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**PORTFOLIO PERFORMANCE
IMPLICATIONS OF ENVIRONMENTAL,
SOCIAL AND GOVERNANCE BASED
ASSET SELECTION**

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Portfolio Performance Implications of Environmental, Social and Governance based Asset Selection

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Abstract

This study examines the linkage between corporate social responsibility and stock market returns in the USA, Canada, Germany, the United Kingdom and Switzerland. Concentrating on corporate disclosure and corporate eco-efficiency, we find mostly mixed results by employing factor performance attribution models. A theoretical framework to model the real underlying relation is presented.

Keywords:

Corporate Social Responsibility, Corporate Sustainability, Corporate Disclosure, Eco-Efficiency, Environmental Performance, Asset Pricing Models, Performance Evaluation, Portfolio Analysis, ESG (environmental, social, governance), Asset Selection

JEL:

C51, G11, G15, G17

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Introduction

The terms sustainability and corporate social responsibility (CSR) have gained increasing public attention in recent years. The growing awareness can be easily related to current trends in the investment practice. According to a report by the Forum for Sustainable and Responsible Investment, professionally managed assets guided by the incorporation of social responsibility strategies totaled 3.07 trillion dollars at the beginning of 2010 in the United States.¹ In the current market, as a result of a disproportionately high growth of this asset category as compared to conventional managed funds, approximately one out of every eight dollars invested in the US is affected by social responsible investment principles. Less coherence is available when it comes to the question if investors are facing a tradeoff between their investment income and their goal to invest responsibly. On the contrary, socially conscious investors may be even receivers of additional financial rewards for their selection of businesses with sustainable business practices.²

The question, whether or not (and if yes, how) corporate social responsibility affects the financial performance of a given company is crucial for all stakeholder groups in the broadest sense. First, shareholders, if not driven on purely moral grounds, are in all likelihood interested if the CSR activities of a company benefit or threaten shareholder value. Secondly, the management, having a fiduciary duty to its shareholders, is required to make informed decisions about how to treat CSR in its overall strategy. Thirdly, governments and supranational bodies, wanting to reinforce corporate sustainability,³ need a keen understanding about its dynamics to build a thriving regulatory environment for businesses. The aim of this study is to evaluate the performance of assets selected by environmental, social and governance (henceforth: ESG) criteria to tackle the imperative questioned relationship between CSR and financial performance. In order to answer this question, we draw on a sample of North American (United States and Canada) and European (Germany, United Kingdom and Switzerland) equities.

The overall complexity of the topic starts from the definition of the concept of CSR.⁴ For the purposes of this study, we will follow the definition set out by the Commission of the European Communities, defining CSR as ‘a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis’.⁵ Analogously, Figge & Hahn (2004) describe the sustainability of a company as a function of its economic, environmental and social performance. In this sense, we will use (corporate) social responsibility and (corporate) sustainability interchangeably.

The study unfolds as follows. Section I gives an outline of the academic literature in the field while paying special attention to papers employing similar performance attribution models or proxies for corporate sustainability. Section II logically derives the hypotheses to be investigated. Section III describes the data being used in the empirical part and gives several reasons substantiating the choice of the particular ESG indicators we selected. Section IV discusses the applied econometric methodology. Section V presents the main results in a cross-country comparison and contrasts properties of socially responsible companies hypothesized in the literature with the current findings. Lastly, section VI returns to the notional linkage between sustainability and financial performance and introduces a unifying theoretical model.

¹ Forum for Sustainable and Responsible Investment (2011)

² See Porter & van der Linde (1995)

³ For example, sustainable development is officially described as ‘an overarching goal of the European Union’ http://ec.europa.eu/enterprise/policies/sustainable-business/index_en.htm (accessed March 18th 2012)

⁴ Dahlsrud (2008) compares 37 established definitions of corporate social responsibility

⁵ Commission of the European Communities (2001)

I Literature Review

The literature on corporate social responsibility is vast. The main field of interest for economically motivated papers is the existence of a link between the sustainability of a firm and its financial performance. This section is dedicated to sketch the academic progress within the field by briefly touching on related papers. The first subsection gives a general overview over previous research in the field; the second and third subsections discuss papers connected with similar performance attribution models and with similar sustainability variables under consideration, respectively.

1.1 The Sustainability Performance – Financial Performance Debate

One strand of literature focuses on the theoretical framework between sustainability and financial performance. An interesting point is made by Bowman & Haire (1975), by addressing the strategic question of the ‘optimal level’ of corporate social responsibility. They argue that even if a positive link exists, more CSR is not necessarily always better since the relationship of costs and benefit cannot be assumed to be linear. Schaltegger & Synnestvedt (2002) amplify this argument by suggesting that the economic success of a company is dependent not solely on the intensity of environmental initiatives, but more importantly on the consistency of environmental efforts within the overall business strategy. Consistent with this theorized relationship, Hillman & Keim (2001) find that paying attention to primary stakeholders increases, but participating in social issues beyond this level, decreases shareholder value.

Another field of research is event studies that primarily examine the short term response of capital markets to the publication of CSR-related information. This does not necessarily allow for conclusions about the long term implications of sustainability practices, but provides critical information on how the markets perceive certain information. With regards to the environmental area, Shane & Spicer (1983) find that companies with poor pollution-control performance exhibit on average significantly more negative returns than their peers. Supporting evidence for this finding comes from Hamilton (1995), who reports significant negative abnormal returns on the day of the release of pollution data by the EPA (Environmental Protection Agency) which accumulates in an average loss of 4.1 million dollars in stock value per firm. Similarly, Yamashita et al. (1999) report significantly lower subsequent performance of companies that have publicly received low environmental conscientiousness scores. Positive stock market reaction for environmental awards winning companies and negative reaction in the case of environmental crisis is documented by Klassen & McLaughlin (1996). While the results coming from this strand seem to be fairly consistent, the study of long term behavior raises more issues. For example, Mahapatra (1984) studies a substantially longer period of eleven years and concludes that the average investor views voluntary or legally enforced pollution control expenditures as a drain on financial resources and does not reward companies for good performance in this respect.

A comparatively smaller, but nonetheless interesting number of papers focus on the direction of causality between both variables of interest. Whereas Waddock & Graves (1997) find that good financial performance leads to elevated corporate social performance in the United States, Makni et al. (2009) find that high ratings of social performance in the environmental context cause weak financial performance for the Canadian market. For a global sample, Ameer & Othman (2011) report a bi-directional relationship between sustainability practices and financial performance. The evidence stemming from this branch of research seems to be largely inconclusive to this point and is debatably subject to the problem of high autocorrelation in the social responsibility of a given company. That is, even if a time lag between a social responsibility score and the financial performance measure is considered, it is likely that the company exhibited a similar degree of social responsibility previous to the first measurement thereof (since CSR can be considered as a somewhat long-term management objective), thus disguising the real underlying causal direction.

Considerable attention has been spent to the environmental positioning of companies, as compared to the social or governance aspect of sustainability. In the face of the growing green movement that is amongst others documented by Vandermerwe & Oliff (1990), the environmental

area offers the benefit of a more straightforward comparison of companies and the hypothesized direct effect on the financial situation of a firm. Evidence from the United States (e.g. Hart & Ahuja, 1996; Russo & Fouts, 1997; Dowell et al., 2000) shows that the adoption of environmental standards pays off for the corporations on average. Despite the concentration on a single market, these studies can be criticized for neglecting the control for risk. More recent research however seems to suggest the opposite effect. According to Chava (2010) better environmental communication does not affect expected stock returns. Fisher-Vanden & Thorburn (2011) even report significant losses after the joining of voluntary environmental programs and question the compatibility of environmental responsibility and the protection of shareholder interests.

