The Influence of

Corporate Responsibility

on the Cost of Capital

An Empirical Analysis 2006

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CONTENTS

Acknowledgement

Executive Summary

Corporate responsibility (CR) issues have gained importance within the financial community due to the exponential growth of specialized institutes, expansion of academic and research departments, increased launching of mutual funds allocated according to sustainability criteria, proliferation of online resources and other publications, and specialized corporate responsibility reports. A closer look at the literature concerning the relationship between CR issues and financial measures indicated three major fields for improvement in this area: (1) the development of a common understanding of CR issues; (2) the measurement of CR performance; and (3) the question of how CR issues affect the risk profile of a company.

Since a common understanding of CR cannot be constructed theoretically, we based our research on the frequently used triple bottom line approach, in which CR incorporates economic, ecological and social responsibility issues. When it comes to the field of measuring CR performance, there are already plenty of methods and frameworks. In this research we developed a unique CR rating scheme based on existing frameworks and using weighting factors from analysts and investors. The question of how CR affects the risk profile of a company led to the project's objective: to analyze the impact of CR on capital market financing with a specific focus on electric utilities, assuming that the lower the company risk, the lower the cost of capital.

We hypothesized that there is a relationship between CR and financial performance (H1) and that good CR performance reduces the risk to a company (H2). A clear relationship between CR and financial performance was not found, but CR and financial performance were indirectly linked throughout company risk. This research delivers evidence that CR performance is strongly linked to financial risk measures. There is also support for the assumption that CR issues are likely to be regulation-driven. Regulation seems to be a driver for CR engagement in the utility industry. It seems that a complete lack of CR engagement exposes a company to unnecessary high risk.

Introduction

Through the dynamics of economic changes, there is an increasing need for companies to fulfill the demands of their stakeholders.[2] Acting in accordance with these demands and taking responsibilities is what known as corporate responsibility (CR). Not acting in accordance to these demands may cause risks (CR risks). It is often argued that CR risk may have an impact on corporate value and therefore may influence the cost of capital. But the costs of CR risks have yet to be explicitly evaluated. A consistent CR assessment scheme does not exist; neither does a methodical proposal for the quantification of CR risks and consequential risk margins. Therefore, the objective of this research is to deliver insights into the relationship between CR issues and corporate risks, and the effects of those risks on capital markets.

Dynamics of Corporate Responsibility

The Definition of Corporate Responsibility

There have been a number of attempts to define exactly the field of CR, the proliferation of which has led to increased confusion (Margolis, 2003). Expressions like "corporate social responsibility" (CSR), "sustainability", "corporate responsibility", "corporate governance" (CG), "environmental social governance" (ESG) and "corporate citizenship" (CC) normally express the responsibility of a company towards stakeholders. The ISO Strategic Advisory Group on Social Responsibility confirms that "there is no single authoritative definition of the term "corporate/organizational social responsibility". Corpo-

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[2] E.g. Crowther, D. & Rayman-Bacchus, L. (2004): Introduction: Perspectives on Corporate Social Responsibility, in: Crowther, D. & Rayman-Bacchus, L. (ed.): Perspectives on Corporate Social Responsibility. Aldershot et al.: Ashgate, 1-17; 3; McIntosh, M.; Thomas, R.; Leipziger, D. & Coleman, G. (2003): Living Corporate Citizenship. Strategic routes to socially responsible business. Edinburgh: Pearson.

rate Responsibility refers to the treatment of stakeholders in an ethical or responsible manner (Hopkins, 2001), the making of a business commitment to contribute to sustainable economic development, and working with employees, their families, the local community, and society at large to improve the quality of life (World Business Council for Sustainable Development, 2006).

All these definitions, as a multitude of authors point out, converge towards the "triple bottom line" model, which, as the name implies, analyzes corporate responsibility from three perspectives: economic, environmental and social. It provides a systematic approach for the analysis of diverse sustainability issues. However, CR is a dynamic concept, and its "ethical" content depends largely on theoretical paradigms, regional economic traditions, business-level specifics, and on the time period involved.

The graphic below (Figure 1) summarizes the different concepts of CR as a dynamic concept and reflects the economical, ecological and social impacts (triple bottom line) of its activities in the context of a stakeholder discourse about the moral responsibility of a company. Corporate responsibility banks on the concepts of sustainability, corporate citizenship and corporate governance and encloses them (Bassen et al., 2005; Systain Consulting 2006).
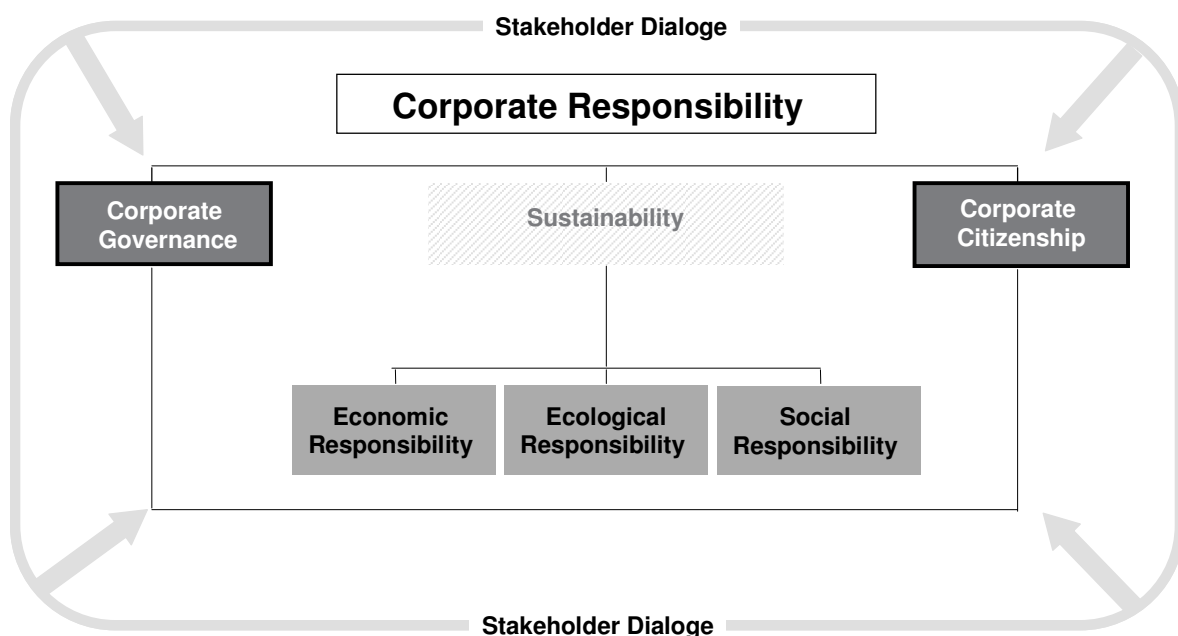

Figure 1: The Framework of Corporate Responsibility

These CR activities take place on a voluntary level, although several CR-issues (such as human rights or environmental issues) relate to international or national laws or standards and are legally binding.

Corporate Responsibility and Risk

However, CR issues expose risks that might impact a company's license to operate. Shareholders are becoming increasingly concerned about these risks. A number of shareholder initiatives have occurred in recent years that are designed to raise awareness at a company level, and to lower investment risk.[3] Mainly, shareholders want to be sure that companies have applied a good management practice to manage these risks. (Goldman Sachs, 2004).

It is apparent that irresponsible corporate behaviour may cause risks. Brand image and reputation are increasingly considered to be a company's most important asset. One of the major risks of irresponsible corporate behaviour is the threat of losing a good reputation. Incidents caused by irresponsible behaviour can damage the trust and the loyalty of stakeholders towards a company. One possible reaction of consumers is a boycott. If a company operates in a responsible manner, investors face a lower risk of consumer boycotts and are more likely to invest, especially in the long run.

