-Taylor estimator for error component models accounts for endogeneity by allowing the individual-level error term to be correlated with some of the covariates. Both environmental deviation and the interaction between deviation and legitimacy were considered endogeneous. In addition, four control variables were assumed to be endogenous: size, prior profitability, strategic deviance, and whether the firm's head office was inside or outside the U.S. The first three were time-varying, while the last was time-invariant. These variables are all related to firm-specific factors, such as capabilities and strategic decisions, and were therefore labelled as endogenous (Gao, 2009). The remaining control variables and environmental legitimacy were treated as exogenous variables. Legitimacy in particular was exogenous as it is determined by the media and not directly from within the organization itself. Legitimacy, financial leverage, slack, and year were time-varying exogenous variables and industry was time-invariant.

In the next section I present the results from applying the methodology to test the research hypotheses.

CHAPTER 6: RESULTS

Table 4 reports descriptive statistics and correlations for the variables used in this dissertation. Tobin's Q has high correlations with Tobin's Q fluctuations (r = -.44), Slack (r = .34), and Strategic Deviation (r = -.32), indicating that high firm profitability is related to reduced financial fluctuations and strategic deviation, and increased slack. Size has high correlations with Prior Financial Performance (r = .66) and Slack (r = -.39), indicating that size is related to high prior financial performance and reduced slack. Lastly, Dynamism has high correlations with Year (r = .63) and Munificence (r = -.39), indicating that the task environment increased in dynamism from 1998-2007 and is related to reduced munificence. We would expect these correlations to exist and none are surprising. Although these correlations are high, all variables are essential to the analyses given their potential impact on both environmental deviation and the two measures of financial performance. Furthermore, the high correlation between Tobin's Q and Tobin's Q fluctuations is not an issue because at no time are these two dependent variables included in the same analyses.

Insert Table 4 about here

6.1. Why do Firms Deviate from Their Predicted Levels of Toxic Emissions?

Table 5 provides the results for the first main research question corresponding to Hypotheses 1-4.

Insert Table 5 about here

For firms with positive environmental deviation we see that environmental integration capacity has a significant positive effect ($p < .05$) on environmental deviation, and for firms with negative environmental deviation we see that environmental integration capacity has a significant negative effect ($p < .05$) on environmental deviation. Thus Hypothesis 1a—which stated that environmental integration capacity would have a positive effect on positive environmental deviation—and Hypothesis 1b—which stated that environmental integration capacity would have a negative effect on negative environmental deviation—are supported.

Strategic deviation is not significant for firms with either positive or negative environmental deviation. Thus Hypothesis 2—which stated that strategic deviation would have a positive effect on environmental deviation—is not supported. The results show that deviation in a firm's business strategy is not related to deviation in its environmental strategy.

For firms with positive environmental deviation we see that both munificence and dynamism have a significant negative effect (both $p < .01$) on environmental deviation, and for firm's with negative environmental deviation we see that both munificence and dynamism have a significant positive effect (both $p < .001$) on environmental deviation. Thus Hypotheses 3a and 4a—which stated munificence and dynamism would have a negative effect on positive environmental deviation—and Hypotheses 3b and 4b—which stated that munificence and dynamism would have a positive effect on negative environmental deviation—are supported.

Looking at the control variables, for firms with both positive and negative environmental deviation we see that all industry dummy codes are significant (minimum $p < .01$). Not

surprisingly, the results show that bigger firms tend to deviate less for positive environmental deviation ($p < .001$), but deviate more for negative environmental deviation ($p < .001$). This is consistent with earlier research that has found that bigger firms tend to pollute more (e.g., Russo & Fouts, 1997). Overall from 1998-2007, firms have tended to increase their positive environmental deviation ($p < .001$) and decrease their negative environmental deviation ($p < .001$). This indicates that from 1998-2007 firms have significantly reduced their overall toxic air emissions. Firms from the U.S. tend to be better at meeting environmental expectations, having both less positive environmental deviation ($p < .001$) and less negative environmental deviation ($p < .001$). This result is not surprising given that the large majority of firms in the sample were from the U.S. and it is the characteristics of these firms that were used to form the expected levels of toxic air emissions. We can then expect, and indeed I find, non-U.S. firms to have greater deviation in general, particularly as it relates to differences in air emission regulations across the different continents (from the more severe European regulations to the relaxed African regulations). Firms with strong prior financial performance tended to have greater positive environmental deviation ($p < .001$) and reduced negative environmental deviation ($p < .001$). This may indicate that firms with strong prior financial performance have the money available to reduce emissions, by for example, purchasing costly environmentally friendly technologies. Lastly, the greater the financial leverage the greater the positive environmental deviation ($p < .05$) and the lesser the negative environmental deviation ($p < .001$). This indicates that a firm's level of risk is significantly related to reductions in toxic air emissions.

6.2. How do Differences in Environmental Deviation Relate to Financial Performance?

Table 6 provides the results for the second main research question corresponding to Hypotheses 5 and 6.

Insert Table 6 about here

Hypothesis 5a predicted that positive environmental deviation would have a positive effect on financial performance. Model 1 in Table 6 shows a non-significant relationship between environmental deviation and Tobin's Q. In contrast, Model 2 shows a marginally significant negative effect ($p < .10$) on fluctuations indicating decreased financial fluctuations. Thus Hypothesis 5a is partially supported.

Hypothesis 5b predicted that negative environmental deviation would have a negative effect on financial performance. Model 3 shows a significant negative effect ($p < .01$) for Tobin's Q, indicating reduced profitability. Model 4 shows a significant positive effect ($p < .001$) on fluctuations indicating increased financial fluctuations. Thus Hypothesis 5b is supported.

Looking only at the profitability measurement (Tobin's Q) we see that Hypothesis 5a was not supported (although the results approached significance: $p = .183$), and that Hypothesis 5b was supported. The non-significant results could be indicative of a curvilinear relationship, and specifically an inverted-U where positive environmental deviation is financially beneficial to a point, but too much deviation from the institutional norm is harmful to financial performance. Stated differently, moderate levels of environmental deviation would be related to higher financial performance compared to high or low levels (an inverted U relationship). To test for a possible curvilinear relationship a squared value for environmental deviation was included (Deephouse, 1999). In neither dataset was the squared value significant, indicating that a curvilinear relationship was not present. In addition, following Deephouse (1999) the two datasets were combined into a single dataset, but again a curvilinear relationship was not found.

Hypothesis 6 examined the moderating effect of corporate environmental legitimacy. Neither legitimacy nor the environmental deviation X environmental legitimacy interaction was significant for firms with positive environmental deviation in terms of either profitability or financial fluctuations. Thus Hypothesis 6a is not supported.

For firms with negative environmental deviation environmental legitimacy was not significant for either measure of financial performance. Therefore, corporate environmental legitimacy was not significant for either positive or negative environmental deviation. However, the interaction between negative environmental deviation and environmental legitimacy was significant and positive for profitability ($p < .10$) and significant and negative for financial fluctuations ($p < .01$). Thus Hypothesis 6b is supported.

Insert Figure 3 about here

Insert Figure 4 about here

I further examined the significant interactions for negative environmental deviation and each measure of financial performance by plotting them in Figures 3 and 4 (Aiken & West, 1991). The plotted interactions show that for firms with environmental legitimacy, as their emissions increase beyond what we would expect the magnitude of the negative relationship between environmental deviation and financial performance is greatly reduced. This equates to a less severe decrease in Tobin's Q and a less severe increase in financial fluctuations. Essentially such firms are effective greenwashers, attaining environmental legitimacy despite having higher

emissions than we would expect given organizational characteristics, and subsequently minimizing the financial consequences (both in terms of Tobin's Q and fluctuations). This is in contrast to their high emission counterparts who are not able to attain environmental legitimacy, and who suffer more severe negative financial consequences to greater toxic emissions.

In regards to the control variables, for firms with positive environmental deviation both size and financial leverage have a significant positive effect on Tobin's Q (both $p < .01$), indicating that greater firm size and leverage are related to increased financial performance. Strategic deviation had a significant negative effect on Tobin's Q ($p < .05$) suggesting that firms that deviate in their business strategy suffer in profitability.

In regards to financial fluctuations, for firms with positive environmental deviation size ($p < .05$), financial leverage ($p < .001$), and slack ($p < .05$) had a significant negative effect on fluctuations; indicating that firms of greater size, leverage and slack tend to have reduced financial fluctuations. Strategic deviation had a significant negative effect on fluctuations ($p < .05$) suggesting that despite the negative consequences on profitability, firms that deviate in their business strategy can benefit by reducing their financial fluctuations.

For firm's with negative environmental deviation, leverage ($p < .001$), slack ($p < .01$) and prior financial performance ($p < .001$) had a significant positive effect on Tobin's Q. Strategic deviation had a significant negative effect ($p < .001$), again suggesting that firms that deviate in their business strategy suffer financially. Year had a significant negative effect ($p < .01$) indicating that firm's with negative environmental deviation suffered reduced financial performance from 1998-2007.

In regards to financial fluctuations, for firms with negative environmental deviation size had a significant positive effect ($p < .01$) indicating that larger firms (that tend to have greater

emissions) suffer greater financial fluctuations. Year also had a significant positive effect ($p <$ .01) indicating that firms with negative environmental deviation suffered increased financial fluctuations from 1998-2007.

6.3. Summary

In summary, Hypotheses 1a, 1b, 3, 4, 5a and 6b were supported, Hypothesis 5a was partially supported, and Hypotheses 2 and 6a were not supported. In addition, a test for a possible curvilinear relationship between environmental deviation and financial performance indicated that a curvilinear relationship did not exist for firms with either positive or negative environmental deviation. All the results are discussed in the next section.

CHAPTER 7: DISCUSSION

This thesis investigates the causes of and the financial implications to corporate environmental deviation. A number of hypotheses were made but not all were supported. All are discussed below.

7.1. Why do Firms Deviate from Their Predicted Levels of Toxic Emissions?

Environmental Integration Capacity. As hypothesized, the results indicated that a demonstrated capability to successfully integrate environmental issues is related to increasing positive environmental deviation, and decreasing negative environmental deviation. These results are aligned with previous research examining capabilities noting that while many firms can purchase environmentally friendly technologies, it is the successful integration of these technologies within the existing strategic approach that most benefits firms (Dean & Brown, 1995). While firms may have access to similar resources, a demonstrated capability to strategically integrate environmental issues into the existing business approach further heightens environmental responsibility.

This result is interesting for two main reasons. First, if firms incorporate environmental issues into their day-to-day operations their environmental deviation grows in a positive direction. While this may not be surprising, after all, if managers seriously consider the environment in all strategic decisions their environmental responsibility should increase, nevertheless, it is heartening because it means that firms can improve their environmental management, they need only decide to do so. In other words, either lessening negative environmental deviation or increasing positive environmental deviation, is not an obscure objective attainable by a small number of firms. Firms need only demonstrate greater willingness and ability to consider environmental concerns. All firms (to varying degrees particularly as it pertains to the relevance of environmental issues to the company), whether they are currently above or below environmental predictions based on their unique organizational characteristics, can, therefore, improve their environmental responsibility by developing an environmental integration capacity. Accordingly, managers seeking to increase their environmental responsibility should consider the natural environment in all strategic business decisions. Of course the development of an environmental integration capacity takes time and effort, but the results of this thesis show it will pay off.

Second, this result suggests that organizations need not sacrifice economic goals to pursue environmental goals. The firms examined in this thesis did not have to put their economic goals aside when they considered environmental concerns in their day-to-day operations; economic and environmental goals can be integrated. Furthermore, through this integration firms can combine existing organizational skills with new environmental resources, and as argued earlier, it is this combination that is most likely to lead to a sustained competitive advantage through social complexity and embeddedness within the firm (Hart, 1995; Newbert, 2007;

Rueda-Manzanares, Aragon-Correa & Sharma, 2008; Teece, 1987). Again this leads to simultaneous benefits to environmental and economic goals. In addition, I found that positive environmental deviation reduced financial fluctuations, providing another possible financial incentive for firms to improve their environmental management.

From a public policy perspective, governments could increase the relevance of environmental management to such an extent that managers are essentially forced to consider it in all operations. This could be done by dramatically increasing the costs associated with toxic emissions for example. As managers and the organizations they work for improve their capacities to integrate environmental issues into their existing business approaches, based on the results of this thesis, we should see a corresponding reduction in toxic air emissions.