1.2 Factor Performance Attribution Models in Social Responsible Investing

Most papers that employ a comparable approach of assessing the performance of socially responsible firms can be labeled as portfolio studies or mutual fund studies. The main advantage of those studies is the implicit consideration of risk in drawing conclusions. Opposed to that, many other studies heavily rely upon balance sheet performance indicators that do not allow accounting for risk in this fashion.

One of the first papers to utilize such a research design was authored by Alexander & Buchholz (1978), who apply the market as a single risk factor. Their findings indicate that CSR has no significant effect on stock market performance. Covering the period from 1990 to 1999, Gompers et al. (2003) build two mutually exclusive portfolios of US-companies based on their perceived level of corporate governance. A hypothetical strategy that went long in companies with the highest shareholder rights and shorted companies with the lowest rights would have earned an annual excess return of 8.5% after controlling for factor exposure of the Carhart (1997) model. Using governance rating data for Europe and applying a similar long/short strategy, Bauer et al. (2004) provide evidence for the United Kingdom and Eurozone markets separately. Their analysis reveals style corrected excess returns of 4.6% for the UK and about negative 1% for the Eurozone after controlling for country effects. The discovered relation, which seems highly specific to a given market is however statistically insignificant due to limitations of the available time series. For the German market, Drobetz et al. (2004) report excess returns of approximately 12% per year for a comparable long/short governance based portfolio. Evaluating portfolios that were built based on eco-efficiency ratings, Derwall et al. (2005) provide results for the United States in the period 1995 to 2003. Considering conventional risk factors they report significant excessive returns of the portfolio of high ranked companies as well as a long/short strategy, which yields an alpha of approximately 6% annually. Brammer et al. (2006) evaluate portfolios of UK companies based on disaggregate corporate social performance measures. The main finding is that companies with a higher composite social performance score tend to exhibit lower returns and stocks with the most unfavorable scores outperform the market.⁶ On a more detailed breakdown, environmental and community indicators seem to be negatively associated with returns whereas employment indicators are weakly positively related. Quite the contrary is found by Ziegler et al. (2002) by analyzing European stock corporations in the period from 1996 to 2001. They implement a multifactor-type model and conclude that environmental performance has a positive effect, whereas social performance has a negative influence on shareholder value and monthly stock returns respectively.

A positive link of employment indicators is also documented by Edmans (2010) - a portfolio consisting of the '100 best companies to work for in America' was found to have an annual alpha of 3.5% for the period 1984 to 2009 under the Carhart (1997) model specification. Kempf & Osthoff (2007) also find the prospects to create economically and statistically meaningful alphas by employing a simple long/short strategy for the period 1992 to 2004 based on sustainability measures. With the use of KLD Research & Analytics⁷ socially responsible ratings for six qualitative criteria, they report the highest alpha of 8.7% resulting from an aggregate corporate social responsibility measure. On the

⁶ Equivalently, Hong & Kacperczyk (2009) and Statman & Glushkov (2009) report the outperformance of so called 'sin stocks' due to mispricing by financial markets.

⁷ a company offering, among other things, ESG-related research for institutional investors

contrary, a recent portfolio study by Lee et al. (2009) highlights a negative relationship between corporate social performance and financial performance for the period 1998 to 2002. Von Arx & Ziegler (2008) however find a positive relation for the adjacent period from 2003 to 2006 in the United States and Europe respectively. The overall impression, arising from the above mentioned, is that the outcome of the relationship seems to be somewhat dependent on the selected time period, CSR-measure and geographical region under consideration. For instance, Kurtz & diBartolomeo (2011) address the overall outperformance of the KLD400 Index⁸ in the 1990s and its underperformance in the years thereafter. This greatly challenges the replicability of results of studies concentrating on this decade.

When it comes to mutual fund studies, the use of factor models for performance attribution is equally attractive (e.g. Hamilton et al., 1993; Geczy et al., 2005; Bauer et al., 2005). Conclusions on the value of sustainable business practices however are harder to draw, since the effect of fund manager skill is not easily separable from the performance of sustainable companies. The majority of studies in this field finds no evidence for a difference in risk-adjusted returns compared to conventional mutual funds (Hamilton et al., 1993; Goldreyer & Diltz, 1999; Statman, 2000; Schröder, 2004; Bauer et al., 2005). In constructing mutual fund portfolios, Geczy et al. (2005) report a cost for the investor of restricting himself to the universe of socially responsible investments.

1.3 Eco-Efficiency and Corporate Disclosure

Ingram (1978) researches five different categories of social responsibility disclosures in the annual reports of US-corporations and finds that the information content is dependent on the market segment the respective company operates in. The consideration of this result is crucial for the derivation of meaningful inferences in other studies considering disclosure. Correspondingly, Gamerschlag et al. (2010) report that CSR disclosure is affected by industry membership for a German sample of companies. Abbott & Monsen (1979) use corporate disclosures as a proxy for general social involvement and find it to serve this purpose well in their research. Very similar to the approach applied in the present case, Anderson & Frankle (1980) construct portfolios based on whether or not companies are disclosing social information. They conclude that disclosure information matters in the market and is positively valued by the investment community. Belkaoui & Karpik (1989) confirm the assumed positive relationship between social performance and the decision to disclose such information in annual reports. Using the Bloomberg ESG database, Cheung & Mak (2010) examine the effect of ESG disclosure scores on the financial performance in the commercial banking sector. They conclude that there is no statistically significant relationship for this sector under the period of observation.

For the concept of eco-efficiency the body of literature is not as exhaustive as in other areas. In addition to the work of Derwall et al. (2005) mentioned in the previous section, Bauer et al. (2006) report a positive relationship between eco-efficiency and operating performance as well as market value.

⁸ a social investment index covering US equities

II Hypothesis Development

The research field of sustainability studies has received much attention considering the number of publications in this area within the last decades.⁹ The general suspicion is that companies regarded as sustainable (however this might be measured) show evidence of a significant difference in returns compared to a benchmark. No consensus however has yet been formed on what sign this supposed difference should take in theory. Arguably, the association between corporate social performance and financial performance can be either positive, negative or neutral. All three propositions can be supported by sound arguments.

2.1 Negative Relationship

Two main arguments can be made in favor of a negative relationship between corporate social performance and financial performance. The first point is that investments in the sustainable positioning of a company might not translate to higher sales or lower costs. In this sense, the efforts that are made to improve the corporate social responsibility of a firm can be interpreted as a drain on financial resources and subsequently decrease shareholder value. Friedman (1970) advocates this point of view by stating that corporations are primarily obligated to the preserve their shareholders' interests within the basic rules of society and not impose avoidable costs. Secondly, as mentioned by Renneboog et al. (2007) the restriction on stocks that are considered socially responsible constrains the total investment universe and thus is likely to deteriorate the risk return tradeoff in the setting of a portfolio study.

2.2 Neutral Relationship

Both empirical and theoretical evidence is available that there is no association between social responsibility and financial performance. Davis (1973) presents logically consistent reasons for and against a positive relationship of corporate social responsibility and financial performance. The complex implications of investments in social responsibility and the problem of accurate measurement might either offset the potential benefits or disguise the real underlying relationship. For example, Aupperle et al. (1985) find no provable relationship and also no differences in financial performance for varying degrees of social orientation. Furthermore they attribute the earlier found relationships largely to methodological inconsistencies.