Therefore CR is not just a method of risk mitigation, but also an opportunity for value creation. Engaging in CR activities from the corporate governance point of view, e.g. transparent reporting, lowers the material risk. SustainAbility (2001) defined six financial drivers for sustainable development at the company level: customer attraction, brand value & reputation, human & intellectual capital, risk profile, innovation and licence to operate. Another driver that is still a niche market is socially responsible investment (SRI). This refers to investment in ecological and or socially acting companies, and is increasingly demanded by stakeholders. SRI encompasses a wide number of extra-financial criteria within the realm of CR. The sector's various applications range from a passive respect of one or many of those criteria to an active approach where investors directly promote social responsibility with the companies in which they invest (Eurosif 2003,6).

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[3] E.g. Carbon Disclosure Project, Goldman Sachs EnergyEnvironment and Social Index, Eurosif

A study on SRI conducted by CSR Europe showed that for 79% of fund managers and analysts surveyed in 2003, good management of social and environmental risks had a positive impact on a company's market value in the long-term, but no impact in the short-term. Another main outcome of the study was that interest in SRI has risen over the past two years, according to 61% of fund managers and analysts (CSR Europe, 2003).

To summarize, investors are becoming increasingly sensitive to CR issues on a risk level. This implies that companies that do not engage in this development might incur a higher cost of capital, assuming that company risk is a major influencing factor on the cost of capital. The cost of capital is a weighted sum of the cost of equity and the cost of debt. The higher the risk of a company, the higher the cost of equity (risk premium) or the cost of debt (interest rate). For an investment to be worthwhile, the return on capital must be greater than the cost of capital. Therefore, reducing company risk (e.g. CR risk) would result in a lower cost of capital.

However, previous empirical research on the questions of whether CR engagement pays off, and in which way it affects the risk profile of a company has delivered mixed results. The following chapter discusses research on the linkage of CR -measures and various financial performance and risk measures.

Previous Empirical Research

Corporate Responsibility has been the focus of several different empirical studies. The question of whether there is a causal relationship between CR and economic performance, as well as the question of the direction of this relationship, has been an often-posed research question.

Recently, two meta-analyses were published aiming to combine studies on the linkage between financial and CR performance. While Margolis and Walsh (2003) present a detailed overview of the literature and apply a simple "vote counting" technique to pool results, Orlitzky et al. (2003) opt for a methodologically more rigorous analysis; the psychometric meta-analysis. Due to dissimilar methodical approaches, the conclusions drawn by these authors differ.

Margolis and Walsh (2003) identified over 95 studies between 1971 and 2001. Their results present a mixed picture. Despite the overall criticism that the sources of data and the measures utilized by many studies are poor, they identified 55 studies with a positive linkage between CR performance and financial performance. In 21 studies no relationship could be found, 7 studies delivered data presenting a negative relationship and 18 studies reported mixed results.

Orlitzky et al. (2003) conducted a meta-analysis of 52 studies and found an overall positive linkage between CR performance and financial performance, in which CR performance measures were more highly correlated with accounting-based measures than with marked-based indicators. They criticized the vote-counting technique used by Margolis and Walsh on the grounds that this technique has been shown to be statistical invalid.

Most theoretical approaches suggest either a strongly positive or strongly negative relationship. A negative relationship is theorized since investment in social or ecological policies incur upfront costs, the recovery of which is uncertain and which is likely to impair corporate profitability.

A neutral relationship was found by McWilliams and Siegel (2000) who argue that a relationship between social and financial measures exists by chance since there are too many variables which influence the relationship. They demonstrate that many studies may suffer from specification errors and may be poorly designed. The authors argue

further that responsibility is correlated with advertising and research &development expenditure, therefore the existing econometric estimates of the impact of CR performance on firm performance are upwardly biased.

A significant positive relationship is often found in aggregated studies with broad measures of CR and financial performance (Waddock et al, 1997; Ziegler et al, 2002). Corporate responsibility in these cases is theorized to stem from good management and to enhance the firm's characteristics, such as competitive advantage and reputation.

Implemented methodology studies can be divided in several groups (Wagner, Schaltegger, 2003): portfolio studies, event studies, case studies and regression analyses. Portfolio studies (e.g. Derwall et al, 2004) usually compare the performance of above average CR performers against below average performers. While they offer some direct implications for institutional investors interested in SRI, their findings are rarely applicable on a firm-level. Event studies analyze the short term effect on capital markets after responsible or irresponsible corporate actions (e.g. Blacconiere et al., 1997; Rao, 1996; Filbeck et al., 1997). Most of the literature implements regression analysis (Cochran and Wood, 1984; McGuire et al., 1988; Ziegler et al., 2002; Cox et al., 2004), which examines the longer-term relationship between CR and financial performance. A multitude of financial and CR performance measures are taken into consideration, with mixed results, as the analysis is often lacking in profound theoretical underpinnings for the expected link. Lastly, case studies are based on a single company and are looking to promote CR. They provide more in depth analyses of the specific links between responsibility and financial returns, but defy any industry-wide generalizations.

Previous research has focused mainly on the relationship between CR measures and accounting or market-based financial measures, and examined the relationship between CR and financial risk measures.

The relationship between CR and risk was first examined by Spicer (1978). Spicer used a sample of companies disposed to pollution and found that companies with better pollution control records tended to have higher profitability, lower total risks, lower systematic risk, and higher price-earning ratios.

Mc Guire (1988) showed that measures of risk are more closely connected with social responsibility than previous studies have suggested. The risk measures utilized in his

study explained a significant portion of the variability in social responsibility across companies.

Research in which the relationship between CR measures and risk measures was examined has been conducted by Herremans et al. (1993). They showed that large U.S manufacturing companies with better performance during a six-year period from 1982 to 1987 provided investors with better stock market returns and lower risks.

However, theoretical arguments can also be made for a relationship between CR performance and firm risk. One theoretical approach focusing on CR from a risk management perspective is presented by Godfrey (2005). Godfrey argues that corporate philanthropy can generate a positive moral capital among communities and stakeholders and also that moral capital can provide shareholders with insurance-like protection, which contributes to shareholder wealth. "Moral capital provides insurance-like protection for relational wealth because it fulfils the core function of an insurance contract: it protects the underlying relational wealth and earning streams against loss of economic value arising from the risks of business operations" (p. 789).

Following this approach, it can be assumed that good CR performance will reduce the overall risk of a company. If this lower risk is rewarded by analysts and investors, the company should gain a lower risk premium and therefore lower the cost of capital. The cost of capital is the weighted sum of the cost of equity and the cost of debt. Lowering these costs through reduced company risk results in lower cost of capital, assuming that the risk premium is a major cost driver for the cost of capital[4].

Our review of the literature also leads to the conclusion that the quantification of CR is moderate and that therefore a clear, direct relationship cannot be proved due to complexity. It is obvious that there is a demand for a consistent CR quantification model. The question of how CR affects a company cannot clearly be answered, but that CR activities do affect a company seems to be evident.

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[4] A company's assets are financed by either debt or equity. The weighted cost of capital (WACC) is the average of the costs of these sources of financing, each of which is weighted by its respective use in the given situation. WACC = (1 - debt to capital ratio) * cost of equity + debt to capital ratio * cost of debt

Problem Formulation and Objectives

Summarizing the major problems of previous research highlights three fields in which more research is called for:

1. there is no general standardized understanding of CR

2. measuring CR performance is a problem

3. the question on how CR affects the risk profile of a company

Because there is not yet a common understanding of CR it is difficult to compare research in this field. Every approach has its own definition and uses measures based on this definition. Additionally, measuring CR has its pitfalls due to the highly subjective nature of the criteria. It is an aim of this paper to develop a CR quantification model using the example of the utility industry. The utility industry has been chosen because these companies tend to cover CR issues; many have incorporated CR in their day-to-day business, and because the industry offers good comparability. We use a single industry approach particularly because many CR issues vary dependent on the industry. Furthermore, analysts and investors are the ones valuating a company and making investment decisions. Therefore, we have opted to integrate their perception in the quantification model.

The relationship between CR and financial performance is a popular research topic. Most researchers have found a positive linkage between these two measures. We also assume a correlation between CR measures and financial performance measures.

Hypotheses:

H1: There is a relationship between CR measures and financial performance measures such as:

a) the relationship between CR and accounting-based measures.

b) the relationship between CR and market- based measures.

$H_0 1$: There is no link between CR performance and financial performance measures.