Strategic deviation. In contrast to what was hypothesized, strategic deviation was not significant for firms with either positive or negative environmental deviation, indicating that deviation in business strategy is not related to deviation in environmental strategy. A possible explanation for the non-significant finding is that the majority of executives working in the companies examined in this thesis do not yet link their business strategy to their environmental strategy. If the two remain unrelated in the opinion of the executives, it makes sense that deviation in one is not related to deviation in the other. Making business and environmental goals consistent within an organization may not yet be a priority or necessity.

It might also be that firms that are willing and able to overcome the pull toward institutional isomorphism in their business strategy are not able to do so in their environmental strategy, or vice versa. That is, the institutional pressures for conformity in the business strategy, and the environmental strategy, are substantially different. It might also be that the institutional

pressures are quiet similar, yet managerial perceptions of them differ. Future research could investigate these potentially different (perceived) institutional pressures.

Lastly, it may be that firms choose to deviate in their business strategy because they believe that this differentiation will be a source of competitive advantage (Barney, 1986; 1991). In contrast, they may not perceive the same benefits to differentiation in their environmental strategy. Indeed, the latter point is substantiated by the non-significant relationship found between positive environmental deviation and profitability. Future research could explore managerial interpretations of the benefits and consequences to differentiation within the different types of strategies.

Munificence and Dynamism. As hypothesized, munificence and dynamism decreased positive environmental deviation and increased negative environmental deviation. In other words, an abundance of resources and unpredictability in the task environment encourage the increased release of toxic emissions.

The availability of resources and opportunities for growth do not encourage firms to allocate resources to the development of environmentally proactive strategies, or environmental capabilities (Rueda-Manzanares et al., 2008). Instead, they encourage wastefulness (or reduced efficiency measured in terms of higher toxic air emissions) and the pursuit of growth at the cost of the natural environment, as regardless of having either positive or negative environmental deviation, munificence lead to increased releases of toxic emissions. Corporate growth regardless of the costs (externalities) has been questioned by a number of environmentally minded authors (e.g., Meadows, Randers & Meadows, 2004, Porritt, 2005). I add to this discussion by finding that growth (i.e. munificence) not only leads to further toxic emissions from firms performing

below predictions, but also from firms exceeding predictions. Thus growth might not only make the bad worse, but also the good worse, creating a race to the bottom where everyone loses.

Given the significant finding of munificence on environmental deviation governments might restrict corporate access to resources, limit the amount of resources available to a firm within a given time, or increase the costs associated with resources exploitation. Restrictions on growth might also be something to consider, although it is very unlikely that a government would want restrict such growth, given the important economic contributions that can result from it.

For managers of firms operating in a munificent environment, there may then be an opportunity for differentiation through emission reductions. If a munificent environment is related to increased emissions, firms operating within this context may be able to differentiate themselves in the eyes of stakeholders, and gain efficiency improvements over their competitors, by reducing emissions. Firms might also be motivated to reduce emissions given that this thesis found that positive environmental deviation reduced financial fluctuations. Furthermore, managers operating firms in a munificent environment should be aware of the significant financial consequences (reduced profitability and increased fluctuations) from failing to perform at a predicted environmental level based on their organizational characteristics.

Similarly, greater unpredictability and uncertainty does not encourage managers to become more proactive as they try to deal with the unpredictability of their surroundings by anticipating events and acting preventatively (Rueda-Manzanares et al., 2008). Instead, the uncertainty and unpredictability reduce the likelihood of firm commitment and investment in environmental responsibility. The greater uncertainty may have made it difficult for managers to assume important commitments, to decide if and where to make large investments, whether or

not to introduce major changes, to identify key strategic factors, to develop and use resources and capabilities, to predict outcomes, to understand changing stakeholder expectations, and to know how and which environmental option and approach to take (Amit & Schoemaker, 1993; Aragon-Correa & Sharma, 2003; Black & Boal, 1994; Rueda-Manzanares, Aragon-Correa & Sharma, 2008).

In addition, for managers of firms operating in a dynamic environment there may be an opportunity to gain some predictability by exceeding environmental predictions in a positive direction. In particular, this thesis found that positive environmental deviation was related to reduced financial fluctuations. The opportunity to reduce financial fluctuations should be particularly attractive to firms in a dynamic environment where it is much more difficult to maintain stable profits.

The fact that dynamism is related to increased emissions provides support for stronger government environmental regulation. For example, it has been argued that the environmentally destructive exploitation of the tar sands in Alberta is a result of the government's inability to send a clear message to corporations that such destructive investments are not an option (Monbiot, 2006). By providing clear regulations governments can reduce uncertainty in the institutional environment and encourage (1) firms with positive environmental deviation to continue to push the upper limits of emission reductions, and (2) firms with negative environmental deviation to reduce their emissions and move toward what we predict based on their organizational characteristics. Other stakeholders such as consumers and the media could also be much clearer to companies operating in a dynamic environment about their environmental expectations, helping to reduce uncertainty for key organizational members.

Lastly, munificence and dynamism as defined in this thesis examined the *financial* task environment. For example, for munificence I examined the extent to which the environment can support sustained *financial* growth (Dess & Beard, 1984: 55), and not the carrying capacity of the ecological environment to sustain an industry. This financial focus is consistent with the rest of the thesis that examines the financial implications to environmental deviation. That is, the thesis tends to follow a financial paradigm, and not a strictly ecological paradigm (as we might label it). Future research, however, might examine how munificence and dynamism as they pertain to the ecological environment might affect environmental deviation in specific, and environmental management in general.

7.2. How do Differences in Environmental Deviation Relate to Financial Performance?

The results demonstrate that the answer to the second research question is complex. For example, while most hypotheses were supported, in contrast to what was predicted, positive environmental deviation was not related to profitability. Despite being contrary to the hypothesis, this finding is consistent with recent research examining environmental and social performance, and their relationship to financial performance. In particular, King and Lennox (2002) argue that earlier findings of a positive relationship between environmental and financial performance (Hart & Ahuja, 1996; Russo & Fouts, 1997) can be explained by mis-specified models or constructs. Correcting for these errors in a 10-year, longitudinal analysis, they found no significant relationship between emissions and financial performance. Similarly, when Garcia-Castro et al., (2010) recreated a number of studies that had found a positive relationship between social and financial performance, but this time used a statistical procedure that addressed endogeneity, they found either a negative or a neutral relationship.

The non-significant finding may simply indicate that there are no benefits to firm profitability for exceeding environmental predictions. It might also be that because exceeding environmental predictions represents a significant organizational investment, there is an increase in costs which offset any potential financial benefits. The finding might also be a testament to the complexity of this relationship. In particular, it demonstrates the fallacy of a universal relationship where all firms benefits in all cases in all contexts from increasing their environmental responsibility. This is simply not how competitive markets work. Some firms will be better positioned and capable to increase their environmental responsibility and they will thereby outperform others. For example, an environmental integration capacity demonstrates that some firms are better than others at integrating the natural environment into their strategic business decisions, and that these firms are further able to increase their positive environmental deviation (or decrease their negative environmental deviation). Furthermore, the fact that not all firms will benefit, or benefit equally, by increasing their environmental responsibility is fundamental to the idea of strategically managing the environmental approach, and to the idea of gaining a competitive advantage. If a universal benefit to exceeding environmental predictions does not exist, researchers should investigate if and under what particular contexts and situations a positive relationship is present.

For managers, the complexity of the relationship can help them obtain a sustained competitive advantage. That is, for an organization that is able to gain financial benefits to positive environmental deviation, the difficulty in doing so could translate into a sustained competitive advantage. This of course assumes that there are financial benefits to positive environmental deviation, yet we know already that such benefits exist by at minimum helping to reduce financial fluctuations.

Although in some ways it is unfortunate that not all firms will benefit financially to positive environmental deviation, the good news is that (1) there is no financial harm to positive deviation, and (2) almost all firms will suffer financial consequences to negative deviation.

As hypothesized, the results show that negative environmental deviation is significantly related to poor financial performance (in terms of both reduced profitability and increased fluctuations). This finding is consistent with earlier research by Konar and Cohen (2001) who found evidence of a negative relationship between toxic emissions and firm valuation.

Possible reasons for the negative relationship between negative environmental deviation and financial performance include that failing to meet environmental predictions can damage stakeholder perceptions of a firm and their products, to the point where transactions are withheld or at least minimized. For example, we might expect a number of customers to avoid BP gas stations following the oil spill in the Gulf of Mexico, particularly customers in the most affected regions. Also, intangible assets such as organizational reputation, organizational culture, and the ability to hire talented individuals could be damaged (Konar & Cohen, 2001; Turban & Greening, 1997). As a converse example, Turban and Greening (1997) found that corporate social responsibility improved a firm's ability to hire talented individuals. We can also anticipate higher costs associated with increased toxic emissions such as increases in fines, penalties, clean-up costs and disposal costs (Bansal & Clelland, 2004). Lastly, toxic air emissions might also be a sign of poor organizational efficiency and wastefulness.

The discussion to this point has focused on firm profitability, when looking strictly at financial fluctuations, all hypotheses were supported. That is, positive environmental deviation is related to reduced financial fluctuations, and negative environmental deviation is related to increased financial fluctuations. The latter relationship may exist because firms with negative

environmental deviation are much more likely to experience large costs for clean-up, disposal, liabilities and fines. Such costs may be relatively inconsistent and could have a substantial impact on the financial performance of the firm (Bansal & Clelland, 2004).

In contrast, it seems likely that positive environmental deviation would be related to a better firm comprehension and reading of the external organizational environment. For example, companies with high environmental responsibility are likely to proactively anticipate changes such as increased environmental regulations (Aragon-Correa & Sharma, 2003). Such proactivity can result in a gradual phase in of upcoming changes before they become compulsory. For example, many corporations have voluntarily begun to decrease and limit their carbon emissions in anticipation of greater government regulations. Furthermore, environmental management has also been shown to offer regulatory advantages by leading to greater flexibility to adapt to legislative changes (Bansal & Bogner, 2002), through the ability to influence environmental laws and regulations (Faucheux et al., 1998; Hart, 1995; Hillman & Hitt, 1999; Miles & Covin, 2000), and by reducing or avoiding legal liabilities (Hart, 1995; Rooney, 1993). All of these could result in reduced financial fluctuations.

Taken together, for a manager, on one hand, the results mean that their organization will not gain any benefits to firm profitability from positive environmental deviation, but also that they will not suffer any negative financial consequences (at least in terms of profitability and fluctuations); they will, however, reduce their financial fluctuations. On the other hand, the results mean that their organization is likely to suffer negative financial consequences in terms of both reduced profitability and increased fluctuations from negative environmental deviation. Therefore, managers would be well advised to at minimum meet emission predictions, but can

also gain the additional benefit of reducing financial fluctuations by having lower emissions than predicted given their organizational characteristics.

For researchers, the fact that positive environmental deviation was not related to profitability but was related to financial fluctuations demonstrates the importance of expanding our measures of performance. Indeed, based on the relationships to financial fluctuations we can reasonably anticipate that other measures of financial performance will be related to environmental deviation.

In line with this point, financial performance was also measured as return on assets (ROA), calculated as net income divided by total assets. There is some debate in the literature as to whether researchers should be using accounting-based financial measures, such as ROA, or market-based measures, such as Tobin's Q. Those arguing in favour of accounting-based performance measures believe market-based measures are influenced by a large number of factors unrelated to individual firm activity (Shane & Spicer, 1983; Brammer & Millington, 2008). Those arguing in favour of market-based performance measures believe that these measures are "most relevant to investors and shareholders", and question "the objectivity and informational value of accounting data (Benton, 1982)" (Brammer & Millington, 2008: 1333).

Tobin's Q, a market-based measure, seemed the most appropriate for this study because (1) the environmental approach and related strategic choices made within the firm are affected by more than the firm itself (e.g., regulations, stakeholder demands, media exposure), and the measure should correspondingly reflect factors unrelated to individual firm activity, and (2) the environmental approach and related strategic choices made within the firm affect much more than the firm itself (we all suffer from the emissions released), and the financial implications should correspondingly reflect greater informational value and relevance to stakeholders. Yet

while Tobin's Q is the most appropriate for this study, it is often better to have multiple measures of financial performance, and therefore, values for both ROA moving average and ROA fluctuations were calculated.