2.3 Positive Relationship

Various academic discussions can be mentioned that argue for a positive relationship. In their renowned hypothesis, Porter & van der Linde (1995) scrutinize the often assumed tradeoff between ecologic and economic welfare of a firm and point out that the potential efficiency improvements and innovative energy triggered by environmental regulations are likely to more than offset the costs. Systematically exploring possible effects of good environmental performance, Ambec & Lanoie (2008) support the suggested positive relationship. Similarly, Smith (2011) discusses the potential benefits of sustainable companies under an increased investor awareness of this topic.

Considering the largely disputed association, both in theory and empiricism, the general hypotheses for this study are:

H₀: There is no measurable relationship between sustainability performance and financial performance

H₁: There is a measurable relationship between sustainability performance and financial performance

Our methodological choice, as described in section IV, allows us to furthermore address supplementary research questions. Firstly, we will examine if there is a structural difference in the composition of value stocks and growth stocks between our higher and lower rated social responsibility portfolios. Secondly, we will investigate if a tendency for larger (smaller) capitalization

⁹ For example, Margolis et al. (2007) review 167 studies examining the relationship between corporate social performance and corporate financial performance.

companies to disclose more (less) nonfinancial information respectively, can be identified. Lastly, an analysis is conducted to find out if there are noticeable differences in market risk exposure between our various portfolio groupings on an international scale.

III Data

The novelty of this study is the use of the data source to proxy for corporate social performance. To our best knowledge, the Bloomberg ESG data was not yet used in the current econometric context in academic research so far.¹⁰ Bloomberg reports a wide variety of detailed ESG data (e.g. training spending per employee, paper consumption per employee or number of phones recycled), that currently totals up to 319 possible fields that can be queried on a company level. The data is updated on an annual basis.

In the course of the present research, eight fields have been selected that are believed to have the strongest potential impact on financial performance. In the process of identifying these eight factors that were used for constructing portfolios, we take into consideration findings of previous research.¹¹ Overall, the factors under consideration can be related to two distinct aspects of sustainability – corporate disclosure and corporate eco-efficiency. Those two areas provide the additional benefit that the connected quantitative measures are transparent and largely objective, as compared to more complex sustainability rating systems.¹²

To derive our results, we examined all equities that are currently or were in the past (since its inception) in Bloomberg's ESG coverage universe in the respective countries under consideration. Thus, the resulting stock price data is survivorship-bias free. Survivorship-bias seems to be a problem that has been a troubling factor in prior research. For example, Chegut et al. (2011) find that 21 out of 40 socially responsible investment studies do not treat survivorship-bias at all. All stock quotes were also taken from the Bloomberg database.

3.1 Disclosure

With respect to disclosure, Bloomberg offers four aggregated disclosure scores that summarize the company's level of disclosure to the general public. In detail, we were able to collect social, governance and environmental disclosure scores as well as an overall ESG disclosure score. All these scores are normalized to the range of 0.1, for companies that disclose the minimum amount of data, to 100, for companies that disclose every data point collected by Bloomberg. Each data point is weighted in terms of importance, thus giving higher weights to more relevant disclosures. Furthermore the scores are also tailored to fit to different industries. In this way, every company is guaranteed to be evaluated in terms of data that is relevant to its respective industry sector.¹³ The rationale in choosing the disclosure level as a factor for portfolio allocation is that disclosure is believed to be an efficient proxy for the company's environmental, social or governance involvement. The argument that increased disclosure is related to increased performance was proved to be correct for the environmental area by Al-Tuwaijri et al. (2004). Our current usage of CSR-disclosure contributes to the existing body of literature in several ways. First, the disclosure scores we use are based on whether or not actual information is revealed and not the mere occurrence of some keywords in a published report. Secondly, by the concentration on information we overcome the potential bias arising from

¹⁰ The aforementioned work by Cheung & Mak (2010) uses the Bloomberg ESG database in a cross-sectional sense, restricted to the commercial banking industry. For the current usage of the data please refer to section IV.

¹¹ E.g. Mănescu (2011) concludes that certain disaggregate ESG factors are value relevant, but others are not; Brammer et al. (2006) suggest to examine different aspects of ESG separately; Derwall et al. (2005) find a significant effect of accounting for corporate eco-efficiency in their portfolio choices.

¹² Griffin & Mahon (1997) address methodological inconsistencies in preceding studies; Konar & Cohen (2001) attribute previous mixed results to subjective environmental performance criteria.

¹³ This weighting scheme implicitly accounts for Ingram (1978)'s critique of conditional information content for differing industries.

‘greenwashing’.¹⁴ That is, artificially inflating the image of a company by creating extensive CSR publications without actually standing behind the idea of greater responsibility. Lastly, our approach considers a multitude of single disclosures and is not prone to omitting relevant information due to a limited keyword list.

Also using Bloomberg ESG data, Eccles et al. (2011) find large market interest in nonfinancial information. In particular, the four disclosure scores used in the current research are among the top six metrics queried on a global basis. With regards to these results, we are confident to have selected sensible means of sustainability-measurement.

3.2 Eco-Efficiency

We define eco-efficiency in accordance with the definition of the World Business Council for Sustainable Development¹⁵ as a ratio between the total product or service value of a company and the environmental influence created to achieve this level of output. In particular, we examine companies based on waste generated, greenhouse gas intensity, energy intensity and water intensity per million of sales revenue. In this context, waste is defined as metric tons of waste, both hazardous and non-hazardous. Greenhouse gas emissions are measured in metric tons, energy is measured in megawatt hours consumed and water is measured in cubic meters of water used by the company. An inspection was conducted if the company reporting currency equals the national currency. If this was not the case, according exchange rate adjustments have been made to ensure comparability.

Estimating the sustainability performance of a company by eco-efficiency ratios offers clear advantages: first, the measures are quantitative by nature and second, the creation of a smaller environmental footprint is likely to affect the competitive position of the company, as suggested by Porter & van der Linde (1995).

3.3 Risk Factors and Risk-free Rates

Griffin (2002) shows that a country-specific version of the Fama French Factors is better suited for explaining the variability in stock returns, as compared to international factors. For this reason we use distinct factors for the USA, Canada, Germany, United Kingdom and Switzerland that kindly have been made accessible for academic research. For the United States, we use the data provided in the Kenneth French Data Library.¹⁶ The factor data for the Canadian market was taken from Claude Francoeur’s database.¹⁷ Hanauer et al. (2012) provide factor data for Germany. Gregory et al. (2009) supply the necessary risk factor data for the United Kingdom. The data for the Swiss stock market came from Ammann & Steiner (2008). The risk-free rate for Switzerland was taken from the website of the Swiss National Bank.¹⁸ All other risk-free rates were included in the aforementioned databases.