The null hypothesis is to be rejected at the 5 percent significance level, which is to be reported as "p<0.05". (significance is given with t above 1.96 for a two-tailed test).

None of the studies previously discussed examined the correlation between CR performance and the costs of capital, even though these costs are important cost drivers on a firm level. Thus, a further objective of this study is to analyze the impact of CR on capital markets, particularly under a risk perspective. We assume that good CR will translate into lower financing costs and thus contribute to value creation.

As already pointed out, CR is a risk issue. To capture these risks it is essential to integrate CR issues into investment analysis and investment decisions.

H2: Good CR reduces the risk of a company in that:

    a) Good CR-performance reduces the risk in equity financing.

    b) Good CR-performance reduces the risk in debt financing.

$H_0$2: There is no link between CR-performance and risk reduction

The null hypothesis is to be rejected at the 5 percent significance level, which is to be reported as "p<0,05". (significance is given with t above 1.96 for a two-tailed test)

To our knowledge, this paper is one of the first studies of CR performance including a close look at the relationship between CR and risk measures. Questioning the perceptions of and dealing with the way in which investors and analysts draw their investment decisions with a quantitative approach is also a unique feature of this study.

Methodology and Data

The following paragraphs present a short description of the methodology used in this study and an overview of the key figures of the data sample. The study can be divided into three major steps: (1) a survey with utility analysts and investors; (2) a ranking of utility companies, and finally (3) the empirical results of the correlation and regression analysis. Figure 2 summarizes the main methodological aspects of the approach.
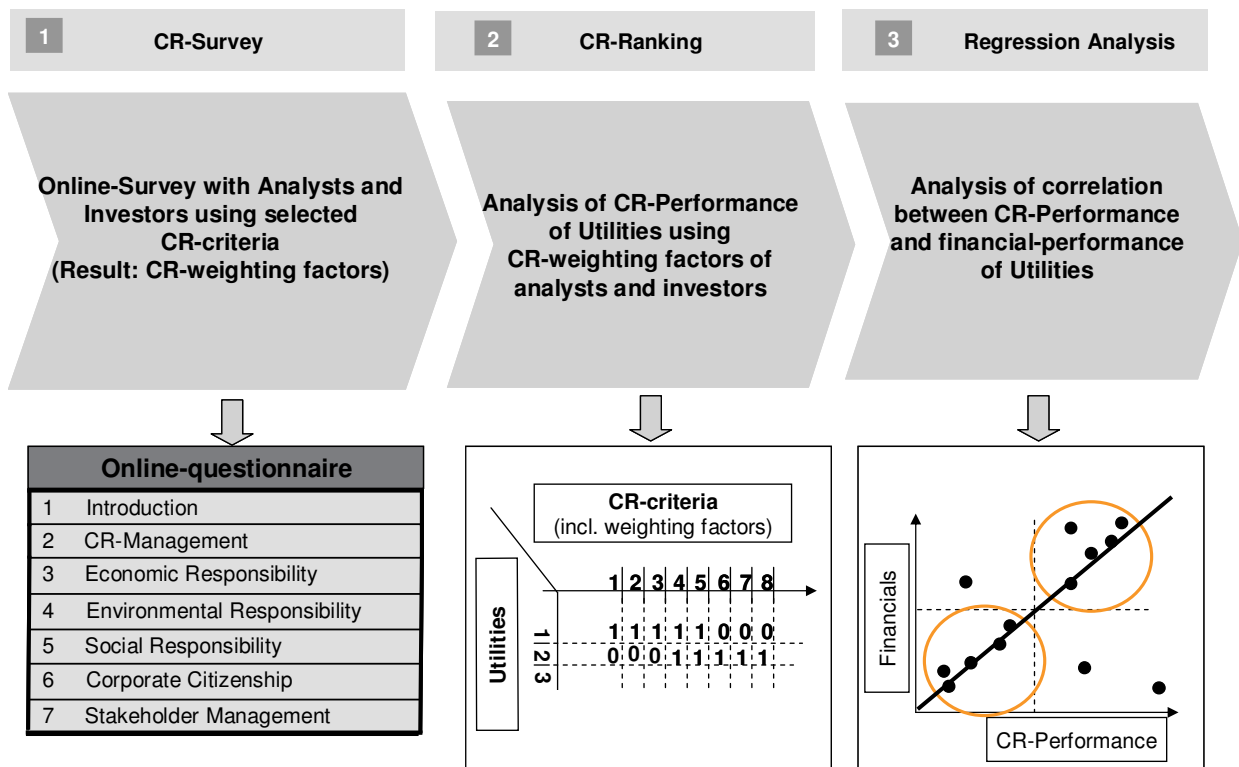

Figure 2: The Methodology

The CR-Survey

The objective of the survey was to aggregate the relevant CR-measures and calculate the CR-weighting factors for the CR-ranking. Due to the fact that one of the main cri-

tiques of previous quantitative research approaches has been the inappropriateness of CR measures used, we opted for a comprehensive CR measurement method.

Our objective was to take a maximum of CR-criteria, especially industry specific criteria, into account. Therefore we used the existing rating questionnaires of 11 renowned rating agencies[5] and the framework of the Global Reporting Initiative. We gathered the criteria of these catalogues and combined them with all CR criteria demanded from electric utilities by CR rating agencies. After identifying more than 900 CR criteria we identified the core CR criteria via multiple-mentioning. The results were 38 core CR-criteria.

These 38 criteria are divided into 6 main topics following the triple bottom line model:

1. CR - Management (CRM)
2. Economic Responsibility (ER)
3. Environmental Management (EM)
4. Social Responsibility(SR)
5. Corporate Citizenship (CC)
6. Stakeholder Management (SM)

In order to integrate the perception of investors and analysts we developed a questionnaire based on these criteria. This questionnaire was then distributed among leading financial analysts and investors, whose answers about the perceived importance of separate CR issues, scaled from 1 to 5, were used as weighting factors in order to identify the emphasis which a certain group of financial players attaches to CR issues. The table below summarizes the structure of the respondents.

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[5] AccountAbility, Business in the Community, Core Rating, Eiris, Fortis Investment, Imug, Innovest, Oekom, Sustainable Asset Management, SiRi, Vigeo, Global Reporting Initiative

Table 1: Structure of Respondents

	Analysts	Investors
Source/ Sample Size	Thomson Financial (Utilities and related industries) 1852	Thomson Financial (Utilities and related industries) 1297
Respondents	117	47
Response Rate	5.6 %	3.6 %
Structure of Responses	25 rate on Bonds, 92 on Equity 64 sell-side, 53 buy-side Analysts	43 active, 4 passiv
Example for Respondents	▪ Goldman Sachs ▪ Citigroup ▪ Morgan Stanley ▪ JP Morgan ▪ Fitch Ratings, etc.	▪ UBS ▪ Merrill Lynch ▪ JP Morgan Asset Management ▪ ING Investment, etc.

The rates of response to the questionnaire of 5.6 percent of analysts and 3.6 percent of investors indicate that CR issues have gained some attention in the financial world, which is also confirmed by the given answers. Although the response rate seems to be low, it is rather common to have a response rate in the 5% area. Still, it can be argued that the low response rate damages the credibility of these results. Therefore we use both weighted and unweighted criteria in this study

The CR Ranking

CR Ranking intends to quantify the CR performance of a company primarily through the use of externally-available company data. Its objective is to frame the quality of a company's CR-performance in relation to its industry competitors. The criteria, implemented for the assessment of the quality of CR performance, are compiled from different external sources of corporate information. Therefore a rating primarily reflects the quality of CR communication and indirectly represents the quality of the underlying CR strategy and operations.

In order to rate the different companies we operationalized the different criteria. We gave 1 point for completely fulfilled criteria, 0.5 points for criteria which were halfway fulfilled or not satisfactory fulfilled and 0 points for criteria not at all fulfilled. The composite ratings resulted from the vertical sum of the separate scores in the six CR categories. The scores, weighted with the factors given by analysts and investors, were used in the form of a complete CR rating (composite rating) and in subcategory vector ratings, which were subsequently used as independent variables in the regression analysis.