Running the same analyses as described earlier but this time with ROA moving average and ROA fluctuations as the dependent variables, nothing was significant for the relationship between environmental deviation (positive or negative) for either ROA measure. It may be that ROA was not significant because it examines financial performance within the firm, to the exclusion of factors in the market that no doubt have a direct influence on within firm strategic choice. In contrast, because Tobin's Q is a market-based measure it better reflects both internal and external factors that influence the strategic choices made within organizations. This is better aligned with environmental deviation which considers both internal (e.g., size, financial leverage) and external factors (e.g., industry, year, slack) in the calculation of expected environmental performance and subsequently on within firm strategic decisions.

Corporate Environmental Legitimacy. Environmental legitimacy was not related to profitability or financial fluctuations for firms with either positive or negative environmental deviation. Thus, while research has demonstrated that organizational legitimacy is related to financial performance (Eisenhardt & Martin, 2000; Thomas, 2007), for the firms in this study environmental legitimacy is not.

Given that earlier results told us that positive environmental deviation is not related to profitability, the non-significant relationship between environmental legitimacy and financial performance is not surprising. In other words, the lack of either a gain or loss of environmental legitimacy from positive environmental deviation is reflected in the non-affect on profitability.

Yet earlier results also showed that negative environmental deviation is related to reduced profitability, so why is this not reflected in a significant relationship between environmental legitimacy and financial performance, where firms with low levels of legitimacy suffer financially? A possible explanation is that negative environmental deviation may have direct costs associated with it (fines, penalties, clean-up costs, disposal costs), and it is, therefore, related to reduced profitability. Yet a perception from the media (my measure of environmental legitimacy) that a firm has poor environmental legitimacy may not have any direct costs for the firm (although we can reasonably anticipate long-term costs to the intangible assets of the firm (Konar & Cohen, 2001)), resulting in a non-significant relationship to profitability.

The final component of this study examined the moderating effect of corporate environmental legitimacy on the relationship between environmental deviation and financial performance. Just as positive environmental deviation and environmental legitimacy were not significant on financial performance, neither was the interaction between the two. Although contrary to what was hypothesized, given the earlier non-significant results related to positive environmental deviation a non-significant interaction was expected.

In contrast, the results show that while negative environmental deviation harms a firm financially both in terms of lower profitability and increased fluctuations, the effect is less severe if the firm is able to obtain environmental legitimacy. Organizations with emissions that exceed predictions that paradoxically have positive environmental legitimacy can be viewed as greenwashers. Somehow these firms have been able to convince the media that they are environmentally responsible, despite being some of the worst toxic emission producers, and they subsequently minimize the financial consequences to exceeding emission predictions (both in terms of increased profitability and reduced fluctuations). This is in contrast to their counterparts

with negative environmental deviation who are not able to attain environmental legitimacy, and who suffer the more severe negative financial consequences to toxic emissions that exceed predictions.

To investigate this finding further, I examined the four companies that had a combination of the best environmental legitimacy and highest values of negative environmental deviation. In all cases, these companies had only one article in *The Wall Street Journal* from 2003-2007 written about them that could be classified as being positive or negative for environmental legitimacy (recall that any neutral articles were dropped in the measurement). Clearly, some firms with higher than predicted toxic emissions are largely able to avoid media scrutiny. This is in contrast to other companies, such as Chevron for example which had 20 articles written about it (twelve positive and eight negative), that are not able to slip under the radar. If a firm is able to limit its media coverage, and have one, or perhaps two, positive articles written about it, it can obtain environmental legitimacy and subsequently positive financial results. It may be that these firms are able to establish legitimacy early on, leading to less scrutiny than their non-legitimate counterparts are subject to (Bansal & Clelland, 2004).

An implication to this result is that stakeholders interested in knowing the extent of environmental responsibility within an organization should be cautious about relying on the media, and in particular as it pertains to the measurement used in this study, *The Wall-Street Journal*. That said, taken as a whole *The Wall Street Journal* did a good job as the correlation between positive environmental deviation and environmental legitimacy was positive and significant ($r = .19$, $p < .001$), and the correlation between negative environmental deviation and environmental legitimacy was not significant ($r = .06$, $p = .06$). Furthermore, an independent samples t-test was run between the environmental legitimacy of firms with positive and negative

environmental deviation, and a significant difference was found ($p < .001$) where firms with positive environmental deviation had significantly higher environmental legitimacy than firms with negative environmental deviation. It may simply be that some firms will be able to successfully greenwash, and effective greenwashing translates to financial benefits.

For managers, the implications are that avoiding negative publicity about your poor corporate environmental performance can help reduce the negative financial consequences.. In other words, greenwashing was shown to significantly reduce the negative financial consequences, in both financial measures, to negative environmental deviation. However, companies should be cautious when greenwashing as the consequences to illegimate claims could be substantial if discovered.

7.3. Theoretical Contributions

Institutional Theory. A major criticism of institutional theory is that it assumes organizational passivity and rarely addresses firm strategic behaviour and the ability of firms to influence institutionalization (Marquis, Glynn & Davis, 2007; Oliver, 1991). These are important areas to investigate as strategic choice can affect all types of organizational performance and survivability (Oliver, 1991). The examination of environmental deviation brought strategic choice to the forefront of the analysis, as the within firm environmental strategy was investigated. Organizations were not assumed to be passive recipients of the institutional context, but their strategic behaviour both in terms of their environmental and business strategies were examined.

In particular, the development of the construct environmental deviation contributes to institutional theory as it permits the combined analysis of the institutional context and within firm strategic choice. Specifically, predicted environmental performance is calculated based on

empirically derived predictors, that include organizational characteristics both inside (size, slack, leverage, financial performance) and outside the firm (industry, year). By using the difference between predicted and actual emissions to measure environmental management, strategic choice and the institutional context are modelled, thereby addressing a major criticism of institutional theory. Future research might use this construct, or develop a similar one related to other organizational areas, to model both strategic choice and the institutional context.

The Resource-Based View. Researchers using RBV have increasingly noted that a resource on its own does not lead to a competitive advantage, and have called for the investigation of capabilities. (Armstrong & Shimizu, 2007; Becerra 2008; Newbert, 2007). In response, this thesis examined the capability environmental integration capacity. The fact that it has a significant effect on both positive and negative environmental deviation reinforces the need to examine environmental capabilities. It also substantiates the recent addition of 'organization' as an important component for a resource to lead to a sustained competitive advantage (Barney & Hesterly, 2006). If a company is able to combine environmental management into their existing policies and procedures by including it in all business decisions, they are further able to reduce toxic emissions. That is, they are able to increase their positive environmental deviation, or decrease their negative environmental deviation, by developing their capability to integrate the natural environment. Lastly, it demonstrates the importance of capabilities to heighten performance, and expands RBV by focusing on an area of organizational performance other than financial performance (Dyck & Bell, forthcoming).

Of particular relevance to RBV is the non-significant result for positive environmental deviation on profitability. The result demonstrates that there is no universal financial benefit to exceeding emission predictions (i.e., having relatively low emissions). This is fundamental to a

resource-based approach, which argues that a competitive advantage can be obtained based on the use and development of resources and capabilities. If all firms that strategically choose to have lower emissions than predicted were able to obtain financial benefits, then there would be little opportunity for a competitive advantage. Instead, it is likely that some firms are better than others at accessing, using, and developing the resources and capabilities related to the natural environment. It is this difference between companies that exhibit positive environmental deviation that can lead to a sustained competitive advantage, and this advantage is not obtained simply from having lower emissions than predicted.

For researchers, this means that we need to further explore how differences in the use and development of resources and capabilities among firms with strong environmental responsibility relate to financial performance. We also need to explore how path dependence, causal ambiguity and social complexity, relate to environmental resource immobility. In other words, given that a sustained competitive advantage cannot be obtained by simply having lower emissions than predicted, we need to explore in more detail how it can be obtained.

The Integration of Institutional Theory and RBV. Institutional theory and RBV were integrated to form the hypotheses for the predicted relationship between environmental deviation and financial performance. While institutional theory suggests that firms should conform to obtain legitimacy, RBV suggests firms should differentiate to obtain a competitive advantage.

From an institutional perspective, to survive firms must conform to the industry norms prevailing in their environment (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 1995), earning legitimacy (Dacin, 1997; Deephouse, 1996; Suchman, 1995); and potentially increasing profitability as institutional norms can represent best practices (Eisenhardt & Martin, 2000). Yet firms can still be successful when operating slightly outside the accepted range if they

are not perceived by members of the organizational field to be different, or if these members are indifferent to some differentiation. This is referred to as the 'range of acceptabiltiy' (Deephouse, 1999). Existence outside this range results in a loss of legitimacy (Deephouse, 1996; DiMaggio and Powell, 1983) which can hinder resource acquisition and reduce performance (Deephouse, 1999).

In terms of toxic emissions, it appears that one end of the range of acceptability stops when environmental predictions are met, but is lost once an organization fails to perform as predicted given its organizational characteristics. That is, any degree of negative environmental deviation is related to financial consequences.

Interestingly, there did not appear to be a range of acceptability for lower than predicted emissions, in that no level of positive environmental deviation was associated with negative financial performance. This is consistent with Bansal and Clelland (2004) who found that firms with higher environmental performance earned higher legitimacy as this level of performance conformed to stakeholders' expectations. Thus there is no evidence of a point where over-commitment to environmental responsibility results in a loss of legitimacy and reduced financial performance.

An additional test for a curvilinear relationship between environmental deviation and financial performance further supports the argument that any degree of negative environmental deviation exists outside the range of acceptability, and the argument that there is no range of acceptability for positive environmental deviation. That is, there was no point where a certain degree of negative environmental deviation lead to positive financial results (the upward part of the inverted-U), and no point where too much positive environmental deviation lead to decreased financial performance (the downward part of the inverted-U).

Therefore, in explaining the results for the relationship between environmental deviation and financial performance, institutional theory and RBV appear to be both correct and incorrect. From an institutional perspective, we might have anticipated a range of acceptability for positive environmental deviation, but one was not found. I did, however, find that failing to conform to expectations by having more emissions than predicted lead to negative financial consequences. From a resource-based perspective, we might have anticipated some financial benefits to differentiation by having higher emissions than similar organizations. The benefits may have come from reduced costs associated with higher emissions, such as not having to purchase end-of-pipe technologies to filter emissions. I did, however, find that having lower emissions than predicted did lead to reduced financial fluctuations. In the end, the results are best explained by a combination of the two theories, and as we will see in the next section, by the addition of prospect theory.

Prospect Theory. The results indicate that the financial consequences to negative environmental deviation (reduced profitability and increased fluctuations) are much greater than the financial benefits to positive environmental deviation (reduced fluctuations only). Prospect theory can be used to explain these results (Kahneman & Taversky, 1979).

The theory states that people value gains and losses differently, and that we are more sensitive to losses than we are to equivalent gains (Brenner, Rottenstreich, Sood & Bilgin, 2007). For example, consumer research finds strong evidence for loss aversion, where people react to losses more strongly than equivalent gains (e.g., the pleasure felt from finding $10 would be less in absolute terms as compared to the pain felt from losing $10) (Kahneman & Tversky, 1984; Novemsky & Kahneman, 2005; Tversky & Kahneman, 1991).

Applied to environmental deviation, the results suggest that the pain/aversion people feel as a result of negative environmental deviation (a perceived loss) drives stakeholders to punish the firm more strongly than would be the drive to reward firms for positive environmental deviation (a perceived gain). The sensitivity to losses/negative information is greater than toward gains/positive information.

The ability of prospect theory to explain the results obtained for this part of the thesis demonstrates how useful the theory could be to ONE research. The idea of severe negative consequences and limited benefits to firm strategic environmental choices makes intuitive sense. For example, BP's current environmental disaster resulting from the explosion and sinking of the Deepwater Horizon oil rig should result in massive financial consequences. Prior to this catastrophic event, BP had a strong environmental reputation (with some exceptions such as the explosion in a Texas refinery and a leak in AMOCO's Alaska pipeline circa 2004-2006). Indeed, BP formerly stood for British Petroleum but has come to mean Beyond Petroleum to signify the organization-wide investments into the natural environment and, in particular, investments in alternative energy. This study's results suggest that the financial consequences to BP for this environmental disaster will be much greater than any positive financial benefits they might have attained from their earlier strong environmental responsibility.