The factor data mentioned above exhibits differences in the covered available time period. The consequence for this study is a varying number of observations in a cross-country comparison. This leads to a holding period of less than 12 months in some countries for the most recent portfolio rebalancing. The specific periods used for econometric analysis are as follows:

¹⁴ See for example Laufer (2003)

¹⁵ http://www.wbcsd.org/web/publications/measuring_eco_efficiency.pdf, online publication. (accessed February 8th 2012)

¹⁶ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html (accessed January 3rd 2012)

¹⁷ http://expertise.hec.ca/professorship_information_financiere_strategique/ (accessed December 15th 2011)

¹⁸ http://www.snb.ch/en/iabout/stat/statpub/akziwe/stats/akziwe/akziwe_S1_Zins (accessed January 7th 2012)

| Country | available period | Observations (monthly) |
|----------------|-------------------|------------------------|
| USA | 04/2003 – 03/2011 | 96 |
| Canada | 04/2003 – 12/2009 | 81 |
| Germany | 04/2003 – 03/2011 | 96 |
| United Kingdom | 04/2003 – 12/2010 | 93 |
| Switzerland | 04/2003 – 03/2011 | 96 |

IV Methodology

The key motivation in choosing the methodological setup presented below is to conclusively answer our main research question about the presence or absence of a significant relationship between sustainability performance and financial performance. Besides being theoretically well explored, the current approach is also widespread in academic research, allowing for clear-cut comparisons.

4.1 Description of the Econometric Approach

To assess whether the constructed portfolios based on the environmental, social and governance data described in the previous section exhibit significantly different returns, models for measurement and attribution of performance are needed. The starting point for our analysis is the famous and commonly used Capital Asset Pricing Model introduced by Sharpe (1964) and Lintner (1965). This single index model is frequently portrayed by the following equation:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it} \quad (1)$$

where

R_{it} = return of portfolio i in time period t

R_{ft} = risk free rate in time period t

R_{mt} = return of the market portfolio in time period t

ε_{it} = error term of the regression

The intercept of the model, known as Jensen's alpha¹⁹ (α_i), describes the relative under- or over-performance of the asset that cannot be explained by the market factor. In this sense, a statistically significant estimate for alpha would imply that the consideration of market risk does not fully capture the variability in returns.

Despite its common use in practice, the basic form of the CAPM has been criticized empirically for its inability to sufficiently explain the variability of stock returns.²⁰ An important enhancement was made by Fama & French (1993) when they introduced the 3-factor model, which adds a value factor, HML (high-minus-low) and a market capitalization factor SMB (small-minus-big) to the familiar CAPM equation. The 3-factor model generally exhibits higher explanatory power as compared to the CAPM but has been shown to fail to explain the returns of momentum strategies proposed by Jegadeesh & Titman (1993). The extension of the model by a fourth factor to capture momentum effects by Carhart (1997) overcomes this limitation and has become a widely used standard in academic research. For this reason our second and more elaborate performance attribution model is based on the latest extension of Carhart. The equation which is to be estimated subsequently takes the following form:

¹⁹ see Jensen (1968)

²⁰ e.g. Banz (1981), Fama & French (1992)

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}(R_{mt} - R_{ft}) + \beta_{1i}SMB_t + \beta_{2i}HML_t + \beta_{3i}UMD_t + \varepsilon_{it} \quad (2)$$

where in addition to the previous equation

SMB_t = difference in returns between a small cap portfolio and a large cap portfolio in time period t

HML_t = difference in returns between a value portfolio (high book-to-market ratio) and a growth portfolio (low book-to-market ratio) in time period t

UMD_t = difference in returns between a portfolio of past winners and past losers (up-minus-down) in time period t

The estimate of alpha follows the same interpretation as stated in the previous model specification and indicates the relative performance differential after accounting for the four risk factors. As it will be seen later in the empirical part of this study, in the vast majority of cases, the 4-factor model is better suited to explain the variations in stock returns measured by an increased adjusted R^2 .²¹

Both model specifications are estimated with monthly return and factor data throughout the analysis. Section V summarizes the most relevant findings from these estimations.

In the face of heteroscedasticity and autocorrelation which frequently afflict financial times series, it is necessary to devote special attention to consistent standard error estimators. We assess the residuals from our investigated models with the Breusch-Pagan test to detect heteroscedasticity and the Durbin-Watson and Ljung-Box procedure to judge the influence of autocorrelation. Whereas we find strong evidence for heteroscedasticity in our portfolio returns, autocorrelation rarely plays a role. We follow the suggestion of Long & Ervin (2000) to use the HC3 heteroscedasticity consistent covariance matrix introduced by MacKinnon & White (1985) because of its superior small sample properties. In the case where we find weak evidence for autocorrelation, we additionally compute heteroscedasticity and autocorrelation consistent standard errors according to Newey & West (1987). This however does not alter the obtained conclusions regarding significance levels, why we choose to retain HC3 standard errors throughout the analysis.

4.2 Portfolio Construction

ESG-information belonging to the disclosure as well as to the eco-efficiency section is published on an annual basis. In order to incorporate this information into the asset allocation, we build a ‘high-rated’ and ‘low-rated’ portfolio for every variable under consideration and reshuffle the constituent equities once a year to account for new ESG-information. We do not employ a negative screening; that is systematically excluding companies from controversial business areas. The reasoning behind this choice is to treat all companies equally on the information they currently provide and not penalize them for the industry they choose to operate in a long time ago.²² In the case of the disclosure scores, we define high-rated companies as companies scoring higher than the median of all companies in the respective year and country. Since the disclosure scores are already industry adjusted, a direct comparison in this manner makes sense. In the case of eco-efficiency ratios, we face strong differences between sectors that are caused by the differing nature of businesses. Therefore we define high-rated companies as companies having a better eco-efficiency performance as compared to their GICS-sector medians in the respective country and year. Low-ranked companies are likewise defined as companies exhibiting worse performance compared with the sector medians.

²¹ The Canadian models are an exceptional case to this rule with a lower number of 4-factor model specifications that exhibit an increased adjusted R^2 as compared to the CAPM. We will present the results anyhow in detail since they reveal additional information about the components of the portfolios.

²² Arguably, a negative screening is done in many investment products that are considered socially responsible to meet moral requirements of investors, but this wider scope of ethical considerations is not of current interest.

Sector membership was also obtained from Bloomberg. In cases where GICS affiliation was not available, the nature of business has been researched and the company was manually assigned to its respective sector according to the GICS sector definitions.²³

To avoid look-ahead bias, we take into account a three month lag after the year end and construct the portfolios at the end of March and hold it for the subsequent 12 month period. Companies that fail to publish the required information in any year are automatically excluded from both portfolios in that year. The Bloomberg ESG database contains reliable information on the required variables for the years 2005 to 2010; however there is a noticeable drop in companies for which this information is available after 2007. Two adjustments are necessary and found adequate to obtain a reasonable sample of companies and stock prices.

Firstly, we amend the disclosure scores and eco-efficiency ratios for the years 2006 and 2005 with the basis of 2007. That is, companies which are not included in the database in those two years obtain the scores and ratios from 2007 and the remaining companies maintain their original scores. Facing low cross-temporal variability in both disclosure scores and eco-efficiency ratios, we believe that artificially increasing the sample size in this way is a sensible choice to make the results less dependent on a limited number of companies.

Secondly, we follow the example of Derwall et al. (2005) and extend the last ratings data two years backwards, to obtain time series of necessary length for analysis. The rationale behind this modification is the same as in the first case and is found to be the best available choice to confront the small sample problem.²⁴ Similar small sample problems were faced by Bauer et al. (2004) and Drobetz et al. (2004) with only one to two yearly observations. Analogously they confronted the limited historical data by utilizing the low observed variability for backward extension or simply by assuming constant scores over time.