To construct the working sample, we compiled a sample of utility companies included in the MSCI World Index. In our sample are 44 diversified utility companies, covering about 80 percent of the capitalization of the utilities in the MSCI utility index universe as of February 2006. The MSCI World Index[6] is a free float-adjusted market capitalization index that is designed to measure globally developed market equity performance. As of May 2005, the MSCI World Index consisted of the following 23 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The respective Global Industry Classification Standard Code (GICS) as of June, 2006 is 5510/Utilities.

The data obtained for the CR ranking are from 2004 (or 2005 if data was already available) and were compiled from sustainability reports, annual reports, company presenta-

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[6]   The index definition is available on www.msci.com

tions and internet information. After the first rating process the results were sent to each company, giving them the opportunity to respond to our findings. Table 2 offers a breakdown of the sample by geographic region. The breakdown reveals an overweight in American (38 percent) and European (29 percent) companies.

Table 2: Country breakdown of the sample

Region	Number of companies
US	17
Europe (without UK)	13
UK	6
Japan	4
Canada	1
Hong Kong	1
Australia	1
Latin America	1
Total	**44**

In our approach we assumed that the quality of CR communication was equivalent to the actual CR performance. For that reason, we measured CR performance via a ranking system using external available resources used by a company, assuming that the measured communication represents the actual CR performance of the company.

Regression Analysis

The starting point of our empirical analysis is a cross section analysis correlating all CR vectors from the CR ranking, unweighted and weighted, using Pearson correlations and two-tailed tests. We then correlate economic performance and risk variables with the CR attributes. Finally we model CR-performance as independent variables in a multivariate regression. For the regressions significance is given with t above 1.96 for a two-tailed test.

Theoretical Models

Independent Variables

Our review of the literature implies that separate CR attributes may impact the risk/return profile of a firm in a tangible or intangible manner. In the light of this and prior research findings, we hypothesize that CR measures influence the risk/return profile of a firm.

Most of the studies (Cochran and Wood, 1984;, Waddock and Graves, 1997; McGuire et al., 1988; Herremans et al., 1993) have modelled sustainability criteria as an independent variable. CR variables are most often implemented in three forms:

- one CR attribute as a proxy for sustainability
- CR vector of attributes as separate variables
- a composite CR rating

We are using the composite CR ranking as an independent variable in our research (see above: CR Ranking). The dependent variables used can be divided into financial performance measures and risk measures. The control variables are represented by the size of the company and the country in which it is operating.

Dependent Variables

In 127 studies investigating the causal relationship between corporate responsibility performance and corporate economic or financial performance conducted between 1972

and 2000[7], analysts utilized approximately seventy economic performance measures that can be classified into two main categories: accounting-based and market-based indicators.

This plurality of perspectives for evaluating the economic performance of a firm displays an ex ante lack of consensus on measurement methodology since each approach has specific theoretical implications and is subject to particular biases. The choice between accounting-based and market-based financial performance measures brings about many controversies. From this multitude, we use as dependent variables some of the most frequently presented indicators for regression purposes.

As an accounting-based financial performance measure we used Return on Equity (ROE). ROE is defined as the equity earnings of a proportion of the net book value.[8] Another indicator used is Return on Asset (ROA). This ratio can be computed by dividing the net income adjusted for tax shields by the relevant average total assets employed during a reporting period. This ratio is considered to be a profitability ratio and measures the return to both the stockholders (net income) and the creditors (interest expense) on their total investments in the firm (average total assets). Accounting-based indicators show the internal efficiency of a target corporation. However, accounting measures grasp only historical aspects of business performance and are subject to a bias inherent in accounting principles and applied procedures, thus making the comparability of results difficult. However, we also assume a correlation between CR measures and financial performance measures.

Leading to the following linear regression equation:

$$ROA = a + CR\,b + \varepsilon$$

and

$$ROE = a + CR\,b + \varepsilon$$

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[7] Margolis and Walsh (2003), p. 273.
[8] Brealy/ Myers (2003), p. 1048

As a market-based financial performance measure, we chose log return, because log return is in comparison to normally-distributed return. Log return was calculated as follows:

Log Return = LN(return 04)-LN(return 05)

The regression equation is:

Log Return = a + b CR + ε

For the regressions with market- and accounting-based measures we presume H1.

H1: There is a relationship between CR measures and financial performance measures in that there is

    a) a relationship between CR and accounting-based measures.

    b) a relationship between CR and market- based measures.

$H_0 1$: There is no link between CR-performance and financial performance measures.

The data used to describe ROA, ROE and log return were obtained from the Thomson Financial database. We acquired the annual measure from 2000 to 2005 but used only the ratios from the year 2005 in the regression.

Starting from our second hypothesis:

H2: Good CR reduces the risk of a company

    a) good CR-performance reduces the risk in equity financing.

    b) good CR-performance reduces the risk in debt financing.

$H_0 2$: There is no link between CR-performance and risk reduction

We searched for appropriate risk measures. Market returns are commonly used as a proxy of financial performance (Rao, 1996; Ziegler et al., 2002). Since stock market returns fail to capture systematic risk, risk-adjusted returns are thought to be more suitable for analysis (Cochran and Wood, 1984). For that reason, we chose beta (β) as a marked-based risk measure. Beta is a measure of the systematic risk faced by an asset

or a project. It is calculated as the covariance between returns on the asset and returns on the market portfolio, divided by the variance of returns on the market portfolio.

$$\beta = COV_{Y,X} / \sigma^2_X$$

We calculated beta on the basis of the returns on the assets for 2004 and 2005 and used the MSCI Global Utility Index as the market portfolio.

The marked-based measures assess the external efficiency of the firm and tend to be more objective and forward-looking than accounting measures. Under conditions of market efficiency, they reflect the ability of the company to generate future economic benefits (McGuire et al., 1988), and therefore can be considered as the proper performance measure. However, notwithstanding of the fact that they better grasp the firm's performance than accounting-based indicators, market-based measures require strong-form market efficiency, which is not always the case in many capital markets.

However, we expected that CR and Beta would be significantly negatively correlated. The better the CR-performance of a company, the lower the risk. The risk can be expressed with the following linear regression equation

Beta = a - b CR + ε

H1 a): Good CR-performance reduces the risk in equity financing

We also describe this hypothesis from the perspective of debt. Debt is the primary means for raising long-term capital in the power industry. Therefore electric utilities receive a larger proportion of scrutiny from bondholders, from regulatory agencies,,and from a larger community of investors and analysts (Filbeck, 1997). Factors that influence the price are therefore of immense economic significance; small changes in yields can lead to large shifts in capital allocation (Bhojraj and Sengupta, 2001). Given the size of the issues and nominal value, the typical holders of corporate debt are large institutional investors—banks and insurance agencies, therefore the adoption of these lenders' perspective is useful for the analysis. Unfortunately, only the large caps have sufficient trading history and even these lack whole months of data. Another limitation to our global sample is that the Japanese and American utilities have multiple issues whereas other companies, mostly Nordic, have a single issue which adds a significant liquidity premium

since only the big issues are regularly traded and fair-valued. Duration is known to compensate for term-structure effects but it was not computed since the relevant information for the computation was missing. In order to avoid biased data we chose a credit rating from S&P for 2005 as a proxy of default risk. A composite rating of S&P and Fitch and Moody's would be more suitable, however, not all of the companies in our sample were covered by the agencies at the same time. We used the conversion methodology of Mansi et al. (2004) to assign an AAA-rated bond a value of 22 and a D-rated bond a value of one[9].

For the following linear regression we expect a positive relationship:

Credit Rating = a + b CR + ε

H1 b) Good CR-performance reduces the risk in debt financing;

We also test risk the two measures (Beta and Credit Rating) with environmental and social responsibility in comparison. The aim was to make a statement of whether environmental issues or social issues or both have a major impact on risk measures.