7.4. Methodological Contributions

This thesis made three main methodological contributions. First, a model of the determinants of the extent of toxic air emissions was estimated and used as the basis of a classification that grouped firms according to the difference between their actual and their predicted emissions. Predicted emissions were calculated by empirically identifying predictors of environmental performance. The resulting environmental deviation measure offered a novel way

to examine within firm strategic choice pertaining to the natural environment. Although this approach has been used in the social sciences (Meier & O'Toole, 2002; Palmer & Whitten, 1999) and recently in the examination of social performance (Brammer & Millington, 2008), it has yet to be applied to ONE research. Most importantly, it allowed for an exploration of the strategic choice component of environmental management, and did not assume that environmental management was the result of institutional pressures alone, but also a result of the strategic choices made within organizations (Oliver, 1991).

Second, by conducting a longitudinal examination it was possible to investigate the effect of environmental deviation on financial fluctuations. Thus, a novel measurement of financial performance was introduced. Furthermore, the identification of significant relationships between financial fluctuations and both positive and negative environmental deviation demonstrates that fluctuations are an important measure of financial performance as it relates to ONE research. It also demonstrates the importance of expanding our measurements of performance, as while positive environmental deviation may not be related to firm profitability when accounting for endogeneity, it is related to reduced financial fluctuations.

Third, this study was one of the few to address endogeneity (Hamilton & Nickerson, 2003; Shaver, 1998). Although endogeneity is a well-known problem and is frequently dealt with in economics by using econometric techniques, such techniques have rarely been used in strategic management (Garcia-Castro, Arino & Canela, 2010; Hamilton & Nickerson, 2003), and are even more rare in ONE research. Addressing endogeneity when examining the relationship between environmental management and financial performance remains an important methodological contribution as managers do not make strategic choices randomly, but make decisions based on their projected effect on performance (Hamilton & Nickerson, 2003). To

better understand managerial strategic choices related to the natural environment and to avoid biased coefficient estimates, unobserved variables correlated with both strategic decisions and corporate performance must be addressed in statistical analyses (Garcia-Castro, Arino & Canela, 2010; Hamilton & Nickerson, 2003).

7.5. Limitations

This study suffered from six limitations. First, I focused on only one aspect of environmental management, toxic air emissions. Environmental management and environmental performance are rich and multidimensional constructs that include a wide range of corporate behaviours including the management of toxic emissions, product innovation, lifecycle analysis, environmental management systems, technological development, carbon capture and storage, recovery projects, stakeholder engagement, employee training, conservation and restoration, waste management, recycling, and independent reviews/audits. It is important to extend this analysis to these other areas.

Second, the empirical methodology did not permit any conclusions regarding causality between the relationship of environmental deviation and financial performance. Although this was never a goal of this paper it remains an important area of investigation and provides an opportunity for future research.

Third, the sample used consisted mostly of large, publicly traded, U.S. firms, and, therefore, the generalizability of the results are limited. Results investigating small, private firms may prove to be very different, and even though some non-American-based firms were included in the sample, 91 percent were U.S. firms. For this study it was necessary to focus on these companies given the availability of data both for the toxic air emissions and the financial measures, and the desire for a relatively large sample size. Future research might extend this

study by, for example, examining the National Pollutant Release Inventory (NPRI), the Canadian counterpart to the TRI.

Fourth, because companies self-complete the documents associated with the TRI, it is possible that air emissions are underreported for a number of companies. Companies would certainly have incentives to underreport, given the increased costs and scrutiny associated with higher emissions. In discussions with executives familiar with self-completed programs like the TRI, it is common practice to report the least amount of releases possible, sometimes going as far as changing the numbers. This is a common dilemma across self-reported measures, and the TRI has steps in place to minimize its occurrence. This includes a data quality check of each facility, and if a potential error is found, the facility is notified and their report is subject to a certified revision or withdrawal. Within academia corporate environmental performance is notoriously difficult to measure and has been subject to criticism (Orlitzky et al., 2003). Of the measures used to date, the TRI is among the most accepted (e.g., Clelland, Douglas & Henderson, 2006; King & Shaver, 2001; King & Lennox, 2002; Klassen & Whybark, 1999; Russo & Harrison, 2005).

Fifth, no reliability analysis was conducted for either environmental integration capacity or corporate environmental legitimacy. Given that this is a dissertation all data collection and analysis was done solely by the author. In the future, a confederate may be employed to code a small percentage of the data for these two variables to confirm a reliable analysis.

Sixth, corporate environmental legitimacy was not significant in any of the analyses. A more detailed examination of some of the firms that had attained environmental legitimacy despite negative environmental deviation showed that their legitimacy measure was based on a single media article. While I purposely focused on a single media source—*The Wall Street*

Journal—to avoid overlap of the same stories (Bansal & Clelland, 2004), future research might include a number of sources to increase the potential amount of articles relevant to each firm in the sample. If the sample size were large enough, it might also be possible to exclude firms that have only one article written about them. That said, the measure used in this study did allow for articles from 2003-2007, a large time frame, and was adopted from Bansal and Clelland (2004) who used it in a paper published in a top academic journal. Having only one article published in *The Wall Street Journal* despite high toxic emissions may also be viewed as an organizational skill, and should, therefore, not be excluded from any analysis.

7.6. Summary

In summary, positive environmental deviation is related to a greater capacity to strategically integrate environmental issues into a firm's existing business approach, less munificence and dynamism in the task environment, and reduced financial fluctuations. Negative environmental deviation is decreased through an environmental integration capacity, and related to greater munificence and dynamism in the task environment, reduced profitability and increased financial fluctuations.

The results examining the relationship between environmental deviation and financial performance are best explained through the integration of institutional theory and RBV, and by applying prospect theory. Prospect theory explains the strong financial losses to negative environmental deviation and the minimal financial benefits to positive environmental deviation.

Although there were no significant main effects for corporate environmental legitimacy, greenwashing appears to be an effective strategy for firms with negative environmental deviation, and is achieved by attaining minimal media attention.

Lastly, recommendations for future research were provided through-out the discussion, and five limitations were delineated.

CHAPTER 8: CONCLUSION

This thesis sought to answer two main research questions: Why do firms deviate from their predicted level of toxic emissions, and how do these differences relate to financial performance? The objective was to understand deviation in corporate environmental performance by looking at both industry and firm level variables, to see how this strategic choice related to both profitability and fluctuations in financial performance, and to see if and how corporate environmental legitimacy affected the relationship between environmental deviation and financial performance.

In the achievement of this objective, beyond the results that were found, the following contributions were made. First, the construct "corporate environmental performance deviation" was developed. By using environmental deviation the underlying strategic choice component of environmental management was examined, and firms were grouped based on their environmental strategies. Environmental management was not assumed to be the result of institutional pressures alone, but also a result of the strategic choices made within organizations.

Second, a contribution to institutional theory was made by showing the importance of strategic choice, where different decisions were made within-firms despite similar institutional pressures, and where different relationships were found between the independent variables, financial performance, and the chosen environmental strategy. Environmental deviation provided a method to examine both within firm strategic choices and the institutional context.

Third, a contribution to RBV was made by demonstrating the need to dig deeper into the relationship between positive environmental deviation and financial performance as we explore

firm differences in resources and capabilities, and examine novel measures of financial performance. The former was reinforced by the finding that environmental integration capacity, an organizational capability related to environmental integration, could help explain environmental deviation.

Fourth, a one-sided range of acceptability for environmental deviation was identified where negative deviation results in financial consequences, but currently, the sky is the limit for positive deviation. That is, at no point did the examined firms have positive environmental deviation that existed outside of a range of acceptability. It seems logical that at some point an upper limit to positive environmental deviation will be reached, where too much positive deviation hampers financial performance. It may be that even the most environmentally responsible firms in the sample examined have a way to go before such a limit is reached.

Fifth, to the best of my knowledge, this is the first study to apply prospect theory to ONE research. The idea of negative financial consequences from failing to meet environmental predictions and minimal benefits from having lower emissions than predicted is intuitively appealing, and the ability of prospect theory to explain this outcome will likely prove very useful in future research.

Sixth, a number of methodological contributions were made including the development of the environmental deviation construct, the longitudinal examination of financial fluctuations, and the need to control for endogeneity in ONE research particularly when financial performance is examined.

Most scientists agree that society, and corporations in particular, are not doing nearly enough to avoid "catastrophic devastation—droughts, floods, massive storms, starvation, resource wars, massive migration, and all the rest" (Makower, 2009: 205). By better

understanding why corporations differ in their environmental management approach, and the financial implications to these differences, we as researchers can help organizations move toward greater environmental responsibility. After all, we are all affected if things continue as they are. As stated by Chris Laszlo (2003: 15): “Corporations as an institution are facing the prospect of an evolutionary leap to sustainable value--or irrelevance and extinction.” This study seeks to aid companies in making this leap.

REFERENCES

Adams, M., & Hardwick, P. 1998. An analysis of corporate donations: United Kingdom evidence. *Journal of Management Studies,* 35(5): 641-654.

Aiken, L. S., & West, S. G. 1991. *Multiple Regression: Testing and Interpreting Interactions.* Newbury Park, London, Sage.

Aldrich, H. E. 1979. *Organizations and Environments*. Englewood Cliffs, NJ: Prentice-Hall.

Aldrich, H. E., & Fiol, C. M. 1994. Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19: 645–670.

Ambec, S., & Lanoie, P. 2008. Does it pay to be green? A systematic overview. *Academy of Management Perspectives,* 22(4): 45-62.

Amit, R., & Schoemaker, P. J. H. 1993. Strategic assets and organizational rent. *Strategic Management Journal*, 14: 33-46.

Andersson, L. M., & Bateman, T. A. 2000. Individual environmental initiative: Championing natural environmental issues in U.S. business organizations. *Academy of Management Journal,* 43(4): 548-570.

Andrews. R. 2009. Organizational task environments and performance: An empirical analysis. *International Public Management Journal*, 12(1): 1-23.

Aragon-Correa, J. A. 1998. Strategic proactivity and firm approach to the natural environment. *Academy of Management Journal*, 41(5): 556-567.

Aragon-Correa, J. A., & Sharma, S. 2003. A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review,* 28(1): 71-88.

Armstrong, C. E., & Shimizu, K. 2007. A review of approaches to empirical research on the resource-based view of the firm. *Journal of Management,* 33(6): 959-986.

Banerjee, S. B. 2001. Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, 38(4): 489-513.

Banerjee, S. B., Iyer, E. S., & Kashyap, R. K. 2003. Corporate environmentalism: Antecedents and influence of industry type. *Journal of Marketing,* 67(2): 106-122.

Bansal, P. 2005. Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal,* 26(3): 197-218.

Bansal, P., & Bogner, W. C. 2002. Deciding on ISO 14001: Economics, institutions, and context. *Long Range Planning,* 35(3): 269.

Bansal, P., & Hunter, T. 2003. Strategic explanations for the early adoption of ISO 14001. *Journal of Business Ethics*, 46(3): 289-299.

Bansal, P., & Clelland, I. 2004. Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management Journal*, 47(1): 93-103.

Bansal, P., & Gao, J. 2006. Building the future by looking at the past: Examining published research in organizations and environment. *Organization and Environment*, 19(4): 458-478.

Bansal, P., & Roth, K. 2000. Why companies go green: A model of ecological responsiveness. *Academy of Management Journal*, 43(4): 717-736.

Barney, J. B. 1986. Strategic factor markets: Expectations, luck and business strategy. *Management Science*, 32: 1231-1241.

Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management,* 17(1): 99-120.

Barney, J. B. 1995. Looking inside for competitive advantage. *Academy of Management Executive*, 9(4): 49-61.

Barney, J., & Hesterly, W. S. 2006. *Strategic Management and Competitive Advantage: Concepts and Cases*, Upper Saddle River, New Jersey.

Barron, D. M. 1998. Pathways to legitimacy among consumer loan providers in New York City, 1914–1934. *Organization Studies*, 19: 207–33.

Baum, J. A. C. & Mezias, S. J. 1992. Localized competition and organizational failure in the Manhattan hotel industry, 1898–1990. *Administrative Science Quarterly*, 37: 580–604.

Baum, J. A. C. & Singh, J. V. 1994. Organizational niche overlap and the dynamics of organizational mortality. *American Journal of Sociology*, 100: 346–380.