Applying this methodology, we obtain an average number of companies reporting disclosure information of 254 per country per year and an average number of companies reporting eco-efficiency ratios of 68 per country per year.

4.3 Portfolio Weighting

In the light of the confirmation of the slack resources theory by Waddock & Graves (1997) we need to consider a portfolio weighting scheme that best corresponds to our research question. By assuming that past financial performance leads to slack resources which consequently will positively affect social performance, a traditional value weighted portfolio would underweight the effect of smaller companies with an outstanding sustainability profile. Additionally, large cap companies (i.e. companies with good past financial performance) have stronger incentives to invest in sustainability related matters since they are scrutinized more heavily by analysts and the general public. Following that reasoning, we employ an equally weighted portfolio approach to reflect the performance of all companies passing our screening in the same way and thus gaining a higher degree of diversification. This indeed may be interpreted as another means to earn the small cap premium, but applying the proposed multifactor framework, the small cap effect should be correctly accounted for and leave an unbiased alpha estimate.

Arguably, this approach also has its downsides as well. To maintain equal weights throughout our analysis, the hypothetical portfolio would need to be rebalanced once a month, inducing an elevated turnover. Implicitly, this introduces a contrarian touch to the portfolios, since past winners and past losers get the same subsequent percentage distribution in the portfolio. However, this issue should be largely reflected in the loading of the momentum factor and guarantees and identical cross-temporal treatment of company returns. In addition, we find proof that naïve diversification, despite its

²³ <http://www.msci.com/resources/pdfs/GICSSectorDefinitions.pdf> (accessed December 29th 2011)

²⁴ We are aware of the reintroduction of survivorship-bias and look-ahead bias that potentially arises from these adjustments. The feature of low variability however gives us confidence to be able to derive meaningful results based on this method.

theoretical shortcoming, is not an inefficient choice in practical asset allocation. DeMiguel et al. (2009) evaluate the performance of various asset allocation models on different empirical datasets and find that none of those models consistently outperforms the simple equally weighted diversification approach.

Lastly, it should be mentioned that the results of this study are only designed to demonstrate the relative performance of companies selected by ESG information. Before incorporating this information into the investment process, transaction costs and potential price shifts caused by liquidity issues of smaller capitalization stocks should be considered.

V Cross-Country Results and Propositions

The preceding body of literature has identified some properties of companies that are regarded to be socially responsible. In many occasions however a single country or region is under consideration, inhibiting the possibility to draw more general conclusions on the matter. This section is devoted to list these properties and contrast them with the current findings on a cross-country level. For the subsequent comparisons we use the median cutoff for the disclosure portfolios to ensure proper diversification. Furthermore this choice grants the maximum number of significant alphas among all countries.

5.1 The HML Effect

The first proposition concerns the division between growth stocks and value stocks when it comes to portfolios built on corporate social responsibility considerations. Investigating ethical fund portfolios from the US, UK and Germany, Bauer et al. (2005) find that they are either more growth oriented or less value oriented than a portfolio of conventional funds. Concentrating on the United States, Kempf & Osthoff (2007) also find what seems to be a systematical difference in the value versus growth question. Higher rated portfolios in their research generally contain more growth stocks for various different CSR measures. The same effect can be discovered in the governance portfolios of Gompers et al. (2003) and the eco-efficiency portfolios of Derwall et al. (2005).

When it comes to the different disclosure areas, we do not find such a structural difference in the HML factor loadings. In fact, we find that most of the high-rated and low-rated portfolios have a comparable exposure to this risk factor which is even more aligned when both HML loadings are found to be significant. For this reason a summary table is not presented at this point. Comparing the results from our eco-efficiency portfolios, we arrive at similar conclusions about the HML factor for the US like Derwall et al. (2005). Whereas all low-ranked portfolios are significantly tilted towards value stock, the high-ranked show either a higher association towards growth stocks or much less value stock orientation. However, this finding seems not to be transferrable to the other countries under consideration. In some portfolios we find a relation similar to what is observed in the United States, but the lack of statistical significance makes a weighty interpretation unattainable. Table 1 generally does not support the hypothesis that this effect persists in an international comparison.

Table 1. HML Factor Loadings of Eco-Efficiency Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|----------|----------|---------|----------------|-------------|
| Waste intensity | | | | | |
| high-rated | 0.02 | 0.07 | 0.08 | -0.09 | 0.33 * |
| low-rated | 0.10 ** | -0.15 | 0.27 * | -0.02 | 0.21 |
| Greenhouse gas intensity | | | | | |
| high-rated | 0.02 | -0.16 | 0.19 | 0.08 | 0.41 *** |
| low-rated | 0.19 *** | -0.05 | 0.15 | 0.06 | 0.37 ** |
| Energy intensity | | | | | |
| high-rated | -0.02 | -0.25 | 0.06 | 0.02 | 0.24 |
| low-rated | 0.17 *** | 0.14 | 0.24 * | -0.05 | 0.38 *** |
| Water intensity | | | | | |
| high-rated | -0.08 * | -0.53 ** | 0.11 | -0.07 | 0.32 * |
| low-rated | 0.15 ** | -0.05 | 0.15 | -0.06 | 0.51 *** |

Notes: The table reports HML estimates of different equally weighted portfolios following equation (2).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

* significant at the 10 percent level ** significant at the 5 percent level *** significant at the 1 percent level

Source: own calculations

5.2 The SMB Effect

As hypothesized by Gamerschlag et al. (2010) for a sample of German equities, large companies generally disclose more information than small companies. In the context of our research design, this would mean that the higher rated portfolios (i.e. equities with a higher disclosure score) should have larger negative or smaller positive SMB factor loadings. Essentially, this is exactly what we observe in all countries under consideration and among all disclosure categories. Table 2 presents a country overview of SMB loadings for the median cutoff. It should be kept in mind at this point that a positive estimate for SMB generally implies a small cap exposure of a portfolio. However, by comparing the SMB estimates we get an impression which portfolio grouping is stronger tilted to small caps or large caps. In this way, we avoid potential misinterpretations that arise in cases when the whole sample of stocks in a given country exhibits a small cap or large cap bias. Arguably, the applied equal weighting of equity returns could affect the interpretation of results. For example, a high number of small cap stocks on its own would shift our portfolio returns towards small cap returns. However, if the few large cap stocks included more than outweigh the more frequent small caps in term of market capitalization, the results are likely to change. In general we are more interested in the equally weighted results since treating every return series in the same way ensures that we discover differences in the factor exposure in a more straightforward way. Nevertheless, we also examined value weighted portfolios to assess the robustness of our proposition. The interpretation of those results does not exhibit material differences.²⁶

²⁶ Regression results for value weighted portfolios are available upon request from the author

Table 2. SMB Factor Loadings of Disclosure Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|----------|-----------|----------|----------------|-------------|
| ESG Disclosure | | | | | |
| high-rated | 0.23 *** | -0.49 *** | 0.30 *** | 0.40 *** | 0.43 *** |
| low-rated | 0.43 *** | -0.26 ** | 0.50 *** | 0.87 *** | 0.53 *** |
| Social-Disclosure | | | | | |
| high-rated | 0.14 *** | -0.54 *** | 0.28 *** | 0.37 *** | 0.36 *** |
| low-rated | 0.35 *** | -0.34 *** | 0.55 *** | 0.78 *** | 0.60 *** |
| Governance-Disclosure | | | | | |
| high-rated | 0.16 *** | -0.43 *** | 0.31 *** | 0.38 *** | 0.35 ** |
| low-rated | 0.38 *** | -0.30 *** | 0.49 *** | 0.77 *** | 0.62 *** |
| Environmental-Disclosure | | | | | |
| high-rated | 0.11 ** | -0.60 *** | 0.32 *** | 0.37 *** | 0.43 *** |
| low-rated | 0.30 *** | -0.33 ** | 0.46 *** | 0.83 *** | 0.57 *** |