The regression equations for social responsibility as independent variable are as follows:

1. Beta (MSCI) = a + b SR + ε

2. Credit Rating (S&P) = a + b SR + ε

For environmental responsibility they regression equations are:

1. Beta (MSCI) = a + b ER + ε

2. Credit Rating (S&P) = a + b ER + ε

Control Variables

Size is often argued to be a significant determinant of CR, since the smaller firms cannot afford extensive CR activities (Waddock et. al., 1997). In terms of size as a control variable our sample is biased, as we pre-selected it according to market capitalization, which could mean that the firms have similar sizes a priori. Nevertheless, we used the number of employees as an indicator of company size.

$$Employees = a + b \, CR + \varepsilon$$

We also constructed a control variable referring to the country of origin. This variable also represents the regulatory status of the country/state that the company is operating in. The regulatory status impacts largely the investment or financial decision of the utilities and therefore is central for an industry analysis.

We grouped our sample into 4 groups:

1. USA and Canada (19 companies)

2. European Union (13 companies)

3. UK (6 companies)

4. Australasia (4 companies)

One company from the developing countries could not be associated to any one of the four groups. For this company we worked with a missing value, rather than setting up a fifth group. The regions per se are not ideally homogeneous in regulatory terms, especially since the separate U.S. states and the individual European countries have different jurisdictions and restructuring approaches. Therefore our classification might bias the results.

We expected a significant correlation between CR performance measures and the country variable. Moreover, we assume that the country variable explains a portion of CR-performance.

$$Country\_regulatory = a + b \, CR + \varepsilon$$

A further dummy variable (country, financial market) grouped after the degree of the development of the financial markets was also tested. We assumed that the degree of de-

velopment of the financial market or the orientation of the financial system influences CR performance. The groups were built as follows:

1. Market orientated: US + UK +Canada + Australia

2. Bank orientated: EU + Japan

3. Developing: Brazil + China

With the following equation:

Country_market $= a + b$ CR $+ \varepsilon$

Multivariate Regression

In his study, we also attempt to explain a large segment of the variance of risk measures with CR performance using the control variables to order to optimize the model. Thus, we set up the following multivariate regression equations:

Beta $= a - b$ CR $+ c$ employees $+ \varepsilon$

Beta $= a - b$ CR $+ c$ country_regulatory $+ \varepsilon$

Beta $= a - b$ CR $+ c$ country_marktet $+ \varepsilon$

Credit Rating $= a + b$ CR $+ c$ employees $+ \varepsilon$

Credit Rating $= a + b$ CR $+ c$ country_regulatory $+ \varepsilon$

Credit Rating $= a + b$ CR $+ c$ country_market $+ \varepsilon$

Empirical Results

Results from the Survey

The survey conducted with analysts and investors concerning the importance of various CR issues delivers remarkable results. Mainstream analysts and investors were concerned about CR issues. CR was seen as crucial and was explicitly not seen as "an overrated trend" but more as "part of good management". The most important CR criteria integrated in the decision making process are economic and environmental criteria, such as good IR, CG, climate and energy issues. Figure 3 below shows the 11 most important criteria for analysts and investors.

Figure 3 can be summarized by the commentary of one participant: "High performance on corporate responsibility is not only essential as a part of risk mitigation, but a vital ingredient for shaping future business strategy—particularly in the utilities sector, which has a range of intrinsic sustainability challenges, not least climate change."

Another remarkable result is that investors tend to rate most criteria higher than analysts do, especially social issues. One possible explanation is that investors are more likely to be interested in a good and balanced overall CR performance

Analysts

	Not important							Very important
	1	1.5	2	2.5	3	3.5	4	4.5	5

Good IR on CR-issues ▬▬▬▬▬▬▬▬ *
Focus on CO2 reduction ▬▬▬▬▬▬▬ -
Compliance with the official Corporate Governance-Code ▬▬▬▬▬▬▬ *
Existence of an environmental policy ▬▬▬▬▬▬▬ **
Focus on SO2 reduction ▬▬▬▬▬▬▬ -
Focus on NOX reduction ▬▬▬▬▬▬▬ -

Investors

	1	1.5	2	2.5	3	3.5	4	4.5	5

Health & Safety Programme for employees ▬▬▬▬▬▬▬▬ ***
Good IR on CR-issues ▬▬▬▬▬▬▬▬ *
Existence of an environmental policy ▬▬▬▬▬▬▬▬ **
Compliance with the official Corporate Governance-Code ▬▬▬▬▬▬▬▬ *
Programme for the improvement of the energy efficiency ▬▬▬▬▬▬▬▬ **
Monitoring and reporting of customer satisfaction ▬▬▬▬▬▬▬▬ *

Significance: * < 0.1; **< 0.05, ***< 0.01; - = not significant

■ Economic	■ Environmental	☐ Social

Figure 3: Opinions of analysts and investors concerning the most important issues.

The less important issues are "accountability/compliance" approaches, namely the external certification of CR reports. Figure 4 presents the less important criteria as identified by analysts and investors.
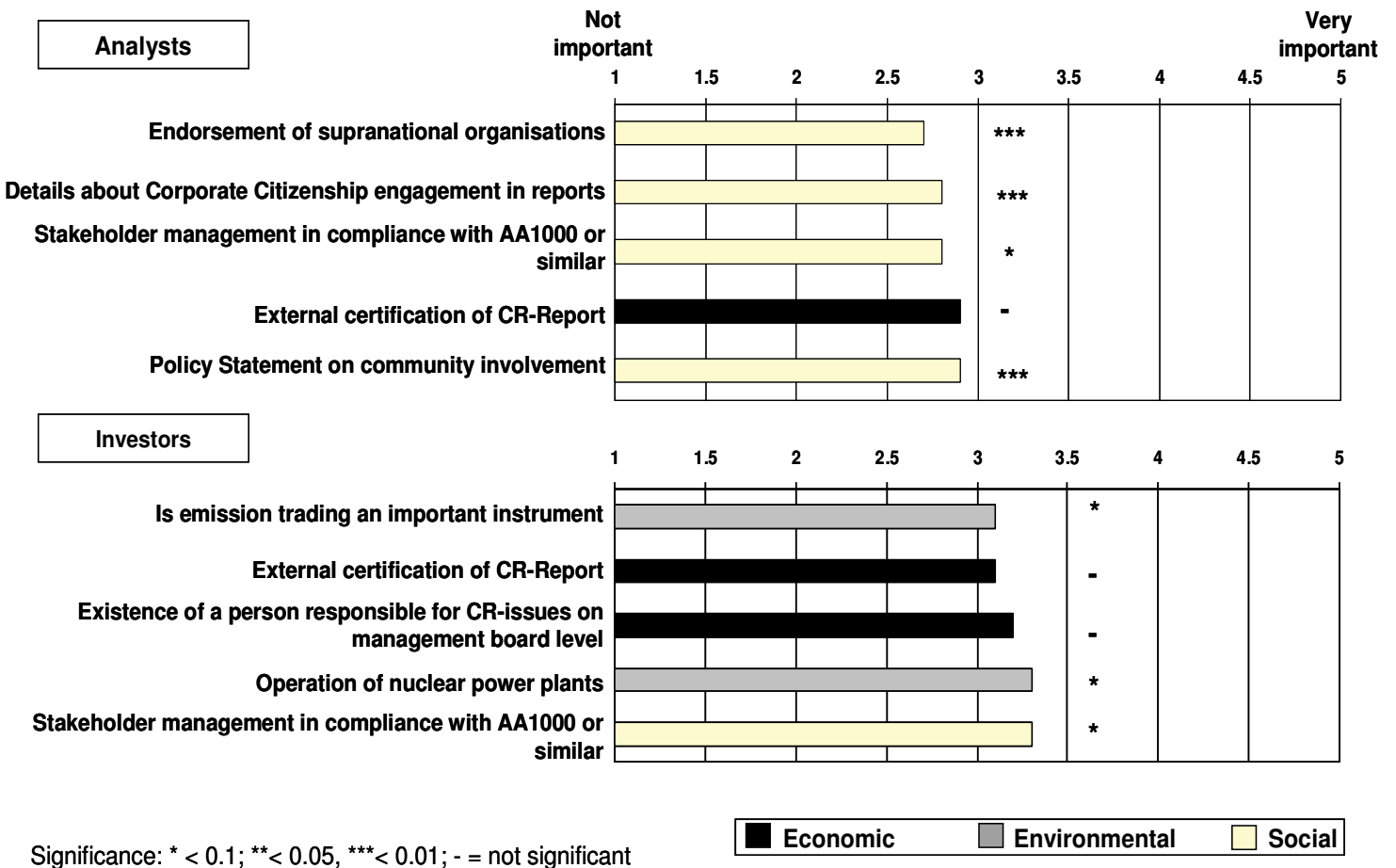
Figure 4: Opinions of analysts and investors concerning the less important issues.