Becerra, M. 2008. A resourceB-based analysis of the conditions for the emergence of profits. *Journal of Management,* 34(6): 1110-1126.

Benton, G. J. 1982. Accounting numbers and economic values. *Antitrust Bulletin*, 27: 161-215.

Berchicci, L., & King, A. A. 2007. Chapter 11: Postcards from the edge. *Academy of Management Annals*, 1(1): 513-547.

Berchicci, L., Dowell, G., & King, A. A. 2009. The effects of acquisitions on targets' routines: Evidence from facilities' environmental performance, 1991-2005. *Alliance for Research on Corporate Sustainability*, May 8-9.

Berman, S. L., Wicks, A. C., Kotha, S., & Jones, T. M. 1999. Does stakeholder orientation matter? The relationship between stakeholder management models and firm financial performance. *Academy of Management Journal*, 42(5): 488-506.

Berrone, P., & Gomez-Mejia, L. R. Environmental performance and executive compensation: An integrated agency-institutional perspective. *Academy of Management Journal*, 52(1): 103-126.

Black, J. A., & Boal, K. B. 1994. Strategic resources: Traits, configurations and paths to sustainable competitive advantage. *Strategic Management Journal*, 15: 131-148.

Bragdon, J. H., & Marlin, J. A. T. 1972. Is pollution profitable? *Risk Management*, 19(4): 9-18.

Brammer, S., & Millington, A. 2008. Does it pay to be different? An analysis of the relationship between corporate social and financial performance. *Strategic Management Journal*, 29: 1325-1343.

Brenner, L., Rottenstreich, Y., Sood, S., & Bilgin, B. 2007. On the psychology of loss aversion: Possession, valence, and reversals of the endowment effect. *Journal of Consumer Research*, 34: 369-376.

Bromiley, P. 1991. Testing a causal model of corporate risk taking and performance. *Academy of Management Journal*, 34(1): 37-59.

Brown, N., & Deegan, C. 1998. The public disclosure of environmental performance information – a dual test of media agenda setting theory and legitimacy theory. *Accounting and Business Research*, 29, 21–41.

Buysse, K., & Verbeke, A. 2003. Proactive environmental strategies: A stakeholder management perspective. *Strategic Management Journal*. 24(5): 453-470.

Carpenter, M. A. 2000. The price of change: The role of CEO compensation in strategic variation and deviation from industry strategy norms. *Journal of Management* 26, 1179-1198.

CBC news. May 3, 2010. *Wal-Mart settles chemical dumping case*. http://www.cbc.ca/money/story/2010/05/03/walmart-settles-chemical-dumping-case.html

Chatterjee, A., & Hambrick, D. C. 2007. It's all about me: Narcissistic chief executive officers and their effects on company strategy and performance. *Administrative Science Quarterly* 52, 351-386.

Chen, Y. S., Lai, S. B., & Wen, C. T. 2006. The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business Ethics*, 67: 331–339.

Child, J., & Tsai, T. 2005. The dynamic between firms' environmental strategies and institutional constraints in emerging economies: Evidence from China and Taiwan. *Journal of Management Studies*, 42(1): 95-125.

Christmannn, P. 2000. Effects of "best practices" of environmental management on cost advantage: The role of complementary assets. *Academy of Management Journal*, 43(4): 663-680.

Christmann, P. 2004. Multinational companies and the natural environment: Determinants of global environmental policy standardization. *Academy of Management Journal*, 47(5): 747-760.

Clelland, I. J., Douglas, T. J., & Henderson, D. A. 2006. Testing resource-based and industry factors in a multi-level model of competitive advantage creation. *Academy of Strategic Management Journal*, 5(1): 1-24.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. 2003. *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.

Cyert, R. M., & March, J. G. 1963. *A Behavioral Theory of the Firm*, Englewood Cliffs, NJ: Prentice-Hall.

Dacin, M. T. 1997. Isomorphism in context: The power of prescription of institutional norms. *Academy of Management Journal*, 40: 46-81.

Dawar, N., & Pillutla, M. M. 2000. Impact of product-harm crises on brand equity: The moderating role of consumer expectations. *Journal of Marketing Research*, 37(2): 215–227.

Dean, T. J., & Brown. R. L. 1995. Pollution regulation as a barrier to new firm entry: Initial evidence and implications for future research. *Academy of Management Journal*, 38: 288-303.

Deephouse, D. L. 1996. Does isomorphism legitimate? *Academy of Management Journal*, 39: 1024-1039.

Deephouse, D. L. 1999. To be different, or to be the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20: 147-166.

Deephouse, D. L., & Carter, S. M. 2005. An examination of differences between organizational legitimacy and organizational reputation. *The Journal of Management Studies*, 42(2): 329-360.

Delmas, M. A., & Toffel, M. W. 2008. Organizational responses to environmental demands: opening the black box. *Strategic Management Journal*, 29(10): 1027-1055.

Dess, G. G., & Beard, D. W. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29(1): 52-73.

DiMaggio, P. J., & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147-160.

Dooley, R. S. and G. E. Fryxell. 1999. Are conglomerates less environmentally responsible? An empirical examination of diversification strategy and subsidiary pollution in the U.S. chemical industry. *Journal of Business Ethics*, 21(1): 1–14.

Douglas, T. J., & Judge, W. Q. Jr. 1995. Integrating the natural environment into the strategic planning process: An empirical assessment. *Academy of Management Journal*, 475-479.

Dyck, B., & Neubert, M. 2010. *Management: Current Practices and New Directions*. Houghton Mifflin Harcourt Publishing Company, Boston.

Dyck, B., & Bell, G. Forthcoming. Conventional resource-based theory and its radical alternative: A less materialist-individualist approach to strategy. *Journal of Business Ethics.*

Eesley, C., & Lenox, M. J. 2006. Firm responses to secondary stakeholder action. *Strategic Management Journal*, 27(8): 765-781.

Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic capabilities: What are they? *Strategic Management Journal* 21: 1105-1121.

Faucheux, S., Nicolai, I., & O'Connor, M. 1998. Globalization, competitiveness, governance and environment: What prospects for a sustainable development? In S. Faucheux, J. Gowdy & I. Nicola. (Eds.). *Sustainability and Firms, Technological Change and the Changing Regulatory Environment*. Edward Elgar Publishing: Massachusetts.

Feldman, S. J., P. A. Soyka, and P. Ameer. 1997. Does improving a firm's environmental management system and environmental performance result in a higher stock price? *Journal of Investing*, 6(4): 87–97.

Finkelstein, S, & Hambrick, D. C. 1990. Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly* 35: 484-503.

Fogler, H. R., & Nutt, F. 1975. A note on social responsibility and stock valuation. *Academy of Management Journal*, 18: 155-160

Fortune. August 7, 2006. *Wal-Mart Saves the Planet. Well Not Quite,* 154 (3).

Freedman, M., & Jaggi, B. 1988. Impact of government regulations on pollution performance of pulp and paper firms. *Environmental Management*, 12: 391-396.

Freeman, R. E., & McVea, J. 2001. A stakeholder approach to strategic management: The state of the art. *I*n M. Hitt, E. Freeman and J. Harrison (eds.), *The Blackwell Handbook of Strategic Management* (Blackwell Publishing, Oxford).

Friedman, M. 1970. The social responsibility of business is to increase profits. New York Times Magazine, September 13, 32-33, 122, 124, 1263.

Frooman, J. 1999. Stakeholder influence strategies. *Academy of Management Review*, 24(2): 191-205.

Gao, J. (2009). *The Evolution of Business Sustainability: Historical Trajectory and Structural Relationship*. Dissertation.

Garcia-Castro, R., Arino, M. A., & Canela, M. A. 2010. Does social performance really lead to financial performance? Accounting for endogeneity. *Journal of Business Ethics*, 92: 107-126.

Geletkanycz, M. A., & Hambrick, D. C. 1997. The external ties of top executives: Implications for strategic choice and performance. *Administrative Science Quarterly* 42: 654-681.

Ghobadian, A., Viney, H., James, P., & Liu, J. 1995. The influence of environmental issues in strategic analysis and choice: A review of environmental strategy among top UK corporations. *Management Decision*, 33(10): 46-58.

Gonzalez-Bonito, J., & Gonzalez-Bonito, O. 2006. A review of determinant factors of environmental proactivity. *Business Strategy and the Environment*, 15(2): 87-102.

Gore, A. 2006. *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*. Rodale, New York.

Greenwood, R., & Hinings, C. R. 1993. Understanding strategic change: The contribution of archetypes. *Academy of Management Journal*, 36: 1052-1081.

Hamilton, J. T. 1995. Pollution as news: Media and stock market reactions to the toxics release inventory data. *Journal of Environmental Economics and Management*, 28: 98–113.

Hamilton, B. H., & Nickerson, J. A. 2003. Correcting for endogeneity in strategic management research. *Strategic Organization*, 1(1): 51-78.

Hannan, M. T., Ranger-Moore, J. & Banaszak-Holl, J. 1990. Competition and the evolution of organizational size distributions. In J. V. Singh (ed.), *Organizational Evolution: New Directions.* Sage, Newbury Park, CA, pp. 246–268.

Hart, S. L. 1995. A natural-resource-based view of the firm. *Academy of Management Review*, 20(4): 986-1014.

Hart, S. L. 2005. *Capitalism at the Crossroads,* Pearson Education, Inc., Wharton School Publishing, Upper Saddle River: New Jersey.

Hart, S. L., & Ahuja, G. 1996. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment*, 5: 30-37.

Henriques, I., & Sadorsky, P. 1999. The relationship between environmental commitment and managerial perceptions of stakeholder importance. *Academy of Management Journal*, 42(1): 87-99.

Hillman, A. J., & Hitt, M. A. 1999. Corporate political strategy formulation: A model of approach, participation, and strategy decisions. *Academy of Management Review*, 24(4): 825–842.

Hoffman, A. J. 1999. Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal,* 42: 351-371.

Hoffman, A. J. 2001. Linking organizational and field-level analyses: The diffusion of corporate environmental practice. *Organization & Environment*, 14(2): 133-156.

Hoffman, A. J. 2006. Getting ahead of the curve: Corporate strategies that address climate change. *Pew Center on Global Climate Change*, 111-138.

Honore, B. E., & Kyriazidou, E. 2000. Panel data discrete choice models with lagged dependent variable. *Econometrica,* 68(4): 839-874.

Horvath, A., C. T. Hendrickson, L. B. Lave, F. C. McMichael, and T.-S.Wu. 1995. Toxic emissions indices for green design and inventory. *Environmental Science and Technology,* 29(2): 86–90.

Howard-Grenville. 2007. Developing issue-selling effectiveness over time: Issue selling as resourcing. *Organization Science,* 18(4): 560-577.

Jennings. P. D., & Zandbergen. P. A. 1995. Ecologically sustainable organizations: An institutional approach. *Academy of Management Review,* 20: 1015-1052.

Judge, W. Q., & Douglas, T. J. 1998. Performance implications of incorporating natural environmental issues into the strategic planning process: An empirical assessment. *Journal of Management Studies,* 35: 241-262.

Kahneman, D., & Taversky, A. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2): 263-291.

Kahneman, D., & Taversky, A. 1984. Choices, values and frames. *American Psychologist,* 39: 341-350.

Kassinis, G., & Vafeas, N. 2006. Stakeholder pressures and environmental performance. *Academy of Management Journal,* 49(1): 145-159.

King, A. A., & Shaver, J. M. 2001. Are aliens green? Assessing foreign establishments' environmental conduct in the United States. *Strategic Management Journal,* 22(11): 1069-1084.

King, A. A., & Lenox, M. J. 2000. Industry self-regulation without sanctions: The chemical industry's responsible care program. *Academy of Management Journal*, 43(4): 698-716.

King, A. A., & Lenox, M. J. 2001. Lean and green? An empirical examination of the relationship between lean production and environmental performance. *Production and Operations Management,* 10(3): 244-256.

King, A. A., & Lenox, M. J. 2002. Exploring the locus of profitable pollution reduction. *Management Science,* 48(2): 289-299.

Klassen, R. D., & McLaughlin. C. P. 1996. The impact of environmental management on firm performance. *Management Science.* 42: 1199-1214.

Klassen, R. D., & Whybark, D. C. 1999. The impact of environmental technologies on manufacturing performance. *Academy of Management Journal*, 42(6): 599-615.