Notes: The table reports SMB estimates of different equally weighted portfolios following equation (2).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

* significant at the 10 percent level ** significant at the 5 percent level *** significant at the 1 percent level

Source: own calculations

To further test this discovery, we also compared the alternative portfolio cutoffs. In case of the top and bottom 35% of equities, we find the same compelling evidence. The SMB estimates for the high-rated portfolios are in every case (for all countries and all disclosure categories) lower than the respective estimates for the low-rated portfolios. The average difference between the estimates increases by restricting ourselves to the more stringent portfolio selection. On a more detailed examination, the difference in every disclosure category apart from social disclosure increases. A similar outcome can be obtained by comparing the top and bottom 20% portfolios. Only two out of the twenty possible disclosure-country comparisons don't show the expected relationship. Interestingly, these two come from the aforementioned social disclosure category. This indicates that indeed some relatively smaller companies take leading roles in disclosing social issues. Still, the average difference between the SMB estimates increases. To summarize, we find strong evidence that larger companies disclose more information to the public than smaller companies. For eco-efficiency portfolios, a comparable systematic size difference does not exist.

5.3 The Beta Effect

The question that shall be addressed in this section is if an increased involvement in CSR activities systematically affects the market risk exposure of a given portfolio. To answer this question, we will be referring to the sub-sample results²⁷ of estimating equation (1), the classical CAPM model. The reason for this choice threefold: First, CAPM betas are used extensively by practitioners (for example to estimate a company's cost of capital) and commonly provided by financial data service providers.²⁸ Secondly, by restricting ourselves to the sub-sample period, we circumvent the possible look-ahead bias that could have arisen from the backfill of the ESG data. Thirdly, the sub-sample

²⁷ In the case of the CAPM results, we also consider a sub-sample, consisting of the period from April 2007 to the end of available data. In doing so, we cut off the period that is affected by backfill.

²⁸ e.g. Bloomberg, Reuters, Yahoo Finance

period is in most cases closer to the common choice for beta estimation of monthly returns data for five years.²⁹

In comparing ethical mutual fund portfolios with portfolios of conventional funds, Bauer et al. (2005) notice that the former ones are less market sensitive than the later ones for samples from Germany, the United Kingdom and the United States. Similar conclusions can be drawn from the work of Derwall et al. (2005) and Feldman et al. (1997) for the environmental area. A comparison between countries of beta factors for disclosure portfolios and eco-efficiency portfolios can be found in Table 3 and Table 4 respectively. The general perception following these tables seems to be roughly in line with the assumed beta effect. In each table we find only three exceptions from the presumed relation among the twenty possible comparisons. Within the disclosure portfolios, the most convincing evidence comes from the portfolios based on the composite ESG disclosure score. The low-rated portfolios exhibit constantly a slightly higher beta estimate than the high-rated portfolios which averages at a 7.5% higher beta estimate in a cross-country comparison. Within the eco-efficiency portfolios, we find the highest cross-country persistence of the proposed beta effect in waste intensity and water intensity portfolios. The low-rated portfolios in these two sections exhibit on average a 12.5% higher beta than the high-rated portfolios. If we consider CAPM beta factors from the whole sample, the conclusions do not change materially.

Table 3. CAPM Sub-sample Betas of Disclosure Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|----------|----------|----------|----------------|-------------|
| ESG Disclosure | | | | | |
| high-rated | 1.12 *** | 0.77 *** | 0.99 *** | 1.19 *** | 1.16 *** |
| low-rated | 1.14 *** | 0.91 *** | 1.02 *** | 1.25 *** | 1.30 *** |
| Social-Disclosure | | | | | |
| high-rated | 1.10 *** | 0.76 *** | 0.98 *** | 1.20 *** | 1.19 *** |
| low-rated | 1.13 *** | 0.94 *** | 1.03 *** | 1.20 *** | 1.31 *** |
| Governance-Disclosure | | | | | |
| high-rated | 1.10 *** | 0.82 *** | 0.99 *** | 1.09 *** | 1.31 *** |
| low-rated | 1.18 *** | 0.92 *** | 0.99 *** | 1.34 *** | 1.17 *** |
| Environmental-Disclosure | | | | | |
| high-rated | 1.08 *** | 0.76 *** | 1.00 *** | 1.20 *** | 1.22 *** |
| low-rated | 1.18 *** | 0.81 *** | 0.96 *** | 1.22 *** | 1.21 *** |

Notes: The table reports beta estimates ($R_m - R_{f_t}$) of different equally weighted portfolios following equation (1).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

* significant at the 10 percent level ** significant at the 5 percent level *** significant at the 1 percent level

Source: own calculations

²⁹ Bartholdy & Peare (2005) also provide evidence in favor of using five years worth of monthly returns for beta estimation.

Table 4. CAPM Sub-sample Betas of Eco-Efficiency Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|----------|----------|----------|----------------|-------------|
| Waste intensity | | | | | |
| high-rated | 1.05 *** | 0.96 *** | 0.94 *** | 1.20 *** | 1.14 *** |
| low-rated | 1.06 *** | 1.03 *** | 1.05 *** | 1.28 *** | 1.24 *** |
| Greenhouse gas intensity | | | | | |
| high-rated | 1.16 *** | 0.72 *** | 0.99 *** | 1.10 *** | 1.09 *** |
| low-rated | 1.13 *** | 0.71 *** | 1.12 *** | 1.29 *** | 1.29 *** |
| Energy intensity | | | | | |
| high-rated | 1.12 *** | 0.72 *** | 1.04 *** | 1.10 *** | 1.09 *** |
| low-rated | 1.10 *** | 0.89 *** | 1.11 *** | 1.28 *** | 1.30 *** |
| Water intensity | | | | | |
| high-rated | 0.94 *** | 0.92 *** | 0.98 *** | 1.14 *** | 1.16 *** |
| low-rated | 1.13 *** | 1.06 *** | 1.09 *** | 1.40 *** | 1.41 *** |

Notes: The table reports beta estimates ($R_m - R_{fi}$) of different equally weighted portfolios following equation (1).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

* significant at the 10 percent level ** significant at the 5 percent level *** significant at the 1 percent level

Source: own calculations

It seems like the beta effect is somewhat systematical across countries, but the extent of difference is in a number of cases sinking to insignificance. Relatively speaking, the biggest magnitude of the effect can be found within the European countries in the eco-efficiency section. The low-rated portfolios show a beta factor approximately 11.7% to 16.9% higher than their high-rated counterparts.