For analysts, social issues are not in the central concern. Investors do not believe in "accountability approaches" like the external certification of CR reports or a certified stakeholder management system. One participant comes to the point: "I am more impressed by how a company ACTS. I see no value in having policies, programmes, reporting (…)".

The general perception evident from this survey was that CR issues count, but they are "not driving the business right now." However, analysts and investors are sensitive to CR issues. One participant expressed this sentiment as follows: "In general I am supportive of the notion of corporate responsibility, especially since trustworthy management is

highly correlated with repayment of debt liabilities. However, during the survey I realized that all else equal, the existence of defined CR targets doesn't much influence my investing behaviour."

Results from the Ranking

In total, 44 companies were assessed concerning their CR performance. We built a horizontal average out of the 38 CR criteria. The scale used was from 0 to 0.5 to 1, with 0 representing not fulfilled/ not implemented, 0.5 representing partly fulfilled/implemented and 1 representing fulfilled/ implemented. The table below illustrates the average fulfilment grade of the 44 companies. It is apparent that there was no a great perception gap between financial market participants and utilities since compliance with the official corporate governance codex of the country, good investor relations, environmental policy existence, monitoring of environmental impacts and in-reports received an above average score, therefore these could be considered of importance for the utility industry. Interestingly, utilities companies ascribe higher priorities to information about corporate citizenship engagement, as well as some social issues as compared to analysts and investors. This result led us to the conclusion that utility companies have a tendency to green and blue washing.

Table 3: Horizontal average of CR-criteria

CSR Issue		Average
1 CR-Management		
1.1 Strategy & Organisation	1.1.1 Existence of a Managementsystem for Non-Financial Risks	0,5
	1.1.2 Consideration of CR-isssues in Risk-Management-System	0,4
	1.1.3 Quantification of CR-targets	0,4
	1.1.4 Existence and description of CR-strategy	0,6
	1.1.5 Existence of a person responsible for CR-issues on management board level	0,4
1.2 Qualtiy of CR-Reporting	1.2.1 CR-Reporting in accordance with GRI (Global Reporting Initiative)	0,4
	1.2.3 External Certification of CR-Report	0,3
2 Economic Responsibility		
	2.0.1Good Investor Relations (trust, transparency, timeliness, quality)	0,7
	2.0.2 Compliance with the official Corporate Governance-Codex of a country (e.g. transparency / reporting, communication, etc.)	0,8
	2.0.3 Policy and guidelines for supplier relations and supplier standards	0,6
	2.0.4 Monitoring of compliance with policy and guidelines for supplier relations and supplier standards	0,4
	2.0.5 Monitoring and reporting of customer satisfaction	0,5
	2.0.6 Existence of Customer-Relationship-Management-System	0,2
3 Environmental Management		
3. 1Environmental Responsibility	3.1.1 Existence of an environmental policy	0,8
	3.1.2 Fixed quantitative environmental targets	0,5
	3.1.3 Certified Environmental-Management-System (ISO 14001, EMAS)	0,7
	3.1.4 Company monitors its environmental impact (risks) without certified Environmental-Management-System (no certificate)	0,8
3.2 Energy	3.2.1 Information about energy mix	0,6
	3.2.2 Programme for the improvement of the energy efficiency	0,6
	3.2.3 Programme for the increasing usage of renewable energy sources	0,7
	3.2.4 Information on precaution of electricity supply	0,2
	3.2.5 How important to you is the fact that utilities operate nuclear power plants?	0,0
3.3 Climate Strategy	3.3.1 Existence of a climate strategy	0,7
	3.3.2 Focus on CO2 reduction	0,3
	3.3.3 Focus on SO2 reduction	0,4
	3.3.4 Focus on NOX reduction	0,4
	3.3.5 Is emission trading an appropriate and important instrument for you?	0,5
4 Social Responsibility		
4.1 Employees	4.1.1 Diversity-Management/ Equal Opportunities (male/female, minorities)	0,7
	4.1.2 Health & Safety Programme for employees	0,7
	4.1.3 Existence of a human resources development strategy (demographic development, war for talents etc.)	0,6
4.2 Human Rights	4.2.1 Endorsement of supranational organisations like ILO, UNO, OECD, Global Compact	0,3
	4.2.2 Conducting social-impact assessments (e.g. during infrastructure projects)	0,1
5 Corporate Citizenship		
	5.0.1 Existence of a Corporate Citizenship Strategy	0,6
	5.0.2 Policy Statement on community involvement	0,7
	5.0.3 Details about Corporate Citizenship engagement in reports	0,9
6 Stakeholder Management		
	6.0.1 Consideration of stakeholder interests	0,7
	6.0.2 Description of stakeholder management in report(s)	0,3
	6.0.3 Stakeholder management in compliance with AA1000 or similar	0,0

Results from the Regression Analysis

Descriptive and Correlation Analysis

Since rating methodologies and experts' weightings are subjective and thus could introduce bias,, we tested for a normal distribution assuming that the scores were representative for the whole population.

A correlation analysis between the separate CR attributes, with or without the experts' weightings[10], demonstrated that all CR aspects are significantly interrelated with exception of corporate citizenship—this fact is an argument for an empirical test of a composite score rather than of the separate attribute vectors. The correlations suggest as well that the variations of the total score are largely be ascribed to the variations in overall management and environmental responsibility, as well as social responsibility (Pearson correlation coefficients of 0.783, 0.733 and 0.754 respectively, in a two - tailed test). The significant interrelationship suggests that the firms pursue and implement either a strategy of good CR performance or a minimum commitment along the whole set of criteria. Positive, statistically significant associations between individual social performance measures have been found by Moore and Robson (2002) for the UK supermarket industry, suggesting that they are mutually reinforcing.

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[10] for simplification reason are only the result with both weightings presented

Table 4: Correlation of CR attributes with weighting

Correlations

		Corporate Responsibility Management (weighted)	Economic Responsibility (weighted)	Environmental Responsibility (weighted)	Social Responsibility (weighted)	Corporate Citizenship (weighted)	Stakeholder Management (weihgted)	Composite CR Rating (weighted)
Corporate Responsibility Management (weighted)	Pearson Correlation	1	,409**	,343*	,587**	,092	,634**	,783**
	Sig. (2-tailed)		,006	,023	,000	,554	,000	,000
	N	44	44	44	44	44	44	44
Economic Responsibility (weighted)	Pearson Correlation	,409**	1	,170	,375*	,202	,354*	,581**
	Sig. (2-tailed)	,006		,270	,012	,189	,019	,000
	N	44	44	44	44	44	44	44
Environmental Responsibility (weighted)	Pearson Correlation	,343*	,170	1	,401**	,004	,138	,733**
	Sig. (2-tailed)	,023	,270		,007	,978	,371	,000
	N	44	44	44	44	44	44	44
Social Responsibility (weighted)	Pearson Correlation	,587**	,375*	,401**	1	,312*	,435**	,754**
	Sig. (2-tailed)	,000	,012	,007		,039	,003	,000
	N	44	44	44	44	44	44	44
Corporate Citizenship (weighted)	Pearson Correlation	,092	,202	,004	,312*	1	,417**	,308*
	Sig. (2-tailed)	,554	,189	,978	,039		,005	,042
	N	44	44	44	44	44	44	44
Stakeholder Management (weihgted)	Pearson Correlation	,634**	,354*	,138	,435**	,417**	1	,610**
	Sig. (2-tailed)	,000	,019	,371	,003	,005		,000
	N	44	44	44	44	44	44	44
Composite CR Rating (weighted)	Pearson Correlation	,783**	,581**	,733**	,754**	,308*	,610**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,042	,000	
	N	44	44	44	44	44	44	44