Klein, J., & Dawar, N. 2004. Corporate social responsibility and consumers attributions and brand evaluations in a product-harm crisis. *International Journal of Research in Marketing,* 21(3): 203–217.

Kleindorfer, P. R., Singhal, K., & Wassenhove, L. N. V. 2005. Sustainable operations management. *Production and Operations Management*, 14(4): 482-492.

Konar, S., & Cohen, M. A. 1997. Information as regulation: The effect of community right to know laws on toxic emissions. *Journal of Environmental Economics and Management*, 32: 109–124.

Konar, S. and M. A. Cohen. 2001. Does the market value environmental performance? *Review of Economics and Statistics*, 83(2): 281–289.

Lamertz, K., & Baum, J. A. C. 1998. The legitimacy of organizational downsizing in Canada: An analysis of explanatory media accounts. *Canadian Journal of Administrative Sciences*, 15, 93–107.

Laszlo, C. 2003. *The Sustainable Company: How to Create Lasting Value Through Social and Environmental Performance*. Island Press.

Lee, S. Y., & Rhee, S-K, 2007. The change in corporate environmental strategies: A longitudinal empirical study. *Management Decision,* 45(2): 196-216.

Leech, N. L., Barrett, K. C., & Morgan, G. A. 2007. *SPSS for Intermediate Statistics: Use and Interpretation*, 3rd ed. Lawrence Erlbaum Associates, Inc.

Lifset, R. 2001. Moving from mass to what matters. *Journal of Industrial Ecology,* 4(2): 1–3.

Lockett, A., Moon, J., & Visser, W. 2006. Corporate social responsibility in management research: Focus, nature, salience and sources of influence. *Journal of Management Studies,* 43(1): 115-136.

Lopez-Gamero, M. D., Claver-Cortes, E., & Molina-Azorin, J. F. 2008. Complementary resources and capabilities for an ethical and environmental management: A qual/quan study. *Journal of Business Ethics,* 82(3): 701-732.

Majumdar, S. K., & Marcus, A. A. 2001. Rules versus discretion: The productivity consequences of flexible regulation. *Academy of Management Journal* 44: 170-179.

Makower, J. 2009. *Strategies for the Green Economy: Opportunities and Challenges in the New World of Business*. New York , McGraw-Hill.

Marcus. A. A., & Geffen, D. 1998. The dialectics of competency acquisition: Pollution prevention in electric generation. *Strategic Management Journal,* 19: 1145-1168.

Margolis, J. D., & Walsh, J. P. 2003. Misery loves companies: Rethinking social initiatives by business. *Administrative Science Quarterly,* 48(2): 268-305.

Margolis, J. D., & Elfenbein, H. A. 2008. Do well by doing good? Don't count on it. *Harvard Business Review,* 86(1): 19-20.

Marquis, C., Glynn, M. A., & Davis, G. F. 2007. Community isomorphism and corporate social action. *Academy of Management Review*, 32(3): 925-945.

Meadows, D., Randers, J., & Meadows, D. 2004. *Limits to Growth: The 30-Year Update.* Chelsea Green Publishing Company: White River Junction, Vermont.

Meier, K. J., & O'Toole, L. J. Jr. 2002. Public management and organizational performance: The effect of managerial quality. *Journal of Policy Analysis & Management,* 21(4): 629-643.

Meyer, J. W., & Rowan, B. 1977. Institutional organizations: Formal structure as myth and ceremony. *American Journal of Sociology,* 83: 340-363.

Miles, M. P., & Covin, J. G. 2000. Environmental marketing: A source of reputational, competitive, and financial advantage. *Journal of Business Ethics,* 23(3): 299-311.

Miller, K. D., & Leiblein, M. J. 1996. Corporate risk-return relations: Returns variability versus downside risk. *Academy of Management Journal,* 39(1): 91-122.

Milstein, M. B., Hart, S. L., & York, A. S. 2002. Coercion breeds variation: The differential impact of isomorphic pressures on environmental strategies. In A. J., Hoffman & M. J. Ventresca, (Eds.). *Organizations, Policy, and the Natural Environment*. Stanford University Press: Stanford, California.

Monbiot, G. M. 2006. *Heat: How to Stop the Planet Burning*. Anchor Canada.

Moore, G. 2001. Corporate social and financial performance: An investigation in the U.K. supermarket industry. *Journal of Business Ethics*, 34(3/4): 299–315.

Murillo-Luna, J. L., Garcés-Ayerbe, C., & Rivera-Torres, P. 2008. Why do patterns of environmental response differ? A stakeholders' pressure approach. *Strategic Management Journal*, 29(11): 1225-1240.

Newbert, S. L. 2007. Empirical research on the resource-based view of the firm: An assessment and future directions. *Strategic Management Journal,* 28: 121-146.

Novemsky, N., & Kahneman, D. 2005. The boundaries of loss aversion. *Journal of Marketing Research,* 42(2): 119-128.

Oliver, C. 1991. Strategic responses to institutional processes. *Academy of Management Review*, 16(1): 145–179.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. 2003. Corporate social and financial performance: A meta-analysis. *Organization Studies,* 24(3): 403-441.

Pacala, S., & Socolow, R. 2004. Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. *Science,* 305(5686): 968-972.

Palepu K. 1985. Diversification strategty, profit performance, and the entropy measure. *Strategic Management Journal,* 6(3): 239-255.

Palmer, H. D., & Whitten, G. D. 1999. The electoral impact of unexpected inflation and economic growth. *British Journal of Political Science,* 29(4): 623-639.

Penrose, E. 1959. *The Theory of the Growth of the Firm*. New York: Wiley.

Pfeffer, J., & Salancik, G. 1978. *The external control of organizations: A resource dependence perspective*. New York: Harper and Row.

Porac, J. F., H. Thomas & Baden-Fuller, C. 1989. Competitive groups as cognitive communities: The case of Scottish knitwear manufacturers. *Journal of Management Studies,* 26: 397–416.

Porritt, J. 2005. *Capitalism as if the World Matters*. Earthscan, Sterling: VA.

Porter, M. E. 1980. *Competitive strategy: Techniques for analyzing industries and competitors*. New York: The Free Press.

Porter, M. E. 1991. Towards a dynamic theory of strategy. *Strategic Management Journal,* 12**:** 95–117.

Porter, M. E., & Van der Linde, C. 1995. Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives,* 9(4): 97-118.

Powell, W. W., & DiMaggio, P. J. 1991. *The New Institutionalism in Organizational Analysis.* University of Chicago Press: Chicago.

Roome, N., & Wijen, F. 2006. Stakeholder power and organizational learning in corporate environmental management. *Organization Studies,* 27(2): 235-263.

Rooney, C. 1993. Economics of pollution prevention: How waste reduction pays. *Pollution Prevention Review,* 3(Summer): 261-276.

Rueda-Manzanares, A., Aragon-Correa, J. A., & Sharma, S. 2008. The influence of stakeholders on the environmental strategy of service firms: The moderating effects of complexity, uncertainty and munificence. *British Journal of Management,* 19(2): 185-203.

Rugman, A. M., & Verbeke, A. 1998. Corporate strategies and environmental regulations: An organizing framework. *Strategic Management Journal, 19*(4), 363–375.

Rumelt, R. P., Schendel, D. E., & Teece, D. J. 1994. *Fundamental Issues in Strategy*. Boston, MA: Harvard Business School Press.

Russo, M. V. 2003. The emergence of sustainable industries: Building on natural capital. *Strategic Management Journal,* 24(4): 317-331.

Russo, M. V., & Fouts, P. A. 1997. A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal,* 40(3): 534-559.

Russo, M. V., & Harrison, N. S. 2005. Organizational design and environmental performance clues from the electronics industry. *Academy of Management Journal,* 48(4): 582-593.

Sanders, W. G., & Hambrick, D. C. 2007. Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal,* 50(5): 1055-1078.

Savitz, A.W., & Weber, K. 2006. *The Triple Bottom Line: How Today's Best-Run Companies are achieving Economic, Social, and Environmental Success-and how you can too*. San Francisco: Jossey-Bass.

Schaefer, A. 2007. Contrasting institutional and performance accounts of environmental management systems: Three case studies in the UK water & sewerage industry. *The Journal of Management Studies,* 44(4): 506-535.

Schuler, D. A. 1996. Corporate political strategy and foreign competition: The case of the steel industry. *Academy of Management Journal,* 39(3): 720-737.

Scott W. R. 1995. *Institutions and Organizations*. Sage: Thousand Oaks, CA.

Shane, P. B., & Spicer, B. H. 1983. Market response to environmental information produced outside the firm. *Accounting Review,* 58(3): 521-538.

Sharfman, M. P., Shaft, T. M., & Tihanyi, L. 2004. A model of the global and institutional antecedents of high-level corporate environmental performance. *Business and Society,* 43(1): 6-36.

Sharfman, M. P., & Fernando, C. S. 2008. Environmental risk management and the cost of capital. *Strategic Management Journal*, 29(6): 569-592.

Sharma. S. 2000. Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal,* 43: 681-697.

Sharma, S., & Vredenburg, H. 1998. Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal.* 19(8): 729-753.

Sharma, S., Aragón-Correa, J. A., & Rueda-Manzanares, A. 2007. The contingent influence of organizational capabilities on proactive environmental strategy in the service sector: An analysis of North American and European ski resorts. *Canadian Journal of Administrative Sciences*, 24(4): 268-28.

Shaver, J. M. 1998. Accounting for endogeneity when assessing strategy performance: Does entry mode choice affect FDI survival? *Management Science*, 44(4): 571-585.

Sheppard, J. 1995. A resource-dependence approach to organizational decline. *Social Science Research*, 24: 28–62.

Shrivastava, P. 1995. Environmental technologies and competitive advantage. *Strategic Management Journal,* 16: 183-200.

Siegel, P. H., Agrawal, S., & Rigsby, J. T. 1997. Organizational and professional socialization: Institutional isomorphism in an accounting context. *The Mid-Atlantic Journal of Business,* 33(1): 49-68.

Simon, H. A. 1955. A behavioural model of rational choice. *The Quarterly Journal of Economics,* 69: 99-118.

Starik, M. 2006. In search of relevance and impact: Introduction to a special feature on the state of organizations and the natural environment research. *Organization & Environment,* 19(4): 431-438.

Suchman, M. C. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3): 571-610.

Tabachnick, B. G., & Fidell, L. S. 2007. *Using Multivariate Statistics*, 5th ed. Boston: Allyn and Bacon.

Teece, D. 1987. Profiting from technological innovation: Implications for integration, collaboration, licensing, and public policy. In D. Teece (ed.*), The Competitive Challenge*, pp. 185–220. Cambridge, MA: Ballinger.

Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal,* 18(7): 509-533.

Thomas, D. E. 2007. How do reputation and legitimacy affect organizational performance? *International Journal of Management*, 24(1): 108-116.

Toffel, M. W., & Marshall, J. D. 2004. Improving environmental performance assessment – A comparative analysis of weighting methods used to evaluate chemical release inventories. *Journal of industrial Ecology,* 8(1-2): 143-172.

Tolbert, P. S., & Zucker, L. G. 1996. The institutionalization of institutional theory. S. R. Clegg, C., Hardy, W. R. Nord, eds. *Handbook of Organization Studies*. Sage, London, UK, 175-190.

Turban, D. B., & Greening, D. W. 1997. Corporate social performance and organizational attractiveness to prospective employees. *Academy of Management Journal*, 40(3): 658–672.

Tversky, A., & Kahneman, D. 1991. Loss aversion in riskless choice: A reference-dependent model. *Quarterly Journal of Economics,* 106(4): 1039-1061.

Weaver, G. R., Trevino, L. K., & Cochran, P. L. 1999. Integrated and decoupled corporate social performance: Management commitments, external pressures, and corporate ethics practices. *Academy of Management Journal,*42(5): 539-552.

Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, 5: 171-180.

Westphal, J. D., & Zajac, E. J. 1994. Substance and symbolism in CEOs' long-term incentive plans. *Administrative Science Quarterly*, 39(3): 367–390.

Westphal, J. D., & Zajac, E. J. 1998. The symbolic management of stockholders: Corporate governance reforms and shareholder reactions. *Administrative Science Quarterly*, 43(1): 127–153.

Westphal, J. D., & Zajac, E. J. 2001. Decoupling policy from practice: The case of stock repurchase programs. *Administrative Science Quarterly*, 46: 202–228.