5.4 The Alpha Effect

A summary of alpha terms for disclosure portfolios is presented in Table 5; the equivalent compilation for eco-efficiency portfolios is provided for in Table 6. A direct comparison of the alphas across countries generally permits two main conclusions. First, there is no convincing structure identifiable that would explain the alpha terms across the different geographic regions. Secondly, we notice the formidable extent of significant alphas and their positive sign. Although it has to be recalled that these alpha terms do not account for prevailing transaction costs, it seems that an investor does not suffer from a worse risk-return tradeoff by restricting his possible investment universe, as noted by Renneboog et al. (2007). Furthermore, our naïve diversification approach does seem to induce negative effects to the overall performance. Generally speaking, we find two disclosure categories (composite ESG disclosure and governance disclosure) that show somewhat of a systematic behavior. Respectively, the low-rated portfolios in both categories exhibit consistently higher alphas than the high-rated ones. However, a concise interpretation is hindered by the mostly significant and occasionally economically not much different alphas on for the respective high-rated portfolios. The sound results from the eco-efficiency portfolios from the United States and Canada are eased by contrariwise results from Germany and neutral results from Switzerland and the United Kingdom. Arguably, the outcome is influenced by various exogenous aspects that are specific to a given country. For example, differences in the regulatory environment and the incentives set out by governments might be crucial determinants on how corporate social responsibility is valued by investors.³⁰ As outlined in section II of this paper, reasonable arguments can be made in favor of a negative, neutral or

³⁰ E.g. Moon (2004) studies the role of the government as a driver of CSR; Matten & Moon (2008) investigate the country-specific dynamic of CSR.

positive relationship between corporate social responsibility and financial performance. We generally find proof for a neutral or positive relationship - however no clear trend that increased disclosure or increased eco-efficiency would boost performance further internationally. It seems however that ESG information can be valuable for investors.

Table 5. Carhart 4-Factor Alphas of Disclosure Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|-----------|-----------|----------|----------------|-------------|
| ESG Disclosure | | | | | |
| high-rated | 2.63% *** | 5.29% ** | 6.23% * | 1.18% | 2.34% |
| low-rated | 5.85% *** | 6.71% ** | 6.91% * | 7.86% *** | 3.21% |
| Social-Disclosure | | | | | |
| high-rated | 2.47% ** | 7.79% *** | 4.69% | 0.16% | 4.07% |
| low-rated | 3.67% *** | 5.23% * | 7.60% * | 7.97% *** | 1.61% |
| Governance-Disclosure | | | | | |
| high-rated | 2.93% *** | 4.22% * | 5.66% | 2.83% ** | 2.33% |
| low-rated | 5.41% *** | 6.53% ** | 8.23% ** | 5.11% * | 3.71% |
| Environmental-Disclosure | | | | | |
| high-rated | 1.97% ** | 7.23% *** | 6.57% * | 1.56% | 1.92% |
| low-rated | 1.56% | 4.63% | 7.03% * | 6.08% *** | 4.67% |

Notes: The table reports alpha estimates of different equally weighted portfolios following equation (2).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

Alphas are annualized percentages.

* significant at the 10 percent level ** significant at the 5 percent *** significant at the 1 percent level

Source: own calculations

Table 6. Carhart 4-Factor Alphas of Eco-Efficiency Portfolios: Country Comparison

| | USA | Canada | Germany | United Kingdom | Switzerland |
|---------------------------------|-----------|------------|------------|----------------|-------------|
| Waste intensity | | | | | |
| high-rated | 4.75% *** | 11.17% * | 3.74% | -1.49% | 1.91% |
| low-rated | -1.46% | 10.72% | 14.88% *** | -0.65% | 1.20% |
| Greenhouse gas intensity | | | | | |
| high-rated | 2.21% | 11.33% *** | 3.41% | 3.58% | 2.82% |
| low-rated | 1.12% | 4.77% | 11.92% ** | 1.68% | 3.57% |
| Energy intensity | | | | | |
| high-rated | 3.78% *** | 11.10% ** | 3.47% | 1.25% | 0.87% |
| low-rated | -0.34% | 5.00% | 13.87% *** | 1.60% | 0.64% |
| Water intensity | | | | | |
| high-rated | 2.83% * | 18.39% ** | 6.26% | 1.26% | 1.54% |
| low-rated | 0.77% | 6.86% | 13.09% *** | 1.30% | -0.63% |

Notes: The table reports alpha estimates of different equally weighted portfolios following equation (2).

Statistical significance was derived from HC3 heteroscedasticity consistent standard errors.

Alphas are annualized percentages.

* significant at the 10 percent level ** significant at the 5 percent *** significant at the 1 percent level

Source: own calculations

VI Revisiting the Theoretical Relationship

To bring the empirical results into line with the existing literature, it makes sense to revisit the fundamental concept of relation between corporate sustainability and financial performance. In the previous sections we have investigated, on the one hand measures of the relative quality of CSR by looking at eco-efficiency ratios and, on the other hand measures of relative quantity of CSR within a company by looking at different disclosure scores. The goal of this section is to unify both dimensions in a theoretical model and relate it to the economic success of a company.

6.1 The Case of a Single CSR Activity – What is the Right Dedication?

Our initial point of reference can be found in the existing literature. The argument by Bowman & Haire (1975), that it is questionable if the relationship between CSR and its derived benefits or costs holds over the entire scale, is taken up again in the deduction of a suggested relationship. Another important contribution is made by Ullmann (1985) in proposing a multidimensional framework to deal with the previous empirical results. The existence of such a curvilinear relationship is empirically supported by Stanwick & Stanwick (1998). Also Schaltegger & Synnestvedt (2002) take the discussion further by conceptually relating environmental protection and economic success.

Taking the previous efforts in the theoretical field into account, we present a refined model of interrelationship. As a first step, possible consequences of sustainable corporate behavior have to be analyzed. In its broadest sense, sustainability practices can benefit a company by increasing revenues or decreasing costs.³¹ However, if this is the case, why is not every single company reshaping its CSR profile in order to reap the associated profits?

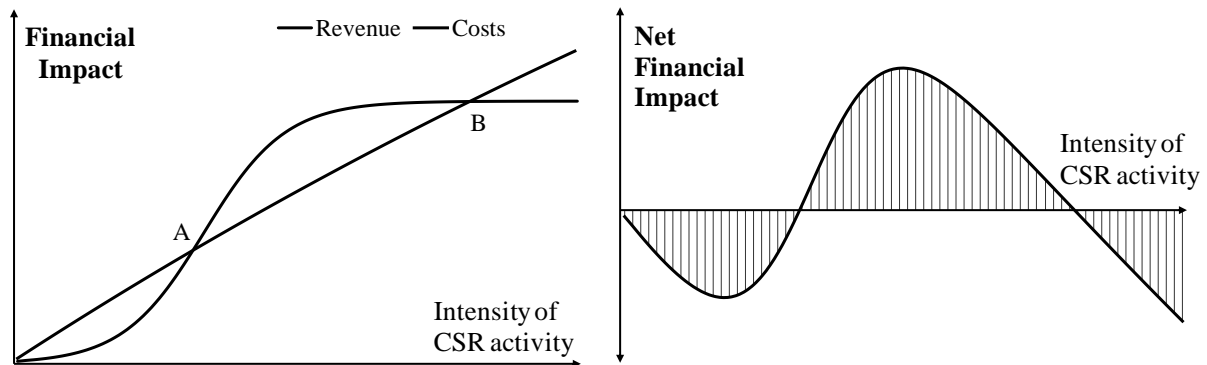
One argument is that the benefits occur with a time delay, whereas the costs are incurred immediately. By that logic, some companies may be incapable to engage in CSR because of pressures on liquidity. On the other hand, it seems negligent to assume that this is the sole reason to keep

³¹ Detailed discussions of this assumption can be found in Davis (1973) and Ambec & Lanoie (2008).

companies from magnifying their CSR agendas. We propose that CSR commitment requires a certain critical extent before it can unfold its positive potential.