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		Corporate Responsibility Management (weighted)	Economic Responsibility (weighted)	Environmental Responsibility (weighted)	Social Responsibility (weighted)	Corporate Citizenship (weighted)	Stakeholder Management (weihgted)	Composite CR Rating (weighted)	ROA 05	ROE 05	Beta MSCI	Credit Rating (S&P) 2004	Employees 05	Country
Corporate Responsibility Management (weighted)	Pearson Correlation	1	,409**	,343*	,587**	,092	,634**	,783**	,157	-,035	-,427**	,532**	,013	,482**
	Sig. (2-tailed)		,006	,023	,000	,554	,000	,000	,332	,828	,004	,000	,937	,001
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Economic Responsibility (weighted)	Pearson Correlation	,409**	1	,170	,375*	,202	,354*	,581**	,065	,062	-,257	,432**	,078	,206
	Sig. (2-tailed)	,006		,270	,012	,189	,019	,000	,689	,700	,092	,003	,648	,184
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Environmental Responsibility (weighted)	Pearson Correlation	,343*	,170	1	,401**	,004	,138	,733**	-,194	,142	-,330*	,308*	-,220	,174
	Sig. (2-tailed)	,023	,270		,007	,978	,371	,000	,229	,376	,029	,042	,190	,266
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Social Responsibility (weighted)	Pearson Correlation	,587**	,375*	,401**	1	,312*	,435**	,754**	-,153	-,081	-,295	,572**	,016	,509**
	Sig. (2-tailed)	,000	,012	,007		,039	,003	,000	,345	,614	,052	,000	,926	,000
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Corporate Citizenship (weighted)	Pearson Correlation	,092	,202	,004	,312*	1	,417**	,308*	,165	-,149	-,079	,144	,260	,144
	Sig. (2-tailed)	,554	,189	,978	,039		,005	,042	,308	,353	,610	,351	,121	,356
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Stakeholder Management (weihgted)	Pearson Correlation	,634**	,354*	,138	,435**	,417**	1	,610**	,360*	-,009	-,198	,415**	,202	,452**
	Sig. (2-tailed)	,000	,019	,371	,003	,005		,000	,022	,956	,197	,005	,230	,002
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Composite CR Rating (weighted)	Pearson Correlation	,783**	,581**	,733**	,754**	,308*	,610**	1	,002	,040	-,447**	,599**	-,032	,466**
	Sig. (2-tailed)	,000	,000	,000	,000	,042	,000		,991	,803	,002	,000	,852	,002
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
ROA 05	Pearson Correlation	,157	,065	-,194	-,153	,165	,360*	,002	1	,068	-,066	,107	,068	,049
	Sig. (2-tailed)	,332	,689	,229	,345	,308	,022	,991		,675	,685	,511	,691	,769
	N	40	40	40	40	40	40	40	40	40	40	40	37	39
ROE 05	Pearson Correlation	-,035	,062	,142	-,081	-,149	-,009	,040	,068	1	,290	-,197	-,046	-,161
	Sig. (2-tailed)	,828	,700	,376	,614	,353	,956	,803	,675		,066	,216	,786	,322
	N	41	41	41	41	41	41	41	40	41	41	41	37	40
Beta MSCI	Pearson Correlation	-,427**	-,257	-,330*	-,295	-,079	-,198	-,447**	-,066	,290	1	-,664**	,039	-,239
	Sig. (2-tailed)	,004	,092	,029	,052	,610	,197	,002	,685	,066		,000	,818	,123
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Credit Rating (S&P) 2004	Pearson Correlation	,532**	,432**	,308*	,572**	,144	,415**	,599**	,107	-,197	-,664**	1	,114	,672**
	Sig. (2-tailed)	,000	,003	,042	,000	,351	,005	,000	,511	,216	,000		,501	,000
	N	44	44	44	44	44	44	44	40	41	44	44	37	43
Employees 05	Pearson Correlation	,013	,078	-,220	,016	,260	,202	-,032	,068	-,046	,039	,114	1	,205
	Sig. (2-tailed)	,937	,648	,190	,926	,121	,230	,852	,691	,786	,818	,501		,231
	N	37	37	37	37	37	37	37	37	37	37	37	37	36
Country	Pearson Correlation	,482**	,206	,174	,509**	,144	,452**	,466**	,049	-,161	-,239	,672**	,205	1
	Sig. (2-tailed)	,001	,184	,266	,000	,356	,002	,002	,769	,322	,123	,000	,231	
	N	43	43	43	43	43	43	43	39	40	43	43	36	43

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

From the correlation presented in Table 5 it is apparent that the composite CR rating correlates significantly with the credit rating from S&P for 2004 and 2006 (Pearson coefficients of correlation 0.477 and 0.598 respectively, two-tailed test). One explanation could be that credit agencies already incorporate some sustainability measures in their analyses. Credit ratings are proven to be driven by higher CR performance (Ashbaugh-Skaife et al., 2004). A potential pitfall is that the credit ratings of utilities that are state owned or controlled may be distorted since they are driven by the likelihood of support rather than stand-alone creditworthiness (Fitch Ratings, 2005).

It is also evident that the composite rating does not correlate with any of the accounting variables. Therefore it is likely to be driven by a multitude of other fundamentals. Beta (MSCI) was significantly correlated with most of the CR variables, especially the composite CR rating (-0.447), CR management (- 0.427) and to a lesser degree, environmental management (-0.330). The correlation coefficients for beta as computed against the three benchmarks and sustainability was negative and significant at the 5% (two-tailed test), signalling that more CR operating firms exhibit lower volatility of excess returns or are likely to achieve more stable abnormal returns when committing to CR issues over their global peers or other market participants.

Linear and Multivariate Regression Analysis

This chapter illustrates the outcomes of the linear and multivariate regression analysis, based on our regression equations introduced above.

Table 6: Structure of regression table

Equation	Constant	R Square	Adjusted R Square	T
Shows the regression equation with its dependent and independent variables	The constant is the independent variable in our case it is the Composite CR Rating (weighted).	R square is the coefficient of determination It is the relative predictive power of a model and is describing how much variation is being explained by the X.	The adjusted R square is a modification of R square. It takes the size of the sample into account.	The t- value gives information about the significance of the coefficient. Significance is given with t above 1.96 for a two-tailed test with a 5% probability of error

CR Performance as independent variable

Accounting and marked based financial performance measures

The table below summarizes the results of the linear regressions with the composite CR rating as the constant and accounting- and market-based financial performance measures as the dependent variable.

Table 7: Regressions Independent variables

Equation	Constant	R Square	Adjusted R Square	T
1. ROA = a + b CR + ε	Composite CR Rating (weighted)	.002	.000	.011
2. ROE = a + b CR + ε	Composite CR Rating (weighted)	.040	.002	.252
3. Log. Return = a + b CR + ε	Composite CR Rating (weighted)	**.139**	.118	**2.602**

The results of the first and second regressions with the accounting based measures, ROA and ROE as the dependent variables deliver statistically insignificant results. The t values are far below 1.96. Thus, no statement on the relationship between accounting based financial performance measures and the CR performance of utilities can be made. One reason for the lack of significance might be that our research has a sample of companies operating in different countries. Thus, the accounting-based data are already biased because of the different accounting principles used. On this account, a significant correlation between accounting-based measures and CR performance can not be expected. In any case, the two models with accounting-based measures have no explanatory impact. Therefore H1a, which assumes that there is a relationship between CR and accounting-based measures can neither be rejected nor accepted.

The third model, using log retun as a market-based measure for financial performance as a dependent variable delivers significant results with a t value above 1.69 (2.602). But CR performance has a rather low explanatory effect for the financial performance of utility companies. With an r^2 of 0.139, only 13.9% of the empirical variance of log return can be explained through CR performance. Even so, there is slight evidence for the hypothesis H1b that there is a relationship between CR and market- based measures.

However, it is assumed that CR influences the financial performance more in an indirect way, through risk. Normally, capital market losses emerge after negative incidents mainly due to loss in reputation (Dowell et al., 1992). In this way the weak relationship between CR performance and financial measures can be explained.

Therefore our approach focuses on risk measures as an indicator for eventually increasing revenue losses.