Wooldridge, J. M. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Zajac, E. J., & Westphal, J. D. 1995. Accounting for the explanations of CEO compensation: Substance and symbolism. *Administrative Science Quarterly*, 40(2): 283–308.

FIGURE 1
Antecedents to Corporate Environmental Performance Deviation

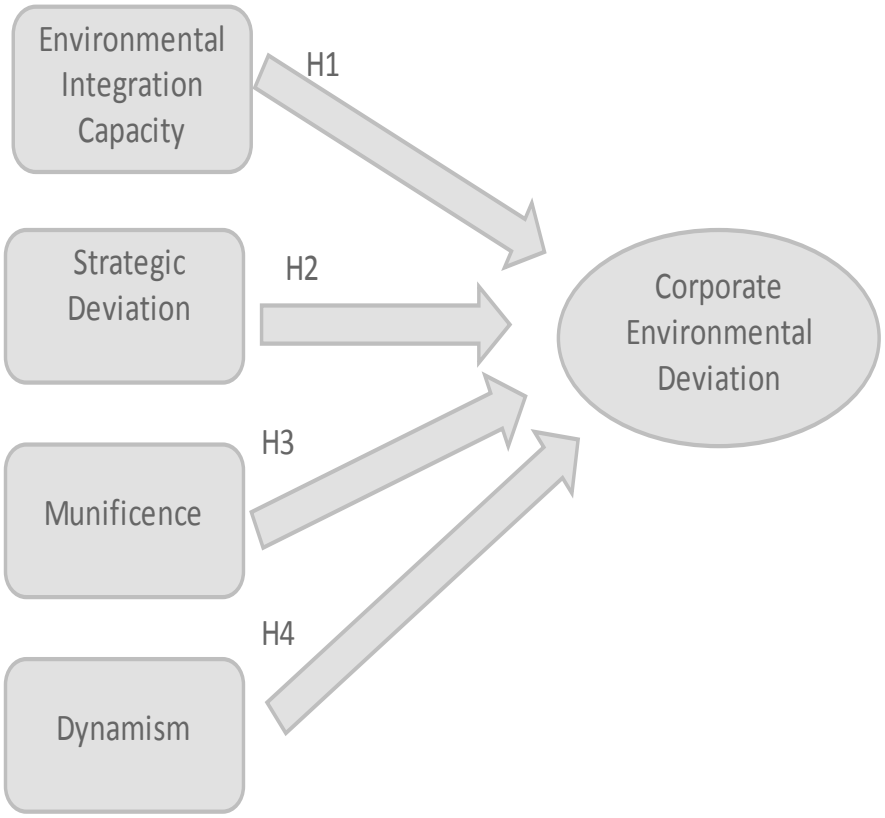

FIGURE 2
The Relationship between Corporate Environmental Performance Deviation and Corporate Financial Performance

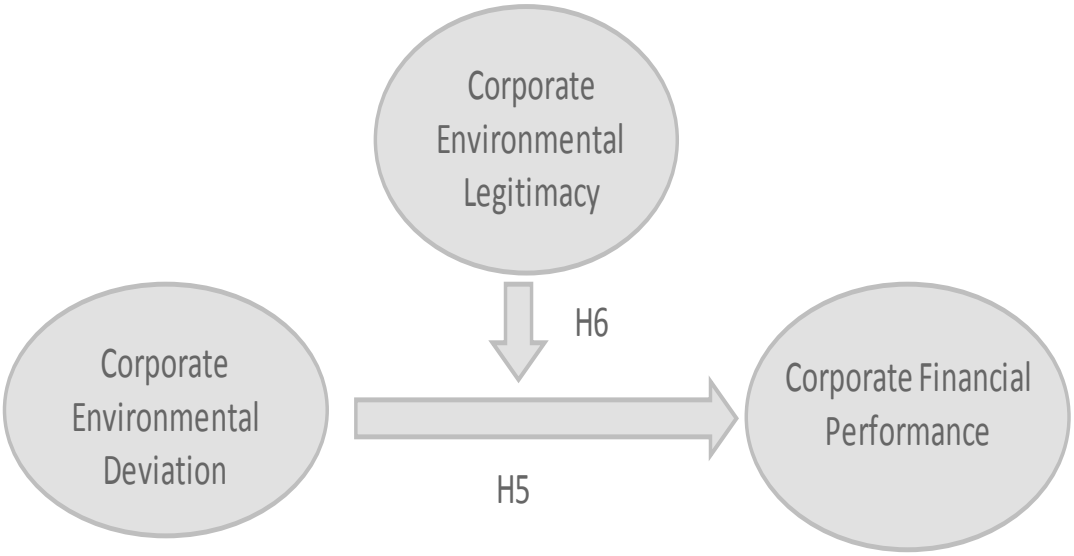

Figure 3
Interaction between Negative Environmental Deviance and Environmental Legitimacy on Tobin's Q

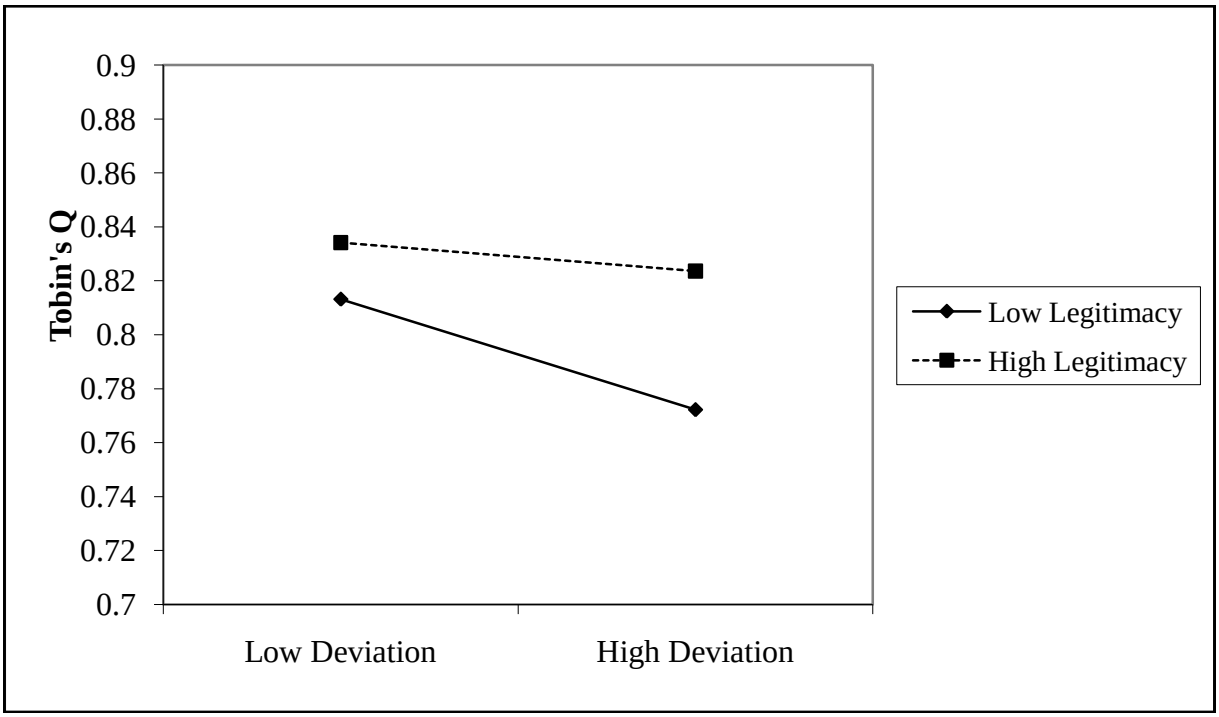

Figure 4
Interaction between Negative Environmental Deviance and Environmental Legitimacy on Tobin's Q Fluctuations

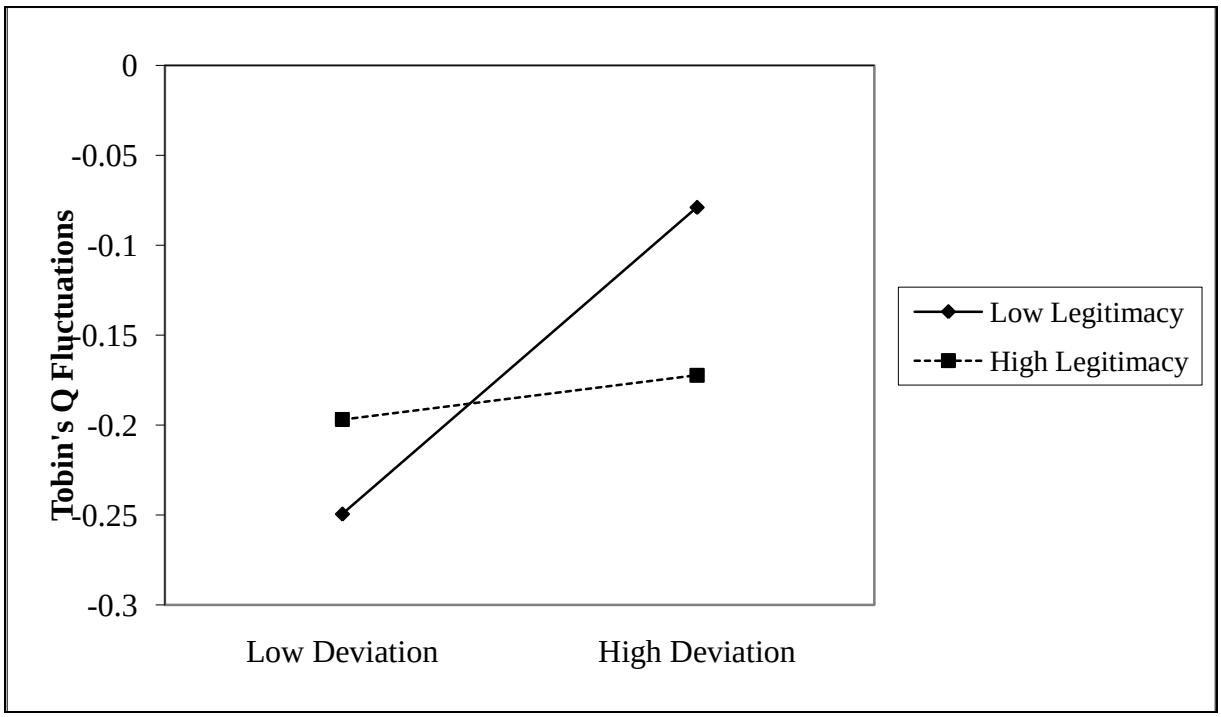

TABLE 1
Variables to Include in the Calculation of Corporate Environmental Performance Deviation

Variables	**Standardized Coefficients (standard errors)**
Constant	6.038*** (.165)
Pulp, paper and paperboard mills	-.397** (.124)
Converted paper product	-2.738*** (.124)
Basic chemical manufacturing	-1.502*** (.083)
Resin, synthetic rubber and artificial synthetic fibers and filaments	-3.027*** (.103)
Pesticide, fertilizer and other agricultural chemicals	-.967** (.135)
Pharmaceutical and medicine	-4.003*** (.144)
Paint, coating and adhesive	-1.480** (.153)
Soap, cleaning compound and toilet preparation	-4.096*** (.160)
Other chemical product and preparation	-3.584*** (.144)
Size	.655*** (.038)
Financial leverage	-.012* (.004)
Slack	.231 † (.122)
Prior profitability	.275** (.039)
Year	.048*** (.005)

Notes:
1. Size, slack, and prior profitability are logged values
2. Non-significant variables not shown
3. All p values reported are at two-tailed significance; † p<.10 * p<.05 ** p<.01 *** p<.001
4. N=308 firms for 2,865 observations
5. The electric utilities industry is the omitted dummy variable for industry.