Figure 1 shows the postulated relationship between the intensity of a single sustainability practice and its financial impact. The underlying reasoning for the shape of the curves can be best explained with the use of an example by concentrating on a certain CSR activity.

Figure 1. Hypothesized Financial Impact of a Single CSR Activity



Source: own graphic

If we consider minimizing the company's impact on climate change as the stated aim, it is likely that this will increase costs in the first step by switching to more eco-friendly production technologies or spending more monetary resources on waste management. Simultaneously, commitment in environmental issues might have the potential to raise revenues by ensuring a flawlessly functioning production process or attracting new customer segments through product differentiation.

Generally, the company faces two potential threats: First, an inefficient management of the defined goal may result in not doing enough (that is, only marginally exhausting the revenue generating potential while already facing high costs) or doing the wrong things (that is, taking measures that are disproportionately expensive although they are inherently aligned with the goal). Both situations can be depicted in situations left to point A in Figure 1, resulting in an overall net financial loss. As opposed to this, finding the optimal intensity and the right means of pursuing this goal potentially increases the resulting revenues above the level of costs, by taking the position of industry leadership and boosting the public image. From point A to point B, the positive effects of acting sustainable outweigh the associated cost. However, as noted by Schaltegger & Synnestvedt (2002), it is hardly likely that an indefinite environmental engagement will be beneficial for the corporation. Not only will the cost of the marginal climate change prevention activity grow rapidly as it is facing its technological boundaries, also the potential reputational effects and additional customers are limited in nature. This inherent limitation of positive financial spillover is conditional for the logistic shape of the revenue curve.

Naturally, there are also CSR activities that predominantly target on cost reductions within the company, which would result in different characteristics of the curves of Figure 1. Intuitively, means to achieve cost reductions can also be tailored to an optimal level in relation to the cost induced by these projects. The main point to be made here is that some CSR activities can arguably only be done in a way which benefits the company, if they are done on a larger scale to avoid for example costs of multiple technological systems and profit from scale effects. Additional to the prevailing mixed empirical results, our model explains the so far hardly questioned finding that past financial performance leads to an increased CSR involvement.³² The previous economic success equips companies with the means pursue a sustainable business that may need considerable investments.

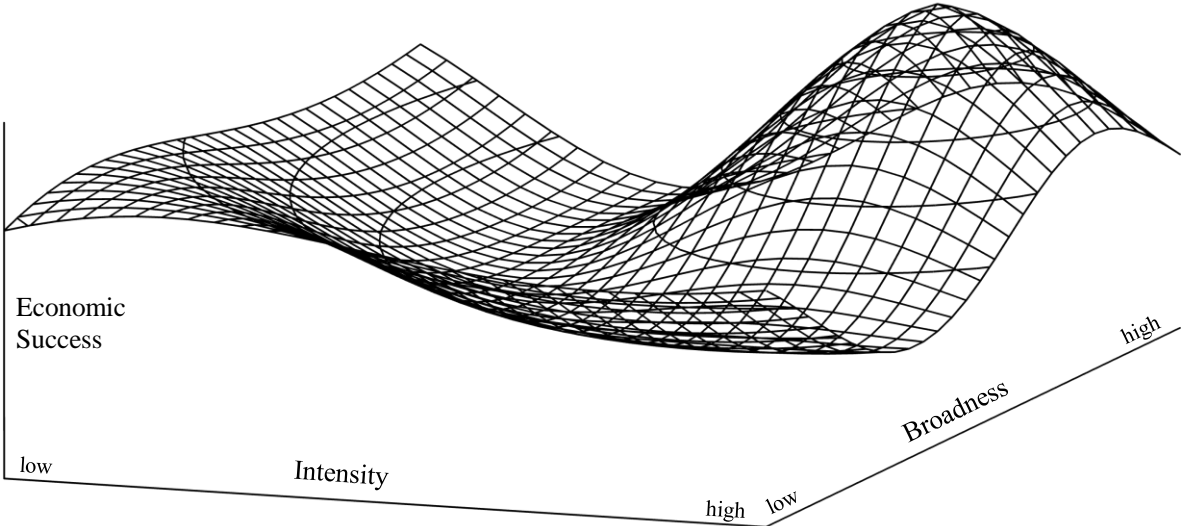
³² See for example: Waddock & Graves (1997), Margolis et al. (2007), Ameer & Othman (2011)

6.2 Broader CSR Commitment – How much is Adequate?

Following the conceptual definition of CSR, there is an undefined number of ways to further a corporation’s social responsibility. As resulting from the empirical part of this study, the highest disclosing companies are rarely the most outperforming which leads us to the conclusion that an intermediate diffusion in different CSR activities may be the optimal choice. This chain of thought is also supported by the findings by Stanwick & Stanwick (1998) and Hillman & Keim (2001).

Figure 2 conceptually relates a company’s economic success to the intensity of a commitment to a CSR activity and the broadness of general CSR involvement. The y-intercept symbolizes the company’s initial economic success without any CSR exposure. X-z combinations further away from the origin of the Cartesian coordinate system represent combinations of different relative CSR quality (intensity) and relative CSR quantity (broadness). Ceteris paribus, the economic success is represented as a function of these factors. With this representation, we basically support the potential positive effect of sustainability practices on the economic success of a company, albeit account for the latent threats accruing from a suboptimal choice of the broadness and intensity thereof, in short bad sustainability management. As a matter of course, the shape of the surface is influenced by the regulatory environment, the specific situation that a firm is facing and possibly other exogenous factors. In this respect, the challenge for management is to precisely assess the position of a company and find ways for its improvement over the long term.

Figure 2. Hypothesized Relation between Economic Success and CSR-Dimensions



Source: own graphic

Conclusions

Various arguments can be made against constraining the investment universe to companies that report on environmental, governance or social issues. Our research, based on Jensen's alphas from CAPM and Carhart (1997) model specifications, shows no significant disadvantages of holding stock portfolios based on corporate social responsibility considerations for equities from the United States, Canada, Germany, the United Kingdom and Switzerland. Contrariwise, in many cases sizeable and statistically meaningful alphas could be generated utilizing this information. Using a country-specific version of the Carhart 4-factor model, we account for conventional risk factors in deriving our results. In detail, we investigate several scores in the disclosure and eco-efficiency area as the basis for the portfolio selection. However, the excess returns do not seem to follow a clear pattern in a cross-country comparison, although there are some peculiarities for Europe and North America respectively. We find convincing evidence that larger companies tend to disclose more information and weak signs that portfolios with a stronger CSR exposure are characterized by lower CAPM betas. We end with presenting a theoretical framework to explain our results and bring them in line with the mixed results in previous studies.

Our suggestions for future research concern four main areas. First, the increasing popularity of sustainability in the corporate landscape will likely allow later researchers to consider longer time horizons within the econometric analysis and enable them to use information from a broader universe of reporting companies. Secondly, an alternative dynamic evaluation system is worthwhile to consider. For example, companies that improved their CSR profile from one year to the other could be assigned to one group and the remaining companies to another group. Thirdly, the introduction of an aggregate eco-efficiency ratio would be a drastic improvement to assess the overall environmental footprint of a company. Lastly, an evaluation of the impact of corporate social responsibility on financial performance, whilst taking into account the role of governments and the regulatory environment, could uncover valuable relationships that have not yet been found empirically.

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