Financial Risk Measures

The following models represent the relationship between risk measures and CR performance.

Table 8: Regressions Financial Risk Measures

Equation	Constant	R Square	Adjusted R Square	T
1. Beta(MSCI) = a + b CR + ε	Composite CR Rating (weighted)	**.200**	.181	**- 3.237**
2. Credit Rating (S&P) = a + b CR + ε	Composite CR Rating (weighted)	**.359**	.343	**4.847**

The first equation uses beta as the dependent variable. The results in this model are significant and negative (-3.237), and 20% of the variation of beta can be explained by CR performance. This result supports our hypotheses H2a, that good CR performance reduces the equity risk of a company. Although this relationship is not very strong, it can be argued that the better the CR performance of the utility company, the lower the beta (negative t-value), and vice versa.

The second regression equation, incorporating credit rating as a dependent variable, delivers even more powerful results. First of all, the model is highly significant with a t-

value of 4.847. Moreover, CR performance has a great explanatory effect on credit rating as a proxy for default risk. 35.9% of the empirical variance of CR can be explained through the credit rating. This result implies that good CR performance can be an indicator for a good credit rating or vice versa. However, as credit rating is used as a risk measure in the hypothesis H2b, the theory that good CR reduces the debt risk is supported by our model. These models might be optimized by using control variables.

Environmental and Social Responsibility in Comparison

Table 9: Regressions Environmental and Social Responsibility in Comparison

Equation	Constant	R Square	Adjusted R Square	T
1. Beta(MSCI) = a + b ER + ε	Environmental Responsibility (weighted)	.109	.087	**- 2.262**
2. Credit Rating (S&P) = a + b ER + ε	Environmental Responsibility (weighted)	.055	.033	1.568

Equation	Constant	R Square	Adjusted R Square	T
1. Beta(MSCI) = a + b SR + ε	Social Responsibility (weighted)	**.087**	.065	**-2.001**
2. Credit Rating (S&P) = a + b SR + ε	Social Responsibility (weighted)	**.327**	.311	**4.510**

The results from the regression analysis with social and environmental responsibility as independent variables are highly significant, with a t value of 4.510. This illustrates that a high degree (32.7%) of the variation in credit rating can be explained by social responsibility. However the results for the model with environmental responsibility as an independent variable and credit rating as a dependent variable were not significant (t value of 1.58). For beta, the results with social and environmental responsibility were both slightly significant (t value of -2.262 for environmental responsibility and a t-value of -2.001 for social responsibility). But both social and environmental responsibility have a very low influence on the variation of beta. These outcomes indicate that the sum of CR engagement is more important than partial engagement, especially for equity risk (with beta as a proxy). But for the debt side, social issues seem to be an important driving factor.

Control Variables

As described in the methodology and sample section we tested 3 control variables in a linear regression.

Table 10: Regressions Control Variables

Equation	Constant	R Square	Adjusted R Square	T
1.Employees 05 = a + b CR + ε	Composite CR Rating (weighted)	.001	- 0.28	- 0.188
2. Country = a + b CR + ε	Composite CR Rating (weighted)	**.145**	.125	**2.669**
3. Development of financial markets = a + b CR + ε	Composite CR Rating (weighted)	.035	.012	1.228

First, we tested employees as a measure of company size. This model does not deliver any significant results. The results do not support the notion that CR commitment depends on the size of the firm, a finding consistent with the findings of D'Arcimoles et al. (2003) but contrary to these of Waddock and Graves (1997). Size is often argued to be a significant determinant of CR, since smaller firms cannot afford extensive CR practices. But as mentioned above, our sample was selected with reference to size (market capitalization). Under these conditions, the results are not surprising and no evidence that the size of a utility company and its CR performance are interrelated could be found.

The second and the third control variables were dummy variables. We constructed these variables according to the country of origin. The first represents the regulatory status in the utility sector (country_regulatory), the second is grouped after the degree of the development of the financial markets (country financial markets).

The model with the dummy variable of country_regulatory delivers significant results (t-value of 2.669). In addition, 14.5% of the variation of the variable of country is explained by CR. Thus, regulative issues seem to have an influence on CR.

The country dummy variable (country_financial markets) delivers different results. There seems to be no relationship between CR performance and the orientation of the financial markets. With a t-value below 1.96 the results are not significant.

The two country models in comparison give evidence that CR performance is more likely to be influenced by regulative actions than by the structure and the development of capital markets. Therefore the dummy variable country_regulatory is used as a control variable in the following multivariate regression analysis.

Multivariate Regression Analysis

Before carrying out the multivariate regressions, the independent variables were tested via a correlation analysis. The correlation between the CR composite rating and the control variable country_regulatory showed a slight dependency, but the multiple regression could still be undertaken.

Table 11: Multivariate Regressions with Beta

Equation	Constant	R Square	Adjusted R Square	T
1. Beta(MSCI) = a + b CR + c employees 05 + ε	Composite CR Rating (weighted) Employees 05	.256	.212	**- 3.409** .156
2. Beta(MSCI) = a + b CR + c country + ε	Composite CR Rating (weighted) country	.200	.161	**- 3.032** .192
3. Beta(MSCI) = a + b CR + c financial markets + ε	Composite CR Rating (weighted) Financial markets	.214	.175	**- 3.329** .853

The results from the multivariate regression analysis with beta as the dependent variable are all significant for the CR composite rating. In contrast, the t-values of the control variable deliver insignificant results. The t-values for CR range between -3.032 and -3.409. The results from the linear regression model (Beta (MSCI) = a + b CR + ε) seem to be stable with nearly the same t-value in the linear regression (-3.327). Also the r-square value did not increase much. For the first regression (Beta(MSCI) = a + b CR + c employees 05 + ε), r-square rose. But this result should be interpreted with caution because the result for employees as the second independent variable was not significant.

Table 12: Multivariate Regressions with Credit Rating

Equation	Constant	R Square	Adjusted R Square	T
1. Credit Rating = a + b CR + c employees 05 + ε	Composite CR Rating (weighted) Employees 05	.390	.354	**4. 580** .997
2. Credit Rating = a + b CR + c country + ε	Composite CR Rating (weighted) country	.397	.368	**3.952** 1.615
3. Credit Rating = a + b CR + c financial markets + ε	Composite CR Rating (weighted) Financial markets	.356	.334	**4.611** .623

The same results seem to apply to the regression analysis with credit rating as dependent variable. None of the t-values for the control variables are significant, but the values for the CR composite rating were again highly significant. A closer look at the r-square values slightly improved the picture (in the linear regression the model: Credit Rating (S&P) = a + b CR + ε had a r square of .359), but the results for r-square can be misleading because the t-values of the second independent variables (control variables) were not significant. So the results from the dummy variables were not significant. That means that no conclusions can be drawn based on this model.

Conclusion

In the empirical tradition of prior research, we constructed a composite rating through a compliance check with a pre-cast list of CR criteria whose importance for the financial world and utilities in the form of expert opinions gained through a survey was translated into coefficient weightings. Such a rating technique quantifies the performance of utilities along the triple bottom line model and makes it comparable and measurable.

In terms of the sample, we compiled diversified utilities included in the MSCI World Index covering about 80 percent of the capitalization in the index. Our sample is clearly biased towards the United States and also towards mega-players with similar sizes, which could explain the lack of correlation between sustainability and firm size measures.

Further on, we source a scope of financial returns—accounting and market returns—to measure financial performance. We then attempted to test the nature and direction of composite rating and separate CR vectors with financial measures in an attempt to isolate the most significant relationship through cross-section regression analysis. We modelled CR as independent variable and subsequently financial performance as dependent variable.

The initial models were reduced to just a few variables, and all the models with CR as independent variable and financial risk measures as dependent variables had statistically significant explanatory power. The main outcome is that risk issues have an important influence on CR performance in debt as well in equity financing.

On the risk side, CR commitment tends to lead to lower regulatory risk. The results of the two linear regressions (see table 8) are very stable. The main outcome of the regression analysis is that a company with good CR performance has a lower risk exposure. Assuming that risk is a major cost driver, companies with a good CR performance can reduce their cost of capital.

Appendix

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