TABLE 2
Examples of Environmental Integration Capacity (EIC) from Annual Reports

Company and Year of Annual Report	Illustrative quote	Why it indicates EIC
3M 2004, page 17	"3M has a long history of **environmental** stewardship. The company's pioneering **Pollution** Prevention Pays (3P) program, which is designed to find ways to avoid the generation of pollutants, marks its 30th anniversary in 2005. Since 1975, more than 5,600 employee-driven 3P projects have prevented the generation of more than 2.2 billion pounds of pollutants and produced first-year savings of nearly $1 billion." (page 17)	Environmental stewardship has been a part of the company for 30 years, demonstrating a long history of including environmental issues in the operation of the company. With more than 5,300 employees involved it is clearly very important to the company and widespread. Both a reduction in pollutants and financial benefits are mentioned.
Exxon Mobil 2003, pages 19 and 30	"ExxonMobil's proprietary Global Energy Management System focuses on opportunities that reduce the energy consumed at our refineries and chemical plants, including the application of cogeneration, which is the simultaneous production of steam and electricity. Cogeneration increases the overall **energy efficiency** of our facilities, lowering costs and substantially reducing emissions. . . ExxonMobil has more than 80 cogeneration facilities at some 30 locations worldwide, which have reduced carbon dioxide emissions by almost 7 million tons a year. We are investing an additional $1 billion to expand our cogeneration capacity by another 30 percent by the end of 2005."	Continually trying to find ways to improve operating efficiency to both lower costs and reduce emissions. The existence of cogeneration facilities is widespread (80 facilities in 30 different locations as of 2003). Continued commitment to pursue these efficiencies by investing $1 billion in two years.
Siemens 2007, pages 29 and 55	"We invest some $2 billion a year in the development of ecofriendly technologies and hold roughly 30,000 patents - nearly half of all the inventions in our patent portfolio - in the **environmental** field. At the same time, we offer products, systems and services for virtually every aspect of power generation, transmission and utilization - in **energy efficient** power plants, buildings, lighting devices, home appliances, transportation systems and industrial applications. Our solutions include everything from virtual power plant networks, energy-saving motors and the world's largest, most efficient gas turbine to extremely reliable wind power systems and the brightest, whitest LEDs on the market. And we're also developing the energy technologies of tomorrow - for example, processes to capture and securely store the CO2 emitted by fossil fuel power plants." "Systems, products and solutions that minimize **environmental** impact and improve resource utilization in industrial processes and infrastructure applications already account for one-fifth of our total revenue."	Massive investment in environmental technologies both in money and patents. Offer a variety of environmentally friendly products, systems and services. Identification and recognition that one-fifth of total revenue is obtained by the successful integration of environmental efficiencies, systems, products and solutions.

Notes: Keywords searched are in bold

TABLE 3
Examples of Low and High Environmental Integration Capacity (EIC) from Annual Reports

Low SIC	High EIC[2]
Ashland, 2005, 7: "We have a clear commitment to operating safely and minimizing the environmental impact we have on society and the communities in which we live and work."	Pope & Talbot, 2000, 4: "Pope & Talbot integrates environmental policies into every process and program and is committed to continuous improvements that protect and benefit the environment and its inhabitants."
Ciba, 1998, 19: "The product thus reduces customer costs and potential environmental impact."	Potlatch, 2006; 8: "Forestry, approached properly, rewards long-term thinking. That's why environmental stewardship is one of our most closely held values, and why sustainable practices are central to our business model. We believe that if we help take care of the forests, its systems, and its inhabitants, the forests will keep providing value for decades to come—for us, for our customers, for society, and for our shareholders."
American Electric Power, 2004, 12: "AEP's decision to build an IGCC plant, combined with its plan for significant investments in emission-reduction technologies at existing coal-fired generating stations, underscores the company's commitment to coal as its primary energy source for the future."	Cascades, 2004, 8: "...considers environmental protection to be an integral aspect of its mission making it a priority in each of its facilities."
Occidental Oil and Gas Corporation, 2006, 9: "Building on our history of strong environmental stewardship, Occidental Oil and Gas Corporation joined the new U.S. EPA-sponsored Natural Gas Star International program. Participation will provide a recognized forum to document and present the significant reductions in methane emissions that have been achieved in Occidental's international assets, primarily by capturing natural gas for sale."	Exelon, 2001, 21: "We believe that environmental performance is an indicator of the quality of our business and that it can be a competitive advantage in creating value for our shareholders. At Exelon we understand the strategic importance that environmental performance has on our current operations and the sustainability of our economic future"
E.ON, 2004, 22: "As part of our commitment to environmental stewardship, we have consistently improved the efficiency of our generating facilities. Since 1990 we have reduced by 22 percent the specific CO2 emissions of the generating fleet of the companies that currently form E.ON. For E.ON companies operating in Europe, the figure is an even more impressive 32 percent."	Ricoh, 2004; 13: "Based on our management principles, we recognize environmental conservation as one of the most important missions given to mankind, and we regard environmental conservation as an integral element in all our business activities. We, therefore, assume responsibility for environmental conservation and approach this on a companywide basis."

[2] The examples included demonstrate strong integration but do not include a list of concrete actions the firms have taken. However, in all cases these were provided in other parts of the annual reports.

TABLE 4
Descriptive Statistics and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Environmental deviation	.00	1.45														
2. Tobin's Q	.85	.10	.10													
3. Tobin's Q fluctuations	.07	.12	.03	-.44												
4. Size (assets)	3.47	.80	-.07	-.38	.03											
5. Prior financial performance	.69	.39	-.14	-.23	-.04	.66										
6. Financial leverage	1.97	2.91	-.12	-.10	-.03	.15	.04									
7. Slack	.56	.10	.09	.34	-.03	-.39	-.29	-.18								
8. Domestic	.09	.29	.05	.04	-.01	.25	.20	-.01	-.04							
9. Year	4.46	2.85	-.03	.09	-.04	-.09	-.11	.00	-.09	-.01						
10. EIC	1.38	.81	-.06	-.24	.04	.26	.23	.09	-.20	.27	-.09					
11. Strategic deviance	.38	.04	-.03	-.20	.25	-.06	-.09	.10	-.04	-.03	-.13	-.02				
12. Munificence	1.27	.29	.01	.00	.01	.04	.05	-.01	.00	-.00	-.27	-.05	.02			
13. Dynamism	.35	.17	-.00	.05	-.02	-.07	-.05	-.05	.00	.01	.63	-.12	.01	-.39		
14. Environmental legitimacy	.00	1.00	.01	.01	-.01	-.06	-.09	.02	.00	-.04	-.01	-.01	.03	-.02	.01	
15. Deviation x Legitimacy	.01	1.33	.07	-.01	-.01	-.04	-.03	.01	-.04	-.01	.01	-.03	-.01	.01	.03	-.04

Notes:

1. N = 2868, except for Tobin's Q, n = 2698; Tobin's Q Fluctuations, n= 2824; Environmental Legitimacy and the interaction, n= 1450
2. Size, prior financial performance, slack, and strategic deviance are logged values; munificence is arcsine value; environmental deviation and environmental legitimacy are centered values.
3. Correlations above .03 or below -.03 are significant at the 5 percent level; correlations above .05 or below -.05 are significant at the .01 level; except for variable 14 and 15 which have a lower sample size and where correlations above .06 or below -.06 are significant at the 5 percent level; correlations above .07 or below -.07 are significant at the .01 level
4. The electric utilities industry is the omitted dummy variable for industry.

TABLE 5

Generalized Least Squares Panel Data Analysis of Corporate Environmental Deviation

Independent and control variables	**Standardized Coefficients (standard errors)**	
	Strong environmental performers	**Poor environmental performers**
Constant	.362 (.389)	.302† (.179)
Pulp, paper and paperboard mills	3.063*** (.289)	1.010*** (.067)
Converted paper product	.970*** (.229)	.576*** (.105)
Basic chemical manufacturing	1.103*** (.100)	.612*** (.054)
Resin, synthetic rubber and artificial synthetic fibers and filaments	2.397*** (.236)	1.208*** (.088)
Pesticide, fertilizer and other agricultural chemicals	2.093*** (.400)	.637*** (.066)
Pharmaceutical and medicine	2.012*** (.187)	.719*** (.094)
Paint, coating and adhesive	.886*** (.247)	.357*** (.103)
Soap, cleaning compound and toilet preparation	2.920*** (.189)	1.557*** (.117)
Other chemical product and preparation	1.772*** (.149)	.551*** (.097)
Domestic	-.422** (.143)	-.392** (.073)
Size	-.069 (.055)	(.026) .176***
Prior financial performance	.500*** (.082)	-.691*** (.033)
Financial leverage	.020* (.008)	-.023*** (.003)
Slack	-.369 (.243)	-.082 (.106)
Year	.038*** (.100)	-.032*** (.004)
Environmental integration capacity	.069* (.032)	-.030* (.015)
Strategic deviation	.849 (.594)	-.244 (.248)
Munificence	-.310** (.119)	.265*** (.045)
Dynamism	-.650** (.200)	.508*** (.097)
Log likelihood	-858.773	-143.956
Wald Chi^2	596.66*** (df: 19)	1170.96*** (df: 19)

Notes:

1. Size, slack, and prior financial performance are logged values, munificence is arcsine value
2. All p values reported are at two-tailed significance; *t* p<.10 * p<.05 ** p<.01 *** p<.001
3. For strong environmental performers, N=151 firms for 1,074 observations; for poor environmental performers, N=212 firms for 1,749 observations.
4. The electric utilities industry is the omitted dummy variable for industry.

TABLE 6
Hausman-Taylor Test with Tobin's Q Moving Average and Tobin's Q Fluctuations

Independent variables	**Strong environmental performers**		**Poor environmental performers**	
	Model 1: Tobin's Q	**Model 2: Tobin's Q fluctuations**	**Model 3: Tobin's Q**	**Model 4: Tobin's Q fluctuations**
Constant	.582*** (.109)	.812*** (.211)	.811*** (.056)	-.174 (.131)
Pulp, paper and paperboard mills	.119 (.092)	.027 (.106)	.091* (.045)	-.033 (.065)
Converted paper product	.297 † (.177)	-.290 (.202)	.115* (.056)	-.035 (.082)
Basic chemical manufacturing	.189** (.069)	-.135 (.083)	.064 † (.037)	.004 (.058)
Resin, synthetic rubber and artificial synthetic fibers and filaments	.097 (.092)	-.008 (.098)	.110* (.055)	-.066 (.075)
Pesticide, fertilizer and other agricultural chemicals	.358* (.145)	-.315† (.187)	.180* (.078)	-.102 (.109)
Pharmaceutical and medicine	.271* (.122)	-.213 (.141)	.139** (.043)	-.067 (.066)
Paint, coating and adhesive	.147 (.104)	-.124 (.111)	.103 (.066)	-.062 (.094)
Soap, cleaning compound and toilet preparation	.271* (.112)	-.162 (.127)	.140 † (.084)	-.085 (.112)
Other chemical product and preparation	.189* (.083)	-.140 (.100)	.160** (.049)	-.095 (.073)
Domestic	-.388 (.370)	.540 (.420)	-.322 (.357)	.355 (.443)
Size	.067** (.021)	-.089* (.043)	-.017 (.012)	.077** (.029)
Prior financial performance	-.029 (.018)	-.011 (.040)	.056*** (.011)	-.035 (.028)
Financial leverage	.004** (.001)	-.017*** (.003)	.003*** (.001)	-.002 (.002)
Slack	.033 (.042)	-.216* (.091)	.074** (.026)	-.033 (.067)
Strategic deviation	-.236* (.111)	-.545* (.243)	-.194*** (.053)	.118 (.135)
Year	-.001 (.002)	-.005 (.004)	-.003** (.001)	.006** (.002)
Environmental deviation	-.005 (.004)	-.016† (.009)	-.013** (.005)	.049*** (.013)
Environmental legitimacy	-.015 (.038)	-.005 (.052)	.018 (.020)	-.010 (.034)
Deviation x legitimacy	-.006 (.007)	.001 (.020)	.008 † (.005)	-.037** (.012)
Sigma_u	.242	.250	.169	.246
Sigma_e	.044	.092	.033	.086
Rho (fraction of variance due to u_i)	.967	.881	.963	.890
Wald Chi^2	52.65*** (df: 19)	63.91*** (df: 19)	137.18*** (df: 19)	46.61*** (df: 19)

Notes:

1. Coefficients are shown, standard errors in parentheses
2. Size, slack, prior profitability, and strategic deviation are logged values
3. All p values reported are at two-tailed significance; † p<.10 * p<.05 ** p<.01 *** p<.001
4. Model 1, N=144 firms for 526 observations; Model 2, N=142 firms for 524 observations; Model 3, N=209 firms for 874 observations; Model 4, N=214 firms for 898 observations; Model 5, N=298 firms for 1,400 observations

The electric utilities industry is the omitted dummy variable for industry.